



MORECAMBE



FLOTATION ENERGY

Morecambe Offshore Windfarm: Generation Assets Environmental Statement

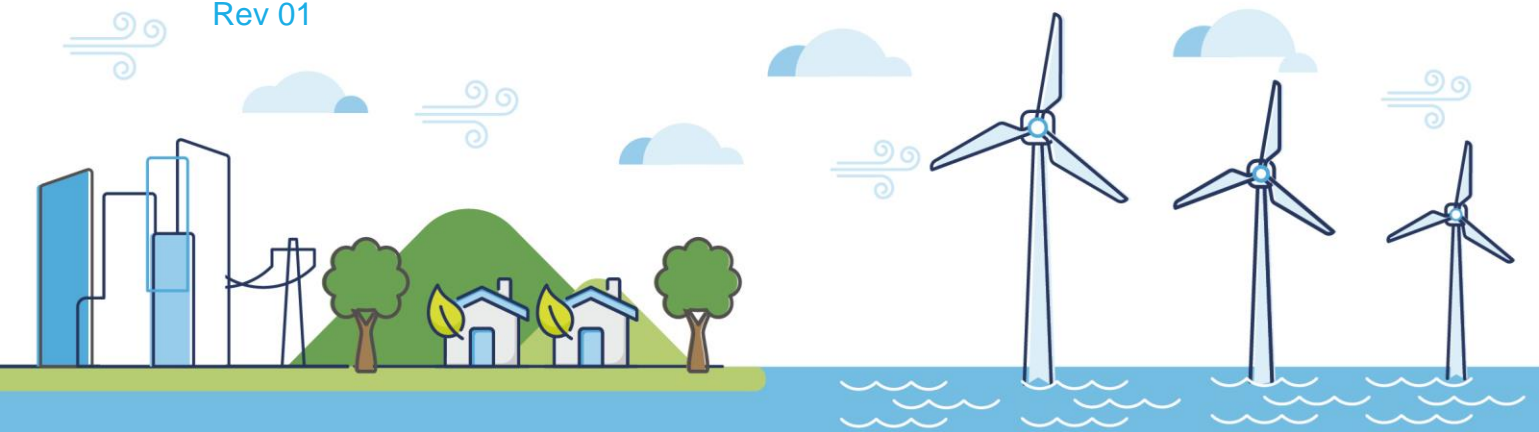
Volume 5

Chapter 4 Site Selection and Assessment of Alternatives

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Glossary of Acronyms

AfL	Agreement for Lease
BEIS	Department of Business, Energy and Industrial Strategy ¹
CRNRA	Cumulative Regional Navigation Risk Assessment
DCO	Development Consent Order
DESNZ	Department for Energy Security and Net Zero
EEC	European Economic Community
EIA	Environmental Impact Assessment
EPP	Evidence Plan Process
ES	Environmental Statement
ETG	Expert Topic Groups
EU	European Union
HAT	Highest Astronomical Tide
IEMA	Institute of Environmental Management and Assessment
IMO	International Maritime Organisation
MOD	Ministry of Defence
NATs	National Air Traffic Service
NPS	National Policy Statement
NRA	Navigation Risk Assessment
NSIP	Nationally Significant Infrastructure Project
O&M	Operation And Maintenance
OSP	Offshore Substation Platform
PDE	Project Design Envelope
PEIR	Preliminary Environmental Impact Report
PEXA	Practice and Exercise Areas
PINS	Planning Inspectorate
SEA	Strategic Environmental Assessment
SPA	Special Protection Area
SWOT	Strengths, Opportunities, Weaknesses and Threats
TCE	The Crown Estate
UK	United Kingdom
WTG	Wind Turbine Generators

¹ As of February 2023, BEIS is known as the Department for Energy Security and Net Zero (DESNZ).

Glossary of Unit Terms

GW	Gigawatt
MW	Megawatt

Glossary of Terminology

Applicant	Morecambe Offshore Windfarm Ltd
Application	This refers to the Applicant's application for a Development Consent Order (DCO). An application consists of a series of documents and plans which are published on the Planning Inspectorate's (PINS) website.
Generation Assets (the Project)	Generation assets associated with the Morecambe Offshore Windfarm. This is infrastructure in connection with electricity production, namely the fixed foundation wind turbine generators (WTGs), inter-array cables, offshore substation platform(s) (OSP(s)) and possible platform link cables to connect OSP(s).
Inter-array cables	Cables which link the WTGs to each other and the OSP(s).
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 OSP(s) ² , interconnector cables, Morgan offshore booster station, offshore export cables, landfall site, onshore export cables, onshore substations, 400kV cables and associated grid connection infrastructure such as circuit breaker infrastructure. Also referred to in this document as the Transmission Assets, for ease of reading.
Offshore export cables	The cables which would bring electricity from the OSP(s) to the landfall.
Offshore substation platform(s)	A fixed structure located within the windfarm site, containing electrical equipment to aggregate the power from the WTGs and convert it into a more suitable form for export to shore.
Windfarm site	The area within which the WTGs, inter-array cables, OSP(s) and platform link cables would be present.
Wind turbine generator (WTG)	A fixed structure located within the windfarm site that converts the kinetic energy of wind into electrical energy.

² At the time of writing the Environmental Statement (ES), a decision had been taken that the offshore substation platforms (OSP(s)) would remain solely within the Generation Assets application and would not be included within the Development Consent Order (DCO) application for the Transmission Assets. This decision post-dated the Preliminary Environmental Information Report (PEIR) that was prepared for the Transmission Assets. The OSP(s) are still included in the description of the Transmission Assets for the purposes of this ES as the Cumulative Effects Assessment (CEA) carried out in respect of the Generation/Transmission Assets is based on the information available from the Transmission Assets PEIR.



