



NORTH FALLS

Offshore Wind Farm

ENVIRONMENTAL STATEMENT

Non-technical Summary

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NORTH FALLS

Offshore Wind Farm

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Glossary of Acronyms

CEA	Cumulative Effects Assessment
DCO	Development Consent Order
DESNZ	Department for Energy Security & Net Zero
EIA	Environmental Impact Assessment
ES	Environmental Statement
GGOW	Greater Gabbard Offshore Wind Farm
GVA	Gross Value Added
GW	Gigawatt
GWF	Galloper Wind Farm
MW	Megawatt
NFOW	North Falls Offshore Wind Farm Limited
NtS	Non-technical Summary
PEIR	Preliminary Environmental Information Report
RWE	RWE Renewables UK Swindon Limited
SSER	SSE Renewables Offshore Windfarm Holdings Limited
UK	United Kingdom

Glossary of Terminology

Array area	The offshore wind farm area, within which the wind turbine generators, array cables, platform interconnector cables, offshore substation platform(s) and/or offshore converter platform will be located.
Array cables	Cables which link the wind turbine generators with each other, and the offshore substation platform(s) and/or the offshore converter platform.
Bentley Road Improvement works	Works involving the widening and improvement of the carriageway along Bentley Road, required to facilitate heavy goods vehicle and Abnormal Indivisible Load access to the onshore cable route and the onshore substation.
Cable circuit	The onshore and offshore export cables are comprised of cable 'circuits'. Each cable circuit is typically comprised of three power cables, as well as fibre cables and earth cables. It is expected that each circuit would comprise up to seven cables in total.
Cable ducts	Housing for the onshore export cables, typically comprising plastic high-density polyethylene (HDPE) pipes buried underground. Each cable circuit will require up to seven individual ducts (i.e. one per cable).
Commissioning	Process of ensuring equipment is installed properly and has the performance and interrelated functioning and communication needed for safe and reliable operation).
Haul road	The track along the onshore cable route used to access different sections of the onshore cable route, the onshore substation and National Grid substation connection works.
Horizontal directional drill	Trenchless technique to bring the offshore export cables ashore at landfall. The technique will also be one of the trenchless techniques used for installation of the onshore export cables at sensitive areas of the onshore cable route.
Landfall	The location where the offshore export cables come ashore at Kirby Brook.
Link boxes	Underground chambers or above ground cabinets next to the onshore export cables housing low voltage electrical earthing links.
Micro-siting	Small scale refinement to the location of offshore infrastructure during detailed design to avoid key constraints.
National Grid connection point	The grid connection location for the Project. National Grid are proposing to construct new electrical infrastructure (a new substation) to allow the Project to connect to the grid, and this new infrastructure will be located at the National Grid connection point.
National Grid substation connection works	North Falls infrastructure required to connect the Project to the new substation at the National Grid connection point.
Offshore cable corridor	The corridor of seabed from array area to the landfall within which the offshore export cables will be located.
Offshore converter platform	Should an offshore connection to a third party HVDC cable be selected, an offshore converter platform would be required. This is a fixed structure located within the array area, containing HVAC and HVDC electrical equipment to aggregate the power from the wind turbine generators, increase the voltage to a more suitable level for export and convert the HVAC power generated by the wind turbine generators into HVDC power for export to shore via a third party HVDC cable.
Offshore export cables	The cables which bring electricity from the offshore substation platform(s) to the landfall, as well as auxiliary cables.
Offshore project area	The overall area of the array area and the offshore cable corridor.
Offshore substation platform(s)	Fixed structure(s) located within the array area, containing High Voltage Alternating Current electrical equipment to aggregate the power from the wind turbine generators and increase the voltage to a more suitable level for export to shore via offshore export cables.
Onshore cable route	Onshore route within which the onshore export cables and associated infrastructure would be located.

Onshore export cables	The cables which take the electricity from landfall to the onshore substation. These comprise High Voltage Alternative Current cables, buried underground.
Onshore project area	The boundary within which all onshore infrastructure required for the Project will be located (i.e., landfall; onshore cable route, accesses, construction compounds; onshore substation and 400kV onshore cable route).
Onshore substation	A compound containing electrical equipment required to transform and stabilise electricity generated by the Project so that it can be connected to the National Grid.
Onshore substation construction compound	Area set aside to facilitate construction of the onshore substation. Will be located adjacent to the onshore substation and within the onshore substation works area.
Onshore substation works area	Area within which all temporary and permanent works associated within the onshore substation are located, including onshore substation, construction compound, access, landscaping, drainage and earthworks.
Platform Interconnector cable	Cable connecting the offshore substation platforms or the offshore substation platform and offshore converter platform.
Safety zones	A marine zone outlined for the purposes of safety around a possibly hazardous installation or works / construction area.
Scour protection	Protective materials to avoid sediment being eroded away from the base of the wind turbine generator foundations and offshore substation platform(s) foundations as a result of the flow of water.
Temporary construction compound	Area set aside to facilitate construction of the onshore cable route. Will be located adjacent to the onshore cable route, with access to the highway where required.
The Applicant	North Falls Offshore Wind Farm Limited (NFOW).
The Project Or 'North Falls'	North Falls Offshore Wind Farm, including all onshore and offshore infrastructure.
Transition joint bay	Underground structures that house the joints between the offshore export cables and the onshore export cables.
Trenchless crossing	Use of a technique to install limited lengths of cable below ground without the need to excavate a trench from the surface, used in sensitive areas of the onshore cable route to prevent surface disturbance. Includes techniques such as horizontal directional drilling.
Trenchless crossing compound	Areas within the onshore cable route which will house trenchless crossing (e.g., horizontal directional drilling) entry or exit points.
Wind turbine generator (WTG)	Power generating device that is driven by the kinetic energy of the wind

1 Introduction

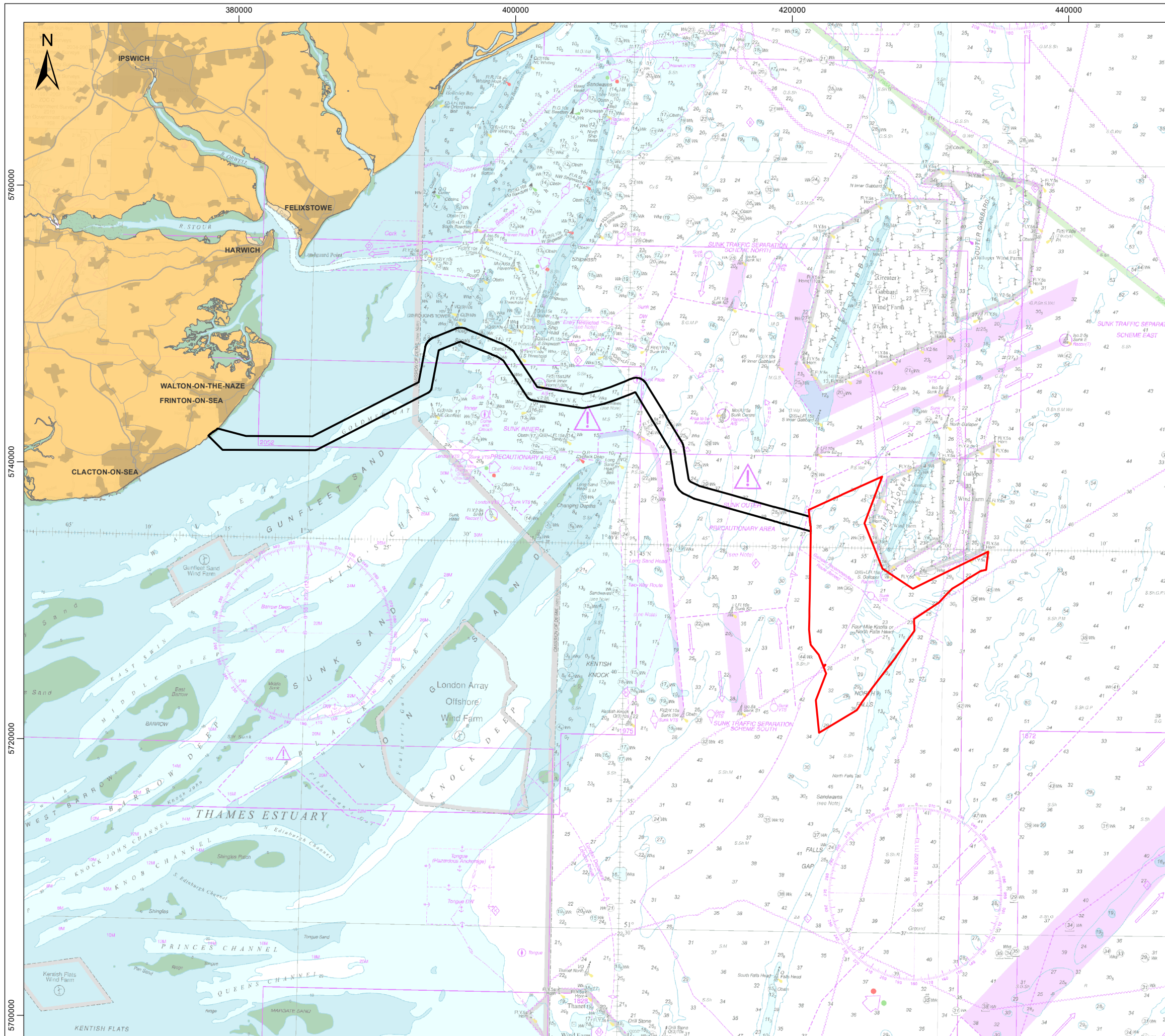
1.1 Purpose of this document

1. This document is the Non-technical Summary (NtS) of the Environmental Statement (ES) for the proposed North Falls Offshore Wind Farm (hereafter 'North Falls'). The NtS provides summary details of the Project, the site selection process and the key findings of the Environmental Impact Assessment (EIA).
2. The NtS provides a summary of the environmental effects of North Falls in non-technical terms. For further information regarding any of the details presented here, please refer to the full North Falls ES (Volume 3.1 of the Development Consent Order (DCO) application).
3. The purpose of the ES is to provide the necessary environmental information to carry out an assessment of the likely significant effects (in EIA terms) of North Falls. The ES also provides an assessment of cumulative effects with other known plans and projects. The ES allows stakeholders to develop an informed view of the effects of the Project on the environment, through its construction, operation and decommissioning. Consultation with stakeholders has informed the development of the North Falls project design and ES through the Scoping Opinion, during consultations at the Preliminary Environmental Information Report (PEIR) stage, during Expert Topic Groups and other focused meetings. The ES is submitted alongside the application for a DCO.

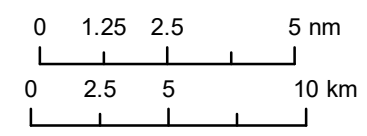
1.2 North Falls

4. North Falls is a Nationally Significant Infrastructure Project. Consent to construct, operate and decommission North Falls is therefore being requested from the Secretary of State for the Department for Energy Security & Net Zero (DESNZ), under the Planning Act 2008, which sets out a statutory framework for the principal consents required.
5. North Falls would be developed as an extension to the existing Greater Gabbard Offshore Wind Farm. Greater Gabbard Offshore Wind Farm has been operational since 2012 and generates enough low-carbon renewable energy each year to power the equivalent of more than 400,000 United Kingdom (UK) homes. Greater Gabbard Offshore Wind Farm has invested significantly in Suffolk throughout its construction period and operational lifetime to date. This includes the development of an operations and maintenance base in Lowestoft, creating approximately 100 long term jobs, and a Community Fund to deliver benefit in Lowestoft and the surrounding areas.
6. The North Falls project area comprises:
 - The offshore project area:
 - The offshore wind farm area (hereafter the 'array area') - within which the wind turbine generators and associated infrastructure will be located;
 - Offshore cable corridor - the corridor of seabed from the array area to the landfall within which the offshore export cables will be located; and

- The onshore project area:
 - Landfall - the location where the offshore export cables come ashore at Kirby Brook on the Essex coast;
 - Onshore cable route - the route within which the onshore export cables and associated infrastructure, including accesses and temporary working areas, would be located;
 - Onshore substation works area – the area within which all temporary and permanent works associated within the onshore substation are located, including the onshore substation, construction compound, earthworks, access, landscaping, drainage and environmental mitigation;
 - National Grid substation connection works – infrastructure required to connect the Project to the National Grid connection point; and
 - Bentley Road improvement works – areas of road amendments along Bentley Road, required to facilitate access to the onshore cable route and the onshore substation.
7. The North Falls array area would be located in the southern North Sea, approximately 40km (at its nearest point) from the coast. North Falls would have an indicative design life of 30 years.
 8. Recognising feedback received from stakeholders, the Applicant has committed to exploring coordinated network designs, along with other relevant projects. As such, the Applicant is currently reviewing the following options for the Project's National Grid connection point:
 - Option 1: Onshore electrical connection at a National Grid connection point within the Tendring peninsula of Essex, with a project alone onshore cable route and onshore substation infrastructure;
 - Option 2: Onshore electrical connection at a National Grid connection point within the Tendring peninsula of Essex, sharing an onshore cable route and onshore cable duct installation (but with separate onshore export cables) and co-locating separate project onshore substation infrastructure with the neighbouring Five Estuaries Offshore Wind Farm *'Five Estuaries'); or
 - Option 3: Offshore electrical connection supplied by a third party.
 9. A decision on the selected option would be made post-consent. Option 2 is subject to North Falls and Five Estuaries achieving consent and financial close in timescales which are sufficiently aligned. In addition, Option 3 is subject to complex commercial, legislative and regulatory hurdles which need to be resolved to make this feasible.
 10. The location of the offshore project area is shown in Figure 1.1, and the location of the onshore project area in Figure 1.2. Further information on the components of the Project is provided in Section 2.



- Legend**
- North Falls Array Area
 - Offshore Cable Corridor



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Drawing Title

North Falls Offshore Project Area

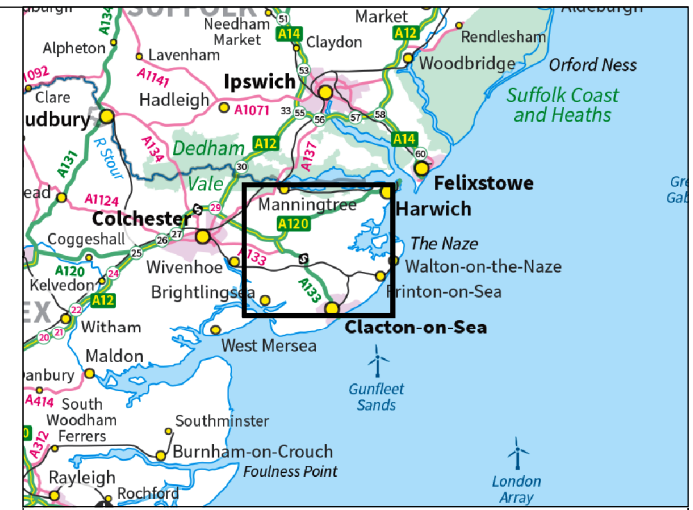
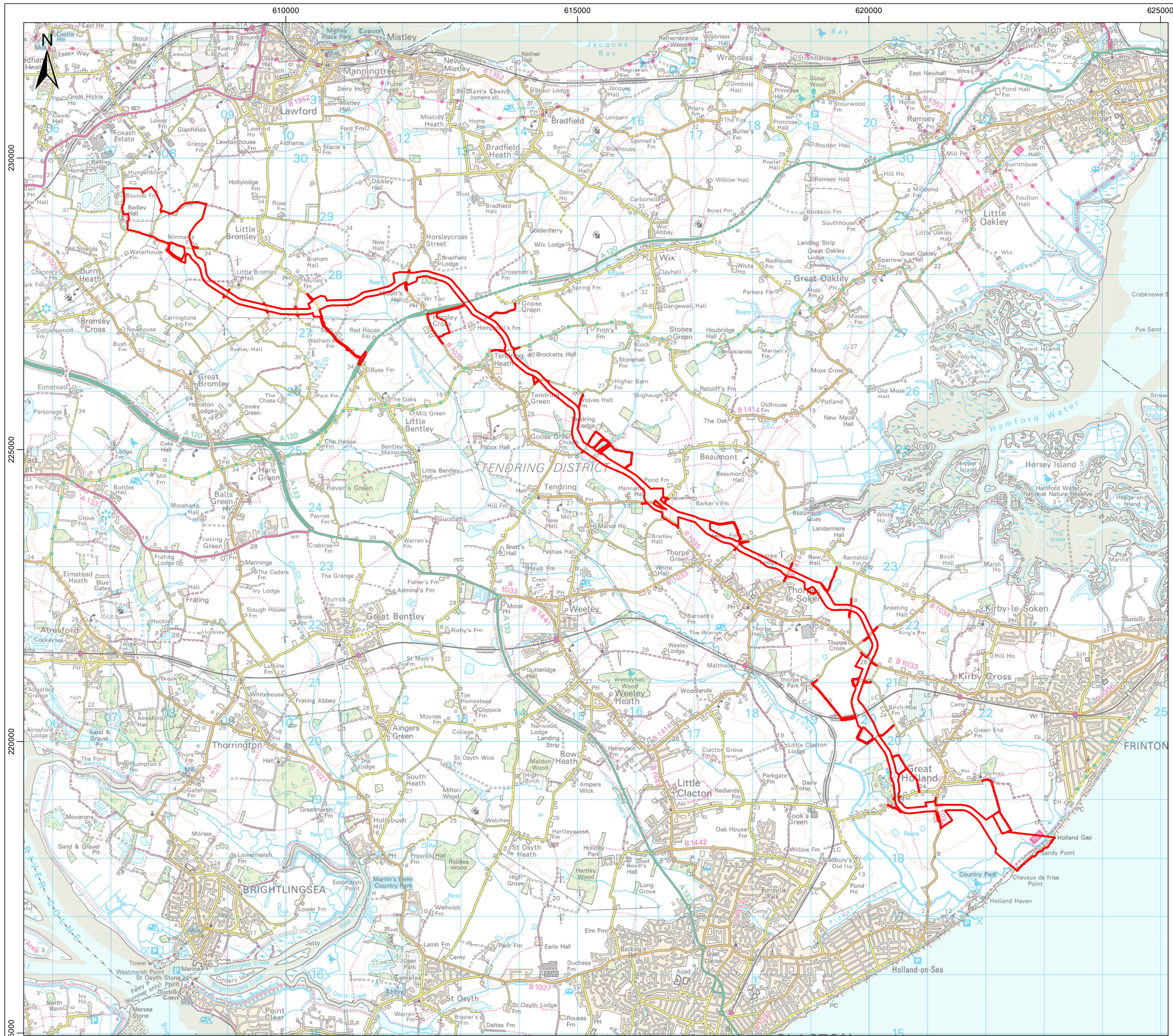
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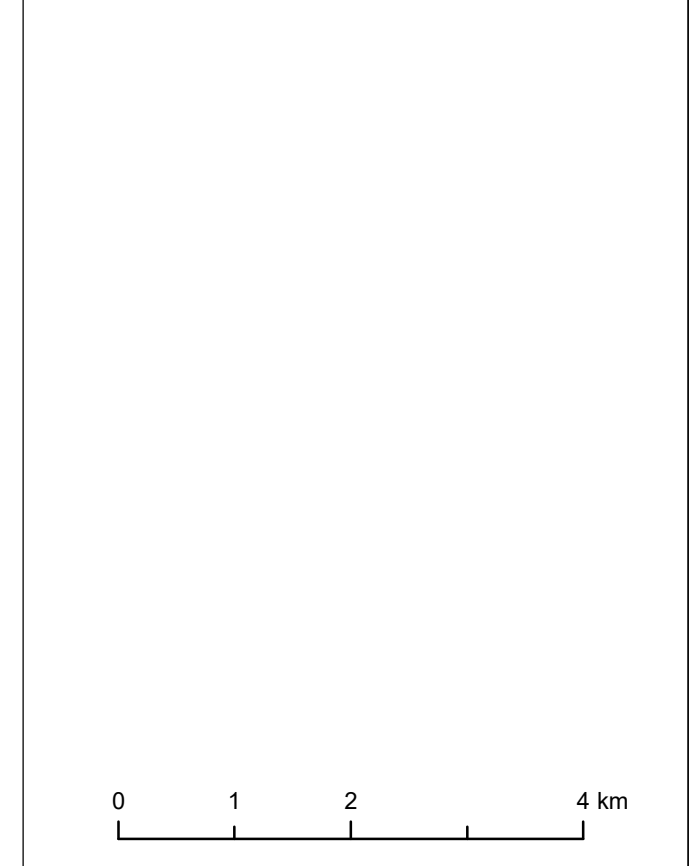
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NORTH FALLS
Offshore Wind Farm



