EP UK Investments

South Humber Bank Energy Centre Project

Planning Inspectorate Reference: EN010107

South Marsh Road, Stallingborough, DN41 8BZ

The South Humber Bank Energy Centre Order

Document Ref: 5.8: Habitats Regulations Assessment Report

Applicant: EP Waste Management Ltd
Date: March 2021

DOCUMENT HISTORY

Document ref	5.8 Habitats Regulations Assessment Report		
Revision	3.0 (updated in response to the ExA's Further Written Questions and submitted at Deadline 5)		
Author	Jo Atkinson, E Checkley and L Deacon (see Appendix 10 for Qualifications)		
Signed		**Date**	March 2021
Approved By	Dr James Riley and Kirsty Cobb (see Appendix 10 for Qualifications)		
Signed		**Date**	March 2021
Document Owner	AECOM		

GLOSSARY OF ABBREVIATIONS AND DEFINITIONS

Abbreviation	Description
ACC	Air Cooled Condenser
AGIs	Above Ground Installations
CCGT	Combined Cycle Gas Turbine
CEMP	Construction Environmental Management Plan
CFA	Continuous Flight Auger
DCO	Development Consent Order
ECJ	European Court of Justice
EcIA	Ecological Impact Assessment
EfW	Energy from waste
EIA	Environmental Impact Assessment
EPH	Energetický A Prumyslový Holding
EPUKI	EP UK Investments Limited
EPWM	EP Waste Management Limited
ES	Environmental Statement
ExA	Examining Authority
GWTEs	Groundwater Dependant Terrestrial Ecosystems
HRA	Habitat Regulations Assessment
IROPI	Imperative Reasons of Overriding Public Interest
kV	Kilovolt
mAOD	m Above Ordnance Datum
MW	megawatt
NELC	North East Lincolnshire Council
NSIP	Nationally Significant Infrastructure Project
ODPM	Office of Deputy Prime Minister
PA 2008	The Planning Act 2008
RDF	Refuse derived fuel
SAC	Special Area of Conservation
SHBPS	South Humber Bank Power Station
SHG	South Humber Gateway (strategic mitigation approach)

SoS	Secretary of State
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
tpa	tonnes per annum

CONTENTS

TABLES

1.0 EXECUTIVE SUMMARY

1.1.1 EP Waste Management Limited (EPWM) is seeking development consent for the construction, operation and maintenance of an energy from waste power station, a new site access, and other associated development on land at South Humber Bank Power Station, South Marsh Road, near Stallingborough in North East Lincolnshire. This report comprises a Habitats Regulations Assessment (HRA) Report for the Proposed Development. Two previous iterations of this document have been submitted to the Planning Inspectorate, both of which were titled 'Habitats Regulations Assessment Signposting'. However, given the substantial changes to the content of the document, the title of this (third) version has been changed to 'HRA Report' to reflect this, although it retains the same document reference number.

1.1.2 The power station will be constructed on land adjacent to the Humber Estuary SAC/ SPA/ Ramsar site and will result in the loss of habitat that is considered functionally linked to the SPA/ Ramsar site.

1.1.3 Mitigation for this loss of habitat will be delivered through the South Humber Gateway (SHG) strategic mitigation approach under Policy 9 of the North East Lincolnshire Local Plan. The appropriate financial contribution towards mitigation required by Policy 9 will be secured via a deed of variation of the existing Section 106 Agreement in force for the Planning Permission. It is therefore concluded that the loss of functionally linked habitat within the Site will not result in any adverse effects on the integrity of the Humber Estuary SPA/ Ramsar.

1.1.4 There are two other developments proposed in the area that will result in the loss of functionally linked habitat in the vicinity of the Site, but these other developments are also committed to the delivery of habitat mitigation through the SHG strategic mitigation route, so it is concluded that there would be no adverse in-combination effects on the Humber Estuary SPA/ Ramsar site.

1.1.5 Likely significant effects as a result of noise impacts during construction (primarily associated with drop hammer piling noise) and during operation have been identified. However, it is concluded that construction and operation noise would not give rise to an adverse effect on the integrity of the Humber Estuary SPA/ Ramsar site either alone or in-combination with other plans or projects.

1.1.6 Likely significant effects as a result of changes in air quality during operation were identified. However, it is concluded that air quality impacts will not result in an adverse effect on the integrity of the Humber Estuary SAC/ SPA/ Ramsar site either alone or in-combination with other plans or projects.

2.0 INTRODUCTION

2.1 Overview

2.1.1 This HRA Report (Document Ref. 5.8) has been prepared on behalf of EP Waste Management Limited ('EPWM' or the 'Applicant'). It forms part of the application (the 'Application') for a Development Consent Order (a 'DCO'), that has been submitted to the Secretary of State (the 'SoS') for Business, Energy and Industrial Strategy, under section 37 of 'The Planning Act 2008' (the 'PA 2008').

2.1.2 EPWM is seeking development consent for the construction, operation and maintenance of an energy from waste ('EfW') power station with a gross electrical output of up to 95 megawatts (MW) including an electrical connection, a new site access, and other associated development (together 'the Proposed Development') on land at South Humber Bank Power Station ('SHBPS'), South Marsh Road, near Stallingborough in North East Lincolnshire ('the Site').

2.1.3 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.

2.1.4 The DCO, if made by the SoS, would be known as the 'South Humber Bank Energy Centre Order' ('the Order').

2.1.5 Full planning permission ('the Planning Permission') was granted by North East Lincolnshire Council ('NELC') for an EfW power station with a gross electrical output of up to 49.9 MW and associated development ('the Consented Development') on land at SHBPS ('the Consented Development Site') under the Town and Country Planning Act 1990 on 12 April 2019. Since the Planning Permission was granted, the Applicant has assessed potential opportunities to improve the efficiency of the EfW power station, notably in relation to its electrical output. As a consequence, the Proposed Development would have a higher electrical output (up to 95 MW) than the Consented Development, although it would have the same maximum building dimensions and fuel throughput (up to 753,500 tonnes per annum (tpa)).

2.2 The Applicant

2.2.1 The Applicant is a subsidiary of EP UK Investments Limited ('EPUKI'). EPUKI owns and operates a number of other power stations in the UK. These include SHBPS and Langage (Devon) Combined Cycle Gas Turbine ('CCGT') power stations, Lynemouth (Northumberland) biomass-fired power station, and power generation assets in Northern Ireland. EPUKI also owns sites with consent for new power stations in Norfolk (King's Lynn 'B' CCGT) and North Yorkshire (Eggborough CCGT).

2.2.2 EPUKI is a subsidiary of Energetický A Prumyslový Holding ('EPH'). EPH owns and operates energy generation assets in the Czech Republic, Slovak Republic, Germany, Italy, Hungary, Poland, Ireland, and the United Kingdom.

2.3 The Proposed Development Site

2.3.1 The Proposed Development Site (the 'Site' or the 'Order limits') is located within the boundary of the SHBPS site, east of the existing SHBPS, along with part of

the carriageway within South Marsh Road. The principal access to the site is off South Marsh Road.

2.3.2 The Site is located on the South Humber Bank between the towns of Immingham and Grimsby; both over 3 km from the Site. The surrounding area is characterised by industrial uses dispersed between areas of agricultural land with the nearest main settlements being the villages of Stallingborough, Healing and Great Coates. The Site lies within the parish of Stallingborough although Stallingborough village lies over 2 km away.

2.3.3 The Site lies within the administrative area of NELC, a unitary authority. The Site is owned by EP SHB Limited, a subsidiary of EPUKI, and is therefore under the control of the Applicant, with the exception of the highway land on South Marsh Road required for the new Site access.

2.3.4 The existing SHBPS was constructed in two phases between 1997 and 1999 and consists of two CCGT units fired by natural gas, with a combined gross electrical capacity of approximately 1,400 MW. It is operated by EP SHB Limited.

2.3.5 The Site is around 23 hectares ('ha') in area and is generally flat, and typically stands at around 2.0 m Above Ordnance Datum (mAOD).

2.3.6 The land surrounding the Site immediately to the south, west and north-west is in agricultural use with a large polymer manufacturing site, Synthomer, and a waste management facility, NEWLINCS, both located to the north of the Site and also accessed from South Marsh Road. The estuary of the River Humber lies around 175 m to the east of the Site.

2.3.7 Access to the South Humber Bank is via the A180 trunk road and the A1173. The Barton railway line runs north-west to south-east between Barton-on-Humber and Cleethorpes circa 2.5 km to the south-west of the Site and a freight railway line runs north-west to south-east circa 300 m (at the closest point) to the Site.

2.3.8 A more detailed description of the Site is provided at Chapter 3: Description of the Proposed Development Site in the Environmental Statement ('ES') Volume I (Document Ref. 6.2).

2.4 The Proposed Development

2.4.1 The main components of the Proposed Development are summarised below:

- Work No. 1— an electricity generating station located on land at SHBPS, fuelled by refuse derived fuel ('RDF') with a gross electrical output of up to 95 MW at ISO conditions;
- Work No. 1A— two emissions stacks and associated emissions monitoring systems;
- Work No. 1B— administration block, including control room, workshops, stores and welfare facilities;
- Work No. 2— comprising electrical, gas, water, telecommunication, steam and other utility connections for the generating station (Work No. 1);
- Work No. 3— landscaping and biodiversity works;

- Work No. 4— a new site access on to South Marsh Road and works to an existing access on to South Marsh Road; and
- Work No. 5— temporary construction and laydown areas.

2.4.2 Various types of ancillary development further required in connection with and subsidiary to the above works are detailed in Schedule 1 of the DCO. A more detailed description of the Proposed Development is provided at Schedule 1 'Authorised Development' of the Draft DCO and Chapter 4: The Proposed Development in the ES Volume I (Document Ref. 6.2) and the areas within which each of the main components of the Proposed Development are to be built is shown by the coloured and hatched areas on the Works Plans (Document Ref. 4.3).

2.5 Relationship with the Consented Development

2.5.1 The Proposed Development comprises the works contained in the Consented Development, along with additional works not forming part of the Consented Development ('the Additional Works'). The Additional Works are set out below along with an explanation of their purpose.

- a larger air-cooled condenser (ACC), with an additional row of fans and heat exchangers – this will allow a higher mass flow of steam to be sent to the steam turbine whilst maintaining the exhaust pressure and thereby increasing the amount of power generated;
- a greater installed cooling capacity for the generator – additional heat exchangers will be installed to the closed-circuit cooling water system to allow the generator to operate at an increased load and generate more power;
- an increased transformer capacity – depending on the adopted grid connection arrangement the capacity will be increased through an additional generator transformer operating in parallel with the Consented Development's proposed generator transformer or a single larger generator transformer. Both arrangements would allow generation up to 95 MW; and
- ancillary works – the above works will require additional ancillary works and operations, such as new cabling or pipes, and commissioning to ensure that the apparatus has been correctly installed and will operate safely and as intended.

2.5.2 The likely construction scenario that was assessed in the ES was for work on the Consented Development (pursuant to the Planning Permission) to commence in Quarter 2 ('Q2') of 2020 and to continue for around three years. Following grant of a DCO for the Proposed Development (approximately halfway through the three-year construction programme), the Applicant would initiate powers to continue development under the Order instead of the Planning Permission. The Order includes appropriate powers and notification requirements for the 'switchover' between consents, to provide clarity for the relevant planning authority regarding the development authorised and the applicable conditions, requirements, and other obligations. Once the Order has been implemented the additional works would be constructed and the Proposed Development would be built out in full. The Proposed Development would commence operation in 2023.

2.5.3 Whilst the specific dates in this construction scenario have subsequently changed, due to the COVID-19 pandemic having had an impact on the procurement timetable (with the Consented Development now anticipated to commence pursuant to the Planning Permission in Q2 2021), the assessment of this scenario presented in the ES remains valid and robust.

2.5.4 Alternative construction scenarios, involving construction entirely pursuant to the Order, are also possible. Accordingly, three representative scenarios are described within Chapter 5: Construction Programme and Management in the ES Volume I (Document Ref. 6.2) and assessed in the Environmental Impact Assessment ('EIA').

2.6 The Purpose and Structure of this Document and Version

2.6.1 This report represents an HRA Report for the Proposed Development. This version of the report (Revision 3.0 dated March 2021) includes changes to the report made at Examination Deadline 5 in response to the Examining Authority (ExA)'s further written questions.

2.6.2 These include updates to the report text where requested by the ExA and the provision of the information cross referenced within the report from those chapters, technical appendices and paragraphs within the ES that contain the information required by the competent authority to undertake an 'Appropriate Assessment' under the terms of Regulation 63 of the Conservation of Habitats and Species Regulations 2017 (commonly referred to as the 'Habitats Regulations'). Previously the approach taken was to provide a simple cross-reference for the reader to the relevant assessment text contained within the main ES chapters. In Revision 2.0 this information was included within various appendices to the HRA Report (see Appendices 3 – 10). In Revision 3.0, at the request of the ExA this information has now been brought into the relevant sections of the main HRA report to provide further clarity and to inform the Secretary of State's Appropriate Assessment. However, it should be noted that all information contained within this Revision 3.0 document has already been presented either within the ES or original HRA document.

2.6.3 The report is designed to serve two key functions:

- to assist the competent authority by making it easier to undertake and consult on a HRA; and
- to act as a confirmatory checklist that can be used to ensure that the relevant information needed for a HRA is adequately presented.

3.0 SCOPE OF ASSESSMENT

3.1 Introduction

3.1.1 It is a requirement of the EC Habitats Directive 1992 and the Habitats Regulations that plans and projects are subject to an Appropriate Assessment if it is likely that they will lead to significant adverse effects on international designated sites[1] (referred to hereafter in this HRA report as 'designated sites'). It is the duty of the 'competent authority' to determine if significant adverse effects are likely and, if necessary, to then undertake the Appropriate Assessment, but the proponent of the Proposed Development can be asked to supply sufficient data/ reports to enable such a decision to be reached.

3.1.2 In the past, the term Appropriate Assessment has been used to describe both the overall process and a particular stage of that process (see below). The term HRA has come into use in order to refer to the process that leads to an Appropriate Assessment, thus avoiding confusion. Throughout this report, HRA is used to refer to the overall procedure required by the Habitats Regulations. The Habitats Regulations set out a stepwise process, including an Appropriate Assessment to consider the impacts and effects of the Proposed Development on the designated site(s). Although the necessity for an Appropriate Assessment has not been established, based on engagement with the competent authority and Natural England regarding the similar Consented Development, this document has been prepared on the assumption that the competent authority will conclude that one is required.

3.1.3 For designated sites subject to the provisions of the Habitats Regulations, it is usual to consider a search radius of 10 km when examining the potential pathways for air quality impacts on the sites.

3.1.4 The following designated sites were identified within this radius; the Humber Estuary Special Area of Conservation (SAC), Special Protection Area (SPA) and Ramsar site, which are approximately 175 m east of the Proposed Development. The SAC supports qualifying Annex I habitats that are potentially susceptible to the effects of emissions to air from the Proposed Development. The SPA/ Ramsar site supports internationally important assemblages of wintering and passage waterbirds that may be displaced from functionally linked habitats outside the designation boundary as a result of the Proposed Development.

3.1.5 Surface water pathways to the designated habitats (and thus the qualifying species they support) have also been considered because the surrounding surface water drainage network, into which surface water from the construction and operation of the Proposed Development will outfall, drains into the Humber Estuary.

[1] Since the departure of the UK from the EU on 31 January 2020, the term 'Natura 2000 site' no longer applies and therefore is no longer used within this HRA report.

3.2 The Legislative Basis for Determining Likely Significant Effects and for Subsequent Appropriate Assessment, If Required

3.2.1 The Conservation of Habitats and Species Regulations (2017) states that:

> *"A competent authority, before deciding to … give any consent for a plan or project which is likely to have a significant effect on a European site or a European Offshore Marine Site (either alone or in combination with other plans or projects) … must make an appropriate assessment of the implications for the site in view of that sites conservation objectives … The authority shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the European site …"(Regulation 63)*

3.3 European Legislation and Withdrawal from the European Union

3.3.1 Since Revision 2.0 of this document was prepared in December 2020 the UK is no longer a member of the European Union (EU).

3.3.2 The UK left the EU on 31 January 2020 under the terms set out in the European Union (Withdrawal Agreement) Act 2020 ("the Withdrawal Act"), subject to a transition period. The Withdrawal Act retains the body of existing EU-derived law within UK domestic law. The transition period ended on 1 January 2021, however HRA requirements as set out in the Habitats Regulations (as amended by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019) continue to apply as they derive from retained EU-law.

3.4 Overview of HRA Procedure and Context

3.4.1 The Planning Inspectorate Advice Note 10: Habitats Regulations Assessment Relevant to National Significant Infrastructure Projects (Planning Inspectorate, 2017) provides guidance on how the Habitats Regulations should be implemented. This is interpreted and summarised as follows - it should be noted that not all steps must be gone through in every case (see Figure 3.1):

- determination of whether the proposal is likely to have a significant effect, either alone or cumulatively (referred to as 'in-combination' in HRA terms) with other plans or projects, on a European site;
- if a significant effect is likely (or cannot be ruled out), the competent authority must conduct an Appropriate Assessment of the implications for the site in view of the site's conservation objectives (Natural England, 2008);
- in considering the project's effects on the site's conservation objectives, the competent authority must determine whether it can ascertain that the proposal will not adversely affect the integrity of the site;
- taking account of the way in which works are proposed to be carried-out, and the site conditions or other restrictions;
- being satisfied that there are no alternative solutions which would have a lesser effect on site integrity;
- considering whether there are Imperative Reasons of Overriding Public Interest (IROPI) to justify granting of permission for the development despite a potentially negative effect on site integrity; and

- in the absence of alternatives, and where the importance of the development outweighs the harm to a European site, consideration of proposed compensatory measures (to ensure that the overall coherence of the network of designated sites is protected).

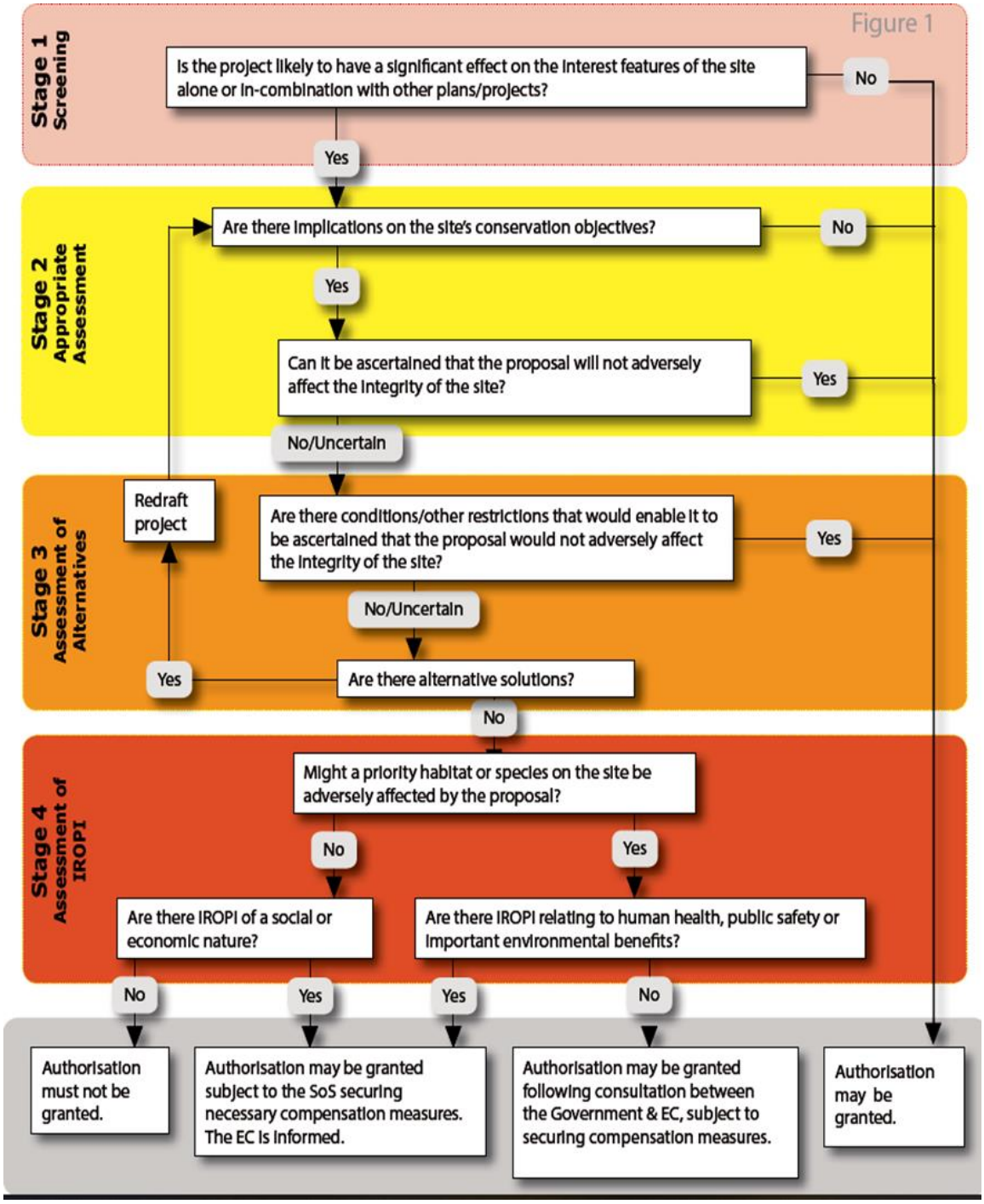
3.4.2 A flow chart of the HRA process (showing the decisions that are required at each stage) is provided as Figure 3.1 below. A four-stage methodology for HRA would therefore include:

- HRA Stage 1: Screening (including a 'likely significant effect' judgement);
- HRA Stage 2: Appropriate Assessment;
- HRA Stage 3: Assessment of Alternatives; and
- HRA Stage 4: Assessment of Imperative Reasons of Overriding Public Interest (IROPI) (where no alternative solutions exist and where adverse effects remain).