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4 Site Selection and Assessment of Alternatives

4.1 Introduction

- 4.1 This chapter of the Environmental Statement (ES) describes the site selection process and the approach undertaken by the Applicant to define the Morecambe Offshore Windfarm Generation Assets (the Project).
- 4.2 The Applicant has considered and assessed reasonable alternatives through the pre-application process. There is a requirement as part of the Environmental Impact Assessment (EIA) process to describe the reasonable alternatives considered during the evolution of the Project (such as development design, technology, location, size and scale) and to set out the main reasons for selecting the chosen option(s).
- 4.3 The chapter outlines the site selection process, good design policies and consideration of alternatives for the windfarm site location and the wider Project design/technology, which has been undertaken with specific reference to the relevant legislation and guidance, of which the primary sources are the National Policy Statements (NPS) (**Section 4.3**).
- 4.4 While this ES relates only to Generation Assets, the site selection process for the windfarm site has been undertaken considering requirements for both the Generation Assets and Morgan and Morecambe Offshore Wind Farms: Transmission Assets (offshore cable route, landfall, onshore cable route and onshore substation). For example, the availability of onshore grid connection options and the siting of Transmission Assets were considered when selecting the windfarm site. The site selection process for Transmission Assets is not described in this ES, as the Transmission Assets are subject to a separate Development Consent Order (DCO) application (as described in **Chapter 1 Introduction** (Document Reference 5.1.1)).

4.2 Key components of the Project

- 4.5 The site selection and assessment of alternatives relates to the following main components of the Project:
- Wind turbine generators (WTGs) and their associated foundations and scour protection
 - Offshore substation platforms (OSP(s)) and associated foundations and scour protection
 - Inter-array and platform link cables and cable protection

- 4.6 All Project components would be located within the windfarm site. Further details of the key components of the Project’s infrastructure can be found in **Chapter 5 Project Description** (Document Reference 5.1.5).

4.3 Legislation, policy and guidance

- 4.7 The site selection process for offshore windfarms in the United Kingdom (UK) is governed by the existing legislative, policy and guidance framework for the development of generating stations and electrical infrastructure and for environmental assessment within the UK (see **Chapter 3 Policy and Legislation** (Document Reference 5.1.3) for more information). The key pieces of legislation, policy and best practice guidance which set the framework for site selection and the assessment of alternatives for offshore windfarms in the UK, and upon which this methodology has been based, are summarised in **Table 4.1**.
- 4.8 The Overarching NPS for Energy (EN-1) and Renewable Energy Infrastructure (EN-3) were revised in November 2023 (Department for Energy Security and Net Zero (DESNZ), 2023a and 2023b) and were designated in January 2024. A review of the NPSs has been undertaken in the context of this ES chapter.

Table 4.1 Legislation, policy and guidance considered during the site selection and assessment of alternatives process

Legislation, Policy & Guidance	Details
Legislation	
EIA Regulations	<p>The consideration of alternatives and major design decisions made during the development of a project has been part of EIA Legislation since the adoption of the original EIA directive in UK law under the European Union (EU) EIA Directive 85/337/EEC (as amended by Directives 97/11/EC, 2003/35/EC and 2009/31/EC).</p> <p>The Infrastructure Planning (Environmental Impact Assessment) Regulations (2017) require a ES to include “<i>a description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects</i>”.</p>
The Planning Act 2008	<p>The Planning Act 2008 (as amended) b is the primary legislation that established the legal framework for applying for, examining and determining applications for Nationally Significant Infrastructure Projects (NSIPs) taking into account the guidance in the relevant NPS (identified below).</p>

Legislation, Policy & Guidance	Details
National policy	
Overarching NPS for Energy (EN-1) (DESNZ, 2023a)	The Overarching NPS for Energy (EN-1) is clear that although <i>“from a policy perspective this NPS does not contain any general requirement to consider alternatives or to establish whether the proposed project represents the best option”</i> , in the execution of a competent EIA <i>“applicants are obliged to include in their ES, information about the main alternatives they have studied. This should include an indication of the main reasons for the applicant’s choice, taking into account the environmental, social and economic effects and including, where relevant, technical and commercial feasibility.”</i>
NPS for Renewable Energy Infrastructure (EN-3) (DESNZ, 2023b)	NE-3 highlights how, in relation to factors influencing site selection and design, it may be appropriate to provide some direction or guidance, for example to areas of search or areas to avoid through Marine Plans, Strategic Environmental Assessments (SEAs) or The Crown Estate (TCE) Leasing Rounds. EN-3 further details factors influencing site selection and design.
PINS Advice Note Seven: EIA (PINS, 2020)	PINS Advice Note Seven suggests the EIA needs to explain <i>“the reasonable alternatives considered and the reasons for the chosen option considering the effects of the Proposed Development on the environment”</i> .
Department of Business, Energy and Industrial Strategy (BEIS) Energy White Paper (BEIS, 2020)	The BEIS Energy White Paper set out how the UK will decarbonise its energy system and reach net zero emissions by 2050, reiterating the UK Government target of achieving 40GW of offshore wind by 2030, of which the Project would contribute up to a nominal 480MW. Seeking the appropriate balance between environmental, social and economic costs is a key component of the white paper.
North West Offshore Marine Plan (Defra, 2021)	The North West Offshore Marine Plan outlined Defra’s approach taken to offshore wind renewable energy infrastructure and subsea cabling in the plan and associated policies. It also is an <i>‘enabling mechanism, providing greater certainty about where activities can best take place, and assisting marine users in determining preferred locations’</i> .

