



Morecambe Offshore Windfarm: Generation Assets Development Consent Order Documents

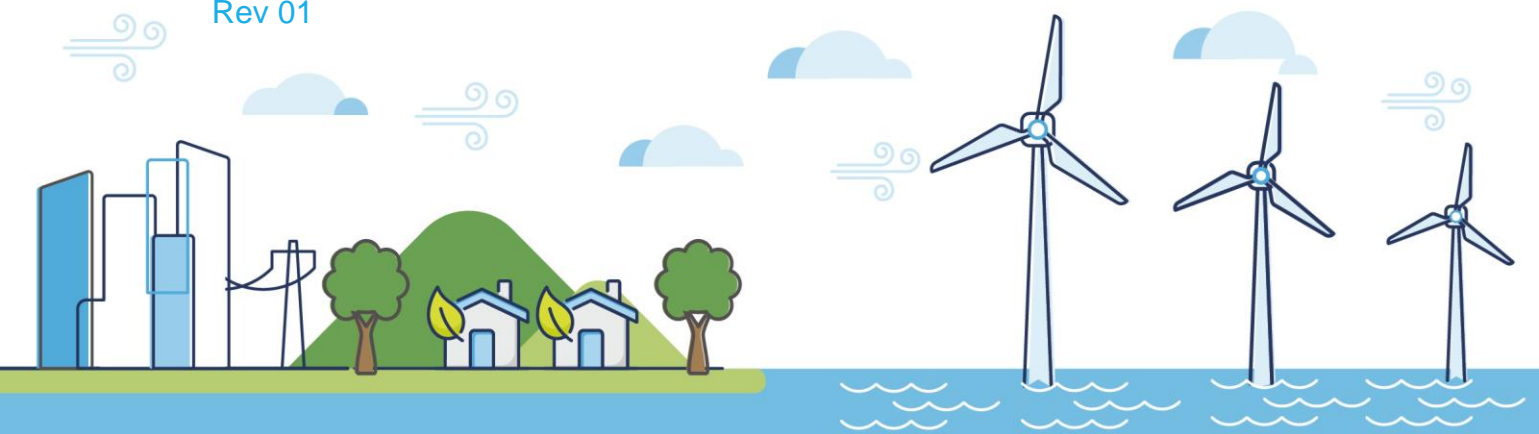
Volume 4

Transmission Assets PEIR Non-Technical Summary

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MORGAN AND MORECAMBE OFFSHORE WIND FARMS: TRANSMISSION ASSETS

Preliminary Environmental Information Report

Non-Technical Summary



October 2023
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RPS

Prepared for:

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Morecambe Offshore Windfarm Limited**

Contents

| | | |
|----------|---|-----------|
| 1 | INTRODUCTION | 1 |
| 1.1 | The Transmission Assets | 1 |
| 1.2 | Structure of the Preliminary Environmental Information Report | 2 |
| 1.3 | About the Applicants | 4 |
| 1.4 | How you can get involved | 4 |
| 2 | NEED FOR THE TRANSMISSION ASSETS | 5 |
| 2.1 | Climate change and renewable energy | 5 |
| 3 | POLICY AND LEGISLATIVE CONTEXT | 6 |
| 3.1 | Introduction..... | 6 |
| 3.2 | Consenting regime | 6 |
| 3.3 | Planning policy context | 8 |
| 4 | PROJECT DESCRIPTION | 9 |
| 4.1 | Overview | 9 |
| 4.2 | Offshore elements of the Transmission Assets | 12 |
| 4.3 | Landfall..... | 16 |
| 4.4 | Onshore elements of the Transmission Assets | 16 |
| 4.5 | Operation and maintenance phase..... | 23 |
| 4.6 | Decommissioning phase | 24 |
| 5 | SITE SELECTION AND ALTERNATIVES | 25 |
| 6 | ENVIRONMENTAL ASSESSMENT METHODOLOGY | 31 |
| 6.1 | Consultation and scoping..... | 31 |
| 6.2 | Approach to EIA | 32 |
| 7 | POTENTIAL ENVIRONMENTAL EFFECTS – OFFSHORE..... | 36 |
| 7.1 | Introduction..... | 36 |
| 7.2 | Physical processes | 36 |
| 7.3 | Benthic subtidal and intertidal ecology..... | 39 |
| 7.4 | Fish and shellfish ecology | 41 |
| 7.5 | Marine mammals..... | 43 |
| 7.6 | Offshore ornithology | 45 |
| 7.7 | Commercial fisheries..... | 47 |
| 7.8 | Shipping and navigation..... | 49 |
| 7.9 | Marine archaeology..... | 51 |
| 7.10 | Other sea users..... | 53 |
| 8 | POTENTIAL ENVIRONMENTAL EFFECTS – ONSHORE..... | 56 |
| 8.1 | Introduction..... | 56 |
| 8.2 | Geology, hydrogeology and ground conditions..... | 56 |
| 8.3 | Hydrology and flood risk..... | 59 |
| 8.4 | Onshore ecology and nature conservation | 61 |
| 8.5 | Onshore and intertidal ornithology | 63 |
| 8.6 | Historic environment | 66 |
| 8.7 | Land use and recreation | 68 |
| 8.8 | Traffic and transport | 70 |
| 8.9 | Noise and vibration | 72 |
| 8.10 | Air quality..... | 74 |
| 9 | POTENTIAL ENVIRONMENTAL EFFECTS – OFFSHORE AND ONSHORE..... | 76 |
| 9.1 | Introduction..... | 76 |
| 9.2 | Seascape, landscape and visual resources..... | 76 |

| | | |
|-----------|-----------------------------|-----------|
| 9.3 | Aviation and radar | 79 |
| 9.4 | Climate change | 80 |
| 9.5 | Socio-economics | 83 |
| 9.6 | Inter-related effects | 84 |
| 10 | NEXT STEPS | 86 |

Figures

| | | |
|-------------|---|----|
| Figure 1.1: | Transmission Assets Red Line Boundary | 3 |
| Figure 3.1: | Overview of the Planning Act 2008 consenting process | 7 |
| Figure 4.1: | Key elements of the Transmission Assets | 9 |
| Figure 4.2: | Transmission Assets Red Line Boundary and Infrastructure Areas | 11 |
| Figure 4.3: | Schematic drawing of a typical offshore substation platform | 14 |
| Figure 4.4: | Illustration of foundation types | 15 |
| Figure 4.6: | Indicative temporary cable corridor cross section | 17 |
| Figure 4.5: | Onshore elements of the Transmission Assets | 18 |
| Figure 4.7: | Onshore substation statutory consultation area and siting options | 21 |
| Figure 4.8: | Onshore biodiversity net gain and mitigation areas | 22 |
| Figure 6.1: | Overview of the scoping process | 31 |
| Figure 6.2: | Engagement and the iterative design process | 34 |
| Figure 7.1: | Offshore environmental constraints | 38 |
| Figure 8.1: | Onshore environmental constraints | 58 |

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 Limited (Morecambe OWL). |
| Biodiversity Net Gain | 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 to ensure that the current loss of biodiversity through development will be halted and ecological networks can be restored. |
| 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. |
| 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. |

| Term | Meaning |
|---|--|
| Draft National Policy Statements | The draft National Policy Statements for energy published for consultation in March 2023. |
| 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. |
| 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. |
| Generation Assets | The generation assets associated with the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm include the offshore wind turbines, together with other electrical infrastructure that contributes to electricity production, including inter-array cables, offshore substation platforms and possible platform link cables to connect offshore substations. |
| Impact | Change that is caused by an action/proposed development, e.g., land clearing (action) during construction which results in habitat loss (impact). |
| Interconnector cables | Cables to connect the Offshore Substation Platforms to each other. |
| 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 bay inclusive of all construction works, including the offshore and onshore cable routes, intertidal working area and landfall compound(s). |
| 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. |
| 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 transmission assets for the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm. This includes the offshore substation platforms, interconnector cables, Morgan offshore booster station, 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 Policy Statement(s) | The current national policy statements published by the Department of Energy and Climate Change in 2011. |
| Offshore booster station | A fixed structure located along the offshore export cable route, containing electrical equipment to ensure bulk wind farm capacity can be fully transmitted to the onshore substations. |
| Offshore export cables | The cables which would bring electricity from the offshore substation platforms to the landfall. |

| Term | Meaning |
|---|--|
| Offshore export cable corridor | The corridor within which the offshore export cables will be located. |
| Offshore substation platform(s) | A fixed structure located within the wind farm sites, containing electrical equipment to aggregate the power from the wind turbine generators and convert it into a more suitable form for export to shore. |
| Onshore export cables | The cables which would bring electricity from the landfall to the onshore substations. |
| 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. |
| 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. |
| Substation | Part of an electrical transmission and distribution system. Substations transform voltage from high to low, or the reverse by means of electrical transformers. |
| 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. |
| Transmission Assets | See Morgan and Morecambe Offshore Wind Farms: Transmission Assets (above). |
| Transmission Assets Red Line Boundary | 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). |

Acronyms

| Acronym | Meaning |
|---------------|--|
| EIA | Environmental Impact Assessment |
| EnBW | Energie Baden-Württemberg AG |
| Morecambe OWL | Morecambe Offshore Windfarm Limited |
| Morgan OWL | Morgan Offshore Wind Limited |
| EWG | Expert Working Group |
| NPS | National Policy Statement |
| PEIR | Preliminary Environmental Information Report |
| UK | United Kingdom |

Units

| Unit | Description |
|-----------------|--------------------|
| km | Kilometres |
| km ² | Kilometres Squared |
| kV | Kilovolt |
| m | Metre |
| % | Percentage |

1 Introduction

1.1 The Transmission Assets

1.1.1 Purpose of this document

1.1.1.1 Morgan Offshore Wind Ltd (Morgan OWL) and Morecambe Offshore Windfarm Ltd (Morecambe OWL) ('the Applicants') are developing the Morgan and Morecambe Offshore Wind Farms: Transmission Assets (referred to in this document as the 'Transmission Assets'). The Transmission Assets are proposed to comprise transmission infrastructure to connect the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm to the National Grid. The location of the Transmission Assets is shown on **Figure 1.1**.

1.1.1.2 This document is the Non-Technical Summary of the Preliminary Environmental Information Report (PEIR) prepared for the Transmission Assets. The PEIR provides the preliminary findings of the Environmental Impact Assessment (EIA) process undertaken to date to support the pre-application consultation activities required under the Planning Act 2008. The EIA process is ongoing and, following completion of pre-application consultation and refinement of the design of the Transmission Assets, the findings of this further work will be reported in an Environmental Statement. The Environmental Statement will accompany the application for development consent.

1.1.1.3 This Non-Technical Summary is intended to act as a stand-alone document that provides an overview of the Transmission Assets and its likely significant effects in non-technical language. Further detailed information is provided in the PEIR at www.morecambeandmorgan.com/transmission.

1.1.2 Introduction to the Transmission Assets

1.1.2.1 The UK's ambition is to lead the world in combatting climate change, reducing reliance on fossil fuels and embracing a future where renewable energy powers homes and businesses. At the centre of this drive is a commitment to reducing UK greenhouse gas emissions and reaching net zero by 2050. The UK government has an ambition to generate 50 gigawatts of clean, renewable energy from offshore wind by 2030.

1.1.2.2 Morgan Offshore Wind Limited (Morgan OWL), a joint venture between bp Alternative Energy Investments Ltd (bp) and Energie Baden-Württemberg AG (EnBW), is developing the Morgan Offshore Wind Project. The Morgan Offshore Wind Project is a proposed wind farm in the East Irish Sea.

1.1.2.3 Morecambe Offshore Windfarm Limited (Morecambe OWL), a joint venture between Cobra Instalaciones y Servicios, S.A. (Cobra) and Flotation Energy Ltd., is developing the Morecambe Offshore Windfarm, also a proposed wind farm in the East Irish Sea.

1.1.2.4 In July 2022, the UK Government published the 'Pathway to 2030 Holistic Network Design' documents, which set out the approach to connecting

50 gigawatts of offshore wind to the National Grid. A key output of this process was the conclusion that the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm should work collaboratively in connecting their two wind farms to the National Grid electricity transmission network at Penwortham in Lancashire.

1.1.2.5 Morgan OWL and Morecambe OWL, being in agreement with the output from the Holistic Network Design process, are jointly seeking a single consent for transmission assets comprising shared offshore export cable corridors to landfall and shared onshore export cable corridors to onshore substation(s), and onward connection to the National Grid at Penwortham, Lancashire.

1.1.3 Approach to consenting the Transmission Assets

1.1.3.1 To best deliver the coordinated grid connection arrangements, the following consenting strategy has been developed by the Applicants:

- a stand-alone application to consent the construction, operation and maintenance and decommissioning of the generation assets of the Morgan Offshore Wind Project;
- a stand-alone application to consent the construction, operation and maintenance and decommissioning of the generation assets of the Morecambe Offshore Windfarm; and
- a stand-alone application to consent the construction, operation and maintenance and decommissioning of the Transmission Assets (to enable the export of electricity from both the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm to the National Grid entry point at Penwortham).

1.1.3.2 This approach provides a formal structure for the two projects to collaborate and align on design, assessment and mitigation approach; allows for integrated consideration of cumulative impacts (particularly onshore); and seeks to minimise any risk of stakeholder fatigue or confusion.

1.1.3.3 This Non-Technical Summary of the PEIR relates to the Transmission Assets for which the Applicants intend to submit an application for a single Development Consent Order that authorises two coordinated but electrically separate sets of transmission works. The development consent application is planned to be submitted in the summer of 2024.

1.2 Structure of the Preliminary Environmental Information Report

1.2.1.1 The PEIR is divided into four volumes:

- Volume 1: Introduction;
- Volume 2: Assessment of offshore effects;
- Volume 3: Assessment of onshore effects; and
- Volume 4: Assessment of offshore and onshore effects.

1.2.1.2 This Non-Technical Summary of the PEIR is provided as a separate document.

1.3 About the Applicants

1.3.1.1 EnBW is one of the largest energy supply companies in Germany and supplies electricity, gas, water and energy solutions and energy industry services to around 5.5 million customers with a workforce of more than 26,000 employees. With a focus on renewable energy and smart infrastructure solutions, EnBW's objective is for half of the electricity it supplies to be from renewable sources by the end of 2025.

1.3.1.2 bp has set out an ambition to be a net zero company by 2050, or sooner. This strategy will see bp transform from an international oil company producing resources, to an integrated energy company providing solutions to customers. bp already has a significant onshore wind business in the United States with a gross generating capacity of 1.7 gigawatts, operating nine wind assets across the country.

1.3.1.3 Cobra is a worldwide leader with more than 75 years of experience in the development, construction and management of industrial infrastructure and energy projects. Cobra has an international presence in Europe, Asia, Africa and the Americas.

1.3.1.4 Flotation Energy Ltd has a growing project pipeline of offshore wind projects with more than 13 gigawatts of installed capacity in the UK, Ireland, Taiwan, Japan and Australia and plans to expand into many more key markets.

1.4 How you can get involved

1.4.1.1 The PEIR is intended to allow those taking part in the consultation to understand the likely significant effects of the Transmission Assets, such that they can make an informed contribution to the process of pre-application consultation under the Planning Act 2008 and to the EIA process. It is important to note that the PEIR contains preliminary information which will be updated with the results of additional surveys and in response to consultation feedback in the Environmental Statement. The Applicants are actively seeking feedback on the PEIR from statutory consultees and interested parties to inform the next stages of the project. Information on how you can get involved is provided in **section 10**.

2 Need for the Transmission Assets

2.1 Climate change and renewable energy

2.1.1.1 As set out in **section 1.1**, the UK government has an ambition to generate 50 gigawatts of clean, renewable energy from offshore wind by 2030.

2.1.1.2 On 7 April 2022, the UK Government published its British energy security strategy. The strategy builds on the UK net zero target, placing a heavy reliance on a renewable and low carbon energy supply with a view to '*bring clean, affordable, secure power to the people for generations to come...*'. The strategy plans to accelerate delivery of offshore wind by developing an Offshore Wind Acceleration Task Force to work on reducing the consenting and delivery times for offshore wind projects and fast-tracking priority projects. Specifically, the strategy states an ambition to deliver up to 50 gigawatts of offshore wind by 2030, an increase on previous targets of 40 gigawatts.

2.1.1.3 The Transmission Assets are required to connect the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm to the National Grid, contributing promptly to:

- the UK Government's ambition to deliver 50 gigawatts of offshore wind by 2030;
- delivering much needed investment and securing construction and operations jobs in the UK;
- securing our energy supply; and
- the UK's response to the climate change crisis.

2.1.1.4 The wind farms have an important part to play in securing the timely delivery of the Government's renewable energy strategy and achieving legally binding emissions reduction targets. The need for offshore wind farm projects is set out in existing national and international policy commitments that demonstrate the need for renewable energy and specifically for offshore wind, in order to meet climate commitments and contribute to addressing the climate crisis.

2.1.1.5 At the local level, Blackpool Council, South Ribble Borough Council and Preston City Council have declared climate emergencies and have made commitments in relation to net zero carbon. The Transmission Assets will connect two large offshore wind farms to the National Grid, contributing to meeting both national and local climate change goals.

2.1.1.6 Further details of the need case will be provided in the Planning Statement and the Statement of Need, which will accompany the application for development consent.

3 Policy and legislative context

3.1 Introduction

3.1.1.1 This section provides a summary of the policy and legislative context for the Transmission Assets with reference to the consenting process, including the Planning Act 2008 and associated planning policy.

3.2 Consenting regime

3.2.1.1 The Morgan Offshore Wind Project and the Morecambe Offshore Windfarm are Nationally Significant Infrastructure Projects under the Planning Act 2008, as they exceed the threshold for an offshore generating station of 100 megawatts.

3.2.1.2 Following a request from the Applicants, on 4 October 2022 the Secretary of State issued a direction that the Transmission Assets should be treated as development for which development consent is required under the Planning Act 2008. Applications for development consent under the Planning Act 2008 are submitted to and examined by the Planning Inspectorate and determined by the relevant Secretary of State. At the time of writing, this is the Secretary of State for Energy Security and Net Zero.

3.2.1.3 The key stages of the consenting process under the Planning Act 2008 are summarised in **Figure 3.1**.

3.2.1.4 The application for development consent will cover all offshore elements of the Transmission Assets located within English offshore and inshore waters, as well as all onshore elements of the Transmission Assets.

3.2.2 Environmental Impact Assessment

3.2.2.1 EIA is the process of identifying and assessing the significant effects on the environment 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.

3.2.2.2 For the Transmission Assets, the legislative requirements for EIA are set by The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017, as amended (referred to in this report as the EIA Regulations).

3.2.2.3 Under the Planning Act 2008, statutory consultation on the proposals is required and, in accordance with the EIA Regulations, this must be accompanied by a PEIR. A PEIR enables consultees to understand the likely environmental effects of the Transmission Assets to help inform consultation responses.

3.2.2.4 The PEIR for the Transmission Assets sets out the preliminary findings of the EIA process undertaken to date.

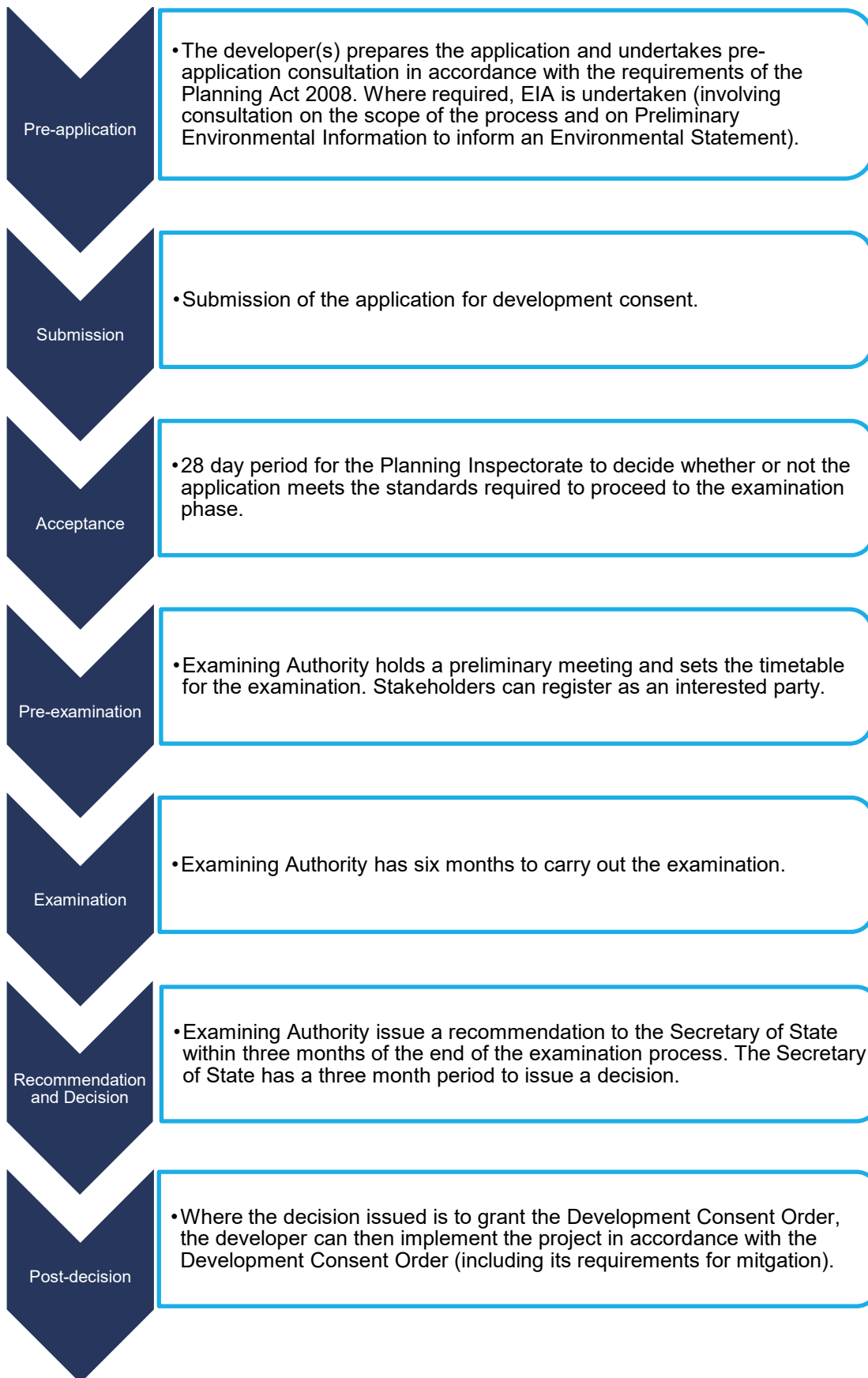


Figure 3.1: Overview of the Planning Act 2008 consenting process

3.2.3 Habitats Regulations

- 3.2.3.1 The Conservation of Habitats and Species Regulations 2017 (as amended) and the Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended) require the assessment of significant effects on internationally important nature conservation sites where these may arise as a result of a project. These internationally important sites include Special Areas of Conservation, or candidate Special Areas of Conservation, Special Protection Areas or potential Special Protection Areas, sites of community importance and Ramsar sites. The assessment is to be undertaken by the 'competent authority', which in the case of the Transmission Assets is the Secretary of State for the Department for Energy Security and Net Zero.
- 3.2.3.2 To allow the Secretary of State to carry out the Habitats Regulations Assessment when determining the application, the Applicants are required to submit a report with the application for development consent that provides the information required for that purpose. A Draft Information to Support Appropriate Assessment report is provided alongside the PEIR. The Information to Support Appropriate Assessment will be finalised following completion of pre-application consultation and will accompany the application to the Secretary of State for development consent.

