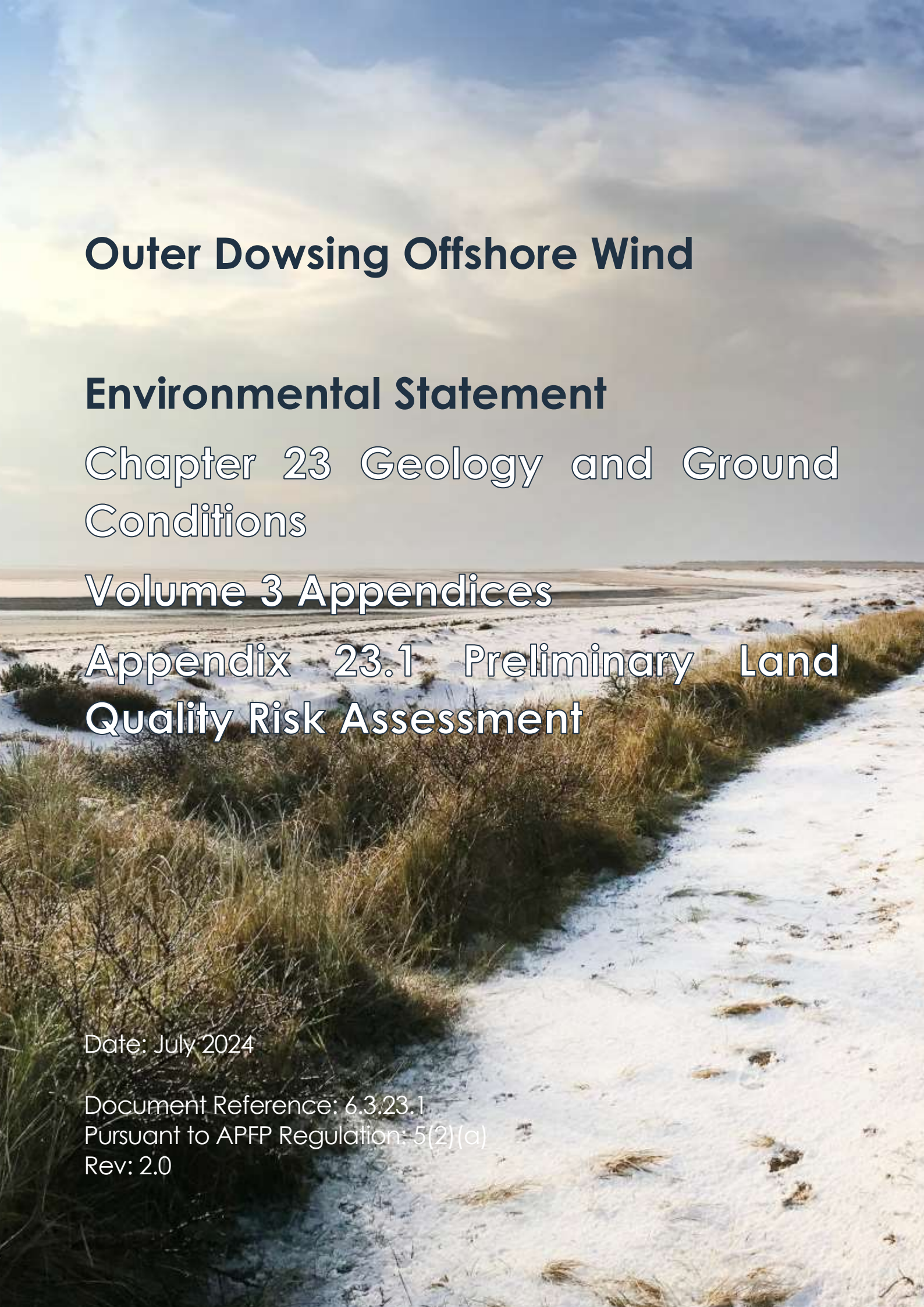

Outer Dowsing Offshore Wind

Environmental Statement

Chapter 23 Geology and Ground Conditions

Volume 3 Appendices

Appendix 23.1 Preliminary Land Quality Risk Assessment

Date: July 2024

Document Reference: 6.3.23.1
Pursuant to APFP Regulation: 5(2)(a)
Rev: 2.0

Company:	**Outer Dowsing Offshore Wind**	Asset:	**Whole Asset**
Project:	**Whole Wind Farm**	Sub Project/Package:	Whole Asset
Document Title or Description:	6.3.23.1 Preliminary Land Quality Risk Assessment		
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Rev No.	Date	Status / Reason for Issue	Author	Checked by	Reviewed by	Approved by
1.0	March 2024	DCO Application	SLR	GoBe	Shepherd and Wedderburn	Outer Dowsing
2.0	July 2024	Response to Section 51 Advice	SLR	GoBe	Shepherd and Wedderburn	Outer Dowsing

Revision Record

Revision	Date	Reason for Change	Change Made
1.1	July 2024	Response to Section 51 Advice	Reference numbers and landfill site names have been added to Figures 23.1.7.1 – 23.1.7.8 to allow easy cross-reference between maps and chapter text.

Volume 3, Appendix 23.1: Preliminary Land Quality Risk Assessment

Outer Dowsing Offshore Wind Environmental Statement

GoBe Consultants Ltd

Prepared by:

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SLR Project No.: 410.V05356.00013.0003.004

Client Reference No: 05653

1 March 2024

Revision: 1

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
1	1 March 2024	SLR	GoBe	ODOW

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Acronyms and Abbreviations

BGS	British Geological Survey
CEMP	Construction Environmental Management Plan
CIRIA	Construction Industry Research and Information Association
CSM	Conceptual Site Model
DCO	Development Consent Order
DEFRA	Department of Environment, Food and Rural Affairs
DoE	Department of Environment
EA	Environment Agency
ECC	Export Cable Corridor
EIA	Environmental Impact Assessment
ES	Environmental Statement
GCR	Geological Conservation Review
GIS	Geographic Information System
GQRA	Generic Quantitative Risk Assessment
HVAC	High Voltage Alternating Current
NGET	National Grid Electricity Transmission
NVZ	Nitrate Vulnerable Zones
LCRM	Land Contamination Risk Management
LGS	Local Geological Site
MMP	Material Management Plan
ODOW	Outer Dowsing Offshore Wind (The Project)
OnSS	Onshore substation
OS	Ordnance Survey
PCB	Polychlorinated biphenyls
PCOC	Potential contaminant of concern
PCSM	Preliminary Conceptual Site Model
PLQRA	Preliminary Land Quality Risk Assessment
PPE	Personal Protective Equipment
RSPB	Royal Society for the Protection of Birds
SMP	Shoreline Management Plan
SPZ	Source Protection Zone
SSSI	Site of Special Scientific Interest
UXO	Unexploded Ordnance
WFD	Water Framework Directive

Terminology

400kV cables	High-voltage cables linking the OnSS to the NGSS.
400kV cable corridor	The 400kV cable corridor is the area within which the 400kV cables connecting the onshore substation to the NGSS will be situated.
Baseline	The status of the environment at the time of assessment without the development in place.
Connection Area	An indicative search area for the NGSS.
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for a Nationally Significant Infrastructure Project (NSIP).
Effect	Term used to express the consequence of an impact. The significance of an effect is determined by correlating the magnitude of the impact with the sensitivity of the receptor, in accordance with defined significance criteria.
Environmental Impact Assessment (EIA)	A statutory process by which certain planned projects must be assessed before a formal decision to proceed can be made. It involves the collection and consideration of environmental information, which fulfils the assessment requirements of the EIA Regulations, including the publication of an Environmental Statement (ES).
Environmental Statement (ES)	The suite of documents that detail the processes and results of the EIA.
Haul Road	The track within the onshore ECC which the construction traffic would use to facilitate construction.
High Voltage Alternating Current (HVAC)	High voltage alternating current is the bulk transmission of electricity by alternating current (AC), whereby the flow of electric charge periodically reverses direction.
Impact	An impact to the receiving environment is defined as any change to its baseline condition, either adverse or beneficial.
Landfall	The location at the land-sea interface where the offshore export cables and fibre optic cables will come ashore.
Mitigation	Mitigation measures are commitments made by the Project to reduce and/or eliminate the potential for significant effects to arise as a result of the Project. Mitigation measures can be embedded (part of the project design) or secondarily added to reduce impacts in the case of potentially significant effects.
Onshore Export Cable Corridor (ECC)	The Onshore Export Cable Corridor (Onshore ECC) is the area within which the export cables running from the landfall to the onshore substation will be situated.
Onshore substation (OnSS)	The Project's onshore HVAC substation, containing electrical equipment, control buildings, lightning protection masts, communications masts, access, fencing and other associated equipment, structures or buildings; to enable connection to the National Grid.
Outer Dowsing Offshore Wind (ODOW)	The Project.
Order Limits	The area subject to the application for development consent, the limits shown on the works plans within which the Project may be carried out.
The Project	Outer Dowsing Offshore Wind, an offshore wind generating station together with associated onshore and offshore infrastructure.

Receptor	A distinct part of the environment on which effects could occur and can be the subject of specific assessments. Examples of receptors include species (or groups) of animals or plants, people (often categorised further such as 'residential' or those using areas for amenity or recreation), watercourses etc.
Study area	Area(s) within which environmental impact may occur – to be defined on a receptor-by-receptor basis by the relevant technical specialist.
Trenchless technique	Trenchless technology is an underground construction method of installing, repairing and renewing underground pipes, ducts and cables using techniques which minimize or eliminate the need for excavation. Trenchless technologies involve methods of new pipe installation with minimum surface and environmental disruptions. These techniques may include Horizontal Directional Drilling (HDD), thrust boring, auger boring, and pipe ramming, which allow ducts to be installed under an obstruction without breaking open the ground and digging a trench.

23.0 Preliminary Land Quality Risk Assessment

23.1 Introduction

1. Outer Dowsing Offshore Wind (ODOW) is a Nationally Significant Infrastructure Project (NSIP). An Environmental Impact Assessment (EIA) is being undertaken, the findings of which will be presented within an Environmental Statement (ES), which will accompany a Development Consent Order (DCO) application under the Planning Act, 2008.

2. SLR Consulting was commissioned by GoBe Consultants LTD, whom has been instructed by GT R4 Limited (trading as Outer Dowsing Offshore Wind) on behalf of ODOW, to undertake an assessment of the ground condition aspects that may be affected by the construction and operation of the onshore aspects of the Project (see Volume 1, Chapter 3: Project Description (document reference 6.1.3)).

3. This report is a Preliminary Land Quality Risk Assessment (PLQRA) and records the findings of a walkover survey of the onshore area aspects of the Project comprising Landfall, Onshore Export Cable Corridor (ECC), 400kV cable corridor and an Onshore Substation (OnSS). A full description of the Project is provided in Volume 1, Chapter 3: Project Description (Document Reference 6.1.3). It presents information with respect to the environmental setting, land use history and the potential for contamination in the context of the proposed development.

4. The PLQRA is presented as a technical appendix to support Volume 1, Chapter 23: Geology and Ground Conditions (document reference 6.1.23) of the ES.

23.1.1 Project Setting

5. The Project is fully described in the ES (see Chapter 3 (document reference 6.1.3)). The ES references the Project's 'Order Limits'. This comprises the extent of the land for which the ES assessments are based upon.

6. A site location plan is shown in Figure 23.21.1.

Coordinate System: British National Grid

0 2.5 5 km

Scale: 1:100,000

A3 Page Size

Legend

- Order Limits
- Onshore Segment Break
- Landfall Trenchless Works
- Transition Joint Bay Area
- Order Limits 250 m Buffer
- Order Limits 500 m Buffer

Environmental Statement

Study Area and ECC Route Segments (Overview)

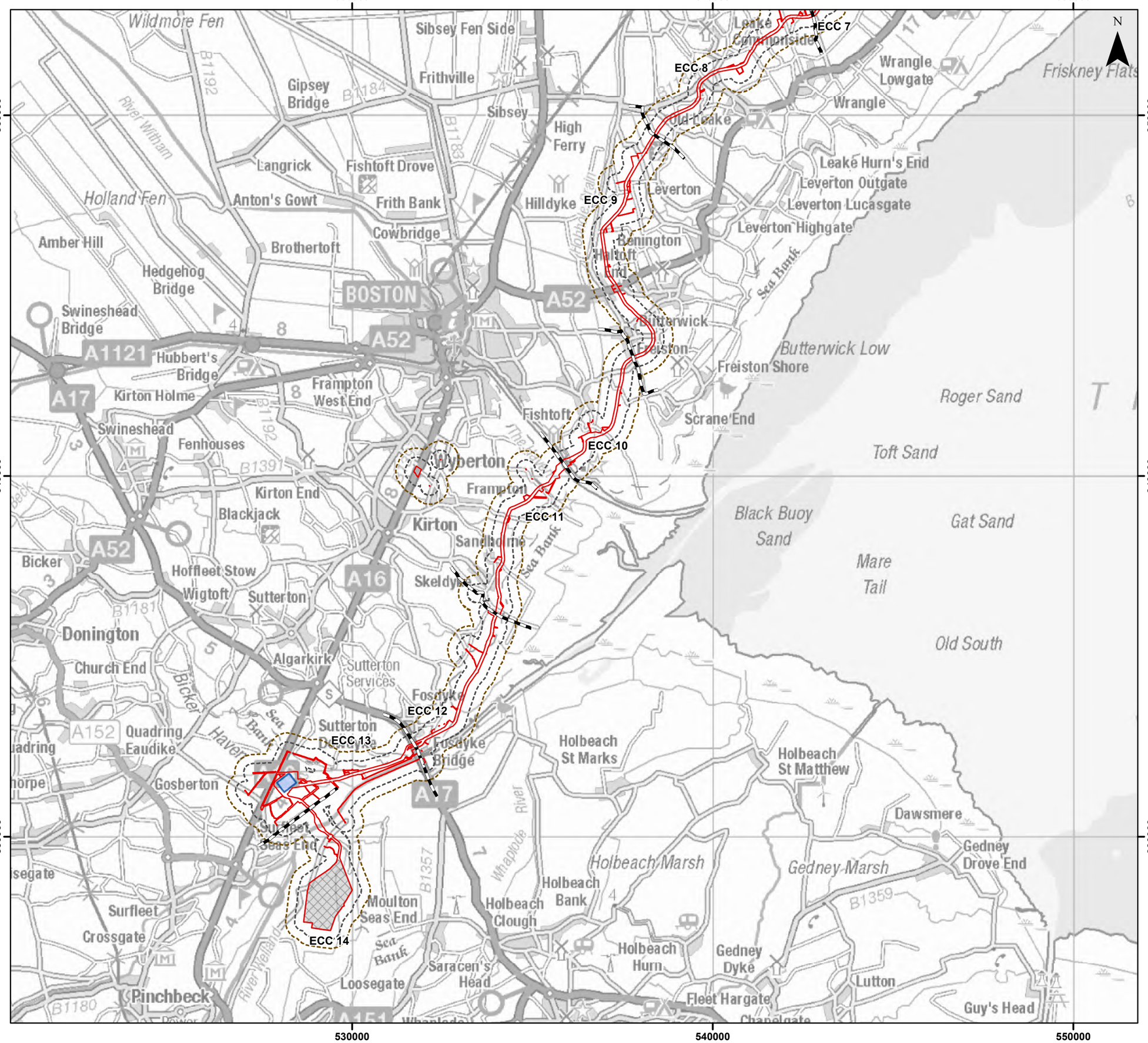
Figure 23.1.1.1

OUTER DOWSING OFFSHORE WIND

Date: 04/03/2024
Produced By: RD
Revision: 0.1

SLR

Document Path: P:\05356 - GoBe Consultants Ltd\00012 GTR4 Outer Dowsing\Tech\GIS\Dwgs\Wking\2023 09 Environmental Statement\Geology and Ground Conditions\TA\PLORA\05356.00012.0843.0 Study Area and ECC Route Segments.mxd



Legend

- Order Limits
- Onshore Segment Break
- Onshore Substation (OnSS) Footprint
- Connection Area
- Order Limits 250 m Buffer
- Order Limits 500 m Buffer

Coordinate System: British National Grid

0 2.5 5 km

Scale: 1:100,000

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Environmental Statement

Study Area and ECC Route Segments (Overview)

Figure 23.1.1.2

OUTER DOWSING OFFSHORE WIND

Date: 04/03/2024
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Revision: 0.1

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23.1.2 Onshore ECC Segments

7. Due to the linear footprint of the Project, the Study Area for some receptors is relatively large-scale, therefore, to assist with the interpretation and explanation of associated data, the Order Limits have been split into segments. The extent of these segments has been aligned with key geographical features such as roads or rivers which cross the Order Limits. To allow for the assessments to be undertaken, the Project has been split into the segments as outlined below:

- ECC 1: Landfall to A52 - Hogsthorpe
- ECC 2: A52 - Hogsthorpe to Marsh Lane
- ECC 3: Marsh Lane to A158 - Skegness Road
- ECC 4: A158 Skegness Road to Low Road
- ECC 5: Low Road to Steeping River
- ECC 6: Steeping River to Fodder Dike Bank/Fen Bank
- ECC 7: Fodder Dike Bank/Fen Bank to Broadgate
- ECC 8: Broadgate to Ings Drove
- ECC 9: Ings Drove to Church End Lane
- ECC 10: Church End Lane to The Haven
- ECC 11: The Haven to Marsh Road
- ECC 12: Marsh Road to Fosdyke Bridge
- ECC 13: Fosdyke to Surfleet Marsh OnSS/Marsh Drove
- ECC 14: Surfleet Marsh OnSS/Marsh Drove to Connection Area

23.2 Objectives

8. This PLQRA report presents detailed site and desk study information which has been reviewed and assessed from the list shown in Table 23.1.

9. The information obtained has been used to develop a preliminary conceptual model of potential risks to human and environmental receptors. The conceptual model examines the potential for contaminant-pathway-receptor linkages in the context of the proposed development.

10. The secondary objective of this PLQRA is to establish if there is any evidence of significant subsurface contamination from past or present activities on or adjacent to the site which could give rise to abnormal development costs i.e. expenditure on remedial works to deal

with unacceptable risks to the environment, site workers or other receptors on Site or in close proximity to the proposed development.

11. The scope of work for the PLQRA includes:

- Review of an Environmental Search Report (Envirocheck) which provides a listing of groundwater and surface water abstraction licences, pollution incidents discharge consents, potentially contaminative sites, waste handling/treatment sites, etc;
- Analysis of historical maps to establish the history of the site as well as past on and off-site potentially contaminative activities;
- Review of published geological, hydrogeological, topographical and groundwater maps;
- Review the environmental setting of the site to determine groundwater vulnerability and the presence of any environmentally sensitive sites (such as SSSI and RAMSAR sites);
- Undertake internet searches to identify if there is any anecdotal information widely available relating to the history of the site;
- Undertake a walkover survey of the site to identify key site features including topography, vegetation type/condition, specific site and surrounding land uses, key surface water features, etc.
- Develop a preliminary Conceptual Site Model (CSM) and undertake a contaminant linkage assessment; and
- Provide conclusions and recommendations in the context of the proposed development.

23.3 Methodology and Data Sources

12. This PLQRA has been completed in accordance with the recommended approach in the Environment Agency Land Contamination: Risk Management (Environment Agency 2019).

13. The assessment is based on a desktop review of available information (e.g. historical maps and regulatory information) which has been supplemented by a site walkover. In the absence of site-specific ground investigation data, the assessments and conclusions drawn adopt a precautionary approach i.e. if a potential contaminant linkage (a source, pathway and receptor must be present for a potential contaminant linkage to exist, refer to Section 3.0 for full details) has been identified it is assumed to be present until further site-specific information is available to clarify whether the linkage actually exists.

14. This PLQRA forms the initial step in the assessment of potentially contaminated land. It precedes, if required, intrusive investigations, risk assessments, options appraisals, remedial designs, implementation planning and completion reporting.

