Site Characterisation Report (~~Clean~~Tracked)

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NORTH FALLS
Offshore Wind Farm

Project	North Falls Offshore Wind Farm
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0	July 2024	Submission	RHDHV	NFOW	NFOW
1	April 2025	Deadline 4	RHDHV	NFOW	NFOW
2	July 2025	Deadline 7	RHDHV	NFOW	NFOW

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Glossary of Acronyms

AL	Action Level
BAC	Background Assessment Concentration
CD	Chart Datum
Cefas	Centre for Environment, Fisheries and Aquaculture
DCO	Development Consent Order
DESNZ	Department for Energy Security and Net Zero
DML	Deemed Marine Licence
DWR	Deep Water Routes
EIA	Environmental Impact Assessment
ERL	Effects Range-Low
ES	Environmental Statement
GGOW	Greater Gabbard Offshore Windfarm
GWF	Galloper Wind Farm
HAT	Highest Astronomical Tide
HDD	Horizontal Directional Drilling
MCAA	Marine and Coastal Access Act
MCZ	Marine Conservation Zone
MMO	Marine Management Organisation
NFOW	North Falls Offshore Wind Farm
OCP	Offshore Convertor Platform
OSP	Offshore Substation Platform
OSPAR	Oslo-Paris Commission
OTNR	Offshore Transmission Network Review
PAH	Polyaromatic Hydrocarbon
PCB	Polychlorinated Biphenyls
RIAA	Report to Inform Appropriate Assessment
RWE	RWE Renewables UK Swindon Limited
SAC	Special Area of Conservation
SPA	Special Protection Area
SSC	Suspended Sediment Concentration
SSER	SSE Renewables Offshore Windfarm Holdings Limited
WTG	Wind Turbine Generator

Glossary of Terminology

Array area	The offshore wind farm area, within which the wind turbine generators, array cables, offshore substation platform(s) and/or offshore converter platform will be located.
Array cables	Cables which link the wind turbine generators with each other, the offshore substation platform(s) and/or the offshore converter platform.
Astronomical tide	The predicted tide levels and character that would result from the gravitational effects of the earth, sun and moon without any atmospheric influences
Bedforms	Features on the seabed (e.g. Sandwaves, ripples) resulting from the movement of sediment over it
Bedload	Sediment particles that travel near or on the bed
Cefas Action Levels	Guideline contaminant concentration levels used as part of a weight of evidence approach for decision-making on the suitability of dredged material for disposal to sea.
Clay	Fine sediment with a typical particle size of less than 0.002mm
Current	Flow of water generated by a variety of forcing mechanisms (e.g. waves, tides, wind)
Gravel	Loose, rounded fragments of rock larger than sand but smaller than cobbles. Sediment larger than 2mm (as classified by the Wentworth scale used in sedimentology)
Gravity Base Structures	Foundation option previously included within the design envelope which would use ballast to secure wind turbine structures and/or offshore substation(s) to the seabed
Habitat	The environment of an organism and the place where it is usually found
Horizontal directional drill	Trenchless technique to bring the offshore cables ashore at the landfall
Hydrodynamic	The process and science associated with the flow and motion in water produced by applied forces
Intertidal	Area on a shore that lies between Lowest Astronomical Tide (LAT) and Highest Astronomical Tide (HAT)
Landfall	The location where the offshore cables come ashore.
Nearshore	The zone which extends from the swash zone to the position marking the start of the offshore zone
Numerical modelling	Refers to the analysis of coastal processes using computational models
Offshore	Area seaward of nearshore in which the transport of sediment is not caused by wave activity
Offshore cable corridor	The corridor of seabed from the array area to the landfall within which the offshore export cables will be located.
Offshore convertor platform	Should an offshore connection to an HVDC interconnector cable be selected, an offshore converter platform would be required. This is a fixed structure located within the array area, containing HVAC and HVDC electrical equipment to aggregate the power from the wind turbine generators, increase the voltage to a more suitable level for export and convert the HVAC power generated by the wind turbine generators into HVDC power for export to shore via a third party HVDC interconnector cable.
Offshore export cables	The cables which bring electricity from the offshore substation platform(s) to the landfall, as well as auxiliary cables.
Offshore project area	The overall area of the array area and the offshore cable corridor.
Offshore substation platform(s)	Fixed structure(s) located within the array area, containing HVAC electrical equipment to aggregate the power from the wind turbine generators and

	increase the voltage to a more suitable level for export to shore via offshore export cables.
Sand	Sediment particles, mainly of quartz with a diameter of between 0.063mm and 2mm. Sand is generally classified as fine, medium or coarse
Sandwave	Bedforms with wavelengths of 10 to 100m, with amplitudes of 1 to 10m
Scour protection	Protective materials to avoid sediment being eroded away from the base of the wind turbine generator foundations and offshore substation platform foundations as a result of the flow of water.
Sea level	Generally, refers to 'still water level' (excluding wave influences) averaged over a period of time such that periodic changes in level (e.g. due to the tides) are averaged out
Sediment	Particulate matter derived from rock, minerals or bioclastic matter
Sediment transport	The movement of a mass of sediment by the forces of currents and waves
Suction bucket	Foundation option included within the design envelope which would use cylindrical structures which penetrate into the seabed to secure wind turbine structures and/or offshore platform(s) to the seabed
Suspended sediment	The sediment moving in suspension in a fluid kept up by the upward components of the turbulent currents or by the colloidal suspension
The Applicant	North Falls Offshore Wind Farm Limited (NFOW)
The Project or 'North Falls'	North Falls Offshore Wind Farm, including all onshore and offshore infrastructure.
Tidal current	The alternating horizontal movement of water associated with the rise and fall of the tide
Tide	The periodic rise and fall of the water that results from the gravitational attraction of the moon and sun acting upon the rotating earth

1 Introduction

1. North Falls Offshore Wind Farm Limited (NFOW) ('the Applicant'), a joint venture between SSE Renewables Offshore Windfarm Holdings (SSER) and RWE Renewables UK Swindon Ltd (RWE), is seeking a Development Consent Order (DCO) for the proposed North Falls Offshore Wind Farm (hereafter 'North Falls' or 'the Project), encompassing both offshore and onshore components.
2. Activities carried out under this DCO might require dredging and subsequent disposal of the dredged material.
3. The Marine and Coastal Access Act 2009 (MCAA) Section 66 states that it is a licensable marine activity to carry out any form of dredging and disposal of dredged material in the seabed within the UK. For the purposes of this document, 'disposal' means the deposit of dredged sediment at the sea surface or at the seabed using a fall pipe; or the deposit of subsurface sediment at the seabed released during any construction activity required for the North Falls Offshore Wind Farm.

1.1 Purpose of this document

4. The Applicant is applying to designate the North Falls array area and the offshore cable corridor as disposal sites for material arising due to construction activities (i.e. excavation of horizontal directional drilling (HDD) exit pits, seabed preparation/sandwave levelling (dredging) for foundations and cable installation and/or drilling for foundations).
5. This document provides the necessary information to characterise the disposal sites application requirements for the North Falls array area and offshore cable corridor. The location of the proposed North Falls disposal sites is shown in Section 2.1.
6. To streamline the disposal sites characterisation and licensing process, this document provides the necessary information for all the offshore project areas to be licensed as disposal sites. It is proposed that these areas are included within the North Falls Deemed Marine Licences (DML) however if any of these areas are not required following detailed design then the Applicant can agree with the Marine Management Organisation (MMO) that the licensed activities will not be undertaken in these areas. In addition, an Outline Sediment Disposal Management Plan **[Document Reference 9.52]** setting out the key constraints and measures proposed for the disposal of seabed material that may arise during the construction of North Falls offshore elements, has been prepared by the Applicant, ~~and~~ submitted at Deadline 4 and updated at Deadlines 5 **[Rev 1, REP5-042]** and Deadline 6 **[Rev 2, REP6-049]**.
7. The purpose of this document is to provide the information required to enable disposal sites designation. Accordingly, this document sets out:
   - Characteristics of the proposed North Falls disposal sites (Section 2);
   - The location of the disposal sites (Section 2.1);
   - The types of material to be disposed of (Section 3);
   - The quantity of the material to be disposed (Section 4);

- Alternatives considered (Section 5); and
- Potential impacts of the disposal (Section 6).

8. This document has been updated at Deadline ~~4~~ 7 to reflect additional mitigation commitments the Applicant has made at Deadlines 1, ~~and~~ 4 and 6 which revised the sediment disposal requirements (described in Supporting Information on Offshore Additional Mitigation, [**Document Reference: ~~9.55, [~~REP4-041]**).

~~8.~~9. It also reflects updates to the Report to Inform Appropriate Assessment (RIAA) Part 2 Benthic Ecology Annex I Habitat in SACs and SPA supporting habitat (**Document Reference: 7.1.2, Rev 1**) and in the Marine Conservation Zone Assessment Report (**Document Reference 7.3, Rev 1**), both submitted at Deadline 7.~~.~~

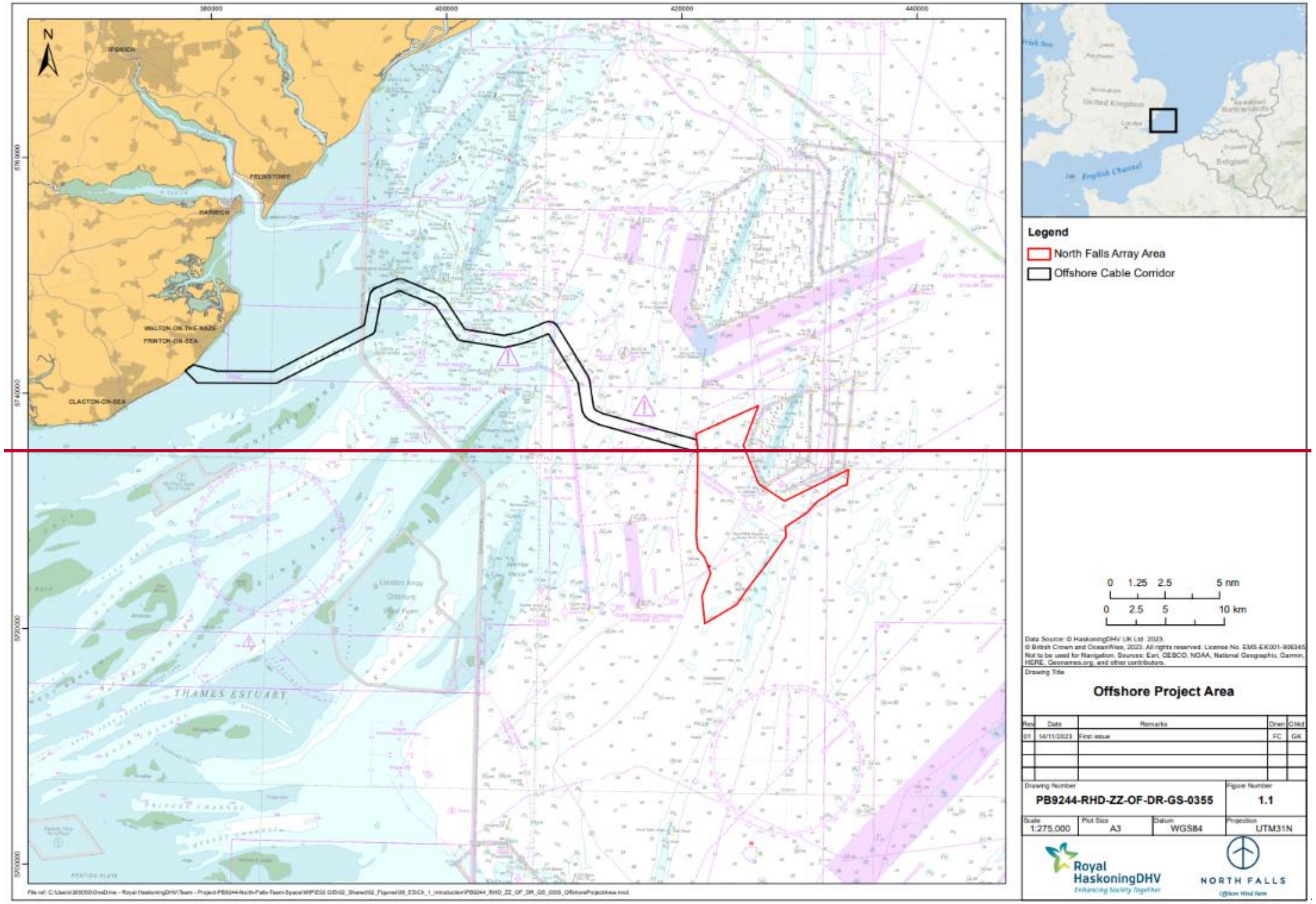
~~9.~~10. In addition, Hydrodynamic and Sediment Dispersion Modelling has been completed at ~~Deadline 4~~ (described further in Hydrodynamic and Sediment Dispersion Modelling Report, [**Document Reference: 9.54, Rev 2 [REP6-053]**); and Sediment Dispersion Modelling Results Interpretation **[Document Reference 9.56, REP4-042]**. This additional supporting information is included, where applicable.

1.1.1 Updates at Deadline 7

Table 1.1 Document updates

Revision	Updates	Relevant Section(s)
01	Removal of Gravity Base foundations from the design envelope	Sections 1.2, 4.1 and 5.2
	Commitment to cable burial depths in the Sunk A and B, and Trinity Deep Water Routes (DWRs) and Pilot Boarding area	Sections 2.2.5 and 5.2
	Expected presence of London clay	Section 3
	Updates on the quantity of material to be disposed	Section 4 and 5
	Updates to include Hydrodynamic and Sediment Dispersion Modelling Report **[REP4-040]** and interpretation of its results **[REP4-42].**	Section 6
0~~0~~2~~1~~	Revised text to addressed Port of London Authority comments **[REP5-111]**	Sections 2.2.5 and 6.4.2
	Incorporate additional cable burial commitment secured at Deadline 6 in the Outline Cable Specification and Installation Plan **[REP6-052]** regarding the Sunk Pilot Diamond Buffer	Sections 2.2.5, 5.2 and 6.4.2
	Inclusion of~~de~~ combined NFOW and Five Estuaries Offshore Wind Farm (VE) cable corridor disposal site in accordance with advice from the MMO.	Section 2.1

Revision	Updates	Relevant Section(s)
	Update disposal volumes following further analysis of geophysical data	Sections 4 and 5.2



~~**Figure 1.1 North Falls array area and offshore cable corridor to be designated as disposal sites for the Project**~~

1.2 Project overview

~~10.~~11. At this stage of the Project's development, some flexibility in the Project's design is required in order to future-proof the Development Consent Order (DCO), therefore North Falls adopts the 'Rochdale Envelope' approach. This means that final project design will be determined based on detailed engineering studies that will be undertaken post-consent. In order to provide a precautionary but robust impact assessment at this stage of the development process, realistic worst-case scenarios have been defined in terms of the likely significant effects that may arise.

~~11.~~12. One area of optionality is in relation to the national grid connection point. Discussions to explore grid connection options, with the Department for Energy Security and Net Zero (DESNZ) and in cooperation with the Offshore Transmission Network Review (OTNR) resulted in the consideration of three grid connection options:

- Option 1 considers an onshore electrical connection at a national grid connection point within the Tendring peninsula of Essex, with a project alone onshore cable route and onshore substation infrastructure.
- Option 2 considers an onshore electrical connection at a national grid connection point within the Tendring peninsula of Essex, sharing an onshore cable route (but with separate onshore export cables) and co-locating separate project onshore substation infrastructure with Five Estuaries Offshore Wind Farm; or
- Option 3 considers an offshore electrical connection, supplied by a third-party.