3.2.4 Marine and Coastal Access Act 2009

- 3.2.4.1 Parts three and four of the Marine and Coastal Access Act 2009 introduced a new marine planning and licensing system for overseeing the marine environment and a requirement to obtain a marine licence for certain activities and works at sea. Section 149A of the Planning Act 2008 allows applicants for development consent to apply for 'deemed marine licences' as part of the consenting process.
- 3.2.4.2 Part five of the Marine and Coastal Access Act 2009 enables the designation of Marine Conservation Zones in England and Wales as well as UK offshore areas. Consideration of Marine Conservation Zones is required for any marine licence application or application for development consent which includes a deemed marine licence.
- 3.2.4.3 A Marine Conservation Zone Screening and Stage 1 Assessment Report is provided for consultation alongside the PEIR.

3.3 Planning policy context

- 3.3.1.1 National planning policy has been taken into account for the PEIR including the current designated National Policy Statements for energy projects and the emerging draft National Policy Statements currently under consideration by the Government.
- 3.3.1.2 The onshore elements of the Transmission Assets are located within the administrative areas of Fylde Council, Blackpool Council, South Ribble Borough Council and Preston City Council (and Lancashire County Council at the County level). Adopted and emerging local plan documents have been taken into account throughout the EIA process.

4 Project description

4.1 Overview

4.1.1 Introduction

4.1.1.1 This section provides a summary of the key elements of the Transmission Assets. The Transmission Assets are in the early stages of the development process, therefore the current project description is indicative and has been designed to include flexibility to accommodate further project refinement during detailed design and post consent. Offshore wind is a continually evolving industry with a constant focus on optimisation, therefore improvements in technology and construction methodologies occur frequently and flexibility is required to allow for the adoption of new technology and methods.

4.1.1.2 The Transmission Assets will be located within the Transmission Assets Red Line Boundary shown on **Figure 4.2**. The Transmission Assets Red Line Boundary comprises approximately 697.8 km² in area.

4.1.2 Key elements of the Transmission Assets

4.1.2.1 The application for development consent for the Transmission Assets will comprise the transmission infrastructure required to connect the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm to the National Grid shown on **Figure 4.1**.

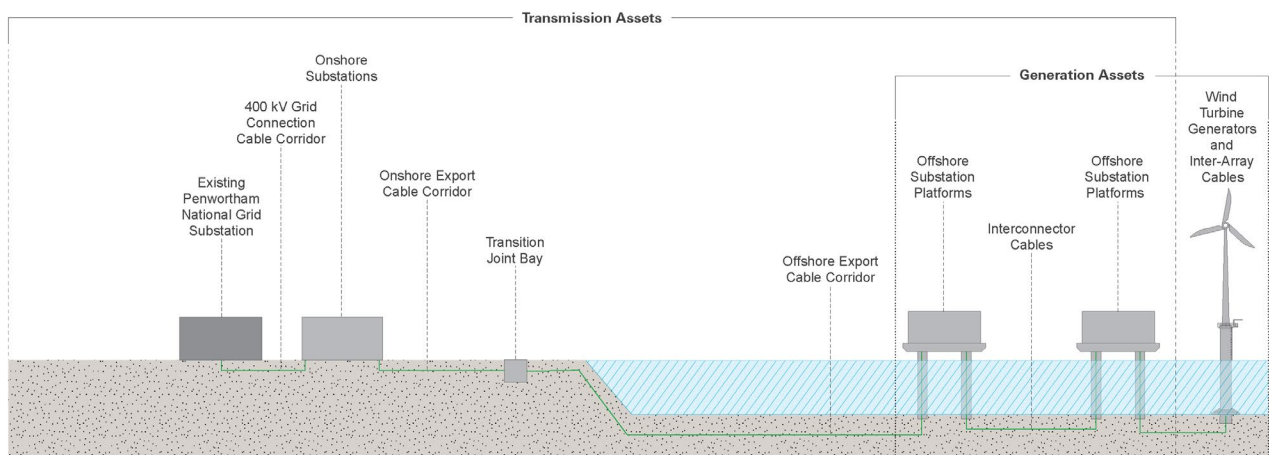


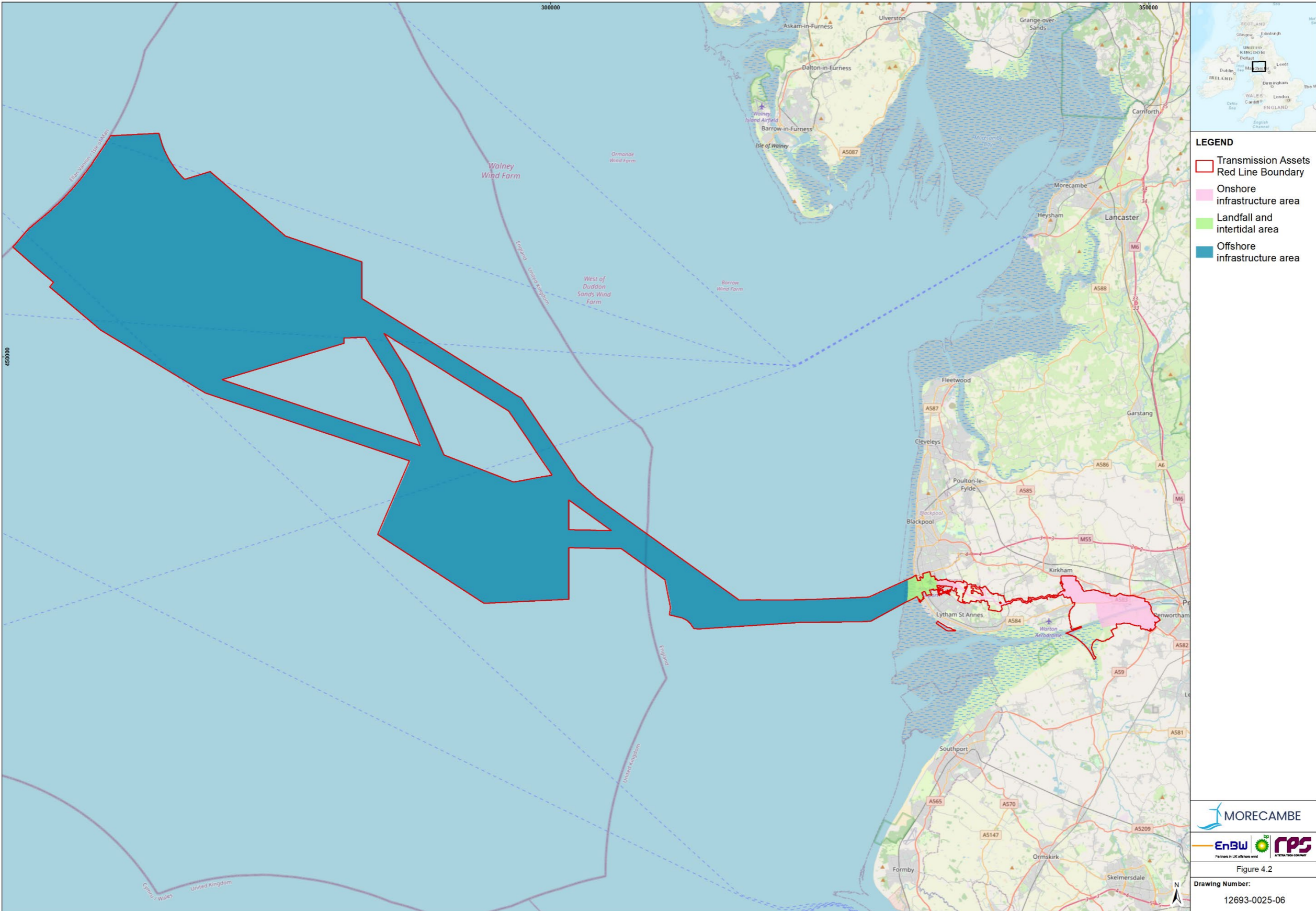
Figure 4.1: Key elements of the Transmission Assets

4.1.2.2 The design philosophy is for the transmission infrastructure for each wind farm to remain electrically independent (i.e., each wind farm to have its own sets of cabling and substation infrastructure). However, the location of the infrastructure will be co-ordinated within shared offshore and onshore cable corridors to minimise impacts to the environment and the community.

4.1.2.3 The key elements of the Transmission Assets include the following:

- offshore elements:

- offshore substation platforms: platforms to transform electricity generated by the wind farms to a higher voltage, allowing the power to be efficiently transmitted to shore;
- interconnector cables: cables to connect the offshore substation platforms to each other;
- Morgan offshore booster station: also known as a mid-point reactive power compensation substation; and
- offshore export cables: these cables will link the offshore substation platforms to the landfall site.
- landfall site: this is where the offshore export cables are jointed to the onshore export cables. This term applies to the entire landfall area between Mean Low Water Springs and the transition joint bay. This includes all construction works, including the offshore and onshore cable routes, intertidal working area and landfall compound(s).
- onshore elements:
 - onshore export cables: these cables will link the landfall site and the proposed onshore substations;
 - onshore substations: the proposed substations containing the components for transforming the power supplied via the onshore export cables up to 400 kilovolts (kV); and
 - 400 kV grid connection cables: these 400 kV cables will connect the proposed onshore substations to the existing National Grid Penwortham substation.



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Project Name:
MORGAN AND MORECAMBE OFFSHORE WIND FARMS: TRANSMISSION ASSETS

Drawing Title:
TRANSMISSION ASSETS RED LINE BOUNDARY AND INFRASTRUCTURE AREAS

0 3,000 6,000 m

Geodetic Information:
Datum: OSGB 1936
Projection: British National Grid
Scale@379mmx231mm: 1:270,000

Data Sources:

Service Layer Credits: © OpenStreetMap (and) contributors, CC-BY-SA
Sources: Esri, DeLorme, Garmin, Intermap, Incremental P, Corp., GEBCO, IGNCO, FAO, NPS, NRCAN, CnoBase, IGN, Keeler, NIT, Ordnance Survey, Esri, Japan, METI, Esri China (Hong Kong), Swisstopo, Mapbox Contributors, and the GIS User Community

| VER | DATE | DETAILS | BY | CHECK |
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Figure 4.2

Drawing Number:
12693-0025-06

Figure 4.2: Transmission Assets Red Line Boundary and Infrastructure Areas

- 4.1.2.4 The onshore export cables and the 400 kV grid connection cables will be completely buried underground for their entire length. No overhead pylons will be installed as part of the Transmission Assets.
- 4.1.2.5 In addition to the permanent elements outlined in **paragraph 4.1.2.2**, temporary onshore infrastructure would be required for the construction phase, including construction compounds and accesses.
- 4.1.2.6 All of the above elements are anticipated to be located within the Transmission Assets Red Line Boundary shown on **Figure 4.2**. Key summary parameters are presented in **Table 4.1**.

Table 4.1: Key summary parameters for the Transmission Assets

| Parameter | Morgan Offshore Wind Project | Morecambe Offshore Windfarm | Total |
|--|------------------------------|-----------------------------|-----------------|
| Transmission Assets Red Line boundary (km ²) | N/A | N/A | 697.8 |
| Maximum number of offshore substation platforms | 4 | 2 | 6 |
| Maximum number of booster stations | 1 | 0 | 1 |
| Maximum number of offshore export cables | 4 | 2 | 6 |
| Maximum number of onshore export cables | 12 (4 circuits) | 6 (2 circuits) | 18 (6 circuits) |
| Maximum number of 400 kV grid connection cables | 6 (2 circuits) | 6 (2 circuits) | 12 (4 circuits) |
| Maximum length of interconnector cables (km) | 60 | 0 | 60 |
| Maximum length of offshore export cables (km) | 500 | 110 | 610 |
| Maximum length of onshore export cables (km) | 25 | 25 | 25 |
| Maximum number of onshore substations | 1 | 1 | 2 |
| Maximum length of 400 KV grid connection cables (km) | 15 | 15 | 15 |

4.1.3 Programme

- 4.1.3.1 At this stage, the timing of construction activities is indicative. Both the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm are intended to be fully operational by 2030. Therefore, it is likely that all elements of the Transmission Assets will need to be completed by this time.
- 4.1.3.2 However, to allow for any unexpected circumstances (such as delay to one project), a range of scenarios have been considered for the environmental assessment including construction of the assets for each wind farm sequentially or concurrently.

4.2 Offshore elements of the Transmission Assets

- 4.2.1.1 The permanent offshore infrastructure and associated installation activities will be located within the Offshore Infrastructure Area shown on **Figure 4.2**.

The maximum design parameters are presented in more detail in Volume 1, Chapter 3: Project Description of the PEIR.

4.2.2 Pre-construction site investigation surveys

4.2.2.1 Pre-construction site investigation surveys will be undertaken to provide detailed information on seabed conditions and to identify the presence/absence of any potential obstructions or hazards. Other pre-construction site investigation surveys are likely to include geophysical and geotechnical surveys which will be conducted within, and in the vicinity of, the footprint of the offshore substation platforms and the Morgan offshore booster station.

4.2.3 Offshore substation platforms

4.2.3.1 The Transmission Assets might require up to six offshore substation platforms (comprising of up to four for the Morgan Offshore Wind Project and two for the Morecambe Offshore Windfarm). The offshore substation platforms will transform electricity generated by the wind farms to a higher voltage, allowing the power to be efficiently transmitted to shore.

4.2.3.2 A schematic drawing of a typical offshore substation platform is shown in **Figure 4.3**.

4.2.4 Morgan offshore booster station

4.2.4.1 One offshore booster station might be required for the Morgan Offshore Wind Project. No booster stations are proposed as part of the Morecambe Offshore Windfarm.

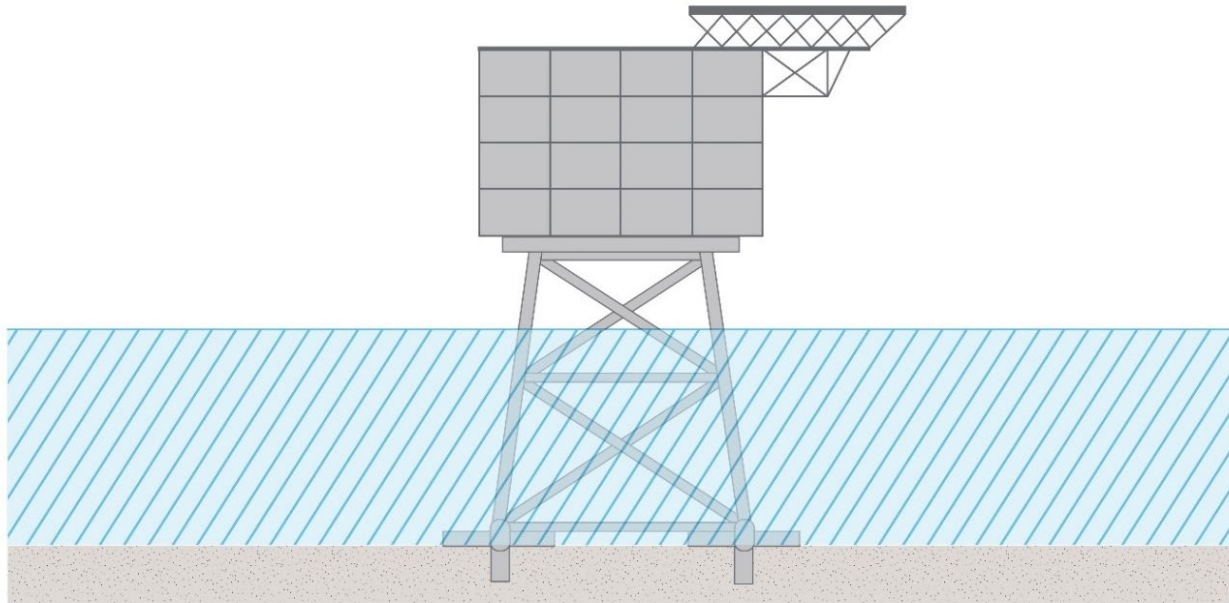


Figure 4.3: Schematic drawing of a typical offshore substation platform

4.2.5 Foundations

4.2.5.1 The offshore substation platforms and the Morgan offshore booster station will be fixed to the seabed by foundation structures. There are a number of foundation types that can be used, and the types used will not be confirmed until the final design, post-consent.

4.2.5.2 The foundation types currently under consideration include:

- monopile foundations;
- piled jacket foundations;
- suction bucket (monopod) foundations;
- jacket foundations on suction buckets;
- conical gravity based foundations; and
- rectangular gravity based foundations.

4.2.5.3 An illustration of the foundation types is provided at **Figure 4.4**.

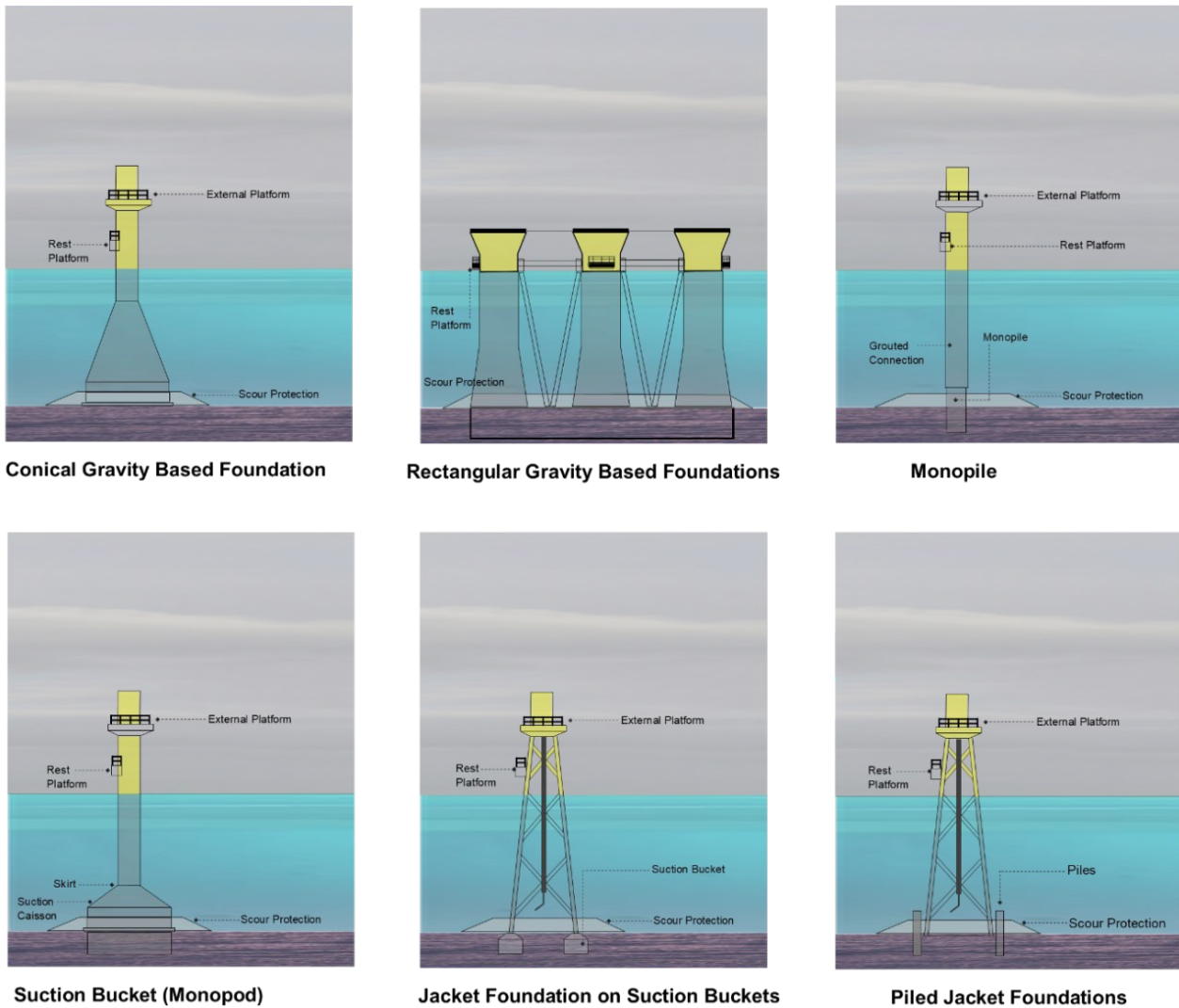


Figure 4.4: Illustration of foundation types

4.2.6 Interconnector cables

4.2.6.1 Interconnector cables connect offshore substation platforms to each other, in order to provide redundancy in the case of cable failure elsewhere. The interconnector cables will have a similar design and installation process to the offshore export cables.

4.2.7 Offshore export cables

4.2.7.1 Offshore export cables are used for the transfer of power from the offshore substation platforms to the landfall. A shared export cable corridor is anticipated.