15. The report has been produced following a review of the sources of information summarised in Table 23.1.

Table 23.1 Information Sources

Information Type	Source
Various datasets	Find open data - data.gov.uk Envirocheck Report (Digital GIS layers)
Soil Type and Character	UK Soil Observatory; http://www.ukso.org/static-maps/soils-of-england-and-wales.html and Cranfield Soil and Agrifood Institute Soilscapes map viewer
Geology	British Geological Survey (BGS) Onshore Geoindex; https://www.bgs.ac.uk/map-viewers/geoindex-onshore/ Groundsure Enviro Data Viewer https://www.groundsure.io/# UK Radon Website (Public Health England)
Groundwater Source Protection Zones (SPZ)	
Mines and quarries	
Coal Authority Map	The Coal Authority website interactive mapping https://mapapps2.bgs.ac.uk/coalauthority/home.html
Historic Active Landfills and Waste Management Sites	Environment Agency and Lincolnshire County Council & Groundsure Enviro Data Viewer https://www.groundsure.io/#
Statutory and Non-Statutory Environmental Designations	DEFRA Multi-Agency Geographic Information for the Countryside (MAGIC) https://magic.defra.gov.uk/magicmap.aspx
Locally Important Geological Sites	Greater Lincolnshire Nature Partnership ecology records relating to Local Geological Sites (LoGs) and Regionally Important Geological/Geomorphological Sites (RIGS).
Radon	Public Health England: UK Radon Map
Unexploded Ordnance (UXO)	Zetica UXO: Risk Maps
Land use	Google Earth aerial imagery
Historical Maps	Digital Ordnance Survey (OS) mapping (Digital GIS layers)

23.4 Study Area Details, Setting and History

23.4.1 Study Area

16. The study area for the PLQRA baseline data collection is defined by the Order Limits as shown on Figure 6.2.1.3 in Chapter 1: Introduction (Document Reference: 6.1.1) and comprises the onshore elements of the Project from Mean High Water Springs (MHWS) to the National Grid connection point, plus a buffer of 1km around the OnSS, and a 250m buffer around the landfall, the onshore ECC and the 400kV cable corridor (including haul roads and temporary construction areas).

17. The 250m buffer is from relatively shallow excavations for the onshore ECC, with no disturbance outside the ECC and reinstatement of current land use following construction. The wider 1km buffer for the OnSS reflects the permanent nature of this development.

18. The study area and available data have been discussed and agreed with stakeholders. It is considered that beyond the study area, there is a geographic separation between development and any potential receptors. This results in low potential impact off-site contaminant sources from being screened out from the assessment.

23.4.2 Stakeholder Consultation

19. The Project has undergone consultation with regulatory and planning authority stakeholders. Consultation regarding PQLRA has been conducted through the following processes:

    Evidence Plan Process (EPP) including Expert Topic Group (ETG) meetings;

    EIA scoping process (ODOW, 2022);

    Bilateral engagement with relevant stakeholders;

    Section 47 consultation process (all public consultation phases including phases 1 and 1a); and

    Section 42 consultation process (Phase 2 Consultation, the Autumn Consultation and the Targeted Winter Consultation).

20. Stakeholders relevant to land quality and land condition issues that have been consulted include:

    - Environment Agency
    - East Lindsey District Council
    - Boston Borough Council
    - Kings Lynn & West Norfolk Borough Council
    - South Holland District Council
    - Lincolnshire County Council
    - Norfolk County Council

21. There have been no land contamination requirements, other than a response from the Environment Agency which stated that an appropriate written scheme is submitted and approved to ensure that any land contamination is dealt with appropriately to protect groundwater.

23.4.3 Study Area Description

22. Table 23.2 summarises the Study Area details. Information has been obtained from OS mapping and a site walkover visit. The site walkover visit is discussed in Section 23.4.8.

Table 23.2 Site Details

Details	Description
Location	The Order Limits is located along and adjacent to the east coast of England between the Humber estuary north of Chael St Leonards, in the northern area, and the town of Spalding, in the southern area. The most northern point of the Order Limits has the National Grid Reference E555134, N375489. The most southern point of the Order Limits has the National Grid Reference E529156, N328591.
Description	The Order Limits comprises a roughly linear shape and extends along approximately 70km of the coastline, including the Lincolnshire coast of the Wash and Gibraltar Point. The onshore ECC originates at the Wolla Bank landfall and heads south to the OnSS site at Surfleet Marsh (up to approximately 13km inland from the coastline). A 400kV cable corridor will then connect the OnSS to a National Grid substation (NGSS) at Weston Marsh.
Current Usage	The majority of the Order Limits are currently open fields used for agricultural purposes, in areas the Onshore ECC and 400kV cable corridor crossroads, a train line and water courses (Steeping River, Hobhole Drain and the Haven).
Land Uses Surrounding the Order Limits	The immediate surroundings of the Order Limits are mostly open fields used for agricultural uses.

23.4.4 Physical Setting

23. A summary of the main physical features of the Order Limits are given in Table 23.3. Information has been obtained from EA and BGS mapping, along with GIS Landmark Envirocheck data. Figures 23.1.2 to 23.1.7 show the Hydrology, Designated Sites, Hydrogeology, Superficial Geology, ES Bedrock Geology, and Potential Sources of Contamination within and surrounding the Order Limits.

Table 23.3: Summary of Physical Features

Feature	Description	
	Elevation	The existing level is c.0m to c.5m Above Ordnance Datum (AOD).

Feature	Description	
Geography and Geology	Gradient	The Order Limits is predominantly flat.
	Made Ground[1]	The majority of the Order Limits is greenfield therefore limited areas of made ground are likely to be present. However, BGS identifies made ground recorded as artificial deposits near Bleak House Farm (ECC 11) located 160m away and Skeldyke (two areas) (ECC 12) within the Order Limits. It is also likely that made ground will be located nearby where the Order Limits crosses numerous roads and the railway line in ECC6 in Wainfleet All Saints. It should be recognised that there may also be other areas of unmapped made ground located in areas of private land or that are unrecorded by publicly available data sources within the Order Limits that could be encountered during below-ground construction works as the Project progresses.
	Superficial Drift Geology	The majority of the Order Limits' superficial and drift geology is recorded as tidal flat deposits of clay and silt. Two relatively localised areas, in sections ECC1 and ECC2 at Moat Farm and Ivy House Farm, respectively recorded superficial deposits of glacial diamicton (Till). Fluvioglacial deposits of sand and gravel have also been recorded at Ivy House Farm.
	Solid (Bedrock) Geology	The Bedrock Geology underlying the Order Limits is recorded as a series of chalk, sandstone and mudstone deposits from north to south, increasing in age towards the south: • Burnham Chalk Formation, the youngest, section ECC1 • Welton Chalk Formation, sections ECC1 and ECC2 • Ferriby Chalk formation, sections ECC2 and ECC3 • Carstone Formation (sandstone), sections ECC3 • Claxby Ironstone Formation, Tealby Formation, Roach Formation (mudstone and limestone interbedded), sections ECC4 and ECC5 • Spilsby Sandstone Formation, sections ECC5 to ECC6 • Kimmeridge Clay Formation, ECC6 and ECC9 • Apthill Clay Formation, ECC9 to ECC11 • West Walton Formation (mudstone and siltstone), ECC11 and ECC12 • Oxford Clay Formation, ECC12 to ECC14
	Borehole Records	BGS Borehole records across the Order Limits identify glacial till underlying tidal flat deposits at depths as shallow as 1.8m bgl to depths of 24.0m bgl. Bedrock has been encountered at: • c.25m bgl to chalk, • c.70m bgl to Spilsby sandstone

[1] Made ground – a term used to describe an area of land that has been man-made or disturbed through other human activity. Generally associated with artificial ground as a result of extraction, reclamation, infilling, deposition or mixing of material to raise, change or alter the state of the pre-existing natural condition. This can include the re-working or mixing of natural soils.

Feature	Description	
		• c.50m bgl to Kimmeridge clay. BGS borehole logs are available at: • ECC6 - Steeping River Flood Relief Channel BH01 ref; Tf46se26 • ECC6 - Steeping River Flood Relief Channel BH02 ref; Tf46se27 • ECC6 -Steeping River Flood Relief Channel BH03 ref; Tf46se28 • ECC6 - Steeping River Flood Relief Channel Ds04; ref Tf46se32 • ECC6 - Steeping River Flood Relief Channel Ds05 ref; Tf46se33 • ECC6 - Steeping River Flood Relief Channel Ds06; ref; Tf46se34 • ECC6 - Steeping River Flood Relief Channel Ds07; ref Tf46se35 • ECC8 - Claxby Bank ref; Tf45sw4 • ECC10 - Ings Bank Culvert Bennington 1 ref; Tf34ne9
	Radon Gas	The majority of the Order Limits is not in a Radon Affected Area, as less than 1% of properties are above the Action Level. An area of the Order Limits has a maximum radon potential of 3-5 % associated with the Spilsby Sandstone Formation in ECC5 to ECC6 in the area of Wainfleet All Saints and Wainfleet St Mary.
	Mining, and Ground Stability Hazards	The only records of mining are brickworks within 2km of the Order Limits. The following natural ground hazard ratings are listed across the Order Limits: Shrink-swell Clays – Low, Negligible in areas Landslides – Very Low Soluble rocks – Negligible Compressible Deposits – Moderate, rarely very Low Collapsible Deposits – Negligible to Very Low Running Sands – Moderate, rarely very Low
Hydrology	Surface Water / River Network	There are five main inland surface water bodies that cross the Order Limits: • Orby River, surface inland river • Steeping River, surface inland river • The Haven, surface inland river • The River Welland, a surface inland river
	Flood Risk	The Envirocheck data indicates the Order Limits is listed as being within a Zone 2 or Zone 3 floodplain. The Order Limits have been designated mostly as low Risk of Flooding from Rivers and the Sea (RoFRaS), with occasional medium and high areas throughout, in all sections.

Feature	Description	
		Flood risk from groundwater is considered to be low across the majority of the Order Limits. Higher risk areas are present: • East of Chapel St Leonards, in ECC 1, GR • East of Chapel St Leonards, in ECC 2, GR
	Surface Water Abstractions	There are 3no. surface water abstractions within Order Limits: • Agriculture, spray irrigation, Southfields - M Leggate and Sons ECC8 • Make-up or Top Up Water River Wetland Support – RSPB ECC11 • Agriculture, spray irrigation, Cragmire Lane - M Leggate and Sons ECC8 There are also a number of abstractions in close proximity to the Order Limits Order Limitsin ECC6 and ECC8 that could be affected.
Hydrogeology	Aquifer	The majority of the superficial deposits across the Order Limits are unproductive strata. Where Glacial Till is present secondary undifferentiated aquifer and Glacio fluvial deposits are present secondary A aquifer. The northern half of the Order Limits predominantly comprises Principal and Secondary A aquifers. The chalk formations are classified as a Principal aquifer along with the Spilsby Sandstone Formation. The Claxby Ironstone Formation, Tealby Formation and Roach Formation are classified as Secondary B aquifers. The remaining bedrock that underlies the southern half of the Order Limits is recorded as unproductive strata.
	Groundwater Abstractions	There are nine groundwater abstraction licenses within 500m of the Order Limits. The closest relating to horticultural watering is c.252m northeast of the Order Limits with the status historical.
	Source Protection Zones	The north of the Order Limits is listed as being in a Source Protection Zone 3 – Total catchment (SPZ). The remainder of the Order Limits is not listed as being within a Source Protection Zone (SPZ).

550000 555000 560000

375000

370000

365000

ECC 2: A52 - Hogsthorpe to Marsh Lane

ECC 1: Landfall to A52 - Hogsthorpe

ECC 3: Marsh Lane to A158 - Skegness Road

ECC 4: A158 Skegness Road to Low Road

Willoughby High Drain

N

Legend

- Order Limits
- Onshore Segment Break
- Landfall Trenchless Works
- Transition Joint Bay Area
- Order Limits 250 m Buffer
- Order Limits 500 m Buffer
- Statutory Main River
- Minor Watercourse
- Waterbody
- Abstraction Licence

Coordinate System: British National Grid

0 1 2 km

Scale: 1:50,000

A3 Page Size

Environmental Statement

Hydrology

Figure 23.1.2.1

OUTER DOWSING OFFSHORE WIND

Date: 01/03/2024
Produced By: RD
Revision: 0.1

SLR

545000 550000 555000

365000 360000 355000

N

ECC 3: Marsh Lane to A158 - Skegness Road
ECC 4: A158 Skegness Road to Low Road
ECC 5: Low Road to Steeping River
ECC 6: Steeping River to Fodder Dike Bank/Fen Bank
ECC 7: Fodder Dike Bank/Fen Bank to Broadgate
ECC 8: Broadgate to Ings Drove

Steeping River
The Lymm
Wainfleet Relief Channel

SKEGNESS
Halton Holegate
Toynton St Peter
Toynton Ings
Halton Fenside
Great Steeping
Little Steeping
Sandhill Fm Heavy Horse Centre
Monksthorpe
Bratoft
Irby in the Marsh
Firsby
Halton Holegate Fen
Hare Hills Fm
Black Horse Br
Thorpe Fendykes
Thorpe Culvert
Thorpe Fen
Thorpe St Peter
Croft End Solar Farm
The Hollies
The Hundreds
Lymm Bank Fm
Oak Bank
Firsby Clough
Marsh
Middlemarsh Fm
Windsor Fm
Coddingtons Yard
Croft Marsh
Kitchen's Yard
The Woodlands
Industrial Estate
Hotel
Croft Ho
Crown Fm
HAVENHOUSE STA
Haven on Steeping River
Clough House Fm
Wainfleet Clough
Sluice
New England
White House Fm
New Yard Fm
Merrifield's Fm
Marsh Farm East
Wainfleet All Saints
Wainfleet Bank
Wainfleet St Mary
Wainfleet Tofts
Keys Toft Ho
Low Grounds
Low Fm
Pool Decoy
Blue Br
Eastville
Eastville Fm
Risdale Fm
Dickon Hills
Friskney Fen
Friskney Eaudyke
Friskney
Small End
Manor Fm
Abbey Hills
Old Fm
Home Fm
Marsh Yard
Pinchbecks Yard
Outmarsh Yard
Hall Fm
Wrangle Common
Wrangle Bank Fm
Wrangle Bank
Gask's Fm
Greenfield Fm
Whitehouse Fm
Greens Marsh
Sigtoft Fm
Judegate Fm
East Toft Fm
Wrangle Lowgate
Wrangle Ground
Manor Fm
Common Fm
Rinders Fm
Welsh's Fm
Orchard Ho
Blacks Fm
Slated House Fm
East Fen
Royalty Fm East
Royalty Fm
Bellwater Fm
Bell Water Drain
Drain Bank
Plantn
St Catherine's Fm
The Deeps
Bethlem Fm
Cranberry Fm
White Cross Clough
Wainfleet St Mary Fen
Newbridge Fm
Kent's Br
Thorpe Drove
Fodder Dike
Sea Bank
Danger Area
New Marsh
Wainfleet Sand
DANGER AREA
Mud & Sand

Legend

- Order Limits
- Onshore Segment Break
- Order Limits 250 m Buffer
- Order Limits 500 m Buffer
- Statutory Main River
- Minor Watercourse
- Waterbody
- Abstraction Licence

Sources:
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Coordinate System: British National Grid

0 1 2 km

Scale: 1:50,000

A3 Page Size

Environmental Statement

Hydrology

Figure 23.1.2.2

OUTER DOWSING OFFSHORE WIND

Date: 01/03/2024
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Revision: 0.1

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535000 540000 545000

350000 345000 340000

ECC 7: Fodder Dike Bank/Fen Bank to Broadgate

ECC 8: Broadgate to Ings Drove

ECC 8: Ings Drove to Church End Lane

ECC 8: Broadgate to Ings Drove

ECC 10: Church End Lane to The Haven

ECC 9: Ings Drove to Church End Lane

ECC 11: The Haven to Marsh Road

ECC 10: Church End Lane to The Haven

N

Legend

- Order Limits
- Onshore Segment Break
- Order Limits 250 m Buffer
- Order Limits 500 m Buffer
- Statutory Main River
- Minor Watercourse
- Waterbody
- Abstraction Licence

Coordinate System: British National Grid

0 1 2 km

Scale: 1:50,000

A3 Page Size

Environmental Statement

Hydrology

Figure 23.1.2.3

OUTER DOWSING OFFSHORE WIND

Date: 01/03/2024
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Revision: 0.1

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530000 535000 540000

335000 330000

N

ECC 11: The Haven to Marsh Road
ECC 12: Marsh Road to Fosdyke Bridge
ECC 13: Fosdyke to Surfleet Marsh OnSS/Marsh Drove
ECC 14: Surfleet Marsh OnSS / Marsh Drove to Connection Area
Risegate Eau
River Welland
River Glen
The Haven
Kirton
Frampton
Frampton Marsh
Kirton Marsh
Fosdyke
Fosdyke Bridge
Sutterton
Sutterton Dowdyke
Wigtoft
Algarkirk
Asperton
Taumberland
Kirton Meeres
Moulton
Moulton Marsh
Whaplode Marsh
Holbeach Marsh
Moulton Seas End
Surfleet
Surfleet Seas End
Spalding
Holbeach
Holbeach Bank
Holbeach Clough
Holbeach Hurn
Saracen's Head
Little Common
Sutterton Common
Wigtoft Marsh
Pinchbeck Marsh
The Scalp
The Cots
Herring Hill
Mud & Sand
Fosdyke Wash
Skeldyke
Sandbridge
Buckgate
Leadenhall Fm
Penny Hill
Cackle Hill
Halesgate
Seas End Hall
Wykeham
Shepherds Fm
Risegate Marsh
Whaplode Drove
Moulton Chain
Sutterton Dowdyke Drain
Wigtoft Drain
Wigtoft Way
Fosdyke Canal
Hobhole Drain
Wrangle Marsh Fm
Bank House Fm
Three Bridges
Majors Fm
Sluice Fm
Leaden Hall
Trevethoe Fm
Bingham Lodge
Grange Fm
Woodstock Ho
Keightley House Fm
Middle Marsh Ho
Poplars Fm
Bertie Lodge
Crowmarsh Fm
Home Fm
Manor Fm
Red House Fm
Cowfield Gould
The Grove
Clays Fm
Coney Garth Ho
Osborne Ho
Old White Ho
Woodhouse Fm
Hurn Hall
The Manor
Hovenden Ho
Reckerby Fm
Willow Tree Ho
Leadenhall Fm
Middle Marsh Fm
Hospital Fm
Lundy's Fm
Hundred Acre Fm
College Fm
Elms Fm
Dean's Fm
Hill Six Acres
The Woodlands
White House Fm
Fosdyke Villa
Gells Fm
Limes Fm
Willow Fm
Belton Fm
Blackjack
Blackjack Fm
Solar Farm
Fishmere End
Southfields Fm
Park's Fm
Manor Fm
Lime Tree Fm
Marsh Fm
Roads Fm
Slate Ho
Struggs Hill
Eastthorpe Court
Casterton Ho
Burtoft
Blackitt's Fm
Burnt Ho
Red House Fm
Crowtree Fm
Reservoir
Crown Fm
Yew Tree Fm
Newlands Fm
Hill Marsh Fm
Bank Ho
Woodlands Fm
Manor Ho
The Gables
Wellands
Welland House Fm
Dowdyke Granes
Sea Bank
Sea Dyke
Middle Drain
Bendike
Wks
Chapel (rems of)
Moat
Mus
Hospl
Welland Hot
Willoughby Ho
Cemy
PH
MP
MS
Resr
CH
Sch
Ho
Fm
Hosp
Mem
Sta
Pol Sta
Ind Est
Gdns
Pk
Ct
Cott
Farm
Grange
Lodge
Villa
Hall
Bridge
Drain
Dyke
Bank
Sea Bank
Sea Dyke
Middle Drain
Whaplode River
Risegate Eau
Wellands
Sutterton Dowdyke Drain
Wigtoft Drain
Wigtoft Way
Fosdyke Canal
Hobhole Drain
Whaplode River
Middle Drain
Sea Bank
Sea Dyke
Bank
Dyke
Drain
Ho
Fm
Cemy
PH
MP
MS
Resr
CH
Sch
Hosp
Mem
Sta
Pol Sta
Ind Est
Gdns
Pk
Ct
Cott
Farm
Grange
Lodge
Villa
Hall
Bridge
Drain
Dyke
Bank
Sea Bank
Sea Dyke
Middle Drain
Whaplode River
Risegate Eau
Wellands
Sutterton Dowdyke Drain
Wigtoft Drain
Wigtoft Way
Fosdyke Canal
Hobhole Drain

Legend

- Order Limits
- Onshore Segment Break
- Onshore Substation (OnSS) Footprint
- Connection Area
- Order Limits 250 m Buffer
- Order Limits 500 m Buffer
- Statutory Main River
- Minor Watercourse
- Waterbody
- Abstraction Licence

Sources:

Coordinate System: British National Grid

0 1 2 km

Scale: 1:50,000

A3 Page Size

Environmental Statement

Hydrology

Figure 23.1.2.4

OUTER DOWSING OFFSHORE WIND

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550000 552500 555000 557500

377500 375000 372500

Marsh Yard to Anderby Creek Dunes LWS

Anderby Creek Sand Dunes LWS

Anderby Gravity Outfall LWS

Greater Wash SPA

Sea Bank Clay Pits SSSI

Wolla Bank South LWS

Chapel Point to Wolla Bank SSSI

Hogsthorpe Pit LWS

ECC 1: Landfall to A52 - Hogsthorpe

ECC 2: A52 - Hogsthorpe to Marsh Lane

HUTTOFT CP

ANDERBY CP

CUMBERWORTH CP

MUMBY CP

CHAPEL ST LEONARDS CP

HOGSTHORPE CP

Huttoft

Anderby

Mumby

Cumberworth

Hogsthorpe

Chapel St Leonards

Huttoft Bank

Anderby Creek

Wolla Bank Pit Nature Reserve

Chapel Pit Nature Reserve

Chapel Point

Legend

- Order Limits
- Onshore Segment Break
- Landfall Trenchless Works Area
- Transition Joint Bay Area
- Order Limits 250 m Buffer
- Order Limits 500 m Buffer
- Special Protection Area (SPA)
- Site of Special Scientific Interest (SSSI)
- Local Wildlife Site (LWS)
- Local Geological Site
- Groundwater Dependent Terrestrial Ecosystem (GWDTE)

Coordinate System: British National Grid

0 0.5 1 km

Scale: 1:25,000

A3 Page Size

Environmental Statement

Designated Sites

Figure 23.1.3.1

OUTER DOWSING OFFSHORE WIND

Date: 01/03/2024
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550000
552500
555000
370000
367500
365000
ECC 2: A52 - Hogsthorpe to Marsh Lane
ECC 3: Marsh Lane to A158 - Skegness Road
ECC 4: A158 Skegness Road to Low Road
Greater Wash SPA
ORBY CP
ADDLETHORPE CP
INGOLDMELLS CP
SKEGNESS CP
BURGH LE MARSH CP
Sloothby
Sloothby Ings
Wyche
Habertoft
Orby Marsh
Ashington End
Addlethorpe
Ingoldmells
Skegness
Burgh Common
Burgh le Marsh
Legend
Order Limits
Onshore Segment Break
Order Limits 250 m Buffer
Order Limits 500 m Buffer
Special Protection Area (SPA)
Local Wildlife Site (LWS)
N
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Local Wildlife Sites and Local Geological Sites data retrieved through Lincolnshire District Council.
LINCOLNSHIRE
THE WASH
Coordinate System: British National Grid
0 0.5 1 km
Scale: 1:25,000
A3 Page Size
Environmental Statement
Designated Sites
Figure 23.1.3.2
OUTER DOWSING OFFSHORE WIND
Date: 01/03/2024
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Revision: 0.1
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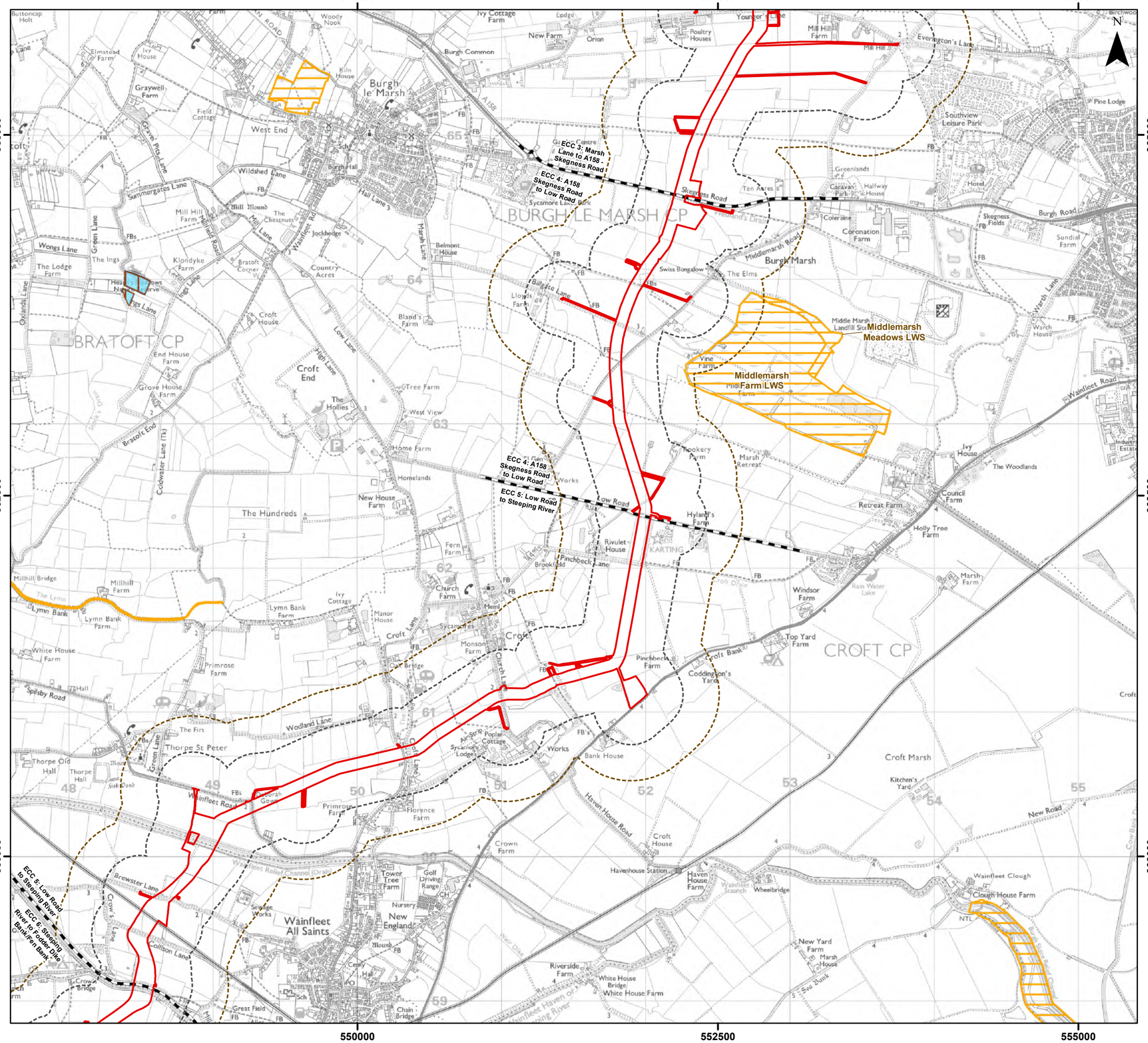

Legend

- Order Limits
- Onshore Segment Break
- Order Limits 250 m Buffer
- Order Limits 500 m Buffer
- Site of Special Scientific Interest (SSSI)
- Local Wildlife Site (LWS)
- Groundwater Dependent Terrestrial Ecosystem (GWDTE)

Coordinate System: British National Grid

0 0.5 1 km

Scale: 1:25,000

A3 Page Size

Environmental Statement

Designated Sites

Figure 23.1.3.3

OUTER DOWSING OFFSHORE WIND

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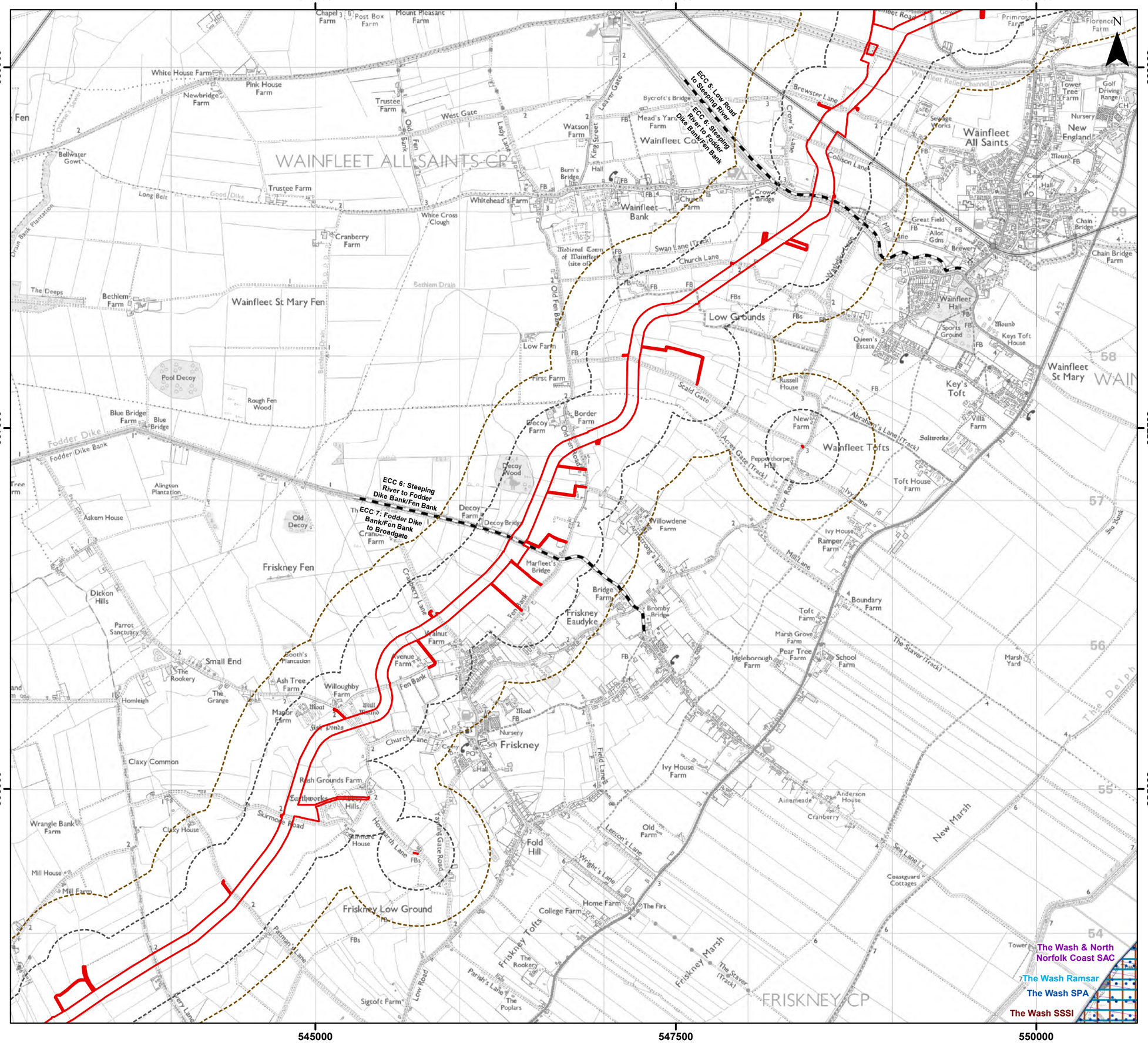

Legend

- Order Limits
- Onshore Segment Break
- Order Limits 250 m Buffer
- Order Limits 500 m Buffer
- Special Protection Area (SPA)
- Ramsar
- Special Area of Conservation (SAC)
- Site of Special Scientific Interest (SSSI)

Coordinate System: British National Grid

0 0.5 1 km

Scale: 1:25,000

A3 Page Size

Environmental Statement

Designated Sites

Figure 23.1.3.4

OUTER DOWSING OFFSHORE WIND

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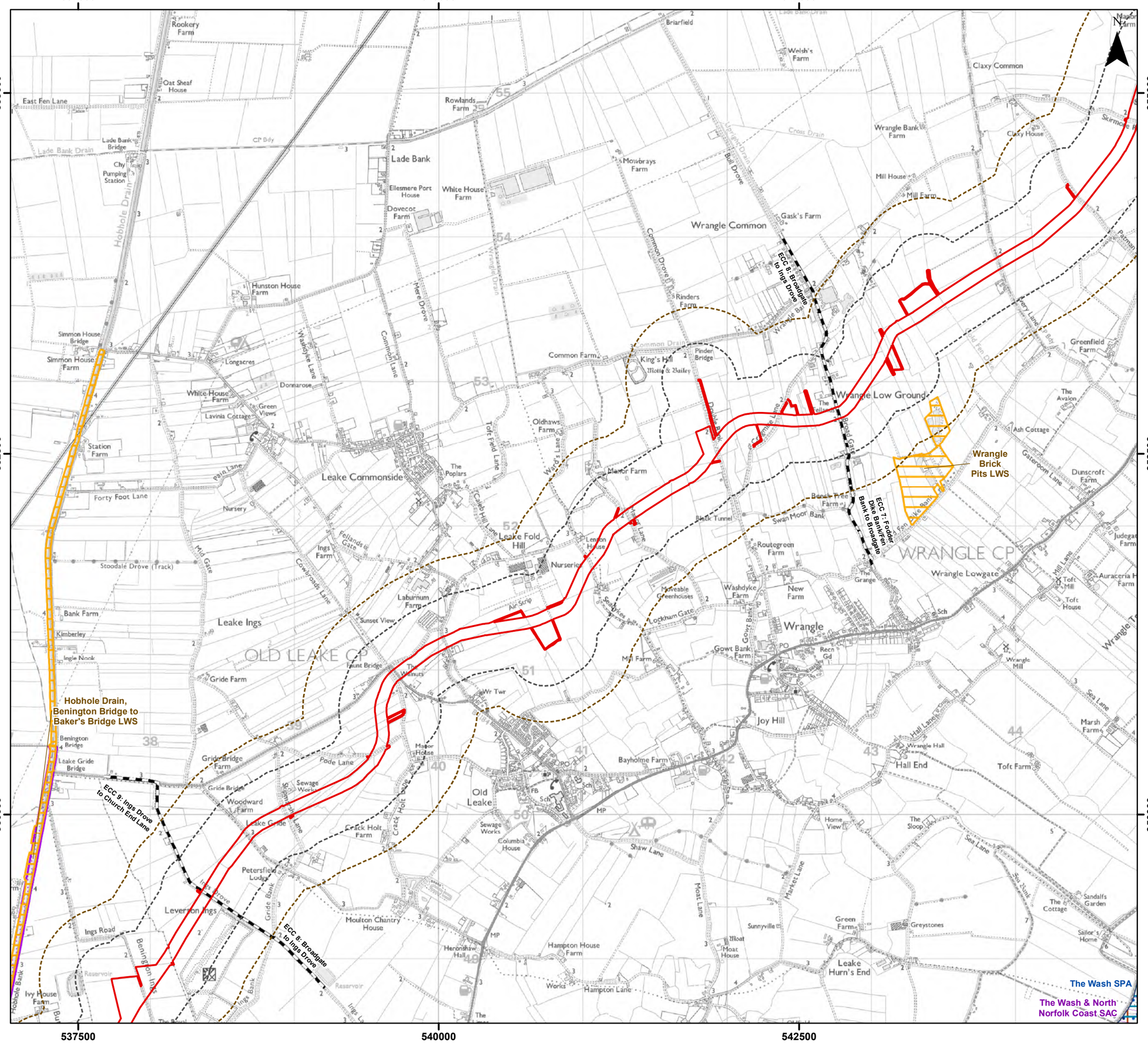

Legend

- Order Limits
- Onshore Segment Break
- Order Limits 250 m Buffer
- Order Limits 500 m Buffer
- Special Protection Area (SPA)
- Ramsar
- Special Area of Conservation (SAC)
- Site of Special Scientific Interest (SSSI)
- Local Wildlife Site (LWS)
- Local Geological Site

Coordinate System: British National Grid

0 0.5 1 km

Scale: 1:25,000 A3 Page Size

Environmental Statement

Designated Sites

Figure 23.1.3.5

OUTER DOWSING OFFSHORE WIND

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535000 537500 540000

347500 345000

Hobhole Drain, Benington Bridge to Baker's Bridge LWS

Hobhole Drain, Baker's Bridge South LWS

Doves' Lane Drains LWS

Shore Road Drain LWS

ECC 8: Broadgate to Ings Drove

ECC 9: Ings Drove to Church End Lane

ECC 10: Church End Lane to The Haven

Havenside LWS

Havenside LNR

The Wash SSSI

The Wash SPA

The Wash Ramsar

The Wash & North Norfolk Coast SAC

FREISTON CP

BENINGTON

BUTTERWICK

Legend

- Order Limits
- Onshore Segment Break
- Order Limits 250 m Buffer
- Order Limits 500 m Buffer
- Special Protection Area (SPA)
- Ramsar
- Special Area of Conservation (SAC)
- Site of Special Scientific Interest (SSSI)
- Local Nature Reserve (LNR)
- RSPB Reserve
- Local Wildlife Site (LWS)
- Local Geological Site

Coordinate System: British National Grid

0 0.5 1 km

Scale: 1:25,000

A3 Page Size

Environmental Statement

Designated Sites

Figure 23.1.3.6

OUTER DOWSING OFFSHORE WIND

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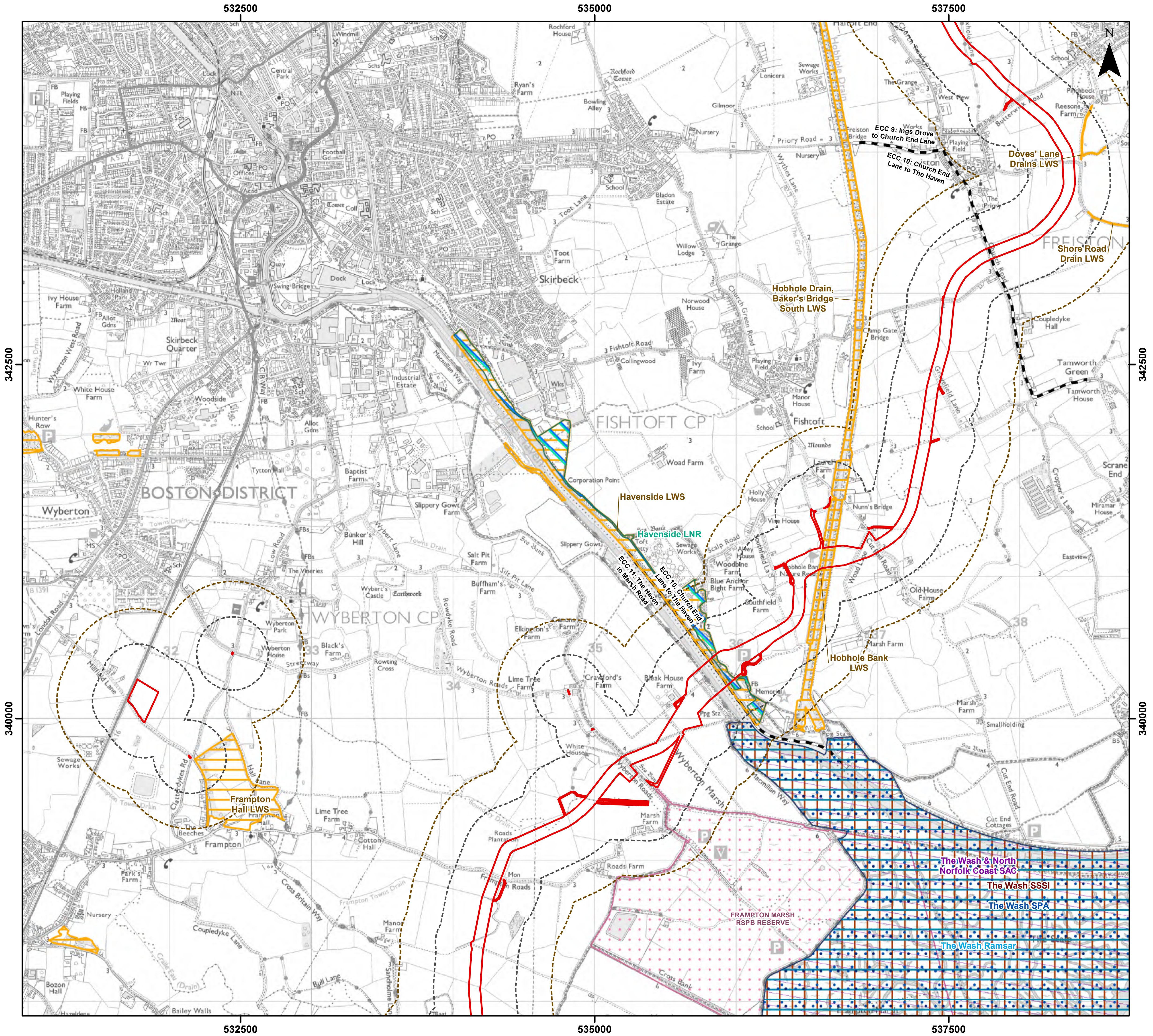

Legend

🟥	Order Limits
▬	Onshore Segment Break
▭	Order Limits 250 m Buffer
▭	Order Limits 500 m Buffer
▭	Special Protection Area (SPA)
▤	Ramsar
▭	Special Area of Conservation (SAC)
▥	Site of Special Scientific Interest (SSSI)
▨	Local Nature Reserve (LNR)
⁚	RSPB Reserve
▭	Local Wildlife Site (LWS)

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Local Wildlife Sites and Local Geological Sites data retrieved through Lincolnshire District Council.