Legend
 Onshore Project Area



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North Falls Onshore Project Area

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Drawing Number: **PB9244-RHD-ZZ-ON-DR-GS-0556** Figure Number: **1.2**

Scale: 1:65,000	Plot Size: A3	Datum: OSGB36	Projection: BNG
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1.3 The Applicant

11. North Falls is being developed by North Falls Offshore Wind Farm Limited (NFOW) (the Applicant), which is a joint venture between SSE Renewables Offshore Windfarm Holdings Limited (SSER) and RWE Renewables UK Swindon Limited (RWE). Both organisations are highly experienced developers and are committed to the responsible development of renewable energy in the UK.
12. SSER is a leading developer, owner and operator of renewable energy across the UK and Ireland, with a portfolio of around 4 gigawatts (GW) of operational onshore wind, offshore wind and hydro energy projects. Part of the SSER strategy is to drive the transition to a net zero future through the world class development, construction and operation of renewable energy assets.
13. RWE Renewables, a subsidiary of the RWE Group, is one of the world's leading renewable energy companies. The company has existing onshore and offshore wind farms, photovoltaic plants and battery storage facilities with a combined capacity of approximately 9GW. RWE Renewables is driving the expansion of renewable energy in more than 15 countries on four continents.
14. Lessons learned and experiences from previously consenting, constructing and operating this extensive portfolio of offshore wind farms have informed the design of North Falls, and also provided an understanding of the potential impacts of the project by drawing on available monitoring data.

1.4 The need for the Project

15. Climate change as a result of greenhouse gas emissions is a global issue associated with impacts on weather, ecosystems, human health and welfare. There are a number of overarching UK environmental targets/goals which set the national framework for tackling climate change and renewable energy production. They include the legally binding target (implemented through the Climate Change Act 2008 and the 2019 Amendment Order) to reduce the net UK carbon account and therefore reduce greenhouse gas emissions by 100% (net zero) by 2050, compared to a 1990 baseline.
16. The British Energy Security Strategy, published in April 2022, set out the UK Government's aim to increase the pace of offshore wind deployment by 25%, with an ambition to deliver 50GW of offshore wind by 2030.
17. The existing energy National Policy Statements were updated by the UK Government in 2023 (and came into force in January 2024) to greater emphasise the need and urgency for new energy infrastructure (see Section 1.5 for further information on National Policy Statements) as set out in the Energy White Paper (2020).
18. North Falls would make a substantial contribution both to the achievement of UK decarbonisation targets and towards global commitments to mitigate climate change.
19. By generating low carbon, renewable electricity in the UK, North Falls will also help to reduce the UK's reliance on imported energy and improve UK energy security. Further information is provided in the North Falls Environmental

Statement Chapter 2 Need for the Project (Document Reference: 3.1.4) and Chapter 3 Policy and Legislative Context (Document Reference: 3.1.5).

20. In addition to meeting national and international targets, North Falls would contribute to the economy by providing jobs during all phases of the project. A preliminary analysis of socio-economic benefits for North Falls is provided in ES Chapter 31 Socio-economics (Document Reference: 3.1.33).

1.5 The role of National Policy Statements in the decision making process

21. Applications for DCOs are considered by the Planning Inspectorate and determined by the Secretary of State of the relevant UK Government department with respect to the policies set out in the applicable National Policy Statement.
22. There are three National Policy Statements which are relevant to North Falls:
 - EN-1 Overarching Energy, which highlights that there should be a presumption in favour of granting consent for critical national priority projects that could provide nationally significant low carbon infrastructure, including offshore wind, as a key factor in meeting UK low carbon energy policy objectives;
 - EN-3 Renewable Energy Infrastructure, which covers nationally significant renewable energy infrastructure, including offshore generating stations in excess of 100MW; and
 - EN-5 Electricity Networks Infrastructure, which covers the electrical network infrastructure required to support and distribute electricity in conjunction with the general directions in EN-1.
23. The ES demonstrates how the development of North Falls would comply with and support the policies stipulated by the National Policy Statements given above.

1.5.1 Other planning policies

24. Local authorities are required to prepare and maintain up-to-date Local Development Plans which set out their objectives for the use and development of land within their jurisdiction, and general policies for implementation.
25. The onshore project area falls under the jurisdiction of Tendring District Council and Essex County Council. Relevant Local Development Plans have been considered during the onshore site selection for North Falls to mitigate conflict with site-specific planning allocations.

1.6 Site selection and assessment of alternatives

26. The siting, design and refinement of the North Falls offshore and onshore project areas has followed a site selection process, taking account of environmental, physical, technical, commercial and social considerations and opportunities, as well as engineering requirements. The site selection and project design process also involved early engagement with communities and stakeholders. This ensured that site selection decisions were communicated with people and allowed feedback to influence and refine the project design. Full details on the site selection process are provided in ES Chapter 4 Site Selection and Assessment of Alternatives (Document Reference: 3.1.6).

27. An overview of the site selection process is provided in Plate 1.1. While Plate 1.1 depicts the site selection process as being linear, in reality, the North Falls site selection process has been an iterative process, undertaken and informed by North Falls’ ongoing EIA studies. Decisions have been made by considering multiple factors from different disciplines and at different stages in the process.

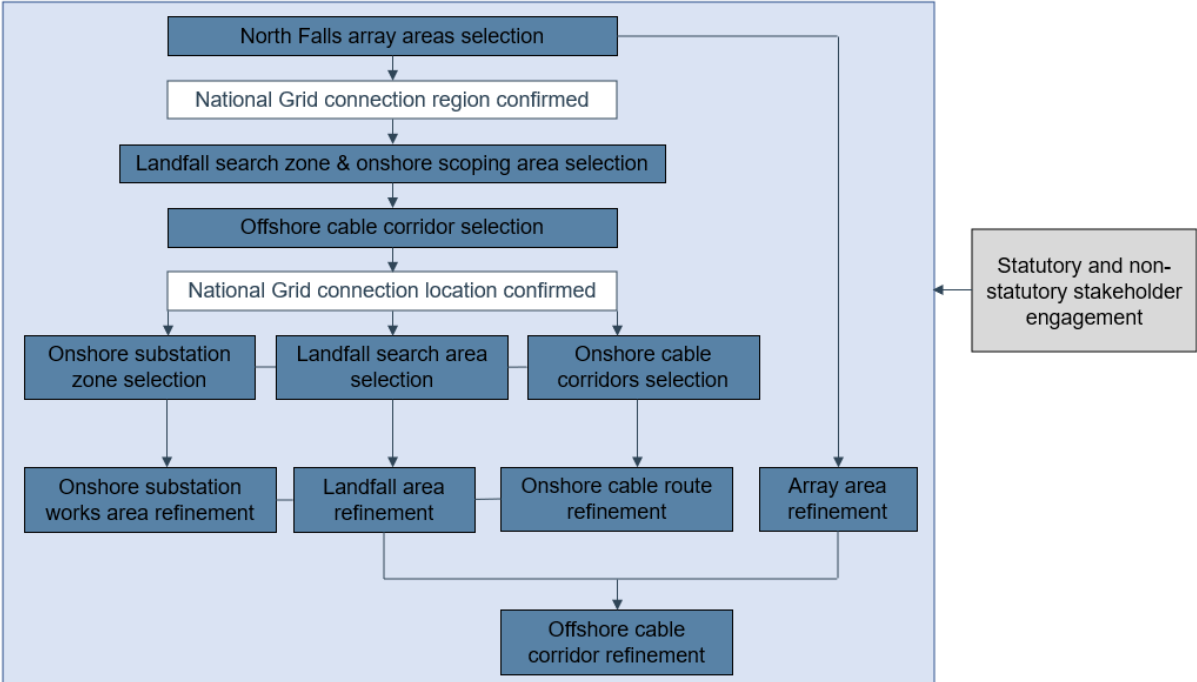


Plate 1.1 Overview of the North Falls site selection process

1.6.1 Co-ordination with other projects

- 28. As discussed in Section 1.2, the Applicant has proactively considered other projects to seek opportunities for co-ordination during the project design process. This is in accordance with the National Policy Statements.
- 29. The key project with which co-ordination has been sought is Five Estuaries (under development by Five Estuaries Offshore Wind Farm Limited). This project, a proposed extension to the existing Galloper Offshore Wind Farm, is located to the east of North Falls and adjacent to the existing Galloper Offshore Wind Farm within the southern North Sea.
- 30. North Falls and Five Estuaries have co-ordinated where practicable through onshore infrastructure design collaboration, data sharing, discussion on shared mitigation and joint consultation.
- 31. Both North Falls and Five Estuaries (under grid connection Options 1 and 2) are seeking to connect to the national grid via export cables connecting the array area to the coast at Kirby Brook within the Tendring Peninsula and onward to a connection to the national grid near the village of Ardeigh, between Colchester and Manningtree. Both projects have developed onshore cable routes which largely align and have identified an onshore substation area in which both the North Falls and Five Estuaries onshore substations can be located. Furthermore, both projects have retained an option in their consent to construct cable ducts for both projects, minimising potential onshore construction effects.

32. Five Estuaries' timeline for construction is similar to that proposed by North Falls and the Five Estuaries DCO application was submitted to the Planning Inspectorate in March 2024.
33. North Falls has also engaged with other developers, including National Grid Electricity Transmission with regards the Norwich to Tilbury project.

1.7 The Environmental Impact Assessment process

34. The EIA has been carried out in accordance with the Planning Act 2008 and the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the 'EIA Regulations'). Furthermore, the approach to the EIA and the production of the ES closely follows relevant guidance. The EIA considers all relevant topics under three general areas of physical environment, biological environment and human environment. The topics to be included in the EIA were agreed with the Planning Inspectorate and other stakeholders through the scoping process, with the Planning Inspectorate providing a Scoping Opinion in August 2021, which is available at:

<https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/projects/EN010119/EN010119-000054-EN010119%20-%20Scoping%20Opinion.pdf>.

35. The EIA requires an assessment of 'likely significant effects' arising from the construction, operation and decommissioning phases of North Falls which have been identified as required by the Scoping Opinion.
36. The findings of the EIA for North Falls are described in the ES. As part of the process to produce the ES, a detailed description of the current baseline (existing environment) of the offshore and onshore project areas has been identified through a combination of desk-based studies, site-specific surveys and stakeholder consultation.
37. For each likely significant effect scoped into the EIA, an assessment of the significance is undertaken by identifying the magnitude of the impact and the sensitivity of the particular environmental or human receptors which are affected. The effect significance is then defined as 'no change', 'negligible', 'minor', 'moderate' and 'major', discussed further in the North Falls ES Chapter 6 EIA Methodology (Document Reference: 3.1.8). This provides a standardised and consistent approach across the various topics of the EIA. Each assessment is undertaken by experienced EIA specialists.
38. Effects identified within the assessment as major or moderate are regarded within the ES as significant. The assessment of significance accounts for proposed mitigation measures which have been identified to reduce the impact of North Falls. A Schedule of Mitigation (Document Reference: 2.6) is provided with the DCO application and provides an overview of all commitments made by the Applicant and shows how these would be legally secured.
39. The EIA process also considers:
 - Interactions, where impacts to one receptor can have a knock-on impact on another (for example an effect on a fish population may in theory lead to reduced prey for birds and marine mammals);

- Inter-relationships between impacts, whereby the same receptor or receptor group could be affected by multiple impacts acting together (e.g., the impacts of changes to prey and increased noise disturbance could together in theory increase the overall impact on marine mammals);
- Cumulative effects, where North Falls is considered alongside the predicted impacts of other projects in the nearby area (for example another offshore wind farm or a road development); and
- Transboundary impacts, where activities in other countries may be impacted (for example fishing activities).

1.8 Structure of the Environmental Statement

40. The ES considers all the onshore and offshore elements of North Falls. The ES comprises three volumes:

- Volume 3.1: ES Chapters (chapter list shown in Table 1.1);
- Volume 3.2: ES Figures; and
- Volume 3.3: ES Appendices.

Table 1.1 ES Volume 3.1 Chapter list

ES Section	Chapter Number	Chapter Name
Introductory Chapters	1	Introduction
	2	Need for the Project
	3	Policy and Legislative Context
	4	Site Selection and Assessment of Alternatives
	5	Project Description
	6	EIA Methodology
	7	Technical Consultation
Offshore Chapters	8	Marine Geology, Oceanography and Physical Processes
	9	Marine Water and Sediment Quality
	10	Benthic and Intertidal Ecology
	11	Fish and Shellfish Ecology
	12	Marine Mammals
	13	Offshore Ornithology
	14	Commercial Fisheries
	15	Shipping and Navigation
	16	Offshore Archaeology and Cultural Heritage
	17	Aviation and Radar
	18	Infrastructure and Other Users
Onshore Chapters	19	Ground Conditions and Contamination
	20	Onshore Air Quality
	21	Water Resources and Flood Risk
	22	Land Use and Agriculture
	23	Onshore Ecology

ES Section	Chapter Number	Chapter Name
	24	Onshore Ornithology
	25	Onshore Archaeology and Cultural Heritage
	26	Noise and Vibration
	27	Traffic and Transport
Project-wide Chapters	28	Human Health
	29	Offshore Seascape, Landscape and Visual Impact Assessment
	30	Landscape and Visual Impact Assessment
	31	Socio-economics
	32	Tourism and Recreation
	33	Climate Change
	34	Major accidents and disasters

1.9 Consultation

41. Consultation is a key feature of an iterative EIA process and continues throughout the lifecycle of a project.
42. The Applicant has undertaken statutory consultation in accordance with ‘the EIA regulations’¹. The Applicant submitted a request for a written opinion from the Planning Inspectorate (the Scoping Opinion), accompanied by the North Falls Scoping Report (Royal HaskoningDHV, 2021) in July 2021, regarding the scope and level of detail of the information to be provided in the ES. A Scoping Opinion (the Planning Inspectorate, 2021c) was received in August 2021. The Scoping Opinion collated and considered comments from consultees and provided the Planning Inspectorate’s opinion on what should be assessed in the EIA. In addition, public and stakeholder consultation under Sections 42, 47 and 48 of the Planning Act 2008 was completed from 16 May to 14 July 2023, with information provided by the Applicant in the PEIR.
43. A response from the Applicant to each comment from the Scoping Opinion and Section 42 consultation on the PEIR is provided within the relevant chapters of the North Falls ES. Further information on consultation undertaken by the Applicant is provided in the Consultation Report (Document Reference: 4.1).
44. Non-statutory consultation with technical stakeholders has been undertaken from an early stage in relation to site selection and survey planning, and through the Evidence Plan Process. The Evidence Plan Process is a non-statutory, voluntary process of stakeholder engagement which aims to assist all parties during the evolution of the proposed DCO application. It gives greater certainty on the amount and range of evidence required in the application and agrees issues at an early stage to ensure that robust decisions can be made and additional data collected if required. The Evidence Plan Process is facilitated by Expert Topic

¹ Regulation 12 of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017

Group meetings, which commenced in June/July 2021 and have been held at relevant milestones for each EIA topic.

45. Consultation with communities, landowners and other stakeholders has been undertaken throughout the pre-application process as detailed in the Consultation Report (Document Reference: 4.1) submitted with the DCO application. A Statement of Community Consultation, which set out how the Applicant intended to undertake consultation with the community ahead of consultation commencing, was published in March 2023 in accordance with Section 47 of the Planning Act.
46. The Applicant considered the feedback from community and stakeholder consultation and, where appropriate, has used it to inform the design of North Falls and the impact assessment reported in the ES.

2 North Falls Project Description

47. ES Chapter 5 Project Description (Document Reference: 3.1.7) describes the construction, operation and maintenance, and the decommissioning of both onshore and offshore components of North Falls.
48. At this stage of development, some optionality is required in order to future proof the DCO. Therefore, the EIA, as described in the North Falls ES, is based on a design envelope approach in accordance with National Policy Statement EN-3. The design envelope provides maximum and minimum parameters, where appropriate, to ensure the worst-case scenario is quantified and is assessed in the EIA. This is the standard approach for assessing the potential effects of offshore wind farms and enables the detailed design to be completed post consent.
49. One area of optionality is in relation to the National Grid connection point. At this time National Grid Electricity Transmission has provided NFOW with a grid connection point within the Tendring peninsula of Essex. However, in addition to this, NFOW is committed to working with DESNZ to explore other grid connection options and as such, NFOW has co-operated with the Offshore Transmission Network Review process. NFOW has also applied to the Offshore Coordination Support Scheme in consortium with National Grid Electricity Transmission and Five Estuaries for an offshore connection to Sea Link, a marine cable between Suffolk and Kent proposed by National Grid Electricity Transmission as part of their Great Grid Upgrade.
50. In order to ensure that North Falls secure consent for these alternative grid connection options should they become available, the following options are therefore included in the Project design envelope:
 - Option 1: Onshore electrical connection at a National Grid connection point within the Tendring peninsula of Essex (discussed in Section 5.7), with a project alone onshore cable route and onshore substation infrastructure;
 - Option 2: Onshore electrical connection at a National Grid connection point within the Tendring peninsula of Essex, sharing an onshore cable route and onshore cable duct installation (but with separate onshore export cables) and co-locating separate project onshore substation infrastructure with Five Estuaries; or

- Option 3: Offshore electrical connection, supplied by a third party.
51. It should be noted that Options 1 and 2, with a connection point within the Tendring peninsula of Essex, are currently the only grid options provided by National Grid Electricity Transmission and therefore available to North Falls.
52. The key offshore components considered under Options 1 and 2 in the ES comprise:
- Wind turbine generators and their associated foundations;
 - Up to two offshore substation platforms and their associated foundations to combine electricity from the wind turbine generators and facilitate the export of electricity via the Project's offshore export cables;
 - Subsea cables:
 - Array cables between each of the wind turbine generators and between the wind turbine generators and the offshore substation platform(s);
 - Platform interconnector cable between the offshore substation platforms, if required.
 - Offshore export cables between the offshore substation platform(s) and landfall where the cables reach the shore;
 - Protection from sediment (for example using rocks) around foundations, where required; and
 - Protection for cables where they cannot be buried (e.g., by placing rocks on top), where required.
53. The key offshore components considered under Option 3 in the ES comprise:
- Wind turbine generators and their associated foundations;
 - Up to one offshore substation platform and associated foundation to aggregate electricity from the wind turbine generators;
 - One offshore converter platform and associated foundation to increase the voltage of electricity for export and convert the type of power generated by the wind turbine generators (from "Alternative Current" into "Direct Current") so it can be exported via an interconnector cable supplied by a third party (the interconnector cable itself does not form part of this DCO application);
 - Array cables between each of the wind turbine generators, and between the wind turbine generators and the offshore substation platform and/or offshore converter platform;
 - Platform interconnector cable between the offshore substation platform and offshore converter platform;
 - Protection from sediment (for example using rocks) around foundations, where required; and
 - Protection for cables where they cannot be buried (e.g., by placing rocks on top), where required.