Legislation, Policy & Guidance		Details
Guidance		
EIA Guide to Shaping Quality Development (Institute of Environmental Management and Assessment (IEMA)) (IEMA, 2015)	IEMA's EIA Guide to Shaping Quality Development states that considering the key environmental and consenting risks alongside the engineering requirements of a project can influence design in many ways. The earlier the interaction commences, the more likely it is that cost effective, positive outcomes will be achievable. This can be considered in several ways: <ul style="list-style-type: none"> ▪ The review of site selection of alternative development sites to avoid key sensitive receptors ▪ Alternating the layout to work within a site's existing natural systems ▪ Amending the design of a specific aspect of the development to manage impacts ▪ Specifying construction techniques to avoid effects on receptors ▪ Changing materials to reduce volume and/or transport impacts 	

4.4 Site selection process

4.4.1 Regional assessment

- 4.9 TCE introduced the process of awarding seabed rights for Round 4 in 2019 (with the publication of the Round 4 Information Memorandum in Sept 2019) in the waters off England, Wales and Northern Ireland (TCE, 2019b). Almost 8GW of new offshore wind projects were allocated in February 2021.
- 4.10 Through extensive spatial analysis of technical resources and constraints, Geographic Information System (GIS) and qualitative analysis, TCE initially identified 18 regions around England, Wales and Northern Ireland that could be potentially developed for offshore wind as part of the Round 4 leasing process (**Plate 4.1**) (TCE, 2019b). These 18 regions were refined by TCE through engagement with stakeholders to five: Dogger Bank, Southern North Sea, East Anglia, North Wales and Irish Sea, with a further four regions “under further consideration”: Yorkshire Coast, The Wash, South East and Anglesey (nine in total). Within these regions were a number of areas excluded due to hard constraints, including separation from operational windfarms (7.5km) and traffic separation schemes.

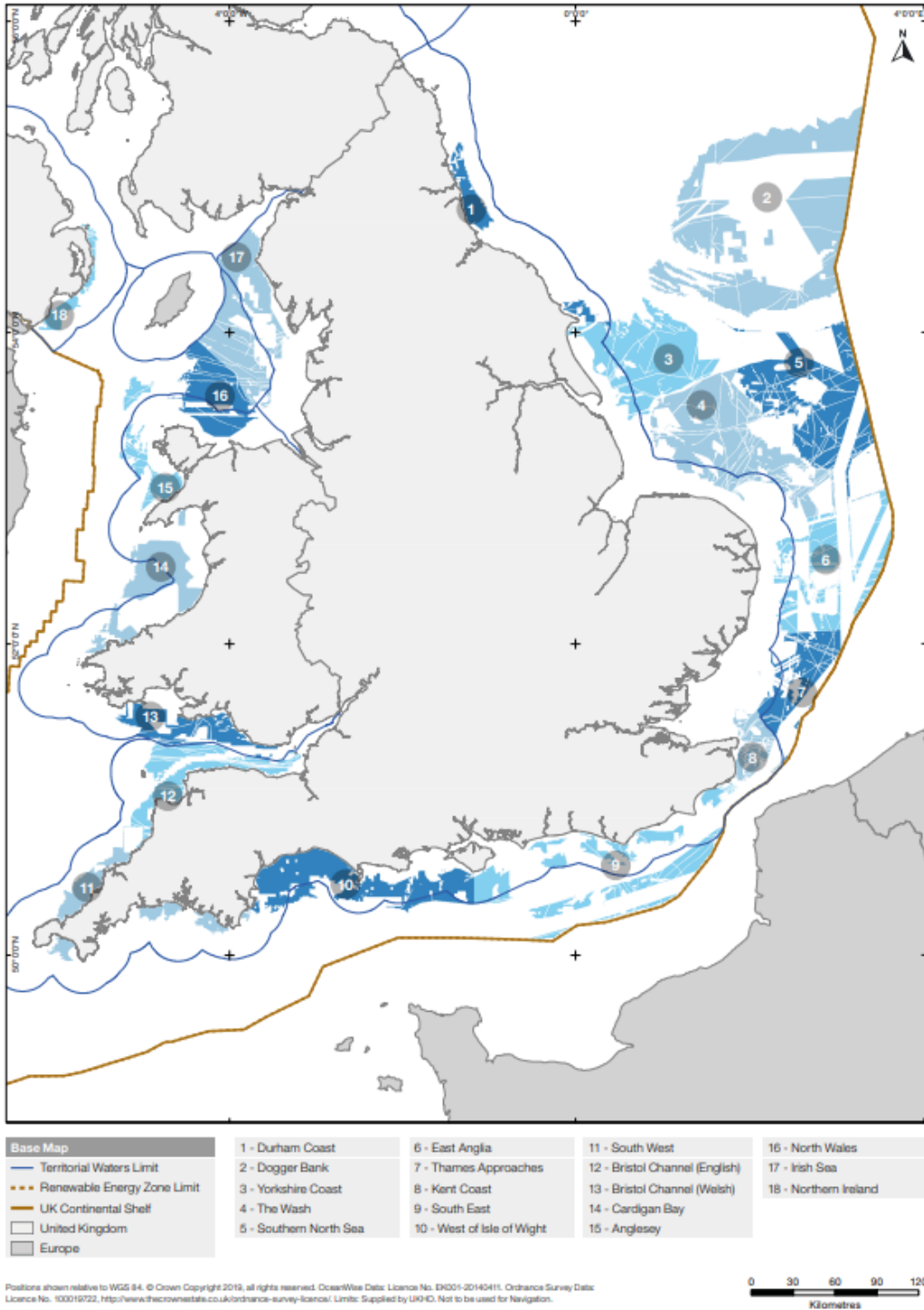


Plate 4.1 The 18 'characterisation areas' identified by TCE (TCE, 2019a)

