VikingCCS

Viking CCS Pipeline

6.5 Habitats Regulations Assessment – Revision E (Tracked)

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a Harbour Energy Company
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Table of Contents

Figures

Tables

1 Introduction

1.1 Overview

1.1.1 This report to inform Habitats Regulations Assessment (HRA) has been prepared on behalf of Chrysaor Production (U.K) Limited, a Harbour Energy group company (the 'Applicant'). It forms part of the application for a Development Consent Order (a 'DCO') for the Viking CCS Pipeline (the 'Proposed Development'), submitted to the Secretary of State for Business, Energy and Industrial Strategy, under Section 37 of The Planning Act (PA) 2008 (Ref-1).

1.1.2 A DCO is required for the Proposed Development as it falls within the definition and thresholds for a 'Nationally Significant Infrastructure Project' (a 'NSIP') under Sections 14 and 15(2) of the PA 2008.

1.1.3 The requirement for an HRA is established through Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora, hereby referred to as the 'Habitats Directive', in Articles 6(3) and 6(4) (Ref-2). The Habitats Directive is transposed into national legislation by the Conservation of Habitats and Species Regulations 2017 (as amended). These are hereafter referred to as the 'Habitats Regulations' (Ref-3).

1.1.4 Under Regulation 63, any project that is likely to have a significant effect on a European site (either alone or in-combination with other projects) and is not directly connected with, or necessary for the management of the site, must be subject to an HRA to determine the implications for the site in view of its conservation objectives.

1.1.5 The purpose of this report is to provide all the relevant information needed to inform the Habitats Regulations Assessment. This document should be read with reference to the following chapters within the Environmental Statement:

- 01. Introduction (*Application Document 6.2.1*);
- 03. Description of the Proposed Development (*Application Document 6.2.3*)
- 06. Ecology and Biodiversity (*Application Document 6.2.6*);
- 09. Geology and Hydrogeology (*Application Document 6.2.9*);
- 13. Noise and Vibration (*Application Document 6.2.13*);
- 14. Air Quality (*Application Document 6.2.14*);
- 15. Climate Change (*Application Document 6.2.15*); and,
- 20. Cumulative Effects (*Application Document 6.2.20*).

1.2 The Proposed Development

1.2.1 The Proposed Development is located in the Yorkshire and Humber region and East Midlands region of England.

1.2.2 The Viking CCS Pipeline ('the Proposed Development') comprises a new 24 " (609 mm) diameter onshore pipeline of approximately 55.5 km in length, which will transport Carbon Dioxide (CO_2) from the Immingham industrial area to the Theddlethorpe area on the Lincolnshire coast, where it will connect into the existing 36 " (921 mm) diameter offshore LOGGS pipeline.

1.2.3 The Proposed Development is an integral part of the overall Viking CCS Project, which intends to transport compressed and conditioned CO2 received at a facility at Immingham to store in depleted gas reservoirs under the Southern North Sea. The offshore elements of

the Viking CCS Project, including the transport of CO2 through the LOGGS pipeline to the Viking gas fields under the North Sea, are subject to a separate consenting process.

1.2.4 The key components of the Proposed Development comprise:

- Immingham Facility;
- Approximately 55.5 km 24 inch (”) onshore steel pipeline (including cathodic protection);
- Three Block Valve Stations;
- Theddlethorpe Facility;
- Existing LOGGS pipeline and isolation valve to the extent of the Order Limits at Mean Low Water Springs (MLWS);
- Permanent access to facilities;
- Mitigation and landscaping works;
- Temporary construction compounds, laydown, parking and welfare facilities;
- Temporary access points during construction.

1.2.5 Further details of each element of the Proposed Development are set out in Chapter 3 of the Environmental Statement (*Application Document 6.2.3*).

1.2.6 To aid in the understanding of the potential environmental impacts, the Proposed Development has been separated in to five sections (Sections 1-5) (refer to Chapter 3):

- Section 1 – Immingham Facility to A180;
- Section 2 – A180 to A46;
- Section 3 – A46 to Pear Tree Lane;
- Section 4 – Pear Tree Lane to Manby Middlegate (B1200); and
- Section 5 – Manby Middlegate (B1200) to Theddlethorpe and down to Mean Water Low Springs.

1.2.7 When discussing potential effects upon birds, functionally linked land is discussed as ‘functionally linked land north’ and ‘functionally linked land south’ (refer to ES Chapter 6: Ecology and Biodiversity, Appendix 6-7: Ornithology Survey Report and Appendix 6-8: Confidential Ornithology Appendix).

2 Legislative Context

2.1.1 This technical report has been prepared to inform and support the competent authority (the Secretary of State, informed by the Planning Inspectorate as Examining Authority) in its decision making. As part of the decision-making process, it is a legal requirement for the competent authority to undertake an appropriate assessment of whether the Proposed Development is likely to have a significant impact on areas that have been internationally designated for nature conservation purposes (i.e., 'European sites'). This requirement is set out in the Conservation of Habitats and Species Regulations 2017 (as amended) (Ref-3).

Box 2-1: The legislative basis for Appropriate Assessment

Conservation of Habitats and Species Regulations 2017 (as amended)

Regulation 63 of the 2017 Regulations states that:

"***A competent authority, before deciding to … give any consent permission or other authorisation for a plan or project which (a) is likely to have a significant effect on a European site (either alone or in combination with other plans or projects) must make an appropriate assessment of the implications for the plan or project in view of the site's conservation objectives… The competent authority may agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the European site.***"

2.1.2 If potential adverse effects on integrity are identified, mitigation should be considered to avoid those effects or reduce them such that any adverse effect on integrity can be ruled out. In the event that an adverse effect on integrity of a European site cannot be excluded, the proposal can only go ahead under a 'derogation' under Regulation 64 of the Habitats Regulations. The HRA methodology is set out in Section 3.

2.1.3 The United Kingdom (UK) left the European Union (EU) on 31 January 2020 under the terms set out in the EU (Withdrawal Agreement) Act 2020 ("the Withdrawal Act") (Ref-4). The Withdrawal Act retains the body of existing EU-derived law within our domestic law, and this include the provisions of the Habitats Directive from which the requirement for HRA arises.

3 Method

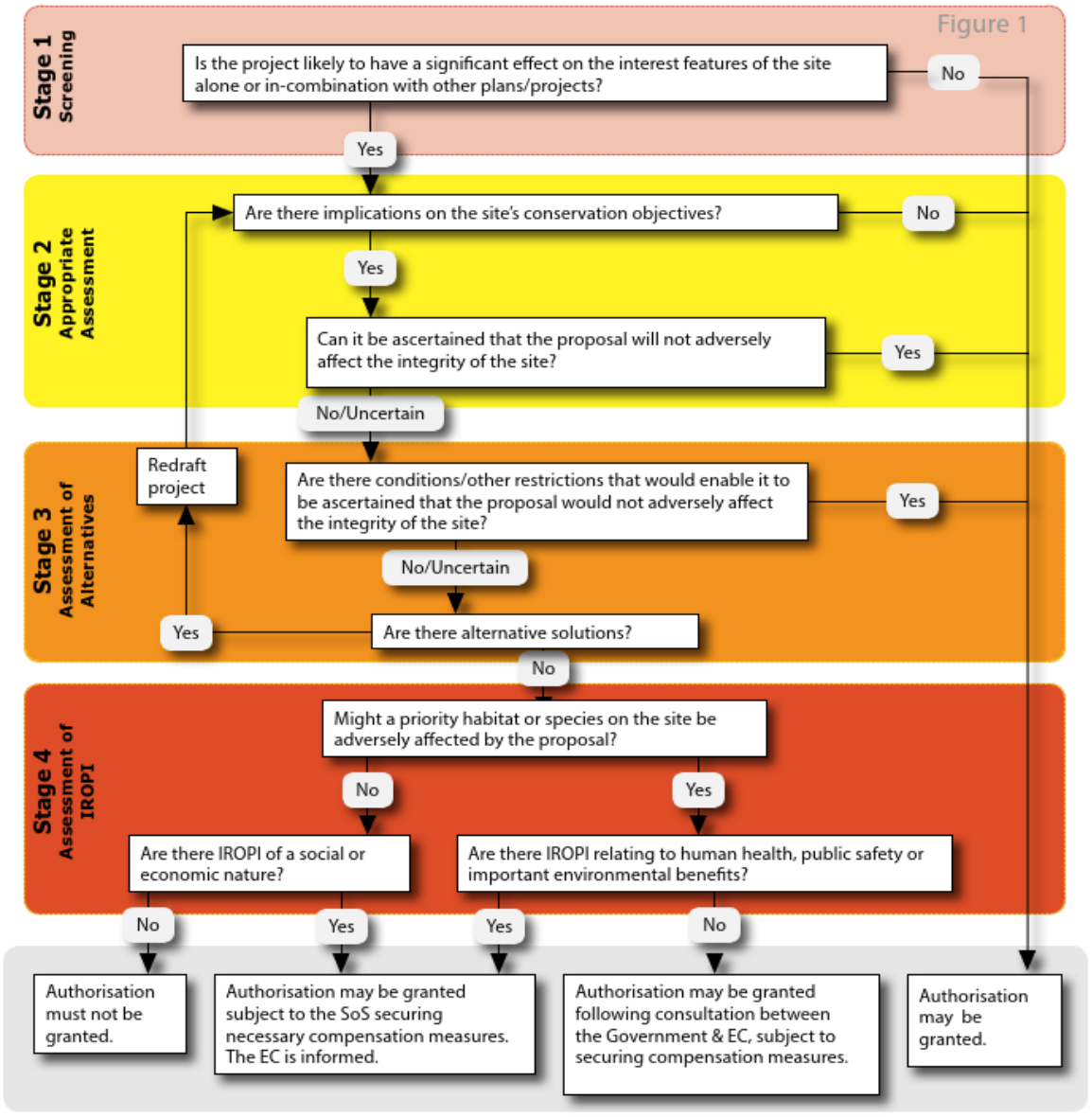
3.1 Introduction

3.1.1 This report to inform HRA has been carried out with reference to the general European Commission guidance on HRA (Ref-5), general guidance on HRA published by the UK government in February 2021 (Ref-6) and Planning Inspectorate (PINS) Advice Note 10 (Ref-7).

3.1.2 Whilst the HRA decisions must be taken by the competent authority, the information needed to undertake the necessary assessments must be provided by the applicant. The information needed for the competent authority to establish whether there are any LSEs from the Proposed Development and thereafter undertake an appropriate assessment is provided in this Report.

3.1.3 Box 3-1 below outlines the stages of the HRA process.

Box 3-1: Four stage approach to Habitats Regulations Assessment of Projects



3.2 HRA Stage 1 – Screening for Likely Significant Effects (LSE's)

3.2.1 The objective of the LSE test is to 'screen out' those aspects of a project and / or the European sites that can, without any detailed appraisal, be said to be unlikely to result in significant adverse effects upon European sites, usually because there is no mechanism for an adverse interaction (i.e., a pathway) with European sites. The remaining aspects are then taken forward to Appropriate Assessment. The assessment must consider the potential for effects 'in combination' with other plans and projects.

3.2.2 This report has been prepared having regard to all relevant case law relating to the Habitats Regulations, the Habitats Directive, and the Birds Directive. This includes the ruling by the Court of Justice of the European Union (CJEU) in the case of People Over Wind, Peter Sweetman v Coillte Teoranta (C-323/17).

3.2.3 This case held that; "*it is not appropriate, at the screening stage, to take account of the measures intended to avoid or reduce the harmful effects of the plan or project on that site"* (paragraph 40). This establishes that 'mitigation measures' cannot be taken into account at the HRA Stage 1 (screening), but they can be taken into account at HRA Stage 2 - Appropriate Assessment. However, it is important to note that not all mitigation measures are excluded from consideration - only those "*intended to avoid or reduce the harmful effects of the… project on that site*". Mitigation measures which are intended to avoid effects, for example on a local watercourse outside the European site designated boundary but which outfalls into the European designated site, can be taken into account as the benefit conveyed to the European site is coincidental and the measures would be delivered as part of good practice even if no European sites were present.

3.2.4 This represents a deviation from the approach usually adopted in the ecological impact assessment (EcIA) undertaken as part of Environmental Impact Assessment (EIA), which considers embedded mitigation (even those measures that are included to directly avoid or reduce harmful effects on a European designated site) to form a part of the Proposed Development and takes these measures into account when assessing the potential effects on qualifying habitats and species.

3.2.5 Where mitigation measures are mentioned in this report and taken into account at the screening stage, they are therefore limited to those that may reduce or avoid harmful effects on certain (local) habitats or species but are not relied on to directly avoid or reduce harmful effects on the qualifying features of the European designated sites. This includes standard best practice mitigation measures incorporated into the Construction Environmental Management Plan (CEMP) such as surface water drainage attenuation.

3.3 HRA Stage 2 – Appropriate Assessment

3.3.1 Where it is determined at Stage 1 that a LSE on a European Site cannot be ruled out, the HRA assessment proceeds to the next stage of HRA known as Appropriate Assessment. Case law has clarified that 'Appropriate Assessment' is not a technical term. In other words, there are no specific technical analyses, or level of detail, which are classified by law as belonging to Appropriate Assessment rather than the screening for LSE. The Appropriate Assessment constitutes whatever level of further assessment is required to determine whether an adverse effect on integrity would arise.

3.3.2 By virtue of the fact that it follows the screening process, there is an understanding that the analysis will be more detailed than that undertaken at the previous stage. One of the key considerations during Appropriate Assessment is whether there is available mitigation that would address the potential effect, allowing for a conclusion of no adverse effect on integrity. In practice, the Appropriate Assessment takes any element of the Proposed Development

that could not be excluded as having LSEs following HRA Stage 1 and assesses the potential for an effect in more detail, with a view to concluding whether there would be an adverse effect on site integrity. Adverse effects on site integrity include disruption of the coherent structure and function of the European site(s) and the ability of the site to achieve its conservation objectives.

3.3.3 In 2018 the Holohan ruling was handed down by the European Court of Justice. Among other provisions paragraph 39 of the ruling states that '*As regards other habitat types or species, which are present on the site, but for which that site has not been listed, and with respect to habitat types and species located outside that site, … typical habitats or species must be included in the appropriate assessment, if they are necessary to the conservation of the habitat types and species listed for the protected area'* . This ruling has been considered in relation to the Proposed Development and particularly with regard to mobile qualifying species in the Humber Estuary SPA / Ramsar and Greater Wash SPA.

3.4 The Rochdale Envelope

3.4.1 In July 2018, the Planning Inspectorate published Advice Note Nine: Rochdale Envelope (Ref-5), explaining how the principles of the Rochdale Envelope should be used by in the Environmental Impact Assessment (EIA) process.

3.4.2 The Rochdale Envelope[1] is applicable where some of the details of a Proposed Development cannot be confirmed when an application is submitted, and flexibility is needed to address uncertainty. Notwithstanding, all significant potential effects of a Proposed Development must be properly addressed.

3.4.3 It encompasses three key principles:

- The assessment should use a cautious worst-case approach;
- The level of information assessed should be sufficient to enable the Likely Significant Effects of a Proposed Development to be assessed; and
- The allowance for flexibility should not be abused to provide inadequate descriptions of projects.

3.4.4 This HRA has given due consideration to the Rochdale Envelope that applies to the Proposed Development. The worst-case (i.e., the potentially most impactful) construction/decommissioning and operational scenarios have been assessed in relation to impact pathways.

3.5 In Combination Effects

3.5.1 It is a requirement of Regulation 63(1)(a) of the 2017 Regulations to not only assess the potential for LSE of a development project alone, but also to investigate whether there is a potential for in-combination effects with other projects or plans. In practice, such in-combination assessment is of greatest relevance when an impact pathway relating to a project would otherwise be screened out - not because it is not present but because its individual contribution is considered not to result in LSEs.

3.5.2 For the purposes of this HRA, several plans, projects and strategies proposing/ aiming for development have been identified, which may act in-combination with the Proposed Development. These are set out in Chapter 5 of this report.

[1] The Rochdale Envelope arises from two cases: R. v Rochdale MBC ex parte Milne (No.1) and R. v Rochdale MBC ex parte Tew [1999], which are cases that dealt with outline planning applications for a proposed business park in Rochdale.

4 Baseline Evidence Gathering

4.1 Scope of the Project

4.1.1 There is no guidance that dictates the general physical scope of an HRA report. This assessment has been guided primarily by the identified impact pathways (called the source-pathway-receptor model).

4.1.2 Briefly defined, impact pathways are routes by which the implementation of a project can lead to an effect upon a European designated site. An example of this would be visual and noise disturbance arising from the construction/decommissioning work or operational phase associated with a project. If there are sensitive ecological receptors within a nearby European site (e.g., non-breeding overwintering birds), this could alter their foraging and roosting behaviour and potentially affect the site's integrity. For some impact pathways (notably air pollution) there is guidance that sets out distance-based zones required for assessment. For others, a professional judgment must be made, based on the best available evidence.

4.1.3 For statutory designated nature conservation sites subject to the provisions of the Habitats Regulations, a search radius of 10 km has been chosen based on standard industry guidance on the assessment of air quality effects (Ref-8, Ref-9 and Ref-10).

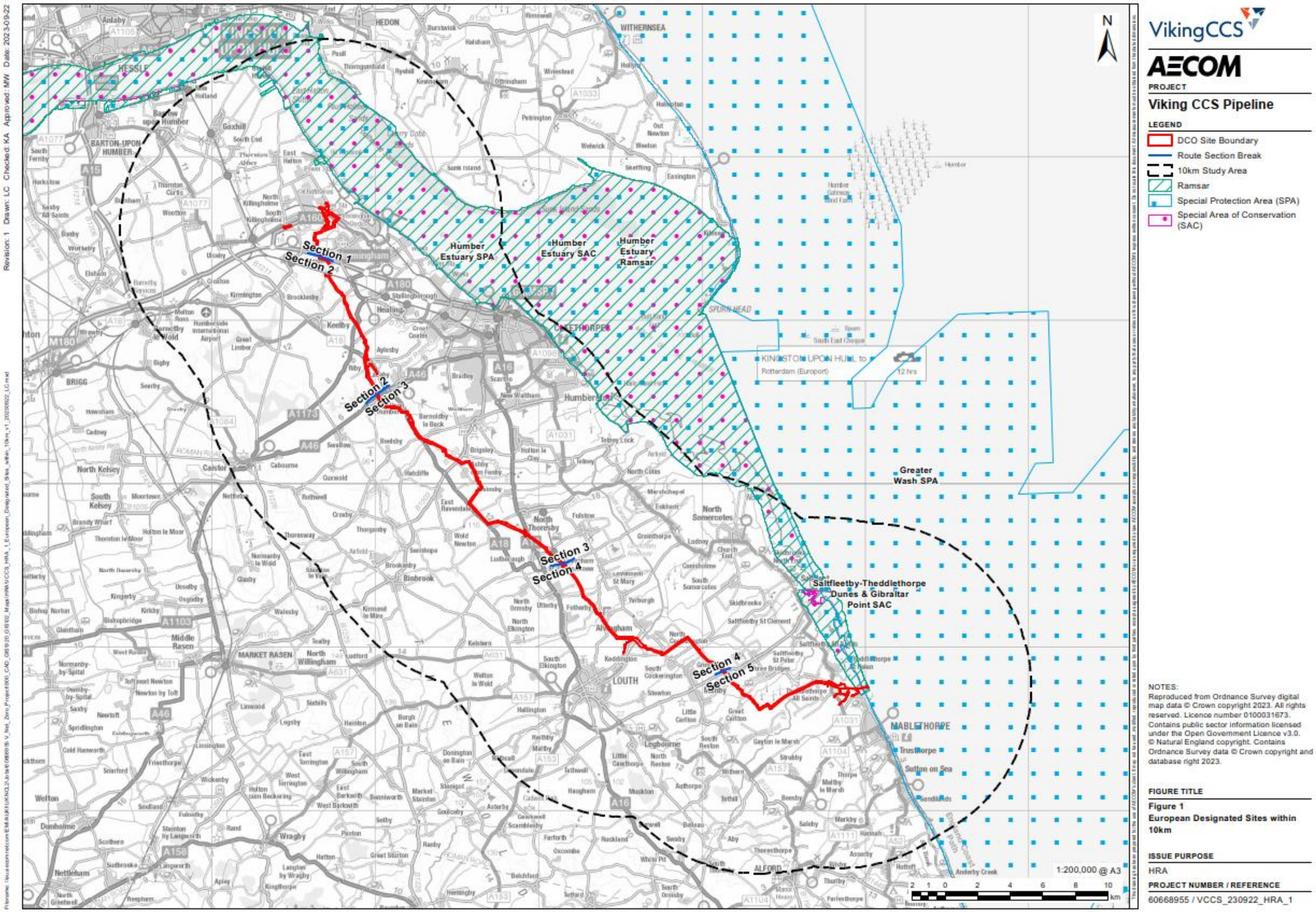
4.2 Relevant European Sites and their Qualifying Features

4.2.1 There are five European designated sites located within 10 km of the Proposed Development.

- Humber Estuary Special Protection Area (SPA) - within the DCO Site Boundary;
- Humber Estuary Special Area of Conservation (SAC) - 1.27 km east of the DCO Site Boundary;
- Humber Estuary Ramsar - within the DCO Site Boundary;
- Saltfleetby-Theddlethorpe Dunes & Gibraltar Point SAC - within the DCO Site Boundary; and,
- Greater Wash SPA with marine components - within the DCO Site Boundary.

4.2.2 **Figure 1** shows the locations of the European sites in relation to the DCO Site Boundary.

Figure 1: European Sites within 10 km of the Proposed Development



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PROJECT

Viking CCS Pipeline

LEGEND

- DCO Site Boundary
- Route Section Break
- 10km Study Area
- Ramsar
- Special Protection Area (SPA)
- Special Area of Conservation (SAC)

FIGURE TITLE

Figure 1
European Designated Sites within 10km

ISSUE PURPOSE

HRA

PROJECT NUMBER / REFERENCE

60668955 / VCCS_230922_HRA_1

4.2.3 The following sections introduce the European sites and provide a summary of the qualifying features, conservation objectives and threats / pressures to site integrity.

4.2.4 Paragraph 4.9 of the Planning Inspectorate Advice Note Ten (Ref-7) requires an evaluation of the potential for the Project to require other consents which could also require Habitats Regulations Assessment by different competent authorities, and a statement as to whether the Order Limits overlap with devolved administrations or other European Economic Area (EEA) States. This Report to Inform HRA therefore includes a discussion of the 'in combination' effects of the export pipeline which is subject to a separate consenting regime. It is confirmed that the Order Limits do not overlap with areas of devolved administrations or with those of other EEA States.

The Humber Estuary SPA

Introduction

4.2.5 The Humber Estuary is located on the east coast of England and comprises extensive wetland and coastal habitats. The SPA covers an area of 37,630.24 ha. The inner estuary supports extensive areas of reedbed, with areas of mature and developing saltmarsh backed by grazing marsh in the middle and outer estuary. On the north Lincolnshire coast, the saltmarsh is backed by low sand dunes with marshy slacks and brackish pools. Parts of the estuary are owned and managed by conservation organisations. The estuary supports important numbers of waterbirds (especially geese, ducks and waders) during the migration periods and in winter. In summer, it supports important breeding populations of bittern (*Botaurus stellaris*), marsh harrier (*Circus aeruginosus*), avocet (*Recurvirostra avosetta*) and little tern (*Sterna albifrons*) (Ref 11)

SPA Qualifying Features

4.2.6 The site qualifies under article 4.1 of the Directive (79/409/EEC) as it is used regularly by 1% or more of the Great Britain populations of the following species listed in Annex I in any season (Ref-11):

- Avocet (*Recurvirostra avosetta*) (breeding and wintering);
- Bittern (*Botaurus stellaris*) (breeding and wintering);
- Hen harrier (*Circus cyaneus*) (wintering);
- Golden plover (*Pluvialis apricaria*) (wintering);
- Bar-tailed godwit (*Limosa lapponica*) (wintering);
- Ruff (*Philomachus pugnax*) (passage);
- Marsh harrier (*Circus aeruginosus*) (breeding);
- Little tern (*Sterna albifrons*) (breeding).

4.2.7 The site qualifies under article 4.2 of the Directive (79/409/EEC) as it is used regularly by 1% or more of the biogeographical populations of the following regularly occurring migratory species (other than those listed in Annex I) in any season:

- Shelduck (*Tadorna tadorna*) (wintering);
- Knot (*Calidris canutus*) (wintering and passage);
- Dunlin (*Calidris alpina*) (wintering and passage);
- Black-tailed godwit (*Limosa limosa*) (wintering and passage); and,
- Redshank (*Tringa totanus*) (wintering and passage).

4.2.8 In addition, the site qualifies under article 4.2 of the Directive (79/409/EEC) as it is used regularly by over 20,000 waterbirds (waterbirds as defined by the Ramsar Convention) in

any season. Natural England advises that the main component species of the Humber Estuary SPA non-breeding waterbird assemblage (as of June 2023) are:

- Avocet (*Recurvirostra avosetta*) (non-breeding);
- Bar-tailed godwit (*Limosa lapponica*) (non-breeding);
- Bittern (*Botaurus stellaris*) (non-breeding);
- Black-tailed godwit (*Limosa limosa islandica*) (non-breeding);
- Brent goose (*Branta bernicla*) (non-breeding);
- Curlew (*N. Arquata*) (non-breeding);
- Dunlin (*Calidris alpina alpina*) (non-breeding);
- Golden plover (*Pluvialis apricaria*) (non-breeding);
- Goldeneye (*Bucephala apricaria*) (non-breeding);
- Greenshank (*T. nebularia*) (non-breeding);
- Grey plover (*P. squatarola*) (non-breeding);
- Knot (*Calidris canutus*) (non-breeding);
- Lapwing (*Vanellus vanellus*) (non-breeding);
- Mallard (*Anas platyrhynchos*) (non-breeding);
- Oystercatcher (*Haematopus ostralegus*) (non-breeding);
- Pochard (*Aythya farina*) (non-breeding);
- Redshank (*Tringa totanus*) (non-breeding);
- Ringed plover (*Charadrius hiaticula*) (non-breeding);
- Ruff (*Philomachus pugnax*) (non-breeding);
- Sanderling (*Calidris alba*) (non-breeding);
- Scaup (*Aythya marila*) (non-breeding);
- Shelduck (*Tadorna tadorna*) (non-breeding);
- Teal (*Anas crecca*) (non-breeding);
- Turnstone (*Arenaria interpres*) (non-breeding);
- Whimbrel (*Numenius phaeopus*) (non-breeding);
- Wigeon (*Anas Penelope*) non-breeding.

4.2.9 The updated list of the bird species considered to form part of the Humber SPA non-breeding waterbird assemblage is provided in Appendix D.

4.2.10 Species which are not listed on the SPA citation but occur at levels more than 1% of the national population according to the most recent WeBS 5 year average count are:

- Green sandpiper (*Tringa ochropus*) (non-breeding);
- Greylag goose (*Anser anser*) (non-breeding)
- Little egret (*Egretta garzetta*) (non-breeding);
- Pink-footed goose (*Anser brachyrhynchus*) (non-breeding);
- Shoveler (*Anas clypeata*); and,

- Crane (*Grus grus*) (non-breeding).

4.2.11 The conservation objectives for the SPA are to:

"*ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring:*

- *The extent and distribution of the habitats of the qualifying features;*
- *The structure and function of the habitats of the qualifying features;*
- *The supporting processes on which the habitats of the qualifying features rely;*
- *The population of each of the qualifying features, and,*
- *The distribution of the qualifying features within the site*" (Ref-12).

4.2.12 The SPA is a part of the Humber Estuary European Marine Site (EMS). The Conservation Objectives should be used in conjunction with the Conservation Advice document for the EMS (Ref 13).

The Humber Estuary SAC

Introduction

4.2.13 The Humber Estuary SAC is a 36,657.15ha large estuarine site in north-eastern England comprising a variety of habitats, including tidal rivers / estuaries (94.9%), saltmarsh (4.4%), coastal sand dunes (0.4%) and bogs / marshes (0.4%).

4.2.14 The SAC is a large macro-tidal coastal plain estuary with high suspended sediment loads. It is a dynamic system that feeds accreting and eroding intertidal and subtidal sand- and mudflats, saltmarsh and reedbeds. It also harbours a range of sand dune types, sandbanks and coastal lagoons. Salinity declines upstream, giving rise to tidal reedbeds and brackish saltmarsh communities. The SAC harbours a significant fish assemblage, including river lamprey (*Lampetra fluviatilis*) and sea lamprey (*Petromyzon marinus*).

4.2.15 The estuary is a favoured feeding site for wintering and passage wildfowl, which forage in the different habitats of the SPA. The sandy habitats attract knot and grey plover, while waterfowl prefer the wetland zones. At high tide, mixed flocks of birds occupy key roost sites, which are under pressure due to the combined effects of land claim, coastal squeeze and habitat loss (Ref-14).

SAC Qualifying Features

4.2.16 The site is designated under article 4(4) of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I (Ref-14):

- Atlantic salt meadows (Glauco-Puccinellietalia maritimae);
- Coastal lagoons;
- Dunes with sea buckthorn (*Hippophae rhamnoides*);
- Embryonic shifting dunes
- Estuaries
- Mudflats and sandflats not covered by seawater at low tide;
- Fixed dunes with herbaceous vegetation (`grey dunes`);
- Glasswort Salicornia sp. and other annuals colonising mud and sand;
- Sandbanks which are slightly covered by sea water all the time; and,
- Shifting dunes along the shoreline with (*Ammophila arenaria*) (`white dunes').

4.2.17 The site is designated under article 4(4) of the Directive (92/43/EEC) as it hosts the following species listed in Annex II:

- Grey seal (*Halichoerus grypus*);
- River lamprey; and,
- Sea lamprey.

4.2.18 The conservation objectives (Ref-15) for the SAC are to:

"*Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring:*

- *The extent and distribution of qualifying natural habitats and habitats of qualifying species;*
- *The structure and function (including typical species) of qualifying natural habitats;*
- *The structure and function of the habitats of qualifying species;*
- *The supporting processes on which qualifying natural habitats and habitats of qualifying species rely;*
- *The populations of qualifying species; and,*
- *The distribution of qualifying species within the site*."

4.2.19 The following threats / pressures to the site integrity of the Humber Estuary SPA and SAC have been identified in Natural England's Site Improvement Plan (Ref -16):

Table 4-1: Threats and Pressures Upon Qualifying Features of the Humber Estuary SPA and SAC

Priority and Issue	Pressure or Threat	Feature(s) affected
Water Pollution	Pressure / Threat	Bittern, common shelduck, marsh harrier, hen harrier, avocet, golden plover, red knot, dunlin, ruff, black-tailed godwit, bar-tailed godwit, common redshank, little tern, estuaries, intertidal mudflats and sandflats, sea lamprey, river lamprey, waterbird assemblage.
Coastal squeeze	Threat	Bittern, common shelduck, marsh harrier, hen harrier, avocet, golden plover, red knot, dunlin, ruff, black-tailed godwit, bar-tailed godwit, common redshank, little tern, estuaries, intertidal mudflats and sandflats, glasswort and other annuals colonising mud and sand, Atlantic salt meadows and waterbird assemblage.
Changes in species distributions	Threat	Bittern, common shelduck, marsh harrier, hen harrier, avocet, golden plover, red knot, dunlin, ruff, black-tailed godwit, bar-tailed godwit, common redshank, little tern, sea lamprey, river lamprey, waterbird assemblage.
Undergrazing	Pressure	Golden plover, red knot, ruff, black-tailed godwit, common redshank, glasswort and other annuals colonising mud and sand,

Priority and Issue	Pressure or Threat	Feature(s) affected
		Atlantic salt meadows, shifting dunes, shifting dunes with marram, dune grassland, dunes with sea buckthorn, waterbird assemblage.
Invasive species	Threat	Bittern, common shelduck, marsh harrier, hen harrier, avocet, golden plover, red knot, dunlin, ruff, black-tailed godwit, bar-tailed godwit, common redshank, little tern, estuaries, Atlantic salt meadows, waterbird assemblage.
Natural changes to the site conditions	Pressure / Threat	Bittern, common shelduck, marsh harrier, hen harrier, avocet, golden plover, red knot, dunlin, ruff, black-tailed godwit, bar-tailed godwit, common redshank, little tern, estuaries, intertidal mudflats and sandflats, waterbird assemblage.
Public access / Disturbance	Pressure	Bittern, common shelduck, marsh harrier, hen harrier, avocet, golden plover, red knot, dunlin, ruff, black-tailed godwit, bar-tailed godwit, common redshank, little tern, waterbird assemblage.
Fisheries: Fish stocking	Pressure	Bittern, common shelduck, marsh harrier, hen harrier, avocet, golden plover, red knot, dunlin, ruff, black-tailed godwit, bar-tailed godwit, common redshank, little tern, waterbird assemblage.
Fisheries: commercial marine and estuarine	Pressure / Threat	Intertidal mudflats and sandflats
Direct land take from development	Threat	Bittern, common shelduck, marsh harrier, hen harrier, avocet, golden plover, red knot, dunlin, ruff, black-tailed godwit, bar-tailed godwit, common redshank, little tern, estuaries, intertidal mudflats and sandflats and waterbird assemblage.
Air pollution: impact of atmospheric nitrogen deposition	Pressure	Glasswort and other annuals colonising mud and sand, Atlantic salt meadows, shifting dunes, shifting dunes with marram, dune grassland and dunes with sea-buckthorn.
Shooting / scaring		Bittern, common shelduck, marsh harrier, hen harrier, avocet golden plover, red knot, dunlin, ruff, black-tailed godwit, bar-tailed godwit, common redshank, little tern and waterbird assemblage.

The Humber Estuary Ramsar

Introduction

4.2.20 The Humber Estuary is the largest macro-tidal estuary on the British North Sea coast (Ref-11). It drains a catchment of some 24,240 square kilometres and is the site of the largest single input of freshwater from Britain into the North Sea. It has the second-highest tidal range in Britain (max 7.4 m) and approximately one-third of the estuary is exposed as mud or sand flats at low tide. The inner estuary supports extensive areas of reedbed with areas of mature and developing saltmarsh backed in places by limited areas of grazing marsh in the middle and outer estuary. On the north Lincolnshire coast the saltmarsh is backed by low sand dunes with marshy slacks and brackish pools. The Estuary regularly supports internationally important numbers of waterfowl in winter and nationally important breeding populations in summer (Ref-17).

Ramsar Criterion 1

4.2.21 The site is a representative example of a near-natural estuary with the following component habitats: dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish/saline lagoons.

4.2.22 It is a large macro-tidal coastal plain estuary with high suspended sediment loads, which feed a dynamic and rapidly changing system of accreting and eroding intertidal and subtidal mudflats, sandflats, saltmarsh and reedbeds. Examples of both strandline, foredune, mobile, semi-fixed dunes, fixed dunes and dune grassland occur on both banks of the estuary and along the coast.

Ramsar Criterion 3

4.2.23 The Humber Estuary Ramsar site supports a breeding colony of grey seals at Donna Nook. It is the second largest grey seal colony in England and the furthest south regular breeding site on the east coast. The dune slacks at Saltfleetby-Theddlethorpe on the southern extremity of the Ramsar site are the most north-easterly breeding site in Great Britain of the natterjack toad (*Bufo calamita*).

Ramsar Criterion 5

4.2.24 Assemblages of international importance:

- 153,934 waterfowl, non-breeding season (5-year peak mean 1996/97-2000/2001)

Ramsar Criterion 6

4.2.25 Species / populations occurring at levels of international importance:

Table 4-2: Species / populations occurring at levels of international importance.

Species	Population
Eurasian golden plover (*Pluvialis apricaria altifrons*) subspecies	NW Europe, W Continental Europe, NW Africa population. 17,996 individuals, passage, representing an average of 2.2% of the population (5-year peak mean 1996-2000).
Red knot, (*Calidris canutus islandica*) subspecies	18,500 individuals, passage, representing an average of 4.1% of the population (5-year peak mean 1996-2000)
Dunlin, (*Calidris alpina alpina*) subspecies	Western Europe (non-breeding) population 20,269 individuals, passage, representing an average of 1.5% of the population (5-year peak mean 1996-2000)

Species	Population
Black-tailed godwit, (*Limosa limosa islandica*) subspecies	915 individuals, passage, representing an average of 2.6% of the population (5-year peak mean 1996-2000)
Common redshank, (*Tringa totanus brittanica*) subspecies	7,462 individuals, passage, representing an average of 5.7% of the population (5-year peak mean 1996-2000)
Common shelduck, (*Tadorna tadorna*) Northwestern Europe (breeding) population	4,464 individuals, wintering, representing an average of 1.5% of the population (5-year peak mean 1996/7-2000/1)
Eurasian golden plover, (*Pluvialis apricaria*) altifrons subspecies	NW Europe, W Continental Europe, NW Africa population 30,709 individuals, wintering, representing an average of 3.8% of the population (5-year peak mean 1996/7-2000/1)
Red knot, (*Calidris canutus islandica*) subspecies	28,165 individuals, wintering, representing an average of 6.3% of the population (5-year peak mean 1996/7-2000/1)
Dunlin, (*Calidris alpina*) alpina subspecies – Western Europe (non-breeding) population	22,222 individuals, wintering, representing an average of 1.7% of the population (5-year peak mean 1996/7-2000/1)
Black-tailed godwit, (*Limosa limosa islandica*) subspecies	1,113 individuals, wintering, representing an average of 3.2% of the population (5-year peak mean 1996/7-2000/1)
Bar-tailed godwit , (*Limosa lapponica) lapponica* subspecies	2,752 individuals, wintering, representing an average of 2.3% of the population (5-year peak mean 1996/7-2000/1)
Common redshank, (*Tringa totanus brittanica*) subspecies	4,632 individuals, wintering, representing an average of 3.6% of the population (5-year peak mean 1996/7-2000/1)

4.2.26 Qualifying species / populations (as identified at designation):

Table 4-3: Species with Peak Counts in Spring / Autumn

Species	Population
European golden plover, (*Pluvialis apricaria apricaria, P. a. altifrons*) Iceland & Faroes/E Atlantic	17,996 individuals, representing an average of 2.2% of the population (1996-2000)
Red knot , (*Calidris canutus islandica*), W & Southern Africa	18,500 individuals, representing an average of 4.1% of the population (1996-2000)
Dunlin , (*Calidris alpina alpina*), W Siberia/W Europe	20,269 individuals, representing an average of 1.5% of the population (1996-2000)
Black-tailed godwit , (*Limosa limosa islandica*), Iceland/W Europe	915 individuals, representing an average of 2.6% of the population (1996-2000)
Common redshank (*Tringa totanus totanus*),	7,462 individuals, representing an average of 5.7% of the population (1996-2000)

Table 4-4: Species with Peak Counts in Winter

Species	Population
Common shelduck (*Tadorna tadorna*), NW Europe	4,464 individuals, representing an average of 1.5% of the population (1996/7 to 2000/1)
European golden plover, (*Pluvialis apricaria apricaria, P. a. altifrons*) Iceland & Faroes/E Atlantic	30,709 individuals, representing an average of 3.8% of the population (1996/7 to 2000/1)
Red knot, (*Calidris canutus islandica*), W & Southern Africa (wintering)	28,165 individuals, representing an average of 6.3% of the population (1996/7 to 2000/1)
Dunlin, (*Calidris alpina alpina*), W Siberia/W Europe	22,222 individuals, representing an average of 1.7% of the population (1996/7 to 2000/1)
Black-tailed godwit, (*Limosa limosa islandica*), Iceland/W Europe	1,113 individuals, representing an average of 3.2% of the population (1996/7 to 2000/1)
Bar-tailed godwit, (*Limosa lapponica lapponica*), W Palearctic	2,752 individuals, representing an average of 2.3% of the population (1996/7 to 2000/1)

Ramsar Criterion 8

4.2.27 The Humber Estuary acts as an important migration route for both river lamprey *Lampetra fluviatilis* and sea lamprey *Petromyzon marinus* between coastal waters and their spawning areas.

Saltfleetby-Theddlethorpe Dunes and Gibraltar Point SAC

Introduction

4.2.28 The SAC is 960.2 ha and comprises two dune systems within the Lincolnshire Coast & Marshes National Character Area (NCA Profile 42) separated by about 25km. Saltfleetby–Theddlethorpe Dunes are the larger of the two systems and run between Saltfleetby and Mablethorpe. Gibraltar Point is located further south adjacent to Skegness, close to where the Wash and the North Sea meet.

4.2.29 The dune systems contain good examples of shifting dunes within a complex site that exhibits a range of dune types. The marram (*Ammophila arenaria*) dominated dunes are associated with lyme-grass (*Leymus arenarius*) and sand couch (*Elytrigia juncea*). These shifting dunes are part of a successional transition with fixed dunes with dune grassland and sea-buckthorn (*Hippophae rhamnoides*).

4.2.30 Saltfleetby-Theddlethorpe Dunes supports the only population of breeding natterjack toad (*Bufo calamita*) in Lincolnshire - the most north-easterly in England. This part of the site receives active management to maintain suitable breeding pools and hunting habitat for the toadlets (Ref 18).

SAC Qualifying Features

4.2.31 The site is designated under article 4(4) of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I:

- Dunes with *Hippophae rhamnoides*. (Dunes with sea-buckthorn);
- Embryonic shifting dunes;
- Fixed dunes with herbaceous vegetation (grey dunes) (Dune grassland);
- Humid dune slacks; and,

- Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes). (Shifting dunes with marram).

Conservation Objectives

4.2.32 The conservation objectives for the SAC (Ref-19) are to:

"*Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring:*

- *The extent and distribution of the qualifying natural habitats;*
- *The structure and function (including typical species) of the qualifying natural habitats; and,*
- *The supporting processes on which the qualifying natural habitats rely*."

Threats and Pressures

4.2.33 Table 1-5 summarises the threats / pressures to the site integrity of Saltfleetby-Theddlethorpe Dunes and Gibraltar Point SAC as identified in Natural England's Site Improvement Plan (Ref-20 and Ref 21).

Table 4-5: Threats and Pressures upon Qualifying Features of Saltfleetby-Theddlethorpe Dunes and Gibraltar Point SAC

Priority and issue	Pressure or Threat	Feature(s) affected
Inappropriate coastal management	Pressure / Threat	Humid dune slacks.
Changes to site conditions	Pressure	Shifting dunes with marram.
Change in land management	Threat	Shifting dunes, shifting dunes with marram, dune grassland and humid dune slacks.
Air pollution: impact of atmospheric nitrogen deposition.	Pressure	Shifting dunes, shifting dunes with marram, dune grassland, humid dune slacks.

Greater Wash SPA

Introduction

4.2.34 The Greater Wash SPA covers an area of 353,578 ha. The Greater Wash SPA is located in the mid-southern North Sea between Bridlington Bay in the north and the Outer Thames Estuary SPA in the south. To the north, off the Holderness coast in Yorkshire, seabed habitats primarily comprise coarse sediments, with occasional areas of sand, mud and mixed sediments. Subtidal sandbanks occur at the mouth of the Humber Estuary, primarily comprising sand and coarse sediments. Offshore, soft sediments dominate, with extensive areas of subtidal sandbanks off The Wash as well as north and east Norfolk coasts. Closer inshore at The Wash and north Norfolk coast, sediments comprise a mosaic of sand, muddy sand, mixed sediments and coarse sediments, as well as occasional Annex I reefs. The area off the Suffolk coast continues the mosaic habitats mostly dominated by soft sediment (Ref-22 and Ref 24).

SPA Qualifying Features

4.2.35 The site qualifies under Article 4.1 of the Directive 2009/147/EC by regularly supporting populations of national importance of the Annex I species:

- Red throated diver (*Gavia stellata*) (non-breeding);
- Little gull (*Hydrocoloeus minutus*) (non-breeding);
- Sandwich tern (*Sterna sandvicensis*) (breeding);
- Common tern (*Sterna hirundo*) (breeding);
- Little tern (*Sternula albifrons*) (breeding); and,
- Common scoter (*Melanitta nigra*) (non-breeding).

4.2.36 The conservation objectives for the SPA (Ref-23) are to:

"*Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;*

- *The extent and distribution of the habitats of the qualifying features*
- *The structure and function of the habitats of the qualifying features*
- *The supporting processes on which the habitats of the qualifying features rely*
- *The population of each of the qualifying features, and,*
- *The distribution of the qualifying features within the site*."

Threats and Pressures

4.2.37 No information is currently available regarding threats and pressures upon this SPA.

5 Information Used in the Assessment

5.1 Introduction

5.1.1 Baseline information to inform this assessment is summarised in the following Technical Appendices (*ES Volume IV, Application Document 6.4*):

- Appendix 6-1: Extended Phase 1 Habitat Survey Report;
- Appendix 6-7: Ornithology Baseline Report; and,
- Appendix 6-8: Confidential Ornithological Baseline.

5.1.2 Information from the following *ES Volume II* chapters has been used to assess noise and visual disturbance, changes in water quality, effects upon air quality and cumulative effects (*ES Volume II, Application Document 6.2*).

- Chapter 7: Landscape and Visual;
- Chapter 11: Water Environment;
- Chapter 13: Noise and Vibration;
- Chapter 14: Air Quality; and,
- Chapter 20: Cumulative Effects Assessment.

5.1.3 Information to inform this assessment has also been obtained from data and reports to inform other relevant planning applications.

6 Test of Likely Significant Effects

6.1 Introduction

6.1.1 This section examines the Likely Significant Effects of the Proposed Development. It is structured by development phase (construction, operation and decommissioning). Within each development phase each potential impact pathway (e.g., noise & visual disturbance, air quality etc.) is discussed separately, covering all European sites to which that impact pathway applies. Each European site to which an impact pathway potentially applies is considered below under the heading describing the type of impact. The analysis is summarised in the screening matrices in Appendix B of this HRA.

6.2 Construction Phase

Humber Estuary SPA

6.2.1 The Humber Estuary SPA overlaps with the DCO Site Boundary. The following pathways to LSE have the potential to occur during the construction phase:

- Direct habitat loss;
- Loss of functionally linked land for birds (permanent or temporary);
- Noise and visual disturbance (including changes in lighting) of birds;
- Changes in water quality (physical or chemical); and
- Atmospheric pollution.

6.2.2 For ease of reporting, the Theddlethorpe Facility, the Immingham Facility, block valve stations, and the pipeline route, are discussed separately.

Direct Habitat Loss within the Designated Site Boundaries

6.2.3 The Humber Estuary SPA and Ramsar overlap with the DCO Site Boundary at the southern extent of the Proposed Development. Although the DCO site boundary overlaps with the Humber Estuary SPA and Ramsar designations, no direct habitat loss will occur as at this point the Proposed Development utilises the existing (below ground) LOGGS pipeline west of the sand dunes at Theddlethorpe (refer to Chapter 3 of the ES for further details), and no works are proposed.