54. Under Options 1 and 2, the key onshore components considered in the ES comprise:
- Landfall;
 - Onshore export cables and associated link boxes;
 - Onshore substation works;
 - Connection to the national electricity grid;
 - Works to improve Bentley Road and provision of temporary footway/cycleway; and
 - Temporary works to facilitate construction (temporary construction compounds, temporary means of access).
55. Under Option 2, this also includes:
- Cable ducts for the installation for Five Estuaries onshore export cables.
56. Under Option 3:
- No onshore components would be required.
57. Sections 2.1 and 2.2 below provide an overview of the offshore (see Table 2.1) and onshore (see Table 2.2) works proposed for North Falls. A summary of the key project design parameters is provided in Table 2.3.

2.1 Offshore works

58. The North Falls array area, where the wind turbine generators, offshore substation platform(s)/offshore converter platform, array cables and platform interconnector cables are proposed to be installed, covers an area of approximately 95km² and is at least 40km away from the coast. The array area is shown in Figure 1.1.
59. A maximum of 57 wind turbine generators will be installed in the array area. The turbines proposed are shown in Plate 2.1.
60. Turbines will be secured to the seabed using foundations, of which four different types are being considered at this stage, as shown in Plate 2.2 – Plate 2.5. Foundations may require scour protection to avoid sediment being eroded away from the base as a result of the flow of water.

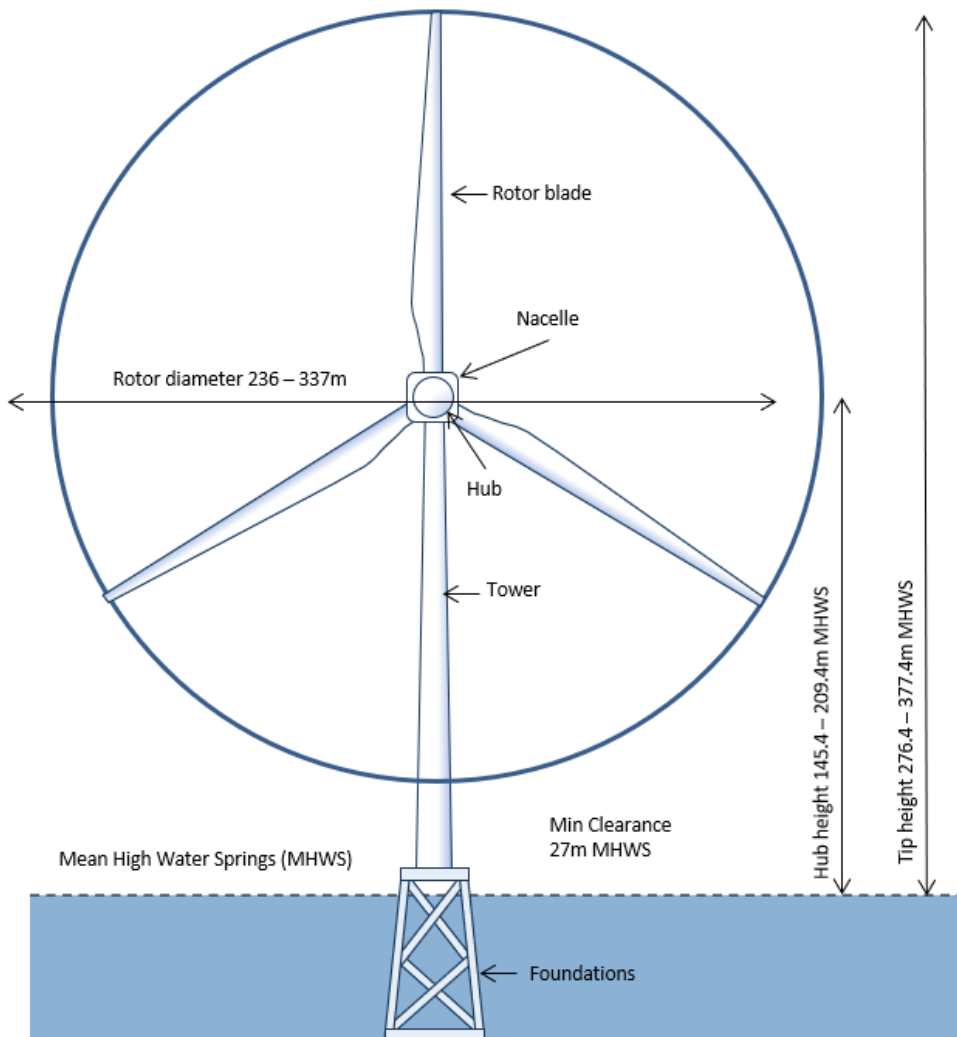


Plate 2.1 Key wind turbine generator dimensions

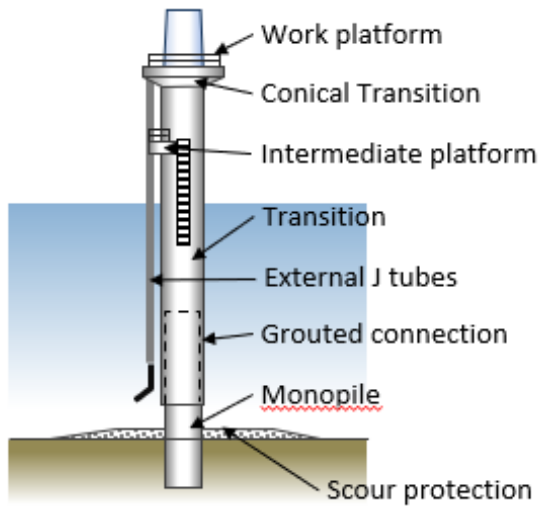


Plate 2.2 Typical monopile

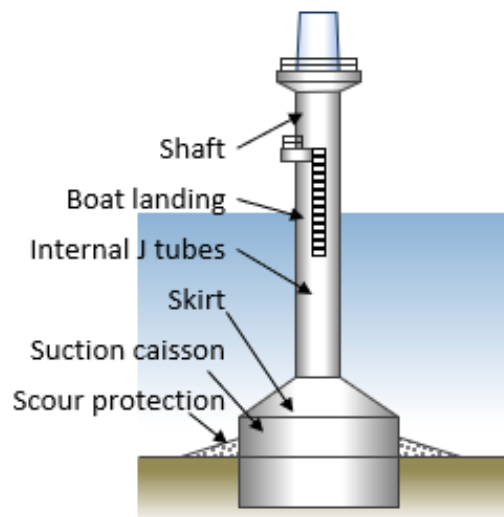


Plate 2.3 Typical suction bucket

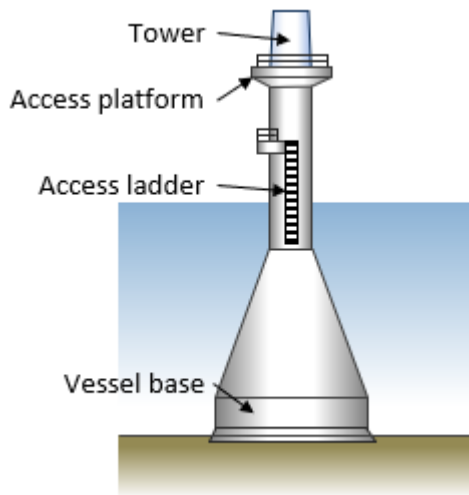


Plate 2.4 Typical gravity-based structure

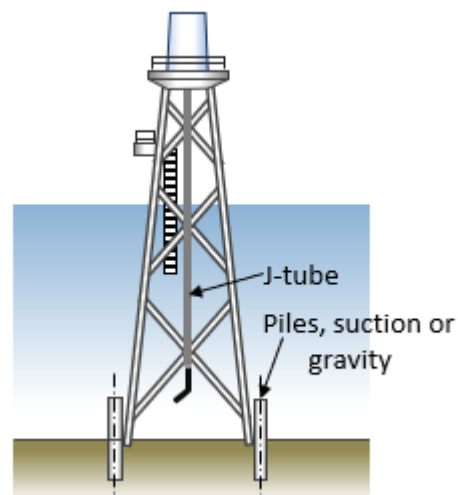


Plate 2.5 Typical jacket structure with pin-pile, suction bucket, or gravity legs

61. Array cables will be used to link the wind turbine generators and in between the wind turbine generators and the offshore substation platform(s). A platform interconnector cable will be used to connect offshore substation platforms (for grid connection Options 1 and 2) or between the offshore substation platform and offshore converter platform (for Option 3).
62. The offshore substation platforms (see Plate 2.6) provide a connection point for the array cables and contain electrical equipment required to transport power to the national electricity grid or to an offshore connection point. In the case an offshore electrical connection is supplied by a third party (Option 3), an offshore converter platform (see Plate 2.7) will convert the high-voltage alternating current power generated by the wind turbine generators into high-voltage direct current power for export via a third party high voltage direct current cable.



Plate 2.6 Example offshore substation platform (image courtesy of RWE)



Plate 2.7 Example offshore converter platform (image courtesy of SSER)

63. Under Options 1 and 2, electricity generated by the wind turbine generators will be brought to shore from the offshore substation platform(s) by offshore export cables which run from the array area to the landfall (Figure 1.1). The offshore cable corridor passes to the north, and outside of the Margate and Long Sands Special Area of Conservation and Kentish Knock East Marine Conservation Zone, with a small overlap with the Outer Thames Estuary Special Protection Area as it approaches landfall.
64. An indicative offshore construction programme is provided in Table 2.1. The overall North Falls construction programme is anticipated to be approximately 5 years, with onshore construction works starting in year 1 and offshore construction works in year 4.
65. It is anticipated that offshore construction works will be undertaken over a period of approximately two years, however, the final design (e.g., number of turbines, platform, cables, etc.) and supply chain will affect the construction programme, as well as weather conditions during construction.

Table 2.1 Indicative offshore construction programme (likely timescale for works shown in dark green, potential construction window in light green)

	Year 1-3			Year 4				Year 5			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4			
Substation installation			Dark Green	Light Green							
Substation testing and commissioning				Dark Green	Dark Green	Dark Green	Light Green				
Export cable installation			Light Green	Dark Green	Light Green						
Foundation installation			Dark Green	Dark Green	Light Green	Light Green	Light Green				
Array cable installation			Dark Green	Dark Green		Light Green	Light Green				
Wind turbine generator installation						Dark Green	Dark Green	Light Green			
Commissioning (testing of the installed offshore infrastructure)						Dark Green	Dark Green	Dark Green	Light Green		

2.2 Onshore works

66. North Falls' onshore infrastructure is proposed to be located entirely within the Tendring Peninsula of Essex. The footprint of the onshore infrastructure is referred to herein as the 'onshore project area' and is shown in Figure 1.2.
67. The landfall encompasses the area at which the offshore export cables are brought onshore and connected to the onshore export cables. The landfall is located at Kirby Brook, between Clacton-on-Sea and Frinton-on-Sea. The cables will be installed at landfall by using a 'horizontal direction drill' to drill under the sea defences and sensitive ecological designations at the coast, avoiding the need for any interaction with these features (an example is shown in Plate 2.8 below). Drilling works will be undertaken from a construction compound located on the land (see Plate 2.9).

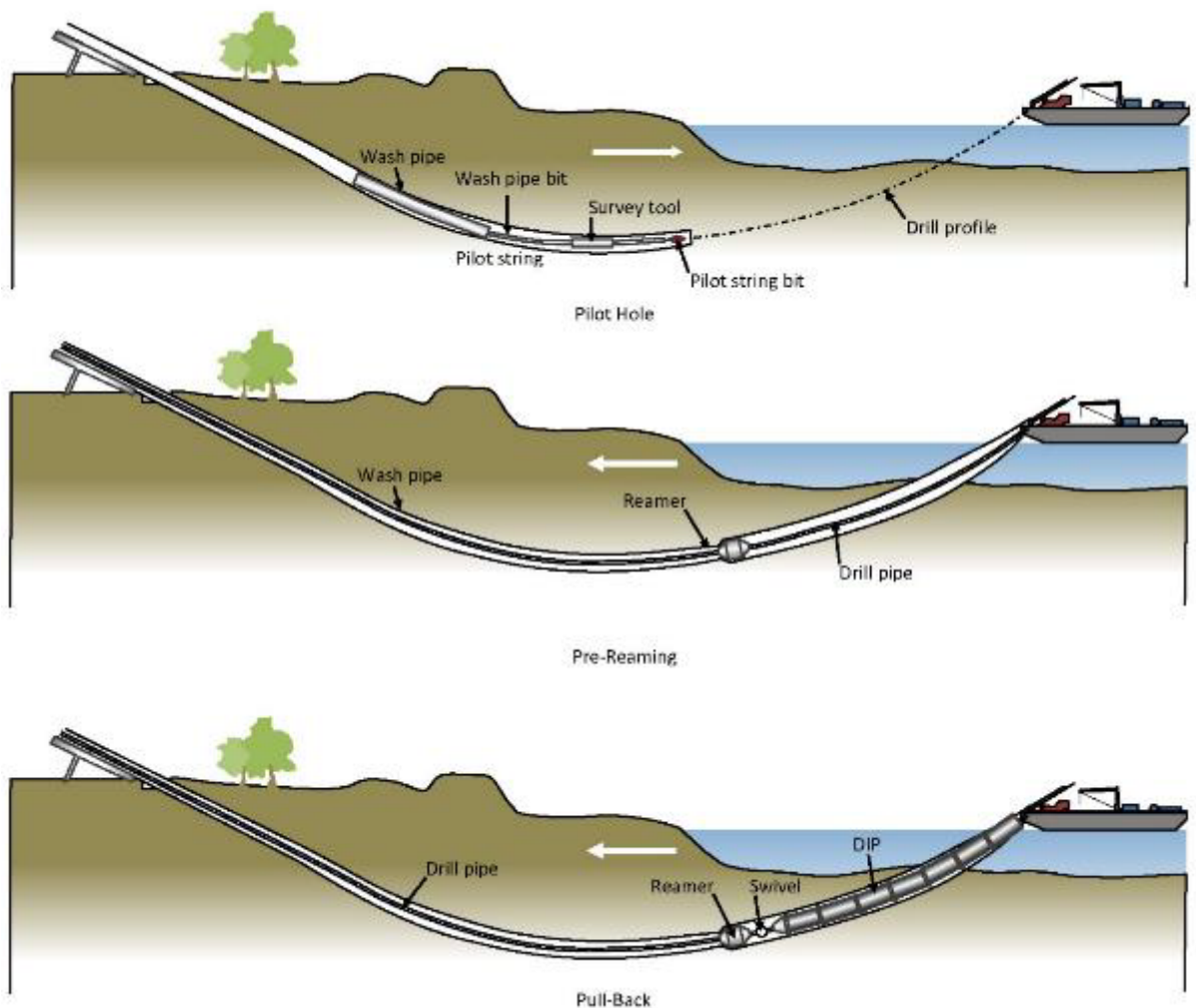


Plate 2.8 Example horizontal directional drill working method at landfall



Plate 2.9 Example of a horizontal direction drill rig at landfall – the cable duct is closest in the foreground (image courtesy of RWE Renewables)

68. From the landfall, onshore export cables will carry electricity to the North Falls' onshore substation. The onshore export cables will be installed inside cable ducts, themselves installed within trenches (see Plate 2.10 for an example trench), with 'trenchless' (i.e., drilled) techniques used for installation in sensitive locations.



Plate 2.10 Example of a cable trench, once cable ducts have been installed and trench has been backfilled (image courtesy of RWE Renewables)

69. The onshore substation is proposed to be located west of Little Bromley close to the project's national electricity grid connection point at National Grid Electricity Transmission's new proposed East Anglia Connection Node substation, shown on Figure 1.2. The onshore substation is located within a wider 'onshore substation works area', where ancillary works, including land required for temporary construction, access ways, drainage, landscaping and environmental

mitigation and onward export cables from the substation to the national grid connection point, will be located. The onshore substation, an example of which is shown in Plate 2.11, will be an ‘air insulated switchgear’ design, where the high voltage equipment is installed outdoors. Some small buildings will be required on site to house control equipment.

70. The North Falls onshore substation will be a similar size to the example onshore substation shown in Plate 2.11 with additional landscaping (such as hedgerow, tree and woodland copse planting) surrounding the substation footprint.



Plate 2.11 Example of an onshore substation (image courtesy of RWE Renewables)

71. Pre-construction works are expected to take place from 2027. These works (as required) are anticipated to include ground investigations and pre-construction surveys, the demarcation of the construction area, road/junction modifications, installation of construction drainage corridors, hedgerow and tree removals, and the implementation of ecological and archaeological mitigation.
72. An indicative onshore construction programme is provided in Table 2.2. It is anticipated that onshore construction works will be undertaken over a maximum period of five years, including pre-construction and site demobilisation works. Onshore works are only anticipated to take place between 0700 to 1900 hours Monday to Saturday, with no activity on Sundays or bank holidays. Outside of these hours, construction work may be required for essential activities including but not limited to continuous periods of operation (e.g., drilling operations, which once started cannot be halted until complete) and delivery of Abnormal Indivisible Loads². Activities between 1300 – 1900 on Saturdays are restricted, to minimise noise levels.

² An Abnormal Indivisible Load is any load that cannot be broken down into smaller loads for transport without undue expense or risk of damage.

Table 2.2 Indicative onshore construction programme

	Year 1				Year 2				Year 3				Year 4				Year 5			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Bentley Road improvement works (6-9 months)																				
Substation construction (21-27 months)																				
Substation commissioning and site demobilisation (9-15 months)																				
Cable route construction (including landfall and cable pull) (18-27 months, of which cable pull = 12 months)																				

2.3 Summary of project design parameters

73. Table 2.3 below sets out the key design parameters (i.e., the maximum/minimum limits of the Project design envelope) for the onshore and offshore infrastructure used to inform the EIA included in the ES.