~~12.~~13. With regards to sediment disposal, Options 1 and 2 would be the same, and these represent the worst case scenario described in Section 4 and assessed in Section 6. For Option 3 there would be no project offshore export cables to shore as the Project's connection to the national grid would be offshore at the offshore converter platform (OCP). Within the array area, under Options 1 and 2 there would be up to two offshore substation platforms (OSPs); whereas for Option 3 there would be one OCP and up to one OSP, i.e. under all scenarios there would be a maximum of two platforms, with no change to the worst case foundation infrastructure.

~~13.~~14. The North Falls project area comprises:

- The offshore project area:
  - Offshore wind farm area (hereafter the 'array area') - within which the wind turbine generators, offshore substation platform, potential offshore converter platforms, in the case transmission Option 3 is selected, and array cables will be located;
  - Offshore cable corridor - the corridor of seabed from array areas to the landfall within which the offshore export cables will be located; and
- The onshore project area.

~~14.~~15. The key offshore components of the Project are:

- Wind turbine generators (WTG) and their associated foundations.
- Up to two OSPs/OCP and their associated foundations.
- Subsea cables:
  - Array cables between the WTGs and OSP(s).
  - Export cables between the OSP(s) and landfall.
- Scour protection around foundations, where required; and
- Surface laid cable protection, where required.

~~15.~~16. A summary of the key project characteristics is presented in Table 1.2 and a full project description is available as part of the Environmental Statement (ES) in Chapter 5 Project Description **[APP-019]**.

Table 1.2 Key project characteristics

Parameter	Details
Approximate offshore construction duration	Two years
Array area	95 km^2
Offshore cable corridor area (excluding offshore temporary works area)	Cable corridor = 3km^2
Wind farm site water depth range	5-59m
Number of WTGs	Up to 57
Maximum array cable length	170km
Maximum platform interconnector cable length	20km
Target minimum cable burial depth, where buried (array, platform interconnector and export cables)	0.6m
Offshore cable corridor length	57km
No. of export cable circuits	2
No. of offshore electrical platforms (OSPs/OCP)	2
Wind turbine foundation type options	Monopile, mono suction bucket and/or multileg (drilled, piled and/or suction buckets~~-~~)
OSP / OCP foundation type options	Monopile and/or multileg (drilled, piled and/or suction buckets)
Number of piles per foundation for wind turbines	8
Maximum number of piles for wind turbines	480
Maximum number of piles for OSPs / OCP	12 (6 per platform)
Maximum drill diameter	18m

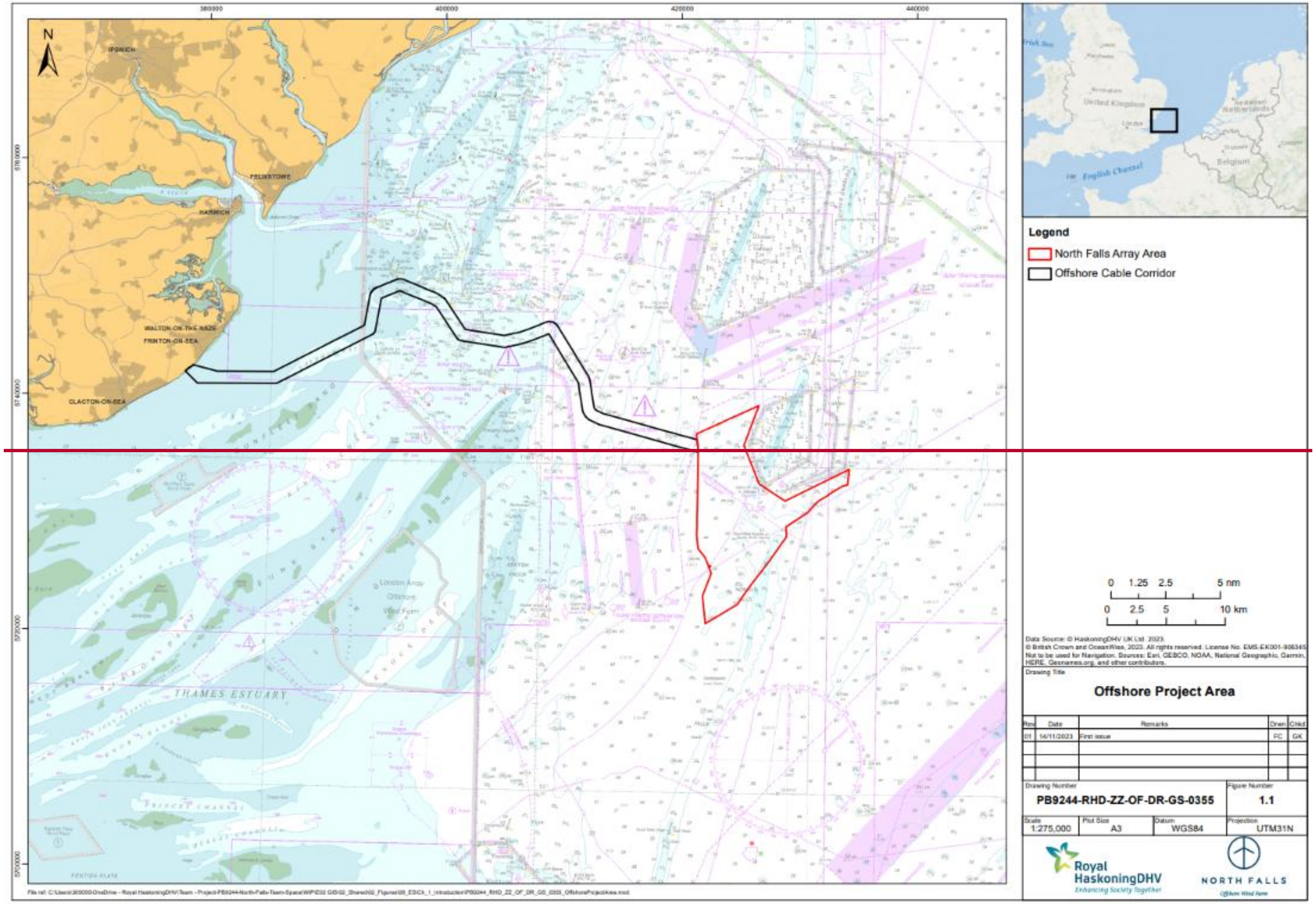
2 Characteristics of the North Falls disposal sites

2.1 Location

17. The North Falls array area is 95km^2 and is located approximately 40km (at the closest point) off the East Anglian coastline. The offshore cable corridor runs from the array area to the landfall area at Kirby Brook, Essex.

18. North Falls is adjacent to the proposed Five Estuaries offshore wind farm and the offshore cable corridors for the two projects overlap. A combined cable corridor disposal site is proposed, in accordance with advice from the Marine

Management Organisation (MMO). Regardless of having a combined disposal site, the disposal from each project will be confined to the relevant Order Limits and associated conditions in the DCO for each project. Therefore disposal for North Falls will be within either the North Falls array area or the North Falls offshore cable corridor, as they are to be designated as two individual disposal sites. This site characterisation, therefore, focuses on the North Falls array area and offshore cable corridor only. Site characterisation of the Five Estuaries order limits was provided by Five Estuaries Wind Farm Ltd (2025).


IPSWICH
FELIXSTOWE
HARWICH
WALTON-ON-THE-NAZE
FRINTON-ON-SEA
CLACTON-ON-SEA
THAMES ESTUARY
Legend
North Falls Array Area
Offshore Cable Corridor
0 1.25 2.5 5 nm
0 2.5 5 10 km
Offshore Project Area
PB9244-RHD-ZZ-OF-DR-GS-0355
1.1
1:275,000
A3
WGS84
UTM31N
Royal HaskoningDHV
NORTH FALLS

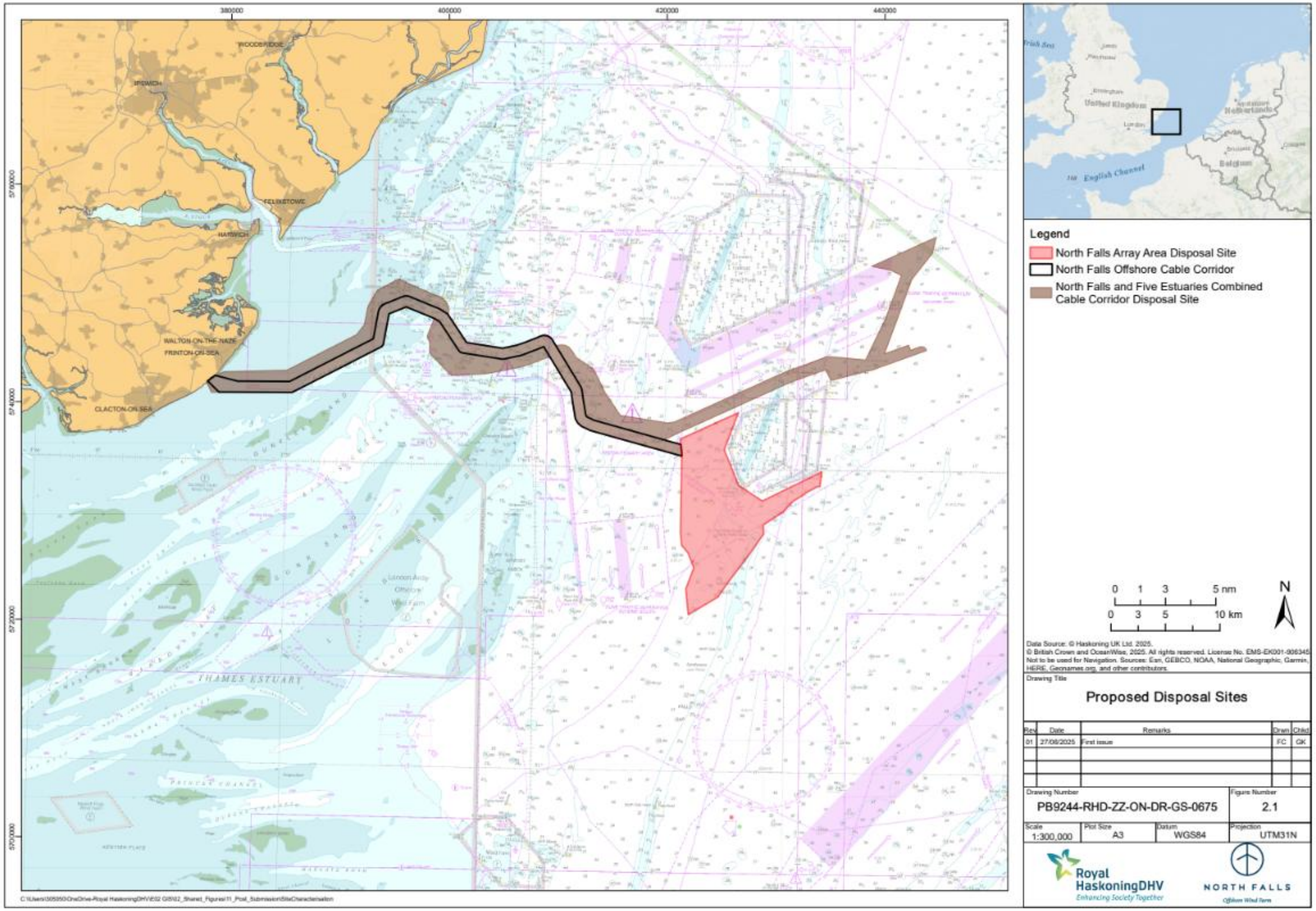


Figure 2.1 North Falls array area and offshore cable corridor to be designated as disposal sites for the Project

~~2.1~~2.2 Physical characteristics

~~16.~~19. This section provides an overview of the physical characteristics of the offshore project area. Further details can be found in Chapter 8 Marine Geology, Oceanography and Physical Processes of the ES **[APP-022]**.

~~2.1.1~~2.2.1 Tide and wave regime

~~17.~~20. The main axes for tidal flows are rectilinear and are directed to the north-north-east during the ebb tide and to the south-south-west during the flood tide. Modelled current velocities are similar on both states of the tide, ranging from 0.9m/s to 1.3m/s. Tidal currents closer to the coast (i.e., Clacton-on-Sea) are approximately 0.26m/s during peak flood spring tide and 0.10m/s during peak ebb spring tide (East Anglia Coastal Group (EACG), 2010).

~~18.~~21. The primary wave directions are from the north-north-east and south-south-west (ABPmer, 2005; PMSS, 2005). The larger waves normally propagate from the north-north-east although these are rarely greater than 4m in height with typical significant wave heights about 3.6m (ABPmer, 2005; PMSS, 2005). The most common wave heights were between 0.5m and 1.5m approaching along the dominant north-north-east to south-south-west axis.

~~19.~~22. Wave conditions towards the landfall will be less severe due to the protection afforded by numerous sandbanks and the presence of East Anglia to the north (EACG, 2010). The most common wave directions close to landfall are from the north-east and south-west. Significant wave heights range between 0.25 and 0.5m (ABPmer, 2018).

~~2.1.2~~2.2.2 Seabed geology

~~20.~~23. The geology of North Falls is predominantly Eocene to Holocene, generally consisting of Holocene deposits overlying Pleistocene channel complexes and infill deposits, which overlie the London Clay Formation and the Harwich Formation.

~~21.~~24. The bedrock across the array area is dominated by the Harwich Formation, which is conformably overlain by the London Clay Formation (Fugro, 2021a). The top of the Harwich Formation deepens from approximately 2m below the seabed in the south-west of the array area, to more than 78m below the seabed in the north of the array area.

~~22.~~25. The Harwich Formation was interpreted to be present between kilometre posts (KP) 14.00 and 26.00 along the offshore cable corridor (Fugro, 2021b). The top of the unit is located between 0 and 14.4m below the seabed, with two outcrops along the cable corridor (Fugro, 2021b).

~~23.~~26. London Clay is present along the entire offshore cable corridor overlying the Harwich Formation (Fugro, 2021b). The depth of the London Clay remains within 2m of the seabed across most of the corridor, with deeper areas caused by the cutting of Pleistocene channels where it reaches a maximum depth of 14.4m below the seabed (Fugro, 2021b). There are also several outcrops of London Clay at the seabed (Fugro, 2021b).

~~2.1.3~~2.2.3 Bedforms and sediment transport

~~24.~~27. Regional bedload sediment transport pathways in the southern North Sea have been investigated by Kenyon and Cooper (2005). They analysed the results of modelling studies and bedform indicators and showed that tidal currents are the dominant mechanism responsible for bedload transport. The dominant regional bedload transport vectors are to the south-south-west across the offshore project area and to the north-north-east further offshore. Between these opposing directions of transport is a bedload transport parting (Reynaud and Dalrymple, 2012).

~~25.~~28. Sediment transport pathways within North Falls have been analysed using the orientation of bedforms. Sandwaves are present across the south, south-east and extreme north-east of the array area and approximately half-way along the offshore cable corridor.

~~26.~~29. The crests of the sandwaves in these areas exhibit a consistent north-west to south-east orientation that indicates a net direction of transport to the south-west and north-east. Tidal currents are the main driving force of sediment transport across sandwaves and as a result, move sediment in a south-westerly direction during a flow tide and a north-easterly direction during an ebb tide. The net direction of sediment transport across areas that are not characterised by migrating bedforms (adjacent to the sandwaves) is likely to be the same.