4.2.7.2 Up to six offshore export cables will be required (up to four for the Morgan Offshore Wind Project and up to two for the Morecambe Offshore Windfarm).

4.2.7.3 Offshore interconnector and export cables would be installed using a range of techniques, such as trenching, pre-lay plough, jetting or mechanical cutting.

4.3 Landfall

- 4.3.1.1 The landfall is the area where the offshore export cables come on shore. This is the transitional area between the offshore cabling and the onshore cabling. The landfall will be located along the north west coast of England near Lytham St. Annes, Lancashire as shown on **Figure 4.2**.
- 4.3.1.2 The offshore export cable will be installed beneath the golf course and the sand dunes at Lytham St. Annes Site of Special Scientific Interest using horizontal directional drilling (or other trenchless techniques). Cable installation across the intertidal (beach) area at Lytham St. Annes will be either by trenchless or open trenching technique.
- 4.3.1.3 The offshore export cables will be jointed to the onshore export cables at transition joint bays. The transition joint bays are an underground concrete structure and will be located in the vicinity of Blackpool Airport.

4.4 Onshore elements of the Transmission Assets

- 4.4.1.1 The permanent offshore infrastructure and associated installation activities will be located within the Onshore Infrastructure Area shown on **Figure 4.2**. The onshore elements are shown in **Figure 4.5**. The maximum design parameters are presented in more detail in Volume 1, Chapter 3: Project Description of the PEIR.

4.4.2 Onshore export cables

- 4.4.2.1 The onshore export cables will provide a cable connection between the landfall site and the proposed onshore substations. The onshore cable corridor will be approximately 25 km in length.
- 4.4.2.2 From the landfall, the onshore export cable corridor will route east inland away from the coast. In the vicinity of Blackpool Airport, the site selection process is considering options including cable installation in land operated by the airport or cable installation within public highways.
- 4.4.2.3 Beyond Blackpool Airport and Queensway (B5261), the route corridor narrows and routes south east towards North Houses Lane. In the Lytham Moss and Higher Ballam area, two route options are present:
- option 1 (north), which passes to the north of Higher Ballam and avoids a farm conservation area; or
 - option 2 (south), which passes to the south of Higher Ballam.
- 4.4.2.4 The cable routes are shown on **Figure 4.5**.
- 4.4.2.5 The two options come together east of Ballam Road and the corridor then continues north east towards Halls Cross, north of Freckleton. In this area, the cable corridor routing will be determined by the final location of the onshore substations. The cable corridor will be located within the Freckleton/Hall Cross onshore export cable corridor search area.
- 4.4.2.6 Up to 18 onshore export cables are anticipated to be required (up to 12 for the Morgan Offshore Wind Project and up to six for the Morecambe Offshore

Windfarm). These will generally be installed through open cut techniques but trenchless techniques, such as horizontal directional drilling, will be used where required.

4.4.2.7 An indicative cross section for a typical part of the construction corridor is shown in **Figure 4.6**.

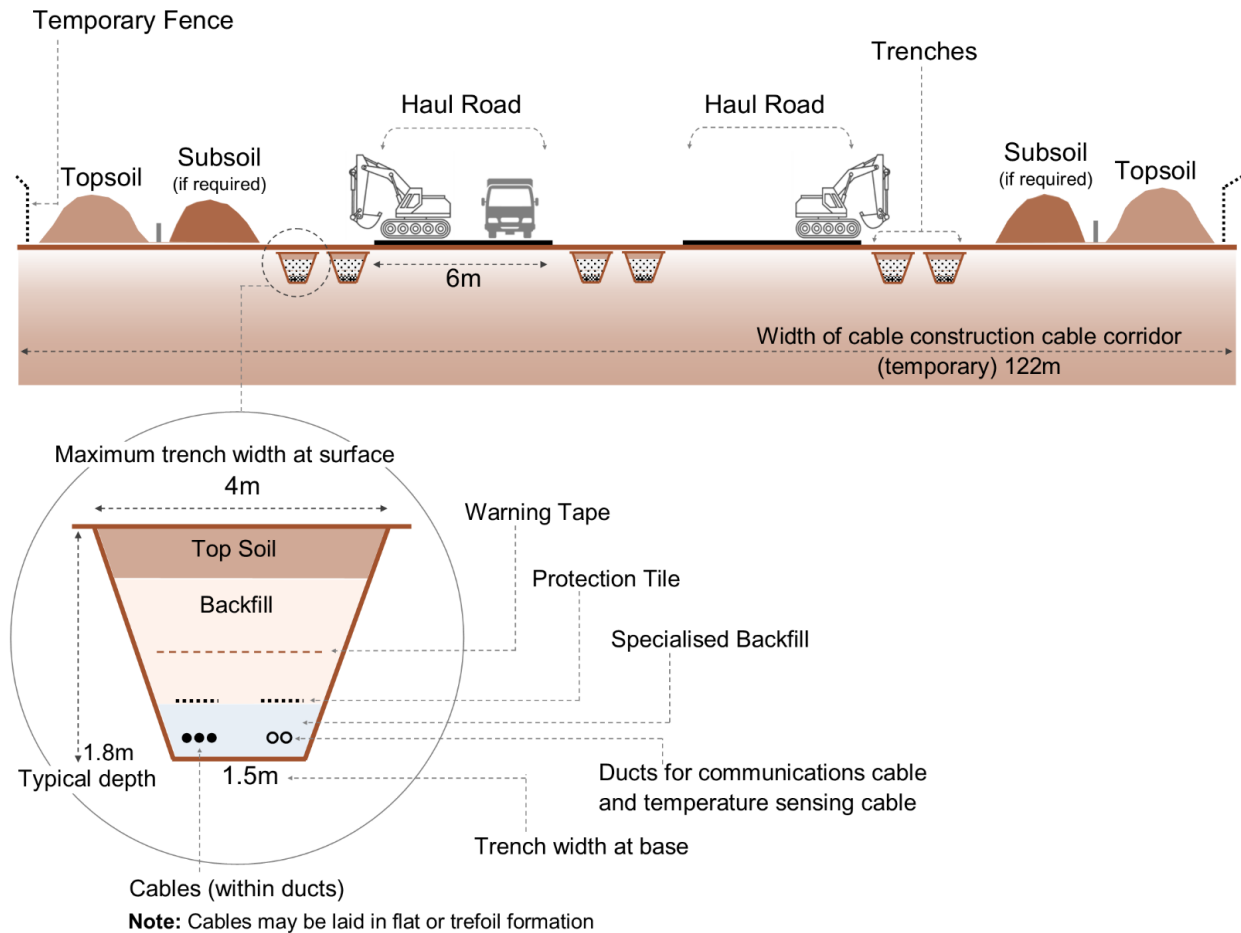


Figure 4.5: Indicative temporary cable corridor cross section

4.4.2.8 Once installed, the cables will typically occupy a corridor up to 70 m wide. The width of the permanent corridor may change and increase in specific locations, for example where obstacles are present, but the maximum width will typically be 70m.

4.4.3 Onshore substations

4.4.3.1 The proposed onshore substations will transform the power supplied through the onshore export cables to 400 kV, to allow a connection to the National Grid substation at Penwortham.

4.4.3.2 To maintain electrical independence, one substation will be required for the Morgan Offshore Wind Project and one for the Morecambe Offshore Windfarm. The onshore substations will be located within the onshore substations statutory consultation area as shown on **Figure 4.5**.

4.4.3.3 At this stage, the following substation site options have been identified within the onshore substations statutory consultation area. These will be refined for the application for development consent.

- One preferred onshore substation site for the Morgan Offshore Wind Project.
- Two onshore substation site options for the Morecambe Offshore Windfarm:
 - Morecambe substation site option 1 (north); or
 - Morecambe substation site option 2 (south).

4.4.3.4 The onshore substations statutory consultation area together with the substation site options are shown on **Figure 4.7**.

4.4.3.5 The siting of the onshore substations will continue to evolve through the EIA process and will consider environmental and engineering constraints as well as stakeholder and commercial factors.

4.4.4 400 kV grid connection cables

4.4.4.1 The connection between the proposed new onshore substations for the Transmission Assets and the existing National Grid Penwortham substation will be achieved by the 400 kV grid connection cables. The 400 kV grid connection cables will be located within the 400 kV grid connection cable corridor search area as shown on **Figure 4.5**. The cable route is likely to be approximately 15 km long.

4.4.4.2 Up to twelve 400 kV grid connection cables are anticipated to be required. The cables are predicted to be buried in up to four separate trenches (one circuit per trench, with up to two cable circuits/trenches for the Morgan Offshore Wind Project and two for the Morecambe Offshore Windfarm).

4.4.5 Onshore biodiversity net gain, enhancement and/or mitigation areas

4.4.5.1 The Applicants aim to mitigate effects on habitats arising as a result of the Transmission Assets and to deliver biodiversity net gain, where practicable and required. Areas identified through the iterative EIA process to date as potentially suitable for biodiversity net gain, enhancement and/or mitigation are shown on **Figure 4.8**.

4.4.5.2 Opportunities are being explored to collaborate with existing biodiversity schemes in proximity to the Transmission Assets. Work has been undertaken to identify potentially suitable schemes and to determine where the project can make a positive contribution towards ongoing conservation.

4.4.5.3 Measures being actively considered as mitigation and enhancement opportunities include, but are not limited to:

- hedgerow and woodland planting;
- construction of new ponds and removal of Invasive Non-Native Species within existing waterways;

- creation of species-rich grassland and meadow; and
- creation of shallow areas that hold water seasonally to provide mitigation for farmland birds, owls and raptors, reptiles, amphibians, invertebrates, badger and bats.

4.4.5.4 In addition, areas will be identified within the Transmission Assets Red Line Boundary where current habitat condition affords an opportunity to improve habitat quality or where enhancements can be made to habitats identified as functionally linked to designated sites.

4.4.6 Construction environmental management

Code of Construction Practice

4.4.6.1 An Outline Code of Construction Practice will be prepared and submitted with the application for development consent. A Code of Construction Practice will be developed in accordance with the Outline Code of Construction Practice. The Code of Construction Practice will include measures to reduce temporary disturbance to residential properties, recreational users and existing land users.

4.4.6.2 Construction will be undertaken in accordance with the Code of Construction Practice, which will set out the key management measures that the Applicants will require their contractors to adopt and implement for all relevant construction activities for the landfall and onshore elements of the Transmission Assets.

4.4.6.3 Measures to be included in the Code of Construction Practice will be identified through the EIA process and through engagement with stakeholders. These measures will include strategies and control measures for managing the potential environmental effects of construction and limiting disturbance from construction activities as far as reasonably practicable.

Working hours

4.4.6.4 With the exception of works being undertaken within and/or adjacent to Blackpool Airport, core working hours for the construction of the landfall and onshore elements of the Transmission Assets will be as follows:

- Monday to Friday: 07:00-19:00 hours;
- Saturday: 07:00-13:00 hours;
- up to one hour before and after core working hours for mobilisation ('mobilisation period'), i.e., 06:00 to 20:00 weekdays and 06:00 to 14:00 Saturdays; and
- maintenance period: 13:00-17:00 Saturdays.

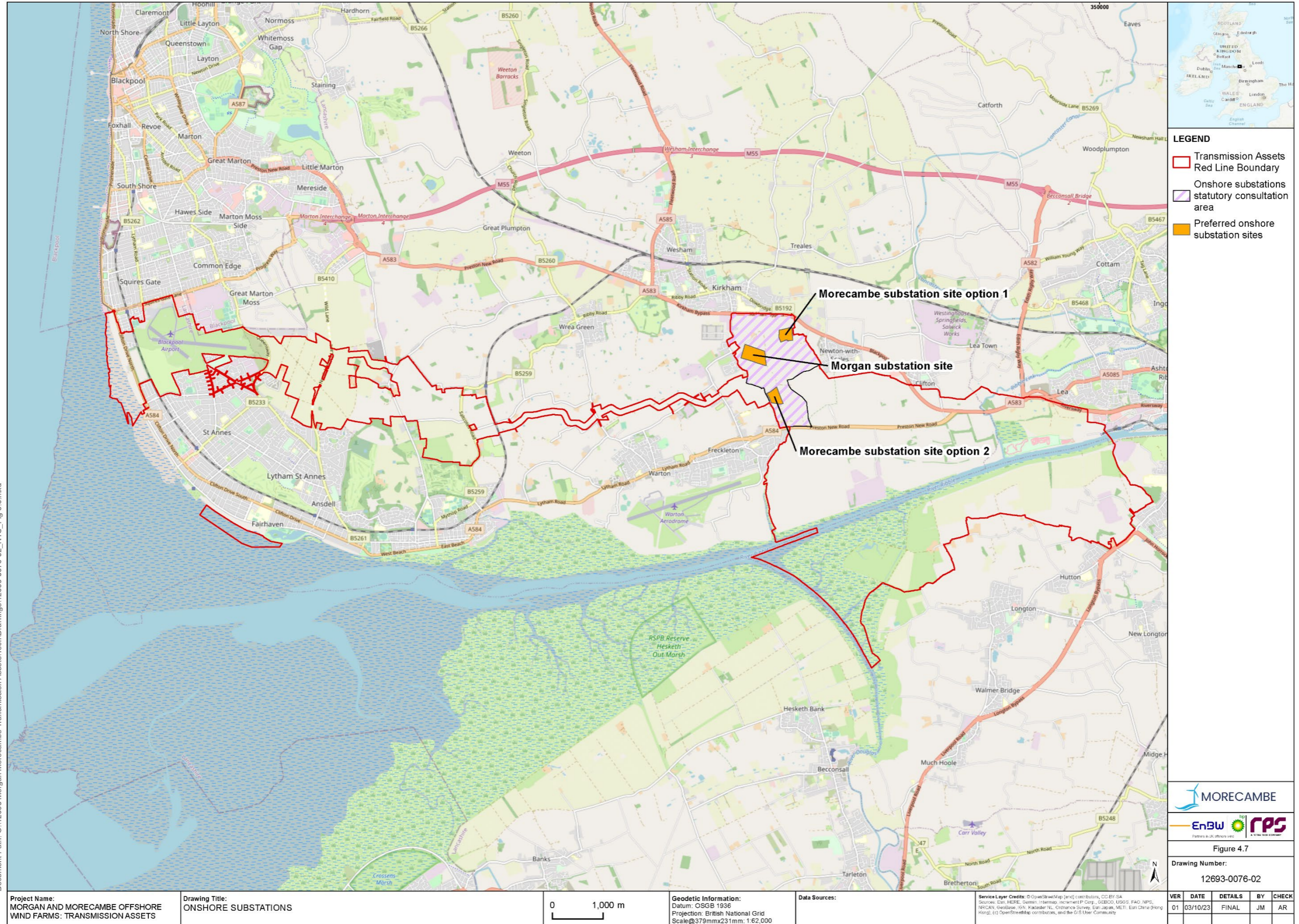


Figure 4.7: Onshore substation statutory consultation area and siting options



Figure 4.8: Onshore biodiversity net gain and mitigation areas

- 4.4.6.5 Activities carried out during mobilisation and maintenance 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. Vehicle movements may however be subject to unscheduled events outside these hours.

Local community liaison

- 4.4.6.6 The Applicants will establish an approach for liaising with the local community and stakeholders during the construction process, which will build on the engagement undertaken throughout the EIA process. A project website, email address and phone number will remain in place.
- 4.4.6.7 The Outline Code of Construction Practice will include provision for a Community Liaison Officer, who will actively work with the local community to ensure the local community is kept up to date with progress and that any queries arising are dealt with appropriately. The plan will also include a procedure for dealing with enquiries or complaints from the public, local authorities or statutory consultees.
- 4.4.6.8 The Outline Code of Construction Practice will also include provision for an agricultural liaison officer, who will act as the main point of contact for landowners, to provide project updates and to resolve any queries arising during the construction phase.

4.5 Operation and maintenance phase

4.5.1 Offshore operation and maintenance activities

- 4.5.1.1 The operation and maintenance requirements for the offshore elements of the Transmission Assets will be set out within an outline Offshore Operations and Maintenance Plan which will be submitted alongside the application for development consent.
- 4.5.1.2 Routine inspections of interconnector and offshore export cables will be undertaken to ensure the cables are buried to an adequate depth and not exposed. The integrity of the cables and cable protection systems will also be checked. It is expected that on average the cables will require up to one visit per year.

4.5.2 Landfall and onshore operation and maintenance activities

- 4.5.2.1 It is not expected that the transition joint bays at the landfall will need to be accessed during the operation and maintenance phase. However, link boxes will be provided with inspection covers to allow for access. Access will be required for an annual check and where corrective activities are required. Joint bays will only require access in the event of a cable failure requiring replacement or repair.
- 4.5.2.2 The operation and maintenance requirements for the onshore export cables and 400 kV grid connection cables will involve infrequent on-site inspections of the cables and corrective maintenance activities. The cables will be continuously monitored remotely.

4.5.2.3 The onshore substations will be unmanned but will be continuously monitored remotely.

4.6 Decommissioning phase

- 4.6.1.1 At the end of the operational lifetime (currently assumed to be 35 years), the Transmission Assets will be decommissioned. As the seabed leases that the Applicants will enter are for up to 60 years, it is anticipated that one re-powering of the Generation Assets may be sought during the lease duration. In this case, new consents are likely to be required for the wind farms and the consenting requirements for the Transmission Assets would also be reviewed as part of that process alongside legislation and guidance in existence at that time. Although the design life of key elements of the Transmission Assets (such as onshore substations) would allow for this, potential future repowering and operational life extension of the Transmission Assets is not included as part of the scope of the development consent application or EIA process.
- 4.6.1.2 If decommissioning takes place, it is anticipated that all structures above ground would be completely removed. It is anticipated that offshore cables and any offshore cable protection may be left *in situ*, to minimise environmental impacts associated with their removal.
- 4.6.1.3 An outline Onshore Decommissioning Plan will be developed prior to decommissioning in a timely manner and will be in line with the latest relevant available guidance.
- 4.6.1.4 To minimise the environmental disturbance during decommissioning, the onshore cables may be recovered and removed by pulling the cables through the ducts (e.g., for recycling). Otherwise, they will be left in place in the ground with the cable ends cut, sealed and securely buried as a precautionary measure.
- 4.6.1.5 Joint bays and link boxes will be removed only if it is feasible with minimal environmental disturbance or if their removal is required to return the land to its current agricultural use.
- 4.6.1.6 The design life for the onshore substations will exceed 35 years. The case for decommissioning the onshore substations in the event of the Generation Assets being decommissioned will be reviewed in discussion with the transmission system operator and the regulator in the light of any other existing or proposed future use of the onshore substations. If complete decommissioning is required, then all the electrical infrastructure will be removed and any waste arising disposed of in accordance with relevant regulations. Foundations will be broken up and the site reinstated to its original condition or for an alternative (separately agreed and consented) use. For the purposes of EIA, decommissioning of the onshore substations is assumed to be similar to the construction and in reverse sequence.

5 Site selection and alternatives

5.1.1 Overview

5.1.1.1 The Applicants have undertaken a route planning and site selection process to identify the location of the Transmission Assets project. The aim was to identify sites and routes that avoid potential impacts, where possible, and which consider environmental, engineering, human and landowner constraints and/or requirements.

5.1.1.2 Each stage of the site selection process forms part of an iterative design process undertaken. The route planning and site selection process will continue to evolve, as required, as consultation continues and where new information and data may come to light.

5.1.2 Point of interconnection

5.1.2.1 Both the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm were scoped into the 'Pathways to 2030' workstream under the Offshore Transmission Network Review. The Offshore Transmission Network Review aims to consider, simplify, and wherever possible facilitate a collaborative approach to offshore wind projects connecting to the National Grid.

5.1.2.2 A number of potential grid connection locations and options were considered by National Grid Electricity System Operator through the Holistic Network Design Review process based on an understanding of the grid infrastructure capacity in relation to the location of the Morgan Offshore Wind Project and Morecambe Offshore Windfarm Agreement for Lease areas (i.e. where the offshore wind farms would be located) (and considering other Round 4 offshore wind projects coming forwards in the Irish Sea).

5.1.2.3 A key output of the Holistic Network Design Review process was the conclusion that the two offshore wind farms should collaborate in connecting to the national grid electricity transmission network at Penwortham in Lancashire.

5.1.3 Landfall

5.1.3.1 The landfall point is where the offshore export cables would be brought ashore before being connected to the onshore export cables. One of the key considerations for landfall was the location of the Agreement for Lease area in relation to the location of the National Grid substation at Penwortham. An initial area of search area was identified for the landfall between the towns of Blackpool and Formby.

5.1.3.2 Broad landfall zones were then identified based on initial constraints analysis and guided by the following overarching design principles.

- Select the shortest route possible.
- Where possible, avoid key sensitive receptors.

- An area with adequate space outlined within the high level design envelope.

5.1.3.3 Of the six potential landfall locations initially identified, those locations south of the Ribble Estuary were primarily discounted due to the number of sensitive environmental designations. This was coupled with the significant engineering feasibility challenges associated with making landfall at these landfall zones. Engineering challenges related to the anticipated length of potential Horizontal Directional Drills (or use of other trenchless methodologies), the potential need for greater stretches of open cut trenching, and for crossing larger areas of statutory nature conservation designations (i.e., international, European and national sites) and sensitive habitats (e.g., saltmarsh, mudflats and/or coastal sand dunes).

5.1.3.4 Onshore constraints adjacent to the landfall zones were also a consideration and included the need for complex interactions between the extent of urban development, Special Category Land (e.g., Royal Air Force/Ministry of Defence land), infrastructure crossings, main rivers and non-statutory nature designations. These constraints, coupled with engineering and environmental constraints in the intertidal and coastal areas adjacent, resulted in the landfall locations south of the Ribble Estuary to be discounted. The Lytham St. Annes Zone north of the Ribble was therefore the only landfall zone taken forward to the Scoping stage of the project. This proposed landfall can be found in **Figure 4.5**.

5.1.4 Offshore elements

5.1.4.1 The offshore export cable corridor routing exercise sought to identify the shortest route from the Agreement for Lease areas where the offshore substation platforms are located to the selected landfall location at Lytham St Annes, whilst avoiding environmental sensitivities and third-party/existing seabed users.