Table 2.3 Summary of project design parameters for ES

Infrastructure	Feature	Parameter
Array	Total array area	95km ²
	Closest distance to shore	40km
	Water depth relative to Lowest Astronomical Tide	5 to 58m (30m mean)
Wind turbine generators	Maximum number of wind turbine generators	57
	Maximum wind turbine generator rotor diameter	337m
	Maximum rotor tip height (above Mean High Water Springs)	377.4m
	Minimum clearance above sea-level (above Mean High Water Springs)	27m
	Minimum separation between wind turbine generators	1180m downwind direction and 944m in the cross wind direction.
Offshore subsea cables	Offshore cable corridor length	57km
	Maximum number of offshore export cable circuits	2
	Maximum array cable length	170km
	Maximum platform interconnector cable length	20km
Offshore platforms	Maximum number of offshore substation platforms/offshore converter platform	2 (either 2 offshore substation platform or 1 offshore substation platform and 1 offshore converter platform)
Landfall	Maximum number of transition joint bays	2
Onshore export cables	Onshore export cable length	24km
	Indicative onshore cable route construction width	Up to 72m (open cut trenching) Up to 90m (trenchless crossings) Up to 130m (complex trenchless crossings)
	Cable trench dimensions	1.2m (width at base) – 3.5m (width at top) x 2m (depth)
	Maximum depth at trenchless crossings	20m
	Maximum number of onshore circuits	Up to 2 circuits, typically comprising 3 power cables, 3 telecommunications cables and 1 earth cable in each circuit (up seven cables in total).
Construction compounds	Estimated number of temporary construction compounds	Up to 11
	Temporary construction compounds (main)	150 x 150m

Infrastructure	Feature	Parameter
	Temporary construction compounds (satellite)	100 x 100m
	Temporary construction compounds (trenchless crossing compounds)	75 x 150m
	Maximum onshore substation construction compound footprint	250 x 150m
Onshore substation	Maximum onshore substation platform footprint	280 x 210m
	Maximum onshore substation equipment height	18m

3 Topics considered in the Environmental Statement

74. The ES assesses a wide range of likely significant effects for physical, biological and human environmental topics.
75. The topic assessments in the North Falls ES have been undertaken with consideration of the Scoping Opinion issued by the Planning Inspectorate, PEIR feedback and technical feedback through the Evidence Plan Process (Section 1.9).
76. Sections 3.1, 3.2 and 3.3 summarise each topic assessment relevant to the offshore project area or onshore project area, or both (project-wide) respectively, in non-technical terms. Each assessment considers the effects on each topic due to activities associated with the construction, operation and maintenance, and decommissioning of the relevant components of North Falls.

3.1 Offshore

3.1.1 Marine geology, oceanography and physical processes

77. Site-specific geophysical surveys and sampling of seabed sediments were completed by Fugro between May and August 2021 in the offshore project.
78. In addition, a desk-based review of available data from wider resources and numerical modelling of impacts on waves was undertaken. The assessment was also supplemented with additional information from other offshore wind farms (e.g., Greater Gabbard Offshore Wind Farm and Galloper Offshore Wind Farm), including modelling of tides and sedimentary processes in the area.
79. The study area for marine geology, oceanography and physical processes has been defined based on an understanding of the tidal processes in the area and covers a buffer area of 15km around the offshore project area.
80. The principal receptors with respect to marine geology, oceanography and physical processes are those features with an inherent geological or geomorphological (i.e., that which moulds or alters the features of the seabed) value or function, such as the coastline and designated sites.
81. Water depths in the array area range from 5m below Lowest Astronomical Tide up to 58m, while along the offshore cable corridor, water depths range between 1.5m below Lowest Astronomical Tide to 42.4m. Tidal flows are directed to the north-north-east during the ebb tide and to the south-south-west during the flood tide. Modelled current velocities are similar on both states of the tide, ranging

from 0.9m/s to 1.3m/s. Primary wave direction is from the north-north-east to south-south-west axis, with the most common wave heights between 0.5m and 1.5m.

82. The geology of North Falls is predominantly Eocene³ to Holocene⁴, generally consisting of Holocene deposits overlying Pleistocene⁵ channel complexes and infill deposits, which overlie the London Clay Formation⁶ and the Harwich Formation⁷.
83. Potential impacts assessed for the construction and decommissioning phases include:
 - Changes to suspended sediment concentrations;
 - Changes in seabed level; and
 - Interruptions to movement of sediment along the seabed and indentations on the seabed, from installation of offshore infrastructure and preparatory seabed works.
84. Potential impacts assessed for the operation and maintenance phase include:
 - Changes to the tides, waves and movement of sediment in the area due to the presence of structures on the seabed;
 - Loss of seabed area;
 - Changes to the distribution and movement of seabed sediment; and
 - Changes in suspended sediment concentrations and indentations on the seabed.
85. Mitigation has been incorporated into the project design, including turbine spacing which reduces interactions between the effects of individual turbines; using micro-siting where practicable to reduce the requirements for seabed preparation prior to installation; and burying cables where practicable to reduce the impact on the typical movement of sediment.
86. With the implementation of mitigation measures, North Falls is predicted to have no greater than negligible adverse (not significant in EIA terms) effects on marine geology, oceanography and physical processes during all project phases.
87. There is potential for cumulative effects to occur with other offshore wind farms and other projects. However, when considering proposed mitigation measures, it is not anticipated that cumulative effects are likely to be significant in EIA terms.

³ Geological period from around 56 to 33.9 million years ago.

⁴ The current geological period, commencing around 11,700 ago.

⁵ The geological period from around 2.58 million to 11,700 years ago.

⁶ London Clay is a seabed sediment, laid down 56-33.9 million years ago in the Eocene epoch.

⁷ Harwich Formation is a geological formation found in the London Basin of southeastern England, formed in the early Eocene.

3.1.2 Marine water and sediment quality

88. Site specific data was collected from a geophysical survey of the array area and offshore cable corridor between May and August 2021. A seabed survey was also undertaken at the same time, where samples were taken for particle size analysis and chemical contaminant analysis.
89. Other water quality and sediment related data from previous years were also used to inform this assessment. These sources included reports and data from the Clean Seas Environmental Monitoring Programme, the Environment Agency Catchment Data Explorer, and wider data on benthic surveys and water profiles.
90. Marine sediment and water quality are closely related to the marine geology and physical processes impact assessment and so they share the same study area of 15km around the offshore project area.
91. Sediment across the study area comprises a mix of gravel, sand and mud. Sand was the predominant sediment type in the array area.
92. The offshore cable corridor runs through the Water Environment Regulations Essex coastal water body, which is characterised as a 'heavily modified' water body due to flood and coastal protection management. It is currently classified as having an overall 'moderate' status.
93. There are nine designated bathing waters (which identify sites popular for swimming) within the Essex coastal Water Environment Regulations water body. The Holland bathing water is located adjacent to the offshore cable corridor/landfall area and the Frinton bathing water is located approximately 1.2km to the north. Both Holland and Frinton are classified as having excellent bathing water quality.
94. Potential impacts assessed for the construction, operation and maintenance and decommissioning phases include:
 - Increase in suspended sediment; and
 - Deterioration of water quality due to the release of existing contaminants in the sediment.
95. Mitigation will be incorporated to minimise these impacts by the commitment to use good practice techniques, such as ensuring relevant risk assessment are carried out for chemicals to be used at sea, and ensuring spill kits are available nearby in the event of a chemical spill, to reduce the likelihood and severity of any accidental release of pollutants.
96. With the implementation of mitigation measures, North Falls is predicted to have no greater than minor adverse (not significant in EIA terms) effects on marine water and sediment quality during all project phases.
97. There is potential for cumulative effect to occur with other offshore wind farms and other projects. However, when considering proposed mitigation measures, it is not anticipated that cumulative effects are likely to be significant in EIA terms.

3.1.3 Benthic and intertidal ecology

98. Benthic communities are the animals and plants associated with the seabed (living on or within the seabed substrate). Intertidal is the shore area between the level of mean high water springs and mean low water springs. Direct effects on the intertidal area will be avoided as the Applicant has committed to drill the export cables under the intertidal zone.
99. Benthic and intertidal site characterisation was undertaken using geophysical surveys, benthic seabed sampling and an intertidal survey.
100. In addition, a desk-based review of available data from wider resources supported the assessment and used benthic survey reports from the neighbouring Greater Gabbard and Galloper offshore wind farms.
101. The study area is as defined for marine geology, oceanography and physical processes, based on an understanding of the tidal regime. The study area encompasses the offshore project area and a 15km buffer.
102. The principal receptors with respect to benthic and intertidal ecology are those habitats or species identified to be present. Of particular note are the Kentish Knock East Marine Conservation Zone which lies adjacent to the array area and the Margate and Long Sands Special Area of Conservation which lies adjacent to the offshore cable corridor.
103. Potential impacts assessed for the construction and decommissioning phases include:
 - Temporary physical disturbance;
 - Increased suspended sediment concentrations;
 - Re-mobilisation of contaminated sediments; and
 - Underwater noise and vibration.
104. For the operation and maintenance phase, potential impacts assessed include:
 - Temporary physical disturbance from maintenance activities;
 - Long term habitat loss from infrastructure on the seabed;
 - Increased suspended sediment concentrations;
 - Re-mobilisation of contaminated sediments;
 - Underwater noise and vibration;
 - Interactions of electromagnetic fields;
 - Colonisation of introduced substrate, including by non-native species; and
 - Indirect effects on intertidal zone.
105. Mitigation has been incorporated into the project design, including:
 - The array area has been reduced to avoid direct overlap with the Kentish Knock East Marine Conservation Zone;
 - The offshore cable corridor avoids overlap with the Margate and Long Sands Special Area of Conservation;

- The use of horizontal directional drilling at landfall to avoid impacts to the intertidal zone;
 - Committing to burying cables where practicable to reduce the effects of habitat loss and electromagnetic fields;
 - Micro-siting where practicable around seabed obstacles such as reefs to reduce potential effects on receptors; and
 - Employing biosecurity measures to reduce the potential spread of invasive non-native species.
106. With the implementation of mitigation measures, North Falls is predicted to have no greater than minor adverse (not significant in EIA terms) effects on the benthic and intertidal ecology during all project phases.
107. Before construction activities take place, surveys will check for the presence of sensitive benthic species or habitats of conservation importance to inform micro-siting where practicable. After the construction of North Falls, to validate the assessment conclusions of no significant changes to benthic communities and no significant spread of invasive non-native species, the seabed around some of the wind turbine generator foundations would be sampled.
108. In addition to the ES, separate reports have been produced which specifically assess the effects on the Special Area of Conservation (see the Report to Inform Appropriate Assessment, Document Reference: 7.1) and the Marine Conservation Zone (see the Marine Conservation Zone Assessment, Document Reference: 7.3). They conclude that there will be no significant effects on the Margate and Long Sands Special Area of Conservation or Kentish Knock Marine Conservation Zone.

3.1.4 Fish and shellfish ecology

109. A desk-based review of available data was undertaken using the results of several fish surveys from other projects, such as Greater Gabbard Offshore Wind Farm and Galloper Offshore Wind Farm, to provide an indication of relevant species present in the offshore project area. It also included data from wider sources and publications such as the International Council for the Exploration of the Sea and the Marine Management Organisation. In addition, sediment samples collected from the benthic baseline characterisation survey in 2021, were also used to analyse the distribution of suitable habitat for herring and sandeels among others.
110. Fish and shellfish ecology receptors have been identified taking account of the presence/abundance in the study area; the location of spawning and nursery grounds relative to the offshore project area; conservation importance; commercial importance; and their role within the North Sea's food-web. The full list of key fish and shellfish species considered in the assessment is given in ES Chapter 11 Fish and Shellfish Ecology (Document Reference: 3.1.13).
111. Species of commercial importance in the array area and offshore cable corridor include Dover sole, whelk, bass and thornback ray bass, skate, herring, turbot, brill, lobster and brown crab. These species are targeted from a mix of trawling, netting and potting.

112. Fish and shellfish species of conservation importance which have the potential to be found in the study area include migratory species (European eel, shads, river and sea lampreys, Atlantic salmon, sea trout, smelt); elasmobranchs (sharks, skates and rays); and other species with designated conservation status.
113. Spawning grounds for herring, lemon sole, plaice, sandeel, Dover sole, sprat, whiting and cod have all been defined in the offshore project area. Nursery grounds for the species mentioned above as well as mackerel, thornback ray, and tope have also been defined within the offshore project area.
114. Potential impacts assessed for the construction and decommissioning phases include:
- Impacts to fish and shellfish due to the temporary physical disturbance and temporary loss of habitat as a result of foundation installation;
 - Smothering of fish and shellfish and their eggs due to increased suspended sediments and re-deposition;
 - Impacts to fish and shellfish due to the remobilisation of contaminated sediments;
 - Disturbance of fish due to underwater noise from construction activities including piling and clearance of ordnance; and
 - Impacts on fish and shellfish populations due to changes in fishing activity.
115. For the operation and maintenance phase, potential impacts assessed include:
- Impacts to fish and shellfish due to physical disturbance and temporary habitat loss during operation and maintenance activities;
 - Long term habitat loss for fish and shellfish from the placement of infrastructure on the seabed;
 - Smothering of fish and shellfish and their eggs due to increased suspended sediments and redeposition due to maintenance activities such as cable repairs;
 - Impacts to fish and shellfish due to the remobilisation of contaminated sediments;
 - Disturbance of fish due to underwater noise during operation of the wind turbines and maintenance activities;
 - Disturbance resulting from electromagnetic fields surrounding the cables during operation;
 - Alteration of fish and shellfish habitat and introduction of non-native species resulting from the introduction of hard substrate (foundations and protection e.g., rock); and
 - Impacts on fish and shellfish populations due to changes in fishing activity.
116. Mitigation proposed within the assessment includes burying cables and the use of cable protection methods where cables cannot be buried to reduce electromagnetic fields; the adoption of a soft-start and ramp-up protocol, whereby underwater noise from piling starts low and gradually increases to allow mobile animals such as fish to move away; a restriction in piling activity during November

to January which is the spawning season for Downs herring; and lastly pollution protection measures to ensure that sediment and water quality are not impacted throughout construction.

117. With the implementation of mitigation measures, North Falls is predicted to have no greater than minor adverse (not significant in EIA terms) effects on the fish and shellfish receptors (alone or cumulatively with other projects).

3.1.5 Marine mammals

118. Site-specific aerial surveys were undertaken for both marine mammals and seabirds. High resolution digital data was collected by HiDef Aerial Surveying Limited, providing digital imagery for marine megafauna over the array area with a 4km buffer. These surveys were conducted monthly over 24 months to provide two years of data to inform the assessment. In addition, wider desk-based sources were used to provide information on abundance and density of marine mammals in and around the North Sea.

119. The study area for marine mammals has been defined on the basis of marine mammals being highly mobile and transitory in nature; therefore, it is necessary to examine species occurrence not only within the offshore project area, but also over the wider area. For each species of marine mammal, study areas have been defined based on the relevant species populations.

120. The assessment considered the following species:

- Harbour porpoise;
- Minke whale;
- Grey seal; and
- Harbour seal.

121. Potential impacts assessed for the construction phase include:

- Auditory injury and disturbance or behavioural impacts resulting from underwater noise during piling, and due to acoustic deterrent device activation prior to piling;
- Auditory injury and disturbance or behavioural impacts resulting from underwater noise during other construction activities, including seabed preparations, rock placement and cable installation;
- Underwater noise and disturbance from construction vessels;
- Vessel interaction (collision risk);
- Barrier effects as a result of underwater noise;
- Disturbance at seal haul-out sites;
- Changes to water quality; and
- Changes to prey resource.

122. For the operation and maintenance phase, potential impacts assessed include:

- Auditory injury and disturbance or behavioural impacts resulting from operational wind turbine generators;

- Auditory injury and disturbance or behavioural impacts resulting from underwater noise during maintenance activities, including cable protection and cable reburial;
- Underwater noise and disturbance from maintenance vessels;
- Vessel interaction (collision risk);
- Barrier effects as a result of underwater noise;
- Disturbance at seal haul-out sites;
- Changes to water quality; and
- Changes to prey resource.

123. For decommissioning, the following impacts were assessed:

- Underwater noise and disturbance from decommissioning activities;
- Underwater noise and disturbance from vessels;
- Barrier effects as a result of underwater noise;
- Increased collision risk with vessels;
- Disturbance at seal haul-out sites;
- Barrier effects due to underwater noise during decommissioning;
- Changes to water quality; and
- Changes to prey resource.

124. A number of mitigation measures are proposed to reduce the effects on marine mammals, including:

- Soft-start and ramp-up for piling activities;
- Adherence to good practice guidance to reduce vessel collision risk (e.g., follow set vessel routes and number of vessel movements kept to a minimum); and
- Implementation of a Project Environmental Monitoring Plan to manage potential pollution events.

125. Additional mitigation will be implemented through a Marine Mammal Mitigation Plan which aims to reduce impacts of physical injury or hearing damage. The Marine Mammal Mitigation Plan will be developed in consultation with relevant stakeholders with consideration of relevant guidance, in accordance with the outline Marine Mammal Mitigation Plan (Document Reference: 7.7) submitted alongside the DCO application. The additional mitigation secured through the Marine Mammal Mitigation Plan includes use of trained and dedicated personnel to watch for marine mammals and delay the start of piling if marine mammals are present within a specified area. This would also be supplemented with passive acoustic monitoring to detect marine mammals underwater. Other additional mitigation could include the use of acoustic deterrent devices to encourage marine mammals to move away from piling activities.

126. With the implementation of mitigation measures, North Falls is predicted to have no greater than minor adverse (not significant in EIA terms) effects on marine mammals during all its phases.
127. There is potential for cumulative effects to occur with other offshore wind farms and other projects. However, when considering proposed mitigation measures, it is not anticipated that cumulative effects are likely to be significant in EIA terms.

3.1.6 Offshore ornithology

128. As discussed above, site-specific data was gathered by 24 monthly digital aerial surveys flown across the North Falls array area including a 4km buffer zone (with an additional extension of 12km in the west to include areas of the red-throated diver in January and February 2021). Other sources used to inform this assessment were the Seabird Mapping and Sensitivity Tool (Bradbury et al., 2014), and the Red-throated diver survey of Outer Thames Estuary Special Protection Area (Irwin et al, 2019).
129. Birds present in offshore waters and potentially affected by the construction, operation, maintenance and decommissioning of North Falls are predominantly seabirds (auks, gulls, terns, gannets, skuas, shearwaters, petrels and divers). These species may be present during the breeding season and non-breeding season (including the spring/autumn migration/passage periods). Other bird species that may be affected include waterfowl (e.g., swans, geese, ducks and waders) and other bird species which may fly through the North Falls array area during the spring and/or autumn migration/passage periods.
130. Additional bird species were recorded irregularly including migratory waterfowl (brent goose, shelduck, whimbrel and wigeon), raptors (peregrine, osprey and sparrowhawk), passerines (carrion crow, chaffinch, fieldfare and starling) and feral pigeon.
131. Potential impacts assessed for the construction phase include:
 - Direct disturbance and displacement
 - Indirect effects on prey species and habitats.
132. For the operation and maintenance phase, potential impacts assessed include:
 - Direct disturbance and displacement;
 - Collision risk;
 - Indirect effects on prey species and habitats.
133. For decommissioning, the following impacts were assessed:
 - Direct disturbance and displacement; and
 - Indirect effects on prey species and habitats.
134. Mitigation proposed includes the complete removal of the former northern array and refinement of the former southern array (now the array area), increasing the distance from the Outer Thames Estuary Special Protection Area, reduction in the number of turbines (from 72 to 57), reduction in the number of largest turbine model (from 40 to 34), sensitive site selection of the offshore cable corridor to reduce the length of overlap with the Outer Thames Estuary Special Protection

Area. Furthermore, a minimum air gap between the sea level and the bottom of the turbines of 27m (5m above the minimum requirement) will be used to reduce the risk of collisions, and a shipping protocol will be implemented to reduce disturbance to higher risk species such as the red-throated diver. This would include measures such as designing transit routes to minimise disturbance within the Special Protection Area, avoiding over-revving of engines and by briefing vessel crews on how and why vessel management practices are implemented.

