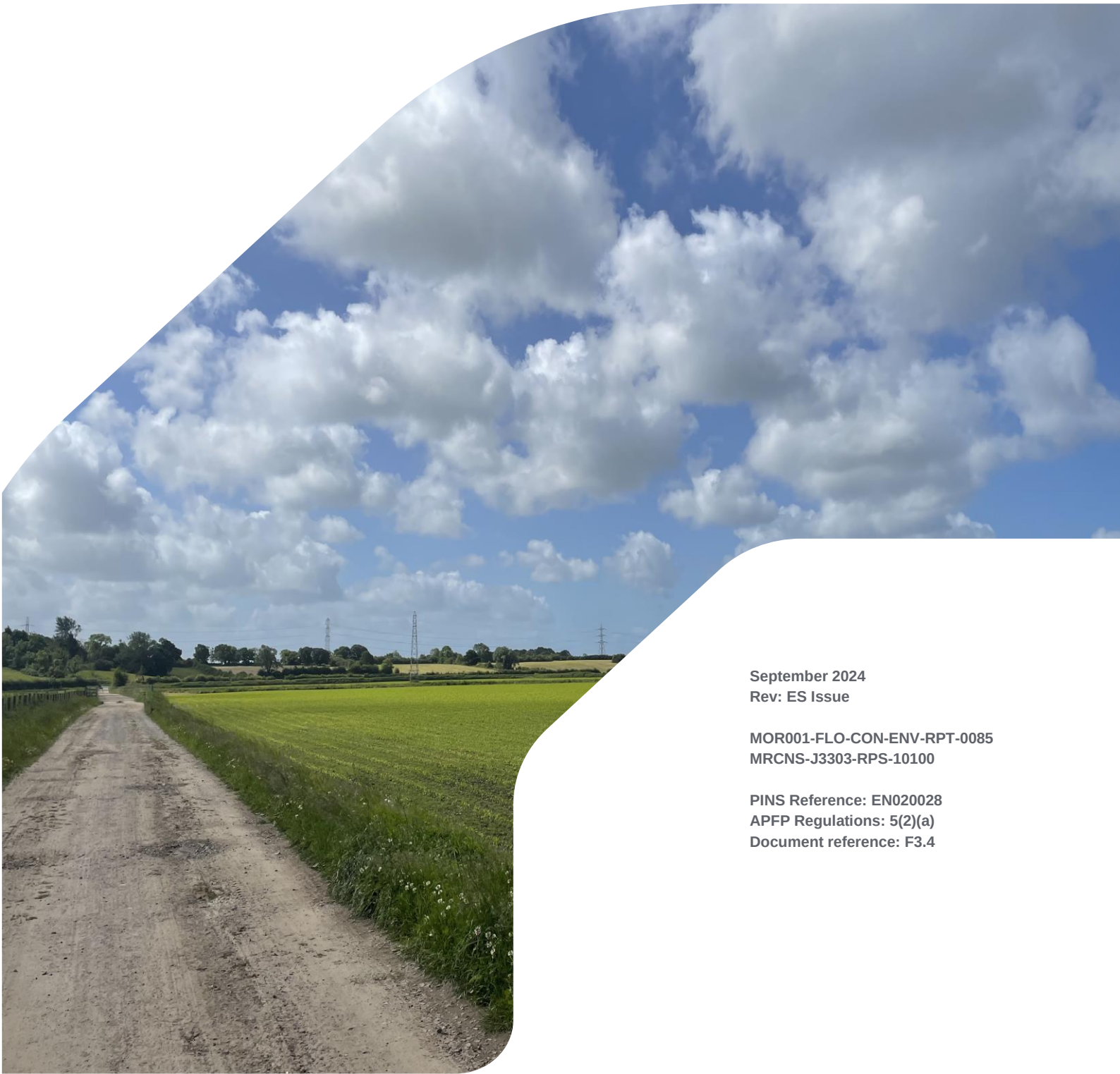
MORGAN AND MORECAMBE OFFSHORE WIND FARMS: TRANSMISSION ASSETS

Environmental Statement

Volume 3, Chapter 4: Onshore and intertidal ornithology



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Glossary

Term	Meaning
400 kV grid connection cables	Cables that will connect the proposed onshore substations to the existing National Grid Penwortham substation.
400 kV grid connection cable corridor	The corridor within which the 400 kV grid connection cables will be located.
Applicants	Morgan Offshore Wind Limited (Morgan OWL) and Morecambe Offshore Windfarm Ltd (Morecambe OWL).
Baseline	The status of the environment without the Transmission Assets in place.
Biodiversity benefit	An approach to development that leaves biodiversity in a better state than before. Where a development has an impact on biodiversity, developers are encouraged to provide an increase in appropriate natural habitat and ecological features over and above that being affected. For the Transmission Assets, biodiversity benefit will be delivered within identified biodiversity benefit areas within the Onshore Order Limits. Further qualitative benefits to biodiversity are proposed via potential collaboration with stakeholders and local groups, contributing to existing plans and programmes, both within and outside the Order Limits.Order Limits.
Climate change	A change in global or regional climate patterns, in particular a change apparent from the mid to late 20th century onwards and attributed largely to the increased levels of atmospheric carbon dioxide produced by the use of fossil fuels.
Code of Construction Practice	A document detailing the overarching principles of construction, contractor protocols, construction-related environmental management measures, pollution prevention measures, the selection of appropriate construction techniques and monitoring processes.
Commitment	This term is used interchangeably with mitigation and enhancement measures. The purpose of commitments is to avoid, prevent, reduce or, if possible, offset significant adverse environmental effects. Primary and tertiary commitments are taken into account and embedded within the assessment set out in the ES.
Cumulative effects	The combined effect of the Transmission Assets in combination with the effects from other proposed developments, on the same receptor or resource.
Development Consent Order	An order made under the Planning Act 2008, as amended, granting development consent.
Duration (of impact)	The time over which an impact occurs. An impact may be described as short, medium or long-term and permanent or temporary.
Effect	The term used to express the consequence of an impact. The significance of effect is determined by correlating magnitude of the impact with the importance, or sensitivity, of the receptor or resource in accordance with defined significance criteria.
EIA Scoping Report	A report setting out the proposed scope of the Environmental Impact Assessment process. The Transmission Assets Scoping Report was submitted to The Planning Inspectorate (on behalf of the Secretary of State) for the Morgan and Morecambe Offshore Windfarms Transmission Assets in October 2022.

Term	Meaning
Environmental Impact Assessment	The process of identifying and assessing the significant effects likely to arise from a project. This requires consideration of the likely changes to the environment, where these arise as a consequence of a project, through comparison with the existing and projected future baseline conditions.
Environmental Statement	The document presenting the results of the Environmental Impact Assessment process.
European Protected Species	Species (such as bats, great crested newts, otters and dormice) which receive full protection under The Conservation of Species and Habitats Regulations 2017 and Conservation of Offshore Marine Habitats and Species Regulations 2017.
European sites	Designated nature conservation sites which include the National Site Network (designated within the UK) and Natura 2000 sites (designated in any European Union country). This includes Sites of Community Importance, Special Areas of Conservation and Special Protection Areas.
Evidence Plan Process	A voluntary consultation process with specialist stakeholders to agree the approach to, and information to support, the EIA and Habitats Regulations Assessment processes for certain topics.
Expert Working Group	A forum for targeted engagement with regulators and interested stakeholders through the Evidence Plan process.
Export cable corridor	The specific corridor of seabed (seaward of Mean High Water Springs and land (landward of Mean High Water Springs) from the Generation Assets to the National Grid Penwortham substation.
Generation Assets	The generation assets associated with the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm include the offshore wind turbines, inter-array cables, offshore substation platforms and platform link (interconnector) cables to connect offshore substations.
Habitats Regulations	The Conservation of Habitats and Species Regulations 2017 (as amended) and the Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended).
Impact	Change that is caused by an action/proposed development, e.g., land clearing (action) during construction which results in habitat loss (impact).
Inter-related effects	Inter-related effects arise where an impact acts on a receptor repeatedly over time to produce a potential additive effect or where a number of separate impacts, such as noise and habitat loss, affect a single receptor.
Intertidal Infrastructure Area	The temporary and permanent areas between MLWS and MHWS.
Landfall	The area in which the offshore export cables make landfall (come on shore) and the transitional area between the offshore cabling and the onshore cabling. This term applies to the entire landfall area at Lytham St. Annes between Mean Low Water Springs and the transition joint bays inclusive of all construction works, including the offshore and onshore cable routes, intertidal working area and landfall compound(s).
Maximum design scenario	The realistic worst -case scenario, selected on a topic-specific and impact specific basis, from a range of potential parameters for the Transmission Assets.
Mean High Water Springs	The height of mean high water during spring tides in a year.
Mean Low Water Springs	The height of mean low water during spring tides in a year.

Term	Meaning
Mitigation measures	This term is used interchangeably with Commitments. The purpose of such measures is to avoid, prevent, reduce or, if possible, offset significant adverse environmental effects.
Morecambe Offshore Windfarm: Generation Assets	The offshore generation assets and associated activities for the Morecambe Offshore Windfarm.
Morgan and Morecambe Offshore Wind Farms: Transmission Assets	The offshore and onshore infrastructure connecting the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm to the national grid. This includes the offshore export cables, landfall site, onshore export cables, onshore substations, 400 kV grid connection cables and associated grid connection infrastructure such as circuit breaker compounds. Also referred to in this report as the Transmission Assets, for ease of reading.
Morgan Offshore Wind Project: Generation Assets	The offshore generation assets and associated activities for the Morgan Offshore Wind Project.
National Network Site	Protected sites within UK territory comprising of the protected sites already designated under the Habitats Directive (European Council Directive 92/43/EEC) and certain elements of the Wild Birds Directive (European Council Directive 2009/147/EC) and any further sites designated under the Habitats Regulations.
National Policy Statement(s)	The current national policy statements published by the Department for Energy Security and Net Zero in 2023 and adopted in 2024.
Offshore export cables	The cables which would bring electricity from the Generation Assets to the landfall.
Onshore export cable corridor	The corridor within which the onshore export cables will be located.
Onshore export cables	The cables which would bring electricity from landfall to the onshore substations.
Onshore Infrastructure Area	The area within the Transmission Assets Order Limits landward of Mean High Water Springs. Comprising the offshore export cables from Mean High Water Springs to the transition joint bays, onshore export cables, onshore substations and 400 kV grid connection cables, and associated temporary and permanent infrastructure including temporary and permanent compound areas and accesses. Those parts of the Transmission Assets Order Limits proposed only for ecological mitigation/biodiversity benefit are excluded from this area.
Onshore Order Limits	See Transmission Assets Order Limits: Onshore (below).
Onshore substations	The onshore substations will include a substation for the Morgan Offshore Wind Project: Transmission Assets and a substation for the Morecambe Offshore Windfarm: Transmission Assets. These will each comprise a compound containing the electrical components for transforming the power supplied from the generation assets to 400 kV and to adjust the power quality and power factor, as required to meet the UK Grid Code for supply to the National Grid.
Order Limits	The limits within which the Transmission Assets may be carried out.
Planning Inspectorate	The agency responsible for operating the planning process for applications for development consent under the Planning Act 2008.

Term	Meaning
Preliminary Environmental Information Report	A report that provides preliminary environmental information in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. This is information that enables consultees to understand the likely significant environmental effects of a project and which helps to inform consultation responses.
Protected species	A species of animal or plant which it is forbidden by law to harm or destroy.
Ramsar sites	Wetlands of international importance that have been designated under the criteria of the Ramsar Convention. In combination with Special Protection Areas and Special Areas of Conservation, these sites contribute to the National Site Network.
Scoping Opinion	Sets out the Planning Inspectorate's response (on behalf of the Secretary of State) to the Scoping Report prepared by the Applicants. The Scoping Opinion contains the range of issues that the Planning Inspectorate, in consultation with statutory stakeholders, has identified should be considered within the Environmental Impact Assessment process.
Site of Special Scientific Interest	A national statutory conservation designation in the UK, recognizing areas of significant ecological or geological value. These sites are legally protected under the Wildlife and Countryside Act 1981, as amended by the Countryside and Rights of Way Act 2000 and the Natural Environment and Rural Communities Act 2006. This legislation empowers Natural England to designate and manage SSSIs, ensuring their protection and conservation.
Spatial extent	Geographical area over which the impact may occur.
Special Areas of Conservation	A site designation specified in the Conservation of Habitats and Species Regulations 2017. Each site is designated for one or more of the habitats and species listed in the Regulations. The legislation requires a management plan to be prepared and implemented for each SAC to ensure the favourable conservation status of the habitats or species for which it was designated. In combination with Special Protection Areas and Ramsar sites, these sites contribute to the National Site Network.
Special Protection Areas	A site designation specified in the Conservation of Habitats and Species Regulations 2017, classified for rare and vulnerable birds, and for regularly occurring migratory species. Special Protection Areas contribute to the National Site Network.
Study area	This is an area which is defined for each environmental topic which includes the Transmission Assets Order Limits as well as potential spatial and temporal considerations of the impacts on relevant receptors. The study area for each topic is intended to cover the area within which an impact can be reasonably expected.
Substation	Part of an electrical transmission and distribution system. Substations transform voltage from high to low, or the reverse by means of electrical transformers.
Survey area	The area within which each survey has been undertaken. This may differ from the Study Area as a Survey Area will be based on species or survey-specific guidance on the extent of survey required, which may be limited by, for example, habitat conditions, or be defined in terms of buffer areas around an area of potential impact.
The Secretary of State for Energy Security and Net Zero	The decision maker with regards to the application for development consent for the Transmission Assets.

Term	Meaning
Transboundary effects	Effects from a project within one state that affect the environment of another state(s).
Transition joint bays	The transition joint bays consist of concrete slab floor excavations into which the offshore and onshore export cables are pulled before the cables are jointed together.
Transmission Assets	See Morgan and Morecambe Offshore Wind Farms: Transmission Assets (above).
Transmission Assets Order Limits	The area within which all components of the Transmission Assets will be located, including areas required on a temporary basis during construction and/or decommissioning (such as construction compounds).
Transmission Assets Order Limits: Onshore	The area within which all components of the Transmission Assets landward of Mean High Water Springs will be located, including areas required on a temporary basis during construction and/or decommissioning (such as construction compounds). Also referred to in this report as the Onshore Order Limits, for ease of reading.

Acronyms

Acronym	Meaning
BAP	Biodiversity Action Plan
BOCC	Birds of Conservation Concern
BTO	British Trust for Ornithology
CEA	Cumulative Effects Assessment
CIEEM	Chartered Institute of Ecology and Environmental Management
CoCP	Code of Construction Practice
DCO	Development Consent Order
Defra	Department for Environment, Food and Rural Affairs
DESNZ	Department for Energy Security and Net Zero
EIA	Environmental Impact Assessment
EPP	Evidence Plan Process
ES	Environmental Statement
EU	European Union
EWG	Expert Working Group
FLL	Functionally linked land
HAT	Highest Astronomical Tide
HDD	Horizontal Directional Drilling
HPAI	Highly Pathogenic Avian Influenza
HRA	Habitats Regulations Assessment
IEF	Important Ecological Feature
IEMA	Institute of Environmental Management and Assessment
INNS	Invasive Non-native Species
ISAA	Information to Support Appropriate Assessment
MDS	Maximum Design Scenario
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
NPPF	National Planning Policy Framework
NPS	National Policy Statement
NSIP	Nationally Significant Infrastructure Project
PEIR	Preliminary Environmental Information Report
PPG	Planning Practice Guidance
PPP	Pollution Prevention Plan

Acronym	Meaning
pSPA	Potential Special Protection Area
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SNCB	Statutory Nature Conservation Bodies
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
UK	United Kingdom
WeBS	Wetland Bird Survey

Units

Unit	Description
ha	Hectare
km	Kilometres
km^2	Kilometres Squared
kV	Kilovolt
m	Metre
nm	Nautical mile
%	Percentage
m^2	Metres squared
MW	Megawatt
MWp	Megawatt peak

4 Onshore and intertidal ornithology

4.1 Introduction

4.1.1 Overview

4.1.1.1 This chapter of the Environmental Statement (ES) presents the findings of the Environmental Impact Assessment (EIA) undertaken for the Morgan and Morecambe Offshore Wind Farms: Transmission Assets. For ease of reference, the Morgan and Morecambe Offshore Wind Farms: Transmission Assets are referred to in this chapter as the 'Transmission Assets'. This ES accompanies the application to the Planning Inspectorate for development consent for the Transmission Assets.

4.1.1.2 The purpose of the Transmission Assets is to connect the Morgan Offshore Wind Project: Generation Assets and Morecambe Offshore Windfarm: Generation Assets (referred to collectively as the 'Generation Assets') to the National Grid. A description of the Transmission Assets can be found in Volume 1, Chapter 3: Project description of the ES.

4.1.1.3 This chapter considers the likely impacts and effects of the Transmission Assets on onshore and intertidal ornithological receptors during the construction, operation and maintenance and decommissioning phases. Specifically, it relates to the onshore and intertidal elements of the Transmission Assets, including up to 1.5 kilometres (km) out to sea from the Highest Astronomical Tide (HAT), and the onshore elements of the Transmission Assets landward of HAT. Those elements of the Transmission Assets located seaward of the nearshore waters (further than 1.5 km out to sea from the HAT) are addressed in Volume 2, Chapter 5: Offshore ornithology of the ES.

4.1.1.4 The Transmission Assets Order limits above Mean Low Water Springs (MLWS) are split into two infrastructure areas. These are the:

- Onshore Infrastructure Area – the area within the Transmission Assets Order Limits landward of Mean High Water Springs. Comprising the offshore export cables from Mean High Water Springs to the transition joint bays, onshore export cables, onshore substations and 400 kV grid connection cables, and associated temporary and permanent infrastructure including temporary and permanent compound areas and accesses. Those parts of the Transmission Assets Order Limits proposed only for ecological mitigation/biodiversity benefit are excluded from this area.
- Intertidal Infrastructure Area – Intertidal Infrastructure Area
  The temporary and permanent areas between MLWS and MHWS.

4.1.1.5 In addition, the Transmission Assets Order Limits (Onshore Order Limits) include onshore and intertidal biodiversity benefit, enhancement and/or mitigation areas.

4.1.1.6 This ES chapter:

- identifies the key legislation, policy and guidance relevant to onshore and intertidal ornithology;
- details the EIA scoping and consultation process undertaken to date for onshore and intertidal ornithology;
- confirms the study area for the assessment, the methodology used to identify baseline environmental conditions and sets out the existing and future environmental baseline conditions, established from desk studies, surveys and consultation;
- identifies the scope of the assessment;
- details the mitigation and/or monitoring measures that are proposed to prevent, minimise, reduce or offset the possible environmental effects identified in the EIA process;
- defines the project design parameters used to inform the impact assessment;
- identifies the impact assessment methodology and presents an assessment of the likely impacts and effects in relation to the construction, operation and maintenance and decommissioning phase of the Transmission Assets on onshore and intertidal ornithological receptors (and, where relevant, the impacts and effects of onshore and intertidal ornithological receptors on the Transmission Assets); and
- identifies any cumulative, transboundary and/or inter-related effects in relation to the construction, operation and maintenance and decommissioning phases of the Transmission Assets on onshore and intertidal ornithological receptors.

4.1.1.7 The assessment presented is informed by the following technical chapters and should be read in conjunction with:

- Volume 2, Chapter 5: Offshore ornithology of the ES;
- Volume 3, Chapter 3: Onshore ecology and nature conservation of the ES;
- Volume 3, Chapter 8: Noise and vibration of the ES; and
- Volume 3, Chapter 9: Air quality of the ES.

4.1.1.8 The assessment presented is also informed by the standalone Habitats Regulations Assessment (HRA) Stage 1: screening report (document reference E3) and the Information to Support the Appropriate Assessment (ISAA) report (document references E2.1, E2.2 and E2.3), both prepared to accompany the ES.

4.1.1.9 This chapter draws upon additional information to support the assessment contained within:

- Volume 3, Annex 4.1: Breeding birds technical report;
- Volume 3, Annex 4.2: Wintering and migratory birds technical report;

- Volume 3, Annex 4.3: Intertidal birds technical report; and
- Volume 3, Annex 4.4: Onshore and intertidal ornithology survey methodologies.

4.2 Legislation, policy and guidance

4.2.1 Legislation

Conservation of Habitats and Species Regulations 2017

4.2.1.1 European Council Directive 2009/147/EC (otherwise known as 'the Birds Directive') aims to protect all European wild birds and the habitats (listed in Annex 1 and 2 respectively), through the designation of Special Protection Areas (SPAs). Hereafter, all species named under Annex 1 of the Birds Directive will just be referred to as Annex 1 species.

4.2.1.2 European Union Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora ('the Habitats Directive') set out provisions for the protection of habitats and species.

4.2.1.3 Parts of the Birds and Habitats Directives were transposed into United Kingdom (UK) law through the Conservation of Habitats and Species Regulations 2017 and the Conservation of Offshore Marine Habitats and Species Regulations 2017 (collectively referred to as 'the Habitats Regulations') and remain in force despite the fact the UK has left the European Union.

4.2.1.4 The Habitats Regulations provide protection for certain species of plants and animals and set out those species that are protected and the activities that are prohibited, such as deliberate disturbance or causing damage to a breeding place.

4.2.1.5 Under Part 5, Regulation 55 of the Habitats Regulations also provides for licences to be granted for certain operations being carried out for specified purposes, such as projects that may affect protected species, subject to:

- there being no satisfactory alternative; and
- the action authorised not being detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.

4.2.1.6 With respect to the Transmission Assets, the protected bird species present have been identified and the likely effects assessed within this chapter. Where possible, effects on sensitive or protected species have been avoided, minimised or mitigated.

4.2.1.7 Under Part 2 Regulation 24 of the Habitats Regulations, it is a requirement that an appropriate assessment be carried out for all plans and projects that are likely to have significant effects on European sites, which include Special Areas of Conservation (SACs), candidate SACs, Sites of Community Importance, Special Protection Areas (SPAs) and as a matter of policy, possible SACs, potential SPAs (pSPAs) and Ramsar sites (listed under the Ramsar Convention).

4.2.1.8 In this chapter, the term 'European site' has been retained to refer to the sites listed above in **paragraph 4.2.1.7** that are protected in European Member States, England and Wales (Defra, 2021). However, where these sites are located in the UK, they no longer form part of the EU's Natura 2000 Ecological Network and now form part of the National Site Network.

4.2.1.9 The European sites relevant to onshore and intertidal ornithology are SPAs, pSPAs and Ramsar sites.

4.2.1.10 A HRA Screening Report (document reference E3) and ISAA report (document references E2.1, E2.2 and E2.3) have been prepared to accompany the ES to consider the effects of the Transmission Assets on European sites.

Natural Environment and Rural Communities Act 2006

4.2.1.11 Section 41 of the Natural Environment and Rural Communities Act 2006 states that:

'the Secretary of State must, as respects England, publish a list of the living organisms and types of habitats which in the Secretary of State's opinion are of principal importance for the purpose of conserving or enhancing biodiversity.'

4.2.1.12 The current list of habitats and species identified as being of principal importance pursuant to section 41 of the Natural Environment and Rural Communities Act 2006 in England includes 56 habitats and 943 species. Under Part 3, Regulation 40, public authorities have a legal duty to have regard to furthering biodiversity in the exercise of their normal functions. Of the 943 species included on the list, 49 are avian species.

Wildlife and Countryside Act 1981 (as amended)

4.2.1.13 Under Part 1, Section 1, all wild birds, their nests and their eggs are protected. Subject to the provisions of Section 1, if any person intentionally:

- kills, injures or takes any wild bird;
- takes, damages, or destroys the nest of a wild bird included in Schedule ZA1;
- takes, damages or destroys the nest of any wild bird while that nest is in use or being built; or
- takes or destroys an egg of any wild bird,

they will be subject to an offence.

4.2.1.14 In addition, for birds listed in Schedule 1 of the Wildlife and Countryside Act 1981, it is also an offence to intentionally or recklessly:

- disturb any species listed under Schedule 1 of the Act whilst it is building a nest or is in, on or near a nest containing eggs or young; or
- disturb the dependent young of any species listed under Schedule 1.

4.2.1.15 Hereafter all species named under Schedule 1 of the Wildlife and Countryside Act, 1981 will just be referred to as Schedule 1 species.

The Ramsar Convention 1971

4.2.1.16 The Ramsar Convention on Wetlands of International Importance (referred to as the Ramsar Convention) is an international treaty for the conservation and sustainable use of designated wetland areas, known as Ramsar sites. The present text of the Ramsar Convention came into force in 1975.

4.2.1.17 Ramsar sites are wetlands of international importance designated under the criteria of the Ramsar Convention (i.e., the wetland supports 20,000 waterbirds and/or supports 1% of the individuals in a population of one species or subspecies of waterbird).

4.2.1.18 In the UK, Ramsar sites are protected under the National Site Network, in the same way as SPAs and SACs.

4.2.2 Planning policy context

4.2.2.1 The Transmission Assets will be located in English offshore waters (beyond 12 nautical miles (nm) from the English coast) and inshore waters (within 12 nm of the English coast), with the onshore infrastructure located wholly in England. As set out in Volume 1, Chapter 1: Introduction of this ES, the Secretary of State for the Department for Business, Energy and Industrial Strategy (the department which preceded the Department for Energy Security and Net Zero (DESNZ)) directed that the Transmission Assets are to be treated as a development for which development consent is required under the Planning Act 2008, as amended.

4.2.2.2 The sections below set out the policy content in relation to onshore and intertidal ornithology. Further details of the overarching policy context for the Transmission Assets are set out in Volume 1, Chapter 2: Policy and legislation context of the ES.

National Policy Statements (NPSs)

4.2.2.3 There are currently six energy NPSs, three of which contain policy relevant to offshore wind development and the Transmission Assets, specifically:

- overarching NPS for Energy (NPS EN-1) which sets out the UK Government's policy for the delivery of major energy infrastructure (DESNZ 2023a);
- NPS for Renewable Energy Infrastructure (NPS EN-3) (DESNZ 2023b); and
- NPS for Electricity Networks Infrastructure (NPS EN-5) (DESNZ 2023c).

4.2.2.4 NPS EN-3 is relevant to offshore wind generation only and is therefore not considered any further.

4.2.2.5 The policies within the current NPSs relevant to all topics in the ES can be viewed in the National Policy Statement tracker (document reference J26)

and Planning Statement (document reference J28), submitted with the application.

Table 4.1: Summary of the NPS EN-1 and NPS EN-5 policies relevant to this chapter

Summary of NPS provision	How and where considered in the ES
NPS EN-1	
Where the development is subject to EIA the applicant should ensure that the ES clearly sets out any effects on internationally, nationally and locally designated sites of ecological or geological conservation importance (including those outside England), on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity, including irreplaceable habitats (NPS EN-1, paragraph 5.4.17).	The baseline ornithological environment is described in **section 4.6.** As part of this chapter, the process of identifying designated sites has been undertaken and results are presented in **section 4.6.2** of this chapter. The specific bird species that may be impacted by the Transmission Assets are identified in **section 4.6.2** and an assessment of the effects for these specific species are identified and considered in **section 4.11**. Impacts on protected sites, habitats and species relating to aspects of ecology and nature conservation other than ornithology are set out in Volume 3, Chapter 3: Onshore ecology and nature conservation of the ES. Impacts on geological conservation interests are considered in Volume 3, Chapter 1: Geology, hydrogeology and ground conditions of the ES.
The applicant should show how the project has taken advantage of opportunities to conserve and enhance biodiversity and geological conservation interests (NPS EN-1, paragraph 5.4.19).	Commitments made as part of the Transmission Assets are set out in **section 4.8**. This includes measures to conserve biodiversity in terms of ornithological interests. It also includes opportunities for biodiversity benefit. Further details of the approach to conserving and enhancing biodiversity are provided in Volume 3, Chapter 3: Onshore ecology and nature conservation of the ES and in the Onshore Biodiversity Benefit Statement (document reference J11). Geological conservation interests are considered in Volume 3, Chapter 1: Geology, hydrogeology and ground conditions of the ES.
Applicants should consider wider ecosystem services and benefits of natural capital when designing enhancement measures (NPS EN-1, paragraph 5.4.20). As set out in Section 4.7, the design process should embed opportunities for nature inclusive design. Energy infrastructure projects have the potential to deliver significant benefits and enhancements beyond Biodiversity Net Gain, which result in wider environmental gains (see Section 4.6 on Environmental and Biodiversity Net Gain). The scope of potential gains will be dependent on the type, scale, and location of each project. (NPS EN-1, paragraph 5.4.21).	Where practicable, the Applicants have looked to provide a coordinated approach to the design and development of mitigation and enhancement measures. The approach to the development of mitigation and enhancement measures is described within **section 4.8**. Those measures adopted are set out within **Table 4.19**. Further details of the approach to conserving and enhancing biodiversity are provided in Volume 3, Chapter 3: Onshore ecology and nature conservation of the ES and in the Onshore Biodiversity Benefit Statement (document reference J11).
The design of Energy Nationally Significant Infrastructure Project proposals will need to consider the movement of mobile/migratory species such as	Those migratory species that have potential to interact with the infrastructure associated with the Transmission Assets have been presented in Volume

Summary of NPS provision	How and where considered in the ES
birds… and their potential to interact with infrastructure. As energy infrastructure could occur anywhere within England and Wales, both inland and onshore and offshore, the potential to affect mobile and migratory species across the UK and more widely across Europe (transboundary effects) requires consideration, depending on the location of development. (NPS EN-1, paragraph 5.4.22).	3, Annex 4.1: Breeding birds technical report of the ES; Volume 3, Annex 4.2: Wintering and migratory birds technical report of the ES and Volume 3, Annex 4.3: Intertidal birds technical report of the ES with summaries included within this chapter in **section 4.6.4**. An assessment of the potential significant effects of the Transmission Assets for these species is given in **section 4.11**. A cumulative assessment of the potential impact of the Transmission Assets and other projects on these species is presented in **section 4.21** The potential for transboundary impacts on these species is considered within **section 4.25.**
The applicant should seek the advice of the appropriate SNCB and provide the Secretary of State with such information as the Secretary of State may reasonably require, to determine whether an HRA Appropriate Assessment (AA) is required. Applicants can request and agree 'Evidence Plans' with SNCBs, which is a way to record upfront the information the applicant needs to supply with its application, so that the HRA can be efficiently carried out. If an AA is required, the applicant must provide the Secretary of State with such information as may reasonably be required to enable the Secretary of State to conduct the AA. This should include information on any mitigation measures that are proposed to minimise or avoid likely significant effects. (NPS EN-1, paragraph 5.4.25 to 2.4.31).	Impacts on internationally designated sites forming part of the National Site Network are considered in **section 4.11** of this chapter and in the ISAA that accompanies the application (document references E2.1, E2.2 and E2.3). A summary of the consultation carried out with Statutory Nature Conservation Bodies (SNCBs) relevant to onshore and intertidal ornithology is provided within **section 4.3.4** and further details of all consultation conducted can be found within the Consultation Report (document reference E1).
Applicants should consider any reasonable opportunities to maximise the restoration, creation, and enhancement of wider biodiversity, and the protection and restoration of the ability of habitats to store or sequester carbon as set out under Section 4.6. (NPS EN-1, paragraph 5.4.25 to 2.4.33).	Commitments made as part of the Transmission Assets are set out in **section 4.8**. This includes measures to conserve biodiversity in terms of ornithological interests. It also includes opportunities for biodiversity benefit. For the Transmission Assets, biodiversity benefit will be delivered within identified biodiversity benefit areas within the Onshore Order Limits. Further qualitative benefits to biodiversity are proposed via potential collaboration with stakeholders and local groups, contributing to existing plans and programmes, both within and outside the Onshore Order Limits. Further details of the approach to conserving and enhancing biodiversity are provided in Volume 3, Chapter 3: Onshore ecology and nature conservation of the ES and in the Onshore Biodiversity Benefit Statement (document reference J11).
Consideration should be given to improvements to, and impacts on, habitats and species in, around and beyond developments, for wider ecosystem services and natural capital benefits, beyond those under protection and identified as being of principal importance. This may include considerations and opportunities identified through Local Nature Recovery Strategies, and national goals and targets set through the Environment Act 2021 and the Environmental Improvement Plan 2023 (NPS EN-1, paragraph 5.4.25 to 2.4.34)	
Applicants should include appropriate avoidance, mitigation, compensation and enhancement measures as an integral part of the proposed development. In particular, the applicant should demonstrate that:	A draft Development Consent Order (DCO) (document reference C1) is provided with the application for development consent. This includes draft requirements, based on the Commitments proposed as part of the Transmission Assets application. Details of the Commitments proposed in

Summary of NPS provision	How and where considered in the ES
• during construction, they will seek to ensure that activities will be confined to the minimum areas required for the works • the timing of construction has been planned to avoid or limit disturbance • during construction and operation best practice will be followed to ensure that risk of disturbance or damage to species or habitats is minimised, including as a consequence of transport access arrangements • habitats will, where practicable, be restored after construction works have finished • opportunities will be taken to enhance existing habitats rather than replace them, and where practicable, create new habitats of value within the site landscaping proposals. Where habitat creation is required as mitigation, compensation, or enhancement, the location and quality will be of key importance. In this regard habitat creation should be focused on areas where the most ecological and ecosystems benefits can be realised. • mitigations required as a result of legal protection of habitats or species will be complied with. (NPS EN-1, paragraph 5.4.35).	relation to species and habitats are set out in **section 4.8** of this chapter. This includes measures to conserve biodiversity in terms of ornithological interests. It also includes opportunities for biodiversity benefit. The measures include. • The Applicants have committed to avoiding the core wintering period (November to February inclusive) where possible (CoT110). • A range of sensitive ecological conservation areas (including statutory and non-statutory designations have been directly avoided where practicable (CoT03). • All vegetation removal is to be undertaken outside of the breeding season for birds. If this is not reasonably practicable, the vegetation will be subject to a nesting bird check by a suitably qualified ecological clerk of works (CoT16). • All temporary compounds will be removed and sites will be reinstated when construction is completed (CoT27). • Measures will be put in place at an area to the south of Newton-with-Scales including the creation of scrapes, drainage control, hedgerow thickening, livestock limiting and organic farming practices (CoT120). • An alternative site will be provided for the supplementary feeding of pink-footed goose during the core wintering bird period (CoT107).
Applicants should produce and implement a Biodiversity Management Strategy as part of their development proposals. This could include provision for biodiversity awareness training to employees and contractors so as to avoid unnecessary adverse impacts on biodiversity during the construction and operation stages (NPS EN-1, paragraph 5.4.36).	An Outline Ecological Management Plan (document reference J6) is provided as part of the application for development consent. Further details of the approach to conserving and enhancing biodiversity are provided in Volume 3, Chapter 3: Onshore ecology and nature conservation of the ES and in the Onshore Biodiversity Benefit Statement (document reference J11).
The government's 25 Year Environment Plan and the Environment Act 2021 mark a step change in ambition for wildlife and the natural environment. The Secretary of State should have regard to the aims and goals of the government's Environmental Improvement Plan 2023, and in Wales the objectives of the Nature Recovery Plan, and any relevant measures and targets, including statutory targets set under the Environment Act or elsewhere (NPS EN-1, paragraph 5.4.39).	Commitments made as part of the Transmission Assets are set out in **section 4.8**. This includes measures to conserve biodiversity in terms of ornithological interests. It also includes opportunities for biodiversity benefit. The Applicants have had regard to the goals of the Environmental Improvement Plan and the need to conserve and enhance habitats in developing appropriate mitigation for the Transmission Assets.
The benefits of nationally significant low carbon energy infrastructure development may include benefits for biodiversity and geological conservation interests and these benefits may outweigh harm to these interests. The Secretary of State may take account of any such net benefit in cases where it	A description of the potential benefits presented to birds is presented within **paragraphs 4.12.6.1** to **4.12.6.3, 4.13.6.1** to **4.13.7.1**, and **4.14.6.1** to **4.14.10.1**. Further details of the approach to conserving and enhancing biodiversity are provided in Volume 3,

Summary of NPS provision	How and where considered in the ES
can be demonstrated (NPS EN-1, paragraph 5.4.41).	Chapter 3: Onshore ecology and nature conservation of the ES and in the Onshore Biodiversity Benefit Statement (document reference J11).
As a general principle, and subject to the specific policies below, development should, in line with the mitigation hierarchy, aim to avoid significant harm to biodiversity and geological conservation interests, including through consideration of reasonable alternatives (as set out in Section 4.3 above). Where significant harm cannot be avoided, impacts should be mitigated and as a last resort, appropriate compensation measures should be sought (NPS EN-1, paragraph 5.4.42).	Design of the Transmission Assets and consideration of design options has had regard to the mitigation hierarchy and to the need to avoid significant harm. Details of the design evolution are set out in Volume 1, Chapter 3: Site selection and consideration of alternatives of the ES. Commitments made as part of the Transmission Assets are set out in **section 4.8**. This includes measures to conserve biodiversity in terms of ornithological interests. It also includes opportunities for biodiversity benefit.
If significant harm to biodiversity resulting from a development cannot be avoided (for example through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then the Secretary of State will give significant weight to any residual harm (NPS EN-1, paragraph 5.4.43).	
The Secretary of State should consider what appropriate requirements should be attached to any consent and/or in any planning obligations entered into, in order to ensure that any mitigation or biodiversity net gain measures, if offered, are delivered and maintained. Any habitat creation or enhancement delivered including linkages with existing habitats for compensation or biodiversity net gain should generally be maintained for a minimum period of 30 years, or for the lifetime of the project, if longer (NPS EN-1, paragraph 5.4.44).	A draft Development Consent Order (DCO) (document reference C1) is provided with the application for development consent. This includes draft requirements, based on the Commitments proposed as part of the Transmission Assets application. Details of the Commitments proposed in relation to species and habitats are set out in **section 4.8** of this chapter. Additionally, details of the proposed monitoring and maintenance of created and enhanced habitat are detailed within an Outline Ecological Management Plan (document reference J6).
The Secretary of State will need to take account of what mitigation measures may have been agreed between the applicant and the SNCB and the MMO/NRW (where appropriate). The Secretary of State will also need to consider whether the SNCB or the MMO/NRW has granted or refused, or intends to grant or refuse, any relevant licences, including protected species mitigation licences (NPS EN-1, paragraph 5.4.45).	Details of the mitigation measures proposed are set out in **section 4.8** of this chapter. These have been developed taking into account discussions held with SNCBs during Expert Working Group (EWG) meetings. Full details of all consultation conducted can be found within the Consultation Report (document reference E1).
Development proposals provide many opportunities for building-in beneficial biodiversity or geological features as part of good design. The Secretary of State should give appropriate weight to environmental and biodiversity enhancements, although any weight given to gains provided to meet a legal requirement (for example under the Environment Act 2021) is likely to be limited (NPS EN-1, paragraph 5.4.46).	Commitments made as part of the Transmission Assets are set out in **section 4.8**. This includes measures to conserve biodiversity in terms of ornithological interests. It also includes opportunities for biodiversity benefit. Further details of the approach to conserving and enhancing biodiversity are provided in Volume 3, Chapter 3: Onshore ecology and nature conservation of the ES and in the Onshore Biodiversity Benefit Statement (document reference J11). Impacts on geological conservation interests are considered in Volume 3, Chapter 1: Geology, hydrogeology and ground conditions of the ES.
When considering proposals, the Secretary of State should maximise such reasonable opportunities in and around developments, using requirements or planning obligations where appropriate. This can	

Summary of NPS provision	How and where considered in the ES
help towards delivering biodiversity net gain as part of or in addition to the approach set out at Section 4.6 (NPS EN-1, paragraph 5.4.47).	
In taking decisions, the Secretary of State should ensure that appropriate weight is attached to designated sites of international, national, and local importance; protected species; habitats and other species of principal importance for the conservation of biodiversity; and to biodiversity and geological interests within the wider environment (NPS EN-1, paragraph 5.4.48).	The baseline ornithological environment is described in **section 4.6.** As part of this chapter, the process of identifying designated sites has been undertaken and results are presented in **section 4.6.2** of this chapter. The specific bird species that may be impacted by the Transmission Assets are identified in **section 4.6.2** and an assessment of the effects for these specific species are identified and considered in **section 4.11**. Impacts on protected sites, habitats and species relating to aspects of ecology and nature conservation other than ornithology are set out in Volume 3, Chapter 3: Onshore ecology and nature conservation of the ES. Impacts on geological conservation interests are considered in Volume 3, Chapter 1: Geology, hydrogeology and ground conditions of the ES.
The Secretary of State must consider whether the project is likely to have a significant effect on a protected site which is part of the National Site Network (a habitat site), a protected marine site, or on any site to which the same protection is applied as a matter of policy, either alone or in combination with other plans or projects (NPS EN-1, paragraph 5.4.49).	Impacts on internationally designated sites forming part of the National Site Network are considered in **section 4.11** of this chapter and in the ISAA that accompanies the application (document references E2.1, E2.2 and E2.3). Consideration is also given to the potential cumulative effects of Transmission Assets in-combination with other projects and plans on the National Site Network within **section 4.21**.
The Secretary of State should use requirements and/or planning obligations to mitigate the harmful aspects of the development and, where possible, to ensure the conservation and enhancement of the site's biodiversity or geological interest (NPS EN-1, paragraph 5.4.50).	A draft DCO (document reference C1) is provided with the application for development consent (document reference J1). This includes draft requirements, based on the Commitments proposed as part of the Transmission Assets application.
The Secretary of State should give due consideration to regional or local designations. However, given the need for new nationally significant infrastructure, these designations should not be used in themselves to refuse development consent (NPS EN-1, paragraph 5.4.52).	Impacts on regionally or locally designated sites have been considered by the identification of key receptors in **section 4.6.6** of this chapter.
The Secretary of State should ensure that species and habitats identified as being of importance for the conservation of biodiversity are protected from the adverse effects of development by using requirements, planning obligations, or licence conditions where appropriate (NPS EN-1, paragraph 5.4.54).	A draft DCO (document reference C1) is provided with the application for development. This includes draft requirements, based on the Commitments proposed as part of the Transmission Assets application. Details of the Commitments proposed in relation to species and habitats are set out in **section 4.8** of this chapter.
The Secretary of State should refuse consent where harm to a protected species and relevant habitat would result, unless there is an overriding public interest and the other relevant legal tests are met. In this context the Secretary of State should give substantial weight to any such harm to the detriment	Impacts on protected bird species and relevant habitats are considered in **section 4.11** of this chapter. Details of impacts on internationally designated sites and the findings of the HRA process, including details of the relevant legal tests are provided in the

Summary of NPS provision	How and where considered in the ES
of biodiversity features of national or regional importance or the climate resilience and the capacity of habitats to store carbon, which they consider may result from a proposed development (NPS EN-1, paragraph 5.4.55).	ISAA that accompanies the application (document reference E2.1, E2.2 and E2.3).
NPS EN-5	
When planning and evaluating the proposed development's contribution to environmental and biodiversity net gain, it will be important – for both the applicant and the Secretary of State – to supplement the generic guidance set out in EN-1 (Section 4.6) with recognition that the linear nature of electricity networks infrastructure can allow for excellent opportunities to: i. reconnect important habitats via green corridors, biodiversity stepping zones, and reestablishment of appropriate hedgerows; … (NPS EN-5, paragraph 2.5.1).	No overhead lines are proposed as part of the Transmission Assets. Nevertheless, Commitments made as part of the Transmission Assets are set out in **section 4.8**. This includes measures to conserve biodiversity in terms of ornithological interests. It also includes opportunities for biodiversity benefit. Further details of the approach to conserving and enhancing biodiversity are provided in Volume 3, Chapter 3: Onshore ecology and nature conservation of the ES and in the Onshore Biodiversity Benefit Statement (document reference J11).
Particular consideration should be given to feeding and hunting grounds, migration corridors and breeding grounds, where they are functionally linked to sites designated or allocated under the 'national site network' provisions of the Conservation of Habitats and Species Regulations (NPS EN-5, paragraph 2.9.6).	The baseline ornithological environment, both onshore and intertidal, is described within **section 4.6**. The process of identifying designated sites has been undertaken and results presented in **section 4.6.2** of this chapter. The assessment of the potential significant effects of the Transmission Assets for bird interests are identified and considered in **section 4.11** of this chapter. Important areas of onshore and intertidal ornithology are considered in: Volume 3 Annex 4.1: Breeding birds technical report of the ES; Volume 3, Annex 4.2: Wintering and migratory birds technical report of the ES; Volume 3, Annex 4.3: Intertidal birds technical report of the ES.

The National Planning Policy Framework

4.2.2.6 The National Planning Policy Framework (NPPF) was published in 2012 and updated in 2018, 2019, 2021 and 2023 (Department for Levelling Up, Housing and Communities, 2023). The NPPF sets out the Government's planning policies for England.

4.2.2.7 The Government has published proposed reforms to the NPPF for consultation on 30 July 2024, with the consultation period ending on 24 September 2024 (Ministry of Housing, Communities and Local Government, 2024). Following consultation, the NPPF will be updated.

4.2.2.8 **Table 4.2** sets out a summary of the NPPF policies relevant to this chapter.

4.2.2.9 The Planning Practice Guidance (PPG) (Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities and Local Government, 2023) supports the NPPF and provides guidance across a

range of topic areas. However, no specific guidance for onshore and intertidal ornithology is provided.

4.2.2.10 In relation to the assessment of effects from a project, the PPG states that regard should be made to the possible cumulative effects arising from existing or approved development (paragraph: 024 reference ID: 4-024-20170728). An assessment of the potential for cumulative effects relevant to onshore and intertidal ornithology is provided within **section 4.21.**

4.2.2.11 The PPG also makes reference to the need to identify designated sites and potential impacts on these (paragraph: 032 reference ID: 4-032-20170728). Designated sites relevant to ornithology and their qualifying features are identified within **section 4.6.2**, the impacts on these sites themselves are assessed within the ISAA (document references E2.1, E2.2 and E2.3). The impacts on the individual receptors that these sites may be designated for are assessed within **section 4.11** of this ES chapter.

4.2.2.12 Paragraph: 035 (reference ID: 4-035-20170728) of the PPG advises that the applicants may consult with statutory and non-statutory consultation bodies. Details of all consultation relevant to onshore and intertidal ornithology are provided in **section 4.3**.

Table 4.2: Summary of NPPF requirements relevant to onshore and intertidal ornithology

Policy	Key provisions	How and where considered in the ES
Conserving and enhancing the natural environment	Planning policies and decisions should contribute to and enhance the natural and local environment by: protecting and enhancing…sites of biodiversity…(in a manner commensurate with their statutory status); and, d. minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures. (NPPF Section 15 paragraph 180)	The process of identifying designated sites has been undertaken and results presented in **section 4.6.2** of this chapter. The hierarchy of designated sites was considered in the identification of key receptors as outlined in **section 4.6.6**. This was then used within the assessment of effects as described within **section 4.10**. Commitments made as part of the Transmission Assets are set out in **section 4.8**. This includes measures to conserve biodiversity in terms of ornithological interests. It also includes opportunities for biodiversity benefit. Further details of the approach to conserving and enhancing biodiversity are provided in Volume 3, Chapter 3: Onshore ecology and nature conservation of the ES and in the Onshore Biodiversity Benefit Statement (document reference J11).
	Plans should: distinguish between the hierarchy of international, national and locally designated sites; take a strategic approach to maintaining and enhancing networks of habitats and green infrastructure; and plan for the enhancement of natural capital at a catchment or landscape scale across local authority boundaries. (NPPF Section 15 paragraph 181)	
Habitats and biodiversity	To protect and enhance biodiversity and geodiversity, plans should: a. identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and	The baseline ornithological environment is described in **section 4.6.** As part of this chapter, the process of identifying designated sites has been undertaken and results are presented in **section 4.6.2**. The specific bird species that may be

Policy	Key provisions	How and where considered in the ES
	locally designated sites of importance for biodiversity and wildlife corridors and steppingstones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation; and promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity. (NPPF Section 15 paragraph 185)	impacted by the Transmission Assets are identified in **section 4.6.2** and an assessment of the effects for these specific species are identified and considered in **section 4.11**. Commitments made as part of the Transmission Assets are set out in **section 4.8**. This includes measures to conserve biodiversity in terms of ornithological interests. It also includes opportunities for biodiversity benefit. Impacts on protected sites, habitats and species relating to aspects of ecology and nature conservation other than ornithology are set out in Volume 3, Chapter 3: Onshore ecology and nature conservation of the ES. Impacts on geological conservation interests are considered in Volume 3, Chapter 1: Geology, hydrogeology and ground conditions of the ES.
	The following should be given the same protection as habitats sites: a. potential Special Protection Areas and possible Special Area of Conservation; listed or proposed Ramsar sites; and sites identified, or required, as compensatory measures for adverse effects on habitats sties, Special Protection Areas, possible Special Area of Conservation and listed or proposed Ramsar sites. (NPPF Section 15 paragraph 187)	European sites within the study area (as defined in **section 4.4**) are identified in **Table 4.7** and described in Volume 3, Annex 4.1: Breeding birds technical report, Volume 3, Annex 4.2: Wintering and migratory birds technical report and Volume 3, Annex 4.3: Intertidal birds technical report of the ES. The identified designated sites include Ramsar sites. No pSPAs were identified within the onshore and intertidal ornithology study area.
	The presumption in favour of sustainable development does not apply where the plan or project is likely to have a significant effect on a habitats site (either alone or in combination with other plans or projects), unless an appropriate assessment has concluded that the plan or project will not adversely affect the integrity of the habitats site. (NPPF Section 15 paragraph 188)	Details on the potential impacts on European sites from the Transmission Assets are contained within the ISAA (document references E2.1, E2.2 and E2.3). Measures adopted as part of the Transmission Assets are presented within **section 4.8**.

4.2.2.13 The consultation draft includes similar provisions as the current designated NPPF. The consultation draft NPPF has been reviewed and there are no significant material updates for 'conserving the natural environment' and 'habitats and biodiversity'.

Local planning policy

4.2.2.14 The onshore elements of the Transmission Assets are located within the administrative areas of Fylde Borough Council, Blackpool Council, South

Ribble Borough Council and Preston City Council (and Lancashire County Council at a County level).

4.2.2.15 The relevant local planning policies applicable to onshore and intertidal ornithology based on the extent of the study areas for this assessment are summarised in **Table 4.3**.

Table 4.3: Summary of local planning policy relevant to this chapter

Policy	Key provisions	How and where considered in the ES
Central Lancashire Adopted Core Strategy Local Development Framework (Adopted July) 2012)		
Policy 18: Green Infrastructure	Manage and improve environmental resources through a Green Infrastructure approach to: a. protect and enhance the natural environment where it already provides economic, social and environmental benefits; invest in and improve the natural environment, particularly; i. the river valley networks including: – The River Ribble at Penwortham and south to Lostock Hall and Bamber Bridge, to create a 'central park' area incorporating footpaths, cycleways and a Local Nature Reserve; – Savick Brook upstream of Preston; – The River Darwen between Roach Bridge and Walton-le-Dale; and – The Yarrow and Cuerden Valley Parks. ii. the canal networks including: – The Lancaster Canal into Preston; and – The Leeds and Liverpool Canal through Chorley and Adlington. iii. where it contributes to the creation of green wedges and the utilisation of other green open spaces that can provide natural extensions into the countryside. (c) secure mitigation and/or compensatory measures where development would lead to the loss of, or damage to, part of the Green Infrastructure network.	Existing habitat networks relevant to the assessment of effects on ornithological receptors, including the River Ribble, have been considered in developing the design of the Transmission Assets. These have been taken into account in developing mitigation measures or Commitments, as set out in **section 4.8** of this chapter. This includes measures to conserve biodiversity in terms of ornithological interests. It also includes opportunities for biodiversity benefit.
Policy 22: Biodiversity and Geodiversity	The Central Lancashire Core Strategy has been produced by the Central Lancashire local authorities of Preston, South Ribble and Chorley with input from Lancashire County Council. The aim of the policy is to conserve, protect and enhance the biological assets of the area through: • promoting the conservation and enhancement of biological diversity, having particular regard to the favourable condition,	Important areas of onshore and intertidal ornithology are considered in Volume 3, Annex 4.1: Breeding birds technical report, Volume 3, Annex 4.2: Wintering and migratory birds technical report and Volume 3, Annex 4.3: Intertidal birds technical report of the ES. Assessment of the effects of the Transmission Assets are discussed in **section 4.11**. Mitigation methodology and

Policy	Key provisions	How and where considered in the ES
	restoration and re-establishment of priority habitats and species populations; and • seeking opportunities to conserve, enhance and expand ecological networks.	measures adopted as part of the Transmission Assets are discussed in **section 4.8**.
Fylde Local Plan to 2032 (incorporating Partial Review) (Adopted December 2021)		
Strategic Policy ENV2 Section 1 – Nature conservation sites and ecological networks	• The hierarchy of nature conservation sites – The Council is committed to ensuring the protection and enhancement of Fylde's biodiversity and geological assets and interests. A hierarchy of nature conservation sites is proposed to be used when making planning decisions. – Development that would directly or indirectly affect any sites of local importance will be permitted only where it is necessary to meet an overriding local public need or where it is in relation to the purposes of the nature conservation, or mitigation can avoid affecting site integrity. • Development within or affecting nature conservation sites and ecological networks – Proposals which primarily seek to enhance or conserve biodiversity will be supported in principle. – Consideration should be given to the impact of development proposals on the County-wide Lancashire ecological network and, where possible, opportunities to support the network by incorporating biodiversity in and around the development should be encouraged. – Where development is considered necessary, adequate mitigation measures and compensatory habitat creation will be required through planning conditions and/or obligations. • Damage to the nature conservation sites and ecological networks is defined by multiple pathways, all damage should be avoided.	All relevant designated sites and areas for wildlife conservation and species afforded extra protections under the Habitats Regulations and Schedule 1 of the Wildlife and Countryside Act 1981 and Section 41 of the Natural Environment and Rural Communities Act 2006 are described in Volume 3, Annex 4.1: Breeding birds technical report, Volume 3, Annex 4.2: Wintering and migratory birds technical report and Volume 3, Annex 4.3: Intertidal birds technical report of the ES. Assessment of the effects of the Transmission Assets are discussed in **section 4.11**. Mitigation methodology and measures adopted by the Transmission Assets are discussed in **section 4.8**. Impacts on geological conservation interests are considered in Volume 3, Chapter 1: Geology, hydrogeology and ground conditions of the ES.
Strategic Policy ENV2 Section 2 – Priority species protection	Section 1. Nature Conservation Sites and Ecological networks **a) Hierarchy of nature conservation sites**	Important areas of onshore and intertidal ornithology are considered in Volume 3, Annex 4.1: Breeding birds technical report, Volume 3, Annex 4.2: Wintering and migratory birds

Policy	Key provisions	How and where considered in the ES
	The Council is committed to ensuring the protection and enhancement of Fylde's biodiversity and geological assets and interests. In order to do this, the Council will have regard to the following hierarchy of nature conservation sites when making planning decisions, according to their designation: i) International Ramsar Sites, SAC, SPA, Candidate SAC/SPA The strongest possible protection will be given to sites of international importance, predominantly the Ribble and Alt Estuaries SPA/Ramsar site. ii) NNR, SSSI, MCZ iii) Local Geodiversity Sites, County Biological Heritage Sites, Local Nature Conservation Sites, Local Nature Reserve Development that would directly or indirectly affect any sites of local importance will be permitted only where it is necessary to meet an overriding local public need or where it is in relation to the purposes of the nature conservation site. **b) Development within or affecting nature conservation sites and ecological networks** In addition to the provisions of National and European law, and in accordance with national planning policy, proposals for development within or affecting the above nature conservation sites must adhere to all of the following principles: • Development that would directly or indirectly affect any sites of local importance including ancient woodland or ancient and veteran trees will be permitted only where it is necessary to meet an overriding local public need or where it is in relation to the purposes of the nature conservation, or mitigation can avoid affecting site integrity. • Proposals which primarily seek to enhance or conserve biodiversity will be supported in principle, subject to the consideration of other Local Plan policies; • Consideration should be given to the impact of development proposals on the County-wide Lancashire Ecological network and, where possible, opportunities to	technical report and Volume 3, Annex 4.3: Intertidal birds technical report of the ES. A range of sensitive ecological conservation areas (including statutory and non-statutory designations have been directly avoided where practicable (CoT03). Assessment of the effects of the Transmission Assets are discussed in **section 4.11**. Mitigation methodology and measures adopted by the Transmission Assets are discussed in **section 4.8**. Further details of the approach to conserving and enhancing biodiversity are provided in Volume 3, Chapter 3: Onshore ecology and nature conservation of the ES and in the Onshore Biodiversity Benefit Statement (document reference J11). Impacts on geological conservation interests are considered in Volume 3, Chapter 1: Geology, hydrogeology and ground conditions of the ES.

Policy	Key provisions	How and where considered in the ES
	support the network by incorporating biodiversity in and around the development should be encouraged; • Where development is considered necessary, adequate mitigation measures and compensatory habitat creation will be required through planning conditions and/or obligations, in order to secure measurable net gains for biodiversity. Measures should be put in place for the ongoing management of such features. Where it has been demonstrated that significant harm cannot be avoided appropriate mitigation or, as a last resort, replacement or other compensation will be required. The location of appropriate mitigation, replacement or other compensation will be targeted, using a sequential approach: • Within the development site; • In the immediate locality; • Within a Nature Improvement Area within the Borough; • Within a Nature Improvement Area elsewhere in the Fylde Coast; and lastly, • Elsewhere. Where significant harm resulting from development cannot be avoided, adequately mitigated or, as a last resort, replaced or compensated, then planning permission will be refused. **c) Damage to nature conservation sites and ecological networks** The following definition of what constitutes damage to nature conservation sites and other ecological assets will be used in assessing developments likely to impact upon them: i) loss of the undeveloped open character of a part, parts or the entire nature conservation site or ecological network; ii) reducing the width of part of an ecological network or causing direct or indirect severance of any part of the ecological network or of any part of a nature conservation site including the flight path of migratory birds; iii) restricting the potential for movement of wildlife within or through an ecological network or nature conservation site;	

Policy	Key provisions	How and where considered in the ES
	iv) causing the degradation of the ecological functions of any part of the ecological network or nature conservation site; v) directly or indirectly damaging or severing links between nature conservation sites, green spaces, wildlife corridors and the countryside; and vi) impeding links to the wider ecological network and nature conservation sites that are recognised by neighbouring planning authorities. Section 1 (Nature Conservation Sites and Ecological networks) of this policy applies to all presently designated nature conservation sites, which are identified on the Policies Map including Inset Plans and to any nature conservation sites or ecological networks that may be designated in the future by appropriate agencies. The Fylde Ecological Network, comprising the Grassland Network, the Wetland and Heath Network and the Woodland Network has been identified and mapped by LCC and Lancashire Wildlife Trust, in compliance with the Framework and is accessible on the Planning Policy website. **Section 2 Priority Species Protection** Planning permission will not be granted for development which would have an adverse effect on a priority species or its habitat, unless the benefits of the development outweigh the need to maintain the population of the species in situ. Should development be permitted that might have an adverse effect on a priority species or its habitat, planning conditions or agreements will be used to: a) Ensure the survival of the individual species affected; and where this cannot be achieved: b) Reduce the disturbance to a minimum; c) Provide adequate alternative habitats to enhance the viability of the local population of that species; and d) Promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity.	