4.11 The Applicant carried out an initial review on these regions. A comparative overview and matrix analysis of constraints of all nine regions were undertaken based on parameters including:

- Physical parameters:
 - Bathymetry
 - Wind capacity
 - Average significant wave height
 - Significant wave height
 - Ground conditions
- Grid connection:
 - Grid capacity
 - Distance to possible grid connection points
- Offshore distance to construction ports
- Offshore distance to operation and maintenance (O&M) ports
- Environmental receptors and constraints:
 - Benthic ecology and species and habitat of conservational interest
 - Fish and shellfish species (spawning and nursery grounds)
 - Marine mammals (ranges and distributions)
 - Seabird density
 - Environmental designations
 - Shipping traffic
 - Commercial fisheries intensity
 - Relative visibility of coastal and marine areas from the land
 - Known offshore wreck sites
 - Military usage (exercise areas, danger areas, chemical munition and explosive disposal sites)
 - Other marine users – e.g. aviation and leisure and recreational boating activity
 - Oil and gas infrastructure
 - Cumulative impacts with other licensed activities

4.12 A Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis assessment was undertaken by the Applicant, based on the information collected, to highlight the key positive factors, whilst at the same time the potential challenges considered.

- 4.13 As a result, the Anglesey and North Wales regions were discounted by the Applicant because of grid connection and visual impact challenges. The South East Region was also discounted due to grid connection challenges and limitations, in addition to cumulative impacts with other marine users. Dogger Bank and the Southern North Sea Regions were also discounted, because of the distance offshore and challenges around cumulative impacts to birds.
- 4.14 Further analysis of constraints by the Applicant, and the establishment of potential sites within the remaining regions, was then undertaken (in the Irish Sea, East Anglia, the Yorkshire Coast and the Wash Regions).
- 4.15 Subsequently, the available regions under the Round 4 licencing process were finalised and categorised by TCE into available bidding areas (**Plate 4.2**):
- Bidding Area 1 - Dogger Bank (comprising the Dogger Bank region)
 - Bidding Area 2 - Eastern regions (comprising the Southern North Sea region, the Wash region and the East Anglia region)
 - Bidding Area 3 - South East (comprising the South East region)
 - Bidding Area 4 - Northern Wales & Irish Sea (comprising the North Wales region, Irish Sea region, and the Anglesey region)

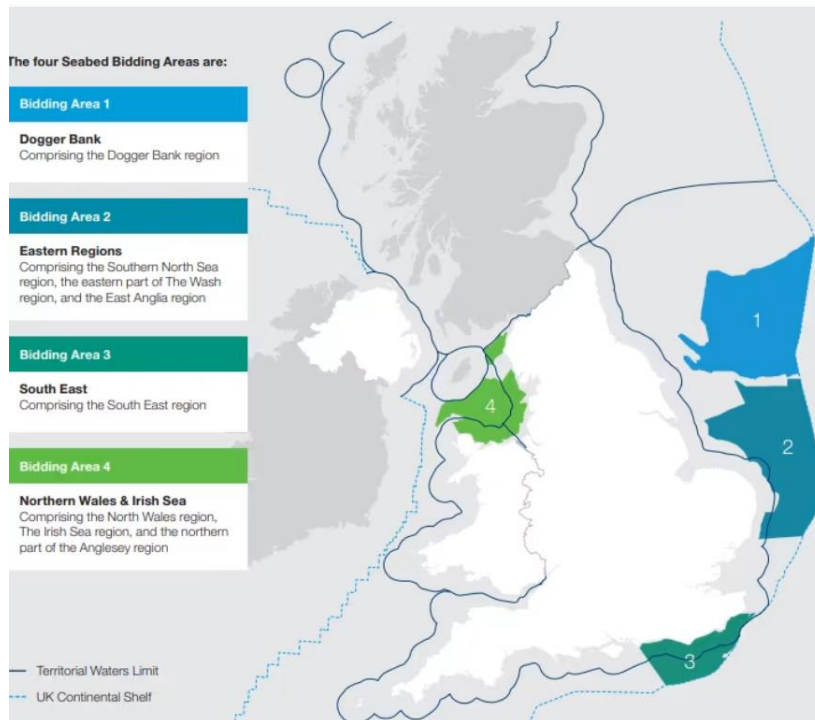


Plate 4.2 The final bidding areas identified by TCE (September 2019)

- 4.16 These bidding areas were offered by TCE as (stated in the TCE Round 4 Information Memorandum) ‘the strongest opportunities for new offshore wind leasing development, on the basis that they are technically feasible, contain large areas of available resource, and offer lower levels of consenting constraint’.
- 4.17 The Applicant’s analysis of regions also included consultation with the oil and gas industry, to consider and investigate potential offshore wind sites where oil and gas infrastructure assets already exist. In particular, areas where assets were expected to be reaching the end of their productive lives. The reasoning was, if a windfarm can co-exist with existing oil and gas assets, then the disturbance to existing sea users and stakeholders can be minimised.
- 4.18 Bidding area 4 (North Wales and the Irish Sea) was selected as the preferred region by the Applicant given, on balance, the lower number of identified constraints across the region and the opportunities to develop a site within an oil and gas field that is expected to be reaching the end of its productive life. It was hoped that, by replacing oil and gas platforms with offshore wind turbines, it would avoid/minimise impacts on some receptors and, placing the generation infrastructure within the vicinity of oil and gas platforms, wells and pipelines would minimise the disturbance of a previously undeveloped area of the Irish Sea. The site selection process has, thus, built-in coordinating and working alongside the existing infrastructure and oil and gas industry from the outset.