5.1.4.2 Initially, five potential export routes were identified, as set out in the following.

- Route 1: Morgan cables exit offshore substation platforms from north and travel east through the northern part of the gas fields. Route 1 joins the Morecambe cables exiting the eastern side of the Morecambe offshore substation platforms and the combined corridor (Route 1 and 5) heads east to the coast.
- Route 2: Morgan cables exit offshore substation platforms from north and travel east through the southern part of the gas fields and along the northern boundary of Morecambe Offshore Substation Platforms. Route 2 joins the Morecambe cables exiting the eastern side of the Morecambe offshore substation platforms and the combined (Route 2 and 5) heads east to the coast.
- Route 3: Morgan cables exit offshore substation platforms from south and travel east through the southern part of the gas fields and along the northern boundary of Morecambe Offshore Substation Platforms. Route 3 joins the Morecambe cables exiting the eastern side of the Morecambe

offshore substation platforms and the combined corridor (Route 3 and 5) heads east to the coast.

- Route 4: Morgan cables exit offshore substation platforms from south and travel to the coast to the south of Morecambe Offshore Substation Platforms. Route 4 joins the Morecambe cables exiting the eastern side of the Morecambe offshore substation platforms and the combined corridor (Route 4 and 5) heads east to the coast.
- Route 5: Morecambe cables exit eastern side of offshore substation platforms and connects with Morgan cable route (Route 1, 2, 3 or 4) and the combined corridor heads east to the coast.

5.1.4.3 After completion of an initial constraints analysis and engineering feasibility studies, Route 4 was discounted largely due to proximity to third party cables/pipeline. The other four routes are retained for PEIR so that the offshore export cable corridor will exit the Morgan OSPs from either the north-eastern (Routes 1 or 2) or the south-western (Route 3) boundaries, heading in a general easterly or south-easterly direction before joining with the Morecambe Cable Route (Route 5) exiting to the east and traversing east to the landfall at Lytham St Annes. Where the Morgan Cable Route joins the Morecambe Cable Route, the corridor width expands to accommodate the cables and allow for sufficient width for crossings and proximity to existing cables.

5.1.4.4 Additionally, one offshore booster station may be required for the Morgan Offshore Wind Project. These are generally located near to the halfway point along the cable corridor with two search areas currently being investigated for the Morgan cable route. The easterly search area could be associated with any of the Cable Corridor Routes 1, 2 and 3 whilst the westerly search area would be for Cable Corridor Routes 2 and 3.

5.1.4.5 The offshore export cable corridor and booster station location will continue to be refined, where required, considering the environmental, human and engineering constraints as a part of the route planning and site selection process.

5.1.5 Onshore substations

5.1.5.1 To maintain electrical independence, one onshore substation will be required for the Morgan Offshore Wind Project and one for the Morecambe Offshore Windfarm.

5.1.5.2 Land up to 8 km of the National Grid substation at Penwortham was assessed for its suitability to accommodate the onshore substations based on a number of factors including but not limited to the following.

- Environmental sensitivities e.g. statutory and non-statutory designated sites, such as priority habitats, flood risk and modelling information, and contaminated land.
- Ground conditions, such as topography.
- Analysis of baseline environmental survey data, including ornithology (breeding bird and wintering bird) surveys.

- Proximity to residential properties and receptors.
- Accessibility to the existing road network.
- Utility infrastructure (mains and high pressure gas and water pipelines, and overhead pylons and lines).

5.1.5.3 This resulted in the identification of four substation zones, two north and two south of the River Ribble.

5.1.5.4 Following the non-statutory consultations in 2022 and 2023, further analysis was undertaken of the substation zones to refine and establish the most suitable zones for siting the onshore substations. Zones 3 and 4, south of the River Ribble, are rich in sensitive habitats, including local ecological networks. The land within the zones were also found to support numerous protected species of birds and are constrained by space, topography and access. Zone 2, north of the River Ribble, contains sensitive habitat similar to that found at Newton Marsh and along the Ribble Estuary and similarly were found to support numerous protected bird species. Zone 2 also contains two gas main pipelines and is generally at higher risk of flooding. Zone 1 is further from designated sites and contains fewer sensitive habitats, as well as having better access to the main highway network, allowing the potential substation areas to be sited. As such the onshore substations consultation area, which is based largely on Zone 1 has been selected to be taken forward (see **Figure 4.7**).

5.1.5.5 The process of site selection and refinement remains ongoing, and following the statutory consultation, the final siting for the onshore substations (and associated temporary and permanent infrastructure) will be presented in the final application alongside the Environmental Statement. Feedback and local knowledge provided to the projects will continue to be reviewed and considered as a part of the route planning and site selection process.

5.1.6 Onshore export cable corridor

5.1.6.1 Electricity generated from offshore wind farms is transported to the onshore substations via the onshore export cable corridor. The applicants are committed to designing cable routes with the best interests of communities and the environment in mind. The feedback received from previous consultations has been utilised within the site selection process. The siting of the onshore export cable corridor had been led at the start and end points by the location of the preferred landfall area (Lytham St. Annes) and the onshore substations statutory consultation area.

5.1.6.2 The onshore export cable corridor (see **Figure 4.5**) (and associated temporary and permanent areas) have been routed based on the identification of environmental and engineering constraints, and landowner, commercial and engineering considerations based on several guiding principles such as selecting the shortest route possible, avoiding environmental sensitivities and residential properties amongst others. Meetings were held with landowners along the proposed onshore export cable corridor route between February and May 2023, to discuss and obtain

any feedback on the identified route. The feedback was then considered and where possible was incorporated.

5.1.6.3 From the landfall, the onshore cable corridor routes head east, away from the coast. Following the 2023 non-statutory consultation an option to install the onshore export cables within some of the roads between Blackpool airport and the Queensway (B5261) has been included within the project (see **Figure 4.5**), should it be required. As understanding of the constraints within and adjacent to the landfall grows, the project will look to refine and update proposals in this area, if and where possible.

5.1.6.4 Beyond Blackpool Airport and Queensway (B5261), the route narrows and heads south east towards North Houses Lane. In the Lytham Moss and Higher Ballam area, there are two route options at present (see **Figure 4.5**):

- Option 1 (north), which passes to the north of Higher Ballam and avoids a farmland conservation area; or
- Option 2 (south), which passes to the south of Higher Ballam.

5.1.6.5 Option 2 (south) is the route we presented at our previous non-statutory consultation. Option 1 (north) is an alternate onshore export cable corridor route option proposed to mitigate potential environmental and ecological impacts. Feedback received on these options at statutory consultation will be used to refine the route planning and site selection process further.

5.1.6.6 The two options come together east of Ballam Road and the onshore cable corridor then turns south to cross Pegs Lane and passes to the north of Lytham Green Drive Golf Club. The onshore export cable corridor then continues northeast towards Halls Cross, north of Freckleton within the onshore substations statutory consultation area. In this area, the final location of the onshore export cable corridor will be determined by the location of the onshore substations, which will be refined and confirmed after the 2023 statutory consultation.

5.1.6.7 The onshore cable corridor location will continue to be refined, where appropriate, following statutory consultation feedback and based on further refinement of the various constraints and analysis of any new data and baseline information.

5.1.6.8 The final location of the 400 kV grid connection cable corridor that will connect the proposed onshore substations to the existing National Grid Penwortham substation has not been identified. This is being considered and will be presented in the Environmental Statement, following consultation with stakeholders.

5.1.7 400 kV grid connection cable corridor search area

5.1.7.1 The 400 kV grid connection cable corridor search area connects the onshore statutory substations consultation area to the National Grid substation at Penwortham. Since EIA Scoping this area has been reduced, primarily to the west in the vicinity of the Ribble River due to the longer and therefore much more challenging trenchless crossing likely to be required. The 400 kV grid connection area remains broad due to various constraints which are under consideration. Including, but not limited to, the presence of other

developments (e.g. solar farms), utilities, historic landfill and ground conditions. The site selection process is therefore ongoing, and will consider these constraints, alongside the environmental designations at the River Ribble and consultation feedback received.

6 Environmental assessment methodology

6.1 Consultation and scoping

6.1.1 Scope of the assessment

6.1.1.1 Scoping is the process of identifying the relevant environmental topics to consider within the EIA process (establishing the scope of the assessment). Scoping is therefore an important preliminary process, which sets the context for the EIA. Through scoping, the key environmental impacts are identified at an early stage, which permits subsequent work to concentrate on those topics for which significant effects may arise.

6.1.1.2 The scoping process is informed by increasing knowledge acquired through the EIA process. **Figure 6.1** highlights some of the key inputs to the scoping process undertaken for the Transmission Assets.



Figure 6.1: Overview of the scoping process

6.1.1.3 Consultation on the proposed EIA methodology was undertaken at the EIA scoping stage. The Transmission Assets Scoping Report, which contained details of the proposed approach to EIA for each topic was submitted to the Planning Inspectorate on 28 October 2022. The Applicants received the Scoping Opinion on 8 December 2022. The Applicants met with a range of stakeholders to discuss the feedback in more detail and to consider

refinements to the Transmission Assets ahead of formal consultation on the PEIR. Consultation will continue throughout the EIA process.

6.1.2 Engagement and the Evidence Plan process

6.1.2.1 Following scoping, engagement is continuing in order to facilitate proportionate EIA and the iterative design process.

6.1.2.2 A key part of this engagement includes the Evidence Plan process. In developing the Evidence Plan for the Transmission Assets, stakeholder engagement and input is of fundamental importance. An Evidence Plan process Steering Group has been set up to include the following:

- the Applicants and their EIA consultants;
- the Planning Inspectorate;
- Natural England;
- the Marine Management Organisation (Cefas);
- Historic England;
- Blackpool Council;
- Fylde Council;
- Preston City Council;
- South Ribble Borough Council; and
- Lancashire County Council.

6.1.2.3 The Steering Group has met and will continue to meet at key milestones throughout the EIA process. In addition, Expert Working Groups (EWGs) have been set up to discuss topic specific areas with the relevant stakeholders.

6.2 Approach to EIA

6.2.1 Design envelope approach

6.2.1.1 At this stage of the EIA and consenting process, the project description for the Transmission Assets is indicative. There may be design elements that are unknown to an applicant at the time of application.

6.2.1.2 In such cases, a Project Design Envelope approach (also known as the Rochdale Envelope approach) may be used. This approach defines a design envelope and parameters within which the final design will sit. It allows flexibility for elements that are likely to require more detailed design following submission of the PEIR or Environmental Statement, such as siting of infrastructure, foundation types and construction methods. It also allows the findings of the consultation process and feedback from statutory and non-statutory stakeholders to be considered during the design process both during the application and after submission, where appropriate. Further information on this approach is included in Volume 1, Chapter 3: Project description of the PEIR.

6.2.1.3 The adoption of this approach allows meaningful EIA to take place by defining a ‘maximum design scenario’ on which to base the identification of likely environmental effects. The maximum design scenario is the scenario that would give rise to the greatest impact (and subsequent effect). For example, where several substation design options are under consideration, the assessment is based on the option predicted to have the largest magnitude of impact. This may be the option with the largest footprint, the greatest height or the largest area of disturbance during construction, depending on the topic under consideration. By identifying the maximum design scenario for any given impact, it can be concluded that the impact (and therefore the resulting effect) would be no greater for any other design scenario.

6.2.1.4 The final design for the Transmission Assets will be selected after development consent has been granted, from within the parameters set out in the Environmental Statement and draft Development Consent Order.

6.2.2 Mitigation and the iterative design process

6.2.2.1 The PEIR has been prepared with the need for proportionate EIA in mind. All topics have been evaluated by competent experts, as required by the EIA Regulations.

6.2.2.2 During the EIA process, environmental issues have been taken into account as part of an ongoing iterative design process. The process of EIA has therefore been used as a means of informing the design. This design process is shown in **Figure 6.2** and allows for the use of good design principles alongside the identification of key constraints to inform the design process.

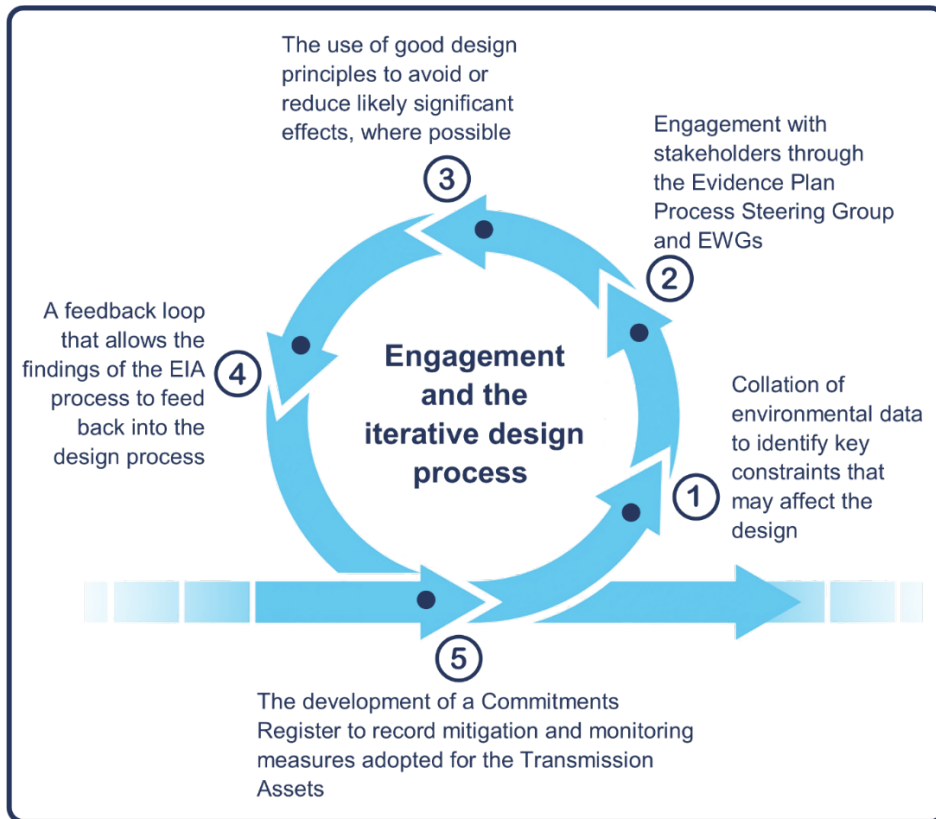


Figure 6.2: Engagement and the iterative design process

6.2.2.3 For the purposes of the PEIR, the term ‘measures adopted as part of the Transmission Assets’ is used to include measures that have been identified during the EIA process to date and that the Applicants are committed to.

6.2.3 Assessment of effects

6.2.3.1 EIA is a means of identifying and collating information to inform an assessment of the likely significant environmental effects of a development. For each of the key environmental topics in the PEIR, the following have been addressed:

- assessment methodology;
- description of the existing environmental (baseline) conditions;
- identification and assessment of the significance of likely effects arising from the Transmission Assets;
- identification of any mitigation measures proposed to avoid, reduce and, if possible, remedy adverse effects; and
- assessment of any cumulative effects with other proposed developments planned in the area and inter-relationships between environmental topics.

6.2.3.2 The Transmission Assets have the potential to create a range of 'impacts' and consequent 'effects' with regard to the environment. The term 'impact' is defined as a change that is caused by an action. The term 'effect' is defined as the consequence of an impact. For example, the laying of a cable (action)

results in disturbance (impact), with the potential to disturb habitats and species (effect). This Non-Technical Summary sets out the significant effects identified during the EIA process at this stage.

6.2.4 Cumulative Effect Assessment

6.2.4.1 Cumulative effects are defined as those that result from incremental changes caused by other reasonably foreseeable projects, alongside the project in question. An assessment of cumulative effects has been undertaken, including consideration of the effects of the Transmission Assets together with the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm. This Non-Technical Summary sets out the significant effects identified during the EIA process at this stage.

6.2.5 Transboundary effects

6.2.5.1 Transboundary effects arise when impacts from a project within one European Economic Area affect the environment of another. The need to consider such transboundary effects has been embodied by the United Nations Economic Commission for Europe Convention on EIA in a Transboundary Context (commonly referred to as the 'Espoo Convention'). The Espoo Convention requires that assessments are extended across borders between parties of the Espoo Convention when a planned activity may cause significant adverse transboundary effects.

6.2.5.2 The Planning Inspectorate's Advice Note Twelve sets out the procedures for consultation in association with an application for development consent, where such development may have significant transboundary effects. The Applicants have notified the Planning Inspectorate of the potential for transboundary impacts arising from the Transmission Assets through the request for a Scoping Opinion.

6.2.5.3 A screening matrix has been prepared for the PEIR (which will be updated for the Environmental Statement) which identifies potential significant transboundary effects to be considered within the EIA process for the following topics:

- fish and shellfish ecology;
- marine mammals;
- offshore ornithology;
- commercial fisheries;
- shipping and navigation; and
- climate change.

7 Potential environmental effects – offshore

7.1 Introduction

7.1.1.1 This section sets out the potential significant environmental effects for the following:

- physical processes;
- benthic subtidal and intertidal ecology;
- fish and shellfish ecology;
- marine mammals;
- offshore ornithology;
- commercial fisheries;
- shipping and navigation;
- marine archaeology; and
- other sea users.

7.1.1.2 Key offshore environmental constraints are shown in **Figure 7.1**.

7.2 Physical processes

7.2.1 Introduction

7.2.1.1 Volume 2, Chapter 1 of the PEIR sets out the assessment of effects in relation to physical processes. The term physical processes refer to coastal and marine processes and their relationship with the physical environment. This includes tidal currents, the wave climate and the sediment transport regime.

7.2.2 Approach

7.2.2.1 The assessment of physical processes for the Transmission Assets has been informed by modelling undertaken for the Morgan Offshore Wind Project and site-specific geophysical and metocean data. This has been considered together with a detailed review of existing studies and datasets, including those relating to the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm.

7.2.3 Baseline environment

7.2.3.1 The existing seafloor morphology includes several distinct features, including sandwaves, megaripples, sediment waveforms and outcrops. The majority of the Transmission Assets Red Line Boundary comprises regions of soft mud/ (clay and silt) rich sediment. However, the north western part of the Transmission Assets Red Line Boundary falls within the central gravel belt containing coarser sands and gravels.

7.2.3.2 The existing wave climate is described as dominated by short period, south westerly/westerly waves. Tidal currents move towards the land and away from sea to the east/north east and move away from the land and towards the sea to the west/south west. Relatively strong flows are present in the offshore region during spring tides. However, the residual current speeds are several orders of magnitude smaller than those along the coastline. Sediment transport rates are highest during spring tides.

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

7.2.4.1 The measures proposed by the Applicants are set out in the PEIR. These measures include the following.

- Outline Offshore Cable Specification and Installation Plan(s) will be produced prior to the construction of the offshore export cable which will include: details of cable burial depths, cable protection, cable monitoring and a cable layout plan.
- Construction Method Statement(s) will be produced and include details of foundation installation of methodology covering scour protection and the deposition of material arising from drilling, dredging, and/or soundwave clearance.
- Development and adherence to an Offshore Cable Specification and Installation Plan which will include cable burial to be the preferred option for cable protection where practicable.

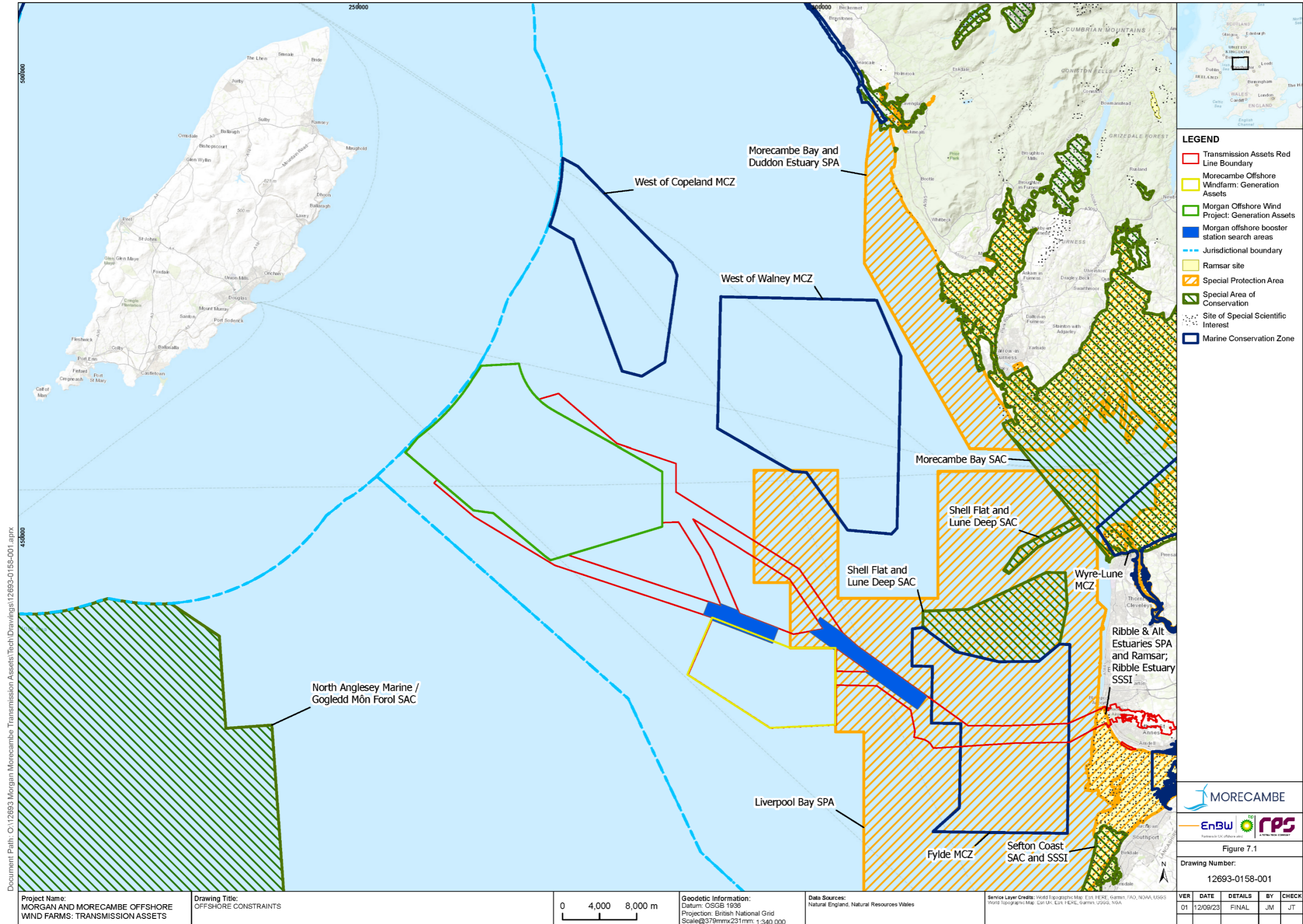
7.2.5 Assessment of effects

7.2.5.1 The assessment has considered:

- increases in suspended sediment concentrations due to construction, operation and maintenance and/or decommissioning related activities, and the potential impact to physical features; and
- changes to wave climate, tidal regime, littoral currents and sediment transport.