Policy	Key provisions	How and where considered in the ES
South Ribble Local Plan 2012-2026 (Adopted July) 2015)		
G7 - Green Infrastructure Existing Provision	Green Infrastructure is defined in the introduction to this chapter. Development proposals should seek to protect and enhance the existing Green Infrastructure. Development which would involve the loss of Green Infrastructure (as identified on the Policies Map) will not be permitted unless: a) Alternative provision of similar and/or better facilities for the community will be implemented on another site or within the locality; or b) It can be demonstrated that the retention of the site is not required to satisfy a recreational need in the local area; and c) The development would not detrimentally affect the amenity value and the nature conservation value of the site.	Existing habitat networks relevant to the assessment of effects on ornithological receptors have been considered in developing the design of the Transmission Assets. These have been taken into account in developing mitigation measures or Commitments, as set out in **section 4.8** of this chapter. This includes measures to conserve biodiversity in terms of ornithological interests. It also includes opportunities for biodiversity benefit.
G8 – Green Infrastructure – Future Provisions	All developments should provide: a) Appropriate landscape enhancements; b) Conservation of important environmental assets, natural resources, biodiversity and geodiversity; c) For the long-term use and management of these areas; and d) Access to well-designed cycleways, bridleways and footways (both off and on road), to help link local services and facilities.	
Policy G16 – Biodiversity and nature conservation	The borough's Biodiversity and Ecological Network resources will be protected, conserved and enhanced. The level of protection will be commensurate with the site's status and proposals will be assessed having regard to the site's importance and the contribution it makes to wider ecological networks: Regard will be had to: • Protecting and safeguarding all designated sites of international, national, regional, county and local level importance including all Ramsar, Special Protection Areas, Special Areas of Conservation, national nature reserves, Sites of Special Scientific Interest and Biological Heritage Sites, Geological Heritage Sites, Local Nature Reserves, wildlife corridors together with any ecological network approved by the Council;	All relevant designated sites and areas for wildlife conservation, bird species afforded extra protections under the: Habitats Regulations and Schedule 1 of the Wildlife and Countryside Act 1981 and Section 41 of the Natural Environment and Rural Communities Act 2006 and important areas of onshore and intertidal ornithology are described in Volume 3, Annex 4.1: Breeding birds technical report, Volume 3, Annex 4.2: Wintering and migratory birds technical report and Volume 3, Annex 4.3: Intertidal birds technical report of the ES. A summary of the results of site-specific ornithological surveys is provided in **section 4.6.4**.

Policy	Key provisions	How and where considered in the ES
	• Protecting, safeguarding and enhancing habitats for European, nationally and locally important species; • When considering applications for planning permission, protecting, conserving and enhancing the borough's ecological network and providing links to the network from and/or through a proposed development site. In addition development should have regard to the provisions set out below: a) The need to minimise impacts on biodiversity and providing net gains in biodiversity where possible by designing in wildlife and by ensuring that significant harm is avoided or, if unavoidable, is reduced or appropriately mitigated and/or, as a last resort, compensated; b) The need to promote the preservation, restoration and re-creation of priority habitats, ecological networks and the protection and recovery of priority species populations; c) Where there is reason to suspect that there may be protected habitats/species on or close to a proposed development site, planning applications must be accompanied by a survey undertaken by an appropriate qualified professional; d) Where the benefits for development in social or economic terms are considered to outweigh the impact on the natural environment, appropriate and proportionate mitigation measures and/or compensatory habitat creation of an equal or greater area will be required through planning conditions and/or planning obligations.	Assessment of the effects of the Transmission Assets are discussed in **section 4.11**. Mitigation methodology and measures adopted by the Transmission Assets are discussed in **section 4.8**. This includes measures to conserve biodiversity in terms of ornithological interests. It also includes opportunities for biodiversity benefit.
Blackpool Local Plan Part 2: Site Allocations and Development Management Policies (Adopted February 2023)		
Policy CS6 – Green Infrastructure	High-quality and well connected networks of green infrastructure in Blackpool will be achieved by: Protecting existing green infrastructure networks and existing areas of Green Belt. The loss of green infrastructure will only be acceptable in exceptional circumstances where it is allowed for as part of an adopted Development Plan Document; or where provision is made for appropriate compensatory measures, mitigation or replacement; or in line with national planning policy.	Existing habitat networks relevant to the assessment of effects on ornithological receptors have been considered in developing the design of the Transmission Assets. These have been taken into account in developing mitigation measures or Commitments, as set out in **section 4.8** of this chapter. This includes measures to conserve biodiversity in terms of ornithological interests. It also includes opportunities for biodiversity benefit. The process of site selection for the onshore infrastructure is detailed within Volume 1, Annex 4.3: Selection and

Policy	Key provisions	How and where considered in the ES
	In terms of Green Belt areas, the Council will apply national policy to protect their openness and character, and retain the local distinctiveness. All development should incorporate new or enhance existing green infrastructure of an appropriate size, type and standard. Where on-site provision is not possible, financial contributions will be sought to make appropriate provision for open space and green infrastructure. International, national and local sites of biological and geological conservation importance will be protected having regard to the hierarchy of designated sites and the potential for appropriate mitigation. Measures that seek to preserve, restore and enhance local ecological networks and priority habitats/species will be required where necessary.	refinement of onshore infrastructure of the ES. A range of sensitive ecological conservation areas (including statutory and non-statutory designations have been directly avoided where practicable (CoT03).
Policy DM35 - Biodiversity	1. Development proposals will be required to: a. result in no loss or harm to biodiversity through avoidance, adequate mitigation either on site or off site or, as a last resort, compensatory measures secured through the establishment of a legally binding agreement; b. minimise the impact on biodiversity and provide net biodiversity gains through good design by incorporating biodiversity enhancements and habitat creation where opportunities exist in line with relevant legislation and guidance. SSSIs 2. Development will not be permitted in or adjacent to a Site of Special Scientific Interest where it would adversely affect, directly or indirectly, its wildlife and nature conservation importance. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest. Other sites of nature conservation value (including Local Nature Reserve and Biological Heritage Sites)	The specific bird species that may be impacted by Transmission Assets are identified in **section 4.6.6**. Important areas of onshore and intertidal ornithology are described in Volume 3, Annex 4.1: Breeding birds technical report, Volume 3, Annex 4.2: Wintering and migratory birds technical report and Volume 3, Annex 4.3: Intertidal birds technical report of the ES. Assessment of the effects of the Transmission Assets are discussed in **section 4.11**. Mitigation methodology and measures adopted by the Transmission Assets are discussed in **section 4.8**. All relevant designated sites and areas for wildlife conservation, bird species afforded extra protections under the: Habitats Regulations and Schedule 1 of the Wildlife and Countryside Act 1981 and Section 41 of the Natural Environment and Rural Communities Act 2006 and important areas of onshore and intertidal ornithology are described in Volume 3, Annex 4.1: Breeding birds technical report, Volume 3, Annex 4.2: Wintering and migratory birds technical report and Volume 3, Annex 4.3: Intertidal birds technical report of the ES.

Policy	Key provisions	How and where considered in the ES
	3. Development will not be permitted where it would adversely affect County Heritage Sites – biological or geological - and other sites of importance to nature conservation interests, including all ponds in the Borough. Where in exceptional circumstances the benefits of development proposals clearly outweigh the extent of ecological or geological harm, developers will be required to compensate for such harm to the fullest practicable extent compatible with the conservation interests of the site. Protected Species 4. Development will not be permitted if after mitigation or compensation it would have an adverse impact on animal or plant species protected under national or international legislation. Development proposals should ensure that species and habitats set out in the UK and Local Biodiversity Action Plans will be protected and where possible enhanced. Where development is permitted, adequate compensatory measures must be undertaken to sustain and enhance the species and its habitat. …	
Preston Local Plan 2012-2026 Site Allocations and Development Management Policies (Adopted July) 2015)		
Policy EN3 - Future provision of green infrastructure	All developments will, where necessary…conserve and enhance important environmental assets, natural resources and biodiversity including the City's ecological network.	Important areas of onshore and intertidal ornithology are described in Volume 3, Annex 4.1: Breeding birds technical report, Volume 3, Annex 4.2: Wintering and migratory birds technical report and Volume 3, Annex 4.3: Intertidal birds technical report of the ES. Mitigation methodology and measures adopted by the Transmission Assets are discussed in **section 4.8**.
Policy EN10 - Biodiversity and nature conservation	In Preston, Biodiversity and Ecological Network resources will be protected, conserved, restored and enhanced: Priority will be given to: i. Protecting and safeguarding all designated sites of international, national, regional, county and local level importance including all Ramsar sites, Special Protection Areas, Special Areas of Conservation, national nature reserves, sites of special scientific interest and biological heritage sites, S41 Habitats of Principal	Important areas for onshore and intertidal ornithology and all relevant designated sites and areas for wildlife conservation, bird species afforded extra protections under the: Habitats Regulations and Schedule 1 of the Wildlife and Countryside Act 1981 and Section 41 of the Natural Environment and Rural Communities Act 2006 are described in Volume 3, Annex 4.1: Breeding birds technical report, Volume 3, Annex 4.2: Wintering and migratory birds technical report and

Policy	Key provisions	How and where considered in the ES
	Importance, geological heritage sites, local nature reserves and wildlife corridors together with any ecological network approved by the Council; lii. Protecting, safeguarding and enhancing habitats for European, nationally and locally important species; iii. The ecology of the site and the surrounding area (safeguarding existing habitats/features such as but not exclusive to trees, hedgerows, ponds and streams), unless justified otherwise. iv. When considering applications for planning permission, protecting, conserving, restoring and enhancing Preston's ecological network and providing links to the network from and/or through the proposed development site. In addition development must adhere to the provisions set out below: a. The production of a net gain in biodiversity where possible by designing in wildlife and by ensuring that any adverse impacts are avoided or if unavoidable are reduced or appropriately mitigated and/or compensated; b. The provision of opportunities for habitats and species to adapt to climate change; c. The support and encouragement of enhancements which contribute to habitat restoration; d. Where there is reason to suspect that there may be protected habitats/species on or close to a proposed development site, the developer will be expected to carry out all necessary surveys in the first instance; planning applications must then be accompanied by a survey assessing the presence of such habitats/species and, where appropriate, make provision for their needs; e. In exceptional cases, where the need for development in social or economic terms is considered to significantly outweigh the impact on the natural environment, appropriate and proportionate mitigation measures and/or compensatory habitat creation and/or restoration of at least equal area, quality and diversity will be required through planning conditions and/or planning obligations.	Volume 3, Annex 4.3: Intertidal birds technical report of the ES. A summary of the results of site-specific ornithological surveys is provided in **section 4.6.4**. Assessment of the effects of the Transmission Assets are discussed in **section 4.11**. Mitigation methodology and measures adopted by the Transmission Assets are discussed in **section 4.8**.

Policy	Key provisions	How and where considered in the ES
	The following definition of what constitutes damage to natural environment assets will be used in assessing applications potentially impacting upon assets: 1. Loss of the undeveloped open character of a part, parts or all of the ecological network; 2. Reducing the width or causing direct or indirect severance of the ecological network or any part of it; 3. Restricting the potential for lateral movement of wildlife; 4. Causing the degradation of the ecological functions of the ecological network or any part of it; 5. Directly or indirectly damaging or severing links between green spaces, wildlife corridors and the open countryside; and 6. Impeding links to ecological networks recognised by neighbouring planning authorities.	
Policy EN11 - Species protection	Planning permission will not be granted for development which would have an adverse effect on a protected species unless the benefits of the development outweigh the need to maintain the population of the species in situ. Should development be permitted that might have an effect on a protected species, planning conditions or agreements will be used to: a. facilitate the survival of the individual species affected; b. reduce the disturbance to a minimum; and c. provide adequate alternative habitats to sustain the viability of the local population of the protected species.	The specific bird species that may be impacted by the effects of the Transmission Assets are identified in **section 4.6.6**. Assessment of the effects of the Transmission Assets are discussed in **section 4.11**. Mitigation methodology and measures adopted by the Transmission Assets are discussed in **section 4.8**.

4.2.3 Relevant guidance

4.2.3.1 The collation of baseline data and the assessment presented within this chapter has considered the following guidance.

- Chartered Institute of Ecology and Environmental Management (CIEEM) guidelines on ecological impact assessment (CIEEM, 2022).
- Offshore Wind Marine Environmental Assessments: Best Practice Advice for Evidence and Data Standards. Phase I: Expectations for pre-application baseline data for designated nature conservation and landscape receptors to support offshore wind applications (Natural England, 2022).

4.2.3.2 Identification of species considered to be key receptors for assessment has been informed by species listed in the following documents/legislation.

- Schedule 1 of the Wildlife and Countryside Act 1981.
- Annex 1 of the Birds Directive.
- Section 41 species of the Natural Environment and Rural Communities Act 2006.
- Species listed as red or amber on the Birds of Conservation Concern 5 (BOCC 5 UK) (Stanbury *et al*., 2021).
- Species listed as a feature in their own right or as an assemblage feature on the citation of a designated site within the onshore and intertidal study area as defined in **section 4.4** of this chapter.

4.2.3.3 Reference is made within this chapter and accompanying annexes to the term ‘Functionally Linked Land’ (FLL). This term is used to describe areas of ‘land occurring within 20 km of an SPA that are regularly used by a significant number of qualifying bird species’ as defined by Natural England (Bowland Ecology, 2021). Within this context, a significant number of birds is defined as a minimum of 0.5 % of the Great British population, or a minimum of 1,000 individuals. Land usage should be recorded for seven or more years since 2010. In relation to the assessment, the relevant areas of FLL are described within **section 4.10.5**.

4.3 Consultation

4.3.1 Scoping

4.3.1.1 On 28 October 2022, the Applicants submitted a Scoping Report to the Planning Inspectorate, which described the scope and methodology for the technical studies being undertaken to provide an assessment of any likely significant effects for the construction, operation and maintenance and decommissioning phases of the Transmission Assets.

4.3.1.2 Following consultation with the appropriate statutory bodies, the Planning Inspectorate (on behalf of the Secretary of State) provided a Scoping Opinion on 8 December 2022.

4.3.2 Evidence plan process

4.3.2.1 Following scoping, consultation and engagement with interested parties specific to onshore and intertidal ornithology has continued. An Evidence Plan Process (EPP) has been developed for the Transmission Assets, seeking to ensure engagement with the relevant aspects of the EIA process throughout the pre-application phase. The development and monitoring of the Evidence Plan and its subsequent progress has been undertaken by the EPP Steering Group. The Steering Group comprises the Planning Inspectorate, the Applicants, the Marine Management Organisation, Natural England, Historic England, the Environment Agency and the Local Planning Authorities as the key regulatory bodies.

4.3.2.2 As part of the EPP, EWGs were set up to discuss and agree topic specific matters with the relevant stakeholders (as referred to in **Table 4.4**).

4.3.3 Statutory consultation responses

4.3.3.1 The preliminary findings of the EIA process were published in the Preliminary Environmental Information Report (PEIR) in October 2023. The PEIR was prepared to provide the basis for formal consultation under the Planning Act 2008. This included consultation with statutory and non-statutory bodies under section 42 and 47 of the Planning Act 2008, as presented in **Table 4.4**.

4.3.4 Summary of consultation responses received

4.3.4.1 A summary of the key items raised specific to onshore and intertidal ornithology is presented in **Table 4.4**, together with how these have been considered in the production of this chapter. It should however be noted that formal responses are provided for all consultation responses received and can be accessed in the Consultation Report (document reference E1).

Table 4.4: Summary of key consultation comments raised during consultation activities undertaken for the Transmission Assets relevant to onshore and intertidal ornithology

Date	Consultee and type of response	Comment raised	Response to comment raised and/or where considered in this chapter
December 2022	Planning inspectorate (Scoping)	The Inspectorate acknowledges that data and knowledge regarding the baseline environment exists from surveys, assessments and postconstruction modelling for other proposed and existing offshore wind projects. The Inspectorate understands the benefits of utilising this information to supplement site specific survey data but advises that suitable care should be taken to ensure that the information in the ES remains representative and fit for purpose. This should include taking into account the impact of more recent developments that have occurred subsequent to when the data was collected. Similarly, where data from other wind farm projects is used to support the assessment, the ES should confirm that these are truly comparable for example in terms of the size of the foundations. The Applicants should make effort to agree the suitability of information used for the assessments in the ES with relevant consultation bodies. (ID 2.2.1 of the Scoping Opinion).	Baseline data from other assessments has been identified. Details of the scale and scope of these assessments are presented in **sections 4.4**, **4.5** and **4.7** of this chapter and details regarding the results of these assessments are presented in **section 4.6.1**.
December 2022	Planning inspectorate (Scoping)	The ES should define what a 'reasonable timescale' or 'short time period' would be within which recovery could occur for an impact to be reversible/not permanent. (ID 2.2.2 of the Scoping Opinion).	A definition for the timescales associated with the recovery from impact is provided within **Table 4.22**.
December 2022	Planning inspectorate (Scoping)	Any mitigation measures identified as necessary from the assessment should be clearly explained and the ES should set out how these would be secured through the DCO process. (ID 2.2.4 of the Scoping Opinion).	Measures adopted as part of the Transmission Assets (or Commitments) are outlined within the Commitments Register (Volume 1, Annex 5.3 of the ES), that includes details of how there are secures. Commitments relevant to onshore and intertidal ornithology are listed in **section 4.8** with details of how they will be secured.

Date	Consultee and type of response	Comment raised	Response to comment raised and/or where considered in this chapter
December 2022	Planning inspectorate (Scoping)	In light of the number of ongoing developments within the vicinity of the Proposed Development application site, the ES should clearly state which developments will be assumed to be part of the baseline and those which are to be considered as other development for the purposes of the cumulative effects assessment. Respondents to the Scoping Report have identified proposed developments or provided advice on the types of projects, plans, or activities that should be included (see Appendix 2 of this Opinion); these should be taken into account in the cumulative effects assessment. The Applicant should seek to agree the scope of the projects assessed with these consultation bodies. (ID 2.2.6 of the Scoping Opinion).	Baseline data and planning proposals for ongoing and future projects have been reviewed in order to carry out an assessment of any potential cumulative effects on ornithological interests. The methodology underpinning this cumulative effects assessment (CEA) is presented in **section 4.20** of this chapter, and the outcomes of this assessment are presented within **section 4.21**.
December 2022	Planning inspectorate (Scoping)	Public bodies have a responsibility to avoid releasing environmental information that could bring about harm to sensitive or vulnerable features. Specific survey and assessment data relating to the presence and locations of features that could be subject to disturbance, damage, persecution, or commercial exploitation resulting from publication of the information, should be provided in the ES as a separate confidential annex. All other assessment information should be included in an ES chapter with a placeholder explaining that a confidential annex has been submitted to the Inspectorate and may be made available subject to request. (ID 2.2.7 of the Scoping Opinion)	Any data that is confidential has been presented separately in confidential annexes that are available on request to those with a legitimate need for the information.
December 2022	Planning inspectorate (Scoping)	On the basis that the activities associated with the operation and maintenance of the onshore elements of the Transmission Assets would require no additional land take and are unlikely to result in any temporary or permanent loss of habitat, the Inspectorate is content to scope out this matter. (ID 3.13.1 of the Scoping Opinion).	Noted and scoped out of assessment. All potential impacts scoped in to the assessment are listed within **Table 4.17** while those potential impacts scoped out are presented within **Table 4.18**.
December 2022	Planning inspectorate (Scoping)	On the basis that the activities associated with the operation and maintenance of the onshore elements of the Transmission Assets are unlikely to result in accidental spills/contaminant release and given that such effects are capable of mitigation through standard management practices, the Inspectorate agrees pollution caused by accidental spills/contaminant release on protected habitats	Noted and scoped out of assessment. Protective measures mitigating the risk of pollution caused by accidental spills/contaminants release have

Date	Consultee and type of response	Comment raised	Response to comment raised and/or where considered in this chapter
		and species during operation can be scoped out of the assessment. The ES should however detail any operational controls on maintenance works. (ID 3.13.2 of the Scoping Opinion).	been adopted as part of the Transmission Assets and are listed in **section 4.8**.
December 2022	Planning inspectorate (Scoping)	Limited information is presented on survey methods for a range of species and habitats. The Inspectorate advises that sufficient baseline data is collected for any habitats and species along the cable route, so that potential impacts can be fully assessed. We advise that all surveys are discussed and agreed through an Evidence Plan process. (Paragraph 3.13.4 of the Scoping Opinion).	The methodology for ornithological surveys was presented to the EWG in March 2023 as part of the EPP. The methodology has also been disseminated to consultees following the first EWG meeting and is presented in **section 4.5** of this chapter and Volume 3, Annex 4.4: Onshore and intertidal ornithology survey methodologies of the ES. The overarching methodologies presented have been agreed, and comments on detailed methodologies were provided in September 2023. Minor amendments to the survey methodologies, in relation to the feedback provided by Natural England, are reflected in Volume 3, Annex 4.4: Onshore and intertidal ornithology survey methodologies of the ES. The amended methodologies were reissued to the EWG for completeness. Final agreement was provided by Natural England on 15 September 2023.
December 2022	Blackpool Council (Scoping)	Further details are required to assist the understanding of any potential impacts upon the Ribble and Alt Estuaries and the biological heritage site at Blackpool Airport.	Pathways and the impacts to the ornithological features of the Ribble and Alt Estuaries have been considered by including all SPA features of the Ribble and Alt

Date	Consultee and type of response	Comment raised	Response to comment raised and/or where considered in this chapter
			Estuaries as high conservation value. The biological heritage site at Blackpool Airport has been assessed via the assessment of FLL associated with the designated sites (FLL at Lytham Moss, as defined in **section 4.10.5**). Additional assessment in relation to terrestrial ecology is presented within Volume 3, Chapter 3: Onshore ecology and nature conservation of the ES. All Important Ecological Features (IEFs) are presented in **section 4.6.6**.
December 2022	Lancashire County Council (Scoping)	It is noted that the scoping report makes mention of the location of a number of environmental records some of which are held by the Council – for instance, the Historic Environment Team (HET) are curators for Lancashire's Historic Environment Record and, under the Lancashire Environment Record Network, the Council is also the local environmental record centre. The Council would therefore welcome any future consultation on proposed sources to be used in compiling the environmental impact assessment and assistance with requests from the Applicant for local information held in the preparation of the environmental impact assessment where possible.	As part of the specific onshore and intertidal ornithology baseline characterisation, a range of data sources have been reviewed. Those data sources used are presented in **section 4.5.1** with the results of all desktop study presented in **section 4.6.1**.
December 2022	Natural England (Scoping)	Internationally Designated Site The ES should thoroughly assess the potential for the proposal to affect designated sites. Internationally designated sites (e.g. designated Special Areas of Conservation (SAC) and Special Protection Areas (SPA)) fall within the scope of the Conservation of Habitats and Species Regulations 2017 (as amended). In addition, paragraph 181 of the National Planning Policy Framework requires that potential Special Protection Areas, possible Special Areas of Conservation, listed or proposed Ramsar sites, and any site identified as being necessary to compensate for adverse impacts on classified, potential or possible SPAs, SACs and Ramsar sites be treated in the same way as classified sites (NB. Sites falling within the scope of regulation 8 of the	Features of internationally designated sites were considered when identifying the list of IEFs listed in **section 4.6.6** of this chapter. The potential for impacts from the Transmission Assets has been assessed in **section 4.11**. The findings of the HRA process are reported in the ISAA (document references E2.1, E2.2 and E2.3), which assesses the impact on all

Date	Consultee and type of response	Comment raised	Response to comment raised and/or where considered in this chapter
		Conservation of Habitats and Species Regulations 2017 are defined as 'habitats sites' in the NPPF). The ES should include a full assessment of the direct and indirect effects of the development on the features of special interest within these sites and should identify such mitigation measures as may be required in order to avoid, minimise or reduce any adverse significant effects. (Section 2.2 of Natural England's response within the Scoping Opinion).	European sites specifically and is submitted alongside the ES. Measures adopted as part of the Transmission Assets (or Commitments) will be secured through the Commitments Register. (Volume 1, Annex 5.3 of the ES). Commitments relevant to onshore and intertidal ornithology are listed in **section 4.8**.
December 2022	Natural England (Scoping)	Protected Species Species protected by the Wildlife and Countryside Act 1981 (as amended) and by the Conservation of Habitats and Species Regulations 2017 (as amended) The ES should assess the impact of all phases of the proposal on protected species (including, for example, pinnipeds (seals), cetaceans (including dolphins, porpoises whales), fish (including seahorses, sharks and skates), marine turtles, birds, marine invertebrates, great crested newts, reptiles, water voles, badgers and bats, etc.). Information on the relevant legislation protecting these species can be reviewed on the following linkttps://www.gov.uk/government/publications/protectedmarine- species. Natural England does not hold comprehensive information regarding the locations of species protected by law but advises on the procedures and legislation relevant to such species. Records of protected species should be sought from appropriate local biological record centres, nature conservation organisations, NBN Atlas, groups and individuals; and consideration should be given to the wider context of the site, for example in terms of habitat linkages and protected species populations in the wider area, to assist in the impact assessment. The conservation of species protected by law is explained in Part IV and Annex A of Government Circular 06/2005 Biodiversity and Geological Conservation: Statutory Obligations and their Impact within the Planning System. The area likely to be affected by the proposal should be thoroughly surveyed by competent ecologists at appropriate times of year for relevant species and the survey results, impact assessments and appropriate accompanying mitigation strategies included as part of the ES.	Consideration of species protected by the Wildlife and Countryside Act 1981 and by the Conservation of Habitats and Species Regulations 2017 has been given in identifying the list of ornithological receptors presented in **section 4.6.6**. Additionally, consideration was given to legislation including the Environment Act 2021, the Conservation of Habitats and Species Regulations 2017 and the Natural Environment and Rural Communities Act 2006, as outlined within **section 4.2.1**. A description of the methodologies used for the ornithological surveys carried out to inform this chapter are provided in **section 4.5.1** and a summary of the survey efforts is located in **Table 4.6**. The results of these surveys are provided in **section 4.6.4**. Further detail can be viewed within Volume 3, Annex 4.1:

Date	Consultee and type of response	Comment raised	Response to comment raised and/or where considered in this chapter
		In order to provide this information there may be a requirement for a survey at a particular time of year. Surveys should always be carried out in optimal survey time periods and to current guidance by suitably qualified and where necessary, licensed, consultants. (Section 2.5 of Natural England's response within the Scoping Opinion).	Breeding birds technical report, Volume 3, Annex 4.2: Wintering and migratory birds technical report and Volume 3, Annex 4.3: Intertidal birds technical report of the ES.
December 2022	Natural England (Scoping)	Habitats and Species of Principal Importance The ES should thoroughly assess the impact of the proposals on habitats and/or species listed as 'Habitats and Species of Principal Importance' within the England Biodiversity List, published under the requirements of S41 of the Natural Environment and Rural Communities (NERC) Act 2006. Section 40 of the NERC Act 2006 places a general duty on all public authorities, including local planning authorities, to conserve and enhance biodiversity. Further information on this duty is available here https://www.gov.uk/guidance/biodiversity-duty-public-authority-duty-to-have-regard-toconserving-biodiversity. Government Circular 06/2005 states that Biodiversity Action Plan (BAP) species and habitats, 'are capable of being a material consideration…in the making of planning decisions'. Natural England therefore advises that survey, impact assessment and mitigation proposals for Habitats and Species of Principal Importance should be included in the ES. Consideration should also be given to those species and habitats included in the relevant Local BAP. (Section 2.6 of Natural England's response within the Scoping Opinion).	'Habitats and Species of Principal Importance' within the England Biodiversity List and Biodiversity Action Plan have been considered in identifying the list of receptors presented in **section 4.6.6** of this chapter. Additionally, consideration was given to legislation including the Environment Act 2021, the Conservation of Habitats and Species Regulations 2017 and the Wildlife and Countryside Act 1981, as outlined within **section 4.2.1**.
December 2022	Natural England (Scoping)	Contacts for Local Records Natural England does not hold local information on local sites, local landscape character and local or national biodiversity priority habitats and species. We recommend that you seek further information from the appropriate bodies (which may include the local records centre, the local wildlife trust, local geoconservation group or other recording society and a local landscape characterisation document). (Section 2.7 of Natural England's response within the Scoping Opinion).	As part of the baseline characterisation, a range of data sources have been reviewed. A list of all sources used to characterise the baseline is presented within **section 4.5.1**.
December 2022	Natural England (Scoping)	Water Quality	The impact of a permanent loss of supporting habitats and a temporary

Date	Consultee and type of response	Comment raised	Response to comment raised and/or where considered in this chapter
		Increases in suspended sediment concentrations during construction and operation (e.g. future dredging works) have the potential to smother sensitive habitats. The ES should include information on the sediment quality and potential for any effects on water quality through suspension of contaminated sediments. The EIA should also consider whether increased suspended sediment concentrations resulting are likely to impact upon the interest features and supporting habitats of the designated sites. The ES should consider whether there will be an increase in the pollution risk as a result of the construction or operation of the development. (Section 4 of Natural England's response within the Scoping Opinion).	loss of supporting habitats and/or resource availability is assessed in **section 4.12** and **section 4.13** of this chapter. The impact of an increased pollution risk is assessed within **section 4.1.1**.
December 2022	Natural England (Scoping)	As export cable installation is yet to be determined, we advise that surveys are designed as such to ensure that impacts from trenchless methods, open cut trenching or a combination of both can be fully assessed. (Annex 2 of Natural England's response within the Scoping Opinion).	Survey methodology has been shared with the EWG and agreement from Natural England was received on 15 September 2023. Assessment of the significant effects is based on the Maximum Design Scenario (MDS) as presented in **section 4.9.1**.
December 2022	Natural England (Scoping)	Identification of receptors and the sensitivity of receptors to impact scale definitions should be discussed and agreed as part of the Evidence Plan process with the relevant EWG. (Annex 2 of Natural England's response within the Scoping Opinion).	All ornithological methodologies have been discussed and disseminated to consultees, including Natural England within and following the first EWG meeting and are presented in Volume 3, Annex 4.4: Onshore and intertidal ornithological survey methodologies of the ES as well as the specific technical reports accompanying this ES: Volume 3, Annex 4.1: Breeding birds technical report, Volume 3, Annex 4.2: Wintering and migratory birds technical report and Volume 3,

Date	Consultee and type of response	Comment raised	Response to comment raised and/or where considered in this chapter
			Annex 4.3: Intertidal birds technical report of the ES. The overarching methodologies presented have been agreed, and comments on detailed methodologies were provided in September 2023. The full methodologies are available in Volume 3, Annex 4.4: Onshore and intertidal ornithology survey methodologies of the ES.
December 2022	Natural England (Scoping)	There is a lack of detail on survey methodology for many of the surveys set out. Details of survey methodology and timings are vague at this stage and for some no approach to survey is stated, it is not possible to confirm if the surveys will follow good practice guidelines. Natural England advise that sufficient baseline data is collected for any habitats and species along the cable route, so that potential impacts can be fully assessed. The baseline data needs to be undertaken at the relevant time of year and of sufficiently long enough period to determine trends. (Annex 3 of Natural England's response within the Scoping Opinion).	The methodology for the ornithological surveys has been presented to the onshore ecology and onshore and intertidal ornithology EWG in March 2023 as part of the Evidence Plan Process. All ornithological survey methodologies have also been disseminated to consultees, including Natural England, following the first EWG meeting and is summarised within **section 4.5.1** of this chapter and presented in full within Volume 3, Annex 4.4: Onshore and intertidal ornithology survey methodologies of the ES and the specific technical reports accompanying this chapter: Volume 3, Annex 4.1: Breeding birds technical report, Volume 3, Annex 4.2: Wintering and migratory birds technical report and Volume 3,

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			Annex 4.3: Intertidal birds technical report of the ES.
December 2022	Natural England (Scoping)	Natural England welcomes the commitment stated that detailed scope, methodologies, and extents of the site-specific surveys stated within section will be discussed and agreed with Natural England prior to commencement. We advise that this should take place at the earliest opportunity to ensure that sufficient data is collected to inform the ES. (Annex 3 of Natural England's response within the Scoping Opinion).	The methodology for the ornithological surveys has been presented to the first onshore ecology and onshore and intertidal ornithology EWG in March 2023 as part of the EPP. The ornithological survey methodology has also been disseminated to consultees in August 2023, including Natural England, following the first EWG meeting and is summarised within **section 4.5.1** and presented in full within Volume 3, Annex 4.4: Onshore and intertidal ornithology survey methodologies of the ES and the specific technical reports accompanying this chapter: Volume 3, Annex 4.1: Breeding birds technical report, Volume 3, Annex 4.2: Wintering and migratory birds technical report and Volume 3, Annex 4.3: Intertidal birds technical report of the ES.
December 2022	Environment Agency (Scoping)	Biodiversity Net Gain will be requested for this project. The project should consider where habitat improvements can be achieved as part of the scheme. We would expect to see this information provided in the Environmental Statement. (Paragraph 7.1 of the Environment Agency's response within the Scoping Opinion).	The Transmission Assets aim to mitigate impacts on habitats arising as a result of the project and to deliver biodiversity benefit, where practicable. Areas identified through the iterative EIA process to date as potentially suitable for mitigation and/or biodiversity benefit are shown

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			on Figure 3.7 (see Volume 1, Figures). More detail is set out in Volume 3, Chapter 3: Onshore ecology and nature conservation of the ES and within the Onshore Biodiversity Benefit Statement (document reference J11), specifically section 1.2.
December 2022	South Ribble Borough Council (Scoping)	The Marine Management Organisation, Royal Society for the Protection of Birds (RSPB) and Natural England are better placed to consider the Marine environment. As regards the Terrestrial impacts of the proposals, I would broadly agree with the Scope of proposed Ecology surveys and assessments as detailed in the EIA Scoping Report, but I would particularly emphasise the following requirements – Habitat Regulations Assessment (HRA) will be required for potential impacts of the development on European designated sites, including the Ribble and Alt Estuaries SPA and Ramsar site. An important element of the HRA should be consideration of functionally linked land. The development should closely follow the mitigation hierarchy; avoidance of harm should be the preferred approach at all times, before seeking to mitigate or compensate for any ecological impacts. The proposals cross inter-tidal and terrestrial areas of very high value to overwintering birds. Assessments should not rely on available desk-top data to appraise the use of sites by overwintering birds; primary field-based survey will also be required to inform the Assessment. The scheme should be required to deliver an overall net gain in biodiversity, as measured using the Defra Metric 3.1. There may be opportunities to create and improve habitats over buried cables which could make a valuable contribution to net gain, and these opportunities must be fully explored.	Site-specific ornithological surveys and a review of existing data sources were undertaken to characterise the baseline and are presented in **section 4.6** of this chapter. The ornithological survey methodology has also been disseminated to consultees in August 2023, including Natural England, following the first EWG meeting and is summarised within **section 4.5.1** of this chapter and presented in full within Volume 3, Annex 4.4: Onshore and intertidal ornithology survey methodologies of the ES and the specific technical reports accompanying this chapter: Volume 3, Annex 4.1: Breeding birds technical report, Volume 3, Annex 4.2: Wintering and migratory birds technical report and Volume 3, Annex 4.3: Intertidal birds technical report of the ES. The findings of the HRA process are reported in the ISAA report (document references E2.1, E2.2 and E2.3), which assesses the

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			impact on all European sites specifically and is submitted alongside the ES. The potential for impacts on FLL are assessed within **section 4.11** of this chapter. All assessment is made against the MDS as presented within **Table 4.20**. The process of site selection for the onshore infrastructure is detailed within ES Volume 1, Annex 4.3: Selection and refinement of onshore infrastructure (document reference F1.4.3). The Transmission Assets aim to mitigate impacts on habitats arising as a result of the project and to deliver biodiversity benefit, where practicable. More detail is set out in Volume 3, Chapter 3: Onshore ecology and nature conservation of the ES and within the Onshore Biodiversity Benefit Statement (document reference J11). Additionally, mitigation is included within the scope of works to minimise any potential impact on species. Measures adopted as part of the Transmission Assets are presented within **section 4.8**. A range of sensitive ecological conservation areas (including statutory and non-statutory designations) have been directly avoided where practicable (CoT03).

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December 2022	St Helens Borough Council (Scoping)	One of the key aspects that may indirectly impact St. Helens relates to wintering species such as pink footed geese, that will use the Ribble Estuary as well as the mossland areas of North St. Helens. It is therefore asked that this is considered within the application process.	Pink-footed goose *Anser brachyrhynchus* has been included in the list of IEFs presented in **section 4.6.6**. An assessment of the potential impacts on IEFs is presented within **section 4.11**.
23 March 2023	EWG 01 - Presentation of onshore and intertidal methodology and findings to date to the RSPB, Natural England, Lancashire County Council and Environment Agency.	The site is located within the Ribble and Alt Special Protection Area and the onshore ornithology study area is divided into three parts which includes coastal intertidal ornithology, estuarine intertidal ornithology and onshore ornithology. Habitats are present on site that have the potential to support a wide range of breeding birds and migratory birds, including rare species. Therefore, all species of birds have been scoped in for further surveys. All methodologies were presented to the EWG along with a summary of findings from the 2022 breeding bird surveys and an update on the winter surveys from 2022/23 and all intertidal surveys completed up to the date of the EWG.	The ornithological survey methodology has been disseminated to consultees in August 2023, including Natural England, following the first EWG meeting and is summarised within **section 4.5.1** and presented in full within Volume 3, Annex 4.4: Onshore and intertidal ornithology survey methodologies of the ES and the specific technical reports accompanying this chapter: Volume 3, Annex 4.1: Breeding birds technical report, Volume 3, Annex 4.2: Wintering and migratory birds technical report and Volume 3, Annex 4.3: Intertidal birds technical report of the ES.
13 September 2023	EWG 02 - Presentation of the findings to date, the proposed survey approach and a high-level summary of the content of the PEIR submission to Natural England, Lancashire County Council, Preston City Council and Environment Agency.	The survey data presented and survey approach to date was considered to be extensive. Comments on the agreement to present one year of wintering and migratory bird site specific survey data will be reserved for a time where the technical reports can be reviewed by consultees. No points of concern were raised in relation to the content for the PEIR assessment. The suggestion to hold separate discussions in relation to Biodiversity Net Gain were welcomed.	Survey methodologies are summarised in **section 4.5**. Desk-based and site-specific survey findings are set out in the in Volume 3, Annex 4.1: Breeding birds technical report, Volume 3, Annex 4.2: Wintering and migratory birds technical report and Volume 3, Annex 4.3: Intertidal birds technical report of the ES.

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			The Transmission Assets aim to mitigate impacts on habitats arising as a result of the project and to deliver biodiversity benefit, where practicable. Areas identified through the iterative EIA process to date as potentially suitable for mitigation and/or biodiversity benefit are shown on Figure 3.7 (see Volume 1, Figures). More detail is set out in Volume 3, Chapter 3: Onshore ecology and nature conservation of the ES.
23 November 2023	Natural England (statutory consultation Response)	Request to identify the breeding, non-breeding and assemblage features of SPAs, Ramsar sites and Site of Special Scientific Interest (SSSIs) (specifically Newton Marsh SSSI, Morecambe and Duddon Estuary SPA, Morecambe Bay Ramsar Site and Martin Mere, Burscough SSSI) within the ES. Request to update the breeding bird methodology to enable greater identification of hard to detect species. Request for updated figures to be submitted alongside the ES. Request for justification of survey area within the ES. Request for a 'whole project alone' assessment of potential impacts on the Ribble and Alt Estuaries SPA and its' functionally linked land. Request to include an assessment of the impact of visual and noise disturbance on ornithological receptors. Request for details pertaining to activities expected to occur during the lifetime of the cables. Request for the ES and HRA to be brought in line with each other and to make sure that impacts are assessed simultaneously.	Features of internationally and nationally designated sites were considered when identifying the list of IEFs listed in **section 4.6.6** of this chapter. The potential for impacts from the Transmission Assets has been assessed in **section 4.11**. The breeding bird methodology is provided in Volume 3, Annex 4.1: Onshore ornithology breeding birds technical report. Figures outlining the extent of survey coverage and study area are presented the within Volume 3, Annex 4.1: Breeding birds technical report, Volume 3, Annex 4.2: Wintering and migratory birds technical report and Volume 3, Annex 4.3: Intertidal birds technical report of the ES.

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			An assessment of the potential impact on key receptors, including qualifying features of the SPAs (e.g., Ribble and Alt Estuaries SPA) as identified in **section 4.6.2**, is presented within **section 4.11**. This assessment includes the potential impact at areas of FLL identified. The assessment of the effects due to disturbance and displacement from construction and decommissioning, and operation and maintenance activities is presented within **section 4.11**. The assessment is conducted against the MDS as set out within **section 4.9.1**. This ES and HRA have been brought in line by aligning the impacts that are assessed in both.
23 November 2023	Natural England (statutory consultation Response)	The presented information within the PEIR is incomplete and there are further surveys to be reported. Currently, Natural England disagree that the survey effort is sufficient to rely on 1% rule of thumb as a screening tool. As well as numbers, the frequency of, or period of occupancy is important. The survey areas presented here require further explanation as to why the core survey area was selected as a subset of the red line boundary. Without sufficient reasoning for this, further survey coverage is needed. Provide a full assessment with all complete surveys in the submitted ES. This is particularly important in terms of presenting a minimum of two survey seasons.	Additional surveys have been completed and reported within this ES. The 1% screening tool that was used in the PEIR HRA has not been used for ES. The survey coverage is reported within Volume 3, Annex 4.1: Breeding birds technical report, Volume 3, Annex 4.2: Wintering and migratory birds technical report and Volume 3, Annex 4.3: Intertidal birds technical report of the ES and is considered robust enough to fully characterise the baseline used in

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		Provide an updated survey effort along with full survey coverage and data analysis in the submitted ES in order to justify using the 1% rule of thumb as a screening tool. Without this, Natural England do not agree with its use.	this assessment. The methodologies were also presented to the EWG in EWG 02. Details of survey coverage and study area are presented the within Volume 3, Annex 4.1: Breeding birds technical report, Volume 3, Annex 4.2: Wintering and migratory birds technical report and Volume 3, Annex 4.3: Intertidal birds technical report of the ES. An assessment of the potential impact on key receptors is presented within **section 4.11**.
23 November 2023	Natural England (statutory consultation Response)	It is not clear why the core survey area was selected as a subset of the red line boundary. This is not appropriate unless the developer is committed to avoiding impacts outside this zone. The submitted ES should provide further justification on why the core survey area only covers a subset of the red line boundary.	This chapter and its supporting annexes set out details of the survey coverage in relation to the Onshore Order Limits and Intertidal Infrastructure Area. See Volume 3, Annex 4.1: Breeding birds technical report, Volume 3, Annex 4.2: Wintering and migratory birds technical report and Volume 3, Annex 4.3: Intertidal birds technical report of the ES, and Volume 3, Annex 4.4: Onshore and intertidal ornithology methodologies of the ES for full details on survey coverage. The survey coverage is reported within Volume 3, Annex 4.1: Breeding birds technical report, Volume 3, Annex 4.2: Wintering and migratory birds technical report and Volume 3, Annex 4.3: Intertidal birds

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			technical report of the ES and is considered robust enough to fully characterise the baseline used in this assessment.
23 November 2023	Natural England (statutory consultation Response)	Due to the shortcomings in the surveys and assessments, Natural England are not able to rule out adverse effect on the integrity of the Ribble and Alt Estuaries SPA and Ramsar site. For further details on this, please see comments 7.24 and 7.35. The submitted ES should provide further robust evidence to support this conclusion or apply the mitigation hierarchy to ensure adverse effects cannot arise.	An assessment of the potential impact on key receptors, including qualifying features of the SPAs (e.g. Ribble and Alt Estuaries SPA) as identified in **section 4.6.2**, is presented within **section 4.11**. Details on the potential impacts on European sites from the Transmission Assets are contained within the ISAA (document references E2.1, E2.2 and E2.3).
23 November 2023	Natural England (statutory consultation Response)	Natural England do not consider that a 'whole project alone' assessment has been undertaken for the Ribble and Alt Estuaries SPA. For further detail, please see comment 7.46. The submitted ES should contain a 'whole project alone' assessment so the totality of potential impacts on the SPA (and other receptors where relevant) are properly quantified and appropriate mitigation put in place where needed. In particular, the assessment should fully consider how the construction pressures impact both the SPA itself and its functionally linked land.	The chapter includes an assessment of the Transmission Assets alone (in **section 4.11**). Details of impacts on designated sites are set out in the ISAA (document references E2.1, E2.2 and E2.3).
23 November 2023	Natural England (statutory consultation Response)	Part of the justification for no adverse impacts on onshore birds is that the cable route will not pass through significant Functionally Linked Land habitat (Lytham Moss BHS). This is not accurate as the final decision of which cable route to use has not been finalised and Option 2 will pass through this habitat. This justification can only be applied once the final decision has been made regarding the cable route. Natural England advises that route Option 1 is chosen to avoid FLL habitat.	The cable route proposed as part of the application and within the Onshore Order Limits and Intertidal Infrastructure Area aims to avoid as much of this sensitive area as possible. Full details of Transmission Assets Order Limits can be found in Volume 1, Chapter 3: Project description of the ES and

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			Volume 1, Chapter 4: Site selection and alternatives.
23 November 2023	Natural England (statutory consultation Response)	No detail has been provided for what is happening at the Fairhaven site. From aerial photos, this area appears to be coastal habitats with dunes and saltmarsh (although not designated, this would still be a Priority Habitat). Part of this area falls within the geological site – Lytham Coastal Changes SSSI. Please provide further detail for this area in the submitted ES.	No construction works related to the Transmission Assets will take place at Fairhaven, as this area is only included as a mitigation site. However, soft fencing may be installed as part of the mitigation measures to reduce recreational disturbance at Fairhaven. Details are included in **Table 4.19**.
23 November 2023	Natural England (statutory consultation Response)	This section sets out the mitigation hierarchy. However, from the measures listed that will be implemented, it's not clear if the full hierarchy is being followed i.e. - avoid, minimise, rectify, reduce and off-set.	This ES assess sets out all embedded and secondary measures in **Table 4.19**, and alternative options and site selection are discussed in Volume 1, Chapter 4: Site selection and consideration of alternatives of the ES.
23 November 2023	Natural England (statutory consultation Response)	'Natural England's Position on Worst Case Scenario or Scenarios 6.12 Vol3; Chp 3 Table 3.11, Table 3:15 Table3.16 The developer recognises Lytham St. Anne's Dunes as a SSSI (Table 3.11) and it has been taken forward as an Important Ecological Feature (Table 3.15). However, as the proposed installation method is Horizontal Directional Drilling (HDD) it is felt the developer has not fully considered the MDS (Table 3.16) for this designated site. The current assessment for Lytham St. Anne's Dunes SSSI (para 3.9.2.8 - 3.9.2.11) notes 'During construction the Transmission Assets will commit to avoiding impacts on the Lytham St Annes Dunes SSSI, as the cables will be	The Applicants have committed to avoiding impacts upon Lytham St Annes Dunes SSSI and saltmarsh along the River Ribble via the use of trenchless techniques (CoT44 and CoT90) (the Lytham St Annes SSSI is discussed further in Volume 3. Chapter 3: Ecology and nature conservation of the ES). However, in order to inform an assessment, two full years of robust data, through the seasons and through the tidal cycle, have been collected (see Volume 3, Annex 4.3: Intertidal birds technical

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		installed beneath this habitat via HDD (or other trenchless techniques) and open trenching techniques would not be used within this habitat. Accordingly, there will be no temporary or permanent loss of this habitat type. The magnitude of impact is therefore, considered to be no change.' The developer goes on to note that while the sensitivity of the habitat is High, the significance of effect is no effect. However, from experience of similar projects Natural England know that on occasions HDD can fail, or the proposed development design changes and for example Transition Joint Bays need to be moved (which presumably currently will be situated on the beach)/or additional vehicle access is required. In such scenarios by excluding any effect early in the assessment process there is a lack of detail later on if the installation methods change. Similarly full consideration of impacts should HDD not be undertaken in saltmarsh along the River Ribble (part of the Ribble Estuary SSSI). A full baseline assessment of Lytham St. Anne's Dunes SSSI should be undertaken so that should the worst-case scenario occur (i.e. HDD is not possible) sufficient ecological data is available to inform/develop suitable mitigation measures. In addition, it could be used as a baseline for post-construction monitoring (and a means to determine recovery). Baseline surveys of Lytham St Annes Dunes SSSI should include mapping to NVC level of the dune habitats present, with supporting quadrat sampling. Quadrat sampling should be sufficient in coverage to ensure all community types are sampled. The SSSI citation notes that the site support classic features of dune formation and ecological succession including the widest range of foredune, yellow dune, dune grassland, acid dune grassland, dune scrub and dune slack habitats found anywhere along the Fylde Coast. The site is botanically diverse with a number of rare or scarce plant species. Use of up-to-date aerial photography taken at the time of the NVC survey would be preferable. The developer should undertake a cable burial risk assessment for all the HDD work (including Lytham St. Anne's Dunes SSSI and the River Ribble (part of the	report of the ES) to inform of any mitigation that would be required.

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		Ribble Estuary SSSI) informed by geotechnical investigations. This should include an outline burial cable specification and installation plan which has a pollution* and contingency plan. This would help determine the likelihood (degree of confidence) of success of HDD at the given locations. *Note a Bentonite breakout plan is in place	
23 November 2023	Natural England (statutory consultation Response)	Morecambe Bay and Duddon Estuary SPA is missing from the designated site list. Only Morecambe Bay SAC and Ramsar are mentioned. It also does not list the Ramsar qualifying features in the relevant qualifying interest section. Note for correction.	Now added. SPAs are assessed in the ISAA (document references E2.1, E2.2 and E2.3).
23 November 2023	Natural England (statutory consultation Response)	For national sites, it mentions Martin Mere, Burscough SSSI – this SSSI is also underpinned by an SPA – Martin Mere SPA which is not included in list. Note for correction.	Now added. SPAs are assessed in the ISAA (document references E2.1, E2.2 and E2.3).
23 November 2023	Natural England (statutory consultation Response)	The description for Lytham Moss BHS is wrong – It is not also known as the Queensway Farmland Conservation Area (FCA).The FCA is a specific area within the BHS site which is managed for qualifying bird species as mitigation provided within a planning application, the BHS itself is separate. The BHS site (which has a wider boundary) is a designated by Lancashire County Council using a set of published guidelines. This needs to be updated, the document needs to clearly set out the correct information for Lytham Moss BHS, its correct boundaries and why it has been designated a Biological Heritage Site. The FCA should be defined with information on its purpose. It is specific mitigation land for qualifying bird species and managed as such. It is also secured under Section 106 agreement between developer and Fylde BC.	This has been noted and updated in the locally designated site figures in Annex 4.1: Breeding birds technical report and 4.2: Wintering and migratory birds technical report of the ES.
23 November 2023	Natural England (statutory consultation Response)	General Comment One of main justification of having less significant impact on ecological receptors is the use of HDD or alternative trenchless techniques, however no evidence is provided within the report why this approach is less intrusive and will have less impact. Further evidence should be provided regarding this approach, to set out why	HDD and trenchless techniques are described fully in Volume 1, Chapter 3: Project description of the ES. The assessment of effects on ornithological IEFs and the use of trenchless techniques to reduce

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		using these techniques will have less of impact including description, predicted noise levels, operation, and methodology. The developer should link to any evidence to support the justification it will be less intrusive and limit impacts on ecological receptors.	and/or mitigate significant effects is presented within **section 4.11**. The assessment of effects on onshore ecological IEFs is presented within Volume 3, Chapter 3: Onshore ecology and nature conservation of the ES.
23 November 2023	Natural England (statutory consultation Response)	General Comment This chapter does not account for impacts of ecological receptors providing habitat to supporting bird species. It is acknowledged that a specific chapter has been dedicated to impacts to onshore birds, ecological receptors assessed in this chapter play a supporting role in supporting qualifying and other significant important bird species. Therefore, the role and value that these habitats have in terms of providing supporting habitat to important bird species needs to be assessed here. The role and value that certain habitats have in terms of providing supporting habitat to important bird species needs to be assessed within the ecological chapters. This is important to consider in line with the overall function and value of these supporting habitats, especially in relation to saltmarsh, FLL habitat, and the Lytham Moss area.	The impact of loss of habitat has been considered separately to that of disturbance in **section 4.23**. In addition, the FLL at Lytham Moss has been assessed separately.
23 November 2023	Natural England (statutory consultation Response)	The CBC methodology described (4 visits) will be insufficient to fully characterise the breeding bird community (a) because survey effort is insufficient to fully record the detectable species (7 visits recommended) and (b) because the methodology is not tailored to detect hard to detect species that may be present (e.g. secretive waders; nocturnal species; species best surveyed by play-back; waterfowl) which require additional targeted visits to allow full characterisation. Update the CBC methodology to fully characterise the breeding bird community.'	Two years of breeding bird surveys have now been completed with nine visits in total (see Annex 4.1: Breeding birds technical report of the ES for full details).
23 November 2023	Natural England (statutory consultation Response)	The developer has concluded no adverse effects for impacts via heavy machinery/people to disturbance of qualifying bird species for Liverpool Bay, Ribble and Alt and Morecambe Bay.	The assessment of the effects due to disturbance and displacement from construction and decommissioning, and operation

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		The assessment has not accounted for visual and noise disturbance for qualifying bird species utilising surrounding area which has potential to be disturbed. Natural England do not concur with these conclusions. These impacts need to be included within the assessment in order to ensure the robustness of the HRA, and determine the scope of any required additional mitigation measures.	and maintenance activities has been updated since the PEIR, and is presented within **section 4.11**.
23 November 2023	Natural England (statutory consultation Response)	Vol 3, Ch4 Table 4.18 lists bird species found within surveys and identified if they are SPA or Ramsar species. It states that Black-headed gulls and mallards are not SPA/Ramsar species. This is incorrect – Black-headed gulls are part of the seabird assemblage species for Ribble and Alt Estuaries SPA, and Mallard are part of the waterbird assemblage species for Morecambe Bay and Duddon Estuaries SPA. Note for correction.	The Applicants note the response and this is clarified in **section 4.6**.
23 November 2023	Natural England (statutory consultation Response)	The presented information within the PEIR is incomplete and there are further surveys to be reported. Currently, Natural England disagree that the survey effort is sufficient to rely on 1% rule of thumb as a screening tool. The survey areas presented here require further explanation as to why the core survey area was selected as a subset of the red line boundary. Without sufficient reasoning for this, further survey coverage is needed. It is also not clear why the core survey area was selected as a subset of the red line boundary. This is not appropriate unless the developer is committed to only causing impacts within this zone.	Noted. Volume 3, Chapter 4: Onshore and intertidal ornithology of the ES does not rely on the 1% rule of thumb as a screening tool. The methodology of the assessment is set out within **section 4.5**.
23 November 2023	Natural England (statutory consultation Response)	There is a lack of assessment on impacts to SSSIs. The documents only seem to assess impacts on notified bird species in SSSIs not other notified features such as various habitats.	This chapter focusses on the ornithological IEFs, including those which are notified features. Wider ecological IEFs, including all relevant designated sites, are discussed in Volume 3, Chapter 3: Onshore ecology and nature conservation ES.

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23 November 2023	Freckleton Parish Council (statutory consultation Response)	Nothing seemed to indicate a benefit that would be demonstrated, other than the 'green' source of electricity. No firm ideas were presented, despite one of the conditions being that they spend a percentage of their funds on new measures to enhance biodiversity. The only suggestion to date was the acquisition of bird boxes and this for an area that is primarily populated by ground nesting birds.	Biodiversity benefit for the permanent habitat loss will be provided within the Transmission Assets Order Limits, which will be set out within the Onshore Biodiversity Benefit Statement (document reference J11). The potential for off-site collaboration and enhancement will be set out within the Outline Ecological Management Plan (document reference J6), including the opportunities for collaboration discussed with key stakeholders.
23 November 2023	Lancashire County Council (statutory consultation Response)	Request to consult Lancashire Environmental Records Network for all statutory and non-statutory designated sites and protected and priority species. Request that relevant species protection legislation is adhered to and mitigation/compensation proposals are included. Request that all surveys are conducted in line with recognised guidelines and at an appropriate time of year. Request an assessment of assessment of the ornithological interest of the site and the predicted Zone of Influence, including breeding and wintering birds. Request that all potential impacts are fully assessed and that monitoring measures should be sufficient to measure the success of mitigation and compensation measures, to inform the need for remedial measures and to inform establishment maintenance and long-term management.	The identification of IEFs listed in **section 4.6.6** of this chapter was done undertaken in accordance with the CIEEM Guidelines on Ecological Impact Assessment (CIEEM, 2022). All legislation, policy and guidance relevant to ornithology and the assessment carried out within this chapter is set out in **section 4.2**. Survey methodologies are summarised in **section 4.5**. Desk-based and site-specific survey findings are set out in the in Volume 3, Annex 4.1: Breeding birds technical report, Volume 3, Annex 4.2: Wintering and migratory birds technical report and Volume 3, Annex 4.3: Intertidal birds technical report of the ES. An assessment of the potential impact on key

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			receptors, including qualifying features of the SPAs and SSSIs, is identified in **section 4.6.2** and presented within **section 4.11**. This assessment includes the potential impact at areas of FLL identified. The assessment is conducted against the MDS as set out within **section 4.9.1**. Proposed mitigation measures are set out in the Outline Ecological Management Plan (document reference J6) alongside proposed monitoring of mitigation.
23 November 2023	BAE Systems (statutory consultation Response)	There is also a 13 km radius wildlife zone. The Aerodrome at Warton needs to be consulted on any developments that have the potential to attract wildlife. Birds are the main concern, particularly large, over-wintering birds. In relation to this, BAE Systems have initial concerns about the proposal to develop an ' Onshore and Intertidal Net Gain Enhancement Plan….to identify areas where biodiversity net gain is proposed. This will include details of the measures proposed, including details of any enhancement measures proposed for waterbirds.' (Preliminary Environmental Information Report Non-Technical Summary, October 2023). BAE Systems is particularly concerned about any enhancement measures in the wildlife zone that will increase the attractiveness of the area for birds (including new areas of standing water) as this has significant potential to negatively affect air safety.	This was taken into consideration when the project was trying to locate areas where mitigation could be provided. Due to BAE Systems concerns, mitigation for large overwintering birds (i.e., geese and swans) was sited further away from Warton Aerodrome.
23 November 2023	Northwest Wildlife Trust (statutory consultation Response)	Concerns raised regarding the potential impact on wintering birds on the foreshore, Lytham Moss, the Ribble Estuary, Newton Marsh SSSI and the functionally linked land. From the Fylde Sand Dunes Project perspective, depending on the route taken and proximity to the dune toe, landfall and HDD operations may impact our Project infrastructure (fencing/signage etc.), events and planned works (dune	An assessment of the potential impact on key receptors, including qualifying features of the SPAs and SSSIs, is identified in **section 4.6.2** and presented within **section 4.11**.