4.4.2 Initial offshore zone selection

- 4.19 A detailed study was undertaken to consider an initial zone in Bidding Area 4 for the most technically and environmentally suitable development sites. This was supported by GIS modelling and analysis of constraints, considering a number of key factors, including:
- Physical parameters (including water depths, wave height, ground conditions and wind resource)
 - Grid connection (distance to shore and available capacity)
 - Landscape designations
 - Environmental designations
 - Oil and gas interaction opportunities
 - Sensitive ecological habitats and receptors
 - Other sea and air users (e.g. Ministry of Defence (MOD) activity, shipping and navigation, National Air Traffic (NATs) services, fishing activity, oil

and gas infrastructure, and key resource areas (carbon capture and storage, marine aggregates, tidal energy))

- Cumulative impacts with other licenced activities

4.20 This process identified an initial zone within Region 4 (Northern Wales and Irish Sea) that was analysed. The zone (Morecambe Zone) was identified as having the lowest number of constraints and the highest potential for opportunities to co-exist within existing oil and gas infrastructure. The location of the initial Morecambe Zone is shown within **Figure 4.1**.

4.4.3 Agreement for Lease area selection

4.21 The refinement of the Morecambe Zone followed an iterative site selection process, taking account of environmental, physical, technical, commercial and social considerations (including the location of grid connection) and opportunities, as well as engineering requirements. The aim was to identify a project that would be both consentable and deliverable and yet sensitive to the receiving environment. A multi-disciplinary team was formed to undertake the site selection process, which included a team of specialists comprising engineers, planners, legal and EIA/technical consultants, whose expertise was drawn upon throughout the site selection process.

4.22 Optioneering and technological and economical assessments were modelled, using a virtual tool, which considered the physical environment, environmental sensitivities, technology, design and fabrication, construction and operation requirements and costings. This modelling identified a number of boundaries, whereby constraints were compared, and maximum output and benefits could be realised.

4.23 This analysis allowed the Applicant to enter into the Round 4 bidding process with a number of feasible options in the Morecambe Zone (shown on **Figure 4.1**).

4.24 In the selection of options, the Applicant ensured that the sites avoided International Maritime Organisation (IMO) shipping traffic separation schemes and deep-water channels, existing offshore wind agreements, marine aggregate licence areas, and capital and navigation dredging areas (in line with the Round 4 bidding rules). Further avoidance of impacts (including interaction with other users) made by the Applicant through site selection were, for example avoiding disposal sites and military Exercise Areas and Danger Areas (PEXA). The Applicant also selected options outside any environmentally designated site, including the nearby Liverpool Bay Special Protection Area (SPA), due to potential impacts to ornithological receptors.

4.25 The size of the Project was also a consideration, with the aim of it being suitable to the receiving environment (including the aim of the array area to

fall within sea areas currently occupied by oil and gas assets). In this way, the Applicant intended that the Project be large enough to be commercially successful and make a significant contribution to achieving the UK's Net Zero by 2050 ambitions, but small enough to minimise impacts on the Irish Sea environment, visual receptors and other sea users.

- 4.26 Consequently, a bid for a site with a nominal capacity of 480MW, was made and subsequently awarded by TCE via the Round 4 leasing process (defined by the Agreement for Lease (AfL) area with TCE shown on **Figure 4.1**).

4.4.4 Refinement of the windfarm site

- 4.27 A windfarm site of 125km² (reflecting the AfL area) was assessed in the Project Preliminary Environmental Impact Report (PEIR). The windfarm site development area has been subsequently reduced to 87km² and reflects the windfarm site assessed in this ES, as shown in **Figure 4.1**. The windfarm site refinement was undertaken following analysis of geophysical survey data, environmental analysis, consultation feedback and layout design development, with the following key drivers for change (alongside power density considerations):

- Shipping and Navigation - The Cumulative Regional Navigation Risk Assessment (CRNRA) carried out for the PEIR considering the Round 4 projects in the Irish Sea (the Project and Morgan and Mona Offshore Wind Projects) identified the benefits of increased sea room between the various project boundaries to mitigate impacts to existing ferry and other shipping routes between Liverpool, the Isle of Man and Belfast, and the wider Irish Sea area. A key concern identified by stakeholders was the impact on recognised sea lanes essential to International Navigation between the Mona array area and the south-western boundary of the Project windfarm site. The Project site refinement reduces the risk of collision between navigating vessels. Allied to this, the ferry operators and the UK Chamber of Shipping, representing the wider shipping industry, raised concerns on the need to revise established passage plans to avoid the windfarm areas, adding emissions, time and cost to their services. The revisions to the windfarm site reduce route deviations in this respect. The effect of the revisions to the boundary, alongside boundary revisions made by the Morgan and Mona Offshore Wind Projects are detailed in **Chapter 14 Shipping and Navigation** (Document Reference 5.1.14) and associated appendices.
- Oil and gas – Until the point of decommissioning of existing oil and gas infrastructure, there is a requirement for the coexistence of activities. Assessments identified the potential interaction between the South Morecambe gas field vessels and helicopter operations and the

windfarm site. The windfarm site refinement reduces this interaction with the gas field operations, including helicopter approaches to the Calder CA1 platform (which now sits outside of the windfarm site boundary).