6.2.4 As there will be no direct loss of habitat within the Humber Estuary SPA or Ramsar there will be no LSE and this pathway can be screened out.

Permanent Loss of Functionally Linked Land – Breeding Birds

6.2.5 The term ‘functionally linked land’ is used to describe areas of land or sea occurring outside a designated site which are considered to be critical to, or necessary for, the ecological or behavioural functions in a relevant season of a qualifying feature for which a habitats site has been designated. There is potential for the breeding bird species listed as part of the Humber Estuary SPA assemblage to use land in the vicinity of the Proposed Development for breeding, foraging, and resting.

Immingham Facility

6.2.6 The Immingham Facility will be located on approximately 11,000 square metres (m^2) of land located to the west of Rosper Road. Habitats at this location comprise bare ground, grassland and scrub (refer to *ES Appendix 6-1 – Phase 1 habitat survey report* (*Application Document 6.4.6.1*).

6.2.7 Six breeding bird surveys were completed between April and June 2021 (*Appendix 6-7: Ornithological Baseline Report (Application Document 6.4.6.7)*). The habitats where the Immingham Facility is proposed are unsuitable for breeding avocet, bittern, marsh harrier or little tern and these species were not recorded using habitats within the DCO Site Boundary (*Appendix 6-7: Ornithological Baseline Report (Application Document 6.4.6.7) and Appendix 6-8: Confidential Ornithological Baseline (Application Document 6.4.6.8)*).

6.2.8 There will be no permanent loss of habitats which are functionally linked at Immingham, and this pathway can be screened out.

Theddlethorpe Facility

6.2.9 There are currently two options proposed for the location of the Theddlethorpe Facility. Option 1 is at the former Theddlethorpe Gas Terminal (TGT) and Option 2 would be a new facility to the west of the former TGT site (refer to *ES Volume II Chapter 3 of the ES: Description of the Proposed Development (Application Document 6.2.3)*). Habitats within Option 1 comprise bare ground and ephemeral / short perennial vegetation whereas habitats within Option 2 are arable.

6.2.10 Breeding bird surveys were completed by AECOM to inform the ecological impact assessment (refer to *ES Volume IV Appendix 6-7: Ornithological Baseline (Application Document 6.4.6.7)*). Four survey visits were completed using the common bird census methodology between April and July 2022. The number of breeding pairs or territories for each species recorded was determined from the mapped survey data to identify and isolate areas within which birds displayed consistent breeding behaviours across more than one visit (following Marchant, 1983; and Gilbert et al. 1998) (Ref 25 and Ref 26).

6.2.11 No evidence of breeding bittern, marsh harrier or little tern were recorded within either of the options proposed for the Theddlethorpe Facility.

6.2.12 **A pair of breeding avocet were recorded on land at the former TGT site in 2022 (Option 1), although the likelihood that this site supports a regularly occurring breeding population is considered to be negligible (refer to *ES Volume II Chapter 6* and *Appendix 6-8: Confidential Ornithological Baseline*). Nevertheless, as habitats within the former TGT site will be lost, there is the potential for LSE upon breeding avocet, and this pathway is taken forward to Appropriate Assessment on a precautionary basis.**

Block Valve Stations

6.2.13 Three block valve stations will be required along the pipeline route. Small areas of arable habitat will be lost in areas where block valves are proposed. These areas are not suitable for breeding avocet, bittern, marsh harrier or little tern.

6.2.14 There will be no permanent loss of functionally linked land where block valves are proposed, and this can be screened out.

Permanent Loss of Functionally Linked Land – Non-Breeding Birds

Immingham Facility

6.2.15 Table 6-1 on page 6-27 summarises the results of the non-breeding bird surveys completed for the Humber Zero project (Ref 47). This project includes the VPI CO2 capture plant and is located immediately to the north of the Proposed Project. As the projects are closely related, the Humber Zero project shared their baseline bird survey information with the Applicant.

6.2.16 The Immingham Facility is located within ‘Field 1’. The only qualifying bird species that was recorded where the Immingham Facility is proposed was lapwing; four lapwing were recorded within Field 1. As only four birds were recorded during the surveys this is below the 1% threshold and there will be no significant effects upon the lapwing population.

6.2.17 There will be no permanent loss of habitats which are functionally linked at Immingham, and this pathway can be screened out.

Theddlethorpe Facility

6.2.18 Non-breeding bird surveys were completed by AECOM at the Theddlethorpe Facility to inform the ecological impact assessment (refer to *ES Volume II Chapter 6 (Application Document 6.2.6)* and *ES Volume IV Appendix 6-7: Ornithological Baseline Report (Application Document 6.4.6.7)*).

6.2.19 **Mallard, oystercatcher, curlew and redshank were recorded within the former TGT site (Option 1). As habitats where the Theddlethorpe Facility is proposed will be lost permanently, this pathway is taken forward to Appropriate Assessment.**

Block Valve Stations

6.2.20 Small areas of arable habitat will be lost in areas where block valve stations are proposed. The arable habitats are unsuitable for avocet, bittern, hen harrier, bar tailed godwit, ruff, shelduck, knot, dunlin, black-tailed godwit, or redshank. Golden plover and lapwing use arable habitats in the winter for foraging and roosting, however neither species were recorded at the locations where block valve stations are proposed.

6.2.21 There will be no permanent loss of habitats which are functionally linked where block valves are proposed, and this pathway can be screened out.

Temporary Loss of Functionally Linked Land – Breeding Birds

6.2.22 The new pipeline will be installed over a 12-month period and there will be temporary habitat loss of mainly arable habitats and hedgerows during the construction phase.

6.2.23 No qualifying bird species were recorded using habitats that will be temporarily lost within the DCO Site Boundary. Avocet were recorded using land at the former TGT site and within the grazing marshes immediately east of the former TGT site and are considered under permanent habitat loss.

6.2.24 There was no evidence of breeding bittern, marsh harrier, or little tern within the DCO site boundary, and these species can be screened out.

Temporary Loss of Functionally Linked Land – Non-breeding Birds

6.2.25 There will be temporary habitat loss during the construction phase of the Proposed Development.

6.2.26 Several non-breeding species that are qualifying features of the Humber Estuary SPA (plus pink-footed goose), were recorded during the baseline surveys within fields which are within or overlap the parts of the DCO site boundary which may be subject to temporary habitat loss. This analysis, for the Functionally Linked Land (FLL) Northern and Southern Areas respectively, is detailed below (refer to the *ES Volume II Chapter 6* (*Application Document 6.2.6)*; Appendix 6-7 Ornithological Baseline Report [Figures 6.12-30] (*Application Document 6.4.6.7))*:

- Irregularly occurring counts of curlew, which are below 1% of the relevant SPA population, were recorded at Fields 20a and 23a (northern FLL area) and at Fields 18a, 28a, 33, 52b and 65b (southern FLL area). Counts at Fields 27a (45 birds - northern FLL area) and Field 54 (50 birds - southern FLL area) were >1% of qualifying populations.
- Irregularly occurring counts of golden plover, which are below 1% of the relevant SPA population, were recorded at Field 25 (northern FLL area).

- Irregularly occurring counts of mallard, which are below 1% of the relevant SPA population, were recorded at Field 115 (northern FLL area) and Fields 17a, 33, 74, 119,120a and 142 (southern FLL area).
- Irregularly occurring counts of lapwing, which are below 1% of the relevant SPA population, were recorded at Fields 17a, 120a and 151 (southern FLL area).
- The following fields in the southern FLL area is irregularly used by pink-footed goose populations which are above the Humber Estuary 1% threshold of 253 birds: Fields 86, 92, 94, 95a and 96a.
- Irregularly occurring counts of teal, which are below 1% of the relevant SPA population, were recorded at Fields 44c, 74, 92, 94,120a,142a (southern FLL area).

6.2.27 **There is potential for LSE upon curlew and pink-footed goose and this pathway is taken forward to Appropriate Assessment.**

6.2.28 As no other species had counts which exceeded 1% of the population threshold they can be screened out.

Table 6-1: ESL Wintering Bird Survey Results (Ref 47)

Survey Type	Peak Count														Humber Estuary 5-year Peak mean Population at SPA Designation	Humber Estuary 5-year Peak mean population 2017/18 – 2021/22	Humber Estuary 1% Threshold
Humber Zero Oct 2021- March 2022 Survey Areas	Field 1	Area 2 (Rosper Road	Field 3	Field 5	Field 6	Field 7	Field 8	Field 9	Field 10	Field 13	Field 14	Field 15	Field 16	Field 17	-	-	-
Relevant Overlapping Functionally Linked Land Bird Surveys Areas	Field 9	Field 10b	Field 8	Field 8	Field 8	Field 8	Field 6	Field 6	Field 7	Field 7	Field 4	Field 4	Field 4	Field 4	-	-	-
Bar-tailed godwit		**6**													2752	1,876	28
Black-tailed godwit		**480**						2	8						1113	5,646	11
Curlew			1	9	**50**	24		**35**	**74**	15	**38**	**35**	3	2	Assemblage	2,544	25
Lapwing	4	66						2				1			Assemblage	15,247	152
Pink-footed goose							1								N/A	25,332	253
Redshank		8													2881	2,659	29
Shelduck		12													4464	6,486	45
Wigeon		**126**				4									Assemblage	3,669	37

Noise, Vibration and Visual Disturbance

6.2.29 The Natural England Site Improvement Plan (SIP) for the Humber Estuary SPA and Ramsar highlights that the following bird species / assemblages are sensitive to disturbance: bittern, common shelduck, marsh harrier, hen harrier, avocet, golden plover, red knot, dunlin, ruff, black-tailed godwit, bar-tailed godwit, common redshank, little tern, and waterbird assemblage.

6.2.30 A study on recreational disturbance in the Humber (Ref 27) assessed different types of noise disturbance on waterfowl referring to studies relating to aircraft (Ref 28), traffic (Ref 29), dogs (Ref 30 and Ref 31) and machinery (Ref 32 and Ref 33). Some types of disturbance are clearly likely to invoke different responses. In very general terms, both distance from the source of disturbance and the scale of the disturbance (noise level, group size) will influence the response (Ref 32; Ref 35). On UK estuaries and coastal sites, a review of WeBS data showed that, as observed by the volunteer WeBS surveyors, driving of motor vehicles and shooting were the two activities most perceived to cause disturbance (Ref 36).

6.2.31 The degree of impact that varying levels of noise will have on different species of bird is relatively poorly understood. Research published by the Institute of Estuarine & Coastal Studies in 2013, summarises the key evidence base relating to this impact pathway. An acceptable receptor dose of 70dB (i.e., maximum noise level at the bird) is often used for projects, based on the observed responses of waterbirds to noise stimuli developed over a period of years (Ref 37, Ref 38 and Ref 39). Alternatively, the change in the noise levels experienced by birds, rather than an absolute noise threshold, can be used as an alternative means of impact assessment and on other projects around the Humber Estuary Natural England have expressed a preference for this approach.

6.2.32 Table 6-2 is taken from the Tide Toolbox (Ref 39) and summarises how noise level effects may affect bird species.

Table 6-2: Summary of Noise Disturbance Effects on Waterbirds (Ref 39)

High Noise Level Effects
Noise disturbance is typified by regular responses to stimuli with birds moving away from the works to areas which are less disturbed (within noise tolerances). Most birds show a degree of response to noise stimuli. Birds that remain in the affected area may not forage efficiently and if there are additional pressures of the birds (cold weather, extreme heat etc.) then this may impact upon the survival of individual birds or their ability to breed. For auditory disturbance to qualify as high level, it must constitute a sudden noise event of over 60 dB (at the bird, not at source) or a more prolonged noise of over 72dB.
Moderate Noise Level Effects
Moderate noise disturbance is typified as high-level noise which has occurred over long periods so that birds become habituated to it, or lower-level noise which causes some disturbance to birds. This encompasses occasional noise events above 55dB, regular noise 60-72dB and long-term regular noise above 72dB, where birds have become habituated. There is cross over in moderate and high-level noise thresholds although the lower band can be assumed unless the species is particularly sensitive. Those species that are particularly sensitive are brent goose, curlew and redshank. Birds that may be more sensitive than average include shelduck and bar-tailed godwit (Smit & Visser, 1993).

Low Noise Level Effects

Low level noise is classes as that which is unlikely to cause response in bird using a fronting intertidal area. As such, noises of less than 55dB at the bird are included in this category. These effects are likely to be masked by background inputs in all but the lease disturbed areas and thus would not disturb the birds close by. Noise between 55-72dB in some highly disturbed areas e.g., industrial or urban and adjacent to roads, may feature a low level of disturbance provide the noise was regular as birds will often habituate to a constant noise level.

6.2.33 Visual stimuli can create a disturbance effect before any associated noise starts to have an effect, e.g., a flight response might be expected by many species if approached to within 100 – 150 m across a mudflat. High level disturbance is typified by regular reactions to visual stimuli with birds moving away from the works (source) to areas that are less disturbed. Most birds will show a degree of response to stimuli. Birds that remain in the area may not forage efficiently and if there are additional pressures on the birds (cold weather, extreme heat) then this may affect the survival of individual birds or their ability to breed.

6.2.34 Lighting during construction has the potential to disturb birds. Birds flying at night are known to aggregate around artificial light and may collide with illuminated objects. This may result from attraction and / disorientation. Birds may also be repelled by light sources. Artificial light can change birds perceptions of habitat quality, resulting in selection or avoidance of illuminated areas (Adams *et al*, 2021).

6.2.35 The construction phase of the Proposed Development has the potential to result in noise and visual disturbance of qualifying bird species of the Humber Estuary SPA. An assessment of construction noise and vibration effects is provided in ES Chapter 13. Calculations have been undertaken using BS 5228:2014+A1:2019 'Code of practice for noise and vibration control on construction and open sites' and noise and vibration are considered together within this HRA. It is not appropriate to separate out noise and vibration to assess potential effects on birds, and noise is the most likely to result in a response. The Humber Estuary SPA supports breeding and non-breeding bird species, therefore visual and noise disturbance associated with construction/decommissioning work requires consideration throughout the entire year.

Noise and Visual Disturbance Breeding Birds – FLL North

6.2.36 Rosper Road Pools Local Wildlife Site (LWS) is approximately 38 m east of the DCO Site Boundary at its closest point and was found to support breeding avocet. This is a large drainage lagoon with a marginal reed fringe, which is linked to the surrounding network of ditches that outfall into the estuary at the northern end of Immingham Docks. The LWS has had some relatively recent habitat enhancement works (c. 2016) to create small islands specifically for nesting avocet.

6.2.37 Breeding avocet is a qualifying feature of the Humber Estuary SPA/ Ramsar with 64 breeding pairs in the five-year peak mean 1998 - 2002 that is listed in the citation (Ref-11). At least 9 individual avocet were recorded feeding and roosting at Rosper Road Pools between late March and May. Approximately 7 – 10 breeding pairs were recorded with chicks at Rosper Road Pools on the 31st of May 2022. The birds were within the eastern half of the pool, approximately 350 m east of the DCO Site Boundary.

6.2.38 Although the avocets at Rosper Road Pools are nesting in habitats outside of the boundary of the designated sites, the area is considered to be functionally linked to the Humber Estuary SPA/ Ramsar for breeding avocet.

6.2.39 There was no evidence of breeding bittern, marsh harrier or little tern within functionally linked land at Immingham. As there is no potential for LSE upon these species they can be screened out.

6.2.40 The proposed development is separated from Rosper Road Pools by Rosper Road and Humber Road which have existing street lighting. As such, it is considered that the bird assemblage at Rosper Road Pools is already subject to some disturbance from street lighting and traffic. The area is also affected by lighting from the existing Phillips 66 development. However, due to the proximity of the Proposed Development to Rosper Road Pools, there could be some disturbance of birds during the construction phase and therefore noise and visual disturbance of birds is taken forward to Appropriate Assessment.

6.2.41 **As there is potential for noise and visual disturbance to affect breeding avocet within functionally linked land at Rosper Road Pools, this will be considered in more detail at Appropriate Assessment.**

Noise and Visual Disturbance Breeding Birds – FLL South

6.2.42 It is determined that the breeding population on the field immediately east of the former TGT site (referred to hereinafter as the Viking Field in line with the Viking Field pools and scrapes - a British Trust for Ornithology Core Count Sector) is approximately 3-4 breeding pairs of avocet (refer to *ES Volume II Chapter 6 (Application Document 6.2.6)* and *ES Volume IV Appendix 6-8* (*Application Document 6.4.6.8*)). One breeding pair was recorded at the TGT site immediately adjacent to the Draft Order Limits (refer to section 6.2.10).

6.2.43 There was no evidence of breeding bittern, marsh harrier or little tern within functionally linked land at Theddlethorpe. As there is no potential for LSE upon these species they can be screened out.

6.2.44 **There is the potential for noise, visual disturbance and changes in lighting during construction of the Theddlethorpe Facility and works at the Dune Valve to disturb nesting avocet. Noise and visual disturbance of birds at Theddlethorpe is screened into Appropriate Assessment**.

Noise and Visual Disturbance Breeding Birds – Pipeline Corridor

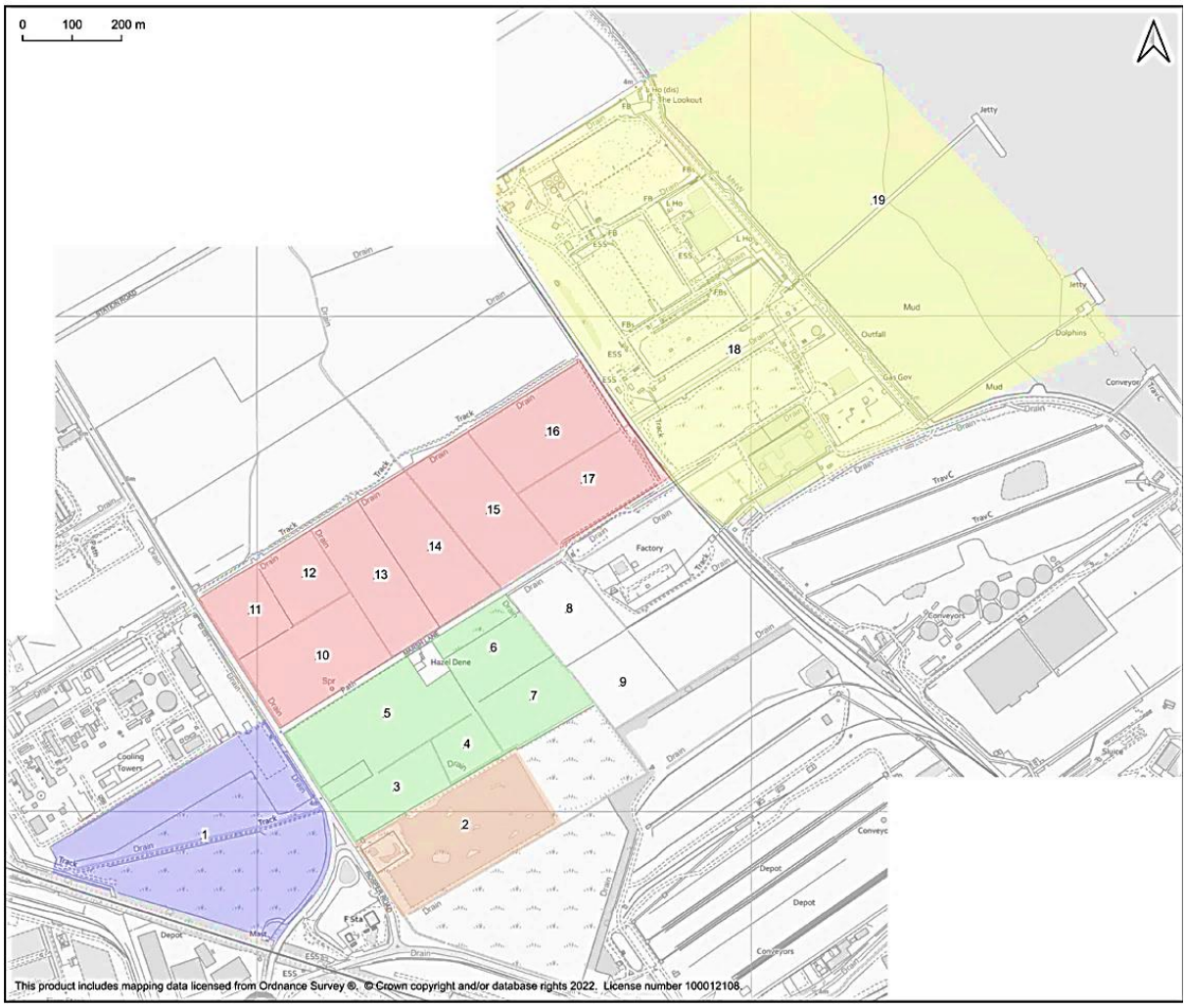
6.2.45 There was no evidence of breeding avocet, bittern, marsh harrier or little tern within functionally linked land at any other locations along the pipeline corridor.

6.2.46 As there is no potential for noise and visual disturbance of SPA breeding birds along the pipeline corridor LSE can be screened out.

Noise and Visual Disturbance Non-breeding birds – FLL North

6.2.47 A summary of the survey results provided by the Humber Zero project is presented in Table 6-1 above and peak counts exceeding the 1% threshold for that species are highlighted in **bold text**. A plan showing the survey areas is provided as Figure 2 below. Additional information regarding the source of this data is provided in *Appendix 6-7 Ornithological Baseline Report*.

Figure 2: Humber Zero Bird Survey Area 2021 – 2022



6.2.48 No Humber Estuary SPA/ Ramsar bird species were recorded in Fields 4, 11 and 12 and therefore these fields are excluded from Table 6-1.

6.2.49 Curlew was recorded in some of the terrestrial fields surveyed in numbers regularly exceeding 1% of the Humber Estuary threshold. In all cases, use of the fields by curlew was sporadic, although the surveys are only a snapshot of the usage across the high tide period and there are likely to be many factors influencing the use of the fields by this species across the passage and wintering period (e.g., localised disturbance, sward height etc.). It is evaluated that the fields are functionally linked land in respect of the Humber Estuary SPA/ Ramsar due to their supporting role in providing feeding, roosting and loafing habitat for curlew across the high tide period. Curlew was recorded in most of the fields surveyed on the east side of Rosper Road, although the smaller fields (3, 4, 11 and 12) were either used by only small numbers or avoided altogether by curlew.

6.2.50 Surveys of Rosper Road Pools (Area 2) recorded black-tailed godwit with several of the monthly counts recording numbers >1% Humber Estuary threshold. A peak count of 480 birds was recorded, and the species occurred regularly (on 10 of the 12 surveys undertaken). Bar tailed godwit was recorded in Area 2 in numbers greater than 1% of the Humber Estuary SPA with a peak count of 6, and it occurred on two of the 12 surveys. Wigeon was also recorded in numbers greater than 1% of the Humber Estuary threshold with a peak count of 126 birds recorded in Area 2, occurring on seven of the 12 surveys.

6.2.51 Very small numbers of other SPA/ Ramsar species were recorded in the fields across the survey period. The fields are therefore providing a supporting habitat to the estuary for these species, but as they are present in such low numbers, which are well below the 1%

thresholds for each species, it is concluded that the fields are not providing functionally linked land for these species.

6.2.52 The Proposed Development is separated from Rosper Road Pools by Rosper Road and Humber Road which have existing street lighting. As such, it is considered that the non-breeding bird assemblage at Rosper Road Pools is already subject to some disturbance from street lighting and traffic. The area is also subject to lighting from the existing Phillips 66 and VPI development's. However, due to the proximity of the Proposed Development to the Rosper Road Pools, there could be some disturbance of birds during the construction phase and therefore, noise and visual disturbance of birds is taken forward to Appropriate Assessment.

6.2.53 The Northern Compound will be located within an arable field immediately south of the A160. This location has previously been used as a construction compound for other projects which have now been completed. The land at the Northern Compound was appraised for its suitability to support breeding and wintering birds during a scoping visit on 4 July 2022 and again on 17 August 2022, and due to the habitats within the parcel and proximity to a major road, was considered unlikely to be functionally linked.

6.2.54 **In summary, there is potential for noise and visual disturbance to affect curlew, black tailed godwit, bar tailed godwit and wigeon (assemblage), are taken forward to Appropriate Assessment.**

Noise and Visual Disturbance Non-breeding Birds – FLL South

6.2.55 During non-breeding bird counts the following species were recorded using habitats at Theddlethorpe / the Viking Fields WeBS Sector and have the potential to be affected by noise and visual disturbance:

- Curlew;
- Golden plover;
- Lapwing;
- Mallard;
- Oystercatcher;
- Pink-footed goose;
- Redshank;
- Shelduck;
- Teal; and,
- Wigeon

6.2.56 The Viking Field site includes a mix of wet grasslands, pools and agricultural land in proximity to coastal habitats. Redshank, teal, wigeon, curlew, mallard and lapwing occurred repeatedly (on at least 3 out of the 7 non-breeding counts) in this area, indicating its importance to a wide range of SPA qualifying features. Curlew, lapwing, teal and wigeon all exceeded 1% of the SPA population in this area on at least one occasion; the fields immediately north of Theddlethorpe St. Helen attracted large numbers of wigeon and teal in December 2021. Wigeon was not recorded inland of this location.

6.2.57 Further inland, records of wading birds were dominated by curlew and lapwing, with only two counts of golden plover, which was recorded infrequently and in small numbers across the survey area as a whole; and scattered records of ducks, the latter with few regular patterns of distribution and rarely (or never in the case of teal occurring in numbers exceeding 1% of the SPA threshold):

- Curlew occurred inland of the TGT site regularly as far as Gayton le Marsh Grange (approximately 4km from the coast), beyond which there were very few records; and
- Lapwing was recorded repeatedly on fields a short distance north of Manby Washlands and more occasionally across the fields between Theddlethorpe St. Helen and Gayton le Marsh Grange.

6.2.58 Other SPA birds (greenshank, hen harrier, dunlin) occurred but as singles, or flyover records with no observable pattern of distribution or habitat use.

6.2.59 Pink-footed goose occurred every month between and including November 2021 - February 2022 and September - October 2022 in numbers significantly exceeding 1% of the Humber Estuary population. This species was consistently present across a wide area between Grimoldby and the TGT site, with the largest counts at the western end of this area, occurring most frequently on winter cereal fields between Grimoldby and Saltfleetby St. Peter, and between Manby Washlands and Gayton le Marsh Grange, where they fed in sometimes large flocks often exceeding 500 and occasionally exceeding 2,000 birds. Scattered occurrences were recorded elsewhere across the survey area although with far less regularity, however, at Field 47 north of Theddlethorpe all Saints, this species was recorded on at least four occasions in feeding flocks of between 150 and 2,100 (mean 812). The majority of records occurred on fields sown with winter cereals and on stubble; habitat use and therefore distribution of this species would be expected to vary year on year with crop rotation and a consistent pattern of occurrence cannot be determined for this species.

6.2.60 **There is potential for noise and visual disturbance to affect non-breeding redshank, teal, wigeon, curlew, mallard, lapwing, golden plover and pink footed goose at Theddlethorpe and this is taken forward to Appropriate Assessment.**

Noise and Visual Disturbance Non-breeding Birds – Pipeline Corridor

6.2.61 The following non-breeding bird species were recorded regularly along the pipeline corridor:

- Curlew;
- Golden plover;
- Lapwing;
- Mallard;
- Pink-footed goose; and
- Teal.

6.2.62 **There is potential for noise and visual disturbance to affect non-breeding curlew, golden plover, lapwing, mallard, pink-footed goose and teal along the pipeline route and these species are considered in more detail at Appropriate Assessment.**

Changes in Water Quality

6.2.63 The quality of the water that feeds European Sites is an important determinant of the nature of their habitats and the species they support, and therefore integral to meeting a site's conservation objectives. Physical and chemical changes in water quality can have a range of environmental impacts.

6.2.64 At high concentrations, toxic chemicals and heavy metals can result in the immediate death of aquatic life (both flora and fauna). At lower concentrations, negative impacts may be more subtle and could increase vulnerability to disease or change the behaviour of wildlife.

6.2.65 Toxic contamination may arise from synthetic toxic compounds, such as pesticides, PCBs (polychlorinated biphenyls) and biocides. Some of these substances are endocrine disrupting chemicals, which have the capacity to mimic animal hormones, prevent their production or breakdown. As discussed above, many of the synthetic compounds tend to

accumulate over time and are likely to be present in animal tissue or substrate for long periods of time. Another factor in determining the magnitude of water pollution is the amount of hydrological mixing and tidal flushing that a site receives.

6.2.66 The main impacts associated with the construction of the Immingham and Theddlethorpe facilities and block valves will be from the removal of topsoil, construction of drainage measures and earthworks to establish foundation levels. These have the potential to cause a reduction in water quality through sediment disturbances if washed down into watercourses as described for construction compounds.

6.2.67 The embedded mitigation states that the topsoil and subsoil will be moved to the edge of the working area and will not be stored directly adjacent to any watercourses to reduce the risk of silt laden run-off (minimum 20 m from the top of the bank surrounding a watercourse) and will be managed to maintain the nature of the soils, with measures taken to prevent soil loss due to erosion. Furthermore, drainage schemes will be constructed where they are required. Fuels, and chemicals will be stored in a bunded area with a capacity of 110% of the maximum stored volume, with spill kits located nearby. A Construction Environmental Management Plan (CEMP) will detail the measures required to prevent adverse effects on water quality and further reduce the likelihood of a pollution event occurring.

6.2.68 The main watercourses and water features in the study area in Sections 1 – 4 flow from west to east and drain into the Humber Estuary (*refer to ES Chapter 11 – Water Environment*). Therefore, these provide potential flow pathways to the Humber Estuary. All construction works associated with these watercourses have the potential to propagate sediments and spillages downstream, however the magnitude of impact on the Humber is negligible due to the distance that the contaminants and pollutants would have to travel. Furthermore, the dilution potential of the Humber estuary is very high due to its size.

6.2.69 Changes in water quality have been considered during screening as the Environmental Damage (Prevention and Remediation) (England) Regulations 2015 and the Environmental Permitting (England and Wales) Regulations 2016 make it an offence to pollute watercourses, irrespective of whether they are designated as European designated sites or connect to designated sites. With embedded mitigation, impacts from run-off are predicted to be short term, intermittent and spatially local.

6.2.70 There will be no LSE from changes in water quality and this pathway of effect can be screened out.

Atmospheric Pollution

Dust and Particulates

6.2.71 The release of dust and synthetic / non-synthetic toxic pollutants during construction can also have effects upon habitats and the species they support. Dust emissions can affect plant growth by coating vegetation, blocking stomata and slowing down the chemical reactions involved in photosynthesis. The death of plants attributed to dust emissions may alter the plant community composition and, ultimately, affect the integrity of European sites designated for habitats and / or specific plant species.

6.2.72 With reference to guidance from the Institute of Air Quality Management (Ref 9) "*an assessment will normally be required where there is…an 'ecological receptor' within: 50 m of the boundary of the site; or 50m of the route(s) used by construction vehicles on the public highway…*". This is based on the view that heavy dust soiling is a threat to vegetation, but only up to a distance of 50 m from dust generating activities even in the absence of mitigation measures (e.g., wetting).

6.2.73 The boundary of the Humber Estuary SPA is located within the DCO Site Boundary at Theddlethorpe. There are pools and scrapes immediately east of the Theddlethorpe Facility which are used by SPA birds. The onshore pipeline will connect to the existing (below

ground) LOGGS pipeline west of the sand dunes at Theddlethorpe and therefore there is potential for dust and contaminants to affect the surrounding area in the absence of mitigation.

6.2.74 **As there is the potential for dust and contaminants to affect habitats used by SPA birds for foraging, this pathway is considered in more detail at Appropriate Assessment.**

Transport Emissions

6.2.75 The main pollutants of concern for European sites are oxides of nitrogen (NOx), ammonia (NH_3) and sulphur dioxide (SO_2); their potential sources and effects are summarised in Table 6-3.

6.2.76 Ammonia can have a directly toxic effect upon vegetation, particularly at close distances to the source such as near road verges (Ref 45). NOx can also be toxic at very high concentrations (far above the annual average critical level). However, in particular, high levels of NOx and NH_3 are likely to increase the total nitrogen deposition to soils, potentially leading to deleterious effects in resident ecosystems (Ref 45, Ref 46). For example, an increase in the total nitrogen deposition from the atmosphere is widely known to enhance soil fertility and to lead to eutrophication. This often has adverse effects on the community composition and quality of semi-natural, nitrogen-limited terrestrial and aquatic habitats (Ref 40; Ref 41). The total nitrogen deposition resulting from a plan or project is therefore often assessed as the overarching parameter determining atmospheric pollution.

Table 6-3: Main Sources and Effects of Air Pollution on Habitats and Species (Ref 44)

Pollutant	Source	Effects on habitats and species
Ammonia (NH_3)	Ammonia is a reactive, soluble alkaline gas that is released following decomposition and volatilisation of animal wastes. It is a naturally occurring trace gas, but ammonia concentrations are directly related to the distribution of livestock. Ammonia reacts with acid pollutants such as the products of SO_2 and NO_X emissions to produce fine ammonium (NH_4+) - containing aerosol. Due to its significantly longer lifetime, NH_4+ may be transferred much longer distances (and can therefore be a significant trans-boundary issue). While ammonia deposition may be estimated from its atmospheric concentration, the deposition rates are strongly influenced by meteorology and ecosystem type.	The negative effect of NH_4+ may occur via direct toxicity, when uptake exceeds detoxification capacity, and via N accumulation. Its main adverse effect is eutrophication, leading to species assemblages that are dominated by fast-growing and tall species. For example, a shift in dominance from heath species (lichens, mosses) to grasses is often seen. As emissions mostly occur at ground level in the rural environment and NH_3 is rapidly deposited, some of the most acute problems of NH_3 deposition are for small relict nature reserves located in intensive agricultural landscapes.
Nitrogen oxides (NO_x)	Nitrogen oxides are mostly produced in combustion processes. Half of NO_X emissions in the UK derive from	Direct toxicity effects of gaseous nitrates are likely to be important in areas close to the source (e.g., roadside verges). A critical level of

Pollutant	Source	Effects on habitats and species
	motor vehicles, one quarter from power stations and the rest from other industrial and domestic combustion processes. In contrast to the steep decline in Sulphur dioxide emissions, nitrogen oxides are falling slowly due to control strategies being offset by increasing numbers of vehicles.	NOx for all vegetation types has been set to 30 ug/m3. Deposition of nitrogen compounds (nitrates (NO_3), nitrogen dioxide (NO_2) and nitric acid (HNO_3)) contributes to the total nitrogen deposition and may lead to both soil and freshwater acidification. In addition, NO_x contributes to the eutrophication of soils and water, altering the species composition of plant communities at the expense of sensitive species.
Nitrogen deposition	The pollutants that contribute to the total nitrogen deposition derive mainly from oxidized (e.g., NO_X) or reduced (e.g., NH_3) nitrogen emissions (described separately above). While oxidized nitrogen mainly originates from major conurbations or highways, reduced nitrogen mostly derives from farming practices. The N pollutants together are a large contributor to acidification (see above).	All plants require nitrogen compounds to grow, but too much overall N is regarded as the major driver of biodiversity change globally. Species-rich plant communities with high proportions of slow-growing perennial species and bryophytes are most at risk from N eutrophication. This is because many semi-natural plants cannot assimilate the surplus N as well as many graminoid (grass) species. N deposition can also increase the risk of damage from abiotic factors, e.g., drought and frost.

6.2.77 The only pollutants likely to be associated with construction or decommissioning of the Proposed Development are NOx and NH_3. NOx and NH_3 will be primarily determined by the associated traffic movements (relating to both on-site construction traffic and commuter traffic), while NOx will also be affected by any diesel plant required for construction or decommissioning. Exceedances of the Critical Level for NOx or NH_3 and / or nitrogen Critical Load (CL) may damage individual plants, as well as changing overall community composition. However, it is widely accepted that the contribution of atmospheric pollutants is negligible beyond 200 m from the edge of roads (Ref 8).

6.2.78 The Air Pollution Information System (APIS) forms the major source of information regarding the air quality impact pathway. It specifies a NOx concentration (critical level) for the protection of vegetation of 30 μgm^{-3} and one for NH_3 of 3 μgm^{-3}. In addition, ecological studies have determined 'critical loads' for atmospheric nitrogen deposition (that is, NOx combined with ammonia NH_3).

6.2.79 According to the Department of Transport's Guidance (Ref 48), beyond 200 m, the contribution of vehicle emissions from the roadside to local pollution levels is not significant. This is therefore the distance that has been used throughout this HRA to determine whether European designated sites are likely to be significantly affected by site traffic associated with the Proposed Development.

6.2.80 No part of the Affected Road Network (ARN) to be used by construction traffic lies within 200 m of the SPA. Chapter 14 of the ES assesses the effects of construction traffic emissions on air quality. Moreover, maximum construction traffic movements are a peak of

411 two-way movements, meaning that the Annual Average Daily Traffic (AADT) will not exceed the DMRB screening thresholds of 1000 AADT (AADT for heavy goods vehicles).

6.2.81 Therefore, LSE from atmospheric pollution can be screened out.

The Humber Estuary Ramsar

6.2.82 The Humber Estuary Ramsar overlaps with the DCO site boundary overlaps with the DCO Site Boundary. The following pathways to LSE are considered during the construction phase:

- Direct habitat loss within the Ramsar site boundary;
- Atmospheric pollution;
- Changes in water quality;
- Effects upon breeding grey seal;
- Effects upon natterjack toad;
- Permanent loss of functionally linked land for waterfowl;
- Temporary loss of functionally linked land for waterfowl; and
- Noise, changes in lighting and visual disturbance of waterfowl, killing or injury, changes in water quality as a result of fine sediment or dust reaching watercourses, and / or noise and vibration affecting river lamprey and sea lamprey.

Direct Habitat Loss within the Ramsar Site Boundary

6.2.83 The Humber Estuary Ramsar overlaps with the DCO Site Boundary at the southern extent of the Proposed Development. Although the DCO site boundary overlaps with the Ramsar designation, no direct habitat loss will occur as the onshore pipeline will connect to the existing (below ground) LOGGS pipeline west of the sand dunes at Theddlethorpe (*refer to ES Volume II Chapter 3 (Application Document 6.2.3) for further details*).

6.2.84 There will be no direct habitat loss from within the Ramsar site boundary and this pathway can be screened out.

Atmospheric Pollution

Vehicle Emissions

6.2.85 No part of the Affected Road Network (ARN) to be used by construction traffic lies within 200 m of the Ramsar site. Chapter 14 of the ES assesses the effects of construction traffic emissions on air quality. Moreover, maximum construction traffic movements are a peak of 411 two-way movements, meaning that the Annual Average Daily Traffic (AADT) will not exceed the DMRB screening thresholds of 1000 AADT (AADT for heavy goods vehicles);

6.2.86 Therefore, LSE from atmospheric pollution can be screened out.

Dust and Particulates

6.2.87 As discussed in section 6.2.62, the release of dust and synthetic / non-synthetic toxic pollutants during construction can also have effects upon habitats and the species they support. As the Humber Estuary Ramsar is within 50 m of the Proposed Development, there is potential for dust and particulates to affect the habitats for which the Ramsar is designated.

6.2.88 **As there is the potential for dust and contaminants to affect qualifying habitats of the Humber Estuary Ramsar this pathway is considered in more detail at Appropriate Assessment.**

Changes in Water Quality

6.2.89 As discussed in Sections 6.2.53 to 6.2.57, physical and chemical changes in water quality can have a range of environmental impacts. The main impacts associated with the construction of the Immingham and Theddlethorpe facilities and block valves will be from the removal of topsoil, construction of drainage measures and earthworks to establish foundation levels. These have the potential to cause a reduction in water quality through sediment disturbances if washed down into watercourses as described for construction compounds.

6.2.90 The embedded mitigation states that the topsoil and subsoil will be moved to the edge of the working area and will not be stored directly adjacent to any watercourses to reduce the risk of silt laden run-off (minimum 20 m from the top of the bank surrounding a watercourse) and will be managed to maintain the nature of the soils, with measures taken to prevent soil loss due to erosion. Furthermore, drainage schemes will be constructed where they are required. Fuels, and chemicals will be stored in a bunded area with a capacity of 110% of the maximum stored volume, with spill kits located nearby. A Construction and Environmental Management Plan (CEMP) will detail the measures required to prevent adverse effects on water quality and further reduce the likelihood of a pollution event occurring.

6.2.91 The main watercourses and water features in the study area in Sections 1 - 4 flow from west to east and drain into the Humber Estuary (*refer to ES Volume II Chapter 11 - Water Environment (Application Document 6.2.11)*). Therefore, these provide potential flow pathways to the Humber Estuary Ramsar. All construction works associated with these watercourses have the potential to propagate sediments and spillages downstream, however the magnitude of impact on the Humber is negligible due to the distance that the contaminants and pollutants would have to travel. Furthermore, the dilution potential of the Humber estuary is considerably high due to its size.

6.2.92 Watercourses which will be crossed by the Proposed Development have the potential to support river and sea lamprey. Increased sediment input to rivers leads to higher turbidity, which can have a range of knock-on impacting resident ecosystems. For example, high turbidity may reduce plant growth (resulting in a concomitant decrease of dissolved oxygen concentrations), the ability of fish to find food or detect predators and smother freshwater / marine invertebrates that form an important food source for both fish and birds. Notably, both lamprey species require clean gravels for spawning, which may be impacted by sediment that settles on the riverbed.

6.2.93 Changes in water quality have been considered during screening as the Environmental Damage (Prevention and Remediation) (England) Regulations 2015 (Ref 42) and the Environmental Permitting (England and Wales) Regulations 2016 (Ref 43) make it an offence to pollute watercourses, irrespective of whether they are designated as European designated sites or connect to designated sites. With embedded mitigation, impacts from run-off are predicted to be short term, intermittent and spatially local.

6.2.94 There will be no LSE from changes in water quality and this pathway of effect can be screened out.

Effects Upon Breeding Grey Seal

6.2.95 The Humber Estuary Ramsar site supports a breeding colony of grey seals at Donna Nook. It is the second largest grey seal colony in England and the furthest south regular breeding site on the east coast. Donna nook is located approximately 13.25 km north of Theddlethorpe and due to the separation distance, there will be no effects upon breeding seals as a result of the Proposed Development.

6.2.96 There are no pathways of effect between the proposed development and breeding grey seal and this species can be screened out.

Effects Upon Natterjack Toad

6.2.97 The dune slacks at Saltfleetby-Theddlethorpe on the southern extremity of the Ramsar site are the most north-easterly breeding site in Great Britain of the natterjack toad. Natterjack toads have the following habitat requirements:

- Open, unshaded terrestrial habitat with extensive areas of unvegetated or minimally vegetated ground (i.e., with vertical plant growth of no more than 1 cm or so); and,
- Unshaded, ephemeral ponds with shallow, gradually shelving margins and few predators or competitors, for reproduction.

6.2.98 Land at the former TGT site was cleared in 2021 and it is unlikely that natterjack toad would be present at this location as the species prefers dune habitats with dune slacks to breed.

Natterjacks have recently been identified using water bodies located on the Viking Fields to the east of the former TGT site (Per. Comm). Localised construction work will be required to upgrade the Dune Valve and install an electrical connection using a mole plough. Access to the Dune Isolation Valve during replacement and maintenance will be via the existing track that runs along the south-eastern edge of the field to the east of the existing TGT site. In the absence of mitigation, there is the potential for machinery to encroach onto habitats used by natterjack toad. Habitats immediately surrounding the Dune Valve comprise scrub and it is unlikely that natterjack toad would be present.

6.2.99 **However, based upon a precautionary approach, effects upon natterjack toad will be considered in more detail at Appropriate Assessment.**

Permanent loss of functionally linked land for waterfowl

6.2.100 As discussed in Section 6-2-12 above, the only qualifying bird species that was recorded where the Immingham Facility is proposed was lapwing. As only four birds were recorded during the surveys this is below the 1% threshold and there will be no significant effects upon the lapwing population.

6.2.101 As discussed in Section 6-2-10, a pair of breeding avocet were recorded on land at the former TGT site.

6.2.102 **As there is potential for permanent loss of functionally linked land at Theddlethorpe, this is considered in more detail at Appropriate Assessment.**

Temporary loss of functionally linked land for waterfowl

6.2.103 Avocet was recorded using habitats within the DCO Site Boundary and there is potential for this species to be temporarily displaced. Avocet were recorded using land at the former TGT site and within the grazing marshes immediately east of TGT site.

6.2.104 Golden plover and black-tailed godwit were recorded in moderate numbers feeding on stubble and ploughed fields near Little London and Immingham Golf Course respectively. Curlew were recorded using ploughed, stubble and recently sown arable fields in the vicinity of Little London and Immingham Golf Course where the species was recorded feeding. In both areas peak counts exceeded the 1% threshold for SPA selection based on the Humber Estuary 5-year peak count for 2017/18-21/22.

6.2.105 **Temporary loss of functionally linked land is taken forward to Appropriate Assessment.**

Noise, changes in lighting and visual disturbance of waterfowl

6.2.106 Rosper Road Pools Local Wildlife Site (LWS) is approximately 38 m east of the DCO Site Boundary at its closest point and was found to support breeding avocet. Curlew was recorded using fields surveyed at Immingham in numbers regularly exceeding 1% of the Humber Estuary threshold.

6.2.107 The Wetland Bird Survey (WeBS) high tide counts for Viking Fields are provided in *ES Volume II Chapter 6*, Appendix 6.7: Ornithology Baseline report. Viking Fields covers the wet coastal grasslands immediately east of TGT site. The data indicates that the grasslands regularly support a modest assemblage predominantly comprising gulls, waders and ducks including nine qualifying species of the Humber Estuary Ramsar site, with the following species meeting or exceeding 1% of the Humber Estuary Ramsar population:

- Avocet in winter and spring;
- Curlew in winter;
- Black-tailed godwit in winter;
- Mallard in winter;
- Teal in winter; and,
- Wigeon in winter.

6.2.108 The sector also supports moderate numbers of redshank and lapwing at numbers close to 1% of the Ramsar threshold population, oystercatcher at numbers that, in autumn, exceed 1% of the Ramsar threshold population for an assemblage feature and very small (non-significant) numbers of shelduck.