7.2.5.2 During construction, increases in suspended sediment concentrations may arise due to seabed preparation involving sandwave clearance, the installation of export cables, interconnector cables, offshore substation platforms and the Morgan offshore booster station. Sediment plumes produced during construction will be localised and will not persist beyond the study area. Sediment increase would not influence bathymetry of key receptors such as sandbanks, mudflats and sandflats.

7.2.5.3 During operation and maintenance, the presence of infrastructure may lead to changes in impacts to the tidal regime, wave regime, sediment transport and associated sediment transport pathways and the associated potential impacts along adjacent shorelines and physical features. However, the impacts will occur in close proximity to the location of the offshore substation platforms and the Morgan offshore booster station and will not extend beyond the physical processes study area. Changes may also occur due to the



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Project Name:
MORGAN AND MORECAMBE OFFSHORE
WIND FARMS: TRANSMISSION ASSETS

Drawing Title:
OFFSHORE CONSTRAINTS

0 4,000 8,000 m

Geodetic Information:
Datum: OSGB 1936
Projection: British National Grid
Scale@379mmx231mm: 1:340,000

Data Sources:
Natural England, Natural Resources Wales

Service Layer Credits: World Topographic Map: Esri, HERE, Garmin, FAO, NOAA, USGS
World Topographic Map: Esri, HERE, Garmin, USGS, NOAA

MORECAMBE
EnBW **bp** **rps**
Partners in UK offshore wind

Figure 7.1
Drawing Number:
12693-0158-001

| VER | DATE | DETAILS | BY | CHECK |
|-----|----------|---------|----|-------|
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Figure 7.1: Offshore environmental constraints

- 7.2.5.4 presence of cable protection in shallow water. No cable protection will be placed in the intertidal zone. The limited magnitude of changes observed would not alter the hydrography of sandbanks.
- 7.2.5.5 Effects during the decommissioning phase would be of lesser magnitude than during the construction or the operation and maintenance phase.
- 7.2.5.6 Overall, the assessment has not identified any significant effects arising from the Transmission Assets during the construction, operation and maintenance or decommissioning phases.

7.2.6 Cumulative effects

- 7.2.6.1 Cumulative effects with other developments have been assessed. Overall, the assessment has not identified any significant cumulative effects.

7.3 Benthic subtidal and intertidal ecology

7.3.1 Introduction

- 7.3.1.1 Volume 2, Chapter 2 of the PEIR sets out the assessment of effects in relation to benthic ecology. Benthic ecology refers to the communities of animals and plants that live on or in the seabed and the relationships that they have with each other and with their physical environment. Subtidal ecology relates to the ecology present beneath mean low water springs, while intertidal relates to the area between mean low water springs and Mean High Water Springs. Effects on the protected features associated with the Fylde Marine Conservation Zone are also set out within the Marine Conservation Zone Assessment.

7.3.2 Approach

- 7.3.2.1 The assessment for benthic ecology has been informed by a series of site-specific surveys using grab sampling and underwater video. An intertidal survey was also undertaken.

7.3.3 Baseline environment

- 7.3.3.1 Site-specific surveys indicated that the subtidal seabed supports a variety of plant and animal communities that are typical of this area. Benthic communities are characterised by high numbers of marine worms and brittlestars in coarser sediments, with a brittlestar bed recorded on sediment in the north west of the survey area. Muddy sands were present in the centre and nearshore parts of the survey area, which were associated with molluscs and a range of different species of marine worms. Sandy sediments were found immediately adjacent to the landfall area, with this dominated by a relatively limited range of mollusc species.
- 7.3.3.2 No reef habitats were recorded within the Transmission Assets Red Line Boundary. A habitats assessment recorded the presence of burrows and these areas were considered to potentially represent a seapens and burrowing megafauna community.

7.3.3.3 The Transmission Assets Red Line Boundary overlaps with the Fylde Marine Conservation Zone in the nearshore. The Shell Flat and Lune Deep Special Area of Conservation, the West of Walney Marine Conservation Zone and the West of Copeland Marine Conservation Zone are located to the north of the Transmission Assets Red Line Boundary.

7.3.3.4 The intertidal survey identified a relatively low diversity range of plants and animals, typical of an exposed sandflat shore. The upper and mid shore contained fine sand shores arranged in largely barren sandbars, between which were waterlogged troughs of muddy sand characterised by marine worms and molluscs. The lower shore reflected the conditions in these troughs, but with higher densities of marine worms, urchins and molluscs in a complex mosaic of species across the shore.

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

7.3.4.1 The measures proposed by the Applicants are set out in the PEIR. These measures include the following.

- An Offshore Cable Specification and Installation Plan will be prepared. This will require offshore export cables to be buried where possible and will provide details of cable protection as necessary.
- Cable Specification and Installation Plan(s) will include measures to limit the extent of cable protection and sandwave clearance within the Fylde Marine Conservation Zone and will be informed through the undertaking of survey works pre-construction.
- An Offshore Construction Environmental Management Plan will be developed, to include a Marine Pollution Contingency Plan. This will include details of measures to prevent accidental spills, address all potential contaminant releases and include key emergency details, as well as action proposed to minimise invasive species.
- Construction Method Statement(s) will be produced prior to construction and details of cable installation and foundation installation.

7.3.5 Assessment of effects

7.3.5.1 The assessment has considered:

- habitat loss/disturbance;
- increased suspended sediment concentrations and associated deposition and disturbance/remobilisation of sediment-bound contaminants;
- introduction of artificial structures and removal of hard substrate;
- increased risk of introduction and spread of Invasive Non-Native Species;
- changes in physical processes; and
- impacts due to electromagnetic fields and heat from undersea cables.

- 7.3.5.2 With respect to temporary habitat disturbance, the proportion of habitat disturbed is predicted to be small overall in the context of available habitats in the wider area.
- 7.3.5.3 In terms of longer term habitat loss, no long term habitat loss is predicted within the intertidal zone. Within the subtidal, the overall area of introduced hard infrastructure, compared to the extensive soft sediments present in the wider area, is small.
- 7.3.5.4 Temporary increases in suspended sediment concentrations and associated deposition will be short term, with sediments expected to disperse to background concentrations rapidly, and most biological features having a low sensitivity to this impact.
- 7.3.5.5 Overall, the assessment has not identified any significant effects arising from the Transmission Assets during the construction, operation and maintenance or decommissioning phases.

7.3.6 Cumulative effects

- 7.3.6.1 Cumulative effects with other developments have been assessed. One significant cumulative effect has been identified with the Morgan Offshore Wind Project, in relation to temporary habitat disturbance. The significance of this cumulative effect is predicted to decrease in the long term as the sediments and associated benthic communities will recover over time. In the longer term, no significant cumulative effects are predicted. Further project design refinements are under consideration to reduce the contribution to this effect from the Transmission Assets.

7.4 Fish and shellfish ecology

7.4.1 Introduction

- 7.4.1.1 Volume 2, Chapter 3 of the PEIR sets out the assessment of effects in relation to fish and shellfish ecology. Fish and shellfish ecology refers to the communities of animals (various commercially and ecologically important fish, crustacean and mollusc species). This includes those that live in the water column or on and in the seabed, including diadromous fish (those that move between freshwater to saltwater) which move into freshwater environments for spawning activity and the relationships these organisms have with each other and the physical environment.

7.4.2 Approach

- 7.4.2.1 The fish and shellfish ecology assessment has been informed primarily by a literature review of the large amount of data available on the species found in the Irish Sea. Relevant data from seabed characterisation surveys were also considered to better understand the habitats present.

7.4.3 Baseline environment

7.4.3.1 The work has identified the presence of a range of fish (including shark and ray) and shellfish species with spawning or nursery grounds in the vicinity of the Transmission Assets and in the wider East Irish Sea. Species of particular ecological and commercial interest include herring, with important spawning grounds to the immediate north west of the Transmission Assets. Sandeel species were also noted as having important populations and spawning grounds in this area, with these being of interest as sandeel are an important food source for a wide range of predators. Datasets for populations of basking shark, angel shark and tope shark, all considered threatened species, were also examined, including the potential for these passing through the area, although the likelihood of this occurring for basking shark and angel shark is considered low.

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

7.4.4.1 The measures proposed by the Applicants are set out in the PEIR. These measures include the following.

- Development and adherence to an Offshore Cable Specification and Installation Plan which will include cable burial to be the preferred option for cable protection, where practicable.
- An Outline Marine Mammal Mitigation Protocols will be developed and implemented during construction to reduce the risk of injury to marine mammals and fish species.
- Development and adherence to an Offshore Construction Method Statement.
- Development of, and adherence to, an Offshore Construction Environmental Management Plan, including actions to minimise invasive species and a Marine Pollution Contingency Plan which will include planning for accidental spills, address all potential contaminant releases and include key emergency details.

7.4.5 Assessment of effects

7.4.5.1 The assessment has considered:

- habitat loss/disturbance;
- underwater sound;
- increased suspended sediment concentrations and associated sediment deposition and remobilisation of sediment-bound contaminants;
- introduction of hard substrates;
- electromagnetic fields from cables; and
- risk of injury to basking shark through collision with vessels.

- 7.4.5.2 There is potential for herring to be subject to effects from underwater sound, should piling occur during the known spawning period for this species, however given the short duration and intermittent nature of planned piling for the Transmission Assets this is an unlikely scenario. No mitigation is considered necessary based upon the assessment outcomes. However, mitigation options are currently being investigated to minimise risks of any potential significant effects if piling occurs during the herring spawning season.
- 7.4.5.3 Cod is also considered sensitive to underwater sound. However, based upon the limited duration of piling, no significant effect for cod, along with herring or other fish and shellfish species is predicted.
- 7.4.5.4 In terms of temporary and long term habitat loss/disturbance, the proportion of habitat lost, including spawning and nursery grounds, associated with the Transmission Assets is predicted to be small in the context of available habitats in the wider area and natural behaviours are expected to return following the short-term habitat disturbance.
- 7.4.5.5 Overall, the assessment has not identified any significant effects arising from the Transmission Assets during the construction, operation and maintenance or decommissioning phases.

7.4.6 Cumulative effects

- 7.4.6.1 Cumulative effects with other developments have been assessed. Overall, the assessment has not identified any significant cumulative effects.

7.5 Marine mammals

7.5.1 Introduction

- 7.5.1.1 Volume 2, Chapter 4 of the PEIR sets out the assessment of effects in relation to marine mammals.

7.5.2 Approach

- 7.5.2.1 No site-specific surveys have been undertaken for marine mammals for the Transmission Assets. However, an extensive review of existing studies and datasets was undertaken to characterise the baseline environment for marine mammals.
- 7.5.2.2 The review included data from the first year of site-specific aerial digital surveys undertaken for the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm, as well as other plans and projects within the study area. Data from research surveys have also been considered.

7.5.3 Baseline environment

- 7.5.3.1 Several species of cetacean (whales, dolphins and porpoises) as well as grey and harbour seals have been recorded in the Irish Sea. Seven species have been identified as being key receptors and taken forward for assessment. These species are harbour porpoise, bottlenose dolphin, minke

whale, short-beaked common dolphin, Risso's dolphin, grey seal and harbour seal.

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

7.5.4.1 The measures proposed by the Applicants are set out in the PEIR. These measures include the following.

- The implementation of a Marine Mammal Mitigation Protocol and measures such as soft start, ramp up for piling and the use of low-order techniques for unexploded ordnance detonation to reduce the risk of injury for all species.
- Development of, and adherence to, an Offshore Construction Environmental Management Plan, including a Marine Pollution Contingency Plan which will include planning for accidental spills, address all potential contaminant releases and include key emergency details.
- Development and adherence to an Offshore Construction Method Statement.
- An Offshore Decommissioning Plan(s) will be developed prior to decommissioning.
- Unexploded Ordnance specific Marine Mammal Mitigation Protocol will be implemented during the Unexploded Ordnance clearance.
- Vessel Management Plan(s) will be developed pre-construction in lines with legislation, guidance and industry best practice which will:
 - determine vessel routing to and from construction areas and ports;
 - include vessel standards and a code of conduct for vessel operators; and
 - minimise, as far as reasonably practicable, encounters with marine mammals.

7.5.5 Assessment of effects

7.5.5.1 The assessment has considered:

- injury and disturbance from underwater sound generated from piling;
- injury and disturbance from underwater sound generated from unexploded ordnance detonation;
- disturbance to marine mammals from vessel use and other (non-piling) sound producing activities;
- injury to marine mammals due to collision with vessels;
- effects on marine mammals due to changes in prey availability; and
- injury and disturbance from underwater sound generated from pre-construction survey sources.

- 7.5.5.2 Underwater sound modelling was undertaken for a range of types of unexploded ordnance. Very low numbers of animals were predicted to be impacted by unexploded ordnance detonation with the implementation of the Marine Mammal Mitigation Protocol.
- 7.5.5.3 All vessels will be required to follow the provisions outlined in the Vessel Management Plan for vessel behaviour and vessel operators including not deliberately approaching mammals and to avoid sudden changes in course or speed, therefore reducing the risk to marine mammals.
- 7.5.5.4 Overall, the assessment has not identified any significant effects arising from the Transmission Assets during the construction, operation and maintenance or decommissioning phases.

7.5.6 Cumulative effects

- 7.5.6.1 Cumulative effects with other developments have been assessed. There is potential for significant cumulative effects as a result of behavioural disturbance during piling for bottlenose dolphins. The cumulative impact of piling at projects across the Irish Sea could result in potential reductions to lifetime reproductive success to some individuals in the Irish Sea population. Disturbance in offshore areas during piling could lead to a longer duration over which individuals may be displaced from key feeding areas. Further project design refinements are under consideration to reduce the contribution to this effect from the Transmission Assets and will be explored/discussed with consultees.

7.6 Offshore ornithology

7.6.1 Introduction

- 7.6.1.1 Volume 2, Chapter 5 of the PEIR sets out the assessment of effects in relation to offshore ornithology. Offshore ornithology refers to the communities of birds that utilise or fly over the area seaward of Mean Low Water Springs.

7.6.2 Approach

- 7.6.2.1 The identification of existing conditions was informed by desk-based studies and supporting survey data from surveys of the Morecambe Offshore Windfarm and the Morgan Offshore Wind Project. The benthic and fish and shellfish assessments that are reported in chapters of the PEIR were also used to inform the assessment, in order to determine potential impacts on prey species.

7.6.3 Baseline environment

- 7.6.3.1 The Transmission Assets are situated in the central part of the Irish Sea. There have been 21 species of seabird reported as regularly nesting on beaches or cliffs around the Irish Sea and a large proportion of the Manx shearwater population has been found breeding on offshore islands around the Irish Sea. Most of the global Manx shearwater population is found in the

UK and over 90% of the population is found on the Islands of Rum, Egg (Scotland), Skomer and Skokholm (Wales). Other abundant and widespread seabird species in the central Irish Sea include northern gannet, common guillemot, European herring gull, black-legged kittiwake, lesser black-backed gull, Manx shearwater and razorbill.

7.6.3.2 During the non-breeding season, large populations of common scoter and red-throated diver use the shallow waters of Liverpool Bay.

7.6.3.3 The Scoping Report response by the Isle of Man Government identified that populations on the Isle of Man exceed 1 % of the UK or British Isles breeding seabird populations for herring gull, little tern, shag and cormorant and for over-wintering populations of shag, herring gull, great black-backed gull and black-throated diver. In addition, they exceed the 0.5 % levels for breeding great black-backed gull, black guillemot and over-wintering cormorant.

7.6.3.4 The Transmission Assets pass through the following designated sites.

- Liverpool Bay Special Protection Area, which is designated for qualifying features including its non-breeding (wintering) populations of red-throated diver and little gull and for providing foraging areas for breeding little tern and common tern. The Special Protection Area also qualifies for its non-breeding (wintering) population of common scoter as well as its wintering waterbird assemblage, which includes over 1 % of the Great Britain population of cormorant and red-breasted merganser.
- Ribble and Alt Estuaries Special Protection Area and Ramsar site, designated for:
 - its breeding population of lesser black-backed gull;
 - spring/autumn passage populations of ringed plover, grey plover, knot Calidris, sanderling, dunlin, black-tailed godwit, redshank and lesser black-backed gull; and
 - winter populations of Bewick's swan, whooper swan, pink-footed goose, shelduck, wigeon, teal, pintail, oystercatcher and bar-tailed godwit.

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

7.6.4.1 The measures proposed by the Applicants are set out in the PEIR. These measures include the following.

- An Offshore Construction Environmental Management Plan (to include a Marine Pollution Contingency Plan) and an Offshore Environmental Monitoring Plan will be produced and followed.
- Operational site lighting at the offshore substation platforms and Morgan offshore booster station will be designed in accordance with the latest legislation.
- An Offshore Decommissioning Plan(s) will be developed prior to decommissioning.

- Development of, and adherence to, an Offshore Construction Environmental Management Plan, including actions to minimise invasive species and a Marine Pollution Contingency Plan which will include planning for accidental spills, address all potential contaminant releases and include key emergency details.

7.6.5 Assessment of effects

7.6.5.1 The assessment has considered:

- disturbance and displacement (from airborne sound, underwater sound and presence of vessels and infrastructure);
- indirect impacts from underwater sound, habitat loss and increased suspended sediment concentrations affecting prey species;
- temporary habitat loss/disturbance; and
- increased suspended sediment concentrations.

7.6.5.2 Some of the ornithological receptors that occur within the area are considered to be of high or very high sensitivity to disturbance and displacement. However, due to the minor, localised and temporary nature of the activities associated with all phases of the Transmission Assets, the magnitude (or size) of the disturbance and displacement impacts resulting from airborne sound, underwater sound and presence of vessels and infrastructure is considered to be negligible.

7.6.5.3 Overall, the assessment has not identified any significant effects arising from the Transmission Assets during the construction, operation and maintenance or decommissioning phases.

7.6.6 Cumulative effects

7.6.6.1 Cumulative effects with other developments have been assessed. Overall, the assessment has not identified any significant cumulative effects.

7.7 Commercial fisheries

7.7.1 Introduction

7.7.1.1 Volume 2, Chapter 6 of the PEIR sets out the assessment of effects in relation to commercial fisheries. Commercial fisheries are defined as any form of fishing activity where the catch is sold for taxable profit.

7.7.2 Approach

7.7.2.1 The existing commercial fisheries conditions were characterised through a review of publicly available data, site-specific surveys and consultation with fisheries' stakeholders.

7.7.3 Baseline environment

7.7.3.1 Within the region, fish landings (catch brought ashore) are dominated by dredge vessels and shellfish are the most important species group in terms of landed weight and value. Within the north most area of the Transmission Assets Red Line Boundary, there is a queen scallop ground of commercial importance to dredging vessels which come from the west coast of Scotland. There are also major queen scallop bed within the Irish Sea. These vessels, as well as vessels from the Isle of Man and nomadic vessels from Ireland and Northern Ireland, also engage in the king scallop fishery in the region.

7.7.3.2 English static gear vessels targeting whelk and crab within the Transmission Assets Red Line Boundary operate out of Fleetwood and Whitehaven. Beam trawl vessels from Belgium and the south coast of England are also present, targeting flatfish such as sole and plaice. Vessels from Ireland and Northern Ireland, deploying pelagic trawls (trawls that target species between the surface and seabed) and seine nets that target herring, are active across the commercial fisheries study area. Norway lobster grounds off the coast of Cumbria are of particular importance to vessels that deploy demersal trawls and otter trawls (trawls which target species on the seabed), which are predominantly from England and Northern Ireland.

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

7.7.4.1 The measures proposed by the Applicants are set out in the PEIR. These measures include the following.

- Offshore Cable Specification and Installation Plan(s) will include for cable burial to be the preferred option for cable protection, where practicable.
- Outline Fisheries Liaison and Coexistence Plan(s) will be produced to set out the commitments relating to coexistence with the fishing industry and to ensure navigational safety. It will reference the appointment and responsibilities of a company fisheries liaison officer. The detailed Fisheries Liaison and Coexistence Plan will accord with the Outline Fisheries Liaison and Coexistence Plan.
- The Outline Fisheries Liaison and Coexistence Plan(s) will also include details for providing advance warning and information on accurate locations for construction and maintenance activities, associated Safety Zones and advisory passing distances to be given via Notifications to Mariners to ensure navigation safety.

7.7.5 Assessment of effects

7.7.5.1 The assessment has considered:

- loss or restricted access to fishing grounds;
- displacement of fishing activity;
- loss or damage to fishing gear due to snagging;

- potential impacts on commercially important fish and shellfish resources; and
- supply chain opportunities for local fishing vessels.

7.7.5.2 The measures proposed as part of the Transmission Assets include the development of an Outline Fisheries Liaison and Coexistence Plan(s). Impacts are limited by the temporary and intermittent nature of the works during the construction phase and the relatively large operational ranges of most fishing vessels that operate within the Transmission Assets Red Line Boundary.

7.7.5.3 Overall, the assessment has not identified any significant effects arising from the Transmission Assets during the construction, operation and maintenance or decommissioning phases.

7.7.6 Cumulative effects

7.7.6.1 Cumulative effects with other developments have been assessed. The assessment has identified the potential for significant cumulative effects in relation to loss or restricted access to fishing grounds for Scottish west coast scallop vessels from the Transmission Assets when assessed alongside the Morgan Offshore Wind Project Generation Assets as well as other projects. Commitments are being developed as part of the Morgan Offshore Wind Project and the Mona Offshore Wind Project to address this.