- Ground conditions – The western section of the AfL area has the highest presence of sandwaves and mega ripples, with the eastern AfL area (i.e. the refined windfarm site area) containing a lower coverage of these features. The reduced incidence of these features may also reduce the level of seabed preparation required. The refined site area also has the deepest areas of rockhead and shallowest water depth which may reduce the size of foundations needed.
- Layout – The exclusion of the area west of the Calder CA1 platform reduces the need for long inter-array cables, thus helping to minimise installation cost, electrical losses, environmental impact. Reduced cabling length would also reduce the risk of cable damage due to anchor or fishing net/gear fouling. The reduction in the western boundary also reduces underwater noise impact ranges out to the west.
- Other marine users – The level of interaction between known marine users and the windfarm is minimised by reducing the Project's boundary and thus also reducing the potentially effected area.

4.4.5 Site selection process summary

4.28 **Plate 4.3** provides a flow diagram of the main steps followed in the site selection process to establish the windfarm site assessed in this ES, as described in **Section 4.4.1** to **Section 4.4.4**.

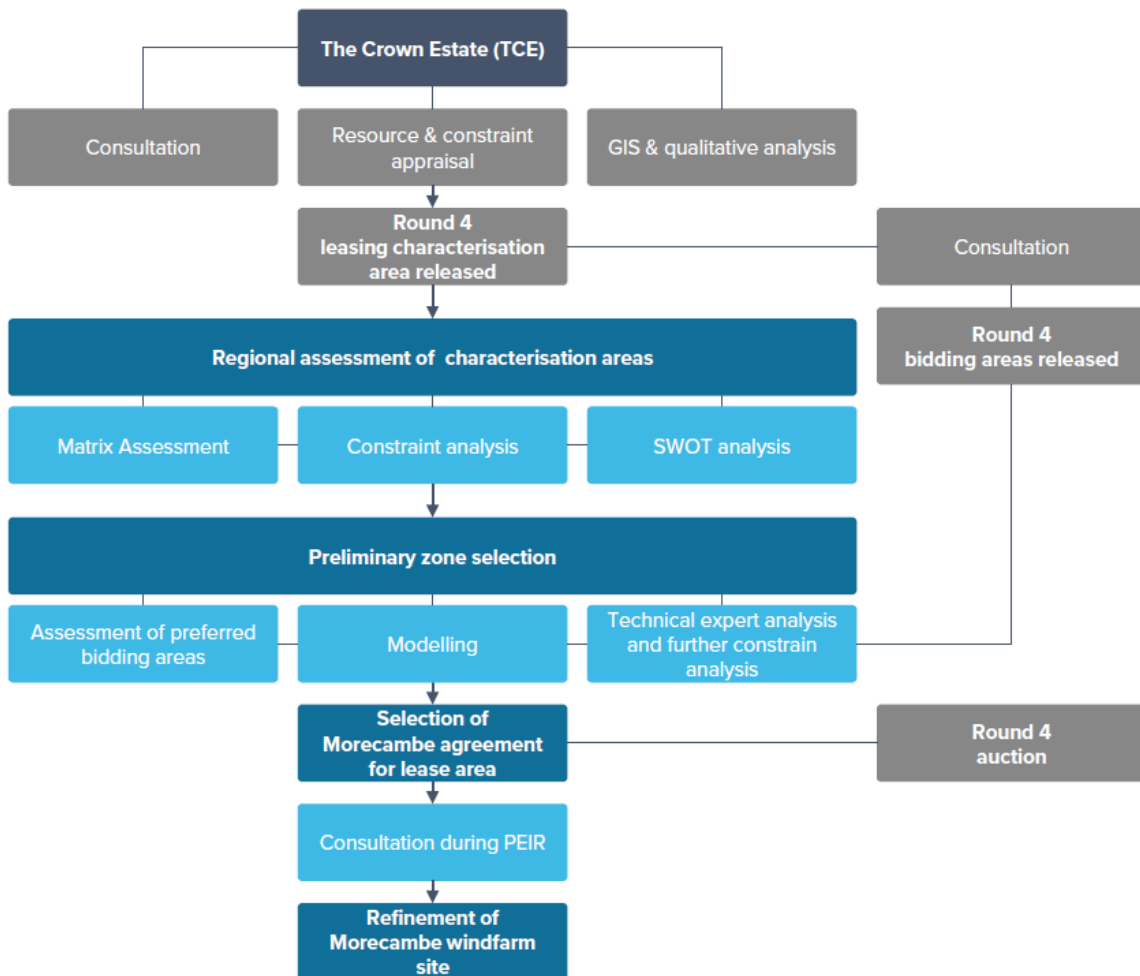


Plate 4.3 Overview of the windfarm site selection and refinement process (grey = TCE, blue = the Applicant)

4.5 Project alternatives

- 4.29 As identified in **Section 4.4.1** and **Section 4.4.2**, a number of alternatives have been considered as part of the site selection decision-making process. The early strategic Project consideration of alternatives fed directly into the site selection process through assessment of TCE bidding areas and analysis of constraints at a regional level, i.e., all regions offered by the TCE.
- 4.30 As well as regional analysis, a number of additional site alternatives (within the Irish Sea) were also identified and considered in detailed analysis during the selection of the windfarm site. These are discussed in **Section 4.4.3**.
- 4.31 Alternatives to the Project design have also been considered. A key consideration was the use of floating wind technology, however given the water depths at the site, a fixed foundation solution was chosen. Further design/technology choices, and the configuration of infrastructure within the windfarm site are described below, noting that this is an ongoing process.