135. With the implementation of mitigation measures, North Falls is predicted to have no greater than minor adverse (not significant in EIA terms) effects on ornithological receptors during all its phases.
136. There is potential for cumulative effects to occur with other offshore wind farms. However, when considering proposed mitigation measures, it is not anticipated that cumulative effects are likely to be significant in EIA terms, with the exception of collision risk for great black-backed gull, kittiwake, and the lesser black-backed gull; and collision and displacement for gannet which were all assessed to be potentially significant in EIA terms.

3.1.7 Commercial fisheries

137. A desk-based study informed the commercial fisheries assessment by the review and analysis of available fisheries data covering the years between 2018 and 2022, any relevant publications and extensive consultation with local fisheries stakeholders.
138. The study area used to characterise the commercial fisheries baseline has been defined with reference to the International Council for the Exploration of the Sea rectangles that overlap with the offshore project area (International Council for the Exploration of the Sea rectangle 32F1 and 32F2).
139. The most relevant International Council for the Exploration of the Sea rectangle to the offshore project area (32F1), captures the majority of the offshore project area (including the whole offshore cable corridor and practically the whole array area). This area is mostly targeted by local UK vessels under 15m in length that operate a range of gear including pots, trawls, nets and longlines for species such as whelks, sole, bass, thornback ray and others. Some of these vessels are multi-purpose and switch between fishing gear to target species depending on the time of year. The array area in 32F1 is targeted by larger UK vessels over 15m, potting for whelks and beam trawling for sole and other demersal species.
140. The offshore project area is also fished by Belgian and Dutch beam trawlers, Belgian demersal trawlers and French pelagic trawlers.
141. Potential impacts assessed for the construction and decommissioning phases include:
 - Temporary loss or restricted access to fishing grounds;
 - Displacement of fishing activities into other areas;
 - Increased sailing times to all fishing grounds;
 - Interference with fishing activities (navigational conflict);
 - Safety issues for fishing vessels (e.g., snagging); and

- Impacts on commercial fisheries as a result of impacts on exploited fish and shellfish species.
142. For the operation and maintenance phase, potential impacts assessed include:
- Temporary loss or restricted access to traditional fishing grounds;
 - Long-term loss or restricted access to traditional fishing grounds;
 - Displacement of fishing activities into other areas;
 - Increased sailing times to all fishing grounds;
 - Interference with fishing activities (navigational conflict);
 - Safety issues for fishing vessels (e.g., snagging); and
 - Impacts on commercial fisheries as a result of impacts on exploited fish and shellfish species.
143. Mitigation measures proposed include the appointment of a Fisheries Liaison Officer for the duration of the construction phase and development of a Fisheries Liaison and Coexistence Plan detailing the approach to liaison with fisheries stakeholders through construction and operation. Measures will also include promulgation of timely and efficient notifications, implementation of a claims procedure for loss of/damage to fishing gear, and development of a Code of Good Practice for project vessels. Mitigation included in the project design also includes a commitment to bury subsea cables where practicable, with cable protection to be used where that is not possible. Cable protection will be designed to reduce the risk of gear snagging, and location information for protected cables will be shared with relevant stakeholders. Where appropriate and practicable, post-lay and burial inspection surveys will be undertaken. Additionally, the wind farm design will keep a minimum spacing between wind turbine generators of 1180m in the downwind direction; and 944m in the cross wind direction allowing for fishing activities during the operational phase.
144. With the implementation of mitigation measures, North Falls is predicted to have no greater than minor adverse (not significant in EIA terms) effects on commercial fisheries during all its phases.
145. There is potential for cumulative effects to occur with a number of other offshore wind farms and other projects. However, when considering proposed mitigation measures, it is not anticipated that cumulative effects are likely to be significant in EIA terms.

3.1.8 Shipping and navigation

146. Vessel traffic surveys were conducted between January 29 and March 2 2022 (winter); June 29 and July 28 2022 (summer); and then again between January 17 and February 1, 2022 (winter). The data included Automatic Identification System, radar, and visual observations, ensuring a full account of traffic within the area. Additional desk-based data was considered to supplement the vessel traffic survey data to inform the assessment.
147. The study area for shipping and navigation has been defined as a 10 nautical mile (nm) (18.5km) buffer of the array area and 2nm (3.7km) around the offshore cable corridor.

148. Commercial vessels are principally routed in the study area according to the following routing measures: the Sunk North, East and South Traffic Separation Schemes; the Sunk Outer Precautionary Area (upon which the three Traffic Separation Schemes converge); the Sunk Inner Precautionary Area (adjacent to the Sunk Outer Precautionary Area); Long Sand Head Two Way Route; and the Area to be Avoided (the central part of the Sunk Outer Precautionary Area).
149. The closest ports to the Project are Felixstowe Port and Harwich Port, both located at the mouth of the Stour and Orwell Estuaries, approximately 22nm and 23nm to the west of the array area, respectively.
150. The vessel traffic surveys showed that an average of 134 vessels per day was recorded within the study area during the winter surveys, rising to 147 during the summer survey. The increase in summer was observed to be primarily associated with increased volumes of wind farm traffic and recreational vessels. On average, two vessels per day intersected the array area during winter and five vessels per day during the summer period.
151. Cargo vessels accounted for more than half of all traffic, followed by tankers, which accounted for approximately one fifth of traffic. An average of 8 recreational vessels were recorded per day in the summer survey, with less than one per day in winter.
152. With respect to maritime incidents:
- 17 search and rescue helicopter taskings were undertaken for incidents within the study area between April 2015 and March 2023;
 - 94 incidents were responded to by the Royal National Lifeboat Institution within the study area between 2013 and 2022; and
 - 21 incidents were recorded by the Marine Accident Investigation Branch within the study area between 2013 and 2021.
153. Potential impacts assessed for the construction and decommissioning phases include:
- Vessel to structure collision;
 - Vessel displacement;
 - Increased risk of vessel-to-vessel collisions (third party to third party vessels and third party to project vessels);
 - Impacts on vessels involved in marine aggregate operations;
 - Impacts on vessels transiting to/from local ports in the area; and
 - Reduction of emergency capabilities due to the increased incident rates and/or reduced access for search and rescue responders.
154. For the operation and maintenance phase, potential impacts assessed include:
- Interaction with subsea cables including cable protection;
 - Vessel to structure collision;
 - Vessel displacement;

- Increased risk of vessel-to-vessel collisions (third party to third party vessels and third party to project vessels);
 - Impacts on vessels involved in marine aggregate operations;
 - Impacts on vessels transiting to/from local ports in the area; and
 - Reduction of emergency capabilities due to the increased incident rates and/or reduced access for search and rescue responders.
155. The Applicant has made a number of mitigation commitments, including: reductions to the array area to reduce impacts on nearby shipping lanes; an exclusion zone for surface piercing infrastructure within 1nm of shipping lanes; appropriate lighting and marking and use of safety zones; adherence to the Convention on the International Regulations for Preventing Collisions at Sea (1972) and the International Convention for the Safety of Life at Sea (1974), and Marine Guidance Note 654; coordination of project vessel movements and use of guard vessels, where appropriate; adherence to an Emergency Response Cooperation Plan; promulgation of information regarding construction and maintenance activities via standard methods, including Notice to Mariners, Kingfisher Bulletins and UK Hydrographic Office/nautical charts; and assessment of required cable protection measures.
156. With the implementation of mitigation measures, North Falls is predicted to have 'tolerable' or 'broadly acceptable' effects on shipping and navigation receptors during all its phases (not significant in EIA terms). The effects are also as low as reasonably practicable.
157. There is potential for cumulative effects to occur with a number of other offshore wind farms and other projects. However, taking into account the mitigation commitments, it is not anticipated that cumulative effects are likely to be significant in EIA terms.

3.1.9 Offshore and intertidal archaeology and cultural heritage

158. The assessment was based on the marine geophysical survey undertaken by Fugro in 2021, alongside desk-based resources. Geophysical data was collected in the array area and offshore cable corridor and provided to Wessex Archaeology for processing and interpretation.
159. The offshore archaeology and cultural heritage existing environment within the study area (footprint of the offshore project area) covers seabed prehistory; maritime archaeology; aviation archaeology; historic seascape character; and buried archaeology.
160. There are no known *in situ* seabed prehistory sites within the study area. However, a number of finds of prehistoric material have been reported from the study area and the immediate vicinity of the offshore cable corridor.

161. There is potential for numerous channel deposits to contain archaeological material, and paleoenvironmental⁸ material. Well-preserved paleogeographic features were identified in the array area and the offshore cable corridor.
162. There are no known maritime and aviation archaeological sites within the study area that are subject to statutory protection. There are three modern wrecks within the offshore project area, however, they are not of archaeological interest due to their age.
163. Geophysical data has demonstrated the presence of 1,514 seabed features which have been identified as being of archaeological or potential archaeological interest. The large number of features reflects considerable historic maritime activity in the study area, the approach to the Thames having been a historically busy area for shipping, with significant military activity in the twentieth century.
164. The potential for encountering previously undiscovered *in situ* archaeological sites within the intertidal zone is anticipated to be very low, and there are no known, extant heritage assets present within the intertidal zone. As well as the use of horizontal directional drilling to install the cable beneath the intertidal zone, which reduces the potential for interactions with heritage assets, historic coastal erosion and subsequent coastal management regimes from the 18th century onwards have significantly reduced the potential for buried remains.
165. It is anticipated that historic seascape character types have capacity to accommodate changes associated with North Falls.
166. Potential impacts assessed for the construction, operation and maintenance, and decommissioning phases include:
 - Direct (physical) impacts to both known and potential heritage sites;
 - Indirect impacts to the heritage assets and seascape character from changes to physical processes, such as changes in seabed levels and sediment movement; and
 - Impacts to the setting of heritage assets.
167. Mitigation measures include the use of Archaeological Exclusion Zones around: known wreck sites; marine geophysical anomalies of archaeological interest recorded in the North Falls geophysical data; and previously recorded sites that have not been seen in the North Falls geophysical data. To mitigate the impact on potential heritage assets, micro-siting has been applied to previously recorded sites where no prior geophysical data has been collected. Further investigation has also been suggested for any identified anomalies that cannot be avoided by micro-siting or by implementing mitigation measures. Details of the mitigation delivery approach, and investigation into the final design of North Falls, are provided in an outline Written Scheme of Investigation (Document Reference: 7.11).

⁸ An historic environment that has been preserved.

168. With the implementation of mitigation measures, North Falls is predicted to have no greater than minor adverse (not significant in EIA terms) effects on offshore and intertidal archaeology and cultural heritage during all its phases.
169. There is potential for cumulative effects to occur with other offshore wind farms and other projects. Taking into account the mitigation commitments, it is not anticipated that cumulative effects are likely to be significant in EIA terms, with the exception of potential beneficial effects due to sharing data with Academics to inform research. The Cumulative Effects Assessment concluded the potential impacts on a regional level can be mitigated by contribution to regional research initiatives and 'joined-up' post-consent investigations in liaison with key stakeholders.

3.1.10 Aviation and radar

170. Desk-based data was used to inform the aviation and radar assessments. UK flight and navigation related information for 2022 was gathered from sources such as the Civil Aviation Publication 032: UK and UK Military Aeronautical Information Publication, providing full coverage across the North Falls aviation and radar study area.
171. The study area for aviation and radar has been defined on the basis of the potential for wind turbine generators within the North Falls array area to interfere with civil and military radars and the potential for the wind turbine generators to become aviation obstacles or obstructions. Modelling has been undertaken to determine whether Primary Surveillance Radars will detect North Falls wind turbine generators.
172. There is a possibility that part or all of the North Falls wind turbine generators will be detected by Primary Surveillance Radars at Southend and Wattisham.
173. In addition, in their pre-application advice, the Ministry of Defence state that wind turbine generators will be detected by Neatishead Primary Surveillance Radars.
174. The planned height of the North Falls wind turbine generators means helicopters operating within the relevant helicopter route will have less than the required 1,000ft (305m) obstacle clearance when crossing the North Falls array area in poor meteorological conditions.
175. The nearest search and rescue base is at Lydd Airport, approximately 99km south-west of the North Falls array area and its helicopters can provide rescue services up to approximately 460km away from base.
176. Potential impacts assessed for the construction phases include:
 - Impacts on civil and military radar systems, due to the height of construction vessels (i.e. cranes and partially complete structures);
 - Creation of an aviation obstacle environment; and
 - Increased air traffic in areas related to wind farm activity.
177. For the operation and maintenance phase, potential impacts assessed include:
 - Wind turbine generators causing permanent interference on civil and military radars;
 - Creation of an aviation obstacle environment; and

- Increased air traffic in areas related to wind farm activity.
178. For decommissioning, the following impacts were assessed:
- Removal of above sea level infrastructure such as wind turbine generators resulting in no interference on civil and military radars;
 - Removal of aviation obstacle environment; and
 - Increased air traffic in areas related to wind farm activity.
179. Mitigation includes the use of obstacle location charts in aeronautical documents, marking and lighting of wind turbine generators in accordance with relevant guidelines and application of minimum separation distances. Additional notification measures will include Notices to Airmen, Aeronautical Information Circulars and publicity in relevant aviation publications/magazines. Mitigation in relation to radar will be agreed with the Ministry of Defence.
180. With the implementation of mitigation measures, North Falls is predicted to have no significant effects on aviation and radar receptors during all its phases.
181. There is potential for cumulative effects to occur with other offshore wind farms. However, when considering mitigation measures, it is not anticipated that cumulative effects are likely to be significant in EIA terms.

3.1.11 Infrastructure and other users

182. Desk-based data was used to inform the infrastructure and other users assessment.
183. The study area encompasses a 50km zone of influence around the offshore project area. Infrastructure and users in the study area include:
- Offshore cables;
 - Wind farms;
 - Oil and gas infrastructure;
 - Aggregate sites;
 - Ministry of Defence practice and exercise areas; and
 - Disposal sites.
184. Commercial fisheries and shipping are considered separately (see Sections 3.1.7 and 3.1.8). Existing infrastructure and other users include:
- 13 consented offshore wind farms in the study area;
 - 3 existing offshore cables and 2 proposed cables which intersect the offshore project area;
 - The closest outfall pipe (sewage) is located 0.2km from the offshore cable corridor;
 - The closest aggregate production area is located adjacent to the array area;
 - 4 closed disposal sites in the offshore project area. There is no overlap of the offshore project area with open disposal sites;

- 3 non-danger military Practice and Exercise Areas overlap the offshore project area; and
 - There is also potential for wartime unexploded ordnance within the southern North Sea.
185. Potential impacts assessed for the construction, operation and maintenance, and decommissioning phases include:
- Potential interference with other wind farms (navigational safety issues; aviation; overlap of infrastructure and potential interactions; increased pressure on port facilities);
 - Physical impacts on subsea cables (potential damage to cables, repairs/reburial);
 - Impacts on disposal/dredging sites (disruption due to vessel movements);
 - Impacts on dredging; and
 - Impacts on Ministry of Defence activities.
186. Mitigation has been incorporated into the project design, including stakeholder engagement with owners and operators of infrastructure (other wind farm developers, dredging companies and cable operators) to put commercial and technical agreements in place ahead of construction. Information for all phases of North Falls will be given via Notices to Mariners and Kingfisher Bulletins alongside other appropriate media. Crossing and proximity agreements will be agreed post-consent with relevant asset owners, consultation with Trinity House will determine appropriate lighting and marking, with consideration of existing oil and gas assets, and alignment of wind turbine generators to provide obstruction free Search and Rescue access.
187. With the implementation of mitigation measures, North Falls is predicted to have no greater than minor adverse (not significant in EIA terms) effects on the infrastructure and other users during all its phases.
188. There is potential for cumulative effects to occur with a number of other offshore wind farms and other projects. However, when considering proposed mitigation measures, it is not anticipated that cumulative effects are likely to be significant in EIA terms.

3.2 Onshore

3.2.1 Ground conditions and contamination

189. The ground conditions assessment was based on a desk-based site characterisation study which consisted of a review of existing data sources such as the British Geological Survey, Groundsure environmental sensitivity data and permitting records data, and historic, radon and unexploded ordnance mapping.
190. The study area for ground conditions and contamination includes a 250m buffer around the onshore project area. The study area is extended to 1km for assessing the presence of Control of Major Accident Hazard sites and groundwater abstraction wells and Source Protection Zones. This is due to the higher risk posed by Control of Major Accident Hazard sites and the sensitivity of groundwater abstraction wells.

191. The geology within the study area for ground conditions and contamination consists of made ground (associated with historical quarrying activities), superficial deposits (including alluvium, head deposits, cover sand and Kesgrave Catchment Subgroup), and bedrock of the Thames Group. There are a number of geological designations within the study area, including Secondary A Aquifers⁹, a Secondary B Aquifer¹⁰, a Principal Aquifer¹¹ and unproductive strata¹². The area of the onshore cable route to the north of Tendring Green up to and including the onshore substation works area is located within a Source Protection Zone 3¹³. There are no potable groundwater abstractions within the onshore project area, however 23 domestic and one commercial potable abstraction wells are located within 1km.
192. The study area crosses three Main Rivers¹⁴: Holland Brook, Kirby Brook, Tendring Brook, as well as unnamed watercourses and ditches that are located either wholly or partially within the study area.
193. There are a number of Mineral Safeguarding Areas¹⁵, and a Mineral Consultation Area¹⁶ within the onshore project area. There are no direct overlaps between the study area and any sensitive land use designated sites (inclusive of Local Geological Sites¹⁷).
194. Potential impacts assessed for the construction and decommissioning phases include:
- Exposure of the workforce, landowners, land users and neighbouring land users to contaminated soils and groundwater and associated health impacts;

⁹ These are permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.

¹⁰ These are predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers.

¹¹ These are layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer.

¹² These are predominantly rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.

¹³ Source Protection Zone (SPZ) - the groundwater catchment area of a water abstraction point and used to identify areas where surface and below ground activities may interfere with the water supply. It is split into 3 zones: SPZ1 (highest risk) – all land within a 50 day travel time of pollutant to source. SPZ2 – all land within a 400 day travel time of pollutant to source. SPZ3 – (lowest risk) the total catchment used to supply a water abstraction.

¹⁴ 'Main Rivers' is a classification by the Environment Agency. This is usually larger rivers and streams. The Environment Agency carries out maintenance, improvement or construction work on Main Rivers to manage flood risk.

¹⁵ Mineral Safeguarding Areas are areas of known mineral resources that are of sufficient economic or conservation value (such as building stones) to warrant protection for generations to come.

¹⁶ Mineral Consultation Areas are areas defined to ensure that the Mineral Planning Authority is informed of significant development proposals which may adversely affect minerals resources and has the opportunity to comment upon or oppose them.