~~2.1.4~~2.2.4 Suspended sediments

~~27.~~30. Suspended Sediment Concentrations (SSCs) were measured at four locations as part of the metocean data collection at Greater Gabbard Offshore Windfarm (GGOW) between 3rd November 2004 and 24th March 2005. The maximum SSC was 85mg/l with a mean concentration of 20mg/l (Emu Ltd, 2005).

~~28.~~31. Cefas (2016) published average SSCs between 1998 and 2015 for the seas around the UK. The average SSC in the vicinity of the array area for the period 1998-2015 was approximately 7-15mg/l. The average SSC in the vicinity of the offshore cable corridor is 15mg/l offshore, ranging to 100mg/l close to the landfall location.

~~2.1.5~~2.2.5 Seabed sediment type

~~29.~~32. Overall, sediments across the offshore project area comprise of mix of gravel, sand and mud with percentages of fines being highest at stations along the nearshore section of the offshore cable corridor. Sand was the predominant sediment type in the array area (Figure 2.2).

~~30.~~33. The dominant sediment type in the array area is medium sand. In general, the mud content is low in this area. The south and north-east of the array area are predominantly composed by sand while higher gravel content is located in the northern part of the array area. Large sandwaves with megaripples are present in the east of the array area whilst the west is predominantly flat and featureless.

~~31.~~34. Along the cable corridor, the dominant sediment type is medium sand. The highest mud content is observed at the nearshore section of the offshore cable corridor. The west of the offshore cable corridor exhibits outcropping bedrock between flat and featureless seabed. Towards the centre of the offshore cable corridor, the seabed is characterised by large sandwaves and megaripples. In the east of the offshore cable corridor, the seabed is flat and featureless with isolated areas of seabed ripples.

~~32.~~35. As discussed in the Outline Sediment Disposal Management Plan **[Document Reference: 9.52]** the Project has committed to install offshore export cables to a depth that will not preclude or impede dredging to a depth of at least 22m below Chart Datum (CD) within the DWR areas Sunk A, and Trinity and Sunk Pilotage ~~Diamond Buffer~~ areas; and 19mCD within the Sunk B to facilitate potential future keel depths~~cables being below 22m below chart datum (CD) within the Sunk A and Trinity Deep Water Routes (DWRs) and 19m within the Sunk B DWR~~. Due to the depth of dredging/trenching required to cross the Sunk and Trinity DWR at these depths, London clay is expected to be present.

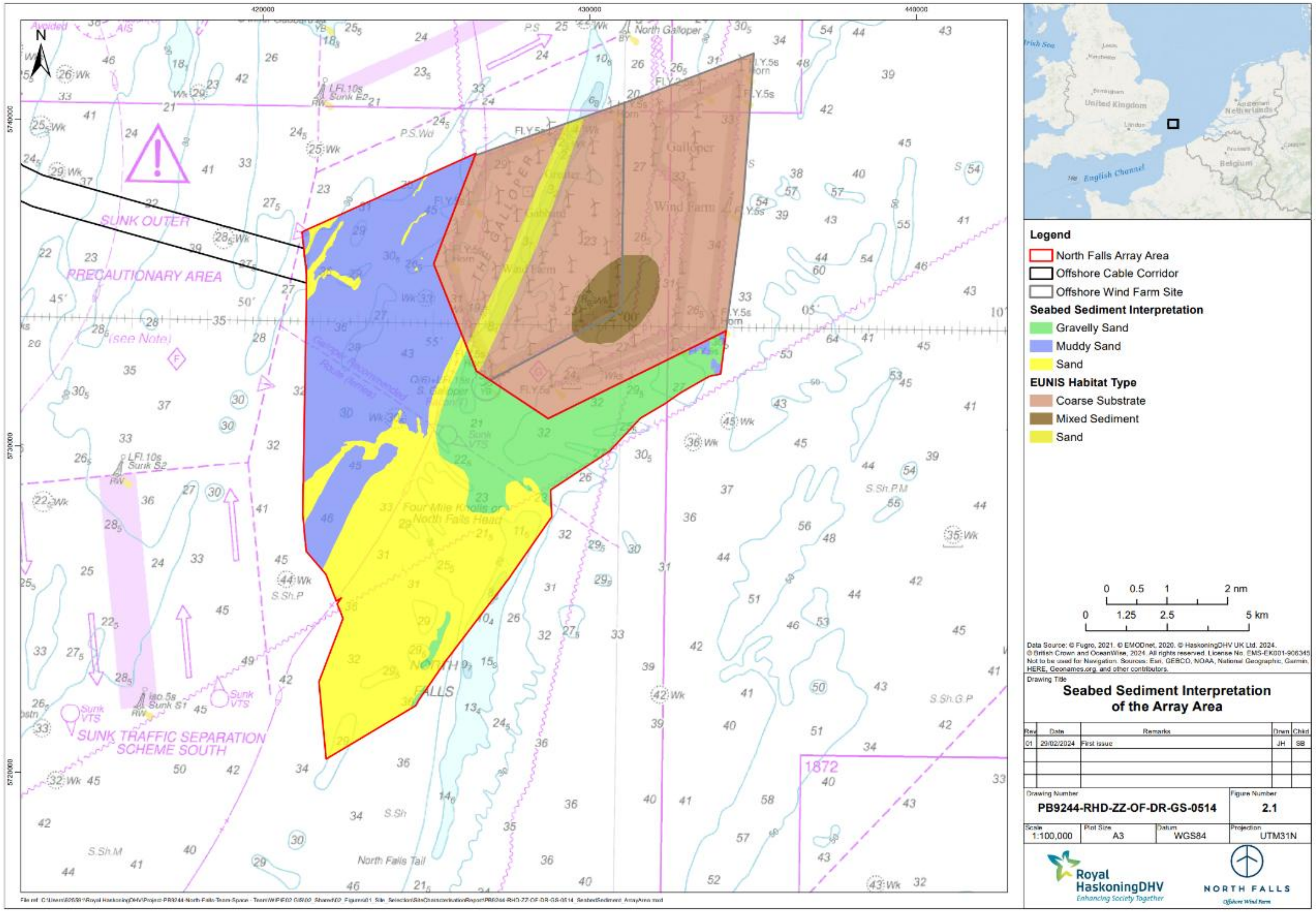


Figure 2.2 North Falls sediment distribution – array area

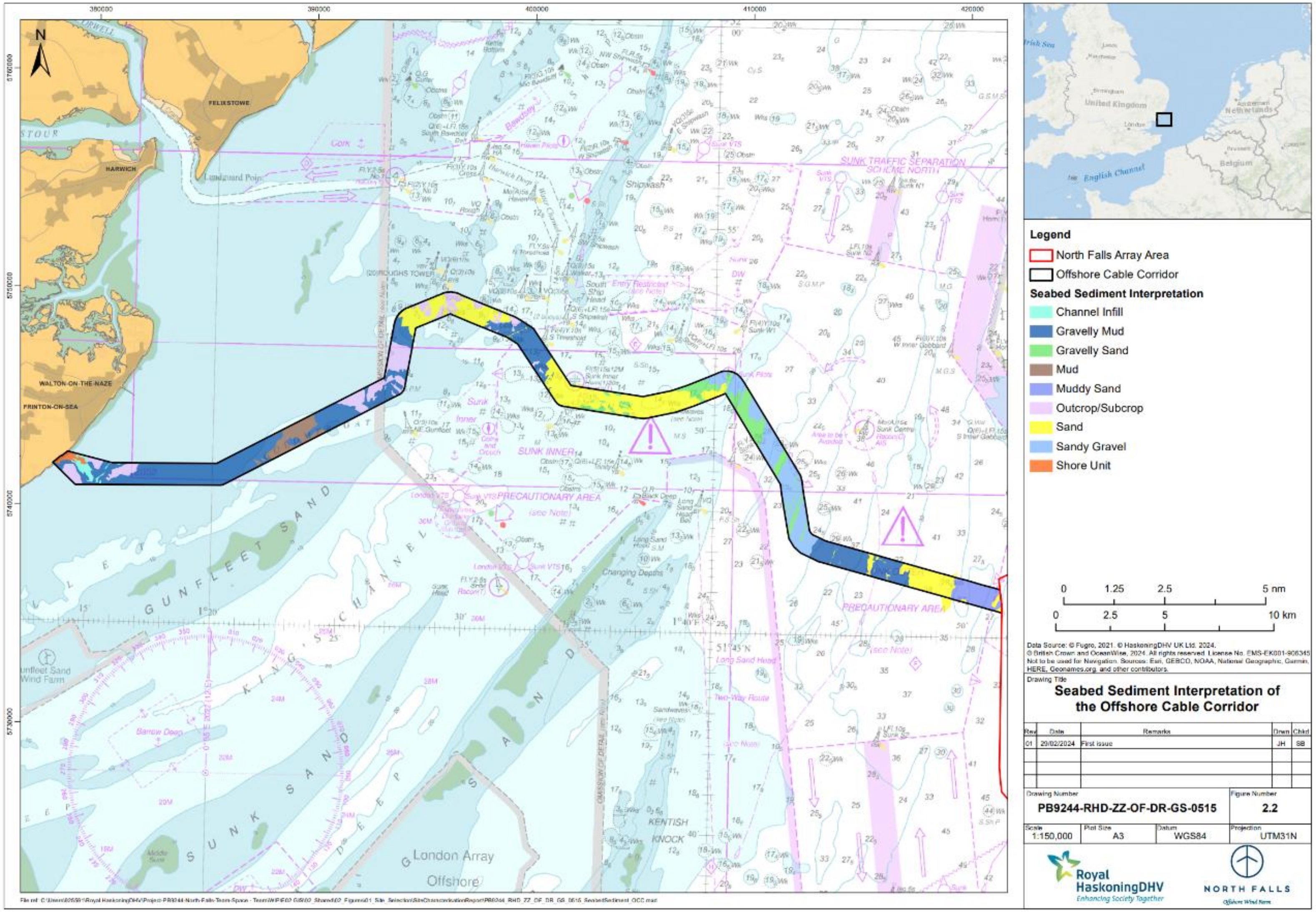


Figure 2.3 North Falls sediment distribution - offshore cable corridor

~~2.2~~2.3 Chemical characteristics

~~2.2.1~~2.3.1 Sediment contamination analysis

36. The sediment quality of the offshore project area is described in the ES Chapter 9 Marine Water and Sediment Quality [APP-023] presenting details of the survey and samples collected for this characterisation. Figure 2.4 presents the locations of the 19 sediment contamination sample collected during the characterization survey. Following reductions of the Project's Offshore Area throughout the consenting process, 6 of the samples collected during the characterisation survey are now located outside of NFOW ~~actual~~current Red Line Boundary (RLB). ~~and d~~Data for metals (Table 2.1) and Polyaromatic Hydrocarbon (PAH)s (Table 2.2) for all samples collected during the characterization the survey are summarised, below.

~~33.~~37. Analysis of polychlorinated biphenyls (PCBs) have also been undertaken with results being below the limit of detection for all samples in the array area and cable corridor and therefore these are not discussed further.

~~34.~~38. Values for contaminants in samples collected within the offshore project area were assessed against OSPAR's Background Assessment Concentration (BAC) and Effects Range-Low (ERL), and Cefas action levels (ALs).

39. Regarding metals, only one sample (ST36) within the array area exceeded both BAC and AL1 for arsenic but within the range for the region. For the cable corridor, four samples (ST01, ST11, ST17 and ST21) exceeded BAC and / or AL1 for arsenic while exceedance of AL1 or BAC was registered in one sample for copper (ST21) and for nickel (ST05). No metals exceedances of AL2 or ERL has been registered within the offshore project area.

~~35.~~40. Four samples collected outside of the NFOW RLB (ST28, ST31, ST32 and ST34) presented arsenic values above AL1, two of which also exceeded BAC (ST28 and ST31). These two samples (ST28 and ST31) also presented nickel values above AL1.

~~36.~~41. For PAHs, only one sample (ST36) within the array area exceeded OSPAR BAC for Anthracene. For the cable corridor, four samples (ST01, ST03, ST05 and ST19) exceeded OSPAR BAC for Benzo(a)anthracene (ST01 and ST03), Benzo(a)pyrene (ST03), Chrysene (ST01 and ST03), Fluoranthene (ST03), Naphthalene (ST01, ST03, ST05 and ST19) and Pyrene (ST01 and ST03). There were no exceedances of Cefas AL1 for HPAs within North Falls array or cable corridor.

~~37.~~42. From the information and data presented in the ES and summarised in this section, it can be concluded that the baseline water and sediment quality for the offshore and coastal waters surrounding the offshore project area is good and site-specific information in relation to the sediment contaminant concentrations are representative of the region and are not likely to present a risk to water quality if disturbed.

Table 2.1 Sediment sample results for metals within the offshore cable corridor and array area. Yellow indicates exceedance of AL1 or BAC. Orange indicates exceedance of both BAC and AL1. There are no exceedances of AL2 or ERL

	Sample reference																			Cefas		OSPAR	
	Offshore cable corridor									Array area			Out of NFOW RLB										
Metals (units mg/kg)	ST01	ST03	ST05	ST07	ST11	ST15	ST17	ST19	ST21	ST36	ST41	ST43	ST28	ST31	ST32	ST34	ST44	ST46	ST49	AL1	AL2	BAC	ERL
Arsenic	30.2	9.7	19.6	16.1	23.5	17.5	33	10.5	33.1	26.3	14.9	8.8	73.6	58.1	23.2	21	10.5	12	4.7	20	100	25	-
Cadmium	0.13	0.08	0.23	<0.04	<0.04	<0.04	0.16	0.07	0.1	0.16	<0.04	<0.04	0.16	0.24	0.06	0.09	0.06	<0.04	<0.04	0.4	5	0.31	1.2
Chromium	17.4	14.2	26.5	8.6	6.8	4.9	9.6	15.3	13.8	14	4.4	4.2	15.8	22.6	5.6	4.9	3.5	3.7	5.9	40	400	81	81
Copper	12.9	6.9	18	5	0.01	6.1	8.4	<0.5	33.6	5.6	2.4	2.5	11.7	9.5	3.7	3.4	2.7	2.4	4.5	40	400	27	34
Mercury	0.07	0.03	0.07	0.01	<0.01	0.04	<0.01	0.01	<0.01	0.01	<0.01	<0.01	<0.01	0.03	<0.01	0.02	0.04	0.02	0.01	0.3	3	0.07	0.2
Nickel	16.1	9.1	25.9	6.1	4.6	4.2	11.9	8.9	13.8	10.8	3.5	3.5	27.8	23.3	4.2	6.3	3.1	3.4	4.2	20	200	36	-
Lead	17.1	10.3	18	8.4	9.6	4.1	6.2	8.9	8.7	5.3	2.6	2.4	7.7	8.3	2.7	5.6	3.5	2.9	2.5	50	500	38	47
Zinc	62	35.5	89.1	33.6	31.9	18.6	26.6	35.8	32.9	26.6	13	11.9	38	47.1	29.3	29.8	15.4	20.5	18.1	130	800	122	150

Table 2.2 Sediment sample results for PAHs within the offshore cable corridor and array area. Cefas Action Level 1 is 100µg/kg for all PAHs with the exception of Dibenzo(ah)anthracene which is 10µg/kg. There are no exceedances of Cefas AL1. Yellow indicates exceedance of the OSPAR BAC