3.4.3 With regards to NSIPs, the Planning Inspectorate published a technical advice note in 2017, which sets out the approach to HRA that has already been summarised above. A set of matrices has been developed by the Planning Inspectorate to assist the relevant secretary of state, as the competent authority, in fulfilling the requirements of the Habitats Directive and the Habitats Regulations in the context of the PA 2008 process. The matrices comprise:

- Screening Matrices (HRA Stage 1: Screening) - which summarise the screening exercise for LSE of the project on the European sites and qualifying features considered (presented in this report as Appendix 1); and
- Integrity Matrices (HRA Stage 2: AA) - which summarise the potential adverse effects on integrity of the European sites, where LSE have been identified (presented in this report as Appendix 2).

Figure 3.1: HRA process (Planning Inspectorate, 2017)



3.4.4 Whilst the Appropriate Assessment and any subsequent assessments are undertaken by a competent authority, the information needed to undertake the assessments is generally provided by the applicant.

3.4.5 Revision 1.0 of the HRA report adopted a simple signposting approach to the relevant chapters in ES Volume I (Document Ref. 6.2), following the approach taken for the Consented Development, for which an HRA Signposting report was agreed with Natural England.

3.4.6 Revision 2.0 of the HRA report included the relevant text from the ES chapters in technical appendices (Appendices 3 – 9), to address the request from the ExA for more detail in the HRA report, whilst maintaining the previously adopted signposting approach for consistency with the Consented Development.

3.4.7 The ExA has submitted a further request for more detail to be included within the HRA report, and therefore a substantial re-working of this document has been undertaken to address this request. Whilst a greater level of information is therefore contained within the body of the HRA report, it should be noted that there have been no changes to the conclusion of the HRA, and all of the data and information now contained within this document has been previously presented either within the main chapters and supporting appendices of the ES (Document Refs. 6.2 and 6.4 respectively), the previous iterations of this HRA document, or both.

3.4.8 The following ES chapters (Document Ref. 6.2) have informed this HRA report:

- Chapter 4: The Proposed Development;
- Chapter 5: Construction Programme and Management;
- Chapter 6: Need, Alternatives and Design Evolution;
- Chapter 7: Air Quality;
- Chapter 8: Noise and Vibration;
- Chapter 10: Ecology;
- Chapter 14: Water Resources, Flood Risk and Drainage; and
- Chapter 17: Cumulative and Combined Effects.

3.4.9 ES Volume I (Document Ref. 6.2) concludes that the Proposed Development will not result in any significant adverse residual effects on the designated sites identified above. It should be appreciated that the mechanism for Environmental Impact Assessment (EIA) used in the ES (including how terminology is used, and how the importance of receptors is evaluated) differs from that adopted for HRA. Consequently, whilst it is considered that all the information necessary to undertake an HRA is contained within the main chapters of the ES in Volume I, a separate process is required to address the specific obligations of the Habitats Regulations. This document seeks to inform the competent authority in completing the HRA process.

3.4.10 Appendix 10 has been included to provide a summary of the qualifications of the lead authors and technical approver.

3.5 Consideration of People Over Wind, Peter Sweetman v Coillte Teoranta ECJ Ruling

3.5.1 This report has been prepared having regard to all relevant case law relating to the Habitats Regulations. In particular, the ruling by the European Court of Justice (ECJ) in the case of *People Over Wind, Peter Sweetman v Coillte Teoranta* (C-323/17) has been taken into account, because it influences the approach to HRA Screening Stage 1.

3.5.2 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 screening stage, but 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*" (emphasis added). Mitigation measures which are, for example, intended to avoid effects on a local watercourse outside the designated site boundary but which outfalls into the l 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.

3.5.3 This represents a deviation from the approach usually adopted in the EIA, which considers embedded mitigation (even those measures that are included to directly avoid or reduce harmful effects on a designated site) to form a part of the Proposed Development and takes these measures into account when assessing the potential impacts on qualifying habitats and species.

3.5.4 Where mitigation measures are mentioned in this report and taken into account at the screening stage, they are therefore ones which may reduce or avoid harmful effects on certain (local) habitats or species but are not introduced or relied on to directly avoid or reduce harmful effects on the designated sites that are the subject of this signposting report. This includes standard good practice mitigation measures incorporated into the Construction Environmental Management Plan (CEMP) (see Outline Construction Environmental Management Plan in ES Volume III, Document Ref. 6.4) such as surface water drainage attenuation. This approach is therefore compliant with the People over Wind case.

4.0 BASELINE EVIDENCE GATHERING

4.1 Proposed Development Description, Need and Alternatives

4.1.1 The Proposed Development is an energy from waste power station with a gross electrical generation capacity of up to 95 MW. The main components of the Proposed Development are summarised in Section 2.4, and the Additional Works required when compared to the Consented Development are summarised in Section 2.5.

4.1.2 The Proposed Development will operate 24 hours a day, 7 days a week with occasional offline periods for maintenance. The Proposed Development will utilise Refuse Derived Fuel (RDF) as the main source of fuel.

4.1.3 Consideration of the alternatives identified by the Applicant, and a comparison of their environmental effects, is provided in Chapter 6: Need, Alternatives and Design Evolution in ES Volume I (Document Ref. 6.2.6). The 'do nothing' scenario has been discounted on the basis that there is a clear need for the Proposed Development, which will provide an additional waste management facility and generate renewable energy.

4.1.4 The Site is considered to be suitable for the Proposed Development on the basis of its good access to the highway network, location away from residential receptors, and situation within an undeveloped area of SHBPS operational land under the Applicant's ownership.

4.1.5 Alternative locations within the Site and alternative technologies have also been considered with consideration and comparison of environmental effects.

4.1.6 The Proposed Development design has evolved following consideration of access points, site layout, stack height, cooling technology, sizing and capacity, phasing of construction, fuel bunker design, Site boundary, biodiversity mitigation and enhancement proposals and foul drainage options, and environmental effects of each option have been appraised alongside technical and commercial considerations.

4.2 Designated Sites Scoped in to HRA Screening

4.2.1 Three international designations associated with the Humber Estuary have been scoped into the impact assessment in ES Volume I Chapter 10: Ecology (Document Ref. 6.2.10).

4.2.2 A stratified approach was taken when defining the desk study area, based on the likely worst-case zone of influence of the Proposed Development on different ecological features, and an understanding of the maximum distances typically considered by statutory consultees. Accordingly, the desk study identified any international nature conservation designations within 10 km of the Main Development Area[2] (refer to Appendix 8 of this HRA report for the full cross-

[2] This has been extended to reflect the potential zone of influence considered for developments that may result in changes in air quality.

referenced text from paragraph 4.1.2 of the PEA Report in ES Volume III Appendix 10C (Document Ref. 6.4)).

4.2.3 The locations of the sites relative to the Proposed Development are shown in Figure 10C.2 of the PEA Report (Document Ref. 6.4.15), which has been included as Appendix 9 of this HRA report.

4.2.4 A summary of the qualifying features for each of the three designated sites and their distance from the Proposed Development is summarised in Table 4.1 below.

Table 4.1: Designated sites scoped into HRA screening

SITE	APPROX. DISTANCE FROM SITE	TOTAL AREA (HA)	DESIGNATED FEATURES
Humber Estuary SAC	175 m east	36,657.15	Annex I Habitats primary reason for site selection: Estuaries Mudflats and sandflats not covered by seawater at low tide Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site: Sandbanks which are slightly covered by sea water all the time Coastal lagoons *Salicornia* and other annuals colonizing mud and sand Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) Embryonic shifting dunes Shifting dunes along the shoreline with European marram grass (*Ammophila arenaria*) (white dunes) Fixed coastal dunes with herbaceous vegetation (grey dunes) Dunes with common sea buckthorn (*Hippophae• rhamnoides*) Annex II species present as a qualifying feature, but not a primary reason for site selection: River lamprey (*Lampetra fluviatilis*) Sea lamprey (*Petromyzon marnius*) Grey seal (*Halichoerus grypus*)
Humber Estuary SPA	175 m east	37,630.24	Populations of European importance of breeding, passage and over-wintering birds: *Botaurus stellaris*; great bittern (non-breeding) *Botaurus stellaris*; great bittern (breeding) *Tadorna tadorna*; common shelduck (non-breeding) *Circus aeruginosus*; Eurasian marsh harrier (breeding)

SITE	APPROX. DISTANCE FROM SITE	TOTAL AREA (HA)	DESIGNATED FEATURES
			Circus cyaneus; hen harrier (non-breeding) *Recurvirostra avosetta*; pied avocet (non-breeding) *Recurvirostra avosetta*; pied avocet (breeding) *Pluvialis apricaria*; European golden plover (non-breeding) *Calidris canutus*; red knot (non-breeding) *Calidris alpina alpina*; dunlin (non-breeding) *Philomachus pugnax*; ruff (non-breeding) *Limosa limosa islandica*; black-tailed godwit (non-breeding) *Limosa lapponica*; bar-tailed godwit (non-breeding) *Tringa totanus*; common redshank (non-breeding) *Sterna albifrons*; little tern (breeding) Waterbird assemblage
Humber Estuary Ramsar site	175 m east	37,987.8	Ramsar **criterion 1**: The site is a representative example of a near-natural estuary with the following component habitats: • dune systems • humid dune slacks • estuarine waters • intertidal mud and sand flats • saltmarshes, and • coastal brackish/ saline lagoons.
			Ramsar **criterion 3**: Grey seal: breeding colony of grey seals at Donna Nook is the second largest grey seal colony in England and the furthest south regular breeding site on the east coast.

SITE	APPROX. DISTANCE FROM SITE	TOTAL AREA (HA)	DESIGNATED FEATURES
			Natterjack toad (*Bufo calamita*): the dune slacks at Saltfleetby-Theddlethorpe on the southern extremity of the Ramsar site are the most north-easterly breeding site in GB of the natterjack toad.
			Ramsar **criterion 5**: Internationally important assemblage of wintering waterfowl: 153,934 waterfowl, non-breeding season
			Ramsar **criterion 6**: Species/ populations occurring at levels of international importance over winter: Common shelduck 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 both river lamprey and sea lamprey between coastal waters and their spawning areas.

4.3 Conservation Objectives

4.3.1 The conservation objectives for each relevant site are summarised in Table 4.2 below.

Table 4.2: Conservation objectives for relevant designated sites

SITE	CONSERVATION OBJECTIVES
Humber Estuary SAC	Ensure that the integrity of the qualifying natural habitat 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 the 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.
Humber Estuary SPA	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 qualifying features; • the supporting processes on which the habitats of the qualifying features rely; • the populations of each of the qualifying features; and • the distribution of the qualifying features within the site.
Humber Estuary Ramsar site	Not specifically listed. Assumed as for Humber Estuary SAC and SPA.

4.4 Baseline Bird Usage: Proposed Development Site

4.4.1 The Proposed Development occupies a parcel of grassland in close proximity to the Humber Estuary SPA/ Ramsar, in which a number of shallow scrapes have been constructed to attract feeding, loafing and roosting birds at high tide that are displaced from coastal mudflats. This area where scrapes have been constructed is referred to as ‘Field 39’ in the South Humber Bank Wintering

Bird Surveys undertaken in 2007/08 and 2010/11 to inform the South Humber Gateway strategic mitigation approach (Policy 9 in the NE Lincolnshire Local Plan).

4.4.2 Surveys of the Site in winter 2007/ 08 recorded very few SPA/ Ramsar birds. Turnstone were recorded in small numbers (1 or 2 birds) at the far eastern end of the field (i.e. nearest to the coastal mudflats) in November, December, January, February and March across this period. The only other species recorded were redshank (one record of 1 bird in December 2017), and curlew (two records of 7 birds in January 2008, and one record of 1 bird in April 2008). No birds were recorded in the field in the 2010/11 surveys. A summary of the peak counts of birds in the 2007/08 survey season is provided in Table 10.7 in Appendix 11, with comparison against the Humber Estuary 5-year peak mean counts (from Frost et al., 2018) and the thresholds for international importance.

4.4.3 Despite the low numbers of records of SPA/ Ramsar birds within the Main Development Area, and that none were recorded in numbers above the 1% threshold of the Humber Estuary population[3], given its proximity to the Humber Estuary it is considered to be functionally linked to the Humber Estuary SPA/ Ramsar. A precautionary approach has been taken to the ecological impact assessment (EcIA), because the survey data are now somewhat out of date and the plot may have become more suitable for wintering birds in the interim period due to sensitive management of the grassland on the Site. The Site is therefore evaluated to be of District nature conservation value to wintering birds and although outside the boundary of the SPA/ Ramsar, is considered to be functionally linked to the adjacent SPA/ Ramsar because it supports the qualifying features.

4.5 Baseline Bird Usage: Field to the South (Field 37)

4.5.1 The large arable field immediately to the south of the Site, for which the southern boundary is defined by Oldfleet Drain, is referred to as ‘Field 37’ in the South Humber Bank counts[4].

4.5.2 This field regularly supports lapwing, curlew and golden plover across the winter months, and is noted to be an important field in the South Humber Bank survey area for high tide roosting, loafing and feeding birds. A summary of the survey results, with the peak counts from the three seasons of survey in 2006/07, 2007/08 and 2010/11 is provided in Table 10.8 in Appendix 11, with comparison against the Humber Estuary 5-year mean peak counts and thresholds for international importance.

4.5.3 This field was evaluated in the EcIA as being of Regional importance to nature conservation for its wintering and passage bird assemblage, for which several

[3] The 1% threshold of the Humber Estuary population is used to identify key terrestrial areas within the Estuary that support the SPA/ Ramsar assemblage, and which would be considered to be of County or higher importance.
[4] The eastern part of this field is allocated in the Local Plan as a location for the creation of strategic mitigation habitat for waterbirds as part of the South Humber Gateway strategic mitigation plan.

key SPA/ Ramsar species have been recorded in numbers above the 1% threshold of the Humber Estuary population. It is therefore concluded that although outside the boundary of the SPA/ Ramsar, this field is functionally linked to the adjacent SPA/ Ramsar because it supports the qualifying features.

4.6 Baseline Bird Usage: Fields to the North (Fields 30 & 31)

4.6.1 Two large arable fields to the north of the Proposed Development (on the north side of South Marsh Road) were also included within the baseline study area; these are Fields 30 and 31 in the South Humber Bank counts.

4.6.2 These fields are also considered to be functionally linked to the Humber Estuary, and although in the most recent survey years they have supported very low numbers of birds, peak counts in 2006/07 for golden plover and lapwing were particularly significant. A summary of the survey results, with the peak counts from the three seasons of survey in 2006/07, 2007/08 and 2010/11 is provided in Table 10.9 in Appendix 11, with comparison against the Humber Estuary 5-year mean peak counts and thresholds for international importance.

4.6.3 This field is evaluated as being of Regional importance to nature conservation for its wintering and passage bird assemblage in the EcIA, for which several SPA/ Ramsar species have been recorded in numbers well above the 1% threshold of the Humber Estuary population. It is therefore concluded that although outside the boundary of the Humber Estuary SPA/ Ramsar, the fields are functionally linked to the adjacent SPA/ Ramsar because they support the qualifying features.

4.7 Baseline Bird Usage: Pyewipe Mudflats in Humber Estuary SPA/ Ramsar

4.7.1 The nearest coastal mudflats to the Site are the Pyewipe mudflats, which are within the boundary of the Humber Estuary SPA/ Ramsar and are approximately 175 m from the eastern boundary of the Main Development Area. This is an extensive area of mudflat referred to as the ‘Pyewipe mudflats’, which extend from the southern end of Immingham Docks south to Grimsby Docks. This mudflat supports large aggregations of SPA/ Ramsar birds, particularly black-tailed godwit for which this part of the Estuary is favoured by this species. No specific surveys of the mudflats were undertaken to inform the EcIA or HRA.

5.0 STAGE 1: SCREENING FOR LIKELY SIGNFICANT EFFECTS

5.1 LSE Screening: Potential Construction Impacts

Source-Receptor Pathways Scoped In

5.1.1 The potential source-receptor pathways by which the Proposed Development could impact the qualifying features of each designated site during construction are as follows[5]:

- physical displacement of SPA/ Ramsar birds – loss of high tide feeding, roosting and loafing habitat within the Proposed Development that is functionally linked to the Humber Estuary;
- noise/ vibration and visual disturbance to SPA/ Ramsar birds – disturbance to birds feeding, roosting and loafing in the large arable fields to the north and south of the Proposed Development, which are functionally linked to the Humber Estuary, and on mudflats within the boundary of the designated site;
- surface water quality – potential pathways for the surface water pollution to the adjacent drainage network, and ultimately to the Humber Estuary SAC/ SPA/ Ramsar into which the surface water drainage flows during the construction phase of the Proposed Development e.g. sedimentation, vehicle fuel spill; and
- air quality - potential pathways identified through emissions to air from fugitive dust emissions during the construction phase of Proposed Development resulting in smothering of susceptible habitats within the Humber Estuary SAC/ Ramsar.

Source-Receptor Pathways Scoped Out

5.1.2 There is no suitable habitat for the Humber Estuary SPA qualifying species of breeding birds (Annex I species; bittern, marsh harrier, avocet and little tern) within the potential zone of influence of noise and visual disturbance arising from the Proposed Development. This pathway is therefore scoped out.

5.1.3 No pathways by which underwater noise could give rise to likely significant effects on Humber Estuary SAC marine mammals and fish (river lamprey, sea lamprey and grey seal) or Humber Estuary Ramsar marine mammals (grey seal) have been identified, given that any works associated with the Proposed Development will be 175 m from the nearest part of the designated site. Over this distance it is reasonable to conclude that there would be no propagation of underwater noise such that the qualifying features could be affected. This pathway is therefore scoped out.

[5] These source-receptor pathways were also scoped into the EcIA, which set the framework for the HRA.

5.1.4 Given the distance between the designated sites and the Proposed Development there is no pathway that could result in direct habitat loss or direct physical damage to any of the designated habitats.