Coordinate System: British National Grid

0 0.5 1 km

Scale: 1:25,000

A3 Page Size

Environmental Statement

Designated Sites

Figure 23.1.3.7

OUTER DOWSING OFFSHORE WIND

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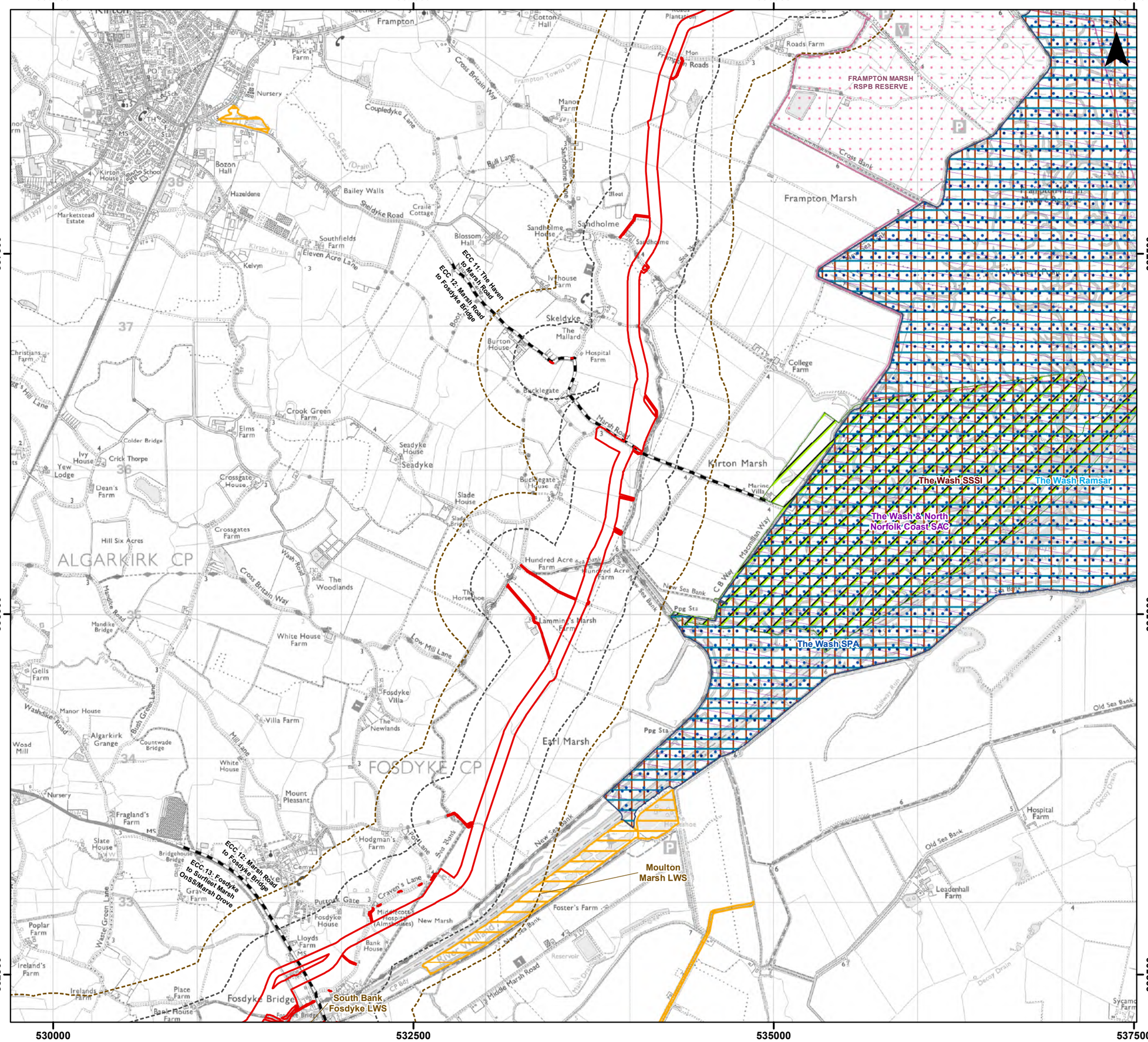

Legend

- Order Limits
- Onshore Segment Break
- Order Limits 250 m Buffer
- Order Limits 500 m Buffer
- Special Protection Area (SPA)
- Ramsar
- Special Area of Conservation (SAC)
- Site of Special Scientific Interest (SSSI)
- National Nature Reserve (NNR)
- RSPB Reserve
- Local Wildlife Site (LWS)

Coordinate System: British National Grid

0 0.5 1 km

Scale: 1:25,000 A3 Page Size

Environmental Statement

Designated Sites

Figure 23.1.3.8

OUTER DOWSING OFFSHORE WIND

Date: 01/03/2024
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SLR

527500 530000 532500

332500 330000 327500

Risegate Eau LWS

South Bank Fosdyke LWS

Moulton Marsh LWS

Surfleet Bank LWS

ECC 12: Marsh Road to Fosdyke Bridge

ECC 13: Fosdyke to Surfleet Marsh OnSS/Marsh Drove

ECC 14: Surfleet Marsh Drove to OnSS / Marsh Drove to Connection Area

ECC 13: Fosdyke to Surfleet Marsh OnSS/Marsh Drove

Weston Marsh

SURFLEET CP

Surfleet Seas End

Moulton Seas End

Moulton Common

Moulton Marsh

Wragg Marsh

Spalding Marsh

Pinchbeck Marsh

Fosdyke Bridge

Sutterton Marsh

Surfleet Marsh

N

Legend

- Order Limits
- Onshore Segment Break
- Onshore Substation (OnSS) Footprint
- Connection Area
- Order Limits 250 m Buffer
- Order Limits 500 m Buffer
- Local Wildlife Site (LWS)

Sources:

Local Wildlife Sites and Local Geological Sites data retrieved through Lincolnshire District Council.

Coordinate System: British National Grid

0 0.5 1 km

Scale: 1:25,000

A3 Page Size

Environmental Statement

Designated Sites

Figure 23.1.3.9

OUTER DOWSING OFFSHORE WIND

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550000 552000 554000 556000

376000 374000 372000

N

ECC 1: Landfall to A52 - Hogsthorpe

ECC 2: A52 - Hogsthorpe to Marsh Lane

Legend

- Order Limits
- Onshore Segment Break
- Landfall Trenchless Works Area
- Transition Joint Bay Area
- Order Limits 250 m Buffer
- Order Limits 500 m Buffer

Source Protection Zone

- 1
- 1c
- 2
- 2c
- 3

Bedrock Aquifer Designation (Clipped to Onshore ES Boundary)

- Principal Aquifer
- Abstraction Licence
- Groundwater Monitoring Locations

Coordinate System: British National Grid

0 0.5 1 km

Scale: 1:25,000

A3 Page Size

Environmental Statement

Hydrogeology

Figure 23.1.4.1

OUTER DOWSING OFFSHORE WIND

Date: 01/03/2024
Produced By: ARE
Revision: 0.1

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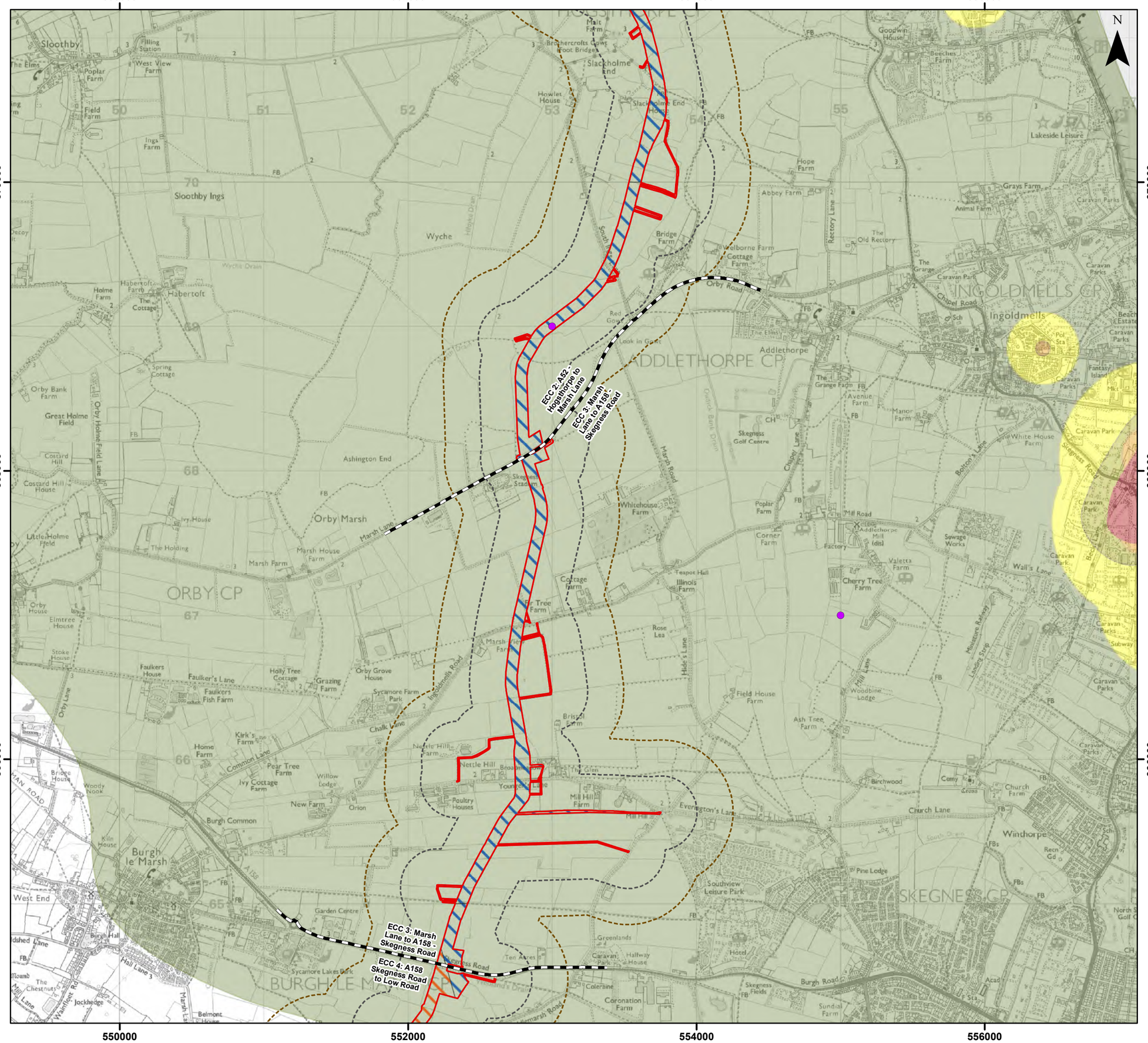

Legend

- Order Limits
- Onshore Segment Break
- Order Limits 250 m Buffer
- Order Limits 500 m Buffer

Source Protection Zone

- 1
- 1c
- 2
- 2c
- 3

Bedrock Aquifer Designation (Clipped to Onshore ES Boundary)

- Principal Aquifer
- Secondary Aquifer - B
- Groundwater Monitoring Locations

Coordinate System: British National Grid

0 0.5 1 km

Scale: 1:25,000

A3 Page Size

Environmental Statement

Hydrogeology

Figure 23.1.4.2

OUTER DOWSING OFFSHORE WIND

Date: 01/03/2024
Produced By: ARE
Revision: 0.1

SLR

548000 550000 552000 554000

364000 362000 360000

ECC 3: Marsh Lane to A158 - Skegness Road

ECC 4: A158 Skegness Road to Low Road

ECC 5: Low Road to Steeping River

ECC 6: Steeping River to Fodder Dike Bank/Fen Bank

BURGH LE MARSH CP

BRATOFT CP

CROFT CP

N

Legend

- Order Limits
- Onshore Segment Break
- Order Limits 250 m Buffer
- Order Limits 500 m Buffer

Source Protection Zone

- 3

Bedrock Aquifer Designation (Clipped to Onshore ES Boundary)

- Principal Aquifer
- Secondary Aquifer - B
- Abstraction Licence
- Groundwater Monitoring Locations

Coordinate System: British National Grid

0 0.5 1 km

Scale: 1:25,000

A3 Page Size

Environmental Statement

Hydrogeology

Figure 23.1.4.3

OUTER DOWSING OFFSHORE WIND

Date: 01/03/2024
Produced By: ARE
Revision: 0.1

SLR

544000 546000 548000 550000

360000 358000 356000 354000

ECC 5: Low Road to Steeping River

ECC 6: Steeping River to Fodder Dike Bank/Fen Bank

ECC 7: Fodder Dike Bank/Fen Bank to Broadgate

WAINFLEET ALL SAINTS CP

FRISKNEY CP

Wainfleet Common

Wainfleet Bank

Wainfleet St Mary Fen

Low Grounds

Wainfleet All Saints

Wainfleet St Mary

Wainfleet Tofts

Friskney Fen

Friskney Low Ground

Friskney Eaudyke

Friskney Tofts

Friskney Marsh

Friskney

Claxy Common

Small End

New Marsh

Fodder Dike

Fodder Dike Bank

Bedhelm Drain

Old Fen Bank

Fen Bank

Low Road

Scald Gate

Swan Lane (Track)

Church Lane

Collison Lane

Brewster Lane

Crow's Lane

Lady Lane

King Street

Leaver Gate

West Gate

Trustee Farm

Pink House Farm

Newbridge Farm

White House Farm

Mount Pleasant Farm

Chapel Farm

Post Box Farm

Bellwater Gowt

Long Belt

Good Dike

Drain Bank Plantation

Cranberry Farm

White Cross Clough

Whitehead's Farm

Burn's Bridge

Watson Farm

Mead's Yard Farm

Bycroft's Bridge

Church Farm

Medieval Town of Wainfleet (site of)

The Deeps

Bethlem Farm

Pool Decoy

Rough Fen Wood

Blue Bridge Farm

Blue Bridge

Low Farm

First Farm

Border Farm

Decoy Farm

Decoy Wood

Old Decoy

Alington Plantation

Askern House

The Apiary

Cranberry Farm

Marfleet's Bridge

Willowdene Farm

Armstrong's Lane

Bridge Farm

Bromby Bridge

Walnut Farm

Avenue Farm

Willoughby Farm

Ash Tree Farm

Booth's Plantation

Manor Farm

Moat

Nursery

Rush Grounds Farm

Claxy House

Wrangle Bank Farm

Mill House

Mill Farm

Skirmett Road

Hollywell Lane

Toyting Gate Road

Fold Hill

Old Farm

Lemon's Lane

Wright's Lane

Home Farm

College Farm

The Firs

Coastguard Cottages

Sea Lane

Sea Bank

Ivy House Farm

Ivy House

Ramper Farm

Mill Lane

Toft Farm

Boundary Farm

Marsh Grove Farm

Pear Tree Farm

School Farm

Ingleborough Farm

Marsh Yard

Toft House Farm

Anderson House

Cranberry

Ainemeade

Sigtoft Farm

The Poplars

Parish's Lane

Low Road

The Rookery

The Grange

Homleigh

Parrot Sanctuary

Dickon Hills

Rush Grounds Farm

Saltworks

Saltmarsh House

Pepperthorpe Hill

New Farm

Russell House

Key's Toft

Villa Farm

Keys Toft House

Queen's Estate

Sports Ground

Wainfleet Hall

Great Field

Allot Gdns

Brewery

Chain Bridge

Chain Bridge Farm

Mill Lane

Waterworks Lane

Primrose Farm

Florence Farm

Tower Tree Farm

Golf Driving Range

Nursery

New England

Mound

Gravity Hall

Sewage Works

Abraham's Lane (Track)

Acres Gate (Track)

Ivy Lane

The Staver (Track)

Tower

Sea Bank

Delph

A52

A158

A155

A16

A17

A1121

A149

A148

A1104

A1111

A1031

A1028

A1023

A1027

A1103

A1101

A1102

A1107

A1108

A1109

A1110

A1112

A1113

A1114

A1115

A1116

A1117

A1118

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A1120

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A1128

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A1153

A1154

A1155

A1156

A1157

A1158

A1159

A1160

A1161

538000 540000 542000 544000

354000 352000 350000

ECC 7: Fodder Dike Bank/Fen Bank to Broadgate

ECC 8: Broadgate to Ings Drove

ECC 8: Broadgate to Ings Drove

ECC 9: Ings Drove to Church End Lane

Legend

- Order Limits
- Onshore Segment Break
- Order Limits 250 m Buffer
- Order Limits 500 m Buffer

Bedrock Aquifer Designation (Clipped to Onshore ES Boundary)

- Unproductive Strata
- Abstraction Licence

Sources:

Bedrock Aquifer Designation data sourced from Environment Agency and British Geological Survey

Coordinate System: British National Grid

0 0.5 1 km

Scale: 1:25,000

A3 Page Size

Environmental Statement

Hydrogeology

Figure 23.1.4.5

OUTER DOWSING OFFSHORE WIND

Date: 01/03/2024
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534000 536000 538000 540000

348000 346000 344000

ECC 8: Broadgate to Ings Drove

ECC 9: Ings Drove to Church End Lane

ECC 9: Ings Drove to Church End Lane

ECC 10: Church End Lane to The Haven

FREISTON CP

BENINGTON CP

BUTTERWICK CP

N

Legend

- Order Limits
- Onshore Segment Break
- Order Limits 250 m Buffer
- Order Limits 500 m Buffer

Bedrock Aquifer Designation (Clipped to Onshore ES Boundary)

- Unproductive Strata
- Abstraction Licence

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Bedrock Aquifer Designation data sourced from Environment Agency and British Geological Survey

Coordinate System: British National Grid

0 0.5 1 km

Scale: 1:25,000

A3 Page Size

Environmental Statement

Hydrogeology

Figure 23.1.4.6

OUTER DOWSING OFFSHORE WIND

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532000 534000 536000 538000

344000 342000 340000 338000

ECC 10: Church End Lane to The Haven

ECC 9: Ings Drove to Church End Lane

ECC 10: Church End Lane to The Haven

ECC 11: The Haven to Marsh Road

BOSTON DISTRICT

WYBERTON CP

FISHTOFT CP

FREISTON

Skirbeck

Skirbeck Quarter

Wyberton

Boston

Freiston

Fishtoft

Tamworth Green

Scrane End

Frampton

Frampton Marsh

Wyberton Marsh

The Haven

The Scalp

Hobhole Drain

Towns Drain

Frampton Towns Drain

Macmillan Way

Cross Britain Way

Cut End Road

Wyberton West Road

Wyberton Low Road

Wyberton Roads

Church Green Road

Priory Road

Fishtoft Road

Freiston Shore Road

Scale: 1:25,000

A3 Page Size

0 0.5 1 km

Coordinate System: British National Grid

Legend

- Order Limits
- Onshore Segment Break
- Order Limits 250 m Buffer
- Order Limits 500 m Buffer

Bedrock Aquifer Designation (Clipped to Onshore ES Boundary)

- Unproductive Strata
- Abstraction Licence

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Environmental Statement

Hydrogeology

Figure 23.1.4.7

OUTER DOWSING OFFSHORE WIND

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530000 532000 534000 536000

338000 336000 334000

ECC 11: The Haven to Marsh Road

ECC 12: Marsh Road to Fosdyke Bridge

ECC 13: Fosdyke to Surfleet Marsh OnSS/Marsh Drove

ALGARKIRK CP

FOSDYKE CP

Frampton Marsh

Kirton Marsh

Earl Marsh

Frampton Marsh Nature Reserve

Legend

- Order Limits
- Onshore Segment Break
- Order Limits 250 m Buffer
- Order Limits 500 m Buffer

Bedrock Aquifer Designation (Clipped to Onshore ES Boundary)