	Sample reference																			Cefas	OSPAR	
	Offshore cable corridor									Array area			Out of NFOW RLB									
	ST01	ST03	ST05	ST07	ST11	ST15	ST17	ST19	ST21	ST36	ST41	ST43	ST28	ST31	ST32	ST34	ST44	ST46	ST49	AL1	BAC	ERL
Acenaphthene	2.33	4.77	1.41	<1	<1	<1	<1	1.54	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	100	-	-
Acenaphthylene	2.94	4.17	1.28	<1	<1	<1	<1	1.21	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	100	-	-
Anthracene	5.01	10.1	2.58	<1	<1	<1	<1	2.97	1.93	27.3	<1	<1	<1	<1	<1	<1	<1	<1	<1	100	5	85
Benzo(a)anthracene	16.9	26.5	8.19	2.03	1.66	<1	<1	8.43	5.32	3.89	<1	<1	1.85	<1	<1	<1	<1	<1	<1	100	16	261
Benzo(a)pyrene	21.2	33.8	10.7	2.72	1.65	<1	1.01	11.1	6.8	2.54	<1	<1	2.78	1.88	<1	<1	<1	<1	<1	100	30	430
Benzo(b)fluoranthene	30.5	45.8	16.5	3.16	1.38	<1	1.3	14.2	9.25	3.54	<1	<1	4.14	1.94	<1	<1	<1	<1	<1	100	-	-
Benzo(e)pyrene	27.7	43.9	15.4	4.28	1.29	<1	1.76	13.4	9.03	2.54	<1	<1	4.02	2.5	<1	1.08	<1	<1	<1	100	-	-
Benzo(ghi)perylene	26.4	42.4	15.2	3.93	1.54	<1	1.5	13.3	8.69	2.9	<1	<1	3.53	2.21	<1	<1	<1	<1	<1	100	80	85
Benzo(k)fluoranthene	13.8	22.4	7.41	2.19	<1	<1	<1	6.29	5.18	1.9	<1	<1	2.17	1.58	<1	<1	<1	<1	<1	100	-	-
C1-Naphthalene	56.3	96.9	35.4	9.25	2.07	1.01	2.78	25.7	11.3	4.53	<1	<1	6.2	3.08	<1	1.33	<1	<1	<1	100	-	-
C2-Phenanthrene	40	66.7	23.7	5.81	3.7	<1	1.99	17.6	9.33	5.03	<1	<1	4.38	2.06	<1	<1	<1	<1	<1	100	-	-

	Sample reference																			Cefas	OSPAR	
	Offshore cable corridor									Array area			Out of NFOW RLB									
	ST01	ST03	ST05	ST07	ST11	ST15	ST17	ST19	ST21	ST36	ST41	ST43	ST28	ST31	ST32	ST34	ST44	ST46	ST49	AL1	BAC	ERL
C2-Napthalene	53.9	94.6	34.3	8.25	1.73	<1	2.92	26.3	11.7	3.16	<1	<1	6.84	2.72	<1	1.47	<1	<1	<1	100	-	-
C3-Napthalene	47.2	83.7	32.1	6.43	1.78	<1	2.56	21.2	9.84	2.42	<1	<1	5.33	2.48	<1	1.01	<1	<1	<1	100	-	-
Chrysene	22	33.6	10.5	2.53	1.65	<1	<1	10.5	6	5.22	<1	<1	2.2	1.66	<1	<1	<1	<1	<1	100	20	384
Dibenzo(ah)anthracene	4.76	7.92	2.29	<1	<1	<1	<1	2.35	1.56	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	10	-	-
Fluoranthene	33.2	58.8	15.8	4.38	2.13	<1	1.57	18.4	12.4	6.83	<1	<1	3.89	2.31	<1	<1	<1	<1	<1	100	39	600
Fluorene	4.62	9.47	2.92	<1	<1	<1	<1	2.5	1.22	6.79	<1	<1	<1	<1	<1	<1	<1	<1	<1	100	-	-
Indeno(1,2,3-cd)pyrene	24.1	39.1	13.5	3.85	1.29	<1	1.55	12.6	8.33	2.61	<1	<1	3.85	2.37	<1	<1	<1	<1	<1	100	103	240
Naphthalene	19	31.4	11.6	3.37	1.28	1.01	1.39	9.13	4.99	2.18	<1	<1	2.52	1.41	<1	<1	<1	<1	<1	100	8	160
Perylene	13.9	24.5	8.26	1.68	<1	<1	<1	6.75	4.16	1.21	<1	<1	1.73	<1	<1	<1	<1	<1	<1	100	-	
Phenanthrene	30.7	60	18.2	4.45	1.1	<1	1.56	15.8	8.76	12	<1	<1	3.58	1.84	<1	<1	<1	<1	<1	100	-	240
Pyrene	31.4	53.8	16	4.17	3.24	<1	1.67	16.8	11.7	5.86	<1	<1	3.78	2.33	<1	1.03	<1	<1	<1	100	24	665

Table 2.1 Sediment sample results for metals within the offshore cable corridor and array area. Yellow indicates exceedance of AL1 or BAC. Orange indicates exceedance of both BAC and AL1. There are no exceedances of AL2 or ERL	Sample reference												Cefas		OSPAR	
	Offshore cable corridor									Array area						
Metals (units mg/kg)	ST01	ST03	ST05	ST07	ST11	ST15	ST17	ST19	ST21	ST36	ST41	ST43	AL1	AL2	BAC	ERL
Arsenic	30.2	9.7	19.6	16.1	23.5	17.5	33	10.5	33.1	26.3	14.9	8.8	20	100	25	-
Cadmium	0.13	0.08	0.23	<0.04	<0.04	<0.04	0.16	0.07	0.1	0.16	<0.04	<0.04	0.4	5	0.31	1.2
Chromium	17.4	14.2	26.5	8.6	6.8	4.9	9.6	15.3	13.8	14	4.4	4.2	40	400	81	81
Copper	12.9	6.9	18	5	0.01	6.1	8.4	<0.5	33.6	5.6	2.4	2.5	40	400	27	34
Mercury	0.07	0.03	0.07	0.01	<0.01	0.04	<0.01	0.01	<0.01	0.01	<0.01	<0.01	0.3	3	0.07	0.15
Nickel	16.1	9.1	25.9	6.1	4.6	4.2	11.9	8.9	13.8	10.8	3.5	3.5	20	200	36	-
Lead	17.1	10.3	18	8.4	9.6	4.1	6.2	8.9	8.7	5.3	2.6	2.4	50	500	38	47
Zinc	62	35.5	89.1	33.6	31.9	18.6	26.6	35.8	32.9	26.6	13	11.9	130	800	122	150

Metals (units mg/kg)	Sample reference: Offshore cable corridor ST01	ST03	ST05	ST07	ST11	ST15	ST17	ST19	ST21	Array area ST36	ST41	ST43	Cefas AL1	AL2	OSPAR BAC	ERL
Arsenic	30.2	9.7	19.6	16.1	23.5	17.5	33.0	10.5	33.1	26.3	14.9	8.8	20	100	25	-
Cadmium	0.13	0.08	0.23	<0.04	<0.04	<0.04	0.16	0.07	0.10	0.16	<0.04	<0.04	0.4	5	0.31	1.2
Chromium	17.4	14.2	26.5	8.6	6.8	4.9	9.6	15.3	13.8	14.0	4.4	4.2	40	400	81	81
Copper	12.9	6.9	18.0	5.0	0.01	6.1	8.4	<0.5	33.6	5.6	2.4	2.5	40	400	27	34
Mercury	0.07	0.03	0.07	0.01	<0.01	0.04	<0.01	0.01	<0.01	0.01	<0.01	<0.01	0.3	3	0.07	0.15
Nickel	16.1	9.1	25.9	6.1	4.6	4.2	11.9	8.9	13.8	10.8	3.5	3.5	20	200	36	-
Lead	17.1	10.3	18.0	8.4	9.6	4.1	6.2	8.9	8.7	5.3	2.6	2.4	50	500	38	47
Zinc	62.0	35.5	89.1	33.6	31.9	18.6	26.6	35.8	32.9	26.6	13.0	11.9	130	800	122	150

~~Table 2.2 Sediment sample results for PAHs within the offshore cable corridor and array area. Cefas Action Level 1 is 100µg/kg for all PAHs with the exception of Dibenzo(ah)anthracene which is 10µg/kg. There are no exceedances of Cefas AL1. Yellow indicates exceedance of the OSPAR BAC~~

PAH (units µg/kg)	Sample reference: Offshore cable corridor ST01	ST03	ST05	ST07	ST11	ST15	ST17	ST19	ST21	Array area ST36	ST41	ST43	Cefas AL1	OSPAR BAC	ERL
Acenaphthene	2.33	4.77	1.41	<1	<1	<1	<1	1.54	<1	<1	<1	<1	100	-	-
Acenaphthylene	2.94	4.17	1.28	<1	<1	<1	<1	1.21	<1	<1	<1	<1	100	-	-
Anthracene	5.01	10.1	2.58	<1	<1	<1	<1	2.97	1.93	27.3	<1	<1	100	5	85

	Sample reference												Cefas	OSPAR	
	Offshore cable corridor									Array area					
PAH (units µg/kg)	ST01	ST03	ST05	ST07	ST11	ST15	ST17	ST19	ST21	ST36	ST41	ST43	AL1	BAC	ERL
Benzo(a)anthracene	16.9	26.5	8.19	2.03	1.66	<1	<1	8.43	5.32	3.89	<1	<1	100	16	261
Benzo(a)pyrene	21.2	33.8	10.7	2.72	1.65	<1	1.01	11.1	6.8	2.54	<1	<1	100	30	430
Benzo(b)fluoranthene	30.5	45.8	16.5	3.16	1.38	<1	1.30	14.2	9.25	3.54	<1	<1	100	-	-
Benzo(e)pyrene	27.7	43.9	15.4	4.28	1.29	<1	1.76	13.4	9.03	2.54	<1	<1	100	-	-
Benzo(ghi)perylene	26.4	42.4	15.2	3.93	1.54	<1	1.50	13.3	8.69	2.90	<1	<1	100	80	85
Benzo(k)fluoranthene	13.8	22.4	7.41	2.19	<1	<1	<1	6.29	5.18	1.90	<1	<1	100	-	-
C1-Naphthalene	56.3	96.9	35.4	9.25	2.07	1.01	2.78	25.7	11.3	4.53	<1	<1	100	-	-
C2-Phenanthrene	40.0	66.7	23.7	5.81	3.70	<1	1.99	17.6	9.33	5.03	<1	<1	100	-	-
C2-Napthalene	53.9	94.6	34.3	8.25	1.73	<1	2.92	26.3	11.7	3.16	<1	<1	100	-	-
C3-Napthalene	47.2	83.7	32.1	6.43	1.78	<1	2.56	21.2	9.84	2.42	<1	<1	100	-	-
Chrysene	22.0	33.6	10.5	2.53	1.65	<1	<1	10.5	6.00	5.22	<1	<1	100	20	384
Dibenzo(ah)anthracene	4.76	7.92	2.29	<1	<1	<1	<1	2.35	1.56	<1	<1	<1	10	-	-
Fluoranthene	33.2	58.8	15.8	4.38	2.13	<1	1.57	18.4	12.4	6.83	<1	<1	100	39	600
Fluorene	4.62	9.47	2.92	<1	<1	<1	<1	2.50	1.22	6.79	<1	<1	100	-	-
Indeno(1,2,3-cd)pyrene	24.1	39.1	13.5	3.85	1.29	<1	1.55	12.6	8.33	2.61	<1	<1	100	103	240
Naphthalene	19.0	31.4	11.6	3.37	1.28	1.01	1.39	9.13	4.99	2.18	<1	<1	100	8	160
Perylene	13.9	24.5	8.26	1.68	<1	<1	<1	6.75	4.16	1.21	<1	<1	100	-	

	Sample reference												Cefas	OSPAR	
	Offshore cable corridor									Array area					
~~PAH (units µg/kg)~~	~~ST01~~	~~ST03~~	~~ST05~~	~~ST07~~	~~ST11~~	~~ST15~~	~~ST17~~	~~ST19~~	~~ST21~~	~~ST36~~	~~ST41~~	~~ST43~~	~~AL1~~	~~BAC~~	~~ERL~~
~~Phenanthrene~~	~~30.7~~	~~60.0~~	~~18.2~~	~~4.45~~	~~1.10~~	~~<1~~	~~1.56~~	~~15.8~~	~~8.76~~	~~12.0~~	~~<1~~	~~<1~~	~~100~~	~~-~~	~~240~~
~~Pyrene~~	~~31.4~~	~~53.8~~	~~16.0~~	~~4.17~~	~~3.24~~	~~<1~~	~~1.67~~	~~16.8~~	~~11.7~~	~~5.86~~	~~<1~~	~~<1~~	~~100~~	~~24~~	~~665~~

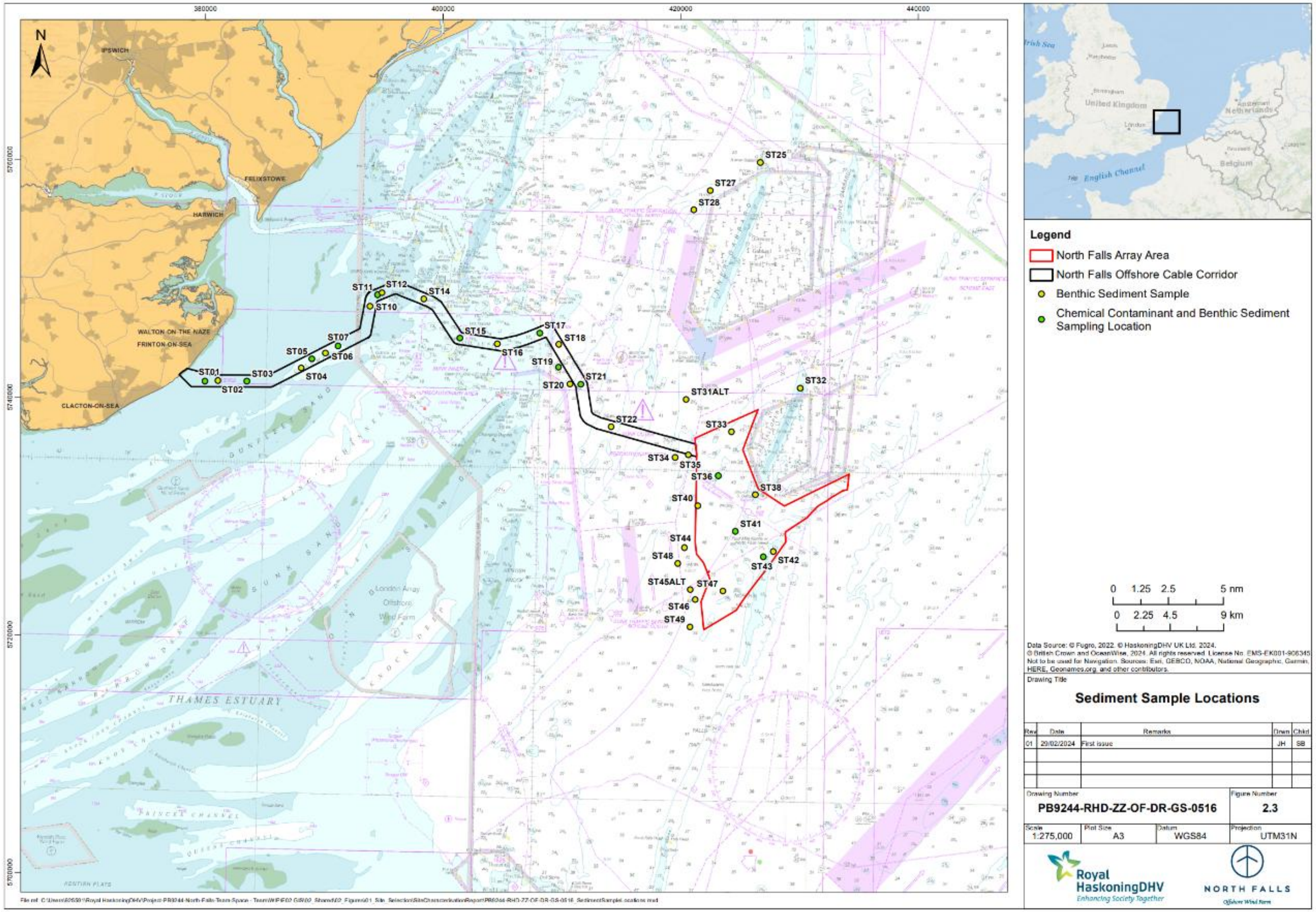


Figure 2.4 Location of sediment sample sites

~~2.3~~2.4 Biological characteristics

~~2.3.1~~2.4.1 Benthic and intertidal ecology

~~38.~~43. Site specific benthic survey in the offshore project area recorded a number of taxa including annelids, arthropods, molluscs, echinoderms and other phyla. Molluscs and annelids had the highest abundance across the offshore project area.