5.1.5 Similarly, there are no groundwater pathways over this distance through which the Proposed Development could give rise to any effects on the groundwater dependent terrestrial ecosystems (GWTEs) of the designated sites. These pathways are therefore scoped out.

5.1.6 There is no potential for any impacts on the breeding grey seal colony for which the Humber Estuary SAC/ Ramsar is designated given the distance between the colony at Donna Nook and the Proposed Development (approximately 22 km south-east).

5.1.7 There is no potential for any impacts (direct or indirect) on the natterjack toad colony at the Saltfleetby-Theddlethorpe dunes due to their distance from the Proposed Development (approximately 25 km south-east).

5.1.8 Given the distance between the Proposed Development and the South Humber Gateway (SHG) mitigation area at Cress Marsh (*c*. 500 m), it is considered that there is no potential for likely significant effects on birds using this habitat as a result of noise and visual disturbance during construction. All construction activities will be on the eastern side of the existing power station, which provides screening of the construction works to waterbirds using the Cress Marsh mitigation area. These pathways are therefore scoped out.

<u>Physical Displacement of Humber Estuary SPA/ Ramsar Birds Due to Loss of Functionally Linked Land</u>

5.1.9 The habitat within the Site boundary has been demonstrated to support low numbers of SPA/ Ramsar waterbirds, and there have been no recorded aggregations above 1% of the Humber Estuary threshold. However, a precautionary approach has been applied to the Proposed Development because it lies within the Mitigation Zone to which Policy 9 is applicable. This states that "…*proposals which adversely affect the Humber Estuary SPA/ Ramsar site due to the loss of functionally linked land will normally be required to provide their own mitigation in order to comply with the requirements of the Habitats Regulations*".

5.1.10 To ensure Habitats Regulations compliance for the Proposed Development, it has therefore been assumed that the land within the Proposed Development boundary is 'functionally linked' to the Humber Estuary SPA/ Ramsar. Policy 9 has therefore been applied to the Site and the Proposed Development and a financial contribution is being secured via a deed of variation of the existing Section 106 agreement in force for the Planning Permission, in conformity with Policy 9.

5.1.11 However, as a result of the *People over Wind* ruling it is not possible to take this embedded mitigation into account for the purposes of LSE screening. Therefore, it is concluded that LSE cannot be ruled out at the screening stage and this pathway is taken forward to Stage 2 Appropriate Assessment.

<u>Surface Water Pollution to Humber Estuary SAC/ SPA/ Ramsar Habitats and Qualifying Features</u>

5.1.12 The ditches within the Site boundary currently capture surface water run-off and divert it to either Oldfleet Drain (to the south of the Site) or Middle Drain (to the north of the Site), from where it is discharged into the Humber Estuary. In the absence of mitigation, there is therefore the potential for contaminated surface water run-off to enter the drainage system and ultimately the Estuary.

5.1.13 However, potential pollution (with sediment or contaminants) arising from surface water run-off from within the Site during construction will be controlled through the adoption of standard best practice construction methods to meet environmental requirements. This may include temporary measures to attenuate surface water run-off (e.g. sustainable drainage systems (SuDS), containment lagoon or similar), the use of drip trays beneath plant and/ or bunding of fuel or oil tanks and the use of double skinned fuel or oil tanks to minimise the risk of spillage. These measures will be detailed in the CEMP, and a pollution plan will be prepared to deal with an accidental pollution event. These are measures which are put in place as standard on similar construction projects and are not included here specifically to avoid an effect on the Humber Estuary[6]. They have therefore been taken into account in the LSE screening.

5.1.14 With these measures in place there is a negligible risk of surface water pollution to the Estuary during the construction phase. It is therefore concluded that there will be no likely significant effects on the Humber Estuary SAC/ SPA/ Ramsar habitats or the ecology features they support (waterbirds, sea lamprey, river lamprey and grey seal).

Noise/ Vibration Disturbance to Humber Estuary SPA/ Ramsar Birds at Pyewipe Mudflats

5.1.15 Given the proximity of the Proposed Development to the Pyewipe mudflats (approximately 175 m) and the noise/ vibration disturbance that may occur, likely significant effects cannot be ruled out and therefore this pathway is taken forward to Task 2 Appropriate Assessment.

Noise/ Vibration Disturbance to Humber Estuary SPA/ Ramsar Birds in Field to South (Field 37)

5.1.16 Given the proximity of the Proposed Development to Field 37 (adjacent to southern boundary) and the noise/ vibration disturbance that may occur, likely significant effects cannot be ruled out and therefore this pathway is taken forward to Task 2 Appropriate Assessment.

Noise/ Vibration Disturbance to Humber Estuary SPA/ Ramsar Birds in Fields to North (Field 30 and 31)

5.1.17 Given the proximity of the Proposed Development to Fields 30 and 31 (immediately north of South Marsh Road) and the noise/ vibration disturbance

[6] Required for compliance with The Environmental Damage (Prevention and Remediation) (England) Regulations 2015 and The Environmental Permitting (England and Wales) Regulations 2016

that may occur, likely significant effects cannot be ruled out and therefore this pathway is taken forward to Task 2 Appropriate Assessment.

Visual Disturbance to Humber Estuary SPA/ Ramsar Birds on Pyewipe Mudflats

5.1.18 Given the distance of the Proposed Development from the Pyewipe mudflats, and the fact that construction will be set against the backdrop of the adjacent SHBPS, waterbirds feeding, roosting or loafing within the boundary of the SPA/ Ramsar are not reasonably expected to be significantly disturbed by construction activities occurring approximately 175 m west. Furthermore, the substantial flood embankment wall will provide screening of construction activities to birds present on the mudflats/ shoreline.

5.1.19 It is concluded that the Proposed Development will not result in any likely significant effects to waterbirds within the boundary of the Humber Estuary SPA/ Ramsar as a result of visual disturbance.

Visual Disturbance to Humber Estuary SPA/ Ramsar Birds in Field to South (Field 37)

5.1.20 Given the proximity of the Proposed Development to Field 37, likely significant effects cannot be ruled out and therefore this pathway is taken forward to Task 2 Appropriate Assessment.

Air Quality Impacts Arising from Dust Deposition to Humber Estuary SAC/ Ramsar Habitats

5.1.21 Designated habitats within the Humber Estuary SAC/ Ramsar that could be potentially susceptible to the effects of dust smothering are not present in close proximity to the Proposed Development. The nearest terrestrial habitat within the designations (coastal saltmarsh) is approximately 500 m from the Proposed Development, and at this distance no dust smothering would be anticipated. This pathway was therefore scoped out of the EcIA. It is concluded that there will be no likely significant effects on designated habitats as a result of dust emissions.

5.2 LSE Screening: Potential Operational Impacts

Source-Receptor Pathways Scoped In

5.2.1 The potential source-receptor pathways by which the Proposed Development could impact the qualifying features of each designated site during operation, and which were scoped into the EcIA are as follows:

- noise and visual disturbance to SPA/ Ramsar birds – disturbance to birds feeding, roosting and loafing in the large arable field to the north and south of the Proposed Development, which is functionally linked to the Humber Estuary, and on mudflats within the boundary of the designated site;
- surface water quality – potential pathways for surface water pollution to the adjacent drainage network, and ultimately to the Humber Estuary SAC/ SPA/ Ramsar into which the surface water drainage flows e.g. sedimentation, vehicle fuel spill, discharge of treated foul drainage from a package treatment plant; and

- air quality - potential pathways identified through emissions to air during the operational phase of Proposed Development resulting in effects on susceptible habitats within the Humber Estuary SAC/ Ramsar.

Source-Receptor Pathways Scoped Out

5.2.2 There is no suitable habitat for the Humber Estuary SPA qualifying species of breeding birds (Annex I species; bittern, marsh harrier, avocet and little tern) within the potential zone of influence of noise and visual disturbance arising from the operation of the Proposed Development. This pathway is therefore scoped out.

5.2.3 Potential air quality impacts on intertidal and subtidal habitats in the Humber Estuary SAC (Sandbanks which are slightly covered by sea water all the time, Mudflats and sandflats not covered by seawater at low tide, Atlantic salt meadows (Glauco-Puccinellietalia maritimae)) were scoped out of the assessment because intertidal habitats are not susceptible to the effects of changes in air quality arising from stack emissions during operation (increased nitrogen and acid deposition) because of their regular tidal inundation. Subtidal habitats have similarly been scoped out.

5.2.4 There is no potential for any impacts on the breeding grey seal colony for which the Humber Estuary Ramsar is designated (Ramsar criterion 3) given the distance between the colony at Donna Nook and the Proposed Development (approximately 22 km south-east).

5.2.5 There is no potential for any impacts on the natterjack toad colony (Ramsar criterion 3) at the Saltfleetby-Theddlethorpe dunes due to their distance from the Proposed Development (approximately 25 km south-east).

Air Quality Impacts Arising from Nitrogen Oxides (NOx) at the Humber Estuary SAC/ Ramsar Habitats

5.2.6 The air quality impact assessment has modelled a number of receptors within the designated site that are sensitive to NOx emissions and the resulting nitrogen deposition. The nearest to the Proposed Development is an area of saltmarsh habitat approximately 400 m south-east (receptors E1_1, E1_2 and E1_3 as shown on Figure 7.2 in ES Volume II (Document Ref. 6.3)). At these three receptors, the process contribution for NOx is 2.4%, 2.4% and 2.5% respectively of the Critical Level for the Humber Estuary (30 µg NOx/m^3). This therefore exceeds the screening threshold at which an adverse effect on the designated habitats (and therefore the species they support) may occur (that being 1% of the Critical Level) and indicates that further assessment is required.

5.2.7 At the screening stage likely significant effects cannot be ruled out and therefore this pathway is taken forward to Task 2 Appropriate Assessment.

Air Quality Impacts Arising from Nitrogen Deposition to Humber Estuary SAC/ Ramsar Habitats

5.2.8 The air quality impact assessment has concluded that the process contribution for nitrogen at the nearest saltmarsh habitat would be 2.1% of the Critical Load (10-20 kg N/ ha/ yr) at receptors E1_1, E1_2 and E1_3 shown on Figure 7.2 in ES Volume II (Document Ref. 6.3). As this is above the 1% screening

threshold for dismissing impacts as numerically imperceptible, it is therefore necessary to examine the output from the modelling in greater detail to establish whether this elevation in nitrogen deposition would result in any significant effects on the saltmarsh habitat.

5.2.9 At the screening stage likely significant effects cannot be ruled out and therefore this pathway is taken forward to Task 2 Appropriate Assessment.

Air Quality Impacts Arising from Acid Deposition to Humber Estuary SAC/ Ramsar Habitats

5.2.10 For acid deposition (expressed as keq/ha/year), the air quality impact assessment identified that there would be no exceedances of the 1% of the Critical Load screening threshold for potential adverse effects on sensitive habitat types within the Humber Estuary. It is therefore concluded that there would be no likely significant effects on the Humber Estuary designated site as a result of acid deposition.

Air Quality Impacts Arising from Sulphur Dioxide (SO_2) Deposition to Humber Estuary SAC/ Ramsar Habitats

5.2.11 For sulphur dioxide, the air quality impact assessment identified that there would be no exceedances of the 1% of the Critical Level screening threshold for potential adverse effects on sensitive habitat types within the Humber Estuary designated site. It is therefore concluded that there would be no likely significant effects on the Humber Estuary designated site as a result of SO_2 emissions from the Proposed Development.

Surface Water Pollution to Humber Estuary SAC/ SPA/ Ramsar Habitats and Qualifying Features

5.2.12 Potential pollution (sediment or contaminants) arising from surface water run-off and treated foul drainage discharge from within the Site during operation will be controlled through the drainage design. This is required irrespective of the designation status of the receiving watercourse since it is a criminal offence to pollute watercourses and therefore does not constitute mitigation for the designated sites.

5.2.13 There is therefore no surface water pathway by which the Proposed Development could impact on the Humber Estuary designated habitats, and the marine ecology features they support (passage/ wintering birds, sea lamprey, river lamprey and grey seal). No likely significant effects have been identified at the screening stage.

Noise/ Vibration Disturbance to Humber Estuary SPA/ Ramsar Birds at Pyewipe Mudflats

5.2.14 Predicted operational noise levels at receptor R3 (at the edge of the Humber Estuary SPA/ Ramsar boundary) are 5 dB below the ambient noise level of 52 dB L_{Aeq} during the worst-case hour at night (06:00 – 07:00). This results in an increase in the ambient level at receptor R3 of no more than 1 dB, which would not be perceptible as a change and is not significant.

5.2.15 With regards to L_{AFmax} levels during operation of the Proposed Development, it is not expected that significant L_{AFmax} events will occur at the Site that would

be audible within the Humber Estuary. The activities that are likely to result in the highest L_{AFmax} levels are the tipping of waste into the bunker when it is delivered and the placing of waste into the shredder. As these activities are undertaken within the enclosed fuel reception hall and fuel bunker parts of the building, which are located at the furthest point of the building from the Estuary, L_{AFmax} levels from these activities will not be audible at the Estuary.

5.2.16 It is assessed that operational noise arising from the Proposed Development will result in no likely significant effect on waterbirds feeding, roosting and loafing in the Pyewipe mudflats.

Noise Disturbance to Humber Estuary SPA/ Ramsar Birds in Field to South (Field 37)

5.2.17 At the nearest part of the southern field to the Proposed Development, operational noise is predicted to be up to 62 dB L_{Aeq}, which is above the ambient level. However, as discussed above in respect of the assessment for construction noise, it is reasonable to assume that waterbirds using the fields would not be using habitats close to boundary features (due to the requirement for scanning distances for predator avoidance) and are therefore more likely to be orientated towards the middle of the field. Towards the centre of Field 37, operational noise levels will have attenuated to around 50 dB L_{Aeq}, which is similar to ambient levels. No displacement of waterbirds would therefore be anticipated.

5.2.18 Noise associated with the operation of the Proposed Development is therefore assessed as giving rise to no likely significant effect on waterbirds using the functionally linked field to the south (Field 37).

Noise Disturbance to Humber Estuary SPA/ Ramsar Birds in Fields to North (Fields 30 and 31)

5.2.19 At the nearest part of the northern fields to the Proposed Development operational noise is predicted to be up to 68 dB L_{Aeq}, which is above the ambient level for the 'worst case hour' between 06:00 and 07:00 (see Chapter 8: Noise and Vibration and the noise contours are shown on Figure 8.2 in ES Volume II (Document Ref. 6.3). However, as discussed above in respect of the assessment for construction noise, it is reasonable to assume that waterbirds using these fields would not be using habitats close to boundary features (due to the requirement for scanning distances for predator avoidance) and are therefore more likely to be orientated towards the middle of the fields. In the centre of fields 30 and 31, operational noise levels will have attenuated with distance to around 50 dB L_{Aeq}, which is similar to ambient levels. No displacement of waterbirds would therefore be anticipated.

5.2.20 Noise associated with the operation of the Proposed Development is therefore assessed as giving rise to a no likely significant effects on waterbirds using the functionally linked fields to the north (fields 30 and 31).

Visual Disturbance to Humber Estuary SPA/ Ramsar Birds in Field to South (Field 37)

5.2.21 The nature and scale of the operational activities associated with the Proposed Development will be set against the backdrop of the SHBPS and will therefore

not represent a significant change in the type of structures already present in habitats adjacent to fields used by waterbirds. It is reasonable to assume that such birds are resilient to any changes that do not directly affect habitats within which they are feeding, roosting and loafing, because they are present in a dynamic and highly commercial environment associated with the busy Humber Estuary. This includes the presence of tall structures such as power stations, bulk handling/ storage facilities and jetties/ cranes.

5.2.22 It is therefore reasonable to assume that any SPA/ Ramsar waterbirds roosting/ loafing/ foraging in the field to the south of the Site are habituated to the industrial nature of the surrounding area such that they would not be disturbed by the presence of tall chimney structures and other buildings on adjacent land. The c.2.5 m high close-boarded fence along the southern border of the Site will also be retained for the operational lifespan of the Proposed Development as a site boundary fence, further reducing the likelihood of disturbance to birds.

5.2.23 Visual impacts on waterbirds feeding, roosting and loafing in the adjacent field to the south are therefore assessed as giving rise to no likely significant effect on Humber Estuary SPA/ Ramsar waterbirds.

Visual Disturbance to Humber Estuary SPA/ Ramsar Birds on Pyewipe Mudflats

5.2.24 This pathway was scoped out of the EcIA due to the distance of the mudflats from the Proposed Development (approximately 175m), the presence of the cooling water pumping station and the substantial flood embankment and sea wall between the mudflats and the Proposed Development, as well as the presence of similar structures in the surrounding environment (including on the SHBPS site). It is therefore concluded that there would be no discernable visual change in the baseline environment and therefore there will be no likely significant effects on waterbirds on the Pyewipe mudflats as a result of visual disturbance from the operation of the Proposed Development.

5.3 LSE Screening: Potential Decommissioning Impacts

5.3.1 The extent of habitat loss that is likely to be required during decommissioning is likely to be much less than at construction (i.e. no further habitat loss), and the resulting effects on ecological features are therefore likely to be reduced.

5.3.2 Impacts associated with the decommissioning phase of the Proposed Development are likely to be of a similar nature to those associated with the construction phase, because the decommissioning methodology will be of a similar impact level to that of construction in terms of noise, vibration, and air quality. As a result, the potential effects on ecological features are not anticipated to differ significantly from those predicted at construction.

5.3.3 On this basis, the LSE screening of decommissioning impacts has assumed that the same source-receptor pathways should be included as for the construction phase, with the exception of the loss of functionally linked land because this impact will have already occurred at the construction phase. This approach represents the worst-case scenario assessment for noise impacts, because there are unlikely to be any piling works associated with the decommissioning phase.

Surface Water Pollution to Humber Estuary SAC/ SPA/ Ramsar Habitats and Qualifying Features

5.3.4 As identified during the construction phase impact assessment, pollution (with sediment or contaminants) arising from surface water run-off from within the Site will be controlled through the adoption of standard best practice methods to meet environmental requirements at the time of demolition/ decommissioning. This may include temporary measures to attenuate surface water run-off (e.g. SuDS, containment lagoon or similar), the use of drip trays beneath plant and/ or bunding of fuel or oil tanks and the use of double skinned fuel or oil tanks to minimise the risk of spillage. These measures will be detailed in a Demolition Environmental Management Plan (DEMP), and a pollution plan will be prepared to deal with an accidental pollution event. These are measures which are put in place as standard on similar demolition projects due to it being an offence to pollute watercourses irrespective of their designation status. They are not included here specifically to avoid an effect on the Humber Estuary. They have therefore been taken into account in the LSE screening.

5.3.5 With these measures in place there is a negligible risk of surface water pollution to the Estuary during the demolition/ decommissioning phase. It is therefore concluded that there will be no likely significant effects on the Humber Estuary SAC/ SPA/ Ramsar habitats, and the ecology features they support (waterbirds, sea lamprey, river lamprey and grey seal).

Noise/ Vibration Disturbance to Humber Estuary SPA/ Ramsar Birds at Pyewipe Mudflats

5.3.6 Given the proximity of the Proposed Development to the Pyewipe mudflats (approximately 175 m) and the noise/ vibration disturbance that may occur, likely significant effects cannot be ruled out and therefore this pathway is taken forward to Task 2 Appropriate Assessment.

Noise/ Vibration Disturbance to Humber Estuary SPA/ Ramsar Birds in Field to South (Field 37)

5.3.7 Given the proximity of the Proposed Development to Field 37 (immediately adjacent to the southern boundary) and the noise/ vibration disturbance that may occur, likely significant effects cannot be ruled out and therefore this pathway is taken forward to Task 2 Appropriate Assessment.

Noise/ Vibration Disturbance to Humber Estuary SPA/ Ramsar Birds in Fields to North (Field 30 and 31)

5.3.8 Given the proximity of the Proposed Development to Fields 30 and 31 (north side of South Marsh Road) and the noise/ vibration disturbance that may occur, likely significant effects cannot be ruled out and therefore this pathway is taken forward to Task 2 Appropriate Assessment.