- Unproductive Strata
- Abstraction Licence

Coordinate System: British National Grid

0 0.5 1 km

Scale: 1:25,000

A3 Page Size

Environmental Statement

Hydrogeology

Figure 23.1.4.8

OUTER DOWSING OFFSHORE WIND

Date: 01/03/2024
Produced By: ARE
Revision: 0.1

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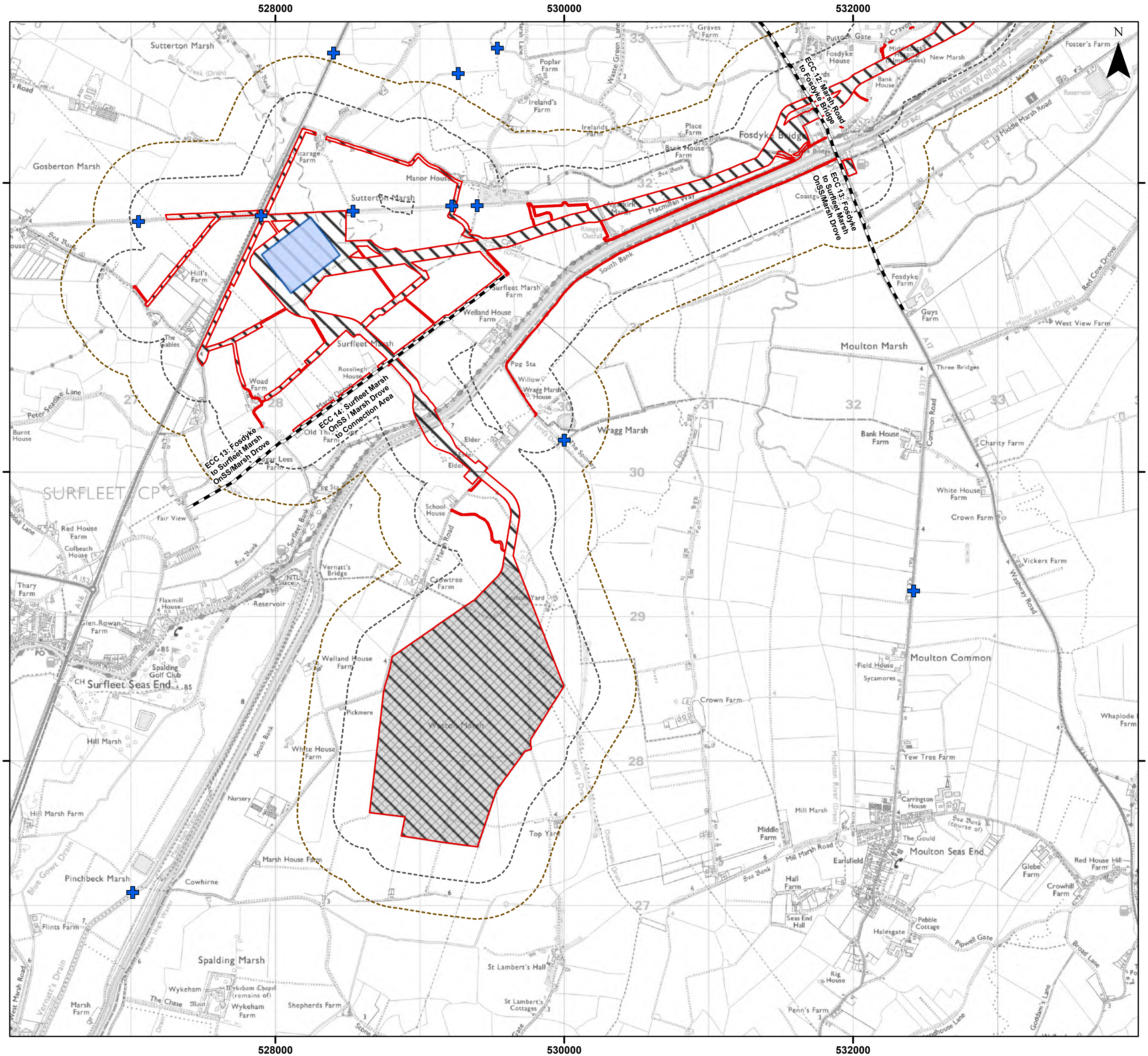

Legend

☐ Order Limits

▬ Onshore Segment Break

▭ Onshore Substation (OnSS) Footprint

▩ Connection Area

⬚ Order Limits 250 m Buffer

⬚ Order Limits 500 m Buffer

Bedrock Aquifer Designation (Clipped to Onshore ES Boundary)

▨ Unproductive Strata

✚ Abstraction Licence

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Bedrock Aquifer Designation data sourced from Environment Agency and British Geological Survey

Coordinate System: British National Grid

0 0.5 1 km

Scale: 1:25,000

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Environmental Statement

Hydrogeology

Figure 23.1.4.9

OUTER DOWSING OFFSHORE WIND

Date: 01/03/2024
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550000
555000
560000
375000
370000
365000
N
Lincolnshire Coast Submerged Forest
Chapel Point to Wolla Bank SSSI
ECC 2: A52 - Hogsthorpe to Marsh Lane
ECC 1: Landfall to A52, Hogsthorpe
ECC 3: Marsh Lane to A158 - Skegness Road
ECC 4: A158 Skegness Road to Low Road
Chapel St Leonards
Ingoldmells
SKEGNESS
Huttoft
Anderby
Mumby
Farlesthorpe
Cumberworth
Willoughby
Bilsby
Thurlby
Sloothby
Wyche
Addlethorpe
Orby
Orby Marsh
Ashington End
Burgh le Marsh
Bratoft
Welton le Marsh
Hogsthorpe
Mawthorpe
Bonthorpe
Helsey
Cumberworth Ings
Willoughby Ings
Sloothby Ings
Habertoft
Marsh
Legend
Order Limits
Onshore Segment Break
Landfall Trenchless Works Area
Transition Joint Bay Area
Order Limits 250 m Buffer
Site of Special Scientific Interest (SSSI) Cited for Geological Features
Local Geological Site
Superficial Deposits
Alluvium - Clay, Silt, Sand And Gravel
Beach And Tidal Flat Deposits - Clay, Silt And Sand
Bedrock at or Near Surface
Blown Sand – Sand
Glaciofluvial Deposits, Devensian - Sand And Gravel
Peat – Peat
Tidal Flat Deposits - Clay, Silt And Sand
Till, Devensian – Diamicton
Sources:
Superficial Geology data obtained via BGS WMS. British Geological Survey © NERC. All Rights Reserved.
LINCOLNSHIRE
Lincoln
Skegness
Boston
Sleaford
THE WASH
Coordinate System: British National Grid
0 1 2 km
Scale: 1:50,000
A3 Page Size
Environmental Statement
Superficial Geology
Figure 23.1.5.1
OUTER DOWSING OFFSHORE WIND
Date: 01/03/2024
Produced By: RD
Revision: 0.1
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545000 550000 555000

365000 360000 355000

N

ECC 3: Marsh Lane to A158 - Skegness Road

ECC 4: A158 Skegness Road to Low Road

ECC 4: A158 Skegness Road to Low Road

ECC 5: Low Road to Steeping River

ECC 6: Steeping River to Fodder Dike Bank/Fen Bank

ECC 5: Low Road to Steeping River

ECC 6: Steeping River to Fodder Dike Bank/Fen Bank

ECC 7: Fodder Dike Bank/Fen Bank to Broadgate

ECC 6: Broadgate to Ings Drove

ECC 7: Fodder Dike Bank/Fen Bank to Broadgate

Legend

- Order Limits
- Onshore Segment Break
- Order Limits 250 m Buffer

Superficial Deposits

- Bank Deposits – Sand
- Beach And Tidal Flat Deposits - Clay, Silt And Sand
- Bedrock at or Near Surface
- Blown Sand – Sand
- Glaciofluvial Deposits, Devensian - Sand And Gravel
- Peat – Peat
- Storm Beach Deposits - Sand And Gravel
- Storm Beach Deposits - Sand And Silt
- Tidal Flat Deposits - Clay And Silt
- Till, Devensian – Diamicton

Sources:
Superficial Geology data obtained via BGS WMS. British Geological Survey © NERC. All Rights Reserved.

Coordinate System: British National Grid

0 1 2 km

Scale: 1:50,000

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Environmental Statement

Superficial Geology

Figure 23.1.5.2

OUTER DOWSING OFFSHORE WIND

Date: 01/03/2024
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Revision: 0.1

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535000 540000 545000

350000

345000

340000

Hobhole Drain, Benington Bridge to Baker's Bridge

ECC 7: Fodder Dike to Bank/Fen Bank to Broadgate

ECC 8: Broadgate to Ings Drove

ECC 9: Ings Drove to Church End Lane

ECC 10: Church End Lane to The Haven

ECC 11: The Haven to Marsh Road

N

Legend

- Order Limits
- Onshore Segment Break
- Order Limits 250 m Buffer
- Local Geological Site

Superficial Deposits

- Bank Deposits – Sand
- Bedrock at or Near Surface
- Blown Sand – Sand
- Intertidal Deposits - Sand, Silt And Clay
- Shell Bank - Sediment, Shell (Shells)
- Storm Beach Deposits - Sand And Silt
- Tidal Flat Deposits - Clay And Silt
- Tidal Flat Deposits, 1 - Clay And Silt
- Till, Devensian – Diamicton

Sources:
Superficial Geology data obtained via BGS WMS. British Geological Survey © NERC.
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Coordinate System: British National Grid

0 1 2 km

Scale: 1:50,000

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Environmental Statement

Superficial Geology

Figure 23.1.5.3

OUTER DOWSING OFFSHORE WIND

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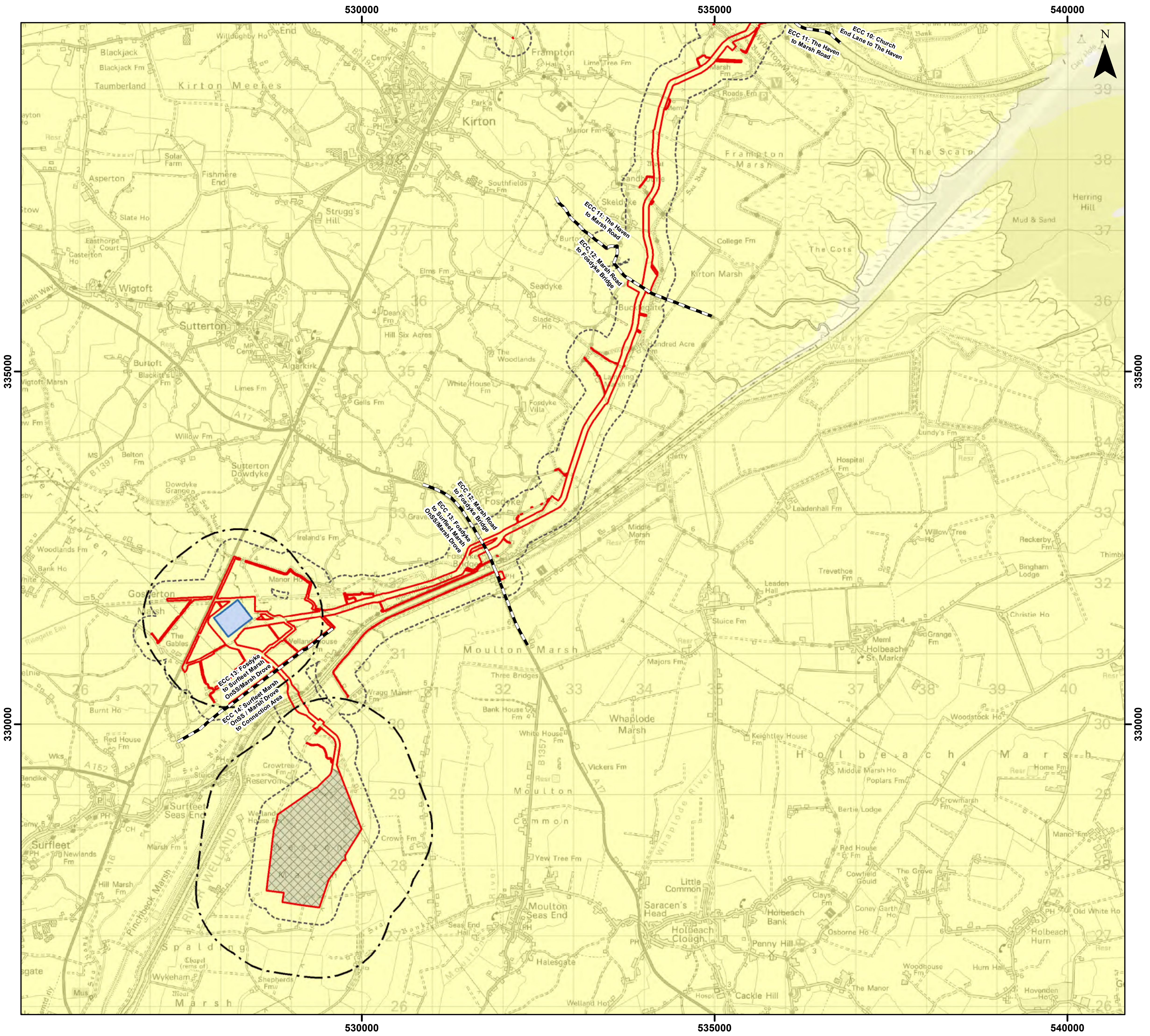

Legend

- ▭ Order Limits
- ▬ Onshore Segment Break
- ▭ Onshore Substation (OnSS) Footprint
- ▨ Connection Area
- ⬚ Order Limits 250 m Buffer
- ⬚ Onshore Substation (OnSS) and Connection Area 1 km Buffer

Superficial Deposits

- ▭ Intertidal Deposits - Sand, Silt And Clay
- ▭ Shell Bank - Sediment, Shell (Shells)
- ▭ Tidal Flat Deposits - Clay And Silt
- ▭ Tidal Flat Deposits - Clay, Silt And Sand

Sources:
Superficial Geology data obtained via BGS WMS. British Geological Survey © NERC. All Rights Reserved.

Coordinate System: British National Grid

0 1 2 km

Scale: 1:50,000

A3 Page Size

Environmental Statement

Superficial Geology

Figure 23.1.5.4

OUTER DOWSING OFFSHORE WIND

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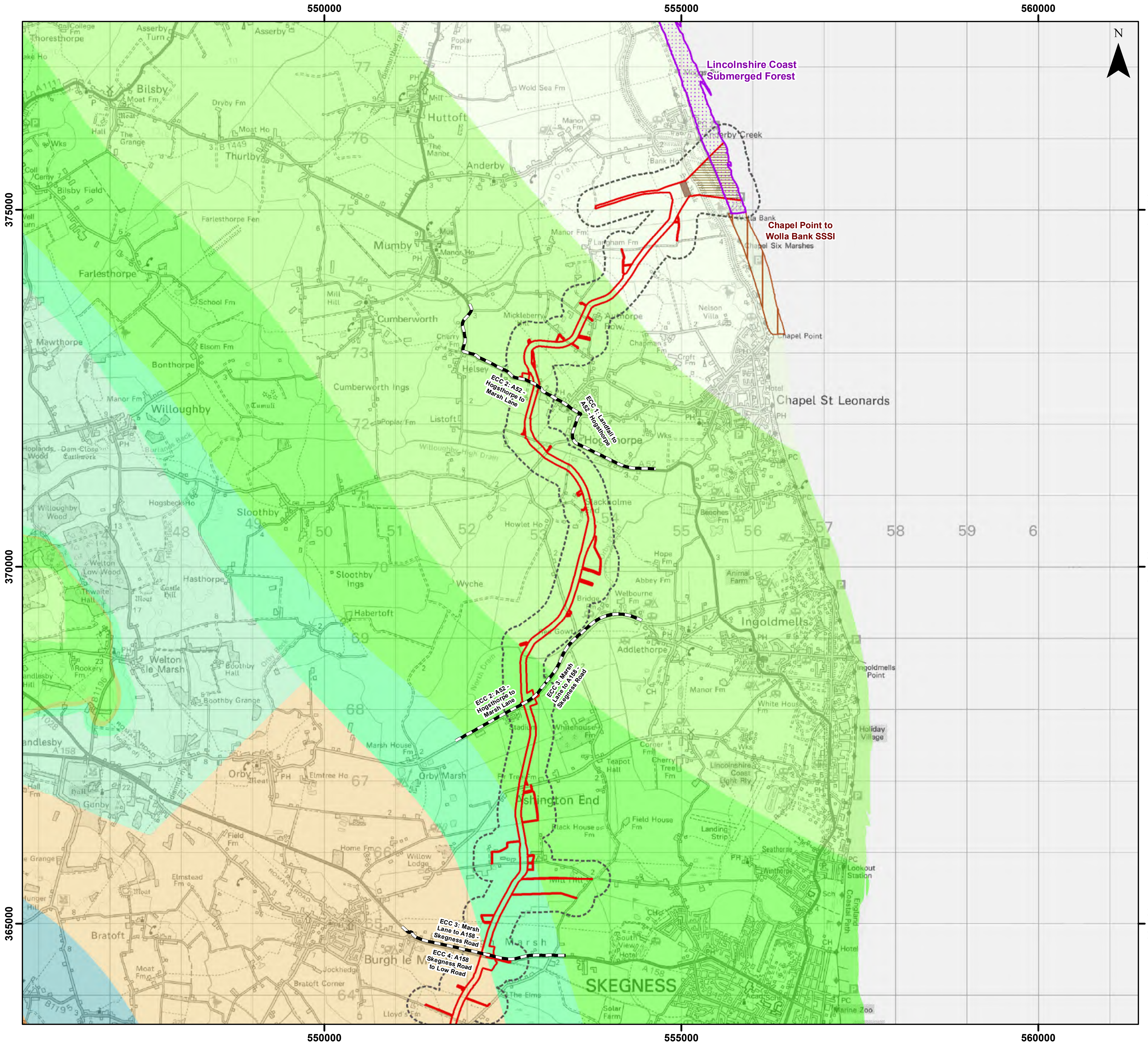

Legend

- ▭ Order Limits
- ▬ Onshore Segment Break
- ▤ Landfall Trenchless Works
- ■ Transition Joint Bay
- ⬚ Order Limits 250 m Buffer
- ▭ Site of Special Scientific Interest (SSSI) Cited for Geological Features
- ▦ Local Geological Site

Sedimentary Bedrock

Cretaceous
- 🟩 Burnham Chalk Formation – Chalk
- 🟩 Welton Chalk Formation – Chalk
- 🟩 Ferriby Chalk Formation – Chalk
- 🟨 Hunstanton Formation – Chalk
- 🟩 Carstone Formation – Sandstone
- 🟩 Roach Formation - Mudstone And Limestone, Interbedded
- 🟧 Claxby Ironstone Formation, Tealby Formation And Roach Formation - Mudstone And Limestone, Interbedded

Jurassic
- 🟦 Spilsby Sandstone Formation – Sandstone

Sources:
Bedrock Geology data obtained via BGS WMS. British Geological Survey © NERC. All Rights Reserved.