7.8 Shipping and navigation

7.8.1 Introduction

7.8.1.1 Volume 2, Chapter 7 of the PEIR sets out the assessment of effects in relation to shipping and navigation. This considers impacts upon maritime safety and the activities of commercial shipping, ferries, ports/harbours, commercial fisheries, recreational cruising and other maritime operations.

7.8.2 Approach

7.8.2.1 The existing shipping and navigation conditions were identified through a review of relevant publications, collection and analysis of historic vessel traffic and incident data and consultation with key stakeholders.

7.8.3 Baseline environment

7.8.3.1 The Transmission Assets are located in an area frequently utilised by a variety of different maritime users. Existing offshore wind farms, oil and gas and aggregate activities are present throughout the region/East Irish Sea. Key commercial shipping routes bound for the Port of Liverpool pass clear of the study area, but smaller shipping routes to Douglas and Heysham cross through the Transmission Assets Red Line Boundary. Regular ferry services between the UK, Isle of Man and Ireland operate in the East Irish Sea, and fishing by static and mobile gear takes place, throughout the study area. Offshore recreational cruising routes between the UK and the Isle of Man

were also identified operating throughout the study area, although the numbers of vessels using them is low. Tug and service activities supporting existing offshore infrastructure is widespread.

7.8.3.2 Adverse weather, particularly from the prevailing south west, was demonstrated to have an influence on vessel traffic patterns. Historic incident data demonstrated that relatively few navigational incidents had occurred within the study area, with the majority analysed occurring in the approaches to Liverpool.

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

7.8.4.1 The measures proposed by the Applicants are set out in the PEIR. These measures include the following.

- Cable Burial Risk Assessment will be included as part of the Outline Offshore Cable Specification and Installation Plan(s).
- Layout Principles to be agreed with the Marine Management Organisation, in consultation with the Maritime Coastguard Agency and Trinity House prior to construction.
- Development of Fisheries Liaison and Co-existence Plan, Offshore Emergency Response and Safety Plan and an Outline Offshore Construction Environmental Management Plan (to include a marine pollution contingency plan).
- Safety Zone Statements will be produced and include safety zones of up to 500 m and the use of guard vessels.
- The Applicants will ensure compliance with legislation for vessel traffic monitoring and continuous watch, where appropriate, in consultation with the Maritime Coastguard Agency. Secured through relevant conditions as part of the marine licence(s).
- Outline Fisheries Liaison and Coexistence Plan(s) will include details for providing advance warning and information on accurate locations for construction and maintenance activities, associated Safety Zones, and advisory passing distances to be given via Notifications to Mariners to ensure navigation safety.
- Suitable lighting and marking of offshore structures.

7.8.5 Assessment of effects

7.8.5.1 The assessment has considered:

- impact on recognised sea lanes essential to international navigation;
- Impact to commercial operators including strategic routes and lifeline ferries;
- impact to adverse weather vessel routing;
- impact on access to ports and harbours;

- impact on emergency response capability due to increased incident rates and reduced access for search and rescue responders;
- impact on vessel to vessel collision risk;
- impact on allision (contact) risk to vessels;
- impact on marine navigation, communications, electromagnetic interference and radar and positioning systems;
- impact on recreational craft passages and safety;
- impact on snagging risk to vessel anchors and fishing gear;
- impact to oil and gas navigation, operations and safety; and
- impact on under keel clearance.

7.8.5.2 Overall, the assessment has not identified any significant effects arising from the Transmission Assets during the construction, operation and maintenance or decommissioning phases.

7.8.6 Cumulative effects

7.8.6.1 Cumulative effects with other developments have been assessed. Significant cumulative effects have been identified when the Transmission Assets are considered together with other projects as follows:

- impact to commercial operators including strategic routes and lifeline ferries;
- impact to adverse weather routeing;
- impact on vessel to vessel collision risk;
- impact on allision risk; and
- impact on oil and gas navigation, operations and safety.

7.8.6.2 Although the contribution of the Transmission Assets to the cumulative effects is relatively small, further work is being undertaken to consider these effects. Commitments set out by the Morgan Offshore Wind Project, Mona Offshore Wind Project and Morecambe Offshore Windfarm will also mitigate against the effects on commercial operators. This will include Notices to Mariners and marine co-ordination.

7.9 Marine archaeology

7.9.1 Introduction

7.9.1.1 Volume 2, Chapter 8 of the PEIR sets out the assessment of effects in relation to marine archaeology. Marine archaeology refers to the physical remains of the human past that survive within the marine environment. This includes maritime archaeology, such as shipwrecks and submerged prehistoric archaeological material.

7.9.2 Approach

7.9.2.1 The existing marine archaeology conditions have been characterised through a review of existing data and studies alongside an assessment of site-specific geophysical surveys.

7.9.3 Baseline environment

7.9.3.1 The site-specific geophysical survey data corroborates academic theories that the now submerged coastal areas of the East Irish Sea would have previously formed a partially terrestrial landscape during the Upper Palaeolithic and into the Mesolithic periods. Submergence to the modern coastline would have occurred towards the end of the Mesolithic periods (circa 6000 years before present). This partially terrestrial landscape would have allowed humans the opportunity to exploit the resources of the intertidal zone during these times and therefore there is the potential for the survival of archaeological material associated with these activities.

7.9.3.2 The East Irish Sea was an area of historically high maritime traffic with 69 anomalies of potential archaeological interest identified. Of these, four have been assessed to be of medium potential and three of high potential. The high potential anomalies include the identification of two wrecks and one potential wreck site. Of the two verified wrecks, the location of MG23_0053 coincides with the known wreck site, the Ben Rein, a British carrier sunk by gunfire from UB57 on 7 February 1918. The other known wreck, MG23_0059, has been identified as a steam ship and possible fishing vessel. The remaining geophysical anomalies have been classified as low potential.

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

7.9.4.1 The measures proposed by the Applicants are set out in the PEIR. These measures include the following.

7.9.4.2 Outline Marine Archaeology Written Scheme of Investigations will be developed in consultation with Historic England to include:

- the requirement for archaeological exclusion zones for assets identified as medium or high potential within the ES, recorded wrecks, and other archaeological sites of significance;
- the requirement for temporary archaeological exclusion zones;
- implementation of a Protocol for Archaeological Discoveries;
- mitigation measures for potential direct impacts to marine archaeology; and
- the incorporation of marine archaeology specification and analysis in further pre-construction surveys such as geophysical, geotechnical, or remotely operated vehicle/diver surveys.

7.9.4.3 This is proposed to be secured as a requirement of the DCO and deemed marine licence (Marine Archaeology Written Scheme of Investigation).

7.9.5 Assessment of effects

7.9.5.1 The assessment has considered:

- sediment disturbance and deposition leading to indirect effects on marine archaeology receptors;
- direct damage to marine archaeology receptors;
- direct damage to deeply buried marine archaeology receptors – submerged prehistoric receptors;
- alteration of sediment transport regimes; and
- effects on historic seascape character.

7.9.5.2 Overall, the assessment has not identified any significant effects arising from the Transmission Assets during the construction, operation and maintenance or decommissioning phases.

7.9.6 Cumulative effects

7.9.6.1 Cumulative effects with other developments have been assessed. Overall, the assessment has not identified any significant cumulative effects.

7.10 Other sea users

7.10.1 Introduction

7.10.1.1 Volume 2, Chapter 9 of the PEIR sets out the assessment of effects in relation to other sea users. This includes consideration of the following.

- aggregate extraction and disposal sites.
- recreational diving and bathing sites.
- recreational activities such as:
 - sailing and motor cruising;
 - recreational fishing; and
 - inshore water sports.
- offshore infrastructure such as:
 - offshore wind farms;
 - cables;
 - pipelines;
 - Carbon Capture and Storage and underground gas storage; and
 - offshore hydrocarbon platforms.

7.10.2 Approach

7.10.2.1 Data has been collated based on existing data sources at both a regional and local level. No site-specific surveys have been undertaken to inform the EIA

process for other sea users. This is because a sufficient amount of information relating to other sea users is already available.

7.10.3 Baseline environment

7.10.3.1 There are no marine aggregate extraction sites or recreational dive sites within the area studied.

7.10.3.2 There is one closed marine disposal site within the area studied. This is the Preston site, which was used for dredge spoil dumping and does not overlap with the Transmission Assets Red Line Boundary.

7.10.3.3 There are four recreational bathing sites identified within the area studied. These are, from north to south:

- Blackpool Central;
- Blackpool South;
- St. Annes North (the only one of these sites to overlap with the Transmission Assets Red Line Boundary); and
- St. Annes.

7.10.3.4 Other sea user receptors within the area studied include:

- recreational activities such as sailing and motor cruising, recreational fishing and inshore water sports; and
- offshore infrastructure such as:
 - offshore wind farms;
 - cables;
 - pipelines;
 - Carbon Capture and Storage and underground gas storage; and
 - offshore platforms.

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

7.10.4.1 The measures proposed by the Applicants are set out in the PEIR. These measures include the following.

- Safety Zone Statement(s) will be produced. Safety zones (an area extending away from above sea infrastructure) of up to 500 m will be applied during construction, maintenance and decommissioning activities.
- Crossing and proximity agreements will be sought with known existing pipeline and cables operators.
- Outline Fisheries Liaison and Coexistence Plan(s) will include details for providing advance warning and information on accurate locations for construction and maintenance activities, associated Safety Zones and

advisory passing distances to be given via Notifications to Mariners to ensure navigation safety.

- Aids to navigation (marking and lighting) will be deployed.
- Offshore Cable Specification and Installation Plan(s) will include for cable burial to be the preferred option for cable protection, where practicable.

7.10.5 Assessment of effects

7.10.5.1 The assessment has considered:

- displacement of recreational activities;
- increased suspended sediment concentrations and associated deposition affecting recreational diving sites and designated bathing water sites;
- impacts to existing cables or pipelines or restrictions on access to cables or pipelines;
- increased suspended sediment concentrations and associated deposition affecting aggregate areas;
- alterations to sediment transport pathways affecting aggregate areas; and
- reduction or restriction of oil and gas , Carbon Capture and Storage and underground gas storage activities (including surveys and decommissioning).

7.10.5.2 Overall, the assessment has not identified any significant effects arising from the Transmission Assets during the construction, operation and maintenance or decommissioning phases.

7.10.6 Cumulative effects

7.10.6.1 Cumulative effects with other developments have been assessed. Overall, the assessment has not identified any significant cumulative effects.

8 Potential environmental effects – onshore

8.1 Introduction

8.1.1.1 This section sets out the potential significant effects for the following:

- geology, hydrogeology and ground conditions;
- hydrology and flood risk;
- onshore ecology and nature conservation;
- onshore and intertidal ornithology;
- historic environment;
- land use and recreation;
- traffic and transport;
- noise and vibration; and
- air quality.

8.1.1.2 Key onshore environmental constraints are shown in **Figure 8.1**.

8.2 Geology, hydrogeology and ground conditions

8.2.1 Introduction

8.2.1.1 Volume 3, Chapter 1 of the PEIR sets out the assessment of effects in relation to geology, hydrogeology and ground conditions. This includes consideration of effects in relation to geological and land conditions (including contaminated land), as well as effects on groundwater.

8.2.2 Approach

8.2.2.1 The assessments undertaken have been based on a desktop review of publicly available information, online data sources and publishing and information contained in a Groundsure Enviro-Geo Insights report.

8.2.3 Baseline environment

8.2.3.1 The Transmission Assets cross a low lying, coastal area that is underlain by a thick sequence of superficial deposits. These unconsolidated deposits are dominated by blown sands (sand that has been transported by wind or sand consisting of mainly wind-borne particles) (restricted to the west), glacial till (a mix of clay, sand gravel and boulders of varying size) and tidal flat deposits (a mix of sediment, mainly mud and/or sand). The superficial deposits cover the bedrock of the Mudstone in western and central areas and sandstones in the east. These blown sand deposits form dune systems, which are nationally and locally designated for geological importance at Lytham St. Annes.

8.2.3.2 The blown sand deposits and sands contained in the glacial till form a locally important aquifer that supports modest groundwater abstraction (an aquifer is

a body of rock and/or sediment that holds groundwater). However, the clay-rich glacial till and tidal flat deposits do not support groundwater dependent surface features. Mudstones of the Mercia Mudstone Group do not support groundwater abstraction in this area.

8.2.3.3 Sandstones of the Sherwood Sandstone Group are classified as an important aquifer unit, although the clay-rich glacial till forms an effective barrier that separates this bedrock aquifer from surface activities and the surface superficial aquifers. The blown sand aquifer and Sherwood Sandstone Group bedrock aquifer both constitute Water Framework Directive groundwater bodies.

8.2.3.4 There are two key areas in the study area, which due to current or historic land uses and/or activities, have the potential to cause contamination of soil or groundwater. These are land around Blackpool Airport, where several historic landfills are located and a developed area situated immediately north of the River Ribble, which includes active and historic landfills; licensed wastes sites; a large sewage works; and multiple historic fuel stations sites on the A584 and A583.

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

8.2.4.1 The measures proposed by the Applicants are set out in the PEIR. These measures include the following.

- Impacts on the designated dunes at Lytham St. Annes will be avoided through the use of trenchless construction techniques (such as horizontal directional drilling) to pass beneath the dunes.
- A Pollution Prevention Plan will be developed and will include details of emergency spill procedures. Good practice guidance will be followed.
- A contaminated land and groundwater discovery strategy will be developed in accordance with the Code of Construction Practice, to identify any contamination and any remedial measures which may be required.
- Appropriate Personal Protective Equipment will be used and relevant good working practices applied to avoid potential risk to human health including from any potential ground contamination, in line with relevant available guidance.

8.2.4.2 The mobilisation of existing areas of contamination during construction has been considered, in terms of the potential to cause a deterioration of groundwater quality in underlying aquifer units. These effects are proposed to be mitigated by a commitment to characterise land and groundwater quality in these areas prior to construction to:

- inform a remediation strategy and/or material management strategy; and
- inform a site-specific crossing method statement to ensure land or groundwater contamination is managed and new pathways are not created.

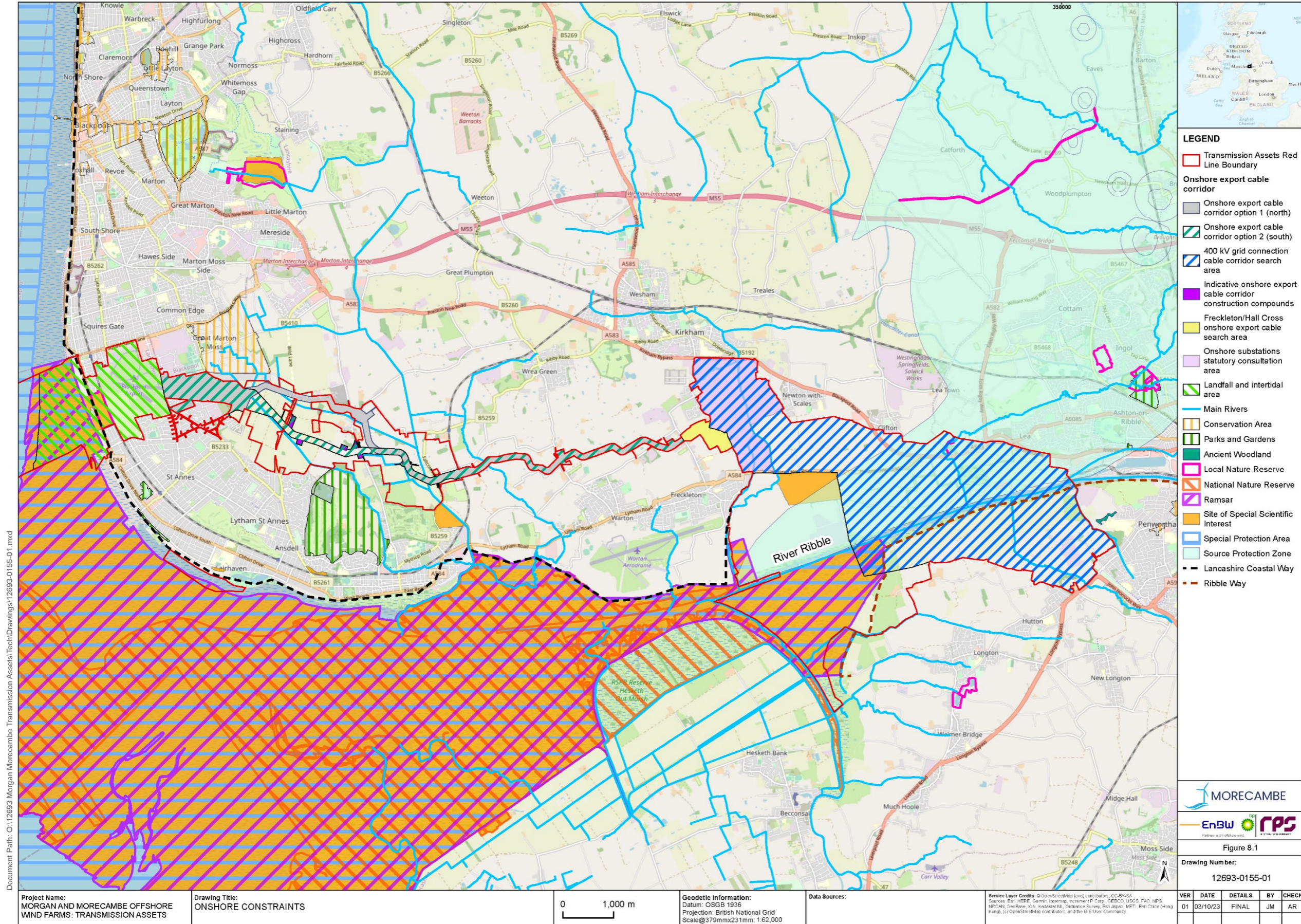


Figure 8.1: Onshore environmental constraints

8.2.5 Assessment of effects

8.2.5.1 The assessment has considered:

- partial or total loss of, or damage, to designated geological or geomorphological sites;
- mobilisation of existing areas of contamination and resulting impacts on groundwater quality;
- impact of reduced groundwater quantity or quality;
- impacts of accidental spillage on groundwater;
- impacts on groundwater dependent sites;
- impact of existing contamination to human receptors;
- impact of ground gas generation;
- sterilisation of existing safeguarded mineral resources; and
- impact of heat generated by the onshore cables on groundwater quality.

8.2.5.2 Whilst significant adverse effects are identified in relation to mobilisation of existing areas of contamination; impacts of reduced groundwater quantity and quality affecting groundwater abstractions (private water supplies); and impact of ground gas generation, overall, with mitigation in place, there will be no significant effects arising from the Transmission Assets during the construction, operation and maintenance or decommissioning phases.

8.2.5.3 Ground investigation is being undertaken and the results will be used to inform the ES. Further work will be undertaken to identify the location and extent of private water supplies as part of the work for the ES.

8.2.6 Cumulative effects

8.2.6.1 Cumulative effects with other developments have been assessed. Overall, the assessment has not identified any significant cumulative effects.

8.3 Hydrology and flood risk

8.3.1 Introduction

8.3.1.1 Volume 3, Chapter 2 of the PEIR sets out the assessment of effects in relation to hydrology and flood risk. This includes effects on onshore surface waterbodies, including rivers and streams.

8.3.2 Approach

8.3.2.1 Information on hydrology and flood risk has been collected through a detailed desktop review of existing studies and datasets. A Flood Risk Assessment and a Water Framework Directive assessment have also been undertaken.

8.3.3 Baseline environment

- 8.3.3.1 The Transmission Assets are located within the wider north west river basin district. The portion of the study area to the north of the River Ribble is located within the Ribble management catchment, whilst land to the south is located within the Douglas management catchment.
- 8.3.3.2 There are multiple named watercourses located within the study area. The Environment Agency is responsible for the management of Main Rivers in England, while the Lead Local Flood Authority, Lancashire County Council manages ordinary watercourses. There are no Internal Drainage Boards located in the study area.
- 8.3.3.3 Flood risk is categorised into zones, with Zone 1 representing the lowest risk of flooding and Zone 3 representing the highest. The Transmission Assets are located within Flood Zones 1, 2 and 3, with flooding associated with river and tidal sources. The proposed locations of the onshore substations lie within Flood Zone 1 (i.e., having a less than 0.1% annual probability of river or sea flooding).

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

- 8.3.4.1 The measures proposed by the Applicants are set out in the PEIR. These measures include the following.
- Trenchless techniques such as horizontal directional drilling, will be used to pass beneath main rivers, where practicable.
 - An Outline Onshore Pollution Prevention Plan will be developed and will include details of emergency spill procedures. Good practice guidance will be followed.
 - Where construction of the onshore substations may require the diversion of ordinary watercourses, any diversions will be appropriately sized to ensure existing watercourse capacity is maintained to afford conveyance of existing flows to mitigate upstream fluvial flood risk.
- 8.3.4.2 The Code of Construction Practice will include measures to ensure effective drainage during the construction phase. An Outline Operational Onshore Substation Drainage Management Plan(s) will be prepared and submitted with the application for development consent. An Outline Operational Onshore Substation Drainage Management Plan(s) will be developed for the substation site(s). This will include measures to limit discharge rates and attenuate flows to maintain greenfield runoff rates at the onshore substations. It will also include measures to control surface water runoff, including measures to prevent flooding of the working areas or offsite and to ensure any runoff is treated appropriately. The Outline Operational Onshore Substation Drainage Management Plan(s) will be developed in line with the latest relevant drainage guidance notes in consultation with the Environment Agency and the Lead Local Flood Authority (Lancashire County Council).

8.3.5 Assessment of effects

8.3.5.1 The assessment has considered:

- the impact of contaminated runoff on the quality of surface water and ground receptors;
- the impact of increased flood risk arising from the diversion of watercourses;
- the impact of increased flood risk arising from additional surface water runoff;
- the impact of increased flood risk arising from damage to existing flood defences;
- the impact of damage to existing field drainage; and
- the impact of damage to existing water pipelines.

8.3.5.2 The Flood Risk Assessment undertaken demonstrates that the onshore elements of the Transmission Assets meet the requirements of relevant local and national planning policy.

8.3.5.3 Taking into account the measures proposed, the assessment has not identified any significant effects arising from the Transmission Assets during the construction, operation and maintenance or decommissioning phases.