Visual Disturbance to Humber Estuary SPA/ Ramsar Birds on Pyewipe Mudflats

5.3.9 Given the distance of the Proposed Development from the Pyewipe mudflats, and the fact that demolition will be set against the backdrop of the adjacent SHBPS, waterbirds feeding, roosting or loafing within the boundary of the SPA/

Ramsar are not reasonably expected to be significantly disturbed by construction activities. Furthermore, the substantial flood embankment wall will provide screening of demolition activities to birds present on the mudflats/ shoreline.

5.3.10 It is concluded that the Proposed Development will not result in any likely significant effects to waterbirds within the boundary of the Humber Estuary SPA/ Ramsar as a result of visual disturbance.

Visual Disturbance to Humber Estuary SPA/ Ramsar Birds in Field to South (Field 37)

5.3.11 Given the proximity of the Proposed Development to Field 37, likely significant effects cannot be ruled out and therefore this pathway is taken forward to Task 2 Appropriate Assessment.

Air Quality Impacts Arising from Dust Deposition to Humber Estuary SAC/ Ramsar Habitats

5.3.12 As assessed above in respect of construction impacts, designated habitats within the Humber Estuary SAC/ Ramsar that could be potentially susceptible to the effects of dust smothering are not present in close proximity to the Proposed Development. The nearest terrestrial habitat within the designations (coastal saltmarsh) is approximately 500 m from the Proposed Development, and at this distance no dust smothering would be anticipated. This pathway was therefore scoped out of the EcIA. It is therefore concluded that there will be no likely significant effects on designated habitats as a result of dust emissions during demolition works.

5.4 Summary of Likely Significant Effects

5.4.1 The tables below summarise the LSE screening undertaken above. Signposting to the relevant ES Volume I (Document Ref. 6.2) chapters in which detailed assessment of the relevant potential construction, operational and decommissioning source-receptor pathways identified above could be found is provided for information (and is as presented in the two previous iterations of the HRA report). Appendices 3 - 8 contain the specific paragraph extracts signposted in Tables 5.1 to 5.3.

Table 5.1: Likely Significant Effects during construction

QUALIFYING FEATURE	POTENTIAL IMPACT	POTENTIAL PATHWAY FOR EFFECTS	SUMMARY OF EVIDENCE PRESENTED	ES VOLUME I REFERENCE (REFER TO APPENDIX 3 FOR FULL WORDING)	LIKELY SIGNIFICANT EFFECT PREDICTED?
Humber Estuary SAC					
Embryonic shifting dunes Shifting dunes along the shoreline with European marram grass (*Ammophila arenaria*) (white dunes) Atlantic salt meadows (Glauco-Puccinellietalia maritimae) Fixed coastal dunes with herbaceous vegetation (grey dunes) Dunes with common sea	Changes in air quality during construction phase	Dust deposition during site clearance works resulting in smothering of vegetation and damage to habitats	These habitat types are not present in close proximity to the Proposed Development. The nearest terrestrial habitat within the designations (coastal saltmarsh) is approximately 500 m from the Proposed Development, and at this distance no dust smothering would be anticipated. This pathway was therefore scoped out.	Chapter 10: Ecology, paragraph 10.6.4 Chapter 7: Air Quality, paragraph 7.6.8	No

QUALIFYING FEATURE	POTENTIAL IMPACT	POTENTIAL PATHWAY FOR EFFECTS	SUMMARY OF EVIDENCE PRESENTED	ES VOLUME I REFERENCE (REFER TO APPENDIX 3 FOR FULL WORDING)	LIKELY SIGNIFICANT EFFECT PREDICTED?
buckthorn (*Hippophae rhamnoides*) *Salicornia* and other annuals colonizing mud and sand					
Estuaries Mudflats and sandflats not covered by seawater at low tide Sandbanks which are slightly covered by seawater all the time Coastal lagoons *Salicornia* and other annuals colonising mud and sand Atlantic salt meadows	Surface water pollution during construction phase	Pollution/ siltation of Humber Estuary via adjacent surface water drain, into which surface water run-off from the Proposed Development will outfall.	Standard environmental measures to control pollution to the drains during construction phase will adequately minimise risk to local surface water bodies (consequently minimising risk to the Humber Estuary too).	Chapter 10: Ecology, paragraphs 10.6.33 to 10.6.35 Chapter 14: Water Resources, Flood Risk and Drainage, paragraph 14.6.18	No

QUALIFYING FEATURE	POTENTIAL IMPACT	POTENTIAL PATHWAY FOR EFFECTS	SUMMARY OF EVIDENCE PRESENTED	ES VOLUME I REFERENCE (REFER TO APPENDIX 3 FOR FULL WORDING)	LIKELY SIGNIFICANT EFFECT PREDICTED?
(*Glauco-Puccinellietalia maritimae*) River lamprey Sea lamprey Grey seal					
Humber Estuary SPA					
Populations of European importance of breeding, passage and over-wintering birds: *Botaurus stellaris*; great bittern (non-breeding) *Botaurus stellaris*; great bittern (breeding) *Tadorna tadorna*; common	Loss of habitat within Proposed Development boundary	Permanent displacement of birds from habitat that is 'functionally linked' to the Humber Estuary by providing high tide roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	Loss of habitat will be addressed through South Humber Bank strategic mitigation, with the mitigation area at Cress Marsh having already been created. Impacts on passage and wintering waterbirds will therefore be avoided, because this habitat will be delivered prior to the commencement of construction. However, this has not been taken into account in the stage 1 LSE screening due to	Chapter 10: Ecology, paragraphs 10.5.3 to 10.5.5 (impact avoidance) and paragraphs 10.6.6 to 10.6.7 (assessment)	Yes

QUALIFYING FEATURE	POTENTIAL IMPACT	POTENTIAL PATHWAY FOR EFFECTS	SUMMARY OF EVIDENCE PRESENTED	ES VOLUME I REFERENCE (REFER TO APPENDIX 3 FOR FULL WORDING)	LIKELY SIGNIFICANT EFFECT PREDICTED?
shelduck (non-breeding) *Circus aeruginosus*; Eurasian marsh harrier (breeding) *Circus cyaneus*; hen harrier (non-breeding) *Recurvirostra avosetta*; pied avocet (non-breeding) *Recurvirostra avosetta*; pied avocet (breeding) *Pluvialis apricaria*; European golden plover (non-breeding)			the *People Over Wind* ruling.		
	Surface water pollution during construction phase to habitats supporting internationally important bird populations	Pollution/ siltation of Humber Estuary via adjacent surface water drain, into which surface water run-off from the Proposed Development will outfall.	Standard environmental measures to control pollution to the drains during construction phase will adequately minimise risk.	Chapter 10: Ecology, paragraphs 10.6.33 to 10.6.35 Chapter 14: Water Resources, Flood Risk and Drainage, paragraph 14.6.18	No
	Noise/vibration impacts during construction to birds using Pyewipe mudflats	Disturbance/ displacement of birds from mudflats. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	Piling activity (drop hammer piling) results in estimated levels of 75 dB L_{Amax} at the nearest part of the Estuary. This is significantly higher than the ambient noise level at the measured location on the edge of the SAC.	Chapter 10: Ecology, paragraphs 10.6.8 to 10.6.14 Chapter 8: Noise and Vibration, paragraph 8.6.14	Yes

QUALIFYING FEATURE	POTENTIAL IMPACT	POTENTIAL PATHWAY FOR EFFECTS	SUMMARY OF EVIDENCE PRESENTED	ES VOLUME I REFERENCE (REFER TO APPENDIX 3 FOR FULL WORDING)	LIKELY SIGNIFICANT EFFECT PREDICTED?
Calidris canutus; red knot (non-breeding) *Calidris alpina alpina*; dunlin (non-breeding) *Philomachus pugnax*; ruff (non-breeding) *Limosa limosa islandica*; black-tailed godwit (non-breeding) *Limosa lapponica*; bar-tailed godwit (non-breeding) *Tringa totanus*; common redshank (non-breeding) *Sterna albifrons*; little tern (breeding)	Noise/vibration impacts during construction to birds using arable field to the south (field 37)	Disturbance/ displacement of birds from field to the south that is 'functionally linked' to the Humber Estuary by providing high tide roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	Piling activity (drop hammer piling) results in predicted noise levels of 62 dB $L_{Aeq,1hr}$, which in excess of the ambient noise level. Peak noise resulting from piling is estimated to be 76 dB L_{Amax}.	Chapter 10: Ecology, paragraphs 10.6.16 to 10.6.22 Chapter 8: Noise and Vibration, paragraph 8.6.15 (noise) and paragraphs 8.6.20 to 8.6.24 (vibration)	Yes

QUALIFYING FEATURE	POTENTIAL IMPACT	POTENTIAL PATHWAY FOR EFFECTS	SUMMARY OF EVIDENCE PRESENTED	ES VOLUME I REFERENCE (REFER TO APPENDIX 3 FOR FULL WORDING)	LIKELY SIGNIFICANT EFFECT PREDICTED?
Waterbird assemblage					
	Noise/vibration impacts during construction to birds using arable fields to the north (fields 30 and 31)	Disturbance/ displacement of birds from fields to the north that are 'functionally linked' to the Humber Estuary by providing high tide roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	Piling activity (drop hammer piling) results in predicted noise levels of 59 dB $L_{Aeq,1hr}$, which is slightly higher than the ambient noise level. Peak noise resulting from piling is estimated to be 72 dB L_{Amax}.	Chapter 10: Ecology, paragraphs 10.6.24 to 10.6.27 Chapter 8: Noise and Vibration, paragraph 8.6.15 (noise) and paragraphs 8.6.20 to 8.6.24 (vibration)	Yes

QUALIFYING FEATURE	POTENTIAL IMPACT	POTENTIAL PATHWAY FOR EFFECTS	SUMMARY OF EVIDENCE PRESENTED	ES VOLUME I REFERENCE (REFER TO APPENDIX 3 FOR FULL WORDING)	LIKELY SIGNIFICANT EFFECT PREDICTED?
	Visual impacts during construction to birds using Pyewipe mudflats	Disturbance/ displacement of birds from fields to the north that are 'functionally linked' to the Humber Estuary by providing high tide roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	Minimal risk of visual disturbance, seawall provides substantial screening to birds on the mudflats.	Chapter 10: Ecology, paragraph 10.6.29	No
	Visual impacts during construction to birds using arable field to the south (field 37)	Disturbance/ displacement of birds from fields to the north that are 'functionally linked' to the Humber Estuary by providing high tide roosting, feeding and loafing habitat. This may	Nature and scale of development similar to existing, but potential for some visual impacts identified.	Chapter 10: Ecology, paragraphs 10.6.30 to 10.6.32	Yes

QUALIFYING FEATURE	POTENTIAL IMPACT	POTENTIAL PATHWAY FOR EFFECTS	SUMMARY OF EVIDENCE PRESENTED	ES VOLUME I REFERENCE (REFER TO APPENDIX 3 FOR FULL WORDING)	LIKELY SIGNIFICANT EFFECT PREDICTED?
		result in reduced feeding times, increased energy expenditure and reduced survival rates.			
Humber Estuary Ramsar					
Saltmarshes Dune systems Humid dune slacks	Changes in air quality during construction phase	Dust deposition during site clearance works resulting in smothering of vegetation and damage to habitats	These habitat types are not present in close proximity to the Proposed Development. The nearest terrestrial habitat within the designations (coastal saltmarsh) is approximately 500 m from the Proposed Development, and at this distance no dust smothering would be anticipated. This pathway was therefore scoped out.	Chapter 10: Ecology, paragraph 10.6.4 Chapter 7: Air Quality, paragraph 7.6.8	No

QUALIFYING FEATURE	POTENTIAL IMPACT	POTENTIAL PATHWAY FOR EFFECTS	SUMMARY OF EVIDENCE PRESENTED	ES VOLUME I REFERENCE (REFER TO APPENDIX 3 FOR FULL WORDING)	LIKELY SIGNIFICANT EFFECT PREDICTED?
Intertidal mud and sand flats Estuarine waters Coastal brackish/ saline lagoons	Surface water pollution during construction phase to habitats	Pollution/ siltation of Humber Estuary via adjacent surface water drain, into which surface water run-off from the Proposed Development will outfall.	Standard environmental measures to control pollution to the drains during construction phase will adequately minimise risk.	Chapter 10: Ecology, paragraphs 10.6.33 to 10.6.35 Chapter 14: Water Resources, Flood Risk and Drainage, paragraph 14.6.18	No
Grey seal River lamprey Sea lamprey	Surface water pollution during construction phase to habitats supporting breeding grey seal and migratory river and sea lamprey	Pollution/ siltation of Humber Estuary via adjacent surface water drain, into which surface water run-off from the Proposed Development will outfall. Impacts on fish resources/ food chain sustaining grey seal breeding colony.	Standard environmental measures to control pollution to the drains during construction phase will adequately minimise risk.	Chapter 10: Ecology, paragraphs 10.6.33 to 10.6.35 Chapter 14: Water Resources, Flood Risk and Drainage, paragraph 14.6.18	No
Internationally important assemblage of	Loss of habitat within Proposed	Permanent displacement of birds from habitat	Loss of habitat will be addressed through South Humber Bank	Chapter 10: Ecology, paragraphs 10.5.3	Yes

QUALIFYING FEATURE	POTENTIAL IMPACT	POTENTIAL PATHWAY FOR EFFECTS	SUMMARY OF EVIDENCE PRESENTED	ES VOLUME I REFERENCE (REFER TO APPENDIX 3 FOR FULL WORDING)	LIKELY SIGNIFICANT EFFECT PREDICTED?
wintering waterfowl Internationally important populations of wintering birds: Common shelduck Golden plover Red knot Dunlin Black-tailed godwit Bar-tailed godwit Common redshank	Development boundary	that is 'functionally linked' to the Humber Estuary by providing high tide roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	strategic mitigation, with the mitigation area at Cress Marsh having already been created. Impacts on passage and wintering waterbirds will therefore be avoided, because this habitat will be delivered prior to the commencement of construction. However, this has not been taken into account in the stage 1 LSE screening due to the *People Over Wind* ruling.	to 10.5.5 (impact avoidance) and paragraphs 10.6.6 to 10.6.7 (assessment)	
	Surface water pollution during construction phase to habitats supporting internationally important bird populations	Pollution/ siltation of Humber Estuary via adjacent surface water drain, into which surface water run-off from the Proposed Development will outfall.	Standard environmental measures to control pollution to the drains during construction phase will adequately minimise risk.	Chapter 10: Ecology, paragraphs 10.6.33 to 10.6.35 Chapter 14: Water Resources, Flood Risk and Drainage, paragraph 14.6.18	No

QUALIFYING FEATURE	POTENTIAL IMPACT	POTENTIAL PATHWAY FOR EFFECTS	SUMMARY OF EVIDENCE PRESENTED	ES VOLUME I REFERENCE (REFER TO APPENDIX 3 FOR FULL WORDING)	LIKELY SIGNIFICANT EFFECT PREDICTED?
	Noise/vibration impacts during construction to birds using Pyewipe mudflats	Disturbance/ displacement of birds from mudflats. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	Piling activity results in estimated levels of 75 dB L_{Amax} at the nearest part of the Estuary. This is significantly higher than the ambient noise level at the measured location on the edge of the SAC.	Chapter 10: Ecology, paragraphs 10.6.8 to 10.6.14 Chapter 8: Noise and Vibration, paragraph 8.6.14	Yes
	Noise/vibration impacts during construction to birds using arable field to the south (field 37)	Disturbance/ displacement of birds from field to the south that is 'functionally linked' to the Humber Estuary by providing high tide roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	Piling activity results in predicted noise levels of 62 dB $L_{Aeq,1hr}$, which in excess of the ambient noise level. Peak noise resulting from piling is estimated to be 76 dB L_{Amax}.	Chapter 10: Ecology, paragraphs 10.6.16 to 10.6.22 Chapter 8: Noise and Vibration, paragraph 8.6.15 (noise) and paragraphs 8.6.20 to 8.6.24 (vibration)	Yes

QUALIFYING FEATURE	POTENTIAL IMPACT	POTENTIAL PATHWAY FOR EFFECTS	SUMMARY OF EVIDENCE PRESENTED	ES VOLUME I REFERENCE (REFER TO APPENDIX 3 FOR FULL WORDING)	LIKELY SIGNIFICANT EFFECT PREDICTED?
	Noise/vibration impacts during construction to birds using arable fields to the north (fields 30 and 31)	Disturbance/ displacement of birds from fields to the north that are 'functionally linked' to the Humber Estuary by providing high tide roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	Piling activity results in predicted noise levels of 59 dB $L_{Aeq,1hr}$, which is slightly higher than the ambient noise level. Peak noise resulting from piling is estimated to be 72 dB L_{Amax}.	Chapter 10: Ecology, paragraphs 10.6.24 to 10.6.28 Chapter 8: Noise and Vibration, paragraph 8.6.15 (noise) and paragraphs 8.6.20 to 8.6.24 (vibration)	Yes
	Visual impacts during construction to birds using Pyewipe mudflats	Disturbance/ displacement of birds from fields to the north that are 'functionally linked' to the Humber Estuary by providing high tide roosting, feeding and loafing habitat. This may	Minimal risk of visual disturbance, seawall provides substantial screening to birds on the mudflats.	Chapter 10: Ecology, paragraph 10.6.29	No

QUALIFYING FEATURE	POTENTIAL IMPACT	POTENTIAL PATHWAY FOR EFFECTS	SUMMARY OF EVIDENCE PRESENTED	ES VOLUME I REFERENCE (REFER TO APPENDIX 3 FOR FULL WORDING)	LIKELY SIGNIFICANT EFFECT PREDICTED?
		result in reduced feeding times, increased energy expenditure and reduced survival rates.			
	Visual impacts during construction to birds using arable field to the south (field 37)	Disturbance/ displacement of birds from fields to the north that are 'functionally linked' to the Humber Estuary by providing high tide roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	Nature and scale of development similar to existing, but potential for some visual impacts identified.	Chapter 10: Ecology, paragraphs 10.6.30 to 10.6.32	Yes

Table 5.2: Likely Significant Effects during Operation

QUALIFYING FEATURE	POTENTIAL IMPACT	POTENTIAL PATHWAY FOR EFFECTS	SUMMARY OF EVIDENCE PRESENTED	ES VOLUME I REFERENCE (REFER TO APPENDIX 4 FOR FULL WORDING)	LIKELY SIGNIFICANT EFFECT PREDICTED?
Humber Estuary SAC					
Atlantic salt meadows (Glauco-Puccinellietalia maritimae) Embryonic shifting dunes Shifting dunes along the shoreline with European marram grass (*Ammophila arenaria*) (white dunes) Fixed coastal dunes with herbaceous vegetation (grey dunes)	Changes in air quality during operational phase	NOx emissions resulting in changes to critical levels and potential effects on vegetation assemblage.	Annual mean NOx change > 1% of critical level. This exceeds the 1% screening threshold beyond which the effects should be considered in more detail.	Chapter 10: Ecology, paragraphs 10.6.63 – 10.6.64 Chapter 7: Air Quality, paragraphs 7.6.32 to 7.6.34	Yes
		Nutrient nitrogen deposition resulting in changes to critical loads and potential effects on vegetation assemblage.	Change is >1% of critical load. This exceeds the 1% screening threshold beyond which the effects should be considered in more detail.	Chapter 10: Ecology, paragraphs 10.6.65 – 10.6.66 Chapter 7: Air Quality, paragraphs 7.6.32 to 7.6.34	Yes