6.2.109 The field surveys found that redshank, teal, wigeon, curlew, mallard and lapwing occurred repeatedly (on at least 3 out of the 7 non-breeding counts) in Viking Fields (fields 7-11 and in some cases northwards through fields 3-6), indicating its importance to a wide range of Ramsar qualifying features. Curlew, lapwing, teal and wigeon all exceeded 1% of the Ramsar population in this area on at least one occasion; the fields immediately north of Theddlethorpe St. Helen (field 12) attracted large numbers of wigeon and teal in December 2021. Wigeon was not recorded inland of this location.

6.2.110 Further inland, records of wading birds were dominated by curlew and lapwing, with only two counts of golden plover, which was recorded infrequently and in small numbers across the survey area as a whole; and scattered records of ducks, the latter with few regular patterns of distribution and rarely (or never in the case of teal) occurring in numbers exceeding 1% of the Ramsar threshold:

- Curlew occurred inland of TGT site regularly as far as Gayton le Marsh Grange (approximately 4km from the coast), beyond which there were very few records; and,
- Lapwing was recorded on several fields a short distance north of Manby Washlands and occasionally within some of the fields between Theddlethorpe St. Helen and Gayton le Marsh Grange, however this species occurred regularly within Viking Fields immediately east of TGT site, occasionally reaching or exceeding 1% of the Ramsar population.

6.2.111 Other Ramsar birds (greenshank, hen harrier, dunlin) occurred but as singles, or flyover records with no observable pattern of distribution or habitat use.

6.2.112 Pink-footed goose occurred every month between and including November 2021 - February 2022 and September - October 2022 in numbers significantly exceeding 1% of the Humber Estuary population. This species was consistently present across a wide area between Grimoldby and TGT site, with the largest counts at the western end of this area, occurring most frequently on winter cereal fields between Grimoldby and Saltfleetby St. Peter, and between Manby Washlands and Gayton le Marsh Grange, where they fed in sometimes large flocks often exceeding 500 and occasionally exceeding 2,000 birds. Scattered occurrences were recorded elsewhere across the survey area although with far less regularity, however at Field 47 north of Theddlethorpe all Saints, this species was recorded on at least four occasions in feeding flocks of between 150 and 2,100 (mean 812). The majority of records occurred on fields sown with winter cereals and on stubble; habitat use

and therefore distribution of this species would be expected to vary year on year with crop rotation and a consistent pattern of occurrence cannot be determined for this species.

6.2.113 **There is potential for noise, visual disturbance and changes in lighting to affect qualifying bird species of the Humber Estuary Ramsar and this is taken forward to Appropriate Assessment.**

Effects upon river lamprey and sea lamprey

6.2.114 Watercourses which will be crossed by the Proposed Development have the potential to support river and sea lamprey. The main watercourses and water features crossed by the Proposed Development drain from west to east into the North Sea. Therefore, these provide potential flow pathways to the Humber Estuary Ramsar.

6.2.115 River lamprey was recorded in The Beck which is connected to Long Eau. River lamprey are migratory, spawning in clean sandy gravels in rivers. The young larvae then swim off to the soft marginal silt of the river to grow, feeding on the algae, bacteria and detritus. They can spend five years in the mud before metamorphosing into adults and migrating down towards the sea.

6.2.116 Main rivers within the Proposed Development will be crossed using HDD or Auger Bore to avoid direct effects upon the structure of the watercourses. Smaller watercourses will be crossed using open cut techniques. There is a low risk of direct mortality and / or injury to river lamprey as a result of open-cut crossing methodologies. There is also a risk of noise and vibration impacts on lamprey from drilling techniques particularly if carried out during spawning or migration periods. There is potential risk of indirect impacts from dust and particulates, surface runoff from constructions areas (i.e., fine sediments) and impacts on water quality from potential pollution incidents (i.e. chemical spills) thereby having potential effects on aquatic species where there are requirements for works taking place above or in proximity to aquatic habitats. There is also a potential indirect impact from light pollution if lighting used during the construction phase is shining directly on water bodies.

6.2.117 **There is potential for LSE upon lamprey species and affects upon this species will be considered in more detail at Appropriate Assessment.**

The Humber Estuary SAC

6.2.118 The Humber Estuary SAC is located 1.27 km east of the DCO site boundary at its closest point. The following pathways to LSE have the potential to occur during the construction phase:

- Changes in water quality;
- Changes in air quality; and
- Killing or injury, changes in water quality as a result of fine sediment or dust reaching watercourses, and / or noise and vibration affecting river lamprey and sea lamprey.

Changes in Water Quality

6.2.119 As discussed in Sections 6.2.53 to 6.2.57, physical and chemical changes in water quality can have a range of environmental impacts. The main impacts associated with the construction of the Immingham and Theddlethorpe facilities and block valves will be from the removal of topsoil, construction of drainage measures and earthworks to establish foundation levels. These have the potential to cause a reduction in water quality through sediment disturbances if washed down into watercourses as described for construction compounds.

6.2.120 The embedded mitigation states that the topsoil and subsoil will be moved to the edge of the working area and will not be stored directly adjacent to any watercourses to reduce the risk of silt laden run-off (minimum 20 m from the top of the bank surrounding a watercourse)

and will be managed to maintain the nature of the soils, with measures taken to prevent soil loss due to erosion. Furthermore, drainage schemes will be constructed where they are required. Fuels, and chemicals will be stored in a bunded area with a capacity of 110% of the maximum stored volume, with spill kits located nearby. A Construction and Environmental Management Plan (CEMP) will detail the measures required to prevent adverse effects on water quality and further reduce the likelihood of a pollution event occurring.

6.2.121 The main watercourses and water features in the study area in Sections 1 - 4 flow from west to east and drain into the Humber Estuary (*refer to ES Chapter 11 - Water Environment*). Therefore, these provide potential flow pathways to the Humber Estuary. All construction works associated with these watercourses have the potential to propagate sediments and spillages downstream, however the magnitude of impact on the Humber is negligible due to the distance that the contaminants and pollutants would have to travel. Furthermore, the dilution potential of the Humber estuary is considerably high due to its size.

6.2.122 Changes in water quality have been considered during screening as the Environmental Damage (Prevention and Remediation) (England) Regulations 2015 and the Environmental Permitting (England and Wales) Regulations 2016 make it an offence to pollute watercourses, irrespective of whether they are designated as European designated sites or connect to designated sites. With embedded mitigation, impacts from run-off are predicted to be short term, intermittent and spatially local.

6.2.123 There will be no LSE from changes in water quality and this pathway of effect can be screened out.

Effects upon River Lamprey and Sea Lamprey

6.2.124 River lamprey was recorded in The Beck which is connected to Long Eau. River lamprey are migratory, spawning in clean sandy gravels in rivers. The young larvae then swim off to the soft marginal silt of the river to grow, feeding on the algae, bacteria and detritus. They can spend five years in the mud before metamorphosing into adults and migrating down towards the sea.

6.2.125 Main rivers within the Proposed Development will be crossed using HDD or Auger Bore to avoid direct effects upon the structure of the watercourses. Smaller watercourses will be crossed using open cut techniques. There is a low risk of direct mortality and / or injury to river lamprey as a result of open-cut crossing methodologies. There is also a risk of noise and vibration impacts on lamprey from drilling techniques particularly if carried out during spawning or migration periods. There is potential risk of indirect impacts from surface runoff from constructions areas (i.e., fine sediments) and impacts on water quality from potential pollution incidents (i.e. chemical spills) thereby having potential effects on aquatic species where there are requirements for works taking place above or in proximity to aquatic habitats. There is also a potential indirect impact from light pollution if lighting used during the construction phase is shining directly on water bodies.

6.2.126 **There is potential for LSE upon lamprey species and affects upon this species will be considered in more detail at Appropriate Assessment.**

Atmospheric Pollution

Dust and Particulates

6.2.127 As discussed in section 6.2.62, the release of dust and synthetic / non-synthetic toxic pollutants during construction can also have effects upon habitats and the species they support.

6.2.128 As the Humber Estuary SAC is over 50 m from the Proposed Development Site and the ARN, there will be no LSE from dust and particulates upon habitats, and this pathway can be screened out.

Vehicle Emissions

6.2.129 According to IAQM Guidance, beyond 200 m, the contribution of vehicle emissions from the roadside to local pollution levels is not significant.

6.2.130 As the Humber Estuary SAC is located 1.27 km east of the DCO site boundary at its closest point there will be no LSE from vehicle emissions and this pathway can be screened out.

Saltfleetby-Theddlethorpe Dunes & Gibraltar Point SAC

6.2.131 Saltfleetby-Theddlethorpe Dunes & Gibraltar Point SAC overlaps with the DCO Site Boundary. The following pathways to LSE have the potential to occur during the construction phase:

- Direct habitat loss or degradation.
- Changes in water quality (physical or chemical); and,
- Atmospheric pollution.

Direct Habitat Loss or Degradation

6.2.132 Saltfleetby-Theddlethorpe Dunes & Gibraltar Point SAC overlaps with the DCO Site Boundary at the southern extent of the Proposed Development. Although the DCO site boundary overlaps with the SAC designation, no direct habitat loss will occur as the onshore pipeline will connect to the existing (below ground) LOGGS pipeline west of the sand dunes at Theddlethorpe (*refer to Chapter 3 of the ES for further details*).

6.2.133 Construction work will be required to replace the Dune Isolation Valve at Theddlethorpe, which is located immediately adjacent to the dune habitats for which the SAC is designated.

6.2.134 The Dune Isolation Valve will be replaced using the following steps:

- The pipeline will be safely isolated either side of the valve;
- The access hatches will be removed to allow access to the pit;
- Actuator will likely be unbolted and removed to gain better access to the valve;
- The current valve is welded into the pipeline so specialist cutting equipment will be utilised to remove the valve;
- A crane will be used to support the valve and lift it out of position once separated; and
- The new valve will be installed by reversing the above steps and then welding the new valve into position.

6.2.135 Access to the Dune Isolation Valve during replacement and maintenance will be via the existing track that runs along the south-eastern edge of the field to the east of the existing TGT site.

6.2.136 In the absence of mitigation, there is the potential for machinery to encroach onto adjacent habitats. This could have an effect on the qualifying habitats of the SAC (dunes).

6.2.137 **As there is the potential for LSE upon the qualifying habitats of the Saltfleetby-Theddlethorpe Dunes & Gibraltar Point SAC, this pathway will be taken forward to Appropriate Assessment.**

Changes in Water Quality

6.2.138 The construction of the Theddlethorpe facility has the potential to cause a reduction in water quality through sediment disturbances if washed down into watercourses or onto adjacent habitats. If a pollution event were to occur, it could affect adjacent habitats. The main watercourses and water features flow from west to east towards Saltfleetby-Theddlethorpe

Dunes & Gibraltar Point SAC. All construction works associated with these watercourses have the potential to propagate sediments and spillages downstream.

6.2.139 **As there is the potential for LSE upon the qualifying habitats of the Saltfleetby-Theddlethorpe Dunes & Gibraltar Point SAC, this pathway will be taken forward to Appropriate Assessment.**

Atmospheric Pollution

Dust and Particulates

6.2.140 The release of dust and synthetic / non-synthetic toxic pollutants during construction can also have effects upon habitats and the species they support.

6.2.141 The boundary of the Theddlethorpe Dunes and Gibraltar Point SAC is located within the DCO Site Boundary at Theddlethorpe. There are qualifying habitats within 50 m of the Proposed Development and there is potential for dust and contaminants to affect the surrounding area in the absence of mitigation.

6.2.142 **As there is the potential for dust and contaminants to affect qualifying habitats of the Theddlethorpe Dunes and Gibraltar Point SAC this pathway is considered in more detail at Appropriate Assessment.**

Transport Emissions

6.2.143 Chapter 14 of the ES assesses the effects of construction traffic emissions on air quality. No part of the Affected Road Network (ARN) to be used by construction traffic lies within 200 m of Saltfleetby-Theddlethorpe Dunes & Gibraltar Point SAC. Moreover, maximum construction traffic movements are a peak of 411 two-way movements, meaning that the Annual Average Daily Traffic (AADT) will not exceed the DMRB screening thresholds of 1000 AADT (AADT for heavy goods vehicles).

6.2.144 Therefore, LSE from atmospheric pollution can be screened out.

Greater Wash SPA with Marine Components

6.2.145 The Greater Wash SPA (with marine components) overlaps with the DCO Site Boundary at Theddlethorpe. The following pathways to LSE are discussed below:

- Direct habitat loss;
- Loss of functionally linked land for birds (permanent or temporary);
- Noise and visual disturbance of birds;
- Changes in water quality (physical or chemical); and,
- Atmospheric pollution.

Direct Habitat Loss within the Designated Site Boundary

6.2.146 Although the DCO site boundary overlaps with the Greater Wash SPA designation, no direct habitat loss will occur as the onshore pipeline will connect to the existing (below ground) LOGGS pipeline west of the sand dunes at Theddlethorpe (*refer to Chapter 3 of the ES for further details*).

6.2.147 As there will be no direct loss of habitat within the Greater Wash SPA there will be no LSE and this pathway can be screened out.

Loss of Functionally Linked Land – Breeding and Non-Breeding Birds

6.2.148 The Greater Wash SPA is designated for breeding sandwich tern, common tern and little tern but is primarily designated to protect their open water foraging habitat rather than their inland nesting locations. There was no evidence of these species breeding in the vicinity of

the proposed development. There will be no LSE upon tern species and this pathway can be screened out.

6.2.149 Red throated diver, little gull and common scoter are pelagic species and although they may pass over the Proposed Development on occasion, habitats within and adjacent are not suitable. There will be no LSE upon these species and this pathway can be screened out.

6.2.150 There will be no temporary or permanent loss of functionally linked land for the qualifying bird species of the Greater Wash SPA and this pathway to LSE can be screened out.

Noise and Visual Disturbance - Birds

6.2.151 There was no evidence of breeding sandwich tern, common tern and little tern within areas which could be subject to noise or visual disturbance from the Proposed Development. Red throated diver, little gull and common scoter are pelagic species and although they may pass over the Proposed Development on occasion, habitats within and adjacent are not suitable and they are unlikely to be affected by noise or visual disturbance during the construction Phase of the Proposed Development. There will be no LSE upon these species and this pathway can be screened out.

6.2.152 There will be no LSE from noise or visual disturbance of qualifying bird species of the Greater Wash SPA and this pathway to LSE can be screened out.

Changes in Water Quality (Physical or Chemical)

6.2.153 The construction of the Proposed Development has the potential to cause a reduction in water quality through sediment disturbances if washed down into watercourses. The main watercourses and water features flow from west to east into the sea. All construction works associated with these watercourses have the potential to propagate sediments and spillages downstream.

6.2.154 The embedded mitigation states that the topsoil and subsoil will be moved to the edge of the working area and will not be stored directly adjacent to any watercourses to reduce the risk of silt laden run-off (minimum 20 m from the top of the bank surrounding a watercourse) and will be managed to maintain the nature of the soils, with measures taken to prevent soil loss due to erosion. Furthermore, drainage schemes will be constructed where they are required. Fuels, and chemicals will be stored in a bunded area with a capacity of 110% of the maximum stored volume, with spill kits located nearby. A Construction and Environmental Management Plan (CEMP) will detail the measures required to prevent adverse effects on water quality and further reduce the likelihood of a pollution event occurring.

6.2.155 The Greater Wash SPA covers an area of 353,578 ha. If a pollution event were to occur the magnitude of impact would be negligible due to the distance that the contaminants and pollutants would have to travel and the dilution potential of the North Sea.

6.2.156 Changes in water quality have been considered during screening as the Environmental Damage (Prevention and Remediation) (England) Regulations 2015 and the Environmental Permitting (England and Wales) Regulations 2016 make it an offence to pollute watercourses, irrespective of whether they are designated as European designated sites or connect to designated sites.

6.2.157 There will be no LSE upon the Greater Wash SPA from changes in water quality and this pathway of effect can be screened out.

Atmospheric Pollution

6.2.158 No part of the ARN for the Proposed Development lies within 200m of Greater Wash SPA. Moreover, the SPA is designated for open water foraging and resting habitat for terns and non-breeding seabirds. This habitat is not susceptible to atmospheric nitrogen deposition and has no critical load on the UK Air Pollution Information System.

6.2.159 LSE from atmospheric pollution can be screened out.

6.3 Operational Phase

6.3.1 Most direct and indirect impacts on qualifying habitats and species of European sites are restricted to the construction period and will not be relevant to the operation phase of the Proposed Development. The only pathways of effect considered for the operational phase are:

- Noise, changes in lighting and visual disturbance of birds within functionally linked land; and
- Changes in water quality.

Noise, changes in lighting and Visual Disturbance – Breeding and Non-breeding Birds using Functionally Linked Land

6.3.2 As described for the construction phase of the Proposed Development, there is the potential for noise and visual disturbance to affect breeding and non-breeding birds using functionally linked land at Immingham and Theddlethorpe.

Immingham Facility

6.3.3 The Immingham Facility is located within an industrial area, and it is envisaged that the plant, machinery, vehicles and structures used during operation will not result in any significant change in the conditions within the locality. The area is already subject to noise and lighting from the existing Philips 66 and VPI developments and Rosper Road / Humber Road.

6.3.4 Equipment on the Immingham Facility is expected to require planned maintenance every two years (or less frequently as required). Systems will typically be designed with a duty/standby configuration that will allow the process to remain online whilst allowing the required maintenance to be undertaken safely.

6.3.5 There will be no LSEs upon the qualifying bird species of the Humber Estuary SPA and Ramsar or the Greater Wash SPA from noise or visual disturbance at Immingham. This pathway is therefore screened out.

Pipeline Route and Block Valves

6.3.6 Once operational, the pipeline and associated facilities are designed for minimal maintenance. Pipeline inspections would be carried out at regular intervals using aerial surveillance and annual walkover of the route. There will be no lighting installed along the pipeline route. Block valve stations will be unmanned, and routine visits will be made only during the hours of daylight. Lighting will be installed but will only be activated if required for an unexpected maintenance visit, during low light conditions or in the event of an emergency. Lighting will therefore only be used for short temporary time periods. Lighting will be directed only into the facility area and will incorporate measures such as louvres and/or barn-doors to minimise light-spill on the occasions that the lighting is required.

6.3.7 Due to the limited maintenance and lighting required, there will be no LSE from noise or visual disturbance of the qualifying bird species of the Humber Estuary SPA and Ramsar or the Greater Wash SPA.

Theddlethorpe Facility

6.3.8 Equipment at the Theddlethorpe Facility is expected to require planned maintenance every two years (or less frequently as required). Systems will typically be designed with a duty/standby configuration that will allow the process to remain online whilst allowing the required maintenance to be undertaken safely. During operation, it is expected that the site

will be visited 2-3 times per week in the initial operating period of approximately six months, and once per week thereafter.

6.3.9 Operational lighting will be zoned to provide light only where required and will follow BS EN 12464 (Part 2) and guidance notes from the Institution of Lighting Professionals GN01.

6.3.10 It is proposed to mount all operational lighting required for the facility onto proposed building/kiosks/pipe racks to limit the visual impacts around the boundaries of the facility, as far as is practical whilst meeting safety and security requirements.

6.3.11 Lighting will be directed only into the facility area and will incorporate measures such as louvres and/or barn-doors to minimise light-spill on the occasions that the lighting is required. Security lighting will provide illumination of security fence areas and be activated upon unauthorised access to the pipeline facilities. A security lighting override switch will be provided for Operator control at any time.

6.3.12 The Theddlethorpe Facility will be unmanned, and routine visits will be made only during the hours of daylight. Lighting will be installed as described above but will only be activated if required for an unexpected maintenance visit, during low light conditions or in the event of an emergency. Lighting will therefore only be used for short temporary time periods.

6.3.13 As such, there will be no LSEs upon the qualifying bird species of the Humber Estuary SPA and Ramsar or the Greater Wash SPA from noise or visual disturbance at Theddlethorpe.

Dune Isolation Valve

6.3.14 The maintenance of the Dune Isolation Valve located east of the former TGT site boundary would also be minimal and mainly depend on the choice of motive power for the valve. A bottled gas supply would potentially need to be inspected on a monthly basis, but this would be visual inspection only. Routine maintenance would be undertaken outside of the nesting bird season. There would be a need to change out the gas cylinder periodically. A hydraulic power source may need periodic draining and re-filling of the hydraulic fluids. An electrical operation would only need infrequent electrical checks. All of these options would only require a maximum of two workers and the use of hand tools or small powered hand tools. Access would be via the existing road.

6.3.15 The dune valve location is adjacent to an existing track and is publicly accessible. There is a caravan site to the south of the Dune Valve, therefore the location is already subject to some anthropogenic disturbance. It is considered unlikely that the minor maintenance works necessary to maintain the dune valve would create a disturbance event greater than existing baseline levels.

6.3.16 As such, there will be no LSEs upon the qualifying bird species of the Humber Estuary SPA and Ramsar or the Greater Wash SPA from noise or visual disturbance at Theddlethorpe.

Venting Systems

6.3.17 Venting systems are described in Section 3.9 of ES Chapter 3: Description of the Proposed Development. Maintenance venting will be undertaken approximately every two years at the Immingham and Theddlethorpe Facilities. The venting of CO_2 will be undertaken at a rate whereby the noise at the nearest Noise Sensitive Receptor will be no greater than 10 dB above daytime background levels, which are 51 dB at Immingham and 38 dB at Theddlethorpe. At Immingham, the closest area of functionally linked land is Rosper Road Pools, which is separated from the Proposed Development by Rosper Road. The nearest noise monitoring location to Roper Road is A2 and noise levels at this location were LAeq 73 dB and LAF max 93 dB (refer to Figure 4). As such, no LSE as a result of noise from maintenance venting is predicted.

6.3.18 Noise under 55 dB is considered to be low level and is unlikely to result in a disturbance response (Cutts *et al*, 2013). At Theddlethorpe, a 10 dB increase in noise will result in noise of 48 dB which is unlikely to result in disturbance. As such, no LSE is predicted.

The static vent stack is not anticipated to cause any visual disturbance to birds, since static structures are features of the landscape that birds will navigate around. Furthermore the proposed vent stacks will be within a landscape that either currently includes similar infrastructure (in the form of the various stacks present within the Phillips 66 oil refinery at Immingham); or included similar infrastructure until recently (at the former Theddlethorpe Gas Terminal, for which the above-ground infrastructure was removed in 2021).

Changes in Water Quality

6.3.19 Operational drainage will be identified and installed to prevent too much standing/excess water, ensure that soil is properly aerated and reduce the risk of soil slippage on slopes and to maintain the previous land drainage performance, as appropriate.

6.3.20 The drainage at both Immingham and Theddlethorpe facilities and Block Valve Stations will be passive and low maintenance. Drainage will be inspected and maintained as necessary to maintain performance.

6.3.21 There will be no LSE upon European Designated Sites from changes in water quality and this pathway can be screened out.

7 Decommissioning Phase

7.1.1 The Proposed Development has a minimum operational life of 25 years, which may be extended further. At the end of the Proposed Development's operations, the pipeline and associated infrastructure would be decommissioned. The decommissioning programme would be developed in line with all applicable legislation and best practice in place at the time and would include engagement with relevant stakeholders and consultees as appropriate, to understand any possible re-use options for the pipeline and associated infrastructure.

7.1.2 The decommissioning strategy would apply to the Immingham Facility, the pipeline between Immingham and Theddlethorpe, the Block Valve Stations, the Theddlethorpe Facility and the Dune Isolation Valve. Removal of the infrastructure at Immingham and Theddlethorpe plus the block valve station removal could take between 6-12 months dependent on sequencing of the works. The base case is that the pipeline will be left in-situ along its entire length. At such locations agreed methodologies between relevant stakeholders will be employed to ensure the pipeline is left in a suitable condition; this may involve cutting out or grout filling sections of pipeline; and any open ends of the pipeline would be capped, and the remaining pipeline marked on all required maps and plans.

7.1.3 Potential impacts on qualifying habitats and species of European designated sites identified for the Construction Phase of the Immingham Facility, Theddlethorpe Facility, Dune Isolation Valve and Block Valve Stations are considered relevant for the decommissioning Phase. As such, the following pathways are taken forward to Appropriate Assessment:

Humber Estuary SPA:

- Noise, vibration and visual disturbance of breeding birds;
- Noise, vibration and visual disturbance of non-breeding birds;
- Atmospheric pollution – dust and particulates

Humber Estuary Ramsar:

- Atmospheric pollution – dust and particulates
- Killing or injury to natterjack toad
- Noise and visual disturbance of waterfowl

Saltfleetby – Theddlethorpe Dunes and Gibraltar Point SAC:

- Direct habitat loss or degradation
- Changes in water quality
- Atmospheric pollution – dust and particulates

7.2 Summary of Likely Significant Effects Test

7.2.1 Table 7-1 summarises the European sites and impact pathways that were screened out or taken forward to the Appropriate Assessment stage.

Table 7-1: Summary of Test of Likely Significant Effects

Designated Site	Qualifying Features	Pathway(s) of Effect	Potential for LSE	Appropriate Assessment Required?
Construction Phase				
Humber Estuary SPA	The site is used regularly by 1% or more of the Great Britain populations of the following species listed in Annex I in any season: • Avocet (breeding and wintering) • Bittern (breeding and wintering) • Hen harrier (wintering) • Golden plover (wintering) • Bar-tailed godwit (wintering) • Ruff (passage) • Marsh harrier (breeding) • Little tern (breeding). The site is used regularly by 1% or more of the biogeographical populations	• Direct habitat loss within the SPA boundary	No – the proposed development connects to the existing LOGGS pipeline at Theddlethorpe which is below ground.	No
		• Permanent loss of functionally linked land for breeding birds (avocet, bittern, marsh harrier, little tern).	Yes – avocet recorded breeding at TGT site. No LSE upon breeding bittern, marsh harrier or little tern and these species can be screened out.	Yes
		• Permanent loss of functionally linked land for non-breeding birds (avocet, bittern, hen harrier, golden plover, bar tailed godwit, ruff, shelduck, knot, dunlin, black-tailed godwit, redshank).	Yes – avocet, mallard, oystercatcher and redshank recorded at TGT site. No LSE upon non-breeding bittern, hen harrier, golden plover, bar tailed godwit, ruff, shelduck, knot, dunlin, black-tailed godwit or redshank and these	Yes

Designated Site	Qualifying Features	Pathway(s) of Effect	Potential for LSE	Appropriate Assessment Required?
	of the following regularly occurring migratory species (other than those listed in Annex I) in any season: • Shelduck (wintering); • Knot (wintering and passage); • Dunlin (wintering and passage); • Black-tailed godwit (wintering and passage) • Redshank (wintering and passage). The site is used regularly by over 20,000 waterbirds in any season.		species can be screened out.	
		• Temporary loss of functionally linked land for breeding birds (avocet, bittern, marsh harrier, little tern). Land along the proposed pipeline route.	No LSE upon avocet, bittern, marsh harrier or little tern and these species can be screened out.	No
		• Temporary loss of functionally linked land for non-breeding birds (avocet, bittern, hen harrier, golden plover, bar tailed godwit, ruff, shelduck, knot, dunlin, black-tailed godwit, redshank). Land along the proposed pipeline route. • Temporary loss of functionally linked land – waterbird assemblage.	Yes – golden plover, curlew, lapwing, pink footed goose. No LSE upon avocet, bittern, hen harrier, bar tailed godwit, ruff, shelduck, knot, dunlin, black-tailed godwit or redshank and these species can be screened out.	Yes

Designated Site	Qualifying Features	Pathway(s) of Effect	Potential for LSE	Appropriate Assessment Required?
		• Noise, visual disturbance, changes is lighting affecting breeding birds (avocet, bittern, marsh harrier, little tern, waterbird assemblage)	Yes – breeding avocet present at Rosper Road Pools and at Theddlethorpe. No LSE upon bittern, marsh harrier or little tern and these species can be screened out.	Yes
		• Noise, visual disturbance, changes in lighting affecting non-breeding birds (avocet, bittern, hen harrier, golden plover, bar tailed godwit, ruff, shelduck, knot, dunlin, black-tailed godwit, redshank, waterbird assemblage).	Yes – curlew, golden plover, lapwing, mallard, oystercatcher, pink-footed goose, redshank, shelduck, teal, black-tailed godwit, bar-tailed godwit, wigeon.	Yes
		• Changes in water quality	No – effects upon the SPA will be negligible due to embedded mitigation and dilution effects.	No
		• Atmospheric pollution – dust and particulates	Yes – habitats used by the qualifying bird species within 50 m of the proposed development.	Yes
		• Atmospheric pollution – vehicle and plant emissions	No – designated sites are within 200 m of the Proposed Development; however, the air quality assessment confirms no significant effects.	No

Designated Site	Qualifying Features	Pathway(s) of Effect	Potential for LSE	Appropriate Assessment Required?
Humber Estuary Ramsar	Wetland of International Importance Ramsar Criterion 1: A near-natural estuary with the following component habitats: dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish/saline lagoons. Ramsar Criterion 3: Supports breeding grey seals at donna nook. The dune slacks at Saltfleetby-Theddlethorpe on the southern extremity of the Ramsar site are the most north-easterly breeding site in Great Britain of the natterjack toad. Ramsar Criterion 5 Assemblages of international importance: 153,934 waterfowl, non-breeding season	• Direct habitat loss within the Ramsar site boundary	No – the proposed development connects to the existing LOGGS pipeline at Theddlethorpe.	No
		• Atmospheric pollution affecting Ramsar habitats – dust and particulates	Yes – dune habitats present within 50 m of the Proposed Development.	Yes
		• Atmospheric pollution affecting Ramsar habitats – vehicle and plant emissions	No –the Ramsar is within 200 m of the Proposed Development; however, the air quality assessment confirms no significant effects upon habitats.	No
		• Changes in water Quality	No – effects upon the Ramsar will be negligible due to embedded mitigation and dilution effects.	No
		• Effects upon breeding grey seal	No – Donna Nook is approximately 13.25 km north of the Proposed Development and there will be no LSE upon breeding seals.	No
		• Killing or injury of natterjack toad	Yes –natterjack reported to be present in adjacent habitats.	Yes

Designated Site	Qualifying Features	Pathway(s) of Effect	Potential for LSE	Appropriate Assessment Required?
	(5-year peak mean 1996/97-2000/2001) Ramsar Criterion 6: Species/populations occurring at levels of international importance: • Common shelduck • Eurasian golden plover • Red knot • Dunlin • Black-tailed godwit • Bar-tailed godwit • Common redshank Ramsar Criterion 8 The Humber Estuary acts as an important migration route for river lamprey. and sea lamprey between coastal waters and their spawning areas.	• Permanent loss of functionally linked land for waterfowl	Yes – avocet, redshank, oystercatcher, mallard recorded at TGT site.	Yes
		• Temporary loss of functionally linked land for waterfowl	Yes – curlew, lapwing, mallard, pink-footed goose, teal.	Yes
		• Noise, changes in lighting and visual disturbance of waterfowl	Yes – curlew, golden plover, lapwing, mallard, oystercatcher, pink-footed goose, redshank, shelduck, teal, black-tailed godwit, wigeon.	Yes
		• Effects upon river lamprey and sea lamprey	Yes – direct mortality or injury as a result of open-cut crossing methodologies. Noise and vibration impacts. Indirect impacts from changes in water quality as a result of surface water runoff or dust. Disturbance from lighting.	Yes
Humber Estuary SAC	The site is designated under article 4(4) of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I (Ref-8):	• Changes in water quality	No – effects upon the SAC will be negligible due to embedded mitigation and dilution effects.	No
		• Changes in air quality	No – SAC is over 50 m from the Proposed development so effects	No

Designated Site	Qualifying Features	Pathway(s) of Effect	Potential for LSE	Appropriate Assessment Required?
	• Atlantic salt meadows (Glauco-Puccinellietalia maritimae); • Coastal lagoons; • Dunes with sea buckthorn (Hippophae rhamnoides); • Embryonic shifting dunes • Estuaries • Mudflats and sandflats not covered by seawater at low tide; • Fixed dunes with herbaceous vegetation (`grey dunes`); • Glasswort Salicornia sp. and other annuals colonising mud and sand; • Sandbanks which are slightly covered by sea water all the time; and, • Shifting dunes along the shoreline with (Ammophila arenaria) (`white dunes'). The site is designated under article 4(4) of the Directive (92/43/EEC) as it hosts the		from dust and particulates can be screened out. SAC is over 200 m from the ARN so effects from vehicle emissions can be screened out.	
		• Effects upon grey seal	No - Donna Nook is approximately 13.25 km north of the Proposed Development and there will be no LSE upon grey seals.	No
		• Effects upon river lamprey or sea lamprey	Yes - direct mortality or injury as a result of open-cut crossing methodologies. Noise and vibration impacts. Indirect impacts from changes in water quality as a result of surface water runoff or dust. Disturbance from lighting.	Yes

Designated Site	Qualifying Features	Pathway(s) of Effect	Potential for LSE	Appropriate Assessment Required?
	following species listed in Annex II: • Grey seal • River lamprey; and, • Sea lamprey.			
Saltfleetby – Theddlethorpe Dunes and Gibraltar Point SAC	The site is designated under article 4(4) of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I: • Dunes with Hippophae rhamnoides. (Dunes with sea-buckthorn); • Embryonic shifting dunes; • Fixed dunes with herbaceous vegetation (grey dunes). (Dune grassland) • Humid dune slacks; and, • Shifting dunes along the shoreline with Ammophila arenaria (white dunes). (Shifting dunes with marram).	• Direct habitat loss or degradation	Yes - In the absence of mitigation, there is the potential for machinery to encroach onto adjacent habitats.	Yes
		• Changes in water quality	Yes – changes in water quality through sediment disturbances if washed down into watercourses or onto adjacent habitats. If a pollution event were to occur, it could affect adjacent habitats.	Yes
		• Atmospheric pollution – dust and particulates	Yes - There are qualifying habitats within 50 m of the Proposed Development and there is potential for dust and contaminants to affect the surrounding area in the absence of mitigation.	Yes
		• Atmospheric pollution – vehicle and plant emissions	No - designated sites are within 200 m of the Proposed Development; however, the air quality	No

Designated Site	Qualifying Features	Pathway(s) of Effect	Potential for LSE	Appropriate Assessment Required?
			assessment confirms no significant effects.	
The Greater Wash SPA (with marine components)	The site qualifies under Article 4.1 of the Directive 2009/147/EC by regularly supporting populations of national importance of the Annex I species: • Red throated diver (non-breeding); • Little gull (non-breeding); • Sandwich tern (breeding); • Common tern (breeding); • Little tern (breeding); and, • Common scoter (non-breeding).	• Direct habitat loss	No - the proposed development connects to the existing LOGGS pipeline at Theddlethorpe	No
		• Loss of functionally linked land for birds (permanent or temporary)	No – habitats within the Proposed development are not suitable for breeding sandwich tern, common tern or little tern. Red throated diver, little gull and common scoter are pelagic species.	No
		• Noise, changes in lighting and and visual disturbance of birds	No – terns do not breed in the vicinity of the Proposed development. Red throated diver, little gull and common scoter are pelagic species.	No
		• Changes in water quality (physical or chemical);	No - effects upon the SPA will be negligible due to embedded mitigation and dilution effects.	No
		• Atmospheric pollution.	No – air quality assessment confirms no LSE.	No
Operational Phase				
	As listed above	• Noise, changes in lighting and visual disturbance of breeding	No - breeding avocet use functionally linked land at	No

Designated Site	Qualifying Features	Pathway(s) of Effect	Potential for LSE	Appropriate Assessment Required?
Humber Estuary SPA		birds (avocet, bittern, marsh harrier, little tern, waterbird assemblage)	Immingham and Theddlethorpe, however noise, lighting and disturbance will not be significant. Maintenance works at the dune valve will be minimal and will not result in disturbance greater than current baseline levels.	
		• Noise and visual disturbance of non-breeding birds (avocet, bittern, hen harrier, golden plover, bar tailed godwit, ruff, shelduck, knot, dunlin, black-tailed godwit, redshank, waterbird assemblage).	No – non-breeding waterbirds are present at Immingham; however, noise, lighting and disturbance will not be significant. Maintenance works at the dune valve will be minimal and will not result in disturbance greater than current baseline levels.	No
		• Changes in water quality	No – embedded mitigation will prevent changes in water quality during operation.	No
Humber Estuary Ramsar	As listed above	• Noise and visual disturbance of waterbirds	No – noise, lighting and visual disturbance will not be significant. Maintenance works at the dune valve will be minimal and will not result in disturbance	No

Designated Site	Qualifying Features	Pathway(s) of Effect	Potential for LSE	Appropriate Assessment Required?
			greater than current baseline levels.	
		• Changes in water quality	No – embedded mitigation will prevent changes in water quality during operation.	No
Humber Estuary SAC	As listed above	• No pathways of effect	Not applicable	No
Saltfleetby – Theddlethorpe Dunes and Gibraltar Point SAC	As listed above	• Changes in water quality	No - embedded mitigation will prevent changes in water quality during operation.	No
The Greater Wash SPA (with marine components)	As listed above	• No pathways of effect	Not applicable	No
Decommissioning Phase				
Humber Estuary SPA	As listed above	• Noise, changes in lighting and visual disturbance of breeding birds (avocet, bittern, marsh harrier, little tern, waterbird assemblage)	Yes – breeding avocet present at Rosper Road Pools and at Theddlethorpe. No LSE upon bittern, marsh harrier or little tern and these species can be screened out.	Yes

Designated Site	Qualifying Features	Pathway(s) of Effect	Potential for LSE	Appropriate Assessment Required?
		• Noise, changes in lighting and visual disturbance breeding non-breeding birds (avocet, bittern, hen harrier, golden plover, bar tailed godwit, ruff, shelduck, knot, dunlin, black-tailed godwit, redshank, waterbird assemblage).	Yes – curlew, black-tailed godwit and bar-tailed godwit and wigeon at Rosper Road pools	Yes
		• Changes in water Quality	No – effects upon the SPA will be negligible due to embedded mitigation and dilution effects.	No
		• Atmospheric pollution – dust and particulates	Yes – habitats used by the qualifying bird species within 50 m of the proposed development.	Yes
		• Atmospheric pollution – vehicle and plant emissions	No – designated sites are within 200 m of the Proposed Development; however, the air quality assessment confirms no significant effects.	No
Humber Estuary Ramsar	As above	• Atmospheric pollution affecting Ramsar habitats – dust and particulates	Yes – dune habitats present within 50 m of the Proposed Development.	Yes

Designated Site	Qualifying Features	Pathway(s) of Effect	Potential for LSE	Appropriate Assessment Required?
		• Atmospheric pollution affecting Ramsar habitats – vehicle and plant emissions	No –the Ramsar is within 200 m of the Proposed Development; however, the air quality assessment confirms no significant effects upon habitats.	No
		• Changes in water Quality	No – effects upon the Ramsar will be negligible due to embedded mitigation and dilution effects.	No
		• Effects upon breeding grey seal	No - Donna Nook is approximately 13.25 km north of the Proposed Development and there will be no LSE upon grey seals.	No
		• Effects upon river lamprey or sea lamprey	No – pipeline to be left in situ.	No
		• Killing or injury of natterjack toad	Yes - natterjack reported to be be present in adjacent habitats.	Yes
		• Noise, changes in lighting and visual disturbance of waterfowl	Yes	Yes
Humber Estuary SAC	As above	• Changes in water quality	No – effects upon the SAC will be negligible due to embedded mitigation and dilution effects.	No

Designated Site	Qualifying Features	Pathway(s) of Effect	Potential for LSE	Appropriate Assessment Required?
		• Changes in air quality	No – SAC is over 50 m from the Proposed development so effects from dust and particulates can be screened out. SAC is over 200 m from the ARN so effects from vehicle emissions can be screened out.	No
		• Effects upon grey seal	No - Donna Nook is approximately 13.25 km north of the Proposed Development	No
		• Effects upon river lamprey or sea lamprey	No – pipeline to be left in situ.	No
Saltfleetby – Theddlethorpe Dunes and Gibraltar Point SAC	As above	• Direct habitat loss or degradation	In the absence of mitigation, there is the potential for machinery to encroach onto adjacent habitats.	Yes
		• Changes in water quality	changes in water quality through sediment disturbances if washed down into watercourses or onto adjacent habitats. If a pollution event were to occur, it could affect adjacent habitats.	Yes
		• Atmospheric pollution – dust and particulates	Yes - There are qualifying habitats within 50 m of the	Yes

Designated Site	Qualifying Features	Pathway(s) of Effect	Potential for LSE	Appropriate Assessment Required?
			Proposed Development and there is potential for dust and contaminants to affect the surrounding area in the absence of mitigation.	
		• Atmospheric pollution – vehicle and plant emissions	No - designated sites are within 200 m of the Proposed Development; however, the air quality assessment confirms no significant effects.	No
The Greater Wash SPA (with marine components)	As above	• Noise, changes in lighting and visual disturbance of birds	No – terns do not breed in the vicinity of the Proposed development. Red throated diver, little gull and common scoter are pelagic species.	No
		• Changes in water quality (physical or chemical)	No - effects upon the SPA will be negligible due to embedded mitigation and dilution effects.	No
		• Atmospheric pollution	No – air quality assessment confirms no LSE.	No

7.3 Appropriate Assessment

Permanent loss of functionally linked land for breeding birds – Construction Phase

7.3.1 Avocet are a qualifying feature of the Humber Estuary SPA. The permanent loss of functionally linked land for qualifying species of the SPA could adversely affect the conservation objective of maintaining or restoring the population of the qualifying feature. A pair of avocets were recorded within TGT site, immediately adjacent to the Draft Order Limits, during an AECOM bird survey on 15th June 2022. This record referred to an off-duty bird observed resting at a small shallow ephemeral rain - fed pool, with an incubating bird present nearby at a nest site on the bare artificial gravel/cobble substrate. These birds were absent during the next survey visit to TGT site on 3rd July 2022 and it is considered likely that the nest failed due to predation at the egg or chick stage; it was noted that the ephemeral pool had completely dried up. One non-breeding adult avocet was observed in August within TGT site. Although this species prefers to site its nest scrape on bare ground, the prevailing bare brownfield habitat within the TGT site area represents suboptimal breeding habitat for this species, as discussed below.

7.3.2 The prevailing topography within TGT site is flat with a permeable artificial gravel/cobble substrate. There are no permanent food rich waterbodies, which are required by avocet chicks after hatching. TGT site is bounded by security mesh fencing. The eastern alignment of the fence is bordered by a ditch (locally a double ditch) which supports a stand of tall riparian vegetation. These features, in-combination, are likely to function as a comprehensive barrier to movement for flightless chicks which, had they hatched at the nest site within TGT site, would have to negotiate the fence and ditches enroute to the suitable natal foraging wetland habitat located at the Lincolnshire Coastal Grazing Marsh Project pools (Viking Field). These artificial and natural barriers make newly hatched chicks vulnerable to predation and starvation if they do attempt to walk between the nest site and Viking Fields.

7.3.3 Avocets tend to nest in loose colonies and single pairs breeding in suboptimal habitat may be more vulnerable to mammalian and avian predation. Therefore, the likelihood that the site could sustain a regularly occurring breeding population is decreased. There is a general absence of low ephemeral and ruderal vegetation at TGT site, which would increase nest vulnerability as nest sites in predominantly bare areas are easier for predators to locate. This is particularly true for avian predators which can potentially use the existing perimeter security fencing as a hunting perch.

7.3.4 It is likely that the nesting attempt by avocet at TGT site in 2022 is an irregular opportunistic occurrence following the recent creation of bare habitat and the demolition of the terminal infrastructure. The birds are likely to be associated with the nearby avocet breeding population which occurs at the Viking Fields pools, located immediately adjacent to the eastern boundary of the TGT site. Considering the late nesting attempt at TGT site in 2022 (mid-June) it is possible that the nesting attempt at TGT site is a second replacement clutch for a pair that had engaged in a failed attempt to breed at Viking Fields pools.

7.3.5 **In summary, for the reasons provided above, the likelihood that TGT site supports a regular breeding population of avocet is negligible. The conservation objective of maintaining or restoring the population of qualifying features would not be undermined during the construction phase and no adverse effects on integrity of the Humber Estuary SPA will occur as a result of permanent habitat loss at the Theddlethorpe Facility.**

Temporary loss of functionally linked land for non-breeding birds – Construction Phase

7.3.6 This section discusses temporary loss of functionally linked land for non-breeding birds which are screened into Appropriate Assessment. These species (curlew, pink-footed goose, golden plover, lapwing) were recorded during the baseline surveys within fields which are within or overlap the parts of the DCO site boundary and which may be subject to temporary habitat loss and could have a potential impact on the conservation objective of 'maintaining and restoring the extent and distribution of the habitats of the qualifying features'. These are detailed below for the Functionally Linked Land (FLL) Northern and Southern Areas respectively (*refer to the ES Volume II Chapter 6; Appendix 6-7 Ornithological Baseline Report [Figures 6.12-30] (Application Document 6.4.6.7)*):

7.3.7 The Proposed Development predominantly runs through an agricultural landscape, bisecting numerous arable fields. Works will take place in phases over approximately 12 months in any one section. *ES Volume IV Appendix 6-7: Ornithology Baseline Report (Application Document 6.4.6.7)* establishes a baseline of bird records along the Proposed Development. This draws on a combination of desk study records and field surveys covering land identified as functionally linked.

7.3.8

7.3.9 Irregularly occurring counts of curlew, which were below 1% of the relevant SPA population, were recorded at Fields 15, 20a and 23a (northern FLL area) and at Fields 18a, 28a, 33, 52b and 65b (southern FLL area). Counts at Fields 27a (45 birds - northern FLL area) and Field 54 (50 birds - southern FLL area) were >1% of qualifying populations. However, there was no evidence that these fields support regularly occurring populations. .

7.3.10 The following fields in the southern FLL area are irregularly used by pink-footed goose populations which are >1% of the Humber Estuary 1% threshold of 253 birds: Fields 86, 92, 94, 95a and 96a. However, there was no evidence that these fields support regularly occurring populations .

7.3.11 An initial construction schedule has been developed and is provided in ES Chapter 3: Description of the Proposed Development. The main construction activities are expected to take around 12 months, with additional time required beforehand for pre-construction and site preparation activities, and afterwards for commissioning works. The main pipe laying works are predominantly planned between April and July. The main pipeline installation activities such as the trench excavation and lower and lay progress at approximately 500m per day. As curlew form part of the non-breeding bird assemblage, the majority of the works will be completed outside of the most sensitive period for this species. The construction process would be programmed as a series of concurrent work packages along the length of the pipeline, where possible, to make sure the construction programme is minimised. The key areas of value for SPA birds are identified to be in particular parts of the scheme separated by a large distance, and pipeline route sections will be installed sequentially rather than simultaneously. Therefore, it is considered that there is limited potential for cumulative impacts from multiple parts of the Proposed Development being worked on simultaneously.