¹⁷ Local Geological Sites exhibit important geological and geomorphological features to the local area.

- Direct impacts on groundwater quality and groundwater resources;
 - Impacts on surface water quality and the ecological habitats they support from contamination;
 - Sterilisation of future mineral resources; and
 - Impacts upon agricultural land and the built environment from contamination.
195. For the operation and maintenance phase, potential impacts assessed include:
- Exposure of the workforce, landowners, land users and neighbouring land users to contaminated soils and groundwater and associated health impacts;
 - Impacts on controlled waters (groundwater and surface waters);
 - Sterilisation of future mineral resources; and
 - Impacts upon agricultural land and the built environment from contamination.
196. Mitigation includes implementation of a Code of Construction Practice which will be adhered to throughout the construction period. The Code of Construction Practice will include an assessment of the potential risks to human health and controlled waters receptors posed by construction activities and will detail industry good practice measures that will be implemented to avoid, minimise and mitigate these potential impacts. The Code of Construction Practice will also include a plan for dealing with unexpected contamination. An outline version of the Code of Construction Practice has been submitted as part of the DCO application and will be secured within the final Code of Construction Practice submitted post-consent.
197. Plans detailing good site waste management, soil management, materials management will also be prepared and will be required to be adhered to during construction.
198. Where practicable, trenchless crossing techniques have been agreed to minimise the potential for contamination from excavation works associated with cable crossings across Main Rivers. Cable routes have been routed in order to avoid interaction with groundwater supplies. Hydrogeological risk assessments will be undertaken at each trenchless crossing location meeting the requirements of the Environment Agency's approach to groundwater protection.
199. The assessment has established that ground conditions and contamination receptors could be affected. However, with the implementation of pre-construction targeted ground investigations, undertaken in areas containing potential sources of contamination, North Falls is predicted to have no greater than minor adverse (not significant in EIA terms) effects on ground conditions during all its phases. Piling risk assessments will also be undertaken where relevant.
200. It is not anticipated that cumulative effects are likely to be significant in EIA terms, with Five Estuaries or any other project when considering the proposed mitigation measures.

3.2.2 Onshore air quality

201. The assessment draws on existing monitoring data and air quality management reports such as Tendring District Council Air Quality Annual Status Reports and Defra local air quality management data.
202. The study area for onshore air quality is defined as follows:
- Construction phase dust and fine particulate matter emissions:
 - Human receptors within 250m of the onshore project area and within 50m of routes used by construction vehicles (for track out up to 500m from the onshore project area); and
 - Ecological receptors within 200m of the onshore project area for construction related dust and within 50m of routes used by construction vehicles (for trackout up to 500m from the onshore project area).
 - Construction phase non-road mobile machinery emissions:
 - Human and ecological receptors within 200m of the onshore project area boundary.
 - Construction phase road traffic emissions:
 - Human and ecological receptors within 200m of routes which will experience traffic flows in exceedance of the relevant air quality screening criteria.
203. The study area for onshore air quality does not pass through, nor is it adjacent to, any statutory designated Air Quality Management Areas. The Tendring District Council monitoring network was amended in 2022 and 2020; therefore, results were obtained from the 2023, 2021 and 2019 Annual Status Reports show the annual mean nitrogen dioxide objective of $40\mu\text{g m}^{-3}$ has not been exceeded across the five-year period. The monitoring records indicate a declining trend in annual mean concentrations of nitrogen dioxide since 2017.
204. Potential impacts assessed for the construction and decommissioning phases include:
- Construction dust and fine particulate matter;
 - Non-road mobile machinery emissions; and
 - Construction phase road vehicle exhaust emissions.
205. Operational impacts on air quality have been scoped out given the cable will be underground and the onshore substation will not produce emissions that would generate levels of dust and particulate matter sufficient to result in significant effects. An exception to this is emission generated during the reinstatement of the haul road connecting Bentley Road to Ardleigh Road to service Abnormal Indivisible Load movements to the onshore substation in the unlikely event of transformer failure during the Project's lifetime.
206. North Falls will implement best practice dust mitigation measures, and follow mitigation measures specific to non-road mobile machinery, which have been detailed in the Outline Code of Construction Practice submitted with the DCO application, including a Dust Management Plan. Additionally, air quality considerations have been included in the site selection process (see ES Chapter

4 Site Selection and Assessment of Alternatives (Document Reference: 3.1.6) for the onshore substation and associated infrastructure and using the shortest cable route length where practicable.

207. With the implementation of mitigation measures, North Falls is predicted to have no significant effects on air quality during all project phases.
208. There is potential for cumulative effects to occur with Five Estuaries or any other project with the potential to generate dust or other air quality impacts. However, when considering proposed mitigation measures, it is not anticipated that cumulative effects are likely to be significant in EIA terms.

3.2.3 Water resources and flood risk

209. The study was based on a review of existing data sources such as the BGS and Environment Agency flood risk data, as well as the findings of a site-specific geomorphological baseline survey conducted in August 2022.
210. The study area for water resources and flood risk includes river water body catchments based on surface hydrological catchments with an area greater than 5km². Receptors are those river water bodies that are crossed, or their catchments are crossed, by the onshore project area, as well as those that are hydrologically connected downstream. The study area for potential impacts to groundwater is limited to those groundwater bodies that lie directly beneath the onshore project area.
211. The onshore infrastructure associated with North Falls lies within the Colne Essex operational catchment (Holland Brook and Tenpenny Brook) and the Stour operational catchment (Wrabness Brook and Coastal catchment associated with Hamford Water). Water quality across the onshore project area is generally poor.
212. Two potable water mains cross the onshore project area and sewage mains are located in the landfall area of the onshore project area.
213. The majority of the onshore project area is in the lower risk Flood Zone 1¹⁸, although there are three areas within the onshore project area at higher risk of flooding (Flood Zones 2¹⁹ and 3²⁰):
- Upper reaches of Holland Brook, immediately west of Abbott's Hall;
 - Tendring Brook, near Tendring Green; and
 - Kirby Brook and the lower course of Holland Brook at Holland Haven Marshes.
214. High risk surface water flow paths occur in the same areas as river and sea flooding, with minor flow paths associated with hillslope hollows and small areas of low to medium surface water flood risk north of Normans Farm. The most

¹⁸ Flood Zone 1 indicates a less than 0.1% annual probability of flooding.

¹⁹ Flood Zone 2 indicates medium risk. medium risk, with a 1% chance from rivers or 0.5% from the sea.

²⁰ Flood Zone 3 indicates the highest risk, with a 1% or higher chance from rivers or 0.5% from the sea, often underpinned by historical flood records.

extensive area of surface water flood risk is around Holland Haven Marshes. Floodplain areas of Kirby Brook and Holland Haven Marshes are at risk of reservoir flooding under certain conditions.

215. Most of the onshore project area is underlain by unproductive strata, but there are areas of low groundwater vulnerability near Thorpe-le-Soken and medium-low vulnerability north of the A120. North of Tendring, the onshore project area lies within Special Protection Zone 3. Superficial deposits of glacial sands and gravels, river terrace deposits and Diamicton till overlay bedrock in this area. The onshore project area is underlain by a single groundwater body (Essex Gravels) currently assessed as poor due to diffuse pollution as a result of poor livestock and nutrient management. Ongoing initiatives are in place to reduce existing and potential new pressures on groundwater to achieve compliance with the Water Environment Regulations and would suggest that groundwater quality and quantity is likely to improve in the future.
216. Potential impacts assessed for the construction and decommissioning phases include:
 - Direct disturbance of surface water bodies;
 - Increased sediment supply;
 - Supply of contaminants to surface and groundwater; and
 - Changes to surface and groundwater flows and flood risk.
217. For the operation and maintenance phase, potential impacts assessed include:
 - Supply of contaminants to surface and groundwater; and
 - Changes to surface and groundwater flows and flood risk.
218. A range of mitigation measures are proposed and are detailed in the Outline Code of Construction Practice submitted with the DCO application. During the construction phase, these measures include ground investigations and a hydrogeological risk assessment, a Horizontal Directional Drill Method Statement and Contingency Plan, crossing all Main Rivers and most ordinary watercourses using trenchless techniques, use of bailey bridges to traverse Main Rivers, applying best practice measures at trenched crossings and appointing a land drainage consultant to develop pre-and post-construction drainage plans designed to comply with the water quality design criteria outlined in the Construction Industry Research and Information Association Sustainable Drainage Systems manual. Outline soil management measures have been detailed in the Outline Code of Construction Practice.
219. With the implementation of mitigation measures, North Falls is predicted to have no greater than negligible or minor adverse (not significant in EIA terms) effects on water resources and flood risk during all its phases.
220. There is potential for cumulative effects to occur with Five Estuaries or any other project. However, when considering proposed mitigation measures, it is not anticipated that cumulative effects are likely to be significant in EIA terms.

3.2.4 Land use and agriculture

221. To inform the land use and agriculture impact assessment, a desk-based review was undertaken of available data and information sources such as agri-environment schemes and soil survey data to provide an understanding of existing baseline conditions. Additional data was gathered as part of an Extended Phase 1 Habitat Survey (undertaken in September and October 2021, March 2022 and August 2023) which was used to establish the existing baseline conditions and to inform the land use and agriculture impact assessment.
222. The study area for land use and agriculture comprises the onshore project area identified for the DCO application. The onshore project area overlaps with Holland Haven Local Nature Reserve, Holland Haven Country Park and Holland Haven Marshes Site of Special Scientific Interest. The onshore project area borders Simon's Wood Local Wildlife Site and Great Holland Pits Local Wildlife Trust site. The onshore project area does not cross through any preferred sites allocated for housing, commercial, employment or special policy by Tendring District Council (adopted 2022).
223. There are 12 agri-environment schemes within the onshore project area. Notably the onshore substation works area is within a Mid-Tier Countryside Stewardship and the onshore cable route crosses two Entry Level plus Higher Level Stewardship Scheme agreement. The onshore cable route also crosses six Mid-Tier, three Higher Tier and one Capital Grant Countryside Stewardship.
224. There are a number of utilities crossing the onshore project area, the majority of which are for domestic services including telecommunications, electricity, water, gas, sewage and street lighting. There is one major Affinity Water main that runs parallel to the onshore project area for approximately 12km between Great Holland and the A120.
225. The landfall overlaps with the existing Gunfleet Sands Offshore Wind Farm underground transmission cable near Holland-on-Sea.
226. There are no areas of open access and common land within the onshore project area. Although not classified as open access land, there is beach and intertidal land located within the onshore project area at landfall between Clacton-on-Sea and Frinton-on-Sea.
227. Arable farming is common throughout Essex, with cereal crops dominating the farmed landscape. The onshore project area primarily consists of Agricultural Land Classification Grade 3 land, which is considered Best and Most Versatile²¹ land. The onshore project area ranges from Grade 1 to Grade 4 land and includes some areas of urban land. The landfall at Great Holland crosses Agricultural Land Classification Grade 4 land and the onshore substation works area is located within Agricultural Land Classification Grade 1 (Best and Most Versatile) land.

²¹ Best and Most Versatile land refers to land defined as Grade 1, 2 or 3a of the Agricultural Land Classification. Best and Most Versatile land is considered the most flexible, productive and efficient and is most capable of delivering crops for food and non-food uses.

228. The onshore project area and onshore cable route consists predominantly of slowly permeable seasonally wet, slightly acid but base-rich loamy and clayey soils, as well as slightly acidic loamy and clayey soils at the onshore substation works area.
229. Potential impacts assessed for the construction and decommissioning phases include:
- Impact to natural and artificial field drainage systems;
 - Temporary loss of agricultural land during construction;
 - Potential for soils to become compacted and for soil structure to deteriorate during construction works;
 - Excavation, storage and reinstatement during construction exposes the soils and potentially leads to soil erosion;
 - Potential ecological and financial impacts on agri-environment schemes; and
 - Impacts on existing utilities.
230. For the operation and maintenance phase, potential impacts assessed include:
- Permanent above ground infrastructure at the onshore substation as well as presence of buried cables having the potential to affect field/land drainage during operation;
 - Permanent loss of agricultural land during operation due to installation of onshore substation, link boxes and joint bays;
 - Soil heating;
 - Loss of land under agri-environment schemes due to permanent infrastructure associated with the onshore substation and link boxes; and
 - Potential for maintenance activities to affect utilities as maintenance may require access to buried cables.
231. During the site selection process, considerations including aligning with field boundaries; avoiding higher quality agricultural land and land subject to Environmental or Countryside Stewardship Schemes; avoiding land allocated in local plans; and avoiding utilities where practicable, have been incorporated into the Project's design to minimise impacts.
232. Mitigation measures to reduce the potential impacts on land use and agriculture have been secured as part of the Outline Code of Construction Practice. These measures commitment to a post-consent Soil Management Plan, the appointment of a land drainage consultant to develop pre- and post-construction drainage plans, avoidance of land parcels that are subject to Environmental Stewardship Schemes and Countryside Stewardship Schemes, protective provisions and/or side agreements agreed for the affected utilities as part of the DCO application process and an Agricultural Liaison Officer to work with landowners/occupiers to reduce impacts on agricultural productivity where practicable.
233. With the implementation of mitigation measures, North Falls is predicted to have no impact to minor adverse (not significant in EIA terms), on the majority of

receptors during the construction, operation and decommissioning phases. The exception is loss of agricultural land, which is concluded as moderate adverse and major adverse (significant in EIA terms) during construction and operation respectively. This is due to the unavoidable loss of Best and Most Versatile, for which mitigation is unavailable.

234. There is potential for cumulative effects to occur with Five Estuaries' onshore connection. For the majority of effects, when considering proposed mitigation measures, it is not anticipated that cumulative effects are likely to be significant in EIA terms. The exception to this is the potential cumulative effects associated with a temporary loss and permanent loss of agricultural land, which were considered to be significant during construction and operation respectively. The cumulative effect on temporary and permanent loss of agricultural land is expected to be no greater than assessed for North Falls alone. Ongoing coordination and collaboration with Five Estuaries will aim to minimise the temporary and permanent loss of agricultural land across the onshore project area.

3.2.5 Onshore ecology

235. The assessment was informed by results of the ecological surveys undertaken between September 2021 and August 2023. Surveys to date comprise of an Extended Phase 1 Habitat Survey, species specific surveys (including bat, reptile, hazel dormouse, water vole and otter), great crested newt environmental DNA surveys and national vegetation classification surveys. A desk-based study was also undertaken to inform the assessment, including a data search with the Essex Field Club (the local biological records centre) in November 2021.

236. The study areas for each onshore ecology receptor are defined below:

- Statutory designated sites – within and up to 5km of the onshore project area;
- Non-statutory designated sites – within and up to 2km of the onshore project area;
- UK Habitats of Principal Importance and protected and notable species (excluding great crested newts) – within and up to 50m of the onshore project area; and
- Great crested newts – within and up to 250m of the onshore project area.

237. Holland Haven Marshes Site of Special Scientific Interest and Local Nature Reserve is located within the onshore project area and Simon's Wood LWS is located directly adjacent to the onshore project area. There are a number of designated sites close to the study area, including Local Wildlife Sites, Special Areas of Conservation, Ramsar sites, Local Nature Reserves and Sites of Special Scientific Interest.

238. The onshore project area is dominated by arable fields interspersed with field margin drains, rivers and areas of scattered and dense scrub. Field boundaries are typically hedgerows (species-poor intact and/or defunct) and dominated by hawthorn and/or blackthorn. Also present are small areas of habitat which are considered to be of a higher ecological value including semi-improved grassland,

marshy grassland, woodland (broadleaved and mixed semi-natural and plantation) and woodland/scrub successional habitats.

239. Species such as common pipistrelle, hazel dormice and common nesting birds are associated with hedgerows within the onshore project area. Trees and woodland are also valuable to badgers, bats and hazel dormice for nesting and foraging resources. Other terrestrial habitats such as grassland support notable species including reptiles and, in particular within Holland Haven Marshes Site of Special Scientific Interest, terrestrial invertebrates. Water vole, otter, great crested newts and, notably within Holland Haven Marshes Site of Special Scientific Interest, aquatic invertebrates are associated with waterbodies within the onshore project area.
240. Potential impacts assessed for the construction and decommissioning phases include:
- Impacts on Holland Haven Marshes Site of Special Scientific Interest and Local Nature Reserve;
 - Impacts on statutory and non-statutory designated sites (excluding Holland Haven Marshes Site of Special Scientific Interest / Local Nature Reserve);
 - Permanent and temporary habitat loss. Relevant habitats include saltmarsh; coastal floodplain; grazing marshes; woodland habitats; good quality semi-improved grassland; hedgerows; and rivers, ponds and reedbeds;
 - Loss or damage to arable field margins;
 - Permanent or temporary impacts on badgers / bats / water voles and otters / great crested newts / reptiles / hazel dormice / fish; and
 - Spread of invasive non-native species.
241. For the operation and maintenance phase, potential impacts assessed include:
- Temporary disturbance to habitats and species during maintenance activities;
 - Disturbance of species from onshore substation operational light and noise;
 - Habitat improvements arising from biodiversity enhancements; and
 - Impacts on migratory Nathusius' pipistrelle.
242. Mitigation by site selection has been carried out for the avoidance of statutory and non-statutory designated sites, ancient woodlands, UK Habitats of Principal Importance, and habitats potentially suitable for supporting legally protected and notable species, as far as practicable. Mitigation by construction method selection includes a commitment to the use of trenchless techniques (e.g. horizontal directional drilling) where practicable and reduce the onshore cable route working width to 30m at hedgerow crossings where open cut trenching is proposed. The Project is also committing to preparing an Ecological Management Plan detailing ecological mitigation measures, which will be implemented during the construction phase and which will be based on the Outline Landscape and Ecological Management Strategy submitted with the DCO application. An Outline Horizontal Directional Drilling Method and Draft Contingency Plan is being submitted as part of the DCO application to minimise the risk of effects upon

interest features of the Holland Haven Marshes Site of Special Scientific Interest during horizontal directional drilling works.

243. All habitats subject to temporary disturbance during construction will be reinstated following completion of construction, with habitat creation being carried out as compensation, and NFOW committed to exploring opportunities to deliver a minimum of 10% biodiversity net gain for North Falls.
244. With the implementation of mitigation measures North Falls is predicted to have no greater than minor adverse (not significant in EIA terms) effects on ecological receptors during all its phases, with the exception of permanent and temporary loss of hedgerows and permanent or temporary impacts on bats during construction. Short term moderate adverse effects (significant in EIA terms) are identified for these potential impacts, however, the effects are predicted to change to moderate beneficial (significant in EIA terms) effects in the long term (after three – seven years). During operation, the effect of biodiversity enhancement is assessed as moderate beneficial (significant in EIA terms).
245. There is potential for cumulative effects to occur with Five Estuaries. During construction, it is anticipated that cumulative effects with Five Estuaries' onshore connection on hedgerows and commuting / foraging bats may have a significant effect (in EIA terms) based on worst-case scenarios during construction. It is not anticipated that cumulative effects with Norwich to Tilbury during construction or cumulative effects with Norwich to Tilbury or Five Estuaries during operation will be significant.