QUALIFYING FEATURE	POTENTIAL IMPACT	POTENTIAL PATHWAY FOR EFFECTS	SUMMARY OF EVIDENCE PRESENTED	ES VOLUME I REFERENCE (REFER TO APPENDIX 4 FOR FULL WORDING)	LIKELY SIGNIFICANT EFFECT PREDICTED?
Dunes with common sea buckthorn (*Hippophae rhamnoides*)		Acid deposition resulting in changes to critical loads and potential effects on vegetation assemblage.	Change resulting from Proposed Development is negligible and is well below the 1% screening threshold beyond which the effects should be considered in more detail.	Chapter 10: Ecology, paragraph 10.6.67 Chapter 7: Air Quality, paragraphs 7.6.32 to 7.6.34	No
		SO2 emissions resulting in changes to critical levels and potential effects on vegetation assemblage.	Change <1% of critical load and is not significant. This does not exceed the 1% screening threshold beyond which the effects should be considered in more detail.	Chapter 10: Ecology, paragraph 10.6.68 Chapter 7: Air Quality, paragraphs 7.6.32 to 7.6.34	No
Estuaries Mudflats and sandflats not covered by	Surface water pollution during operational phase	Pollution of Humber Estuary via adjacent surface water drains, into which surface water run-off	Standard environmental measures to control pollution to the drain during operational	Chapter 10: Ecology, paragraphs 10.6.70 – 10.6.71	No

QUALIFYING FEATURE	POTENTIAL IMPACT	POTENTIAL PATHWAY FOR EFFECTS	SUMMARY OF EVIDENCE PRESENTED	ES VOLUME I REFERENCE (REFER TO APPENDIX 4 FOR FULL WORDING)	LIKELY SIGNIFICANT EFFECT PREDICTED?
seawater at low tide Sandbanks which are slightly covered by seawater all the time Coastal lagoons Salicornia and other annuals colonising mud and sand Atlantic salt meadows (Glauco-Puccinellietalia maritimae) River lamprey Sea lamprey Grey seal		and treated foul drainage from the Proposed Development will outfall.	phase will adequately minimise risk.	Chapter 14: Water Resources, Flood Risk and Drainage, paragraph 14.6.36	
Humber Estuary SPA					
Populations of European importance of breeding, passage	Surface water pollution during operational phase to habitats	Pollution of Humber Estuary via adjacent surface water drain, into which surface	Standard environmental measures to control pollution to the drain	Chapter 10: Ecology, paragraphs	No

QUALIFYING FEATURE	POTENTIAL IMPACT	POTENTIAL PATHWAY FOR EFFECTS	SUMMARY OF EVIDENCE PRESENTED	ES VOLUME I REFERENCE (REFER TO APPENDIX 4 FOR FULL WORDING)	LIKELY SIGNIFICANT EFFECT PREDICTED?
and over-wintering birds: *Botaurus stellaris*; great bittern (non-breeding) *Botaurus stellaris*; great bittern (breeding) *Tadorna tadorna*; common shelduck (non-breeding) *Circus aeruginosus*; Eurasian marsh harrier (breeding) *Circus cyaneus*; hen harrier (non-breeding) *Recurvirostra avosetta*; pied avocet (non-breeding) *Recurvirostra avosetta*; pied avocet (breeding)	supporting internationally important bird populations	water run-off and treated foul drainage from the Proposed Development will outfall.	during operational phase will adequately minimise risk.	10.6.70 to 10.6.71 Chapter 14: Water Resources, Flood Risk and Drainage, paragraph 14.6.36	
	Noise impacts during operation to birds using Pyewipe mudflats	Disturbance/ displacement of birds from mudflats. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	Predicted operational noise levels are 5 dB below the ambient noise level of 52 dB LAeq.	Chapter 10: Ecology, paragraphs 10.6.72 – 10.6.75 Chapter 8: Noise and Vibration, Table 8.30 and paragraphs 8.6.39-8.6.40, and 8.6.44	No
	Noise impacts during operation to birds using arable field to the south (field 37)	Disturbance/ displacement of birds from field to the south that is 'functionally linked'	Predicted operational noise levels are within ambient range across central	Chapter 10: Ecology, paragraphs 10.6.76 – 10.6.77	No

QUALIFYING FEATURE	POTENTIAL IMPACT	POTENTIAL PATHWAY FOR EFFECTS	SUMMARY OF EVIDENCE PRESENTED	ES VOLUME I REFERENCE (REFER TO APPENDIX 4 FOR FULL WORDING)	LIKELY SIGNIFICANT EFFECT PREDICTED?
Pluvialis apricaria; European golden plover (non-breeding) *Calidris canutus*; red knot (non-breeding) *Calidris alpina alpina*; dunlin (non-breeding) *Philomachus pugnax*; ruff (non-breeding) *Limosa limosa islandica*; black-tailed godwit (non-breeding) *Limosa lapponica*; bar-tailed godwit (non-breeding) *Tringa totanus*; common redshank (non-breeding)		to the Humber Estuary by providing high tide roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	portion of field where birds are most likely to be located due to predator avoidance reasons.	Chapter 8: Noise and Vibration, Table 8.31 and paragraphs 8.6.39, 8.6.41, 8.6.42 and 8.6.44	
	Noise impacts during operation to birds using arable fields to the north (fields 30 and 31)	Disturbance/ displacement of birds from fields to the north that are 'functionally linked' to the Humber Estuary by providing high tide roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure and	Predicted operational noise levels are within ambient range across central and eastern portions of field where birds are most likely to be located due to predator avoidance reasons.	Chapter 10: Ecology, paragraphs 10.6.76 – 10.6.77 Chapter 8: Noise and Vibration, Table 8.32 and paragraphs 8.6.39, 8.6.41 8.6.43 and 8.6.44	No

QUALIFYING FEATURE	POTENTIAL IMPACT	POTENTIAL PATHWAY FOR EFFECTS	SUMMARY OF EVIDENCE PRESENTED	ES VOLUME I REFERENCE (REFER TO APPENDIX 4 FOR FULL WORDING)	LIKELY SIGNIFICANT EFFECT PREDICTED?
Sterna albifrons; little tern (breeding)		reduced survival rates.			
	Visual impacts during operation to birds using Pyewipe mudflats	Disturbance/ displacement of birds from roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	Topic scoped out of assessment due to distance and presence of similar structures in the surrounding environment.	Chapter 10: Ecology, paragraph 10.6.55	No
	Visual impacts during operation to birds using arable field to the south (field 37)	Disturbance/ displacement of birds from fields that are 'functionally linked' to the Humber Estuary by providing high tide roosting, feeding and loafing habitat. This may result in reduced feeding times, increased	Reasonable to assume that waterbirds using this field are habituated to presence of existing power station and its industrial nature, as such that they would not be disturbed by the presence of tall chimney structures	Chapter 10: Ecology, paragraphs 10.6.80 – 10.6.81	No

QUALIFYING FEATURE	POTENTIAL IMPACT	POTENTIAL PATHWAY FOR EFFECTS	SUMMARY OF EVIDENCE PRESENTED	ES VOLUME I REFERENCE (REFER TO APPENDIX 4 FOR FULL WORDING)	LIKELY SIGNIFICANT EFFECT PREDICTED?
		energy expenditure and reduced survival rates.	and other buildings on adjacent land; Proposed Development operation not significantly different to this.		
Humber Estuary Ramsar					
Saltmarshes Dune systems Humid dune slacks	Changes in air quality during operational phase	NOx emissions resulting in changes to critical levels and potential effects on vegetation assemblage.	Annual mean NOx change > 1% of critical level. This exceeds the 1% screening threshold beyond which the effects should be considered in more detail.	Chapter 10: Ecology, paragraphs 10.6.63 – 10.6.64 Chapter 7: Air Quality, paragraphs 7.6.32 to 7.6.34	Yes
		Nutrient nitrogen deposition resulting in changes to critical loads and potential effects on vegetation assemblage.	Change is >1% of critical load. This exceeds the 1% screening threshold beyond which the effects should be considered in more detail.	Chapter 10: Ecology, paragraphs 10.6.65 to 10.6.66 Chapter 7: Air Quality,	Yes

QUALIFYING FEATURE	POTENTIAL IMPACT	POTENTIAL PATHWAY FOR EFFECTS	SUMMARY OF EVIDENCE PRESENTED	ES VOLUME I REFERENCE (REFER TO APPENDIX 4 FOR FULL WORDING)	LIKELY SIGNIFICANT EFFECT PREDICTED?
				paragraphs 7.6.32 to 7.6.34	
		Acid deposition resulting in changes to critical loads and potential effects on vegetation assemblage.	Change <1% of critical load and is not significant. This does not exceed the 1% screening threshold beyond which the effects should be considered in more detail.	Chapter 10: Ecology, paragraph 10.6.67 Chapter 7: Air Quality, paragraphs 7.6.32 to 7.6.34	No
		SO2 emissions resulting in changes to critical levels and potential effects on vegetation assemblage.	Change <1% of critical load and is not significant. This does not exceed the 1% screening threshold beyond which the effects should be considered in more detail.	Chapter 10: Ecology, paragraph 10.6.68 Chapter 7: Air Quality, paragraphs 7.6.32 to 7.6.34	No
Intertidal mud and sand flats Estuarine waters	Surface water pollution during	Pollution of Humber Estuary via adjacent surface water drain,	Standard environmental measures to control	Chapter 10: Ecology, paragraphs	No

QUALIFYING FEATURE	POTENTIAL IMPACT	POTENTIAL PATHWAY FOR EFFECTS	SUMMARY OF EVIDENCE PRESENTED	ES VOLUME I REFERENCE (REFER TO APPENDIX 4 FOR FULL WORDING)	LIKELY SIGNIFICANT EFFECT PREDICTED?
Coastal brackish/ saline lagoons	operational phase to habitats	into which surface water run-off and treated foul drainage from the Proposed Development will outfall.	pollution to the drain during operational phase will adequately minimise risk.	10.6.70 to 10.6.71 Chapter 14: Water Resources, Flood Risk and Drainage, paragraph 14.6.36	
Grey seal River lamprey Sea lamprey	Surface water pollution during operational phase to habitats supporting breeding grey seal and migratory river and sea lamprey	Pollution of Humber Estuary via adjacent surface water drain, into which surface water run-off from the Proposed Development will outfall.	Standard environmental measures to control pollution to the drain during operational phase will adequately minimise risk.	Chapter 10: Ecology, paragraphs 10.6.70 to 10.6.71 Chapter 14: Water Resources, Flood Risk and Drainage, paragraph 14.6.36	No
	Foul drainage pollution during operational phase to habitats	Pollution of Humber Estuary via adjacent surface water drains, into which	Foul drainage will be processed via an on-site package treatment plant. The	Chapter 10: Ecology, paragraph 10.5.16	No

QUALIFYING FEATURE	POTENTIAL IMPACT	POTENTIAL PATHWAY FOR EFFECTS	SUMMARY OF EVIDENCE PRESENTED	ES VOLUME I REFERENCE (REFER TO APPENDIX 4 FOR FULL WORDING)	LIKELY SIGNIFICANT EFFECT PREDICTED?
	supporting breeding grey seal and migratory river and sea lamprey	foul drainage discharge from an on-site package treatment plant for the Proposed Development will outfall.	volume of processed discharge is anticipated to be below the threshold for which a Permit is required; and as such is not considered to represent a significant effect		
Internationally important assemblage of wintering waterfowl Internationally important populations of wintering birds: Common shelduck Golden plover Red knot Dunlin	Surface water pollution during operational phase to habitats supporting internationally important bird populations	Pollution of Humber Estuary via adjacent surface water drain, into which surface water run-off from the Proposed Development will outfall.	Standard environmental measures to control pollution to the drain during operational phase will adequately minimise risk.	Chapter 10: Ecology, paragraphs 10.6.70 to 10.6.71 Chapter 14: Water Resources, Flood Risk and Drainage, paragraph 14.6.36	No
	Noise impacts during operation	Disturbance/ displacement of	Predicted operational noise	Chapter 10: Ecology,	No

QUALIFYING FEATURE	POTENTIAL IMPACT	POTENTIAL PATHWAY FOR EFFECTS	SUMMARY OF EVIDENCE PRESENTED	ES VOLUME I REFERENCE (REFER TO APPENDIX 4 FOR FULL WORDING)	LIKELY SIGNIFICANT EFFECT PREDICTED?
Black-tailed godwit Bar-tailed godwit Common redshank	to birds using Pyewipe mudflats	birds from mudflats. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	levels are 5 dB below the ambient noise level of 52 dB LAeq.	paragraphs 10.6.72 to 10.6.75 Chapter 8: Noise and Vibration, Table 8.30 and paragraphs 8.6.39, 8.6.40 and 8.6.44	
	Noise impacts during operation to birds using arable field to the south (field 37)	Disturbance/ displacement of birds from field to the south that is 'functionally linked' to the Humber Estuary by providing high tide roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	Predicted operational noise levels are within ambient range across central portion of field where birds are most likely to be located due to predator avoidance reasons.	Chapter 10: Ecology, paragraphs 10.6.78 – 10.6.79 Chapter 8: Noise and Vibration, Table 8.31 and paragraphs 8.6.39, 8.6.41, 8.6.42 and 8.6.44	No

QUALIFYING FEATURE	POTENTIAL IMPACT	POTENTIAL PATHWAY FOR EFFECTS	SUMMARY OF EVIDENCE PRESENTED	ES VOLUME I REFERENCE (REFER TO APPENDIX 4 FOR FULL WORDING)	LIKELY SIGNIFICANT EFFECT PREDICTED?
	Noise/ vibration impacts during operation to birds using arable fields to the north (fields 30 and 31)	Disturbance/ displacement of birds from fields to the north that are 'functionally linked' to the Humber Estuary by providing high tide roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	Predicted operational noise levels are within ambient range across central and eastern portions of field where birds are most likely to be located due to predator avoidance reasons.	Chapter 10: Ecology, paragraphs 10.6.76 to 10.6.77 Chapter 8: Noise and Vibration, Table 8.32 and paragraphs 8.6.39, 8.6.41, 8.6.43 and 8.6.44	No
	Visual impacts during operation to birds using Pyewipe mudflats	Disturbance/ displacement of birds from fields to the north that are 'functionally linked' to the Humber Estuary by providing high tide roosting, feeding and loafing	Topic scoped out of assessment due to distance and presence of similar structures in the surrounding environment.	Chapter 10: Ecology, paragraph 10.6.55	No

QUALIFYING FEATURE	POTENTIAL IMPACT	POTENTIAL PATHWAY FOR EFFECTS	SUMMARY OF EVIDENCE PRESENTED	ES VOLUME I REFERENCE (REFER TO APPENDIX 4 FOR FULL WORDING)	LIKELY SIGNIFICANT EFFECT PREDICTED?
		habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.			
	Visual impacts during operation to birds using arable field to the south (field 37)	Disturbance/ displacement of birds from fields to the north that are 'functionally linked' to the Humber Estuary by providing high tide roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	Reasonable to assume that waterbirds using this field are habituated to presence of existing power station and its industrial nature, as such that they would not be disturbed by the presence of tall chimney structures and other buildings on adjacent land; Proposed Development operation not	Chapter 10: Ecology, paragraphs 10.6.80 to 10.6.81	No

QUALIFYING FEATURE	POTENTIAL IMPACT	POTENTIAL PATHWAY FOR EFFECTS	SUMMARY OF EVIDENCE PRESENTED	ES VOLUME I REFERENCE (REFER TO APPENDIX 4 FOR FULL WORDING)	LIKELY SIGNIFICANT EFFECT PREDICTED?
			significantly different to this.		

Table 5.3: Likely Significant Effects during decommissioning

QUALIFYING FEATURE	POTENTIAL IMPACT	POTENTIAL PATHWAY FOR EFFECTS	SUMMARY OF EVIDENCE PRESENTED	ES VOLUME I REFERENCE (REFER TO APPENDIX 3 FOR FULL WORDING)	LIKELY SIGNIFICANT EFFECT PREDICTED?
Humber Estuary SAC					
Embryonic shifting dunes Shifting dunes along the shoreline with European marram grass (*Ammophila arenaria*) (white dunes) Fixed coastal dunes with herbaceous vegetation (grey dunes) Dunes with common sea buckthorn (*Hippophae rhamnoides*) Atlantic salt meadows (*Glauco-*	Changes in air quality during decommissioning phase	Dust deposition during site clearance works resulting in smothering of vegetation and damage to habitats	Impacts assumed the same (or no environmentally worse than) as for construction phase. These habitat types are not present in close proximity to the Proposed Development. The nearest terrestrial habitat within the designations (coastal saltmarsh) is approximately 500 m from the Proposed Development, and at this distance no dust smothering would be anticipated. This	Chapter 10: Ecology, paragraph 10.6.4 Chapter 7: Air Quality, paragraph 7.6.8	No

QUALIFYING FEATURE	POTENTIAL IMPACT	POTENTIAL PATHWAY FOR EFFECTS	SUMMARY OF EVIDENCE PRESENTED	ES VOLUME I REFERENCE (REFER TO APPENDIX 3 FOR FULL WORDING)	LIKELY SIGNIFICANT EFFECT PREDICTED?
Puccinellietalia maritimae)			pathway was therefore scoped out.		
Estuaries Mudflats and sandflats not covered by seawater at low tide Sandbanks which are slightly covered by seawater all the time Coastal lagoons *Salicornia* and other annuals colonising mud and sand Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)	Surface water pollution during decommissioning phase	Pollution/ siltation of Humber Estuary via adjacent surface water drain, into which surface water run-off from the Proposed Development will outfall.	Impacts assumed the same (or no environmentally worse than) as for construction phase. Standard environmental measures to control pollution to the drains will adequately minimise risk to local surface water bodies (consequently minimising risk to the Humber Estuary too).	Chapter 10: Ecology, paragraphs 10.6.33 to 10.6.35 Chapter 14: Water Resources, Flood Risk and Drainage, paragraph 14.6.18	No
Humber Estuary SPA					

QUALIFYING FEATURE	POTENTIAL IMPACT	POTENTIAL PATHWAY FOR EFFECTS	SUMMARY OF EVIDENCE PRESENTED	ES VOLUME I REFERENCE (REFER TO APPENDIX 3 FOR FULL WORDING)	LIKELY SIGNIFICANT EFFECT PREDICTED?
Populations of European importance of breeding, passage and over-wintering birds: *Botaurus stellaris*; great bittern (non-breeding) *Botaurus stellaris*; great bittern (breeding) *Tadorna tadorna*; common shelduck (non-breeding) *Circus aeruginosus*; Eurasian marsh harrier (breeding) *Circus cyaneus*; hen harrier (non-breeding)	Surface water pollution during decommissioning phase to habitats supporting internationally important bird populations	Pollution/ siltation of Humber Estuary via adjacent surface water drain, into which surface water run-off from the Proposed Development will outfall.	Impacts assumed the same (or no environmentally worse than) as for construction phase. Standard environmental measures to control pollution to the drains will adequately minimise risk.	Chapter 10: Ecology, paragraphs 10.6.33 to 10.6.35 Chapter 14: Water Resources, Flood Risk and Drainage, paragraph 14.6.18	No
	Noise/vibration impacts during decommissioning to birds using Pyewipe mudflats	Disturbance/ displacement of birds from mudflats. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	Impacts assumed the same (or no environmentally worse than) as for construction phase.	Chapter 10: Ecology, paragraphs 10.6.8 to 10.6.14 Chapter 8: Noise and Vibration, paragraph 8.6.14	Yes

QUALIFYING FEATURE	POTENTIAL IMPACT	POTENTIAL PATHWAY FOR EFFECTS	SUMMARY OF EVIDENCE PRESENTED	ES VOLUME I REFERENCE (REFER TO APPENDIX 3 FOR FULL WORDING)	LIKELY SIGNIFICANT EFFECT PREDICTED?
Recurvirostra avosetta; pied avocet (non-breeding) *Recurvirostra avosetta*; pied avocet (breeding) *Pluvialis apricaria*; European golden plover (non-breeding) *Calidris canutus*; red knot (non-breeding) *Calidris alpina alpina*; dunlin (non-breeding) *Philomachus pugnax*; ruff (non-breeding) *Limosa limosa islandica*; black-tailed godwit (non-breeding)	Noise/ vibration impacts during decommissioning to birds using arable field to the south (field 37)	Disturbance/ displacement of birds from field to the south that is 'functionally linked' to the Humber Estuary by providing high tide roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	Impacts assumed the same (or no environmentally worse than) as for construction phase.	Chapter 10: Ecology, paragraphs 10.6.16 to 10.6.22 Chapter 8: Noise and Vibration, paragraph 8.6.15 (noise) and paragraphs 8.6.20 to 8.6.24 (vibration)	Yes
	Noise/ vibration impacts during decommissioning to birds using arable fields to the north (fields 30 and 31)	Disturbance/ displacement of birds from fields to the north that are 'functionally linked' to the Humber Estuary by providing high tide roosting, feeding and loafing habitat.	Impacts assumed the same (or no environmentally worse than) as for construction phase.	Chapter 10: Ecology, paragraphs 10.6.24 to 10.6.27 Chapter 8: Noise and Vibration, paragraph 8.6.15 (noise) and paragraphs 8.6.20	Yes