7.3.12 The majority of habitats within the Proposed Development site are used for agriculture and as such, are not undisturbed. The nature of farmland in the wider foraging / roosting zone around an SPA / Ramsar is that pockets of habitat will be moving in and out of suitability constantly due farm management, such as crop rotation and farming activities (e.g., ploughing and harvesting). Individual fields in a landscape also go temporarily out of suitability (e.g. being put fallow, or having their crop changed) as part of routine farming use of the landscape. The temporary loss of functionally linked habitat will not have an adverse effect on site integrity as a sufficiently large amount of foraging habitat is available in the

wider landscape sufficient to sustain the SPA/Ramsar populations. Even if a small amount of foraging habitat is temporarily lost, this will not affect the long-term cumulative resource availability to SPA / Ramsar birds, especially when the habitats involved are widespread and easily recreated, and the original land use of impacted fields will be reinstated immediately following completion of the works.

7.3.13 As noted above, fields 15, 20a, 23a, 27a within the northern FLL area were used by curlew. These fields are all within Section 1 of the Proposed Development. The main pipeline activities will progress at approximately 500 m per day; therefore field 15 will be crossed in a day, and Fields 20, 23a and 27a in under a week. Within the southern FLL area, curlew in numbers <1% were recorded in fields 18a, 28a, 33, 52b and 65b, and in numbers >1% in field 54. This whole section of route is approximately 3,000 metres in length, and it is therefore likely that the main pipeline construction works would pass through in approximately 6 days. In addition, there will be other short periods of construction activity, lasting a few days in any one location, within the total construction period from erecting fencing, marking out the working area, and topsoil stripping, to topsoil reinstatement and removal of fencing.

7.3.14 Fields 86, 92, 94, 95a and 96a were used by pink-footed goose in numbers above 1% of the Humber Estuary qualifying population. Again, it is likely that these sections will be passed through in around a week, though noting there would be other periods of activity before and after the pipeline laying. The level of disturbance could be considered similar in magnitude to agricultural activity such as ploughing a field or harvesting crops and is not considered likely to have an adverse effect on site integrity.

7.3.15 Within the northern FLL area, golden plover was recorded in Field 25 with a peak count of 1 bird which is less than the 1% threshold. Within the southern FLL area, golden plover was not recorded in any fields which overlap with the Order Limits.

7.3.16 Lapwing was not recorded within fields that overlap the Order Limits within the northern FLL area. Within the southern FLL area, lapwing was recorded in Field 151 (count of 50 birds in January 2022), 120a (count of 200 birds in January 2022) and 17a (24 birds in December 2021), which overlap with the Order Limits. The works will not be undertaken in this area during these months. Furthermore, these fields are separated from one another, and it is likely that the main construction activity will be completed in these areas in different weeks, and as such the areas will not be impacted simultaneously.

7.3.17 Within the northern FLL area, mallard was recorded in Field 15 with a peak count of 3 which is below the 1% threshold. Within the southern FLL area, mallard was recorded in fields 142a (peak count of 2), 120a (peak count of 2), 119 (peak count of 2), 74 (peak count of 2) and 33 (peak count of 15). Again, these fields are spaced out along Sections 4 and 5 of the route and will not be impacted simultaneously by the main pipeline construction works.

7.3.18 **Overall, it is concluded that the conservation objective of maintaining or restoring the extent and distribution of the habitats of the qualifying features will not be undermined during the construction phase. The temporary loss of habitats with irregular use by qualifying curlew and pink-footed goose within and directly adjoining the working corridor will not result in adverse effects on the integrity of the Humber Estuary SPA and Ramsar from the temporary loss of functionally linked land.**

Noise and visual disturbance of breeding birds within Functionally Linked Land – Construction, Operation, and Decommissioning Phases

7.3.19 Based on the observed responses of waterbirds to noise stimuli, a noise threshold (i.e., maximum noise level at the bird) of ‘below 70 decibels (dB)’ is sometimes used to assess the potential for noise disturbance upon bird species. On other projects, including some around the Humber Estuary, such as Humber Zero, the change in the noise levels experienced by birds, rather than an absolute noise threshold, is used as an alternative

means of impact assessment. There are no formal guidelines for a change threshold (compared to the measured baseline) that is disturbing to waterfowl and waders, and seabirds but they are known to have hearing comparable to humans. For humans a change of 3 dB defines the threshold for a change in noise to be perceptible. However, there is a significant difference between a change being perceptible and it being disturbing thus causing displacement or otherwise disrupting activity.

7.3.20 As such, it is considered in this assessment that a 3dB change would be excessively cautious to use as a significance threshold for disturbance. Due to the logarithmic nature of the decibel scale a change of 10dB equates to a doubling of the perceived loudness of a sound and is reasonably likely to be disturbing, although this does depend on the nature of the noise; a change of 5 dB or less is unlikely to elicit a reaction. For the purposes of this assessment a change of 5dB is considered sufficiently precautionary to denote a change which is not just perceptible as a difference but may be disturbing to the extent that it may represent an adverse effect on integrity.

7.3.21 The areas of greatest sensitivity for breeding birds associated with Humber Estuary SPA/Ramsar are Rosper Road Pools at Immingham (FLL North) and the area near the Dune Valve at the TGT Site at Theddlethorpe (FLL South). At both of these locations a population of breeding avocet have been recorded. At the Immingham end of the scheme (Northern FLL area), and particularly for Rosper Road Pools where breeding avocet have been recorded and which is the closest sensitive area to works at the northern end of the scheme, the baseline average (LAeq) noise level is approximately 53 dB (Appendix E Figure 2, sound monitoring location A4). Breeding avocet are a qualifying feature of the Humber Estuary SPA. Works that disturb nesting avocet could impact the conservation objectives of maintaining and restoring the structure and function of the habitats of the qualifying features and maintaining and restoring the population of the qualifying features. Construction works will have a maximum unmitigated average noise level of 55-60 dB at Rosper Road Pools, which is up to 7 dB above the baseline. This may be disturbing, but with close-board noise fencing or other appropriate acoustic barriers this would reduce average noise levels at Rosper Road Pools due to the works to 45-50 dB, which is below the baseline. Maximum (LAmax) noise levels due to the works will be well below the baseline maximum noise levels at Rosper Road Pools (Appendix E Figures 3 and 4, sound monitoring location E4) of 70dB.

7.3.22 At the TGT Site (Theddlethorpe; FLL South) a mole plough would be used to make the connection through the area used by nesting avocet, to the Dune Valve. This will create a small slit in the turf in which the cable duct will be immediately installed, and the turf closed behind by a small mini digger. No wetland features in this area will be directly affected. Installation is expected to be undertaken in one pass in a single day. Works at the Dune Valve could also provide disturbance to nesting avocet. Therefore, all works at Viking Fields, including replacement of the Dune Valve, will need to be undertaken during August/September when avocets are no longer likely to be breeding and non-breeding numbers are still low**.**

7.3.23 Routine maintenance visits to the Dune Isolation Valve will be undertaken outside of the bird breeding season (that is, 1st March 31st August inclusive).

7.3.24 It is considered unlikely that works at the southern compound would result in noise and visual disturbance of birds within Viking Fields as existing woodland to the east of the proposed Southern Compound location provides screening. Therefore, effects from noise, lighting and visual disturbance at this location will not be significant.

7.3.25 Theddlethorpe Facility Option 2 is approximately 700m west of Viking Fields and is screened by a shelter belt of dense mixed woodland. Therefore, effects from noise, lighting and visual disturbance at this location will not be significant.

7.3.26 **As the construction phase will be avoiding the breeding season it can be concluded that the conservation objective of maintaining or restoring the structure and function**

of the habitats of qualifying features and maintaining or restoring the population of the qualifying features is not undermined and will not result in adverse effects on the integrity of the Humber Estuary SPA from noise and visual disturbance of breeding birds within functionally linked land.

Noise and Visual Disturbance of non-breeding birds within Functionally Linked Land – Construction and Decommissioning Phases

7.3.27 The remainder of the Proposed Development has limited value to non-breeding birds and generally supports bird populations below 1% of the Humber Estuary SPA or Ramsar population. The only areas supporting significant numbers of non-breeding SPA birds were survey fields 27a and 54 (Appendix E Figure 2; FLL North), which supported more than 1% of the Humber Estuary SPA / Ramsar population of non-breeding curlew, and survey fields 86, 92, 94, 95a and 96a which supported more than 1% of the Humber Estuary SPA / Ramsar population of pink-footed goose) at the Theddlethorpe end of the Proposed Development (FLL South). Curlew and pink footed goose are qualifying features of the internationally important assemblage of over wintering birds which is a reason for designation for the Humber Estuary SPA and Ramsar. Works that disturb non-breeding qualifying features could impact the conservation objectives of maintaining and restoring the structure and function of the habitats of the qualifying features and maintaining and restoring the population of the qualifying features.

7.3.28 Rosper Road Pools and the TGT site have already been discussed regarding breeding birds, and noise mitigation identified. For the remainder of the Proposed Development, including the 55km pipeline route and most of the Northern and Southern FLL area, noise levels (both baseline and project-related) vary but in general, baseline typical (LAeq) noise levels are in the region of 48 dB on average (LAeq averaged across noise monitoring locations E4 to E20). Project average construction noise levels (LAeq) therefore exceed 5dB above the average baseline LAeq up to c. 500m from the works footprint as a worst-case (Appendix E Figure 5, showing the Theddlethorpe section of the route – Southern FLL - where the average construction noise levels are highest compared to the baseline). Mitigation (close-board noise fencing or other appropriate acoustic barriers) would reduce noise levels to below the baseline LAeq.

7.3.29 ‘Core’ mitigation will be required to address potential noise and visual disturbance in areas where more than 1% of the Humber Estuary SPA / Ramsar population of curlew (wintering i.e. October to March, as per the SPA data sheet) or pink footed goose have been recorded.

7.3.30 Noise fencing will be included for works within 500m of the relevant survey fields, to minimise the area of noise exposure. The relevant fields based upon pre-application surveys are survey fields 27a in FLL North and 54 in FLL South, which supported more than 1% of the Humber Estuary SPA / Ramsar population of non-breeding curlew, and survey fields 86, 92, 94, 95a, and 96a, which supported more than 1% of the Humber Estuary SPA / Ramsar population of pink-footed goose in FLL South.

7.3.31 In these locations the fencing will be 2.4m high close-board acoustic fencing or an equally effective alternative, which could either include 2.4m Heras fencing with an overlapped acoustic blanket/mattress attached, or else the use of the topsoil bund itself, which would be a minimum of 2.4m high on the most appropriate edge of the working width (typically that which faces the relevant field). The indicative fence location based upon the surveys to inform the application are provided as Appendix I~~Figure 11~~.

7.3.32 If the topsoil bund is to be used, consideration will be given to the need for temporary acoustic fencing to be erected to screen activities to be undertaken before and after topsoil removal. This will be decided by the EcOW, based upon ~~the timing of the works, and~~ pre-construction checks.~~the results of surveys undertaken in the relevant season prior to works~~

~~commencing, and inspections undertaken immediately prior to the commencement of works~~.

7.3.33 Acoustic enclosures and/ or fencing will be erected around all trenchless launch and reception areas where these are within FLL areas.

7.3.34 In addition to this core mitigation, additional mitigation has been identified to accommodate for any changes in field use between the surveys undertaken to inform the application, and the results ~~of surveys~~ of site checks undertaken immediately prior to construction. The ECoW will undertake ~~surveys~~ site checks in advance of works commencing to ascertain any changes to field usage in the construction year and any resulting need for mitigation to be deployed in addition to the core mitigation proposed above. Again, the range of mitigation will include close-board fencing, temporary Heras fencing with an acoustic mattress or making use of the location of the topsoil bund.

7.3.35 Where multiple species are present simultaneously in numbers that are individually lower than their respective 1% thresholds, their collective numbers will be totalled and any combined exceedance of 1% of the total waterbird assemblage population for the Humber Estuary SPA across a 500m working section of the pipeline route will trigger the installation of acoustic/visual screens along that section. 1% of the waterbird assemblage feature is 1,539 birds.

Table 7-2: Examples of Screening Thresholds to be used by ECoW

Species	SPA population	1% Threshold for use of screening
Curlew	3,253	33
Redshank	4,632	46
Golden plover	30,709	307
Lapwing	22,765	228
Pink-footed goose	23,330	233

7.3.36 Maximum sound levels (LAmax) are associated with the various sections of HDD and are shown in Appendix E Figures 6-10. These show that for noise monitoring locations E3 (Immingham/Northern FLL) and E5 (Northern FLL; Appendix E Figures 6-8), baseline LAmax levels are not forecast to be exceeded except in the immediate vicinity of the HDD. At noise monitoring location E2 (Immingham/Northern FLL; Appendix E Figures 6-7) LAmax levels are forecast to be exceeded by up to 5dB up to 200m from the HDD, in the absence of mitigation. With mitigation (close-board noise fencing or other appropriate acoustic barriers) LAmax levels would not be exceeded except in the immediate vicinity of the HDD. At noise monitoring locations E13 and E16 (Southern FLL; Appendix E Figures 9 and 10) construction LAmax would be more than 5 dB above baseline LAmax up to approximately 250-300m from the HDD. However, with mitigation (close-board noise fencing or other appropriate acoustic barriers) LAmax would be below the baseline except within the immediate vicinity of the HDD.

7.3.37 As already discussed regarding habitat loss, an initial construction schedule has been developed and is provided in ES Chapter 3: Description of the Proposed Development. The main pipe laying works are predominantly planned during late spring, summer and early autumn months. As the main pipeline activities will cover approximately 500 m per day, disturbance in any one area will be temporary. There will also be other periods of 'noisy' construction activity, for example topsoil stripping, but again these will be limited in duration (approximately 20 days, which includes the main pipeline construction activities) in any single location. As curlew and pink footed goose form part of the non-breeding bird

assemblage, the majority of the works will be completed outside of the most sensitive period for these species. The construction process would be programmed as a series of concurrent work packages along the length of the pipeline, where possible, to make sure the construction programme is minimised. The key areas of value for SPA birds are identified to be in particular parts of the scheme separated by a large distance, and pipeline route sections will be installed sequentially rather than simultaneously. Therefore, it is considered that there is limited potential for cumulative impacts from multiple parts of the Proposed Development being worked on simultaneously.

7.3.38 In addition to the phasing of the development, functionally linked land moves into and out of suitability within an agricultural landscape on a regular basis. Therefore, in the long-term, individual fields are less important than the long-term preservation of a sufficiently large amount of foraging habitat in the wider landscape around designated sites to sustain the SPA/Ramsar populations. Regular farming activities (such as ploughing, spraying, fertilising and harvesting) will present a similar disturbing presence to construction crews installing pipelines. While birds may displace from the immediate vicinity of the works while they are occurring, they will move to the opposite side of fields, or utilise other fields, returning when the works have ceased. Moreover, earth disturbance to install pipelines can attract foraging birds by bringing earthworms, seeds and other food items to the surface. Even if birds are temporarily displaced from a linear corridor of habitat within a given field, this will not affect the long-term cumulative resource availability to SPA / Ramsar birds, especially when the habitats involved are widespread and easily recreated, and the original land use of impacted fields will be reinstated immediately following completion of the works.

7.3.39 Therefore, in general, noise mitigation is not considered necessary away from Rosper Road Pools and the TGT Site. However, in the areas where non-breeding birds congregate at the northern (curlew) and (for pink footed geese) southern end of the scheme, noise fencing will be included for works within 500m of the relevant survey fields, to minimise the area of noise exposure. Indicative locations for noise fencing are shown on Figure 1.1 in Appendix E.

7.3.40 **As close-board noise fencing or other appropriate acoustic barriers will ensure the LAmax is not exceeded (E2) or will be below baseline (E13 and E16) (except in the immediate vicinity of the HDD) it can be concluded that the conservation objective of maintaining or restoring the structure and function of the habitats of qualifying features and maintaining or restoring the population of the qualifying features is not undermined and will not result in adverse effects on the integrity of the Humber Estuary SPA and Ramsar from noise and visual disturbance of non-breeding birds within functionally linked land.**

Atmospheric Pollution – Dust and Particulates – Construction and Decommissioning Phases

7.3.41 The HRA screening process identified that dust and particulates have the potential to affect the qualifying features of the following designated sites:

- Humber Estuary SPA and Ramsar; and,
- Saltfleetby – Theddlethorpe Dunes and Gibraltar Point SAC.

7.3.42 ES Chapter 14 and the Draft CEMP (*ES Volume IV Appendix 3.1 Draft CEMP (Application Document 6.4.3.1))* set out the additional mitigation measures proposed to control dust and particulates. These mitigation measures are based on recommendations by IAQM and are summarised below. Each entry in the Mitigation Register has an alpha-numerical reference e.g., "B1" to provide a cross reference to the secured commitment.

7.3.43 The following measures will be adopted during the construction phase:

- A3: Develop and implement a stakeholder communications plan that includes community engagement before work commences on site;

- A6: A separate project specific Safety Health and Environment (SHE) Plan would be produced in accordance with relevant legislation;
- H2: Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials;
- H3: Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing);
- J1: Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible;
- J2: Develop a Dust Management Plan (DMP), which includes measures to control other emissions. This will form part of the Final CEMP;
- J3: Display the name and contact details of person(s) accountable for air quality and dust issues on the construction compound fence. This may be the environment manager/engineer or the site manager;
- J4: Display the head or regional office contact information of the main contractor on site;
- J5: Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken;
- J6: Make the complaints log available to the local authorities when asked;
- J7: Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the log book;
- J8: Undertake daily on-site and off-site inspection (including roads), where receptors are nearby, to monitor dust, record inspection results, and make the log available to the Local Authority when asked;
- J9: Carry out regular site inspections to monitor compliance with the DMP commitments, record inspection results, and make an inspection log available to the Local Authorities when asked;
- J10: Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions;
- J11: Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site, cover;
- J12: Ensure all vehicles switch off engines when stationary - no idling vehicles;
- J13: Sustainable power sources (solar panels etc) to be used where practicable. Where available, generators are to be low emission with hybrid battery systems (or to current best practice);
- J14: Impose and signpost a maximum-speed-limit on surfaced roads and in work areas;
- J15: Use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g., suitable local exhaust ventilation systems;
- J16: Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate;
- J17: Use enclosed chutes and conveyors (if used) and covered skips;

- J18: Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods;
- J19: No bonfires and burning of waste materials;
- J20: Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use;
- J21: Avoid dry sweeping of large areas;
- J22: Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport;
- J23: Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable;
- J24: Record all inspections of haul routes and any subsequent action in a site logbook;
- J25: Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable);
- J26: Agree dust deposition, dust flux, or real-time PM10 continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences;
- J27: Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site;
- J28: Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period;
- J29: Avoid site runoff of water or mud;
- J30: Keep site fencing, barriers and scaffolding clean using wet methods;
- J31: Cover, seed or fence stockpiles to prevent wind whipping;
- J32: Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable;
- J33: Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate;
- J34: Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable;
- J35: Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable;
- J36: Only remove the cover in small areas during work and not all at once;
- J37: Avoid scabbling (roughening of concrete surfaces) if possible;
- J38: Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place;

- J39: Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery;
- J40: For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust;
- J41: Haul routes, damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned;
- J42: Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits; and
- J43: Access gates to be located at least 10 m from receptors where possible.

7.3.44 A schedule of aforementioned environmental commitments is presented within *ES Volume IV Appendix 3.1 Draft CEMP (Application Document 6.4.3.1).*

7.3.45 **With the above dust mitigation implemented on site throughout the works (which are considered standard practice on all well managed construction sites of this scale), it is considered that there will be no adverse effect upon the integrity of the Humber Estuary SPA and Ramsar or Saltfleetby – Theddlethorpe Dunes and Gibraltar Point SAC.**

Effects upon River Lamprey and Sea Lamprey – Construction Phase

7.3.46 The HRA screening process identified the potential for LSE upon lamprey species during the construction phase of the Proposed Development. River and sea lamprey are qualifying species of the Humber Estuary SAC and Ramsar. LSEs upon lamprey could result from direct mortality or injury as a result of open-cut crossing methodologies, noise and vibration impacts, indirect impacts from dust and particulates, changes in water quality and / or disturbance from lighting. This could affect the conservation objectives of maintaining the extent and distribution of qualifying natural habitats and habitats of qualifying species or maintaining or restoring the populations of qualifying species.

7.3.47 To prevent harm to lamprey, all WFD main rivers will be crossed by non-intrusive methods. Where minor watercourses and ditches are crossed, they will be reinstated, and culverts will include a natural bed to maintain longitudinal connectivity.

7.3.48 The CEMP (*ES Volume IV Appendix 3.1 (Application Document 6.4.3.1)*) sets out the additional mitigation measures identified to avoid adverse effects upon biodiversity. The following measures identified within the Draft CEMP will prevent effects on lamprey. Each entry in the Mitigation Register has an alpha-numerical reference e.g., “B1” to provide a cross reference to the secured commitment.

- B6: Develop a method statement to ensure works within watercourse crossings include suitable measures to allow the passage of otters, water vole and fish throughout construction (i.e., during fluctuating water levels);
- G5: Prepare a Pollution Prevention Plan with measures necessary for the effective prevention of pollution;
- G6: Produce an Environmental Emergency Response Plan documenting measures to prevent pollutants infiltrating into the soils beneath the site and reaching surface and groundwater receptors;
- G7: Temporary access and pipeline crossings of watercourses will be undertaken in accordance with good practice guidance: Environment Agency and Construction Industry Research and Information Association (CIRIA) Pollution Prevention Guidelines (although evoked represent good practice), including CIRIA Report C750

'Groundwater Control: Design and Practice' and C648 'Control of Water Pollution from Linear Construction Projects';

- G8: Crossing locations will be selected to make the crossing as close to perpendicular to the watercourse as reasonably practicable, ensuring the crossing is as short as possible and for open cut / temporary access crossings reducing the risk of localised scour at the structures;
- G9: The watercourse crossings will be designed to maintain downstream flows and to allow continued and unobstructed passage for aquatic organisms and mammals using river corridors;
- G12: At the temporary construction compounds, materials will be stored in accordance with good practice and the compounds will have suitable surface water and foul water drainage provision. This will prevent pollution of the water environment;
- G13: Appropriate equipment (e.g., spill kits) will be made available for all items of plant on site to deal with accidental spillages and Pollution Prevention Plan will provide a full list of protocols and communication channels with the Environment Agency in the event of an accidental pollution incident;
- G14: Surface water runoff from the pipeline spread will be managed to prevent discharge of silted water into any surface watercourse or drain. Details to be included in the Drainage Strategy;
- G15: Where practicable, plant to be filled with biodegradable oil, in line with the plant manufacturer's instruction, to reduce the potential for pollution to watercourses in the event of a hydraulic oil pipe failure;
- G16: Watercourses near work sites would be inspected daily when work activity is being carried out. Inspections will need to consider locations upstream (control) and downstream of the working area so comparisons can be made. The Contractor should familiarise themselves with any other potential sources of contamination in advance of the works starting. During inspections any signs of pollution should be considered using visual and olfactory observations and in-situ water quality testing using hand-held water quality meters (that may include temperature, dissolved oxygen, pH, turbidity and electrical conductivity). Evidence of water pollution may include, but not limited to, siltation, deposits of aggregates and other materials or litter, turbidity, oil sheens, odours, dis-colourisation, surface foam and scum. Monitoring should continue daily for the duration of the works affecting each watercourse. Work site drainage and any interception, containment or treatment measures would also be regularly inspected and maintained as required during the works, so that it continues to operate to their design standard;
- G17: If a wheel washing system is required, the wash down of construction vehicles and equipment will take place in designated washdown areas within construction compounds. Waste wash water will be prevented from passing untreated into watercourses or groundwater. Appropriate measures will include use of sediment traps;
- G18: Consider battery powered plant when working close to watercourses;
- G20: Topsoil and subsoil will not be stored directly adjacent to the watercourse but will be stored a minimum of 20m from the watercourse, with additional mitigation such as silt fences installed if there is a risk of sediment entering the watercourse. No topsoil or subsoil will be stored within a fluvial or surface water flood zone (flood zone 2 and 3) unless supported by a risk assessment (i.e., consideration of weather forecast and duration of storage) and additional mitigation (i.e., drainage bypass channel for overland flow). Where site constraints mean that it is not possible to maintain a 20m

buffer from a water body, additional mitigation measures will be implemented to provide an adequate barrier between the potential source of contaminated runoff and the receptor. Smaller stockpiles could be created, reducing the pile height.

- G21: A 'frac-out' (the unintentional return of drilling fluids to the surface) is a potential risk when HDD techniques is used in sensitive habitats and water environments. Frac-out during a trenchless operation can happen due to various reasons. To minimise the potential risk and potential impacts of a frac-out, risk assessments and contingency plans should be prepared.
- G24: Where temporary crossings and open-cut crossings of drains connect to chalk streams, additional sediment management should be used such as straw bales being placed downstream of the crossing prior to flume removal. These will trap suspended sediment while allowing water to pass through the bales;
- G25: To mitigate the impacts against falling aggregate from haul trucks, the culverts (flumes) crossing water bodies should be wider than the haul road themselves (approximately 1m either side of the culvert);
- G26: Pea shingle/gravel to be used instead of sandbags. It is a larger aggregate that does not erode as quickly as sand. It is also easier to remove from a water feature than sand;
- G27: Where temporary crossings and open-cut crossings of drains connect to chalk streams, additional sediment management will be used such as straw bales being placed downstream of the crossing prior to flume removal. These will trap suspended sediment while allowing water to pass through the bales;
- G28: Water quality monitoring will be undertaken pre, during and post-construction on sensitive water bodies such as WFD water bodies and chalk streams alongside daily inspections. Where effects are identified through monitoring then additional mitigation would be identified; and
- G29: For water features that are being flumed, a phased approach of flume removal would be undertaken to remove the risk of large sediment plumes. There are multiple watercourses which drain into sensitive water features which have the potential to increase the cumulative effects on the water features, particularly through sediment inputs. A phased approach of removal would ensure that water features would not be impacted by multiple sources of sediment from upstream receptors simultaneously.

7.3.49 **With the application of the above mitigation, it can be concluded that the conservation objectives of maintaining restoring the structure and function of the habitats of qualifying features and maintaining or restoring the population of the qualifying features is not undermined and will not result in adverse effects upon the integrity of the river or the Humber Estuary SAC and Ramsar.**

Direct Habitat Loss or Degradation – Construction and Decommissioning Phases

7.3.50 The HRA screening process identified the potential for LSE upon the qualifying habitats of Saltfleetby – Theddlethorpe Dunes and Gibraltar Point SAC (dunes) which could occur due to encroachment of machinery into adjacent habitats during the upgrade of the Dune Valve. This could affect the conservation objectives of maintaining the extent and distribution of qualifying natural habitats or maintaining or restoring the structure and function (including typical species) of the qualifying natural habitats.

7.3.51 The CEMP *(ES Volume IV Appendix 3.1 (Application Document 6.4.3.1))* sets out the additional mitigation measures identified to avoid adverse effects upon habitats during construction:

- **B3:** Establish a Construction Exclusion Zone (CEZ) to define working areas and protect habitats outside of the DCO Site Boundary and retained habitats throughout the Proposed development. The CEZ may need to be extended beyond 10m for certain Important Ecological Features, such as dune habitat, woodlands and mature / veteran trees, for example to protect root protection zones. The location of CEZ's will be defined within the Final CEMP and informed by a pre-construction ecological walkover (to identify any changes to the baseline and a tree survey (to BS 5837:2012);
- **B11:** A minimum buffer of 10m (where practicable) will be retained around retained IEF's to reduce any potential direct or indirect impacts on the species and habitats associated with them.
- **B13**: A suitably qualified ecologist is to be available for the duration of the construction period to resolve any uncertainties regarding ecological issues and to monitor compliance with good practice mitigation measures (as defined in the Final CEMP).

7.3.52 No works, fencing or vehicle access will take place within the SAC; the CEZ will be defined around the works area only.

7.3.53 A decommissioning management plan will outline the measures required to protect adjacent habitats during the decommissioning process. Those measures will be similar to those applied for the construction phase.

7.3.54 **With the implementation of the control measures set out above, it can be concluded that the conservation objectives of maintaining the extent and distribution of qualifying natural habitats or maintaining or restoring the structure and function (including typical species) of the qualifying natural habitats is not undermined and will not result in adverse effects upon the integrity of the Saltfleetby – Theddlethorpe Dunes and Gibraltar Point SAC.**

Changes in Water Quality – Construction and Decommissioning Phases

7.3.55 The HRA screening process identified the potential for LSE upon the qualifying habitats of Saltfleetby – Theddlethorpe Dunes and Gibraltar Point SAC (dunes) which could occur due to contaminated surface water runoff or a pollution event reaching adjacent habitats during construction or decommissioning. This could affect the conservation objectives of maintaining the extent and distribution of qualifying natural habitats or maintaining or restoring the structure and function (including typical species) of the qualifying natural habitats.

7.3.56 The CEMP (*ES Volume IV Appendix 3.1 (Application Document 6.4.3.1*)) sets out the additional mitigation measures identified to avoid adverse effects upon water quality.

7.3.57 A Drainage Strategy will be developed by the Contractor during detailed design, as required by the Development Consent Order *(Application Document 2.1)*. The Drainage Strategy will identify all known risks to the water environment and include appropriate measures to prevent pollution during construction; and to manage runoff rates. The Drainage Strategy will define the installation of pre-construction drainage measures to intercept run-off and ensure that discharge and runoff rates are controlled in quality and volume, in turn causing no degradation to water quality. This may include specific measures to be used in high-risk areas (for example construction along or across steep gradients and water course crossings). A phased approach may be taken to the development of the Drainage Strategy to reflect the phasing of the construction programme. The Drainage Strategy will include a Site Drainage Plan.

7.3.58 In addition, a Water Management Plan will be developed by the Contractor during detailed design. The plan will detail the management principles and procedures throughout the construction period that will be implemented on site to ensure that water features are protected from pollution from construction works. It will set out plans for water quality

monitoring during construction and post-construction, pollution prevention measures, permits and consents and incidents and emergencies measures.

7.3.59 **It is considered that will the implementation of control measures outlined within the CEMP, drainage strategy and water management plans, it can be concluded that the conservation objectives of maintaining the extent and distribution of qualifying natural habitats or maintaining or restoring the structure and function (including typical species) of the qualifying natural habitats is not undermined and will not result in adverse effects upon the integrity of the Saltfleetby – Theddlethorpe Dunes and Gibraltar Point SAC.**

Harm to Natterjack Toad – Construction Phase

7.3.60 The HRA screening process identified the potential for LSE upon natterjack toad during the construction phase of the Proposed Development. Natterjack toad is a qualifying species of the Humber Estuary Ramsar. LSEs upon natterjack could result from direct mortality or injury as a result of works to upgrade the existing Dune Valve or installation of the electrical cable across the Viking Fields. This could affect the conservation objectives of maintaining the extent and distribution of qualifying natural habitats and habitats of qualifying species or maintaining or restoring the populations of qualifying species.

7.3.61 Prior to the installation of the electrical cable or works to the Dune Valve habitat manipulation would be undertaken. This would involve sensitively managing the habitat along the route of the cable installation prior to works (and prior to the Natterjack Toad Breeding Season) to reduce the likelihood of Natterjack Toad using the area, but ensuring they are still able to commute across it. The method of habitat manipulation will be agreed in advance with Natural England and will itself be preceded by a fingertip search.

7.3.62 Immediately prior to installation of the electrical cable or commencement of the works on the Dune Valve the ECoW would undertake a fingertip search for natterjack toad. The habitat manipulation methods should reduce the likelihood of Natterjack Toads being present in the cable installation area, and where the fingertip search indicates no presence of Natterjack Toads, the construction work in this area (including mole ploughing) is unlikely to cause an adverse effect on the Natterjack Toad population associated with the Ramsar Designation and would remove the likelihood of committing an offence under the Habitat Regulations.

~~7.3.61~~7.3.63 ~~Immediately Prior to works commencing at the Dune Valve or electrical connection, an ecologist or ecological clerk of works will undertake a walkover of the area and identify any potential ecological constraints. Any sensitive habitats will be fenced off to prevent accidental encroachment of machinery and a fingertip search will be completed for reptiles or amphibians.~~ In the unlikely event that natterjack toad is found within the works area at any point~~,~~ works will stop, and Natural England will be consulted for further advice and / or a licence sought, based on the most recent season of natterjack toad survey data available.

~~7.3.62~~7.3.64 It is considered that will the implementation of the above control measures, it can be concluded that the conservation objectives of maintaining the extent and distribution of qualifying natural habitats and habitats of qualifying species or maintaining or restoring the populations of qualifying species is not undermined and will not result in adverse effects upon the integrity of the Humber Estuary SAC and Ramsar.

7.4 In Combination Effects

7.4.1 The HRA Process requires potential effects to be considered in combination with other plans and projects. This is to account for the cumulative effects of development plans, particularly where the individual effects of a proposal are screened out due to there being an insufficient magnitude of impact. Ultimately this approach allows the identification of individually small, but cumulatively material effects with the potential to cause LSE.

7.4.2 Table 7-2 in Appendix A provides a summary of the projects that have been considered in the in-combination assessment, detailing plan / project name, and a verdict on the potential for interaction with the Proposed Development and thus whether 'in combination' effects would arise. The following impact pathways have been considered in Table 7-2: noise & visual disturbance, loss of functionally-linked habitat, water quality and air quality.

7.4.3 In the absence of mitigation there is the potential for the following projects to have effects in combination with the Proposed Development:

- Immingham Eastern Ro-Ro Terminal (DCO at Recommendation stage);
- Immingham Green Energy Terminal (DCO going through Examination);
- Associated British Ports – Land adjacent to the Westgate entrance, Port of Immingham (Pending – validated 18th August 2022);
- VPI Immingham Pilot Carbon Capture Plant (approved with conditions);
- Orsted Gigastack Ltd and Philips 66 Gigastack Project (awaiting scoping opinion);
- Humber Zero Project – Philips 66 Carbon Capture Plant (Pending – validated 16th March 2023)
- Humber Zero VPI Immingham Carbon Capture plant (Pending – validated 8th March 2023)
- Associated British Ports – Immingham Onshore Wind (Scoping opinion given 20th June 2023)
- Able UK Limited - Monopole Manufacturing Facility at Land at Able Marine Energy Park, south of Station Road, South Humber Bank, South Killingholme (approved 8th August 2022).
- Able UK Limited – Site Enabling Works, Land East of Rosper Road, Killingholme. Full planning application for enabling works on land east of Rosper Road, Killingholme. (Pending – validated March 2023).

7.4.4 Of the above listed projects, only VPI Carbon Capture Plant and Monopole Manufacturing Facility at Land at Able Marine Energy Park are consented. For all projects where applications have been submitted, the potential effects have been reviewed for this HRA and their proposed mitigation measures also reviewed. In all cases, it is concluded that either:

- the zones of influence of the Proposed Development and the other project do not overlap (for example, the Immingham Eastern Ro-Ro Terminal has potential effects mainly on intertidal habitat, whereas the Proposed Development has potential effects on terrestrial functionally linked land);
- Impact pathways present for the other project (e.g., operational nitrogen emissions) are not present for the Proposed Development (which has no operational emissions); or
- Where similar impact pathways (e.g., noise disturbance of functionally-linked land) do exist, there is either a sufficiently great unaffected area that no adverse effect on integrity will arise, or the mitigation that is proposed for both the other project and Proposed Development will collectively ensure that overall impacts are reduced to a non-significant level.

7.4.5 For the VPI Immingham Pilot Capture Plant, Humber Zero Project and Associated British Ports - Land adjacent to Westgate entrance applications, development on all three of these sites was modelled cumulatively for their applications. The nature of the noise mitigation proposed for the three projects is modelled to be sufficient to reduce noise from each development to an acceptable level thus avoiding additive noise impacts. As such there are

no residual impacts that need addressing. Provided the Proposed Development also applies mitigation to reduce its noise levels in the vicinity of Rosper Road Pools to an acceptable level, there will also be no residual impacts from the three developments.

7.4.6 Gigastack, Humber Hub Blue, and Immingham Onshore Wind are early in their consenting processes and based on current programmes there will be no temporal overlap between these three projects and the Proposed Development. The Proposed Development will have been completed in the vicinity of Rosper Road Pools before these projects are underway and therefore there will be no overlap of potential disturbance of functionally-linked land impacts. Furthermore the timing of works for the Proposed Development will avoid the most sensitive periods for birds to avoid potential effects. This is discussed in Appendix A. No effects dismissed as insignificant in the LSE section of this report would become significant in the light of these other projects. Moreover, all projects not yet consented will be assessed by the competent authority as part of the HRA process. These projects will only proceed if it can be demonstrated that there will be no LSE either alone or in combination with other plans or projects.

7.4.7 **As mitigation is proposed for these projects to reduce disturbance to acceptable levels , there will be no adverse effects on the integrity of European designated sites in combination with the Proposed Development.**

7.5 Summary

7.5.1 On the basis of HRA Stage 2 – Appropriate Assessment, it is concluded that the adverse effects of the Proposed Development (with regard to all Route Sections) on the integrity of the Humber Estuary SPA and Ramsar and Saltfleetby – Theddlethorpe Gibraltar Point SAC can be excluded, both alone and in combination with other projects or plans. Therefore, consent can be granted without the need to consider a derogation under the Habitats Regulations.

7.6 References

Ref-1 Planning Act (2008) [Online] Available at: https://www.legislation.gov.uk/ukpga/2008/29/contents Accessed 18.09.2023

Ref-2 Council Directive 92/43/EEC (1992) [Online] Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A01992L0043-20130701 Accessed 18.09.2023.

Ref-3 The Conservation of Habitats and Species Regulations (2017) [Online] Available at: https://www.legislation.gov.uk/uksi/2017/1012/contents/made Accessed 18.09.2023

Ref-4 European Union (Withdrawal) Act (2018) [Online] Available at: https://www.legislation.gov.uk/ukpga/2018/16/contents Accessed 18.09.2023

Ref-5 European Commission, Directorate-General for Environment, Guidance document on assessment of plans and projects in relation to Natura 2000 sites – A summary, Publications Office of the European Union, 2022, https://data.europa.eu/doi/10.2779/086397

Ref-6 Department for Environment, Food and Rural Affairs and Natural England (2021) Habitats Regulations Assessments; protecting a European site [Online] Available at: https://www.gov.uk/guidance/habitats-regulations-assessments-protecting-a-european-site Accessed 18.09.2023

Ref-7 National Infrastructure Planning (2022) Advice Note Ten: Habitats Regulations Assessment relevant to nationally significant infrastructure projects [Online] Available at:

https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-ten/ Accessed 18.09.2023

Ref-8 Natural England (2018) Natural England's approach to advising tent authorities on the assessment of road traffic emissions under the Habitats Regulations [Online] Available at: https://publications.naturalengland.org.uk/publication/4720542048845824 Accessed 18.09.2023

Ref-9 Institute of Air Quality Management (2020) A guide to the assessment of air quality impacts on designated nature conservation sites [Online] Available at: https://iaqm.co.uk/text/guidance/air-quality-impacts-on-nature-sites-2020.pdf Accessed 18.09.2023

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Appendix A Projects that have been appraised as part of the in-combination assessment and likelihood of an adverse effect on integrity

Table 7-3: Projects that have been appraised as part of the in-combination assessment and likelihood of an adverse effect on integrity

ID	Application Reference	Development Name and Details	Reported Effects of Other Development	Mitigation Proposed to Address Effects of Other Development	Likelihood of adverse effect on integrity in combination with Viking CCS pipeline
Nationally Significant Infrastructure Projects					
#DCO-3	EN010098	Hornsea Project Four Offshore Wind Farm (Orsted Hornsea Project Four Limited) The Hornsea Four onshore export cable corridor consists of an 80 m onshore temporary easement (although a wider corridor of 120 m is provided for at the crossing of the National Rail Network at Beswick). The permanent easement width will be 60 m except where obstacles are encountered such as the Network Rail Crossing near Beswick (where the permanent footprint may be extended up to 120 m to facilitate trenchless crossing of the railway line), and on the approach to the landfall and onshore substation.	The HRA identified the potential for adverse effects upon the following features: Subtidal and benthic ecology features; Marine mammal features; Offshore and intertidal ornithological features. Impacts on the following sites were assessed: Southern North Sea SAC; Moray Firth SAC; The Wash and North Norfolk Coast SAC; Humber Estuary SAC; Humber Estuary Ramsar Site; and, Berwickshire and North Northumberland Coast SAC.	Embedded mitigation was proposed to avoid effects upon designated sites. Measures to avoid dust and emissions were proposed. Embedded mitigation was proposed to prevent effects upon birds.	The potential adverse effects from Hornsea Four were mainly associated with offshore and intertidal impacts. As the Proposed Development is an onshore scheme, there is limited potential for in combination effects. Given the location of Hornsea Four (the export cable corridor is 32km from the Humber Estuary SAC/SPA/Ramsar site at the closest), the Report to Inform Appropriate Assessment for the DCO submitted by the applicant identified that the only functionally-linked habitat that could be affected was that associated with Southern North Sea SAC and potentially Flamborough and Filey Coast SPA. Both of these involve marine habitat. There is no spatial overlap in the effect areas for the Proposed Development and Hornsea Four and thus no potential for adverse effects on integrity 'in combination'.
#DCO-5	TR030007	Immingham Eastern Ro-Ro Terminal - pre-examination stage. A new roll-on/roll-off facility comprising a new jetty with up to four berths, improved hardstanding, Terminal buildings and an internal side bridge to cross over existing port infrastructure.	The HRA identified the potential for adverse effects upon the following features: Subtidal and benthic ecology features and species, intertidal habitats, offshore and intertidal ornithological interests Impacts on the following sites were assessed: Humber Estuary SPA, SAC, Ramsar scoped in.	Mitigation for noise and visual disturbance to ornithological interest during construction and operation will be implemented including; winter marine construction restrictions, noise suppression systems for piling, soft starts, cold weather construction restrictions as well as screening during operation and monitoring for the first two years. Mitigation for underwater noise and vibration includes soft starts, vibro-piling, seasonal and night piling restrictions, and a marine mammal observer.	The potential impacts associated with the Immingham Eastern Ro-Ro Terminal would arise on intertidal and underwater habitat whereas the Proposed Development effects would mainly affect onshore terrestrial habitat; therefore, there is both a disconnect in impact on space and type of habitat qualifying species would utilise between the two projects. Both projects would affect functionally linked land. However, intertidal functionally-linked land has a different role from the terrestrial functionally-linked land that could be affected by the Proposed Development, since the latter is of importance at high tide when intertidal habitat is unavailable. Moreover, the very small areas of intertidal habitat to be lost for Eastern Ro-Ro Terminal are only uncovered under low water spring conditions and are submerged 99% of the time. Therefore, they are not of significance for foraging or roosting. Therefore no adverse effects on the integrity of European sites in combination is expected.

ID	Application Reference	Development Name and Details	Reported Effects of Other Development	Mitigation Proposed to Address Effects of Other Development	Likelihood of adverse effect on integrity in combination with Viking CCS pipeline
#DCO-7	EN070006	Humber Low Carbon Pipelines (National Grid Carbon) A new onshore pipeline network to transport captured carbon dioxide from the region's emitters for safe subsea storage and to enable industries to fuel-switch from fossil fuels to low carbon hydrogen. This project is at pre-application stage and the scoping boundary is approximately 2.6 km west of the Proposed Development boundary.	In January 2024, this project was withdrawn from the DCO process.	N/A	This project was withdrawn from DCO in January 2024. Therefore, the likelihood of adverse effects on the integrity in combination with the Proposed Development is negligible.
#DCO-8	TR030008	Immingham Green Energy Terminal IGET (Associated British Ports) The Project comprises a new liquid bulk import terminal and associated processing facility, the purpose of which is to deliver a green hydrogen production facility. Imported ammonia will be stored and processed at the site to create green hydrogen, for onward transport to filling stations throughout the UK. Key project infrastructure comprises; a new approach trestle; jetty superstructure and topside infrastructure; and land side processing infrastructure. The project is at application stage and is located approximately 2.2 km south of the Proposed Development	The ornithology chapter of the PEIR identifies the potential for direct loss of terrestrial habitats that are functionally linked to the Humber Estuary SPA, Ramsar. However, the submitted Report to Inform Appropriate Assessment confirms that '*There is no functionally linked land within the Project boundary'.*	N/A	Given there is no functionally linked land within the IGET project boundary, the likelihood of adverse effects on the integrity in combination with the Proposed Development is negligible.
North East Lincolnshire Council					
#NELCCULM-1	DM/0211/20/REM	Keigar Homes Ltd – Residential Development off Station Road, Habrough. Reserved matters application following DM/0950/15/OUT (Outline application for a residential development of up to 118 dwellings, with access to be considered) to erect 118 dwellings with appearance, landscaping, layout and scale to be considered.	No HRA required. No impacts on European sites identified.	No mitigation for European designated sites required.	No potential for adverse effects in combination given there is no mechanism for the Station Road application to affect European sites.
#NELCCULM-2	DM/1175/17/FUL	Peter Ward Homes – Brocklesby Avenue Habrough Road Residential development for 145 dwellings with associated parking, landscaping and emergency vehicular access only onto Mill Lane (amended plans and documents January 2019).	No HRA required. No impacts on European sites identified. The habitats on site are not suitable for SPA birds.	No mitigation for European designated sites required.	No potential for adverse effects in combination given there is no mechanism for the Brocklesby Avenue application to affect European sites. .
#NELCCULM-3	DM/0696/19/FUL	Cyden Homes – Residential development at Midfield Road, Humberston. Erection of 225 dwellings with access off Midfield Road and Andrew Road with ancillary parking, garaging and associated infrastructure and widening of Andrew Road (additional information supplied: Habitat Regulations Assessment June 2022) - amended plans and information July 2022	No significant effects upon designated sites, habitats or protected / notable species are identified within the ecology report. Moreover, this application was dismissed and the appeal refused.	No mitigation for European designated sites required.	No potential for adverse effects in combination given this application has been refused and the appeal dismissed.