Date	Consultee and type of response	Comment raised	Response to comment raised and/or where considered in this chapter
		expansion using posts/paling and thatching with donated Christmas trees and Marram on the foreshore).	
23 November 2023	Northwest Wildlife Trust (statutory consultation Response)	13. BNG, enhancement and mitigation land areas for the Project We have not had time to review the indicative onshore route(s) in detail but we would strongly suggest the use of opportunity mapping to see how the Project could contribute to Lancashire's Local Nature Recovery Strategy (link to interactive map here) as well as bigger initiatives such as Nature North's Green Northern Connections. On a more local level, we could discuss enhancements on the Fylde Sand Dunes and other Ribble Estuary saltmarsh projects that the Trust is involved with.	Biodiversity benefit for the permanent habitat loss will be provided within the Transmission Assets Order Limits, which will be set out within the Onshore Biodiversity Benefit Statement (document reference J11). The potential for off-site collaboration and enhancement will be set out within the Outline Ecological Management Plan (document reference J6), including the opportunities for collaboration discussed with key stakeholders.
23 November 2023	National Infrastructure Team Environment Agency (statutory consultation Response)	CoT76 Ecological Management Plan will be developed in accordance with the Outline Ecological Management Plan (document reference J6). The Outline Ecological Management Plan will be submitted as part of the application for the development consent and will include but not be limited to pre-construction, construction and post-mitigation measures relating to habitats and protected or notable species, where relevant. The Outline Ecological Management Plan will also include a Breeding Bird Protection Plan which will set out mitigation measures such as vegetation clearance in winter (e.g., hedgerows), pre-construction breeding bird survey, appropriate protection zones upon confirmation of nest building/breeding taking place of key protected or sensitive species. The Ecological Management Plan will also include details of any long-term mitigation and management measures relevant to onshore ecology and nature conservation and in relation to onshore and intertidal ornithology. This will include the management of ecological mitigation areas. The Ecological Management Plan will be developed in consultation with the relevant responsible authorities.	This commitment remains in place and an Outline Ecological Management Plan (document reference J6) is provided as part of the application for development consent.

Date	Consultee and type of response	Comment raised	Response to comment raised and/or where considered in this chapter
23 November 2023	National Infrastructure Team Environment Agency (statutory consultation Response)	CoT83 An Onshore and Intertidal Net Gain Enhancement Plan will be developed and submitted as part of the application to identify areas where biodiversity net gain and/or opportunities for any enhancement are proposed. This will include details of the measures proposed. Issue The identification of areas for mitigation, BNG or enhancement have yet to be fully developed. and may alter the red line boundary on the DCO submission. Impact The clarification of BNG intentions may alter the red line boundary on the DCO submission. Solution An Outline Net Gain Enhancement Plan to be included in DCO submission	An Onshore Biodiversity Benefit Statement is provided as part of the application for development consent (document reference J11).
18 December 2023	EWG 03 - Presentation on approach to mitigation and BNG to the Environment Agency and Natural England	The potential for impacts on ornithological features was highlighted.. The opportunities for potential collaboration with ongoing and planned enhancement and mitigation schemes were outlined. Attendees were invited to send further suggestions.	The Transmission Assets aim to mitigate impacts on habitats arising as a result of the project and to deliver biodiversity benefit, where practicable. Areas identified through the iterative EIA process to date as potentially suitable for mitigation and/or biodiversity benefit are shown on Figure 3.7 (see Volume 1, Figures). More detail is set out in Volume 3, Chapter 3: Onshore ecology and nature conservation of the ES. Pink-footed goose *Anser brachyrhynchus* has been included in the list of IEFs presented in

Date	Consultee and type of response	Comment raised	Response to comment raised and/or where considered in this chapter
			section 4.6.6. An assessment of the potential impacts on IEFs is presented within **section 4.11** of this chapter. Measures adopted as part of the Transmission Assets (or Commitments) will be secured through the Commitments Register (Volume 1, Annex 5.3 of the ES). Commitments relevant to onshore and intertidal ornithology are listed in **section 4.8**.
26th January 2024	EWG 04 - Presentation to Natural England, Lancashire County Council, Preston City Council and Environment Agency.	Presentation of statutory consultation key comments and approach to addressing comments in ES. Update on baseline surveys undertaken to date and baseline data proposed to be included in the ES.	A description of the methodologies used for the ornithological surveys carried out to inform this chapter are provided in **section 4.5.1** and a summary of the survey efforts is located in **Table 4.6.** The results of these surveys are provided in **section 4.6.4**. Further detail can be viewed within Volume 3 Annex 4.1 Onshore and intertidal ornithology - breeding birds technical report of the ES; Volume 3, Annex 4.2 Onshore and intertidal ornithology - wintering and migratory birds technical report of the ES; Volume 3, Annex 4.3: onshore and intertidal ornithology - intertidal birds technical report of the ES. All desktop data sources used to add to the characterisation of the baseline are described within **section 4.5** and results of this

Date	Consultee and type of response	Comment raised	Response to comment raised and/or where considered in this chapter
			baseline analysis presented within **section 4.6.1**.
19 June 2024	EWG 06A - Presentation to Natural England, Lancashire County Council, Preston City Council and RSPB.	Presentation of updates to the intertidal works methodology and how Transmission Assets aims to limit works within this area during the winter months. Additionally, the areas where secondary mitigation is to be applied (and suggested measures) were introduced to the EWG alongside how these were to be used to reduce the impacts upon IEFs.	The mitigation strategy has been considered in **Table 4.19** and throughout the assessment.
31 July 2024	Natural England	Natural England advised that there is insufficient information to conclude that the project will have no adverse effects on the integrity of Ribble & Alt Estuaries Special Protection Area (SPA), Ribble & Alt Estuaries Ramsar and Liverpool Bay SPA. Natural England were unable to provide comments on the certainty of the proposed mitigation measures, as no evidence has been provided yet to show how these mitigation measures have been informed. Any proposed mitigation measures need to be informed by a rigorous and robust assessment, and as no details of the assessment undertaken have been provided to Natural England, they were unable to provide detailed comments on their effectiveness.	A separate technical note has been produced for Natural England that outlines the mitigation approach taken by the project to avoid, minimise, and mitigate potential impacts. In addition, the note summarises this assessment, sets out the rationale for the secondary mitigation and provides evidence to justify this, and summarises the residual effects and the ISAA assessments. The applicants look forward to working closely with Natural England in the post application phase.

4.4 Study area

4.4.1 Onshore and intertidal ornithology study area

4.4.1.1 The onshore and intertidal ornithology study area (hereafter referred to as 'the study area') covers:

- European sites with ornithological features, specifically SPAs and Ramsar sites located within 20 km of the Onshore Order Limits and Intertidal Infrastructure Area (Figure 4.1, see Volume 3, Figures);
- nationally designated sites with ornithological features, specifically SSSIs and National Nature Reserves (NNRs), located within 20 km of the Onshore Order Limits and Intertidal Infrastructure Area (Figure 4.1, see Volume 3, Figures); and
- locally designated sites with ornithological features, specifically Local Nature Reserves located within 20 km of the Onshore Order Limits and Intertidal Infrastructure Area (Figure 4.1, see Volume 3, Figures).

4.4.1.2 The study area has been used to identify designated sites as part of the desk study. Onshore and intertidal elements of the Transmission Assets contained within the study area (as shown in Figure 4.1, see Volume 3, Figures) are included as part of the desk study.

4.4.2 Onshore and intertidal ornithology survey area

4.4.2.1 The Transmission Assets onshore and intertidal ornithology survey area (hereafter referred to as 'the survey area') encompasses the Onshore Order Limits (excluding the proposed mitigation area at Fairhaven Saltmarsh, Lytham St Annes) and Intertidal Infrastructure Area plus a 500 m buffer around both elements. The 500 m buffer was included to take account of ornithological receptors that may occur adjacent or close to the Transmission Assets. The 500 m buffer was based on a typical disturbance buffer (Goodship and Furness, 2022) for the non-breeding bird assemblage expected to occur in the survey area. Figure 4.2 (see Volume 3, Figures) shows the onshore and intertidal ornithology survey area alongside the Onshore Order Limits and Intertidal Infrastructure Area.

4.4.2.2 The onshore and intertidal ornithology survey area was further split into three survey areas to conduct site-specific survey methodologies (intertidal bird species, wintering and migratory bird species, and breeding bird species);

- the onshore survey area (Figure 4.2, see Volume 3, Figures)
- the coastal survey area (Figure 4.3, see Volume 3, Figures); and
- the estuarine survey area (Figure 4.4, see Volume 3, Figures).

4.4.2.3 Details of the survey areas for the site-specific survey methodologies can be viewed within Volume 3, Annex 4.1: Breeding birds technical report, Volume 3, Annex 4.2: Wintering and migratory birds technical report, Volume 3, Annex 4.3: Intertidal birds technical report of the ES, and Volume 3, Annex 4.4: Ornithological survey methodologies.

4.5 Baseline methodology

4.5.1 Methodology for baseline studies

Desk-based review

4.5.1.1 A comprehensive desk-based review was undertaken to inform the baseline for onshore and intertidal ornithology. The existing studies and datasets referred to as part of the desk-based review are summarised in **Table 4.5** below.

4.5.1.2 A brief description of the scope of each data source, i.e., temporal and spatial extent of the data reviewed, is provided below. Further analysis of the data sources is presented in the relevant annexes to this chapter.

4.5.1.3 As stated in **section 4.4**, designated sites within the onshore and intertidal ornithology study area have been identified and are included as part of the desk-based review. A summary of the designated sites with relevant ornithological features is made in **section 4.6.2**.

Table 4.5: Summary of datasets/studies utilised in the desk-based review

Title	Source	Year obtained	Author
British Trust for Ornithology (BTO) Data Report for the Transmission Assets – onshore elements.	BTO	2023	BTO
Fylde Bird Club records. 2014 - 2023	Fylde Bird Club	2023	Ellis, P.
Fylde – Sand Extraction, Lytham St Annes 2020/2021 Wintering Bird Report.	Golder Associates UK Ltd.	2021	Brookes, F.
Morecambe Offshore Windfarm – Fylde Export Cable Route: Coastal and Estuarine Wintering Bird Survey Report – 2021/2022.	Avian Ecology Ltd.	2022	Hinchcliffe, Z.
Queensway Farmland Conservation Area and Nature Park Lytham St Annes Breeding Bird Survey report.	The Environment Partnership Ltd	2021a	Jenkins, L.
Queensway Farmland Conservation Area and Nature Park Lytham St Annes Winter Bird Survey report 2020/2021.	The Environment Partnership Ltd.	2021b	Jenkins, L.
Wetland Bird Survey (WeBS), Core count 5-Year summary: • River Ribble – Bull Nose-Clifton Marsh (2017/18 to 2021/22); and • St Annes Beach (2017/18 to 2021/22).	BTO data request of WeBS core count data.	2022	BTO/RSPB/Joint Nature Conservation Committee (JNCC).

BTO data

4.5.1.4 Data from the BTO is presented for two periods and two data sources: survey data from across the UK between 2007 to 2011 to provide data for a complete atlas of the UK's wintering and breeding species and a separate list

of species calculated for 2019 to 2023 from the BTO's breeding bird survey BirdTrack application data.

4.5.1.5 The 2007 to 2011 data uses a 2 km square resolution, whereas the more recent data (2019 to 2023 uses a 1 km resolution, therefore the BTO records provide an indication of species that could be present within or in the vicinity of the Onshore Order Limits and Intertidal Infrastructure Area. The resolution of the BTO data is high enough to know whether presence at the 1 km or 2 km square indicates presence within the Onshore Order Limits and Intertidal Infrastructure Area. Further details on how these data were processed can be found in Volume 3, Annex 4.1: Breeding birds technical report of the ES and Volume 3, Annex 4.2: Wintering and migratory birds technical report of the ES.

WeBS core count

4.5.1.6 WeBS core count data was obtained for two WeBS sectors that overlap with the intertidal areas at the coastal survey area and the estuarine survey area. Data was provided by WeBS, a Partnership jointly funded by the BTO, RSPB and Joint Nature Conservation Committee, in association with The Wildfowl and Wetlands Trust, with fieldwork conducted by volunteers.

4.5.1.7 Records provided detail of annual peak counts for waterbird species and the five-year mean of peaks. Data is split into the WeBS year (running July to June) giving annual data between 2017/18 through to 2021/2022. WeBS data is presented within Volume 3, Annex 4.3: Intertidal birds technical report of the ES.

4.5.1.8 It should be noted that during WeBS core count surveys the recording of gulls and terns is optional. Therefore, data on these species may be unreliable.

4.5.1.9 WeBS low tide data was also obtained, although the most recent count was in 2012. Therefore, low tide count data have not been used as they are considered too old to provide meaningful insight.

Fylde Bird Club data

4.5.1.10 Fylde Bird Club records were provided for a total of 26 tetrad squares (a group of four 1 km squares arranged into a 2 km by 2 km square) that are within, or partly overlap with, the survey area. Records were provided detailing a combination of individual species counts, dates and locations recorded across all months for ten years of data (2014 to 2023).

4.5.1.11 Whilst the Fylde Bird Club data records provide a wealth of valuable data, in particular providing evidence of a species presence within the survey area, the records do not necessarily represent an accurate relative abundance of all species present in the area. The Fylde Bird Club data includes arbitrary ornithological records but no evidence of systematic data collection was provided with the records. Further details on how these data were processed can be found in Volume 3, Annex 4.1: Breeding birds technical report of the ES, and Volume 3, Annex 4.2: Wintering and migratory birds technical report of the ES.

The Queensway development data

4.5.1.12 The Queensway development, which overlaps with a portion of the onshore survey area, includes a phased residential development as well as the creation of a Farmland Conservation Area and Nature Park to compensate for the loss of FLL associated with the Ribble and Alt Estuaries SPA and Ramsar site. The ornithological surveys for this project have covered an area of the study area to the north east of Lytham St Annes, close to Blackpool Airport. Breeding and wintering bird surveys were undertaken and reported in Jenkins (2021a; 2021b).

Fylde sand extraction data

4.5.1.13 Wintering bird surveys of land associated with sand extraction for commercial purposes at Lytham St. Annes were conducted by Turnstone Ecology UK Ltd on behalf of Golder Associates UK Ltd under commission from Fylde Borough Council. The surveys took place on the beach at Lytham St. Annes from the MLWS to MHWS and extended from the Ribble Estuary in the south to Squires Gate Lane, Blackpool to the north and included the Lytham St. Annes Dunes SSSI (Brookes, 2021). Six survey visits were conducted between October 2020 and March 2021 with the aim of gaining an understanding of the value of the area to intertidal birds. The area surveyed overlaps with the coastal survey area.

Morecambe Offshore Windfarm: Generation Assets

4.5.1.14 Intertidal vantage point, intertidal nocturnal surveys, and terrestrial waterbird surveys concentrated in three key areas (the Intertidal Infrastructure Area, Lytham Moss and the area to the south of the River Ribble crossing) were undertaken between October 2021 and April 2022 as part of early work by Avian Ecology Ltd for the Morecambe Offshore Windfarm: Generation Assets. The data is presented in Hinchcliffe (2022). The Morecambe Offshore Windfarm: Generation Assets surveys overlap with the coastal survey area.

Site-specific surveys

4.5.1.15 Site-specific surveys have been undertaken for the onshore survey area, estuarine survey area and coastal survey area (Volume 3, Chapter figures, **Figures 4.2** to **4.4**).

4.5.1.16 Breeding bird surveys and wintering and migratory bird surveys were undertaken within the onshore survey area to characterise the spatial and temporal assemblage of birds throughout the year. Year-round surveys were also undertaken in the estuarine and coastal survey areas to characterise the spatial and temporal assemblage of intertidal waterbirds and seabirds.

4.5.1.17 The surveys were undertaken following the latest guidance on ornithological surveying, details of the specific guidance followed are presented in the appropriate annexes (see below).

4.5.1.18 Detailed methodologies for the site-specific surveys are presented in each of the annexes to this chapter (see Volume 3, Annexes), as set out in the following.

- Volume 3, Annex 4.1: Breeding birds technical report of the ES.
- Volume 3, Annex 4.2: Wintering and migratory birds technical report of the ES.
- Volume 3, Annex 4.3: Intertidal birds technical report of the ES.
- Volume 3, Annex 4.4: Onshore and intertidal ornithology survey methodologies.

4.5.1.19 A summary of site-specific surveys, including species surveyed, survey methodology and the frequency and number of survey visits is presented in **Table 4.6**.

Table 4.6: Summary of the site-specific surveys included in this chapter

Survey area	Ornithological species surveyed	Survey methodology	Survey frequency	No. of visits and survey duration
Coastal survey area	Seabirds and waterbirds.	Diurnal, through the tidal cycle, counts (full tidal cycle) from vantage points	Twice monthly year-round.	48 visits (September 2021 to August 2023).
		Nocturnal, through the tidal cycle, counts (half tidal cycle)	Monthly over the core winter period (November to March).	Nine visits (between November and April in 2021/22 and 2022/23). One survey was missed due to winter storms.
Estuarine survey area	Waterbirds.	Diurnal, through the tidal cycle, counts (full tidal cycle) from Vantage Points (VPs)	Twice monthly year-round.	20 visits (October 2022 to March 2024). Further visits have taken place but are not reported in this ES.
Onshore survey area	Terrestrial waterbirds.	Driven and walked transects scanning fields with optics from public access land.	Monthly between September and March.	14 visits (September 2022 to March 2023 and September 2023 to March 2024).
	Supplementary wintering and migratory walkover surveys.	'look and see' walkover methodology.	Two to three visits over the core winter period (November to March).	Five visits (November 2022 and February 2023 in the first winter, and November/December 2023, January 2024 and February 2024 in the second winter).

Survey area	Ornithological species surveyed	Survey methodology	Survey frequency	No. of visits and survey duration
	Breeding birds.	'look and see' walkover methodology using a modified Common Bird Census methodology.	Monthly during the breeding season (March to July).	Nine visits (April 2022 to July 2022 and March 2023 to July 2023).

4.6 Baseline environment

4.6.1 Desk-based review data sources

Breeding birds in the onshore survey area

4.6.1.1 The findings of the desk-based study for breeding birds are presented in detail in Volume 3, Annex 4.1: Breeding birds technical report of the ES. A summary of the desk-based study findings is included below.

4.6.1.2 The desk-based study focused on a review of three key data sources: BTO breeding bird records, Fylde Bird Club data records and breeding bird surveys results at the Queensway development.

BTO data

4.6.1.3 BTO's Bird Atlas surveys (2007 to 2011) recorded 103 species with breeding evidence within the tetrads which overlapped with the survey area during the breeding season. This included four Annex 1 and six Schedule 1 listed species (see **section 4.2.1** for a full explanation of the protective legislation). Of the 103 species, 72 were recorded as confirmed breeders, 18 were recorded as probable breeders and 13 as possible breeders. Additionally, this data presents a 'site importance' which indicates whether any species are present within the vicinity at more than 0.5 % of the UK's breeding population. The BTO data suggests that oystercatcher *Haematopus ostralegus*, avocet *Recurvirostra avosetta*, black-tailed godwit *Limosa limosa* and dunlin *Calidris alpina* surpass this threshold, although the avocet and dunlin are likely to be on the freshwater and brackish marshes bordering the Ribble saltmarsh with only oystercatcher and black-tailed godwit found regularly foraging on farmland habitats.

4.6.1.4 Data from the BTO's Breeding Bird Survey and anecdotal evidence from the BTO's BirdTrack application contains 64 species recorded within the 1 km tetrads that overlap with the survey area. One Annex 1 species was recorded and there were no Schedule 1 species recorded. Within 2 km of the Onshore Order Limits and Intertidal Infrastructure Area, a further 69 species are recorded. Of these, 14 are Annex 1 listed and 19 are Schedule 1 listed species.

Fylde Bird Club data

4.6.1.5 A total of 203 species were recorded as present during the breeding season (March to July) during the last five years (2019 to 2023) of Fylde Bird Club data. However, whilst these records are of birds present during the breeding season, not all of these species will necessarily represent breeding attempts. We categorised Fylde Bird Club records as potentially breeding or non-breeding after reference to the Bird Atlas (Balmer *et al*., 2013).

4.6.1.6 A total of 118 of the 203 species recorded as present during the breeding season (March to July) have been categorised as potential breeding species.

4.6.1.7 The most abundant taxonomic family group when looking at the sum of the five-year mean of peak (rounded up to a whole number) were passerines (5,210 individuals) across 51 species, followed, in order of abundance, by: waders (4,487 individuals) across 12 species, goose, duck and swan (1,420 individuals) across 15 species and gull and tern (1,321) across seven species. An additional 1,110 individual birds were recorded across species from 13 other taxonomic groups including cuckoo, dove and pigeon, swallow, martin, swift, heron, raptor, rail, crake and coot, pheasant and partridge, grebe, owl, woodpecker, parakeet, kingfisher and dipper.

The Queensway development data

4.6.1.8 The Queensway development breeding bird surveys recorded a total of 51 bird species. The site was considered by Jenkins (2021) to be of local importance for breeding birds due to the number of birds red or amber listed in the Birds of Conservation Concern 5 (BOCC5) UK. There were ten species confirmed as breeding at the site, a further 20 considered probably breeding at the site and 12 more species considered to be possibly breeding.

Wintering and migratory birds in the onshore survey area

4.6.1.9 The findings of the desk-based studies for wintering and migratory birds are presented in detail in Volume 3, Annex 4.2: Wintering and migratory birds technical report of the ES. A summary of the desk-based study findings is provided below.

4.6.1.10 The desk-based study for wintering and migratory birds focused on a review of four key data sources: BTO wintering and migratory bird records, Fylde Bird Club data records for wintering and migratory birds, the winter bird survey report for the Morecambe Offshore Windfarm: Generation Assets (Hinchcliffe, 2022) and the winter bird survey report for Queensway (Jenkins, 2021b).

BTO data

4.6.1.11 BTO's Bird Atlas Surveys (2007 to 2011) recorded 147 species within the tetrads which overlapped the survey area during the non-breeding season, this included 19 Annex 1 listed species. More recent data (2019 to 2023) recorded 134 species within the same tetrads, this included 18 Annex 1 listed species.

Fylde Bird Club data

4.6.1.12 Fylde Bird Club data records showed a total of 209 species were recorded at least once during the non-breeding season (August to February) from the Fylde Bird Club data records (2018 to 2019 through to 2022 to 2023). Of the 209 species recorded, the most abundant taxonomic group was passerines (85,499 individuals) across 67 species when looking at the five-year peak count. This was followed by goose, duck and swan (55,061 individuals) across 32 species, waders (31,967 individuals) across 31 species and gull and tern (21,481 individuals) across 15 species. An additional 6,558 individual birds across 17 other taxonomic groups were also recorded: cormorant and shag, cuckoo, diver, dove and pigeon, grebe, heron, stork and ibis, kingfisher, owl, parakeet, pheasant and partridge, swift, rail, crake and coot, raptor, seabird, skua, swallow and martin and woodpecker.

Morecambe Offshore Windfarm - Fylde export cable route data

4.6.1.13 A total of 12 target species were recorded in the survey area around Lytham Moss.

4.6.1.14 A total of 22 target species were recorded in the area to the south of the River Ribble. Three of these recorded species exceeded the threshold of 0.5% of the national population: pink-footed goose, black-tailed godwit and ruff *Calidris pugnax*.

The Queensway development data

4.6.1.15 Results of the wintering bird surveys conducted between September 2020 and April 2021 at the Queensway development showed an increase in pink-footed goose (11,000) and whooper swan *Cygnus cygnus* (247) compared to the previous winters. The surveys also indicated an increase in flock sizes of the target wading birds (lapwing *Vanellus vanellus*, curlew *Numenius arquata* and black-tailed godwit), likely due to the establishment of the Farmland Conservation Area and the current land management practices (Jenkins, 2021b).

Intertidal waterbirds in the coastal and the estuarine survey area

4.6.1.16 The findings of the desk-based study for intertidal waterbirds are presented in detail in Volume 3, Annex 4.3: Intertidal birds technical report of the ES. A summary of the desk-based study findings is provided below.

4.6.1.17 Desk-based studies for wintering and migratory birds focused on a review of four data sources, including the WeBS core data, Fylde Bird Club data, the earlier Morecambe Offshore Windfarm: Coastal and Estuarine Wintering Bird Survey Report (Hinchcliffe, 2022) and wintering bird surveys of land associated with sand extraction at Lytham St. Annes (Brookes, 2021).

WeBS core count five-year summary

4.6.1.18 WeBS core count data was obtained for two sectors that overlap with the intertidal survey areas at landfall (the coastal survey area) and at the River

Ribble crossing point (the estuarine survey area). Records provided detail of annual peak counts for waterbird species and the five-year mean of peaks. Data is split into the WeBS year (running July to June) giving annual data between 2017/18 through to 2021/2022.

St Annes Beach

4.6.1.19 Species from a total of four taxonomic groups were recorded at the St Annes Beach sector, including cormorant and shag, goose, duck and swan, gull and tern and wader.

4.6.1.20 The most abundant group were wader with a sum of five-year peak counts of 6,448 individuals, of which sanderling were the most abundant with a peak of 2,385, dunlin and knot were also abundant with peaks of 1,550 and 1,500 respectively. This group was followed by gull and tern (2,312 individuals) with a peak of 1,700 herring gull and 370 sandwich tern, goose, duck and swan (199 individuals) and cormorant with a peak of 113 individuals.

River Ribble-Bull Nose-Clifton Marsh

4.6.1.21 Species from a total of seven taxonomic groups were recorded within the River Ribble-Bull Nose-Clifton Marsh sector, including cormorant and shag, goose, duck and swan, grebe, gull and tern, heron, rail, crake and coot and wader.

4.6.1.22 The most abundant taxonomic group were waders by the sum of five-year peak counts, total of 6,314 individuals were noted (with a peak of 2,800 lapwing, 1,900 black-tailed godwit and 760 dunlin). This was followed by goose, duck and swan (3,314 individuals) which, with a peak count of wigeon of 995, and gull and tern (1,536 individuals) with a 680 peak count for herring gull.

Fylde Bird Club data

Coastal survey area

4.6.1.23 A total of 91 species were recorded as present within the tetrads overlapping the coastal survey area during the most recent five years of complete data (2018 to 2019 through to 2022 to 2023).

4.6.1.24 The most abundant taxonomic group were goose, duck and swan (22,340 individuals) when looking at the sum of five-year peak counts. This was followed by gull and tern (18,624 individuals) and waders (16,886). An additional 5,168 individual birds (five-year peak counts) were recorded from seven other taxonomic groups: cormorant and shag, diver, grebe, heron and stork, rail, crake and coot, seabird and skua. A total of 256 unidentified auk species (five-year peak counts) and one unidentified skua species were also recorded. Notable counts include 16,345 common scoter, 10,000 knot, 2,635 dunlin and 2,427 sanderling.

Estuarine survey area

4.6.1.25 A total of 41 species were recorded as present within tetrads overlapping with the estuarine survey area during the most recent five years of complete data (2018/19 through to 2022/23).

4.6.1.26 The most abundant taxonomic groups by sum of five-year peak counts were gull and tern (3,827 individuals), goose, duck and swan (2,143 individuals) and wader (795 individuals). This order was maintained when considering the sum of five-year mean of peaks, gull and tern (2,246), goose, duck and swan (660) and wader (413). A total of 94 birds were also recorded from five additional taxonomic groups when summing five-year peak counts. These species came from grebe, heron and stork, kingfisher, rail and cormorant and shag. Notable peak counts include wigeon with 1,500, teal with 312, and 1,200 black-tailed godwit.

Morecambe Offshore Windfarm - Fylde export cable route data

4.6.1.27 The intertidal waterbird surveys undertaken previously for the Morecambe Offshore Windfarm: Generation Assets recorded the presence of a total of 20 species during vantage point surveys and five species during the nocturnal survey. Sanderling *Calidris alba* were recorded in numbers up to 290 and oystercatcher up to 180, whilst up to 1,680 common scoter were present on the intertidal and nearshore waters.

Fylde sand extraction data

4.6.1.28 The wintering bird surveys associated with the Fylde sand extraction application recorded the presence of a total of 23 species.

4.6.1.29 During the vantage point surveys sanderling distribution ranged throughout the survey area and up to 2,500 individuals were foraging along the shoreline. The highest numbers of grey plover *Pluvialis squatarola* , knot *Calidris canutus* and dunlin mainly occurred during periods of low tide near the mouth of the Ribble Estuary.

4.6.2 Designated sites

4.6.2.1 All designated sites within the study area with qualifying interest features or connectivity that could be potentially impacted by the construction, operation and maintenance and decommissioning phases of the Transmission Assets are set out in **Table 4.7** (international designations), **Table 4.8** (national designations) and **Table 4.9** (local designations). Some assemblage features may not have a designated season and are therefore considered under both the breeding and non-breeding seasons as a precautionary measure.

Table 4.7: International designated sites and relevant qualifying interests

Designated site	Distance to the Onshore Order Limits and Intertidal Infrastructure Area (nearest point) (km)	Relevant qualifying interest
Ribble and Alt Estuaries SPA	0.0	Breeding features include ruff, black-headed gull *Chroicocephalus ridibundus*, lesser black-backed gull Larus *Fuscus graellsii*, common tern *Sterna hirundo.* Non-breeding features include pink-footed goose, Bewick's swan *Cygnus columbianus*, whooper swan, shelduck *Tadorna tadorna,* wigeon *Mareca penelope*, pintail Anas acuta,teal *Anas crecca*, oystercatcher, golden plover, grey plover, ringed plover, bar-tailed godwit *Limosa lapponica*, black-tailed godwit, knot, sanderling, dunlin and redshank *Tringa totanus*. Assemblages include non-breeding waterbird and non-breeding seabird.
Ribble and Alt Estuaries Ramsar site	0.0	The only breeding feature on site is lesser black-backed gull Non-breeding features include pink-footed goose, Bewick's swan, whooper swan, shelduck, wigeon, pintail, teal, oystercatcher, grey plover, ringed plover, bar-tailed godwit, black-tailed godwit, knot, sanderling, dunlin, redshank and lesser black-backed gull. Assemblages include non-breeding waterbird and breeding wetland bird.
Liverpool Bay/Bae Lerpwl SPA	0.0	Breeding features include little tern *Sternula albifrons* and common tern. Non-breeding features include common scoter, red-throated diver, and little gull *Hydrocoloeus minutus*. There is a waterbird assemblage.
Morecambe Bay and Duddon Estuary SPA	9.5	Breeding features include herring gull *Larus argentatus*, lesser black-backed gull, sandwich tern *Thalasseus sandvicensis*, little tern *Sternula albifrons*, common tern, Little egret *Egretta garzetta.* Non-breeding features include pink-footed goose, whooper swan, shelduck, pintail, oystercatcher, golden plover *Pluvialis apricana*, grey plover *Pluvialis squatarola*, ringed plover *Charadrius hiaticula*, curlew *Numenius arquata*, bar-tailed godwit, black-tailed godwit, turnstone *Arenaria interpres*, knot, ruff, sanderling, dunlin, redshank *Tringa totanus*, Mediterranean gull *Ichthyaetus melancephalus* and lesser black-backed gull, Assemblages include both breeding and non-breeding seabirds and waterbirds.
Morecambe Bay Ramsar site	9.5	Breeding features include , lesser black-backed gull, sandwich tern and herring gull. Non-breeding features include pink-footed goose, shelduck, wigeon, pintail, eider *Polysticta stelleri*,

Designated site	Distance to the Onshore Order Limits and Intertidal Infrastructure Area (nearest point) (km)	Relevant qualifying interest
		goldeneye *Bucephala clangula*, red-breasted merganser *Mergus serrator*, great crested grebe *Podiceps cristatus*, oystercatcher, lapwing, golden plover, grey plover, ringed plover, curlew, bar-tailed godwit, turnstone, knot, sanderling, dunlin, redshank, lesser black-backed gull and cormorant *Phalacrocorax carbo*. There is a non-breeding waterbird assemblage.
Martin Mere SPA	11.49	Breeding features include greylag goose *Anser anser*, gadwall *Mareca strepera*, mallard *Anas platyrhynchos* and snipe *Gallinago gallinago* Non-breeding features include Bewick's swan, whooper swan, pink-footed goose, shoveler *Anas clypeata*, gadwall *Anas strepera*, mallard, pintail, teal, lapwing, black-tailed godwit *Limosa limosa islandica*, ruff and snipe. There is a non-breeding waterbird assemblage.
Martin Mere Ramsar site	11.49	Non-breeding features include pink-footed goose, Bewick's swan, whooper swan wigeon and pintail. There is a non-breeding waterbird assemblage.
Bowland Fells SPA	17.6	Breeding features include hen harrier *Circus cyaneus*, merlin *Falco columbarius* and lesser black-backed gull.

Table 4.8: National designated sites with relevant qualifying interests

Designated site	Distance to the Onshore Order Limits and Intertidal Infrastructure Area (nearest point) (km)	Relevant qualifying interest
Lytham St Annes Dunes SSSI	0.0	Stonechat *Saxicola rubicola* are a feature of both the breeding and non-breeding season.
Ribble Estuary SSSI	0.0	Breeding features include shoveler, mallard, teal, lapwing, ringed plover, curlew, ruff, snipe, redshank, black-headed gull, common tern and skylark *Alauda arvensis*. Non-breeding features include pink-footed goose, Bewick's swan, whooper swan, shelduck, wigeon, mallard, pintail, oystercatcher, golden plover, grey plover, ringed plover, curlew, bar-tailed godwit, black-tailed godwit, knot, sanderling, dunlin and redshank.
Ribble Estuary NNR	0.0	Lesser black-backed gull are an interest feature however no season is specified on the site citation.

Designated site	Distance to the Onshore Order Limits and Intertidal Infrastructure Area (nearest point) (km)	Relevant qualifying interest
		Features relevant to breeding birds include a seabirds assemblage of international importance, Annex 1 breeding bird species, breeding birds of conservation concern and BAP species, nationally important breeding bird populations., saltmarsh - non-breeding Annex 1 species, saltmarsh - a seabird assemblage of international importance (season not specified). Features relevant to non-breeding birds include saltmarsh - non-breeding birds - migratory species curlew, lapwing, saltmarsh - non-breeding Annex 1 species, saltmarsh - a seabird assemblage of international importance (season not specified), saltmarsh - littoral sediment internationally significant migratory birds waterfowl, saltmarsh - littoral sediment internationally significant populations of regularly occurring migratory bird species.
Newton Marsh SSSI	0.2	Breeding features include mute swan *Cygnus olor*, shelduck, mallard, moorhen *Gallinula chloropus*, coot *Fulica atra*, little grebe *Tachybaptus ruficollis*, oystercatcher, lapwing, snipe, redshank, skylark, yellow wagtail *Motacilla flava*, meadow pipit *Anthus pratensis*, corn bunting *Emberiza calandra*, and reed bunting *Emberiza schoeniclus*. Non-breeding features include shelduck, wigeon, mallard, teal, lapwing, golden plover, bar-tailed godwit, sanderling, dunlin, common sandpiper *Actitis hypoleucos*, redshank, spotted redshank *Actitis macularis* and greenshank.
Marton Mere, Blackpool SSSI	3.78	Breeding features include shoveler, mallard, tufted duck, coot, little grebe, great crested grebe, oystercatcher, curlew, ruff and redshank. Non-breeding features include shoveler, mallard, pochard *Aythya ferina*, tufted duck *Aythya fuligula*, coot, little grebe *Tachybaptus ruficollis*, great crested grebe, oystercatcher, curlew, ruff, redshank and greenshank.
Red Scar and Tun Brook Woods SSSI	7.83	Hawfinch *Coccothraustes coccothraustes* are a feature of both the breeding and non-breeding season.
Sefton Coast SSSI	8.63	Non-breeding features include oystercatcher, grey plover, ringed plover, bar-tailed godwit, knot, sanderling and dunlin.
Wyre Estuary SSSI	8.81	Non-breeding features include teal, oystercatcher, lapwing, golden plover, black-tailed godwit, turnstone, dunlin and redshank.
Martin Mere, Burscough SSSI	9.9	Breeding features include greylag goose *Anser anser*, gadwall *Mareca strepera*, mallard and snipe. Non-breeding features include pink-footed goose, Bewick's swan, whooper swan, shoveler, gadwall,

Designated site	Distance to the Onshore Order Limits and Intertidal Infrastructure Area (nearest point) (km)	Relevant qualifying interest
		mallard, pintail, teal, avocet, lapwing, black-tailed godwit, ruff, snipe, lesser yellowlegs *Tringa flavipes*, marsh sandpiper *Trina stagnatilis* and white-winged black tern *Chlidonias leucopterus*.
Rough Hey Wood SSSI	13.1	Breeding features include grey heron *Ardea cinerea*, sparrowhawk *Accipiter nisus*, tawny owl *Strix aluco*, great spotted woodpecker *Dendrocopus major*, chiffchaff *Phylloscopus collybita* and blackcap *Sylvia atricapilla*.
West Pennine Moors SSSI	13.7	Breeding features include teal, red grouse *Lagopus lagopus*, lapwing, golden plover, curlew, dunlin, black-headed gull, Mediterranean gull, grey heron, buzzard *Buteo buteo*, short-eared owl *Asio flammeus*, merlin, peregrine *Falco peregrinus*, raven *Corvus corax*, willow tit *Poecile montanus*, wood warbler *Phylloscopus sibilatrix*, spotted flycatcher *Muscicapa striata*, pied flycatcher *Ficedula hypoleuca*, wheatear *Oenanthe oenanthe*, tree pipit *Anthus trivialis* and twite *Linaria flavirostris*.
Ainsdale Sand Dunes NNR	15.6	Features relevant to breeding birds include supralittoral sediment: sand dune breeding birds. Features relevant to non-breeding birds include supralittoral sediment: aggregations of non-breeding birds.
Lune Estuary SSSI	16.7	Breeding features include shelduck, wigeon, mallard and common tern. Non-breeding features include pink-footed goose, shelduck, wigeon, mallard, oystercatcher, grey plover, ringed plover, curlew, turnstone, knot, sanderling, dunlin and redshank.
Bowland Fells SSSI	17.6	Breeding features include oystercatcher, lapwing, golden plover, curlew, woodcock *Scolopax rusticola*, snipe, common sandpiper, redshank, lesser black-backed gull, hen harrier, short-eared owl, kestrel *Falco tinnunculus*, merlin, peregrine, skylark, ring ouzel *Turdus torquatus*, spotted flycatcher, whinchat *Saxicola rubetra*, wheatear, dipper *Cinclus cinclus*¸meadow pipit, grey wagtail *Motacilla cinerea* and redstart *Phoenicurus phoenicurus*.

Table 4.9: Local designated sites with interest features

Designated site	Distance to the Onshore Order Limits and Intertidal Infrastructure Area (nearest point) (km)	Relevant qualifying interest
Lytham St Annes LNR	0.0	Area of sand dune including wet dune slacks with associated helleborines, orchids and rush species. The area supports a range of passerine and wildfowl species.
Fishwick Bottoms LNR	0.03	An area of woodland primarily made up of non-native species being managed into greater biodiversity with more native species. The area supports wildflower meadows and contains ponds that attract herons and kingfishers.
Longton Brickcroft LNR	1.62	Former brickworks providing habitat for a changing population of birds.
Haslam Park, Preston LNR	2.02	Part of Haslam Park occupying an area previously used as farmland. The area contains woodland, meadows, freshwater and hedgerows.
Preston Junction LNR	2.17	Former railway line providing habitat for a changing population of birds, mammals and invertebrates.
Marton Mere LNR	3.78	Open water, reedbeds, grassland and small pockets of woodland and scrub. Many bird species recorded including water rail, long-eared owls, terns, little gulls, waders, warblers, bitterns, whimbrel, marsh harrier, and osprey. Non-ornithological features include orchids, butterflies, moths, dragonflies and bats.
Hills and Hollows LNR	6.16	A diverse mosaic of habitats along Savick Brook. The area supports a number of bird species associated with woodland and grassland.
Grange Valley LNR	6.63	Open parkland supporting a range of bird species.
Pope Land Open Space LNR	7.39	Wildflower meadows provide habitat for small wildlife and birds. The marshy grassland is damp and has many ruts and hollows which provide a home to different types of plants such as rushes and sedge. It also provides a habitat for great crested newt.
Ainsdale and Birkdale Hills LNR	10.88	Area of sand dunes and beach. Wet dune slacks are present and support breeding natterjack toad and great crested newt.
Withnell Fold LNR	10.96	Developed from a series of filter beds and sludge lagoons from the paper mill. The area contains woodland and wetland habitats.
Pleasington Old Hall Woods LNR	13.50	A narrow strip of mixed woodland surrounding a stream. A wildlife garden is located to the north of the site.

Designated site	Distance to the Onshore Order Limits and Intertidal Infrastructure Area (nearest point) (km)	Relevant qualifying interest
Withnell Nature Reserve LNR	13.54	Woodland and scrub areas provide an excellent roosting and nesting territory with recorded species including wren, great, blue and long-tailed tits, blackbird, song thrush and chaffinch.
Hic Bibi, Coppull LNR	15.62	A former brickworks providing habitat for a range of species including great crested newt and grasshopper warbler.
River Darwen Parkway LNR	16.72	A Biological Heritage Site (BHS 62NE06) with wetland, standing and running water, grassland, woodland and heathland habitats of good quality and local significance. It is a river valley corridor and includes willow scrub, marsh areas and ponds. acidic and neutral unimproved and semi-improved grassland, marshy grassland, tall herb and fern, heathland, bog and flush, flood plain mire, swamp, fen and inundation communities. Birds include sparrowhawk, kestrel, long tailed tit, yellowhammer, heron and sand martin. Other animals include dragonflies, damselflies, frogs, newts, water boatmen, butterflies including painted lady, comma, and peacock.
Sunnyhurst Woods LNR	16.84	A Biological Heritage Site (BHS 62NE07) selected for its woodland and scrub habitats, breeding birds, flowering plants and ferns. Birds include kingfisher and heron. About 702 species of plants, birds, invertebrates, and mammals have been recorded.
Arran Trail LNR	19.19	A wildlife corridor supporting a range of habitats including semi-natural grassland, woodland and man-made ponds.

4.6.3 Land use

4.6.3.1 In order to characterise land use within the survey area, the Corine Land Cover 2018 data set was reviewed for the onshore survey area (Copernicus, 2020). The total area for each land use type was calculated in ArcGIS.

4.6.3.2 The onshore survey area is characterised by predominantly pasture, which comprises over half of the survey area (54.3%) (**Table 4.10**). Arable and urban are respectively the second (19.8%) and third largest land use type (15.7%) of the total land use type present within the survey area.

4.6.3.3 Estuarine, sport and leisure and sand dune represented only 5.2% of the total land use type present. Blackpool Airport accounts for 4.5% of the total land use type present within the onshore survey area.

4.6.3.4 Land use within the onshore survey area is shown in Figure 4.2, Volume 3, Figures.

Table 4.10: The area and percentage of habitat types present within the onshore survey area

Land use type	Area of land use (km^2)	Percentage of total land use (%)
Pasture	23.5	54.34
Arable	7.69	19.81
Urban	6.77	15.65
Airport	1.95	4.52
Sport and leisure	0.12	2.78
Sand dunes	0.60	1.39
Estuarine	0.47	1.10
Landfill	0.17	0.40
Total	**41.27**	**N/A**

4.6.4 Site-specific surveys

Breeding bird survey findings in the onshore survey area

4.6.4.1 The findings of the site-specific surveys undertaken for breeding birds in the onshore survey area during the 2022 and 2023 breeding seasons are presented in detail in Volume 3, Annex 4.1: Breeding birds technical report of the ES.

4.6.4.2 During the 2022 breeding season, a total of 40 species of conservation concern were found likely to be holding territory or displaying territorial behaviour within the onshore survey area. A wide range of species was recorded and identified as breeding, including three species of ducks, three of waders, two of owls, two of raptors and 25 passerines comprising species associated with farmland, scrub and woodland habitats. Species from five other taxonomic groups were also identified during the 2022 breeding season. These were doves and pigeons, herons, swifts, partridges, swallows and martins.

4.6.4.3 During the breeding bird surveys completed in 2023, a total of 66 species (45 of conservation concern) were found to be holding territory or displaying territorial behaviour within the onshore survey area. A wide range of species was recorded and identified as potentially holding breeding territories within the survey area, including six species from the geese, ducks and swans group, six species of waders, three of owls, three of raptors and 43 of passerines comprising of species associated with farmland, scrub and woodland habitats. Species from eight other taxonomic groups were also identified during the 2023 breeding season. These were doves and pigeons, herons, kingfishers, partridges, swifts, swallows and martins, rails, and woodpeckers.

4.6.4.4 Combining the results of the breeding bird surveys conducted across both of the 2022 and 2023 breeding seasons, a total of 72 species were identified as likely to be holding breeding territories within the onshore survey area. A list

of the species identified as breeding and holding territory within the survey area during the 2022 and 2023 breeding surveys is shown in **Table 4.11**.

4.6.4.5 Barn owl *Tyto alba* were the only likely breeding species present within the onshore survey area during the 2022 breeding bird surveys that are listed in Schedule 1. Six Schedule 1 species were identified within the survey area following the 2023 breeding surveys. These were avocet, barn owl, black-tailed godwit, Cetti's warbler, kingfisher and little ringed plover *Charadrius dubius*. The avocet, black-tailed godwit and little ringed plover were all located at Newton Marsh SSSI to the south of the A584.

4.6.4.6 Little egret was the only likely breeding species present during the 2022 season which are listed as Annex 1 species. During the 2023 season, two Annex 1 listed species were identified as likely to be holding breeding territories. These were avocet and kingfisher *Alcedo atthis*.

4.6.4.7 A total of 16 species recorded during the 2022 surveys are listed under Section 41 of the Natural Environment and Rural Communities Act 2006. During the 2023 surveys, a total of 15 species listed under Section 41 were recorded.

4.6.4.8 A total of 16 BOCC5 UK red listed and 21 amber listed species were recorded during the 2022 breeding season. During the 2023 surveys a total of 14 red listed species and 23 amber listed species were recorded.

4.6.4.9 The distribution of identified potential breeding territories is presented within Volume 3, Annex 4.1: Breeding birds technical report of the ES.

Table 4.11: Number of breeding territories identified within the survey area during the 2022 and 2023 breeding bird site-specific surveys and details of their conservation and legal protection status

Taxonomic group	Species	Number of territories 2022	Number of territories 2023	Maximum number of territories	UK BOCC5 status	Legislative protection status	Designated site breeding features
Geese, ducks and swans	Canada goose *Branta canadensis*	Not calculated*	7	7	Not assessed	N/A	N/A
	Shelduck	23	14	23	Amber	N/A	Ramsar, SSSI
	Shoveler	0	4	4	Amber	N/A	Ramsar, SSSI
	Gadwall	0	1	1	Amber	N/A	SSSI
	Mallard	36	7	36	Amber	N/A	SPA, SSSI
	Teal	1	1	1	Amber	N/A	SPA, Ramsar, SSSI
Pheasants and partridges	Grey partridge *Perdix perdix*	3	1	3	Red	Section 41	N/A
Swifts	Swift *Apus apus*	4	0	4	Red	N/A	N/A
Cuckoos, doves and pigeons	Stock dove *Colmba oenas*	3	1	3	Amber	N/A	N/A
Rails, crakes and coots	Moorhen	0	3	3	Amber	N/A	SSSI
	Coot	0	1	1	Green	N/A	SSSI
Waders	Oystercatcher	14	18	18	Amber	N/A	Ramsar, SSSI
	Avocet	0	5	5	Amber	Annex 1 Schedule 1	N/A
	Lapwing	25	33	33	Red	Section 41	SPA, Ramsar, SSSI
	Little ringed plover	0	1	1	Green	Schedule 1	N/A

Taxonomic group	Species	Number of territories 2022	Number of territories 2023	Maximum number of territories	UK BOCC5 status	Legislative protection status	Designated site breeding features
	Curlew	2	0	2	Red	Section 41	Ramsar, SSSI
	Black-tailed godwit	0	1	1	Red	Schedule 1 Section 41	Ramsar
	Redshank	0	4	4	Amber	N/A	Ramsar, SSSI
Herons	Grey heron	0	7	7	Green	N/A	SSSI
	Little egret	1	0	1	Green	Annex 1	N/A
Kingfishers	Kingfisher	0	3	3	Green	Annex 1 Schedule 1	N/A
Raptors	Sparrowhawk	1	3	3	Amber	N/A	SSSI
	Buzzard	0	2	2	Green	N/A	SSSI
	Kestrel	9	9	9	Amber	N/A	SSSI
Owls	Barn owl	2	5	5	Green	Schedule 1	N/A
	Little owl	0	1	1	Not assessed	N/A	N/A
	Tawny owl	1	1	1	Amber	N/A	SSSI
Woodpeckers	Great spotted woodpecker	0	5	5	Green	N/A	SSSI
Swallows and martins	Swallow	0	14	14	Green	N/A	N/A
	House martin	5	4	5	Red	N/A	N/A
Passerines	Jay	Not calculated*	3	3	Green	N/A	N/A
	Rook	2**	2**	2**	Amber	N/A	N/A
	Coal tit	Not calculated*	3	3	Green	N/A	N/A

Taxonomic group	Species	Number of territories 2022	Number of territories 2023	Maximum number of territories	UK BOCC5 status	Legislative protection status	Designated site breeding features
	Blue tit	Not calculated*	30	30	Green	N/A	N/A
	Great tit	Not calculated*	33	33	Green	N/A	N/A
	Skylark	51	74	74	Red	Section 41	SSSI
	Cetti's warbler	0	3	3	Green	N/A	N/A
	Long-tailed tit	Not calculated*	8	8	Green	N/A	N/A
	Willow warbler	9	21	21	Amber	N/A	N/A
	Chiffchaff	Not calculated*	72	72	Green	N/A	SSSI
	Sedge warbler	10	55	55	Amber	N/A	N/A
	Reed warbler	Not calculated*	11	11	Green	N/A	N/A
	Grasshopper warbler	1	4	4	Red	Section 41	N/A
	Blackcap	Not calculated*	32	32	Green	N/A	SSSI
	Lesser whitethroat	Not calculated*	8	8	Green	N/A	N/A
	Common whitethroat	37	45	45	Amber	N/A	N/A
	Wren	8	49	49	Amber	N/A	N/A
	Nuthatch	Not calculated*	8	8	Green	N/A	N/A

Taxonomic group	Species	Number of territories 2022	Number of territories 2023	Maximum number of territories	UK BOCC5 status	Legislative protection status	Designated site breeding features
	Treecreeper	Not calculated*	9	9	Green	N/A	N/A
	Starling	9	10	10	Red	Section 41	N/A
	Song thrush	29	57	57	Amber	Section 41	N/A
	Mistle thrush	2	7	7	Red	N/A	N/A
	Blackbird	Not calculated*	70	70	Green	N/A	N/A
	Robin	Not calculated*	69	69	Green	N/A	N/A
	Redstart	1	0	1	Amber	N/A	SSSI
	Stonechat	1	6	6	Green	N/A	SSSI
	Wheatear	2	0	2	Amber	N/A	SSSI
	Tree sparrow	18	10	18	Red	Section 41	N/A
	House sparrow	14	1	14	Red	Section 41	N/A
	Dunnock	6	33	33	Amber	Section 41	N/A
	Yellow wagtail	2	0	2	Red	Section 41	SSSI
	Grey wagtail	2	1	2	Amber	N/A	N/A
	Pied wagtail	Not calculated*	10	10	Green	N/A	N/A
	Meadow pipit	11	7	11	Amber	N/A	SSSI
	Chaffinch	Not calculated*	41	41	Green	N/A	N/A
	Bullfinch	1	5	5	Amber	Section 41	N/A

Taxonomic group	Species	Number of territories 2022	Number of territories 2023	Maximum number of territories	UK BOCC5 status	Legislative protection status	Designated site breeding features
	Greenfinch	23	28	28	Red	N/A	N/A
	Linnet	15	13	15	Red	Section 41	N/A
	Goldfinch	Not calculated*	9	9	Green	N/A	N/A
	Corn bunting	3	9	9	Red	Section 41	SSSI
	Yellowhammer	7	4	7	Red	Section 41	N/A
	Reed bunting	27	54	54	Amber	Section 41	SSSI

* No data was collected on these species during the first year as they are not of conservation concern. ** Relates to the number of rookeries, there are at least 35 nests between these two rookeries.

Wintering and migratory bird survey findings in the onshore survey area

2022 to 2023 non-breeding season

4.6.4.10 The findings of the surveys undertaken for wintering and migratory birds from September 2022 to March 2023 and September 2023 to March 2024 are presented in detail in Volume 3, Annex 4.2: Wintering and migratory birds technical report of the ES.

4.6.4.11 A total of 36 waterbird species, 32 passerines and seven raptor species were recorded during wintering and migratory bird surveys of the survey area during the 2022 to 2023 non-breeding season. Additionally, two dove and pigeon species, one woodpecker species, one owl species and one kingfisher species were also recorded. A wide range of waterbird species were recorded, including 14 species from the geese, ducks and swans group, 13 waders, five gulls, two species of herons, one species from the cormorant group and one species from the rail group. A list of the species recorded within the survey area during the wintering and migratory surveys is shown in **Table 4.12**.

4.6.4.12 During the 2022 to 2023 surveys, nine wintering species that are features of the SPAs within the study area had monthly peak counts exceeding 0.5% of the GB population, which is one of Natural England's criteria for the FLL threshold (Bowland Ecology, 2021). These species were: pink-footed goose, whooper swan, shelduck, wigeon, teal, golden plover, curlew, black-tailed godwit, and little egret.

4.6.4.13 Six of the recorded waterbird species (whooper swan, avocet, ruff, barnacle goose, golden plover and little egret) are listed as Annex 1 species of the EU Habitats Directive. Four of the recorded raptors (peregrine, merlin, marsh harrier, and red kite) are listed as Annex 1 species of the EU Habitats Directive. Kingfisher are also an Annex 1 listed species.

4.6.4.14 Four of the recorded waterbird species (black-tailed godwit, curlew, lapwing and herring gull) are listed under Section 41 of the Natural Environment and Rural Communities Act 2006. There was a total of 11 species listed under Section 41 of the Natural Environment and Rural Communities Act 2006 recorded during the supplementary walkover surveys, including starling, linnet, skylark, reed bunting, tree sparrow, song thrush, bullfinch, dunnock, corn bunting, yellowhammer, and lesser redpoll.

4.6.4.15 A total of 19 species recorded during the survey are red listed on the BOCC5 UK. 33 species recorded are amber listed on BOCC5 UK.

2023 to 2024 non-breeding season

4.6.4.16 During the wintering and migratory bird surveys undertaken in the 2023 to 2024 non-breeding season, a total of 39 waterbird species, 41 passerine species and six raptor species were recorded. Additionally, four doves and pigeons, one woodpecker species, one owl species, one pheasant species and one kingfisher species were also recorded. A wide range of waterbird species were recorded including 13 species from the geese, ducks and

swans family group, 13 waders, five gulls, four species of herons, one species from the cormorant group and three species from the rails, crakes and coots family group (**Table 4.12**).

4.6.4.17 There were 11 wintering species recorded that are features of the SPAs within the study area that had monthly peak counts exceeding 0.5% of the GB population, which is one of Natural England's criteria for the FLL threshold (Bowland Ecology, 2021). These species were: pink-footed goose, whooper swan, shelduck, wigeon, teal, golden plover, oystercatcher, curlew, black-tailed godwit, redshank, and little egret.

4.6.4.18 Seven of the recorded waterbird species (whooper swan, avocet, bar-tailed godwit, barnacle goose, golden plover, great white egret and little egret) are listed as Annex 1 species of the EU Habitats Directive. Three of the recorded raptors (peregrine, merlin and marsh harrier) are listed as Annex 1 species of the EU Habitats Directive. Kingfisher are also an Annex 1 listed species and were recorded during the surveys.

4.6.4.19 Four of the recorded waterbird species (black-tailed godwit, curlew, lapwing and herring gull) are listed under Section 41 of the Natural Environment and Rural Communities Act 2006. There was a total of 11 non-waterbird species listed under Section 41, including skylark, starling, song thrush, tree sparrow, house sparrow, dunnock, bullfinch, twite, linnet, yellowhammer and reed bunting.

4.6.4.20 A total of eight of the waterbird species recorded are red listed in the BOCC5 UK red list. There were 11 non-waterbird species recorded that are listed on the BOCC5 UK red list. A total of 23 of the waterbird species recorded are amber listed in BOCC5 UK and a further 12 non-waterbird species that are BOCC5 UK amber listed were recorded.

Wintering and migratory assemblage

4.6.4.21 Both the desk-based study and site-specific surveys show that the survey area during winter and migration periods is important either locally or nationally for several ornithological features, including waders, raptors, passerines, geese, ducks and swans. In particular, areas of importance for waterbirds (especially pink-footed goose and whooper swan) are located at the FLL at Lytham Moss, Newton Marsh SSSI (and the flooded fields to the north) and in the fields to the south of the River Ribble. Wintering passerines and raptors species were more widespread throughout the survey area. Many of the passerine species of conservation concern are sedentary (e.g., corn bunting and tree sparrow) and are found within their breeding territories. The more migratory species (e.g., lesser redpoll) come from higher latitudes and/or altitudes and may be more wide ranging in their habitats. Some species (e.g., skylark and starling) are resident but are also joined by birds from the north and may form feeding flocks over the winter months.