Coordinate System: British National Grid

0 1 2 km

Scale: 1:50,000

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Environmental Statement

Bedrock Geology

Figure 23.1.6.1

OUTER DOWSING OFFSHORE WIND

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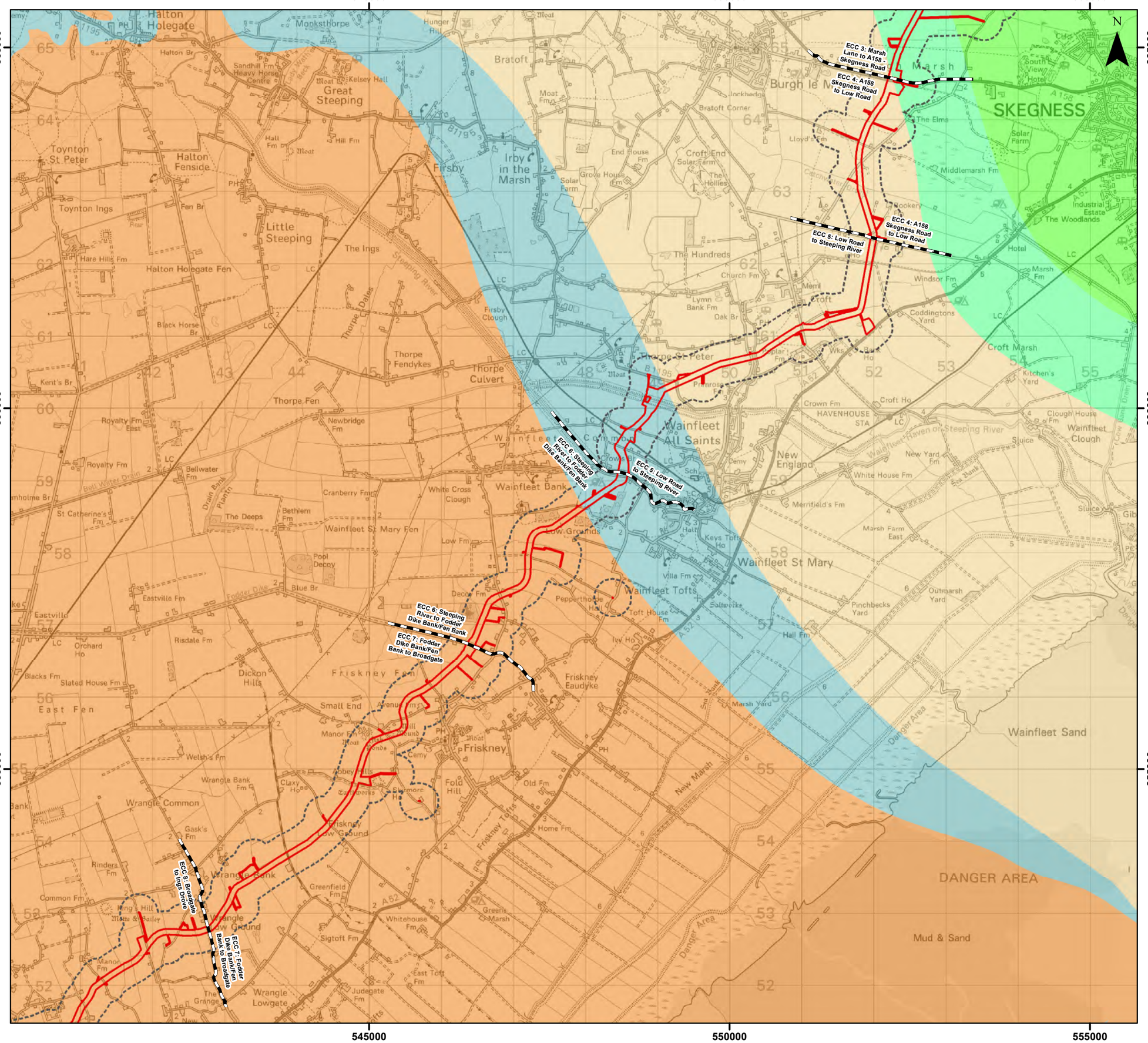

Legend

- Order Limits
- Onshore Segment Break
- Order Limits 250 m Buffer

Sedimentary Bedrock

- Ferriby Chalk Formation – Chalk
- Carstone Formation – Sandstone
- Claxby Ironstone Formation, Tealby Formation And Roach Formation - Mudstone And Limestone, Interbedded
- Spilsby Sandstone Formation – Sandstone
- Kimmeridge Clay Formation – Mudstone

Cretaceous

Jurassic

Sources:
Bedrock Geology data obtained via BGS WMS. British Geological Survey © NERC. All Rights Reserved.

Coordinate System: British National Grid

0 1 2 km

Scale: 1:50,000

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Environmental Statement

Bedrock Geology

Figure 23.1.6.2

OUTER DOWSING OFFSHORE WIND

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535000 540000 545000

350000 345000 340000

Hobhole Drain, Benington Bridge to Baker's Bridge

ECC 6: Broadgate to Ings Drove

ECC 7: Fodder Dike Bank to Broadgate

ECC 8: Broadgate to Ings Drove

ECC 9: Ings Drove to Church End Lane

ECC 8: Ings Drove to Church End Lane

ECC 10: Church End Lane to The Haven

ECC 10: Church End Lane to The Haven

ECC 11: The Haven to Marsh Road

N

Legend

- Order Limits
- Onshore Segment Break
- Order Limits 250 m Buffer
- Local Geological Site

Sedimentary Bedrock

Jurassic

- Kimmeridge Clay Formation – Mudstone
- Ampthill Clay Formation – Mudstone

Sources:
Bedrock Geology data obtained via BGS WMS. British Geological Survey © NERC. All Rights Reserved.

Coordinate System: British National Grid

0 1 2 km

Scale: 1:50,000

A3 Page Size

Environmental Statement

Bedrock Geology

Figure 23.1.6.3

OUTER DOWSING OFFSHORE WIND

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530000 535000 540000

335000

330000

ECC 10: Church End Lane to The Haven

ECC 11: The Haven to Marsh Road

ECC 12: Marsh Road to Fosdyke Bridge

ECC 13: Fosdyke to Surfleet Marsh OnSS/Marsh Drove

ECC 14: Surfleet Marsh OnSS / Marsh Drove to Connection Area

N

Legend

- Order Limits
- Onshore Segment Break
- Onshore Substation (OnSS) Footprint
- Connection Area
- Order Limits 250 m Buffer
- Onshore Substation (OnSS) and Connection Area 1 km Buffer

Sedimentary Bedrock

Jurassic

- Ampthill Clay Formation – Mudstone
- West Walton Formation - Mudstone And Siltstone
- Oxford Clay Formation – Mudstone

Coordinate System: British National Grid

0 1 2 km

Scale: 1:50,000

A3 Page Size

Environmental Statement

Bedrock Geology

Figure 23.1.6.4

OUTER DOWSING OFFSHORE WIND

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Historic Landfill Site Reference
28: Lowgate Farm
29: Lowgate Road
32: Field Farm
34: Hogsthorpe Landfill Site

550000 552500 555000 557500

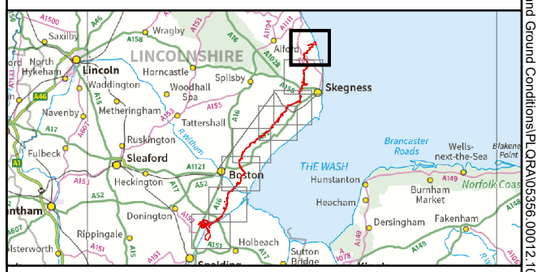
377500 375000 372500

N

Huttoft Bank
Black House Fm
Poplar Fm
Moggs Eye
Wold Sea Fm
Huttoft
Manor Fm
Anderby Creek
Bank Ho
The Manor
Anderby
Main Drain
Wolla Bank
Manor Fm
Langham Fm
Chapel Six Marshes
Mumby
Manor Ho
Mill Hill
Cumberworth
Mickleberry Hill
Authorpe Row
Nelson Villa
Chapel Point
Cherry Fm
Chapman's Fm
Croft Fm
Cumberworth Ings
Listoft
Poplar Fm
Hogsthorpe
Wks
Willoughby High Drain
Slackholme End
Howlet Ho
Beeches Fm
Hotel
Chapel St Leonards
Hope
A52
dismantled railway
ECC 1: Landfall to A52 - Hogsthorpe
ECC 2: A52 - Hogsthorpe to Marsh Lane
28
29
32
34

Legend

- Order Limits
- Onshore Segment Break
- Landfall Trenchless Works
- Transition Joint Bay Area
- Order Limits 250 m Buffer
- Order Limits 500 m Buffer
- Historic Landfill Site (Centroid)
- Historic Landfill Site (Boundary)
- Potentially Contaminative Industrial Uses (Past Land Use) Point
- Potentially Contaminative Industrial Uses (Past Land Use) Line
- Potentially Contaminative Industrial Uses (Past Land Use)
- Licensed Waste Management Facilities Location
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Water) Point
- Infilled Ground (Water) Line
- Potentially Infilled Land (Water)
- Registered Landfill Site
- Registered Waste Treatment Site
- Registered Waste Transport Site
- Substantiated Pollution Incident Register



Coordinate System: British National Grid
0 0.75 1.5 km
Scale: 1:30,000
A3 Page Size

Environmental Statement

Potential Sources of Contamination

Figure 23.1.7.1

OUTER DOWSING OFFSHORE WIND

Date: 10/07/2024
Produced By: JRS
Revision: 1.1

SLR

Historic Landfill Site Reference

34: Hogsthorpe Landfill Site
37: School Lane
42: Rear of Claremont Road
43: Gravel Pit
44: Former Gravel Pit adjacent to Gravel Pits Farm
45: West Way
46: Old Brick Pit
47: Old Brick Pits

550000 552500 555000

370000 367500 365000

N

Legend

- Order Limits
- Onshore Segment Break
- Order Limits 250 m Buffer
- Order Limits 500 m Buffer
- Historic Landfill Site (Centroid)
- Historic Landfill Site (Boundary)
- Potentially Contaminative Industrial Uses (Past Land Use) Point
- Potentially Contaminative Industrial Uses (Past Land Use)
- Licensed Waste Management Facilities Location
- Licensed Waste Management Facilities Landfill Boundary
- Potentially Infilled Land (Water) Point
- Infilled Ground (Water) Line
- Registered Landfill Site
- Substantiated Pollution Incident Register

Coordinate System: British National Grid

0 0.75 1.5 km

Scale: 1:30,000 A3 Page Size

Environmental Statement

Potential Sources of Contamination

Figure 23.1.7.2

OUTER DOWSING OFFSHORE WIND

Date: 10/07/2024
Produced By: JRS
Revision: 1.1

SLR

Historic Landfill Site Reference
52: Field south of A52
53: Green Hill
54: Chainbridge Farm
56: O.S. Field No.4900
59: Old Fen Road

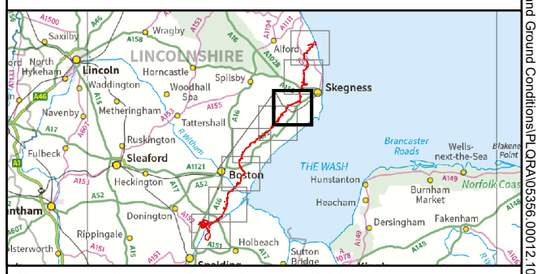
547500 550000 552500

362500 360000 357500

N

Legend

- Order Limits
- Onshore Segment Break
- Order Limits 250 m Buffer
- Order Limits 500 m Buffer
- Historic Landfill Site (Centroid)
- Historic Landfill Site (Boundary)
- Potentially Contaminative Industrial Uses (Past Land Use) Point
- Potentially Contaminative Industrial Uses (Past Land Use) Line
- Potentially Contaminative Industrial Uses (Past Land Use)
- Licensed Waste Management Facilities Location
- Licensed Waste Management Facilities Landfill Boundary
- Potentially Infilled Land (Non-water) Point
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Water) Point
- Infilled Ground (Water) Line
- Registered Landfill Site
- Registered Waste Treatment Site
- Registered Waste Transport Site
- Substantiated Pollution Incident Register



Coordinate System: British National Grid

0 0.75 1.5 km

Scale: 1:30,000 A3 Page Size

Environmental Statement

Potential Sources of Contamination

Figure 23.1.7.3

OUTER DOWSING OFFSHORE WIND

Date: 10/07/2024
Produced By: JRS
Revision: 1.1

SLR

Historic Landfill Site Reference
53: Green Hill
54: Chainbridge Farm
56: O.S. Field No.4900
59: Old Fen Road
60: Pet Crematorium
61: Land to East of Main Road

542500 545000 547500 550000

360000 357500 355000 352500

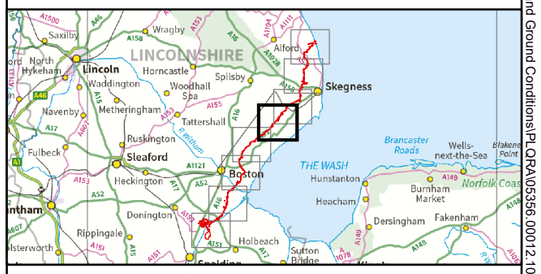
Thorpe Fen
Newbridge Fm
Wainfleet Common
Wainfleet All Saints
Crow's Br
Cemy
New England
Drain Bank
Plantn
Cranberry Fm
White Cross Clough
Wainfleet Bank
The Deeps
Bethlem Fm
Wainfleet St Mary Fen
Low Grounds
Keys Toft Ho
Low Fm
Pool Decoy
Villa Fm
Wainfleet Tofts
Eastville Fm
Fodder Dike
Blue Br
Decoy Fm
Pepperthorpe Hall
Saltworks
Decoy Wood
Toft House Fm
Risdale Fm
Ivy Ho
A52
Hall Fm
Dickon Hills
Friskney Fen
Friskney Eaudyke
Small End
Avenue Fm
Marsh Yard
Manor Fm
Moat
Mill Mound
Fish Ponds
Friskney
Welsh's Fm
Cemy
Abbey Hills
Earthworks
Wrangle Bank Fm
Claxy Hall
Skirmore Ho
Fold Hill
Old Fm
New Marsh
Friskney Tofts
Home Fm
Gask's Fm
Friskney Low Ground
Wrangle Bank
Greenfield Fm
Greens Marsh
Whitehouse Fm
Hill Bailey
Wrangle Low Ground
Sigtoft Fm
Danger Area
East Toft Fm
The Grange
Wrangle Lowgate
Judegate Fm

ECC 5: Low Road to Stepping River
ECC 6: Stepping River to Fodder Dike Bank/Fen Bank
ECC 7: Fodder Dike Bank/Fen Bank to Broadgate
ECC 8: Broadgate to Ings Drove

53 54 56 59 60 61

Legend

- Order Limits
- Onshore Segment Break
- Order Limits 250 m Buffer
- Order Limits 500 m Buffer
- Historic Landfill Site (Centroid)
- Historic Landfill Site (Boundary)
- Potentially Contaminative Industrial Uses (Past Land Use) Point
- Potentially Contaminative Industrial Uses (Past Land Use) Line
- Potentially Contaminative Industrial Uses (Past Land Use)
- Potentially Infilled Land (Water) Point
- Infilled Ground (Water) Line
- Registered Landfill Site



Coordinate System: British National Grid

0 0.75 1.5 km

Scale: 1:30,000 A3 Page Size

Environmental Statement

Potential Sources of Contamination

Figure 23.1.7.4

OUTER DOWSING OFFSHORE WIND

Date: 10/07/2024
Produced By: JRS
Revision: 1.1

SLR

Historic Landfill Site Reference
62: Hall Lane

537500 540000 542500

352500 350000 347500

ECC 8: Broadgate to Ings Drove
ECC 9: Ings Drove to Church End Lane
ECC 7: Fodder Dike Bank/Fen Bank to Broadgate

Legend

- Order Limits
- Onshore Segment Break
- Order Limits 250 m Buffer
- Order Limits 500 m Buffer
- Historic Landfill Site (Centroid)
- Historic Landfill Site (Boundary)
- Potentially Contaminative Industrial Uses (Past Land Use) Point
- Potentially Contaminative Industrial Uses (Past Land Use)
- Licensed Waste Management Facilities Location
- Potentially Infilled Land (Water) Point
- Infilled Ground (Water) Line
- Local Authority Landfill Sites

Coordinate System: British National Grid

0 0.75 1.5 km

Scale: 1:30,000 A3 Page Size

Environmental Statement

Potential Sources of Contamination

Figure 23.1.7.5

OUTER DOWSING OFFSHORE WIND

Date: 10/07/2024
Produced By: JRS
Revision: 1.1

SLR

Historic Landfill Site

62: Hall Lane
66: Burgess Pit
67: Richmond House and former Council Depot
70: Bath Garden
72: Former Salvage Depot
73: Old Golf Course
74: Boston Landfill Site
75: Boston Landfill Site

535000 537500 540000

347500 345000 342500 340000

BOSTON
Leverton
Leverton Lucasgate
The Grange
West End
Benington
Benington Sea End
Butterwick
Freiston
Freiston Shore
Tamworth Green
Cold Harbour
Coupledyke Hall
Haltoft End
Brand End
Willoughby Hills
Fishtoft
Skirbeck
Rochford Tower
Wybert's Castle Earthwork
Havenside Country Park
North Sea Camp (HM Prison)
Freiston Low
Glebe Fm
White Loaf Hall
Butterwick Ings Fm
Long Hedges
Baker's Br
Oak Ho
Round Ho
Burton Corner
Hall
Hospl
Sch
Hotel
Mill
Tower
Coll
Dock
Ind Est
Woad Fm
Crawford's Fm
Marsh Fm
Miramar Ho
Scrane End
Nunn's Br
Freiston Br
Wks
Mem
Sea Bank
Seal Bank
Cross Britain Way
Sewer Way
Drain
A16
A52
B1183
ECC 10: Church End Lane to The Haven
ECC 9: Ings Drove to Church End Lane
ECC 11: The Haven to Marsh Road

Legend

- Order Limits
- Onshore Segment Break
- Order Limits 250 m Buffer
- Order Limits 500 m Buffer
- Historic Landfill Site (Centroid)
- Historic Landfill Site (Boundary)
- BGS Recorded Landfill Site
- Potentially Contaminative Industrial Uses (Past Land Use) Point
- Potentially Contaminative Industrial Uses (Past Land Use)
- Licensed Waste Management Facilities Location
- Licensed Waste Management Facilities Landfill Boundary
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Water) Point
- Infilled Ground (Water) Line
- Potentially Infilled Land (Water)
- Local Authority Landfill Sites
- Registered Waste Treatment Site
- Registered Waste Transport Site
- Substantiated Pollution Incident Register

Coordinate System: British National Grid

0 0.75 1.5 km

Scale: 1:30,000 A3 Page Size

Environmental Statement

Potential Sources of Contamination

Figure 23.1.7.6

OUTER DOWSING OFFSHORE WIND

Date: 10/07/2024
Produced By: JRS
Revision: 1.1

SLR

Historic Landfill Site Reference

78: Holbeach Marsh WDS
80: Moulton Marsh Landfill Site
81: Middle Marsh Road
82: North of Moulton Sluice
83: Main Drain
84: Middle Marsh Road

530000 532500 535000 537500

340000 337500 335000 332500

BOSTON DISTRICT

HAVEN

Frampton Hall
Lime Tree Fm
Marsh Fm
Roads Fm
Meml
Wyberton Marsh
Sea Bank
Marsh Fm
North Sea Camp (HM Prison)
ECC 10: Church End Lane to The Haven
ECC 11: The Haven to Marsh Road
Park's Fm
Kirton
PH
Sch
Manor Fm
Frampton Marsh
The Scalp
Mount
Sandholme
Southfields Fm
Skeldyke
Sea Bank
ECC 11: The Haven to Marsh Road
ECC 12: Marsh Road to Fosdyke Bridge
Burton Ho
College Fm
The Cots
Kirton Marsh
Elms Fm
Seadyke
Bucklegate
Dean's Fm
Hill Six Acres
Slade Ho
Hundred Acre Fm
The Woodlands
Lamming's Marsh Fm
White House Fm
Gells Fm
Fosdyke Villa
Fosdyke Wash
78
Lundy's Fm
Jetty
80
81
82
83
84
Hospital Fm
Resr
Leadenhall Fm
Willow Tree Ho
Middle Marsh Fm
Graves Fm
Cemy
Fosdyke
ECC 12: Marsh Road to Fosdyke Bridge
ECC 13: Fosdyke to Surfleet Marsh Ons&Marsh Drove
Fosdyke Bridge
Trevethoe Fm
Leaden Hall

Legend

- Order Limits
- Onshore Segment Break
- Order Limits 250 m Buffer
- Order Limits 500 m Buffer
- Historic Landfill Site (Centroid)
- Historic Landfill Site (Boundary)
- BGS Recorded Landfill Site
- Potentially Contaminative Industrial Uses (Past Land Use) Point
- Potentially Contaminative Industrial Uses (Past Land Use)
- Licensed Waste Management Facilities Location
- Potentially Infilled Land (Water) Point
- Infilled Ground (Water) Line
- Potentially Infilled Land (Water)
- Registered Landfill Site
- Substantiated Pollution Incident Register

Coordinate System: British National Grid

0 0.75 1.5 km

Scale: 1:30,000

A3 Page Size

Environmental Statement

Potential Sources of Contamination

Figure 23.1.7.7

OUTER DOWSING OFFSHORE WIND

Date: 10/07/2024
Produced By: JRS
Revision: 1.1

SLR

Historic Landfill Site Reference
80: Moulton Marsh Landfill Site
81: Middle Marsh Road
82: North of Moulton Sluice
83: Main Drain
84: Middle Marsh Road
89: Surfleet Bank
97: Fox and Hounds

527500 530000 532500

332500 330000 327500

Legend

- Order Limits
- Onshore Segment Break
- Onshore Substation (OnSS) Footprint
- Connection Area
- Order Limits 250 m Buffer
- Order Limits 500 m Buffer
- Onshore Substation (OnSS) and Connection Area 1 km Buffer
- Historic Landfill Site (Centroid)
- Historic Landfill Site (Boundary)
- BGS Recorded Landfill Site
- Potentially Contaminative Industrial Uses (Past Land Use) Point
- Potentially Contaminative Industrial Uses (Past Land Use) Line
- Potentially Contaminative Industrial Uses (Past Land Use)
- Licensed Waste Management Facilities Location
- Licensed Waste Management Facilities Landfill Boundary
- Potentially Infilled Land (Water) Point
- Infilled Ground (Water) Line
- Potentially Infilled Land (Water)
- Registered Landfill Site
- Substantiated Pollution Incident Register

Coordinate System: British National Grid

0 0.75 1.5 km

Scale: 1:30,000 A3 Page Size

Environmental Statement

Potential Sources of Contamination

Figure 23.1.7.8

OUTER DOWSING OFFSHORE WIND

Date: 10/07/2024
Produced By: JRS
Revision: 1.1

SLR

23.4.5 Environmental Search Data

24. Digital GIS Landmark Envirocheck information has been obtained and reviewed. A summary of the findings from the search information

Table 23.4: Environmental Search Information

Land-use / Activity	Search Information
Historical Industrial Sites	There are no records of historical potentially contaminative land uses within the Order Limits. Within 2km of the Order Limits: • ECC1 - Clay bricks and tiles and sewage – Anderby Creek • ECC1 - Clay and bricks, Gas manufacture and distribution, Sewage – Hogsthorpe • ECC3 - Unspecified factory or works – Bowmans Business Park • ECC5 - Clay bricks and tile manufacture and Sewage – Burgh le Marsh • ECC5 - Electricity production & distribution inc large transformers – Middle Marsh Road • ECC5 - Unspecified sewage - Middlemarsh Landfill Site • ECC 6 -Storit - Caravan Storage – Church Lane, Croft • ECC6 - Unspecified factory or works – Bank House farm • ECC6 - Brewing and Malting - Wainfleet St Mary • ECC9 - Unspecified factory or works – Butterwick • ECC9 - Unspecified factory or works – Freiston • ECC13 – Road Haulage - Surfleet
Historic Landfill Sites	Approximate distance from Order Limits shown: • ECC1 – Lowgate Farm (25m) - unknown and household waste • ECC1 – Lowgate Road (30m) - unknown and household waste • ECC2 – Field Farm Hogsthorpe (On-Site) – commercial and household between 1984 and 1994 • ECC2 – Hogsthorpe Landfill (265m) – multiple types of waste stream between 1984 and 1994 • ECC6 – Scaldgate (170m) – inert waste • ECC6 – Old Fen Road (200m) • ECC13 – Surfleet Bank (Inert) (750m) - registered between 1993 and 2006, accepting inert materials.
Records of historical potentially contaminative land use within 250m of the Site	• ECC1 – one heap, unknown constituents • ECC11 – transport support and cargo handling
Historical Tanks	There are no historical tanks recorded on Order Limits.