ID	Application Reference	Development Name and Details	Reported Effects of Other Development	Mitigation Proposed to Address Effects of Other Development	Likelihood of adverse effect on integrity in combination with Viking CCS pipeline
#NELCCULM-5	DM/1240/21/FUL	Barratt York – New Waltham Phase 2 Residential Development Erection of 227 dwellings, garaging, creation of new vehicular access on Louth Road, landscaping and associated works (Amended Plans and Description to include 3 additional units).	The ecological appraisal report states that there will be no significant effects upon designated sites. Impacts on European sites are considered but specifically dismissed on the basis of absence of impact pathways.	No mitigation for European designated sites required.	No potential for adverse effects in combination, given there is no mechanism for the New Waltham application to affect European sites.
#NELCCULM-6	DM/0026/18/FUL	North Beck Energy Ltd – North Beck Energy Centre Erect an Energy Recovery Facility with an electricity export capacity of up to 49.5MW and associated infrastructure including a stack to 90m high, parking areas, hard and soft landscaping, access road, weighbridge facility and drainage infrastructure.	The ecology chapter of the ES states that there will be no significant effects upon statutory designated sites. The project will have stack emissions and be located within 10km of Humber Estuary SAC. The report states that the habitat on site (tall vegetation / bramble scrub) renders it unsuitable as functionally linked habitat for Humber Estuary SPA. Since the site is 1km from the Humber Estuary SPA, no other potential impacts were identified except downstream water quality during construction.	Mitigation is proposed to prevent adverse effects upon water quality.	No potential for adverse effects in combination. For the most part there are no two impact pathways in common between the Proposed Development and North Beck Energy Centre (for example there is no functionally-linked land at North Beck Energy Centre and the Proposed Development will have no operational emissions). The only impact pathway in common is downstream water quality. For both developments, a construction environment management plan will be required to manage runoff and pollution risk such that there would be no deterioration in water quality criteria set by the Environment Agency. Those criteria are applicable to all projects, and the acceptable concentrations are specifically set to capture the potential for cumulative and in combination effects from multiple projects.
#NELCCULM-7	DM/1145/19/FUL	Engie - NEL Energy Park Construction and operation of an energy park comprising photovoltaic (PV) solar panels together with energy (battery) storage and associated infrastructure.	The ES chapter prepared to inform NEL Energy Park confirmed that there will be no significant effects upon statutory designated sites. No significant effects predicted for breeding birds or wintering birds. Natural England correspondence over the application states that *'Natural England is of the opinion that it is very unlikely that the proposed development area is functionally linked to the Humber Estuary SPA/Ramsar'.* Since the site is 2km from the Humber Estuary SPA, no other potential impacts were identified except downstream water quality during construction.	Pollution control measures to be implemented.	No potential for adverse effects in combination. For the most part there are no two impact pathways in common between the Proposed Development and NEL Energy Park (for example there is no functionally-linked land at NEL Energy Park). The only impact pathway in common is downstream water quality. For both developments, a construction and environmental management plan will be required to manage runoff and pollution risk such that there would be no deterioration in water quality criteria set by the Environment Agency. Those criteria are applicable to all projects, and the acceptable concentrations are specifically set to capture the potential for cumulative and in combination effects from multiple projects.
#NELCCULM-8	DM/0105/18/FUL	Engie – SHIIP Stallingborough Interchange Hybrid application seeking outline consent with access, landscaping and scale to be considered for the development of a 62ha Business Park comprising up to 120,176 sq. m for B1 (Business), B2 (General Industrial) and B8 (Storage and Distribution), associated infrastructure and internal highways. Full application for the creation of a new roundabout, new access roads, associated highway works, substations, pumping stations, drainage and landscaping. (Amended FRA and Drainage	The report to inform HRA concluded that there would be no likely significant effects upon European designated sites, either alone or in combination with other plans or projects. Specifically, it noted that the land is not functionally-linked to the Humber Estuary SPA/Ramsar site. Natural England agreed with this conclusion. Since the site is over 2km from the Humber Estuary SPA, no other potential impacts were identified except	Mitigation proposed included a CEMP	No potential for adverse effects in combination. For the most part there are no two impact pathways in common between the Proposed Development and SHIIP (for example there is no functionally-linked land at SHIIP). The only impact pathway in common is downstream water quality. For both developments, a construction and environmental management plan will be required to manage runoff and pollution risk such that there would be no deterioration in water quality criteria set by the Environment Agency. Those criteria are applicable to all projects, and the acceptable concentrations are

ID	Application Reference	Development Name and Details	Reported Effects of Other Development	Mitigation Proposed to Address Effects of Other Development	Likelihood of adverse effect on integrity in combination with Viking CCS pipeline
		Strategy July 2018). The site is approximately 1.9 km east of the Project Development boundary	downstream water quality during construction.		specifically set to capture the potential for cumulative and in combination effects from multiple projects.
#NELCCULM-9	DM/0198/20/REM	Cyden Homes – Proposed Residential Development at Land Off Larkspur Avenue Reserved matters application following DM/0378/15/OUT (Outline planning application with means of access to be considered for the construction of up to 250 residential dwellings, a new primary access with Stallingborough Road and secondary / emergency access via Larkspur Avenue, public open space, and landscaping, surface water drainage attenuation and associated works) to erect 150 dwellings, play equipment, public open space and infrastructure with appearance, landscaping, layout and scale to be considered (Amended Plans January 2021).	No ecology reports provided for the Reserved Matters application. However the ecological assessment for the outline consent notes that the site does not constitute functionally-linked habitat for Humber Estuary SPA/Ramsar	No mitigation for European designated sites required.	No potential for adverse effects in combination, given there is no mechanism for the Larkspur Avenue application to affect European sites.
#NELCCULM-12	DM/0899/21/FUL	Grimsby Solar Farm – Aura Power Install solar farm with associated works and infrastructure to include ground mounted solar panels, access tracks, inverters, transformers, storage units, substation compound, underground cables and conduits, temporary construction compound, perimeter fencing and planting scheme.	The report to inform Habitats Regulations Assessment screens in the potential for likely significant effects upon the Humber Estuary SPA and Ramsar. However, at Appropriate Assessment the report states that the site is not used by the qualifying bird species and the habitats within the site are not functionally linked land. No in combination effects are identified.	N/A	No potential for adverse effects in combination, given there is no mechanism for the Grimsby Solar Farm application to affect European sites.
#NELCCULM-20	DM/0728/18/OUT	Brocklesby Estate – Residential Development on Land East of Stallingborough Road, Immingham. Outline planning application for the development of up to 525 residential dwellings together with an extra care facility for the elderly with up to 80 units with access to be considered.	HRA was not required for this project. The ecology report confirms no significant effects upon statutory designated sites. The Humber Estuary SPA, SAC and Ramsar is located 3 km from the proposed site. Wintering bird surveys recorded no qualifying bird species using the site or adjacent fields.	N/A	No potential for adverse effects in combination, given there is no mechanism for the Brocklesby Estate application to affect European sites.
#NELCCULM-24	DM/0118/15/OUT	Monmouth Properties – Residential Development on Land at Toll Bar New Waltham. Outline application with access to be considered for residential development (of up to 400 dwellings) including the provision of a small corner shop, open space and associated infrastructure.	HRA was not required for this project. No effects upon statutory or non-statutory designated sites were identified and the habitat was not identified as supporting SPA/Ramsar birds. Potential for adverse water quality effects upon Buck Beck watercourse which connects to Humber Estuary SAC 7km downstream.	Standard pollution prevention measures were recommended.	No potential for adverse effects in combination. For the most part there are no two impact pathways in common between the Proposed Development and Land at Toll Bar (for example there is no functionally-linked land at Land at Toll Bar). The only impact pathway in common is downstream water quality. For both developments, a construction and environmental management plan will be required to manage runoff and pollution risk such that there would be no deterioration in water quality criteria set by the Environment Agency. Those criteria are applicable to all projects, and the acceptable concentrations are specifically set to capture the

ID	Application Reference	Development Name and Details	Reported Effects of Other Development	Mitigation Proposed to Address Effects of Other Development	Likelihood of adverse effect on integrity in combination with Viking CCS pipeline
					potential for cumulative and in combination effects from multiple projects.
#NELC CULM-28	DM/0769/22/FUL	CHI Investments – The Willows Construction of new foul sewer and associated works.	HRA was not required for this project. No effects upon European designated sites identified. Habitat areas affected too small to be functionally-linked to European sites. No impact pathways to European sites identified.	No mitigation required.	No potential for adverse effects in combination, given there is no mechanism for the Willows application to affect European sites.
#NELC CULM-31	DM/1133/17/OUT	Humberside Land Developers Ltd - Residential Development in Laceby Outline application for 152 dwellings with means of access to be considered, including an emergency vehicular access onto Charles Avenue. (Amended Transport Assessment and Travel Plan 13th April 2018)	HRA not required. No linking impact pathways to European sites identified in ecology report.	N/A	No potential for adverse effects in combination, given there is no mechanism for the Laceby application to affect European sites.
#NELC CULM-33	DM/1167/16/FUL / AP/001/19	Cyden Homes – Residential Development Land off Brigsley Road, Waltham Hybrid application to include Full Planning for 194 dwellings (houses and bungalows) and an Outline application to erect 5 detached dwellings with associated works including foul pumping station, landscaping, public open space, parking areas and garaging (Amended plans for layout, road details, landscaping and Transport Assessment - 24th November 2017)	No linking impact pathways to European sites identified in ecology report. HRA not required.	N/A	No potential for adverse effects in combination, given there is no mechanism for the Brigsley Road application to affect European sites.
#NELC CULM-38	DM/0118/23/FUL	Land Developers (Lincs) Ltd – Residential Development at Land off Field Head Road, Laceby Erection of 60 dwellings including access from Fieldhead Road with emergency vehicular access onto Caistor Road and associated works	No linking impact pathways to European sites identified in ecology report. HRA not required.	No mitigation for European designated sites required.	No potential for adverse effects in combination, given there is no mechanism for the Field Head Road application to affect European sites.
#NELC CULM-39	DM/0261/23/OUT	Residential Development at Land off Waltham Road, Barnoldby Outline erection of 42 dwellings and associated infrastructure (all matters reserved)	No linking impact pathways to European sites identified in ecology report. HRA not required.	N/A	No potential for adverse effects in combination, given there is no mechanism for the Waltham Road application to affect European sites.
North Lincolnshire Council					
#NLC CULM-2	PA/2022/1223	Associated British Ports (ABP) – Land Adjacent to the Westgate Entrance, Port of Immingham A hybrid application comprising full planning permission for the development of land adjacent to the West Gate Entrance of the Port of Immingham for port related employment uses.	Noise and visual disturbance during construction to functionally linked land for the Humber Estuary SPA and Ramsar (Rosper Road Pools). No functionally-linked land identified within the project boundary. **Potential for significant adverse effects**.	Mitigation is proposed to reduce noise levels and lighting to acceptable levels for both the ABP development and the Proposed Development. The ABP development, VPI Immingham development (see next row) were modelled cumulatively in the latest HRAs for both applications and the noise mitigation identified for both was confirmed to be sufficient	The nature of the noise mitigation proposed for the ABP development and VPI Immingham is modelled to be sufficient to reduce noise from each development to an acceptable level thus avoiding additive noise impacts. As such there are no residual impacts that need addressing. Provided the Proposed Development also applies mitigation to reduce its noise levels in the vicinity of Rosper Road Pools to an acceptable level, there will also be no residual impacts from the three developments.

ID	Application Reference	Development Name and Details	Reported Effects of Other Development	Mitigation Proposed to Address Effects of Other Development	Likelihood of adverse effect on integrity in combination with Viking CCS pipeline
				to reduce noise levels to an acceptable degree.	
#NLC CULM-3	PA/2022/1548	VPI Immingham - VPI Immingham Pilot Carbon Capture Plant Planning permission to construct and operate a temporary pilot post-combustion carbon capture plant and associated infrastructure	The ecological assessment states that there will be no adverse effects on statutory designated sites. There are no habitats of principal importance within the site. No functionally-linked land identified within the project boundary. There will be no adverse air quality effects. There will be no impacts in water quality.	The ABP development, VPI Immingham development (see previous row) were modelled cumulatively in the latest HRAs for both applications and the noise mitigation identified for both was confirmed to be sufficient to reduce noise levels to an acceptable degree.	The nature of the noise mitigation proposed for the ABP development and VPI Immingham is modelled to be sufficient to reduce noise from each development to an acceptable level thus avoiding additive noise impacts. As such there are no residual impacts that need addressing. Provided the Proposed Development also applies mitigation to reduce its noise levels in the vicinity of Rosper Road Pools to an acceptable level, there will also be no residual impacts from the three developments.
#NLC CULM-4	PA/2022/628	MF Strawson Limited – Residential Development at Main Road, Sturton Hybrid application comprising full planning permission to erect 32 dwellings and outline planning permission for 85 dwellings with appearance, landscaping, layout and scale reserved for subsequent consideration.	No effects upon European designated sites identified. North Lincolnshire Council ecology identifies the site has limited biodiversity value.	No mitigation required.	No potential for adverse effects in combination given there are no linking impact pathways between the Sturton development and European sites.
#NLC CULM-5	PA/2022/443	Lightrock Power Ltd – Sweetbriar Farm Planning permission for the installation of a solar photovoltaic array/solar farm & associated infrastructure. This development is approximately 70 hectares (ha) in size.	Potential for noise and visual disturbance of passage and wintering wildfowl was considered. However, due to distance from the SPA and the fact the HRA determined that the site did not constitute functionally linked land for Humber Estuary SPA/Ramsar no mitigation was required.	No mitigation required.	No potential for adverse effects in combination given there are no linking impact pathways between the Sweetbriar Farm development and European sites.
#NLC CULM-9	PA/SCO/2022/13	Orsted Gigastack Limited and Phillips 66 Limited – Gigastack Project EIA Scoping request for a 100MV hydrogen electrolyser together with an underground electrical cable connection to the Hornsea Two onshore substation, water discharge and a hydrogen export pipeline to the Humber Refinery.	The scoping report identifies the potential for cumulative effects on birds using functionally linked land from noise and visual disturbance.	As only a scoping report is available for this project, there is insufficient information available to inform the in-combination assessment.	Potential for cumulative effects – refer to PA/2023/422 below. The potential for significant effects upon European designated sites will be assessed as part of the HRA process. If the competent authority confirms that the proposed mitigation is acceptable effects will be no adverse effects alone or in combination. However, given the mitigation included in the Proposed Development for those impacts that were identified as being significant (such as noise impacts on Rosper Road Pools) and that any loss of functionally linked land due to the Gigastack project will be strategically mitigated by the South Humber Gateway strategic mitigation project, no in combination effect is expected. This is particularly the case since the fact Gigastack is early in its process means that there will be no temporal overlap between the Gigastack project and the Proposed Development. The Proposed Development

ID	Application Reference	Development Name and Details	Reported Effects of Other Development	Mitigation Proposed to Address Effects of Other Development	Likelihood of adverse effect on integrity in combination with Viking CCS pipeline
					will have been completed in the vicinity of Rosper Road Pools before the Gigastack project is underway and therefore there will be no overlap of potential disturbance of functionally-linked land impacts.
#NLC CULM-12	PA/2023/422	Phillips 66 Limited - Humber Zero Project Planning permission for the construction and operation of a post-combustion carbon capture plant, including carbon dioxide compression and metering, cooling equipment, stacks, substations, new and modified services, connections, internal roads, new access onto Eastfield Road, and maintenance and laydown areas (EIA development)	The report to inform HRA considered noise and visual disturbance of SPA / Ramsar birds using functionally linked land near Rosper Road Pools during construction and operation. It also considered changes in surface water quality during construction and operation and changes in air quality. Noise and visual disturbance were screened out at Stage 1 of the HRA process. Changes in water quality during operation was taken to Appropriate Assessment.	Mitigation is proposed to prevent adverse effects from changes in water quality. Mitigation is proposed to reduced noise and visual disturbance as a result of the Proposed Development to an acceptable level. The ABP development (see earlier), VPI Immingham development (see next row) and Phillips 66 development were modelled cumulatively in the latest HRAs for all three applications and the noise mitigation identified for both was confirmed to be sufficient to reduce noise levels to an acceptable degree.	The nature of the noise mitigation proposed for the ABP development, Phillips 66, and VPI Immingham is modelled to be sufficient to reduce noise from each development to an acceptable level thus avoiding additive noise impacts. As such there are no residual impacts that need addressing. Provided the Proposed Development also applies mitigation to reduce its noise levels in the vicinity of Rosper Road Pools to an acceptable level, there will also be no residual impacts from the three developments.
#NLC CULM-13	PA/2023/421	Humber Zero – VPI Immingham Carbon Capture Plant Planning permission for the construction & operation of a post-combustion carbon capture plant, including carbon dioxide compressor & metering, cooling equipment, stacks, substations, internal roads, partial ditch realignment, new & modified services, connections, internal roads, accesses, maintenance & laydown areas.	The report to inform HRA identifies the potential for noise and visual disturbance of birds at Rosper Road Pools during construction and operation. There is also the potential for operational changes in air quality.	Mitigation is proposed to reduced noise and visual disturbance as a result of the Proposed Development to an acceptable level. Desulphurisation of flue gasses to reduce effluent sulphate levels below 1,000 mg/l.	The nature of the noise mitigation proposed for the ABP development, Phillips 66, and VPI Immingham is modelled to be sufficient to reduce noise from each development to an acceptable level thus avoiding additive noise impacts. As such there are no residual impacts that need addressing. Provided the Proposed Development also applies mitigation to reduce its noise levels in the vicinity of Rosper Road Pools to an acceptable level, there will also be no residual impacts from the three developments.
#NLC CULM-14	PA/SCO/2023/1	Associated British Ports – Immingham Onshore Wind EIA Scoping request for Immingham onshore wind including up to three wind turbines (Immingham Dock Western Entrance, Humber Road, South Killingholme).	The scoping report identifies the potential for effects upon statutory and non-statutory designated sites and protected / notable species.	As only a scoping report is available for this project, there is insufficient information available to inform the in-combination assessment.	There is insufficient information in the Scoping Report for the other development to allow for cumulative assessment to be undertaken. The potential for significant effects upon European designated sites will be assessed as part of the HRA process. If the competent authority confirms that the proposed mitigation is acceptable effects will be no adverse effects alone or in combination. However, as mitigation is proposed to reduce noise and visual disturbance from the Proposed Development to an acceptable level, it is considered unlikely that cumulative effects could be significant. This is particularly the case since the fact Immingham Onshore Wind is early in its process means that there

ID	Application Reference	Development Name and Details	Reported Effects of Other Development	Mitigation Proposed to Address Effects of Other Development	Likelihood of adverse effect on integrity in combination with Viking CCS pipeline
					will be no temporal overlap between the that project and the Proposed Development. The Proposed Development will have been completed in the vicinity of Immingham before the Onshore Wind project is underway and therefore there will be no overlap of potential disturbance of functionally-linked land impacts.
#NLC CULM-15	PA/SCO/2023/2	Associated British Ports – Immingham Onshore Wind EIA Scoping request for Immingham onshore wind including up to three wind turbines (Land Along Tracks, West Haven Way, South Killingholme).	The scoping report identifies the potential for effects upon statutory and non-statutory designated sites and protected / notable species.	HRA required. Potential for cumulative effects upon designated sites / birds. The potential for significant effects upon European designated sites will be assessed as part of the HRA process.	There is insufficient information in the Scoping Report for the other development to allow for cumulative assessment to be undertaken. However, as mitigation is proposed to reduce noise and visual disturbance from the Proposed Development to an acceptable level, it is considered unlikely that cumulative effects could be significant. However, given the mitigation included in the Proposed Development for those impacts that were identified as being significant (such as noise impacts on Rosper Road Pools) no in combination effect is expected. This is particularly the case since the fact Immingham Onshore Wind is early in its process means that there will be no temporal overlap between the that project and the Proposed Development. The Proposed Development will have been completed in the vicinity of Immingham before the Onshore Wind project is underway and therefore there will be no overlap of potential disturbance of functionally-linked land impacts.
#NLC CULM-16	PA/2023/612	VEV Services Limited - Vitol (VPI Immingham) Planning permission for the installation of a 71.28 kwp solar carport and infrastructure for renewable energy generation.	No ecology information provided.	N/A	Unknown at this stage. There is insufficient information in the Scoping Report for the other development to allow for cumulative assessment to be undertaken.
#NLC CULM-17	PA/2018/918	Planning permission to construct a new gas-fired power station with a gross electrical output of up to 49.9 megawatts.	Site is brownfield habitat and therefore unsuitable as functionally-linked land for the Humber Estuary SPA. There is potential for effects on the Humber Estuary SAC / SPA / Ramsar through changes in air and surface water pollution.	Industry best practice measures to prevent surface and ground water pollution. A CEMP will detail all requirements for environmental protection and legal compliance. Pre-construction survey for protected species. Lighting impacts to be minimised. Noise and visual disturbance of birds was found to be not significant.	This development is currently being built and there will therefore be no temporal overlap of construction period with the Proposed Development. Therefore, there is no potential for adverse effects on integrity in combination with the Proposed Development.
#NLC CULM-18	PA/SCO/2022/12	Uniper - Humber Hub Blue Project EIA scoping request for the Humber Hub Blue Project; a blue hydrogen production facility (HPF) on the south bank of the Humber to supply low-carbon hydrogen via a pipeline to industrial and power customers. Although the majority of the hydrogen produced is likely to be	The scoping report identifies the potential for effects upon statutory and non-statutory designated sites and protected / notable species.	N/A	Unknown at this stage. Potential for cumulative effects upon designated sites / birds. The potential for significant effects upon European designated sites will be assessed as part of the HRA process.

ID	Application Reference	Development Name and Details	Reported Effects of Other Development	Mitigation Proposed to Address Effects of Other Development	Likelihood of adverse effect on integrity in combination with Viking CCS pipeline
		used for combustion following fuel switching by industrial processes within 3 km of the production site, there is also the potential for hydrogen blending into power generation facilities or the existing natural gas network and for supplying hydrogen to other regional hydrogen projects, including mobility.			If the competent authority confirms that the proposed mitigation is acceptable effects will be no adverse effects alone or in combination. However, given the mitigation included in the Proposed Development for those impacts that were identified as being significant (such as noise impacts on Rosper Road Pools) will be mitigated, no in combination effect is expected. This is particularly the case since the fact Humber Hub Blue is early in its process means that there will be no temporal overlap between the that project and the Proposed Development. The Proposed Development will have been completed in the vicinity of Immingham before the Humber Hub Blue project is underway and therefore there will be no overlap of potential disturbance of functionally-linked land impacts.
#NLC CULM-19	PA/2023/502	Able UK Limited – Site Enabling Works, Land East of Rosper Road, Killingholme. Full planning application for enabling works on land east of Rosper Road, Killingholme, The proposed development comprises: • regrading of land with general fill and raising site levels with imported fill, • installation of ground drainage as required, • installation of boundary fencing, • widening of Marsh Lane (vertical alignment to be retained) and construction of new footpath - hedge to be replaced north of road widening, • upgrades at junction of Marsh Lane with Rosper Road, including extending a drainage culvert, • diversion of a section of Station Road and construction of new road, • new ditch culvert under Marsh Lane, • five new entrances to proposed sites to be created, • demolition of buildings, • construction of new 33kV substation, • new drainage ditch/diversion and new ditch crossings, • bridge crossings of existing over ground pipelines, • diversion to existing Exolum underground pipeline, and • construction of new rail sidings.	Loss of terrestrial habitat during construction, lighting impacts and cumulative effects. Noise and visual disturbance of birds .	Embedded mitigation including ditch realignment and retention and enhancement of hedgerows. Mitigation for birds provided as part of the Halton Marshes Wet Grassland Scheme. Preconstruction checks for otter and water vole.	As the Able UK development is providing mitigation as part of the Halton Marshes Wet Grassland Scheme it is not anticipated that there will be in combination effects with the Proposed Development as there will be no residual effects on functionally linked land from the Able scheme to operate in combination with the Proposed Development. Moreover, these works are expected to be completed before the Proposed Development commences. Mitigation in the form of noise fencing is included for the Proposed Development to avoid noise and visual disturbance upon the bird assemblage at Rosper Road Pools. As such, no in combination effect is expected.

ID	Application Reference	Development Name and Details	Reported Effects of Other Development	Mitigation Proposed to Address Effects of Other Development	Likelihood of adverse effect on integrity in combination with Viking CCS pipeline
#NLC CULM-27	PA/2021/1525	Able UK Limited - Monopole Manufacturing Facility at Land at Able Marine Energy Park, south of Station Road, South Humber Bank, South Killingholme Planning permission to erect a monopole manufacturing facility to provide an offshore wind turbine monopile foundation manufacturing facility ('the monopile factory'). The proposed development is a complex of large industrial steel-clad buildings used to manufacture monopiles for the offshore renewable energy sector. This development is approximately 25 ha in size.	Loss of grassland habitat used by foraging birds (curlew).	Loss of terrestrial habitat has been mitigated through the provision of habitat as part of the Halton Marshes Wet Grassland Scheme.	Given the mitigation included in the Proposed Development for those impacts that were identified as being significant (such as noise impacts on Rosper Road Pools) and that any loss of functionally-linked land due to the project will be strategically mitigated by the Halton Marshes Wet Grassland Scheme, no in combination effect is expected as there will be no residual effects on functionally linked land from the Able scheme to operate in combination with the Proposed Development. Moreover, the Monopole development is already underway and will be completed before the Viking project.
East Lindsey District Council					
#ELDC CULM-1	N/085/00883/15	Land East of Louth Road, Grimsby A hybrid application consisting of outline erection of up to 300 dwellings with means of access to be considered and full planning permission for change of use of land from agricultural land to a recreation ground.	No effects upon European designated sites identified. HRA was not required.	No mitigation for European designated sites required.	No potential for adverse effects in combination as there is no impact pathway linking the Louth Road development with European sites.
#ELDC CULM-2	N/133/01413/21	Cyden Homes – Residential development at Ludborough Road Application for the erection of 198no. dwellings with associated garages and construction of a vehicular and pedestrian access	No significant ecological effects identified in the ecology report. HRA was not required.	No mitigation for European designated sites required.	No potential for adverse effects in combination as there is no impact pathway linking the Ludborough Road development with European sites.
#ELDC CULM-15	N/105/01055/22	Charterpoint (Louth) Limited – Daisy Way, Louth Outline erection of up to 90no. dwellings with garages with means of access to be considered. This development is approximately 6 ha in size.	No ecology reports available. HRA was not required.	No mitigation for European designated sites required.	No potential for adverse effects in combination as there is no impact pathway linking the Daisy Way development with European sites.
#ELDC CULM-18	N/019/01451/20	Brackenborough Ltd – Brackenborough Hotel Change of use of land for the siting of 114 no. holiday lodges and excavation of land to form 3 no. wildlife ponds.	HRA was not required. No effects upon European designated sites identified.	No mitigation for effects on European designated sites required.	No potential for adverse effects in combination as there is no impact pathway linking the Brackenborough Hotel development with European sites.
#ELDC CULM-19	N/092/01017/20	Lovell – Residential Development Chestnut Drive Outline erection of up to 141no. dwellings (with means of access, landscaping and layout to be considered). This development is approximately 6ha in size.	HRA was not required.	No mitigation for effects on European designated sites required.	No potential for adverse effects in combination as there is no impact pathway linking the Chesnut Drive development with European sites..
#ELDC CULM-22	N/085/01215/21	Homes by Gleeson – Residential Development Louth Road, Holton Le Clay Application for approval of reserved matters (appearance, landscaping, layout and scale) for 233no. dwellings on part phase A and phases B and C pursuant to Outline planning permission ref. no. N/085/01207/20. This development is approximately 12 hectares in size.	HRA was not required. No ecology reports provided.	No mitigation recommended.	No potential for adverse effects in combination as there is no impact pathway linking the Louth Road development with European sites.
#ELDC CULM-31	N/105/019	Gleeson - Proposed Residential Brackenborough Road, Louth	HRA was not required. No ecology reports provided.	No mitigation recommended.	No potential for adverse effects in combination as there is no impact pathway linking the Brackenborough Road development with European sites.

ID	Application Reference	Development Name and Details	Reported Effects of Other Development	Mitigation Proposed to Address Effects of Other Development	Likelihood of adverse effect on integrity in combination with Viking CCS pipeline
	61/19	Erection of 237no. dwellings, associated garages, provision of 3no. attenuation ponds, areas of open space and children's play areas, erection of a pumping station and a substation, construction of vehicular and pedestrian accesses and internal access roads.			
#ELDC CULM-32	N/105/00593/19	Cyden Homes – Proposed Residential Development at The Park, Eastfield Road, Louth. Erection of 2no. detached bungalows, 4no. pairs of semi-detached houses, 28no. detached houses, 1no. block of 6no. terraced houses, 3no. blocks of 4no. terraced houses, 1no. block of 4no. bungalows (60no. houses in total) and associated garage blocks, provision of an attenuation pond and play area and construction of internal access roads.	HRA was not required.	No mitigation for effects on European designated sites required.	No potential for adverse effects in combination as there is no impact pathway linking the Eastfield Road development with European sites..
Lincolnshire County Council					
#LCC CULM - 7	PL/0037/23	Manby BGE Ltd - Anaerobic Digestor and Fertiliser Production Plant For an anaerobic digestor and fertiliser production plant at Land at Manby Airfield, off Manby Middlegate, Manby.	HRA was not required. No significant effects identified during construction or operation.	N/A	No potential for adverse effects in combination as there is no impact pathway linking the Manby Digestor development with European sites.
Wider Viking CCS Project					
#OFF CULM-1	N/A	Wider Viking CCS Project – offshore elements including refurbishment of the existing offshore Lincolnshire Offshore Gas Gathering system (LOGGS) Pipeline and a newly installed spur pipeline, to the offshore injection facilities for permanent storage.	No ecology reports available	No mitigation identified	As this element of the project is within the marine environment, 120 km offshore, and the Proposed Development will have no effects on the marine environment, no in-combination effects are anticipated.

Appendix B European Designated Site Citations

EC Directive 92/43 on the Conservation of Natural Habitats and of Wild Fauna and Flora

Citation for Special Area of Conservation (SAC)

Name:	Humber Estuary
Unitary Authority/County:	City of Kingston upon Hull, East Riding of Yorkshire, Lincolnshire, North East Lincolnshire, North Lincolnshire
SAC status:	Designated on 10 December 2009
Grid reference:	TA345110
SAC EU code:	UK0030170
Area (ha):	36657.15
Component SSSI:	Humber Estuary

Site description:
The Humber is the second largest coastal plain **Estuary** in the UK, and the largest coastal plain estuary on the east coast of Britain. The estuary supports a full range of saline conditions from the open coast to the limit of saline intrusion on the tidal rivers of the Ouse and Trent. The range of salinity, substrate and exposure to wave action influences the estuarine habitats and the range of species that utilise them; these include a breeding bird assemblage, winter and passage waterfowl, river and sea lamprey, grey seals, vascular plants and invertebrates.

The Humber is a muddy, macro-tidal estuary, fed by a number of rivers including the Rivers Ouse, Trent and Hull. Suspended sediment concentrations are high, and are derived from a variety of sources, including marine sediments and eroding boulder clay along the Holderness coast. This is the northernmost of the English east coast estuaries whose structure and function is intimately linked with soft eroding shorelines. The extensive mud and sand flats support a range of benthic communities, which in turn are an important feeding resource for birds and fish. Wave exposed sandy shores are found in the outer/open coast areas of the estuary. These change to the more moderately exposed sandy shores and then to sheltered muddy shores within the main body of the estuary and up into the tidal rivers.

Habitats within the Humber Estuary include **Atlantic salt meadows** and a range of sand dune types in the outer estuary, together with **Sandbanks which are slightly covered by sea water all the time**, extensive intertidal mudflats, ***Salicornia* and other annuals colonising mud and sand**, and **Coastal lagoons**. As salinity declines upstream, reedbeds and brackish saltmarsh communities fringe the estuary. These are best-represented at the confluence of the Rivers Ouse and Trent at Blacktoft Sands.

Upstream from the Humber Bridge, the navigation channel undergoes major shifts from north to south banks, for reasons that have yet to be fully explained. This section of the estuary is also noteworthy for extensive mud and sand bars, which in places form semi-permanent islands. The sand dunes are features of the outer estuary on both the north and south banks particularly on Spurn peninsula and along the Lincolnshire coast south of Cleethorpes. Examples of both **Fixed dunes with herbaceous vegetation (`grey dunes`)** and **Shifting dunes along the shoreline with *Ammophila arenaria* (`white dunes)** occur on both banks of the estuary and along the coast. Native sea buckthorn **Dunes with *Hippophae rhamnoides*** also occurs on both sides of the estuary.

Significant fish species include **river lamprey** *Lampetra fluviatilis* and **sea lamprey** *Petromyzon marinus* which breed in the River Derwent, a tributary of the River Ouse. **Grey seals** *Halichoerus grypus* come ashore in autumn to form breeding colonies on the sandy shores of the south bank at Donna Nook.

Qualifying habitats: The site is designated under **article 4(4)** of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I:

- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
- Coastal lagoons*
- Dunes with *Hippophae rhamnoides*
- Embryonic shifting dunes
- Estuaries
- Mudflats and sandflats not covered by seawater at low tide
- Fixed dunes with herbaceous vegetation (`grey dunes`)*
- *Salicornia* and other annuals colonising mud and sand
- Sandbanks which are slightly covered by sea water all the time
- Shifting dunes along the shoreline with *Ammophila arenaria* (`white dunes')

Qualifying species: The site is designated under **article 4(4)** of the Directive (92/43/EEC) as it hosts the following species listed in Annex II:

- Grey seal *Halichoerus grypus*
- River lamprey *Lampetra fluviatilis*
- Sea lamprey *Petromyzon marinus*

Annex I priority habitats are denoted by an asterisk (*)

This citation relates to a site entered in the Register of European Sites for Great Britain.
Register reference number: UK0030170
Date of registration:10 December 2009

Signed: [redacted]

On behalf of the Secretary of State for Environment, Food and Rural Affairs

EC Directive 79/409 on the Conservation of Wild Birds
Special Protection Area (SPA)

Name: Humber Estuary

Unitary Authorities/Counties: City of Kingston-upon-Hull, East Riding of Yorkshire, Lincolnshire, North East Lincolnshire, North Lincolnshire

Component SSSIs: The SPA encompasses all or parts of the following Sites of Special Scientific Interest (SSSIs): Humber Estuary SSSI, North Killingholme Haven Pits SSSI, Saltfleetby-Theddlethorpe Dunes SSSI, and The Lagoons SSSI.

Site description: The Humber Estuary is located on the east coast of England, and comprises extensive wetland and coastal habitats. The inner estuary supports extensive areas of reedbed, with areas of mature and developing saltmarsh backed by grazing marsh in the middle and outer estuary. On the north Lincolnshire coast, the saltmarsh is backed by low sand dunes with marshy slacks and brackish pools. Parts of the estuary are owned and managed by conservation organisations. The estuary supports important numbers of waterbirds (especially geese, ducks and waders) during the migration periods and in winter. In summer, it supports important breeding populations of bittern *Botaurus stellaris*, marsh harrier *Circus aeruginosus*, avocet *Recurvirostra avosetta* and little tern *Sterna albifrons*.

Size of SPA: The SPA covers an area of 37,630.24 ha.

Qualifying species:
The site qualifies under **article 4.1** of the Directive (79/409/EEC) as it is used regularly by 1% or more of the Great Britain populations of the following species listed in Annex I in any season:

Annex I species	Count and season	Period	% of GB population
Avocet *Recurvirostra avosetta*	59 individuals – wintering	5 year peak mean 1996/97 – 2000/01	1.7%
Bittern *Botaurus stellaris*	4 individuals – wintering	5 year peak mean 1998/99 – 2002/03	4.0%
Hen harrier *Circus cyaneus*	8 individuals – wintering	5 year peak mean 1997/98 – 2001/02	1.1%
Golden plover *Pluvialis apricaria*	30,709 individuals – wintering	5 year peak mean 1996/97 – 2000/01	12.3%
Bar-tailed godwit *Limosa lapponica*	2,752 individuals – wintering	5 year peak mean 1996/97 – 2000/01	4.4%
Ruff *Philomachus pugnax*	128 individuals – passage	5 year peak mean 1996-2000	1.4%
Bittern *Botaurus stellaris*	2 booming males – breeding	3 year mean 2000-2002	10.5%
Marsh harrier *Circus aeruginosus*	10 females – breeding	5 year mean 1998-2002	6.3%
Avocet *Recurvirostra avosetta*	64 pairs – breeding	5 year mean 1998 – 2002	8.6%
Little tern *Sterna albifrons*	51 pairs – breeding	5 year mean 1998-2002	2.1%

The site qualifies under **article 4.2** of the Directive (79/409/EEC) as it is used regularly by 1% or more of the biogeographical populations of the following regularly occurring migratory species (other than those listed in Annex I) in any season:

Migratory species	Count and season	Period	% of subspecies/ population
Shelduck *Tadorna tadorna*	4,464 individuals – wintering	5 year peak mean 1996/97 – 2000/01	1.5% Northwestern Europe (breeding)
Knot *Calidris canutus*	28,165 individuals – wintering	5 year peak mean 1996/97 – 2000/01	6.3% *islandica*
Dunlin *Calidris alpina*	22,222 individuals – wintering	5 year peak mean 1996/97 – 2000/01	1.7% *alpina*, Western Europe (non-breeding)
Black-tailed godwit *Limosa limosa*	1,113 individuals – wintering	5 year peak mean 1996/97 – 2000/01	3.2% *islandica*
Redshank *Tringa totanus*	4,632 individuals – wintering	5 year peak mean 1996/97 – 2000/01	3.6% *brittanica*
Knot *Calidris canutus*	18,500 individuals – passage	5 year peak mean 1996 – 2000	4.1% *islandica*
Dunlin *Calidris alpina*	20,269 individuals – passage	5 year peak mean 1996 – 2000	1.5% *alpina*, Western Europe (non-breeding)
Black-tailed godwit *Limosa limosa*	915 individuals – passage	5 year peak mean 1996 – 2000	2.6% *islandica*
Redshank *Tringa totanus*	7,462 individuals – passage	5 year peak mean 1996 – 2000	5.7% *brittanica*

Bird counts from: Wetland Bird Survey (WeBS) database and *The Humber Estuary: A comprehensive review of its nature conservation interest* (Allen *et al.* 2003).

Assemblage qualification:
The site qualifies under **article 4.2** of the Directive (79/409/EEC) as it is used regularly by over 20,000 waterbirds (waterbirds as defined by the Ramsar Convention) in any season:

In the non-breeding season, the area regularly supports 153,934 individual waterbirds (five year peak mean 1996/97 – 2000/01), including dark-bellied brent goose *Branta bernicla bernicla*, shelduck *Tadorna tadorna*, wigeon *Anas penelope*, teal *Anas crecca*, mallard *Anas platyrhynchos*, pochard *Aythya ferina*, scaup *Aythya marila*, goldeneye *Bucephala clangula*, bittern *Botaurus stellaris*, oystercatcher *Haematopus ostralegus*, avocet *Recurvirostra avosetta*, ringed plover *Charadrius hiaticula*, golden plover *Pluvialis apricaria*, grey plover *P. squatarola*, lapwing *Vanellus vanellus*, knot *Calidris canutus*, sanderling *C. alba*, dunlin *C. alpina*, ruff *Philomachus pugnax*, black-tailed godwit *Limosa limosa*, bar-tailed godwit *L. lapponica*, whimbrel *Numenius phaeopus*, curlew *N. arquata*, redshank *Tringa totanus*, greenshank *T. nebularia* and turnstone *Arenaria interpres*.

Non-qualifying species of interest: The SPA is used by non-breeding merlin *Falco columbarius*, peregrine *F. peregrinus* and short-eared owl *Asio flammeus*, and breeding common tern *Sterna hirundo* and kingfisher *Alcedo atthis* (all species listed in Annex I to the EC Birds Directive) in numbers of less than European importance (less than 1% of the GB population).

Status of SPA:
1) Humber Flats, Marshes and Coast (Phase 1) SPA was classified on 28 July 1994.
2) The extended and renamed Humber Estuary SPA was classified on 31 August 2007.

This citation relates to a site entered in the Register of European Sites for Great Britain.
Register reference number: UK9006111
Date of registration: 31 August 2007

Signed: [redacted]

On behalf of the Secretary of State for Environment, Food and Rural Affairs

Information Sheet on Ramsar Wetlands (RIS)

Categories approved by Recommendation 4.7 (1990), as amended by Resolution VIII.13 of the 8th Conference of the Contracting Parties (2002) and Resolutions IX.1 Annex B, IX.6, IX.21 and IX. 22 of the 9th Conference of the Contracting Parties (2005).

Notes for compilers:

1. The RIS should be completed in accordance with the attached *Explanatory Notes and Guidelines for completing the Information Sheet on Ramsar Wetlands*. Compilers are strongly advised to read this guidance before filling in the RIS.

2. Further information and guidance in support of Ramsar site designations are provided in the *Strategic Framework for the future development of the List of Wetlands of International Importance* (Ramsar Wise Use Handbook 7, 2nd edition, as amended by COP9 Resolution IX.1 Annex B). A 3rd edition of the Handbook, incorporating these amendments, is in preparation and will be available in 2006.

3. Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Secretariat. Compilers should provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of all maps.

1. Name and address of the compiler of this form:

FOR OFFICE USE ONLY.

DD MM YY

Designation date | Site Reference Number

Joint Nature Conservation Committee
Monkstone House
City Road
Peterborough
Cambridgeshire PE1 1JY
UK
Telephone/Fax: +44 (0)1733 – 562 626 / +44 (0)1733 – 555 948
Email: RIS@JNCC.gov.uk

2. Date this sheet was completed/updated:

Designated: 31 August 2007

3. Country:

UK (England)

4. Name of the Ramsar site:

Humber Estuary

5. Designation of new Ramsar site or update of existing site:

This RIS is for: Updated information on an existing Ramsar site

6. For RIS updates only, changes to the site since its designation or earlier update:

a) Site boundary and area:

The boundary has been extended

** Important note: If the boundary and/or area of the designated site is being restricted/reduced, the Contracting Party should have followed the procedures established by the Conference of the Parties in the Annex to COP9 Resolution IX.6 and provided a report in line with paragraph 28 of that Annex, prior to the submission of an updated RIS.

b) Describe briefly any major changes to the ecological character of the Ramsar site, including in the application of the Criteria, since the previous RIS for the site:

7. Map of site included:

Refer to Annex III of the *Explanatory Notes and Guidelines*, for detailed guidance on provision of suitable maps, including digital maps.

a) A map of the site, with clearly delineated boundaries, is included as:

i) **hard copy** (required for inclusion of site in the Ramsar List): *yes* ✓ -or- *no* □;
ii**) an electronic format** (e.g. a JPEG or ArcView image) Yes
iii) **a GIS file providing geo-referenced site boundary vectors and attribute tables** *yes* ✓ -or- *no* □;

b) Describe briefly the type of boundary delineation applied:

e.g. the boundary is the same as an existing protected area (nature reserve, national park etc.), or follows a catchment boundary, or follows a geopolitical boundary such as a local government jurisdiction, follows physical boundaries such as roads, follows the shoreline of a waterbody, etc.

The site boundary is the same as, or falls within, an existing protected area.

For precise boundary details, please refer to paper map provided at designation

8. Geographical coordinates (latitude/longitude):

053 32 59 N 000 00 03 E

9. General location:

Include in which part of the country and which large administrative region(s), and the location of the nearest large town.

Nearest town/city: Kingston-upon-Hull

The Humber Estuary is located on the boundary between the East Midlands Region and the Yorkshire and the Humber Region, on the east coast of England bordering the North Sea.

Administrative region: City of Kingston upon Hull; East Riding of Yorkshire; Humberside; Lincolnshire; North East Lincolnshire; North Lincolnshire

10. Elevation (average and/or max. & min.) (metres): 11. Area (hectares): 37987.8

Min. -13
Max. 10
Mean No information available

12. General overview of the site:

Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

The Humber Estuary is the largest macro-tidal estuary on the British North Sea coast. It drains a catchment of some 24,240 square kilometres and is the site of the largest single input of freshwater from Britain into the North Sea. It has the second-highest tidal range in Britain (max 7.4 m) and approximately one-third of the estuary is exposed as mud or sand flats at low tide. The inner estuary supports extensive areas of reedbed with areas of mature and developing saltmarsh backed in places by limited areas of grazing marsh in the middle and outer estuary. On the north Lincolnshire coast the saltmarsh is backed by low sand dunes with marshy slacks and brackish pools. The Estuary regularly supports internationally important numbers of waterfowl in winter and nationally important breeding populations in summer.

13. Ramsar Criteria:

Circle or underline each Criterion applied to the designation of the Ramsar site. See Annex II of the *Explanatory Notes and Guidelines* for the Criteria and guidelines for their application (adopted by Resolution VII.11).

1, 3, 5, 6, 8

14. Justification for the application of each Criterion listed in 13 above:

Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

Ramsar criterion 1

The site is a representative example of a near-natural estuary with the following component habitats: dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish/saline lagoons.

It is a large macro-tidal coastal plain estuary with high suspended sediment loads, which feed a dynamic and rapidly changing system of accreting and eroding intertidal and subtidal mudflats, sandflats, saltmarsh and reedbeds. Examples of both strandline, foredune, mobile, semi-fixed dunes, fixed dunes and dune grassland occur on both banks of the estuary and along the coast. The estuary supports a full range of saline conditions from the open coast to the limit of saline intrusion on the tidal rivers of the Ouse and Trent. Wave exposed sandy shores are found in the outer/open coast areas of the estuary. These change to the more moderately exposed sandy shores and then to sheltered muddy shores within the main body of the estuary and up into the tidal rivers. The lower saltmarsh of the Humber is dominated by common cordgrass *Spartina anglica* and annual glasswort *Salicornia* communities. Low to mid marsh communities are mostly represented by sea aster *Aster tripolium*, common saltmarsh grass *Puccinellia maritima* and sea purslane *Atriplex portulacoides* communities. The upper portion of the saltmarsh community is atypical, dominated by sea couch *Elytrigia atherica* (*Elymus pycnanthus*) saltmarsh community. In the upper reaches of the estuary, the tidal marsh community is dominated by the common reed *Phragmites australis* fen and sea club rush *Bolboschoenus maritimus* swamp with the couch grass *Elytrigia repens (Elymus repens)* saltmarsh community. Within the Humber Estuary Ramsar site there are good examples of four of the five physiographic types of saline lagoon.

Ramsar criterion 3

The Humber Estuary Ramsar site supports a breeding colony of grey seals *Halichoerus grypus* at Donna Nook. It is the second largest grey seal colony in England and the furthest south regular breeding site on the east coast. The dune slacks at Saltfleetby-Theddlethorpe on the southern extremity of the Ramsar site are the most north-easterly breeding site in Great Britain of the natterjack toad *Bufo calamita*.