Table 4.12: Abundance of species recorded during the wintering and migratory bird survey (September 2022 to March 2024)

Taxonomic group	Species	Peak count recorded in 2022 to 2023	Peak count recorded in 2023 to 2024	UK BOCC5 status	Legislative protection status	Non-breeding designated site feature
Geese, ducks and swans	Brent goose	12	0	Amber	Section 41	SPA
	Canada goose	420	636	Not listed		
	Barnacle goose	1	12	Amber	Annex 1	
	Greylag goose	12	517	Amber		
	Pink-footed goose	5,324	8,319	Amber		SPA, Ramsar, SSSI
	Mute swan	4	24	Green		
	Whooper swan	132	123	Amber	Annex 1	SPA, Ramsar, SSSI
	Shelduck	75	374	Amber		SPA, Ramsar, SSSI
	Shoveler	29	31	Amber		SPA, SSSI
	Gadwall	1	11	Amber		SPA, SSSI
	Wigeon	1,647	878	Amber		SPA, Ramsar, SSSI
	Mallard	273	161	Amber		SPA, SSSI
	Teal	261	312	Amber		SPA, Ramsar, SSSI
	Goosander	2	4	Green		
Pheasants	Pheasant	Not counted	16	Not listed		
Doves and pigeons	Feral pigeon	Not counted	19	Green		
	Stock dove	6	29	Amber		
	Woodpigeon	18	687	Amber		
	Collared dove	Not counted	8	Green		

Taxonomic group	Species	Peak count recorded in 2022 to 2023	Peak count recorded in 2023 to 2024	UK BOCC5 status	Legislative protection status	Non-breeding designated site feature
Rails, crakes and coots	Water rail	0	1	Green		
	Moorhen	1	16	Amber		
	Coot	0	6	Green		
Waders	Oystercatcher	9	126	Amber		SPA, Ramsar, SSSI
	Avocet	6	17	Amber	Annex 1	SSSI
	Lapwing	763	2,081	Red	Section 41	SPA, Ramsar, SSSI
	Golden plover	100	381	Green	Annex 1	SPA, Ramsar, SSSI
	Grey plover	2	0	Amber		SPA, Ramsar, SSSI
	Curlew	410	696	Red	Section 41	SPA, Ramsar, SSSI
	Bar-tailed godwit	0	3	Amber	Annex 1	SPA, Ramsar, SSSI
	Black-tailed godwit	390	423	Red	Section 41	SPA, Ramsar, SSSI
	Ruff	2	0	Red	Annex 1	SPA, Ramsar, SSSI
	Woodcock	1	6	Red		
	Jack snipe	1	3	Green		
	Snipe	78	72	Amber		SPA, SSSI
	Green sandpiper	1	1	Amber		
	Redshank	7	61	Amber		SPA, Ramsar, SSSI
Gulls and terns	Black-headed gull	1,123	1,927	Amber		SPA, Ramsar
	Common gull	461	404	Red		SPA

Taxonomic group	Species	Peak count recorded in 2022 to 2023	Peak count recorded in 2023 to 2024	UK BOCC5 status	Legislative protection status	Non-breeding designated site feature
	Great black-backed gull	36	44	Red		
	Herring gull	185	1,009	Red	Section 41	SPA
	Lesser black-backed gull	152	176	Amber		SPA, NNR
Cormorants and shags	Cormorant	2	6	Green		SPA, Ramsar
Herons	Cattle egret	0	1	Amber		
	Grey heron	28	36	Green		
	Great white egret	0	1	Amber		
	Little egret	38	27	Green	Annex 1	SPA
Raptors	Sparrowhawk	3	8	Amber		
	Marsh harrier	1	1	Amber	Annex 1	
	Red kite	1	0	Green	Annex 1	
	Buzzard	30	30	Green		
	Kestrel	9	25	Amber		
	Merlin	1	1	Red	Annex 1	
	Peregrine	2	2	Green	Annex 1	
Owls	Barn owl	0	9	Green	Schedule 1	
	Little owl	1	0	Not assessed		
Kingfishers	Kingfisher	1	4	Green	Schedule 1	

Taxonomic group	Species	Peak count recorded in 2022 to 2023	Peak count recorded in 2023 to 2024	UK BOCC5 status	Legislative protection status	Non-breeding designated site feature
Woodpeckers	Great spotted woodpecker	2	3	Green		
Swallows	Swallow	2	0	Green		
Passerines	Jay	3	6	Green		
	Magpie	Not counted	90	Green		
	Jackdaw	Not counted	325	Green		
	Rook	19	255	Amber		
	Carrion crow	Not counted	312	Green		
	Raven	7	6	Green		
	Coal tit	Not counted	13	Green		
	Blue tit	Not counted	110	Green		
	Great tit	Not counted	59	Green		
	Skylark	78	98	Red	Section 41	
	Cetti's warbler	0	1	Green	Schedule 1	
	Long-tailed tit	31	197	Green		
	Chiffchaff	1	3	Green		
	Goldcrest	2	11	Green		
	Wren	19	90	Amber		
	Nuthatch	1	3	Green		
	Treecreeper	1	5	Green		

Taxonomic group	Species	Peak count recorded in 2022 to 2023	Peak count recorded in 2023 to 2024	UK BOCC5 status	Legislative protection status	Non-breeding designated site feature
	Starling	4,350	7,579	Red	Section 41	
	Song thrush	19	300	Amber	Section 41	
	Mistle thrush	4	22	Red		
	Redwing	192	196	Amber		
	Blackbird	8	221	Green		
	Fieldfare	1,170	1,325	Red		
	Robin	Not counted	101	Green		
	Whinchat	3	0	Red		
	Stonechat	6	20	Green		SSSI
	Tree sparrow	20	18	Red	Section 41	
	House sparrow	0	40	Red	Section 41	
	Dunnock	3	43	Amber	Section 41	
	Grey wagtail	6	2	Amber		
	Pied wagtail	50	31	Green		
	Meadow pipit	61	147	Amber		
	Chaffinch	36	82	Green		
	Brambling	0	3	Green		
	Bullfinch	7	9	Amber	Section 41	
	Greenfinch	34	77	Red		
	Twite	0	3	Red	Section 41	

Taxonomic group	Species	Peak count recorded in 2022 to 2023	Peak count recorded in 2023 to 2024	UK BOCC5 status	Legislative protection status	Non-breeding designated site feature
	Linnet	304	730	Red	Section 41	
	Lesser redpoll	1	0	Red	Section 41	
	Goldfinch	58	134	Green		
	Siskin	14	24	Green		
	Snow bunting	1	0	Amber		
	Corn bunting	3	0	Red	Section 41	
	Yellowhammer	9	3	Red	Section 41	
	Reed bunting	14	56	Amber	Section 41	

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Intertidal bird survey findings

4.6.4.22 The findings of the surveys undertaken for intertidal waterbirds in the coastal survey area and the estuarine survey area are presented in detail in Volume 3, Annex 4.3: Intertidal birds technical report of the ES.

Coastal survey area

4.6.4.23 From the surveys, there is evidence that the intertidal habitats within the coastal survey area support a wader assemblage that is of importance in the context of the Ribble and Alt Estuaries SPA population. Sanderling were observed to forage or roost in large numbers, up to 71.95% of the SPA population (citation value), along the tide line (peak count of 4,702 individuals in February 2022) and there was a large influx of up to 10.67% of the SPA dunlin population at citation (peak count of 4,200 individuals) in the study area during February 2022. There were higher peaks for most wader species during the 2021/22 winter than 2022/23, the exception to this being oystercatcher with a February 2023 peak of 1,073. During autumn passage (July to October) 2022 saw a peak count of 353 post breeding lesser black-backed gull, whereas 2023 saw 93 ringed plover, 427 sandwich tern and 90 common tern.

4.6.4.24 Additionally, intertidal habitats at the landfall support an over-wintering population of redshank (annual peak count of 70 individuals, which equates to 2.79% of the SPA population at citation) and turnstone (annual peak count of 142 individuals, not a qualifying species of the SPA). The nearshore waters also support a high number of common scoter (4,000 in August 2022) and low numbers of red-throated diver (14 in September 2023). The abundance of waterbird species recorded during the surveys of the coastal survey area is provided in **Table 4.13**.

Estuarine survey area

4.6.4.25 The surveys show that the estuarine survey area supports numbers of lapwing (444), curlew (24), oystercatcher (54), redshank (40), teal (275) and wigeon (822) in the intertidal habitats and channels alongside moderate numbers of naturalised Canada and greylag goose and large numbers of mallard. The most common gull species were black-headed gull (296) and herring gull (156), the area was used by low numbers of lesser black-backed gull and common tern during the breeding season. In total there were 33 waterbird species recorded using the area between October 2022 and March 2024 with at least 3,031 individual waterbirds recorded. The annual abundance of waterbird species recorded during the surveys of the estuarine survey area is provided in **Table 4.14**.

Table 4.13: Peak abundance of waterbirds recorded in the coastal survey area during site-specific surveys (September 2021 to August 2023)

Taxonomic group	Species	Peak count 2021/22	Peak count 2022/23	UK BOCC5 status	Conservation status	Designated site feature or assemblage component
Geese, ducks and swans	Bar-headed goose	0	2	No status		
	Shelduck	1 (May)	1 (Oct, May, June)	Amber		SPA, Ramsar, SSSI
	Scaup	0	4 (February)	Red	Schedule 1	SPA
	Eider	0	5 (October)	Amber		SPA, Ramsar
	Common scoter	4,000 (August)	3,934 (January)	Red	Schedule 1, Section 41	SPA, Ramsar
Grebes	Great crested grebe	0	2 (Sep, Feb, March)	Green		Ramsar
Waders	Oystercatcher	822 (January)	1,073 (February)	Amber		SPA, Ramsar, SSSI
	Golden plover	1 (November)	0	Green	Annex 1	SPA, Ramsar, SSSI
	Grey plover	118 (April)	62 (February)	Amber		SPA, Ramsar, SSSI
	Ringed plover	37 (February)	93 (August)	Red		SPA, Ramsar, SSSI
	Whimbrel	4 (April)	6 (May)	Red	Schedule 1	SPA
	Curlew	9 (December)	1 (Oct, Dec, January)	Red	Section 41	SPA, Ramsar, SSSI
	Bar-tailed godwit	625 (November)	500 (November)	Amber	Annex 1	SPA, Ramsar, SSSI

Taxonomic group	Species	Peak count 2021/22	Peak count 2022/23	UK BOCC5 status	Conservation status	Designated site feature or assemblage component
	Turnstone	142 (February)	143 (January)	Amber		SPA, Ramsar, SSSI
	Knot	370 (December)	300 (Dec, March)	Amber		SPA, Ramsar, SSSI
	Sanderling	4,702 (February)	2,000 (Jan, February)	Amber		SPA, Ramsar, SSSI
	Dunlin	4,200 (February)	677 (March)	Red		SPA, Ramsar, SSSI
	Redshank	70 (January)	33 (February)	Amber		SPA, Ramsar, SSSI
Gulls and terns	Kittiwake	2 (July))	0	Red		
	Black-headed gull	877 (February)	620 (January)	Amber		SPA, Ramsar, SSSI
	Mediterranean gull	1 (December)	0	Amber		SPA
	Common gull	438 (Jan, February)	750 (January)	Red		SPA
	Great black-backed gull	17 (September)	23 (December)	Red		
	Herring gull	1,543 (May)	1,600 (November)	Red		SPA
	Lesser black-backed gull	353 (August)	210 (June)	Amber		SPA, SSSI, NNR
	Sandwich tern	84 (July))	427 (August)	Amber		SPA
	Little tern	1 (July))	0	Amber		SPA

Taxonomic group	Species	Peak count 2021/22	Peak count 2022/23	UK BOCC5 status	Conservation status	Designated site feature or assemblage component
	Common tern	29 (June)	90 (August)	Amber		SPA, Ramsar, SSSI
Skuas	Arctic skua	0	3 (August)	Red		
Auks	Guillemot	1 (August)	3 (July))	Amber		
Divers	Red-throated diver	6 (August)	14 (September)	Green	Annex 1, Schedule 1	SPA, Ramsar
Seabirds	Manx shearwater	0	77 (July))	Amber	Annex 1	
Cormorants and shags	Cormorant	14 (August)	112 (December)	Green	Section 41	SPA, Ramsar
Herons, storks and ibis	Grey heron	0	1 (October)	Green		
	Little egret	2 (June)	4 (October)	Green	Annex 1	SPA

Table 4.14: Peak abundance of waterbirds recorded in the estuarine survey area during the site-specific surveys (October 2022 to March 2024)

Taxonomic group	Species	Peak count 2022/23	Peak count 2023/24	UK BOCC5 status	Conservation status	Designated site feature or assemblage component
Geese, ducks and swans	Canada goose	282 (October)	268 (December)	Green		
	Greylag goose	84 (August)	67 (October)	Amber		
	Mute swan	0	2 (October)	Green		
	Whooper swan	30 (December)	0	Amber	Annex 1, Schedule 1	SPA, Ramsar, SSSI
	Shelduck	11 (January, April)	66 (February)	Amber		SPA, Ramsar, SSSI
	Wigeon	822 (December)	670 (January)	Amber		SPA, Ramsar, SSSI
	Mallard	60 (November)	88 (January)	Amber		SPA, SSSI
	Teal	275 (January)	167 (December)	Amber		SPA, Ramsar, SSSI
	Goldeneye	1 (December)	0	Red		SPA
	Goosander	5 (March)	9 (December)	Green		
Waders	Oystercatcher	54 (February)	28 (March)	Amber		SPA, Ramsar, SSSI
	Lapwing	444 (December)	82 (September)	Red	Section 41	SPA, Ramsar, SSSI
	Grey plover	2 (November)	0	Amber		SPA, Ramsar, SSSI
	Curlew	24 (November)	10 (October)	Red	Section 41	SPA, Ramsar, SSSI
	Black-tailed godwit	14 (December)	0	Red	Schedule 1, Section 41	SPA, Ramsar, SSSI
	Dunlin	222 (January)	46 (October)	Red		SPA, Ramsar, SSSI
	Jack snipe	0	1 (October)	Green		
	Snipe	13 (October)	21 (October)	Amber		SPA, SSSI

Taxonomic group	Species	Peak count 2022/23	Peak count 2023/24	UK BOCC5 status	Conservation status	Designated site feature or assemblage component
	Common sandpiper	4 (July)	1 (September – March)	Amber		SSSI
	Green sandpiper	1 (October, July))	1 (February)	Amber	Schedule 1	
	Redshank	40 (November)	22 (January)	Amber		SPA, Ramsar, SSSI
	Greenshank	0	1 (September)	Amber	Schedule 1	SPA, SSSI
Gulls and terns	Black-headed gull	296 (January)	80 (January)	Amber		SPA, SSSI
	Common gull	8 (February)	3 (September)	Red		SPA
	Great black-backed gull	5 (October)	5 (September)	Red		
	Herring gull	156 (October)	83 (September)	Red	Section 41	SPA
	Lesser black-backed gull	41 (June)	2 (September)	Amber		SPA, Ramsar, SSSI
	Common tern	5 (May)	0	Amber	Annex 1	SPA, Ramsar, SSSI
Cormorants and shags	Cormorant	11 (November)	5 (December)	Green		SPA
Herons, storks and ibis	Cattle egret	3 (October)	0	Amber		
	Grey heron	4 (November)	8 (October)	Green		
	Little egret	3 (December, March, May, June)	10 (September)	Green	Annex 1	SPA
Kingfishers	Kingfisher	1 (November)	1 (February)	Green	Annex 1, Schedule 1	

4.6.5 Future baseline conditions

4.6.5.1 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 require that 'an outline of the likely evolution thereof without implementation of the 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 ES. This section provides an outline of the likely future baseline conditions in the absence of the Transmission Assets, as far as changes are reasonably foreseeable.

4.6.5.2 WeBS alerts (Woodward *et al*. 2019) were consulted to ascertain the current population trends at sites where data was available. The WeBS alerts interface gives population trends for designated waterbird species within SPAs and SSSIs. Current trends indicate a predominantly decreasing pattern in the population of qualifying species for SPAs identified in **section 4.6.2** that are assessed for WeBS alerts.

4.6.5.3 For migratory birds, many of the current and future threats relate to changing availability of wintering, stopover and breeding locations along migratory pathways. Migratory species differ from other species because individuals depend on multiple locations that may be spread over continents, and individual sites can support substantial proportions of entire populations during annual migrations. The loss of key locations at any point on migratory routes can therefore have far-reaching consequences for whole populations. As such, environmental changes taking place on the breeding grounds (e.g., in the Arctic and the sub-Arctic regions for wader species) can impact population size on the wintering grounds (e.g., in the temperate and tropical regions).

4.6.5.4 There are a number of short-term or persistent processes that are likely to affect populations significantly. Sutherland *et al*. (2012), in a horizon scanning of current and potential future threats to migratory waders, listed punctuated threats (e.g., volcano eruption), gradual threats (e.g., climate change) and future threats (e.g., microplastic pollution). The biggest threat to waterbirds is habitat loss, be it by destruction or degradation, including intertidal reclamation in estuaries, changes in agricultural practices, drainage, pollution, disturbance, dredging, river management and ploughing up of grasslands. In addition, sea-level rise due to climate change is predicted to reduce the availability of intertidal habitats used by foraging waterbirds. Climate change may also lead to a shift in the distribution of breeding and wintering birds. Therefore, the combined effect of land use change and climate change may result in population changes at the medium to long-term scale.

4.6.5.5 Lastly, the prevalence of Highly Pathogenic Avian Influenza (HPAI) in wild bird populations may impact abundance and vital rates (productivity and survival) of birds in the short, medium and long-term. Although the long-term impact and spread across bird taxa is unclear, there is increasing evidence that some populations (e.g., seabirds and waterbirds) have been severely affected, with thousands of suspected deaths resulting from infection (Lane *et al*., 2023; NatureScot, 2023; BTO, 2023a).

4.6.5.6 Although future impacts upon certain species may be hard to predict and quantify accurately, with some species being hit harder than others (e.g., black-headed gull and common tern being hit harder than other species by HPAI outbreaks during the 2023 summer), the BOCC is updated at regular intervals to reflect changes in population trends. The BOCC5 list has been used as a tool in determining the conservation status and sensitivity of species.

4.6.6 Key receptors

4.6.6.1 In accordance with the CIEEM Guidelines on Ecological Impact Assessment (CIEEM, 2022), the assessment of the likely ecological effects of the Transmission Assets has focused on and identified IEFs. IEFs are species of medium, high and very high conservation importance, present within the onshore survey area, estuarine survey area and coastal survey area that may be likely to be affected as a result of the Transmission Assets.

4.6.6.2 The conservation importance of ornithological receptors is based on the population from which individuals are predicted to be drawn. This reflects current understanding of the movements of species, with site-based protection (e.g., SPAs) generally limited to specific periods of the year (e.g., the breeding season). Therefore, conservation importance can vary throughout the year depending on the relative sizes of the number of individuals predicted to be at risk of impact and the population from which they are estimated to be drawn. Conservation importance also considers species of national importance, regional importance and local importance, for which the criteria are defined in **Table 4.15**.

4.6.6.3 Although this assessment has not focused upon sites (internationally designated sites are assessed in depth in the HRA Stage 1 Screening Report, and the Habitats Regulations Assessment Stage 2 Information to Support an Appropriate Assessment: Part Three – Special Protection Areas (SPA) and Ramsar Site Assessments), the features have been used to inform the conservation importance of IEFs (**Table 4.15**), and a full list of all sites and named features can be found in **Table 4.7**, **Table 4.8**, and **Table 4.9**.

4.6.6.4 Therefore, impacts upon the sites themselves are assessed through their features as per CIEEM guidance (CIEEM, 2022), and the mitigation hierarchy applied as necessary. With the exception of the Ribble and Alt Estuaries SPA and Ramsar (which are fully assessed in Habitats Regulations Assessment Stage 2 Information to Support an Appropriate Assessment: Part Three – Special Protection Areas (SPA) and Ramsar Site Assessments) and the SSSI that underpins it, as well as the Lytham Moss BHS, there will be no direct impacts (e.g., habitat loss) upon any ornithologically designated sites,. Lytham Moss is a locally designated site that is also recognised as having high potential for being FLL by Natural England (Bowland Ecology, 2021), and the applicants have committed to mitigating for impacts upon sensitive IEFs within this area (CoT107, **Table 4.19**).

4.6.6.5 For the purposes of this assessment, IEFs are identified as those species of medium (BOCC listed species) to very high (SPA or Ramsar features) conservation importance as defined by the criteria listed in **Table 4.15** and in line with CIEEM guidance (2022).

Table 4.15: Definition of conservation importance of the receptor

Conservation importance	Definition
Very High	One of the following criteria indicates that the species is of international/European importance. The criteria are: • a species that is a cited interest feature of SPA or Ramsar within the study area individually or as part of an assemblage; or • the population present within the survey area exceeds 1 % threshold of international importance.
High	One of the following criteria indicates that the species is of national importance. The criteria are: • a species that is listed on Annex 1 of the EU Birds Directive and exceeds 1 % threshold of national importance; • a species that is listed on Schedule 1 of the Wildlife and Countryside Act 1981 and present during the breeding season; • a species that are named features of a SSSI within the study area individually or as part of an assemblage; or • the population present within survey area exceeds 1 % threshold of national importance.
Medium	One of the following criteria indicates that the species is of regional importance. The criteria are: • a species that is listed on the BOCC5 UK red list or BOCC5 UK amber list; • a species that is listed on Section 41 of the Natural Environment and Rural Communities Act 2006; or • a species that is considered to be of regional significance due to population size or distribution restrictions.
Low	The species is of local importance and is listed on the BOCC5 UK green list.
Negligible	All species of lowest conservation importance.

4.6.6.6 **Table 4.16** identifies the individual IEF species taken forward into the assessment. The IEF includes a total of 112 species. Of these, 43 are cited features of either SPAs or Ramsar sites (species of international/European importance) within the study area and therefore considered of very high conservation value. A further 40 species are considered to be of high conservation value. An additional 29 species are considered to be of medium importance.

Table 4.16: IEFs considered for assessment based on their medium to very high conservation value

Taxonomic group	Species	Season recorded within survey area	SPA or Ramsar feature	Annex 1 listed	Schedule 1 listed	Section 41	SSSI feature	Conservation value
Geese, ducks and swans	Brent goose	Non-breeding				Yes		Medium
	Barnacle goose	Non-breeding		Yes				High
	Greylag goose	Non-breeding						Medium
	Pink-footed goose	Non-breeding	Yes				Yes	Very high
	Mute swan	Non-breeding					Yes	High
	Whooper swan	Non-breeding	Yes	Yes	Yes		Yes	Very high
	Shelduck	Breeding and non-breeding	Yes				Yes	Very high
	Shoveler	Breeding and non-breeding	Yes				Yes	Very high
	Gadwall	Breeding and non-breeding	Yes				Yes	Very high
	Wigeon	Non-breeding	Yes				Yes	Very high
	Mallard	Breeding and non-breeding	Yes				Yes	Very high
	Teal	Breeding and non-breeding	Yes				Yes	Very high
	Scaup	Non-breeding	Yes		Yes	Yes		Very high
	Eider	Non-breeding	Yes					Very high
	Common scoter	Non-breeding	Yes		Yes	Yes		Very high
	Goldeneye	Non-breeding	Yes					Very high
Partridges	Grey partridge	Breeding				Yes		Medium
Rails, crakes and coots	Moorhen	Breeding and non-breeding					Yes	High
	Coot	Breeding and non-breeding					Yes	High

Taxonomic group	Species	Season recorded within survey area	SPA or Ramsar feature	Annex 1 listed	Schedule 1 listed	Section 41	SSSI feature	Conservation value
Grebes	Great crested grebe	Non-breeding	Yes				Yes	Very high
Waders	Oystercatcher	Breeding and non-breeding	Yes				Yes	Very high
	Avocet	Breeding and non-breeding		Yes	Yes		Yes	High
	Lapwing	Breeding and non-breeding	Yes			Yes	Yes	Very high
	Golden plover	Non-breeding	Yes	Yes			Yes	Very high
	Grey plover	Non-breeding	Yes				Yes	Very high
	Ringed plover	Non-breeding	Yes				Yes	Very high
	Little ringed plover	Breeding			Yes			High
	Whimbrel	Breeding (migration)	Yes		Yes			Very high
	Curlew	Breeding and non-breeding	Yes			Yes	Yes	Very high
	Bar-tailed godwit	Non-breeding	Yes	Yes			Yes	Very high
	Black-tailed godwit	Breeding and non-breeding	Yes		Yes	Yes	Yes	Very high
	Turnstone	Non-breeding	Yes				Yes	Very high
	Knot	Non-breeding	Yes				Yes	Very high
	Ruff	Non-breeding	Yes	Yes	Yes		Yes	Very high
	Sanderling	Non-breeding	Yes				Yes	Very high
	Dunlin	Non-breeding	Yes				Yes	Very high
	Woodcock	Non-breeding					Yes	High
	Snipe	Non-breeding	Yes				Yes	Very high
	Common sandpiper	Non-breeding					Yes	High

Taxonomic group	Species	Season recorded within survey area	SPA or Ramsar feature	Annex 1 listed	Schedule 1 listed	Section 41	SSSI feature	Conservation value
	Green sandpiper	Non-breeding			Yes			High
	Redshank	Breeding and non-breeding	Yes				Yes	Very high
	Greenshank	Non-breeding	Yes		Yes		Yes	Very high
Gulls and terns	Kittiwake	Breeding						Medium
	Black-headed gull	Non-breeding	Yes				Yes	Very high
	Mediterranean gull	Non-breeding	Yes	Yes	Yes			Very high
	Common gull	Non-breeding	Yes					Very high
	Great black-backed gull	Non-breeding						Medium
	Herring gull	Breeding	Yes			Yes		Very high
	Lesser black-backed gull	Non-breeding	Yes				Yes	Very high
	Sandwich tern	Breeding	Yes	Yes				Very high
	Little tern	Breeding	Yes	Yes				Very high
	Common tern	Breeding	Yes	Yes				Very high
Skuas	Arctic skua	Breeding						Medium
Auks and seabirds	Guillemot	Breeding and non-breeding						Medium
	Manx shearwater	Breeding		Yes				High
Divers	Red-throated diver	Non-breeding	Yes	Yes	Yes			Very high
Cormorants and shags	Cormorant	Non-breeding	Yes					Very high
	Cattle egret	Non-breeding						Medium

Taxonomic group	Species	Season recorded within survey area	SPA or Ramsar feature	Annex 1 listed	Schedule 1 listed	Section 41	SSSI feature	Conservation value
Herons, storks and ibis	Grey heron	Breeding and non-breeding					Yes	High
	Great white egret	Non-breeding	Yes	Yes				Very high
	Little egret	Breeding and non-breeding	Yes	Yes				Very high
Owls	Barn owl	Breeding and non-breeding			Yes			High
	Tawny owl	Breeding					Yes	High
Raptors	Sparrowhawk	Breeding and non-breeding					Yes	High
	Marsh harrier	Non-breeding		Yes	Yes			High
	Red kite	Non-breeding		Yes	Yes			High
	Buzzard	Breeding and non-breeding					Yes	High
	Kestrel	Breeding and non-breeding					Yes	High
	Merlin	Non-breeding	Yes	Yes	Yes		Yes	Very high
	Peregrine	Non-breeding		Yes	Yes		Yes	High
Passerines and others	Swift	Breeding						Medium
	Stock dove	Breeding and non-breeding						Medium
	Woodpigeon	Non-breeding						Medium
	Kingfisher	Breeding and non-breeding		Yes	Yes			High
	Great spotted woodpecker	Breeding and non-breeding					Yes	High
	Rook	Breeding and non-breeding						Medium
	Raven	Non-breeding					Yes	High
	Skylark	Breeding and non-breeding				Yes	Yes	High

Taxonomic group	Species	Season recorded within survey area	SPA or Ramsar feature	Annex 1 listed	Schedule 1 listed	Section 41	SSSI feature	Conservation value
	House martin	Breeding						Medium
	Cetti's warbler	Breeding and non-breeding			Yes			High
	Willow warbler	Breeding						Medium
	Chiffchaff	Breeding and non-breeding					Yes	High
	Sedge warbler	Breeding						Medium
	Grasshopper warbler	Breeding				Yes		Medium
	Blackcap	Breeding					Yes	High
	Whitethroat	Breeding						Medium
	Wren	Breeding and non-breeding						Medium
	Starling	Breeding and non-breeding				Yes		Medium
	Song thrush	Breeding and non-breeding				Yes		Medium
	Mistle thrush	Breeding and non-breeding						Medium
	Redwing	Non-breeding			Yes			High
	Fieldfare	Non-breeding			Yes			High
	Redstart	Breeding					Yes	High
	Whinchat	Non-breeding					Yes	High
	Stonechat	Breeding and non-breeding					Yes	High
	Wheatear	Breeding					Yes	High
	Tree sparrow	Breeding and non-breeding				Yes		Medium
	House sparrow	Breeding and non-breeding				Yes		Medium

Taxonomic group	Species	Season recorded within survey area	SPA or Ramsar feature	Annex 1 listed	Schedule 1 listed	Section 41	SSSI feature	Conservation value
	Dunnock	Breeding and non-breeding				Yes		Medium
	Yellow wagtail	Breeding				Yes	Yes	High
	Grey wagtail	Breeding and non-breeding					Yes	High
	Meadow pipit	Breeding and non-breeding					Yes	High
	Brambling	Non-breeding			Yes			High
	Bullfinch	Breeding and non-breeding				Yes		Medium
	Greenfinch	Breeding and non-breeding						Medium
	Twite	Non-breeding				Yes	Yes	High
	Linnet	Breeding and non-breeding				Yes		Medium
	Lesser redpoll	Non-breeding				Yes		Medium
	Snow bunting	Non-breeding			Yes			High
	Corn bunting	Breeding				Yes	Yes	High
	Yellowhammer	Breeding and non-breeding				Yes		Medium
	Reed bunting	Breeding and non-breeding				Yes	Yes	High

4.7 Scope of the assessment

4.7.1.1 The scope of the ES has been developed in consultation with relevant statutory and non-statutory consultees as detailed in **Table 4.4**.

4.7.1.2 Taking into account the scoping and consultation process, including feedback provided on the ISAA, Part 3 (document reference E2.1, 2.2 and 2.3) to improve the consistency between said document and this chapter, **Table 4.17** summarises the matters considered as part of this assessment.

Table 4.17: Impacts considered within this assessment

Activity	Impacts scoped into this assessment
Construction and decommissioning phase	
Construction and decommissioning within the landfall, including the coastal survey area. Construction and decommissioning within the landfall, including the estuarine survey area. Construction and decommissioning along the Onshore Order Limits (plus 500 m buffer for disturbance impacts). Construction and decommissioning of the onshore substations. Construction and decommissioning within FLL at Lytham Moss. Construction and decommissioning within land in proximity to FLL at Newton Marsh.	• Effects due to permanent loss of supporting habitats associated with construction and decommissioning activities. • Effects due to temporary loss of supporting habitats and/or resource availability associated with construction and decommissioning activities. • Effects due to Disturbance and displacement from construction, decommissioning, and operation and maintenance activities associated with construction and decommissioning activities. • Effects due to pollution caused by accidental spills and/or contaminant release from activities associated with construction and decommissioning. • Effects due to the spreading of Invasive Non-native Species (INNS) during the activities associated with construction and decommissioning. • Effects due to the impact of habitat fragmentation and species isolation from activities associated with construction and decommissioning.
Operation and maintenance phase	
Operation and maintenance within the landfall, including the intertidal area. Operation and maintenance of the onshore substations and permanent infrastructure.	• Effects due to Disturbance and displacement from construction, decommissioning, and operation and maintenance activities associated with the operation and maintenance activities. • Effects due to the impact of habitat fragmentation and species isolation from activities associated with the operation and maintenance activities.

4.7.1.3 Impacts that are not likely to result in significant effects have been scoped out of the assessment. A summary of the impacts scoped out, together with justification for scoping them out and whether the approach has been agreed with key stakeholders through either scoping or consultation, is presented in **Table 4.18**.

Table 4.18: Impacts scoped out of the assessment

Impacts	Justification
The impact of temporary and permanent habitat loss on protected habitats and species during operation and maintenance of the onshore elements of the Transmission Assets.	Activities associated with the operation and maintenance of the onshore elements of the Transmission Assets would require no additional land take and are unlikely to result in any temporary or permanent loss of habitat. Therefore, the potential impact on protected habitats and species arising from the temporary and permanent habitat loss during operation and maintenance of the onshore elements of the Transmission Assets is unlikely to result in significant effects and has been scoped out of the assessment for onshore and intertidal ornithology. The Planning Inspectorate confirmed that it is content with this approach through the Scoping Opinion.
The impact of pollution caused by accidental spills/contaminant release on protected habitats and species during operation and maintenance of the onshore elements of the Transmission Assets.	Activities associated with the operation and maintenance of the onshore elements of the Transmission Assets are unlikely to result in accidental spills/contaminant release. Notwithstanding this, best practice measures to be incorporated into an Ecological Management Plan would include measures to avoid or minimise the likelihood and the degree of impact of any accidental pollution event. Therefore, the potential impact of pollution on protected habitats and species arising from accidental spills/contaminant release during operation and maintenance of the onshore elements of the Transmission Assets is unlikely to result in significant effects and has been scoped out of the assessment for onshore and intertidal ornithology. The Planning Inspectorate confirmed that it is content with this approach through the Scoping Opinion.

4.8 Measures adopted as part of the Transmission Assets (commitments)

4.8.1.1 For the purposes of the EIA process, the term ‘measures adopted as part of the Transmission Assets’ is used to include the following two types of mitigation measures (adapted from Institute of Environmental Management and Assessment (IEMA), 2016). These measures are set out in Volume 1, Annex 5.3: Commitments register of the ES.

- Embedded mitigation. This includes the following.
  - Primary (inherent) mitigation - measures included as part of the project design. IEMA describes these as ‘*modifications to the location or design of the development made during the pre-application phase that are an inherent part of the project and do not require additional action to be taken*’. This includes modifications arising through the iterative design process. These measures will be secured through the consent itself through the description of the project and the parameters secured in the DCO and/or marine licences. For example, a reduction in footprint or height.
  - Tertiary (inexorable) mitigation. IEMA describes these as ‘*actions that would occur with or without input from the EIA feeding into the design process. These include actions that will be undertaken to meet other existing legislative requirements, or actions that are considered to be standard practices used to manage commonly occurring environmental effects*’. It may be helpful to secure such measures through a CoCP or similar.

- Secondary (foreseeable) mitigation. IEMA describes these as '*actions that will require further activity in order to achieve the anticipated outcome'*. These include measures required to reduce the significance of environmental effects (such as lighting limits) and may be secured through an environmental management plan.

4.8.1.2 In addition, where relevant, measures have been identified that may result in enhancement of environmental conditions. Such measures are clearly identified within Volume 1, Annex 5.3: Commitments register of the ES. The measures relevant to this chapter are summarised in **Table 4.19**.

4.8.1.3 Embedded measures that will form part of the final design (and/or are established legislative requirements/good practice) have been taken into account as part of the initial assessment presented in **section 4.11** below (i.e., the initial determination of impact magnitude and significance of effects assumes implementation of these measures). This ensures that the measures to which the Applicants are committed are taken into account in the assessment of effects.

4.8.1.4 Where an assessment identifies likely significant adverse effects, further or secondary mitigation measures may be applied. These are measures that could further prevent, reduce and, where possible, offset these effects. They are defined by IEMA as actions that will require further activity in order to achieve the anticipated outcome and may be imposed as part of the planning consent, or through inclusion in the ES (referred to as secondary mitigation measures in IEMA, 2016). For further or secondary measures both pre-mitigation and residual effects are presented.

Table 4.19: Measures (commitments) adopted as part of the Transmission Assets

Commitment number	Measure adopted	How the measure will be secured
Embedded measures		
CoT02	The following features will be crossed by trenchless techniques, as set out in the Onshore Crossing Schedule submitted as part of the application for development consent: • A, B and Classified unnumbered roads (known as C roads) (including the Preston Western Distributor Road, A582 South Ribble Western Distributor Upgrade and M55 Heyhouses Link Road; excluding Leech Lane); • All Environment Agency Main Rivers, including: Moss Sluice, east of Midgeland Road along Pegs Lane; Savick Brook, south of A583; Wrea Brook southeast of Cartmell Lane; Dow Brook east of Lower Lane between the A584 and the A583; Middle Pool north of Lund Way; and • All Network Rail crossings, including along the line which runs between Blackpool North and Preston, south of Cartmell Lane; and at the Network Rail crossing along the line which runs to Blackpool North, south east of Squires Gate, parallel to the A584.	DCO Schedules 2A & 2B, Requirement 5(2) (Detailed design parameters onshore); DCO Schedules 2A & 2B, Requirement 8 (Code of Construction Practice)"
CoT03	A range of sensitive historical, cultural and ecological conservation areas (including statutory and non-statutory designations) have been directly avoided where practicable during the site selection process for Morgan and Morecambe Offshore Wind Farms: Transmission Assets footprint. The Works Plans identify the areas where different works are currently proposed. These include, but are not restricted to: • Listed Buildings • Scheduled Monuments • Registered Parks and Gardens • Onshore Conservation Areas • Onshore National Site Network • Offshore National Site Network • Sites of Special Scientific Interest (Onshore only)	DCO Article 3(1); Works Plans - Onshore and Intertidal"

Commitment number	Measure adopted	How the measure will be secured
	• Local Nature Reserves • Local Wildlife sites • Lancashire Wildlife Trust Reserves • Royal Society for the Protection of Birds (RSPB) Reserves • National Trust land; • Ancient Woodland sites and known Tree Preservation Orders (TPOs); & • non-designated built heritage assets. Where possible, unprotected areas of woodland, mature and protected trees (i.e. veteran trees) have and will also be avoided, including the veteran tree located to the north east of National Grid Penwortham substation.	
CoT04	An Outline Pollution Prevention Plan (PPP) forms part of the Outline Code of Construction Practice submitted with the application for development consent. Detailed PPP(s) will be developed in accordance with the Outline PPP and includes details of emergency spill procedures. Good practice guidance detailed in the Environment Agency's Pollution Prevention Guidance notes (including Pollution Prevention Guidance notes 01, 05, 08 and 21) will be followed where appropriate, or the latest relevant available guidance.	DCO Schedules 2A & 2B, Requirement 8 (Code of Construction Practice)
CoT12	The onshore export cables and the 400 kV grid connection cables will be completely buried underground for the entire length. No overhead pylons will be installed as part of the Transmission Assets.	DCO Schedule 1, Part 1, Authorised Development
CoT14	Joint bays will be completely buried, with the land above reinstated. An inspection cover will be provided on the surface for link boxes for access during operation and maintenance phase.	DCO Schedules 2A & 2B, Requirement 8 (Code of Construction Practice)
CoT16	All vegetation requiring removal will be undertaken outside of the bird breeding season. If this is not reasonably practicable, the vegetation requiring removal will be subject to a nesting bird check by a suitably qualified ecological clerk of works. If nesting birds are present, the vegetation will not be removed until the young have fledged or the nest failed.	DCO Schedules 2A & 2B, Requirement 12 (Ecological Management Plan); and Requirement 8 (Code of Construction Practice)

Commitment number	Measure adopted	How the measure will be secured
CoT18	Core working hours for the construction of the intertidal and onshore works will be as follows: • Monday to Saturday: 07:00 - 19:00 hours; and • up to one hour before and after core working hours for mobilisation ("mobilisation period") i.e. 06:00 to 20:00. Activities carried out during the mobilisation period will not generate significant noise levels (such as piling, or other such noisy activities). In circumstances outside of core working practices, specific works may have to be undertaken outside the core working hours. This will include, but is not limited to, works being undertaken within and/or adjacent to Blackpool Airport and cable installation at landfall and at the River Ribble. Advance notice of such works will be given to the relevant planning authority.	DCO Schedules 2A & 2B, Requirement 14 (Construction hours)
CoT27	All temporary compounds will be removed and sites will be reinstated when construction has been completed.	DCO Schedules 2A & 2B, Requirement 8 (Code of Construction Practice) DCO Schedules 2A & 2B, Requirement 16 (Restoration of land used temporarily for construction)"
CoT28	Construction site lighting will only operate when required and will be positioned and directed to avoid unnecessary illumination to residential properties, sensitive ecological receptors and footpath users, and minimise glare to users of adjoining public highways. Construction site lighting will be designed in accordance with latest relevant available guidance and legislation and the details of the location, height, design and luminance of lighting to be used will be detailed within the Outline Construction Artificial Light Emissions Management Plan, as part of the Outline CoCP. The design of construction site lighting will accord with the details provided in the Outline Code of Construction Practice (CoT35) and Outline Ecological Management Plan (CoT76).	DCO Schedules 2A & 2B, Requirement 8 (Code of Construction Practice) DCO Schedules 2A & 2B, Requirement 12 (Ecological management plan)
CoT35	An Outline Code of Construction Practice (CoCP) has been prepared and submitted with the application for development consent. Detailed CoCP(s) will be developed in accordance with the Outline CoCP. The Outline CoCP includes measures to maintain and address: • flood protection and control measures;	DCO Schedules 2A & 2B, Requirement 8 (Code of Construction Practice)

Commitment number	Measure adopted	How the measure will be secured
	• water environment and drainage; • pollution prevention; • geology and ground conditions; • ecology and nature conservation (including protected species and invasive species); • historic environment; • soil management; • traffic and transport; • noise management measures; • air quality and dust management; • landscape and visual; • recreation; and • bentonite breakout.	
CoT36	Onshore Decommissioning Plan(s) will be developed prior to decommissioning. The Onshore Decommissioning Plan(s) will include provisions for the removal of all onshore above ground infrastructure and the decommissioning of below ground infrastructure (if and where relevant and practicable), and details relevant to flood risk, pollution prevention and avoidance of ground disturbance. The Onshore Decommissioning Plan(s) will be in line with the latest relevant available guidance.	DCO Schedules 2A & 2B, Requirement 22 (Onshore decommissioning)
CoT44	The Project Description (Volume 1, Chapter 3 of the Environmental Statement) sets out that the installation of the offshore export cables under Lytham St Annes SSSI and the St Annes Old Links Golf Course will be undertaken by direct pipe trenchless installation technique. The exit pits associated with the direct pipe installation will be at least 100 m seaward of the western boundary of the SSSI.	DCO Schedules 2A & 2B, Requirement 8 (Code of Construction Practice)
CoT73	An Outline Biosecurity Protocol has been prepared, as part of the Outline CoCP and submitted as part of the application for development consent. Detailed CoCP(s) will be developed in accordance with the outline CoCP.	DCO Schedules 2A & 2B, Requirement 8 (Code of Construction Practice)

Commitment number	Measure adopted	How the measure will be secured
CoT90	The Project Description (Volume 1, Chapter 3 of the Environmental Statement) sets out that the installation of the 400kV Grid Connection Cable Corridor beneath the River Ribble will be undertaken by direct pipe or micro tunnel trenchless installation techniques.	DCO Schedules 2A & 2B, Requirement 5(3)(Detailed design parameters onshore); and Requirement 8 (Code of Construction Practice)"
Secondary measures		
CoT15	Detailed Landscape Management Plan(s) will be developed in accordance with the Outline Landscape Management Plan. Detailed Landscape Management Plan(s) will include details of mitigation planting at the onshore substation sites, including the number, location, species and details of management and maintenance of planting. Where practicable, landscape mitigation planting will be established as early as reasonably practicable in the construction phase..	DCO Schedules 2A & 2B, Requirement 6 (Provision of landscaping)
CoT76	Detailed Ecological Management Plan(s) (EMP) will be developed in accordance with the Outline Ecological Management Plan (OEMP). The Outline Ecological Management Plan has been prepared and submitted as part of the application for development consent and includes but is not limited to pre-construction, construction and post-construction mitigation measures relating to habitats and protected or notable species, species mitigation licences and the role of the Ecological Clerk of Works (ECoW) where relevant. The Outline Ecological Management Plan also includes a Breeding Bird Protection Plan which will set out mitigation measures such as vegetation clearance in winter (e.g., hedgerows), pre-construction breeding bird survey, appropriate protection zones upon confirmation of nest building/breeding taking place of key protected or sensitive species. In addition to the Breeding Bird Protection Plan, the OEMP sets out species-specific mitigation plans for Important Ecological Features identified as part of the assessment. Detailed Ecological Management Plan(s) will include details of any long term mitigation and management measures relevant to onshore ecology and nature conservation and in relation to onshore and intertidal ornithology. This will include the management of ecological mitigation areas. The Detailed EMPs will be developed in consultation with the relevant statutory advisors and regulators.	DCO Schedules 2A & 2B, Requirement 12 (Ecological management plan)
CoT107	Where construction activities are undertaken along the onshore export cable corridor within areas of Functionally Linked Land (Lytham Moss Biological Heritage Site) in proximity to Higher Ballam and Lower Ballam, a mitigation area will be provided for supplementary feeding of pink-footed goose and whooper swan	DCO Schedules 2A & 2B, Requirement 12 (Ecological management plan)

Commitment number	Measure adopted	How the measure will be secured
	during the core wintering bird period (November to March, inclusive). The feeding may comprise retention of spoiled crop and/or the import of additional feed, as appropriate. In addition, scrapes will be provided for terrestrial wader features. This is detailed within the Outline Ecological Management Plan.	
CoT110	Construction activities associated with the offshore cable pull in for the Morgan Offshore Wind Project and Morecambe Offshore Windfarm Limited will be undertaken in accordance with the Outline Offshore Cable Specification and Installation Plan (CSIP). This will restrict the Applicants to completing one cable pull in (a maximum of five weeks) per wintering season (i.e. during the months of November – February, inclusive), unless otherwise agreed with the MMO, in consultation with Natural England. Detailed CSIP(s) will be developed in accordance with the Outline CSIP.	DCO Schedule 14 (Marine Licence 1: Morgan Offshore Wind Project Transmission Assets) Part 2 – Condition 18(1)(e) (Pre-construction plans and documentation) and DCO Schedule 15 (Marine Licence 2: Morecambe Offshore Wind Farm Transmission Assets), Part 2 - Condition18(1)(e) (Pre-construction plans and documentation)
CoT113	Where construction activities are undertaken within the Intertidal Infrastructure Area, mitigation measures will be provided at Fairhaven saltmarsh to reduce disturbance upon roosting wader features of Ribble and Alt Estuary SPA. This may comprise a combination of the employment of a warden, educational signage, and soft fencing. This is detailed within the Outline Ecological Management Plan.	DCO Schedules 2A & 2B, Requirement 12 (Ecological management plan)
CoT120	To mitigate for potential permanent habitat loss associated with each of the Onshore Substations, mitigation areas south of Newton-with-Scales will be provided for waders and farmland birds. Measures within these areas may include measures, such as, the creation of scrapes and thickening of hedgerows. This is detailed within the Outline Ecological Management Plan. The final measures will be developed and agreed with the relevant stakeholders as a part of the detailed Ecological Management Plan(s) prior to construction.	DCO Schedules 2A & 2B, Requirement 12 (Ecological management plan)

4.9 Key parameters for assessment

4.9.1 Maximum design scenario

4.9.1.1 The maximum design scenarios identified in **Table 4.20** have been selected as those having the potential to result in the greatest effect on an identified onshore and intertidal ornithological receptor or receptor group. These scenarios have been selected from the Project Design Envelope provided in Volume 1, Chapter 3: Project description of the ES. Effects of greater adverse significance are not predicted to arise should any other development scenario, based on details within the Project Design Envelope (e.g., different infrastructure layout), to that assessed here be taken forward in the final design.

Table 4.20: Maximum design scenario considered for the assessment of impacts

Potential impact	Phase [a]			Maximum design scenario	Justification
	C	O	D		
The impact of permanent loss of supporting habitats	✓	x	✓	**Construction phase: landfall (sequential)** • Open trenching in the intertidal area (MLWS to MHWS): There will be six cables in total (four for Morgan and two for Morecambe). • There will be six exit pits for the direct pipe, these will be 875 m^2 per circuit (including cofferdam), this equates to a combined area of 5,250 m^2. • From the exit pits the open trench will be 10 m wide at the top and up to 300 m long. There will be 20 m either side of the trench for vehicles and personnel to use. This equates to an area of 15,000 m^2 per cable or 90,000 m^2 in total. • The open trench will transition to a beach trencher, this will be 3 m wide and up to 1,250 m long, the trench will be contained within a working corridor with a 50 m width. This is an area of habitat disturbance of up to 62,500 m^2 per cable, or 375,000 m^2 in total. • There will be two intermediate pulling platforms per cable. The pulling platforms are 120 m^2 each which equates to a total area of 1,440 m^2. • There will be up to 600 cable roller boxes per cable pull in, or 3,600 in total. Each roller box will be installed via a single vibro-pile spaced at approx. 3 m. • One cofferdam will be required per cable, these will be up to 15 m x 15 m with a total area for six cables of 450 m^2. • There will be one storage compound on the beach, this will be 50 m x 50 m. This equates to an area of 2,500 m^2. • These areas combined equal a total area of intertidal and beach habitats and resources that may be temporarily lost, of 474,640 m^2. • In a sequential scenario, works will take place over a 66-month period. However, the duration of active construction works is expected to be shorter with up to two weeks direct pipe installation and up to six weeks per cable pull in.	**Construction phase** Open cut trenching in the intertidal area (and any short section landward of e MHWS between the HDD exit pit and MHWS) would result in the largest compound footprint and largest total area of disturbance. Direct pipe will be used to install the landfall beneath Lytham St Annes Dunes SSSI. All major crossings, such as major roads, river and rail crossings will be undertaken using HDD or other trenchless techniques, where practicable. In terms of noise disturbance (and potentially disturbance from lighting), trenchless techniques are likely to represent the MDS, particularly if 24-hour drilling activity is required. Disturbance may also result from construction traffic using the haul road. In terms of duration, the MDS is represented by sequential construction of the Morgan Offshore Wind Project: Transmission Assets and the Morecambe Offshore Windfarm Transmission Assets (rather than concurrent construction), as this represents the longest overall period. However, it is recognised that the concurrent scenario represents the
The impact of temporary loss of supporting habitats and/or resource availability	✓	x	✓		
Disturbance and displacement from construction, decommissioning, and operation and maintenance activities	✓	✓	✓		
The impact of pollution caused by accidental spills and/or contaminant release	✓	x	✓		
The impact of spreading INNS	✓	✓	✓		
The impact of habitat fragmentation and species isolation	✓	x	✓		

Potential impact	Phase [a]			Maximum design scenario	Justification
	C	O	D		
				Construction phase: onshore export cables (sequential) • The maximum number of trenches will be six, with a target trench depth of 1.2 m. • Construction corridor width 100 m, with a length of up to 17 km. Width will include two haul roads. There will be up to 110 joint bays and 110 link boxes. Temporary habitat loss due to joint bays construction will amount to 2,750 m^2. Area of permanent habitat loss due to link boxes will amount to 440 m^2. • For Morgan there may be up to four compounds of 150 m x 100 m each, with a further one compound of 100 m x 100 m. For Morecambe there may be up to four compounds of 115 m x 100 m and a further one compound of 100 m x 75 m. Duration of installation of up to 66 months (sequentially) for all compounds. • The maximum number of trenchless technique locations is 120. Each major trenchless technique location will have a compound, measuring up to 150 m x 100 m. Drilling mud will be stored and used at these compounds. There would be up to 720 launch pits and 720 exit pits associated with the trenchless techniques. • Duration of installation is up to 66 months (sequential construction). • No construction works directly related to the onshore infrastructure area are proposed outside of the onshore infrastructure area, as described in Volume 1, Chapter 3: Project Description of the Environmental Statement. **Construction phase: 400 kV grid connection cable (sequential)** • Open cut trenching: The maximum number of trenches will be four, with a target trench depth of 1.2 m. The width of the cable corridor is 76 m. There will be a total of 60 joint bays and 60 link boxes. Temporary habitat loss due to joint bays construction will amount to 15,000 m^2. Area of permanent habitat loss due to link boxes will amount to 240 m^2.	largest temporary land take for construction compounds. The MDS is represented by the largest permanent footprint for the onshore substations, which represents the largest physical impact and greatest area of habitat loss, land disturbance and the greatest risk of spreading INNS. **Operation and maintenance phase** Regular maintenance will result in disturbance from lighting and noise from road traffic. **Decommissioning phase** Decommissioning is likely to operate within the parameters identified for construction.

Potential impact	Phase [a]			Maximum design scenario	Justification
	C	O	D		
				• For Morgan there will be three compounds of 150 m x 100 m and one further compound of 100 m x 100 m. For Morecambe there will be three compounds of 115 m x 100 m and one further compound of 100 m x 75 m. • The working area will include a construction corridor width of 50 m (which includes two haul roads), with a length of up to 13 km. Duration of installation of up to 66 months (sequential construction). • There will be a maximum of 46 trenchless techniques crossings (excluding the Ribble Estuary crossing) and the trenchless techniques compound locations will be 76 m x 50 m. Onshore survey areas at each crossing will require 46 launch pits and 46 exit pits. • The River Ribble direct pipe crossing: There will be a maximum corridor width of 150 m and a maximum length of the crossing of 650 m. A maximum of four launch pits and four reception pits will be required, with a depth of up to 45 m each. The maximum permanent area of start pits will be 450 m^2 per circuit and finish pits will be 750 m^2 per circuit. The approximate maximum duration of works will be 24 months. • In a concurrent direct pipe scenario there are up to two compounds to the north and one to the south with a total area of 10,500 m^2 to the north and 60,000 m^2 to the south. • Duration of installation is up to 66 months (sequential construction). • No excavation or intrusive works associated with the construction of the electrical infrastructure will occur within the biodiversity benefit/mitigation areas. **Construction phase: onshore substations** • The combined permanent footprint of the Morecambe and Morgan onshore substations is 223,500 m^2, including main buildings, with permanent access roads at 15 m width each. With 164,000 for Morgan and 59,500 for Morecambe. The permanent footprint excluding attenuation area and landscaping is 80,000 for Morgan and 29,700 for Morecambe or 109,700 combined.	

Potential impact	Phase [a]			Maximum design scenario	Justification
	C	O	D		
				• The area of temporary compounds (combined) includes working and laydown areas (excludes permanent substation footprint) is 122,500 m^2 (additional to permanent footprint). • Duration: enabling works 12 months, main construction 54 months. **Operation and maintenance phase: landfall (concurrent)** • Morecambe have envisaged that a precautionary up to 2.4 km of intertidal cable may be subject to repair and reburial every 10 years. • Morecambe also predict that there may be reburial events of up to approx. 500 m every five years. • Morgan have envisaged that up to 1 km of intertidal cable may be subject to repair and reburial every 10 years. • Morgan also predict reburial events of up to approx. 1 km every five years. • This equates to a lifetime (assuming 35 years) reburial of up to 10.5 km for Morgan and up to 11.9 km for Morecambe, or 22.4km for both combined. • Repair and reburial events are expected to be similar in scale, activities and equipment as the construction phase at the landfall described above, although these are predicted to be limited to sections of between 250 and 500 m at a time, rather than the entire landfall (i.e. up to 25,000 m2 of temporary habitat loss per event assuming a maximum 50 m working corridor). • Repair and reburial events are expected to be shorter duration than those of construction with and will take between two and four weeks per event. **Operation and maintenance phase: all other areas** • Maintenance to the onshore export cables and the 400 kV grid connection cables will be undertaken only as required. Corrective activities will be limited. • The onshore export cable, the 400 kV grid connection cable and the onshore substations will be monitored remotely but will involve	

Potential impact	Phase [a]			Maximum design scenario	Justification
	C	O	D		
				regular visits. Lighting at the onshore substations will comprise security lighting around the perimeter fence and standard car park lighting, with task related lighting where necessary. • Link boxes will be subjected to an annual check unless otherwise required. Joint bays will not be accessed unless replacement or repair is required. • The combined permanent footprint of the Morecambe onshore substation and Morgan onshore substation 223,500 m^2, including eight main buildings and areas required for attenuation ponds and landscaping. The onshore substations will be monitored remotely but will involve regular visits at no less than every six months. • Vehicle movements will usually be during the hours of 07:00 to 23:00 but may be subject to unscheduled events outside of this range. **Decommissioning phase** • Decommissioning is likely to operate within the parameters identified for construction (i.e., any activities are likely to occur within construction working areas and to require no greater amount or duration of activity than assessed for construction). Onshore export cables and 400 kV grid connection cables may be recovered from the ducts for recycling but the ducts, joint bays and link boxes will only be removed if feasible and if required to return the lands to normal agricultural use. For the purposes of EIA, decommissioning of the onshore substations is assumed to be similar to the construction and in reverse sequence.	

[a] C=construction, O=operation and maintenance, D=decommissioning

4.10 Assessment methodology

4.10.1 Overview

4.10.1.1 The approach to determining the significance of an effect is a two-stage process that involves defining the magnitude of the impact and the sensitivity of the receptor. This section describes the criteria applied in this chapter to assign values to the magnitude of impacts and the sensitivity of the receptors. The terms used to define magnitude and sensitivity are based on those used in the Guidelines for Ecological Impact Assessment (CIEEM, 2022), where appropriate as described in further detail in Volume 1, Chapter 5: EIA methodology of the ES.

4.10.2 Receptor sensitivity/value

4.10.2.1 The assessment process considers the best practice set out in Guidelines for Ecological Impact Assessment (CIEEM, 2022).

4.10.2.2 The criteria for defining sensitivity in this chapter are outlined in **Table 4.21**. The definition of sensitivity considers the vulnerability and recoverability of a receptor as well as taking into account the conservation importance of each receptor.

4.10.2.3 The conservation importance of each receptor is presented in **Table 4.15**. The vulnerability of a receptor to each potential impact is presented for each impact pathway within **section 4.11**. The recoverability of a receptor is categorised as set out in the following.

- Low: a species with a low reproductive success and a declining UK long-term trend in breeding abundance and productivity or uncertainty regarding the long-term trend (due to data availability).
- Medium: a species with a low reproductive success and a stable or increasing UK long-term trend in breeding abundance and productivity.
- High: a species with a low to medium reproductive success and a stable or increasing UK trend in breeding abundance and productivity.

4.10.2.4 It should be noted that high vulnerability and/or low recoverability are not necessarily linked with high conservation importance. A receptor could be categorised as being of high conservation importance (e.g. an interest feature of a SPA) but have a low or negligible vulnerability to an effect and vice versa. Determination of sensitivity takes these differing aspects into consideration, as set out in **Table 4.21**.

Table 4.21: Sensitivity criteria

Sensitivity	Definition
Very High	A bird species has high or very high conservation importance, high vulnerability to impact and has no ability to recover.
	A bird species has very high conservation importance, high vulnerability to impact and has low recoverability.
High	A bird species has very high conservation importance, low vulnerability and high recoverability.
	A bird species has high or very high conservation importance, medium or high vulnerability to impact and has medium recoverability.
	A bird species has high conservation importance, medium vulnerability to impact and has low recoverability.
	A bird species has high conservation importance, high vulnerability and high recoverability.
	A bird species has medium conservation importance, high vulnerability to impact and has low recoverability.
Medium	A bird species has high conservation importance, low vulnerability to impact and has low to medium recoverability.
	A bird species has medium, high or very high conservation importance, low, medium or high vulnerability to impact and has medium to high recoverability.
Low	A bird species has medium conservation importance, medium vulnerability to impact and high recoverability.
	A bird species has low conservation importance, medium or high vulnerability to impact and medium or high recoverability.
Negligible	A bird species has low conservation importance, low vulnerability to impact and medium or high recoverability.
	A bird species is not vulnerable to impacts.

4.10.3 Magnitude of impact

4.10.3.1 The criteria for defining magnitude in this chapter are outlined in **Table 4.22** below. This set of definitions has been determined on the basis of changes to bird populations.

Table 4.22: Magnitude of impact criteria

Magnitude of impact	Definition
High	A change in the size or extent of distribution of the relevant biogeographic population or the population that is the interest feature of a specific protected site that is predicted to irreversibly alter the population in the short to long term and to alter the long-term viability of the population and/or the integrity of the protected site. Impacts felt long-term. Includes impacts that may be reversible in the long-term (i.e., more than five years) following cessation of the project activity.
Medium	A change in the size or extent of distribution of the relevant biogeographic population or the population that is the interest feature of a specific protected site that occurs in the short and long-term, but which is not predicted to alter the long-term viability of the

Magnitude of impact	Definition
	population and/or the integrity of the protected site. Impacts felt medium to long term. Impacts are predicted to be reversed in the medium-term (i.e., no more than five years) following cessation of the project activity.
Low	A change in the size or extent of distribution of the relevant biogeographic population or the population that is the interest feature of a specific protected site that is sufficiently small-scale or of short duration to cause no long-term harm to the feature/population. Impacts present for a short to medium duration. Impacts are predicted to be reversed in the short-term (i.e., no more than one year) following cessation of the project activity.
Negligible	Very slight change from the size or extent of distribution of the relevant biogeographic population or the population that is the interest feature of a specific protected site. Impacts present for a short duration. Impacts are predicted to be reversed rapidly (i.e., no more than circa six months) following cessation of the project related activity.
No change	No loss or alteration of characteristics, features or elements; no observable impact either adverse or beneficial.