QUALIFYING FEATURE	POTENTIAL IMPACT	POTENTIAL PATHWAY FOR EFFECTS	SUMMARY OF EVIDENCE PRESENTED	ES VOLUME I REFERENCE (REFER TO APPENDIX 3 FOR FULL WORDING)	LIKELY SIGNIFICANT EFFECT PREDICTED?
Limosa lapponica; bar-tailed godwit (non-breeding) *Tringa totanus*; common redshank (non-breeding) *Sterna albifrons*; little tern (breeding)		This may result in reduced feeding times, increased energy expenditure and reduced survival rates.		to 8.6.24 (vibration)	
	Visual impacts during decommissioning to birds using Pyewipe mudflats	Disturbance/ displacement of birds from roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	Impacts assumed the same (or no environmentally worse than) as for construction phase. Minimal risk of visual disturbance, seawall provides substantial screening to birds on the mudflats.	Chapter 10: Ecology, paragraph 10.6.29	No
	Visual impacts during decommissioning to birds using arable field to the south (field 37)	Disturbance/ displacement of birds from fields to the south that are 'functionally linked' to the Humber Estuary by	Impacts assumed the same (or no environmentally worse than) as for construction phase.	Chapter 10: Ecology, paragraphs 10.6.30 to 10.6.32	Yes

QUALIFYING FEATURE	POTENTIAL IMPACT	POTENTIAL PATHWAY FOR EFFECTS	SUMMARY OF EVIDENCE PRESENTED	ES VOLUME I REFERENCE (REFER TO APPENDIX 3 FOR FULL WORDING)	LIKELY SIGNIFICANT EFFECT PREDICTED?
		providing high tide roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	Nature and scale of development similar to existing, but potential for some visual impacts identified.		
Humber Estuary Ramsar					
Intertidal mud and sand flats Estuarine waters Coastal brackish/ saline lagoons	Surface water pollution during decommissioning phase to habitats	Pollution/ siltation of Humber Estuary via adjacent surface water drain, into which surface water run-off from the Proposed Development will outfall.	Impacts assumed the same (or no environmentally worse than) as for construction phase. Standard environmental measures to control pollution to the drains during construction phase will adequately minimise risk.	Chapter 10: Ecology, paragraphs 10.6.33 to 10.6.35 Chapter 14: Water Resources, Flood Risk and Drainage, paragraph 14.6.18	No
Grey seal River lamprey	Surface water pollution during	Pollution/ siltation of Humber Estuary	Impacts assumed the same (or no	Chapter 10: Ecology,	No

QUALIFYING FEATURE	POTENTIAL IMPACT	POTENTIAL PATHWAY FOR EFFECTS	SUMMARY OF EVIDENCE PRESENTED	ES VOLUME I REFERENCE (REFER TO APPENDIX 3 FOR FULL WORDING)	LIKELY SIGNIFICANT EFFECT PREDICTED?
Sea lamprey	decommissioning phase to habitats supporting breeding grey seal and migratory river and sea lamprey	via adjacent surface water drain, into which surface water run-off from the Proposed Development will outfall.	environmentally worse than) as for construction phase. Standard environmental measures to control pollution to the drains during construction phase will adequately minimise risk.	paragraphs 10.6.33 to 10.6.35 Chapter 14: Water Resources, Flood Risk and Drainage, paragraph 14.6.18	
Internationally important assemblage of wintering waterfowl Internationally important populations of wintering birds: Common shelduck Golden plover Red knot Dunlin Black-tailed godwit	Surface water pollution during decommissioning phase to habitats supporting internationally important bird populations	Pollution/ siltation of Humber Estuary via adjacent surface water drain, into which surface water run-off from the Proposed Development will outfall.	Impacts assumed the same (or no environmentally worse than) as for construction phase. Standard environmental measures to control pollution to the drains during construction phase will adequately minimise risk.	Chapter 10: Ecology, paragraphs 10.6.33 to 10.6.35 Chapter 14: Water Resources, Flood Risk and Drainage, paragraph 14.6.18	No

QUALIFYING FEATURE	POTENTIAL IMPACT	POTENTIAL PATHWAY FOR EFFECTS	SUMMARY OF EVIDENCE PRESENTED	ES VOLUME I REFERENCE (REFER TO APPENDIX 3 FOR FULL WORDING)	LIKELY SIGNIFICANT EFFECT PREDICTED?
Bar-tailed godwit Common redshank	Noise/vibration impacts during decommissioning to birds using Pyewipe mudflats	Disturbance/ displacement of birds from mudflats. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	Impacts assumed the same (or no environmentally worse than) as for construction phase.	Chapter 10: Ecology, paragraphs 10.6.8 to 10.6.14 Chapter 8: Noise and Vibration, paragraph 8.6.14	Yes
	Noise/ vibration impacts during decommissioning to birds using arable field to the south (field 37)	Disturbance/ displacement of birds from field to the south that is 'functionally linked' to the Humber Estuary by providing high tide roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	Impacts assumed the same (or no environmentally worse than) as for construction phase.	Chapter 10: Ecology, paragraphs 10.6.16 to 10.6.22 Chapter 8: Noise and Vibration, paragraph 8.6.15 (noise) and paragraphs 8.6.20 to 8.6.24 (vibration)	Yes

QUALIFYING FEATURE	POTENTIAL IMPACT	POTENTIAL PATHWAY FOR EFFECTS	SUMMARY OF EVIDENCE PRESENTED	ES VOLUME I REFERENCE (REFER TO APPENDIX 3 FOR FULL WORDING)	LIKELY SIGNIFICANT EFFECT PREDICTED?
	Noise/ vibration impacts during decommissioning to birds using arable fields to the north (fields 30 and 31)	Disturbance/ displacement of birds from fields to the north that are 'functionally linked' to the Humber Estuary by providing high tide roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	Impacts assumed the same (or no environmentally worse than) as for construction phase.	Chapter 10: Ecology, paragraphs 10.6.24 to 10.6.28 Chapter 8: Noise and Vibration Paragraph 8.6.15 (noise) and paragraphs 8.6.20 to 8.6.24 (vibration)	Yes
	Visual impacts during decommissioning to birds using Pyewipe mudflats	Disturbance/ displacement of birds from high tide roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure	Impacts assumed the same (or no environmentally worse than) as for construction phase. Minimal risk of visual disturbance, seawall provides substantial	Chapter 10: Ecology, paragraph 10.6.29	No

QUALIFYING FEATURE	POTENTIAL IMPACT	POTENTIAL PATHWAY FOR EFFECTS	SUMMARY OF EVIDENCE PRESENTED	ES VOLUME I REFERENCE (REFER TO APPENDIX 3 FOR FULL WORDING)	LIKELY SIGNIFICANT EFFECT PREDICTED?
		and reduced survival rates.	screening to birds on the mudflats.		
	Visual impacts during decommissioning to birds using arable field to the south (field 37)	Disturbance/ displacement of birds from fields to the south that are 'functionally linked' to the Humber Estuary by providing high tide roosting, feeding and loafing habitat. This may result in reduced feeding times, increased energy expenditure and reduced survival rates.	Impacts assumed the same (or no environmentally worse than) as for construction phase. Nature and scale of development similar to existing, but potential for some visual impacts identified.	Chapter 10: Ecology, paragraphs 10.6.30 to 10.6.32	Yes

6.0 IN-COMBINATION EFFECTS WITH OTHER PLANS OR PROJECTS

6.1.1 As part of the Stage 1 Screening exercise, it is also necessary to undertake an assessment in combination with other plans or projects. Relevant projects considered as part of the in-combination effects assessment are detailed below.

6.1.2 Developments have been scoped in to the screening task only where they could potentially affect the European site through loss of functionally linked habitat, noise or visual disturbance/ displacement to Humber Estuary SPA/ Ramsar waterbirds, or air quality impacts on sensitive habitats.

6.1.3 A summary of the HRA stage 1 screening exercise for in-combination construction impacts is provided in Table 6.1. A summary of the HRA stage 1 screening exercise for in-combination operational impacts is provided in Table 6.2. Topics are highlighted in shaded cells where likely significant effects have been identified and they have been taken forward to HRA stage 2 appropriate assessment.

6.1.4 In respect of screening for LSE in-combination decommissioning impacts, as discussed in Section 5.3, the approach has been to assume the impacts during decommissioning for the Proposed Development are the same, or no environmentally worse than, those identified during the construction phase. This approach has therefore been adopted for the in-combination LSE screening. Neither of the HRAs for the two developments for which potential in-combination construction LSEs were identified consider potential decommissioning impacts (Stallingborough Link Road Ref: DM/0094/18/FUL and Sustainable Transport Fuels Facility Ref: DM/0664/19/FUL). The potential for likely significant effects during decommissioning of the Proposed Development in-combination with other projects has therefore been discounted.

Table 6.1: Likely Significant in-combination Effects during construction

PLAN/ PROJECT	POTENTIAL LIKELY SIGNIFICANT IN-COMBINATION EFFECT ON HUMBER ESTUARY SPA/ RAMSAR?		
	NOISE/ VISUAL DISTURBANCE TO SPA/ RAMSAR[7]	**NOISE/ VISUAL DISTURBANCE TO SPA/ RAMSAR FUNCTIONALLY LINKED HABITAT[2]**	**LOSS OF SPA/ RAMSAR FUNCTIONALLY LINKED HABITAT**
1 – Stallingborough Link Road DM/0094/18/FUL	No – HRA concluded that the distance of the scheme from the designated site (c. 1 km), along with visual screening provided by existing developments north-east of Moody Lane that were between the scheme and the SPA/ Ramsar, resulted in there being no potential for construction-related disturbance to qualifying features within the boundaries of the designations.	Yes – HRA concluded that there was potential for temporary noise disturbance to functionally linked habitat and could not rule out likely significant effects.	Yes – HRA identified potential for scheme to result in loss of supporting habitat (i.e. functionally linked land).
2 – Sustainable Transport Fuels Facility DM/0664/19/FUL	No - HRA states that potential direct noise and vibration disturbance of SPA was scoped out of the assessment.	Yes - HRA states that significant effects would be unlikely, but included for further consideration as likely significant	Yes - HRA states that significant effects would be unlikely, but included for further consideration as likely significant

[7] Other schemes considered noise and visual impacts together in the assessment rather than separating them out as distinct impacts, as was the approach for the Proposed Development. Noise and visual impacts are therefore grouped into one column for the in-combination effects LSE screening to avoid repetition.

PLAN/ PROJECT	POTENTIAL LIKELY SIGNIFICANT IN-COMBINATION EFFECT ON HUMBER ESTUARY SPA/ RAMSAR?		
	NOISE/ VISUAL DISTURBANCE TO SPA/ RAMSAR[7]	**NOISE/ VISUAL DISTURBANCE TO SPA/ RAMSAR FUNCTIONALLY LINKED HABITAT[2]**	**LOSS OF SPA/ RAMSAR FUNCTIONALLY LINKED HABITAT**
		effects cannot be ruled out at this stage.	effects cannot be ruled out at this stage.
3 – Engineering Works – Paragon House SM/0147/16/FUL	No – due to distance from Estuary (c. 1.2 km) and presence of industrial areas between the scheme and the Estuary.	No - not considered in impact assessment therefore assume scoped out.	No – habitats not used by large aggregations of waterbirds above 1% Humber Estuary populations, and are not considered to be functionally linked to the SPA/ Ramsar.
4 – Renewable Energy Power Facility – Kiln Lane DM/0848/14/FUL	No - not considered in impact assessment therefore assume scoped out.	No - not considered in impact assessment therefore assume scoped out.	No – habitats within the scheme boundary are not suitable for wintering birds and therefore not functionally linked to the SPA/ Ramsar.
5 – Selvic Shipping CHP Boilers DM/0449/17/FUL	No – no potential for in-combination noise effects identified.	No – no potential for In-combination noise effects identified.	No – habitats not suitable for wintering birds and therefore not functionally linked to the SPA/ Ramsar.
6 – Waste Tyre Pyrolysis – Immingham Rail Freight DM/0333/17/FUL	No – no potential for in-combination noise effects identified.	No – no potential for in-combination noise effects identified.	No – habitats not suitable for wintering birds and therefore not functionally linked to the SPA/ Ramsar.

PLAN/ PROJECT	POTENTIAL LIKELY SIGNIFICANT IN-COMBINATION EFFECT ON HUMBER ESTUARY SPA/ RAMSAR?		
	NOISE/ VISUAL DISTURBANCE TO SPA/ RAMSAR[7]	NOISE/ VISUAL DISTURBANCE TO SPA/ RAMSAR FUNCTIONALLY LINKED HABITAT[2]	LOSS OF SPA/ RAMSAR FUNCTIONALLY LINKED HABITAT
7 – VPI Immingham - Energy Park A PA/2018/918	No – HRA concluded no likely significant effects.	No – HRA concluded no likely significant effects.	No – habitats not suitable for wintering birds and therefore not functionally linked to the SPA/ Ramsar.
8 – Great Coates Renewable Energy Centre DM/0329/18/FUL	No – HRA concluded no likely significant effects. Operational noise levels within ambient range at Pyewipe mudflats.	No – HRA concluded no likely significant effects.	No – habitats not suitable for wintering birds and therefore not functionally linked to the SPA/ Ramsar.
9 – Waste to Energy – Immingham Rail Freight DM/0628/18/FUL	No - not considered in impact assessment therefore assume scoped out.	No - not considered in impact assessment therefore assume scoped out.	No – habitats not suitable for wintering birds and therefore not functionally linked to the SPA/ Ramsar.
10 – North Beck Energy Centre DM/0026/18/FUL	No – implementation of best practice construction methods means that there will be no potential for in-combination effects.	No – not considered in noise impact assessment so assume scoped out.	No – habitats not suitable for wintering birds and therefore not functionally linked to the SPA/ Ramsar.
11 – Stallingborough Interchange Business Park DM/0105/18/FUL	No – not specifically addressed in impact assessment, but reasonable to scope out on the	No – not considered in impact assessment so assume scoped out.	No – habitats do not support important assemblages of SPA/ Ramsar wintering birds and are therefore not

PLAN/ PROJECT	POTENTIAL LIKELY SIGNIFICANT IN-COMBINATION EFFECT ON HUMBER ESTUARY SPA/ RAMSAR?		
	NOISE/ VISUAL DISTURBANCE TO SPA/ RAMSAR[7]	**NOISE/ VISUAL DISTURBANCE TO SPA/ RAMSAR FUNCTIONALLY LINKED HABITAT[2]**	**LOSS OF SPA/ RAMSAR FUNCTIONALLY LINKED HABITAT**
	basis of distance (c. 2 km from SPA/ Ramsar).		functionally linked to the SPA/ Ramsar.
12 – VPI Immingham OCGT DCO EN010097	No – no potential for in-combination noise effects identified.	No – no potential for in-combination noise effects identified.	No – habitats do not support important assemblages of SPA/ Ramsar wintering birds and are therefore not functionally linked to the SPA/ Ramsar.
13 – 525 Residential Development DM/0728/18/OUT	No – not specifically addressed in impact assessment, but reasonable to scope out on the basis of distance (c. 2 km from SPA/ Ramsar).	No – not considered in impact assessment so assume scoped out.	No – habitats not suitable for wintering birds and therefore not functionally linked to the SPA/ Ramsar.

Table 6.2: Likely Significant In-Combination Effects during Operation

PLAN/ PROJECT	POTENTIAL LIKELY SIGNIFICANT IN-COMBINATION EFFECT ON HUMBER ESTUARY SAC/ SPA/ RAMSAR?		
	CHANGES IN AIR QUALITY TO SAC/ RAMSAR	**NOISE/ VISUAL DISTURBANCE TO SPA/ RAMSAR[8]**	**NOISE/ VISUAL DISTURBANCE TO SPA/ RAMSAR FUNCTIONALLY LINKED HABITAT[3]**
1 – Stallingborough Link Road DM/0094/18/FUL	No – no potential for in-combination air quality effects identified.	No – HRA concluded that the distance of the scheme from the designated site (c. 1 km), along with visual screening provided by existing developments north-east of Moody Lane that were between the scheme and the SPA/ Ramsar, resulted in there being no potential for operational disturbance to qualifying features within the boundaries of the designations.	Yes – HRA concluded that there was potential for noise disturbance to functionally linked habitat and could not rule out likely significant effects due to an increase in ambient noise.
2 – Sustainable Transport Fuels Facility DM/0664/19/FUL	Yes – ADMS 5 modelling has been undertaken to consider in-combination air quality effects.	No – due to distance from Estuary (c. 1 km) and presence of industrial areas between the	Yes - HRA states that significant effects would be unlikely, but included for further consideration as likely significant

[8] Other schemes considered noise and visual impacts together in the assessment rather than separating them out as distinct impacts, as was the approach for the Proposed Development. Noise and visual impacts are therefore grouped into one column for the in-combination effects LSE screening to avoid repetition.

PLAN/ PROJECT	POTENTIAL LIKELY SIGNIFICANT IN-COMBINATION EFFECT ON HUMBER ESTUARY SAC/ SPA/ RAMSAR?		
	CHANGES IN AIR QUALITY TO SAC/ RAMSAR	**NOISE/ VISUAL DISTURBANCE TO SPA/ RAMSAR[8]**	**NOISE/ VISUAL DISTURBANCE TO SPA/ RAMSAR FUNCTIONALLY LINKED HABITAT[3]**
		scheme and the Estuary.	effects cannot be ruled out at this stage.
3 – Engineering Works – Paragon House SM/0147/16/FUL	No – scheme will not result in emissions to air.	No – due to distance from Estuary (c. 1.2 km) and presence of industrial areas between the scheme and the Estuary.	No - not considered in impact assessment therefore assume scoped out.
4 – Renewable Energy Power Facility – Kiln Lane DM/0848/14/FUL	No – no potential for in-combination air quality effects identified. Air quality assessment for the scheme concluded that emissions were insignificant and would not affect the Humber Estuary designated site.	No – no potential for in-combination noise effects identified.	No – no potential for in-combination noise effects identified.
5 – Selvic Shipping CHP Boilers DM/0449/17/FUL	No – no potential for in-combination air quality effects identified	No – no potential for in-combination noise effects identified.	No – no potential for in-combination noise effects identified.
6 – Waste Tyre Pyrolysis – Immingham Rail Freight DM/0333/17/FUL	Yes – ADMS 5 modelling undertaken to consider in-combination air quality effects.	No – no potential for in-combination noise effects identified.	No – no potential for in-combination noise effects identified.
7 – VPI Immingham Energy Park A	Yes – ADMS 5 modelling undertaken to	No – no potential for in-combination	No – no potential for in-combination

PLAN/ PROJECT	POTENTIAL LIKELY SIGNIFICANT IN-COMBINATION EFFECT ON HUMBER ESTUARY SAC/ SPA/ RAMSAR?		
	CHANGES IN AIR QUALITY TO SAC/ RAMSAR	**NOISE/ VISUAL DISTURBANCE TO SPA/ RAMSAR[8]**	**NOISE/ VISUAL DISTURBANCE TO SPA/ RAMSAR FUNCTIONALLY LINKED HABITAT[3]**
PA/2018/918	consider in-combination air quality effects.	noise impacts identified	noise impacts identified
8 – Great Coates Renewable Energy Centre DM/0329/18/FUL	Yes – ADMS 5 modelling undertaken to consider in-combination air quality effects.	No – no potential for in-combination noise effects identified.	No – no potential for in-combination noise effects identified.
9 – Waste to Energy – Immingham Rail Freight DM/0628/18/FUL	No – no potential for in-combination air quality effects identified. Scheme occupies the same space as Development Ref: 6 and it is not possible for both developments to occur.	No – noise impact assessment concluded that there would be no increase in ambient noise during operation.	No – noise impact assessment concluded that there would be no increase in ambient noise during operation.
10 – North Beck Energy Centre DM/0026/18/FUL	Yes – ADMS 5 modelling undertaken to consider in-combination air quality effects.	No – no potential for in-combination noise effects identified.	No – no potential for in-combination noise effects identified.
11 – Stallingborough Interchange Business Park DM/0105/18/FUL	No – information provided in the planning application is inadequate to undertake dispersion modelling.	No – operational noise for this scheme is 5dB below ambient levels.	No – not considered in impact assessment so assume scoped out.
12 – VPI Immingham OCGT DCO	Yes – ADMS 5 modelling undertaken to	No – no potential for in-combination	No – no potential for in-combination

PLAN/ PROJECT	POTENTIAL LIKELY SIGNIFICANT IN-COMBINATION EFFECT ON HUMBER ESTUARY SAC/ SPA/ RAMSAR?		
	CHANGES IN AIR QUALITY TO SAC/ RAMSAR	**NOISE/ VISUAL DISTURBANCE TO SPA/ RAMSAR[8]**	**NOISE/ VISUAL DISTURBANCE TO SPA/ RAMSAR FUNCTIONALLY LINKED HABITAT[3]**
EN010097	consider in-combination air quality effects.	noise effects identified.	noise effects identified.
13 – 525 Residential Development DM/0728/18/OUT	No – no potential for in-combination air quality effects identified due to the type of development.	No – no potential for in-combination noise effects identified.	No – no potential for in-combination noise effects identified.