Ramsar criterion 5

Assemblages of international importance:

153,934 waterfowl, non-breeding season

(5 year peak mean 1996/97-2000/2001)

Ramsar criterion 6 – species/populations occurring at levels of international importance.

Eurasian golden plover, *Pluvialis apricaria*

altifrons subspecies – NW Europe, W Continental Europe, NW Africa population

17,996 individuals, passage, representing an average of 2.2% of the population

(5 year peak mean 1996-2000)

Red knot, *Calidris canutus*

islandica subspecies

18,500 individuals, passage, representing an average of 4.1% of the population

(5 year peak mean 1996-2000)

Dunlin, *Calidris alpina*
alpina subspecies – Western Europe (non-breeding) population
20,269 individuals, passage, representing an average of 1.5% of the population
(5 year peak mean 1996-2000)

Black-tailed godwit, *Limosa limosa*
islandica subspecies
915 individuals, passage, representing and average of 2.6% of the population
(5 year peak mean 1996-2000)

Common redshank, *Tringa totanus*
brittanica subspecies
7,462 individuals, passage, representing an average of 5.7% of the population
(5 year peak mean 1996-2000)

Common shelduck, *Tadorna tadorna*
Northwestern Europe (breeding) population
4,464 individuals, wintering, representing an average of 1.5% of the population
(5 year peak mean 1996/7-2000/1)

Eurasian golden plover, *Pluvialis apricaria*
altifrons subspecies – NW Europe, W Continental Europe, NW Africa population
30,709 individuals, wintering, representing an average of 3.8% of the population
(5 year peak mean 1996/7-2000/1)

Red knot, *Calidris canutus*
islandica subspecies
28,165 individuals, wintering, representing an average of 6.3% of the population
(5 year peak mean 1996/7-2000/1)

Dunlin, *Calidris alpina*
alpina subspecies – Western Europe (non-breeding) population
22,222 individuals, wintering, representing an average of 1.7% of the population
(5 year peak mean 1996/7-2000/1)

Black-tailed godwit, *Limosa limosa*
islandica subspecies
1,113 individuals, wintering, representing an average of 3.2% of the population
(5 year peak mean 1996/7-2000/1)

Bar-tailed godwit , *Limosa lapponica*
lapponica subspecies
2,752 individuals, wintering, representing an average of 2.3% of the population
(5 year peak mean 1996/7-2000/1)

Common redshank, *Tringa totanus*
brittanica subspecies
4,632 individuals, wintering, representing an average of 3.6% of the population
(5 year peak mean 1996/7-2000/1)

Ramsar criterion 8
The Humber Estuary acts as an important migration route for both river lamprey *Lampetra fluviatilis* and sea lamprey *Petromyzon marinus* between coastal waters and their spawning areas.

Ramsar criterion 5

Assemblages of international importance:

Species with peak counts in winter:
153934 waterfowl (5 year peak mean 1998/99-2002/2003)

Ramsar criterion 6 – species/populations occurring at levels of international importance.

Qualifying Species/populations (as identified at designation):

Species with peak counts in spring/autumn:

European golden plover , *Pluvialis apricaria apricaria*, P. a. altifrons Iceland & Faroes/E Atlantic	17996 individuals, representing an average of 2.2% of the population (1996-2000)
Red knot , *Calidris canutus islandica*, W & Southern Africa	18500 individuals, representing an average of 4.1% of the population (1996-2000)
(wintering)	
Dunlin , *Calidris alpina alpina*, W Siberia/W Europe	20269 individuals, representing an average of 1.5% of the population (1996-2000)
Black-tailed godwit , *Limosa limosa islandica*, Iceland/W Europe	915 individuals, representing an average of 2.6% of the population (1996-2000)
Common redshank , *Tringa totanus totanus*,	7462 individuals, representing an average of 5.7% of the population (1996-2000)

Species with peak counts in winter:

Common shelduck , *Tadorna tadorna*, NW Europe	4464 individuals, representing an average of 1.5% of the population (1996/7 to 2000/1)
European golden plover , *Pluvialis apricaria apricaria*, P. a. altifrons Iceland & Faroes/E Atlantic	30709 individuals, representing an average of 3.8% of the population (1996/7 to 2000/1)
Red knot , *Calidris canutus islandica*, W & Southern Africa	28165 individuals, representing an average of 6.3% of the population (1996/7 to 2000/1)
(wintering)	
Dunlin , *Calidris alpina alpina*, W Siberia/W Europe	22222 individuals, representing an average of 1.7% of the population (1996/7 to 2000/1)

Black-tailed godwit , *Limosa limosa islandica*, Iceland/W Europe	1113 individuals, representing an average of 3.2% of the population (1996/7 to 2000/1)
Bar-tailed godwit , *Limosa lapponica lapponica*, W Palearctic	2752 individuals, representing an average of 2.3% of the population (1996/7 to 2000/1)

Contemporary data and information on waterbird trends at this site and their regional (sub-national) and national contexts can be found in the Wetland Bird Survey report, which is updated annually. See www.bto.org/survey/webs/webs-alerts-index.htm.
See Sections 21/22 for details of noteworthy species
Details of bird species occuring at levels of National importance are given in Section 22

15. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):

Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalisation system that has been applied.

a) biogeographic region:

Atlantic

b) biogeographic regionalisation scheme (include reference citation):

Council Directive 92/43/EEC

16. Physical features of the site:

Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

Soil & geology	neutral, shingle, sand, mud, clay, alluvium, sedimentary, sandstone, sandstone/mudstone, limestone/chalk, gravel, nutrient-rich
Geomorphology and landscape	lowland, coastal, floodplain, shingle bar, intertidal sediments (including sandflat/mudflat), estuary, islands, cliffs
Nutrient status	eutrophic
pH	circumneutral
Salinity	brackish / mixosaline, fresh, saline / euhaline
Soil	mainly mineral
Water permanence	usually permanent
Summary of main climatic features	Annual averages (Cleethorpes, 1971–2000) (www.metoffice.com/climate/uk/averages/19712000/sites/cleethorpes.html) Max. daily temperature: 13.1° C Min. daily temperature: 6.4° C Days of air frost: 29.0 Rainfall: 565.4 mm Hrs. of sunshine: 1521.9

General description of the Physical Features:

The Humber estuary is approximately 70 km long from the limit of saline intrusion on the River Ouse at Boothferry to the estuary mouth at Spurn Head, where it enters the North Sea. The area of the estuary is approx. 365 km2, and it has a width of 6.6 km at the mouth.

The Humber is a macro-tidal estuary with a tidal range of 7.4 m, the second-largest range in the UK and comparable to other macro-tidal estuaries worldwide. It is a shallow and well mixed estuary, with an average depth of 6.5m rising to 13.2 m at the mouth.

The Humber is the second-largest coastal plain estuary in the UK, and the largest coastal plain estuary on the east coast of Britain. Suspended sediment concentrations are high, and are derived from a variety of sources, including marine sediments and eroding boulder clay along the Holderness coast. This is the northernmost of the English east coast estuaries whose structure and function is intimately linked with soft eroding shorelines.

Upstream from the Humber Bridge, the navigation channel undergoes major shifts from north to south banks. This section of the estuary is noteworthy for extensive mud and sand bars, which in places form semi-permanent islands.

The estuary covers the full salinity range from fully marine at the mouth of the estuary (Spurn Head) to the limit of saline intrusion on the Rivers Ouse and Trent)). A salinity gradient from north to south bank is observed in the outer estuary, due to the incoming tide flowing along the north bank, while the fresh water keeps to the south bank as it discharges to the sea. As salinity declines upstream, reedbeds and brackish saltmarsh communities fringe the estuary..

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17. Physical features of the catchment area:

Describe the surface area, general geology and geomorphological features, general soil types, general land use, and climate (including climate type).

The Humber catchment covers an area of ca. 24,240 km2, more than 20% of the land area of England. Average annual precipitation in the upland areas of the catchment is as much as 1000 mm. Average freshwater flow into the Humber estuary from the rivers is 250 m3s-1, ranging from 60 m3s-1 in drier periods to 450 m3s-1 in wet periods. Peak flows of up to 1500 m3s-1 have been recorded during floods. The rivers Trent and Ouse, which provide the main fresh water flow into the Humber, drain large industrial and urban areas to the south and west (River Trent), and less densely populated agricultural areas to the north and west (River Ouse). The Trent/Ouse confluence is known as Trent Falls.

On the north bank of the Humber estuary the principal river is the river Hull, which flows through the city of Kingston-upon-Hull, and has a tidal length of 32 km, up to the Hempholme Weir. The Hull provides only about 1% of the freshwater input to the estuary. On the south bank, the River Ancholme enters the Humber at South Ferriby, but the tide is excluded by a sluice and a tidal lock. Altogether, the total tidal length of rivers and estuary is 313 km.

There are several major urban centres within the river catchments. Nottingham, Leicester, and the West Midlands/Birmingham conurbation are drained by the Trent, the Leeds-Bradford area in West Yorkshire is drained by the Aire/Calder and the Sheffield/Rotherham/Doncaster area in South Yorkshire is drained by the Don. There are also large rural regions, whose populations are currently experiencing high population growth, while the urban areas are showing a small decline. The 1992 population for the Ouse catchment was 4.1 million, and for the Trent catchment was 7.1 million. The population of Humberside, which comprises North and North-east Lincolnshire, the East Riding of Yorkshire, and Kingston-upon-Hull (Hull), was just under 0.9 million. Land use around the estuary itself is 50-98% agricultural, within only two areas of high population/ industry – the major conurbation around Kingston-upon-Hull (Hull) on the north bank, and several large industrial areas around Grimsby/ Immingham/ Cleesthorpes on the south bank.

The area around the Humber estuary is low-lying, and much land-claim of wetlands and supratidal zones, as well as parts of the intertidal zone, was carried out in the past two centuries. The mid to

outer estuary (Humber Bridge to Spurn Point) changed from a region of low water erosion in the 19th century to one of accretion in the 20th century, nonetheless a net loss of intertidal zone of some 3000 ha has taken place since the mid-19th century. Around the estuary some 894 km2 of land are below the 5 m contour, protected by extensive coastal defences. Most of the sediment entering the estuary comes from the North Sea, and a large part of it is believed to come from the continuing erosion of the Holderness Cliffs, which form the coastline to the north of the estuary mouth at Spurn Head. The estuary currently has approximately 1,775 ha of saltmarsh

18. Hydrological values:

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

Sediment trapping

19. Wetland types:

Marine/coastal wetland

Code	Name	% Area
F	Estuarine waters	66.8
G	Tidal flats	26.4
H	Salt marshes	4.7
E	Sand / shingle shores (including dune systems)	0.8
7	Gravel / brick / clay pits	0.5
Q	Saline / brackish lakes: permanent	0.3
J	Coastal brackish / saline lagoons	0.3
Other	Other	0.1
9	Canals and drainage channels	0.01
Y	Freshwater springs	0.01

20. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site, and the ecosystem services of the site and the benefits derived from them.

Description

Much of the intertidal area of the Humber Estuary consists of mudflats with fringing saltmarsh. There are smaller areas of intertidal sand flats, and sand dunes. The saltmarsh is both eroding and accreting; although coastal squeeze is resulting in net losses, and cord grass Spartina anglica is a major colonising species. In areas of reduced salinity such as the Upper Humber there are extensive areas of common reed Phragmites australis with some sea club-rush Bolboschoenus maritimus. Mid-level saltmarsh tends to be much more floristically diverse, and in the higher level marsh with its dendritic network of drainage channels, salt pans and borrow pits grasses dominate with thrift Armeria maritima where the marsh is grazed by cattle and sheep. Extensive areas of eel grass Zostera marina and Z. nolti have been known to occur at Spurn Bight, although in recent years records are limited. Behind the sandflats of the Cleethorpes coast the mature sand-dune vegetation contains some locally and nationally rare species including chestnut flat sedge Blysmus rufus, bulbous meadow grass Poa bulbosa and dense silky-bent Apera interrupta. The sand dunes, which cap the shingle spit that forms Spurn Peninsula are dominated by marram grass Ammophila arenaria and patches of dense sea buckthorn Hippophae rhamnoides.

Ecosystem services

Aesthetic

Education

Food

Recreation

Storm/wave protection

21. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in **12**. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

None reported

22. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in **12**. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Birds

Species Information

Species Information
Birds
Species currently occurring at levels of national importance:

Great bittern, *Botaurus stellaris*
stellaris subspecies – W Europe, NW Africa (breeding) population
2 booming males, breeding, representing an average of 10.5% of the GB population
(3 year mean 2000-2002)

Eurasian marsh harrier, *Circus aeruginosus*
Europe population
10 females, breeding, representing an average of 6.3% of the GB population
(5 year mean 1998-2002)

Pied avocet, *Recurvirostra avosetta*
Western Europe (breeding) population
64 pairs, breeding, representing an average of 8.6% of the GB population
(5 year mean 1998-2002)

Little tern, *Sterna albifrons*
albifrons subspecies, Western Europe (breeding) population
51 pairs, breeding, representing an average of 2.1% of the GB population
(5 year mean 1998-2002)

Dark-bellied brent goose, *Branta bernicla*
bernicla subspecies
2,098 individuals, wintering, representing an average of 2.1% of the GB population
(5 year peak mean 1996/7-2000/1)

Eurasian wigeon, *Anas penelope*
Northwestern Europe (non-breeding) population
5,044 individuals, wintering, representing an average of 1.2% of the GB population
(5 year peak mean 1996/7-2000/1)

Common teal, *Anas crecca*
crecca subspecies, Northwestern Europe (non-breeding population)
2,322 individuals, wintering, representing an average of 1.2% of the GB population

(5 year peak mean 1996/7-2000/1)

Common pochard, *Aythya ferina*
Northeastern & Northwestern Europe (non-breeding) population
719 individuals, wintering, representing an average of 1.2% of the GB population
(5 year peak mean 1996/7-2000/1)

Greater scaup, *Aythya marila*
marila subspecies, Western Europe (non-breeding) population
127 individuals, wintering, representing an average of 1.7% of the GB population
(5 year peak mean 1996/7-2000/1)

Common goldeneye, *Bucephala clangula*
clangula subspecies, Northwestern & Central Europe (non-breeding) population
467 individuals, wintering, representing an average of 1.9% of the GB population
(5 year peak mean 1996/7-2000/1)

Great bittern, *Botaurus stellaris*
stellaris subspecies – W Europe, NW Africa (breeding) population
4 individuals, wintering, representing an average of 4.0% of the GB population
(5 year peak mean 1998/9-2002/3)

Hen harrier, *Circus cyaneus*
Europe population
8 individuals, wintering, representing an average of 1.1% of the GB population
(5 year peak mean 1997/8-2001/2)

Eurasian oystercatcher, *Haematopus ostralegus*
ostralegus subspecies
3,503 individuals, wintering, representing an average of 1.1% of the GB population
(5 year peak mean 1996/7-2000/1)

Pied avocet, *Recurvirostra avosetta*
Western Europe (breeding) population
59 individuals, wintering, representing an average of 1.7% of the GB population
(5 year peak mean 1996/7-2000/1)

Great ringed plover, *Charadrius hiaticula*
hiaticula subspecies
403 individuals, wintering, representing an average of 1.2% of the GB population
(5 year peak mean 1996/7-2000/1)

Grey plover, *Pluvialis squatarola*
squatarola subspecies, Eastern Atlantic (non-breeding) population
1,704 individuals, wintering, representing an average of 3.2% of the GB population
(5 year peak mean 1996/7-2000/1)

Northern lapwing, *Vanellus vanellus*
Europe (breeding) population
22,765 individuals, wintering, representing an average of 1.1% of the GB population
(5 year peak mean 1996/7-2000/1)

Sanderling, *Calidris alba*
Eastern Atlantic (non-breeding) population

486 individuals, wintering, representing an average of 2.3% of the GB population
(5 year peak mean 1996/7-2000/1)

Curlew, *Numenius arquata*
arquata subspecies
3,253 individuals, wintering, representing an average of 2.2% of the GB population
(5 year peak mean 1996/7-2000/1)

Ruddy turnstone, *Arenaria interpres*
interpres subspecies, Northeastern Canada & Greenland (breeding) population
629 individuals, wintering, representing an average of 1.3% of the GB population
(5 year peak mean 1996/7-2000/1)

Great ringed plover, *Charadrius hiaticula*
psammodroma subspecies
1,766 individuals, passage, representing an average of 5.9% of the GB population
(5 year peak mean 1996-2000)

Grey plover, *Pluvialis squatarola*
squatarola subspecies, Eastern Atlantic (non-breeding) population
1,590 individuals, passage, representing an average of 2.3% of the GB population
(5 year peak mean 1996-2000)

Sanderling, *Calidris alba*
Eastern Atlantic (non-breeding) population
818 individuals, passage, representing an average of 2.7% of the GB population
(5 year peak mean 1996-2000)

Ruff, *Philomachus pugnax*
Western Africa (non-breeding) population
128 individuals, passage, representing an average of 1.4% of the GB population
(5 year peak mean 1996-2000)

Whimbrel, *Numenius phaeopus*
islandicus subspecies
113 individuals, passage, representing an average of 2.3% of the GB population
(5 year peak mean 1996-2000)

Common greenshank, *Tringa nebularia*
Northwestern Europe (breeding) population
77 individuals, passage, representing an average of 5.5% of the GB population
(5 year peak mean 1996-2000)

23. Social and cultural values:

Describe if the site has any general social and/or cultural values e.g. fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values.

Aesthetic
Aquatic vegetation (e.g. reeds, willows, seaweed)
Archaeological/historical site
Environmental education/ interpretation
Fisheries production
Livestock grazing
Non-consumptive recreation

Sport fishing
Sport hunting
Tourism
Transportation/navigation

b) Is the site considered of international importance for holding, in addition to relevant ecological values, examples of significant cultural values, whether material or non-material, linked to its origin, conservation and/or ecological functioning? No

If Yes, describe this importance under one or more of the following categories:

i) sites which provide a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland:

ii) sites which have exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland:

iii) sites where the ecological character of the wetland depends on the interaction with local communities or indigenous peoples:

iv) sites where relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland:

24. Land tenure/ownership:

Ownership category	On-site	Off-site
Non-governmental organisation (NGO)	+	+
Local authority, municipality etc.	+	+
National/Crown Estate	+	+
Private	+	+
Public/communal	+	+

25. Current land (including water) use:

Activity	On-site	Off-site
Nature conservation	+	+
Tourism	+	+
Recreation	+	+
Current scientific research	+	
Cutting of vegetation (small-scale/subsistence)	+	
Fishing: commercial	+	+
Fishing: recreational/sport	+	+
Gathering of shellfish	+	+
Bait collection	+	+
Permanent arable agriculture		+
Permanent pastoral agriculture	+	+
Hunting: recreational/sport	+	+
Industrial water supply	+	+
Industry	+	+
Sewage treatment/disposal	+	+
Harbour/port	+	+

Flood control	+	+
Irrigation (incl. agricultural water supply)		+
Mineral exploration (excl. hydrocarbons)		+
Oil/gas exploration	+	+
Transport route	+	+
Domestic water supply		+
Urban development		+
Non-urbanised settlements		+
Military activities	+	+
Horticulture (incl. market gardening)		+

26. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

Explanation of reporting category:

1. *Those factors that are still operating, but it is unclear if they are under control, as there is a lag in showing the management or regulatory regime to be successful.*
2. *Those factors that are not currently being managed, or where the regulatory regime appears to have been ineffective so far.*

NA = Not Applicable because no factors have been reported.

Adverse Factor Category	Reporting Category	Description of the problem (Newly reported Factors only)	On-Site	Off-Site	Major Impact?
Disturbance to vegetation through cutting / clearing	1	Reedbeds being cut and cleared on margins of pits associated with angling. Management agreements and enforcement to address.	+		
Vegetation succession	1	Lack of reedbed management leading to scrub encroachment. Management agreement to address.	+		
Water diversion for irrigation/domestic/industrial use	1	Abstraction causes reduced freshwater input. Review of consents well advanced but not yet implemented.	+	+	
Overfishing	2	Substantial lamprey by-catch in eel nets in River Ouse.		+	
Pollution – domestic sewage	1	Reduced dissolved oxygen in River Ouse is a barrier to fish migration. Review of consents well advanced but not yet implemented.	+	+	+
Pollution – agricultural fertilisers	1	Reduced dissolved oxygen in River Ouse is a barrier to fish migration. To be addressed through Catchment Sensitive Farming Initiatives and implementation of Water Framework Directive.	+	+	+
Recreational/tourism disturbance (unspecified)	1	Particularly illegal access by motorised recreational vehicles and craft. Control through management scheme.	+		

Other factor	1	Coastal squeeze causing loss of intertidal habitats and saltmarsh due to sea level rise and fixed defences. The Humber Flood Risk Management Strategy has been developed and is being implemented.	+		+

For category 2 factors only.
What measures have been taken / are planned / regulatory processes invoked, to mitigate the effect of these factors?
Overfishing - Overfishing – to be considered through an 'in-combination' assessment of possible factors as part of the Review of Consents exercise.

Is the site subject to adverse ecological change? YES

27. Conservation measures taken:

List national category and legal status of protected areas, including boundary relationships with the Ramsar site; management practices; whether an officially approved management plan exists and whether it is being implemented.

Conservation measure	On-site	Off-site
Site/ Area of Special Scientific Interest (SSSI/ASSI)	+	+
National Nature Reserve (NNR)	+	
Special Protection Area (SPA)	+	
Land owned by a non-governmental organisation for nature conservation	+	+
Management agreement	+	+
Site management statement/plan implemented	+	
Area of Outstanding National Beauty (AONB)		+
Special Area of Conservation (SAC)	+	
IUCN (1994) category IV	+	

b) Describe any other current management practices:
The management of Ramsar sites in the UK is determined by either a formal management plan or through other management planning processes, and is overseen by the relevant statutory conservation agency. Details of the precise management practises are given in these documents.

28. Conservation measures proposed but not yet implemented:

e.g. management plan in preparation; official proposal as a legally protected area, etc.

No information available

29. Current scientific research and facilities:

e.g. details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

Fauna.
Numbers of migratory and wintering wildfowl and waders are monitored annually as part of the national Wetland Birds Survey (WeBS) organised by the British Trust for Ornithology, Wildfowl & Wetlands Trust, the Royal Society for the Protection of Birds and the Joint Nature Conservation Committee.
Seal populations are monitored by the Sea Mammal Research Unit
Humber Wader Ringing Group
Spurn Bird Observatory
National Nature Reserve monitoring

Environment.
Institute of Estuarine & Coastal Studies, Hull: various
Industrial Concerns: monitoring on behalf of companies such as Associated British Ports and BP
Environment Agency monitoring: various
Geomorphological studies associated with shoreline management planning
National Nature Reserve monitoring

30. Current communications, education and public awareness (CEPA) activities related to or benefiting the site:

e.g. visitor centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

There are a four National Nature Reserves with associated facilities within the Ramsar site (Spurn, Far Ings, Donna Nook and Saltfleetby – Theddlethorpe Dunes) and a number of other visitor, information and/or education centres including the Spurn Bird Observatory, the Cleethorpes Discovery Centre, Water's Edge and Far Ings. A wide range of Humber wide and area-specific information is available through a range of media (eg leaflets, displays, internet etc) including 'Humber Estuary European Marine Site Codes of Conduct' developed with a range of stakeholders to cover a range of recreational and educational activities and 'Coastal Futures' – a partnership project working with local communities affected by flood risk and associated issues including managed realignment includes proactive education work within schools.

31. Current recreation and tourism:

State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

Activities, Facilities provided and Seasonality.
Sailing: marinas at Brough, Winteringham, Hull, Grimsby and South Ferriby.

Bathing etc: Cleethorpes (some 6m visitors/yr).

Walking/Horse riding: throughout

Beach fishing, match sea-fishing, non-commercial bait digging.

Non-commercial samphire collection

Wildfowling

Tourist amusements: Cleethorpes.

Bird watching: throughout but particularly at Blacktoft Sands RSPB reserve and the four National Nature Reserves.

32. Jurisdiction:

Include territorial, e.g. state/region, and functional/sectoral, e.g. Dept. of Agriculture/Dept. of Environment, etc.

Head, Natura 2000 and Ramsar Team, Department for Environment, Food and Rural Affairs, European Wildlife Division, Zone 1/07, Temple Quay House, 2 The Square, Temple Quay, Bristol, BS1 6EB

33. Management authority:

Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the wetland.

Site Designations Manager, English Nature, Sites and Surveillance Team, Northminster House, Northminster Road, Peterborough, PE1 1UA, UK

34. Bibliographical references:

Scientific/technical references only. If biogeographic regionalisation scheme applied (see **15** above), list full reference citation for the scheme.

Site-relevant references

Site-relevant references

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EC Directive 92/43 on the Conservation of Natural Habitats and of Wild Fauna and Flora

Citation for Special Area of Conservation (SAC)

Name:	Saltfleetby–Theddlethorpe Dunes and Gibraltar Point
Unitary Authority/County:	Lincolnshire
SAC status:	Designated on 1 April 2005
Grid reference:	TF480906
SAC EU code:	UK0030270
Area (ha):	960.20
Component SSSI:	Gibraltar Point SSSI, Saltfleetby–Theddlethorpe Dunes SSSI

Site description:

The dune system on this composite site contains good examples of shifting dunes within a complex site that exhibits a range of dune types. The marram *Ammophila arenaria*-dominated dunes are associated with lyme-grass *Leymus arenarius* and sand sedge *Carex arenaria*. These shifting dunes are part of a successional transition with fixed dunes with dune grassland and sea-buckthorn *Hippophae rhamnoides*. The rapidly-accreting dunes on the seaward sand bars and shingle banks make this an important site for research into the processes of coastal development.

There are extensive areas of fixed dune vegetation within largely intact geomorphologically-active systems, with representation of early successional stages on the seaward side, and more stable areas. The lime-rich dunes support a rich and diverse flora, dominated in places by red fescue *Festuca rubra* and with unusual species including pyramidal orchid *Anacamptis pyramidalis*, bee orchid *Orchis apifera*, sea-holly *Eryngium maritimum*, lesser meadow-rue *Thalictrum minus* and sea campion *Silene maritima*.

This site also supports a good example of dunes with sea-buckthorn *Hippophae rhamnoides* in the main part of its natural range in the UK. This habitat develops on dune areas and is present in a range of successional stages from early colonisation to mature scrub associated with other species such as elder *Sambucus nigra*, hawthorn *Crataegus monogyna* and ivy *Hedera helix*, typically associated with an understorey of ruderal species.

The dune slacks at this site are part of a successional transition between a range of dune features, and some have developed from saltmarsh to freshwater habitats after becoming isolated from tidal inundation by sand deposition. There is a range of different communities and the species present depend on the wetness of the slack, its location within the system and the management history. Some of the drier slacks support a very wide range of species; this has been encouraged by management. The wetter slacks often have more permanent standing water and are composed of stands of sedges and rushes.

Qualifying habitats: The site is designated under **article 4(4)** of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I:

- Dunes with *Hippophae rhamnoides*. (Dunes with sea-buckthorn)
- Embryonic shifting dunes
- Fixed dunes with herbaceous vegetation (grey dunes). (Dune grassland)*
- Humid dune slacks
- Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes). (Shifting dunes with marram)

Annex I priority habitats are denoted by an asterisk (*).

This citation relates to a site entered in the Register of European Sites for Great Britain.
Register reference number: UK0030270
Date of registration: 14 June 2005
Signed: [redacted]
On behalf of the Secretary of State for Environment, Food and Rural Affairs

Directive 2009/147/EC on the Conservation of Wild Birds
Special Protection Area (SPA)

Name: Greater Wash SPA

Counties/Unitary Authorities: East Riding of Yorkshire, Lincolnshire, Norfolk, Suffolk

Boundary of the SPA:

The landward boundary of the SPA covers the coastline from Bridlington Bay in the north (at the village of Barmston), to the existing boundary of the Outer Thames Estuary SPA in the south. Along this stretch of coast, the boundary will come to Mean High Water (MHW). Across the mouth of the Humber Estuary, the boundary abuts the boundary of the Humber Estuary SPA, except where neither the little tern foraging zone or the red-throated diver Maximum Curvature Analysis (MCA) density threshold reaches the SPA. The landward boundary abuts the seaward boundary of The Wash SPA except where the former overlaps the latter to encompass the foraging area of Sandwich tern.

The seaward boundary lies approximately 14 nautical miles (nm) from the shore at its furthest extent and is driven by the distribution of red-throated diver along the length of the SPA, with a small length off the north Norfolk Coast driven by the area used by foraging Sandwich tern.

Size of SPA: The SPA covers an area of 353,578 ha or 3,536 km^2.

Site description:

The Greater Wash SPA is located in the mid-southern North Sea between Bridlington Bay in the north and the Outer Thames Estuary SPA in the south. To the north, off the Holderness coast in Yorkshire, seabed habitats primarily comprise coarse sediments, with occasional areas of sand, mud and mixed sediments. Subtidal sandbanks occur at the mouth of the Humber Estuary, primarily comprising sand and coarse sediments. Offshore, soft sediments dominate, with extensive areas of subtidal sandbanks off The Wash as well as north and east Norfolk coasts. Closer inshore at The Wash and north Norfolk coast, sediments comprise a mosaic of sand, muddy sand, mixed sediments and coarse sediments, as well as occasional Annex I reefs. The area off the Suffolk coast continues the mosaic habitats mostly dominated by soft sediment.

Qualifying species:

The site qualifies under **Article 4.1** of the Directive 2009/147/EC by regularly supporting populations of national importance of the Annex I species:

Species	**Count (period)**	**% of subspecies or population**	**SPA selection guideline**
Red-throated diver *Gavia stellata*	1,407 individuals (MoP 2002/03 - 2005/06)	8.3% GB non-breeding population	1.1
Little gull *Hydrocoloeus minutus*	1,255 individuals (MoP 2004/05 –2005/06)	No current GB population estimate	1.4
Sandwich tern *Sterna sandvicensis*	3,852 pairs (5 year MoP 2010-14)	35.0% of GB breeding population	1.1
Common tern *Sterna hirundo*	510 breeding pairs (5 year MoP 2010-2014)	5.1% of GB breeding	1.1
Little tern *Sternula albifrons*	798 pairs (5 year MoP 2009-2013)	42.0% of GB breeding population	1.1

In addition, the site qualifies under **Article 4.2** of the Directive 2009/147/EC by regularly supporting a population of international importance of the migratory species:

Species	Count (period)	% of subspecies or population	SPA selection guideline
Common scoter *Melanitta nigra*	3,449 individuals (MoP 2002/03, - 2007/08)	0.6% biogeographic population [1]	1.4

Mean of Peak (MoP) for non-breeding populations[2], breeding populations taken from various sources and are summed across the relevant site-specific population estimates. GB populations derived from Musgrove *et al*. (2013)[3] unless otherwise stated.

Principal bird data sources:

Populations on non-breeding waterbirds from:
MoP non-breeding populations for red-throated diver, common scoter and little gull were calculated by Natural England using Area of Search (AoS) data reported by Lawson *et al.* 2015a (Appendix 4).
Colony counts for Sandwich and common tern from:
JNCC Seabird Monitoring Programme contributed by colony managers from: National Trust, Natural England (North Norfolk Coast SPA) and RSPB (Breydon Water SPA).
Colony counts for little tern from:
RSPB for EU LIFE+ Little Tern Recovery Project contributed by site managers from: Easington Little Tern Protection Scheme (Humber Estuary SPA); Lincolnshire Wildlife Trust (Gibraltar Point SPA); RSPB, National Trust, Norfolk Wildlife Trust, Natural England (North Norfolk Coast SPA); and RSPB (Great Yarmouth North Denes SPA).

Status of SPA:
Greater Wash SPA was classified under Directive 2009/147/EC on 28th March 2018

This citation relates to a site entered in the Register of European Sites for Great Britain.
Register reference number: UK9020329
Date of registration: 28 March 2018

Signed: [redacted]

On behalf of the Secretary of State for Environment, Food and Rural Affairs

[1] Common scoter biogeographic population from Waterbird Population Estimates online database (http://wpe.wetlands.org/) accessed 26/01/2016)
[2] MoP (Mean of Peaks) non-breeding populations for red-throated diver, common scoter and little gull were calculated by Natural England using AoS data reported by Lawson *et al.* 2015 (http://jncc.defra.gov.uk/page-7104).
[3] Musgrove *et al.* (2013) collates population estimates of birds in Great Britain and the UK, by extrapolation of previous estimates using recognised trend measures, new surveys and novel analytical approaches (https://www.britishbirds.co.uk/wp-content/uploads/2010/12/APEP3.pdf).

Appendix C Conservation Objectives where LSE have not been excluded.

European Site Conservation Objectives for Humber Estuary Special Protection Area Site Code: UK9006111

With regard to the SPA and the individual species and/or assemblage of species for which the site has been classified (the 'Qualifying Features' listed below), and subject to natural change;

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;

- **The extent and distribution of the habitats of the qualifying features**
- **The structure and function of the habitats of the qualifying features**
- **The supporting processes on which the habitats of the qualifying features rely**
- **The population of each of the qualifying features, and,**
- **The distribution of the qualifying features within the site.**

This document should be read in conjunction with the accompanying *Supplementary Advice* document, which provides more detailed advice and information to enable the application and achievement of the Objectives set out above.

Qualifying Features:

A021 *Botaurus stellaris*; Great bittern (Non-breeding)
A021 *Botaurus stellaris*; Great bittern (Breeding)
A048 *Tadorna tadorna*; Common shelduck (Non-breeding)
A081 *Circus aeruginosus*; Eurasian marsh harrier (Breeding)
A082 *Circus cyaneus*; Hen harrier (Non-breeding)
A132 *Recurvirostra avosetta*; Pied avocet (Non-breeding)
A132 *Recurvirostra avosetta*; Pied avocet (Breeding)
A140 *Pluvialis apricaria*; European golden plover (Non-breeding)
A143 *Calidris canutus*; Red knot (Non-breeding)
A149 *Calidris alpina alpina*; Dunlin (Non-breeding)
A151 *Philomachus pugnax*; Ruff (Non-breeding)
A156 *Limosa limosa islandica*; Black-tailed godwit (Non-breeding)
A157 *Limosa lapponica*; Bar-tailed godwit (Non-breeding)
A162 *Tringa totanus*; Common redshank (Non-breeding)
A195 *Sterna albifrons*; Little tern (Breeding)
Waterbird assemblage

This is a European Marine Site

This SPA is a part of the Humber Estuary European Marine Site (EMS). These Conservation Objectives should be used in conjunction with the Conservation Advice document for the EMS. Natural England's formal Conservation Advice for European Marine Sites can be found via GOV.UK.

Explanatory Notes: European Site Conservation Objectives

These Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2017 (as amended) ('the Habitats Regulations'). They must be considered when a competent authority is required to make a 'Habitats Regulations Assessment' including an Appropriate Assessment, under the relevant parts of this legislation.

These Conservation Objectives, and the accompanying Supplementary Advice (where this is available), will also provide a framework to inform the management of the European Site and the prevention of deterioration of habitats and significant disturbance of its qualifying features

These Conservation Objectives are set for each bird feature for a Special Protection Area (SPA).

Where these objectives are being met, the site will be considered to exhibit a high degree of integrity and to be contributing to achieving the aims of the Wild Birds Directive.

Publication date: 21 February 2019 (version 4). This document updates and replaces an earlier version dated 30 June 2014 to reflect the consolidation of the Habitats Regulations in 2017.

European Site Conservation Objectives for Humber Estuary Special Area of Conservation Site Code: UK0030170

With regard to the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change;

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

- **The extent and distribution of qualifying natural habitats and habitats of qualifying species**
- **The structure and function (including typical species) of qualifying natural habitats**
- **The structure and function of the habitats of qualifying species**
- **The supporting processes on which qualifying natural habitats and habitats of qualifying species rely**
- **The populations of qualifying species, and,**
- **The distribution of qualifying species within the site.**

This document should be read in conjunction with the accompanying *Supplementary Advice* document, which provides more detailed advice and information to enable the application and achievement of the Objectives set out above.

Qualifying Features:

H1110. Sandbanks which are slightly covered by sea water all the time; Subtidal sandbanks

H1130. Estuaries

H1140. Mudflats and sandflats not covered by seawater at low tide; Intertidal mudflats and sandflats

H1150. Coastal lagoons*

H1310. *Salicornia* and other annuals colonising mud and sand; Glasswort and other annuals colonising mud and sand

H1330. Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)

H2110. Embryonic shifting dunes

H2120. Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes"); Shifting dunes with marram

H2130. Fixed dunes with herbaceous vegetation ("grey dunes"); Dune grassland*

H2160. Dunes with *Hippophae rhamnoides*; Dunes with sea-buckthorn

S1095. *Petromyzon marinus*; Sea lamprey

S1099. *Lampetra fluviatilis*; River lamprey

S1364. *Halichoerus grypus*; Grey seal

* denotes a priority natural habitat or species (supporting explanatory text on following page)

This is a European Marine Site

This site is a part of the Humber Estuary European Marine Site. These Conservation Objectives should be used in conjunction with the Conservation Advice document for the EMS. Natural England's formal Conservation Advice for European Marine Sites can be found via GOV.UK.

*** Priority natural habitats or species**

Some of the natural habitats and species for which UK SACs have been selected are considered to be particular priorities for conservation at a European scale and are subject to special provisions in the Habitats Regulations. These priority natural habitats and species are denoted by an asterisk (*) in Annex I and II of the Habitats Directive. The term 'priority' is also used in other contexts, for example with reference to particular habitats or species that are prioritised in UK Biodiversity Action Plans. It is important to note however that these are not necessarily the priority natural habitats or species within the meaning of the Habitats Regulations.

Explanatory Notes: European Site Conservation Objectives

These Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2017 as amended from time to time (the "Habitats Regulations"). They must be considered when a competent authority is required to make a 'Habitats Regulations Assessment', including an Appropriate Assessment, under the relevant parts of this legislation.

These Conservation Objectives and the accompanying Supplementary Advice (where available) will also provide a framework to inform the measures needed to conserve or restore the European Site and the prevention of deterioration or significant disturbance of its qualifying features.

These Conservation Objectives are set for each habitat or species of a Special Area of Conservation (SAC). Where the objectives are met, the site will be considered to exhibit a high degree of integrity and to be contributing to achieving Favourable Conservation Status for that species or habitat type at a UK level. The term 'favourable conservation status' is defined in regulation 3 of the Habitats Regulations.

Publication date: 27 November 2018 (version 3). This document updates and replaces an earlier version dated 31 March 2014 to reflect the consolidation of the Habitats Regulations in 2017.

European Site Conservation Objectives for Saltfleetby–Theddlethorpe Dunes and Gibraltar Point

Special Area of Conservation
Site code: UK0030270

With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change;

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

- **The extent and distribution of the qualifying natural habitats**
- **The structure and function (including typical species) of the qualifying natural habitats, and,**
- **The supporting processes on which the qualifying natural habitats rely**

This document should be read in conjunction with the accompanying *Supplementary Advice* document, which provides more detailed advice and information to enable the application and achievement of the Objectives set out above.

Qualifying Features:

H2110. Embryonic shifting dunes

H2120. Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes"); Shifting dunes with marram

H2130. Fixed dunes with herbaceous vegetation ("grey dunes"); Dune grassland*

H2160. Dunes with *Hippophae rhamnoides*; Dunes with sea-buckthorn

H2190. Humid dune slacks

* denotes a priority natural habitat or species (supporting explanatory text on following page)

*** Priority natural habitats or species**

Some of the natural habitats and species for which UK SACs have been selected are considered to be particular priorities for conservation at a European scale and are subject to special provisions in the Habitats Regulations. These priority natural habitats and species are denoted by an asterisk (*) in Annex I and II of the Habitats Directive. The term 'priority' is also used in other contexts, for example with reference to particular habitats or species that are prioritised in UK Biodiversity Action Plans. It is important to note however that these are not necessarily the priority natural habitats or species within the meaning of the Habitats Regulations.

Explanatory Notes: European Site Conservation Objectives

These Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2017 as amended (the "Habitats Regulations"). They must be considered when a competent authority is required to make a 'Habitats Regulations Assessment', including an Appropriate Assessment, under the relevant parts of this legislation.

These Conservation Objectives and the accompanying Supplementary Advice (where available) will also provide a framework to inform the measures needed to conserve or restore the European Site and the prevention of deterioration or significant disturbance of its qualifying features.

These Conservation Objectives are set for each habitat or species of a Special Area of Conservation (SAC). Where the objectives are met, the site will be considered to exhibit a high degree of integrity and to be contributing to achieving Favourable Conservation Status for that species or habitat type at a UK level. The term 'favourable conservation status' is defined in regulation 3 of the Habitats Regulations.

Publication date: 9 January 2019 (version 3). This document updates and replaces an earlier version dated 30 June 2014 to reflect the consolidation of the Habitats Regulations in 2017.

Appendix D Humber Estuary SPA component species as provided by Natural England

Annex B: Humber Estuary Special Protection Area: non-breeding waterbird assemblage

The Humber Estuary Special Protection Area (SPA) qualifies under article 4.2 of the European Commission Bird Directive (79/409/EEC) in that it supports an internationally important assemblage of waterbirds. Confusion can arise concerning which species to consider when assessing the Humber Estuary SPA non-breeding, waterbird assemblage feature.

Natural England recommends focusing on what are referred to as the 'main component species' of the assemblage. Main component species are defined as:

a) All species listed individually under the assemblage feature on the SPA citation (i.e the species that qualified in 2004 when the site was designated).
b) Species which might not be listed on the SPA citation but occur at site levels of more than 1% of the national population according to the most recent Humber Estuary Wetland Bird Survey (WeBS) 5-year average count.
c) Species where more than 2000 individuals are present according to the most recent Humber Estuary WeBS count.

The assemblage qualification is therefore subject to change as species' populations change. It should be noted that species listed on the citation under the assemblage features, whose populations have fallen to less than 1% of the national population, retain their status as a main component species and should be considered when assessing the impacts of a project or plan on the Humber Estuary SPA.