3.2.6 Onshore ornithology

246. Several site-specific surveys have been undertaken to inform the assessment for onshore ornithology and were completed between September 2020 and March 2023. These surveys comprised:
 - non-breeding season walkover surveys within the landfall area;
 - non-breeding season walkover surveys within the onshore cable route and onshore substation works area;
 - breeding bird surveys within the landfall area;
 - breeding bird surveys covering the onshore cable route and onshore substation works area; and
 - autumn post-breeding and passage walkovers within the landfall area.
247. Results of the surveys have been included in the assessment detailed in the ES.
248. The study area for onshore ornithology includes a 400m buffer around the onshore project area. The study area for each onshore ornithology receptor is defined below:
 - Statutory designated sites - within and up to 10km of the onshore ornithology study area;
 - Breeding and non-breeding birds – within and up to 400m of the onshore project area; and
 - Cumulative assessment - within 10km of the onshore project area.

249. There are a number of designated sites within, and close to, the onshore project area, including Sites of Special Scientific Interest, Local Nature Reserves, Special Protection Areas, Ramsar sites and National Nature Reserves.
250. A total of 102 species were recorded during the breeding bird surveys in 2021, and 127 species recorded in 2022. Breeding attempts were confirmed for a number of species listed on Schedule 1 of the Wildlife and Countryside Act 1981 and Birds of Conservation Concern Amber and Red-listed species.
251. A total of 142 species (including 61 target species) were recorded during the non-breeding bird surveys in 2021-2022. This was an increase from 113 species recorded in the 2020-2021 non-breeding season.
252. The impact assessment considered the potential impacts on 'Important Ornithological Features' – i.e. those with elevated conservation value – recorded within the study areas. Potential impacts assessed for the construction and decommissioning phases include:
- Habitat loss;
 - Construction disturbance; and
 - Indirect impacts due to habitat alteration (such as smothering or contamination, including drilling fluid breakout associated with horizontal directional drilling).
253. For the operation and maintenance phase, potential impacts assessed include:
- Disturbance due to operation and maintenance activities; and
 - Onshore substation operational noise and light disturbance.
254. Mitigation measures to reduce the potential impacts on identified bird species have been secured as part of an Outline Ecological and Landscape Management Strategy, Outline Horizontal Directional Drill Method Statement and Contingency Plan and through delivering biodiversity net gain for the onshore elements of the Project. They include best practice measures for minimising impacts on notable habitats, species and watercourse disturbance, habitat reinstatement measures and sensitive construction methods such as trenchless techniques.
255. Additionally, considerations in relation to onshore ornithology have been included within the site selection process (see ES Chapter 4 Site Selection and Assessment of Alternatives (Document Reference: 3.1.6)). These considerations include: avoidance of statutory and non-statutory designated sites for conservation and associated buffer zones; avoidance of ancient woodland and associated buffer zones; avoidance of UK Habitats of Principal Importance; and avoidance of habitat suitable for supporting legally protected and notable species as far as practicable.
256. With the implementation of mitigation measures, North Falls is predicted to have no greater than negligible or minor adverse (not significant in EIA terms) effects on the majority of onshore ornithological receptors during all its phases. One exception is corn bunting where up to moderate adverse (significant in EIA terms) effects are predicted due to the habitat loss and construction disturbance at the onshore substation.

257. There is potential for cumulative effects to occur with a number of other offshore wind farms and/or projects. However, when considering proposed mitigation measures, it is not anticipated that cumulative effects are likely to be significant in EIA terms.

3.2.7 Onshore archaeology and cultural heritage

258. Site specific data was collected to inform the baseline, including a historic environment walkover survey, desk-based assessment (including geoarchaeological desk-based assessment), archaeological geophysical survey, and archaeological evaluation trenching at the onshore substation works area. Other data sources were used to inform the assessment, such as the National Heritage List for England and the Essex Historic Environment Record. Further information concerning conservation areas was sourced from the Essex County Council; and relevant regional, local, and period archaeological information was found from cartographic sources, aerial photographic data, archaeological studies, and journals.

259. The two study areas for onshore archaeology and cultural heritage are defined as:

- Designated heritage assets study area - within 1km of the onshore project area and 5km of the onshore substation works area; and
- Non-designated heritage assets study area - within 500m of the onshore project area.

260. There are 449 designated heritage assets within the designated heritage assets study area, comprising:

- Seven Scheduled Monuments
- Two Registered Parks and Gardens;
- 432 Listed Buildings; and
- Eight Conservation Areas.

261. At present, one designated heritage asset is partly located within the onshore project area, being Great Holland Conservation Area. Operation and Maintenance access routes to service the landfall located within the onshore project area currently extend into the southern half of the Frinton Conservation Area.

262. There are 240 non-designated heritage assets within the non-designated heritage assets study area, of which 52 fall within the onshore project area. Non-designated heritage assets potentially subject to direct physical impacts are confined to the onshore project area and may include potential subsurface archaeological remains and above ground heritage assets (e.g. earthworks or structures). Non-designated heritage assets which may be subject to indirect physical or non-physical impacts (associated with a change in setting) as a result of North Falls may be either within or beyond the footprint of the onshore project area.

263. The archaeological evaluation trenching at the onshore substation works area has identified a number of features that have been attributed to as early as the

Later Prehistoric period based on artefactual evidence, with one intense period of Post-Medieval activity also being recorded. The geoarchaeological evaluation identified deposits on site as being of generally low importance, but a gully identified in the geoarchaeological evaluation may be of medium importance at the onshore substation works area.

264. Impacts assessed for the construction and decommissioning phases include:
- Direct physical impact on (permanent change to) designated heritage assets;
 - Direct physical impact on (permanent change to) non-designated heritage assets (including buried archaeological remains, historic earthworks and structures);
 - Indirect physical impact on (permanent change to) designated and non-designated heritage assets; and
 - Temporary change to the setting of designated and non-designated heritage assets which could affect their heritage significance.
265. For the operation and maintenance phase, impacts assessed include:
- Permanent change to the setting of designated and non-designated heritage assets which could affect their heritage significance.
266. Mitigation has been proposed with further route refinement and micro-siting during detailed design post-consent to help ensure that areas of high archaeological potential are avoided where practicable. The onshore substation will be designed to reduce the overall height and massing of associated structures and other elements as far as practicable. North Falls have also submitted a project-specific Outline Written Scheme of Investigation (WSI) which describes the scope of additional surveys and evaluation which the Project has committed to inform the archaeological mitigation requirements.
267. With the implementation of mitigation measures, North Falls is predicted to have no greater than minor adverse residual (not significant in EIA terms) effects upon onshore archaeology and cultural heritage receptors during all its phases.
268. There is potential for cumulative effects to occur between North Falls and other projects within the study area, including Five Estuaries. However, when considering proposed mitigation measures, it is not anticipated that cumulative effects are likely to be significant in EIA terms.

3.2.8 Noise and vibration

269. The study area for noise and vibration has been defined on the basis of the nearest noise and vibration sensitive receptors to the onshore project area including the landfall, onshore cable route (including Bentley Road improvement works), onshore substation works area and the nearshore works. The study area also includes road traffic links with the potential to be utilised by North Falls during the construction phase.
270. To inform the impact assessment for noise and vibration during the construction and operational phase, a baseline noise survey was conducted in June 2022 in the vicinity of the landfall and at the onshore substation works area. Measurement locations were identified and agreed with Tendring District Council and Essex

County Council in advance. To inform the study, calculations were made based on the attenuation of noise and vibration from various activities including:

- Construction noise associated with cable duct installation (open cut trenching and trenchless techniques) and cable laying;
- Construction noise at the onshore substation;
- Noise from off-site construction traffic;
- Noise from the operational onshore substation; and
- Construction vibration.

271. The following noise and vibration sensitive receptors have been scoped into the assessment:

- Five noise and vibration sensitive receptor locations at the landfall;
- 38 along the onshore cable route
- Seven with the potential to be impacted by construction traffic;
- Three with the potential to be impacted by Bentley Road improvement works; and
- 10 at the onshore substation.

272. No significant sources of vibration have been identified in the vicinity of the onshore project area; hence, baseline vibration levels are assumed to be negligible.

273. Potential impacts assessed for the construction and decommissioning phases include:

- Noise of landfall and nearshore works;
- Noise of onshore cable route works;
- Noise of onshore substation works;
- Noise from Bentley Road improvement works;
- Noise from off-site construction traffic; and
- Construction vibration.

274. Potential impacts assessed for the operation and maintenance phase include:

- Onshore substation noise.

275. Mitigation measures during the construction phase are detailed in the Outline Code of Construction Practice, which has been submitted alongside the DCO application, including restrictions on using construction plant within 8m of structures at risk from vibration, temporary screening, speed restrictions, traffic management to reduce vehicle movement peaks, selection of quieter working methods or equipment where practicable, phasing of works to avoid sensitive times, ensuring normal working hours for the project between 0700 and 1900 hours Monday to Friday and between 1300 and 1900 hours on a Saturday. During detailed design post-consent, consideration will also be given to micro-siting (strategic selection of locations) noisy activities as far from residual properties as practicable within the design envelope. Mitigation measures for the operational

phase include enclosure of certain equipment related to the onshore substation and use of vibration isolation mounts, if required. Cumulative operational noise limits with the Five Estuaries and Norwich to Tilbury projects, to ensure the combined noise of all three projects' onshore substations does not exceed certain levels, have also been proposed and committed to within the DCO.

276. With the implementation of mitigation measures, North Falls is predicted to have no greater than minor adverse (not significant in EIA terms) effects on noise and vibration receptors during all its phases.
277. Cumulative effects for other projects were assessed and found to be not significant without the need for additional mitigation, except for construction road traffic noise which are potentially significant. Hence, additional monitoring and mitigation measures have been proposed, including traffic management measures. Including the noise limits outlined above, residual effects are considered no greater than minor adverse i.e., not significant in EIA terms.

3.2.9 Traffic and transport

278. The Traffic and Transport Study Area has been established by determining the most probable routes for traffic, for both the transportation of materials and employees, in consultation with stakeholders. The Traffic and Transport Study Area is divided into 46 separate highway sections known as links, which are sections of road with similar characteristics and traffic flows. In total, the Traffic and Transport Study Area comprises approximately 92km of highway network.
279. A review of existing data such as traffic flows and collision data has informed the baseline, in addition to site-specific Automatic Traffic Count surveys undertaken at 27 locations within the Traffic and Transport Study Area over a period of seven representative days in 2022. Traffic demand was forecast by generating traffic volumes from an understanding of material quantities and employee numbers required for the construction of North Falls and converting those metrics into vehicle trips.
280. The local highway network includes the A133 and A137, with the A120 and the A12 forming part of the Strategic Road Network. The A120 provides the main link between Colchester and the A12 to the northwest and the port of Harwich to the east. The Essex County Council Local Transport Plan also describes the County Routes network, which provides the main arteries for the flow of commerce, goods and people within Essex, and which carries high volumes of traffic through and around the county.
281. A desktop exercise augmented by site visits has been undertaken to identify the sensitive receptors in the Traffic and Transport Study Area and assign a sensitivity to all 46 link-based sensitive receptors. Detailed vehicle, cyclist and pedestrian counts are presented within the ES Chapter 27 Traffic and Transport (Document Reference: 3.1.29). The baseline environment also includes pedestrian, cycle and bus routes within the local area.
282. Potential impacts assessed for the construction and decommissioning phases include:
 - Severance of communities by major traffic arteries;
 - Impacts to pedestrian and cyclist amenity;

- Highway safety;
 - Driver delay during construction (road closures); and
 - Impacts due to delivery of abnormal loads.
283. An assessment of effects on traffic and transport receptors during operation was scoped out. No significant effects are anticipated during the maintenance phase.
284. Mitigation measures include:
- Delivery time restrictions on heavy goods vehicle movements;
 - The construction of temporary haul roads along the onshore cable route;
 - Use of trenchless crossing techniques where practicable; and
 - Creation of vehicle crossovers and controls on vehicle routing.
285. In particular, it has been agreed with Essex County Council to restrict heavy goods vehicle movements through Thorpe-le-Soken to outside of school start and finish times. Furthermore, to avoid vehicle access via unsuitable routes, vehicles will be routed around certain sensitive roads (such as Little Clacton Road and Great Holland), and instead be routed via the temporary haul road, where practicable, and along other designated routes. To facilitate the safe and efficient movement of construction traffic, a series of highway improvements will take place, including road widening, a temporary speed limit and provision of a temporary pedestrian / cycleway along Bentley Road, which have been agreed with Essex County Council and National Highways. These measures will reduce the impacts of heavy goods vehicle traffic on sensitive communities.
286. Full details of the strategy for traffic and transport management during the construction phase have been outlined in the Outline Construction Traffic Management Plan, which has been submitted alongside the DCO application. The Outline Construction Traffic Management Plan contains details of measures to control, monitor and enforce heavy goods vehicle movements and provides details of the mechanisms for managing design of accesses and offsite highway works.
287. With the implementation of mitigation measures, North Falls is predicted to have no greater than minor adverse effects (not significant in EIA terms) on traffic and transport during all its phases.
288. An assessment of the potential for cumulative effects with other schemes has been undertaken. Notable schemes considered include Five Estuaries and the Norwich to Tilbury project. With the application of additional mitigation measures (as appropriate) the residual cumulative effects upon all receptors were assessed to be not significant in EIA terms. Additional mitigation includes a commitment to limit heavy goods vehicle numbers, enhanced maintenance measures and enhanced driver inductions.

3.3 Project wide impacts

3.3.1 Human health

289. The human health assessment is based on a desk-based review of available health and population data held by the Ministry for House, Communities and Local Government, Office for Health Improvement and Disparities and Office for National Statistics. The assessment has also drawn on information presented in other chapters of the North Falls ES, including Chapter 19 Ground Conditions and Contamination, Chapter 20 Onshore Air Quality, Chapter 21 Water Resources and Flood Risk, Chapter 26 Noise and Vibration, Chapter 27 Traffic and Transport, Chapter 31 Socio-economics, Chapter 32 Tourism and Recreation and Chapter 33 Climate Change.
290. Potential effects are assessed at site-specific (i.e. the onshore project area), local (Tendring District), regional (Essex County), national (England) and international levels where appropriate.
291. Eleven different population groups for the assessment of human health effects have been identified within the study area, including geographic and vulnerable population groups:
- The population near landfall between Clacton-on-Sea and Frinton-on-Sea (site-specific);
 - The population along the onshore cable route) (site-specific);
 - The population near the onshore substation works area (site-specific);
 - The population of Tendring District (local);
 - The population of Essex County (regional);
 - The population of England and neighbouring countries (national and international);
 - Children and young people;
 - Older people (particularly those suffering with dementia);
 - People with heightened sensitivity e.g. spending more time in affected dwellings (e.g. due to low economic activity, home working, shift work, retirement, or ill health) and/or neurological conditions;
 - People living in deprivation (including those experiencing income and/or access/geographic vulnerability); and
 - People with existing poor health (physical and mental health).
292. Potential impacts assessed for the construction and decommissioning phases include:
- Noise effects;
 - Air quality effects;
 - Ground and/or water contamination effects;
 - Physical activity effects;

- Employment effects; and
 - Journey times and/or reduced access effects.
293. For the operation and maintenance phase, potential impacts assessed include:
- Noise effects;
 - Employment effects;
 - Electromagnetic fields effects; and
 - Wider societal benefits.
294. Mitigation measures proposed include work undertaken during the site selection process to site activities with the potential to generate human health effects away from receptors (see ES Chapter 4 Site Selection and Assessment of Alternatives, Document Reference: 3.1.6), the use of trenchless crossing techniques to minimise disruption to the public and transport users, commitments by the Scheme to providing appropriate Occupational Health and Hygiene services for the workforce, providing road diversions where necessary with appropriate signage, cable design to minimise electromagnetic fields and implementation of an Outline Construction Traffic Management Plan, as well as ensuring the level of dust and non-road mobile machinery emissions experienced would be within the Institute of Air Quality Management guidance and Defra technical guidance, undertaken in accordance with the relevant British Standards identified in ES Chapter 20 Air Quality (Document Reference: 3.1.22). The Outline Code of Construction Practice, submitted with the DCO application, also details a communication plan for mitigating effects upon emergency services.
295. With the implementation of mitigation measures, North Falls is predicted to have no greater than minor adverse (not significant in EIA terms) effects on human health during all its phases. Moderate beneficial (significant in EIA terms) effects were identified for employment during the construction and operation and maintenance phase, and moderate wider societal benefits during operation.
296. There is potential for cumulative effects to occur with Five Estuaries or any other project. The cumulative effects assessment concluded that there are no likely significant adverse health effects (in EIA terms) and some likely significant beneficial effects on employment when North Falls is considered cumulatively with these projects.

3.3.2 Seascape Visual Impact Assessment

297. Site-specific data was collected by a site characterisation survey and visits to viewpoints between November 2021 and July 2022. The study area covers a 60km radius around offshore array areas. A total of 17 viewpoints were selected across the study area, to comprise a selection of locations that represent the experience of different visual receptors. Both the study area and viewpoint locations were agreed with statutory consultees. Desk based data sources on seascape and landscape character were also used to inform the assessment.
298. To aid the assessment, a zone of theoretical visibility was established, to evaluate the theoretical extent to which the development would be visible. Theoretical visibility of the offshore project infrastructure is widespread offshore and along the coastal edge within the study area. Inland, visibility is more fragmented and

is likely to be much reduced due to a combination of vegetation and presence of buildings.

299. Potential key visual receptors include: residents, including views from isolated coastal properties and settlements; road users, including tourists; those engaged in recreational activities, e.g. walkers using coastal paths, cyclists and recreational users of the coastline; and people at their place of work, including agricultural workers.
300. Potential impacts assessed for the construction and decommissioning phases include:
- Effects on seascape character arising from the presence and movement of vessels and equipment;
 - Effects on seascape character arising from the presence of partially constructed turbines and platforms;
 - Effects on landscape character arising from the presence and movement of vessels and equipment, and partly constructed turbines in the offshore area;
 - Effects on landscape character arising from vessel activity at landfall;
 - Effects on landscape character arising from the presence of partially constructed turbines and platforms in offshore views; and
 - Visual impacts arising from the presence and movement of vessels and equipment, and partly constructed turbines.
301. For the operation and maintenance phase, potential impacts assessed include:
- Effects on marine character areas (East Anglian Shipping Waters and Suffolk Coastal Waters);
 - Effects on onshore landscape character areas and types (coastal dunes and shingle ridges; coastal levels; and saltmarsh and inter-tidal flats);
 - Effects on landscape designations (Suffolk Coast and Heaths Area of Outstanding Natural Beauty);
 - Effects on viewpoints, both during night and daytime, in visibility conditions between very poor and excellent; and
 - Effects on routes (Suffolk Coastal Path).
302. Mitigation measures include the reduction of the size of the array area, reduction of the maximum tip height of the wind turbines and reduction of the number of turbines from 72 to 57 of the smallest turbines or 40 to 34 of the largest turbines to reduce the impact to seascape, landscape and visual effects.
303. Significant effects are predicted to arise within the character of the offshore seascape but will be localised to an area within 10km of the array area, and effects will not be significant elsewhere in the MCA, or the wider seascape. As well as a number of onshore viewpoints effected, including the coast between The Naze and Orford Ness, as well as sequential effects on users of the Suffolk Coast between Butley River and Landguard Point. Beyond these areas, effects experienced by all visual receptors are predicted to fall below the level of significance.