7.0 STAGE 2: APPROPRIATE ASSESSMENT

7.1 Introduction

7.1.1 The Proposed Development has been identified at the HRA Stage 1 screening as resulting in likely significant effects on the Humber Estuary SAC/ SPA/ Ramsarsite. To avoid repetition, the assessments for some of the features have been combined in this report (for example, where LSE on waterbird assemblages for which both the SPA and Ramsar are designated):

- loss of functionally linked habitat used by SPA/ Ramsar waterbirds during construction of the Proposed Development alone and in-combination with other proposed developments;
- noise disturbance to SPA/ Ramsar waterbirds using Pyewipe mudflats during construction of the Proposed Development alone;
- noise disturbance to SPA/ Ramsar waterbirds using functionally linked arable field (Field 37) to the south of the Proposed Development during construction and decommissioning of the Proposed Development alone and in-combination with other proposed developments;
- noise disturbance to SPA/ Ramsar waterbirds using functionally linked arable fields (Fields 30 and 31) to the north of the Proposed Development during construction and decommissioning of the Proposed Development alone and in-combination with other proposed developments;
- visual disturbance to SPA/ Ramsar waterbirds using functionally linked arable field (Field 37) to the south of the Proposed Development during construction, operation and decommissioning of the Proposed Development alone and in combination with other proposed developments; and
- changes in air quality during the operation of the Proposed Development resulting in impacts on sensitive SAC/ Ramsar habitats alone and in combination with other proposed developments.

7.2 Construction Impacts

<u>Loss of Functionally Linked Land for the Humber Estuary SPA/ Ramsar</u>

7.2.1 Although the habitat within the Site boundary has been demonstrated to support low numbers of SPA/ Ramsar waterbirds, and there have been no recorded aggregations above 1% of the Humber Estuary threshold, a precautionary approach has been applied to the Proposed Development because it lies within the Mitigation Zone to which Policy 9 is applicable. This states that "…*proposals which adversely affect the Humber Estuary SPA/ Ramsar site due to the loss of functionally linked land will normally be required to provide their own mitigation in order to comply with the requirements of the Habitats Regulations*".

7.2.2 The EcIA has therefore assumed that the land within the Proposed Development boundary is 'functionally linked' to the Humber Estuary SPA/ Ramsar. The loss of functionally linked habitat within the Main Development Area, in the absence of mitigation, therefore has the potential to displace SPA/ Ramsar waterbirds,

which could result in decreased resting/ feeding times and increased energy expenditure (as birds seek new areas to roost/ feed in that are further from the mudflats), and have subsequent impacts on body condition and winter survival rates.

7.2.3 When examining the potential for adverse effects on integrity, the Stage 2 appropriate assessment has taken into account the mitigation at Cress Marsh that has been delivered to meet Policy 9 of the Local Plan. Within the Mitigation Zone identified on the policies map, development proposals on greenfield land that adversely affect the Humber Estuary SPA/ Ramsar site due to the loss of functionally linked land are required to make contributions towards the provision and management of the mitigation sites identified. This is secured on a proportional approach relating to the site area. As the Site lies within the Mitigation Zone, as per the policy, the Applicant is required to commute a sum of money based on the relevant site area lost to the Cress Marsh SHG strategic mitigation site.

7.2.4 The calculation of the sum of money required for the application of Policy 9 to the Proposed Development was undertaken for the Consented Development. The same will apply to the Proposed Development as the area of land to be lost is the same. The financial contribution for the Consented Development was secured by a Section 106 agreement and this provision would be varied through a deed of variation to ensure that the financial contribution would also be secured for the Proposed Development (although the sum would only need to be paid once, for either the Consented Development or the Proposed Development). The relevant area of mitigation land at Cress Marsh has already been created by the Council.

7.2.5 There will therefore be no net loss of functionally linked habitat available for SPA/ Ramsar waterbirds and consequently no adverse effects on the integrity of the designated sites.

<u>Noise Disturbance to Humber Estuary SPA/ Ramsar Waterbirds on the Pyewipe Mudflats</u>

7.2.6 A noise impact assessment has been completed, and baseline monitoring and noise modelling undertaken to determine whether the Proposed Development would result in any construction phase noise impacts on waterbirds in the nearest part of the Humber Estuary SPA/ Ramsar (see ES Volume I Chapter 8: Noise and Vibration (Document Ref. 6.2)), which is at the Pyewipe mudflats (represented by Receptor R3 on Figure 8.1 in ES Volume II, Document Ref. 6.3). The dB $L_{Aeq,1h}$ values provide an 'average' of noise levels expected to occur in any one hour as a result of each activity. Such 'continuous equivalent noise levels' form the basis of most noise assessments on human receptors but are of limited relevance when considering the effect of noise on waterbirds because waterbirds are perceived to be more susceptible to being disturbed by short, sharp 'peaks' of noise e.g. during piling (IECS, 2009). Therefore, for piling activities, the L_{Amax} values have been predicted at the nearest sensitive receptors to provide an indication of the likely 'peak' noise events so that they can be compared to the ambient conditions.

7.2.7 Ambient noise levels at noise receptor R3 (on the seawall at the edge of the Humber Estuary SPA/ Ramsar boundary) were recorded at 47 – 53 dB $L_{Aeq,T}$ (see

Table 8.14 in ES Volume I Chapter 8: Noise and Vibration). The main sources of noise at this location were found to be waves breaking along the shoreline and birdsong. Occasional vehicle usage along the top of the sea wall (motorbikes and quad bikes) resulted in an increase in ambient noise, with a peak noise range of 51.3 – 77.7 dB $L_{AFMax15\ min}$.

7.2.8 Predicted noise levels for the majority of construction activities at R3 were predicted to be within the range 47 – 52 dB $L_{Aeq,1hr}$, which is within the ambient range at the nearest part of Pyewipe mudflats. There will therefore be no discernible change in the noise levels reaching the Humber Estuary SPA/ Ramsar during the majority of the construction phase of the Proposed Development. Predicted ambient noise levels across the nearest mudflats for the majority of the construction activities (excluding piling) are below 44 dB $L_{Aeq,1hr}$ and are therefore within the ambient range. The majority of construction activities would therefore not be expected to disturb birds.

7.2.9 The noisiest construction activity that potentially could be used is drop hammer piling, which the modelling predicts will result in noise levels of 62 dB $L_{Aeq,1hr}$ at R3, which represents an exceedance in the ambient noise level by up to 4 dB, although on the basis that bird hearing thresholds are similar to those of humans it is likely to be barely perceptible as a change. The type of noise being emitted by drop hammer piling (regular impulsive high noise levels) may be considered as more disturbing to birds. An estimation of the peak noise from drop hammer piling activity results in predicted unmitigated levels of 75 dB L_{Amax} at the nearest part of the Estuary. This is significantly higher than the ambient noise level at the measured location on the edge of the Estuary, although as discussed above it is reasonable to assume that there would be some attenuation due to the topography of the seawall, and the fact that the mudflats are below the level of the measured receptor location.

7.2.10 Previous studies such as IECS (1999) and ERM (1996) have demonstrated that birds occupying mudflats elsewhere in the Estuary, such as the Salt End and Pyewipe mudflats, are relatively tolerant of piling noise levels (e.g. marine piling to construct new jetties). Based on bird behaviour and noise monitoring studies undertaken by Xodus Group during construction piling for the Grimsby River Terminal (Xodus Group 2012), the significance criteria for disturbance to birds are summarised below:

- ≤ 65 dB L_{AmaxF} – negligible;
- > 65 to ≤ 75 dB L_{AmaxF} – minor adverse;
- > 75 to ≤ 85 dB L_{AmaxF} – moderate adverse; and
- > 85 dB L_{AmaxF} – major adverse.

7.2.11 The significance levels in the Xodus study were determined based on the visible responses of waterbirds to noise stimuli and included a variety of behaviours including a ‘heads-up’ response, physical movement on the ground away from the disturbance source and taking flight. They are relevant because they were specifically based on the responses of birds within the Humber Estuary.

7.2.12 The impact assessment has identified that construction noise during piling works will give rise to noise levels of up to 75 dB L_{Amax} at the nearest part of the mudflats to the Proposed Development. Noise levels of this magnitude may be expected to result in disturbance to birds. However, using the Xodus study the assessment concludes that there would only be a minor adverse effect on birds, particularly given that there would be some attenuation of noise reaching the mudflats as a result of the seawall.

7.2.13 Piling activity associated with construction would be temporary, and the elevated noise levels would only reach the portion of Pyewipe mudflats closest to the Main Development Area. This may result in some localised disturbance, which would likely cause displacement of waterbirds within the mudflat area, rather than causing them to leave the mudflats altogether. However, this would be temporary for the duration of the piling activity nearest the SPA/ Ramsar boundary, and thus would occur over a relatively short period of time (i.e. weeks rather than months). Any such short-term displacement would not reasonably be considered likely to adversely affect the survival of waterbirds or result in them being permanently displaced from the Pyewipe mudflats or wider Estuary.

7.2.14 It is also necessary to examine the context of any temporary displacement of birds against the availability of large areas of this mudflat, which is at its narrowest point (and thus least area of exposed mudflat across low tide) in the closest part to the Proposed Development, and which extends for over 6 km south-east, that would be unaffected by elevated noise resulting from piling. It is reasonable to assume that such a large area of mudflat would be able to accommodate any birds displaced from the area potentially affected by piling noise.

7.2.15 Moreover, if Continuous Flight Auger (CFA) piling was to be undertaken instead of drop hammer piling, noise levels will be reduced to 50 dB $L_{Aeq,1h}$ at R3, falling below the ambient noise level at this location. Peak noise levels would also be reduced significantly due to CFA piling not producing regular, impulsive high peak noise levels. There would therefore be no discernible change in the noise levels reaching the Humber Estuary SPA/ Ramsar during the majority of the construction phase of the Proposed Development if CFA piling is used.

7.2.16 It is concluded that construction piling noise reaching this location will not result in significant disturbance/ displacement of waterbirds, and no adverse effect on the integrity of the Humber Estuary SPA/ Ramsar is predicted.

<u>Noise Disturbance to Humber Estuary SPA/ Ramsar Waterbirds in the Field to the South (Field 37)</u>

7.2.17 The noise impact assessment considers the potential for noise and vibration impacts during construction on the field to the south of the Proposed Development (i.e. field 37), which although outside the boundary of the Humber Estuary SPA/ Ramsar is considered to be functionally linked due to the important aggregations of wintering waterbirds present (see ES Volume Chapter 8: Noise and Vibration (Document Ref. 6.2)).

7.2.18 Baseline noise levels were monitored along the southern edge of the Proposed Development at location LT3. This therefore represents the nearest part of the field 37 to the Proposed Development and is considered to be the worst case for

assessment of effects on this receptor because, in reality, the majority of waterbirds will be located towards the centre of the field/ towards the eastern edge that borders the Estuary (for predator avoidance reasons).

7.2.19 Noise at this location was generally dominated by noise from the SHBPS, as well as noise from the associated cooling water pumping station and the adjacent chemical plant (Synthomer). Ambient noise levels were in the range 47 – 53 $L_{Aeq,T}$ and 49 – 65 dB L_{AFmax}.

7.2.20 Predicted noise levels arising from construction at this location are in the range 42 – 73 dB $L_{Aeq,1hr}$, at the nearest modelled receptors (on the boundary fence), with the noisiest activity assessed, as expected, being the drop hammer piling. This represents an increase of up to 20 dB on the ambient noise levels, which is a significant increase. However, this would be the worst-case scenario, with the modelled receptors being right on the boundary fence. In reality, most waterbirds would be located towards the central and eastern portions of this field (closer to the Estuary) and would therefore be further away from the noise source. The estimated noise levels at various points across the field were therefore examined to establish the proportion of the field that would be subject to construction noise levels in excess of ambient levels. Vibration associated with drop hammer piling is also assessed in Section 8.6 of Chapter 8: Noise and Vibration in ES Volume I (Document Ref. 6.2) and the same approach has been applied to the assessment of effects on birds.

7.2.21 In the centre of field 37, noise from the drop hammer piling activities is predicted to be 62 dB $L_{Aeq,1hr}$, which is still in excess of the ambient noise level. Peak noise resulting from drop hammer piling is estimated to be 76 dB L_{Amax}, which is within the 'moderate adverse' disturbance threshold based on the Xodus study considered earlier in this assessment. At the furthest receptors, estimated peak noise levels are in the range 69 – 70 dB L_{Amax}, which would be expected to result in 'minor adverse' disturbance. For all other construction activities, noise will have attenuated to within the ambient range at this distance from the Proposed Development, and it is reasonable to conclude that the other construction activities would not result in the disturbance or displacement of waterbirds feeding, roosting and loafing in field 37.

7.2.22 In the absence of mitigation, it is therefore assessed that piling noise and vibration associated with construction will likely result in disturbance to birds feeding, roosting and loafing in field 37, if this takes place within the winter months when the highest aggregations of waterbirds are present in the field (September to March inclusive). This may result in displacement of birds within this field i.e. birds choose to move further away from the source of the noise but remain within the field (e.g. moving further south and east), or displacement of birds from this field entirely. This may result in increased energy expenditure as birds are spending more time flying between the mudflats and high tide roosts, and reduced feeding time as they are using more time and energy to find high tide roosting, loafing and feeding sites. This may have adverse effects on body condition and winter survival rates.

7.2.23 At this stage, the noise mitigation measures to be employed have not been fixed; this is to allow the contractor to determine the best available technique for noise

abatement during the piling works which will be agreed with North East Lincolnshire Council. The mitigation will comprise:

- seasonal piling restrictions – piling will be restricted for two hours either side of high tide in the period September to March inclusive, to avoid the most sensitive winter months, and the time period when birds are most likely to be present in the fields (i.e. when they are pushed off the coastal mudflats at high tide); and/ or
- CFA piling – this technique is virtually vibration free, and one of the quietest forms of piling because it does not require the loud 'bangs' associated with drop hammer piling techniques. If this technique is adopted, it will be possible to reduce construction noise to within ambient levels. The use of alternative piling methods e.g. CFA piling are expected to reduce the noise to 50 dB $L_{Aeq,1h}$ to mitigate impacts on waterbirds in the fields to the south of the Site (R4). This is up to 8 dB below the ambient noise level measured at the Site boundary. In addition, the nature of the noise from CFA piling is less disturbing to birds as there is no impulsive noise.

7.2.24 Whilst the specific mitigation measures are not fixed at this stage, the commitment to implement appropriate mitigation (to be secured by DCO requirement) reduces the effect at Receptor R4 (field to south of the Site). It is therefore concluded that piling noise reaching this location will not result in an adverse effect on the integrity of the Humber Estuary SPA/ Ramsar.

Noise Disturbance to Arable Fields to the North (Fields 30 and 31)

7.2.25 Fields to the north of the Proposed Development on the north side of South Marsh Road (fields 30 and 31) were scoped into the noise and vibration impact assessment, because they are considered to be functionally linked to the Humber Estuary SPA/ Ramsar due to the aggregations of wintering birds they support. These fields are expected to experience typically higher ambient noise levels than those to the south, as a result of HGV and other vehicle movements along South Marsh Road and Hobson Way, which runs along the western boundary of field 30.

7.2.26 The potential for piling activity to result in the displacement of birds (either partially or entirely) from or within fields 30 and 31, which are on the opposite side of South Marsh Road to the Proposed Development, was identified. Although only temporary in duration given the limited duration of piling, this has the potential to result in increased energy expenditure while birds attempt to seek alternative feeding, roosting and loafing locations, and reduced feeding times over the high tide period when favoured mudflats are covered by seawater. This has implications on body condition and winter survival rates.

7.2.27 The central point of these two fields is approximately 400 m north-west for the nearest part of the Proposed Development. For all construction activities except drop hammer piling, noise levels will have attenuated to within the ambient range at this distance from the works and would therefore not be reasonably expected to displace waterbirds in fields 30 and 31. Vibration from drop hammer piling also decreases with distance from the piling location.

7.2.28 For drop hammer piling, the predicted noise level at the centre of the fields is 59 dB $L_{Aeq,1hr}$, which is slightly higher than the ambient noise level. Peak noise levels are estimated to be 72 dB L_{Amax} at this location, which is within the threshold for 'minor adverse' disturbance effects based on the Xodus study previously referred to in this chapter. This may result in some localised displacement of waterbirds within the field, should the drop hammer piling activity overlap with the wintering period when birds are present. However, it is considered that the noise levels are not sufficiently high to result in complete displacement from the fields, particularly given that the southern and western extents of these fields (particularly field 30) are subject to relatively high ambient noise levels as a result of traffic along Hobson Way and South Marsh Road.

7.2.29 Moreover, if CFA piling is used instead of drop hammer piling, noise levels will be reduced significantly (42 - 62 dB $L_{Aeq,1h}$). Peak noise levels will also be reduced significantly due to CFA piling not producing regular, impulsive high peak noise levels. There will therefore be a slight increase above ambient in the noise levels reaching the qualifying SPA/ Ramsar wintering bird assemblage in the field to the north of the Main Development Area during the majority of the construction phase of the Proposed Development with CFA piling; however, this is within the threshold for negligible disturbance effects based on the Xodus study previously referred to.

7.2.30 It is therefore concluded that piling noise reaching these locations will not result in an adverse effect on the integrity of the Humber Estuary SPA/ Ramsar.

Visual Disturbance to Arable Field to the South (Field 37)

7.2.31 The nature and scale of the construction activities associated with the Proposed Development will be set against the backdrop of the SHBPS and will therefore not represent a significant change in the type of structures already present in habitats adjacent to fields used by waterbirds. It is reasonable to assume that such birds are resilient to changes that do not directly affect habitats within which they are feeding, roosting and loafing, because they are present in a dynamic and highly commercial environment associated with the busy Humber Estuary. This includes the presence of tall structures such as power stations, bulk handling facilities, jetties and cranes, and the movement of large commercial vessels in and out of the nearby ports of Immingham and Grimsby.