Natural England advises that the main component species of the Humber Estuary SPA non-breeding waterbird assemblage include (October 2022):

a) Species listed individually under the assemblage feature on the SPA citation:

- Avocet, *Recurvirostra avosetta* (non-breeding)
- Bar-tailed godwit*, Limosa lapponica* (non-breeding)
- Bittern, *Botaurus stellaris* (non-breeding)
- **Black-tailed godwit*, Limosa limosa islandica* (non-breeding)[1]**
- **Brent goose, *Branta bernicla* (non-breeding)[1]**
- **Curlew, *N. arquata* (non-breeding)[1]**
- **Dunlin, *Calidris alpina alpina* (non-breeding)[1]**
- **Golden plover, *Pluvialis apricaria* (non-breeding)[1]**
- Goldeneye, *Bucephala clangula* (non-breeding)
- Greenshank, *T. nebularia* (non-breeding)
- Grey plover, *P. squatarola* (non-breeding)
- Knot, *Calidris canutus* (non-breeding)
- **Lapwing, *Vanellus vanellus* (non-breeding)[1]**
- **Mallard, *Anas platyrhynchos* (non-breeding[1]**
- Oystercatcher, *Haematopus ostralegus* (non-breeding)
- Pochard, *Aythya farina* (non-breeding)
- **Redshank, *Tringa totanus* (non-breeding[1]**
- Ringed plover, *Charadrius hiaticula* (non-breeding)
- **Ruff, *Philomachus pugnax* (non-breeding)[1]**
- Sanderling, *Calidris alba* (non-breeding)

[1] Species known to use non-wetland habitats (e.g. arable farmland and/or grassland/pasture)

Appendix E Construction and Operational Noise Mapping

Monitor Location	$L_{Aeq,1h}$ dB	$L_{AFmax,\ 1hr}$ dB
E1	56	81
E2	48	58
E3	52	86
E4	49	63
E5	44	74
E6	61	36
E7	60	96
E8	47	80
E9	59	92
E10	67	103
E11	46	70
E12	43	57
E13	38	53
E14	42	47
E15	44	59
E16	39	53
E17	42	54
E18	41	65
E19	54	80
E20	43	61
A1	44	60
A2	73	93
A3	51	69
A4	53	70

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VikingCCS

AECOM

PROJECT

Viking CCS Pipeline

LEGEND

- DCO Site Boundary
- Ecology Noise Monitoring Location
- Ramsar
- Special Protection Area (SPA)
- Special Protection Area with Marine Components (SPA)
- Site of Special Scientific Interest (SSSI)
- Functionally Linked Land
- Survey Field Boundary

Equivalent noise level 0.5m above ground - dB(A)

- 0 - 35
- 35 - 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- 70 - 75
- 75 - 80

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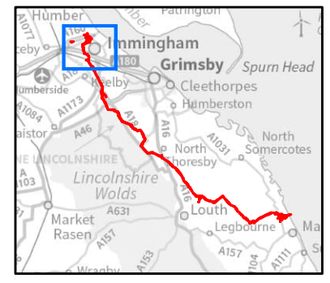

FIGURE TITLE

Figure 2
Immingham Average Sound Levels

ISSUE PURPOSE

HRA

PROJECT NUMBER / REFERENCE

60668955 / VCCS_231004_HRA_2

1:25,000 @ A3

500 250 0 500 1,000 1,500 2,000 m

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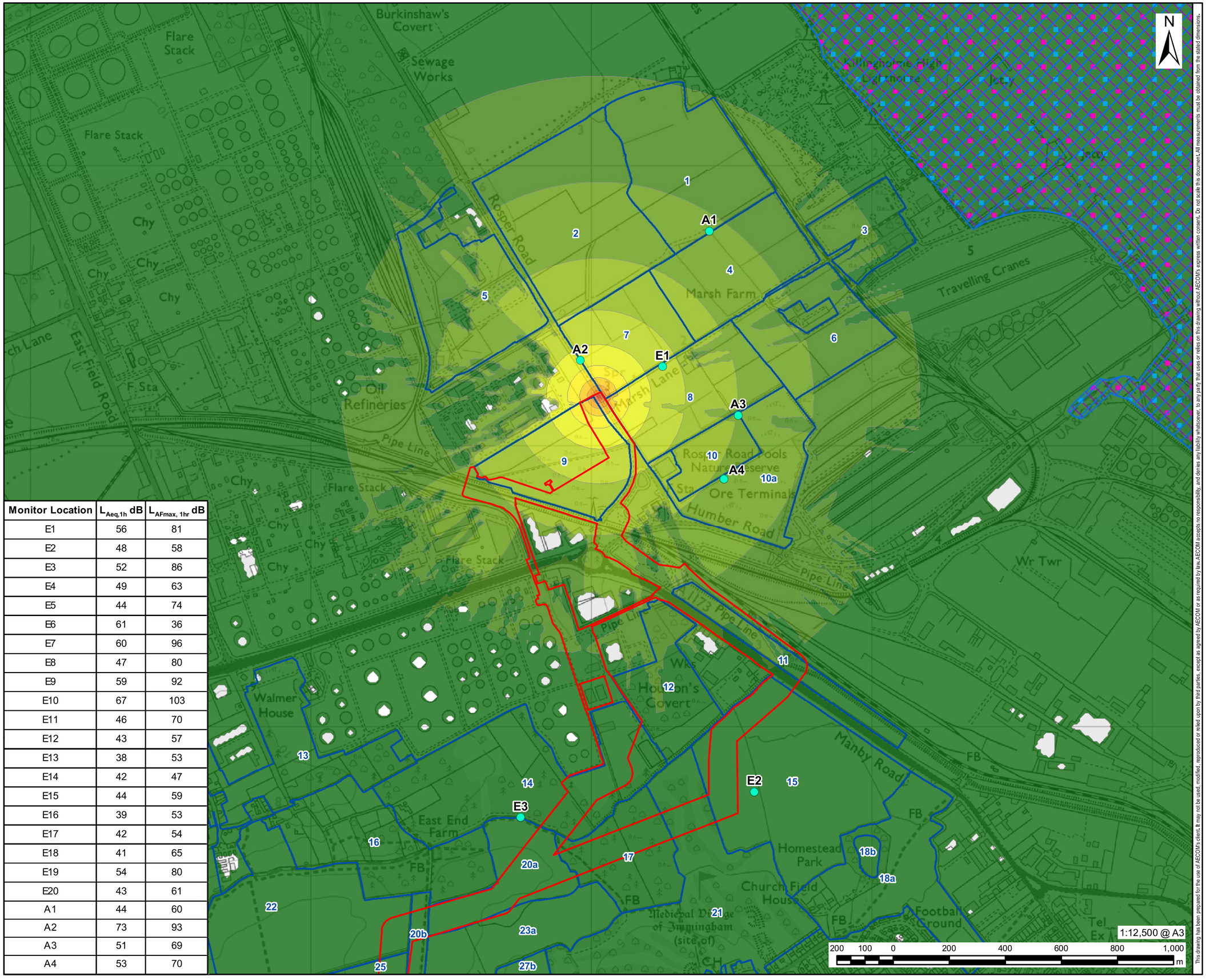

Monitor Location	$L_{Aeq,1h}$ dB	$L_{AFmax,\ 1hr}$ dB
E1	56	81
E2	48	58
E3	52	86
E4	49	63
E5	44	74
E6	61	36
E7	60	96
E8	47	80
E9	59	92
E10	67	103
E11	46	70
E12	43	57
E13	38	53
E14	42	47
E15	44	59
E16	39	53
E17	42	54
E18	41	65
E19	54	80
E20	43	61
A1	44	60
A2	73	93
A3	51	69
A4	53	70

VikingCCS

AECOM

PROJECT

Viking CCS Pipeline

LEGEND

- DCO Site Boundary
- Ecology Noise Monitoring Location
- Ramsar
- Special Protection Area (SPA)
- Special Protection Area with Marine Components (SPA)
- Site of Special Scientific Interest (SSSI)
- Survey Field Boundary

Equivalent noise level 0.5m above ground - dB(A)

- 0 - 35
- 35 - 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- 70 - 75
- 75 - 80
- 80 - 85
- >85

NOTES:

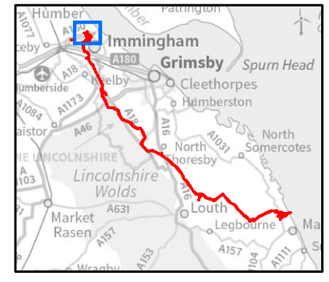

FIGURE TITLE

Figure 3
Immingham Maximum Sound Levels Location 1

ISSUE PURPOSE

HRA

PROJECT NUMBER / REFERENCE

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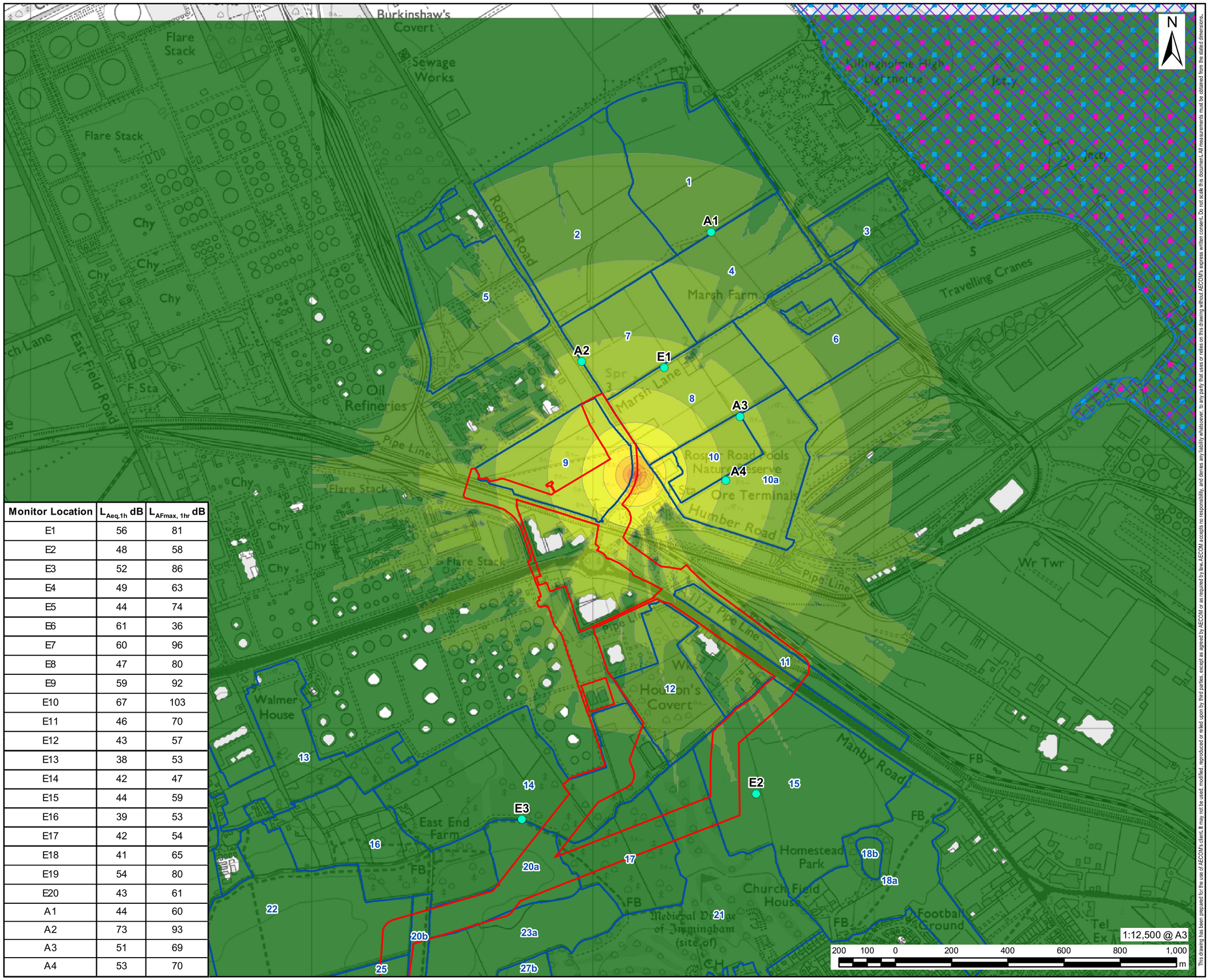
Monitor Location	$L_{Aeq,1h}$ dB	$L_{AFmax,\ 1hr}$ dB
E1	56	81
E2	48	58
E3	52	86
E4	49	63
E5	44	74
E6	61	36
E7	60	96
E8	47	80
E9	59	92
E10	67	103
E11	46	70
E12	43	57
E13	38	53
E14	42	47
E15	44	59
E16	39	53
E17	42	54
E18	41	65
E19	54	80
E20	43	61
A1	44	60
A2	73	93
A3	51	69
A4	53	70



VikingCCS

AECOM

PROJECT

Viking CCS Pipeline

LEGEND

- DCO Site Boundary
- Ecology Noise Monitoring Location
- Ramsar
- Special Protection Area (SPA)
- Special Protection Area with Marine Components (SPA)
- Site of Special Scientific Interest (SSSI)
- Survey Field Boundary

Equivalent noise level 0.5m above ground - dB(A)

- 0 - 35
- 35 - 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- 70 - 75
- 75 - 80
- 80 - 85
- >85

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FIGURE TITLE

Figure 4
Immingham Maximum Sound Levels Location 2

ISSUE PURPOSE

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PROJECT NUMBER / REFERENCE

60668955 / VCCS_231004_HRA_4

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Monitor Location	$L_{Aeq,1h}$ dB	$L_{AFmax,\ 1hr}$ dB
E1	56	81
E2	48	58
E3	52	86
E4	49	63
E5	44	74
E6	61	36
E7	60	96
E8	47	80
E9	59	92
E10	67	103
E11	46	70
E12	43	57
E13	38	53
E14	42	47
E15	44	59
E16	39	53
E17	42	54
E18	41	65
E19	54	80
E20	43	61
A1	44	60
A2	73	93
A3	51	69
A4	53	70

VikingCCS

AECOM

PROJECT

Viking CCS Pipeline

LEGEND

- DCO Site Boundary
- Ecology Noise Monitoring Location
- National Nature Reserve (NNR)
- Ramsar
- Special Protection Area (SPA)
- Special Protection Area with Marine Components (SPA)
- Site of Special Scientific Interest (SSSI)
- Survey Field Boundary

Equivalent noise level 0.5m above ground - dB(A)

- 0 - 35
- 35 - 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- 70 - 75
- 75 - 80

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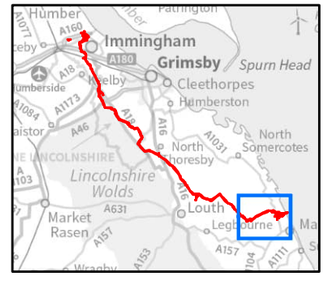

FIGURE TITLE

Figure 5
Theddlethorpe Average Sound Levels

ISSUE PURPOSE

HRA

PROJECT NUMBER / REFERENCE

60668955 / VCCS_231004_HRA_5

1:25,000 @ A3

500 250 0 500 1,000 1,500 2,000 m

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Monitor Location	$L_{Aeq,1h}$ dB	$L_{AFmax,\ 1hr}$ dB
E1	56	81
E2	48	58
E3	52	86
E4	49	63
E5	44	74
E6	61	36
E7	60	96
E8	47	80
E9	59	92
E10	67	103
E11	46	70
E12	43	57
E13	38	53
E14	42	47
E15	44	59
E16	39	53
E17	42	54
E18	41	65
E19	54	80
E20	43	61
A1	44	60
A2	73	93
A3	51	69
A4	53	70

VikingCCS

AECOM

PROJECT

Viking CCS Pipeline

LEGEND

- DCO Site Boundary
- Ecology Noise Monitoring Location
- Ramsar
- Special Protection Area (SPA)
- Special Protection Area with Marine Components (SPA)
- Site of Special Scientific Interest (SSSI)
- Survey Field Boundary

Equivalent noise level 0.5m above ground - dB(A)

- 0 - 35
- 35 - 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- 70 - 75
- 75 - 80
- 80 - 85
- >85

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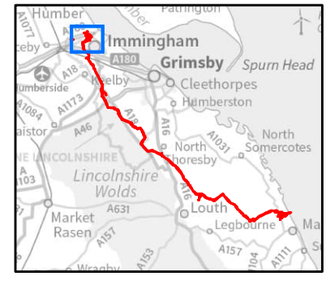

FIGURE TITLE

Figure 6
HDD 1 Option 1 Maximum Sound Levels

ISSUE PURPOSE

HRA

PROJECT NUMBER / REFERENCE

60668955 / VCCS_231004_HRA_6

1:15,000 @ A3

200 100 0 200 400 600 800 1,000 m

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Monitor Location	$L_{Aeq,1h}$ dB	$L_{AFmax,\ 1hr}$ dB
E1	56	81
E2	48	58
E3	52	86
E4	49	63
E5	44	74
E6	61	36
E7	60	96
E8	47	80
E9	59	92
E10	67	103
E11	46	70
E12	43	57
E13	38	53
E14	42	47
E15	44	59
E16	39	53
E17	42	54
E18	41	65
E19	54	80
E20	43	61
A1	44	60
A2	73	93
A3	51	69
A4	53	70

VikingCCS

AECOM

PROJECT

Viking CCS Pipeline

LEGEND

- DCO Site Boundary
- Ecology Noise Monitoring Location
- Ramsar
- Special Protection Area (SPA)
- Special Protection Area with Marine Components (SPA)
- Site of Special Scientific Interest (SSSI)
- Survey Field Boundary

Equivalent noise level 0.5m above ground - dB(A)

- 0 - 35
- 35 - 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- 70 - 75
- 75 - 80
- 80 - 85
- >85

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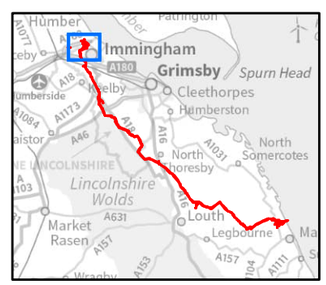

FIGURE TITLE

Figure 7
HDD 1 Option 2 Maximum Sound Levels

ISSUE PURPOSE

HRA

PROJECT NUMBER / REFERENCE

60668955 / VCCS_231004_HRA_7

1:15,000 @ A3

200 100 0 200 400 600 800 1,000 m

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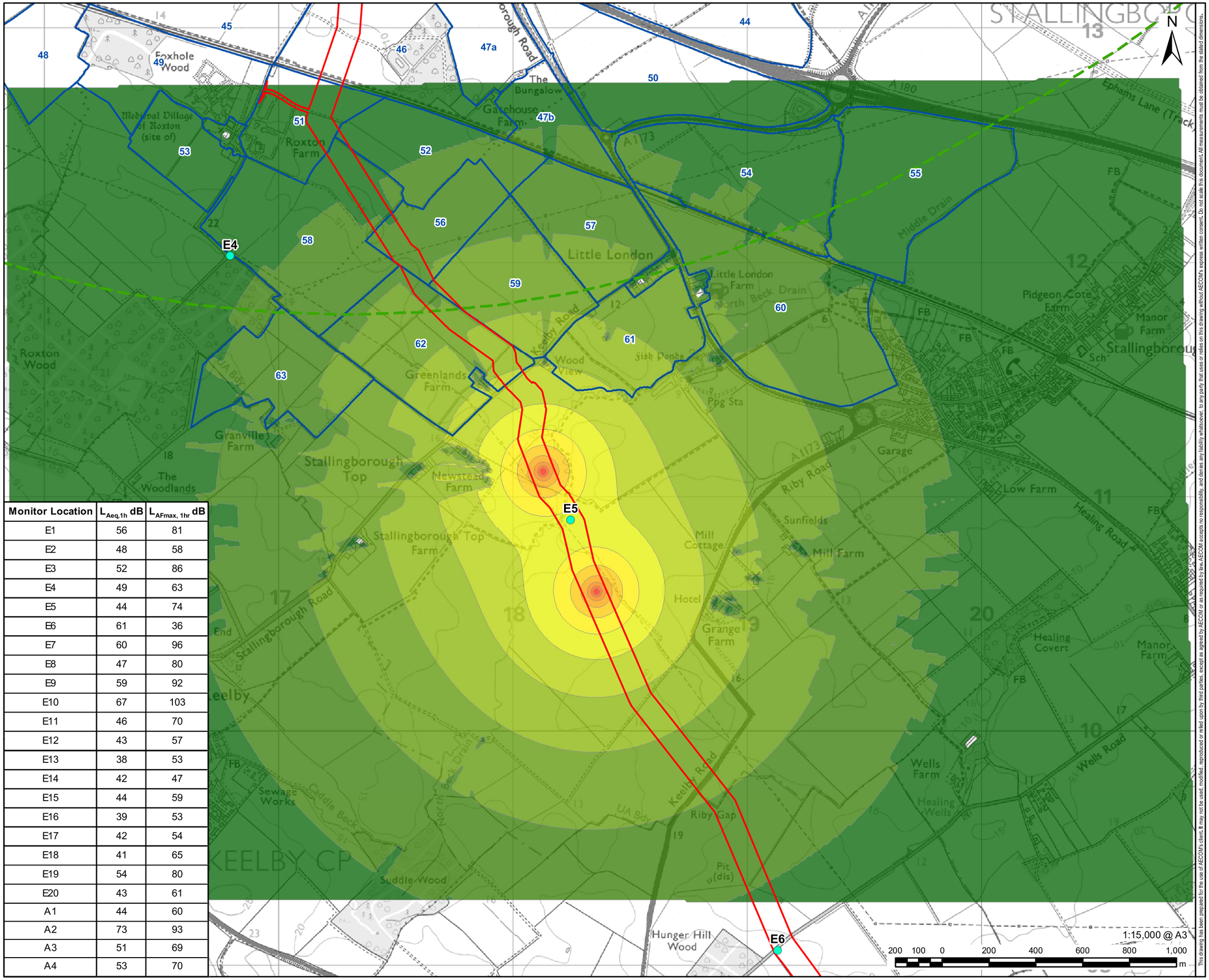

Monitor Location	$L_{Aeq,1h}$ dB	$L_{AFmax,\ 1hr}$ dB
E1	56	81
E2	48	58
E3	52	86
E4	49	63
E5	44	74
E6	61	36
E7	60	96
E8	47	80
E9	59	92
E10	67	103
E11	46	70
E12	43	57
E13	38	53
E14	42	47
E15	44	59
E16	39	53
E17	42	54
E18	41	65
E19	54	80
E20	43	61
A1	44	60
A2	73	93
A3	51	69
A4	53	70

VikingCCS

AECOM

PROJECT

Viking CCS Pipeline

LEGEND

- DCO Site Boundary
- Ecology Noise Monitoring Location
- Functionally Linked Land
- Survey Field Boundary

Equivalent noise level 0.5m above ground - dB(A)

- 0 - 35
- 35 - 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- 70 - 75
- 75 - 80
- 80 - 85
- >85

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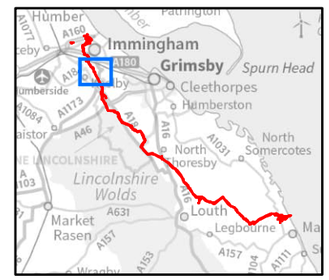

FIGURE TITLE

Figure 8
HDD 2 Maximum Sound Levels

ISSUE PURPOSE

HRA

PROJECT NUMBER / REFERENCE

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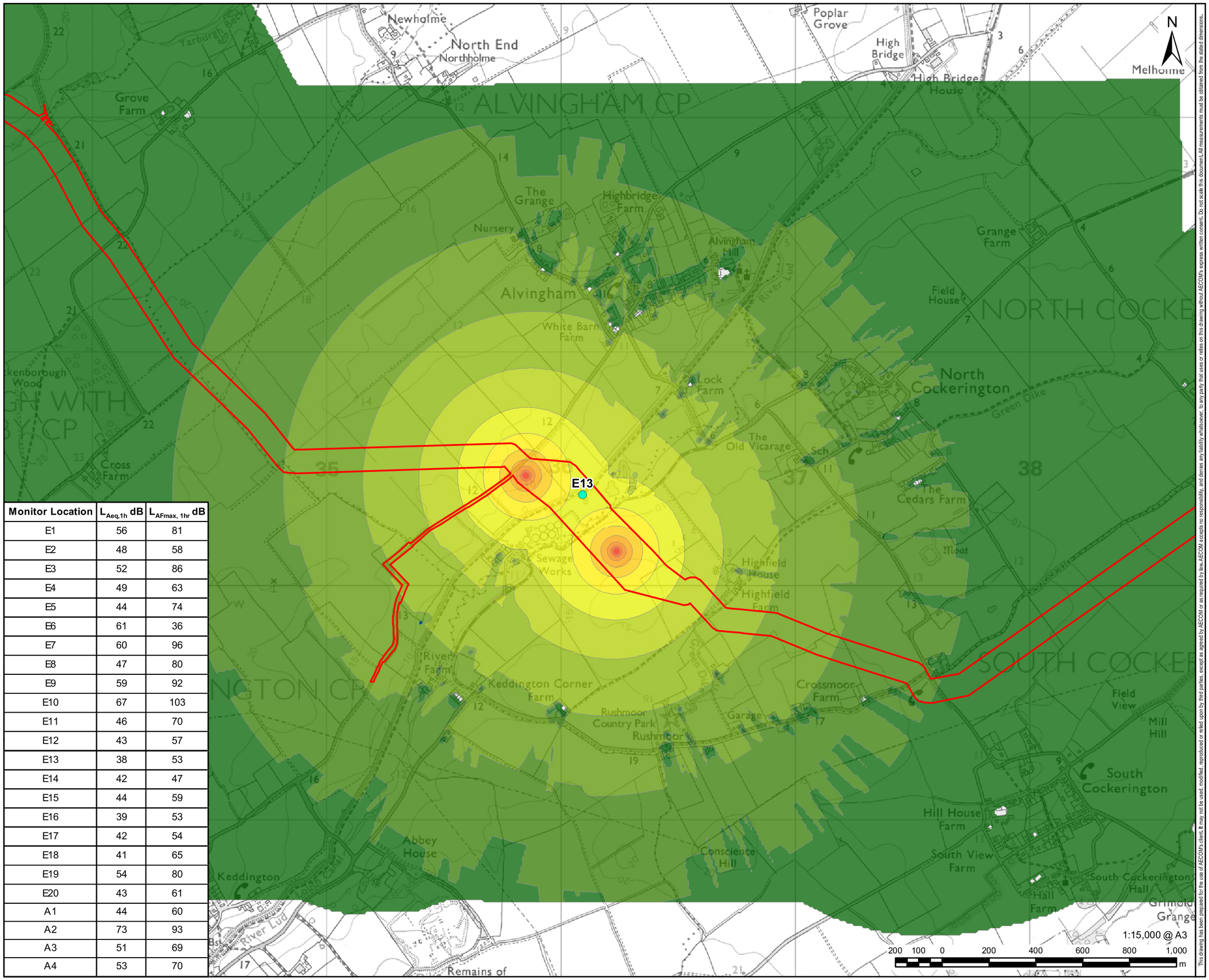
Monitor Location	$L_{Aeq,1h}$ dB	$L_{AFmax,\ 1hr}$ dB
E1	56	81
E2	48	58
E3	52	86
E4	49	63
E5	44	74
E6	61	36
E7	60	96
E8	47	80
E9	59	92
E10	67	103
E11	46	70
E12	43	57
E13	38	53
E14	42	47
E15	44	59
E16	39	53
E17	42	54
E18	41	65
E19	54	80
E20	43	61
A1	44	60
A2	73	93
A3	51	69
A4	53	70



VikingCCS

AECOM

PROJECT

Viking CCS Pipeline

LEGEND

- DCO Site Boundary
- Ecology Noise Monitoring Location
- Survey Field Boundary

Equivalent noise level 0.5m above ground - dB(A)

- 0 - 35
- 35 - 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- 70 - 75
- 75 - 80
- 80 - 85
- >85

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FIGURE TITLE

Figure 9
HDD 3 Maximum Sound Levels

ISSUE PURPOSE

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PROJECT NUMBER / REFERENCE

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Monitor Location	$L_{Aeq,1h}$ dB	$L_{AFmax,\ 1hr}$ dB
E1	56	81
E2	48	58
E3	52	86
E4	49	63
E5	44	74
E6	61	36
E7	60	96
E8	47	80
E9	59	92
E10	67	103
E11	46	70
E12	43	57
E13	38	53
E14	42	47
E15	44	59
E16	39	53
E17	42	54
E18	41	65
E19	54	80
E20	43	61
A1	44	60
A2	73	93
A3	51	69
A4	53	70

VikingCCS

AECOM

PROJECT

Viking CCS Pipeline

LEGEND

- DCO Site Boundary
- Ecology Noise Monitoring Location
- National Nature Reserve (NNR)
- Ramsar
- Special Protection Area (SPA)
- Special Protection Area with Marine Components (SPA)
- Site of Special Scientific Interest (SSSI)
- Survey Field Boundary

Equivalent noise level 0.5m above ground - dB(A)

- 0 - 35
- 35 - 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- 70 - 75
- 75 - 80
- 80 - 85
- >85

NOTES:
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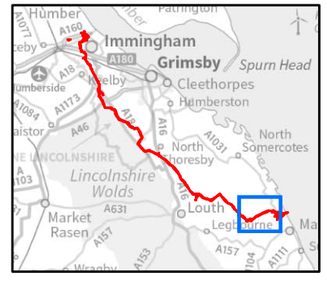

FIGURE TITLE

Figure 10
HDD 4 Maximum Sound Levels

ISSUE PURPOSE

HRA

PROJECT NUMBER / REFERENCE

60668955 / VCCS_231004_HRA_10

1:20,000 @ A3

200 100 0 200 400 600 800 1,000 m

Appendix F Relevant Impact Pathways

7.6.1 The European sites included in the screening assessment are:

- The Humber Estuary SPA
- The Humber Estuary Ramsar
- The Humber Estuary SAC
- Saltfleetby-Theddlethorpe Dunes and Gibraltar Point SAC
- Greater Wash SPA with Marine Components

Designation	Impact Pathways Identified on the Current Evidence Base	Presented in the Screening Matrices as
Humber Estuary SPA	Direct habitat loss within the SPA boundary during construction	Habitat loss
	Permanent loss of functionally linked land for breeding birds during construction	Permanent loss of functionally linked land
	Permanent loss of functionally linked land for non-breeding birds during construction	Permanent loss of functionally linked land
	Temporary loss of functionally linked land for breeding birds during construction	Temporary loss of functionally linked land
	Temporary loss of functionally linked land for non-breeding birds during construction	Temporary loss of functionally linked land
	Noise, vibration, lighting and visual disturbance of breeding birds during construction and decommissioning	Noise and visual disturbance
	Noise, vibration, lighting and visual disturbance of non-breeding birds during construction, operation and decommissioning	Noise and visual Disturbance
	Changes in water quality (including dust and fine sediments) during construction and decommissioning	Water Quality
	Atmospheric pollution – dust and particulates during construction and decommissioning	Dust and Particulates
	Atmospheric pollution – vehicle and plant emissions during construction, operation and decommissioning.	Transport emissions
	In combination effects as a result of noise & visual disturbance, loss of functionally-linked habitat, changes in water quality or changes in air quality.	In combination effects
Humber Estuary Ramsar	Direct habitat loss within the Ramsar boundary during construction	Habitat Loss
	Atmospheric pollution affecting Ramsar habitats – dust and particulates during construction and decommissioning	Dust and Particulates

Designation	Impact Pathways Identified on the Current Evidence Base	Presented in the Screening Matrices as
	Atmospheric pollution from vehicles and plant affecting Ramsar habitats during construction, operation and decommissioning	Transport emissions
	Changes in water quality (including dust and fine sediments) during construction or decommissioning	Water Quality
	Noise, visual disturbance or changes in water quality affecting grey seal	Noise and Visual Disturbance Water Quality
	Killing or injury of natterjack toad	Killing or injury
	Permanent loss of functionally linked land for waterfowl during construction	Permanent loss of functionally linked land
	Temporary loss of functionally linked land for waterfowl during construction	Temporary loss of functionally linked land
	Noise, vibration, lighting and visual disturbance of waterfowl during construction, operation or decommissioning.	Noise and visual Disturbance
	Direct mortality, disturbance from noise or vibration, or changes in water quality affecting river or sea lamprey during construction.	Killing or injury Noise and vibration Water Quality
	In combination effects as a result of noise & visual disturbance, loss of functionally-linked habitat, changes in water quality or changes in air quality.	In combination effects
Humber Estuary SAC	Changes in water quality (including dust and fine sediments) during construction or decommissioning	Water Quality
	Changes in air quality during construction, operation or decommissioning	Air Quality
	Noise, vibration, visual disturbance or changes in water quality affecting grey seal during construction	Noise and Vibration Visual disturbance Water Quality

Designation	Impact Pathways Identified on the Current Evidence Base	Presented in the Screening Matrices as
	Direct mortality, disturbance from noise or vibration, or changes in water quality affecting river or sea lamprey during construction.	Killing or injury Noise and vibration Water Quality
	In combination effects as a result of noise, vibration & visual disturbance, changes in water quality or changes in air quality.	In combination effects
Saltfleetby-Theddlethorpe Dunes and Gibraltar Point SAC	Direct habitat loss or degradation during construction or decommissioning	Habitat Loss
	Changes in water quality (including dust and fine sediments) during construction or decommissioning	Water quality
	Atmospheric pollution from dust and particulates during construction and decommissioning	Dust and particulates
	Atmospheric Pollution from Vehicles and Plant during construction, operation and decommissioning	Transport emissions
	In combination effects as a result of changes in water quality or atmospheric pollution.	In combination effects
Greater Wash SPA with Marine Components	Direct habitat loss during construction	Habitat loss
	Loss of functionally linked land for birds during construction	Loss of functionally linked land
	Noise, vibration, lighting and visual disturbance of birds during construction, operation or decommissioning.	Noise and visual disturbance
	Changes in water quality during construction	Water quality
	Atmospheric Pollution from dust and particulates or vehicles and Plant during construction, operation and decommissioning	Dust and particulates Transport emissions
	In combination effects as a result of noise & visual disturbance, loss of functionally-linked habitat, changes in water quality or changes in air quality.	In combination effects

Appendix G Screening Matrices

General matrix key:
✓ = Likely significant effect cannot be excluded
× = Likely significant effect can be excluded
C = Construction
O = Operation
D = Decommissioning

Table 1: Detailed screening matrix assessing the qualifying features of the Humber Estuary SPA against the identified impact pathways during construction (C columns), operation (O columns) and decommissioning (D columns).

	Name of European Site and Designation: Humber Estuary SPA															
	EU Code: UK9006111															
	Distance from DCO Site Boundary: Overlapping															
Effect	**Habitat loss**	**Permanent loss of functionally linked land**	**Temporary loss of functionally linked land**	**Noise and visual disturbance**			**Water Quality**			**Dust and particulates**		**Atmospheric Pollution from Vehicles and Plant**		**In Combination Effects**		
Stage of Proposed Development	C	C	C	C	O	D	C	O	D	C	D	C	D	C	O	D
Avocet	×a	✓b	×f	✓g	×j	✓k	×l	×l	×l	✓m	✓m	×n	×n	✓o	×p	✓o
Bittern	×a	×d	×f	×i	×j	×k	×l	×l	×l	✓m	✓m	×n	×n	×p	×p	×p
Hen Harrier	×a	×d	×f	×i	×j	×k	×l	×l	×l	✓m	✓m	×n	×n	×p	×p	×p
Golden Plover	×a	×d	×f	✓h	×j	✓k	×l	×l	×l	✓m	✓m	×n	×n	×p	×p	×p
Bar-tailed godwit	×a	×d	×f	✓h	×j	✓k	×l	×l	×l	✓m	✓m	×n	×n	×p	×p	×p
Ruff	×a	×d	×f	×i	×j	×k	×l	×l	×l	✓m	✓m	×n	×n	×p	×p	×p
Marsh harrier	×a	×d	×f	×i	×j	×k	×l	×l	×l	✓m	✓m	×n	×n	×p	×p	×p
Little tern	×a	×d	×f	×i	×j	×k	×l	×l	×l	✓m	✓m	×n	×n	×p	×p	×p
Shelduck	×a	×d	×f	×i	×j	×k	×l	×l	×l	✓m	✓m	×n	×n	×p	×p	×p

	Name of European Site and Designation: Humber Estuary SPA																
	EU Code: UK9006111																
	Distance from DCO Site Boundary: Overlapping																
Effect	**Habitat loss**	**Permanent loss of functionally linked land**	**Temporary loss of functionally linked land**	**Noise and visual disturbance**			**Water Quality**			**Dust and particulates**		**Atmospheric Pollution from Vehicles and Plant**		**In Combination Effects**		
Knot	×a	×d	×f	×i	×j	×k	×l	×l	×l	✓m	✓m	×n	×n	×p	×p	×p
Dunlin	×a	×d	×f	×i	×j	×k	×l	×l	×l	✓m	✓m	×n	×n	×p	×p	×p
Black-tailed godwit	×a	×d	×f	✓h	×j	✓k	×l	×l	×l	✓m	✓m	×n	×n	×p	×p	×p
Redshank	×a	✓c	×f	✓h	×j	✓k	×l	×l	×l	✓m	✓m	×n	×n	×p	×p	×p
Waterbird assemblage	×a	✓c	✓e	✓h	×j	✓k	×l	×l	×l	✓m	✓m	×n	×n	✓o	×p	✓o

a. Paragraph 6.2.3 confirms that although the DCO site boundary overlaps with the Humber Estuary SPA designation, no direct habitat loss will occur as the onshore pipeline will connect to the existing (below ground) LOGGS pipeline west of the sand dunes at Theddlethorpe (refer to Chapter 3 of the ES for further details).
b. Paragraph 6.2.12 confirms that a pair of breeding avocet were recorded on land at the former Theddlethorpe Gas Terminal.
c. Paragraphs 6.2.19 confirms that non-breeding mallard, oystercatcher, curlew and redshank were recorded within the former Theddlethorpe Gas Terminal.
d. Paragraphs 6.2.5 to 6.2.21 confirms that no other qualifying bird species were recorded in numbers above the 1% population threshold within the DCO site boundary.
e. Paragraph 6.2.27 confirms that curlew and pink footed goose were recorded within functionally linked land in numbers that exceeded the 1% population threshold.
f. Paragraph 6.2.28 confirm that all other species were recorded in numbers below the 1% population threshold and can be screened out.
g. Paragraphs 6.2.36 to 6.2.41 identify that there is potential for noise and visual disturbance of avocet at Rosper road pools during construction. Paragraphs 6.2.42 to 6.2.44 identify that there is potential for noise and visual disturbance of avocet at Viking Field pools and scrapes.
h. Paragraph 6.2.49 identifies that there is potential for noise and visual disturbance to affect curlew within FLL North. Paragraphs 6.2.55 to 6.2.60 identify that there is potential for noise and visual disturbance to affect redshank, teal, wigeon, curlew, mallard, lapwing, golden

plover and pink footed goose within FLL south. Paragraph 6.2.50 confirms that Rosper Road Pools (Area 2) was recorded to support black-tailed godwit, bar tailed godwit and wigeon with monthly counts recording numbers >1% Humber Estuary threshold.

i. Paragraphs 6.2.36 to 6.2.62 confirm that all other qualifying bird species were recorded in numbers below the 1% population threshold and can be screened out.
j. Paragraphs 6.3.3 to 6.3.19 confirm no LSE on qualifying bird species during the operational phase.
k. Paragraph 7.1.3 states that potential impacts on qualifying species identified for the construction phase are considered relevant for the decommissioning phase.
l. Paragraph 6.2.69 states that the Environmental Damage (Prevention and Remediation) (England) Regulations 2015 and the Environmental Permitting (England and Wales) Regulations 2016 make it an offence to pollute watercourses, irrespective of whether they are designated as European designated sites or connect to designated sites. With embedded mitigation, impacts from run-off are predicted to be short term, intermittent and spatially local. There will be no LSE from changes in water quality during construction, operation or decommissioning and this pathway of effect can be screened out. Paragraph 7.1.3 states that potential impacts identified for the Construction Phase are considered relevant for the decommissioning Phase.
m. Paragraph 6.2.72 makes reference to the Institute of Air Quality Management guidance (Ref 9) where “an assessment will normally be required where there is…an ‘ecological receptor’ within: 50 m of the boundary of the site; or 50m of the route(s) used by construction vehicles on the public highway…”. This is based on the view that heavy dust soiling is a threat to vegetation, but only up to a distance of 50 m from dust generating activities even in the absence of mitigation measures (e.g., wetting). The boundary of the Humber Estuary SPA is located within the DCO Site Boundary at Theddlethorpe. There are pools and scrapes immediately east of the Theddlethorpe Facility which are used by SPA birds. Although the onshore pipeline will connect to the existing (below ground) LOGGS pipeline west of the sand dunes at Theddlethorpe and will not directly affect this area, there is potential for dust and contaminants to affect the surrounding area in the absence of mitigation. Paragraph 7.1.3 states that potential impacts identified for the Construction Phase are considered relevant for the decommissioning Phase.
n. Paragraph 6.2.80 confirms that no part of the Affected Road Network (ARN) to be used by construction traffic lies within 200 m of the SPA. Chapter 14 of the ES assesses the effects of construction traffic emissions on air quality. Maximum construction traffic movements are a peak of 411 two-way movements, meaning that the Annual Average Daily Traffic (AADT) will not exceed the DMRB screening thresholds of 1000 Annual Average Daily Traffic (AADT) (and heavy good vehicle (HGV) movements do no exceed the 200 AADT for heavy goods vehicles). Therefore, LSE from atmospheric pollution can be screened out.
o. Section 7.4 and Appendix A identify that there is the potential for projects at Immingham to have in combination effects from noise and visual disturbance on the bird assemblage at Rosper Road pools.
p. Qualifying bird species were recorded in numbers below the 1% population threshold. Table 7.2 within Appendix A confirms there will be no effects on these species in combination with the Proposed Development.

Table 2: Detailed screening matrix assessing the qualifying features of the Humber Estuary Ramsar against the identified impact pathways during construction (C columns), operation (O columns) and decommissioning (D columns).

		Name of European Site and Designation: Humber Estuary Ramsar																	
		Ramsar Information Sheet: UK11031																	
		Distance from DCO Site Boundary: Overlapping																	
Effect		**Habitat loss**	**Dust and particulates**		**Atmospheric Pollution from Vehicles and Plant**		**Water Quality**			**Noise and visual disturbance**			**Killing or injury**		**Permanent loss of functionally linked land**	**Temporary loss of functionally linked land**	**In Combination effects**		
Stage of Proposed Development		C	C	D	C	D	C	O	D	C	O	D	C	D	C	C	C	O	D
Habitats		×a	✓b	✓b	×d	×d	×e	×e	×e	×i	×i	×i	×i	×i	×i	×i	× m	× m	× m
Grey Seal		×a	×c	×c	×d	×d	×e	×e	×e	×c	×c	×c	×i	×i	×i	×i	× m	× m	× m
Natterjack Toad		×a	✓b	✓b	×d	×d	×e	×e	×e	×f	×i	×f	×i	×i	×i	×i	× m	× m	× m
Waterbird assemblage (non-breeding)		×a	✓b	✓b	×d	×d	×e	×e	×e	✓g	× g	✓g	×i	×i	✓ j	✓k, p	✓l	✓l	✓l
Shelduck		×a	✓b	✓b	×d	×d	×e	×e	×e	×g	× g	×g	×i	×i	× j	×k	× m	× m	× m
Golden plover		×a	✓b	✓b	×d	×d	×e	×e	×e	✓g	× g	✓g	×i	×i	× j	× k	× m	× m	× m
Red knot		×a	✓b	✓b	×d	×d	×e	×e	×e	×g	× g	×g	×i	×i	× j	× k	× m	× m	× m

		Name of European Site and Designation: Humber Estuary Ramsar																
		Ramsar Information Sheet: UK11031																
		Distance from DCO Site Boundary: Overlapping																
Effect	**Habitat loss**	**Dust and particulates**		**Atmospheric Pollution from Vehicles and Plant**		**Water Quality**			**Noise and visual disturbance**			**Killing or injury**		**Permanent loss of functionally linked land**	**Temporary loss of functionally linked land**	**In Combination effects**		
Dunlin	×a	✓b	✓b	×d	×d	×e	×e	×e	×g	× g	×g	×i	×i	× j	× k	× m	× m	× m
Bar-tailed godwit	×a	✓b	✓b	×d	×d	×e	×e	×e	×g	× g	×g	×i	×i	× j	× k	× m	× m	× m
Black-tailed godwit	×a	✓b	✓b	×d	×d	×e	×e	×e	✓g	× g	✓g	×i	×i	× j	× k	✓l	✓l	✓l
Redshank	×a	✓b	✓b	×d	×d	×e	×e	×e	✓g	× g	✓g	×i	×i	× j	✓p	× m	× m	× m
Lamprey	×i	✓h	×n	×i	×i	✓h	×i	×n	✓h	×i	×n	✓h	×n	×i	×i	×m	×m	×m

a. Paragraph 6.2.83 confirms that no direct habitat loss will occur as the onshore pipeline will connect to the existing (below ground) LOGGS pipeline west of the sand dunes at Theddlethorpe (refer to Chapter 3 of the ES for further details). There will be no direct habitat loss from within the Ramsar site boundary and this pathway can be screened out.
b. Paragraph 6.2.87 notes that as the Humber Estuary Ramsar is within 50 m of the Proposed Development, there is potential for dust and particulates to affect the habitats for which the Ramsar is designated.
c. Paragraph 6.2.95 notes that the Humber Estuary Ramsar site supports a breeding colony of grey seals at Donna Nook. Donna nook is located approximately 13.25 km north of Theddlethorpe and due to the separation distance, there will be no effects upon breeding seals as a result of the Proposed Development. There are no pathways of effect between the proposed development and breeding grey seal and this species can be screened out.
d. Paragraph 6.2.85 confirms that no part of the Affected Road Network (ARN) to be used by construction traffic lies within 200 m of the Ramsar site. Maximum construction traffic movements are a peak of 411 two-way movements, meaning that the Annual Average Daily

Traffic (AADT) will not exceed the DMRB screening thresholds of 1000 AADT (AADT for heavy goods vehicles). Therefore, LSE from atmospheric pollution during construction and decommissioning can be screened out.

e. Paragraph 6.2.93 notes that the Environmental Damage (Prevention and Remediation) (England) Regulations 2015 (Ref 42) and the Environmental Permitting (England and Wales) Regulations 2016 (Ref 43) make it an offence to pollute watercourses, irrespective of whether they are designated as European designated sites or connect to designated sites. With embedded mitigation, impacts from run-off are predicted to be short term, intermittent and spatially local. There will be no LSE from changes in water quality and this pathway of effect can be screened out.
f. Natterjack toad are a qualifying feature of the Humber Estuary Ramsar, however they are unlikely to be affected by noise and visual disturbance. Paragraph 6.2.98 notes that land at the former TGT site was cleared in 2021 and it is unlikely that natterjack toad would be present at this location. Localised construction work will be required to upgrade the Dune Valve, but disturbance will be limited and unlikely to affect natterjack present within the wider area.
g. Paragraph 6.2.106 confirms that avocet and curlew are present at Rosper Road Pools and there is the potential for them to be affected by noise and visual disturbance. Rosper Road Pools (Area 2) was recorded to support good numbers of black-tailed godwit with several of the monthly counts recording numbers >1% Humber Estuary threshold. A peak count of 480 birds was recorded (frequency of occurrence 12). Paragraph 6.2.107 confirms that avocet, curlew, mallard, teal and wigeon were recorded in numbers above the 1% threshold at Viking Fields. There is potential for noise and visual disturbance of these species during construction and commissioning. Paragraphs 6.3.2 to 6.3.19 discuss noise and visual disturbance during operation and conclude there will be no LSE. Paragraphs 6.2.106 to 6.2.113 confirm that all other species were recorded in numbers below the 1% threshold and LSE can be screened out.
h. Paragraph 6.2.116 identifies that there is a risk of risk of noise and vibration impacts on lamprey from drilling techniques particularly if carried out during spawning or migration periods. There is potential risk of indirect impacts from surface runoff from constructions areas (i.e., fine sediments) and impacts on water quality from potential pollution incidents (i.e. chemical spills) thereby having potential effects on aquatic species where there are requirements for works taking place above or in proximity to aquatic habitats. There is also a potential indirect impact from light pollution if lighting used during the construction phase is shining directly on water bodies. 6.2.125 notes There is a low risk of direct mortality and / or injury to river lamprey as a result of open-cut crossing methodologies.
i. No pathway of effect.
j. Paragraph 6.2.101 confirms that a pair of breeding avocet were recorded on land at the TGT site. No other species were recorded in numbers above the 1% threshold.
k. Paragraph 6.2.103 to 6.2.104 state that avocet was recorded using habitats within the DCO Site Boundary and there is potential for this species to be temporarily displaced. Avocet were recorded using land at the former TGT site and within the grazing marshes immediately east of TGT site. Curlew were recorded using ploughed, stubble and recently sown arable fields in the vicinity of Little London and Immingham Golf Course where the species was recorded feeding. In both areas peak counts exceeded the 1% threshold for SPA selection based on the Humber Estuary 5-year peak count for 2017/18-21/22.
l. Section 7.4 and Appendix A identify that there is the potential for projects at Immingham to have in combination effects from noise and visual disturbance on the bird assemblage at Rosper Road pools.

m. No potential in-combination effects identified.
n. Paragraph 7.1.2 confirms that for decommissioning, the base case is for the pipeline to be left in situ along its entire length. Therefore, there will be no likely significant effects upon lamprey as watercourses and surrounding habitats will remain undisturbed.
o. Paragraph 6.2.94 confirms that localised construction work will be required to replace the Dune Valve. In the absence of mitigation, there is the potential for machinery to encroach onto adjacent habitats. Habitats immediately surrounding the Dune Valve comprise scrub and it is unlikely that natterjack toad would be present. However, based upon a precautionary approach, killing or injury of natterjack toad is taken forward to Appropriate Assessment.
p. Paragraph 6.2.17 confirms that non-breeding mallard, oystercatcher, curlew and redshank were recorded within the former Theddlethorpe Gas Terminal.

Table 3: Detailed screening matrix assessing the qualifying features of the Humber Estuary SAC against the identified impact pathways during construction (C columns), operation (O columns) and decommissioning (D columns).