4.10.3.2 For the purposes of assessment, habitat loss may be temporary or permanent, as discussed below. The duration of temporary habitat loss is defined as follows:

- short term: a period of months, up to one year;
- medium term: a period of more than one year, up to three years; or
- long term: a period of greater than three years.

4.10.4 Significance of effect

4.10.4.1 The significance of the effect upon onshore and intertidal ornithology has been determined by taking into account the sensitivity of the receptor and the magnitude of the impact. The assessment matrix employed is presented in **Table 4.23**. Where a range of significance levels is presented, the final assessment for each effect is based upon expert judgement and takes a precautionary approach.

4.10.4.2 In all cases, the evaluation of receptor sensitivity, impact magnitude and significance of effect has been informed by professional judgement and is underpinned by narrative to explain the conclusions reached.

4.10.4.3 For the purpose of this assessment, any effects with a significance level of minor or less are not considered to be significant in terms of The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.

Table 4.23: Assessment matrix

Sensitivity of Receptor	Magnitude of Impact			
	Negligible	**Low**	**Medium**	**High**
Negligible	Negligible	Negligible or Minor	Negligible or Minor	Minor
Low	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate
Medium	Negligible or Minor	Minor	Moderate	Moderate or Major
High	Minor	Minor or Moderate	Moderate or Major	Major
Very High	Minor	Moderate or Major	Major	Major

4.10.4.4 Where the magnitude of impact is 'no change', no effect would arise. The definitions for significance of effect levels are described as follows.

- Major: These beneficial or adverse effects are very important considerations and are likely to be material in the decision-making process. These effects are generally, but not exclusively, associated with sites or features of international, national, or regional importance that are likely to suffer a most damaging impact and loss of resource integrity. However, a major change in a site or feature of local importance may also enter this category. Effects upon human receptors may also be attributed this level of significance.
- Moderate: These beneficial or adverse effects have the potential to be important and may influence the key decision-making process. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse or beneficial effect on a particular resource or receptor.
- Minor: These beneficial or adverse effects are generally, but not exclusively, raised as local factors. They are unlikely to be critical in the decision-making process but are important in enhancing the subsequent design of the project.
- Negligible: Effects are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

4.10.5 Areas used for the assessment

4.10.5.1 IEFs will be affected differently across the study areas dependent on spatial considerations. Therefore, the study area has been split into four distinct areas to afford a detailed, robust assessment of impacts, accounting for spatial differences within the study area. These four areas are shown in Figure 4.6 of Volume 3, Figures, and are identified as follows.

- Coastal survey area - the area encompassing the coastal survey area, defined by HAT out to 1.5 km seaward and 500 m either side of the Intertidal Infrastructure Area and Onshore Order Limits (below HAT only).
- Estuarine survey area - the area covered by the estuarine survey area, defined by the Transmission Assets Order Limits plus a 500 m buffer

along the River Ribble (excluding terrestrial habitats on either side of the river).

- Permanent onshore substations area - the area within which the onshore substations and all permanent infrastructure, earthworks, landscaping and attenuation associated with the substations will be located (e.g., permanent access tracks, as defined in Volume 1, Chapter 3: Project description of the ES).
- Onshore survey area - the area covered by the temporary works that will contain the onshore export cable corridor, 400 kV grid connection cable corridor, temporary compounds associated with works at the Onshore Infrastructure Area plus a 500 m buffer.

4.10.6 Key receptors in assessment areas

4.10.6.1 Not all IEFs (presented in **section 4.6.6**) have been recorded as present across all areas used for assessment nor during all periods of the year. The assessment has therefore been structured to assess only those receptors using each area, and therefore have the potential to be impacted at each area, during each period of the year (i.e.' during the breeding or non-breeding seasons). **Table 4.24** sets out those receptors and taxonomic groups recorded within each area and each period used for assessment.

4.10.6.2 The birds in the substation areas have been derived by clipping territory and winter count data to the footprint of the onshore substation sites. The peak data for the onshore survey area are unaffected by the peak count data for the substation area so that the impact of temporary loss of supporting habitats and/or resource availability, and disturbance and displacement from construction, decommissioning, and operation and maintenance activities are fully assessed over all receptors, whilst the impact of permanent loss of supporting habitats is only assessed against those receptors that will be impacted.

4.10.6.3 The assessments in **section 4.11** focus on 'taxonomic group' due to the similarity in the species ecology and ecological niche within the same taxonomic group.

4.10.6.4 Full details on the peak counts used for this assessment can be found in **Table 4.11**, **Table 4.12**, **Table 4.13**, and **Table 4.14**, and within Volume 3, Annex 4.1: Breeding birds technical report, Volume 3, Annex 4.2: Wintering and migratory birds technical report and Volume 3, Annex 4.3: Intertidal birds technical report. Monthly count data are appended to each of the technical reports for clarity.

Table 4.24: Peak count of key receptors identified within the four areas used for assessment

Taxonomic Group	Species	Coastal survey area	Estuarine survey area	Permanent onshore substations area		Onshore survey area	
		Peak count over all seasons	Non-breeding peak count	Breeding territories	Non-breeding peak count	Breeding territories	Non-breeding peak count
Geese, ducks and swans	Brent goose	0	0	0	0	0	12
	Barnacle goose	0	0	0	0	0	12
	Greylag goose	0	0	0	0	0	517
	Pink-footed goose	0	0	0	11	0	8,319
	Mute swan	0	0	0	0	0	24
	Whooper swan	0	30	0	0	0	132
	Shelduck	1	66	2	4	23	374
	Shoveler	0	0	0	0	4	31
	Gadwall	0	0	0	0	1	11
	Wigeon	0	822	0	0	0	1,647
	Mallard	0	88	0	4	36	273
	Teal	0	275	0	0	1	312
	Scaup	4	0	0	0	0	0
	Eider	5	0	0	0	0	0
	Common scoter	4,000	0	0	0	0	0
	Goldeneye	0	1	0	0	0	0
Partridges	Grey partridge	0	0	0	0	3	0
Rails, crakes and coots	Moorhen	0	0	0	0	3	16
	Coot	0	0	0	0	1	6
Grebes	Great crested grebe	2	0	0	0	0	0
Waders	Oystercatcher	1,073	54	1	2	14	126
	Avocet	0	0	0	0	5	17
	Lapwing	0	444	0	120	25	2,081
	Golden plover	1	0	0	104	0	381
	Grey plover	118	2	0	0	0	2
	Ringed plover	93	0	0	0	0	0
	Little ringed plover	0	0	0	0	1	0
	Whimbrel	4	0	0	0	0	3
	Curlew	9	24	0	4	2	696
	Bar-tailed godwit	625	0	0	0	0	0
	Black-tailed godwit	0	14	0	0	1	423
	Turnstone	143	0	0	0	0	0

Taxonomic Group	Species	Coastal survey area	Estuarine survey area	Permanent onshore substations area		Onshore survey area	
		Peak count over all seasons	Non-breeding peak count	Breeding territories	Non-breeding peak count	Breeding territories	Non-breeding peak count
	Knot	370	0	0	0	0	0
	Ruff	0	0	0	2	0	2
	Sanderling	4,702	0	0	0	0	0
	Dunlin	4,200	222	0	0	0	0
	Woodcock	0	0	0	0	0	6
	Snipe	0	21	0	28	0	78
	Common sandpiper	0	4	0	0	0	0
	Green sandpiper	0	1	0	0	0	1
	Redshank	70	40	0	0	4	61
	Greenshank	0	1	0	0	0	0
Gulls and terns	Kittiwake	2	0	0	0	0	0
	Black-headed gull	877	296	0	320	0	1,926
	Mediterranean gull	1	0	0	0	0	0
	Common gull	750	8	0	20	0	461
	Great black-backed gull	23	5	0	0	0	44
	Herring gull	1,600	156	0	25	0	1,009
	Lesser black-backed gull	353	41	0	46	0	176
	Sandwich tern	427	0	0	0	0	0
	Little tern	1	0	0	0	0	0
	Common tern	90	5	0	0	0	0
Skuas	Arctic skua	3	0	0	0	0	0
Auks and seabirds	Guillemot	1	0	0	0	0	0
	Manx shearwater	77	0	0	0	0	0
Divers	Red-throated diver	14	0	0	0	0	0
Cormorants and shags	Cormorant	112	11	0	1	0	6
Herons, storks and ibis	Cattle egret	0	3	0	1	0	1
	Grey heron	1	8	0	1	7	36
	Great white egret	0	0	0	0	0	1
	Little egret	4	10	0	6	1	38
Owls	Barn owl	0	0	0	0	5	9
	Tawny owl	0	0	0	0	1	0
Raptors	Sparrowhawk	0	0	0	0	3	8
	Marsh harrier	0	0	0	0	0	1

Taxonomic Group	Species	Coastal survey area	Estuarine survey area	Permanent onshore substations area		Onshore survey area	
		Peak count over all seasons	Non-breeding peak count	Breeding territories	Non-breeding peak count	Breeding territories	Non-breeding peak count
	Red kite	0	0	0	0	0	1
	Buzzard	0	0	0	2	2	30
	Kestrel	0	0	1	1	9	25
	Merlin	0	0	0	0	0	1
	Peregrine	0	0	0	0	0	2
Passerines (including hirundine)	Swift	0	0	0	0	4	0
	Stock dove	0	0	0	0	3	29
	Woodpigeon	0	0	0	75	0	687
	Kingfisher	0	1	0	0	3	4
	Great spotted woodpecker	0	0	0	0	5	3
	Rook	0	0	0	17	2*	255
	Raven	0	0	0	0	0	7
	Skylark	0	0	3	2	74	98
	House martin	0	0	0	0	5	0
	Cetti's warbler	0	0	0	0	3	1
	Willow warbler	0	0	0	0	21	0
	Chiffchaff	0	0	1	0	72	3
	Sedge warbler	0	0	1	0	55	0
	Grasshopper warbler	0	0	0	0	4	0
	Blackcap	0	0	0	0	32	0
	Whitethroat	0	0	0	0	45	0
	Wren	0	0	0	3	49	90
	Starling	0	0	0	250	10	7,579
	Song thrush	0	0	1	0	57	300
	Mistle thrush	0	0	0	0	7	22
	Redwing	0	0	0	25	0	196
	Fieldfare	0	0	0	150	0	1,325
	Redstart	0	0	0	0	1	0
	Whinchat	0	0	0	0	0	3
	Stonechat	0	0	0	2	6	20
	Wheatear	0	0	0	0	2	0
	Tree sparrow	0	0	0	0	18	18

Taxonomic Group	Species	Coastal survey area	Estuarine survey area	Permanent onshore substations area		Onshore survey area	
		Peak count over all seasons	Non-breeding peak count	Breeding territories	Non-breeding peak count	Breeding territories	Non-breeding peak count
	House sparrow	0	0	0	0	14	40
	Dunnock	0	0	0	3	33	86
	Yellow wagtail	0	0	0	0	2	0
	Grey wagtail	0	0	0	0	2	6
	Meadow pipit	0	0	0	7	11	147
	Brambling	0	0	0	0	0	3
	Bullfinch	0	0	0	0	5	9
	Greenfinch	0	0	0	0	28	77
	Twite	0	0	0	0	0	3
	Linnet	0	0	0	0	15	730
	Lesser redpoll	0	0	0	0	0	1
	Snow bunting	0	0	0	0	0	1
	Corn bunting	0	0	0	0	9	3
	Yellowhammer	0	0	1	0	7	9
	Reed bunting	0	0	0	0	54	56

* Relates to rookeries, there are at least 35 nests in these two rookeries.

4.10.7 Assumptions and limitations of the assessment

4.10.7.1 Baseline characterisation of the survey and study area and assessments of significance have used desk study data and site-specific data. Surveys were conducted across the onshore survey area for two breeding seasons (April to July 2022 and March to July 2023) and two non-breeding periods (September 2022 to April 2023 and September 2023 to March 2024). Specific intertidal habitat bird surveys were conducted over two years at the coastal survey area (September 2021 to August 2023) and 18 months of intertidal surveys at the estuarine survey area (October 2022 to March 2024 with surveys ongoing to capture a full two years' worth of data).

4.10.7.2 All surveys conducted were undertaken in line with accepted industry standard methodologies. The surveys conducted may be considered to represent a snapshot of each month and, in combination, each survey period. Whilst allowing for the determination of individual species presence and estimates of abundance, surveys can never be definitive. However, the sampling regimes adopted, and methodologies followed are considered appropriate to this assessment and suitable for baseline characterisation.

4.10.7.3 The breeding bird surveys covered up to 61.04% of the onshore survey area in total, with 28.49 % being visited on a monthly basis. The wintering terrestrial waterbird surveys covered up to 59.92% of the onshore survey area in 2022/23 and 71.42% in 2023/24. The supplementary walkover surveys also achieved a coverage of up to 68.92% of the onshore survey area. There are parts of the survey area that are restricted, and the surveyors were unable to access (e.g., Blackpool Airport) and several private land parcels where access was not granted at the time of surveys. However, effort was made to cover all land parcels where access was possible using public rights of way to ensure adequate sampling of all habitat's representative of the survey area. Urban areas also make up a significant proportion of the survey area (15.65%). Although site-specific coverage does not provide a complete spatial coverage of the onshore survey area, desk-based studies reviewed provide comprehensive data sources which, combined with the site-specific surveys, are considered to be acceptable to provide a robust preliminary assessment of the species assemblage that is likely to be present within the survey area. Spatial coverage of the coastal and estuarine survey areas was 100%. For full details on survey coverage see Table 2.3 in Volume 3, Annex 4.4: Onshore and intertidal ornithology survey methodologies.

4.10.7.4 Previous outbreaks of HPAI have tended to affect wintering waterfowl, subsiding as wintering flocks disperse. Over the winter of 2021 and 2022 an outbreak of HPAI was confirmed in a population of barnacle goose wintering on the Solway Firth, and from late spring 2022 an increased number of reports of the disease were received from seabird colonies around the north of the UK (Pearce-Higgins *et al*., 2022). The extent of impact of HPAI on individual species is assessed through ongoing monitoring. In 2023 reports of HPAI indicate that mass mortalities of seabirds, particularly black-headed gull and common tern, have occurred at inland and coastal colonies (BTO, 2023a).

4.10.7.5 As the baseline was characterised during the outbreak, there is potential that the baseline is not a true representation of a typical year. It must be noted that bird populations are subject to natural fluctuations in response to a range of environmental conditions, including disease. This may cause variations in abundance between years.

4.10.7.6 Low counts of several seabird species were recorded within the survey areas that are likely to be migrant or infrequent visitors and are not considered further within the assessment. These species are Arctic skua, Manx shearwater, guillemot. The justification for omitting these species for the assessment is laid out below.

- Arctic skua - this species was recorded on two occasions within the coastal survey area (one individual in July) 2023 and three individuals in August 2023). It is considered that these birds were non-breeding flyovers as the nearest recorded breeding grounds are in the western and far north isles of Scotland (Balmer *et al*., 2013).
- Guillemot - this species was recorded in the coastal survey area on four occasions with a maximum monthly count of three (July 2023). It is considered possible that these occurrences were of non-breeding birds.
- Manx shearwater - this species was recorded on one occasion within the coastal survey area (77 individuals in July 2023). It is considered possible that this occurrence was a flyover of a foraging trip.

4.10.7.7 All three of these are pelagic foraging species and have been fully assessed in Volume 2, Chapter 5: Offshore ornithology of the ES.

4.11 Assessment of effects

4.11.1 Introduction

4.11.1.1 The potential impacts of the construction, operation and maintenance and decommissioning phases of the Transmission Assets have been assessed. These potential impacts are listed in **Table 4.20** along with the MDS against which each potential impact has been assessed.

4.11.1.2 A description of the effect on receptors within each relevant area (as described in **section 4.5.1**) caused by each identified impact is given below.

4.12 The impact of permanent loss of supporting habitats

4.12.1 Construction and decommissioning

Introduction

4.12.1.1 During the construction and decommissioning phases of the Transmission Assets, permanent loss of habitat that support IEFs is predicted to occur at the onshore substation sites and within the remainder of the Onshore Infrastructure Area. Permanent habitat loss is predicted to occur during the construction phase but there is not predicted to be any additional permanent habitat loss during the operation and maintenance phase.

4.12.1.2 The MDS is represented by the maximum surface area of habitat loss and is summarised in **Table 4.20**.

4.12.1.3 As the cable and joint transition bays are to be buried and habitats replaced, there is only predicted to be substantial permanent habitat loss within the onshore substation sites. In other areas there may be small areas of habitat loss (e.g., for inspection covers), this will largely be on arable and pasture and the impacts on bird populations will be on such a small scale as to be inconsequential.

4.12.1.4 Permanent habitat loss at the onshore substation sites has the potential to impact terrestrial breeding and non-breeding birds. The IEFs found at the onshore substation sites have been assessed accordingly.

4.12.1.5 The maximum area of land predicted to be permanently lost at the substation sites is 223,500 m^2 (including attenuation pond and landscaping). That is apportioned to 164,000 m^2 for Morgan and 59,500 m^2 for Morecambe.

4.12.1.6 This land is largely composed of pasture and arable land. These were described as: B4 Improved grassland; B6 Poor semi-improved grassland; and J1.1 Arable, in Volume 3, Annex 3.3: Phase 1 habitat, national vegetation classification and hedgerow survey technical report.

4.12.1.7 There will be no additional permanent habitat loss during the operation and maintenance phase and habitats will be restored during the decommissioning phase.

4.12.2 Key receptors for assessment

Coastal survey area

4.12.2.1 There is no permanent habitat loss predicted to occur at the coastal survey area (**Table 4.20)**.

Estuarine survey area

4.12.2.2 As no above ground permanent infrastructure will be located within the estuarine survey area, there is no permanent habitat loss predicted to occur at the estuarine survey area (**Table 4.20)**.

Onshore survey area

4.12.2.3 The main permanent infrastructure within the onshore survey area is covered by the onshore substation sites, and there is no extra permanent habitat loss predicted to occur (**Table 4.20)** with the exception of the ground level inspection cover for the joint bays and link boxes, each with a maximum area of 4 m^2 and located within arable or pasture, and access tracks that follow existing farm tracks. Within these habitats, this is considered to be of such small scale, that there would be no perceptible impacts to IEFs. Therefore, permanent habitat loss within the onshore survey area is not considered further within this assessment.

Permanent onshore substations area

Breeding geese, ducks and swans

4.12.2.4 The terrestrial habitats available within the onshore substation sites supported two pairs of breeding shelduck. Shelduck traditionally prefer to breed in open areas that are close to water (e.g., grazed saltmarsh) but can also be found in ground level tree hollows and rabbit burrows further from water.

4.12.2.5 The IEFs taken forward for assessment are shelduck.

Non-breeding geese, ducks and swans

4.12.2.6 The terrestrial habitats available within the onshore substation sites had a very small assemblage of non-breeding ducks and geese, with peak counts of 11 pink-footed geese, four shelduck and four mallard. No swans were recorded.

4.12.2.7 The IEFs taken forward for assessment are pink-footed goose, shelduck and mallard.

Breeding waders

4.12.2.1 The terrestrial habitats available within the onshore substation sites supported one pair of breeding oystercatcher.

4.12.2.2 The IEFs taken forward for assessment are oystercatcher.

Non-breeding waders

4.12.2.3 The terrestrial habitats available within the onshore substation sites had a small assemblage of non-breeding waders, with peak counts of two oystercatchers, 120 lapwings, 104 golden plover, four curlews, two ruff and 28 snipe were recorded foraging or resting on the pasture that dominates the footprint of the onshore substation sites.

4.12.2.4 The IEFs taken forward for assessment are oystercatcher, lapwing, golden plover, curlew, ruff and snipe.

Non-breeding gulls and terns

4.12.2.5 The terrestrial habitats available within the onshore substation sites had a small assemblage of non-breeding gull. No tern species were recorded. Up to 320 black-headed gull, 20 common gull, 25 herring gull and 46 lesser black-backed gull were recorded foraging or resting on the pasture that dominates the footprint of the onshore substation sites.

4.12.2.6 The IEFs taken forward for assessment are black-headed gull, common gull, herring gull and lesser black-backed gull.

Non-breeding cormorants

4.12.2.7 The terrestrial habitats available within the onshore substation sites had a peak count one cormorant.

4.12.2.8 The IEFs taken forward for assessment are cormorant.

Non-breeding herons

4.12.2.9 The terrestrial habitats available within the onshore substation sites had a small assemblage of non-breeding heron, which consisted of one cattle egret, one grey heron and six little egret. Cattle egret are a relatively scarce migrant bird, although becoming more common as their range expands.

4.12.2.10 The IEFs taken forward for assessment are cattle egret, grey heron and little egret.

Breeding raptors

4.12.2.11 The terrestrial habitats available within the onshore substation sites support one pair of breeding kestrel.

4.12.2.12 IEFs taken forward for assessment are kestrel.

Non-breeding raptors

4.12.2.13 The terrestrial habitats available within the onshore substation sites had a peak count of two buzzard and one kestrel.

4.12.2.14 IEFs taken forward for assessment are buzzard and kestrel.

Breeding passerines and other species

4.12.2.15 The terrestrial habitats available within the onshore substation sites supported three pairs of skylark, one pair of chiffchaff, one pair of sedge warbler, one pair of song thrush, and one pair of yellowhammer. Yellowhammer are a relatively scarce breeding bird on the northwest coast.

4.12.2.16 The IEFs taken forward for assessment are skylark, chiffchaff, sedge warbler, song thrush and yellowhammer.

Non-breeding passerines and other species

4.12.2.17 The terrestrial habitats available within the onshore substation sites had a small assemblage of non-breeding passerine. 75 woodpigeon, 17 rook, two skylark, three wren, 250 starling, 25 redwing, 150 fieldfare, two stonechat, three dunnock and seven meadow pipit were recorded foraging or resting on the pasture that dominates the footprint of the onshore substation sites.

4.12.2.18 The IEFs taken forward for assessment are woodpigeon, rook, skylark, wren, starling, redwing, fieldfare, stonechat, dunnock and meadow pipit.

All substation IEFs

4.12.2.19 Permanent habitat loss may force birds into a smaller area and lead to an increase in intra/inter-specific competition due to a higher density of individuals competing for the same resource (e.g., foraging ground or nesting sites) may have an impact on bird fitness (i.e., survival) and lead to localised decline in breeding and non-breeding birds. This is assessed below.

4.12.3 Sensitivity of the receptor

Permanent onshore substations area

Breeding geese, ducks and swans

4.12.3.1 IEFs are shelduck. Habitat loss is one of the greatest threats to breeding geese, ducks and swans and species such as shelduck are considered to be highly vulnerable to the loss of suitable nesting habitat.

4.12.3.2 Shelduck are deemed to be of very high conservation importance, high vulnerability and medium recoverability as the long-term population abundance of this species has remained relatively stable (Heywood et al., 2024). The sensitivity of the receptor is therefore, considered to be **high**.

Non-breeding geese, ducks and swans

4.12.3.3 IEFs are pink-footed goose, shelduck and mallard. Although most geese, duck and swans are flexible in their habitat use during the non-breeding season, they are considered to be very vulnerable to the loss of foraging grounds.

4.12.3.4 Pink-footed goose, shelduck and mallard are deemed to be of very high conservation importance, high vulnerability and medium recoverability as the long-term trends of these species are increasing or relatively stable (Heywood et al., 2024). The sensitivity of the receptor is therefore, considered to be **high**.

Breeding waders

4.12.3.5 IEFs are oystercatcher. Habitat loss is one of the greatest threats to breeding waders and species such as oystercatcher are considered to be highly vulnerable to the loss of suitable nesting habitat.

4.12.3.6 Oystercatcher are deemed to be of very high conservation importance, high vulnerability and medium recoverability as the oystercatcher population is stable (Heywood et al., 2024). The sensitivity of the receptor is therefore, considered to be **high**.

Non-breeding waders

4.12.3.7 IEFs are oystercatcher, lapwing, golden plover, curlew, ruff and snipe. Field-feeding species such as curlew are considered to be very vulnerable to the loss of foraging grounds (e.g., wet grasslands and pastures in proximity of intertidal habitats).

4.12.3.8 Oystercatcher, lapwing, golden plover, curlew, ruff and snipe are deemed to be of high to very high conservation importance, high vulnerability and medium recoverability as the long-term population trends of these species show they are relatively stable or increasing (Heywood et al., 2024). The sensitivity of the receptor is therefore, considered to be **high**.

Non-breeding gulls

4.12.3.9 IEFs are black-headed gull, common gull, herring gull and lesser black-backed gull. Gulls are very flexible in their habitat use during the non-breeding season. Gull species can utilise a wide range of terrestrial, intertidal and marine habitats during the non-breeding season.

4.12.3.10 Black-headed gull, common gull, herring gull and lesser black-backed gull are deemed to be of very high conservation importance, low vulnerability and high recoverability as the populations of these species are relatively stable or increasing (Heywood et al., 2024). The sensitivity of the receptor is therefore, considered to be **high**.

Non-breeding cormorants

4.12.3.11 IEFs are cormorant. Cormorant are a marine or aquatic species and not vulnerable to the loss of pasture or arable land.

4.12.3.12 Cormorant are considered to be of very high conservation concern, low vulnerability, and high recoverability as the cormorant population has steadily risen since the creation of the index in 1994 (Heywood et al., 2024). The sensitivity of the receptor is therefore, considered to be **high**.

Non-breeding herons

4.12.3.13 IEFs are cattle egret, grey heron and little egret. Heron species are vulnerable to the loss of foraging grounds (e.g., wet grasslands and wetlands).

4.12.3.14 Non-breeding herons are deemed to be of medium to very high (little egret only) conservation importance, medium vulnerability and medium recoverability. The sensitivity of the receptor is therefore, considered to be **high**.

Breeding raptors

4.12.3.15 IEFs are kestrel. Kestrel are vulnerable to the loss of nesting and foraging habitat.

4.12.3.16 Kestrel are deemed to be of high conservation importance, high vulnerability and medium recoverability as this species has suffered a large decline since the index was set in 1994, only stabilising in recent years (Heywood et al., 2024). The sensitivity of the receptor is therefore, considered to be **high**.

Non-breeding raptors

4.12.3.17 IEFs are kestrel and buzzard. Non-breeding raptors are wide ranging and are therefore less vulnerable to the loss of foraging habitat.

4.12.3.18 Non-breeding raptors are deemed to be of high conservation importance, low vulnerability and high recoverability as buzzard population abundance has almost doubled since the creation of the index in 1994, and kestrel numbers are now relatively stable (Heywood et al., 2024).The sensitivity of the receptor is therefore, considered to be **high**.

Breeding passerines and other species

4.12.3.19 IEFs are skylark, chiffchaff, sedge warbler, song thrush and yellowhammer. Habitat loss is one of the greatest threats to passerines and other species and the breeding species assemblage found at the onshore substation sites is considered to be highly vulnerable to the loss of suitable nesting habitat.

4.12.3.20 Breeding passerines are deemed to be of medium to high conservation importance, medium vulnerability and medium recoverability as some passerines have exponentially increased since the index was created, and with other suffering rapid declines (Heywood et al., 2024). The sensitivity of the receptor is therefore, considered to be **medium**.

Non-breeding passerines and other species

4.12.3.21 IEFs are woodpigeon, rook, skylark, wren, starling, redwing, fieldfare, stonechat, dunnock and meadow pipit. Most passerines and other species are flexible in their habitat use during the non-breeding season

4.12.3.22 Non-breeding passerines are deemed to be of medium to high conservation importance, medium vulnerability and medium recoverability as some passerine populations have exponentially increased since the index was created, and with other suffering rapid declines (Heywood et al., 2024). The sensitivity of the receptor is therefore, considered to be **medium**.

4.12.4 Magnitude of impact

Permanent onshore substations area

Breeding geese, ducks and swans

4.12.4.1 A single pair of shelduck was found at the onshore substation sites.

4.12.4.2 Whilst permanent habitat loss as the result of the onshore substation sites may lead to a displacement of two pairs of shelduck, the UK breeding population of shelduck in 2016 was 7,850 pairs (BTO, 2023b). Therefore, the potential impact at the population level is undetectable for breeding shelduck. The species is widely distributed around the Ribble Estuary and flexible in the choice of nesting locations. The magnitude of impact is therefore considered to be **negligible**.

Non-breeding geese, ducks and swans

4.12.4.3 11 pink-footed geese, four shelduck and one mallard were found at the onshore substation sites.

4.12.4.4 Whilst the loss of foraging and loafing (loafing has no precise definition but is generally used to describe behaviours such as sitting, resting and preening outside of feeding, roosting and breeding) habitats may lead to a displacement of non-breeding geese, ducks and swans, the local non-breeding metapopulation of pink-footed goose is 55,686 (Devenish, *et al*., 2015), the most recent WeBS estimate for shelduck in the Ribble and Alt Estuaries SPA is 5,050, and (in the absence of reliable local data) the UK wintering population of mallard in 2016 was 675,000 (BTO, 2023b).

4.12.4.5 Therefore, the impact at the population level is undetectable given that displaced birds may re-locate to other areas to meet their daily energy requirement during the non-breeding season. The magnitude of impact is therefore considered to be **negligible**.

Breeding waders

4.12.4.6 A single pair of oystercatcher constituted the breeding wader assemblage found at within the onshore substation sites.

4.12.4.7 Whilst permanent habitat loss within the onshore substations area may lead to a displacement of one pair of oystercatcher, the UK breeding population in 2016 was estimated at 96,000 pairs (BTO, 2023b). Therefore, the potential impact at the population level is undetectable for breeding oystercatcher. The magnitude of impact is therefore considered to be **negligible**.

Non-breeding waders

4.12.4.8 Two oystercatcher, 120 lapwing, 104 golden plover, four curlew, two ruff and 28 snipe were found within the onshore substation sites.

4.12.4.9 The loss of foraging and loafing habitats may lead to a displacement of non-breeding waders. Usage of the area by non-breeding waders was very sporadic and there was no evidence that the birds regularly used the area for foraging and loafing. The latest WeBS estimates for the Ribble and Alt Estuaries SPA was 16,165 for oystercatcher, 15,936 for lapwing, 5,038 for golden plover, 2,644 for curlew, and 37 for ruff (Woodward, *et. al*., 2024). Snipe are likely to be undercounted by the WeBS but the UK non-breeding population was estimated at 1.1 million in 2004/05 (BTO, 2023b).

4.12.4.10 The impact at the population level is deemed small scale and unlikely to cause long term harm to the SPA populations given that displaced birds may re-locate to other areas to meet their daily energy requirement during the non-breeding season. The magnitude of impact is therefore considered to be **low**.

Non-breeding gulls

4.12.4.11 320 black-headed gull, 20 common gull, 25 herring gull and 46 lesser black-backed gull were found at within the onshore substation sites.

4.12.4.12 The loss of foraging and loafing habitats may lead to a displacement of non-breeding gull that use the onshore substation sites for foraging or resting on the pasture. Whilst lesser black-backed gull have an internationally important breeding population, non-breeding gulls can range over huge distances. The

UK non-breeding population estimates of black-headed gull in 2003-06 was 2.2 million, for common gull 710,000, for herring gull 740,000 and for lesser black-backed gull 130,000.

4.12.4.13 The impact at the population level is undetectable given that displaced birds may re-locate to other areas to meet their daily energy requirement during the non-breeding season, and that gulls are known to range over a wide area (Woodward, *et al*., 2019). The magnitude is therefore considered to be **negligible.**

Non-breeding cormorants

4.12.4.14 One cormorant was found within the onshore substation sites.

4.12.4.15 Cormorant are reliant upon marine and aquatic environments with plenty of fish for them to eat. As the only habitat to be permanently lost is pasture with hedgerows and small ponds, there will be **no change** for cormorant.

Non-breeding herons

4.12.4.16 One cattle egret, one grey heron and six little egret were found within the substation area.

4.12.4.17 Whilst the loss of foraging and loafing habitats may lead to a displacement of non-breeding herons foraging on the pasture that dominates the footprint of the onshore substation sites. The UK non-breeding population of cattle egret was estimated as 66 (2011-15) (although this is likely to be higher now as cattle egret continue to expand their range), grey heron was estimated as 46,000 individuals (2012-17), and little egret 12,000 (2012-17) (BTO, 2023b). The impact at the population level is undetectable given that displaced birds may re-locate to other areas to meet their daily energy requirement during the non-breeding season. The magnitude of impact is therefore considered to be **negligible**.

Breeding raptors

4.12.4.18 One kestrel territory was located within the substation area.

4.12.4.19 Whilst permanent habitat loss within the onshore substation sites may lead to a displacement of one pair of kestrel, the UK breeding population in 2016 was estimated at 31,000 pairs (BTO, 2023b), and there is plenty of potential breeding habitat within the vicinity. Therefore, the potential impact at the population level is undetectable for breeding kestrel. The magnitude of impact is therefore considered to be **negligible**.

Non-breeding raptors

4.12.4.20 Two buzzards and one kestrel were recorded within the onshore substation sites.

4.12.4.21 Permanent habitat loss within the onshore substation sites may lead to a displacement of non-breeding raptors, the UK breeding population of kestrel in 2016 was estimated at 31,000 pairs, and buzzard 63,000 pairs (BTO, 2023b). Therefore, due to the low numbers of birds involved and the fact that

they are wide ranging outside of the breeding season, the potential impact at the population level is undetectable for non-breeding raptors. The magnitude of impact is therefore considered to be **negligible**.

Breeding passerines and other species

4.12.4.22 Three pairs of skylark, one pair of chiffchaff, one pair of sedge warbler, one pair of song thrush, and one pair of yellowhammer were found at the onshore substation sites. The UK breeding population of skylark in 2016 was 1.6 million pairs, for chiffchaff 1.8 million pairs, for sedge warbler 240,000 pairs, for song thrush 1.3 million pairs, and for yellowhammer 700,000 pairs.

4.12.4.23 Whilst permanent habitat loss within the onshore substation sites may lead to a displacement of breeding passerines, the potential impact at the population level is undetectable. The magnitude of impact is therefore considered to be **negligible**.

Non-breeding passerines and other species

4.12.4.24 75 woodpigeon, 17 rook, two skylark, three wren, 250 starling, 25 redwing, 150 fieldfare, two stonechat, three dunnock and seven meadow pipit were recorded. The UK population of woodpigeon in 2016 was estimated at 5.2 million pairs, rook 980,000 pairs, skylark 1.6 million pairs, wren 11 million pairs, starling 1.8 million pairs, stonechat 65,000 pairs, dunnock 2.5 million pairs, and meadow pipit 2.5 million pairs (BTO, 2023b). The UK also has a winter influx of Scandinavian birds for many of these species. Redwing and fieldfare are very rare breeding birds in the UK but in autumn there is an influx of wintering Scandinavian birds, the 1981-84 population estimate for wintering redwing was 690,000, with 720,000 for fieldfare (BTO, 2023b).

4.12.4.25 Whilst the loss of foraging and loafing habitats may lead to a displacement of a small assemblage of non-breeding passerines, the impact at the population level is undetectable given that displaced birds may re-locate to other areas to meet their daily energy requirement during the non-breeding season. The magnitude of impact is therefore considered to be **negligible**.

4.12.5 Significance of the effect

Permanent onshore substations area

4.12.5.1 The sensitivity of all IEFs is medium to high and the magnitude of the impact for all IEFs is negligible to low. The effect will, therefore, be of **minor or moderate adverse** significance. For each of the IEF groups the significance is detailed in **Table 4.25**.

Table 4.25: Significance of effect during construction and decommissioning phases of permanent loss of supporting habitats on IEFs

Area	IEF group	Sensitivity of receptor	Magnitude of impact	Significance of effect
Permanent onshore substations area	Breeding geese, ducks and swans	High	Negligible	Minor adverse
	Non-breeding geese, ducks and swans	High	Negligible	Minor adverse
	Breeding waders	High	Negligible	Minor adverse
	Non-breeding waders	High	Low	Moderate adverse
	Non-breeding gulls	High	Negligible	Minor adverse
	Non-breeding herons	High	Negligible	Minor adverse
	Non-breeding cormorants	High	No change	No change
	Breeding raptors	High	Negligible	Minor adverse
	Non-breeding raptors	High	Negligible	Minor adverse
	Breeding passerines and other species	Medium	Negligible	Negligible
	Non-breeding passerines and other species	Medium	Negligible	Negligible

4.12.6 Further mitigation and residual effects

4.12.6.1 An area of wet pasture, to the south of Newton-with-Scales, has been identified and included in the mitigation hierarchy for the Transmission Assets (CoT120). This area has been identified to provide permanent mitigation for the potential minor to moderate adverse effect from permanent loss of supporting habitat within the onshore substation sites. This will provide benefit for breeding geese, ducks and swans, non-breeding geese, ducks and swans, and breeding waders and non-breeding waders. In addition, the area will be enhanced for breeding farmland birds.

Wet pasture at Newton-with-Scales

4.12.6.2 This area will mitigate for the permanent habitat loss of non-breeding waders within the onshore substation sites.

4.12.6.3 The area of wet pasture to the south of Newton with Scales has been identified as a location where seasonal scrapes could be created, and ditches blocked to flood the fields (CoT120). The aim of this would be to improve habitat in the long term for non-breeding waders. In addition, these mitigation measures will also enhance the area for breeding waders, and for both breeding and non-breeding geese, ducks and swans. Additional enhancement measures in this area will also target farmland birds such as yellowhammer, tree sparrow and corn bunting, kestrel, and barn owl.

4.12.7 Conclusion

4.12.7.1 The implementation of the above measures will reduce the impact on breeding and non-breeding geese, ducks and swans, and breeding and non-breeding waders that are identified as being potential receptors to the impacts of permanent habitat loss. With these measures in place, it is predicted that the residual significance of effect (for non-breeding waders) will be reduced to **minor adverse** and therefore not significant in EIA terms. In addition, inadvertent benefits will be provided for other waterbirds (and non-waterbirds) within the area and will therefore lower the impacts on other receptors.

Table 4.26: Residual significance of effect during construction decommissioning phases of permanent loss of supporting habitats on IEFs further to mitigation measures

Area	IEF group	Significance of effect	Residual significance of effect
Permanent onshore substations area	Breeding geese, ducks and swans	Minor adverse	Minor adverse
	Non-breeding geese, ducks and swans	Minor adverse	Minor adverse
	Breeding waders	Minor adverse	Minor adverse
	Non-breeding waders	Moderate adverse	Minor adverse
	Non-breeding gulls	Minor adverse	Minor adverse
	Non-breeding herons	Negligible	Negligible
	Non-breeding cormorants	No change	No change
	Breeding raptors	Minor adverse	Minor adverse
	Non-breeding raptors	Minor adverse	Minor adverse
	Breeding passerines and other species	Negligible	Negligible
	Non-breeding passerines and other species	Negligible	Negligible

4.13 The impact of temporary loss of supporting habitats and/or resource availability

4.13.1 Construction and decommissioning phases

Introduction

4.13.1.1 The construction and decommissioning phases of the Transmission Assets may result in the temporary loss of habitats which support IEFs. In addition, the distribution and availability of resources vital to the fitness and survival of IEFs may be altered or reduced.

4.13.1.2 The MDS is represented by the maximum surface area of temporary habitat loss within the Onshore Infrastructure Area and is summarised in **Table 4.20**.

4.13.1.3 During construction, there is predicted temporary habitat loss at the coastal survey area, onshore survey area and onshore substation sites. Due to the commitment to trenchless techniques under the River Ribble (CoT90), there will be no temporary habitat loss within the estuarine survey area. During decommissioning, the scope of work is anticipated to operate within the parameters identified for construction. The IEFs found at the onshore substation sites have been assessed accordingly.

4.13.1.4 At the coastal survey area between HAT and MLWS there is predicted to a temporary loss of supporting habitat and/or resource availability of 474,640 m^2. This will include open trenching, the exit pits of the Direct Pipe, beach trenching with a cable plough, construction compounds, and working areas for vehicles and plant. Within the intertidal there could also be up to 600 cable rollers installed along the beach, to facilitate the offshore export cable pull in. Each of these cable rollers will be a single pile. The open trenching will consist of up to six trenches and will terminate at the direct pipe exit pit. The exit pit for the direct pipe could include pile driven cofferdams. There is a commitment by the project (CoT110) to avoid working during the core winter period (November to February), with only a five-week contingency planned for winter works below MHWS. Although it may take time for the benthic communities to recover, it is noted that the majority of these impacts are due to take place outside of the sensitive winter period, and that, although resources may not have fully recovered, habitats will be available for loafing or roosting birds during the winter period. Therefore, the impacts of temporary loss of supporting habitat and/or resource availability are predicted to be lower than disturbance which will impact a larger area.

4.13.1.5 Within the onshore survey area the onshore infrastructure area is an area of approx. 4,655,995 m^2 above MHWS. This includes all areas of open trenching for the onshore export cable corridor and 440 kV grid connection cable corridor, all HDDs and direct pipes, all access tracks, construction compounds, temporary works areas at the permanent onshore substations, and grid connection works. The temporary loss of supporting habitats and/or resource availability is predicted to impact this area, although the whole area will not be affected (e.g., areas of HDD), and the area between MHWS and HAT will be assessed as part of the coastal survey area. Furthermore, it is

not predicted that habitat loss will occur throughout the entire area at any one time, with works likely staggered along the route.

4.13.1.6 Volume 3, Annex 3.3: Phase 1 habitat, national vegetation classification and hedgerow survey technical report of the ES, reported that 3,163,190 m^2 of improved and semi-improved grassland which is likely to be pasture, and 786,230 m^2 of arable were within the Onshore Order Limits. The Onshore Order Limits is a larger area than the Onshore Infrastructure Area as it also contains the mitigation areas, however this gives an indication of the amount of supporting habitats that may be subject to temporary loss of supporting habitats and/or resource availability.

4.13.1.7 The assessment areas are larger than the area over which the impact is due to take place. The proportion of temporary loss of supporting habitat and/or resource availability compared to the assessment areas is:

- **9.4%** of the coastal survey area (taken as the total area of habitat disturbance that overlaps the coastal survey area);
- **0%** of the estuarine survey area (due to the commitment to trenchless techniques at this location (CoT90));
- **10.1%** of the onshore survey area (taken as the amount that the onshore infrastructure area overlaps the onshore survey area); and
- **0%** of the onshore substation sites (temporary habitat loss at this location has been included in the temporary habitat loss for the onshore survey area).

4.13.2 Key receptors for assessment

Coastal survey area

Non-breeding geese, ducks and swans

4.13.2.1 The nearshore habitats available at the coastal survey area had a peak count of 4,000 common scoter, equating to 7.06% of the Liverpool Bay/Bae Lerpwl SPA citation population, or 2.82% of the recent population estimate (HiDef Aerial Surveying, 2023). Common scoter were present in significant numbers during the two years of site-specific surveys in nearshore waters, especially to the north of the coastal survey area. In addition, one shelduck, four scaup and five eider were recorded, all of these species were occasionally recorded.

4.13.2.2 The IEFs taken forward for assessment are common scoter, shelduck, scaup and eider.

Non-breeding grebes

4.13.2.3 Two non-breeding great crested grebe were recorded using the nearshore waters at the coastal survey area.

4.13.2.4 The IEFs taken forward for assessment are great crested grebe.

Non-breeding waders

4.13.2.5 The intertidal habitats at the coastal survey area support a significant population of Ribble and Alt Estuaries SPA wader features with peak counts of 1,073 oystercatcher, 118 grey plover, 93 ringed plover, 625 bar-tailed godwit, 370 knot and an internationally important count of 4,702 sanderling. The latter species was regularly present at the coastal survey area in nationally important numbers. A peak count of 4,200 dunlin was also recorded, however the species was usually present in much lower numbers. 70 redshank were recorded roosting in the sea defences at high tide. Non-SPA species found in low abundance were four whimbrel, which are a passage species that stop off in April/May, nine curlew and 143 turnstone, which were regularly found roosting on the sea defences at high tide with the redshank.

4.13.2.6 The IEFs taken forward for assessment are oystercatcher, grey plover, ringed plover, whimbrel, curlew, bar-tailed godwit, turnstone, knot, sanderling, dunlin and redshank.

Non-breeding gulls and terns

4.13.2.7 The intertidal and nearshore waters at the coastal survey area supported large numbers of loafing and foraging gulls, with nocturnal roosts occasionally present. Herring gull were the most abundant species, with 1,600 birds recorded. Herring gull were present year-round, with urban breeding colonies nearby in Blackpool. 877 black-headed gull were recorded, which were more abundant during the winter, and 750 non-breeding common gull. Lesser black-backed gull were present in numbers of up to 353 and were found during the breeding season predominately, these birds may have been foraging birds from one of the nearby SPA colonies. Gull species found in lower numbers included great black-backed gull, which were regularly present in low numbers of 23 birds. One Mediterranean gull was present on one occasion and the pelagic kittiwake were occasionally present with up to two birds seen. Mediterranean gull were infrequent visitors and kittiwake are assessed in Volume 2, Chapter 5: Offshore ornithology of the ES. Both species are not considered further in this assessment.

4.13.2.8 In addition, terns included sandwich tern which were a passage visitor with 427 birds seen during the post breeding period, common tern which were present in low numbers during the breeding period, but with 90 birds seen during the post breeding period. Little tern were seen just once, and this was thought to be a non-breeding bird as the coastal survey area is beyond the 5km foraging range (Woodward, *et al*., 2019) for any known little tern breeding colonies (SMP,2024), they are not considered further in this assessment.

4.13.2.9 The IEFs taken forward for assessment are black-headed gull, common gull, great black-backed gull, lesser black-backed gull, herring gull, sandwich tern and common tern.

Non-breeding divers and cormorants

4.13.2.10 14 red-throated diver were recorded utilizing the nearshore waters and 112 cormorant were recorded using both the nearshore waters for foraging and the intertidal for non-foraging activities (i.e., dry and re-oil feathers).

4.13.2.11 The IEFs taken forward for assessment are red-throated diver and cormorant.

All coastal survey area IEFs

4.13.2.12 Temporary habitat loss and/or resource availability may force birds into a smaller area and lead to an increase in intra/inter-specific competition due to a higher density of individuals competing for the same resource (e.g., foraging ground or nesting sites) may have an impact on bird fitness (i.e., survival) and lead to localised decline in breeding and non-breeding birds. This is considered within the assessment.

Estuarine survey area

4.13.2.13 There is no temporary habitat loss predicted to occur at the estuarine survey area (**Table 4.20**), as trenchless techniques are proposed for crossing the River Ribble (CoT90). Therefore, temporary habitat loss within the estuarine survey area is not considered further within this assessment.

Permanent onshore substations area

4.13.2.14 The species present within the onshore substation sites (**Table 4.20**) have been counted within the onshore survey area (see **section 4.10.6**). Therefore, these receptors are assessed as part of the onshore survey area.

Onshore survey area

Breeding geese, ducks and swans

4.13.2.15 Up to 23 territories of shelduck, four of shoveler, one of gadwall, 36 of mallard and one of teal were located within the onshore survey area. Within the patchwork of low-lying farmland there are ditches and ponds available for breeding ducks.

4.13.2.16 The IEFs taken forward for assessment are shelduck, shoveler, gadwall, mallard and teal.

Non-breeding geese, ducks and swans

4.13.2.17 Peak counts of 8,319 pink-footed goose were recorded within the onshore survey area. The northwest pink-footed goose population is known to forage over a wide area and the geese within the onshore survey area could consist of birds from the Ribble and Alt Estuaries SPA, Martin Mere SPA and/or Morecambe Bay and Duddon Estuary SPA (Brides *et al*., 2013).

4.13.2.18 The peak count of birds was in December 2023, pink-footed goose mostly feed on arable land, i.e., root and cereal crops (Devenish et al., 2017), with

grass shoots only making up a small proportion of their winter diet although they will often use pasture to loaf on.

4.13.2.19 There were 132 whooper swan recorded within the onshore survey area. The peak count was recorded in February 2023 although a similar peak of 123 were recorded the following year in February 2024. The highest densities were recorded to the south of the River Ribble and in the arable land around Lytham Moss.

4.13.2.20 In addition, a peak of 12 brent goose, 12, barnacle goose, 517 greylag goose, 24 mute swan, 374 shelduck, 31 shoveler, 11 gadwall, 1,647 wigeon, 273 mallard and 312 teal were present within the onshore survey area. The brent and barnacle goose were only sporadically recorded, the greylag goose concentrated to the south of the Ribble, the shelduck and the mallard were distributed throughout the onshore survey area. However, the teal, wigeon and shoveler were mostly concentrated at the area of land to the south of Newton-with-Scales where there are seasonally flooded ditches and scrapes. The gadwall were located in low densities to the south of Moss Side. See Volume 3, Annex 4.2: Wintering and migratory birds technical report of the ES for full details on distribution.

4.13.2.21 The IEFs taken forward for assessment are brent goose, barnacle goose, greylag goose, pink-footed goose, whooper swan, mute swan, shelduck, shoveler, gadwall, wigeon, mallard and teal.

Breeding partridges

4.13.2.22 Three territories of grey partridge were located within the onshore survey area. Grey partridge are a locally scarce and nationally declining farmland species.

4.13.2.23 The IEFs taken forward for assessment are grey partridge.

Breeding rails

4.13.2.24 Three moorhen territories and one coot territory are contained within the onshore survey area.

4.13.2.25 The IEFs taken forward for assessment are moorhen and coot.

Non-breeding rails

4.13.2.26 A peak of 16 moorhen and six coot were recorded during the non-breeding period.

4.13.2.27 The IEFs taken forward for assessment are moorhen.

Breeding waders

4.13.2.28 14 oystercatcher territories, five avocet, 25 lapwing, one little ringed plover, two curlew, one black-tailed godwit, and four redshank territories were located within the onshore survey area.

4.13.2.29 All of the avocet, little ringed plover, black-tailed godwit and redshank territories were located within Newton Marsh SSSI (see Volume 3, Annex

4.2: Wintering and migratory birds technical report for full details on distribution) where there will be no impacts, so these species are discounted from further assessment.

4.13.2.30 There were also two recorded curlew territories in 2022. The curlew were mapped on a precautionary basis based upon anecdotal evidence from a member of the public. However, they were not located during 2023 and it may be that these were passage birds. Both oystercatcher and lapwing breed on open grassland (amongst other habitats) and benefit from having access to wet areas for the young to feed in.

4.13.2.31 The IEFs taken forward for assessment are oystercatcher, lapwing and curlew.

Non-breeding waders

4.13.2.32 Non-breeding waders that have been recorded within the onshore survey area included peak counts of 126 oystercatcher, 17 avocet, 2,081 lapwing, 381 golden plover, 696 curlew, 423 black-tailed godwit, 2 ruff, six woodcock, 78 snipe, and 61 redshank. Three bar-tailed godwit, two grey plover were also recorded and one green sandpiper, however they prefer muddy and/or tidal areas and all were recorded sporadically with only one record of each.

4.13.2.33 All of the other species were more frequently recorded, and all are known to frequent wet grassland habitats over the winter period for foraging.

4.13.2.34 The IEFs taken forward for assessment are oystercatcher, avocet, lapwing, golden plover, curlew, black-tailed godwit, ruff, woodcock, snipe, and redshank.

Non-breeding gulls and terns

4.13.2.35 No gulls or terns were recorded as breeding within the onshore survey area. 1,926 black-headed gull, 461 common gull, 1,009 herring gull, 176 lesser black-backed gull and 44 great black-backed gull were recorded during the wintering and migratory surveys in the onshore survey area. No tern species were recorded within the onshore survey area. The black-headed gull and common gull are regular field-foraging species, with the great black-backed gull more likely to frequent the coastline. Great black-backed gull have however been recorded coming inland to predate upon the high numbers of wintering birds in the onshore survey area, as well as congregating near waste centres.

4.13.2.36 Lesser black-backed gull were absent from most of the winter months and only returned to the area in February/March time.

4.13.2.37 The IEFs taken forward for assessment are black-headed gull, common gull, great black-backed gull, herring gull and lesser black-backed gull.

Non-breeding cormorants

4.13.2.38 No cormorant were recorded as breeding within the onshore survey area. Up to six cormorant were recorded.

4.13.2.39 The IEFs taken forward for assessment are cormorant.

Breeding herons

4.13.2.40 Seven grey heron and one little egret were recorded as holding territories (or nests as both species are frequently communal breeders) within the onshore survey area.

4.13.2.41 The IEFs taken forward for assessment are grey heron and little egret.

Non-breeding herons

4.13.2.42 One cattle egret, 28 grey heron, one great white egret, and 38 little egret were recorded using the onshore survey area during the non-breeding season.

4.13.2.43 The IEFs taken forward for assessment are cattle egret, grey heron, great white egret and little egret.

Breeding owls

4.13.2.44 Five barn owl territories and one tawny owl territory were recorded within the onshore survey area. Whilst woodland within the onshore survey area is limited for tawny owl, there are plenty of habitats available for nesting or foraging barn owl. This species can often be found nesting in abandoned and/or agricultural buildings and there are also a number of barn owl nest boxes available locally. In good years barn owls can have an extended breeding season when resources allow with up to three broods per year, this may last well into November (Hardy *et al*., 2006).

4.13.2.45 The IEFs taken forward for assessment are barn owl and tawny owl.

Non-breeding owls

4.13.2.46 Nine barn owl were recorded within the onshore survey area during the non-breeding season. As barn owl are generally sedentary within their lowland range it is likely that these birds are either resident breeding adults, or pre-dispersal juveniles.

4.13.2.47 The IEFs taken forward for assessment are barn owl.

Breeding kingfishers

4.13.2.48 Three kingfisher territories were recorded within the onshore survey area. Kingfisher breed in burrows in the soft sand of riverbanks and waterways. They are tied to aquatic habitats and utilize the waterway corridors for transiting and fishing.

4.13.2.49 The IEFs taken forward for assessment are kingfisher.

Non-breeding kingfishers

4.13.2.50 Four kingfisher were recorded during the non-breeding season within the onshore survey area. Although kingfisher are largely sedentary, they can disperse in winter with an influx of birds to coastal and estuarine habitats.

Non-breeding individuals recorded are likely to be local breeding birds dispersing in winter.

4.13.2.51 The IEFs taken forward for assessment are kingfisher.

Breeding raptors

4.13.2.52 Three sparrowhawk, two buzzard, and nine kestrel territories were recorded within the onshore survey area. All nest in trees but don't need extensive woodland, kestrel also nest in barn owl boxes and buildings.

4.13.2.53 The IEFs taken forward for assessment are sparrowhawk, buzzard and kestrel.

Non-breeding raptors

4.13.2.54 Eight sparrowhawk, one marsh harrier, one red kite, 30 buzzard, 25 kestrel, one merlin and two peregrine were recorded within the onshore survey area during the non-breeding season. Both merlin and peregrine are more commonly associated with upland areas however they are both short distance migrants that follow the high densities of avian prey that congregate around estuaries and other lowland habitats. During the non-breeding season, they are likely to roost on the extensive saltmarshes of the Ribble Estuary (Warton, Banks, Crossens and Hesketh) and will range over large areas hunting avian prey during the diurnal periods. Marsh harrier also have a roost on Warton saltmarsh and hunt over a wider area. Red kite are scarce locally but are a scavenger and can cover large distances during the day whilst searching for food.

4.13.2.55 The sparrowhawk, buzzard and kestrel are more likely to be sedentary birds but sparrowhawk also often hunt over saltmarsh during the winter. The red kite was only recorded once over two years and may have travelled from far away.

4.13.2.56 The IEFs taken forward for assessment are sparrowhawk, marsh harrier, red kite, buzzard, kestrel, merlin and peregrine.

Breeding passerines and other species

4.13.2.57 33 species of passerines and other species were found holding territories during the breeding season. These were four territories of swift, four of stock dove, five of great spotted woodpecker, two rookeries with approx. 35 nesting pairs, 74 of skylark, five of house martin, three of Cetti's warbler, 21 of willow warbler, 72 of chiffchaff, 55 of sedge warbler, four of grasshopper warbler, 32 of blackcap, 45 of common whitethroat, 49 of wren, 10 of starling, 57 of song thrush, seven of mistle thrush, one of common redstart, six of stonechat, two of wheatear, 18 of tree sparrow, 14 of house sparrow, 33 of dunnock, two of grey wagtail, two of yellow wagtail, 11 of meadow pipit, five of bullfinch, 28 of greenfinch, 15 of linnet, seven of yellowhammer, nine of corn bunting and 54 of reed bunting.

4.13.2.58 The presence of Cetti's warbler was notable as they are Schedule 1 species, the presence of grasshopper warbler, tree sparrow, yellow wagtail,

yellowhammer and corn bunting was also of note as these species are in decline due to modern farming practices.

4.13.2.59 The IEFs taken forward for assessment are swift, stock dove, great spotted woodpecker, rook, skylark, house martin, Cetti's warbler, willow warbler, chiffchaff, sedge warbler, grasshopper warbler, blackcap, common whitethroat, wren, starling, song thrush, mistle thrush, common redstart, stonechat, wheatear, tree sparrow, house sparrow, dunnock, grey wagtail, yellow wagtail, meadow pipit, bullfinch, greenfinch, linnet, yellowhammer, corn bunting and reed bunting.

Non-breeding passerines and other species

4.13.2.60 Up to 32 species of passerines and other species were found within the onshore survey area during the non-breeding season. These were stock dove with a peak count of 29, woodpigeon with 687, great spotted woodpecker with three, rook with 255, raven with seven, skylark with 98, Cetti's warbler with one, chiffchaff with three, wren with 90, starling with 7,579, song thrush with 316, mistle thrush with 22, redwing with 346, fieldfare with 1,560, stonechat with 20, whinchat with three, tree sparrow with 21, house sparrow with 76, dunnock with 86, grey wagtail with six, meadow pipit with 147, brambling with three, bullfinch with nine, greenfinch with 77, twite with three, linnet with 730, lesser redpoll with one, snow bunting with one, corn bunting with three, yellowhammer with nine, and reed bunting with 56.

4.13.2.61 Species of note included whinchat, which are likely to have been passage birds on their way to and from the upland habitats where they breed, and twite which breeds in upland area and winter on the Lancashire coast.

4.13.2.62 The IEFs taken forward for assessment are stock dove, woodpigeon, great spotted woodpecker, rook, raven, skylark, Cetti's warbler, chiffchaff, wren, starling, song thrush, mistle thrush, redwing, fieldfare, stonechat, whinchat, tree sparrow, house sparrow, dunnock, grey wagtail, meadow pipit, brambling, bullfinch, greenfinch, twite, linnet, lesser redpoll, snow bunting, corn bunting, yellowhammer and reed bunting.

All onshore survey area IEFs

4.13.2.63 Temporary habitat loss and/or resource availability may force birds into a smaller area and lead to an increase in intra/inter-specific competition due to a higher density of individuals competing for the same resource (e.g., foraging ground or nesting sites) may have an impact on bird fitness (i.e., survival) and lead to localised decline in breeding and non-breeding birds. This is assessed below.

4.13.3 Sensitivity of the receptor

Coastal survey area

Non-breeding geese, ducks and swans

4.13.3.1 IEFs are common scoter, shelduck, scaup and eider. They are flexible in their habitat use during the non-breeding season, they are considered to be very vulnerable to the loss of foraging grounds.

4.13.3.2 Common scoter, shelduck, scaup and eider are deemed to be of very high conservation importance, high vulnerability and medium recoverability as the number of reports of common scoter in BTO WeBS surveys has risen significantly since the early 2000s, with reports of shelduck and eider remaining relatively stable, and a slight decline in number of reports of scaup (Woodward et al., 2024). The sensitivity of the receptor is therefore, considered to be **high**.