~~39.~~44. Annelids have the highest species richness across the offshore project area with highest representation from polychaetes. Specifically, *Lagis koreni*, *Scalibregma inflatum*, *Lumbrineris cingulate*, *Sabellaria spinulosa* and species of genus *Notomastus*/*Pseudonotomastus*. *S. spinulosa* is found solitary or in small groups and favours encrusting pebbles, shells and bedrock (OSPAR, 2013), which correlates with the location of their distribution in the site specific survey as highest abundance was found at ST01 which has almost 50% gravel composition.

~~40.~~45. Molluscs had the highest species abundance across the offshore project area, in particular bivalves. *Kurtiella bidentata* and *Abra alba* were in the top five most frequent species. Mollusca comprised most of the abundance at stations ST01 to ST05 and ST22. Analysis of the species indicated a numerical dominance of the bivalves *Nucula nucleus, Nucula nitidosa, Musculus discors, A. alba* and *Saxicavella jeffreysi* at stations ST01 to ST05, and a numerical dominance of *S. jeffreysi* and *K. bidentata* at station ST22.

~~41.~~46. The most common echinoderms were brittlestars. Specifically, *Ophiura albida, Ophiura fragilis* and *Amphipholis squamata. Echinodermata* had the highest abundance at station ST21, which was associated mainly with the abundance of *O. albida*. ST21 was located in the offshore cable corridor and had a large presence of gravel within the sediment composition. Sea urchins *Psammechinus miliaris* were also reported.

~~42.~~47. The number of colonial epifauna was generally higher at stations featuring coarse and/or mixed sediment, owing to the sediment coarseness and heterogeneity which provide microhabitats and hard substrate for the settlement of epifaunal species. This in turn increases the structural complexity of the habitat and may provide additional microhabitats for smaller fauna, thus increasing the overall richness and diversity.

~~43.~~48. *S. spinulosa* crusts were reported from seabed video and photography at ST39 in the array area and this was assigned the biotope '*S. spinulosa* on Stable Circalittoral Mixed Sediment' (A5.611).

~~44.~~49. The biotope '*Sabellaria spinulosa* on stable circalittoral mixed sediment' (A5.611), is part of the Annex I habitat 'Reefs' when it occurs as biogenic reef (JNCC, 2022). As a biogenic reef, this habitat is also on the OSPAR list of threatened and/or declining species and habitats (OSPAR, 2021).

~~45.~~50. ST39 was described as having high abundances of the tube-building polychaete *S. spinulosa* on mixed sediments in the circalittoral zone. It was characterised by gravelly muddy sand interspersed with rippled sand with shell fragments and varying proportions of pebbles, cobbles, consolidated clay and clay clasts.

~~46.~~51. Owing to the presence of *S. spinulosa* crusts, no grab sampling was undertaken at station ST39, therefore video transects were undertaken to assess the potential for reef.

~~47.~~52. *S. spinulosa* was found along all the transects studied around ST39. Most of *S. spinulosa* aggregations along the transects at stations ST39 and 50m east (ST39_50E) and west (ST39_50W) of station ST39, were classified as 'Not a reef' owing to an elevation of < 2 cm and/or a cover < 10 %. Some areas along all transects associated with station ST39 were classified as 'Low reef'. One area was classified as 'Medium reef' along transect ST_39Eb. One area classified as 'High reef' occurred at the start of transect ST39_50Ea and along transect ST39_50Eb.

~~48.~~53. In addition, the offshore cable corridor is adjacent to the Margate and Long Sands Special Area of Conservation (SAC) which is designated for Annex I Sandbank slightly covered by seawater at all the times; and the array area is adjacent to the Kentish Knock East MCZ which is designated for the following broadscale habitats:

- Subtidal coarse sediment;
- Subtidal sand; and
- Subtidal mixed sediment.

~~2.3.2~~2.4.2 Fish and shellfish ecology

~~49.~~54. Whiting was the most common demersal bony fish species recorded in the study area (IBTS data, 2017 – 2021). Other species found in relatively high numbers in the IBTS data included dab *Limanda limanda*, bib *Trisopterus luscus*, poor cod *Trisopterus minutus*, plaice *Pleuronectes platessa* and Dover sole *Solea solea*. Species such as lesser weever *Echiichthys vipera*, grey gurnard *Eutrigla gurnardus*, lemon sole *Microstompus kitt* and stripped red mullet *Mullus surmuletus* were also relatively abundant but for the most part their catches were concentrated in rectangle 32F2, with relatively low numbers found in 32F1, where the majority of the offshore project area is located. The remaining species of demersal bony fish were all recorded in relatively low numbers.

~~50.~~55. Small spotted catshark was the elasmobranch found in greatest numbers, followed by thornback ray and smoothhounds. Thornback ray, blonde ray, small spotted catshark, smoothhounds, spurdog and tope were also recorded in either the GWF or GGOW fish ecology surveys.

~~51.~~56. The species of commercial importance from the study area are sole *Solea solea*, whelk *Buccinum undatum*, bass *Dicentrarchus labrax*, thornback ray *Raja clavata*, horse mackerel *Trachurus trachurus*, herring *Clupea harengus*, cod *Gadus morhua* and plaice *Pleuronectes platessa*.

~~52.~~57. The principal species landed by weight by UK vessels from the study area are molluscs, predominantly cockle *Cerastoderma edule* and whelk *B. undatum*.

~~53.~~58. In ICES rectangle 32F1, where the majority of the offshore project area is located, the species of highest commercial importance are considered to be sole, whelk, bass and thornback ray. Local vessels to the offshore cable corridor are reported as targeting species such as bass, sole, skate, herring, turbot, brill, lobster and crab from a mix of trawling, netting and potting.

~~54.~~59. Species for which spawning or nursery grounds have been defined in areas that overlap with the array area and offshore cable corridor based on information provided in Coull *et al* (1998) and Ellis *et al* (2010, 2012). Spawning grounds for herring, lemon sole, plaice, sandeel (*Ammodytidae* spp.), Dover sole, sprat, whiting and cod have all been defined in the offshore project area. Nursery grounds for the species mentioned above as well as mackerel, thornback ray, and tope have also been defined within the offshore project area.

~~55.~~60. Various diadromous species have the potential to transit parts of the offshore project area, during certain periods of their life cycle. These include:

- European eel *Anguilla anguilla*;
- Shads (*Alosa alosa* and *Alosa fallax*);
- River and sea lampreys (*Lampetra fluviatilis* and *Petromyzon marinus*);
- Atlantic salmon *Salmo salar*;
- Sea trout *Salmo trutta*; and
- Smelt *Osmerus eperlanus*.

~~56.~~61. Typically these species, if present in the area, would be expected in coastal areas (i.e. in inshore areas possibly in the proximity of the offshore cable corridor) rather than in the array area.

~~2.3.3~~2.4.3 Marine mammals

~~57.~~62. Site-specific aerial surveys were conducted for both marine mammals and seabirds. HiDef Aerial Surveying Limited collected high resolution aerial digital still imagery for marine megafauna (combined with ornithology during 24 months of survey between March 2019 and February 2021.

~~58.~~63. The following marine mammal were recorded:

- Harbour porpoise *Phocoena phocoena*;
- Minke whale *Balaenoptera acutorostrata*;
- Grey seal *Halichoerus grypus*; and
- Harbour seal *Phoca vitulina*.

~~59.~~64. Harbour porpoise was the most commonly sighted marine mammal species during the surveys, with a total of 702 individuals recorded through the 24 survey dates. A seasonal pattern of harbour porpoise abundance within North Falls is indicated within the results, with the highest numbers generally recorded in the winter months, while lower numbers were recorded during summer.

~~60.~~65. The North Falls offshore project area is located within the Southern North Sea SAC which is designated for harbour porpoise.

~~61.~~66. A single minke whale was identified in September 2019 of the 24 months of aerial surveys.

~~62.~~67. A relatively low number of grey seal were recorded during the site-specific aerial surveys, with a total of 13 individuals recorded during the 24 surveys and no harbour seal sightings were confirmed during surveys.

~~63.~~68. In addition, a total of 23 unidentified seal species (either harbour or grey seal) were recorded, as well as 17 seal / small cetacean species.

~~2.3.4~~2.4.4 Offshore ornithology

~~64.~~69. The key bird species recorded during the site-specific aerial surveys are listed in Table 2.3 along with details of their conservation status.

Table 2.3 Seabird species recorded at North Falls and their conservation status

Species[1]	Scientific name	Conservation status[2]
Arctic skua	*Stercorarius parasiticus*	BoCC Red, Birds Directive Migratory Species
Black-headed gull	*Chroicocephalus ridibundus*	BoCC Amber, Birds Directive Migratory Species
Common gull	*Larus canus*	BoCC Amber, Birds Directive Migratory Species
Common tern	*Sterna hirundo*	BoCC Amber, Birds Directive Annex 1
Cormorant	*Phalacrocorax carbo*	BoCC Green, Birds Directive Migratory Species
Fulmar	*Fulmarus glacialis*	BoCC Amber, Birds Directive Migratory Species
Gannet	*Morus bassanus*	BoCC Amber, Birds Directive Migratory Species
Great black-backed gull	*Larus marinus*	BoCC Amber, Birds Directive Migratory Species
Great skua	*Stercorarius skua*	BoCC Amber, Birds Directive Migratory Species
Guillemot	*Uria aalge*	BoCC Amber, Birds Directive Migratory Species
Herring gull	*Larus argentatus*	BoCC Red, Birds Directive Migratory Species
Kittiwake	*Rissa tridactyla*	BoCC Red, Birds Directive Migratory Species
Lesser black-backed gull	*Larus fuscus*	BoCC Amber, Birds Directive Migratory Species
Little gull	*Hydrocoloeus minutus*	BoCC Green, Birds Directive Migratory Species
Puffin	*Fratercula arctica*	BoCC Red, Birds Directive Migratory Species
Razorbill	*Alca torda*	BoCC Amber, Birds Directive Migratory Species
Red-throated diver	*Gavia stellata*	BoCC Green, Birds Directive Annex 1
Sandwich tern	*Thalasseus sandvicensis*	BoCC Amber, Birds Directive Annex 1

1. Vernacular British names as defined by the British Ornithologists Union (https://bou.org.uk/british-list/bird-names/) are used (rather than international English bird names)
2. BOCC = Birds of Conservation Concern in the UK, Stanbury *et al.* (2021)

~~65.~~70. In addition to the seabird species listed in Table 2.3, additional bird species were recorded irregularly including migratory waterfowl (Brent goose *Branta bernicla*, Shelduck *Tadorna tadorna*, Whimbrel *Numenius phaeopus* and Wigeon *Anas Penelope*), raptors (Peregrine *Falco peregrinus*, Osprey *Pandion haliaetus* and Sparrowhawk *Accipiter nisus*), passerines (Carrion crow *Corvus corone*, Chaffinch *Fringilla coelebs*, Fieldfare *Turdus pilaris* and Starling *Sternus vulgaris*) and feral pigeon *Columba livia.*

~~66.~~71. The offshore cable corridor overlaps the Outer Thames Estuary Special Protection Area (SPA) which is designated for wintering red-throated diver and breeding common tern and little tern.

~~2.4~~2.5 Human characteristics

~~2.4.1~~2.5.1 Commercial fisheries

~~67.~~72. The offshore project area is situated in International Council for the Exploration of the Sea (ICES) division IVc (southern North Sea) with the array area located approximately 22.7nm (42km) from shore.

~~68.~~73. The study area used to characterise the commercial fisheries baseline has been defined with reference to the ICES rectangles that overlap with the offshore project area. These are as follows:

- ICES rectangle 32F1, where the majority of the offshore project area is located (including the whole offshore cable corridor and most of the array area);
- ICES rectangle 32F2 – where a small section of the array area is located.

~~69.~~74. The offshore cable corridor in 32F1 is mostly targeted by local UK vessels under 15m in length that operate a range of gear including pots, trawls, nets and longlines for species such as cockles, whelks, sole, bass, thornback ray and others. Some of these vessels are multi-purpose and switch between fishing gear to target species depending on the time of year.

~~70.~~75. The array area in 32F1 is predominantly fished by Belgian and Dutch beam trawlers, Belgian demersal trawlers and French pelagic trawlers, as well as larger UK vessels over 15m, potting for whelks and beam trawling for sole and other demersal species.

~~71.~~76. ICES rectangle 32F2 is nearshore, with activity being mainly potting, demersal trawling and netting for whelks, sole and bass.

~~2.4.2~~2.5.2 Shipping and navigation

~~72.~~77. Data from three vessel traffic surveys have been used to inform the ES Chapter 15 Shipping and Navigation **[APP-029]** as follows:

- 14th February to 2nd March 2022 winter survey;
- 14th to 28th July 2022 summer survey; and
- January 17th to February 1st 2024 winter survey.

~~73.~~78. Commercial vessels are principally routed according to the International Maritime Organization routing measures: the Sunk North, East and South TSSs; the Sunk Outer Precautionary Area (upon which the three TSS converge); the Sunk Inner Precautionary Area (adjacent to the Sunk Outer Precautionary Area); the Long Sand Head Two Way Route, and the Area to be Avoided (the central part of the Sunk Outer Precautionary Area).

~~74.~~79. There are a number of charted anchorage areas inshore of the array area including the closest to the array area the Sunk DW Anchorage; approximately 1.6nm north of the offshore cable corridor. The Sunk Inner Anchorage is also located 0.9nm from the offshore cable corridor.

~~75.~~80. There are three DWRs (Trinity, Sunk and Black Deep DWRs) located converging within the Sunk Inner Precautionary Area, within the vicinity of the Sunk Pilot Boarding Station. The most northern of these leads to the entrance of the Harwich Deep Water Channel, which has a maintained depth of 16m, and leads north-west on approach to the Harwich Haven. Both the Trinity and the Sunk DWRs are crossed by the offshore cable corridor, with these routes adjoining further south before heading into ports within the Thames and Medway via the Black Deep DWR.

~~76.~~81. The vessel traffic surveys showed that an average of 134 vessels per day were recorded within the study area during the winter vessel traffic surveys, rising to 147 during the summer survey. The increase in summer was observed to be primarily associated with increased volumes of wind farm vessels and recreational vessels. On average, five vessels per day intersect the array area during the summer, and two per day in winter.

~~77.~~82. Cargo vessels accounted for more than half of all traffic, followed by tankers, which accounted for approximately a quarter of traffic. An average of 8 recreational vessels were recorded per day in the summer survey, with less than one per day in winter.