		Name of European Site and Designation: Humber Estuary SAC														
		EU Code: UK0030170														
		Distance from DCO Site Boundary: 1.27 km														
Effect		**Dust and Particulates**		**Water Quality**			**Air Quality**		**Noise and vibration**		**Killing or injury**		**Visual Disturbance**		**In Combination Effects**		
Stage of Proposed Development		C	D	C	O	D	C	D	C	D	C	D	C	D	C	O	D
Habitats		N/A	N/A	×a	×a	×a	×c	×c	×d	×d	×d	×d	×d	×d	×d	×d	×d
Grey Seal		N/A	N/A	×a	×a	×a	×c	×c	×d	×d	×d	×d	×d	×d	×d	×d	×d
Lamprey		✓f	×g	✓b	×a	×g	×c	×c	✓e	×g	✓e	×g	×d	×g	×d	×d	×d

a. Paragraph 6.2.122 notes that the Environmental Damage (Prevention and Remediation) (England) Regulations 2015 and the Environmental Permitting (England and Wales) Regulations 2016 make it an offence to pollute watercourses, irrespective of whether they are designated as European designated sites or connect to designated sites. With embedded mitigation, impacts from run-off are predicted to be short term, intermittent and spatially local. There will be no LSE from changes in water quality and this pathway of effect can be screened out.
b. Paragraph 6.2.125 notes that there is potential risk of indirect impacts from surface runoff from constructions areas (i.e., fine sediments) and impacts on water quality from potential pollution incidents (i.e. chemical spills) thereby having potential effects on aquatic species where there are requirements for works taking place above or in proximity to aquatic habitats.
c. Paragraph 6.2.128 notes that the Humber Estuary SAC is over 50 m from the Proposed Development Site and the ARN, there will be no LSE from dust and particulates upon habitats, and this pathway can be screened out. Paragraph 6.2.129 refers to IAQM Guidance. Beyond 200 m, the contribution of vehicle emissions from the roadside to local pollution levels is not significant. As the Humber Estuary SAC is located 1.27 km east of the DCO site boundary at its closest point there will be no LSE from vehicle emissions and this pathway can be screened out.
d. No pathway of effect.
e. Paragraph 6.2.125 notes that main rivers within the Proposed Development will be crossed using HDD or Auger Bore to avoid direct effects upon the structure of the watercourses. Smaller watercourses will be crossed using open cut techniques. There is a low risk of

direct mortality and / or injury to river lamprey as a result of open-cut crossing methodologies. There is also a risk of noise and vibration impacts on lamprey from drilling techniques particularly if carried out during spawning or migration periods.

f. Paragraph 6.2.125 notes that there is potential risk of indirect impacts from dust from constructions areas (i.e., fine sediments) and impacts on water quality.

g. Paragraph 7.1.2 confirms that for decommissioning, the base case is for the pipeline to be left in situ along its entire length. Therefore, there will be no likely significant effects upon lamprey as watercourses and surrounding habitats will remain undisturbed.

Table 4: Detailed screening matrix assessing the qualifying features of the Saltfleetby – Theddlethorpe Dunes and Gibraltar Point SAC against the identified impact pathways during construction (C columns), operation (O columns) and decommissioning (D columns).

	Name of European Site and Designation: Saltfleetby – Theddlethorpe Dunes and Gibraltar Point SAC										
	EU Code: UK0030270										
	Distance from DCO Site Boundary: Overlapping										
Effect	**Habitat Loss or degradation**		**Water Quality**		**Dust and particulates**		**Transport emissions**		**In Combination Effects**		
Stage of Proposed Development	C	D	C	D	C	D	C	D	C	O	D
Habitats	✓a	✓a	✓b	✓b	✓c	✓c	✕d	✕d	✕e	✕e	✕e

a. Paragraph 6.2.136 states that in the absence of mitigation, there is the potential for machinery to encroach onto adjacent habitats. This could have an effect on the qualifying habitats of the SAC.
b. Paragraph 6.2.138 states that the construction of the Theddlethorpe facility has the potential to cause a reduction in water quality through sediment disturbances if washed down into watercourses or onto adjacent habitats. If a pollution event were to occur, it could affect adjacent habitats. The main watercourses and water features flow from east to west towards Saltfleetby-Theddlethorpe Dunes & Gibraltar Point SAC. All construction works associated with these watercourses have the potential to propagate sediments and spillages downstream.
c. Paragraph 6.2.141 notes that the boundary of the Theddlethorpe Dunes and Gibraltar Point SAC is located within the DCO Site Boundary at Theddlethorpe. There are qualifying habitats within 50 m of the Proposed Development and there is potential for dust and contaminants to affect the surrounding area in the absence of mitigation.
d. Paragraph 6.2.143 states that no part of the Affected Road Network (ARN) to be used by construction traffic lies within 200 m of Saltfleetby-Theddlethorpe Dunes & Gibraltar Point SAC. Moreover, maximum construction traffic movements are a peak of 411 two-way movements, meaning that the Annual Average Daily Traffic (AADT) will not exceed the DMRB screening thresholds of 1000 AADT (AADT for heavy goods vehicles). Therefore, LSE from atmospheric pollution can be screened out.
e. No potential in-combination effects identified.

Table 5: Detailed screening matrix assessing the qualifying features of the Greater Wash SPA with Marine Components against the identified impact pathways during construction (C columns), operation (O columns) and decommissioning (D columns).

		Name of European Site and Designation: Greater Wash SPA with Marine Components												
		EU Code: UK9020329												
		Distance from DCO Site Boundary: Overlapping												
Effect	**Habitat Loss**	**Loss of Functionally Linked Land**		**Noise and Visual Disturbance**			**Changes in Water Quality**			**Atmospheric Pollution**		**In Combination Effects**		
Stage of Proposed Development	C	C	D	C	O	D	C	O	D	C	D	C	O	D
Red throated diver	×a	×b	×b	×c	×c	×c	×d	×d	×d	×e	×e	×f	×f	×f
Little gull	×a	×b	×b	×c	×c	×c	×d	×d	×d	×e	×e	×f	×f	×f
Sandwich tern	×a	×b	×b	×c	×c	×c	×d	×d	×d	×e	×e	×f	×f	×f
Common tern	×a	×b	×b	×c	×c	×c	×d	×d	×d	×e	×e	×f	×f	×f
Common scoter	×a	×b	×b	×c	×c	×c	×d	×d	×d	×e	×e	×f	×f	×f

a. Paragraph 6.2.146 states that although the DCO site boundary overlaps with the Greater Wash SPA designation, no direct habitat loss will occur as the onshore pipeline will connect to the existing (below ground) LOGGS pipeline west of the sand dunes at Theddlethorpe.
b. Paragraphs 6.2.148 and 6.2.149 state that there was no evidence of tern species breeding in the vicinity of the proposed development. There will be no Red throated diver, little gull and common scoter are pelagic species and although they may pass over the Proposed Development on occasion, habitats within and adjacent are not suitable.
c. Paragraph 6.2.151 states that there was no evidence of breeding sandwich tern, common tern and little tern within areas which could be subject to noise or visual disturbance from the Proposed Development. Red throated diver, little gull and common scoter are pelagic species and although they may pass over the Proposed Development on occasion, habitats within and adjacent are not suitable and they are unlikely to be affected by noise or visual disturbance during the construction Phase of the Proposed Development.

d. Paragraph 1.2.155 notes that the Greater Wash SPA covers an area of 353,578 ha. If a pollution event were to occur the magnitude of impact would be negligible due to the distance that the contaminants and pollutants would have to travel and the dilution potential of the North Sea. Changes in water quality have been considered during screening as the Environmental Damage (Prevention and Remediation) (England) Regulations 2015 and the Environmental Permitting (England and Wales) Regulations 2016 make it an offence to pollute watercourses, irrespective of whether they are designated as European designated sites or connect to designated sites.
e. Paragraph 6.2.158 notes that no part of the ARN for the Proposed Development lies within 200m of Greater Wash SPA. Moreover, the SPA is designated for open water foraging and resting habitat for terns and non-breeding seabirds. This habitat is not susceptible to atmospheric nitrogen deposition and has no critical load on the UK Air Pollution Information System. LSE from atmospheric pollution can be screened out.
f. No potential in-combination effects identified.

Appendix H Appropriate Assessment Matrices

~~Appendix I~~Appendix A ~~Indicative Locations for Noise and Visual Screening~~

Table 6: Detailed matrix assessing the qualifying species of the Humber Estuary SPA against the identified impact pathways during construction (C columns), and decommissioning (D columns).

Effect	Permanent loss of functionally linked land	Temporary loss of functionally linked land	Noise and visual disturbance		Dust and particulates		In Combination Effects	
Stage of Proposed Development	C	C	C	D	C	D	C	D
Avocet	×a	×b	×c	×c	×d	×d	×e	×e
Bittern	×a	×b	×c	×c	×d	×d	×e	×e
Hen Harrier	×a	×b	×c	×c	×d	×d	×e	×e
Golden Plover	×a	×b	×c	×c	×d	×d	×e	×e
Bar-tailed godwit	×a	×b	×c	×c	×d	×d	×e	×e
Ruff	×a	×b	×c	×c	×d	×d	×e	×e
Marsh harrier	×a	×b	×c	×c	×d	×d	×e	×e
Little tern	×a	×b	×c	×c	×d	×d	×e	×e
Shelduck	×a	×b	×c	×c	×d	×d	×e	×e
Knot	×a	×b	×c	×c	×d	×d	×e	×e

Effect	Permanent loss of functionally linked land	Temporary loss of functionally linked land	Noise and visual disturbance		Dust and particulates		In Combination Effects	
Dunlin	×a	×b	×c	×c	×d	×d	×e	×e
Black-tailed godwit	×a	×b	×c	×c	×d	×d	×e	×e
Redshank	×a	×b	×c	×c	×d	×d	×e	×e
Waterbird assemblage	×a	×b	×c	×c	×d	×d	×e	×e

a. Paragraphs 7.3.1 to 7.3.5 discuss the loss of functionally linked land upon avocet. A pair of avocets were recorded within TGT site, immediately adjacent to the Draft Order Limits, during an AECOM bird survey on 15th June 2022. This record referred to an off-duty bird observed resting at a small shallow ephemeral rain - fed pool, with an incubating bird present nearby at a nest site on the bare artificial gravel/cobble substrate. These birds were absent during the next survey visit to TGT site on 3rd July 2022 and it is considered likely that the nest failed due to predation at the egg or chick stage; it was noted that the ephemeral pool had completely dried up. One non-breeding adult avocet was observed in August within TGT site. Although this species prefers to site its nest scrape on bare ground, the prevailing bare brownfield habitat within the TGT site area represents suboptimal breeding habitat for this species, as discussed below.

   The prevailing topography within TGT site is flat with a permeable artificial gravel/cobble substrate. There are no permanent food rich waterbodies, which are required by avocet chicks after hatching. TGT site is bounded by security mesh fencing. The eastern alignment of the fence is bordered by a ditch (locally a double ditch) which supports a stand of tall riparian vegetation. These features, in-combination, are likely to function as a comprehensive barrier to movement for flightless chicks which, had they hatched at the nest site within TGT site, would have to negotiate the fence and ditches enroute to the suitable natal foraging wetland habitat located at the Lincolnshire Coastal Grazing Marsh Project pools, immediately adjacent to the east (referred to as 'Viking Fields' herein). These artificial and natural barriers make newly hatched chicks vulnerable to predation and starvation if they do attempt to walk between the nest site and Viking Fields.

Avocets tend to nest in loose colonies and single pairs breeding in suboptimal habitat may be more vulnerable to mammalian and avian predation. Therefore, the likelihood that the site could sustain a regularly occurring breeding population is decreased. There is a general absence of low ephemeral and ruderal vegetation at TGT site, which would increase nest vulnerability as nest sites in predominantly bare areas are easier for predators to locate. It is likely that the nesting attempt by avocet at TGT site in 2022 is an irregular opportunistic occurrence following the recent creation of bare habitat and the demolition of the terminal infrastructure. The birds are likely to be associated with the nearby avocet breeding population which occurs at the Viking Fields pools, located immediately adjacent to the eastern boundary of the TGT site. Considering the late nesting attempt at TGT site in 2022 (mid-June) it is possible that the nesting attempt at TGT site is a second replacement clutch for a pair that had engaged in a failed attempt to breed at Viking Fields pools.

In summary, for the reasons provided above, the likelihood that TGT site supports a regular breeding population of avocet is negligible and no adverse effects on integrity will occur as a result of permanent habitat loss at the Theddlethorpe Facility.

b. Paragraphs 7.3.6 to 7.3.10 discuss the temporary loss of functionally linked land for non-breeding birds during the construction phase. The Proposed Development predominantly runs through an agricultural landscape, bisecting numerous arable fields. Works will take place in phases over approximately 12 months in any one section. Appendix 6-7: Ornithology Baseline Report of the ES establishes a baseline of bird records along the Proposed Development. This draws on a combination of desk study records and field surveys covering land identified as functionally linked.

   Several non-breeding species that are qualifying features of the Humber Estuary SPA (and pink-footed goose), were recorded during the baseline surveys within fields which are within or overlap the parts of the DCO site boundary and which may be subject to temporary habitat loss. These are detailed below for the Functionally Linked Land (FLL) Northern and Southern Areas respectively (refer to the Chapter 6 of the ES; Appendix 6-7 Ornithological Baseline Report [Figures 6.12-30]:

   Irregularly occurring counts of curlew, which are below 1% of the relevant SPA population, were recorded at Fields 20a and 23a (northern FLL area) and at Fields 18a, 28a, 33, 52b and 65b (southern FLL area). Counts at Fields 27a (45 birds - northern FLL area) and Field 54 (50 birds - southern FLL area) were >1% of qualifying populations. However, there was no evidence that these fields support regularly occurring populations which could be considered to be significant.

   The following fields in the southern FLL area is irregularly used by pink-footed goose populations which are >1% of the Humber Estuary 1% threshold of 253 birds: Fields 86, 92, 94, 95a and 96a. However, there was no evidence that these fields support regularly occurring populations which could be considered to be significant.

   The temporary loss will not have negative implications at the population level of SPA / Ramsar bird species and not result in adverse effects on the integrity of the relevant European sites. In practice, the nature of farmland in the wider foraging / roosting zone around an SPA / Ramsar is that pockets of habitat will be moving in and out of suitability constantly due farm management, such as crop rotation and farming activities (e.g., ploughing and harvesting). What is important is the long-term preservation of a sufficiently large amount of foraging habitat in the wider landscape around designated sites to sustain the SPA/Ramsar populations. Even if a small amount of foraging habitat is temporarily lost, this will not affect the long-term cumulative resource availability to SPA / Ramsar birds, especially when the habitats involved are widespread and easily recreated, and the original land use of impacted fields will be reinstated immediately following completion of the works.

Overall, it is concluded that the temporary loss of habitats with irregular use by qualifying curlew and pink-footed goose within and directly adjoining the working corridor will not result in adverse effects on the integrity of the Humber Estuary SPA and Ramsar from the temporary loss of functionally linked land.

c. Paragraphs 7. 3.11 to 7.3.24 discuss noise and visual disturbance of breeding and non-breeding birds within functionally linked land. The areas of greatest sensitivity for breeding birds associated with Humber Estuary SPA/Ramsar are Rosper Road Pools at Immingham (FLL North) and the area near the Dune Valve at the TGT Site at Theddlethorpe (FLL South). At both of these locations a population of breeding avocet have been recorded. At the Immingham end of the scheme (Northern FLL area), and particularly for Rosper Road Pools where breeding avocet have been recorded and which is the closest sensitive area to works at the northern end of the scheme, the baseline average (LAeq) noise level is approximately 53 dB (Appendix E Figure 2, sound monitoring location A4). Construction works will have a maximum unmitigated average noise level of 55-60 dB at Rosper Road Pools, which is up to 7 dB above the baseline. This may be disturbing, but with close-board noise fencing or other appropriate acoustic barriers this would reduce average noise levels at Rosper Road Pools due to the works to 45-50 dB, which is below the baseline. Maximum (LAmax) noise levels due to the works will be well below the baseline maximum noise levels at Rosper Road Pools of 70dB.

   At the TGT Site (Theddlethorpe; FLL South) a mole plough would be used to make the connection through the area used by nesting avocet, to the Dune Valve. This will create a small slit in the turf in which the cable duct will be immediately installed, and the turf closed behind by a small mini digger. No wetland features in this area will be directly affected. Installation is expected to be undertaken in one pass in a single day. Works at the Dune Valve could also provide disturbance to nesting avocet. Therefore, all works at Viking Fields will need to be undertaken during August/September when avocet is no longer likely to be breeding and non-breeding numbers are still low.

   For the remainder of the Proposed Development, including the 50km pipeline route and most of the Northern and Southern FLL area, noise levels (both baseline and project-related) vary but in general, baseline typical (LAeq) noise levels are in the region of 48 dB on average. Project average construction noise levels (LAeq) therefore exceed 5dB above the average baseline LAeq up to c. 500m from the works footprint as a worst-case. Mitigation (close-board noise fencing or other appropriate acoustic barriers) would reduce noise levels to below the baseline LAeq.

   Maximum sound levels (LAmax) are associated with the various sections of HDD and are shown in Appendix E Figures 6-10. These show that for noise monitoring locations E3 (Immingham/Northern FLL) and E5 (Northern FLL; Appendix E Figures 6-8), baseline LAmax levels are not forecast to be exceeded except in the immediate vicinity of the HDD. At noise monitoring location E2 (Immingham/Northern FLL; Appendix E Figures 6-7) LAmax levels are forecast to be exceeded by up to 5dB up to 200m from the HDD, in the absence of mitigation. With mitigation (close-board noise fencing or other appropriate acoustic barriers) LAmax levels would not be exceeded except in the immediate vicinity of the HDD. At noise monitoring locations E13 and E16 (Southern FLL; Appendix E Figures 9 and 10) construction LAmax would be more than 5 dB above baseline LAmax up to approximately 250-300m from the HDD. However, with mitigation (close-board noise fencing or other appropriate acoustic barriers) LAmax would be below the baseline except within the immediate vicinity of the HDD.

Noise mitigation is proposed for areas where there is potential for qualifying bird species to be disturbed (refer to Figure 11). In the areas where non-breeding birds congregate at the northern end of the scheme (curlew) and (for pink footed geese) southern end of the scheme, noise fencing will be included for works within 500m of the relevant survey fields, to minimise the area of noise exposure.

d. Paragraphs 7.3.25 to 7.3.29 discuss the effects of dust and particulates on the Humber Estuary SPA. The draft CEMP (ES Volume IV Appendix 3.1 Draft CEMP (Application Document 6.4)) sets out the additional mitigation measures proposed to control dust and particulates. These mitigation measures are based on recommendations by IAQM. Provided that mitigation is implemented on site throughout the, it is considered that there will be no LSE upon the Humber Estuary SPA.

e. Section 7.4 discusses in combination effects. Table 7.2 in Appendix A provides a summary of the projects that have been considered in the in-combination assessment, detailing plan / project name, and a verdict on the potential for interaction with the Proposed Development and thus whether 'in combination' effects would arise.

In the absence of mitigation there is the potential for the following projects to have effects in combination with the Proposed Development:

Immingham Eastern Ro-Ro Terminal (DCO at pre-examination stage);

Humber Low Carbon Pipelines (DCO at pre-application stage);

Immingham Green Energy Terminal (DCO at pre-application stage);

- Associated British Ports - Land adjacent to the Westgate entrance, Port of Immingham (Pending - validated 18th August 2022);
- VPI Immingham Pilot Carbon Capture Plant (approved with conditions);
- Orsted Gigastack Ltd and Philips 66 Gigastack Project (awaiting scoping opinion);
- Humber Zero Project - Philips 66 Carbon Capture Plant (Pending - validated 16th March 2023)
- Humber Zero VPI Immingham Carbon Capture plant (Pending - validated 8th March 2023)
- Associated British Ports - Immingham Onshore Wind (Scoping opinion given 20th June 2023)
- Able UK Limited - Monopole Manufacturing Facility at Land at Able Marine Energy Park, south of Station Road, South Humber Bank, South Killingholme (approved 8th August 2022).
- Able UK Limited - Site Enabling Works, Land East of Rosper Road, Killingholme. Full planning application for enabling works on land east of Rosper Road, Killingholme. (Pending - validated March 2023).

Of the above listed projects, only VPI Carbon Capture Plant and Monopole Manufacturing Facility at Land at Able Marine Energy Park are consented. The potential for effects upon European designated sites has been assessed as part of the HRA process for these sites and mitigation proposed. For all projects where applications have been submitted, the potential effects have been reviewed for this HRA and their proposed mitigation measures also reviewed. In all cases, it is concluded that either:

- the zones of influence of the Proposed Development and the other project do not overlap (for example, the Immingham Eastern Ro-Ro Terminal has potential effects mainly on intertidal habitat, whereas the Proposed Development has potential effects on terrestrial functionally linked land);
- Impact pathways present for the other project (e.g., operational nitrogen emissions) are not present for the Proposed Development (which has no operational emissions); or
- Where similar impact pathways (e.g., noise disturbance of functionally linked land) do exist, there is either a sufficiently great unaffected area that no adverse effect on integrity will arise, or the mitigation that is proposed for both the other project and Proposed Development will collectively ensure that overall impacts are reduced to a non-significant level.

No effects dismissed as insignificant in the LSE section of this report would become significant in the light of these other projects. Moreover, all projects not yet consented will be assessed by the competent authority as part of the HRA process. These projects will only proceed if it can be demonstrated that there will be no LSE either alone or in combination with other plans or projects. As these projects are not yet consented, there will be no LSE in combination with the Proposed Development.

Table 7: Detailed matrix assessing the qualifying species of the Humber Estuary Ramsar against the identified impact pathways during construction (C columns), operation (O columns) and decommissioning (D columns).

Name of European Site and Designation: Humber Estuary Ramsar												
Ramsar Information Sheet: UK11031												
Distance from DCO Site Boundary: Overlapping												
Effect	**Dust and particulates**		**Water Quality**		**Noise and visual disturbance**		**Killing or injury**		**Permanent loss of functionally linked land**	**Temporary loss of functionally linked land**	**In Combination effects**	
Stage of Proposed Development	C	D	C	D	C	D	C	D	C	C	C	D
Habitats	×a	×a	×b	×b	×c	×c	×d	×d	×d	×d	×f	×f
Grey Seal	×a	×a	×b	×b	×c	×c	×d	×d	×d	×d	×f	×f
Natterjack Toad	×a	×a	×b	×b	×c	×c	×d	×d	×d	×d	×f	×f
Waterbird assemblage (non-breeding)	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	×f	×f
Shelduck	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	×f	×f
Golden plover	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	×f	×f
Red knot	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	×f	×f
Dunlin	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	×f	×f
Bar-tailed godwit	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	×f	×f
Redshank	×a	×a	×b	×b	×c	×c	×d	×d	×e	×e	×f	×f
Lamprey	×a	×a	×b	×b	×b	×b	×b	×b	×d	×d	×f	×f

a. Paragraphs 7.3.25 to 7.3.29 discuss the effects of dust and particulates on the Humber Estuary SPA. The draft CEMP (ES Volume IV Appendix 3.1 Draft CEMP (Application Document 6.4)) sets out the additional mitigation measures proposed to control dust and particulates. These mitigation measures are based on recommendations by IAQM. Provided that mitigation is implemented on site throughout the, it is considered that there will be no LSE upon the Humber Estuary SPA.

b. Paragraphs 10.3.30 to 10.3.33 discuss the potential for LSE upon lamprey species. To prevent harm to lamprey, all WFD main rivers will be crossed by non-intrusive methods. Where minor watercourses and ditches are crossed, they will be reinstated, and culverts will include a natural bed to maintain longitudinal connectivity. The Draft Construction Environmental Management Plan (CEMP) (ES Volume IV Appendix 3.1 (Application Document 6.4)) sets out the additional mitigation measures identified to maintain water quality. Paragraphs 10.3.33 to 10.2.10.2.34 confirm that a drainage strategy and water management plan will be developed by the contractor during detailed design. With the application of mitigation, there will be no LSE upon the river or sea lamprey.

c. Paragraphs 7. 3.11 to 7.3.24 discuss noise and visual disturbance of breeding and non-breeding birds within functionally linked land. The areas of greatest sensitivity for breeding birds associated with Humber Estuary SPA/Ramsar are Rosper Road Pools at Immingham (FLL North) and the area near the Dune Valve at the TGT Site at Theddlethorpe (FLL South). The baseline average (LAeq) noise level is approximately 53 dB (Appendix E Figure 2, sound monitoring location A4). Construction works will have a maximum unmitigated average noise level of 55-60 dB at Rosper Road Pools, which is up to 7 dB above the baseline. This may be disturbing, but with close-board noise fencing or other appropriate acoustic barriers this would reduce average noise levels at Rosper Road Pools due to the works to 45-50 dB, which is below the baseline. Maximum (LAmax) noise levels due to the works will be well below the baseline maximum noise levels at Rosper Road Pools of 70dB.

   At the TGT Site (Theddlethorpe; FLL South) a mole plough would be used to make the connection through the area used by nesting avocet, to the Dune Valve. This will create a small slit in the turf in which the cable duct will be immediately installed, and the turf closed behind by a small mini digger. No wetland features in this area will be directly affected. Installation is expected to be undertaken in one pass in a single day. Works at the Dune Valve could also provide disturbance to nesting avocet. Therefore, all works at Viking Fields will need to be undertaken during August/September when avocet is no longer likely to be breeding and non-breeding numbers are still low.

   For the remainder of the Proposed Development, including the 50km pipeline route and most of the Northern and Southern FLL area, noise levels (both baseline and project-related) vary but in general, baseline typical (LAeq) noise levels are in the region of 48 dB on average. Project average construction noise levels (LAeq) therefore exceed 5dB above the average baseline LAeq up to c. 500m from the works footprint as a worst-case. Mitigation (close-board noise fencing or other appropriate acoustic barriers) would reduce noise levels to below the baseline LAeq.

Maximum sound levels (LAmax) are associated with the various sections of HDD and are shown in Appendix E Figures 6-10. These show that for noise monitoring locations E3 (Immingham/Northern FLL) and E5 (Northern FLL; Appendix E Figures 6-8), baseline LAmax levels are not forecast to be exceeded except in the immediate vicinity of the HDD. At noise monitoring location E2 (Immingham/Northern FLL; Appendix E Figures 6-7) LAmax levels are forecast to be exceeded by up to 5dB up to 200m from the HDD, in the absence of mitigation. With mitigation (close-board noise fencing or other appropriate acoustic barriers) LAmax levels would not be exceeded except in the immediate vicinity of the HDD. At noise monitoring locations E13 and E16 (Southern FLL; Appendix E Figures 9 and 10) construction LAmax would be more than 5 dB above baseline LAmax up to approximately 250-300m from the HDD. However, with mitigation (close-board noise fencing or other appropriate acoustic barriers) LAmax would be below the baseline except within the immediate vicinity of the HDD.

Noise mitigation is proposed for areas where there is potential for qualifying bird species to be disturbed (refer to Figure 11). In the areas where non-breeding birds congregate at the northern (curlew) and (for pink footed geese) southern end of the scheme, noise fencing will be included for works within 500m of the relevant survey fields, to minimise the area of noise exposure.

d. Not relevant to this receptor.

e. Paragraphs 7. 3.11 to 7.3.24 discuss noise and visual disturbance of breeding and non-breeding birds within functionally linked land. The areas of greatest sensitivity for breeding birds associated with Humber Estuary SPA/Ramsar are Rosper Road Pools at Immingham (FLL North) and the area near the Dune Valve at the TGT Site at Theddlethorpe (FLL South). At both of these locations a population of breeding avocet have been recorded. At the Immingham end of the scheme (Northern FLL area), and particularly for Rosper Road Pools where breeding avocet have been recorded and which is the closest sensitive area to works at the northern end of the scheme, the baseline average (LAeq) noise level is approximately 53 dB (Appendix E Figure 2, sound monitoring location A4). Construction works will have a maximum unmitigated average noise level of 55-60 dB at Rosper Road Pools, which is up to 7 dB above the baseline. This may be disturbing, but with close-board noise fencing or other appropriate acoustic barriers this would reduce average noise levels at Rosper Road Pools due to the works to 45-50 dB, which is below the baseline. Maximum (LAmax) noise levels due to the works will be well below the baseline maximum noise levels at Rosper Road Pools of 70dB.

   At the TGT Site (Theddlethorpe; FLL South) a mole plough would be used to make the connection through the area used by nesting avocet, to the Dune Valve. This will create a small slit in the turf in which the cable duct will be immediately installed, and the turf closed behind by a small mini digger. No wetland features in this area will be directly affected. Installation is expected to be undertaken in one pass in a single day. Works at the Dune Valve could also provide disturbance to nesting avocet. Therefore, all works at Viking Fields will need to be undertaken during August/September when avocet is no longer likely to be breeding and non-breeding numbers are still low.

   For the remainder of the Proposed Development, including the 50km pipeline route and most of the Northern and Southern FLL area, noise levels (both baseline and project-related) vary but in general, baseline typical (LAeq) noise levels are in the region of 48 dB on

average. Project average construction noise levels (LAeq) therefore exceed 5dB above the average baseline LAeq up to c. 500m from the works footprint as a worst-case. Mitigation (close-board noise fencing or other appropriate acoustic barriers) would reduce noise levels to below the baseline LAeq.

Maximum sound levels (LAmax) are associated with the various sections of HDD and are shown in Appendix E Figures 6-10. These show that for noise monitoring locations E3 (Immingham/Northern FLL) and E5 (Northern FLL; Appendix E Figures 6-8), baseline LAmax levels are not forecast to be exceeded except in the immediate vicinity of the HDD. At noise monitoring location E2 (Immingham/Northern FLL; Appendix E Figures 6-7) LAmax levels are forecast to be exceeded by up to 5dB up to 200m from the HDD, in the absence of mitigation. With mitigation (close-board noise fencing or other appropriate acoustic barriers) LAmax levels would not be exceeded except in the immediate vicinity of the HDD. At noise monitoring locations E13 and E16 (Southern FLL; Appendix E Figures 9 and 10) construction LAmax would be more than 5 dB above baseline LAmax up to approximately 250-300m from the HDD. However, with mitigation (close-board noise fencing or other appropriate acoustic barriers) LAmax would be below the baseline except within the immediate vicinity of the HDD.

Functionally linked land moves into and out of suitability within an agricultural landscape on a regular basis. Therefore, in the long-term, individual fields are less important than the long-term preservation of a sufficiently large amount of foraging habitat in the wider landscape around designated sites to sustain the SPA/Ramsar populations. Regular farming activities (such as ploughing, spraying, fertilising and harvesting) will present a similar disturbing presence to construction crews installing pipelines. While birds may displace from the immediate vicinity of the works while they are occurring, they will move to the opposite side of fields, or use other fields, returning when the works have ceased. Moreover, earth disturbance to install pipelines can attract foraging birds by bringing earthworms, seeds and other food items to the surface. Even if birds are temporarily displaced from a linear corridor of habitat within a given field, this will not affect the long-term cumulative resource availability to SPA / Ramsar birds, especially when the habitats involved are widespread and easily recreated, and the original land use of impacted fields will be reinstated immediately following completion of the works.

Therefore, in general noise mitigation is not considered necessary away from Rosper Road Pools and the TGT Site. However, in the areas where non-breeding birds congregate at the northern (curlew) and (for pink footed geese) southern end of the scheme, noise fencing will be included for works within 500m of the relevant survey fields, to minimise the area of noise exposure.

f. Section 7.4 discusses in combination effects. Table 7.2 in Appendix A provides a summary of the projects that have been considered in the in-combination assessment, detailing plan / project name, and a verdict on the potential for interaction with the Proposed Development and thus whether ‘in combination’ effects would arise.

In the absence of mitigation there is the potential for the following projects to have effects in combination with the Proposed Development:

- Immingham Eastern Ro-Ro Terminal (DCO at pre-examination stage);
- Humber Low Carbon Pipelines (DCO at pre-application stage);

- Immingham Green Energy Terminal (DCO at pre-application stage);
- Associated British Ports - Land adjacent to the Westgate entrance, Port of Immingham (Pending - validated 18th August 2022);
- VPI Immingham Pilot Carbon Capture Plant (approved with conditions);
- Orsted Gigastack Ltd and Philips 66 Gigastack Project (awaiting scoping opinion);
- Humber Zero Project - Philips 66 Carbon Capture Plant (Pending - validated 16th March 2023)
- Humber Zero VPI Immingham Carbon Capture plant (Pending - validated 8th March 2023)
- Associated British Ports - Immingham Onshore Wind (Scoping opinion given 20th June 2023)
- Able UK Limited - Monopole Manufacturing Facility at Land at Able Marine Energy Park, south of Station Road, South Humber Bank, South Killingholme (approved 8th August 2022).
- Able UK Limited - Site Enabling Works, Land East of Rosper Road, Killingholme. Full planning application for enabling works on land east of Rosper Road, Killingholme. (Pending - validated March 2023).

Of the above listed projects, only VPI Carbon Capture Plant and Monopole Manufacturing Facility at Land at Able Marine Energy Park are consented. The potential for effects upon European designated sites has been assessed as part of the HRA process for these sites and mitigation proposed. For all projects where applications have been submitted, the potential effects have been reviewed for this HRA and their proposed mitigation measures also reviewed. In all cases, it is concluded that either:

- the zones of influence of the Proposed Development and the other project do not overlap (for example, the Immingham Eastern Ro-Ro Terminal has potential effects mainly on intertidal habitat, whereas the Proposed Development has potential effects on terrestrial functionally linked land);
- Impact pathways present for the other project (e.g., operational nitrogen emissions) are not present for the Proposed Development (which has no operational emissions); or
- Where similar impact pathways (e.g., noise disturbance of functionally linked land) do exist, there is either a sufficiently great unaffected area that no adverse effect on integrity will arise, or the mitigation that is proposed for both the other project and Proposed Development will collectively ensure that overall impacts are reduced to a non-significant level.

No effects dismissed as insignificant in the LSE section of this report would become significant in the light of these other projects. Moreover, all projects not yet consented will be assessed by the competent authority as part of the HRA process. These projects will only proceed if it can be demonstrated that there will be no LSE either alone or in combination with other plans or projects. As these projects are not yet consented, there will be no LSE in combination with the Proposed Development.

Table 8: Detailed matrix assessing the qualifying species of the Humber Estuary SAC against the identified impact pathways during construction (C columns), operation (O columns) and decommissioning (D columns).

Name of European Site and Designation: Humber Estuary SAC						
EU Code: UK0030170						
Distance from DCO Site Boundary: 1.27 km						
Effect	**Water Quality**		**Noise and vibration**		**Killing or injury**	
Stage of Proposed Development	C	D	C	D	C	D
Lamprey	✕a	✕a	✕a	X b	✕a	✕ b

a. Paragraphs 10.3.30 to 10.3.33 discuss the potential for LSE upon lamprey species. To prevent harm to lamprey, all WFD main rivers will be crossed by non-intrusive methods. Where minor watercourses and ditches are crossed, they will be reinstated, and culverts will include a natural bed to maintain longitudinal connectivity. The Draft Construction Environmental Management Plan (CEMP) (ES Volume IV Appendix 3.1 (Application Document 6.4)) sets out the additional mitigation measures identified to maintain water quality. Paragraphs 10.3.33 to 10.2.10.2.34 confirm that a drainage strategy and water management plan will be developed by the contractor during detailed design. Use of battery powered plant will be considered to minimise noise and vibration when working close to watercourses. With the application of mitigation, there will be no LSE upon the river or sea lamprey.
b. For decommissioning, the base case is for the pipeline to be left in situ along its entire length. Therefore, there will be no likely significant effects upon lamprey as watercourses and surrounding habitats will remain undisturbed.

Table 9: Detailed matrix assessing the qualifying species of Saltfleetby – Theddlethorpe Dunes and Gibraltar Point SAC against the identified impact pathways during construction (C columns), operation (O columns) and decommissioning (D columns).

	Name of European Site and Designation: Saltfleetby – Theddlethorpe Dunes and Gibraltar Point SAC					
	EU Code: UK0030270					
	Distance from DCO Site Boundary: Overlapping					
Effect	**Habitat Loss or degradation**		**Water Quality**		**Dust and particulates**	
Stage of Proposed Development	C	D	C	D	C	D
Habitats	✕a	✕d	✕b	✕b	✓c	✓c

a. Paragraphs 7.3.34 to 7.3.38 consider direct habitat loss or degradation upon Saltfleetby – Theddlethorpe Dunes and Gibraltar Point SAC. The Draft Construction Environmental Management Plan (CEMP) (ES Volume IV Appendix 3.1 (Application Document 6.4)) sets out the additional mitigation measures identified to avoid adverse effects upon habitats during construction. With the application of mitigation there will be no LSE upon the qualifying habitats of the SAC.

b. Paragraphs 7.3.39 to 7.3.43 discuss measures to prevent changes in water quality. The Draft Construction Environmental Management Plan (CEMP) (ES Volume IV Appendix 3.1 (Application Document 6.4)) sets out the additional mitigation measures identified to avoid adverse effects upon water quality. A Drainage Strategy will be developed by the Contractor during detailed design. In addition, a Water Management Plan will be developed by the Contractor during detailed design. The plan will detail the management principles and procedures throughout the construction period that will be implemented on site to ensure that water features are protected from pollution from construction works. It will set out plans for water quality monitoring during construction and post-construction, pollution prevention measures, permits and consents and incidents and emergencies measures.

c. Paragraphs 7.3.25 to 7.3.29 discuss measures to prevent dust and particulates from having an adverse effect upon Saltfleetby – Theddlethorpe Dunes and Gibraltar Point SAC. ES Chapter 14 and the Draft CEMP (ES Volume IV Appendix 3.1 Draft CEMP (Application Document 6.4)) set out the additional mitigation measures proposed to control dust and particulates. These mitigation measures are based on recommendations by IAQM. Provided that the above dust mitigation is implemented on site throughout the works (which are considered standard practice on all well managed construction sites of this scale), it is considered that there will be no LSE upon the qualifying habitats of the SAC.

d. A decommissioning management plan will outline the measures required to protect adjacent habitats during the decommissioning process. Measures to protect habitats will be similar to those applied for the construction phase.

Appendix I Indicative Locations for Noise and Visual Screening

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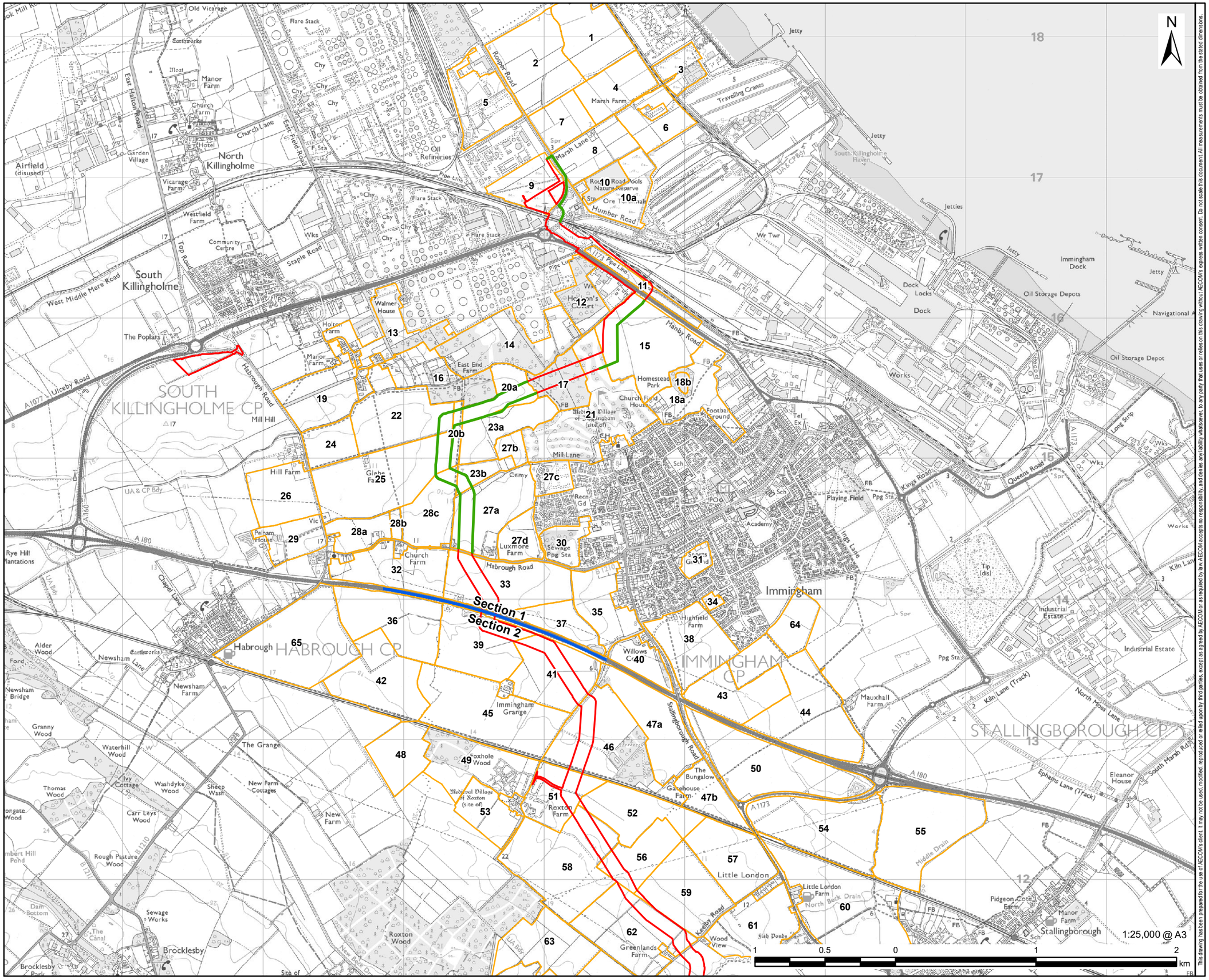
Revision: 1 Drawn: LC Checked: KA Approved: MW Date: 2024-05-14



VikingCCS

AECOM

PROJECT

Viking CCS Pipeline

LEGEND

- DCO Site Boundary
- Route Section Break
- Proposed Screening Fence - Sections where acoustic fencing may potentially be required pending on site review by an Ecological Clerk of Works
- Survey Field Boundary

NOTES:
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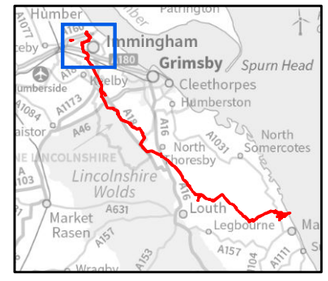

FIGURE TITLE

Figure 1.1 (1 of 2)
Indicative Locations for Noise and Visual Screening

ISSUE PURPOSE

HRA

PROJECT NUMBER / REFERENCE

60668955 / VCCS_240514_HRA_1.1

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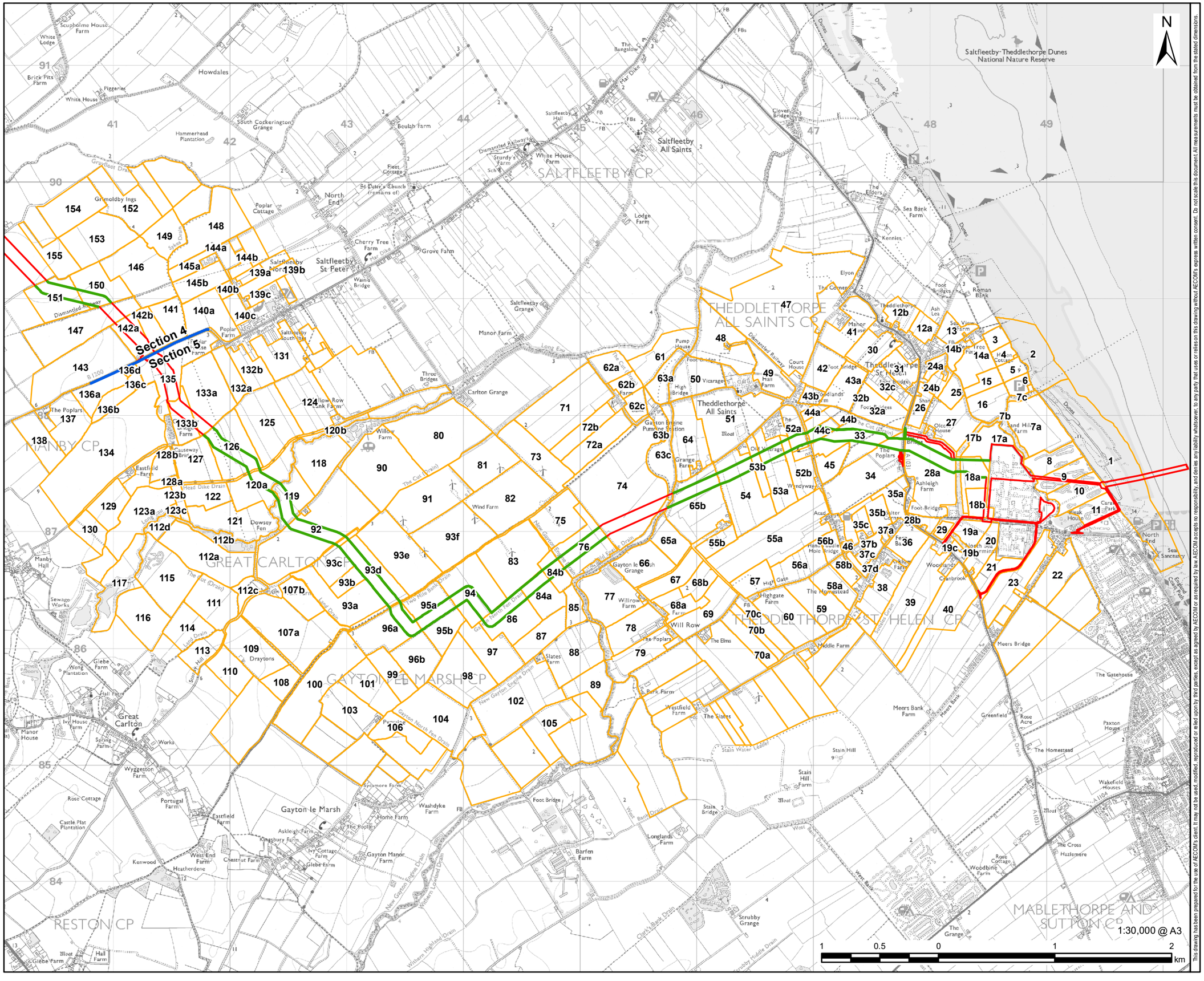

VikingCCS

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PROJECT

Viking CCS Pipeline

LEGEND

- DCO Site Boundary
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- Survey Field Boundary

NOTES:

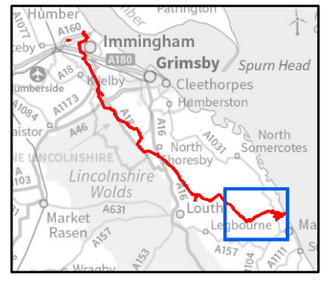

FIGURE TITLE

Figure 1.1 (2 of 2)
Indicative Locations for Noise and Visual Screening

ISSUE PURPOSE

HRA

PROJECT NUMBER / REFERENCE

60668955 / VCCS_240514_HRA_1.1