Non-breeding grebes

4.13.3.3 IEFs are great crested grebe.

4.13.3.4 Although great crested grebe are flexible in their habitat use during the non-breeding season, they are considered to be very vulnerable to the loss of foraging grounds. The non-breeding grebe assemblage at the coastal survey area consisted of great crested grebes which forage in the nearshore waters.

4.13.3.5 Great crested grebe are deemed to be of very high conservation importance, high vulnerability and medium recoverability as their population abundance has remained broadly stable since the index was created in 1995 (Heywood et al., 2024), and WeBS reporting has also remained stable during the same period (Woodward et al., 2024). The sensitivity of the receptor is therefore, considered to be **high**.

Non-breeding waders

4.13.3.6 IEFs are oystercatcher, grey plover, ringed plover, whimbrel, curlew, bar-tailed godwit, turnstone, knot, sanderling, dunlin and redshank. These species rely on intertidal habitats to feed on benthic invertebrates and are therefore considered to be very vulnerable to the loss of foraging grounds.

4.13.3.7 The species are deemed to be of very high conservation importance, high vulnerability and medium recoverability as many of the populations of these species have remained broadly stable since the early 2000s, with sanderling numbers increasing (Woodward, *et al*., 2024). The sensitivity of the receptor is therefore, considered to be **high**.

Non-breeding gulls and terns

4.13.3.8 IEFs are black-headed gull, common gull, great black-backed gull, herring gull, lesser black-backed gull sandwich tern and common tern.

4.13.3.9 Most non-breeding gulls are flexible in their habitat use during the non-breeding season so they are considered to be less vulnerable to the small

scale loss of foraging grounds. Additionally, tern species are also flexible in their habitat use during the non-breeding season. However, more so than with gulls, terns are very vulnerable to the loss of foraging grounds.

4.13.3.10 The species are deemed to be of very high conservation importance, low vulnerability and high recoverability as the populations of these species have remained relatively stable or have increased (Heywood et al., 2024). The sensitivity of the receptor is therefore, considered to be **high**.

Non-breeding divers and cormorants

4.13.3.11 IEFs are red-throated diver and cormorant. Although diver and cormorant species are flexible in their habitat use during the non-breeding season, they are considered to be very vulnerable to the loss of foraging grounds.

4.13.3.12 The species are deemed to be of very high conservation importance, high vulnerability and medium recoverability as populations have remained relatively stable since 1994 (Heywood et al., 2023), with Liverpool Bay SPA populations increasing (HiDef Aerial Surveying Ltd, 2024). The sensitivity of the receptor is therefore, considered to be **high**.

Onshore survey area

Breeding geese, ducks and swans

4.13.3.13 IEFs are shelduck, shoveler, gadwall, mallard and teal. The species are deemed to be of very high conservation importance, high vulnerability and medium recoverability as the long-term population abundance and frequency of WeBS reports of these species has remained relatively stable (Heywood et al., 2024; Woodward et al., 2024). The sensitivity of the receptor is therefore, considered to be **high**.

Non-breeding geese, ducks and swans

4.13.3.14 IEFs are brent goose, barnacle goose, greylag goose, pink-footed goose, whooper swan, mute swan, shelduck, shoveler, gadwall, wigeon, mallard and teal.

4.13.3.15 The species are deemed to be of very high conservation importance, high vulnerability and medium recoverability. The sensitivity of the receptor is therefore, considered to be **high**.

Breeding partridges

4.13.3.16 IEFs are grey partridge.

4.13.3.17 Grey partridge are deemed to be of medium conservation importance, high vulnerability and medium recoverability as this species has undergone a steep population decline of 92% in the period 1967 to 2020 (BTO, 2023a). The sensitivity of the receptor is therefore, considered to be **medium**.

Breeding rails

4.13.3.18 IEFs are moorhen and coot.

4.13.3.19 Moorhen and coot are deemed to be of high conservation importance, high vulnerability, and high recoverability. Whilst both species have undergone declines since the early 2000s, both lay between five and seven eggs in 1-2 broods (BTO, 2023a), and potential for recovery is consequently high. The sensitivity of the receptor is therefore, considered to be **high**.

Non-breeding rails

4.13.3.20 IEFs are moorhen and coot.

4.13.3.21 Moorhen and coot are deemed to be of high conservation importance, high vulnerability and high recoverability. The sensitivity of the receptor is therefore, considered to be **high**.

Breeding waders

4.13.3.22 IEFs are oystercatcher, lapwing and curlew.

4.13.3.23 The species are deemed to be of very high conservation importance, high vulnerability and medium recoverability. The sensitivity of the receptor is therefore, considered to be **high**.

Non-breeding waders

4.13.3.24 IEFs are oystercatcher, avocet, lapwing, golden plover, curlew, black-tailed godwit, ruff, woodcock, snipe, green sandpiper and redshank.

4.13.3.25 The species are deemed to be of high to very high conservation importance, high vulnerability and medium recoverability as although the long-term population abundance of some species has remained relatively stable (Heywood et al., 2024), there have been mild to steep declines in the populations of others. The sensitivity of the receptor is therefore, considered to be **high**.

Non-breeding gulls

4.13.3.26 IEFs are black-headed gull, common gull, great black-backed gull, herring gull and lesser black-backed gull.

4.13.3.27 The species are deemed to be of very high conservation importance, low vulnerability and high recoverability as the populations of these species have remained relatively stable or have increased (Heywood et al., 2024).. The sensitivity of the receptor is therefore, considered to be **high**.

Non-breeding cormorants

4.13.3.28 IEFs are cormorant.

4.13.3.29 Cormorant is deemed to be of very high conservation importance, high vulnerability and medium recoverability. The sensitivity of the receptor is therefore, considered to be **high**.

Breeding herons

4.13.3.30 IEFs are grey heron and little egret.

4.13.3.31 Grey heron and little egret are deemed to be of high to very high conservation importance, high vulnerability and medium recoverability as the population abundance of these species has remained relatively stable since 1994 (Heywood et al., 2024), but grey heron and little egret only lay three to four and four to five eggs, respectively, in one brood per year (BTO, 2023a). The sensitivity of the receptor is therefore, considered to be **high**.

Non-breeding herons

4.13.3.32 IEFs are cattle egret, grey heron, great white egret, and little egret.

4.13.3.33 These species are deemed to be of high to very high conservation importance, high vulnerability and medium recoverability. The sensitivity of the receptor is therefore, considered to be **high**.

Breeding owls

4.13.3.34 IEFs are barn owl and tawny owl.

4.13.3.35 Barn owl and tawny owl are deemed to be of high conservation importance, high vulnerability and medium recoverability as barn owl numbers have remained relatively stable since 1994, but tawny owl numbers have decreased steadily in the same period (Heywood et al., 2024). Barn owls lay two broods of four to six eggs per year, whereas tawny owls lay one brood of two to three eggs per year (BTO, 2023a). The sensitivity of the receptor is therefore, considered to be **high**.

Non-breeding owls

4.13.3.36 IEFs are barn owl.

4.13.3.37 Barn owls are deemed to be of high conservation importance, high vulnerability and medium recoverability as the species are green listed on BOCC5. The sensitivity of the receptor is therefore, considered to be **high**.

Breeding kingfishers

4.13.3.38 IEFs are kingfisher.

4.13.3.39 Kingfisher is deemed to be of high conservation importance, high vulnerability and medium recoverability as kingfisher numbers have remained stable (Heywood et al., 2024), and lay one to two broods of five to seven eggs per year (BTO, 2023a). The sensitivity of the receptor is therefore, considered to be **high**.

Non-breeding kingfishers

4.13.3.40 IEFs are kingfisher.

4.13.3.41 Kingfisher is deemed to be of high conservation importance, high vulnerability and medium recoverability as they are green listed on BOCC5. The sensitivity of the receptor is therefore, considered to be **high**.

Breeding raptors

4.13.3.42 IEFs are sparrowhawk, buzzard and kestrel.

4.13.3.43 These species are deemed to be of medium conservation importance, medium vulnerability and medium recoverability as buzzard population abundance has almost doubled since the creation of the index in 1994, and kestrel numbers are now relatively stable (Heywood et al., 2024). However, sparrowhawk population abundance has declined by around 12% since 1995 (Heywood et al., 2024). The sensitivity of the receptor is therefore, considered to be **medium**.

Non-breeding raptors

4.13.3.44 IEFs are sparrowhawk, marsh harrier, red kite, buzzard, kestrel, merlin and peregrine.

4.13.3.45 These species are deemed to be of high to very high conservation importance, high vulnerability and medium recoverability. The sensitivity of the receptor is therefore, considered to be **high**.

Breeding passerines and other species

4.13.3.46 IEFs are swift, stock dove, great spotted woodpecker, rook, skylark, house martin, Cetti's warbler, willow warbler, chiffchaff, sedge warbler, grasshopper warbler, blackcap, common whitethroat, wren, starling, song thrush, mistle thrush, common redstart, stonechat, wheatear, tree sparrow, house sparrow, dunnock, grey wagtail, yellow wagtail, meadow pipit, bullfinch, greenfinch, linnet, yellowhammer, corn bunting and reed bunting.

4.13.3.47 These species are deemed to be of medium to high conservation importance, medium vulnerability and medium recoverability as some passerines have increased since the index was created, and with other suffering rapid declines (Heywood *et al*., 2024). The sensitivity of the receptor is therefore, considered to be **medium**.

Non-breeding passerines and other species

4.13.3.48 IEFs are stock dove, woodpigeon, great spotted woodpecker, rook, raven, skylark, Cetti's warbler, chiffchaff, wren, starling, song thrush, mistle thrush, redwing, fieldfare, stonechat, whinchat, tree sparrow, house sparrow, dunnock, grey wagtail, meadow pipit, brambling, bullfinch, greenfinch, twite, linnet, lesser redpoll, snow bunting, corn bunting, yellowhammer and reed bunting.

4.13.3.49 These species are deemed to be of medium to high conservation importance, medium vulnerability and medium recoverability. The sensitivity of the receptor is therefore, considered to be **medium**.

4.13.4 Magnitude of impact

Coastal survey area

Non-breeding geese, ducks and swans

4.13.4.1 Temporary loss of intertidal and subtidal habitat at the coastal survey area may result in the temporary loss of a food and/or roosting resource to birds, including species such as common scoter. The nearshore habitats available at the coastal survey area supported up to 4,000 common scoter, equating to 7.06% of the Liverpool Bay/Bae Lerpwl SPA population, or 2.82% of the latest population estimate (HiDef Aerial Surveying Ltd, 2023).

4.13.4.2 Temporary habitat loss as the result of the construction and decommissioning is expected to occur on the intertidal zone due to construction activities. Whilst the this may lead to a temporary avoidance of the affected areas, the impact at the population level is undetectable given that displaced birds may re-locate to other areas to meet their daily energy requirement. Furthermore, it is anticipated that the effects of the construction and decommissioning phases upon the supporting habitats will be reversible.

4.13.4.3 Moreover, the temporary loss of up to 474,640 m^2 for nearshore species is considered to be negligible in context of the 2,527,600,000 m^2 of habitats available to support the common scoter in the Liverpool Bay/Bae Lerpwl SPA.

4.13.4.4 The potential impact is therefore predicted to be of local spatial extent, short term duration (with only up to five weeks work during the winter period), intermittent and highly reversible. The magnitude is therefore, considered to be **negligible**.

Non-breeding grebes

4.13.4.5 Site-specific surveys recorded a very low abundance of birds in the nearshore waters with a peak count of only two great crested grebes. Furthermore, the temporary loss of subtidal habitats for great-crested grebe is considered to be negligible in context of the habitats available to support great crested grebes in the Liverpool Bay/Bae Lerpwl SPA.

4.13.4.6 The potential impact is therefore predicted to be of local spatial extent, short term duration, intermittent and highly reversible. The magnitude is therefore, considered to be **negligible**.

Non-breeding waders

4.13.4.7 The intertidal habitats at the coastal survey area support a significant population of SPA wader features with peak counts of 1,073 oystercatcher, 118 grey plover, 93 ringed plover, 625 bar-tailed godwit, 370 knot, and internationally important count of 4,702 sanderling (exceeding the 1% threshold of international importance).

4.13.4.8 There will be an interim loss of intertidal habitats (474,640 m^2) which may impact resource temporarily (i.e., prey abundance and availability). It must be noted that the area affected represents 0.38% of available roosting, loafing or

foraging habitats the Ribble and Alt Estuary SPA. It is possible that the benthic community impacted by interim habitat loss may not fully recover prior the arrival of birds in winter. However, the temporary loss of intertidal habitats is considered to be negligible in context of the habitats available to support non-breeding waders in the Ribble and Alt Estuary SPA.

4.13.4.9 The potential impact is therefore predicted to be of local spatial extent, short term duration (with only up to five weeks works work during the winter period), intermittent and highly reversible. The magnitude is therefore, considered to be a precautionary **low**.

Non-breeding gulls and terns

4.13.4.10 The intertidal and nearshore waters at the coastal survey area support large numbers of loafing and foraging gull, with nocturnal roosts occasionally present, as well as foraging terns.

4.13.4.11 There will be an interim loss of intertidal habitats (474,640 m^2) which may impact resource (i.e., prey abundance and availability) of gull and tern species foraging on the intertidal habitats. Indeed, it is possible that the benthic community impacted by interim habitat loss may not fully recover prior the arrival of birds in winter. However, gulls and terns are flexible in the use of habitats during the non-breeding season and do not rely on intertidal habitats to forage. Furthermore, the area affected represents 0.38% of the available habitats the Ribble and Alt Estuary SPA and the temporary loss of intertidal habitats is considered to be negligible in context of the habitats available to support non-breeding gulls and terns in the Ribble and Alt Estuary SPA.

4.13.4.12 The potential impact is therefore predicted to be of local spatial extent, short term duration, intermittent and highly reversible. The magnitude is therefore, considered to be **negligible**.

Non-breeding divers and cormorants

4.13.4.13 14 red-throated diver were recorded utilizing the nearshore waters and 112 cormorant recorded using both the nearshore waters for foraging.

4.13.4.14 Whilst temporary habitat loss as the result of the construction and decommissioning is expected to occur on the intertidal zone due to construction activities, negligible loss of subtidal habitats are expected to occur. Whilst the this may lead to a temporary avoidance of the affected areas due to resource availability, the impact at the population level is undetectable given that displaced birds may re-locate to other areas to meet their daily energy requirement. Furthermore, it is anticipated that the effects of the construction and decommissioning phases upon the supporting habitats will be reversible. Moreover, the temporary loss of subtidal habitats for nearshore species is considered to be negligible in context of the habitats available to support the common scoter in the Liverpool Bay/Bae Lerpwl SPA.

4.13.4.15 The potential impact is therefore predicted to be of local spatial extent, short term duration, intermittent and highly reversible. The magnitude is therefore, considered to be **negligible**.

Onshore survey area

Breeding geese, duck and swans

4.13.4.16 23 territories of shelduck, four of shoveler, one of gadwall, 36 of mallard and one of teal will be affected during the construction phase. None of these species are named as designated breeding features of nearby designated areas however the estimated 2016 UK breeding population of shelduck was 7,850 pairs, for mallard 61,000 and for gadwall 1,250 (BTO, 2023b). All three species are widely distributed on the coastal plains of Lancashire (Balmer et al., 2011). Therefore, the potential impact at the population level is undetectable. Shelduck, gadwall and mallard are widely distributed in the region and flexible in habitat use during the breeding season, with the shoveler and teal located closer to Newton Marsh SSSI. The magnitude is therefore considered to be **negligible.**

Non-breeding geese, ducks and swans

4.13.4.17 Whilst the loss of foraging habitats may lead to a displacement of 12 brent goose, 12 barnacle goose, 517 greylag goose, 8,319 pink-footed goose,24 mute swan, 132 whooper swan, 366 shelduck, 31 shoveler, 11 gadwall, 1,647 wigeon, 273 mallard and 312 teal within the onshore survey area, the impact at the population level is undetectable given that displaced birds may re-locate to other areas to meet their daily energy requirement during the non-breeding season.

4.13.4.18 The north-west SPA population of pink-footed goose was 55,686 (five-year mean of peak 2009/10 – 2013/14 from Devenish *et al*., 2015) and may now exceed that. The geese within the onshore survey area may belong to any one of three SPAs with connectivity (Ribble and Alt, Martin Mere and Morecambe Bay), considering a 20 km foraging range (NatureScot, 2016). The 8,319 birds within the onshore survey area represents 14.9 % of the north-west SPA population.

4.13.4.19 The 132 whooper swan and 1,647 wigeon together with 374 shelduck and 312 teal are all Ribble and Alt Estuaries SPA features. The shoveler, mallard and gadwall are not SPA features. The whooper swan were present at levels close to the SPA citation (72.5 %), whereas the wigeon were present at 1.9 %, shelduck at 7.6 % and the teal at 4.4 %.

4.13.4.20 The peak counts included birds recorded up to 500 m away from construction works and therefore will represent an over-estimation of the likely numbers of birds affected by interim loss of supporting habitats and/or loss of foraging resources.

4.13.4.21 The total terrestrial habitats that will be temporarily lost are 4,655,995 m^2 (the entire Onshore Infrastructure Area). This represents the maximum impact scenario, and it is likely that all displaced birds will be able to feed on alternative habitats. As works will not take place within the entire Onshore

Infrastructure Area at any one time, and although the entire duration of works is long-term, not all areas will be impacted for the entire duration, the magnitude is considered to be **low**.

Breeding partridges

4.13.4.22 Three territories of grey partridge were located within the onshore survey area. The UK population of grey partridge is estimated at 37,000 pairs in 2016 (BTO, 2023b) and they are distributed widely throughout Lancashire (Balmer et al., 2011).

4.13.4.23 The temporary loss of supporting habitats and/or resource availability will not affect individual bird survival and/or productivity of grey partridge given population size and availability of alternative habitats. The magnitude is therefore considered to be **negligible**.

Breeding rails

4.13.4.24 Three territories of moorhen and one of coot were located within the onshore survey area. Moorhen are a common and widespread species with an estimated population of 210,000 pairs in the UK in 2016, with coot having 26,000 pairs (BTO, 2023b).

4.13.4.25 The temporary loss of supporting habitats and/or resource availability will not affect individual bird survival and/or productivity of breeding moorhen or coot given population size availability of alternative habitats. The magnitude is therefore considered to be **negligible**.

Non-breeding rails

4.13.4.26 16 moorhen and six coot were located within the onshore survey area. Moorhen are a common and widespread species with an estimated population of 210,000 pairs in the UK in 2016, with coot having 26,000 pairs (BTO, 2023b).

4.13.4.27 The temporary loss of supporting habitats and/or resource availability will not affect individual bird survival of non-breeding moorhen or coot given population size and availability of alternative habitats. The magnitude is therefore considered to be **negligible**.

Breeding waders

4.13.4.28 14 oystercatcher territories, 25 lapwing territories and two curlew territories were located along the onshore survey area. The 2016 UK breeding population of oystercatcher is estimated at 96,000 pairs, lapwing at 98,000 pairs and curlew at 59,000 pairs and there is no connectivity with the upland protected sites where these birds are a breeding feature.

4.13.4.29 The temporary and localised habitat loss of up to 0.02% (oystercatcher), 0.03% (lapwing) and less than 0.00% (curlew) of the UK population of species that are not named breeding features of a nearby protected site, and that will be quickly reversed after the cessation of works is thought to be **negligible**.

Non-breeding waders

4.13.4.30 Whilst the loss of foraging habitats may lead to a displacement of 126 oystercatcher, 17 avocet, 2,081 lapwing, 381 golden plover, 696 curlew, 423 black-tailed godwit, two ruff, six woodcock, 78 snipe, and 61 redshank within the onshore survey area, the impact at the population level is undetectable given that displaced birds may re-locate to other areas to meet their daily energy requirement during the non-breeding season.

4.13.4.31 The peak counts included birds recorded up to 500 m away from construction works will represent an over-estimation of the likely numbers of birds affected by interim loss of supporting habitats and/or loss of foraging resources. The 500 m buffer was based on the lower limit of the disturbance buffer (Goodship and Furness, 2022) for the non-breeding bird assemblage expected to occur in the survey area. The total terrestrial habitats that will be temporarily lost are 4,655,995 m2. This represents the maximum impact scenario, and it is likely that all displaced birds will be able to feed on alternative habitats given that these species are flexible in terrestrial habitat use during the non-breeding season. The magnitude is therefore considered to be a precautionary **low**.

Non-breeding gulls

4.13.4.32 Gulls are flexible in their habitat use and forage over a wide area (Woodward et al., 2019). Non-breeding gulls have large non-breeding populations with estimated UK populations in 2016 of 2.2 million black-headed gull, 710,000 common gull, 740,000 herring gull, 130,000 lesser black-backed gull, 77,000 great black-backed gull (BTO, 2023b).

4.13.4.33 No terns or gulls were recorded as breeding within the onshore survey area, Whilst the loss of foraging habitats may lead to a displacement of 1,926 black-headed gull, 461 common gull, 1,009 herring gull, 176 lesser black-backed gull and 44 great black-backed gull during the non-breeding season. The impact at the population level is undetectable given that displaced birds may re-locate to other areas to meet their daily energy requirement during the non-breeding season. Indeed, gulls are very flexible in terrestrial habitat use during the non-breeding season. As bird fitness will not be affected during the non-breeding season, the magnitude is therefore considered to be **negligible.**

Non-breeding cormorants

4.13.4.34 Up to six cormorants were located within the onshore survey area. The latest population estimate for cormorant in the Liverpool Bay/Bae Lerpwl SPA is 1,217 (mean taken from HiDef Aerial Surveying Limited, 2023). This equates to 0.5% of the SPA population and although this species often breeds in freshwater habitats it does not utilise the arable and pasture habitats that dominate the onshore survey area. The onshore survey area is therefore not considered functionally linked for this seabird.

4.13.4.35 The temporary loss of supporting habitats and/or resource availability will not affect individual bird survival of non-breeding cormorants given population

size and availability of alternative habitats. The magnitude is therefore considered to be **negligible**.

Breeding herons

4.13.4.36 Up to seven grey heron and one little egret were recorded as holding territories (or nests as both species are frequently communal breeders) within the onshore survey area. The UK breeding population of grey heron in 2016 was estimated as 11,000 pairs and little egret 1,100 pairs (BTO, 2023b).

4.13.4.37 The temporary loss of supporting habitats and/or resource availability will not affect individual bird survival and/or productivity of breeding grey heron and little egret given the availability of alternative habitats for breeding birds. The magnitude is therefore considered to be **negligible**.

Non-breeding herons

4.13.4.38 Whilst the loss of foraging habitats may lead to a displacement of one cattle egret, 28 grey heron, one great white egret, and 38 little egret within the onshore survey area. The UK non-breeding population of cattle egret was estimated as 66 (2011-15) (although this is likely to be higher now as cattle egret continue their colonisation), grey heron was estimated as 46,000 individuals (2012-17), great white egret at 72 (2011-15) (although this is likely to be higher now as cattle egret continue their colonisation) and little egret 12,000 (2012-17) (BTO, 2023b).

4.13.4.39 The temporary loss of supporting habitats and/or resource availability will not affect individual bird survival of non-breeding cattle egret, grey heron, great white egret, and little egret given the availability of alternative habitats for non-breeding birds. The magnitude is therefore considered to be **negligible**.

Breeding owls

4.13.4.40 Up to five barn owl territories and one tawny owl territory were recorded within the onshore survey area. Although not a feature interest of a nearby protected site, breeding barn owl are protected under Schedule 1 of the Wildlife and Countryside Act, 1981. There were estimated to be up to 4,000 pairs of barn owl in the UK in 2016 and up to 50,000 pairs of tawny owl (BTO, 2023b).

4.13.4.41 The temporary loss of supporting habitats and/or resource availability will not affect individual bird survival and/or productivity of breeding owls given the availability of alternative habitats for foraging and breeding birds (e.g., nesting sites). The magnitude is therefore considered to be **negligible**.

Non-breeding owls

4.13.4.42 Whilst the loss of foraging habitats may lead to a displacement of a two-year peak count of up to nine barn owl within the onshore survey area, There were estimated to be up to 4,000 pairs of barn owl in the UK in 2016

4.13.4.43 The temporary loss of supporting habitats and/or resource availability will not affect individual bird survival of non-breeding barn owl given the availability of alternative habitats. The magnitude is therefore considered to be **negligible**.

Breeding kingfishers

4.13.4.44 Kingfisher were recorded as potentially breeding in three locations within the onshore survey area. Kingfisher breed in burrows in the soft sand of riverbanks and waterways. Although not a feature interest of a nearby protected site, breeding kingfisher are protected under Schedule 1 of the Wildlife and Countryside Act, 1981. The UK population was estimated at 3,850 pairs in 2016 (BTO, 2023b).

4.13.4.45 Due to the commitment to trenchless technique under watercourses (CoT04 and CoT90), the magnitude is considered to be **no change**.

Non-breeding kingfishers

4.13.4.46 Four non-breeding kingfisher were recorded within the onshore survey area. Most of the non-breeding sightings were from within the ditches and tributaries. Although not a feature interest of a nearby protected site, breeding kingfisher are protected under Schedule 1 of the Wildlife and Countryside Act, 1981. The UK population was estimated at 3,850 pairs in 2016 (BTO, 2023b).

4.13.4.47 Due to the commitment to trenchless technique under watercourses (CoT04 and CoT90), the magnitude is considered to be **no change**.

Breeding raptors

4.13.4.48 Whilst the temporary loss of foraging habitats may lead to a displacement of three sparrowhawk territories, two buzzard and nine kestrel. The UK breeding population of sparrowhawk was estimated at 31,000 pairs (2016), buzzard at 63,000 pairs (2016), and kestrel at 31,000 pairs (2016) (BTO, 2023b).

4.13.4.49 The temporary loss of supporting habitats and/or resource availability will not affect individual bird survival and/or productivity of breeding raptors given the availability of alternative habitats for foraging and breeding birds (e.g., nesting sites). The magnitude is therefore considered to be **negligible**.

Non-breeding raptors

4.13.4.50 Whilst the temporary loss of foraging habitats may lead to a displacement of eight sparrowhawk, one marsh harrier, one red kite, 30 buzzard, 25 kestrel, one merlin and two peregrine within the onshore survey area The UK non-breeding population of marsh harrier, red kite, merlin and peregrine is unknown however there were 31,000 pairs (62,000 individuals) of sparrowhawk in 2016, 590 pairs (1,180 individuals) of marsh harrier, 4,400 pairs of red kite (8,800 individuals), 63,000 pairs of buzzard (126,000 individuals), and 31,000 pairs of kestrel (62,000 individuals) also in 2016. In 2008 there were 1,150 pairs (2,300 individuals) of merlin, and in 2014 1,750 pairs (3,500 individuals) of peregrine (BTO, 2023b).

4.13.4.51 Raptors can cover large areas whilst foraging over the non-breeding season, especially the non-sedentary birds such as the marsh harrier, red kite, merlin, and peregrine which may even locate to other areas of the country.

4.13.4.52 The temporary loss of supporting habitats and/or resource availability will not affect individual bird survival and/or productivity of non-breeding raptors given the availability of alternative habitats for non-breeding birds. The magnitude is therefore considered to be **negligible**.

Breeding passerines and other species

4.13.4.53 33 species of passerines and other species were found holding territories during the breeding season within the onshore survey area. These were four territories of swift, four of stock dove, five of great spotted woodpecker, two rookeries with approx. 35 nesting pairs, 74 of skylark, five of house martin, three of Cetti's warbler, 21 of willow warbler, 72 of chiffchaff, 55 of sedge warbler, four of grasshopper warbler, 32 of blackcap, 45 of common whitethroat, 49 of wren, 10 of starling, 57 of song thrush, seven of mistle thrush, one of common redstart, six of stonechat, two of wheatear, 18 of tree sparrow, 14 of house sparrow, 33 of dunnock, two of grey wagtail, two of yellow wagtail, 11 of meadow pipit, five of bullfinch, 28 of greenfinch, 15 of linnet, seven of yellowhammer, nine of corn bunting and 54 of reed bunting.

4.13.4.54 The temporary loss of supporting habitats and/or resource availability will not affect individual bird survival and/or productivity of breeding passerines and other species given the availability of alternative habitats for breeding birds. The magnitude is therefore considered to be **negligible**.

Non-breeding passerines and other species

4.13.4.55 Up to 32 species of passerines and other species were found within the onshore survey area during the non-breeding season. These were stock dove with a peak count of 29, woodpigeon with 687, great spotted woodpecker with three, rook with 255, raven with seven, skylark with 98, Cetti's warbler with one, chiffchaff with three, wren with 90, starling with 7,579, song thrush with 316, mistle thrush with 22, redwing with 346, fieldfare with 1,560, stonechat with 20, whinchat with three, tree sparrow with 21, house sparrow with 76, dunnock with 86, grey wagtail with six, meadow pipit with 147, brambling with three, bullfinch with nine, greenfinch with 77, twite with three, linnet with 730, lesser redpoll with one, snow bunting with one, corn bunting with three, yellowhammer with nine, and reed bunting with 56.

4.13.4.56 The temporary loss of supporting habitats and/or resource availability will not affect individual bird survival and/or productivity of breeding passerines and other species given the availability of alternative habitats for breeding birds. The magnitude is therefore considered to be **negligible**.

4.13.5 Significance of the effect

4.13.5.1 The sensitivity of all IEFs is medium to high and the magnitude of the impact for all IEFs is negligible to low. The effect will, therefore, be of **negligible to moderate adverse** significance. For each of the IEF groups the significance is detailed in **Table 4.27**.

Table 4.27: Significance of effect during construction and decommissioning phases of temporary loss of supporting habitats and/or resource availability on IEFs

Area	IEF group	Sensitivity of receptor	Magnitude of impact	Significance of effect
Coastal survey area	Non-breeding geese, ducks and swans	High	Negligible	**Minor adverse**
	Non-breeding grebes	High	Negligible	**Minor adverse**
	Non-breeding waders	High	Low	**Moderate adverse**
	Non-breeding gulls and terns	High	Negligible	**Minor adverse**
	Non-breeding divers and cormorants	High	Negligible	**Minor adverse**
Onshore survey area	Breeding geese, ducks and swans	High	Negligible	**Minor adverse**
	Non-breeding geese, ducks and swans	High	Low	**Moderate adverse**

Area	IEF group	Sensitivity of receptor	Magnitude of impact	Significance of effect
	Breeding partridge	Medium	Negligible	**Negligible**
	Breeding rails	High	Negligible	**Minor adverse**
	Non-breeding rails	High	Negligible	**Minor adverse**
	Breeding waders	High	Negligible	**Minor adverse**
	Non-breeding waders	High	Low	**Moderate adverse**
	Non-breeding gulls	High	Negligible	**Minor adverse**
	Non-breeding cormorants	High	Negligible	**Minor adverse**
	Breeding herons	High	Negligible	**Minor adverse**
	Non-breeding herons	High	Negligible	**Minor adverse**
	Breeding owls	High	Negligible	**Minor adverse**
	Non-breeding owls	High	Negligible	**Minor adverse**

Area	IEF group	Sensitivity of receptor	Magnitude of impact	Significance of effect
	Breeding kingfishers	High	No change	**No change**
	Non-breeding kingfishers	High	No change	**No change**
	Breeding raptors	Medium	Negligible	**Negligible**
	Non-breeding raptors	High	Negligible	**Minor adverse**
	Breeding passerines and other species	Medium	Negligible	**Negligible**
	Non-breeding passerines and other species	Medium	Negligible	**Negligible**

4.13.6 Further mitigation and residual effects

4.13.6.1 Two areas have been identified and included in the mitigation areas for the Transmission Assets (CoT107 and CoT113) for the potential moderate adverse impact of temporary loss of supporting habitat and/or resource availability within the onshore survey area.

- the high tide roost at Fairhaven saltmarsh (CoT113);
- Arable land at Lytham Moss (CoT107).

The high tide roost at Fairhaven saltmarsh

4.13.6.2 This area is located approximately 2.5 km to the southeast of the coastal survey area and has been identified as holding large numbers of roosting SPA features including, oystercatcher, bar-tailed godwit, knot, sanderling and dunlin. The area is exposed to recreational disturbance with walkers and dogs frequently causing disturbance events.

4.13.6.3 As temporarily disturbed intertidal habitat cannot be recreated during the duration of the works, The applicants have committed to trying to reduce disturbance in this area in order to reduce the daily energy requirements of the SPA features that have been identified as being potential receptors to the temporary loss of supporting habitats and/or resource availability at the coastal survey area (CoT113).

4.13.6.4 The proposed measures include either the employment of a warden who will aim to educate and dissuade members of the public from walking along the tideline at high tide when the birds are present in high numbers roosting or the addition of educational signage to instil the importance of the high tide roost for these sensitive species, and soft fencing to dissuade walkers from accessing the tideline at high tide.

4.13.6.5 These measures around the Fairhaven saltmarsh area will mitigate for the potential impact from temporary loss of supporting habitats and/or resource availability at the coastal survey area which may affect SPA features.

Arable land at Lytham Moss

4.13.6.6 A patch of arable farmland contained within Lytham Moss and adjacent to the Farmland Conservation Area has been identified as the location for mitigation. This will take two forms.

- Supplementary feeding of geese and swans.
- Creation of temporary scrapes for waders and ducks.

4.13.6.7 Supplementary feeding of pink-footed goose and whooper swan, and the creation of seasonal scrapes (CoT107) have already been employed with success within Lytham Moss by the Farmland Conservation Area. The measures aim to provide similar habitats to those that will be lost and move sensitive receptors away from areas where they are reliant upon seasonal food resources towards an area where they will not be disturbed during the duration of the works. As geese and swans already visit this area there is a high chance of this mitigation measure working.

4.13.6.8 Imported crop such as potatoes to be scattered throughout the identified fields. This will require supplementation throughout the winter. However, the calorific value will be equal to that being lost by the geese and swans to prevent the attraction of additional birds to the area. This measure will need to be in place for the duration of construction but will not need to be continued indefinitely as the potential impact from the works is anticipated to be reversible. The scrapes will provide better quality habitat than that to be temporarily lost for loafing geese, ducks, and swans, and foraging, loafing or roosting waders.

4.13.6.9 This area will mitigate for the temporary loss of supporting habitats and/or resource availability of non-breeding geese, ducks and swans, and non-breeding waders within the onshore survey area.

4.13.7 Conclusion

4.13.7.1 The implementation of the above measures will reduce the impact of the non-breeding geese, ducks and swans that are identified as being potential receptors to the low impacts of temporary loss of supporting habitats and/or resource availability. If these measures are adhered to it is predicted that the residual significance of effect (for all IEFs where a moderate effect was predicted) will be reduced to **minor** and therefore not significant in EIA terms.

Table 4.28: Residual significance of effect during construction and decommissioning phases of temporary loss of supporting habitats and/or resource availability on IEFs further to mitigation measures

Area	IEF group	Significance of effect	Residual significance of effect
Coastal survey area	Non-breeding geese, ducks and swans	Minor adverse	Minor adverse
	Non-breeding grebes	Minor adverse	Minor adverse
	Non-breeding waders	Moderate adverse	Minor adverse
	Non-breeding gulls and terns	Minor adverse	Minor adverse
	Non-breeding divers and cormorants	Minor adverse	Minor adverse
Onshore survey area	Breeding geese, ducks and swans	Minor adverse	Minor adverse
	Non-breeding geese, ducks and swans	Moderate adverse	Negligible
	Breeding partridge	Negligible	Negligible
	Breeding rails	Minor adverse	Minor adverse
	Breeding waders	Minor adverse	Minor adverse
	Non-breeding waders	Moderate adverse	Minor adverse
	Non-breeding gulls	Minor adverse	Negligible
	Non-breeding cormorants	Minor adverse	Minor adverse
	Breeding herons	Minor adverse	Minor adverse
	Non-breeding herons	Minor adverse	Negligible
	Breeding owls	Minor adverse	Minor adverse
	Non-breeding owls	Minor adverse	Minor adverse
	Breeding kingfishers	No change	No change

Area	IEF group	Significance of effect	Residual significance of effect
	Non-breeding kingfishers	No change	No change
	Breeding raptors	Negligible	Negligible
	Non-breeding raptors	Minor adverse	Minor adverse
	Breeding passerines and other species	Negligible	Negligible
	Non-breeding passerines and other species	Negligible	Negligible

4.13.8 Operation and maintenance phase

Coastal survey area

4.13.8.1 Within the Intertidal Infrastructure Area there may be the requirement to rebury up to one km of cable every five years for Morgan, additionally there may be the requirement to repair and subsequently rebury up to one km every 10 years. Morecambe have envisaged that a precautionary 2.4 km of intertidal cable may be subject to repair and reburial and predict one event every 10 years, additionally it is predicted that there may be reburial events of approximately 500 m every five years. This equates to a lifetime (assuming 35 years) reburial of 10.5 km for Morgan and 11.9 km for Morecambe, a combined total of up to 22.4 km. However, these maintenance works to rebury/replace and carry out repair works are likely to require on average between 250 to 500 m of cable repair and/or reburial per event with each event generally taking approximately two to four weeks. Although there is potential for works to be similar in scope as during the construction phase, these works are likely to concentrate on small areas at a time. Therefore, the magnitude will be of a similar or lesser scale than during construction.

All other areas

4.13.8.2 There will be no additional habitat loss (either temporary or permanent) during the operation and maintenance phase. It is thus assessed that there will be no change.

4.13.9 Key receptors for assessment

4.13.9.1 The receptors taken forward for assessment are those outlined in **section 4.13.2**.

4.13.10 Sensitivity of the receptor

4.13.10.1 The sensitivity of the IEFs is predicted to be the same as that discussed in **section 4.13.3**, which is medium to high.

4.13.11 Magnitude of impact

Coastal survey area

All receptors

4.13.11.1 Although there is potential for works to be similar in scope as during the construction phase, these works are likely to concentrate on small areas at a time and the associated infrastructure that is present during construction will not be needed. Therefore, at any one time the magnitude will be of a similar or lesser scale than during construction.

All other areas

All receptors

4.13.11.2 Disturbance and displacement from construction, decommissioning, and operation and maintenance activities will be limited and sporadic during the operation and maintenance phase with the impact deemed to be similar to background levels. Therefore, the magnitude of impact during operation and maintenance will be of **no change**.

4.13.12 Significance of the effect

4.13.12.1 The significance of impact is summarised in **Table 4.29**. Due to the magnitude of impact on all IEFs at all locations being no change the significance of effect for all IEFs and for all assessment areas is predicted to **minor to moderate adverse** for the coastal survey area and **no change** for all other areas.

Table 4.29: Significance of effect during the operation and maintenance phase of temporary loss of habitats and/or resource availability on IEFs

Area	IEF group	Sensitivity of receptor	Magnitude of impact	Significance of effect
Coastal survey area	All receptors	Medium to High	Negligible to Low	Minor to moderate adverse
All other areas	All receptors	High	No change	No change

4.13.13 Further mitigation and residual effects

4.13.13.1 One area has been identified and included in the mitigation areas for the Transmission Assets to provide mitigation for temporary loss of supporting habitats and/or resource availability for non-breeding wader at the coastal survey area:

- the high tide roost at Fairhaven saltmarsh (CoT113);

The high tide roost at Fairhaven saltmarsh

4.13.13.2 This area is located approximately 2.5 km to the southeast of the coastal survey area and has been identified as holding large numbers of roosting SPA features including, oystercatcher, bar-tailed godwit, knot, sanderling and dunlin. The area is exposed to recreational disturbance with walkers and dogs frequently causing disturbance events.

4.13.13.3 As temporarily disturbed intertidal habitat cannot be recreated during the duration of the works, The applicants have committed to trying to reduce disturbance in this area in order to reduce the daily energy requirements of the SPA features that have been identified as being potential receptors to the temporary loss of supporting habitats and/or resource availability at the coastal survey area (CoT113).

4.13.13.4 The proposed measures include either the employment of a warden who will aim to educate and dissuade members of the public from walking along the tideline at high tide when the birds are present in high numbers roosting or the addition of educational signage to instil the importance of the high tide roost for these sensitive species, and soft fencing to dissuade walkers from accessing the tideline at high tide.

4.13.13.5 These measures around the Fairhaven saltmarsh area will mitigate for the potential impact from temporary loss of supporting habitats and/or resource availability at the coastal survey area which may affect SPA features.

4.13.14 Conclusion

4.13.14.1 The implementation of the above measures will reduce the pressures on the non-breeding IEFs that are identified as being potential receptors to the adverse impacts of temporary loss of supporting habitats and/or resource availability. If these measures are adhered to, it is predicted that the residual significance of effect (for all IEFs where a moderate effect was predicted) will be reduced to **minor adverse** and therefore not significant in EIA terms.

Table 4.30: Residual significance of effect during the operation and maintenance phase of Disturbance and displacement from construction, decommissioning, and operation and maintenance activities on IEFs

Area	IEF group	Significance of effect	Residual significance of effect
Coastal survey area	All receptors	Minor to moderate adverse	Minor adverse
All other areas	All receptors	No change	No change

4.14 The impact of disturbance and displacement from construction, decommissioning, and operation and maintenance activities

4.14.1 Construction and decommissioning

Introduction

4.14.1.1 The construction and decommissioning phases of the Transmission Assets may result in the disturbance and displacement. This may lead to IEFs competing for resources in a smaller area which may result in reductions to the fitness and survival of IEFs.

4.14.1.2 Disturbance and displacement from construction, decommissioning, and operation and maintenance activities will be greatest during the construction phase when the cables must be trenched and buried, and substations constructed. During decommissioning, much of the underground infrastructure will be left in place and impacts will be equal or lower than during construction.

4.14.1.3 The MDS is represented by the maximum surface area of temporary and permanent works plus an associated species-specific buffer. The area of temporary and permanent works is summarised in **Table 4.20**.

4.14.1.4 IEFs may be subject to the impact of disturbance at a distance from the works which will in turn lead to displacement over a wider area than that of the works themselves. The distance over which IEFs are subject to disturbance effects varies between species and with the nature of the disturbance. However, disturbance (and subsequent displacement) effects may be felt up to 600 m away from the source of disturbance for sensitive species such as pink-footed goose and whooper swan (Cutts, *et al*., 2013; Goodship and Furness, 2022). Despite many waterbird species being highly sensitive to disturbance, many of the smaller passerines are tolerant and may become habituated to regular disturbance.

4.14.1.5 Therefore, to make the assessment for disturbance and displacement from construction, decommissioning, and operation and maintenance activities, species-specific evidence from the literature has been assessed where it is available. Where no evidence base exists, evidence for similar species and/or professional judgement have been relied upon.

4.14.1.6 Although the Onshore Order Limits and Intertidal Infrastructure Area represents the area where disturbance will take place, and that the MDS accounts for a start through to completion date, disturbance will not be constant and will not take place throughout the entire area at once. Rather, disturbance will be spatially limited and take place intermittently and for limited periods of time throughout the Onshore Order Limits and Intertidal Infrastructure Area. This will enable birds to avoid these areas temporarily and move back into them after the cessation of disturbance.

4.14.1.7 At the coastal survey area, although intertidal birds are present outside of the core wintering period (November to March) these birds are under less energetic pressure as temperatures are warmer and inclement weather is

less likely to impede foraging activities. In addition, available benthic prey abundance is generally higher outside winter as many benthic invertebrates bury deeper in the benthos during the colder winter months. Therefore, the impacts upon intertidal passage birds that are moving through the area are thought to be of a lesser magnitude than those impacts within the core wintering period.

4.14.1.8 Within the coastal survey area (between MHWS and MLWS), the Applicants have committed to only one cable pull in taking place in the intertidal area during the core wintering bird period (November to February), this will take a maximum of five weeks (CoT110) (**Table 4.19**). When works do take place only one cable will be trenched at a time thus reducing the area over which birds may be disturbed or displaced.

4.14.2 Key receptors for assessment

Coastal survey area

4.14.2.1 The IEFs taken forward for assessment are those discussed in **sections 4.13.2.15** to **4.13.2.62** and highlighted in **Table 4.24**.

Coastal survey area - All IEFs

4.14.2.2 Disturbance and displacement may increase the daily energy needs of birds and force birds into a smaller area and lead to an increase in intra/inter-specific competition due to a higher density of individuals competing for the same resource (e.g., foraging ground or nesting sites), this may have an impact on bird fitness (i.e., survival) and lead to localised decline in breeding and non-breeding birds. This is assessed in the following **paragraphs 4.14.2.2** to **4.14.2.19** .

Estuarine survey area

Non-breeding geese, ducks and swans

4.14.2.3 During the non-breeding season 66 shelduck were found within the estuarine survey area. The most abundant species were, however, wigeon and teal with 822 individuals and 275 individuals respectively. Both species were regularly recorded and are key species in the SPA assemblage. In addition, one goldeneye was recorded and 88 mallard. There was also a single record of 30 whooper swan using the river to rest.

4.14.2.4 The IEFs taken forward to the assessment are whooper swan, shelduck, wigeon, mallard, teal and goldeneye.

Non-breeding waders

4.14.2.5 The muddy and tidal estuarine and saltmarsh habitats at the estuarine survey area support a diverse assemblage of non-breeding wader. The most abundant species were lapwing with peak counts of up to 444. Other regularly occurring waders were up to 54 oystercatcher, 24 curlew, 222 dunlin, 21 snipe, four common sandpiper, one green sandpiper and 40

redshank. The green sandpiper are notable for wintering in the area as the UK wintering population is thought to be in the low 100s respectively (Balmer *et al*., 2016). Infrequent visitors included 14 black-tailed godwit that were only recorded on one occasion, one greenshank and two grey plover.

4.14.2.6 The IEFs taken forward to the assessment are oystercatcher, lapwing, grey plover, curlew, black-tailed godwit, dunlin, snipe, common sandpiper, green sandpiper, redshank, and greenshank.

Non-breeding gulls and terns

4.14.2.7 Although no gull or tern were recorded breeding within the estuarine survey area some of the gull and tern were recorded during the breeding season and it was likely that they were from nearby breeding colonies. However, despite the large lesser black-backed gull and black-headed gull colonies nearby only low numbers of the species were recorded during the breeding period. Black-headed gull had a peak of 23 during the breeding season whereas 296 birds were present during the non-breeding season. Lesser black-backed gull also had a small peak of 32 during the breeding season, and 41 birds were recorded in the post breeding period. Although they were present all year, herring gull were the second most abundant gull with peak of 156 birds during the non-breeding season. Common gull and great black-backed gull were recorded in low numbers, eight and five respectively.

4.14.2.8 Common tern was the only tern species recorded with a peak count of five birds. These birds likely came from the common tern colony at Preston Dock which recorded 33 Apparently Occupied Nests (AONs) in 2023 (Fylde Bird Club, 2023). Despite the proximity to the colony there were relatively few sightings, and it is concluded that birds forage in more productive and suitable areas.

4.14.2.9 The IEFs taken forward to the assessment are black-headed gull, common gull, great black-backed gull, herring gull, lesser black-backed gull and common tern.

Non-breeding cormorants

4.14.2.10 Up to 11 cormorant were recorded within the estuarine survey area. Although there was no indication that they bred in the area, small numbers of cormorant continued to utilize the estuarine survey area throughout the breeding period. Most birds were recorded as using posts and other man-made structures to rest and dry their feathers.

4.14.2.11 The IEFs taken forward to the assessment are cormorant.

Non-breeding herons

4.14.2.12 Although there was no indication of any heron species breeding in the estuarine survey area, both grey heron and little egret were recorded using the estuarine survey area during the breeding season. Both species had higher peak counts during the non-breeding season. Generally, heron species were recorded in low numbers with peak counts for cattle egret of three, eight for grey heron and 10 for little egret.

4.14.2.13 The IEFs taken forward to the assessment are cattle egret, grey heron and little egret.

Non-breeding kingfishers

4.14.2.14 Kingfisher were recorded twice during the non-breeding season with single birds seen. Although they are known to breed in nearby Savick Brook, it is unclear whether these individuals are from local sedentary birds or from afield.

4.14.2.15 The IEFs taken forward to the assessment are kingfisher.

Estuarine survey area - All IEFs

4.14.2.16 Disturbance and displacement may increase the daily energy needs of birds and force birds into a smaller area and lead to an increase in intra/inter-specific competition due to a higher density of individuals competing for the same resource (e.g., foraging ground or nesting sites), this may have an impact on bird fitness (i.e., survival) and lead to localised decline in breeding and non-breeding birds. This is assessed in the following sections.

Permanent onshore substations area

4.14.2.17 The species present within the onshore substation sites (**Table 4.20**) have been double counted in the onshore survey area (see **section 4.10.6**). Therefore, these receptors have been assessed as part of the onshore survey area.

Onshore survey area

4.14.2.18 The IEFs taken forward for assessment are those discussed in sections **4.13.2.15** to **4.13.2.62** and highlighted in **Table 4.24**.

All onshore survey area IEFs

4.14.2.19 Disturbance and displacement may increase the daily energy needs of birds and force birds into a smaller area and lead to an increase in intra/inter-specific competition due to a higher density of individuals competing for the same resource (e.g., foraging ground or nesting sites), this may have an impact on bird fitness (i.e., survival) and lead to localised decline in breeding and non-breeding birds. This is assessed in the following sections.

4.14.3 Sensitivity of the receptor

Coastal survey area

Non-breeding geese, ducks and swans

4.14.3.1 IEFs that may be temporarily disturbed or displaced are common scoter, shelduck, eider and scaup.

4.14.3.2 Although most geese, ducks, swans and heron species are flexible in their habitat use during the non-breeding season, they are considered to be very

vulnerable to displacement (Bradbury *et al*., 2014). Maximum distance that trigger disturbance responses for common scoter varied between 2 km as reported by Kaiser *et al*. (2006), and 3.2 km reported by Schwemmer *et al.* (2011).

4.14.3.3 Common scoter, shelduck, scaup and eider are deemed to be of very high conservation importance, high vulnerability, and medium recoverability, wintering common scoter populations have risen significantly since the early 2000s, with reports of shelduck and eider remaining relatively stable, and a slight decline in number of reports of scaup (Woodward et al., 2024). The sensitivity of the receptor is therefore, considered to be **high**.

Non-breeding grebes

4.14.3.4 Although grebe species are flexible in their habitat use during the non-breeding season, they are considered sensitive to disturbance. The non-breeding grebe assemblage at the coastal survey area consisted of great crested grebe which forage in the nearshore waters.

4.14.3.5 Great crested grebe are deemed to be of very high conservation importance, high vulnerability, and medium recoverability as their population abundance has remained broadly stable since 1995 (Heywood et al., 2024), numbers counted in the WeBS have also remained stable during the same period (Woodward et al., 2024). The sensitivity of the receptor is therefore, considered to be **high**.

Non-breeding waders

4.14.3.6 IEFs that may be temporarily disturbed or displaced are oystercatcher, grey plover, ringed plover, whimbrel, curlew, bar-tailed godwit, turnstone, knot, sanderling, dunlin and redshank.

4.14.3.7 Sensitivity to disturbance varies from highly sensitive for the larger waders such as curlew, which may be sensitive up to 650 m away from the source of disturbance (Goodship and Furness, 2022), to the more tolerant smaller waders such as sanderling which are sensitive of disturbance up to 100 m away from source (Cutts *et al*., 2013).

4.14.3.8 The species are deemed to be of very high conservation importance, high vulnerability, and medium recoverability as the WeBS peak counts of these species have remained broadly stable since the early 2000s. The sensitivity of the receptor is therefore, considered to be **high**.

Non-breeding gulls and terns

4.14.3.9 IEFs that may be temporarily disturbed or displaced are black-headed gull, common gull, great black-backed gull, herring gull, lesser black-backed gull, sandwich tern and common tern.

4.14.3.10 Non-breeding gulls and terns are tolerant of high levels of disturbance and often forage near disturbance sources (e.g., vehicles and people).

4.14.3.11 The species group are deemed to be of medium to very high conservation importance, low vulnerability, and medium recoverability as the wintering

populations of these species have remained relatively stable or have increased (Heywood et al., 2024). The sensitivity of the receptor is therefore, considered to be **medium**.

Non-breeding divers and cormorants

4.14.3.12 IEFs that may be temporarily disturbed or displaced are red-throated diver and cormorant.

4.14.3.13 Red-throated diver are highly susceptible to displacement (Bradbury *et al*., 2014) with a mean distance at which disturbance responses were noted of 1,200 m (Laursen *et al*., 2017). Cormorant are less susceptible to disturbance and displacement.

4.14.3.14 The species group are deemed to be of very high conservation importance, high vulnerability, and medium recoverability as, whilst populations have remained relatively stable since 1994 (Heywood et al., 2024), these species have low productivity; red-throated diver lay a maximum of two eggs at a time in one brood per year, and cormorant lay three to four eggs in one brood per year (BTO, 2023a). The sensitivity of the receptor is therefore, considered to be **high**.

Estuarine survey area

Non-breeding geese, ducks and swans

4.14.3.15 IEFs that stand to be subject to disturbance and displacement are whooper swan, shelduck, wigeon, mallard, teal and goldeneye.

4.14.3.16 Whooper swan are highly vulnerable to disturbance and may be displaced from as far as 600 m. Goldeneye may also be flushed from as far as 800 m (Goodship and Furness, 2022). The other species are more tolerant although shelduck may still be displaced from as far away as 400 m (Goodship and Furness, 2022).

4.14.3.17 The species group are deemed to be of high to very high conservation importance, high vulnerability and medium recoverability as the long-term population abundance and frequency of WeBS reports of these species has remained relatively stable (Heywood et al., 2024; Woodward et al., 2024). The sensitivity of the receptor is therefore, considered to be **high**.

Non-breeding waders

4.14.3.18 IEFs that stand to be subject to disturbance and displacement are oystercatcher, lapwing, grey plover, curlew, black-tailed godwit, dunlin, snipe, common sandpiper, green sandpiper, redshank, and greenshank.

4.14.3.19 Sensitivity to disturbance varies from highly sensitive for the larger waders such as curlew which may be sensitive up to 650 m from the source of disturbance (Goodship and Furness, 2022). The other species present are all thought to elicit disturbance responses up to 300 m away from the source of the disturbance.

4.14.3.20 The species group are deemed to be of high to very high conservation importance, high vulnerability and medium recoverability as although the long-term population abundance of some species has remained relatively stable (Heywood et al., 2024), there have been mild to steep declines in the populations of others. The sensitivity of the receptor is therefore, considered to be **high**.

Non-breeding gulls and terns

4.14.3.21 IEFs that stand to be subject to disturbance and displacement are black-headed gull, common gull, great black-backed gull, herring gull, lesser black-backed gull and common tern.

4.14.3.22 Away from nesting colonies gulls are tolerant of high levels of disturbance, (e.g., urban areas). Terns may be more sensitive, however Perrow *et al*. (2010) found that less than 1% of birds that they were following by boat at distances of between 50 and 100 m elicited disturbance responses. In addition, Bradbury *et al*. (2014) ranked common tern as having a low vulnerability to displacement.

4.14.3.23 The species group are deemed to be of high to very high conservation importance, low vulnerability and medium recoverability. The sensitivity of the receptor is therefore, considered to be **medium**.

Non-breeding cormorants

4.14.3.24 IEFs that stand to be subject to disturbance and displacement are cormorant.

4.14.3.25 Cormorant were noted by Bradbury *et al*. (2014) as having a moderate vulnerability to displacement.

4.14.3.26 The species group are deemed to be of high to very high conservation importance, high vulnerability and medium recoverability as the population abundance of these species has remained relatively stable since 1994 (Heywood et al., 2024), but grey heron and little egret only lay three to four and four to five eggs, respectively, in one brood per year (BTO, 2023a). The sensitivity of the receptor is therefore, considered to be **high**.

Non-breeding herons

4.14.3.27 IEFs that stand to be subject to disturbance and displacement are cattle egret, grey heron and little egret.

4.14.3.28 There is an absence of evidence within the literature to quantify the sensitivity of this species group. However, they are relatively easily flushed by disturbance events and therefore thought to be susceptible to disturbance events.

4.14.3.29 The species group are deemed to be of high to very high conservation importance, high vulnerability and medium recoverability. The sensitivity of the receptor is therefore, considered to be **high**.

Non-breeding kingfishers

4.14.3.30 IEFs that stand to be subject to disturbance and displacement are kingfisher.

4.14.3.31 Kingfisher are noted as having a low to medium sensitivity to disturbance with both breeding and non-breeding suggested buffer zones of 50 to 100 m (Goodship and Furness, 2022).

4.14.3.32 The species group are deemed to be of high conservation importance, medium vulnerability and medium recoverability as kingfisher numbers have remained stable (Heywood et al., 2024), and they are a green listed species. The sensitivity of the receptor is therefore, considered to be **high**.

Onshore survey area

Breeding geese, ducks and swans

4.14.3.33 The IEFs taken forward for assessment are shelduck, shoveler, gadwall, mallard and teal.

4.14.3.34 Shelduck are highly vulnerable to disturbance with a suggested buffer zone for non-breeding shelduck of between 100 and 400 m (Goodship and Furness, 2022). The distances at which mallard, teal and gadwall are thought to elicit a response are much lower at 50 to 200 m.

4.14.3.35 The species are deemed to be of high to very high conservation importance, high vulnerability and medium recoverability as the long-term population abundance and frequency of WeBS reports of these species has remained relatively stable (Heywood et al., 2024; Woodward et al., 2024). The sensitivity of the receptor is therefore, considered to be **high.**

Non-breeding geese, ducks and swans

4.14.3.36 The IEFs taken forward for assessment are brent goose, barnacle goose, greylag goose, pink-footed goose, whooper swan, mute swan, shelduck, shoveler, gadwall, wigeon, mallard and teal.

4.14.3.37 Whooper swan are highly vulnerable to disturbance and may be displaced from as far as 600 m. The other species are more tolerant although pink-footed goose may be disturbed from up to 500 m and shelduck from as far away as 400 m.

4.14.3.38 The species are deemed to be of high to very high conservation importance, high vulnerability and medium recoverability. The sensitivity of the receptor is therefore, considered to be **high.**

Breeding partridges

4.14.3.39 IEFs that stand to be subject to disturbance and displacement are grey partridge.

4.14.3.40 There is an absence of evidence within the literature to quantify the sensitivity of this species. Whilst they are relatively easy to flush, they do so at relatively short distances. Therefore, grey partridges are considered to be of low to medium susceptibility to disturbance events.

4.14.3.41 The species group are deemed to be of medium conservation importance, medium vulnerability and medium recoverability. The sensitivity of the receptor is therefore, considered to be **medium**.

Breeding rails

4.14.3.42 IEFs that stand to be subject to disturbance and displacement are moorhen and coot.

4.14.3.43 There is an absence of evidence within the literature to quantify the sensitivity of these species. Whilst they are relatively easy to flush, they do so at relatively short distances. Therefore, rail species are considered to be of low to medium susceptibility to disturbance events.

4.14.3.44 The species are deemed to be of high conservation importance, high vulnerability and high recoverability Whilst both species have undergone declines since the early 2000s, both lay between five and seven eggs in 1-2 broods (BTO, 2023a), and potential for recovery is consequently high. The sensitivity of the receptor is therefore, considered to be **medium**.