~~2.4.3~~2.5.3 Marine archaeology and cultural heritage

~~78.~~83. The offshore archaeology and cultural heritage existing environment within this study area is defined as the known archaeological and cultural heritage resource (including designated and non-designated heritage assets) and the potential for previously unrecorded heritage assets and finds to be present within the offshore project area with respect to:

- Seabed prehistory (i.e. archaeological remains on the seabed corresponding to the activities of prehistoric populations that may have inhabited what is now the seabed when sea levels were lower);
- Maritime archaeology (i.e. the remains of boats and ships and archaeological material associated with prehistoric and historic maritime activities);
- Aviation archaeology (i.e. the remains of crashed aircraft and archaeological material associated with historic aviation activities);
- Historic seascape character (i.e. the attributes that contribute to the formation of the historic character of the seascape); and

- Buried archaeology (including palaeoenvironmental deposits) within the intertidal zone below MHWS.

~~79.~~84. The recent geological history of the southern North Sea is directly linked to glacial/interglacial cycles experienced by the area during the Pleistocene (2.5 million to 10 thousand years ago), which resulted in large areas of the southern North Sea being periodically exposed as a terrestrial environment. These glacial cycles, and accompanying changes in sea level, are recorded as Marine Isotope Stage (MIS).

~~80.~~85. Sidescan sonar, multibeam echosounder and magnetometer data interpreted by Wessex Archaeology has demonstrated the presence of 1514 seabed features within the study area which have been identified as being of archaeological interest (A1) or potential archaeological interest (A2 and A3). The large number of features reflects considerable historic maritime activity in the study area, the approach to the Thames having been a historically busy area for shipping, with significant military activity in the twentieth century.

~~81.~~86. A total of 310 features have been identified within the array area and 1204 within the offshore cable corridor.

~~2.4.4~~2.5.4 Infrastructure and other users

~~82.~~87. North Falls is adjacent to the parent GGOW, and also Galloper wind farm (GWF). North Falls is an extension to GGOW which is a 504MW offshore wind farm which has been operational since 2012. Both projects are owned by SSE Renewables (50%) and RWE Renewables (50%). SSE Renewables acts as the operator of the GGOW on behalf of the consortium.

~~83.~~88. GWF is an earlier extension to GGOW with a capacity of 353MW, which became operational in 2018. GWF is owned by a consortium of RWE Renewables (25%), Equitix (25%), Siemens Financial Services (25%), Spring Infrastructure (12.5%) and ESB (12.5%).

~~84.~~89. Other nearby operational OWFs include London Array, Thanet, Gunfleet Sands (I, II and Demo), Kentish Flats and East Anglia ONE.

~~85.~~90. The North Falls offshore export cables would make landfall at Kirby Brook on the Tendring Peninsula of Essex, over 1km to the north east of the existing offshore export cable landfall for the Gunfleet Sands I and II operational wind farms.

~~86.~~91. The export cables for GGOW and GWF make landfall in Suffolk, and London Array in Kent notably a different region to North Falls.

~~87.~~92. There is a slight overlap between the North Falls array area and the GGOW export cables which interconnect the two GGOW arrays. The GWF export cables are c 5.5km from the North Falls offshore project area (at the closest point).

~~88.~~93. The consented East Anglia TWO and East Anglia ONE North wind farms are c.31km and 65km from the North Falls array area. These wind farms are expected to complete construction prior to North Falls.

~~89.~~94. ~~Within the study area,~~ Five Estuaries is within the study area. Five Estuaries is an extension to GWF being developed by RWE, submitted a DCO application in March 2024 and concluded examination on 17 March 2025.

~~90.~~95. The southern North Sea is crossed by many cables, and the majority of those not related to offshore wind are telecommunication cables between the UK and mainland Europe. Several electrical interconnector cables also connect the power grids of the UK and mainland Europe.

~~91.~~96. There are currently two operational cables, one telecommunication and one electrical, that cross the Project array area. The Atlantic Crossing 1 is a telecommunications cable connection between the UK and the Netherlands. The Britned HVDC is an electrical interconnector cable connecting the UK and the Netherlands.

~~92.~~97. There are outfall pipes in proximity to the landfall area. The closest is a sewage outfall pipe located to the north east of Frinton Golf Course, which is c. 0.2km from the North Falls offshore cable corridor, at the closest point.

~~93.~~98. There are four closed disposal sites which overlap the offshore project area:

- Galloper OWF (TH057) overlapping the array area;
- Britned (NS100) overlapping the array area;
- Warren Spring Exptl Area 2/1 (TH024) overlapping the cable corridor area; and
- Warren Spring Exptl Area 2 (TH025) overlapping the cable corridor area.

~~94.~~99. There is no overlap of the offshore project area with open disposal sites, with the exception of the Five Estuaries cable corridor disposal site (TH019), which is proposed to be expanded to incorporate North Falls (see Section 2.1).

~~95.~~100. There are no aggregate production agreement areas or exploration and option areas located within the offshore project area. The nearest production agreement area to the array area is licenced to DEME Building Materials Ltd (524). This area is adjacent to the south-east of the array area.

~~96.~~101. The following non-danger military practice and exercise areas (PEXAs) overlap or are in proximity to the North Falls offshore project area:

- Kentish Knock – X5119 (overlaps the array area);
- North Galloper – X5121 (adjacent to the eastern boundary of the array area);
- Outer Gabbard – X5117 (located to the north of the array area);
- South Galloper – X5120 (overlaps the array area); and
- Gunfleet – X5118 (overlaps the offshore cable corridor).

~~97.~~102. No danger PEXAs overlap with the offshore project area. The closest danger PEXA is c. 11km to the south of the offshore cable corridor.

3 Type of material to be disposed

~~98.~~103. The type of sediment to be disposed of has been discussed in Section 2.2.5. It is primarily a mix of gravel, sand and mud. London Clay is expected to be present at the DWRs. Sand is the predominant sediment type in the array area and the offshore cable corridor.

4 Quantity of material to be disposed

~~99.~~104. The construction and installation method(s) required for North Falls' wind turbines, cables and other offshore structures (i.e. OSPs/OCPs) are yet to be determined. However, material to be disposed of may arise from the following sources:

- Sandwave levelling (pre-sweeping) for offshore cable installation;
- Seabed preparation and levelling for foundations installation;
- Seabed preparation and levelling for OSP/OCPs installation;
- Drilling cuttings associated with installing piled foundations; and
- Dredging/excavation associated with HDD exit during cable installation at the landfall.

It is proposed that any spoil material generated during the activities will be disposed of within the offshore project area, with the spoil subsequently winnowed away by the natural tide and wave driven processes (see ES Chapter 8 Marine Geology, Oceanography and Physical Processes **[APP-022]**).

4.1 Foundations installation

~~100.~~105. The foundation types currently under consideration for the installation of WTGs and other substructure are:

- Monopile[1];
- Mono suction bucket;
- Multi-leg pin-piled[1] jacket foundations; and/or
- Multi-leg suction bucket jacket foundations.

4.1.1 Wind Turbine Generators (WTGs)

~~101.~~106. If piled foundations are chosen for the installation of WTGs, drilling may be required at up to 10% of the site. The worst case volume of WTG arisings is 34,728m^3 for largest turbines.

~~102.~~107. If suction bucket monopile foundations are adopted, sandwave levelling could be required during seabed preparation. The worst case seabed preparation volume for WTGs is 1,040,625m^3 for up to 57 wind turbines.

~~103.~~108. The final design of North Falls could include more than one foundation type, however it should be noted that, should all foundations be suction bucket jacket (i.e. the basis of the sandwave levelling volumes described above), there

[1] Piles will be driven and/or drilled depending on geology.

would be no drill arisings and therefore the volumes described above should not be combined.

4.1.2 OSP/OCPs

~~104.~~109. Up to two offshore platforms (OSP or OCP) are being considered for North Falls. If piled foundations are used for the installation of OSPs/OCP, up to 50% of foundations could require drilling. The worst case volume of OSPs/OCP drill arisings is 11,451m^3.

~~105.~~110. As for WTGs, if suction bucket jacket are adopted for the OSPs/OCP, sandwave levelling could be required during seabed preparation considering the possibility of sandwaves within the array area. The worst case seabed preparation volume for OSPs/OCP is 38,485m^3.

~~106.~~111. As with WTG, the volumes described above for drilling and sandwave levelling for OSPs/OCP should not be combined.

4.2 Cables installation

4.2.1 Sandwave levelling (pre-sweeping)

~~107.~~112. Mobile sandwaves are present in parts of the offshore project area. Therefore, sandwave levelling (pre-sweeping) to a stable reference seabed level may be undertaken in areas with large ripples and sandwaves to reduce the potential that cables become unburied over the life of the Project. An interim cable burial study has been undertaken, informed by geophysical survey, to calculate the following worst case scenario sandwave levelling volumes:

- ~~24~~22,~~203~~204,~~332m^3~~ 296m^3 for the array cables;
- 1,436,480m^3 for the platform interconnector cables; and
- 4,~~634~~297,~~673m^3~~ 282m^3 for the export cables.

~~108.~~113. As a worst case scenario, ~~304,917~~496,467m^3 of clay could be present when dredging/trenching across the Sunk and Trinity DWRs. These volumes of clay are included in the export cable total listed above and would be deposited in the array area to ensure they do not reduce navigable depth within the deep water routes. The Outline Sediment Disposal Plan **[Document Reference 9.52]** secures that disposal of dredged material will avoid the Sunk and Trinity DWRs.

4.3 Summary of sediment disposal quantities

Table 4.1 Summary of sediment disposal quantities

Infrastructure / Activity	Worst case volume (m^3)	
	Drill arisings for piled foundations	Seabed preparation for non-piled foundations
Seabed preparation – WTGs	-	1,040,625
Seabed preparation – OSP/OCP	-	38,485

Infrastructure / Activity	Worst case volume (m^3)	
	Drill arisings for piled foundations	Seabed preparation for non-piled foundations
Seabed preparation – export cables	4,~~634,673~~297,282	
Seabed preparation – platform interconnector cables	1,436,480	
Seabed preparation – array cables	~~24,203,332~~22,204,296	
Drilling – foundations installation	34,728	-
Drilling – OSP/OCP	11,451	-
Total	~~30,320,664~~27,984,237	~~31,353,595~~29,017,168

5 Alternatives considered

5.1 Prevention

~~109.~~114. The construction and installation method(s) required for North Falls' WTG, cables, and OSPs/OCP are yet to be determined. However, as described above it is expected that activities might require dredging and/or drilling, resulting in the generation of spoil material and therefore, the need for disposal.

~~110.~~115. Prevention is therefore not an alternative.

5.2 Reduction

~~111.~~116. Following stakeholder feedback, a number of reductions have been implemented into the Project. Table 5.1 presents key parameter changes from PEIR to ES for the offshore project area.

Table 5.1 Key parameter changes from PEIR to ES

Parameter	PEIR	ES
Array areas	149.5km^2	95km^2
Number of WTGs	72	57
Number of export cables	4	2
Length of offshore export cables (km)	250.8	125.4
Length of array/platform interconnector cables (km)	228	190

~~112.~~117. Since submission of the DCO Application, the Applicant has made the following commitments and updates which influence the sediment volumes:

- Removal of Gravity Base foundations;
- Further engineering analysis of array cable seabed levelling requirements; and
- Commitment to install offshore export cables to a depth that will not preclude dredging to 22mCD ~~Chart Datum~~ within the DWR areas Sunk A, and Trinity and Sunk Pilot Diamond Buffer areas;~~within the Sunk A and Trinity Deep Water Routes (DWRs)~~ and 19mCD ~~Chart Datum~~ within the Sunk B to facilitate potential future keel depths.

~~113.~~118. The revised volumes are shown in Table 5-2.

Table 5-2. Comparison of sediment volumes during seabed preparation/ sandwave levelling

Sediment volumes	Original volume (m3)	Revised volume (m3)
Seabed preparation for installation of turbine and OSP/OCP foundations	1,096,809 + 38,485 = 1,135,294	1,040,625 + 38,485 = 1,079,110
Export cable seabed preparation	1,544,891	4,~~634,673~~297,282
Array cable seabed preparation	27,293,114	~~24~~22,~~203~~204,~~332~~296
Platform interconnector cable seabed preparation	1,436,480	No change
Total	**31,409,780**	**~~31,353,595~~29,017,168**

5.3 Re-use/recycle

5.3.1 Use of material for ballast

~~114.~~119. As gravity base foundations have been removed from the design envelope, this is not an option.

5.3.2 Use of material for coastal protection or aggregate

~~115.~~120. In the North Falls Scoping Opinion, Essex County Council stated that "*beneficial use options of any dredged material (which can often be used in other coast protection schemes)*" should be considered. In addition, recent feedback from Essex County Council (email: 27th March 2025) queried whether the sediment could be used in habitat creation.

~~116.~~121. The Applicant is open to considering the feasibility of alternative suggestions, however the feasibility of such an option is highly uncertain and would be subject to a range of factors such as the shoreline management strategy, type of aggregate required, permitting and timing of both projects and/or any interim storage requirements. It is therefore critical to the viability of North Falls that at-sea disposal sites are available.

5.4 Disposal

5.4.1 Other disposal sites

~~117.~~122. The largest open disposal sites in the vicinity of the North Falls offshore project area are associated with the East Anglia offshore wind farms (EAOW3 and TH023), however, the marine licence conditions for these disposal sites state that they are only to be used for disposal of material derived from their associated wind farm, therefore these sites are not available to North Falls.

~~118.~~123. Other, smaller disposal sites in the vicinity of North Falls include:

- TH220 and TH221: Only to be used for EA One OWF (MLA/2017/00371);
- TH027: Only to be used for MLA/2013/00292;
- TH052: Inner Gabbard;
- TH056: Inner Gabbard East; and
- TH070: South Falls.

~~119.~~124. Disposal sites TH220, TH221 and TH027 can only be used for disposal of sediment from the specified marine licence applications, therefore they are not available to the Project.

~~120.~~125. The other nearby disposal sites, TH052, TH056 and TH070, are used for sediment disposal from capital and maintenance dredge campaigns. It is the norm for disposal sites to be designated for specific volumes and do not allow for additional volumes beyond their purpose. Furthermore, in order to use these sediment disposal sites, sediment would need to be transported via vessel and it is unknown whether the sediment characteristics are suitable for disposal in these locations.

~~121.~~126. Disposing of sediment arising from the Project construction activities within the offshore project area would retain sediment and minimise the effects to hydrodynamic processes and sediment transport.

6 Potential impacts of disposal

~~122.~~127. The effect of disposal of material within the offshore project area has been incorporated into impacts assessed within the North Falls ES.

~~123.~~128. Specifically, the effects on the physical and chemical characteristics are assessed within ES Chapter 8 Marine Geology, Oceanography and Physical Processes **[APP-022]** ,ES Chapter 9 Marine Water and Sediment Quality **[APP-023]** and in the Sediments Dispersion Modelling Results Interpretation **[Document Reference 9.56]**. The Sediments Dispersion Modelling Results Interpretation has been informed by the Hydrodynamic and Sediment Dispersion Modelling Report **[Document reference 9.54]**.

~~124.~~129. The consequences of these physical and chemical changes on the biological character are assessed in ES Chapter 10 Benthic and Intertidal Ecology **[APP-024]**; ES Chapter 11 Fish and Shellfish Ecology **[APP-025]**; ES Chapter 12 Marine Mammals **[APP-026]**; and ES Chapter 13 Offshore Ornithology **[APP-027]**.