4.5.1 Project design and layout development

- 4.32 Work is continuing on the Project design, including how infrastructure would occupy the windfarm site. The Applicant is considering a number of design options, including consideration of the available technology, possible layouts and installation methods and distance to third party assets. The Project Design Envelope (PDE) is given in **Chapter 5 Project Description**, which encompasses all options being considered.
- 4.33 The PDE includes two WTG scenarios (larger or smaller WTGs) and a number of foundation options for both. The maximum number and size of WTGs have been reduced since PEIR and the number of foundations options refined. For example, the maximum blade tip height has been reduced, which reduces both visual impacts and impacts to aviation receptors. The reduction in the maximum number and size of WTGs also reduces the seabed footprint occupied by foundations. Ground condition survey and analysis have also allowed for the refinement of estimates of parameters, such as seabed preparation areas.
- 4.34 The minimum rotor clearance between turbine rotors and sea level (air gap) has also been increased from 22m to 25m above High Astronomical Tide (HAT) to reduce impacts on ornithological receptors, and in response to comments made by Natural England on the PEIR in this respect. The increase in air gap was also considered against other constraints such as visual and aviation impacts and installation feasibility. At 22m above HAT, the air gap was greater than the minimum requirement for shipping and navigation, with the increase to 25m HAT further surpassing this requirement.
- 4.35 Further development of the design and infrastructure layout within the windfarm site is ongoing, based upon the Project's Design Principles, which include safety, engineering and other requirements (as set out in the Design Statement (Document Reference 4.3) and commitments made as outlined in the Schedule of Mitigation (Document Reference 5.5). Design work has been progressed alongside environmental analysis and consultation feedback (**Section 4.6**) and embedded mitigation measures built into the design relevant to each ES technical topic are provided within chapters 7-22. These include the commitment to undertake Project piling activities at only one foundation location at a time (i.e. no concurrent piling activities), and to minimise the use of cable protection as far as practicable.
- 4.36 The analysis undertaken in this ES, and potential effects to receptors, have been carefully considered as the design process has progressed (as described further in **Section 4.4.4**). Optimisation of the infrastructure design is a complex process and would be finalised post-consent in the detailed design phase. However, the Project's Design Principles establish a framework

to prevent and reduce likely significant adverse effects on the environment and deliver a final design which accords with applicable legislation and policy.

4.6 Consultation

- 4.37 Consultation is a key feature of the EIA process, and continues throughout the lifecycle of a project, from its initial stages through to consent and post-consent. The Applicant has strongly committed to, and undertaken, meaningful engagement throughout the pre-application period.
- 4.38 The Applicant has undertaken pre-application engagement with stakeholders to seek input to refine the Project design, and to communicate key decisions made with regard to both design and location.
- 4.39 **Table 4.2** summarises the consultee responses received prior to publishing this ES relevant to site selection and assessment of alternatives, which is further described in **Section 4.6.1** and **Section 4.6.2**.

Table 4.2 Summary of consultation responses regarding site selection and assessment of alternatives

Consultee	Date	Comment	Response/where addressed in the ES
Scoping Opinion responses			
Planning Inspectorate (PINS) (ref 2.1.2)	2 nd August 2022	The Scoping Report discusses the alternatives reviewed when identifying the location of the Proposed Development. the reasoning for the selection of the chosen option(s), including a comparison of the environmental effects. However, the Scoping Report does not explain if a discussion of alternatives will be provided in the ES. The Inspectorate would expect to see a discrete section in the ES that provides details of the reasonable alternatives studied up to the point of submission and the reasoning for the selection of the chosen option(s), including a comparison of the environmental effects.	The reasons outlined for choosing the windfarm site are outlined in Sections 4.4 and project alternatives are outlined in Section 4.5 .
Natural England	2 nd August 2022	Schedule 4 of the Town & Country Planning (Environmental Impact Assessment) Regulations 2017 / Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 (Regulation 10) sets out the necessary information to assess impacts on the natural environment to be included in an ES, specifically: An assessment of alternatives and clear reasoning as to why the preferred option has been chosen	The reasons outlined for choosing the windfarm site are outlined in Sections 4.4 and project alternatives are outlined in Section 4.5 .

Consultee	Date	Comment	Response/where addressed in the ES
Statutory consultation feedback on the PEIR			
Chamber of Shipping	2 nd June 2023	As stated in Paragraph 2.6.162 of NPS EN-3 states: “Site selection should have been made with a view to avoiding or minimising disruption or economic loss to the shipping and navigational industries.” The above statement cannot be agreed with based on the proposed developments as presented at PEIR.	The site selection process undertaken for the Project (given the location and scale of the Project) has minimised effects to shipping and navigation and contribution to regional effects on shipping and navigation. The Project has undertaken continued engagement with stakeholders and the reduction of the windfarm site area reduces Project-alone (and any contribution to cumulative effects) impacts to shipping and navigation (as described in Chapter 14 Shipping and Navigation and the supporting Navigation Risk Assessment (NRA) and CRNRA).
Ferry operators (including Stena Line, Seatruck and Isle of Man Steam Packet Company)	Through continued consultation	Concerns were raised over cumulative impacts to ferry routing and navigation safety in respect of all Round 4 projects.	
Natural Resources Wales (ref AOS – 22086-0003)	21 st May 2023	NRW (A) strongly advise that cable protection measures are minimised as far as possible to reduce the potential for significant cable/scour protection to alter the seabed sediment transport processes leading to permanent alterations to the seabed morphodynamics	The Applicant is committed to minimising cable protection by using burial where ground conditions allow. Cable protection volumes are estimated on a precautionary basis but would only be used where ground conditions prevent burial, at cable crossings and at entry points to the WTGs and OSP(s).