8.3.6 Cumulative effects

8.3.6.1 Cumulative effects with other developments have been assessed. Overall, the assessment has not identified any significant cumulative effects.

8.4 Onshore ecology and nature conservation

8.4.1 Introduction

8.4.1.1 Volume 3, Chapter 3 of the PEIR sets out the assessment of effects in relation to onshore ecology and nature conservation. Ecology refers to the communities of animals and plants which live in the environment and the relationships that they have with each other and with the physical environment.

8.4.2 Approach

8.4.2.1 The assessment of effects has been informed by both collection of existing data including records of protected sites and species and site-specific baseline surveys.

8.4.3 Baseline environment

8.4.3.1 The baseline surveys have identified a range of habitat types of varying quality, including habitats of importance such as ancient and deciduous woodland, coastal and floodplain grazing marsh, coastal saltmarsh, coastal sand dunes, semi-improved grassland, lowland fens and meadows, mudflats,

mature broadleaved trees, scrub, waterbodies, watercourses and field boundaries comprised of species-rich hedgerows.

8.4.3.2 Areas of higher value habitat are associated with the Lytham St Annes Dunes and Newton Marsh, both of which are designated as Sites of Special Scientific Interest.

8.4.3.3 The identified habitats have the potential to support a range of protected species including badgers, bats, fish and eel, invertebrates, otters, reptiles, water voles and white clawed crayfish.

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

8.4.4.1 The measures proposed by the Applicants are set out in the PEIR. These measures include the following.

- Avoidance of designated sites and key areas of habitat during the site selection process, where possible.
- A Code of Construction Practice will be implemented during the construction phase and will include measures to reduce temporary disturbance to ecological receptors and to protect species.
- Trenchless techniques will be used to install the landfall beneath the designated sand dunes at Lytham St. Annes Dunes Site of Special Scientific Interest.
- An Outline Ecological Management Plan will also be developed, which will include provision for an ecological clerk of works. The Ecological Management Plan will include details of long term mitigation and management measures, including the management of ecological mitigation areas. The Ecological Management Plan will be developed in consultation with the relevant responsible authorities.

8.4.5 Enhancement

8.4.5.1 An Onshore and Intertidal Net Gain Enhancement Plan will be developed to identify areas where biodiversity net gain is proposed. This will include details of the measures proposed, including details of any enhancement measures proposed.

8.4.6 Assessment of effects

8.4.6.1 The assessment has considered:

- temporary and permanent habitat loss;
- habitat disturbance, habitat fragmentation and species isolation;
- pollution caused by accidental spills/contaminant release; and
- the spread of non-native invasive species.

8.4.6.2 Measures adopted as part of the Transmission Assets include the use of trenchless techniques (such as horizontal directional drilling) beneath the

designated sand dunes at Lytham St. Annes Dunes Site of Special Scientific Interest and beneath mature woodland where practicable.

8.4.6.3 There is the potential for significant effects from temporary or permanent habitat loss for great crested newt, otter and water vole, mature broadleaved trees and hedgerows. Mitigation measures are proposed to address the potential significant effects associated with habitat loss. With these measures in place, there will be no significant effects arising from the Transmission Assets during the construction, operation and maintenance or decommissioning phases.

8.4.6.4 It is noted that a number of areas have been identified as having potential for Biodiversity Net Gain, including provision of opportunities for enhancement of habitats including waterbodies, hedgerows, and grassland, which in turn will contribute to the Lancashire ecological networks. This will be developed further for the Environmental Statement through liaison with landowners and conservation projects to confirm the opportunities to be developed further. This will result in a long term beneficial effect, which may be significant.

8.4.6.5 Further surveys will be undertaken in the next stages of the EIA process to refine and develop the design of the Transmission Assets.

8.4.7 Cumulative effects

8.4.7.1 Cumulative effects with other developments have been assessed. Overall, the assessment has not identified any significant cumulative effects.

8.5 Onshore and intertidal ornithology

8.5.1 Introduction

8.5.1.1 Volume 3, Chapter 4 of the PEIR sets out the assessment of effects in relation to onshore and intertidal ornithology. This includes consideration of the bird population from mean low water springs and landward to Penwortham.

8.5.2 Approach

8.5.2.1 To inform the assessment, information on breeding, wintering and migratory birds was collected through a desktop review of existing studies and datasets and through site-specific surveys, including breeding, wintering and migratory bird surveys.

8.5.3 Baseline environment

8.5.3.1 Breeding, wintering, and migratory birds use both the terrestrial and intertidal habitats located within or near to the Transmission Assets Red Line Boundary. Waterbird and seabird species that depend on wetlands and the marine environment for survival at some point in their life cycle use the intertidal habitats and nearshore waters close to the landfall and River Ribble in winter and during passage periods (i.e., spring and autumn).

- 8.5.3.2 In addition, terrestrial habitats near the landfall and along the onshore cable routes provide a range of functions (e.g., foraging, non-foraging activities and nesting) for breeding birds (e.g., birds of prey and passerines) and wintering and migratory birds.
- 8.5.3.3 The site-specific intertidal ornithological surveys indicated that the intertidal habitats within the coastal area support a wader assemblage which is of importance in the context of the Ribble and Alt Estuaries Special Protection Area and Ramsar site population. Sanderling were observed to forage or roost in large numbers along the tide line and there was a very large influx of dunlin during March and April. Additionally, intertidal habitats in the vicinity of the landfall support a small over-wintering population of redshank and turnstone.
- 8.5.3.4 Both the desk-based study and site-specific surveys show that the area is important during winter and migration periods either locally or nationally for several ornithological features, including wader, raptor, passerine, goose, duck and swan species. The site-specific breeding bird surveys undertaken found a wide range of species identified as breeding, including species of duck, wader, owl, raptor, but mostly passerine species, predominantly species associated with farmland, scrub and woodland habitats.

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

- 8.5.4.1 The measures proposed by the Applicants are set out in the PEIR. These measures include the following.
- Avoidance of designated sites and key areas of habitat during the site selection process, where possible.
 - A Code of Construction Practice will be implemented during the construction phase and will include measures to reduce temporary disturbance to ornithological receptors.
 - Trenchless techniques will be used to install the landfall beneath the designated sand dunes at Lytham St. Annes Dunes Site of Special Scientific Interest.
 - An Outline Ecological Management Plan will also be developed, which will include provision for an ecological clerk of works. The Ecological Management Plan will include details of long term mitigation and management measures, including the management of areas proposed to provide mitigation for waterbirds. The Ecological Management Plan will be developed in consultation with the relevant responsible authorities.
 - All vegetation requiring removal will be undertaken outside of the bird breeding season where this is reasonably practicable. 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.

8.5.5 Enhancement

- 8.5.5.1 An Onshore and Intertidal Net Gain Enhancement Plan will be developed 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.

8.5.6 Assessment of effects

- 8.5.6.1 The assessment has considered:

- temporary and permanent habitat loss;
- habitat disturbance, habitat fragmentation and species isolation;
- pollution caused by accidental spills/contaminant release;
- the spread of non-native invasive species; and
- provision of ecological mitigation and net gain habitats

- 8.5.6.2 There is the potential for significant effects on the following:

- habitat loss for waterbirds (wader, goose, duck, swan and heron species) during the construction phase; and
- disturbance to waterbirds (wader, goose, duck, swan and heron species) during the construction phase.

- 8.5.6.3 Mitigation measures are proposed to address this. With these measures in place, there will be significant effects arising from the Transmission Assets during the construction phase for waterbirds (wader, goose, duck, swan and heron species) in relation to option 2 (south) of the onshore export cable corridor. No significant effects are anticipated for waterbirds in relation to option 1 (north) during the construction phase. No significant effects are anticipated for all important ecological features during the operation and maintenance or decommissioning phases.

- 8.5.6.4 In addition, it is noted that a number of areas have been identified as having potential for biodiversity net gain, including provision of opportunities for enhancement for birds. This will be developed further for the Environmental Statement through liaison with land-owners and conservation projects to confirm the opportunities to be developed further. This will result in a long-term beneficial effect, which may be significant.

- 8.5.6.5 Effects from pollution caused by accidental spills/contaminant release on ornithological receptors will not be significant given the control measures proposed. Similarly, a spread of invasive non-native species and habitat fragmentation and isolation of bird species will not be significant.

- 8.5.6.6 No significant effect on the integrity of the Ribble and Alt Estuaries Special Protection Area has been identified.

8.5.7 Cumulative effects

- 8.5.7.1 Cumulative effects with other developments have been assessed. Potential for significant cumulative effects has been identified for habitat loss and

disturbance during construction and decommissioning., Work on mitigation will continue during the EIA process as further details of other projects become available and an updated assessment presented in the Environmental Statement.

8.6 Historic environment

8.6.1 Introduction

8.6.1.1 Volume 3, Chapter 5 of the PEIR sets out the assessment of effects in relation to the historic environment. Historic environment encompasses all aspects of the past including buried archaeological remains, deposits of geoarchaeological or palaeoenvironmental interest, built heritage and the character of the historic landscape.

8.6.2 Approach

8.6.2.1 The assessment of effects on the historic environment has been informed by a combination of desk-based research, site visits and site-specific fieldwork.

8.6.3 Baseline environment

8.6.3.1 Land within the Transmission Assets Red Line Boundary has the potential to contain archaeological sites and features of all periods, along with deposits of geoarchaeological and/or palaeoenvironmental interest. Consideration of this potential is intrinsically linked to an understanding of the physical processes which have led to the development of the current landscape across the south western coastal plain of the Fylde peninsula. Due to the low-lying nature of this landscape, the history of the area throughout the Quaternary period and including the Holocene period is a complex one, as sea levels changed in accordance with the series of glacial episodes.

8.6.3.2 A series of wetlands developed behind the coastal strip, some of which were interconnected and most of which have now been drained. Organic material accumulated over time within these wetlands to create raised bogs, known as 'mosses'. The onshore export cable corridor crosses two named mosses (Lytham Moss and Marton Moss), within which there is potential for sites and features of Late Upper Palaeolithic and Mesolithic date. The slightly elevated land adjacent to these mosses has an enhanced potential for sites of Neolithic and Bronze Age date.

8.6.3.3 The potential for sites and features of Iron Age date to be present within the Transmission Assets Red Line Boundary is considered to be low, with very little material from this period having been identified. Roman activity is concentrated around a known fort close to Kirkham, with Early Medieval and Medieval activity represented mostly through place name evidence rather than artefacts and sites.

8.6.3.4 Designated heritage assets are present in the vicinity of the Transmission Assets Red Line Boundary, including Registered Parks and Gardens of Historic Interest, Conservation Areas and Listed Buildings.

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

8.6.4.1 The measures proposed by the Applicants are set out in the PEIR. These measures include the following.

- A range of sensitive historical areas have been avoided where possible during the site selection process, including listed buildings, scheduled monuments and registered parks and gardens.
- The ongoing programme of geophysical survey will be completed and a follow-up programme of archaeological trial trenching will be implemented.
- A programme of core sampling will be undertaken to enable geoarchaeological deposit modelling, where appropriate.
- An outline Onshore Written Scheme of Investigation will be developed. This will detail the survey and archaeological mitigation requirements in advance of and during construction.

8.6.5 Assessment of effects

8.6.5.1 The assessment has considered:

- loss of, or harm to, buried archaeological remains and deposits of geoarchaeological and palaeoenvironmental interest;
- the impact of the onshore elements of the Transmission Assets on above ground heritage assets as a result of change within their setting;
- the impact of the onshore elements of the Transmission Assets on the character of the historic landscape; and
- the impact of the offshore substation platforms and the Morgan offshore booster station on above ground heritage assets as a result of change within their setting.

8.6.5.2 No designated heritage assets would be directly physically impacted by the construction, operation and maintenance and decommissioning phases of the Transmission Assets.

8.6.5.3 Direct physical impacts on buried archaeological remains and deposits of geoarchaeological or palaeoenvironmental interest during construction would be permanent. Well designed and targeted programmes of fieldwork undertaken ahead of construction will seek to identify such remains and deposits within the Transmission Assets Red Line Boundary and hence allow impacts to be avoided or minimised through the design process and/or appropriate mitigation at those locations.

8.6.5.4 No significant effects have been identified with regard to any aspect of the historic environment. The effects arising from loss of, or harm to, buried archaeological remains and deposits of geoarchaeological and palaeoenvironmental interest currently remain under consideration pending completion of the targeted programmes of fieldwork.

8.6.6 Cumulative effects

8.6.6.1 Cumulative effects with other developments have been assessed. Overall, the assessment has not identified any significant cumulative effects.

8.7 Land use and recreation

8.7.1 Introduction

8.7.1.1 Volume 3, Chapter 6 of the PEIR sets out the assessment of effects in relation to land use and recreation. This includes consideration of effects in relation to agricultural land quality, agricultural land holdings and recreational resources.

8.7.2 Approach

8.7.2.1 Land use and recreational resources likely to be affected by the Transmission Assets have been identified through a combination of desk-based analysis of existing studies and data sets. Site-specific surveys will be undertaken to inform the assessment of land use and recreation for the Environmental Statement, including detailed Agricultural Land Classification surveys.

8.7.3 Baseline environment

8.7.3.1 The desk-based analysis has determined that land within the Transmission Assets Red Line Boundary predominantly includes land of Agricultural Land Classification Grades 2 (very good quality) and 3a (good quality). It includes 224 agricultural land holdings. Both Grades 2 and 3a agricultural land are categorised as best and most versatile land and considered the most capable of delivering crops for food and non-food uses.

8.7.3.2 Recreational resources identified within or near the Transmission Assets Red Line Boundary include the coastal area and beaches, open greenspace areas (playing fields, golf courses, parks), National Cycle Routes 62 and 622, Long Distance footpaths (Ribble Way, Lancashire Coastal Way), other public rights of way and other recreational facilities, such as waterways, Blackpool Airport, holiday parks, livery yards and stables.

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

8.7.4.1 The measures proposed by the Applicants are set out in the PEIR. These measures include the following.

- Impacts on the Lancashire Coastal Way Long Distance Path and the Ribble Way Long Distance Path will be minimised through site design considerations where reasonably practicable.
- Prior to the commencement of works, the contractor (or project appointed Land Agent) will undertake a record of condition. Such work will inform the reinstatement of the land.

- Topsoil and subsoil will be stored in separate stockpiles in line with the Construction Code of Practice for the Sustainable Use of Soils on Construction Sites or the latest relevant available guidance. During Post-construction, the working area will be reinstated to pre-existing condition as far as reasonably practical in line with the same guidance.
- Where practically possible public rights of way will be reinstated as soon as reasonably practicable. A Public Rights of Way Management Plan will include details of temporary and permanent diversions, closures, gated crossings and signage to be provided during construction and details to reinstate all public rights of way potentially affected during construction.

8.7.5 Assessment of effects

8.7.5.1 The assessment has considered:

- temporary and permanent loss of agricultural land, including best and most versatile land;
- temporary and permanent disruption and reduced access to agricultural land; and
- temporary impact (disruption or reduced access) to the recreational use of recreational resources, including coastal recreational resources.

8.7.5.2 The construction of the Transmission Assets would be likely to lead to temporary and permanent loss of agricultural land, including that considered to be best and most versatile. However, the areas for each timescale would be less than 20 hectares and therefore is not considered to be significant.

8.7.5.3 The construction would result in temporary severance of farmland within agricultural land holdings, leading to temporary disruption to farming management, access, field drainage and irrigation systems. However, the working area will be reinstated to pre-existing condition as far as reasonably practical following construction. The permanent loss of land associated with the onshore substations would also result in disruption, but interested parties will be consulted in order to limit any potential effects on the operation of farming enterprises and reduce, as far as possible, the potential for any impacts on the viability of those businesses.

8.7.5.4 There could potentially be some requirement to close an area of the beach to public access during construction works associated with landfall. However, there are large areas to the east and west of the affected area of beach that would remain accessible for beach-based activities during the construction phase. Whilst there may be physical works to a limited section of the coastal area, this would not compromise the overall use of the coastal asset.

8.7.5.5 There is an area of access land on the north side of the River Ribble, which is largely used for motorsport related activity, but construction works are not proposed within the area. It is proposed that installation of the landfall between land near Blackpool Airport and the exit pit would be by horizontal directional drilling or equivalent trenchless technique and would pass beneath St. Annes Old Links golf club. Construction works are therefore not proposed within this or the other areas of open greenspace land.

8.7.5.6 The Lancashire Coastal Way Long Distance Path, National Cycle Route 62 and the Ribble Way Long Distance Path would all remain *in situ* during the construction period with works managed to minimise any potential impacts during the construction period. Public Rights of Way, bridleways, tracks and local lanes could be subject to temporary disruption during construction. Where closures are required for longer periods due to unforeseen circumstances encountered during construction, Lancashire County Council will be informed in writing and suitable diversions measures will be implemented where possible. Furthermore, a Public Rights of Way Management Plan will be implemented to minimise disruption.

8.7.5.7 No significant effects have been identified with regard to land use and recreation.

8.7.6 Cumulative effects

8.7.6.1 Cumulative effects with other developments have been assessed. There is potential for significant adverse cumulative effects with other projects in relation to permanent loss of best and most versatile land. However, they will not materially reduce the permanent loss of agricultural land. Although opportunities have been explored during the design process, some permanent loss of agricultural land is an unavoidable consequence of the construction of the permanent infrastructure. Therefore, at this stage the residual effect on areas of permanent land take, combined with other projects, would remain significant adverse. An updated assessment will be provided in the Environmental Statement.

8.8 Traffic and transport

8.8.1 Introduction

8.8.1.1 Volume 3, Chapter 7 of the PEIR sets out the assessment of effects in relation to traffic and transport. Traffic and transport relate to the movement demand generated by the Transmission Assets and its effects upon other road users and surroundings.

8.8.2 Baseline environment

8.8.2.1 An initial traffic and transport study area has been identified in liaison with the local highway authorities including relevant parts of the strategic road network and local road network determined as likely to be used by construction generated vehicles. An initial baseline position has been established by obtaining publicly available traffic flow data, undertaking new traffic surveys, assessing road safety and analysing public transport services and provision and facilities for pedestrians and cyclists.

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

8.8.3.1 The measures proposed by the Applicants are set out in the PEIR. These measures include the following.

- A Construction Traffic Management Plan will set standards and procedures for:
 - managing the numbers and routing of Heavy Goods Vehicles during the construction phase;
 - managing the movement of employee traffic during the construction phase;
 - measures to manage the safe passage of Heavy Goods Vehicle traffic via the local highway network; and
 - details of localised road improvements if and where these may be necessary to facilitate safe use of the existing road network.
- Temporary access points from the highway will be installed to facilitate vehicular access from the road during construction. The access points will be constructed in line with Lancashire County Council's requirements, relevant appropriate standards and in accordance with the principles established in the Outline Construction Traffic Management Plan.
- Haul road(s) will be installed within the temporary working area the onshore export cable corridor and 400 kV grid connection corridor to minimise impacts during construction.

8.8.4 Assessment of effects

8.8.4.1 The assessment has considered:

- driver delay including delays to public transport services;
- severance of routes;
- pedestrian delay; and
- pedestrian amenity;
- accidents and safety.

8.8.4.2 The construction phase of the Transmission Assets will generate the greatest number of vehicle movements as the transportation of construction materials will incur the greatest number of heavy goods and staff vehicle movements and it is therefore this phase that the traffic and transport assessment focusses on.

8.8.4.3 An initial assessment has been undertaken to consider the effects of construction traffic generated by the Transmission Assets and concluded that there may be some significant effects on pedestrian amenity in some locations as a result of the construction phase of Transmission Assets. As a result, further work is proposed to address this. This will include further interrogation of the construction vehicle movements to reduce the peak daily construction vehicle movements, where practicable.

8.8.4.4 Highways movements associated with the option to install cables within highways near Blackpool Airport will also be considered in further detail within the Environmental Statement. However, whilst it is expected that this option would not require road closures, there is the potential for significant

effects. It is anticipated that this option may require short diversions to afford safe working areas during the construction phase.

8.8.4.5 In addition, work is proposed to finalise the onshore substation locations and access points and to continue engagement with Blackpool Council, Lancashire County Council and National Highways through the EWG.

8.8.5 Cumulative effects

8.8.5.1 Three proposed road schemes (Preston Western Distributor Road, M55 Heyhouses Link Road and A582 South Ribble Western Distributor Dualling) have been identified for consideration in terms of cumulative effects. At the time of undertaking the assessment for the PEIR, there is some uncertainty with regard to the data available for the three proposed road schemes, with regard to how each scheme has considered the other schemes within their assessment and potential consequential double counting. The Applicants have requested details of the traffic modelling undertaken for the three road schemes from Lancashire County Council to clarify this. The cumulative assessment will be considered at the Environmental Statement stage.

8.9 Noise and vibration

8.9.1 Introduction

8.9.1.1 Volume 3, Chapter 8 of the PEIR sets out the assessment of effects in relation to noise and vibration. Unwanted noise and vibration can lead to adverse impacts on existing residential amenity and public health. As such, it is important that the impacts of noise and vibration predicted from the construction and operation of new developments be assessed and mitigated as far as reasonably practicable.

8.9.2 Approach

8.9.2.1 The existing sound environment has been characterised via site-specific surveys where long term noise monitoring provided data for the determination of impact assessment criteria.

8.9.3 Baseline environment

8.9.3.1 The long term sound survey highlighted that much of the area affected by the Transmission Assets has a fairly low existing noise climate due to the rural nature of certain areas. The dominant source of noise was noted to be traffic on local highway networks.

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

8.9.4.1 The measures proposed by the Applicants are set out in the PEIR. These measures include the following.

- A Code of Construction Practice will be implemented during the construction phase and will include measures to reduce temporary

disturbance to residential properties, recreational users and existing land users. This will include a Construction Noise and Vibration Management Plan, including measures to control noise impacts during construction. In addition, the Construction Traffic Management Plan will manage the numbers and routing of construction vehicles.

- For the operational phase, noise control measures are proposed in relation to the design of the onshore substations.
- A Construction Noise Management Plan will be prepared as part of the outline Code of Construction Practice and submitted as part of the application for the development consent. The detailed Code of Construction Practice(s) will be developed in accordance with the outline Code of Construction Practice. They will include measures to mitigate noise from construction activities associated with the Transmission Assets. If required, a bespoke method statement will be developed to ensure suitable noise limits can be met on specific sensitive noise receptors.