~~125.~~130. Impacts on the human characteristics are assessed in ES Chapter 14 Commercial Fisheries **[APP-028]**; ES Chapter 15 Shipping and Navigation **[APP-029]**; ES Chapter 16 Offshore Archaeology and Cultural Heritage **[APP-030]**; and ES Chapter 18 Infrastructure and Other Users **[APP-032]**.

~~126.~~131. It should be noted however that the impacts presented within the ES assess the effects of North Falls as a whole and so the specific parts of the assessment that consider disposal of sediment have been drawn out and are presented below.

~~127.~~132. ES Chapter 6 EIA Methodology **[APP-020]** presents an overarching method for enabling assessments of the potential impacts arising from North Falls on the receptors under consideration. The assessment methodologies used in this report are described further in the relevant ES chapters.

6.1 Potential impacts of sediment disposal on physical characteristics

6.1.1 Identified receptors for the physical processes assessment

~~128.~~133. The principal receptors with respect to marine geology, oceanography and physical processes are those features with an inherent geological or geomorphological value or function which may potentially be affected by North Falls. These are listed below:

- Suffolk coast, from Lowestoft to Felixstowe, composing of gravel and sand beaches, dunes and cliffs.
- Essex coasts, from Harwich to Canvey Island including the landfall at Kirby Brook, comprising of gravel and sand beaches, dunes and cliffs.
- Annex I reef;
- Annex I sandbanks;
- Margate and Long Sands SAC; and
- Kentish Knock East Marine Conservation Zone (MCZ).

6.1.2 Changes in SSCs

~~129.~~134. SSCs may increase as a result of seabed preparation for installation of wind turbines and OSPs and associated drill arisings and sandwave levelling. Table 4.1 describes the worst-case quantity of sediment that may need to be disposed of.

~~130.~~135. ES Chapter 8 Marine Geology, Oceanography and Physical Processes **[APP-022]** presents the detailed impact assessment of the changes in SSCs on marine geology, oceanography and physical processes receptors due to:

- Seabed preparation for foundation installation of WTGs and OSP/OCP (ES Chapter 8, Section 8.6.2.1);
- Drilling for installation of piled foundation for WTGs and OSP/OCP (ES Chapter 8, Section 8.6.2.2);
- Offshore export cable installation (ES Chapter 8, Section 8.6.2.5);

- Array and platform interconnector cable installation (ES Chapter 8, Section 8.6.2.7).

~~131.~~136. In addition, the Hydrodynamic and Sediment Dispersion Modelling Results Interpretation **[Document reference 9.56, Section 3.8]** provides further assessment of the effects of disposal in the array area. Section 2.1.1 of the Hydrodynamic and Sediment Dispersion Modelling Results Interpretation describes the suspended sediment concentrations for sandwave levelling in the offshore cable corridor based on mass flow excavation.

~~132.~~137. Average baseline SSC in the offshore section of the offshore project area is up to 15mg/l (Cefas, 2016), however these concentrations may increase significantly during storm events (HR Wallingford *et al.*, 2002). Baseline SSC increases with proximity to shore, ranging to 100mg/l close to the landfall location. The Hydrodynamic and Sediment Dispersion Modelling provides highly conservative plume ranges based on levels greater than 5mg/l and using the worst case scenario of mass flow excavation.

~~133.~~138. Modelling shows the foundation levelling plumes near the seabed could extend about 25km north-northeast from the northern boundary of the array area and about 11km south-southwest from the southern boundary of the array area, along the predominant tidal flow directions. However, these would return to ambient levels within 1-2 hours.

~~134.~~139. The modelling of the levelling plume near the seabed associated with array cable installation could extend about 19km north-northeast from the northern boundary of the array area and about 12km south-southwest from the southern boundary of the array area, along the predominant tidal flow directions. However, these would return to ambient levels within 11 hours.

~~135.~~140. The modelling also shows the levelling plumes near the seabed as a result of export cable installation could extend about 13-20km north-northeast from the northern boundary of the array area and about 7-20km south-southwest from the southern boundary of the array area, along the predominant tidal flow directions. However, these would return to ambient levels within 1-3 hours.

~~136.~~141. The assessment concludes there will be no change to identified receptor groups for marine geology, oceanography and physical processes associated with SSC and a summary of the assessment is presented in Table 6.1. As discussed in the Hydrodynamic and Sediment Dispersion Modelling Results Interpretation **[Document Reference 9.56]**, the significance of effects from changes in SSC remain as presented in ES Chapter 8 **[APP-022]**.

Table 6.1 Summary of the potential impacts related to changes in SSCs on marine geology, oceanography and physical processes receptors due to different activities

Receptor	Sensitivity	Magnitude	Effect Significance	Additional mitigation measures proposed	Residual significance
Seabed preparation for foundation installation of WTGs and OSP/OCP					
Essex coast	N/A	Medium (near-field)	No change	N/A	No change

Receptor	Sensitivity	Magnitude	Effect Significance	Additional mitigation measures proposed	Residual significance
		Low (far-field)			
Suffolk coast	N/A	Medium (near-field) Low (far-field)	No change	N/A	No change
Annex 1 sand banks	N/A	Medium (near-field) Low (far-field)	No change	N/A	No change
Margate and Long Sands SAC	N/A	Medium (near-field) Low (far-field)	No change	N/A	No change
Kentish Knock East MCZ	N/A	Medium (near-field) Low (far-field)	No change	N/A	No change
Drilling for installation of piled foundation for WTGs and OSP/OCP					
Essex coast	N/A	Negligible (near-field) Negligible (far-field)	No change	N/A	No change
Suffolk coast	N/A	Negligible (near-field) Negligible (far-field)	No change	N/A	No change
Annex 1 sand banks	N/A	Negligible (near-field) Negligible (far-field)	No change	N/A	No change
Margate and Long Sands SAC	N/A	Negligible (near-field) Negligible (far-field)	No change	N/A	No change
Kentish Knock East MCZ	N/A	Negligible (near-field) Negligible (far-field)	No change	N/A	No change
Offshore export cable installation					
Essex coast	N/A	Negligible (near-field (nearshore)) Negligible (near-field (offshore)) Negligible (far-field)	No change	N/A	No change
Suffolk coast	N/A	Negligible (near-field (nearshore)) Negligible (near-field (offshore))	No change	N/A	No change

Receptor	Sensitivity	Magnitude	Effect Significance	Additional mitigation measures proposed	Residual significance
		Negligible (far-field)			
Annex 1 sand banks	N/A	Negligible (near-field (nearshore)) Negligible (near-field (offshore)) Negligible (far-field)	No change	N/A	No change
Margate and Long Sands SAC	N/A	Negligible (near-field (nearshore)) Negligible (near-field (offshore)) Negligible (far-field)	No change	N/A	No change
Kentish Knock East MCZ	N/A	Negligible (near-field (nearshore)) Negligible (near-field (offshore)) Negligible (far-field)	No change	N/A	No change
Array and platform interconnector cable installation					
Essex coast	N/A	Negligible (near-field) Negligible (far-field)	No change	N/A	No change
Suffolk coast	N/A	Negligible (near-field) Negligible (far-field)	No change	N/A	No change
Annex 1 sand banks	N/A	Negligible (near-field) Negligible (far-field)	No change	N/A	No change
Margate and Long Sands SAC	N/A	Negligible (near-field) Negligible (far-field)	No change	N/A	No change
Kentish Knock East MCZ	N/A	Negligible (near-field) Negligible (far-field)	No change	N/A	No change

6.1.3 Changes in seabed level

~~137.~~142. Changes in seabed levels on the receptor groups for marine geology, oceanography and physical processes have been assessed in ES Chapter 8 Marine Geology, Oceanography and Physical Processes **[APP-022]** in relation to:

- Seabed preparation for installation of WTGs and OSP/OCP foundations (ES Chapter 8, Section 8.6.2.3);
- Drilling for installation of piled foundations for WTGs and OSP/OCPs (ES Chapter 8, Section 8.6.2.4);
- Offshore export cable installation (ES Chapter 8, Section 8.6.2.6); and
- Array and platform interconnector cable installation (ES Chapter 8, Section 8.6.2.8).

~~138.~~143. In addition, the Hydrodynamic and Sediment Dispersion Modelling Results Interpretation **[Document Reference 9.56, Section 3.8]** provides further assessment of the effects of disposal in the array area. Section 2.2.1 of the Hydrodynamic and Sediment Dispersion Modelling Results Interpretation describes the seabed level changes associated with sandwave levelling in the offshore cable corridor based on mass flow excavation.

~~139.~~144. The passive plume of fine sediment described above would become widely dispersed before settling on the seabed.

~~140.~~145. Coarser sediment would fall more rapidly to the seabed (within minutes or tens of minutes) as a highly turbid dynamic plume immediately.

~~141.~~146. Modelling shows maximum changes in seabed level associated with the foundation levelling of 5cm to 60cm, localised around foundations.

~~142.~~147. The modelling of the seabed level changes associated with array cables could result in minor changes of 5cm to ranges of 11km to the north-northeast from the northern boundary of the array area and 9km to the south-southwest. Most effects would be highly localised, with changes of up to 3m along the cable routes.

~~143.~~148. The modelling also shows the seabed level changes associated with export cable installation could result in minor changes of 5cm to ranges of 9km either side of the offshore cable corridor, spatially restricted to narrow elongate areas. Most effects would be highly localised, with changes of up to 3m along the cable routes.

~~144.~~149. Should drilling be required for piled foundations (up to 10% of the foundations), the drill could potentially penetrate four different geological units; Holocene deposits, underlying Pleistocene channel complexes and infill deposits, London Clay Formation, and the Harwich Formation. The coarser sediment fractions (silty gravelly sand and silty sandy gravel) of the Pleistocene would settle out of suspension near to the point of release (up to thicknesses of approximately 40mm over a seabed area of 300m). For the most part, the deposited sediment layer across the wider seabed area would be very thin and confined to an area around a maximum of 10% of 34 wind turbine foundations and one OSP/OCP foundation (see Table 4.1 for worst case drill arisings).

~~145.~~150. If the drilling penetrates the underlying mud deposits, then a worst case scenario is considered whereby the sediment released from the drilling is assumed to be wholly in the form of larger aggregated 'clasts' which would settle rapidly. These clasts would remain on the seabed (at least initially), rather than being disaggregated into their individual fine sediment grains immediately upon release. Under this scenario, the worst case scenario assumes that a 'mound' would reside on the seabed near the site of release.

~~146.~~151. These mounds would be composed of sediment with a different particle size and would behave differently (they would be cohesive) to the surrounding sandy seabed, and therefore represent the worst case scenario for mound formation during construction. Because of their potentially large particle sizes, future transport of the aggregated clasts would be limited, and most would remain static within the mound. However, over time the flow of tidal currents over the mound would gradually winnow (there would be a gradual disaggregation of the clasts into their constituent particle sizes) the topmost clasts and over time the mound would lower through erosion.

~~147.~~152. As the mounds from disposal of dredged sediment and/or drill arisings would be highly localised, the assessment concludes there will be negligible effect significance to no impact. Table 6.2 summarises the potential impacts related to changes in seabed level on marine geology, oceanography and physical processes receptors.

~~148.~~153. As discussed in Hydrodynamic and Sediment Dispersion Modelling Results Interpretation **[Document Reference 9.56]**, the significance of effects from changes in seabed level remain as presented in ES Chapter 8 **[APP-022]**.

Table 6.2 Summary of the potential impacts related to changes in seabed level on marine geology, oceanography and physical processes receptors due to different activities.

Receptor	Sensitivity	Magnitude	Effect significance	Additional mitigation measures proposed	Residual significance
Seabed preparation for foundation installation of WTGs and OSP/OCP					
Essex coast	Negligible	Low (near-field) Negligible (far-field)	Negligible	N/A	Negligible
Suffolk coast	Negligible	Low (near-field) Negligible (far-field)	Negligible	N/A	Negligible
Annex 1 sand banks	Negligible	Low (near-field) Negligible (far-field)	Negligible	N/A	Negligible
Margate and Long Sands SAC	Negligible	Low (near-field) Negligible (far-field)	Negligible	N/A	Negligible
Kentish Knock East MCZ	Negligible	Low (near-field) Negligible (far-field)	Negligible	N/A	Negligible
Drilling for installation of piled foundation for WTGs and OSP/OCP					

Receptor	Sensitivity	Magnitude	Effect significance	Additional mitigation measures proposed	Residual significance
Essex coast	Negligible	Low (near-field) Negligible (far-field)	Negligible	N/A	Negligible
Suffolk coast	Negligible	Low (near-field) Negligible (far-field)	Negligible	N/A	Negligible
Annex 1 sand banks	Negligible	Low (near-field) Negligible (far-field)	Negligible	N/A	Negligible
Margate and Long Sands SAC	Negligible	Low (near-field) Negligible (far-field)	Negligible	N/A	Negligible
Kentish Knock East MCZ	Negligible	Low (near-field) Negligible (far-field)	Negligible	N/A	Negligible
Offshore export cable installation					
Essex coast	Negligible	Low (near-field) Negligible (far-field)	Negligible	N/A	Negligible
Suffolk coast	Negligible	Low (near-field) Negligible (far-field)	No impact	N/A	No impact
Annex 1 sand banks	Negligible	Low (near-field) Negligible (far-field)	Negligible	N/A	Negligible
Margate and Long Sands SAC	Negligible	Low (near-field) Negligible (far-field)	Negligible	N/A	Negligible
Kentish Knock East MCZ	Negligible	Low (near-field) Negligible (far-field)	Negligible	N/A	Negligible
Array cables installation					
Essex coast	Negligible	Low (near-field) Negligible (far-field)	Negligible	N/A	Negligible
Suffolk coast	Negligible	Low (near-field) Negligible (far-field)	Negligible	N/A	Negligible

Receptor	Sensitivity	Magnitude	Effect significance	Additional mitigation measures proposed	Residual significance
Annex 1 sand banks	Negligible	Low (near-field) Negligible (far-field)	Negligible	N/A	Negligible
Margate and Long Sands SAC	Negligible	Low (near-field) Negligible (far-field)	Negligible	N/A	Negligible
Kentish Knock East MCZ	Negligible	Low (near-field) Negligible (far-field)	Negligible	N/A	Negligible

6.1.4 Interruptions to bedload sediment transport

~~149.~~154. No change or negligible effect significance has been associated to changes in interruptions to bedload sediment transport due to sandwave levelling.

~~150.~~155. Table 6.3 summarises the potential impacts related to Interruptions to bedload sediment transport on these receptors (see ES Chapter 8 Marine Geology, Oceanography and Physical Processes **[APP-022]**, Section 8.6.2.9, for complete assessment).

Table 6.3 Summary of the potential impacts related to Interruptions to bedload sediment transport on marine geology, oceanography and physical processes receptors due to different activities.

Receptor	Sensitivity	Magnitude	Effect significance	Additional mitigation measures proposed	Residual significance
Seabed preparation					
Essex coast	Negligible	Low (near-field) Negligible (far-field)	Negligible	N/A	Negligible
Suffolk coast	Negligible	Low (near-field) Negligible (far-field)	No change	N/A	No change
Annex 1 sand banks	Negligible	Low (near-field) Negligible (far-field)	Negligible	N/A	Negligible
Margate and Long Sands SAC	Negligible	Low (near-field) Negligible (far-field)	Negligible	N/A	Negligible

Receptor	Sensitivity	Magnitude	Effect significance	Additional mitigation measures proposed	Residual significance
Kentish Knock East MCZ	Negligible	Low (near-field) Negligible (far-field)	No change	N/A	No change

6.2 Potential impacts of sediment disposal on chemical characteristics

~~151.~~156. Section 9.6 of ES Chapter 9 Marine Water and Sediment Quality **[APP-023]** provides an assessment of significance of the impacts associated to changes in water quality that may raise due to the disposal dredged and spoil materials in the offshore project area. These include:

- Increase in SSC (discussed in Section 2.2.4); and
- Deterioration in water quality associated with release of sediment bound contaminants (ES Chapter 9, Section 9.6.1.4).