Consultee	Date	Comment	Response/where addressed in the ES
Natural England (ref. E1)	2 nd June 2023	The minimum rotor clearance above sea level is 22m. Natural England highlight that increasing the minimum rotor clearance would reduce collision risk estimates generated by the project and request that the Applicant explore the feasibility of achieving greater clearance	<p>The minimum rotor clearance (air gap) outlined in the PEIR was 22m above highest astronomical tide (HAT). Following stakeholder consultation, alongside other constraints, the minimum rotor clearance has been increased to 25m above HAT (see Section 5.5 of Chapter 5 Project Description).</p> <p>Collision risk modelling undertaken in Chapter 12 Offshore Ornithology (Document Reference 5.1.12) has been undertaken based on the revised (25m above HAT) air gap.</p>

4.6.1 Statutory and public consultation

4.40 Refinements to the windfarm site, Project design, layout and configurations have been undertaken through formal and informal consultation in the pre-application stages. Feedback received has been taken into consideration throughout, via a range of means, including (but not limited to):

- Introductory meetings with a number of statutory (and non-statutory organisations)
- The Scoping Report (submitted to PINS in June 2022; Morecambe Offshore Windfarm Ltd, 2022) sets out the development of the site selection and consideration of alternatives at the scoping stage. Consultation feedback was provided by stakeholders through the PINS Scoping Opinion (PINS, 2022)
- Non-statutory consultation on the Project between 2nd November and 13th December 2022, including Public Information Events held across November 2022
- The PEIR (published in April 2023; Morecambe Offshore Windfarm Ltd, 2023) which provided preliminary environmental information in relation to the Project to enable consultees (both specialist and non-specialist) to understand the likely environmental effects of the Project and help to inform their consultation responses on the Project during the pre-application stage. PEIR consultation responses were provided by statutory consultees, stakeholders and the public between April – June 2023
- Public Information Events held in May 2023 as part of the Project’s formal consultation process between April – June 2023
- Dedicated project e-mail address, feedback form and freepost address to assist local communities in contacting the Applicant
- Provision on the Project consultation website (www.morecambeandmorgan.com/morecambe) where interested members of the public are able to provide their comments
- Online webinars held in 2022 and 2023, providing opportunity for those that could not attend face to face events to provide comments

4.6.2 Additional technical engagement

4.41 Technical stakeholder engagement was primarily undertaken via the EIA Evidence Plan Process (EPP). Several Expert Topic Groups (ETGs) were established as part of the EPP to enable detailed discussions on particular

topics, as described further in **Chapter 6 EIA Methodology** (Document Reference 5.1.6).

- 4.42 The EPP is a non-statutory, voluntary process and agreements are non-binding, however, it provides a useful stakeholder engagement approach on key elements and outcomes of the EIA process, which allowed continued dialogue on the environmental effects of the Project and feedback into the design process. This has been undertaken throughout the EIA process to secure the required embedded and additional mitigation, as well as technology and methodologies selection, throughout all phases of the Project.
- 4.43 Targeted consultation has also been undertaken with key user groups potentially impacted by the Project, to allow views to be incorporated into the design process. For example, consultation was undertaken with oil and gas operators during the Round 4 bidding process by the Applicant to support the selection process of the windfarm site, given its location in the South Morecambe gas field. The Applicant has also worked closely with oil and gas operators throughout the pre-application period, with one of the key factors influencing the reduction in the windfarm site area being the facilitation of co-existence of the Project alongside oil and gas operations.
- 4.44 Navigation risk assessments have been undertaken for the Project, involving consultation with shipping and navigation stakeholders, including engagement via a targeted Marine Navigational Engagement Forum. Following stakeholder feedback that cumulative effects in the Irish Sea were a concern, navigation risk assessments were undertaken at both a regional cumulative level (considering other adjacent planned windfarms via the CRNRA and involvement of key stakeholders), in addition to the Project level. The findings of these assessments at PEIR informed the Project decision to reduce the windfarm site area to take account of shipping and navigation aspects at a regional level (looking at cumulative effects on users) particularly with the nearby planned Mona Offshore Wind Project and Morgan Offshore Wind Project Generation Assets.
- 4.45 Full details of the technical consultations undertaken for each EIA technical topic are presented in chapters 7 to 22 of this ES.

4.7 Summary

- 4.46 Initial consideration of technical and environmental constraints was undertaken through regional assessment of TCE Round 4 characterisation areas. This was followed by detailed constraint analysis by the Applicant to identify suitable development areas that minimise associated environmental effects and effects on other users. This analysis led to the selection of the AfL area. The windfarm site and PDE have thereafter been refined, taking into

consideration EIA assessments undertaken, as well as further detailed site-specific studies, surveys and continued consultation.

4.47 Key design decisions that have been made by the Applicant as a result of the site selection, design and assessment studies, consultation process and feedback received, include:

- The location and extent of the windfarm boundary has been designed to take account of exclusion zones and operations of existing oil and gas infrastructure to successfully coexist with other marine users
- The windfarm site has been located outside of any environmental designation
- The windfarm site area has been reduced using design studies and information from detailed shipping and navigation assessments (including a cumulative regional assessment)
- The windfarm site refinement reduces underwater noise impact ranges to the west. Further, piling (if used) would not be undertaken at more than one location at any time by the Project (i.e. no concurrent piling), to reduce underwater noise impacts
- The location of the site provides opportunity to avoid sandwaves and minimise associated seabed preparation (due to seabed bathymetry)
- Minimum WTG rotor clearance above sea level has been increased from 22m to 25m above HAT to reduce impacts to ornithological receptors
- The size of the largest WTG in consideration has been reduced, resulting in a reduction in blade tip height
- The maximum number of WTGs has been reduced from 40 to 35, reducing the number of foundations required interacting with the seabed

4.48 This chapter explains the process that has informed the site selection and refinement of the windfarm site and the PDE. The design and parameters set out in **Chapter 5 Project Description** and the boundary of the windfarm site shown on **Figure 4.1** has been taken forward for assessment within the ES technical chapters 7 to 22.

4.8 References

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