Non-breeding rails

4.14.3.45 IEFs that stand to be subject to disturbance and displacement are moorhen and coot (see above).

4.14.3.46 The species are deemed to be of high conservation importance, medium vulnerability and medium recoverability. The sensitivity of the receptor is therefore, considered to be **medium**.

Breeding waders

4.14.3.47 IEFs that stand to be subject to disturbance and displacement are oystercatcher, lapwing and curlew.

4.14.3.48 Whilst oystercatcher and lapwing are often found in areas with human disturbance, curlew are less tolerant and may be disturbed at a distance of 300 m. They are recorded as having a high sensitivity to disturbance in Goodship and Furness (2022). Despite oystercatcher being more tolerant, repeated disturbance may still reduce productivity (Stillman and Goss-Custard, 2002).

4.14.3.49 The species are deemed to be of high to very high conservation importance, high vulnerability and medium recoverability as the populations of these species have remained relatively stable (Heywood et al., 2024). The sensitivity of the receptor is therefore, considered to be **high**.

Non-breeding waders

4.14.3.50 IEFs that stand to be subject to disturbance and displacement are oystercatcher, avocet, lapwing, golden plover, curlew, black-tailed godwit, ruff, woodcock, and redshank.

4.14.3.51 Sensitivity to disturbance varies from highly sensitive for the larger waders such as curlew which may be sensitive up to 650 m from the source of

disturbance (Goodship and Furness, 2022). The other species present are all thought to elicit disturbance responses up to 300 m away from the source of the disturbance.

4.14.3.52 The species are deemed to be of high to very high conservation importance, high vulnerability and medium recoverability as although the long-term population abundance of some species has remained relatively stable (Heywood et al., 2024), there have been mild to steep declines in the populations of others. The sensitivity of the receptor is therefore, considered to be **high**.

Non-breeding gulls

4.14.3.53 IEFs that stand to be subject to disturbance and displacement are black-headed gull, common gull, great black-backed gull, herring gull and lesser black-backed gull.

4.14.3.54 Non-breeding gulls are tolerant of high levels of disturbance and often forage near disturbance sources (e.g., vehicles, vessels and people).

4.14.3.55 The species are deemed to be of high to very high conservation importance, low vulnerability and medium recoverability as the populations of these species have remained relatively stable or have increased (Heywood et al., 2024). The sensitivity of the receptor is therefore, considered to be **medium**.

Non-breeding cormorants

4.14.3.56 IEFs that stand to be subject to disturbance and displacement are cormorant.

4.14.3.57 Cormorant were noted by Bradbury *et al*. (2014) as having a moderate vulnerability to displacement.

4.14.3.58 The species is deemed to be of high to very high conservation importance, high vulnerability and medium recoverability. The sensitivity of the receptor is therefore, considered to be **high**.

Breeding herons

4.14.3.59 IEFs that stand to be subject to disturbance and displacement are grey heron and little egret.

4.14.3.60 There is little published evidence surrounding the effects of disturbance on breeding grey heron or little egret. However, as they are communal breeders a greater number of individuals may be subject to the impact at any one time.

4.14.3.61 The species are deemed to be of high conservation importance, high vulnerability and medium recoverability as the population abundance of these species has remained relatively stable since 1994 (Heywood et al., 2024), but grey heron and little egret only lay three to four and four to five eggs, respectively, in one brood per year (BTO, 2023a). The sensitivity of the receptor is therefore, considered to be **high**.

Non-breeding herons

4.14.3.62 IEFs that stand to be subject to disturbance and displacement are cattle egret, grey heron, great white egret and little egret.

4.14.3.63 Whilst they are relatively easy to flush, they do so at relatively short distances. Therefore, herons are considered to be of low to medium susceptibility to disturbance events.

4.14.3.64 The species are deemed to be of high conservation importance, high vulnerability and medium recoverability. The sensitivity of the receptor is therefore, considered to be **high**.

Breeding owls

4.14.3.65 IEFs that stand to be subject to disturbance and displacement are barn owl and tawny owl.

4.14.3.66 Barn owls are relatively tolerant to disturbance given their propensity to nest in buildings and a recommended nest site buffer is usually between 50 and 100 m (Goodship and Furness, 2022). They are also known to be tolerant of disturbance from people and vehicles whilst foraging with vehicle collision a major cause of mortality (de Jong *et al*., 2018). Tawny owl are also deemed to have a low sensitivity to disturbance (Goodship and Furness, 2022) although the buffer zone around a nest site may need to be larger (up to 200 m) for disturbance taking place within any woodland where they are present.

4.14.3.67 This species group are deemed to be of high to very high conservation importance, medium vulnerability and medium recoverability as barn owl numbers have remained relatively stable since 1994, but tawny owl numbers have decreased steadily in the same period (Heywood et al., 2024). Barn owls lay two broods of four to six eggs per year, whereas tawny owls lay one brood of two to three eggs per year (BTO, 2023a). The sensitivity of the receptor is therefore, considered to be **medium**.

Non-breeding owls

4.14.3.68 IEFs that stand to be subject to disturbance and displacement are barn owl.

4.14.3.69 Although largely sedentary in their lowland range barn owl are generally solitary whilst not breeding and may range over a wider area. Disturbance of barn owl at the roosting site can impact upon the individual survival (Hardy *et al*., 2013). Buffer zones are lower during the non-breeding period with a buffer of 50 m.

4.14.3.70 This species group is deemed to be of high to very high conservation importance, low vulnerability and medium recoverability. The sensitivity of the receptor is therefore, considered to be **medium**.

Breeding kingfishers

4.14.3.71 IEFs that stand to be subject to disturbance and displacement are kingfisher.

4.14.3.72 Kingfisher are noted as having a low to medium sensitivity to disturbance with both breeding and non-breeding suggested buffer zones of 50 to 100 m (Goodship and Furness, 2022).

4.14.3.73 Kingfisher is deemed to be of high to very high conservation importance, low vulnerability and medium recoverability. The sensitivity of the receptor is therefore, considered to be **medium**.

Non-breeding kingfishers

4.14.3.74 IEFs that stand to be subject to disturbance and displacement are kingfisher.

4.14.3.75 Kingfisher are noted as having a low to medium sensitivity to disturbance with both breeding and non-breeding suggested buffer zones of 50 to 100 m (Goodship and Furness, 2022).

4.14.3.76 Kingfisher is deemed to be of high to very high conservation importance, low vulnerability and medium recoverability. The sensitivity of the receptor is therefore, considered to be **medium**.

Breeding raptors

4.14.3.77 IEFs that will be subject to disturbance and displacement are sparrowhawk, buzzard and kestrel.

4.14.3.78 These raptors are noted as having a low to medium sensitivity to disturbance (Goodship and Furness, 2022). They are therefore deemed to be of medium conservation importance, medium vulnerability, and medium recoverability as buzzard population abundance has almost doubled since the creation of the index in 1994, and kestrel numbers are now relatively stable (Heywood et al., 2024). However, sparrowhawk population abundance has declined by around 12% since 1995 (Heywood et al., 2024). The sensitivity of the receptor is therefore, considered to be **medium**.

Non-breeding raptors

4.14.3.79 IEFs that stand to be subject to disturbance and displacement are sparrowhawk, marsh harrier, red kite, buzzard, kestrel, merlin and peregrine.

4.14.3.80 Although these raptors are highly susceptible to disturbance during the breeding season, during the non-breeding season and whilst hunting they range over an extended area and can easily avoid disturbed areas. The exception to this would be roosting sites, however these are located on the saltmarshes of the Ribble Estuary and are not to be impacted by the Transmission Assets.

4.14.3.81 The species are deemed to be of high to very high conservation importance, low vulnerability and medium recoverability. The sensitivity of the receptor is therefore, considered to be **medium**.

Breeding passerines and other species

4.14.3.82 IEFs that stand to be subject to disturbance and displacement are swift, stock dove, great spotted woodpecker, rook, skylark, house martin, Cetti's warbler,

willow warbler, chiffchaff, sedge warbler, grasshopper warbler, blackcap, common whitethroat, wren, starling, song thrush, mistle thrush, common redstart, stonechat, wheatear, tree sparrow, house sparrow, dunnock, grey wagtail, yellow wagtail, meadow pipit, bullfinch, greenfinch, linnet, yellowhammer, corn bunting and reed bunting.

4.14.3.83 Most species are breeding birds of hedgerows and gardens. However, there are some breeding birds of farmland such as yellow wagtail, linnet, yellowhammer and corn bunting, as well as some reed bed specialists such as Cetti's warbler and sedge warbler. The latter are only likely to be encountered in vegetation along watercourses and waterbodies.

4.14.3.84 There is not much data on disturbance distances for passerines however Hötker *et al*. (2006) found that meadow pipit avoided windfarm infrastructure by up to 41 m (the mean value from nine studies), common whitethroat by 79 m (again the mean from nine studies), skylark by 93 m (mean of 20), yellow wagtail 89 m (mean of seven), willow warbler and chiffchaff 42 m (mean of five), sedge warbler 14 m (mean of seven), reed bunting 56 m (mean of 13) and linnet 135 m (mean of five). Therefore, breeding passerines are thought to be of medium vulnerability to disturbance.

4.14.3.85 Cetti's warbler are deemed to be of high conservation importance, medium vulnerability and high recoverability as most species are capable of having multiple broods per year, (Cetti's warbler only). The sensitivity of the receptor is therefore, considered to be **high**.

4.14.3.86 The presence of Cetti's warbler which is a Schedule 1 listed species inflates the conservation importance of this species group. Whilst Cetti's warbler is treated as being of high sensitivity, the medium conservation importance of the remaining species present means that the sensitivity of rest of this group is considered to be **medium**.

Non-breeding passerines and other species

4.14.3.87 IEFs that stand to be subject to disturbance and displacement are stock dove, woodpigeon, great spotted woodpecker, rook, raven, skylark, Cetti's warbler, chiffchaff, wren, starling, song thrush, mistle thrush, redwing, fieldfare, stonechat, whinchat, tree sparrow, house sparrow, dunnock, grey wagtail, meadow pipit, brambling, bullfinch, greenfinch, twite, linnet, lesser redpoll, snow bunting, corn bunting, yellowhammer, and reed bunting.

4.14.3.88 Non-breeding passerines are more flexible in their habitat choice during the non-breeding season.

4.14.3.89 The species are deemed to be of medium conservation importance (Cetti's warbler have no extra protection outside of the nesting area or breeding season), low vulnerability and medium recoverability. The sensitivity of the receptor is therefore, considered to be **medium**.

4.14.4 Magnitude of impact

Coastal survey area

Non-breeding geese, ducks and swans

4.14.4.1 The receptor with the highest conservation value, and with regular high numbers recorded, is common scoter. Up to 4,000 birds were present in the nearshore waters during the two-year site-specific surveys (albeit there were marked differences between months). This is a substantial proportion of the Liverpool Bay SPA (7.06%). In addition, birds may be displaced up to 3,200 m (Schwemmer *et al*., 2011).

4.14.4.2 The pull in for the offshore export cables at the landfall will take six weeks per cable with only one installed at any one time. The cable trench between the direct pipe punchout and the transition to marinized trencher will be up to 300 m long and 10 m wide, the trench will be dug by a backhoe digger or similar and could be below MHWS. There will be 20 m of working area either side of the trench. The trench below MHWS will be 3 m wide and 1,250 m long and installed by a marinized trencher. It will have a 23.5 m working area either side. In addition, there will be cofferdams surrounding the exit pits of the direct pipe on the upper beach, these will be 200 m^2, constructed one at a time and be within the area of trenching.

4.14.4.3 Although a significant number of common scoter may be disturbed and/or displaced at any one time, this will be of short duration, very temporary, avoiding the most sensitive season and be reversible in the very short-term. Therefore, the magnitude of impact will be **negligible**.

Non-breeding grebes

4.14.4.4 Site-specific surveys recorded a very low abundance of birds in the nearshore waters with a peak count of only two great crested grebes during the site-specific surveys. Furthermore, displacement from subtidal habitats is considered to be negligible in context of the habitats available to support great crested grebes in the Liverpool Bay SPA.

4.14.4.5 The potential impact is therefore predicted to be of local spatial extent, short term duration, intermittent and highly reversible. It is predicted that the potential impact will affect the receptor directly. The magnitude is therefore, considered to be **negligible**.

Non-breeding waders

4.14.4.6 The intertidal habitats at the coastal survey area support a significant population of SPA wader features with peak counts of 1,073 oystercatcher, 118 grey plover, 93 ringed plover, 625 bar-tailed godwit, 370 knot, and an internationally important count of 4,702 sanderling.

4.14.4.7 Birds were present during the passage periods. With only one cable being trenched at a time, the maximum area that can be disturbed on the intertidal and between MHWS and HAT is 1,352,160 m^2 (calculated in GIS assuming a 300 m displacement zone surrounding the works). There are 124,123,100 m^2

of roosting, loafing or foraging habitats available within the Ribble and Alt SPA, based on the SPA citation. The area affected represents 1.09 % of the Ribble and Alt Estuary SPA. The period of active works on the beach will be up to 48 weeks maximum within a 36-month period (six weeks per cable **Table 4.20**).

4.14.4.8 Works will be of short duration, very temporary, avoiding the most sensitive season and be reversible in the very short term. Nevertheless, due to the number of IEFs predicted to be impacted, the magnitude of impact is predicted to be **low** on a precautionary basis.

Non-breeding gulls and terns

4.14.4.9 Up to 877 black-headed gull, 750 common gull, 1,600 herring gull, 353 lesser black-backed gull and 23 great black-backed gull were recorded using the coastal survey area. With the exception of common gull, these birds were found all year-round, gull species are not intertidal habitat specialists and can exploit a wide variety of resources. They are also more tolerant of disturbance and have larger foraging ranges ranging from 18.5 km for black-headed gull to 236 km for lesser black-backed gull (mean max plus one standard deviation taken from Woodward, *et al*., 2019). These factors combine to lower the magnitude of impact for gulls.

4.14.4.10 In addition, 427 sandwich tern and 90 common tern were seen roosting and loafing on the intertidal during the passage periods with small numbers of common tern recorded foraging in the nearshore waters during the breeding season. Foraging terns are fairly tolerant of disturbance (Perrow *et al*., 2009) and passage birds are not tied to a nesting colony and are wide ranging.

4.14.4.11 Works will be of short duration, very temporary and reversible in the very short term. Therefore, the magnitude of impact will be **negligible**.

Non-breeding cormorants and divers

4.14.4.12 Up to 14 red-throated diver and 112 cormorant were recorded using the coastal survey area. Red-throated diver are scored as highly sensitive to displacement and cormorant moderately with red-throated diver also noted as being one of the most sensitive species to disturbance (Goodship and Furness, 2022).

4.14.4.13 Cables will be floated ashore one at a time so disturbance will be limited to one vessel at a time (CoT110).

4.14.4.14 Works will be of short duration, very temporary, avoiding the most sensitive season and be reversible in the very short term. Therefore, the magnitude of impact will be **negligible**.

Estuarine survey area

All receptors

4.14.4.15 Due to the commitment by the Applicants to use trenchless techniques across the Ribble River (CoT90), and due to the entry and exit pits being

situated behind natural screening (banking and trees/hedgerows), the effects of disturbance upon birds at this location are deemed to be **no change**.

Onshore survey area

Breeding geese, ducks and swans

4.14.4.16 23 territories of shelduck, four of shoveler, one of gadwall, 36 of mallard and one of teal were located within the onshore survey area. Whilst gadwall and mallard are thought to be fairly tolerant of disturbance shelduck may be disturbed at up to 400 m away from the source of disturbance (Goodship and Furness, 2022).

4.14.4.17 None of these species are named as designated breeding features of nearby designated areas however the estimated 2016 UK breeding population of shelduck was 7,850 pairs, for mallard 61,000 and for gadwall 1,250 (BTO, 2023b). All three species are widely distributed on the coastal plains of Lancashire (Balmer *et al*., 2011).

4.14.4.18 The breeding population of these species are not interest features of a protected site, and the potential change in distribution will be very slight, temporary, and quickly reversible. Therefore, the magnitude of impact will be **negligible**.

Non-breeding geese, ducks and swans

4.14.4.19 The pasture and arable habitats along the onshore survey area support peak counts of 8,319 pink-footed goose, 132 whooper swan, 12 brent goose, 12, barnacle goose, 517 greylag goose, 24 mute swan, 374 shelduck, 31 shoveler, 11 gadwall, 1,647 wigeon, 273 mallard and 312 teal .

4.14.4.20 The north-west SPA population of pink-footed goose was 55,686 (five-year mean of peak 2009/10 – 2013/14 from Devenish *et al*., 2015) and may now exceed that. The geese within the onshore survey area may belong to any one of three SPAs with connectivity (Ribble and Alt, Martin Mere and Morecambe Bay), considering a 20 km foraging range (NatureScot, 2016). The 8,319 birds within the onshore survey area represents 14.9 % of the north west SPA population.

4.14.4.21 The 132 whooper swan and 1,647 wigeon together with 374 shelduck and 312 teal are all Ribble and Alt Estuaries SPA features. The shoveler, mallard and gadwall are not SPA features. The whooper swan were present at levels close to the SPA citation (72.5 %), whereas the wigeon were present at 1.9 %, shelduck at 7.6 % and the teal at 4.4 %.

4.14.4.22 Whooper swan and pink-footed goose are intolerant to disturbance and may elicit responses as far away as 500 to 600 m (Goodship and Furness, 2022), and the numbers of birds represent a significant proportion of the nearby protected sites citation counts. Therefore, although there will be a localised change in the distribution of the reference populations, this will be temporary and quickly reversible. The magnitude of impact will therefore be **low**.

Breeding partridges

4.14.4.23 Three grey partridge territories were located within the onshore survey area. The UK population of grey partridge is estimated at 37,000 pairs in 2016 (BTO, 2023b) and they are distributed widely throughout Lancashire (Balmer *et al*., 2011).

4.14.4.24 The temporary and localised disturbance will be quickly reversed after the cessation of works and is thought to be **negligible** at a population level.

Breeding rails

4.14.4.25 Three territories of moorhen and one of coot were located within the onshore survey area. Moorhen are a common and widespread species with an estimated population of 210,000 pairs in the UK in 2016, with coot having 26,000 pairs (BTO, 2023b).

4.14.4.26 The temporary and localised disturbance will be quickly reversed after the cessation of works and is thought to be **negligible**.

Non-breeding rails

4.14.4.27 A total of 16 moorhen and 6 coot were located within the onshore survey area during the non-breeding season. The UK wintering population of moorhen was estimated at 305,000 (2012-17), with 205,000 coot over the same period (BTO, 2023b).

4.14.4.28 The temporary and localised disturbance will be quickly reversed after the cessation of works and is thought to be **negligible**.

Breeding waders

4.14.4.29 14 oystercatcher territories, 25 lapwing, and two curlew territories were located along the onshore survey area. There were also two curlew territories that were mapped on a precautionary basis in 2022.

4.14.4.30 The 2016 UK breeding population of oystercatcher is estimated at 96,000 pairs, lapwing at 98,000 pairs and curlew at 59,000 pairs and there is no connectivity with the upland protected sites where these birds are a breeding feature.

4.14.4.31 The temporary and localised disturbance of up to 0.02% (oystercatcher), 0.03% (lapwing) and less than 0.00% (curlew) of the UK population of species that are not named breeding features of a nearby protected site, and that will be quickly reversed after the cessation of works is thought to be **negligible**.

Non-breeding waders

4.14.4.32 126 oystercatcher, 17 avocet, 2,081 lapwing, 381 golden plover, 696 curlew, 423 black-tailed godwit, 2 ruff, six woodcock, 78 snipe, and 61 redshank were located within the onshore survey area.

4.14.4.33 Many species of wader are intolerant to disturbance and may elicit responses as far away as 500 m (Goodship and Furness, 2022), and the numbers of

birds represent a moderate proportion of the nearby protected sites citation counts.

4.14.4.34 Although all construction works are not predicted to run concurrently within the whole of the Onshore Order Limits and Intertidal Infrastructure Area, there may be a localised change in the distribution of the reference populations, this will be however temporary and quickly reversible. The magnitude of impact is therefore predicted to be **low** on a precautionary basis.

Non-breeding gulls

4.14.4.35 1,926 black-headed gull, 461 common gull, 1,009 herring gull, 176 lesser black-backed gull and 44 great black-backed gull were recorded within the onshore survey area.

4.14.4.36 Gulls are flexible in their habitat use and forage over a wide area (Woodward *et al*., 2019). Non-breeding gull are also not designated features of any nearby protected sites and have large non-breeding populations with estimated UK populations in 2016 of 2.2 million black-headed gull, 710,000 common gull, 740,000 herring gull, 130,000 lesser black-backed gull, 77,000 great black-backed gull (BTO, 2023b).

4.14.4.37 Although works are not predicted to run concurrently within the whole of the Onshore Order Limits and Intertidal Infrastructure Area, there may be a localised change in the distribution of the baseline population, this will be however temporary and quickly reversible. Because of the gull's flexibility in habitat use and availability of alternative habitats, the magnitude of impact is considered to be **negligible.**

Non-breeding cormorants

4.14.4.38 Six cormorant were recorded within the onshore survey area.

4.14.4.39 The latest population estimate for cormorant in the Liverpool Bay/Bae Lerpwl SPA is 1,217 (mean taken from HiDef Aerial Surveying Limited, 2023). This equates to 0.5% of the SPA population and although this species often breeds in freshwater habitats it does not utilise the arable and pasture habitats that dominate the onshore survey area. The onshore survey area is therefore not considered functionally linked for this seabird.

4.14.4.40 Disturbance and displacement from construction, decommissioning, and operation and maintenance activities will not affect individual bird survival of non-breeding cormorant given population size affected and availability of alternative habitats. The magnitude is therefore considered to be **negligible**.

Breeding herons

4.14.4.41 Seven grey heron and one little egret were recorded as holding territories (or nest sites as both species are frequently communal breeders) within the onshore survey area. The UK breeding population of grey heron in 2016 was estimated as 11,000 pairs and little egret 1,100 pairs (BTO, 2023b).

4.14.4.42 Disturbance and displacement from construction, decommissioning, and operation and maintenance activities within each area will not affect individual bird survival/productivity of breeding heron given population size affected and availability of alternative habitats. The magnitude is therefore considered to be **negligible**.

Non-breeding herons

4.14.4.43 One cattle egret, 28 grey heron, one great white egret and 38 little egret were recorded using the onshore survey area during the non-breeding season. The UK non-breeding population of cattle egret was estimated as 66 (2011-15) (although this is likely to be higher now as cattle egret continue their colonisation), grey heron was estimated as 46,000 individuals (2012-17), great white egret at 72 (2011-15) (although this is likely to be higher now as cattle egret continue their colonisation) and little egret 12,000 (2012-17) (BTO, 2023b).

4.14.4.44 Disturbance and displacement from construction, decommissioning, and operation and maintenance activities will not affect individual bird survival of non-breeding heron given population size affected and availability of alternative habitats. The magnitude is therefore considered to be **negligible**.

Breeding owls

4.14.4.45 Five barn owl and one tawny owl territories were present within the onshore survey area. Although not a feature interest of a nearby protected site, breeding barn owl are protected under Schedule 1 of the Wildlife and Countryside Act, 1981. There were estimated to be up to 4,000 pairs of barn owl in the UK in 2016 and up to 50,000 pairs of tawny owl (BTO, 2023b).

4.14.4.46 Disturbance and displacement from construction, decommissioning, and operation and maintenance activities will not affect individual bird survival/productivity of breeding owl given population size affected and availability of alternative habitats. The magnitude is therefore considered to be **negligible.**

Non-breeding owls

4.14.4.47 Nine barn owl were present within the onshore survey area. There are estimated to be up to 4,000 pairs of barn owl in the UK in 2016 (BTO, 2023b).

4.14.4.48 Disturbance and displacement from construction, decommissioning, and operation and maintenance activities will not affect individual bird survival/productivity of non-breeding owl given population size affected and availability of alternative habitats. The magnitude is therefore considered to be **negligible**.

Breeding kingfishers

4.14.4.49 Three territories of kingfisher were present within the onshore survey area. Although not a feature interest of a nearby protected site, breeding kingfisher

are protected under Schedule 1 of the Wildlife and Countryside Act, 1981. The UK population was estimated at 3,850 pairs in 2016 (BTO, 2023b).

4.14.4.50 Disturbance and displacement from construction, decommissioning, and operation and maintenance activities will not affect individual bird survival/productivity of breeding kingfisher given population size affected and availability of alternative habitats. The magnitude is therefore considered to be **negligible**.

Non-breeding kingfishers

4.14.4.51 Four kingfisher were present within the onshore survey area during the non-breeding season. The UK population was estimated at 3,850 pairs in 2016 (BTO, 2023b).

4.14.4.52 The Transmission Assets has committed to trenchless techniques under all watercourses. Therefore, the magnitude of impact upon kingfisher is deemed **negligible**.

Breeding raptors

4.14.4.53 Three sparrowhawk, two buzzard, and nine kestrel territories were recorded within the onshore survey area. The UK breeding population of sparrowhawk was estimated at 31,000 pairs (2016), buzzard at 63,000 pairs (2016), and kestrel at 31,000 pairs (2016) (BTO, 2023b).

4.14.4.54 Disturbance and displacement from construction, decommissioning, and operation and maintenance activities will not affect individual bird survival/productivity of breeding raptors given population size affected and availability of alternative habitats. The magnitude is therefore considered to be **negligible**.

Non-breeding raptors

4.14.4.55 Eight sparrowhawk, one marsh harrier, one red kite, 30 buzzard, 25 kestrel, one merlin and two peregrine were recorded within the onshore survey area during the non-breeding season. The UK non-breeding population of marsh harrier, red kite, merlin and peregrine is unknown however there were 31,000 pairs (62,000 individuals) of sparrowhawk in 2016, 590 pairs (1,180 individuals) of marsh harrier, 4,400 pairs of red kite (8,800 individuals), 63,000 pairs of buzzard (126,000 individuals), and 31,000 pairs of kestrel (62,000 individuals) also in 2016. In 2008 there were 1,150 pairs (2,300 individuals) of merlin, and in 2014 1,750 pairs (3,500 individuals) of peregrine (BTO, 2023b).

4.14.4.56 Little is known of the extent of the winter foraging ranges, however the area disturbed by the Transmission Assets is thought to represent a small fraction of the foraging habitat available for these species. The magnitude is therefore considered to be **negligible.**

Breeding Cetti's warblers

4.14.4.57 Three Cetti's warbler territories were present. Although not a feature interest of a nearby protected site, breeding Cetti's warbler are protected under Schedule 1 of the Wildlife and Countryside Act, 1981. In 2016 there were estimated to be 3,450 singing male Cetti's warbler in the UK.

4.14.4.58 The temporary and localised disturbance will be quickly reversed after the cessation of works. The Applicants have committed to trenchless techniques under all watercourses (CoT10). Therefore, the magnitude of impact upon Cetti's warbler is deemed **negligible**.

Breeding passerines

4.14.4.59 The other 32 breeding passerine species present within the onshore survey area, although declining and therefore of medium conservation concern, are relatively common and widespread.

4.14.4.60 Disturbance and displacement from construction, decommissioning, and operation and maintenance activities will not affect individual bird survival/productivity of breeding passerines given population size affected and availability of alternative habitats. The magnitude is therefore considered to be **negligible**.

Non-breeding passerines

4.14.4.61 The 32 non-breeding passerine species present within the onshore survey area, although declining and therefore of medium conservation concern, are relatively common and widespread.

4.14.4.62 Disturbance and displacement from construction, decommissioning, and operation and maintenance activities will not affect individual bird survival of non-breeding passerines given population size affected and availability of alternative habitats. The magnitude is therefore considered to be **negligible**.

4.14.5 Significance of the effect

4.14.5.1 The sensitivity of all IEFs is medium to high and the magnitude of the impact for all IEFs is no change or negligible to low. The effect will, therefore, be of **negligible** to **minor** or **moderate adverse** significance, summarised in **Table 4.31**.

Table 4.31: Significance of effect during construction and decommissioning phases of Disturbance and displacement from construction, decommissioning, and operation and maintenance activities on IEFs

Area	IEF group	Sensitivity of receptor	Magnitude of impact	Significance of effect
Coastal survey area	Non-breeding geese, ducks and swans	High	Negligible	Minor adverse
	Non-breeding grebes	High	Negligible	Minor adverse
	Non-breeding waders	High	Low	Moderate adverse
	Non-breeding gulls and terns	Medium	Negligible	Negligible
	Non-breeding divers and cormorants	High	Negligible	Minor adverse
Estuarine survey area	Non-breeding geese, ducks and swans	High	No change	No change
	Non-breeding waders	High	No change	No change
	Non-breeding gulls and terns	Medium	No change	No change
	Non-breeding cormorants	High	No change	No change
	Non-breeding herons	High	No change	No change
	Non-breeding kingfishers	Medium	No change	No change
Onshore survey area	Breeding geese, ducks and swans	High	Negligible	Minor adverse
	Non-breeding geese, ducks and swans	High	Low	Moderate adverse
	Breeding partridges	Medium	Negligible	Negligible
	Breeding rails	Medium	Negligible	Negligible
	Non-breeding rails	Medium	Negligible	Negligible
	Breeding waders	High	Negligible	Minor adverse
	Non-breeding waders	High	Low	Moderate adverse

Area	IEF group	Sensitivity of receptor	Magnitude of impact	Significance of effect
	Non-breeding gulls	Medium	Negligible	Negligible
	Non-breeding cormorants	High	Negligible	Minor adverse
	Breeding herons	High	Negligible	Minor adverse
	Non-breeding herons	High	Negligible	Minor adverse
	Breeding owls	Medium	Negligible	Negligible
	Non-breeding owls	Medium	Negligible	Negligible
	Breeding kingfishers	Medium	Negligible	Negligible
	Non-breeding kingfishers	Medium	Negligible	Negligible
	Breeding raptors	Medium	Negligible	Negligible
	Non-breeding raptors	Medium	Negligible	Negligible
	Breeding Cetti's warblers	High	Negligible	Minor adverse
	Breeding passerines	Medium	Negligible	Negligible
	Non-breeding passerines	Medium	Negligible	Negligible
Permanent onshore substations area	Receptors at this location have already been assessed under the onshore survey area			

4.14.6 Further mitigation and residual effects

4.14.6.1 Two areas have been identified and included in the mitigation areas for the Transmission Assets to provide mitigation for disturbance and displacement from construction, decommissioning, and operation and maintenance activities for non-breeding waders at the coastal survey area and the onshore survey areas and non-breeding geese, ducks and swans at the onshore survey area. These two areas are as follows, with more detail on the proposed mitigation to be delivered in each area included in the following:

- the high tide roost at Fairhaven saltmarsh (CoT113); and
- arable land at Lytham Moss (CoT107).

The high tide roost at Fairhaven saltmarsh

4.14.6.2 This area is located approximately 2.5 km to the southeast of the coastal survey area and has been identified as holding large numbers of roosting SPA features including, oystercatcher, bar-tailed godwit, knot, sanderling and dunlin. The area is exposed to recreational disturbance with walkers and dogs frequently causing disturbance events.

4.14.6.3 As temporarily disturbed intertidal habitat cannot be recreated during the duration of the works, The applicants have committed to trying to reduce disturbance in this area in order to reduce the daily energy requirements of the SPA features that have been identified as being potential receptors to the low impact of disturbance and displacement caused by construction works at the coastal survey area (CoT113).

4.14.6.4 The proposed measures include either the employment of a warden who will aim to educate and dissuade members of the public from walking along the tideline at high tide when the birds are present in high numbers roosting or the addition of educational signage to instil the importance of the high tide roost for these sensitive species, and soft fencing to dissuade walkers from accessing the tideline at high tide.

4.14.6.5 These measures around the Fairhaven saltmarsh area will mitigate for the potential impact from disturbance and displacement caused by construction activities at the coastal survey area which may affect SPA features.

Arable land at Lytham Moss

4.14.6.6 A patch of arable farmland contained within Lytham Moss and adjacent to the Farmland Conservation Area has been identified as the location for supplementary feeding of pink-footed goose and whooper swan (CoT107). This measure has already been employed with success by the Farmland Conservation Area and aims to move sensitive receptors away from areas where they are reliant upon seasonal food resources towards an area where they will not be disturbed during the duration of the works.

4.14.6.7 Imported crop such as potatoes to be scattered throughout the identified fields. This will require supplementation throughout the winter; however, the calorific value will be equal to that being lost by the geese and swans to prevent the attraction of additional birds to the area. This measure will need

to be in place for the duration of construction but will not need to be continued indefinitely as the potential impact from the works is anticipated to be reversible.

4.14.6.8 This area will mitigate for the disturbance and displacement of goose, duck and swan receptors both within the onshore survey area.

4.14.7 Conclusion

4.14.7.1 The implementation of the above measures will reduce the pressures on the non-breeding IEFs that are identified as being potential receptors to the adverse impacts of Disturbance and displacement from construction, decommissioning, and operation and maintenance activities. If these measures are adhered to it is predicted that the residual significance of effect (for all IEFs where a moderate effect was predicted) will be reduced to **minor adverse** and therefore not significant in EIA terms.

Table 4.32: Residual significance of effect during construction and decommissioning phases of Disturbance and displacement from construction, decommissioning, and operation and maintenance activities on IEFs

Area	IEF group	Significance of effect	Residual significance of effect
Coastal survey area	Non-breeding geese, ducks and swans	Minor adverse	Minor adverse
	Non-breeding grebes	Minor adverse	Minor adverse
	Non-breeding waders	Moderate adverse	Minor adverse
	Non-breeding gulls and terns	Negligible	Negligible
	Non-breeding divers and cormorants	Minor adverse	Minor adverse
Estuarine survey area	Non-breeding geese, ducks and swans	No change	No change
	Non-breeding waders	No change	No change
	Non-breeding gulls and terns	No change	No change
	Non-breeding cormorants	No change	No change
	Non-breeding herons	No change	No change
	Non-breeding kingfishers	No change	No change
Onshore survey area	Breeding geese, ducks and swans	Minor adverse	Minor adverse
	Non-breeding geese, ducks and swans	Moderate adverse	Minor adverse
	Breeding partridges	Negligible	Negligible
	Breeding rails	Negligible	Negligible
	Non-breeding rails	Negligible	Negligible
	Breeding waders	Minor adverse	Minor adverse
	Non-breeding waders	Moderate adverse	Minor adverse

Area	IEF group	Significance of effect	Residual significance of effect
	Non-breeding gulls	Negligible	Negligible
	Non-breeding cormorants	Minor adverse	Minor adverse
	Breeding herons	Minor adverse	Minor adverse
	Non-breeding herons	Minor adverse	Minor adverse
	Breeding owls	Negligible	Negligible
	Non-breeding owls	Negligible	Negligible
	Breeding kingfishers	Negligible	Negligible
	Non-breeding kingfishers	Negligible	Negligible
	Breeding raptors	Negligible	Negligible
	Non-breeding raptors	Negligible	Negligible
	Breeding Cetti's warblers	Minor adverse	Minor adverse
	Breeding passerines	Negligible	Negligible
	Non-breeding passerines	Negligible	Negligible

4.14.8 Operation and maintenance phase

Coastal survey area

4.14.8.1 Within the Intertidal Infrastructure Area there may be the requirement to rebury up to one km of cable every five years for Morgan, additionally there may be the requirement to repair and subsequently rebury up to 1 km every 10 years. Morecambe have envisaged that a precautionary 2.4 km of intertidal cable may be subject to repair and reburial and predict one event every 10 years, additionally it is predicted that there may be reburial events of approximately 500 m every five years. This equates to a lifetime (assuming 35 years) reburial of 10.5 km for Morgan and 11.9 km for Morecambe, a combined total of up to 22.4 km. However, these maintenance works to rebury/replace and carry out repair works are likely to require on average between 250 m to 500 m of cable repair and/or reburial per event with each event generally taking approximately two to four weeks. Although there is potential for works to be similar in scope as during the construction phase, these works are likely to concentrate on small areas at a time. Therefore, the magnitude will be of a similar or lesser scale than during construction.

All other areas

4.14.8.2 The impacts of Disturbance and displacement from construction, decommissioning, and operation and maintenance activities during operation and maintenance is predicted to be occasional and of low intensity. Therefore, the impacts during this phase will be similar to background levels caused by agricultural machinery, traffic, air traffic, and recreational and dog walkers, etc. It is thus assessed as such.

4.14.9 Key receptors for assessment

4.14.9.1 The receptors taken forward for assessment are those outlined in **section 4.14.2**.

4.14.10 Sensitivity of the receptor

4.14.10.1 The sensitivity of the IEFs is predicted to be the same as that discussed in **section 4.14.3**, which is **medium** to **high**.

4.14.11 Magnitude of impact

Coastal survey area

All receptors

4.14.11.1 Although there is potential for works to be similar in scope as during the construction phase, these works are likely to concentrate on small areas at a time and the associated infrastructure that is present during construction will not be needed. Therefore, the magnitude will be of a similar or lesser scale than during construction which is **negligible** to **low**.

All other areas

All receptors

4.14.11.2 Disturbance and displacement from construction, decommissioning, and operation and maintenance activities will be limited and sporadic during the operation and maintenance phase with the impact deemed to be similar to background levels. Therefore, the magnitude of impact during operation and maintenance will be of **no change**.

4.14.12 Significance of the effect

4.14.12.1 The significance of impact is summarised in **Table 4.33**. The significance of effect for IEFs at the coastal survey area is predicted to be **minor to moderate adverse**, the significance of effect for all IEFs and for all other assessment areas is predicted to be **no change**, which is not significant in EIA terms.

Table 4.33: Significance of effect during the operation and maintenance phase of Disturbance and displacement from construction, decommissioning, and operation and maintenance activities on IEFs

Area	IEF group	Sensitivity of receptor	Magnitude of impact	Significance of effect
Coastal survey area	All receptors	Medium to High	Negligible to Low	Minor to moderate adverse
All other areas	All receptors	High	No change	No change

4.14.13 Further mitigation and residual effects

4.14.13.1 One area has been identified and included in the mitigation areas for the Transmission Assets to provide mitigation for disturbance and displacement during the operation and maintenance phase for non-breeding waders at the coastal survey area:

- the high tide roost at Fairhaven saltmarsh (CoT113);

The high tide roost at Fairhaven saltmarsh

4.14.13.2 This area is located approximately 2.5 km to the south east of the coastal survey area and has been identified as holding large numbers of roosting SPA features including, oystercatcher, bar-tailed godwit, knot, sanderling and dunlin. The area is exposed to recreational disturbance with walkers and dogs frequently causing disturbance events.

4.14.13.3 As temporarily disturbed intertidal habitat cannot be recreated during the duration of the works, The applicants have committed to trying to reduce disturbance in this area in order to reduce the daily energy requirements of the SPA features that have been identified as being potential receptors to the low impact of disturbance and displacement caused by construction works at the coastal survey area (CoT113).

4.14.13.4 The proposed measures include either the employment of a warden who will aim to educate and dissuade members of the public from walking along the tideline at high tide when the birds are present in high numbers roosting or the addition of educational signage to instil the importance of the high tide roost for these sensitive species, and soft fencing to dissuade walkers from accessing the tideline at high tide.

4.14.13.5 These measures around the Fairhaven saltmarsh area will mitigate for the potential impact from disturbance and displacement caused by construction activities at the coastal survey area which may affect SPA features.

4.14.14 Conclusion

4.14.14.1 The implementation of the above measures will reduce the pressures on the non-breeding IEFs that are identified as being potential receptors to the adverse impacts of disturbance and displacement from construction, decommissioning, and operation and maintenance activities. If these measures are adhered to it is predicted that the residual significance of effect (for all IEFs where a moderate effect was predicted) will be reduced to **minor adverse** and therefore not significant in EIA terms.

Table 4.34: Residual significance of effect during the operation and maintenance phase of Disturbance and displacement from construction, decommissioning, and operation and maintenance activities on IEFs

Area	IEF group	Significance of effect	Residual significance of effect
Coastal survey area	All receptors	Minor to moderate adverse	Minor adverse
All other areas	All receptors	No change	No change

4.15 The impact of pollution caused by accidental spills and/or contaminant release

4.15.1 Construction and decommissioning phases

Introduction

4.15.1.1 Activities required for the construction and decommissioning of the Transmission Assets may result in accidental spills/contaminant release which could adversely affect IEF fitness.

4.15.1.1 The MDS is represented by the greatest amount of land that will be disturbed and is summarised in **Table 4.20**. In addition, pollution may happen due to the leaking of drilling fluids as set out in Volume 1, Chapter 3: Project description (document reference F1.3), although it is hard to quantify what area, if any, this could affect. Bentonite breakout is mitigated for by the Bentonite Breakout Plan (document reference J1.13).

4.15.1.2 All species of bird utilising the environment in the vicinity of a pollution incident may be vulnerable to either direct mortality from oil/contaminant coverage preventing flight, for example, or indirectly via a reduction in ability to forage due to damage to foraging habitats. Therefore, all IEFs are assessed together.

4.15.1.3 The proportions of each assessment area that may be subject to the impact of pollution caused by accidental spills and/or contaminant release are approximately:

- **9.4%** of the coastal survey area (taken as the total area of habitat disturbance that overlaps the coastal survey area); and
- **10.1%** of the onshore survey area (taken as the amount that the onshore infrastructure area overlaps the onshore survey area).

4.15.2 Key receptors for assessment

All areas

All receptors

4.15.2.1 The number of receptors present within the coastal survey area, estuarine survey area, and onshore survey area are summed up in **Table 4.24** and **section 4.14.2**.

4.15.3 Sensitivity of the receptor

All areas

All receptors

4.15.3.1 Bird species that spend large amounts of time in/on the water or on the sea surface may be vulnerable to pollution incidents (such as the accidental release of synthetic compounds, fuels or other substances).

4.15.3.2 Although sensitivity may differ within the onshore IEFs, the receptors are overall considered to be low vulnerability to pollution events resulting from accidental spills. The receptors are considered to have medium recoverability based on IEFs with the lowest reproductive success and decreasing trend in the numbers of breeding and non-breeding birds.

4.15.3.3 The receptors identified are therefore deemed to be of medium to very high conservation importance, low vulnerability and medium recoverability. The sensitivity of the receptor to this impact is therefore, considered to be **medium**.

4.15.4 Magnitude of impact

All areas

All receptors

4.15.4.1 Although the likelihood of a pollution event occurring is low, should an event occur, the impact is predicted to be of local spatial extent and short-term duration. Furthermore, the Outline PPP (CoT04; document reference J1.4) will control impacts as far as practicable (**Table 4.19**). The Outline PPP shall identify how potentially polluting substances will be stored, handled and used appropriately by including the following elements:

- reference to relevant regulatory guidance and industry best practice;
- consideration of environmental receptors during the design of compounds and the management of surface water runoff thereon;
- the design of material storage and refuelling areas; and
- production of method statements and emergency response plans for activities involving potentially polluting materials and associated training of the relevant personnel.

4.15.4.2 Impacts during decommissioning will be controlled through the Onshore Decommissioning Plan (CoT36).

4.15.4.3 The magnitude is therefore, considered to be **negligible**.

4.15.5 Significance of the effect

4.15.5.1 The significance of effect is summarised in **Table 4.35**. Overall, the magnitude of the impact during construction and decommissioning is deemed to be negligible and the sensitivity of the receptor is medium. The effect will, therefore, be of **negligible adverse** significance, which is not significant in EIA terms.

Table 4.35: Significance of effect during construction and decommissioning phases of pollution caused by accidentally spills and/or contaminant release on IEFs

Area	IEF group	Sensitivity of receptor	Magnitude of impact	Significance of effect
All areas	All receptors	Medium	Negligible	Negligible

4.16 The impact of spreading INNS

4.16.1 All phases

Introduction

4.16.1.1 Construction and decommissioning of the Transmission Assets may cause the spread of INNS, which could adversely affect the status of native habitats and species that bird species rely on. The MDS is represented by the greatest amount of land that will be disturbed and is summarised in **Table 4.20**.

4.16.1.2 Construction and decommissioning activities potentially involve the introduction and/or spread of INNS through the movement of earth during works, including the digging of trenches and the use of machinery and presence of operating personnel. Both machinery and operating personnel have the potential to carry on their equipment (e.g., heavy machinery tracks or vehicle tyres or working clothing, e.g., boots) seeds, or spores of INNS from either within or outside the Onshore Order Limits and Intertidal Infrastructure Area.

4.16.1.3 The introduction, or unintentional spread of seeds, spores or other parts of plant material may result in the spread of plant species (e.g., Himalayan balsam *Impatiens glandulifera*, giant hogweed *Heracleum mantegazzianum* and water primrose *Ludwigia peploides*). These species have the potential to displace native species and to potentially replace or become dominant in those areas of habitat and change the community composition and structure.

4.16.1.4 If wide-scale habitat changes result from the spread of INNS there is the potential to replace existing valuable habitat and supporting ecosystems that are used by birds for foraging, roosting, loafing or nesting with less valuable habitats which could limit the bird's ability to survive or be productive.

4.16.1.5 Further detail on the presence of INNS, and related measures adopted to mitigate the potential impact of the Transmission Assets can be viewed in Volume 3, Annex 3.3: Phase 1 habitat, National Vegetation Classification and hedgerow survey technical report of the ES and Volume 3, Annex 3.14: Invasive non-native species technical report of the ES.

4.16.2 Key receptors for assessment

All areas

All receptors

4.16.2.1 The number of receptors present within the coastal survey area, estuarine survey area, and onshore survey area are summed up in **Table 4.24** and **section 4.14.2**.

4.16.3 Sensitivity of the receptor

All areas

All receptors

4.16.3.1 Although the spread of INNS, such as Japanese knotweed and Himalayan balsam, may reduce botanical and invertebrate species richness, these INNS are unlikely to affect the specialist saline habitats or the managed farmland that many of the IEFs rely upon.

4.16.3.2 Additionally, INNS may provide excellent cover for breeding birds (e.g., Japanese knotweed on riverbanks) or attract a good food supply of insects at certain times of the year (e.g., Himalayan balsam). Therefore, the receptors identified are deemed to be of medium to very high conservation importance, low vulnerability and medium recoverability. The sensitivity of the receptor is therefore, considered to be **medium.**

4.16.4 Magnitude of impact

All areas

All receptors

4.16.4.1 The survey area is dominated by pasture and arable land, as described in **Table 4.10**. These habitats are not likely to be vulnerable to large scale habitat change resulting from changes in plant species composition as a consequence of the spread of INNS.

4.16.4.2 An Outline Biosecurity Protocol (document reference J1.12) (CoT73) will be prepared and implemented during the construction phase. This will be implemented through the CoCP. Equivalent measures during decommissioning will be implemented through the Onshore Decommissioning Plan (CoT36).

4.16.4.3 Watercourses or waterbodies are more susceptible to the spread of INNS, including curly waterweed *Lagarosiphon major* and floating pennywort *Hydrocotyle ranunculoides*.

4.16.4.4 The impact is predicted to be of local spatial extent and short/medium-term duration. The magnitude is therefore, considered to be **negligible**.

4.16.5 Significance of the effect

All areas

4.16.5.1 The significance of effect is summarised in **Table 4.36**. Overall, the sensitivity of the receptor is considered to be medium and the magnitude of the impact during construction and decommissioning is deemed to be negligible. The effect will, therefore, be of **negligible adverse** significance, which is not significant in EIA terms.

Table 4.36: Significance of effect during the construction and decommissioning phase of spreading INNS on IEFs

Area	IEF group	Sensitivity of receptor	Magnitude of impact	Significance of effect
All areas	All receptors	Medium	Negligible	Negligible

4.17 The impact of habitat fragmentation and species isolation

4.17.1 Construction and decommissioning

Introduction

4.17.1.1 The construction and decommissioning of the Transmission Assets has the potential to result in habitat fragmentation and species isolation through creating changes to habitat configuration at a landscape scale. The MDS is based upon the largest footprint of disturbed land and is summarised in **Table 4.20**.

4.17.1.2 Changes which cause existing habitat to become broken up or fragmented can lead to the isolation of individual species and reduce the individual patch size in which they forage and are ecologically dependent upon, and therefore potentially affect their population size and viability.

4.17.1.3 Birds are mobile species with some species able to cover vast distances daily. Species that are more susceptible to this potential impact are those species that are habitat specialists and are dependent upon specific types of habitat, such as woodland specialists.

4.17.1.4 Whilst construction may cause displacement of species from the disturbed area, this potential impact has already been considered within the impact of habitat loss and Disturbance and displacement from construction, decommissioning, and operation and maintenance activities.

4.17.1.5 Therefore, as all IEFs are considered to be similarly impacted by fragmentation, the assessment of this potential impact has considered all receptors equally.

4.17.1.6 There are not predicted to be any additional impacts of habitat fragmentation and species isolation during operation and maintenance.

4.17.2 Key receptors for assessment

All areas

All receptors

4.17.2.1 The number of receptors present within the coastal survey area, estuarine survey area, and onshore survey area are summed up in **Table 4.24** and **section 4.14.2**.

4.17.3 Sensitivity of the receptor

All areas

All receptors

4.17.3.1 Habitat fragmentation on a landscape scale can be significant if a species population is small and therefore more vulnerable to change locally, and/or if a species population is already fragmented and vulnerable to a loss of connectivity. A loss of connectivity between individuals of a species may affect their ability to pair, breed and be reproductively successful. This vulnerability is increased if a species is relatively immobile, occupies small territories and is unable to move increased distances created between individual patch sizes or territories (Andren, 1994). As bird species can move a large distance between nesting areas or breeding areas, the susceptibility to fragmentation leading to an observable impact is low. Non-breeding birds are not tied to territories can move freely between fragmented patches of habitat.

4.17.3.2 The IEFs identified in the survey area are of high or very high conservation importance but are all relatively widely distributed species. Each species is relatively mobile throughout both its annual range, migratory movements, wintering foraging ranges and/or breeding home range. Consequently, the receptors are not considered to be particularly vulnerable to habitat fragmentation and species isolation at a local scale.

4.17.3.3 The receptors identified are deemed to be of medium to very high conservation importance, very low vulnerability and high recoverability. The sensitivity of the receptor to this impact is therefore, considered to be **medium**.

4.17.4 Magnitude of impact

All areas

All receptors

4.17.4.1 The Transmission Assets are proposed across predominantly grassland/pasture and intertidal habitats. The majority of the work within the Onshore Infrastructure Area and Intertidal Infrastructure Area is temporary in nature with the habitats fragmented for up to 66 months.

4.17.4.2 Following completion of the construction, the habitats will be returned to pre-construction land use with the cables buried underground. Any permanent fragmentation will occur at the onshore substation sites. However, all IEFs can easily navigate over or around these structures. As the permanent habitat lost is manly arable/pasture it is considered that the proportion and location of each habitat will be maintained within the survey area.

4.17.4.3 The impact is therefore predicted to be of very low spatial extent as a minor change in habitat extent and medium-term duration. The magnitude is therefore, considered to be **negligible**.

4.17.5 Significance of the effect

All areas

4.17.5.1 The significance of effect is summarised in **Table 4.37**. The magnitude of the impact for all receptors is negligible and the sensitivity of the receptors is medium. The effect will, therefore, be of **negligible** adverse significance, which is not significant in EIA terms.

Table 4.37: Significance of effect during construction and decommissioning phases of habitat fragmentation and species isolation on IEFs

Area	IEF group	Sensitivity of receptor	Magnitude of impact	Significance of effect
All areas	All receptors	Medium	Negligible	Negligible

4.17.6 Operation and maintenance phase

4.17.6.1 The impacts of habitat fragmentation and species isolation during operation and maintenance is predicted to be occasional and of low intensity. Therefore, the impacts during this phase will be similar to background levels.

4.17.7 Key receptors for assessment

All areas

All receptors

4.17.7.1 The number of receptors present within the coastal survey area, estuarine survey area, and onshore survey area are summed up in **Table 4.24** and **section 4.14.2**.

4.17.8 Sensitivity of the receptor

All areas

All receptors

4.17.8.1 The sensitivity of the IEFs is predicted to be the same as that discussed in **paragraphs 4.17.3.1** to **4.17.3.3,** which is **medium**.

4.17.9 Magnitude of impact

All areas

All receptors

4.17.9.1 The impact of habitat fragmentation and species isolation during the operation and maintenance phase is deemed to be similar to existing background levels of agricultural activities and daily traffic. Therefore, the magnitude of impact during operation and maintenance will be **no change**.

4.17.10 Significance of the effect

All areas

4.17.10.1 The significance of impact is summarised in **Table 4.38**. Due to the magnitude of impact on all IEFs at all locations being no change the significance of effect for all IEFs and for all assessment areas is predicted to be **no change**, which is not significant in EIA terms.

Table 4.38: Significance of effect during operation and maintenance phases of habitat fragmentation and species isolation on IEFs

Area	IEF group	Sensitivity of receptor	Magnitude of impact	Significance of effect
All areas	All receptors	Medium	No change	No change.

4.18 Provision of ecological mitigation and biodiversity benefit habitats

4.18.1.1 As detailed, several areas have been identified and included within the Onshore Order Limits to allow for ecological mitigation. Some are temporary and only in place during construction (CoT107 and CoT113). Whereas others are permanent measures that will also enhance the area for other ornithological receptors (CoT120).

4.18.1.2 These are areas identified as having potential for biodiversity benefit, including provision of opportunities for enhancement of habitats for birds.

4.18.1.3 An Onshore Biodiversity Benefit Statement (document reference J11) has been developed and submitted as part of the application to identify areas where biodiversity benefit are proposed. Details of these measures are provided within **sections 4.12**, **4.13**, **4.13.8**, **4.14.13** and **4.16**.

4.19 Future monitoring

4.19.1.1 Monitoring of the sites set aside for further mitigation will be needed to ascertain if they have been successful in providing adequate mitigatory effects upon the impacted IEFs.

4.19.1.2 Monitoring is recommended for the Fairhaven saltmarsh to see if there has been a reduction in human disturbance as a result of measures employed.

4.19.1.3 Pre-construction surveys will be undertaken prior to construction to provide a baseline for the proposed monitoring.

4.19.1.4 Monitoring of the number and frequency of the pink-footed goose and whooper swan at the Lytham Moss feeding area is recommended to ascertain if the measure is successful.

4.19.1.5 Long-term monitoring of the fields south of Newton with Scales is recommended to ascertain if the measures employed attract more breeding and non-breeding wildfowl and waders to the area.

4.19.1.6 An Ecological Management Plan has been developed in accordance with the Outline Ecological Management Plan (CoT76; document reference J6). The Ecological Management Plan includes details of the mitigation and any longer term management and monitoring measures in relation to onshore and intertidal ornithology. This includes the management of the described mitigation areas.

4.20 Cumulative effect assessment methodology

4.20.1 Introduction

4.20.1.1 The CEA takes into account the impact associated with the Transmission Assets together with other projects and plans. The projects and plans selected as relevant to the CEA presented within this chapter are based upon the results of a screening exercise (see Volume 1, Annex 5.5: Cumulative screening matrix and location plan of the ES). Each project and plan 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.

4.20.1.2 It must be noted that in keeping with the in-combination approach set out in the Information to Support Appropriate Assessment part 3: SPAs and Ramsar (document reference E2.3), the onshore and intertidal ornithology CEA only considers projects based upon the location of the impact, i.e., only projects with impacts landwards of MLWS are considered (for the assessment projects with offshore (below MLWS) impacts please refer to Volume 2, Chapter 5: Offshore ornithology, document reference F2.5).

4.20.1.3 The onshore and intertidal ornithology CEA methodology has followed the methodology set out in Volume 1, Chapter 5: Environmental assessment methodology of the ES. As part of the assessment, all projects and plans considered alongside the Transmission Assets have been allocated into 'tiers' reflecting their current stage within the planning and development process.

- Tier 1.
  - Under construction.
  - Permitted application
  - Submitted application.
  - Those currently operational that were not operational when baseline data were collected, and/or those that are operational but have an ongoing impact.
- Tier 2.
  - Scoping report has been submitted.
- Tier 3.
  - Scoping report has not been submitted.
  - Identified in the relevant Development Plan.

– Identified in other plans and programmes.

4.20.1.4 The Tier 1 assessment considers the Transmission Assets alongside those projects defined within Tier 1, unless otherwise stated. The Tier 2 assessment includes the Transmission Assets, the Generation Assets, Tier 1 and other Tier 2 projects unless otherwise stated. The Tier 3 assessment is based upon less definitive parameters due to the limited nature of the information available for projects of this Tier and is subject to qualitative assessment cumulatively with the Transmission Assets only.

4.20.1.5 This tiered approach is adopted to provide a clear assessment of the Transmission Assets alongside other projects, plans and activities.

4.20.1.6 All projects and plans within the Transmission Assets Order Limits, major developments within 10 km and wind turbine developments within 35 km were identified during the screening process. However, for the onshore and intertidal ornithology CEA, only projects which are contained within 1 km of the Onshore Order Limits and Intertidal Infrastructure Area and have a larger footprint than 0.5 hectares (ha) have been screened in due to a lack of cumulative impact risk at a greater distance.

4.20.1.7 Where the potential significant effect for the Transmission Assets alone is assessed as negligible, or where a potential impact is predicted to be highly localised, these have not generally been considered within the CEA as there is not considered to be a potential for cumulative effects with other plans, projects or activities.

4.20.1.8 Only those that involve building upon undisturbed land (greenfield) are considered to have the potential to result in significant effects, those plans which involve demolition of existing buildings to create the footprint for new development (brownfield) are not considered to impact upon cumulative habitat loss.

4.20.1.9 Any development less than 0.5 ha were excluded from the CEA due to their *de minimis* footprint and potential impact on onshore and intertidal ornithology together with the Transmission Assets. A total of 34 Tier 1 projects located within, or adjacent to, the Transmission Assets Order Limits have been reviewed and screened into this CEA. Thirteen of the plans, projects and activities are within the boundary of the landfall and onshore infrastructure area. The specific projects and plans screened into the onshore and intertidal ornithology CEA, are presented **section 4.21**.

4.20.1.10 The CEA methodology set out in Volume 1, Chapter 5: Environmental assessment methodology of the ES also considers CEA scenarios which consider the Transmission Assets together with the Generation Assets. These cumulative scenarios are: the Transmission Assets together with Morecambe Offshore Windfarm: Generation Assets only (scenario 1), Transmission Assets together with Morgan Offshore Wind Project: Generation Assets only (scenario 2) and Transmission Assets together with Morgan Offshore Wind Project: Generation Assets and Morecambe Offshore Windfarm: Generation Assets (scenario 3).

4.20.1.11 Onshore and intertidal ornithology has been scoped out of the assessment conducted for the Morecambe Generation Assets. This has been agreed in

the Scoping Opinion for Morecambe Offshore Windfarm (Generation Assets) (The Planning Inspectorate, 2022). Similarly, impacts on intertidal and onshore birds was also outside of the scope of the Morgan Offshore Wind Project: Generation Assets (RPS, 2024). Furthermore, due to the considerable difference in both the impacts associated with the Generation Assets on ornithological features (e.g. collision, displacement due to presence of turbines) and bird usage of offshore areas, compared to those associated with the Transmission Assets, there is no potential for the Generation Assets to contribute cumulatively to the impacts assessed within the CEA below. As such, Scenarios 1 to 3 are not considered further in this CEA.