6.2.1 Sediment bound contaminants

~~152.~~157. Deterioration in water quality may occur through the release of contaminants bound to the sediment during disposal of dredged and spoil material at the construction phase.

~~153.~~158. Site specific data collected to inform the EIA indicates that, with the exception of arsenic, sediment contaminant concentrations are low, and sediments are not predicted to remain in suspension for long periods of time (see Section 2.3.1).

~~154.~~159. Given these low levels of contamination the significance of effect is assessed as negligible adverse.

6.3 Potential impacts of sediment disposal on biological characteristics

6.3.1 Benthic ecology

~~155.~~160. ES Chapter 10 Benthic and Intertidal Ecology **[APP-024]** incorporates the likely significant effects of disposal. This assessment builds upon the assessment in ES Chapter 8 Marine Geology, Oceanography and Physical Processes **[APP-022]** and ES Chapter 9 Marine Water and Sediment Quality **[APP-023]**. The impacts which contain relevant information for this assessment are as follows:

- Increased suspended sediment concentrations and smothering in the offshore project area (ES Chapter 10, Section 10.6.1.2); and
- Remobilisation of contaminated sediments in the offshore project area (ES Chapter 10, Section 10.6.1.3).

~~156.~~161. In addition, as discussed in Section 2.4.1, the offshore project area is adjacent to the Margate and Long Sands SAC and Kentish Knock East MCZ.

The effects on these designated sites are assessed in RIAA Part 2 Benthic Ecology Annex I Habitat in SACs and SPA supporting habitat (**Document Reference 7.1.2, Rev 1**) and in the Marine Conservation Zone Assessment Report (**Document Reference 7.3, Rev 1**), ~~the Supporting Information on Offshore Additional Mitigation **[Document Reference 9.55]**,~~ informed by the outputs of the Hydrodynamic and Sediment Dispersion Modelling Report **[Document Reference 9.54, Rev 2]**, all submitted at Deadline 7, and taking into account additional mitigation secured by the Applicant at Deadline 1.

6.3.1.1 *Suspended sediment and smothering*

~~157.~~162. As discussed in Section 6.1.2, the disposal of material associated to seabed levelling and drilling may cause increased SSC in the water column. The subsequent deposition of this sediment, within the offshore project area, has the potential to affect benthic ecology by blocking feeding apparatus as well as by smothering sessile species upon redeposition.

~~158.~~163. Drill arisings would form aggregated clasts which would remain close to the point of release. These would remain relatively static and over time, would gradually reduce through erosion.

~~159.~~164. Sediment deposition from coarse sediment could be tens of centimetres to a few metres high. At the higher levels, these effects remain local to the release point. The species present are typical of dynamic sediment habitats and therefore typically have low to negligible sensitivity to SSC and smothering, including *S. spinulosa* reef. Peat and clay exposures with piddocks were recorded at three locations in the array area and two locations in the offshore cable corridor. This habitat is stated to be not sensitive to increased suspended sediment and have medium sensitivity to smothering (Tillin & Hill, 2016), however piddocks are shown to have low sensitivity (Hill, 2006).

~~160.~~165. The impact assessment presented in ES Chapter 10 Benthic and Intertidal Ecology **[APP-024]**, considers the effects of disposal combined with other construction activities that could cause increase in SSC and smothering associated with North Falls. Given the localised and/or small scale increases in SSC and smothering, a minor adverse significance of effect on benthic ecology is predicted.

6.3.1.2 *Remobilisation of contaminated sediments*

~~161.~~166. The disposal of dredged and drilled spoil material could lead to the mobilisation of contaminants which may be lying dormant within sediment, and which could be harmful to the benthos, however as discussed in Section 2.3.1 and 6.2.1, site specific data shows low levels of contamination.

~~162.~~167. The assessment (ES Chapter 10 Benthic and Intertidal Ecology **[APP-024]**, Section 10.6.1.3), therefore concludes that a negligible magnitude and effect significance on benthic ecology receptors resulting from the re-mobilisation of contaminated sediments might occur due to North Falls construction activities.

6.3.1.3 *Indirect effects on designated sites*

6.3.1.3.1 Margate and Long Sands SAC

~~163.~~168. The effects of SSC and seabed level changes on the integrity of the Margate and Long Sands SAC are assessed in the RIAA Part 2 Benthic Ecology Annex I Habitat in SACs and SPA supporting habitat **[Document Reference**

7.1.2, Rev 1] ~~and in the Marine Conservation Zone Assessment Report~~ ~~**[Document Reference 7.3, Rev 1]**~~, informed by the outputs of the Hydrodynamic and Sediment Dispersion Modelling Report **[Document Reference 9.54, Rev 2]**, all submitted at Deadline 7~~in Supporting Information on Offshore Additional Mitigation~~ ~~**[Document Reference 9.55]**~~. Based on the levels of effect described above, an adverse effect on the integrity of the SAC can be ruled out.

6.3.1.3.2 Kentish Knock East MCZ

~~164.~~169. The risk of SSC and seabed level changes hindering the conservation objectives of the Kentish Knock East MCZ are assessed in the ~~RIAA Part 2 Benthic Ecology Annex I Habitat in SACs and SPA supporting habitat~~ ~~**[Document Reference 7.1.2, Rev 1]** and in~~ the Marine Conservation Zone Assessment Report **[Document Reference 7.3, Rev 1]**, informed by the outputs of the Hydrodynamic and Sediment Dispersion Modelling Report **[Document Reference 9.54, Rev 2]**, all submitted at Deadline 7~~Supporting Information on Offshore Additional Mitigation~~ ~~**[Document Reference 9.55]**~~. Based on the levels of effect described above, there is no risk of hindering the conservation objectives of the MCZ.

6.3.2 Fish and shellfish ecology

~~165.~~170. ES Chapter 11 Fish and Shellfish Ecology **[APP-025]** provides an assessment of significance (ES Chapter 11, Section 11.6) of the impacts associated to changes on fish and shellfish receptors that may raise due to the disposal dredged and spoil materials in the offshore project area. These include:

- Increased suspended sediment concentrations (ES Chapter 11, Section 11.6.1.2); and
- Remobilisation of contaminated sediments (ES Chapter 11, Section 11.6.1.3).

6.3.2.1 Increased suspended sediment concentrations

~~166.~~171. Taking account of the anticipated levels of increase in SSCs described in Section 6.1.2 and the expected level of sediment deposition (Section 6.1.3), the magnitude of the impact taking account of construction activities for the whole project is considered to be negligible.

~~167.~~172. Adult and juvenile fish, shellfish and other species with known spawning grounds, considered receptors of low sensitivity to increased SSCs and deposition would result in an effect of negligible significance. When considering herring, sandeels, and sedentary/sessile filter feeders for which medium sensitivity was considered, an effect of minor significance would be expected.

6.3.2.2 Remobilisation of contaminated sediments

~~168.~~173. As outlined in Section 2.3.1 and 6.2.1, site specific data shows low levels of contamination.

~~169.~~174. There is, therefore, negligible magnitude of risk to fish and shellfish ecology receptors from re-mobilisation of contaminated sediments.

~~170.~~175. Given the levels of contaminants found within the offshore project area are within environmental protection standards, all receptors are assessed as not sensitive (negligible sensitivity) to changes that remain within these standards.

~~171.~~176. The effect of re-mobilisation of contaminated sediment on fish and shellfish receptors is considered to be of negligible significance given the negligible magnitude of impact and negligible receptor sensitivity.

6.3.3 Marine mammals

~~172.~~177. ES Chapter 12 Marine Mammals **[APP-026]** considers the conclusions of ES Chapter 9 Marine Water and Sediment Quality **[APP-023]**, ES Chapter 10 Benthic and Intertidal Ecology **[APP-024]** and ES Chapter 11 Fish and Shellfish Ecology **[APP-025]** in relation to the following impacts which incorporate the effects of sediment disposal:

- Changes to water quality (ES Chapter 12, Section 12.6.1.7); and
- Changes to prey resource (ES Chapter 12, Section 12.6.1.8).

~~173.~~178. In addition, as discussed in Section 2.4.3, the offshore project area is located within the Southern North Sea SAC which is designated for harbour porpoise.

6.3.3.1 Changes to water quality

~~174.~~179. As discussed in Sections 6.1.2 and 6.2.1 changes to water quality are negligible. Marine mammals often inhabit turbid environments and cetaceans utilise sonar to sense the environment around them and there is little evidence that turbidity affects cetaceans directly, therefore are considered to have negligible sensitivity to increases in suspended sediments.

~~175.~~180. Any direct impacts to marine mammals as a result of contaminated sediment are unlikely as exposure to contaminants is more likely to be via prey species (assessed below). Therefore, marine mammals are considered to have negligible sensitivity to any direct impacts from contaminated sediment and the effect significance is negligible.

6.3.3.2 Changes to prey resource

~~176.~~181. Taking account of the feeding strategies of the relevant marine mammal species, ES Chapter 12 Marine Mammals **[APP-026]** concludes harbour porpoise and minke whale have low to medium sensitivity; and grey and harbour seals have low sensitivity to changes in prey resource. With regards to the levels of change described in Section 6.3.2, the effect significance on marine mammals would be negligible to minor.

6.3.3.3 Effects on designated sites

~~177.~~182. The effects of changes in water quality and prey resource on the integrity of the Southern North Sea SAC are assessed in the ~~Report to Inform Appropriate Assessment (~~RIAA~~)~~ Part 3 Marine Mammals **[APP-176]**. Based on the levels of effect described above, an adverse effect on the integrity of the SAC as a result of sediment disposal can be ruled out.

6.3.4 Offshore ornithology

~~178.~~183. ES Chapter 13 Offshore Ornithology **[APP-027]** considers the conclusions of ES Chapter 9 Marine Water and Sediment Quality **[APP-023]**, ES Chapter 10 Benthic and Intertidal Ecology **[APP-024]** and ES Chapter 11 Fish and Shellfish Ecology **[APP-025]** in relation to the following impact which incorporates the effects of sediment disposal:

- Indirect effects through effects on habitats and prey species (ES Chapter 13 Offshore Ornithology **[APP-027]**, Section 13.6.1.2).

~~179.~~184. In addition, the offshore cable corridor overlaps the Outer Thames Estuary SPA and an assessment of the effects on habitats within the SPA are assessed in the RIAA Part 4 Offshore Ornithology **[APP-178]**.

6.3.4.1 Indirect effects through effects on habitats and prey species

~~180.~~185. As discussed previously, changes to water quality are negligible (Sections 6.1.2 and 6.2.1) and changes to prey resource are minor (Section 6.3.2). The resultant effect significance on offshore ornithology is therefore also of minor significance.

6.3.4.2 Designated sites

~~181.~~186. Based on the levels of effect described above, an adverse effect on the integrity of the Outer Thames Estuary SPA as a result of sediment disposal can be ruled out.

6.4 Potential impacts of sediment disposal on human characteristics

6.4.1 Commercial fisheries

~~182.~~187. The effects of sediment disposal on commercial fisheries relates to the effects on fish and shellfish ecology (Section 2.4.2), as these effects are negligible to minor, the effects on commercial fisheries would be minor.

6.4.2 Shipping and navigation

~~183.~~188. MGN 654 requires that any reduction in water depth of greater than 5% must be discussed with the Maritime and Coastguard Agency (MCA) to agree appropriate mitigation. Changes in water depth within any "areas of critical depths in relation to under keel clearance" including routeing measures and port approaches must also be discussed with the MCA regardless of the extent of the change. Sediment disposal would be undertaken in line with these requirements and therefore there would be no impact on shipping and navigation.

~~184.~~189. The Project has committed to install offshore export cables to a depth that will not preclude or impede dredging to a depth of at least 22mCD within the DWR areas Sunk A, and Trinity and Sunk Pilotage ~~Diamond Buffer~~ areas; and 19mCD within the Sunk B to facilitate potential future keel depths~~cables being installed to a depth below 22m CD within the Sunk A and Trinity DWRs and 19m CD in the Sunk B. Sediment would be deposited in the array area to ensure there is no reduction in navigable water depth within the deep water routes~~. As discussed in the Outline Sediment Disposal Management Plan **[Document Reference 9.52]** there will be no disposal within the deep water routes.

6.4.3 Marine archaeology and cultural heritage

~~185.~~190. Given the negligible changes to the physical characteristics described in Section 6.1, and that changes will be short term and limited in extent, it is concluded that there is no pathway for change to the fabric of any heritage asset as a result of sediment disposal.

~~186.~~191. Sediment disposal will be undertaken in accordance with the Outline Offshore Written Scheme of Investigation **[REP3-015/016]**.

6.4.4 Infrastructure and other users

~~187.~~192. ES Chapter 18 Infrastructure and Other Users **[APP-032]** considers the impacts of works associated with the North Falls offshore project area as a whole on the following:

- Potential interference with other wind farms (ES Chapter 18, Section 18.6.1.1);
- Physical impacts on subsea cables and pipelines (ES Chapter 18, Section 18.6.1.2);
- Impacts on disposal sites (ES Chapter 18, Section 18.6.1.3);
- Impacts on dredging (ES Chapter 18, Section 18.6.1.4); and
- Impacts on MoD activities (ES Chapter 18, Section 18.6.1.5).

~~188.~~193. Construction of North Falls offshore infrastructure and associated sediment disposal would occur within a two year window, with short periods of disposal activity within this time. Therefore, potential disruption from disposal vessel activity would be short term temporary and of negligible significance to other users. The deposition of sediment on the seabed would have no impact on other users.

7 Summary

~~189.~~194. As part of the DCO application for North Falls, the Applicant is applying for disposal licences for the areas identified in Figure 2.1 ~~Figure 1.1~~. The array may be built in isolation of the export cable, and it is currently unknown whether construction of the offshore cable corridor will be required. However, in order to streamline the disposal sites characterisation and licensing process, this document provides the necessary information for all areas to be licensed as disposal sites. If any of these areas are not required following detailed design, then the Applicant can agree with the MMO and Cefas that the licensed activities will not be undertaken in these areas.

~~190.~~195. Of the impacts assessed in this site characterisation report, there are no exceedances of minor significance effect. The impacts in which minor significance was concluded are:

- Suspended sediments and smothering of benthic receptors;
- Changes to prey resource for marine mammals;
- Indirect effects through effects on habitats and prey species of offshore ornithological receptors; and
- Commercial fisheries.

~~191.~~196. Licensing of the proposed disposal sites would allow the Applicant to dispose of material arising from construction activities (including dredging and drilling). Licensing of the proposed areas would allow the Applicant, as far as possible, to dispose of sediment in the vicinity of the locations from which it was extracted, ensuring sediment is disposed of within areas of similar sediment type and subject to the same sedimentary processes.

~~192.~~197. The seabed sediments in the offshore project area are primarily sandy gravel/gravelly sand. Maximum quantities of material which would need to be excavated for foundations are provided along with maximum quantities of material released from drilling should piled foundations be used.

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HARNESSING THE POWER OF NORTH SEA WIND

North Falls Offshore Wind Farm Limited

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

To contact please email contact@northfallsoffshore.com

North Falls Offshore Wind Farm Limited Registered Address: Windmill Hill Business Park, Whitehill Way, Swindon, Wiltshire, SN5 6PB, United Kingdom

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