304. There is potential for cumulative effects to occur with a number of other offshore wind farms during all project phases. Total cumulative effects are predicted to be significant (major) for effects on marine character areas, and there is potential for significant effects (moderate) for certain seafront locations between The Naze and Orford Ness.

3.3.3 Landscape Visual Impact Assessment

305. Site-specific data was collected by a site characterisation survey and visits to viewpoints between November 2021 and October 2023. The study area has been defined as a 500m buffer around the onshore project area, with a wider 2km buffer around the North Falls onshore substation. A total of eight viewpoints were selected across the study area, to comprise a selection of locations that represent the experience of different visual receptors. Both the study area and viewpoint locations were agreed with statutory consultees. Desk-based data sources on landscape character were also used to inform the assessment.
306. To aid the assessment, a zone of theoretical visibility was established, to evaluate the theoretical extent to which an indicative location for the onshore substation (within the onshore substation works area) may be visible across the study area. Theoretical visibility is predicted within a 1km radius of the indicative onshore substation location, with a more intermittent pattern beyond 1km. The landscape around the onshore substation is generally fairly flat. As such, areas of woodland and hedgerows will influence the level of actual visibility.
307. Potential key visual receptors include residents, including views from farms, properties, small hamlets and settlements; those engaged in recreational activities, such as walkers using Public Rights of Way, horse riders, cyclists, and users of the coastal edge near the proposed landfall; road users; and people at their place of work (including agricultural workers).
308. The impact assessment for operational effects is based on a maximum structure height of 18m (lightning rods) at the onshore substation. Visualisations have been generated based on an indicative onshore substation layout to inform the assessment.
309. Potential impacts assessed for the construction, operation and maintenance, and decommissioning phases include:
- Effects on landscape fabric;
 - Effects on landscape character; and
 - Effects on views.
310. Mitigation measures to reduce the potential impacts on landscape and visual effects include an extensive site selection process to avoid siting components in areas with adverse effects (see ES Chapter 4 Site Selection and Assessment of Alternatives (Document Reference: 3.1.6)), choice of appropriate construction methods (e.g. trenchless crossings), habitat reinstatement (as detailed in the Outline Landscape and Ecological Management Strategy, submitted with the DCO application) and mitigation by design. Additional landscape mitigation and biodiversity enhancement at the onshore substation, which includes new grassland, hedgerow and woodland planting, are described in the Project's

Design Vision (Document Reference: 2.3) and Outline Landscape and Ecological Management Strategy.

311. North Falls is predicted to have a moderate adverse (significant in EIA terms) effect on the landscape fabric and visual amenity of the study area surrounding the onshore substation during its construction and operational phases. The area within which significant effects would occur is approximately bounded by Ardleigh Road to the south, Grange Road to the south-west, Wormseywood Farm to the north, and the junction of Barn Lane and Ardleigh Road to the east. Significant visual effects are predicted at viewpoint 2, 3 and 5, which represent higher sensitivity residential or recreational receptors and are located within 1km of the onshore substation. No significant effects (in EIA terms) were identified for designated landscapes, including National Landscape designations.
312. The ES includes further detail of the proposed landscape mitigation and detailed assessment of effects 15 years after establishment of landscape planting. These are supported by visualisations which show maturing landscape mitigation at year 15. Whilst landscape planting will help to reduce certain landscape and visual impacts, it is likely that some localised landscape and visual effects at viewpoint 3 (an adjacent residential property) will remain significant.
313. Three developments were scoped into the cumulative effects assessment for further assessment due to their scale and potential for overlapping effects with that of North Falls, namely: Norwich to Tilbury, Five Estuaries and a planning application for a small scale energy development at Land adjacent to Lawford Grid Substation. The total cumulative effects on the landscape character of all projects combined was deemed significant for a localised area to the west of Bromley during construction and operation of the onshore substations and cable route. Additionally, it was not possible to rule out significant cumulative effects on Public Rights of Way near Lilley's Farm, Little Bromley Road, Norman's Farm, and the bridleway at Barn Lane as a result of the construction and operational effects of the onshore substation works area across the projects. Joint landscape mitigation proposals with Five Estuaries are in development to help soften and screen views of the onshore substation works area and integrate them into the landscape.

3.3.4 Socio-economics

314. The baseline environment was characterised by review of desk-based resources, including datasets from the Office of National Statistics, Department for Education, Ministry of Housing, Communities and Local Government, UK Property Data and the Land Registry, Essex County Council, the NHS and the Department of Health and Social Care.
315. The study area includes both Essex and Suffolk and assesses impacts at local level (250m of onshore project area) for mineral resources, and at national (UK) level for economic receptors.
316. Receptors considered in the assessment include the economy, health infrastructure, social and community infrastructure, imports and exports, volume and value of fishing catch and mineral resources.
317. Potential impacts assessed for the construction, operation and maintenance, and decommissioning phases include:

- Direct / indirect economic benefit:
 - Supply chain onshore and offshore (economic value);
 - Employment onshore and offshore;
 - Potential adverse effects on socio-economic receptors:
 - Pressure on local onshore infrastructure and services (housing and health);
 - Onshore disturbance (noise, air, visual, and traffic) to social and community infrastructure facilities;
 - Wider economic effects from disruption to shipping and navigation;
 - Wider economic effects from disruption to fishing; and
 - Wider economic effects related to minerals.
318. The economic benefits predicted for the Project include increases in 'gross value added' (the value of goods and services of the local and national economy) and job-creation. It is estimated that the Project's total (direct and indirect) annual gross value added contribution to the UK economy would be around £4.9 to £41.9 million during construction and £17.9 to £19.6 million during operation.
319. The total contribution to UK employment (direct and indirect jobs) is estimated to range from £50 to £730 million in terms of full-time equivalent jobs per annum during the onshore and offshore construction phase. A further £110 to £200 million in terms of full-time equivalent jobs per annum has been calculated during the operational phase (onshore and offshore).
320. Offshore employment retained within Essex and Suffolk is estimated to support an average of between 80 and 90 full-time employment jobs per year throughout the operational phase.
321. For the adverse effects identified above, mitigation measures include:
- Best practice dust management;
 - Reduction of construction phase noise and vibration and operational substation noise and vibration;
 - Delivery time restrictions;
 - Strategy for access and a vehicle routing strategy;
 - Use of trenchless crossings;
 - Mitigation for crossing private access tracks; and
 - Mitigation by construction method and design to reduce landscape and visual impacts.
322. These measures are secured in the Outline Code of Construction Practice and Outline Construction Traffic Management Plan and Outline Landscape and Ecological Management Strategy, submitted with the DCO application.
323. Additionally, mitigation was considered during onshore site selection, with the aim of avoiding residential titles, mature and ancient woodland, scheduled monuments and listed buildings, internationally and nationally designated areas, landscape designations, important tourism destinations and recreational assets.

It also considered how to minimise the number of crossings of utilities, roads and rail lines, where practicable. Site selection for the offshore cable route considered feedback from key stakeholders to select a route minimising impact on designated sites, shipping and navigation.

324. North Falls is predicted to result in minor beneficial effects on employment and the supply chain during its construction and operation. With the implementation of mitigation measures, North Falls is predicted to have no greater than minor adverse (not significant in EIA terms) effects on other socio-economic receptors during all its phases.
325. There is potential for cumulative effects to occur with Five Estuaries or any other project. For cumulative effects on employment and direct economic benefit, the cumulative effect is anticipated to be major beneficial during construction, and moderate beneficial during the operation and maintenance phase, which are considered to be significant in EIA terms.
326. For potential adverse cumulative effects, when taking into account mitigation measures effects have been assessed as not significant (in EIA terms) for cumulative effects during all project phases.

3.3.5 Tourism and recreation

327. The baseline environment was characterised by a review of desk-based resources. Sources dated between 2016 and 2023 were used to provide information on tourism assets and activities in Essex and Suffolk counties, and Tendring District.
328. For marine and coastal tourism and recreation, the study area is based on the Seascape, Landscape and Visual Impact Assessment study area, and includes the East Suffolk coast and offshore waters and Essex coast and offshore waters. For onshore tourism and recreation, the study area comprises the onshore project area, including the area around landfall between Clacton-on-Sea and Frinton-on-Sea, through to the onshore substation works area near Little Bromley (north west of the A120).
329. Receptors considered in the assessment include: visitors engaging in marine tourism and recreational activities; visitors to coastal tourist destinations; visitors using coastal Public Rights of Way; sailing, yachting and other recreational crafts; recreational fishing; water sports; Frinton Golf Club; beach huts and Frinton Beach; Holland Haven Country Park; Greensward Park; The Rock Hotel; designated bathing waters; visitors to nature reserves; recreational sports users; visitors using the local road network; and accommodation providers and users.
330. Potential impacts assessed for the construction and decommissioning phases include:
 - Impact on users' enjoyment of recreational and tourist assets due to the construction of onshore infrastructure;
 - Impact on enjoyment of marine and coastal recreational and tourism assets due to the construction of offshore infrastructure;
 - Reductions in tourist accommodation availability due to a non-resident workforce; and

- Impact on the volume and value of tourism due to construction.
331. For the operation and maintenance phase, potential impacts assessed include:
- Impact of operational activity of onshore infrastructure on the enjoyment of tourism and recreational assets;
 - Impact of operational activity of offshore infrastructure on the enjoyment of tourism and recreational assets;
 - Reductions in tourist accommodation availability due to a non-resident workforce; and
 - Impact on the volume and value of tourism during operations.
332. Mitigation proposed includes an appropriate site selection process for offshore and onshore sites to minimise impacts on tourism receptors, including any nationally or internationally designated areas, ancient monuments or listed buildings, and tourist destinations (including camping or caravan sites). This comprehensive site selection also aimed to minimise the number of crossings across roads and rail lines, to minimise impacts associated with locals' access to services and road usage. The offshore cable corridor was selected in consultation with key stakeholders in order to select a route which minimised impacts on a range of receptors such as designated sites, shipping and navigation.
333. Other mitigation measures proposed include:
- Using trenchless crossing techniques such as horizontal directional drilling when installing cables to help avoid any physical disturbance or prolonged access restrictions;
 - Use of a rolling construction programme;
 - Use of perimeter fencing and safety zones around working areas;
 - Leaving Public Rights of Way crossings open and/or providing diverted routes for the purpose of traffic control and other safety measures detailed in the Outline Public Rights of Way Management Plan, submitted with the DCO application;
 - Circulating public notices advising of project activities;
 - Implementation of relevant management plans, included an Outline Code of Construction Practice covering construction dust, noise, vibration, and other forms of pollution, an Outline Construction Traffic Management Plan, an Outline Landscape and Ecological Management Strategy, and an Outline Public Rights of Way Management Plan, all submitted with the DCO application; and
 - Commitment to using underground cable systems onshore rather than overhead lines.
334. With the implementation of mitigation measures, North Falls is predicted to be negligible or minor adverse (not significant in EIA terms) effects on tourism and recreation during all its phases.
335. There is potential for cumulative effects to occur with Five Estuaries or any other project. However, when considering proposed mitigation measures, potential cumulative effects have been assessed as not significant (in EIA terms).

3.3.6 Climate change

336. This chapter includes two separate assessments:

- A greenhouse gas assessment, which predicts the contribution of the Project to greenhouse gas emissions in the UK, and its 'net effect' compared to a baseline of the Project not being constructed; and
- A climate change resilience assessment, assessing the Project's ability to adapt to the climatic change predicted during its operational lifespan.

337. The greenhouse gas climate change resilience assessments were informed by desk-based data sources on climate science, carbon accounting and Project details regarding construction methods, materials and supply chains.

338. The study area for the greenhouse gas assessment includes the UK wide electricity grid. The study area for the climate change risk assessment includes the onshore project area and offshore project area, the location of which is shown in Figures 1.1 and 1.2.

339. The greenhouse gas assessment has highlighted that the main emission sources of Project greenhouse gases were associated with embodied emissions from within materials (both onshore and offshore), releases from marine vessels during works/transit, road traffic vehicles, non-road mobile machinery during construction and the use of helicopters.

340. The assessment assumed that if North Falls was not constructed, the energy produced would instead be gained from natural gas, as this is the most common form of new plant in terms of fossil fuel combustion. North Falls is estimated to emit 2.65 million tonnes CO_{2e} during the construction phase of the Project and the total of greenhouse gas emissions saved as a result of the Project are approximately 46.8 million tonnes CO_{2e} over the 30-year operational phase.

341. The greenhouse gas payback period – i.e. the period until the project accounts for the emissions it generates during construction through the clean energy it provides during operation – for the project is 2.5 years from the time it becomes fully operational.

342. The climate change risk assessment identified the likelihood of climate hazards, specifically flooding, heatwaves and storms events occurring within the study area. The project was determined to have low vulnerability to all potential hazards identified.

343. Mitigation has been incorporated into the design of the project to reduce, eliminate, and/or compensate for emissions, in line with the Institute of Environmental Management and Assessment Greenhouse Gas Management Hierarchy (IEMA, 2020). In accordance with the Applicant's technical requirements and specifications which are built upon best practice engineering codes and standards in the offshore wind sector, the Project will be designed to be resilient to hazards arising from current extreme weather events and climatic conditions, and have adaptive capacity to future climate change impacts where appropriate. Offshore structures are resilient to flooding and have been designed to withstand severe storm conditions, including potential changes in conditions as a result of future climate change. The onshore infrastructure has been

designed to take account of the effects of climatic changes such as flooding and heatwaves.

344. With the implementation of mitigation measures, North Falls is predicted to have a significant beneficial effect (significant in EIA terms) in relation to climate change targets. No significant effects arising from climate hazards were identified.
345. The assessment of the impacts of climate change risk assessment and greenhouse gases is inherently cumulative, and therefore no specific cumulative assessment is required.

3.3.7 Major accidents and disasters

346. The major accidents and disasters study area for each individual hazard has been determined in relation to the impact pathways, the distances to sensitive receptors or from examination of the scale of impacts from examples of historical incidents, where available.
347. The onshore and offshore project areas are not within the consultation zones of any major accident hazard sites or major accident hazard pipelines as highlighted by the Health and Safety Executive.
348. The screening and assessment of major accidents and disasters is split into 4 stages:
- Stage 1 and 2: describes and identifies the likely significant effects deriving from the vulnerability of the Project to major accidents and disasters.
 - Stage 3: definition of the likely significant effects that may occur from the hazards and classification of the likelihood that the events may occur. Mitigation measures for each hazard are considered.
 - Stage 4: mitigation measures are evaluated to ensure that risks from the hazards are sufficient to reduce the risks to 'As Low As Reasonably Possible'.
349. The potential receptors relevant to the major accidents and disasters screening and assessment are:
- Population and human health;
 - Designated sites (international, national and other);
 - Scarce habitats;
 - Widespread habitats;
 - Particular species; and
 - The marine environment.
350. Hazards considered for assessment are:
- Major Accidents
 - Major fires.
 - Project Specific Hazards:
 - Exposed cables leading to vessel snagging;

- Vessel interactions (e.g. collision²², allision²³);
- Aviation collision;
- Accidental spills of hazardous material;
- Disturbance of unexploded ordnance; and
- Workplace accidents.

351. Mitigation measures are embedded into the construction, operation and maintenance and decommissioning phases of the Project. Alongside use of industry safety standards, the Project will act to reduce the impacts on the relevant receptors identified during Stage 3. With a commitment to the highest health and safety standards in design and working practices enacted, none of the anticipated construction works or operational procedures are expected to pose an appreciable risk from major accidents or disasters.

²² Collision is when two moving vessels crash.

²³ Allision is when a vessel crashes or runs into another vessel that is stationary.

4 Conclusion

352. For all offshore topics, the assessments in the North Falls ES predict that, following mitigation, the project alone will not result in any significant effects in EIA terms.
353. For the majority of onshore topics, the assessments in the North Falls PEIR predict that, following mitigation, the project will not result in any significant effects in EIA terms. However, significant adverse effects have been identified in relation to:
- Land use and agriculture, with temporary and permanent loss of agricultural land during construction and operation;
 - Onshore ecology, with permanent and temporary loss of hedgerows and permanent or temporary impacts on bats during construction;
 - Onshore ornithology, with a moderate adverse effect on corn bunting due to habitat loss and construction disturbance at the onshore substation;
354. For project-wide topics, significant adverse effects have been identified in relation to:
- Seascape, Landscape and Visual Impact Assessment, with widespread visibility of North Falls during operation, influencing the seascape and landscape character; and
 - Landscape Visual Impact Assessment with respect to effect on the landscape fabric and visual amenity of the onshore substation during the construction and operational phase of North Falls.
355. Significant beneficial effects were also identified for a number of topics, including:
- Offshore and intertidal archaeology and cultural heritage, with potential opportunities for beneficial effects by regional mapping of accessible data and provision of this data publicly, post-consent;
 - Onshore ecology, with significant beneficial effects of biodiversity enhancement during operation; and moderate beneficial long term effects (i.e. after three to seven years) following application of mitigation measures for hedgerows, bats, and hazel dormice;
 - Human health, with significant beneficial effects identified for employment during the construction and operation and maintenance phase, and moderate wider societal benefits during operation; and
 - Climate change, with significant beneficial effect in relation to climate change targets.
356. Significant cumulative effects were identified for:
- Benthic and intertidal ecology, with cumulative effects associated with temporary physical disturbance, increased suspended sediment concentrations, loss of habitat and colonisation of introduced substrate;
 - Offshore ornithology, with cumulative effects associated with collision risk for a number of bird species (great black-backed gull, kittiwake, and the lesser black-backed gull);

- Land use and agriculture, with cumulative effects associated with a permanent change of agricultural land during operation;
- Human health, with some likely significant cumulative beneficial effects with regard to employment and wider societal benefits;
- Seascape, Landscape and Visual Impact Assessment, with total cumulative effects predicted to be significant (major) for effects on marine character areas, and with potential for significant effects (moderate) on landscape and views;
- Landscape Visual Impact Assessment, with respect to the total operational cumulative landscape and visual effects, which was deemed significant for a localised area to the west of Bromley. It was not possible to rule out significant cumulative effects on Public Rights of Way near Lilley's Farm, Little Bromley Road, Norman's Farm, and the bridleway at Barn Lane; and
- Socio-economics, with significant beneficial cumulative effects on employment and direct economic benefit during construction (major beneficial), and during the operation and maintenance phase (moderate beneficial).

357. North Falls has committed to implement mitigation measures to ensure that any potential impacts are minimised as far as practicable, to reduce the potential for significant effects.

5 Contact Us

358. This document provides a NtS of the ES for the North Falls Offshore Wind Farm. If you wish to see more detailed information the full ES is available at the following link:

<https://national-infrastructure-consenting.planninginspectorate.gov.uk/projects/EN010119/documents>

359. If you have any further questions on the EIA process, please feel free to get in touch via the North Falls website: <https://www.northfallsoffshore.com/contact/>

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NORTH FALLS

Offshore Wind Farm



RWE

HARNESSING THE POWER OF NORTH SEA WIND

North Falls Offshore Wind Farm Limited

A joint venture company owned equally by SSE Renewables and RWE.

To contact please email contact@northfallsoffshore.com

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