Table 4.39: List of other projects, plans and activities considered within the CEA

ID no. (1)	Project/plan	Status	Distance from the Transmission Assets Order Limits (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Transmission Assets
Tier 1							
1	Residential development of 280 properties - Bloor Homes North West	Permitted	0.28	Up to 280 dwellings, with associated infrastructure and open space. Development to cover a total area of 14.5 ha.	Licensable/consent period 11 August 2022 to 11 August 2037	Not available	Construction and operation phases
3	Construction of crossroads at junction of Kilnhouse Lane, Queensway and the proposed Heyhouses Bypass - Rowland Homes Ltd	Under construction	0.25	In support of application 08/0058 (1,150 residential dwellings). This application seeks to provide an interim access arrangement, to allow further parcels of the Richmond Point site to be developed (beyond the current limit of 168 dwellings). This includes a signal-controlled pedestrian crossing and an interim access road. Area of this development is 1.58 ha.	Construction to have begun no later than three years from the date of permission. Decision notice dated 12 March 2021.	Not available	Construction and operation phases
4	Installation of a solar photovoltaic (PV) farm - Lightsource SPV 142	Under construction	0.37	Installation of solar panels and associated infrastructure, approximately 25-Megawatt peak (MWp). 40-year operating life, with a further six months to	Construction to have begun no later than three years from the date of permission. Decision	Not available	Construction and operation phases

[1] Refer to Volume 1, Annex 5.5: Cumulative effects screening matrix and location plan of the ES for full list of projects in the CEA.

ID no. (1)	Project/plan	Status	Distance from the Transmission Assets Order Limits (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Transmission Assets
	on behalf of Lightsource bp			allow for decommissioning and reinstatement. Development to cover an area of 75.4 ha.	notice dated 3 February 2023.		
6	Creation of sports pitches and open space - Blackpool Airport Enterprise Zone	Under construction	Within Order Limits	Blackpool Airport Enterprise Zone - formation of 12 natural grass sports pitched with a portion designated as public open space. The site area covers 11.5 ha.	Construction to have begun no later than three years from the date of permission. Decision notice dated 26 June 2020.	Not available	Construction and operation phases
8	Erection of 12 dwellings - Brooksland Ltd	Under construction	0.04	Erection of twelve dwellings, including three six-bed and nine five-bed dwellings. All are 2.5 storeys tall. Development to cover 4.8 ha.	Construction to have begun no later than three years from the date of permission. Decision notice dated 12 June 2020.	Not available	Construction and operation phases
10	Gas fired electricity generating facility (GFEGF) - Statera Energy Limited	Pending	0.05	Development of an energy facility comprising a gas fired electricity generation facility made up of 11 4.5 MW Gas Engine Casements with associated cooling fans, control buildings, switch gear, transformers, gas regulation compound, gas connection compound and a 132 kV substation, access, fencing, internal roads, attenuation tanks and other ancillary	Not available	Not available	Construction and operation phases

ID no. (1)	Project/plan	Status	Distance from the Transmission Assets Order Limits (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Transmission Assets
				infrastructure. Development to cover 1.2 ha.			
22	Outline planning for residential development of 155 properties - Gladman Developments	Pending	0.24	Outline application for up to 155 dwellings with open public space, sustainable drainage systems, vehicular access and landscaping. Indicative plans show houses up to 2.5 storeys high. Total site area is 6.84 ha of this approximately 4.37 ha will be developed.	Not available	Not available	Construction and operation phases
23	Outline application for business, industrial and storage warehouse uses - Blackpool Council	Under construction	Within Order Limits	An outline planning application for a mixed-use development including for business, industrial and warehousing, with all matters reserved. The application site covers 13 ha of land.	Construction to have begun no later than two years from the date of approval of the last of the reserved matters. Decision notice dated 4 August 2023.	Not available	Construction and operation phases
24	Development of 882 properties - Kensington Developments	Under construction	0.37	The development of 882 dwellings as a component of approved outline application for 1,150 dwellings, including temporary access. The area that the dwellings will cover is 24.7 ha.	Not available	Not available	Construction and operation phases
25, 165	Development of 66 properties - Kensington Developments	Under construction	0.07	The development of 66 dwellings as a component of approved outline application for	Construction to have begun no later than three years from the date of	Not available	Construction and operation phases

ID no. (1)	Project/plan	Status	Distance from the Transmission Assets Order Limits (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Transmission Assets
				1,150 dwellings, including temporary access. The site area is 64.8 ha.	approval of the last of the reserved matters. Decision notice dated 12 December 2017.		
33	Erection of one public house and associated infrastructure - Whyndyke	Permitted	0.05	Reserved matters application for one public house (matters of layout, scale, appearance, access and landscaping applied for), including access works, parking facilities and landscaping treatment, associated with the outline planning application ref: 11/0221 for the development of 1,400 residential properties, industrial units, road infrastructure, primary school, car parking, allotments, sports pitches and landscaping. Total area for whole project is 90.86 ha, area of public house and related landscaping, car park etc is 0.75 ha.	Construction of public house to have begun no later than two years from the date of approval of the last of the reserved matters. Decision notice dated 1 February 2023.	Not available	Construction and operation phases
101	Residential development of 28 affordable dwellings - Great Places Housing Association	Under construction	0.84	Erection of 22 affordable dwellings and six affordable apartments with associated car parking, landscaping and access from Bowden Lane. Site area is 0.6 ha.	Construction to have begun no later than three years from the date of approval of the last of the reserved matters.	Not available	Construction and operation phases

ID no. (1)	Project/plan	Status	Distance from the Transmission Assets Order Limits (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Transmission Assets
					Decision notice dated 25 June 2020.		
192	Outline application for a residential development of 52 dwellings - Rowland Homes Ltd	Under construction	0.71	Residential development of 52 dwellings and demolition of existing dwelling, stables and paddocks. Site area is 1.7 ha.	Construction to have begun no later than two years from the date of approval of the last of the reserved matters. Decision notice dated 7 December 2023.	Not available	Construction and operation phases
238	Application for approval of reserved matters for a residential development - Countryside Properties (UK) Ltd and Warton East Developments Ltd	Under construction	0.71	Application for 364 dwellings and associated works, comprising of two-, three- and four-bedroom houses all over two storeys. The site area is 0.7 ha.	Not available	Not available	Construction and operation phases
239	Amendment to planning application for site access associated with a residential development - Hallam Land Management	Under construction	0.97	Application for the layout, appearance, landscaping and scale of 96 residential dwellings and associated open space and infrastructure. Site area is 3.7 ha.	Not available	Not available	Construction and operation phases
240	Application for approval of reserved matters for a residential development and associated	Under construction	0.88	The development of approximately 160 residential dwellings and associated infrastructure. The site area is 4.6 ha.	Not available	Not available	Construction and operation phases

ID no. (1)	Project/plan	Status	Distance from the Transmission Assets Order Limits (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Transmission Assets
	infrastructure - Morris Homes Ltd						
298	Application for approval of reserved matters for a residential development and associated infrastructure and landscaping - Story Homes Ltd and Hollins Strategic Land	Under construction	0.32	A residential development of 170 units that will be a mix of one and five bed dwellings, all of which will be two storeys. The development will include extensive areas of open space. The site area is 12.9 ha.	Not available	Not available	Construction and operation phases
303	Outline application for residential development of 30 dwellings - Mr Robinson	Pending	0.21	Outline application for 30 residential dwellings, including 10 affordable homes. The site has been identified with emerging Fylde Local Plan to 2032: Revised. The site area is 1.2 ha.	Not available	Not available	Construction and operation phases
475	Application for alterations to existing sports facilities and erection of new structures - Preston North End Football Club	Permitted	0.62	Demolition of the existing single-storey southern extension to the sports hall and erection of a new two-storey building to the east of the sports hall and ancillary infrastructure. A new outdoor store and security hut is also included. Site area is 4.1 ha.	Construction to have begun no later than three years from the date of approval. Decision notice dated 14 May 2020.	Not available	Construction and operation phases

ID no. (1)	Project/plan	Status	Distance from the Transmission Assets Order Limits (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Transmission Assets
718	Erection of two two-storey buildings consisting of industrial/storage and office units and associated infrastructure - Mr Martin Crouch	Permitted	Within Order Limits	Development of two buildings comprising 16 units - each unit with a warehouse, staff room and supporting infrastructure. This includes access and car parking. Site area is 0.7 ha.	Construction to have begun no later than two years from the date of approval. Decision notice dated 6 September 2023.	Not available	Construction and operation phases
719	Outline planning application for commercial development and related infrastructure - Blackpool Council	Permitted	0.32	Phase one of the Blackpool Enterprise Zone comprising road infrastructure and highways improvement, new access road, café, retail unit, nursey and associated infrastructure. Site area is 13.6 ha.	Construction to have begun no later than two years from the date of approval of the last of the reserved matters. Decision notice dated 7 January 2023.	Not available	Construction and operation phases
783	Relocation of intermediate roundabout - Lancashire County Council	Permitted	0.50	Relocation of intermediate roundabout on the proposed Heyhouses to M55 Link Road and realignment of adjacent highways to tie in with highway alignment. Site area is 2.6 ha.	Construction to have begun no later than three years from the date of approval of the last of the reserved matters. Decision notice dated 25 June 2019	Not available	Construction and operation phases
784	Application for redesign and realignment of the southern end of the Heyhouses to M55 link	Permitted	0.70	The M55 Heyhouses Link Road will deliver a new 2.5 km single carriageway road between Lytham St Annes Way near Peel Hill and North Houses	Construction to have begun no later than three years from the date of approval of the last of the reserved matters.	Not available	Construction and operation phases

ID no. (1)	Project/plan	Status	Distance from the Transmission Assets Order Limits (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Transmission Assets
	road - Lancashire County Council			Lane to the north of St Annes. Includes construction compound and working area. Site area is 7.4 ha.	Decision notice dated 22 May 2019.		
810	Residential development of 41 properties and associated infrastructure - Breck	Pending	0.49	Erection of 41 dwellings with associated access off Ash Court, car parking, open space, landscaping and pumping station. Site area is 1.1 ha.	Not available	Not available	Construction and operation phases
812	Erection of a battery energy storage system - Energi Generation	Under construction	0.74	Erection of a 20 MW battery energy storage system facility consisting of 120 battery cabinets, a welfare/office building, security fencing, CCTV columns, access and internal roads, parking, landscaping and all other associated infrastructure. Site area is 0.6 ha.	Construction to have begun no later than three years from the date of approval of the last of the reserved matters. Decision notice dated 6 September 2023.	Not available	Construction and operation phases
820	Recreational centre at Phoenix Park – De Pol Associates	Permitted	0.02	Dry ski slope, mountain bike track, creation of leisure lake and siting of up to 13 lodges to be occupied by children in care (Class C2) together with associated development. Site area to cover 10.6 ha.	Construction to have begun no later than three years from the date of approval of the last of the reserved matters. Decision notice dated 17 August 2023.	Not available	Construction and operation phases
834	Screening opinion for proposed changes to	Pending	0.86	Proposed land reprofiling and landscaping, including drainage	Not available	Not available	Construction and operation phases

ID no. (1)	Project/plan	Status	Distance from the Transmission Assets Order Limits (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Transmission Assets
	golf course - Booth Ventures			engineering of the golf course at Lytham Green Drive Golf Club - formal request for Scoping Opinion. Site area covers 6.2 ha.			
879	Scoping opinion in respect of a 49.9MW solar farm - Natural Power Consultants Ltd	Pending	0.12	Proposed development comprises the construction and operation of a 49.9 MW solar farm and associated infrastructure, including solar PV modules, transformers, inverter units, a switch room, fencing and security measures, access tracks, onsite and offsite cabling, landscaping and habitat enhancement. The site area covers 69.7 ha.	Not available	Not available	Construction and operation phases
882	Hybrid planning application relating to the infrastructure associated with the Enterprise Zone - Blackpool Council	Pending	Within Order Limits	Highways improvement works and drainage works, construction of new access roads and an outline planning application for the construction of 5 hangars, a commercial unit and car park alongside associated infrastructure. The site area is 3.6 ha.	Not available	Not available	Construction and operation phases
883	Outline planning application for the erection of a residential	Pending	0.99	Proposed demolition of existing buildings and structures and the subsequent erection of a	Not available	Not available	Construction and operation phases

ID no. (1)	Project/plan	Status	Distance from the Transmission Assets Order Limits (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Transmission Assets
	care home and associated infrastructure - Muller Property Group			residential care home with up to 76 rooms (use Class C2) and associated infrastructure to include a sub-station, vehicular access, car parking, servicing and other associated works. The site area is 0.80.			
914	Variation of condition two of a planning application for a battery storage facility - Penwortham Storage Limited	Under construction	0.02	Development of a 49.99 MW battery storage facility with associated infrastructure and landscaping. The site area is 1.5 ha.	Construction to have begun no later than three years from the date of approval of the last of the reserved matters. Decision notice dated 14 July) 2021.	Not available	Construction and operation phases
926	Formation of new access onto North Houses Lane and construction of connecting road to Richmond Point Development - Rowland Homes	Pending	0.77	Formation of a new access between North Houses Lane and the construction of a connecting road between the new access and the Richmond Point Development, to include associated highway reconfiguration works and supporting infrastructure and landscaping. Site area is 1.63 ha.	Not available	Not available	Construction and operational phases
948	Scoping opinion in respect of a 49.9 MW solar farm - Bluefield	Permitted	Within Order Limits	Solar farm battery energy storage scheme and associated	Not available	Not available	Construction and operational phases

ID no. (1)	Project/plan	Status	Distance from the Transmission Assets Order Limits (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Transmission Assets
	Renewable Developments Ltd			development and infrastructure. Site area is 32 ha.			

4.20.2 Scope of cumulative effects assessment

4.20.2.1 The projects identified in **Table 4.42** have been selected as those having the potential to result in the greatest cumulative effect on an identified receptor or receptor group. The cumulative effects presented and assessed in this section have been based on the Project Design Envelope set out in Volume 1, Chapter 3: Project description of the ES as well as the information available on other projects and plans.

4.20.2.2 Having reviewed the documentation from the planning applications, few of the projects have included an assessment of the following impact pathways. Therefore, in accordance with Volume 1, Chapter 5: Environmental Assessment methodology of the ES, a CEA has not been carried out on the following impacts due to a lack of data availability which would therefore call into question the validity of any CEA conducted:

- habitat fragmentation and species isolation;
- the impact of pollution caused by accidental spills and/or contaminant release; and
- spreading INNS.

4.20.2.3 It is important to note that the embedded mitigation identified for the Transmission Assets as set out in **Table 4.19** would be expected to be required, as appropriate, for the Tier 1 projects or plans as part of the permissions process. This would be likely to include pollution control and INNS management measures submitted with the relevant applications.

4.20.2.4 The impacts of permanent loss of supporting habitats, temporary loss of supporting habitats and/or resource availability and disturbance and displacement from construction, decommissioning, and operation and maintenance activities are assessed within this CEA.

Table 4.40: Scope of assessment of cumulative effects

Cumulative effect	Phase[a]			Project(s) considered	Justification
	C	O	D		
The impact of permanent loss of supporting habitats.	✓	x	✓	MDS as described for the Transmission Assets (**Table 4.20**) assessed cumulatively with all 34 Tier 1 projects within **Table 4.39.** **Tier 1** • Assumed that construction works to occur concurrently with the Transmission Assets. • The magnitude of operation and maintenance phase impacts will be significantly smaller than for the construction phase impacts, except for at the Intertidal Infrastructure Area where impacts are predicted to be of equal or lower magnitude. • The magnitude of decommissioning phase impacts will be no greater than for the construction phase impacts.	Outcome of the CEA will be greatest when the greatest number of other plans are considered. Only Tier 1 schemes within 1 km of the Onshore Order Limits and Intertidal Infrastructure Area that involve building upon undisturbed land are considered to have the potential to result in significant effects, those plans which involve demolition of existing buildings to create the footprint for new development are not considered to impact upon cumulative habitat loss. For the CEA it is assumed that: • baseline conditions will be shared for all projects; and • outcome of the CEA will be greatest when projects are constructed concurrently.
The impact of temporary loss of supporting habitat and/or resource availability.	✓	x	✓		Activities associated with the operation and maintenance of the onshore elements of the Transmission Assets would require no additional land take and are unlikely to result in any temporary or permanent loss of habitat. Therefore, this potential impact is unlikely to result in significant effects and has been scoped out of the cumulative assessment for this phase.
Disturbance and displacement from construction, decommissioning, and operation and maintenance activities.	✓	✓	✓		Outcome of the CEA will be greatest when the greatest number of other plans are considered. All Tier 1 plans within 1 km of the onshore infrastructure area are considered as disturbance travels beyond the source point and is dependent upon the IEFs involved. For the CEA it is assumed that: • baseline conditions will be shared for all projects; and • outcome of the CEA will be greatest when projects are constructed concurrently.

[a] C=construction, O=operation and maintenance, D=decommissioning

4.21 Cumulative effects assessment

4.21.1 Introduction

4.21.1.1 A description of the significance of cumulative effects upon onshore and intertidal ornithology receptors arising from each identified impact is given below.

4.21.1.2 Based on professional experience of other projects, the application of a 1 km buffer distance is considered to be compliant with best practice measures and industry standards. As such, this has been adopted for the Transmission Assets CEA. A description of the significance of cumulative effects upon onshore and intertidal ornithological receptors arising from each identified impact is given below.

4.21.1.3 A total of 34 Tier 1 projects or plans have been identified as having potential cumulative impact pathways with the Transmission Assets. These include several new housing developments (up to 1,988 new properties) to smaller scale industrial unit developments on brownfield land. The CEA focuses on development of greenfield sites as a larger potential impact to onshore and intertidal ornithology is predicted to occur via these developments.

4.21.1.4 No Tier 2 or Tier 3 projects were identified during the screening exercise.

4.21.1.5 One project is proposed to have a potential cumulative impact in the estuarine survey area (Recreational Centre at Phoenix Park by De Pol Associates).

4.21.1.6 No information relating to ornithology was available for the following projects listed within **Table 4.39**: project 1, project 10, project 33, project 240, project 298, project 718, project 897, and project 914. However a precautionary assessment can be made with the assumption that the site footprint of each project will result in that degree of habitat loss. All of these projects have been included for cumulative assessment on the basis that bird species cannot be excluded from impact on a review of the available desktop data sources.

4.21.1.7 All the other onshore projects within **Table 4.39** have been included within the CEA on the basis of specific assessments made in the regard of ornithological receptors.

4.22 The impact of permanent loss of supporting habitats

4.22.1 Construction and decommissioning

Key receptors for assessment

Coastal survey area

4.22.1.1 There is not anticipated to be any permanent habitat loss at the coastal survey area from Transmission Assets, therefore no cumulative assessment is required.

Estuarine survey area

4.22.1.2 There is not anticipated to be any permanent habitat loss at the estuarine survey area from Transmission Assets, therefore no cumulative assessment is required.

Onshore substation sites

4.22.1.3 The receptors taken forward for assessment of permanent loss of supporting habitats are those listed in **Table 4.24** and outlined in **section 4.12.2**.

Result of the impact upon all onshore substation IEFs

4.22.1.4 Permanent habitat loss may force birds into a smaller area and lead to an increase in intra/inter-specific competition due to a higher density of individuals competing for the same resource (e.g., foraging ground or nesting sites) may have an impact on bird fitness (i.e., survival) and lead to localised decline in breeding and non-breeding birds.

Onshore survey area

4.22.1.5 There is not anticipated to be any permanent habitat loss within the temporary works area from Transmission Assets, therefore no cumulative assessment is required.

4.22.2 Available data from other projects and plans

4.22.2.1 The construction and decommissioning phases of the Transmission Assets will result in the permanent loss of habitat which supports IEFs across the onshore substation sites. The MDS of the Transmission Assets alone is represented by the maximum surface area of habitat lost and is summarised in **Table 4.20**. These impacts have the potential to be greater when viewed cumulatively with the potential impacts from the other projects and plans identified, as outlined in **Table 4.39**.

4.22.2.2 Although the Transmission Assets will result in a permanent loss of habitat within the onshore substation sites only, all projects and plans within 1 km of the Transmission Assets Order Limits have been included within this CEA to assess the maximum potential for cumulative impact to occur.

4.22.2.3 The known maximum total of potential habitat loss from the identified projects and plans is approximately 391.53 ha if all are built to cover the entire proposed footprint. There is a total of 6.6 ha across three projects that involve demolition of existing buildings and construction in the same footprint that is not considered to represent new permanent habitat loss (projects 192, 475, and 883 within **Table 4.39**). There is a known 13.22 ha for projects that involve changes to the road network which overlap with the existing layout, this has been included within the potential permanent habitat loss.

4.22.2.4 Of those projects that have not provided detail of an impact assessment on birds, a maximum permanent habitat loss of 36.14 ha could occur. This area has been included within the maximum potential permanent habitat loss of 391.53 ha.

4.22.2.5 The total potential area for these projects and plans includes permitted projects, under construction projects and pending applications. Therefore, the total habitat loss may not equal this figure in real terms. Where any project listed within **Table 4.39** has a quoted site area of 'less than 1 ha', an area of 1 ha was used as a worst-case scenario for calculating maximum potential habitat loss.

4.22.2.6 When viewed cumulatively with the Transmission Assets, the total area of permanent habitat loss is 413.88 ha. Permanent habitat loss associated with the Transmission Assets is 22.35 ha which accounts for 5.40 % of this total.

4.22.2.7 All Tier 1 projects, excluding those projects involving the demolition of existing buildings, are considered to represent a permanent habitat loss due to the nature of the plans/projects.

4.22.3 Sensitivity of the receptors

Onshore substation sites

4.22.3.1 The sensitivity of the IEFs is the same as that outlined in **section 4.12.3**.

4.22.4 Magnitude of impact

4.22.4.1 For the assessment of the potential impact of permanent loss of supporting habitat for the Transmission Assets alone the construction and decommissioning phases were identified as potentially leading to the displacement of IEFs from the impacted substation area.

4.22.4.2 Projects 3, 24, 25 and 165, 783, 784 and 926 as listed within **Table 4.39** are all related to the same overall project known as Richmond Point, formerly known as the Queensway housing development to the east of the B5261 at Lytham St Annes. As such, these projects all fall under the same shadow HRA (The Environment Partnership, 2021). This shadow HRA identified the loss of habitat within FLL at Lytham Moss as an LSE, in particular this LSE was assessed in relation to non-breeding goose, swan and wader species with qualifying SPA populations. It was deemed that the construction phase of this project presented a likely significant adverse effect of medium magnitude on these populations without any mitigation in place. However, as this project is now under construction with mitigation in place, it is deemed that the magnitude of impact is **negligible**.

4.22.4.3 The Information to Inform an HRA document (Avian Ecology, 2021) for project 4 within **Table 4.39** the installation of a 25 MWp solar farm, considered the loss of habitat within the site as a potential impact on SPA populations. However, following assessment this potential impact was **screened out**. This same conclusion of **no adverse effects** from habitat loss within the site was also recorded within the shadow appropriate assessment conducted for project 22 within **Table 4.39**, an application to develop 155 properties (CSA Environmental, 2020).

4.22.4.4 Consultation of the ISAA (Wardell Armstrong, 2021) for project 23 within **Table 4.39** indicated that the loss of habitat within FLL was considered as a potential impact on SPA populations. Surveys conducted on behalf of this

project indicated that the FLL contained within the site did not contribute to the resource significantly. It was therefore concluded that habitat loss within the FLL: Projects 719 and 882 within **Table 4.39** are also considered under this ISAA.

4.22.4.5 Project 192 within **Table 4.39** involves the demolition of existing structures and development of 52 dwellings on the resulting land did not screen habitat loss into the shadow HRA conducted for the project (Envirotech, 2021). Therefore, habitat loss is **not expected to present a significant adverse effect**.

4.22.4.6 The shadow HRA (United Environmental Services Ltd, 2023) for project 810 within **Table 4.39** indicates that habitat loss was not a consideration for this project. Therefore, habitat loss is **not expected to present a significant adverse effect**.

4.22.4.7 Project 820 within **Table 4.39** is anticipated to have the potential for a cumulative impact at the estuarine survey area with Transmission Assets. However, through consultation of the shadow HRA (ERAP, 2023) it was identified that habitat loss is **not a potential impact** of this project.

4.22.4.8 Consultation of the HRA screening report prepared for project 883 within **Table 4.39**, an outline application for a residential care home, highlighted that no LSE were screened in for further consideration (Arbtech Consulting Limited, 2023). Therefore, habitat loss is **not expected to present a significant adverse effect**.

4.22.4.9 The following projects within **Table 4.39** have not got HRA or EIA related documents available, or have not had such assessments conducted, however ecological surveys and reports in support of these projects indicate that the sites may have value to ornithological receptors.

- Project 6 - Development of Blackpool Airport Enterprise Zone to include outdoor open space and sports pitches.
- Project 8 - Development of 12 homes.
- Project 50 - Change of land use to create woodland and memorial burial ground.
- Project 101 - Residential development of 28 affordable homes and associated infrastructure.
- Project 238 - Application for approval of reserved matters in relation to development of 364 homes.
- Project 239 - Amendment to an application to develop 96 dwellings, open space and associated infrastructure.
- Project 303 - Outline application for the development of 30 houses.
- Project 475 - Application to alter existing sports facilities, including the demolition of an existing structure.
- Project 879 - Scoping opinion in respect of a solar farm development and associated infrastructure.

- Project 948 - Scoping opinion in respect of a solar farm and associated infrastructure.

4.22.4.10 Of these projects, breeding passerines were identified within woodland for project 50 and within hedgerows for project 238. Analysis of application documents for projects 6, 8, 101, 239, 303, 475 and 879 indicated suitable nesting habitat for breeding birds in hedgerows with some limited ground nesting opportunities, this included oystercatcher and lapwing territories for project 879. The consultation process carried out for project 948 indicated that wintering birds may be vulnerable to impact from the proposed development.

4.22.4.11 Plans for project 6, the development of sports pitches and outdoor space as part of the Blackpool Enterprise Project, indicate that the hedgerows with potential value for breeding birds are to be retained. It is therefore anticipated that **no change** will be observed in relation to breeding birds.

4.22.4.12 Plans for project 8, the development of 12 dwellings, indicate that the habitats onsite do not hold any value to ornithological receptors except for hedgerows. These hedgerows will be retained, it is therefore anticipated that **no change** will be observed regarding breeding birds.

4.22.4.13 A review of the planning and design documents available for project 50 do not specify if any habitat is to be retained. The site baseline shows suitable nesting habitat for breeding birds, with breeding attempts confirmed. Due to the nature of the proposed project, it is expected that nesting opportunities will be enhanced through the planting of trees and hedgerows. Therefore, it is anticipated that the magnitude of change will be **negligible** at a worst-case scenario that would include initial vegetation clearance.

4.22.4.14 The site location of project 101 within **Table 4.39** is a brownfield site. The redevelopment proposals include a landscape plan indicating the inclusion of several new trees and hedgerow areas. Therefore, it is anticipated that the magnitude of change will be **negligible**.

4.22.4.15 A review of the documents presented to support project 238 within **Table 4.39** indicates that several common passerine species were confirmed to be breeding within the site, this included BOCC5 UK red listed species. Landscape plans for this project indicate the inclusion of several bird boxes, trees and hedgerows to replace those lost during the construction phase. Therefore, it is anticipated that the magnitude of change will be **negligible**.

4.22.4.16 Plans for project 239 within **Table 4.39**, a non-material amendment to a planning application to develop 96 dwellings, indicate that ecological features within the site, including those hedgerows that may support breeding birds, are to largely be retained. These features will also be supplemented by additional planting during construction. Therefore, it is anticipated that the magnitude of change will be **negligible**.

4.22.4.17 The site location plan indicates that the development of project 303 within **Table 4.39** will include the planting of several trees across the area. These trees will replace the lost habitats that have potential to support breeding birds lost during construction. Additionally, it was deemed unlikely that the site would support any ground nesting or wintering birds. The development

will also be supplemented by additional planting during construction. Therefore, it is anticipated that the magnitude of change will be **negligible**.

4.22.4.18 Project 475 within **Table 4.39** involves the demolition and redevelopment of existing buildings. The proposed development plans indicate that those hedgerows and trees assessed as holding some limited value for breeding and foraging birds will be retained. Therefore, it is anticipated that **no change** will be observed regarding breeding birds.

4.22.4.19 A consultation of the proposed plans for project 853 within **Table 4.39** indicate that one existing pine tree will be removed, and additional trees will be planted on site. It is also indicated that existing hedgerows will be retained. It is therefore anticipated that this proposal to demolition an existing structure and redevelop the site will result in a **negligible** magnitude of change.

4.22.4.20 The screening opinion for project 879 within **Table 4.39** indicates that a HRA may be required for the development of a solar farm. Any development would likely result in the loss of breeding territories for skylark, lapwing and oystercatcher. As no plans are presented at this stage it is not possible to assess the potential magnitude however from the findings of the initial bird survey reports there is the likelihood of adverse impacts from this project.

4.22.4.21 The following projects have not got HRA or EIA related documents available, or have not had such assessments conducted, however ecological surveys and reports in support of these projects indicate that the sites have no or negligible value to ornithological receptors.

- Project 812 - Erection of a battery storage system.
- Project 834 - Screening opinion for proposed changes to Lytham Green Drive Golf Course.

4.22.4.22 The Preliminary Ecological Appraisal (PEA) produced in support of project 812 indicates the site is of **negligible** value to bird species, however no specific bird survey work is known to have been conducted prior to construction beginning (RSK ADAS Ltd, 2023). The scoping response from Lancashire County Council indicted that **no adverse effects** on SPA features was anticipated from this proposal (Lancashire County Council, 2023).

4.22.4.23 Those projects listed within **paragraph 4.21.1.6** that have not presented any information in relation to the potential impact on birds present a combined potential permanent habitat loss of 36.14 ha. Individually, these projects are not located within areas of high value habitat to bird species. The sites are located within areas likely to experience high levels of disturbance from nearby traffic or other human activity. It is therefore considered that at a worst-case scenario the cumulative permanent habitat loss presents a **negligible** magnitude of change.

4.22.5 Significance of effect

4.22.5.1 The overall magnitude of the cumulative impact is low, and the sensitivity of the receptors is high. The conclusion of a low cumulative magnitude of impact has been made on a precautionary basis. The largest individual magnitude of impact from the identified projects is negligible. However, when

viewed together, a maximum potential permanent habitat loss of 413.88 ha presents a substantial potential loss of habitat resource. As per the assessment matrix set out in **Table 4.23**, the cumulative effect will, therefore, be of a **minor adverse** effect. A minor adverse effect was considered applicable here rather than a moderate adverse effect due to the low value the loss of habitat presents to bird species compared to the available habitat across the onshore and intertidal ornithology survey area that will not be lost.

4.23 The impact of temporary loss of supporting habitats and/or resource availability

4.23.1 Construction and decommissioning

Key receptors for assessment

All areas

All receptors

4.23.1.1 The IEFs taken forward for cumulative assessment are the same as those in **Table 4.24** and outlined in **section 4.13.2**.

4.23.2 Available data from other projects and plans

4.23.2.1 The construction and decommissioning phases of the Transmission Assets may result in the temporary loss of habitat and/or resource availability which may support IEFs across the coastal survey area, onshore survey area, onshore substation sites and FLL at Lytham Moss. The MDS of the Transmission Assets alone is represented by the maximum surface area of temporary habitat lost and is summarised in **Table 4.20**. These impacts have the potential to be greater when viewed cumulatively with the potential impacts from the other projects and plans identified, as outlined in **Table 4.39**.

4.23.2.2 The maximum area of temporary loss of habitat and/or resource availability from Transmission Assets within the Onshore Infrastructure Area is 4,655,995 m^2 (calculated in GIS as the area of the Onshore Infrastructure Area). The maximum area of temporary loss of habitat and/or resource availability at the landfall is 474,640 m^2. This combined equates to 5,130,635 m^2, although this likely includes some overlap on the upper beach at the landfall. The temporary loss of supporting habitats and/or resource availability is not predicted to occur throughout the entire area at any one time, with works likely staggered along the route.

4.23.2.3 Although Transmission Assets will result in a temporary loss of supporting habitat and/or available resources within the coastal survey area, onshore survey area and onshore substation sites only, all projects and plans within 1 km of the Transmission Assets Order Limits have been included within this CEA to assess the maximum potential for cumulative impact to occur.

4.23.2.4 As shown in **Table 4.39**, there is the potential for all project and plans identified to overlap with both the construction and operational phases of

Transmission Assets. Only the construction and decommissioning phase of Transmission Assets will result in temporary habitat loss of habitat and/or resources within the Onshore Infrastructure Area, however there are predicted to be operation and maintenance impacts within the Intertidal Infrastructure Area. As an exact end date for these other projects and plans is unavailable, the maximum known habitat loss and impact, as quoted within **section 4.22** has been used within this CEA in conjunction with the potential impact from Transmission Assets.

4.23.3 Sensitivity of all receptors

All areas

All receptors

4.23.3.1 The sensitivity of the receptors is the same as that outlined in **section 4.13.3**.

4.23.4 Magnitude of impact

4.23.4.1 The potential impact of temporary loss of supporting habitat was not assessed for any of the projects identified in **Table 4.39** as this has been assessed under the impact from permanent habitat loss, and there are no other infrastructure projects with a large temporary footprint but a small permanent one. For those projects that have not conducted an impact assessment, the planning documents were reviewed in order to understand the potential for impact from temporary loss of habitat. In all cases the impact of temporary loss of supporting habitat and/or resource availability was superseded by the impact of permanent habitat loss. Therefore, the maximum magnitude from the impact of temporary loss of supporting habitat and/or resource availability was **negligible**.

4.23.5 Significance of effect

4.23.5.1 The overall magnitude of the cumulative impact is negligible, and the sensitivity of the receptors is high. As per the assessment matrix set out in **Table 4.23**, the cumulative effect will, therefore, be of a **minor adverse** effect.

4.23.6 Operation and maintenance

4.23.6.1 Although temporary loss of supporting habitat and/or resource availability is not predicted to impact the Onshore Infrastructure Area, there will be minor operational impacts of cable repair and reburial at the Intertidal Infrastructure Area (see **section 4.13.8**). However, there are no additional operational projects that will impact the ornithological receptors in this area. Therefore, the operation and maintenance impacts of temporary loss of supporting habitat and/or resource availability is not considered further in this CEA.

4.24 Disturbance and displacement from construction, decommissioning, and operation and maintenance activities

4.24.1 Construction and decommissioning phases

4.24.2 Key receptors for assessment

4.24.2.1 The IEFs taken forward for cumulative assessment are the same as those in **Table 4.24** and outlined in **section 4.14.2**.

4.24.3 Available data from other project and plans

4.24.3.1 The following projects as listed in **Table 4.39** assessed the potential impact of disturbance on ornithological receptors from the proposals: project 4, the installation of a solar farm, project 22, the development of 155 properties, projects 24, 25 and 165, 783 and 926, the Richmond Point development, project 192, the development of 52 dwellings, project 23 and 719, the Blackpool Enterprise Zone development, project 810, the development of 41 properties, project 820, the development of a recreational centre at Phoenix Park and project 883, the demolition of existing structures and construction of a care home. All these projects determined that there would be no significant impact from the proposals.

4.24.3.2 The Richmond Point development identified the potential for disturbance to impact a total of 47.5 ha of land at Lytham Moss that is frequented by SPA and Ramsar site qualifying species. This represents a total of 10.6% of the area used to record SPA birds on Lytham Moss (450 ha total). This area of impact was determined through using Natural England's advice to the project on disturbance zones with 200 m from any construction activity considered vulnerable to disturbance. This disturbance would be experienced during the construction and operational phases of the development. Prior to considering any mitigation measures implemented, it was concluded that this project alone and in-combination would result in a significant effect on SPA qualifying features from activities related to the construction and operational phases.

4.24.3.3 However, construction phase disturbance was concluded to be avoidable through the adoption of planning consents already in place for separate aspects of the housing development and the M55 link road close by.

4.24.3.4 The operational phase disturbance was calculated as likely to have a significant effect on the SPA populations of Whooper swan and pink-footed goose but was not expected to be significant for black-tailed godwit or Bewick's swan.

4.24.3.5 Through the implementation of mitigation measures, including the creation of the Farmland Conservation Area, it was ascertained that the project alone, and in combination would not have a significant adverse effect.

4.24.4 Sensitivity of all receptors

All areas

All receptors

4.24.4.1 The sensitivity of the receptors is the same as that outlined in **section 4.14.3**.

4.24.5 Magnitude of impact

4.24.5.1 Although it may take place over a wider area, the impacts of disturbance from the combined projects will be staggered temporally and spread sporadically over a wide area. In addition, as the impacts will be temporary, they will be of a lesser magnitude than the permanent loss of habitats that will be caused by these projects. Therefore, any disturbance impact form all of the other projects identified **Table 4.39** would result in an equal or lower impact than the permanent loss of habitat and, the maximum magnitude of impact across all identified projects and plans is therefore **negligible**.

4.24.6 Significance of effect

4.24.6.1 The overall magnitude of the cumulative impact from all identified projects and plans is negligible and the sensitivity of receptors is high. As per the assessment matrix set out in **Table 4.23**, the cumulative effect will, therefore, be of a **minor adverse** effect.

4.24.7 Operation and maintenance phase

4.24.8 Significance of effect

4.24.8.1 Although disturbance and displacement from construction, decommissioning, and operation and maintenance activities is not predicted to impact the Onshore Infrastructure Area, there will be minor operational impacts of cable repair and reburial at the Intertidal Infrastructure Area (see **section 4.14.8**). However, there are no additional operational projects that will impact the ornithological receptors in this area. Therefore, the operation and maintenance impacts of temporary loss of supporting habitat and/or resource availability is not considered further in this CEA.

4.25 Transboundary effects

4.25.1.1 The onshore elements of the Transmission Assets have the potential to affect the qualifying features of designated sites through short-term disturbance during construction, operation and maintenance activities and decommissioning. However, due to the distance between the Transmission Assets Order Limits and Natura 2000 sites located outside the UK, it is not considered feasible that migratory birds directly associated with Natura 2000 sites in other states would be disturbed or suffer from loss of foraging or resting opportunities in any way that would be likely to result in significant effects on those Natura 2000 sites. Therefore, there is no potential for significant transboundary effects relating to onshore and intertidal ornithology from the Transmission Assets upon the interests of other states.

4.25.1.2 A screening of transboundary impacts has been carried out and has identified that there was no potential for significant transboundary effects in relation to onshore and intertidal ornithology from the Transmission Assets upon the interests of other states. The potential transboundary impacts are assessed within Volume 1, Annex 5.4: Transboundary screening of the ES.

4.26 Inter-related effects

4.26.1.1 Inter-relationships are the impacts and associated effects of different aspects of the Transmission Assets on the same receptor. These are as follows.

- Project lifetime effects: Assessment of the scope for effects that occur throughout more than one phase of the Transmission Assets (construction, operation and maintenance and decommissioning), to interact to potentially create a more significant effect on a receptor than if just assessed in isolation.
- Receptor led effects: Assessment of the scope for all effects (including inter-relationships between environmental topics) to interact, spatially and temporally, to create inter-related effects on a receptor.

4.26.1.2 This chapter assesses the significance of effects on onshore and intertidal ornithology. This includes consideration of the potential for permanent loss of supporting habitat, temporary loss of supporting habitats and/or resource availability, Disturbance and displacement from construction, decommissioning, and operation and maintenance activities, pollution caused by accidental spills and/or contaminant release, the spreading of INNS and habitat fragmentation and species isolation based on the findings of the following chapters.

- Volume 2, Chapter 5: Offshore ornithology of the ES.
- Volume 3, Chapter 1: Geology, hydrogeology and ground conditions of the ES.
- Volume 3, Chapter 2: Hydrology and flood risk of the ES.
- Volume 3, Chapter 3: Onshore ecology and nature conservation of the ES.

- Volume 3, Chapter 6: Land use and recreation of the ES.
- Volume 3, Chapter 8: Noise and vibration of the ES.
- Volume 3, Chapter 9: Air quality of the ES.

4.26.1.3 Effects associated with offshore ornithology are assessed within Volume 2, Chapter 5: Offshore ornithology of the ES. Effects associated with groundwater and contamination are assessed within Volume 3, Chapter 1: Geology, hydrogeology and ground conditions of the ES. Effects associated with drainage and water quality are assessed within Volume 3, Chapter 2: Hydrology and flood risk of the ES. Effects on agricultural land use are assessed in Volume 3, Chapter 6: Land use and recreation of the ES. The generation of construction dust is assessed in Volume 3, Chapter 9: Air quality of the ES and of noise emissions in Volume 3, Chapter 8: Noise and vibration of the ES.

4.26.1.4 A description of the likely interactive effects arising from the Transmission Assets on onshore and intertidal ornithology is provided in Volume 4, Chapter 3: Inter-relationships of the ES.

4.27 Summary of impacts, mitigation measures and monitoring

4.27.1.1 Information on onshore and intertidal ornithology within the study area was collected through review of available literature, other assessments, UK statutory guidance, detailed analysis of data gathered during site-specific surveys and consultation with relevant stakeholders.

4.27.1.2 **Table 4.41** presents a summary of the impacts, measures adopted as part of the Transmission Assets and residual effects in respect to onshore and intertidal ornithology. The impacts assessed include the following.

- Effects due to permanent loss of supporting habitats associated with construction and decommissioning activities.
- Effects due to temporary loss of supporting habitat and/or resource availability associated with construction, operation and maintenance and decommissioning activities.
- Effects due to disturbance and displacement due to construction, operation and maintenance, and decommissioning activities associated with the construction, operation and maintenance and decommissioning phases.
- Effects due to pollution caused by accidental spills and/or contaminant release associated with construction and decommissioning activities.
- Effects due to the spreading of INNS associated with construction, operation and maintenance and decommissioning activities.
- Effects due to habitat fragmentation and species isolation associated with construction and decommissioning activities.

4.27.1.3 Overall, it is concluded that there is no residual potential for significant effects arising.

4.27.1.4 **Table 4.42** presents a summary of the potential cumulative impacts, mitigation measures and residual effects. The cumulative impacts assessed include the following.

- Effects due to permanent loss of supporting habitats associated with construction and decommissioning activities.
- Effects due to temporary loss of supporting habitat and/or resource availability associated with construction and decommissioning activities.
- Effects due to disturbance and displacement due to construction and decommissioning activities associated with construction, operation and maintenance and decommissioning activities.

4.27.1.5 Overall, it is concluded that there will be no significant cumulative effects from the Transmission Assets alongside other projects and plans.

4.27.1.6 No potential transboundary impacts have been identified regarding the effects of the Transmission Assets.

Table 4.41: Summary of environmental effects, mitigation and monitoring

Description of impact	Phase[a]			Commitment number	Assessment area	IEF	Sensitivity of the receptor (phase)	Magnitude of impact (phase)	Significance of effect (phase)	Further mitigation	Residual effect (phase)	Proposed monitoring
	C	O	D									
The impact of permanent loss of supporting habitats	✓	×	✓	CoT12, CoT14	Permanent onshore substations area	Breeding geese, ducks and swans	High (C and D)	Negligible (C and D)	Minor adverse (C and D)	None required	**Minor adverse** (C and D)	None required
						Non-breeding geese, ducks and swans	High (C and D)	Negligible (C and D)	Minor adverse (C and D)		**Minor adverse** (C and D)	
						Breeding waders	High (C and D)	Negligible (C and D)	Minor adverse (C and D)		**Minor adverse** (C and D)	
						Non-breeding waders	High (C and D)	Low (C and D)	Moderate adverse (C and D)	CoT120 Wet pasture at Newton with Scales	**Minor adverse** (C and D)	Long-term monitoring of the fields south of Newton with Scales is recommended to ascertain if the measures employed attract more non-breeding waders to the area.

Description of impact	Phase[a]			Commitment number	Assessment area	IEF	Sensitivity of the receptor (phase)	Magnitude of impact (phase)	Significance of effect (phase)	Further mitigation	Residual effect (phase)	Proposed monitoring
	C	O	D									
						Non-breeding gulls	High (C and D)	Negligible (C and D)	Minor adverse (C and D)	None required	**Minor adverse** (C and D)	None required
						Non-breeding herons	High (C and D)	Negligible (C and D)	Minor adverse (C and D)		**Minor adverse** (C and D)	
						Non-breeding cormorants	High (C and D)	No change (C and D)	No change (C and D)		**No change (C and D)**	
						Breeding raptors	High (C and D)	Negligible (C and D)	Minor adverse (C and D)		**Minor adverse** (C and D)	
						Non-breeding raptors	High (C and D)	Negligible (C and D)	Minor adverse (C and D)		**Minor adverse** (C and D)	
						Breeding passerines	Medium (C and D)	Negligible (C and D)	Negligible (C and D)		**Negligible (C and D)**	
						Non-breeding passerines	Medium (C and D)	Negligible (C and D)	Negligible (C and D)		**Negligible (C and D)**	
					All other areas	This impact is not predicted to affect any of the other areas. Therefore, there will be **no change**.						
The impact of temporary loss of supporting habitat and/or	✓	✓	✓	CoT02, CoT03, CoT12, CoT14, CoT44,	Coastal survey area	Non-breeding geese, ducks and swans	High (C, O, and D)	Negligible (C, O, and D)	Minor adverse (C, O, and D)	None required	**Minor adverse (C, O, and D)**	None required

Description of impact	Phase[a]			Commitment number	Assessment area	IEF	Sensitivity of the receptor (phase)	Magnitude of impact (phase)	Significance of effect (phase)	Further mitigation	Residual effect (phase)	Proposed monitoring
	C	O	D									
resource availability				CoT90, CoT36		Non-breeding grebes	High (C, O, and D)	Negligible (C, O, and D)	Minor adverse (C, O, and D)		**Minor adverse (C, O, and D)**	
						Non-breeding waders	High (C, O, and D)	Low (C, O, and D)	Moderate adverse (C, O, and D)	CoT113 Fairhaven saltmarsh	**Minor adverse (C, O, and D)**	Monitoring is recommended for the Fairhaven saltmarsh to see if there has been a reduction in human disturbance as a result of measures employed (baseline surveys are currently taking place).
						Non-breeding gulls and terns	High (C, O, and D)	Negligible (C, O, and D)	Minor adverse (C, O, and D)	None required	**Minor adverse (C, O, and D)**	None required
						Non-breeding divers and	High (C, O, and D)	Negligible (C, O, and D)	Minor adverse (C, O, and D)		**Minor adverse (C, O, and D)**	

Description of impact	Phase[a]			Commitment number	Assessment area	IEF	Sensitivity of the receptor (phase)	Magnitude of impact (phase)	Significance of effect (phase)	Further mitigation	Residual effect (phase)	Proposed monitoring
	C	O	D									
						cormorants						
					Onshore survey area	Breeding geese, ducks and swans	High (C and D)	Negligible (C and D)	Minor adverse (C and D)	None required	**Minor adverse (C and D)**	
						Non-breeding geese, ducks and swans	High (C and D)	Low (C and D)	Moderate adverse (C and D)	CoT107 Arable land at Lytham Moss	**Negligible (C and D)**	Monitoring of the number and frequency of the pink-footed goose and whooper swan at the Lytham Moss feeding area is recommended to ascertain if the measure is successful
						Breeding partridges	Medium (C and D)	Negligible (C and D)	Negligible (C and D)	None required	**Negligible (C and D)**	None required
						Breeding rails	High (C and D)	Negligible (C and D)	Minor adverse (C and D)		**Minor adverse (C and D)**	

Description of impact	Phase[a]			Commitment number	Assessment area	IEF	Sensitivity of the receptor (phase)	Magnitude of impact (phase)	Significance of effect (phase)	Further mitigation	Residual effect (phase)	Proposed monitoring
	C	O	D									
						Non-breeding rails	High (C and D)	Negligible (C and D)	Minor adverse (C and D)		**Minor adverse (C and D)**	
						Breeding waders	High (C and D)	Negligible (C and D)	Minor adverse (C and D)		**Minor adverse (C and D)**	
						Non-breeding waders	High (C and D)	Low (C and D)	Moderate adverse (C and D)		**Minor adverse (C and D)**	
						Non-breeding gulls	High (C and D)	Negligible (C and D)	Minor adverse (C and D)		**Negligible (C and D)**	
						Non-breeding cormorants	High (C and D)	Negligible (C and D)	Minor adverse (C and D)		**Minor adverse (C and D)**	
						Breeding herons	High (C and D)	Negligible (C and D)	Minor adverse (C and D)		**Minor adverse (C and D)**	
						Non-breeding herons	High (C and D)	Negligible (C and D)	Minor adverse (C and D)		**Negligible (C and D)**	
						Breeding owls	High (C and D)	Negligible (C and D)	Minor adverse (C and D)		**Minor adverse (C and D)**	
						Non-breeding owls	High (C and D)	Negligible (C and D)	Minor adverse (C and D)		**Minor adverse (C and D)**	
						Breeding kingfishers	High (C and D)	No change (C and D)	No change (C and D)		**No change (C and D)**	

Description of impact	Phase[a]			Commitment number	Assessment area	IEF	Sensitivity of the receptor (phase)	Magnitude of impact (phase)	Significance of effect (phase)	Further mitigation	Residual effect (phase)	Proposed monitoring
	C	O	D			Non-breeding kingfishers	High (C and D)	No change (C and D)	No change (C and D)		**No change (C and D)**	
						Breeding raptors	Medium (C and D)	Negligible (C and D)	Negligible (C and D)		**Negligible (C and D)**	
						Non-breeding raptors	High (C and D)	Negligible (C and D)	Minor adverse (C and D)		**Minor adverse (C and D)**	
						Breeding passerines	Medium (C and D)	Negligible (C and D)	Negligible (C and D)		**Negligible (C and D)**	
						Non-breeding passerines	Medium (C and D)	Negligible (C and D)	Negligible (C and D)		**Negligible (C and D)**	
					All other areas	This impact is not predicted to affect any of the other areas. Therefore, there will be **no change**.						
Disturbance and displacement from construction, decommissioning, and operation and maintenance activities	✓	✓	✓	CoT02, CoT03, CoT12, CoT14, CoT16. CoT18, CoT35, CoT36, CoT44, CoT90	Coastal survey area	Non-breeding geese, ducks and swans	High (C, O, and D)	Negligible (C, O and D)	Minor adverse (C, O, and D)	None required	**Minor adverse (C, O, and D)**	None required
						Non-breeding grebes	High (C, O, and D)	Negligible (C, O and D)	Minor adverse (C, O, and D)		**Minor adverse (C, O, and D)**	
						Non-breeding waders	High (C, O, and D)	Low (C, O, and D)	Moderate adverse (C, O, and D)	CoT113 Fairhaven saltmarsh	**Minor adverse (C, O, and D)**	Monitoring is recommended for the

Description of impact	Phase[a]			Commitment number	Assessment area	IEF	Sensitivity of the receptor (phase)	Magnitude of impact (phase)	Significance of effect (phase)	Further mitigation	Residual effect (phase)	Proposed monitoring
	C	O	D									
									No change (O)			Fairhaven saltmarsh to see if there has been a reduction in human disturbance as a result of measures employed (baseline surveys are currently taking place).
						Non-breeding gulls and terns	Medium (C, O, and D)	Negligible (C, O and D)	Negligible (C, O, and D)	None required	**Negligible (C, O, and D)**	None required
						Non-breeding divers and cormorants	High (C, O, and D)	Negligible (C, O and D)	Minor adverse (C, O, and D)		**Minor adverse (C, O, and D)**	
					Estuarine survey area	Non-breeding geese, ducks and swans	High (C, O, and D)	No change (C, O, D)	No change (C, O, D)	None required	**No change (C, O, D)**	None required

Description of impact	Phase[a]			Commitment number	Assessment area	IEF	Sensitivity of the receptor (phase)	Magnitude of impact (phase)	Significance of effect (phase)	Further mitigation	Residual effect (phase)	Proposed monitoring
	C	O	D									
						Non-breeding waders	High (C, O, and D)	No change (C, O, D)	No change (C, O, D)		**No change (C, O, D)**	
						Non-breeding gulls and terns	Medium (C, O, and D)	No change (C, O, D)	No change (C, O, D)		**No change (C, O, D)**	
						Non-breeding cormorants	High (C, O, and D)	No change (C, O, D)	No change (C, O, D)		**No change (C, O, D)**	
						Non-breeding herons	High (C, O, and D)	No change (C, O, D)	No change (C, O, D)		**No change (C, O, D)**	
						Non-breeding kingfishers	Medium (C, O, and D)	No change (C, O, D)	No change (C, O, D)		**No change (C, O, D)**	
					Onshore survey area	Breeding geese, ducks and swans	High (C, O, and D)	Negligible (C and D) No change (O)	Minor adverse (C and D) No change (O)	None required	**Minor adverse (C and D)** **No change (O)**	None required
						Non-breeding geese, ducks and swans	High (C, O, and D)	Low (C and D) No change (O)	Moderate adverse (C and D) No change (O)	CoT107 Arable land at Lytham Moss	**Minor adverse (C and D)** **No change (O)**	Monitoring of the number and frequency of the pink-footed goose and

Description of impact	Phase[a]			Commitment number	Assessment area	IEF	Sensitivity of the receptor (phase)	Magnitude of impact (phase)	Significance of effect (phase)	Further mitigation	Residual effect (phase)	Proposed monitoring
	C	O	D									whooper swan at the Lytham Moss feeding area is recommended to ascertain if the measure is successful.
						Breeding partridges	Medium (C, O, and D)	Negligible (C and D) No change (O)	Negligible (C and D) No change (O)	None required	**Negligible (C and D)** **No change (O)**	None required
						Breeding rails	Medium (C, O, and D)	Negligible (C and D) No change (O)	Negligible (C and D) No change (O)		**Negligible (C and D)** **No change (O)**	
						Non-breeding rails	Medium (C, O, and D)	Negligible (C and D) No change (O)	Negligible (C and D) No change (O)		**Negligible (C and D)** **No change (O)**	
						Breeding waders	High (C, O, and D)	Negligible (C and D) No change (O)	Minor adverse (C and D) No change (O)		**Minor adverse (C and D)** **No change (O)**	
						Non-breeding waders	High (C, O, and D)	Low (C and D) No change (O)	Moderate adverse (C and D) No change (O)	CoT120 Land south of Newton with Scales	**Minor adverse (C and D)** **No change (O)**	Long-term monitoring of the fields south of Newton with Scales

Description of impact	Phase[a]			Commitment number	Assessment area	IEF	Sensitivity of the receptor (phase)	Magnitude of impact (phase)	Significance of effect (phase)	Further mitigation	Residual effect (phase)	Proposed monitoring
	C	O	D									is recommended to ascertain if the measures employed attract more breeding and non-breeding wildfowl and waders to the area.
						Non-breeding gulls	Medium (C, O, and D)	Negligible (C and D) No change (O)	Negligible (C and D) No change (O)	None required	**Negligible (C and D)** **No change (O)**	None required
						Non-breeding cormorants	High (C, O, and D)	Negligible (C and D) No change (O)	Minor adverse (C and D) No change (O)		**Minor adverse (C and D)** **No change (O)**	
						Breeding herons	High (C, O, and D)	Negligible (C and D) No change (O)	Minor adverse (C and D) No change (O)		**Minor adverse (C and D)** **No change (O)**	
						Non-breeding herons	High (C, O, and D)	Negligible (C and D) No change (O)	Minor adverse (C and D) No change (O)		**Minor adverse (C and D)** **No change (O)**	
						Breeding owls	Medium (C, O, and D)	Negligible (C and D)	Negligible (C and D)		**Negligible (C and D)**	

Description of impact	Phase[a]			Commitment number	Assessment area	IEF	Sensitivity of the receptor (phase)	Magnitude of impact (phase)	Significance of effect (phase)	Further mitigation	Residual effect (phase)	Proposed monitoring
	C	O	D					No change (O)	No change (O)		**No change (O)**	
						Non-breeding owls	Medium (C, O, and D)	Negligible (C and D) No change (O)	Negligible (C and D) No change (O)		**Negligible (C and D)** **No change (O)**	
						Breeding kingfishers	Medium (C, O, and D)	Negligible (C and D) No change (O)	Negligible (C and D) No change (O)		**Negligible (C and D)** **No change (O)**	
						Non-breeding kingfishers	Medium (C, O, and D)	Negligible (C and D) No change (O)	Negligible (C and D) No change (O)		**Negligible (C and D)** **No change (O)**	
						Breeding raptors	Medium (C, O, and D)	Negligible (C and D) No change (O)	Negligible (C and D) No change (O)		**Negligible (C and D)** **No change (O)**	
						Non-breeding raptors	Medium (C, O, and D)	Negligible (C and D) No change (O)	Negligible (C and D) No change (O)		**Negligible (C and D)** **No change (O)**	
						Breeding Cetti's warblers	High (C, O, and D)	Negligible (C and D) No change (O)	Minor adverse (C and D) No change (O)		**Minor adverse (C and D)** **No change (O)**	
						Breeding passerines	Medium (C, O, and D)	Negligible (C and D) No change (O)	Negligible (C and D) No change (O)		**Negligible (C and D)** **No change (O)**	
						Non-breeding passerines	Medium (C, O, and D)	Negligible (C and D) No change (O)	Negligible (C and D) No change (O)		**Negligible (C and D)** **No change (O)**	

Description of impact	Phase[a]			Commitment number	Assessment area	IEF	Sensitivity of the receptor (phase)	Magnitude of impact (phase)	Significance of effect (phase)	Further mitigation	Residual effect (phase)	Proposed monitoring
	C	O	D									
					All other areas	This impact is not predicted to affect any of the other areas. Therefore, there will be **no change**.						
The impact of pollution caused by accidental spills/contaminant release	✓	×	✓	CoT04, CoT35, CoT36	All areas	All receptors	Medium (C, and D)	Negligible (C and D)	Negligible (C and D)	None required	**Negligible (C and D)**	None required
The impact of spreading INNS	✓	×	✓	CoT35, CoT36, CoT73	All areas	All receptors	Medium (C, and D)	Negligible (C and D)	Negligible (C and D)	None required	**Negligible (C and D)**	None required
The impact of habitat fragmentation and species isolation	✓	✓	✓	CoT02, CoT03, CoT12, CoT14, CoT16, CoT36, CoT73, CoT90	All areas	All receptors	Medium (C, O, and D)	Negligible (C and D) No change (O)	Negligible (C and D) No change (O)	None required	**Negligible (C and D)** **No change (O)**	None required

[a] C=construction, O=operation and maintenance, D=decommissioning

Table 4.42: Summary of cumulative environmental effects

Description of effect	Phase[a]			Assessment area	IEF	Project alone residual significance of effect (phase)	Cumulative significance of effect (phase)
	C	O	D				
The impact of permanent loss of supporting habitat	✓	×	✓	Onshore substation sites	All receptors	**Up to minor adverse (C and D)**	**Minor adverse (C and D)**
The impact of temporary loss of supporting habitat and/or resource availability	✓	×	✓	All areas	All receptors	**Up to minor adverse (C and D)**	**Minor adverse (C and D)**
Disturbance and displacement from construction, decommissioning, and operation and maintenance activities	✓	×	✓	All areas	All receptors	**Up to minor adverse (C and D)**	**Minor adverse (C and D)**

[a] C=construction, O=operation and maintenance, D=decommissioning

4.28 References

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