8.9.5 Assessment of effects

8.9.5.1 The assessment has considered:

- the impact of noise and vibration generated by construction and decommissioning activities for the Transmission Assets on human receptors;
- the impact of noise generated by additional vehicle movements on the local highway network during the construction and decommissioning phase for the Transmission Assets on human receptors; and
- the impact of noise generated during operation and maintenance of the onshore substations on human receptors.

8.9.5.2 There will likely be the following significant effects arising from the Transmission Assets during the construction, operation and maintenance or decommissioning phases:

- construction noise impacts due to sheet piling activities for the horizontal directional drilling or equivalent trenchless technique exit pit areas;
- construction vibration impacts due to sheet piling and horizontal directional drilling or equivalent trenchless technique; and
- construction noise impacts due to horizontal directional drilling or equivalent trenchless technique.

8.9.5.3 The above effects may be reduced via the implementation of a bespoke method statement for trenchless techniques in close proximity to receptors. This will ensure suitable noise and vibration limits can be met at noise and vibration sensitive locations. With such measures in place, no significant effects are predicted.

8.9.6 Cumulative effects

8.9.6.1 Cumulative effects with other developments have been assessed. There is potential for significant adverse cumulative effects with other projects in relation to construction noise and vibration at specific locations. However, suitable mitigation measures are being developed to minimise the contribution of the Transmission Assets to any cumulative effects. The primary mitigation option will be altering or updating the construction programme, where practicable, to avoid significant noise and vibration generating works occurring at the same time as those on other nearby sites (if and where they are likely to result in adverse cumulative impacts). Where this is not possible, other noise control measures may be implemented, such as acoustic enclosures or barriers. An updated assessment will be provided in the Environmental Statement.

8.10 Air quality

8.10.1 Introduction

8.10.1.1 Volume 3, Chapter 9 of the PEIR sets out the assessment of effects in relation to air quality. The term air quality is a measure used to describe the level of pollutants present within the air.

8.10.2 Approach

8.10.2.1 Existing air quality data has been obtained from available sources, including local monitoring studies and national or government data sources, including the Department for Environment, Food & Rural Affairs (Defra) UK AIR Air Information Source national pollution maps.

8.10.3 Baseline environment

8.10.3.1 The nearest Air Quality Management Area designated to manage and improve existing air quality is approximately 900 m to the east of the Transmission Assets Red Line Boundary in Penwortham, which has been designated due to elevated concentrations of nitrogen dioxide.

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

8.10.4.1 The measures proposed by the Applicants are set out in the PEIR. These measures include the following.

- A Code of Construction Practice will be implemented during the construction phase and will include measures to reduce temporary disturbance to residential properties, recreational users and existing land users. This will include dust control measures based on the guidance provided by the Institute of Air Quality Management.

8.10.5 Assessment of effects

8.10.5.1 The assessment has considered:

- the impact of dust and suspended particulates on human and ecological receptors; and
- the impact of emissions from traffic.

8.10.5.2 Dust and particulate matter can be generated by onsite construction activities and dust also can be tracked out onto the public road network by vehicles exiting the site. There may also be changes in atmospheric pollutant concentrations due to the combustion of fuel in vehicles.

8.10.5.3 During construction and decommissioning, the key pollutant is dust, covering both the particulate matter fraction that is suspended in the air that can be breathed and the deposited dust that has fallen out of the air onto surfaces and which can potentially cause temporary annoyance effects. Property, human health and vegetation (ecological receptors) are all potentially affected.

8.10.5.4 With the proposed mitigation measures in place, there will be no significant effects arising from the Transmission Assets during the construction, operation and maintenance or decommissioning phases in relation to dust.

8.10.5.5 There is some potential for significant effects on air quality to arise as a result of traffic generated during the construction and decommissioning phases. However, this is based on a conservative approach to assessment at this stage and will be considered in further detail in the Environmental Statement based on refined traffic flows and detailed dispersion modelling.

8.10.6 Cumulative effects

8.10.6.1 Cumulative effects with other developments have been assessed. Overall, it is concluded that there will be no significant cumulative effects from dust arising from the Transmission Assets alongside other projects. The potential for cumulative effects in relation to emissions from traffic will be addressed in the Environmental Statement.

9 Potential environmental effects – offshore and onshore

9.1 Introduction

9.1.1.1 This section sets out the potential significant environmental effects for the following:

- seascape, landscape and visual resources;
- aviation and radar;
- climate change;
- socio-economics; and
- inter-related effects.

9.2 Seascape, landscape and visual resources

9.2.1 Introduction

9.2.1.1 Volume 4, Chapter 1 of the PEIR sets out the assessment of effects in relation to seascape, landscape and visual impacts. Seascape, landscape and visual resources refer to the existing character and physical elements of the seascape and landscape, areas designated for their scenic or landscape/seascape-related qualities, and views from publicly accessible locations such as settlements, transport routes, and public rights of way.

9.2.2 Approach

9.2.2.1 The seascape, landscape and visual baseline comprises two distinct but connected aspects; seascape and landscape character baseline, including international, national and local designated landscapes, and the visual baseline. Both resources were collated via a desktop analysis of publicly available data, site-specific surveys and fieldwork.

9.2.2.2 Where no published seascape character assessment coverage is available, as is the case with some areas of the Isle of Man's territorial waters, appropriate marine character areas have been defined and described in accordance with relevant best practice guidance.

9.2.2.3 The visual baseline analysis involved a desktop exercise and consultation process to identify appropriate visual receptors and representative viewpoints. A Zone of Theoretical Visibility has been created, which is a computer-generated tool which identifies the likely extent (theoretical) of visibility of the Transmission Assets on the terrain and helps to identify locations for candidate representative viewpoints.

9.2.2.4 The representative viewpoints have been selected to represent a broad range of locations and sensitive visual receptors across the study area. Fieldwork was undertaken to verify the visual receptors and representative viewpoint locations and photography captured.

9.2.3 Baseline environment

9.2.3.1 National landscape character areas, national marine character areas and relevant regional landscape and seascape character areas within the study area have been identified. These include the following.

- Seascape character: Welsh Seascape Sensitivity Zones, English Marine Character Areas and Isle of Man Seascape/Marine Character Areas.
- Landscape character: National Character Areas and local character areas identified in the Lancashire landscape strategy.

9.2.3.2 No designated landscape/seascape areas of international, national or local importance are located within the study area.

9.2.3.3 To date, 15 representative viewpoints have been identified. These are subject to consultation with stakeholders and may be refined for the Environmental Statement.

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

9.2.4.1 The measures proposed by the Applicants are set out in the PEIR. These measures include the following.

- The onshore cables will be completely buried underground for the entire length. No overhead pylons will be installed.
- Where hedgerows and/or trees require removal, this will be undertaken prior to topsoil removal. Sections of hedgerows and trees which are removed will be appropriately mitigated for.
- 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.
- A Landscape Management Plan will be developed. The Landscape Management Plan 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 practical, landscape mitigation planting will be established as early as reasonably practicable in the construction phase.
- Where practically possible public rights of way will be reinstated as soon as reasonably practicable. An outline Public Rights of Way Management Plan will include details of temporary and permanent diversions, closures, gated crossings and signage to be provided during construction and details to reinstate all public rights of way potentially affected during construction.

9.2.5 Assessment of effects

9.2.5.1 The assessment has considered:

- the impact of the onshore and offshore elements of the Transmission Assets on seascape and landscape character; and
- the impact of the onshore and offshore elements of the Transmission Assets on publicly accessible views.

9.2.5.2 A number of potential daytime and night time impacts upon seascape, landscape, and visual resources associated with the construction, operation and maintenance and decommissioning phases of the Transmission Assets have been identified. The majority of these effects are not considered to be significant.

9.2.5.3 Overall, it is concluded that there may be the following significant effects arising from the Transmission Assets.

- Temporary effects on the landscape character of Landscape Character Area 19a: Coastal Dunes – Fylde Coastal Dunes as a result of offshore Transmission Assets/landfall construction activities.
- Temporary and permanent effects on the landscape character of Landscape Character Area 15d: Coastal Plain – Fylde as a result of onshore substation options 1 and 2 during construction and at Year 1 when complete but before landscape mitigation proposals are mature. These effects would be limited in extent (arising as a result of the change in character of agricultural fields to energy infrastructure). The effects on the wider character area would not be significant.
- Temporary and short term effects on views gained by people using the bridleways near the Morgan onshore substation site during construction and at Year 1 when complete but before landscape mitigation proposals are mature.
- Temporary effects on views gained by people using the beach, public rights of way and occupiers of residential properties as a result of onshore cable/landfall construction activities.

9.2.5.4 No significant permanent visual effects are predicted by Year 15, once new landscape planting proposals have matured.

9.2.5.5 No significant effects are predicted on designated landscapes or seascapes as a result of the Transmission Assets.

9.2.6 Cumulative effects

9.2.6.1 Cumulative effects with other developments have been assessed. The majority of these effects will not be significant.

9.2.6.2 The following potentially significant cumulative effects have been identified.

- Temporary cumulative effects on the visual amenity of walkers using public rights of way and people living in residential properties as a result of onshore cable construction activities in combination with onshore cumulative projects.
- Permanent cumulative effects on the seascape character of Marine Character Area 38: Irish Sea South, Seascape Sensitivity Zone 2: North

East Wales Offshore, Seascape Sensitivity Zone 4: North Wales and Anglesey Inshore, Seascape Sensitivity Zone 5 North Wales and Anglesey Outer Offshore and MCA A: Dreswick Point to Maughold Head Isle of Man as a result of offshore elements of the Transmission Assets in combination with offshore cumulative wind farm projects.

- Permanent cumulative effects on views gained by passengers and staff on the Heysham to Douglas Ferry and Liverpool to Douglas Ferry as a result of offshore elements of the Transmission Assets in combination with offshore cumulative wind farm projects.

9.2.6.3 No significant cumulative effects are predicted on designated landscapes or seascapes as a result of the Transmission Assets.

9.3 Aviation and radar

9.3.1 Introduction

9.3.1.1 Volume 4, Chapter 2 of the PEIR sets out the assessment of effects in relation to aviation and radar. Aviation and radar refers to the stakeholders/receptors that operate in the UK and international airspace, interacting with each other, the air traffic management provided and the relationship/effects of the physical environment.

9.3.2 Approach

9.3.2.1 The aviation receptors around the Transmission Assets have been characterised via a desk study utilising UK and international aviation guidance material and site-specific study of regional aviation.

9.3.3 Baseline environment

9.3.3.1 The study indicated that several discrete operators utilise the airspace around the Transmission Assets. Key receptors identified include:

- Blackpool Airport;
- Warton Aerodrome;
- National Air Traffic Services St. Anne's Primary Surveillance Radar;
- Defence Security Cooperation Agency Inskip; and
- regional low-level airspace flight operators (Ministry of Defence, search and rescue helicopters and operators supporting the Liverpool and Morecambe Bays' offshore oil and gas industry).

9.3.3.2 The information on aviation and radar was collected through detailed review of existing guidance and datasets. This included defining Military Practice and Exercise Areas, aerodromes, flight procedures, other aviation communications, navigation and surveillance infrastructure, helicopter main route indicators and other low flying operations such as Ministry of Defence and helicopter search and rescue activities.

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

9.3.4.1 The measures proposed by the Applicants are set out in the PEIR. These measures include the following.

- Appropriate lighting and marking of the offshore substation platforms and the Morgan offshore booster station in accordance with Civil Aviation Authority regulations and guidance.
- For all phases, the aerodrome operator will publish a Notification to Airmen or Notice to Aviation Missions to warn users of any activity that may affect airfield users.
- Offshore Emergency Response and Safety Plan(s) will be prepared and include the completion of a Search and Rescue Checklist.
- Consultation with Blackpool Airport will be undertaken regarding the installation of aerodrome obstacle lighting.
- Building dimensions for onshore substations will be developed so as not to affect aerodrome obstacle limitation surfaces, radar and transmitter/receiver aerial protected surfaces.

9.3.5 Assessment of effects

9.3.5.1 The assessment has considered:

- landfall and trenching activity and onshore substations (creation of an onshore obstacle to aviation operations);
- electromagnetic fields; and
- offshore substation platforms and the Morgan booster station (creation of an offshore physical obstacle to aviation operations).

9.3.5.2 Significant effects are identified in relation to the creation of an onshore physical obstacle to aviation operations) at Blackpool Airport and DCSA Inskip and also for electromagnetic field creation at Blackpool Airport. With mitigation measures in place there will be no significant effects arising from the Transmission Assets during the construction, operation and maintenance or decommissioning phases.

9.3.6 Cumulative effects

9.3.6.1 Cumulative effects with other developments have been assessed. Overall, it is concluded that there will be no significant cumulative effects arising from the Transmission Assets alongside other projects.

9.4 Climate change

9.4.1 Introduction

9.4.1.1 Volume 4, Chapter 3 of the PEIR sets out the assessment of effects in relation to climate change. Climate change in this context refers to the long-

term shifts in temperatures and weather patterns that are fundamentally driven by human activities.

9.4.1.2 The assessment considers the potential impacts and effects of the Transmission Assets on climate change during the construction, operation and maintenance and decommissioning phases. The purpose of the Transmission Assets is to connect the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm to the National Grid, contributing to:

- the UK Government's ambition to deliver 50 gigawatts of offshore wind by 2030;
- delivering much needed investment and securing construction and operations jobs in the UK;
- securing our energy supply; and
- the UK's response to the climate change crisis.

9.4.1.3 The projects, therefore, have an important part to play in securing the timely delivery of the Government's renewable energy strategy and achieving legally binding emissions reduction targets.

9.4.1.4 The Morgan Offshore Wind Project and the Morecambe Offshore Windfarm Generation Assets will be consented separately. Therefore, the focus of the assessment in the PEIR is on the impacts of the Transmission Assets.

9.4.1.5 However, given their purpose, the Transmission Assets would never operate in isolation. As such, the cumulative impacts of the Transmission Assets with the Generation Assets on the global atmospheric mass of carbon dioxide have been assessed.

9.4.2 Approach

9.4.2.1 The greenhouse gas emissions arising from the Transmission Assets have been characterised by a series of desk-based assessments and articles using published data to determine both the impact of the Transmission Assets on climate change and the impact of climate change on the Transmission Assets. The potential risks to the Transmission Assets from a changing climate have also been assessed.

9.4.3 Baseline environment

9.4.3.1 With regards to greenhouse gas emissions, the current baseline comprises the offshore environment, consisting of various subtidal habitats of mixed sediments and intertidal mudflats and the onshore environment consisting of agricultural land. Of most importance is any land that is high in carbon stores, i.e., woodland and peat. Available mapping does not precisely detail the presence of peat within the relevant areas and this will be examined through detailed assessment for inclusion at the Environmental Statement stage. Should peat be present, the assessment of greenhouse gas emissions will account for any associated carbon stored that would be subject to disturbance by construction.

9.4.3.2 With regards to climate change risk, the offshore baseline environment is characterised by varied temperature, rainfall and wind speeds in the Irish Sea and North West England.

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

9.4.4.1 The measures proposed by the Applicants are set out in the PEIR. The Applicants are committed to exploring options to reduce construction related emissions. Areas to be explored could include:

- optimisation of construction activity to reduce emissions;
- identification of opportunities to reduce emissions via the supply chain; and
- inclusion of environmental criteria (e.g. low-carbon materials) within construction related activities, where practicable.

9.4.5 Assessment of effects

9.4.5.1 The assessment has considered:

- the impact of greenhouse gas emissions arising from the manufacturing and installation of the Transmission Assets;
- the impact of greenhouse gas emissions arising from the consumption of materials and activities required to facilitate the operations and maintenance of the Transmission Assets;
- the impact of greenhouse gas emissions from decommissioning works (plant, fuel and vessel use) and recovery or disposal of materials;
- the impact of greenhouse gas emissions arising from land use and sea bed change; and
- the impact of the effects of climate change on the Transmission Assets' onshore and offshore infrastructure over the operation and decommissioning phases.

9.4.5.2 Without mitigation there will be a significant adverse effect at the construction phase due to greenhouse gas emissions from the manufacturing and installation of the Transmission Assets. However, with mitigation in place, there will not be a significant effect.

9.4.6 Cumulative effects

9.4.6.1 The Transmission Assets form one element of a wider proposed network of offshore wind farms, including the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm. The Transmission Assets enable the renewable energy generated by these generation assets to be transported to the UK electricity grid.

9.4.6.2 Overall, the cumulative effect of the Transmission Assets, together with the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm on the global climate will be significant and beneficial.

9.5 Socio-economics

9.5.1 Introduction

9.5.1.1 Volume 4, Chapter 4 of the PEIR sets out the assessment of effects in relation to socio-economics. It addresses effects on the economy (including employment), housing and tourism.

9.5.2 Approach

9.5.2.1 The socio-economics impact assessment considers the local economies and populations which are located at a number of spatial levels that might be affected by the Transmission Assets. This includes the areas closest to offshore and onshore activities as well as other important locations that may be used to support the construction, operation and maintenance and decommissioning activities related to the Transmission Assets (e.g., laying cables offshore, installing onshore substation etc.). These areas are primarily related to the regions where potential support facilities (i.e., ports) within the relevant spatial levels are located and the onshore substation which will be located at Penwortham.

9.5.3 Baseline environment

9.5.3.1 The offshore wind sector is identified as a high priority industry within national, regional and local policies across the UK. This reflects the opportunities the sector provides for supporting economic development and growth and providing jobs and incomes for UK residents. The offshore wind sector is identified as a potential employment opportunity for workers transitioning from other related industries, in particular activities that will require a significant degree of adaptation due to the continuation of efforts to decarbonise the economy.

9.5.3.2 The tourism sector is an important sector within the relevant policy environments. North Wales is known for its opportunities to experience the natural landscapes and supports a wide range of adventurous activities which draw in visitors. North west England has a wide range of recreation assets to offer, with a mixture of rural and urban landscapes. With access to the coast and the Cumbrian landscape as well as large urban centres, such as Liverpool and Manchester, the region is able to draw a great number of visitors each year.

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

9.5.4.1 The measures proposed by the Applicants are set out in the PEIR. These measures include the following.

- Skills and Employment Plan(s) will be produced prior to construction which will detail how the Applicants will engage with local workers and training providers for anticipated employment opportunities associated with the Transmission Assets.

9.5.5 Assessment of effects

9.5.5.1 The assessment has considered the following impacts:

- effects on the economy, including employment and Gross Value Added;
- effects on the labour market;
- effects on housing and accommodation; and
- effects on tourism.

9.5.5.2 Potential onshore effects on economic receptors, employment opportunities for local residents and population changes resulting from workforce requirements during the construction, operation and maintenance and decommissioning phases will be beneficial although not significant.

9.5.5.3 The Transmission Assets has the potential to support existing offshore wind sector employment through contracts placed with existing enterprises and support new employment and economic activity by enabling the expansion of the offshore wind sector which is a high priority policy.

9.5.5.4 The impact on tourism is not likely to be significant in EIA terms.

9.5.5.5 Overall, it is concluded that there will be the following significant effects arising from the Transmission Assets during the construction phase.

- Beneficial effect on economic receptors including Gross Value Added, employment and supply chain demand in the North Wales socio-economics offshore regional study area.

9.5.5.6 No significant effects have been identified during the operation and maintenance or decommissioning phases.

9.5.6 Cumulative effects

9.5.6.1 Cumulative effects with other developments have been assessed. There will be significant beneficial cumulative effects during construction on:

- economic receptors including Gross Value Added, employment, and supply chain demand in the North Wales socio-economics offshore regional study area and North West England socio-economics offshore regional study area; and
- the potential impact on population, housing, and accommodation in the North Wales socio-economics offshore regional study area.

9.5.6.2 There will be significant beneficial cumulative effects during operation on the potential impact on population, housing, and accommodation in the North Wales socio-economics offshore regional study area.

9.6 Inter-related effects

9.6.1.1 An assessment of inter-related effects has been undertaken.

9.6.1.2 These have been reviewed to identify receptors likely to be affected by project life time effects (effects throughout construction, operation and

maintenance and decommissioning) and one or more of the environmental topics.

- 9.6.1.3 Potential effects are identified for other sea users associated with restrictions on survey activity that may prevent the potential for drilling and also on people from effects associated with transport together with noise and vibration, air quality, recreational resources and human health during construction.
- 9.6.1.4 Potential inter-related effects for both project lifetime and receptor led will be reviewed for the ES following project refinements for the application for development consent.

10 Next steps

- 10.1.1.1 Consultees are invited to consider all of the information provided in this Non-Technical Summary and the PEIR and to advise on whether they agree with the conclusions. There are a number of ways that stakeholders can provide feedback on the PEIR as part of statutory consultation.
- 10.1.1.2 As part of the current consultation process, the Applicants will hold public exhibitions and online webinars. At these events, the Applicants will specifically consult stakeholders and the local community on the contents of the PEIR. Anyone who could potentially be affected by, or may have an active interest in, the Transmission Assets is encouraged to attend. The consultation events are to be held from 26 October to 16 November 2023, and their timings and locations are detailed on the Transmission Assets website:
- <https://morecambeandmorgan.com/transmission/>
- 10.1.1.3 Comments on the PEIR should be made in writing and submitted:
- by post to: FREEPOST MORECAMBE AND MORGAN;
 - by email to: info@morecambeandmorgan.com; or
 - by feedback form: www.morecambeandmorgan.com/transmission (or at consultation events).
- 10.1.1.4 The full PEIR can be viewed on the Transmission Assets website:
- <https://morecambeandmorgan.com/transmission/>
- 10.1.1.5 Additional copies are available on request from:
- info@morecambeandmorgan.com
- 10.1.1.6 A charge will be made for paper copies, starting from £0.28p per page. Alternatively, a USB containing the documents can be provided on request, free of charge.
- 10.1.1.7 The deadline for receipt of comments on this consultation is 23 November 2023. Comments received during pre-application consultation will be collated and considered prior to finalising the application.
- 10.1.1.8 The Applicants will further refine the Transmission Assets design and EIA based on the consultation responses received in relation to the PEIR. The final results of the EIA process will be presented in the Environmental Statement and a summary of all the consultation responses received will be presented in a Consultation Report, both of which will accompany the application for development consent to be submitted in summer 2024.