Land-use / Activity	Search Information
Historical Energy Features	There are no records of historical energy features within 500m of the Order Limits.
Historical Petrol Stations	There are no records of petrol stations recorded within 250m.
Historical Garages	There are no records of historical garages within 250m of the Order Limits.
Waste and Landfill Sites	Registered Landfill Sites: • ECC5 - Middlemarsh Landfill Site – FCC Environmental Ltd • ECC13 – Surfleet Bank - Birse Construction ltd 750m from substation boundary • ECC12 - Boston Landfill Site – Lincwaste Ltd (1km) • ECC12 – Moulton Marsh Landfill Site – Lincolnshire County Council (1.05km)
Current Industrial Sites	• ECC1 – unspecified works • ECC2 – two records, general construction, farming • ECC8 – one tank present c.120m from the Order Limits • ECC11 – one tank present on track, not cable route, one record of water pumping station • ECC12 – one tank present c.140m from site
Current Petrol and Fuel Sites	There are no records of current petrol or fuels sites within 250m.
Environmental Permits	There are no records of environmental permits, authorisations or sites determined as contaminated land within 500m
Licensed Discharge Consents	There are records of licensed discharge consents within 250m of the Order Limits in sections: • ECC1 – one recorded as unknown discharge • ECC2 – three recorded as unknown and sewage • ECC3 – one recorded sewage • ECC4 – one recorded as trade discharge • ECC5 – eight recorded as sewage or unknown • ECC9 – one recorded as trade discharge • ECC10 – one recorded as sewage discharge • ECC11 - one recorded as sewage • ECC12 - one recorded as sewage
Licenced pollutant release	There are no records of licensed pollutant release.
EA Recorded Pollution Incidents	There is no record of pollution incidents within 500m of the Order Limits.
Designated Environmentally Sensitive Sites	The Chapel Point – Wolla Bank Site of Special Scientific Interest (SSSI) & Geological Conservation Review (GCR) and the Lincolnshire Coast Submerged Forest Local Geological Site (LGS) are present within the landfall ECC1 section. These sites are situated adjacent to each other along the coastal beach and shoreline between Chapel St Leonards and Sutton-

Land-use / Activity	Search Information
	on-Sea. There are also local wildlife sites associated with further inland surface waters within the Order Limits.

23.4.6 History

25. The following section presents a summary of the history of the Order Limits and its surrounds from a review of historic OS map extracts and aerial images. The age and general type of activity and land use can often be determined from the type and layout of structures depicted on the maps and aerial images. However, specific elements of site operations cannot normally be determined from such extracts. Large-scale (1:2,500 and 1:10,560) historical map extracts were reviewed for selected years between 1885 and 2023.

26. The Order Limits has existed as a series of open fields used for agricultural purposes with a network of open farmland and associated dwellings, watercourses and field drainage, agricultural farm tracks, main roads and a railway from the first reviewed map in 1885.

27. The immediate surroundings appear to have no significant changes over a period of time until present day, with the exception of some urban areas increasing in size where residential properties have been developed and extended nearby towns. There has been some localised industrial development (unspecified factory and works, brick and tile manufacture), landfilling and waste activity, however, this has generally not occurred within the 250m buffer of the Order Limits where the predominant land use has remained as agricultural.

23.4.7 Unexploded Ordnance (UXO)

28. The Zetica UXO mapping indicates the potential for UXO to be present as a result of WW2 bombing. The study area is identified as a Low-Risk site. Therefore, this is not considered further within this assessment.

23.4.8 Site Walkover

29. A walkover survey of the Study Area was undertaken in March 2023. This survey was undertaken by SLR with access to the OnSS location and Onshore ECC obtained on foot.

30. In summary, the majority of the Order Limits are located across agricultural land. The majority of the surrounding areas comprised open undeveloped agricultural land, with

farming and residential properties occasionally located in low-density proximity. No potential significant contaminant sources or land uses were identified during the walkover that could impact on the study area.

23.4.9 Summary

31. The majority of the Order Limits is underlain by tidal mudflats (unproductive stratum), with localised areas of glacial diamicton (Till) and glaciofluvial deposits (secondary A aquifers) in northern areas;

32. The Bedrock Geology underlying the Order Limits is recorded as a series of chalk (Principal aquifer), sandstone (Principal aquifer), ironstone (Secondary B aquifer) and mudstone (unproductive stratum) deposits from north to south;

33. The north of the Order Limits is located within a groundwater Source Protection Zone 3 (SPZ3).

34. There are a high number of surface water courses, drains and ditches that the Order Limits crosses through, with the Steeping River, Orby River, Steeping River, the Haven and the River Welland identified.

35. There are a number of surface water abstractions located within the Order Limits;

36. There are no SSSI's or nationally significant nature reserves within the Order Limits, however, there are local nature reserves and other natural areas of interest;

37. The Order Limits are listed as being within a Zone 2/3 floodplain.

38. There is a negligible to very low risk from ground stability hazards within the Order Limits, with the exception of compressible deposits and running sands which are moderate;

39. There are numerous roads which cross through the Order Limits and one railway line which crosses at Wainfleet All Saints;

40. There are no built-up areas of development or commercial/industrial land use through which the Order Limits is located;

41. There are a number of recorded areas of made ground and landfill located within the Order Limits;

42. The majority of the Order Limits does not require radon protection measures, with the exception of an area located near Wainfleet All Saints and Wainfleet St Mary associated with the Spilsby Sandstone Formation;

43. There are no known recorded pollution incidents that could impact the Order Limits.

23.5 Preliminary Conceptual Site Model

23.5.1 Contaminant Linkage Approach

44. UK contaminated land statutory guidance for the assessment of land contamination under Part 2A of the Environmental Protection Act (1990) requires potential sources, pathways and receptors to be considered within the context of contaminant or pollutant linkages.

45. The statutory guidance for Part 2A, DEFRA Circular 04/12, defines a Contaminant as:

"a substance which is in, on or under the land and which has the potential to cause significant harm to a relevant receptor, or to cause significant pollution of Controlled Waters".

46. The statutory guidance for Part 2A, DEFRA Circular 04/12, defines a Pathway as:

"a route by which a receptor is or might be affected by a contaminant".

47. The statutory guidance for Part 2A, DEFRA Circular 04/12, defines a Receptor as:

"something that could be adversely affected by a contaminant, for example, a person, an organism, an ecosystem, property, or Controlled Waters."

48. In addition, a contaminant linkage must be demonstrated as having the potential of causing 'significant harm', the 'significant potential of significant harm' or the pollution of controlled waters prior to it being determined as contaminated land.

49. An evaluation of the risks associated with each linkage should drive decisions regarding the status of the land as uncontaminated, requiring further investigation/assessment or contaminated and requiring remediation. Where the PLQRA indicates a low or negligible risk, no further investigation is recommended. SLR's approach to PLQRA including the regulatory context is included in Annex 1.

50. This report section uses the information gathered in previous sections and aims to identify the potential Contaminants, Pathways and Receptors present with respect to the site and assess their significance and acceptability.

23.5.2 Sources

51. The data and information references summarised in Section 23.3 have been used to identify the likely contaminant sources, receptors and pathways present at the Order Limits. The elements of the preliminary conceptual site model (PCSM) have been used to consider the potential contaminant linkages (PPL), their significance and acceptability.

52. Whilst the historical maps do not show evidence of potentially significant contaminative land use within the study area it should be recognised that agricultural land use may result in land contamination. Contamination from such use may occur from a number of activities and include, for example, usage of pesticides and fertilizers, small spillages and leakages of fuel or oil and deposition of waste materials in or onto land.

53. A number of landfills have been identified within the Order Limits. The historic landfill within ECC2 at Field Farm poses a localised area of higher potential risk as this is located within the cable route corridor. The landfill is recorded to contain commercial and household waste.

54. It has however been identified on British Geological Survey (BGS) mapping that there is made ground present within areas of the Order Limits, and there may be other areas of unrecorded made ground or landfilling/raising. There is a possibility for historical structures such as sheds, outhouses and barns introducing the presence of made ground in localised areas along the route that are not mapped. Construction and demolition materials could be encountered in such areas.

55. As such, it should be recognised there may be areas of unmapped or unrecorded areas of activity that may have impacted ground and groundwater conditions within the Order Limits

that could be encountered during below-ground construction works as the Project progresses.

56. Figure 23.1.7 shows the potential sources of contamination within and surrounding the Order Limits.

Table 23.5 Potential Sources of Contamination

Potential Source	Potential Contaminants of Concern (PCoC)
Landfill	Areas of landfilling have been identified within or close to the Order Limits. The waste has been recorded as inert, household, and commercial however there are also unrecorded inputs registered. There may therefore be a range of PCoC including asbestos, metals, and hydrocarbons could be associated with these areas.
Made Ground	BGS mapping identified the presence of made ground. This could comprise a mixture of construction/demolition (brick, concrete), ashy material, organic (wood, timber) and reworked natural ground. A range of PCOC, including asbestos, metals, and hydrocarbons could be present.
Agricultural / Unrecorded land-raise	In addition to herbicides and pesticides, it is not uncommon for discarded material to be buried on farmland such as demolition rubble associated with remodelling works and can include asbestos sheeting and old farm machinery.
Infrastructure - Rail	Active and historical railway activity is a potential source of contamination. These activities are historically associated with herbicides, metals, hydrocarbons and sulphates. A range of PCOC, including asbestos, can also be associated with the materials used within the track bedding material and fill used in the formation of embankments.
Infrastructure - Road	Road construction may comprise tarmac, asphalt, granular sub-base and roadstone gravel. It is possible some areas may have been raised using construction/demolition materials. A range of PCOC, including asbestos, metals, and hydrocarbons could be present.
Electricity substations and pylons	Potential sources of PCBs and oils associated with possible electrical equipment, plant, interceptors and oil storage tanks.
Unspecified works	A number of unspecified works have been recorded within close proximity to the Order Limits. A range of PCOC may be associated with these areas.
Unspecified tanks	A number of unspecified tanks have been recorded within close proximity to the Order Limits. A range of PCOC may be associated with these areas.

57. Following a review of available information, potential sources of contamination are present that should be considered in the risk assessment. These can be summarised as:

- S1 – natural sources such as radon, organic soils
- S2 – known landfill
- S3 – transport infrastructure (road and rail)
- S4 – energy infrastructure (electricity substations and pylons)
- S5 – made ground / previous phases of development
- S6 – unspecified works / unspecified tanks
- S7 – unknown or unmapped areas of burial or land-raise

23.5.3 Pathways

58. Potential environmental fate[2] and exposure pathways specific to the Order Limits are:

- Human Health
  - P1 – Direct dermal contact
  - P2 - Ingestion and inhalation of contaminated soils/dusts
  - P3 – Inhalation of ground gases/vapours
- Controlled Waters
  - P4 – Infiltration and leaching of soil contaminants to groundwater
  - P5 – Vertical and lateral migration of contaminants in groundwater
  - P6 – Vertical and lateral migration of contaminants in groundwater to surface water
  - P7 – Overground/surface run-off water flows to surface waters
- Infrastructure
  - P8 – Accumulation of ground gases/vapours
  - P9 – Degradation of buried infrastructure due to aggressive ground conditions

23.5.4 Receptors

59. Potential receptors specific to the Order Limits are:

- Human Health
  - R1 – Construction/maintenance workers
  - R2 – Farming, neighbouring land users
- Controlled Waters
  - R3 – Groundwater: Principal, Secondary A and Secondary B Aquifers

[2] Fate and transport – refers to how the nature of contaminants might change (chemically, physically, or biologically), attenuate/degrade and how and where they may migrate as they move through the soil, water and air environment.

- R4 – Surface water: Main river networks (Orby River, Steeping River, The Haven, The River Welland); non-main and ordinary watercourses; agricultural field drainage

- Ecological
  - R5 – Designated Sites: water-dependent ecological habitats (SSSI's); local wildlife sites
  - Property
  - R6 – Property: cables and associated energy infrastructure
  - R7 – Property: livestock grazing, field crops

23.5.5 Qualitative Risk Assessment

60. UK contaminated land statutory guidance and associated supporting guidance documents including LCRM[3] and R&D66[4] recommend that a qualitative assessment of risk should be provided for each identified potential contaminant linkage (PCL) in order to determine any risk management actions. Qualitative assessment has been completed according to the methodology set out in Annex 1.

61. Risk is based on a consideration of both:

- The likelihood of an event (probability); [takes into account both the presence of the hazard and receptor and the integrity of the pathway]; and
- The severity of the potential consequence [takes into account both the potential severity of the hazard and the sensitivity of the receptor].

62. In order to then determine the risk to the identified receptor, both the likelihood and severity of the potential hazard are considered in line with the matrix in Annex 4 of R&D66. Error! Reference source not found. summarises the CSM and provides a contaminant linkage assessment.

[3] Land Contamination Risk Management (LCRM), 2020.

[4] Guidance for the Safe Development of Housing, R&D66, DEFRA, EA, CIEH 2008

Table 23.6: Preliminary Conceptual Site Model & Contaminant Linkage Assessment

Source	Pathway	Receptor	Consequence	Likelihood	Risk Classification
• S1 – natural sources (radon, organic soils) • S2 – landfill • S3 – transport infrastructure (road and rail) • S4 – energy infrastructure (electricity substations, pylons) • S5 – made ground / previous development • S6 – unspecified works/tanks • S7 – unmapped burial / landraise	• P1 – Direct dermal contact • P2 - Ingestion and inhalation of contaminated soils/dusts • P3 – Inhalation of ground gases/vapours	• R1 – Construction / maintenance workers	• Health Impact – Medium	• Low	Moderate / Low Risk Construction workers have the potential to be exposed to contaminants if any are present during groundworks excavations. Exposure risks to construction workers will be addressed via Contractor Health and Safety Plans and Risk Assessments as part of Health and Safety requirements. There will also be supporting documents such as the Construction Environmental Management Plan (CEMP) which will also detail required mitigation measures such as monitoring of dust and clean/dirty areas for contractor welfare. A Remediation / Discovery Strategy and watching brief will be put in place to identify potentially contaminated material so that it can be dealt with should it be uncovered. It is therefore considered that with such controls in place that exposure risks will be suitably mitigated. It is recommended that this report is shared with groundworks and enabling contractors to ensure they have an understanding of the site history and setting and potential ground contamination risk issues that they could need to deal with. Exposure risks to construction workers will be addressed via Contractor Health and Safety Plans and Risk Assessments as part of Health and Safety requirements.
• S2 – landfill • S5 – made ground • S7 – unmapped burial / landraise	• P1 – Direct dermal contact • P2 - Ingestion and inhalation of contaminate	• R2 – Farming, neighbouring land users	• Health Impact – Medium	• Low	Low Risk There are farming properties within and in areas surrounding the Order Limits. However, the cable route has been designed to avoid the presence of building structures and other built property. No demolition is required along the route and it is not anticipated that significant areas of previously developed land will be encountered. The predominant land use is agricultural land for grazing and field crops. The potential exposure pathways to farm users

Source	Pathway	Receptor	Consequence	Likelihood	Risk Classification
	d soils / dusts				are considered to be the release of airborne dusts that could be transported and deposited in residential properties immediately closest to the Order Limits. The works within the Order Limits will be undertaken in a controlled way and in accordance with other supporting documents such as the CEMP. A Remediation / Discovery Strategy and watching brief will be put in place to identify potentially contaminated material so that it can be dealt with should it be uncovered. Mitigation measures will be put in place to monitor and control airborne/dust exposure risks. Exposure risk will be mitigated through health & safety working practices and a CEMP. A Remediation / Discovery Strategy should be prepared prior to works commencing and a watching brief implemented to deal with any unexpected contamination.
• S2 – landfill • S3 – transport infrastructure (road and rail) • S4 – energy infrastructure (electricity substations, pylons) • S5 – made ground / previous development • S6 – unspecified works / tanks • S7 – unmapped burial / landraise	• P4 – Infiltration / leaching of soil • P5 – Vertical and lateral migration in groundwater	• R3 – Groundwater: Principal, Secondary A and Secondary B Aquifers	• Groundwater - Medium	• Low	Low Risk Sensitive groundwater resources have been identified to underlie areas of the Order Limits and the ground conditions are such that they could allow the migration of contaminants if present. Potential isolated sources have been identified which could be present within or near to the Order Limits. Construction activities associated with the proposed development include trenching, horizontal directional drilling and piling (if required) have the potential to disturb existing contamination and/or create preferential pathways which could result in contaminant migration to sensitive water resources. There is potential for ground to be excavated and hardcover removed in areas that could increase infiltration during construction, although this is considered to be relatively localised and of short duration. Excavation of potentially contaminated material in stockpiles could impact on groundwater from leaching, however good practice measures will be implemented in accordance with the

Source	Pathway	Receptor	Consequence	Likelihood	Risk Classification
					CEMP. Dewatering of excavations will need to be undertaken in accordance with EA permit requirements. A Remediation / Discovery Strategy and watching brief will be put in place to identify potentially contaminated such material so that it can be dealt with should it be uncovered. Material used to backfill infrastructure will be suitable for use under a Material Management Plan (MMP) and therefore there will be betterment of existing conditions and a potential contaminant risk that has been removed. Migration risk and impact on groundwater will be mitigated following good practice measures in a CEMP. This will include materials re-use, stockpile management and dewatering. A Remediation / Discovery Strategy will be prepared prior to works commencing and a watching brief implemented to deal with any unexpected contamination and provide betterment. An MMP will track suitability of material.
	• P6 – Vertical and lateral migration in groundwater to surface water • P7 – Overground / surface run-off water flows	• R4 – Surface water: Main rivers (Orby River, Steeping River, The Haven, The River Welland); non-main and ordinary watercourses; agricultural field drainage	• Surface Water - Medium	• Medium	Moderate Risk In areas in close proximity to surface waters there is the risk that during construction works runoff from exposed contaminated soils may occur which could transport contaminated sediments or dissolved contaminants to nearby surface waters. Construction activities associated with the proposed development include trenching, horizontal directional drilling and piling (if required) which have the potential to disturb existing contamination and/or create preferential pathways within groundwater which could result in lateral contaminant migration to sensitive surface waters. The management of excavation arisings and stockpiling will follow good practice measures in accordance with the CEMP. Dewatering of excavations will need to be undertaken in accordance with EA permit requirements. A Remediation / Discovery Strategy and watching brief will be put in place to identify potentially contaminated such

Source	Pathway	Receptor	Consequence	Likelihood	Risk Classification
					material so that it can be dealt with should it be uncovered. Material used to backfill infrastructure will be suitable for use under an MMP and therefore there will be betterment of existing conditions and a potential contaminant risk that has been removed. A Soil Management Plan (SMP) will be developed to mitigate potential silt/sediment flows into surface waters. Migration risk and impact on surface water will be mitigated following good practice measures in a CEMP. This will include excavation, materials re-use, stockpile management and dewatering. A Remediation / Discovery Strategy will be prepared prior to works commencing and a watching brief implemented to deal with any unexpected contamination and provide betterment. An MMP will track suitability of material and SMP will control silt/sediment flows to surface water.
	• P6 – Vertical and lateral migration in groundwater to surface water • P7 - Overground water flows	• R5 – Designated Sites: water dependent ecological habitats; local wildlife sites; geological conservation	• Ecological - Medium	• Low	Low Risk The Chapel Point – Wolla Bank Site SSSI & GCR and the Lincolnshire Coast Submerged Forest LGS are present within the landfall area. There are local wildlife sites within the Order Limits, and water dependent habitats in the surrounding area. Construction activities could disturb contamination, if present, which could result in the migration of contamination via leaching, groundwater transport and physical transport by surface runoff, which could impact upon surface water ecological sensitivities. The management of construction activities on site will therefore need to be aware of sensitive habitats and the requirement to protect such water dependant biodiversity. Trenchless techniques will be used to install the onshore cable from a temporary construction compound (TCC) on landfall situated on the beach to a compound on the western site of Roman Bank Road. Mitigation measures will follow

Source	Pathway	Receptor	Consequence	Likelihood	Risk Classification
					those for the protection of controlled waters which will include the management of excavation arisings and stockpiling to follow good practice measures in accordance with the CEMP. Dewatering of excavations will need to be undertaken in accordance with EA permit requirements. A Remediation / Discovery Strategy and watching brief will be put in place to identify potentially contaminated such material so that it can be dealt with should it be uncovered. Material used to backfill infrastructure will be suitable for use under an MMP and therefore there will be betterment of existing conditions and a potential contaminant risk that has been removed. A Soil Management Plan (SMP) will be developed to mitigate potential silt/sediment flows into surface waters. Migration risk and impact on surface water will be mitigated following good practice measures in a CEMP. This will include excavation, materials re-use, stockpile management and dewatering. A Remediation / Discovery Strategy will be prepared prior to works commencing and a watching brief implemented to deal with any unexpected contamination and provide betterment. An MMP will track suitability of material and SMP will control silt/sediment flows to surface water.
• S1 – natural sources (radon, organic soils) • S2 – landfill • S5 – made ground • S7 – unmapped burial / landraise	• P8 – accumulation of ground gases / vapours • P9 – aggressive ground conditions	• R6 – Property: cables and associated energy infrastructure	• Property infrastructure - Low	• Low	Low Risk During excavation works there is the potential for ground gases (radon, methane) and/or aggressive ground conditions to be encountered which could impact on energy infrastructure and below ground structures during construction and operational phases of the development. It is to be ensured that both temporary and permanent designs consider these potential in-ground risks and ensure that engineering design mitigates the potential for gas accumulation and corrosion/degradation of the infrastructure.

Source	Pathway	Receptor	Consequence	Likelihood	Risk Classification
					Property risk to be mitigated through engineering design considerations for temporary and permanent works throughout the lifetime use of the energy infrastructure.
• S2 – landfill • S5 – made ground • S7 – unmapped burial / landraise	•	• R7 – Property: livestock grazing, field crops	• Property agricultural / farming - low	• Low	Low Risk The predominant land use on the Order Limits and surrounding area is agricultural land for grazing and field crops. During excavation there is the potential for uncovering ground that may be impacted by contamination and result in exposure to livestock grazing or impacts on crop growth from land that may have contaminated soil deposited or spread at surface. As such, ground impacted from contamination will need to be controlled appropriately during construction and re-instatement to ensure that it is not deposited at or near ground surface. The management of excavation arisings and stockpiling will follow good practice measures in accordance with the CEMP. A Remediation / Discovery Strategy and watching brief will be put in place to identify potentially contaminated such material so that it can be dealt with should it be uncovered. Mitigation measures will be put in place to monitor and control airborne/dust deposition. Material used to backfill infrastructure will be in accordance with an MMP and specification. Soils reinstated at ground surface will be demonstrated that they are suitable for their proposed use in accordance with a soil management plan. Agricultural / farming risk from soil contamination mitigated following good practice measures in a CEMP. This will include excavation, materials re-use, dust and stockpile management. A Remediation / Discovery Strategy will be prepared, and a watching brief implemented to deal with any unexpected contamination. Material used to backfill will be in accordance with an MMP/ specification. Soils will be suitable for use in accordance with a soil management plan.

23.5.6 Potential Contaminant Linkages (PCL)

63. The predominant land-use within the Order Limits and surrounding areas is agricultural land, however there are relatively localised areas of potential contamination associated with farming uses, naturally occurring radon and ground gas, landfill / land raise activities, areas of made ground and previous development, infrastructure and unspecified works. There may also be potential areas of unmapped / unrecorded contaminated ground that may be present.

64. The assessment has identified plausible contaminant linkages at the Order Limits; however, it has been identified that such risks could be controlled and mitigated during the design, construction and operation phases of the Project. The potential risks to receptors identified as part of the contaminant linkage assessment assuming the mitigation measures are implemented are summarised below:

- R1 – Construction / maintenance workers – Moderate / Low
- R2 – Farming, neighbouring land users – Low
- R3 – Groundwater – Low
- R4 – Surface water – Moderate
- R5 – Ecological – Low / Moderate
- R6 – Property energy infrastructure – Low
- R7 – Property agricultural - Low

23.5.7 Uncertainties in the Conceptual Site Model

65. The CSM and contaminant linkage assessment has been developed based on a desk-based review of available information, and in the absence of site-specific ground investigation data. For this reason, they adopt a precautionary approach, assuming that if a potential contaminant linkage has been identified, it is present, until further site-specific information is available to clarify whether the linkage actually exists. Without further site-specific data potential contaminant linkages cannot be ruled out.

66. At this stage in the process there are a number of uncertainties associated with the preliminary conceptual site model, specifically associated with defining the potential sources and the respective pathways as summarised below:

- The presence, magnitude and extent of the PCOC needs to be established to determine risks to human health, controlled waters, ecology and property;
- The mobility of contaminants needs to be established to determine risks to controlled waters; and
- The geology and hydrogeological regime at the site needs to be established to determine the potential for contaminant migration, including radon and ground gas (carbon dioxide, methane).

23.6 Conclusions

67. The key objective of the PLQRA was to develop a PCSM to aid in the identification of any potential contaminant linkages and potentially unacceptable risks to sensitive receptors associated with development of the Project, so that appropriate mitigation measures can be adopted to ensure the Project is delivered without risk to sensitive receptors. These are then used to inform decisions with regards to whether further investigation or assessment is needed (i.e. a Generic Quantitative Risk Assessment) to understand and mitigate potential impacts.

68. The Order Limits are located in an area of predominantly agricultural land use, however relatively localised areas of potential contamination have been identified associated with farming uses, naturally occurring radon and ground gas, landfill / land raise activities, areas of made ground and previous development, infrastructure and other unspecified works. There may also be potential areas of unmapped / unrecorded contaminated ground that may be present.

69. The assessment has identified plausible contaminant linkages within the Order Limits; however, it has been identified that with implementation of the measures within the CoCP such risks could be controlled and mitigated during the design, construction and operation phases of the Project.

70. It should be noted that the PLQRA has been developed based on a desk-based review of available information, on information gathered during the site walkover inspection, and in the absence of ground investigation data, and the PCSM adopts a precautionary approach.

23.7 Recommendations

71. There is the potential for the Order Limits to pass through areas of potential soil and/or groundwater contamination and therefore plausible contaminant linkages to human

health, controlled waters, property and ecological receptors are present. Given the potential sources of contamination identified it is recommended:

- Groundworkers to be informed of encountering potential ground contamination and the measures required to mitigate potential exposure risks (including from asbestos). Works to be undertaken in accordance with Health and Safety Plans and Risk Assessments;
- Identification of specific precaution measures required to mitigate exposure from potential radon and other ground gas (carbon dioxide, methane);
- Further assess in detail each segment of the Order Limits through ground investigation. The purpose of the ground investigation would be to:
    - target potential sources of contamination where they have been identified to potentially exist and to characterise contamination encountered through a laboratory chemical analysis testing suite (in particular the historic landfill recorded at Field Farm within ECC2);
    - characterise soils on the basis of potential re-use and aggressive ground condition properties;
    - confirm the thickness of overlying tidal flat deposits where Principal and Secondary A and B aquifers are present to assess overlying protection from contamination;
    - install groundwater and ground gas monitoring wells in boreholes and subsequently monitor groundwater elevations, groundwater quality and the presence/absence of ground gases such as radon, carbon dioxide and methane; and
    - enable a Generic Quantitative Risk Assessment (GQRA) to be undertaken to baseline the contaminant condition of the Order Limits and provide recommendations for the re-use, treatment or removal of material.
- Prepare a CoCP to include detailing of information such as site plans, cross sections, working and laydown areas and information regarding stockpile management, control of dusts, leakage/spillage management, suspended solids and runoff.
- Prepare a Remediation / Discovery Strategy for implementation during construction phase so that any contamination encountered can be dealt with accordingly (this is to include segregation, stockpile management, soil treatment or disposal);
- Preparation of a design detailing appropriate dewatering of excavations in accordance with Environment Agency permit standards (if required). An Outline Surface Water Drainage Strategy has been prepared as part of the Outline CoCP to ensure the protection and reinstatement of surface waters and field drainage following construction;
- Implementation of a watching brief during the construction phase works to identify potential contamination (including asbestos) if it is encountered;
- An Outline Soil Management Plan (SMP) has been prepared as part of the CoCP and which should be followed to ensure that soils used in agricultural / field crop areas are suitable for use and that potential silt/sediment flows are prevented from entering surface water during construction;

- Preparation of a Completion Report for the project to record whether any contaminated material was encountered, how it was dealt with, if any imported material had been used; records of material tracking and where they have been placed; disposal of waste off-site, as-built details and drawings.

Appendix A SLR Approach to Qualitative Risk Assessment

Preliminary Land Quality Risk Assessment

Outer Dowsing Offshore Wind Environmental Statement

GoBe Consultants Ltd

SLR Project No.: 410.V05356.00013.0003.004

1 March 2024

A.1 Qualitive Risk Assessment Methodology

Risk assessment is the process of collating known information on a hazard or set of hazards in order to estimate actual or potential risks to receptors. The receptor may be human health, a water resource, a sensitive local ecosystem or even future construction materials. Receptors can be connected with the hazard under consideration via one or several exposure pathways (e.g. the pathway of direct contact). Risks are generally managed by isolating or removing the hazard, isolating the receptor, or by intercepting the exposure pathway. Without the three essential components of a source (hazard), pathway and receptor, there can be no risk. Thus, the mere presence of a hazard at a site does not mean that there will necessarily be attendant risks. The following risk assessment thus focuses on those parts of the site where hazards or potential hazards have been identified and is not general to the whole site.

A.1.1 Hazards

Potential sources of contamination are identified for the site, based on a review of the current and previous site uses. Not only the nature but also the likely extent of any contamination is considered, e.g. whether such contamination is likely to be localised or widespread.

A.1.2 Receptors

The varying effects of a hazard on individual receptors depends largely on the sensitivity of the target. Receptors include any people, animal or plant population, or natural or economic resources within the range of the source which are connected to the source by the transport pathway. Receptors can, in addition, extend to remediation processes and future construction materials that may be adversely affected by on-site contamination. In general, however, receptors can be divided into a number of groups depending on the final use of the site.

A.1.3 Pathways

The mere presence of contamination does not infer a risk. The exposure pathway determines the dose delivered to the receptor and the effective dose determines the extent of the adverse effect on the receptor. The pathway which transports the contaminants to the receptor or target generally involves conveyance via soil, water or air.

A.1.4 Exposure Assessment

By considering the source, pathway and receptor, an assessment is made for each contaminant on a receptor by receptor basis with reference to the significance and degree of the risk. In assessing this information, a measure is made of whether the source contamination can reach a receptor, determining whether it is of a major or minor significance. The exposure risks are assessed against the present site conditions.

A preliminary risk assessment has been undertaken for these potential source-pathway-receptor linkages to identify potentially unacceptable risks on a qualitative basis. This approach is based on DEFRA and CIRIA guidance on risk assessment and Model Procedures. Risk is based on a consideration of both:

- The likelihood of an event (probability); [takes into account both the presence of the hazard and receptor and the integrity of the pathway].
- The severity of the potential consequence [takes into account both the potential severity of the hazard and the sensitivity of the receptor].

In order to then determine the risk to the identified receptor, both the likelihood and severity of the potential hazard is input into a risk assessment matrix as follows:

		Consequence			
		Severe	**Medium**	**Mild**	**Minor/Negligible**
Probability (Likelihood)	**High Likelihood**	Very high risk	High risk	Moderate risk	Moderate/Low risk
	Likely	High risk	Moderate risk	Moderate/Low risk	Low risk
	Low Likelihood	Moderate risk	Moderate/Low risk	Low risk	Negligible risk
	Unlikely	Moderate/Low risk	Low risk	Negligible risk	Negligible risk

Under such a classification system the following categorisation of risk has been developed and the terminology adopted as follows:

Term	Description
Very high risk	Severe harm to a receptor may already be occurring OR a high likelihood that severe harm will arise to a receptor, unless immediate remedial action works / mitigation measures are undertaken.
High risk	Harm is likely to arise to a receptor, and is likely to be severe, unless appropriate remedial actions / mitigation measures are undertaken. Remedial works may be required in the short term, but likely to be required over the long term.
Moderate risk	Possible that harm could arise to a receptor but low likelihood that such a harm would be severe. Harm is likely to be medium. Some remedial works may be required in the long term.
Moderate / low risk	Possible that harm could arise to a receptor, but where a combination of likelihood and consequence results in a risk that is above low but is not of sufficient concern to be classified as medium. It can be driven by cases where there is an acute risk which carries a severe consequence, but where the exposure is unlikely.
Low risk	Possible that harm could arise to a receptor. Such harm would at worse normally be mild.
Negligible risk	Low likelihood that harm could arise to a receptor. Such harm unlikely to be any worse than mild.

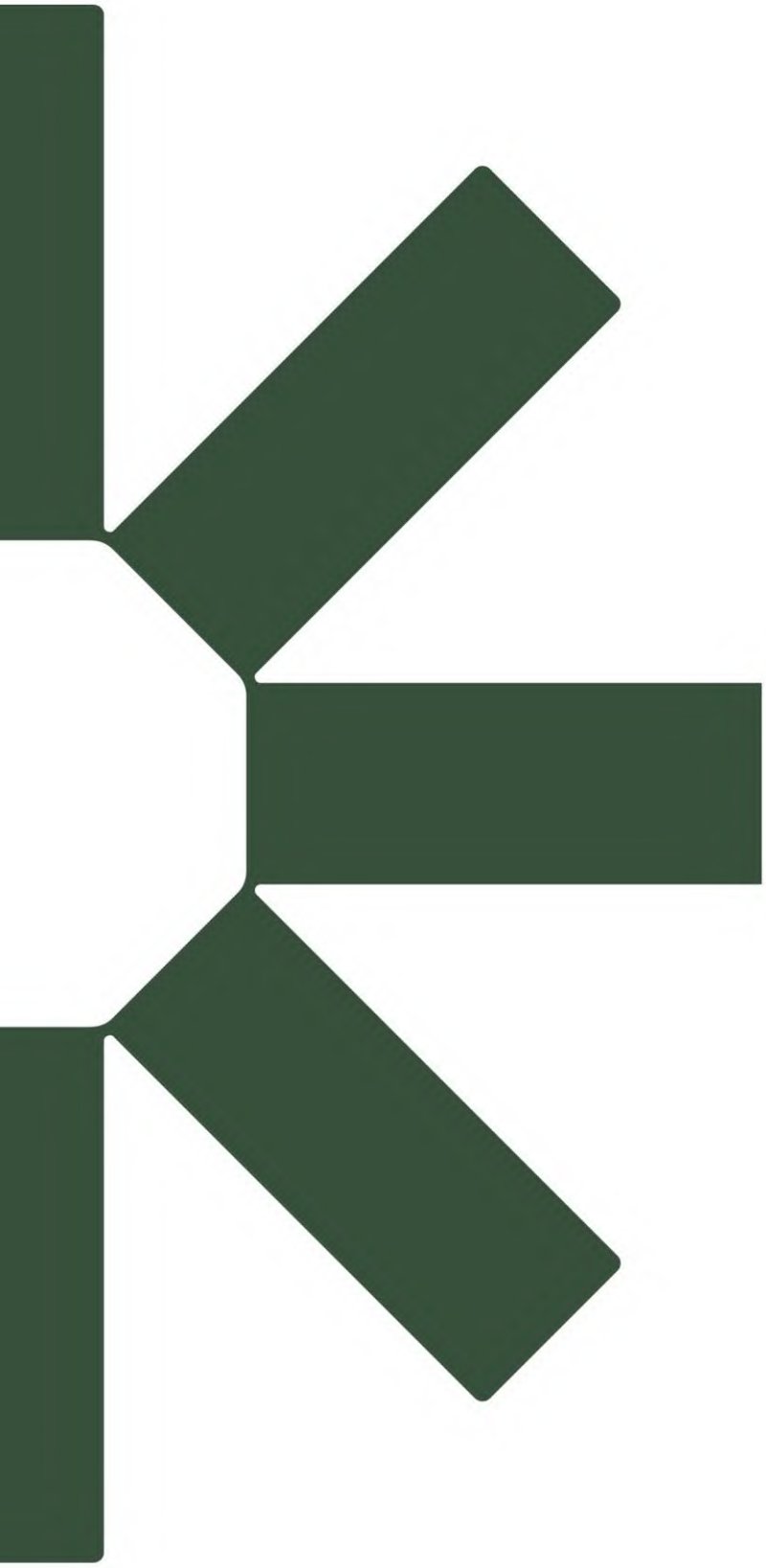
The colour coding for each risk category is used in the risk assessment summary table.

A.1.5 Classification of Consequences

Classification	Definition
Severe	• Acute risks to human health • Short-term risk of pollution of sensitive water resource (e.g. major spillage into controlled waters) • Impact on controlled waters e.g. large-scale pollution or very high levels of contamination • Catastrophic damage to buildings or property e.g. explosion causing building collapse) • Ecological system effects – irreversible adverse changes to a protected location. Immediate risks.
Medium	• Chronic risks to human health • Pollution of sensitive water resources (e.g. leaching of contaminants into controlled waters) • Ecological system effects – substantial adverse changes to a protected location. • Significant damage to buildings, structures and services (e.g. damage rendering a building unsafe to occupy, such as foundation damage)
Mild	• Non-permanent health effects to human health • Pollution of non-sensitive water resources (e.g. pollution of non-classified groundwater) • Damage to buildings, structures and services (e.g. damage rendering a building unsafe to occupy, such as foundation damage) • Substantial damage to non-sensitive environments (unprotected ecosystems e.g. crops)
Minor/ Negligible	• Non-permanent health effects to human health (easily prevented by appropriate use of PPE • Minor pollution to non-sensitive water resources • Minor damage to non-sensitive environments (unprotected ecosystems e.g. crops) • Easily repairable effects of damage to buildings, structures, services or the environment (e.g. discoloration of concrete, loss of plants in a landscaping scene).

A.1.6 Classification of Likelihood

Classification	Definition
High Likelihood	An event is very likely to occur in the short term, and is almost inevitable over the long term OR there is evidence at the receptor of harm or pollution
Likely	It is probably that an event will occur. It is not inevitable, but possible in the short term and likely over the long term
Low Likelihood	Circumstances are possible under which an event could occur. It is by no means certain that even over a longer period such an event would take place, and less likely in the short term
Unlikely	It is improbable that an event would occur even in the very long term



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