7.2.32 It is concluded that there could be minor localised displacement of birds within the field given its proximity to construction works. Precautionary mitigation in the form of a c.2.5 m high close-boarded fence will be installed along part of the southern boundary of the Site (see Figure 4.2 in ES Volume II, Document Ref. 6.3) to provide visual screening from vehicle and personnel movements during construction to any waterbirds feeding, roosting or loafing in the field. Construction temporary lighting will be arranged so that glare is minimised outside the construction site. These measures to minimise the impact of lighting are stated in the ES Volume III Appendix 5A Outline CEMP (ES Volume III, Document Ref. 6.4) and Indicative Lighting Strategy (ES Volume III, Document Ref. 5.12)). When considered with mitigation, it is concluded that visual disturbance at this location will not result in an adverse effect on the integrity of the Humber Estuary SPA/ Ramsar.

7.3 Operational Impacts

Changes in Air Quality - Nitrogen Oxides (NOx)

7.3.1 The assessment of likely significant effects concluded that there was a risk of air quality impacts on the nearest sensitive habitats within the SAC/ Ramsar as a result of increased NOx emissions during operation.

7.3.2 The air quality impact assessment has modelled a number of receptors within the Humber Estuary designated site that are sensitive to NOx emissions. The nearest to the Proposed Development is an area of saltmarsh habitat approximately 400 m south-east (receptors E1_1, E1_2 and E1_3 as shown on Figure 7.2 in ES Volume II (Document Ref. 6.3)). At these receptors, the process contribution for NOx is 2.4%, 2.4% and 2.5% respectively of the Critical Level for the Humber Estuary SAC/ SPA/ Ramsar. This therefore exceeds the screening threshold at which an adverse effect on the designated habitats (and therefore the species they support) may occur and indicates that further assessment is required.

7.3.3 At this location (receptors E1_1, E1_2 and E1_3), APIS data indicate that the background annual mean NOx concentration at these receptors is 25.9 µg/m^3. The process contribution from the Proposed Development, although greater than 1%, results in total NOx of 26.7 µg/m^3, which does not exceed the Critical Level for NOx which is 30 µg/m^3. As most of the reported concentration of NOx is due to the published background value used in the calculations, further analysis was undertaken using project-specific survey data, which concluded that the annual mean NOx process contribution would be 2.5% of the Critical Level, resulting in total annual mean NOx concentration of 18.6 µg/m^3.

7.3.4 It is therefore concluded that there would be no adverse effect on the integrity of the designated site as a result of annual NOx contributions from the Proposed Development.

Changes in Air Quality – Nutrient Nitrogen (N) Deposition

7.3.5 The assessment of likely significant effects concluded that there was a risk of air quality impacts on the nearest sensitive habitats within the designated site as a result of increased nutrient N deposition during operation.

7.3.6 The assessment of air quality impacts on the relevant designated habitats as a result of NOx is presented in ES Volume I Chapter 10: Ecology paragraphs 10.6.65 to 10.6.66 (refer to Appendix 7 for full text).

7.3.7 The air quality impact assessment has concluded that the annual N deposition rate (kg N/ha/year) process contribution at the nearest saltmarsh habitat would be 2.1% of the Critical Load of 20 kgN/ha/yr at receptors E1_1, E1_2 and E1_3. As this is above the 1% screening threshold, it is therefore necessary to examine the output from the modelling in greater detail to establish whether this elevation in N deposition would result in any significant effects on the saltmarsh habitat.

The total annual N deposition predicted at these three receptors is 0.4 kg N/ha/yr, resulting from NOx and ammonia (NH_3), compared to the background deposition of 15.5 kg N/ha/yr. Even when the additional nitrogen attributable to the Proposed Development is added to the background deposition total nitrogen

deposition rates would not exceed the Critical Load for this habitat type, which is 20 – 30 kg N/ha/yr. It is therefore concluded that the increased N deposition during operation will result in no adverse effects on the integrity of the designated site.

7.4 Decommissioning Impacts

7.4.1 Impacts from decommissioning are considered to be similar/ no environmentally worse than those arising during the construction phase.

7.4.2 There will therefore be no adverse effects on the integrity of the Humber Estuary SPA/ Ramsar as a result of the LSEs identified for noise/ vibration disturbance to Pyewipe mudflats, noise/ vibration disturbance to the field to the south (Field 37) or fields to the north (Fields 30 & 31), and visual disturbance to the field to the south (Field 37) in accordance with the conclusions of the appropriate assessment of these impacts arising during the construction phase; see Section 7.1 above.

7.5 In-Combination Impacts (Construction)

Losses of Functionally Linked Habitat

In-Combination Effects with Stallingborough Link Road and Sustainable Transport Fuels Facility

7.5.1 There is the potential for cumulative effects on waterbirds using functionally linked habitat surrounding the Estuary in the absence of mitigation, should multiple developments proceed that result in the loss of such habitat.

7.5.2 Only two of the developments considered on the cumulative effects shortlist (Table 17.5 ES Volume I Chapter 17 (Cumulative and Combined Effects) (Document Ref. 6.2.17)) were identified as potentially combining with the Proposed Development to result in a cumulative adverse effect through this pathway; these are the Stallingborough Link Road and the Sustainable Transport Fuels Facility, which will result in the loss of waterbird habitat to the south and west of the Proposed Development. Both of these are located in North East Lincolnshire, and Policy 9 of the NELC Local Plan stipulates that for developments affecting such habitats full mitigation is provided, through a commuted sum secured via legal agreement to draw down from a dedicated strategic mitigation scheme (South Humber Gateway) being delivered directly by NELC ahead of the construction of the relevant development.

7.5.3 The applicants for these developments have committed to commuting sums of money via Local Plan Policy 9 to the SHG strategic mitigation scheme, which will draw down mitigation habitat. With this mitigation, there is therefore no potential for adverse in-combination effects on the integrity of the Humber Estuary SPA/ Ramsar as a result of the loss of functionally linked habitat.

Noise/ Visual Disturbance to Functionally Linked Habitats

In-Combination Effects with Stallingborough Link Road and Sustainable Transport Fuels Facility

7.5.4 The construction of the Proposed Development at the same time as the construction or use of the other developments would not result in a significant in-

combination noise effect on functionally linked fields to the north and south of the Proposed Development.

7.5.5 The noise assessment undertaken for the Stallingborough Link Road considers receptors within a series of defined Study Areas. The receptors assessed include residential dwellings at Woad Lane (to the south of the A180 on the edge of Grimsby) and on identified Greenfield areas 2 km from the high tide of the Humber Estuary and the Humber Estuary SPA/ Ramsar.

7.5.6 The noise assessment predicts that the noise impact of the Link Road development construction on the Humber Estuary SPA/ Ramsar and the Greenfield areas is negligible. Overall it is predicted that the noise effect on all receptors from the Link Road will not be significant, and therefore there will be no adverse effects on the integrity of the Humber Estuary designated site in-combination with the Proposed Development.

7.5.7 The noise assessment undertaken for the Sustainable Transport Fuels Facility (STFF) includes 2 receptors in common with the noise assessment included at Chapter 8: Noise and Vibration of this ES; R1 (Poplar Farm) and R2 (Cress Cottage).

7.5.8 The highest construction noise level predicted at Poplar Farm as a result of the STFF is 53 dB, which is assessed as not significant. The highest predicted noise level from the construction of the Proposed Development at Poplar Farm is 48 dB if drop hammer piling is undertaken, resulting in a cumulative construction noise level of 54 dB L_{Aeq}. This is equal to the measured ambient noise level resulting in an assessment of no significant cumulative operational effect should the construction of the STFF and the Proposed Development coincide.

7.5.9 The highest construction noise level predicted at Cress Cottage as a result of the STFF is 53 dB, which is assessed as not significant. The highest predicted noise level from the construction of the Proposed Development at Cress Cottage is 48 dB if drop hammer piling is undertaken, resulting in a cumulative construction noise level of 54 dB L_{Aeq}. This is substantially below the measured ambient noise level of 65 dB L_{Aeq}, resulting in an assessment of no significant cumulative effect should the construction of the STFF and the Proposed Development coincide.

7.5.10 No assessment of ecological sites was provided in the STFF ES. However, given the predicted noise levels at residential receptors, it is judged that noise levels to the designated sites will not significantly add to those resulting from the Proposed Development. It is therefore concluded that there will be no adverse effects on the integrity of the Humber Estuary designated site with the Proposed Development.

7.5.11 As described above the other developers will commit to commuting sums of money to enable mitigation habitat to be created. With this mitigation providing alternative bird habitat, and taking into account the proposed contributions to the SHG strategic mitigation scheme, there is therefore no potential for adverse in-combination effects on the integrity of the Humber Estuary SPA/ Ramsar as a result of construction disturbance to functionally linked habitat.

7.6 In-Combination Impacts (Operation)

Changes in Air Quality

In-Combination Effects with Waste Tyre Pyrolysis, VPI Immingham Energy Park A, Great Coates Renewable Energy Centre, North Beck Energy Centre, Sustainable Transport Fuels Facility and VPI Immingham OCGT DCO.

7.6.1 The assessment of likely significant effects concluded that there was a risk of combined (in-combination) air quality impacts on the nearest sensitive habitats within the SAC/ Ramsar as a result of increased NO_x emissions and increased nutrient N deposition during the simultaneous operation of these developments.

Cumulative Emissions of Nitrogen Oxides (NOx)

7.6.2 The air quality assessment has identified that the cumulative process contribution of NOx at the nearest saltmarsh habitat to the Proposed Development (receptors E1_1, E1_2 and E1_3 in Chapter 7: Air Quality) is between 7.3 and 8.0%. This therefore exceeds the threshold for insignificance and indicates that further assessment is required.

7.6.3 On this basis, the total contribution from all developments to the habitat has been combined with the background concentration to determine total annual mean deposition rates. Using the background concentration from the APIS website, the cumulative PEC results in total annual mean NOx concentrations of 28.1 – 28.3 µg/m^3 at these locations, which is slightly below the Critical Level for all vegetation types from the effects of NOx of 30 µg/m^3. However, using a more precise background NOx concentration derived from NO_2 project-specific measurement data recorded at the saltmarsh site itself (see Appendix 7A in ES Volume III, Document Ref. 6.4 for details), the total PEC is between 19.9 µg/m^3 and 20.1 µg/m^3, which is well below the Critical Level.

7.6.4 An additional saltmarsh habitat receptor within the Humber Estuary (receptor E3_1) slightly exceeds the 1% process contribution threshold (1.3%), although the total PEC results in a cumulative contribution of 45.1 µg/m^3. However, as the baseline levels of NOx at this receptor are already exceeding the Critical Level (baseline level is 44.7 µg/m^3), this small additional contribution is not reasonably considered to result in any adverse effects on the integrity of the designated site, in-combination with the other developments that have been assessed.

Cumulative Nutrient Nitrogen (N) Deposition

7.6.5 The air quality impact assessment has concluded that the annual N deposition rate (kg N/Ha/year) process contribution at the nearest saltmarsh habitat would be between 3.9% and 4.2% of the Critical Load at receptors E1_1, E1_2 and E1_3. As this is above the 1% insignificance screening threshold, it is therefore necessary to examine the output from the modelling in greater detail to establish whether this elevation in N deposition would result in any significant effects on the saltmarsh habitat.

7.6.6 The total cumulative annual N deposition predicted at these three receptors is 0.8 kg N/ha/yr, resulting from NOx and ammonia (NH_3). When combined with the background deposition of 15.5 kg N/ha/yr the cumulative PEC for nitrogen deposition will remain below the Critical Load for saltmarsh; being a maximum of

16.3 kg N/ha/yr compared to a Critical Load range of 20 – 30 kg N/ha/yr. There will therefore be no adverse in-combination effects on the integrity of the Humber Estuary designated site.

7.6.7 Moreover, it is important to note that the experimental studies that underlie conclusions regarding the sensitivity of saltmarsh to nitrogen deposition, and the selection of 20 kg N/ha/yr as the minimum Critical Load have "… *neither used very realistic N [nitrogen] doses nor input methods i.e. they have relied on a single large application more representative of agricultural discharge*" (APIS website), which is far in excess of anything that would be deposited from atmosphere. For coastal saltmarshes such as those for which Humber Estuary SAC/ Ramsar is partly designated, nitrogen inputs from air are not as important as nitrogen effects from other sources because the effect of any deposition of nitrogen from the atmosphere is likely to be dominated by much greater flushes of more readily utilized nitrogen from marine, fluvial or agricultural sources. This is reflected on APIS itself, which states regarding saltmarsh that "*Overall, N deposition [from the atmosphere] is likely to be of low importance for these systems as the inputs are probably significantly below the large nutrient loadings from river and tidal inputs*". In addition, the nature of intertidal saltmarsh in this area means that there is flushing by tidal incursion twice per day. This is likely to further reduce the role of nitrogen from atmosphere in controlling botanical composition.

Cumulative Acid Deposition

7.6.8 For acid deposition (keq/Ha/year), the air quality impact assessment identified that at the nearest sensitive receptors (sand dune habitats at E4_1, E4_2, E4_3, E4_4 and E4_5, E4_6) the cumulative process contribution would slightly exceed the 1% insignificance screening threshold for potential adverse effects on sensitive habitat types within the Humber Estuary designated site (predicted to be between 1.1 and 1.2%). However, given the very small process contribution resulting from these developments, it is assessed that there would be no adverse effects on the integrity of the Humber Estuary designated site as a result of acid deposition in-combination with the other developments.

Cumulative Emissions of Sulphur Dioxide (SO2)

7.6.9 For SO_2, the air quality impact assessment identified that there would be exceedances of the 1% Critical Level insignificance screening threshold at receptors E1_1, E1_2 and E1_3 (nearest saltmarsh habitat) within the Humber Estuary SAC/ SPA/ Ramsar/ SSSI of 2.4 – 2.7%. However, the PEC for sulphur dioxide is not exceeded, and therefore it is concluded that there will be no adverse in-combination effects on the integrity of the Humber Estuary designated site .

<u>Noise/ Visual Disturbance to Functionally Linked Habitat</u>

In-combination Effects with Stallingborough Link Road and Sustainable Transport Fuels Facility

7.6.10 The noise assessment undertaken for the Stallingborough Link Road predicts that noise levels ($L_{A10,18hr}$) in the short term or long term may increase by more than 1 dB or 3 dB because of the construction of a new link road; however the assessment concludes that there will be a negligible noise impact on the Humber Estuary designated site.

7.6.11 The noise sensitive receptors (NSR) identified for the Proposed Development fall outside of the Study Area for the Stallingborough Link Road. The NSR to the Proposed Development that is closest to the Study Area for the Stallingborough Link Road is R2. The noise assessment undertaken for the Proposed Development predicts that the magnitude of impact for operational noise will be negligible at this location (R2). It is therefore concluded that there is no potential for adverse effects on the integrity of the designated site in-combination with the simultaneous operation of the Proposed Development and Stallingborough Link Road.

7.6.12 With regards to the operation of the Sustainable Transport Fuels Facility, the noise assessment undertaken predicts operational noise to be 37 dB $L_{Aeq(t)}$ at Poplar Farm. The highest predicted noise level from the operation of the Proposed Development at R1 (Poplar Farm) is 35 dB, resulting in a cumulative operational noise level of 39 dB L_{Aeq}. The lowest typical background noise level at Poplar Farm during the day is 48 dB L_{A90}. With a +3 dB penalty for intermittency, the cumulative rating level from the operation of the Sustainable Transport Fuels Facility and the operation of the Proposed Development would fall below the measured background noise level. It is therefore concluded that there will be no adverse in-combination effects resulting from the operation of the Sustainable Transport Fuels Facility with the Proposed Development.

7.6.13 The other developers will also be required to commit to commuting a sum of money via Local Plan Policy 9 to the South Humber Gateway strategic mitigation scheme. With this mitigation providing alternative bird habitat and taking into account the proposed contribution to the SHG strategic mitigation scheme for the Proposed Development, there is therefore no potential for adverse in-combination effects on the Humber Estuary SPA/ Ramsar as a result of operational disturbance to functionally linked habitat.

8.0 CONCLUSIONS

8.1.1 The Proposed Development will be constructed on land adjacent to the Humber Estuary SAC/ SPA/ Ramsar site, and will result in the loss of habitat that is considered functionally linked to the SPA/ Ramsar site due to the aggregations of feeding, roosting and loafing waterbirds it supports over the high tide period.

8.1.2 Mitigation for this loss has been delivered through the SHG strategic mitigation approach which has been put in place through the North East Lincolnshire Local Plan (Policy 9). The habitats have been prepared are and in place. It is therefore concluded that the loss of functionally linked habitat within the Site will not result in any adverse effects on the integrity of the Humber Estuary SPA/ Ramsar.

8.1.3 There are two other developments proposed in the area that will result in the loss of functionally linked habitat in the vicinity of the Site (Stallingborough Link Road and Sustainable Transport Fuels Facility), and the potential for likely significant in-combination effects was identified at the HRA screening stage. However, these other developments are also committed to the delivery of habitat mitigation through the SHG strategic mitigation route, so it is concluded that there would be no adverse effects on the Humber Estuary SPA/ Ramsar in-combination with the Proposed Development as a result of the losses of functionally linked habitat.

8.1.4 Likely significant effects as a result of noise impacts during construction (primarily associated with drop hammer piling noise) were identified at the HRA screening stage. However, following detailed assessment it is concluded that construction noise would not give rise to an adverse effect on the integrity of the Humber Estuary SPA/ Ramsar. This conclusion applies to the Proposed Development alone or in-combination with other plans or projects.

8.1.5 Likely significant effects as a result of visual disturbance to the field to the south (Field 37) were identified at the HRA screening stage. However, following more detailed assessment and taking into account the mitigation measures (close board fencing), it is concluded that there will be no adverse effect on the integrity of the Humber Estuary SPA/ Ramsar alone or in-combination with other plans or projects.

8.1.6 Likely significant effects as a result of noise impacts during operation were also identified at the HRA screening stage. However, following detailed assessment it is concluded that construction noise would not give rise to an adverse effect on the integrity of the Humber Estuary SAC/ SPA/ Ramsar site, alone or in-combination with other plans or projects.

8.1.7 Likely significant effects as a result of changes in air quality during operation were identified at the HRA screening stage. However, following detailed assessment it is concluded that air quality impacts will not result in an adverse effect on the integrity of the Humber Estuary SAC/ SPA/ Ramsar site, alone or in-combination with all other plans or projects that have been assessed to date.

9.0 REFERENCES

European Commission (2007) Guidance Document on Article 6(4) of the 'Habitats Directive' 92/43/EEC. Published online:

http://ec.europa.eu/environment/nature/natura2000/management/docs/art6/guidance_art6_4_en.pdf

European Commission (2001) Assessment of plans and projects significantly affecting Natura 2000 sites. Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC.

Planning Inspectorate (2017) Advice Note Ten: Habitats Regulations Assessment Relevant to Nationally Significant Infrastructure Projects, version 4, November 2017

APPENDIX 1: PLANNING INSPECTORATE HRA SCREENING MATRICES

Table 1A.1: Effects Considered Within the Screening Matrices

DESIGNATION	EFFECTS DESCRIBED IN SUBMISSION INFORMATION	PRESENTED IN SCREENING MATRICES AS
Humber Estuary SAC	Deterioration in air quality	Air quality
	Deterioration in water quality during construction or operation	Water quality
Humber Estuary SPA	Displacement of qualifying species using functionally linked habitat	Loss of functionally linked habitat
	Deterioration in water quality during construction or operation	Water quality
	Deterioration in air quality	Air quality
	Disturbance of qualifying species using functionally linked habitat	Noise / visual disturbance
Humber Estuary Ramsar site	Displacement of qualifying species using functionally linked habitat	Loss of functionally linked habitat
	Deterioration in water quality during construction or operation	Water quality
	Deterioration in air quality	Air quality
	Disturbance/ displacement of qualifying species using functionally linked habitat	Noise/ visual disturbance

1A.1 The European sites included within this screening assessment are:

- Humber Estuary SAC;
- Humber Estuary SPA; and
- Humber Estuary Ramsar site.

1A.2 Evidence for, or against, likely significant effects on the European site(s) and its qualifying feature(s) is detailed as necessary within the footnotes to the screening matrices below.

Matrix key:

✓ = Likely significant effect **cannot** be excluded

× = Likely significant effect **can** be excluded

NA = feature not susceptible to potential effect OR is outside the zone of influence

C = construction

O = operation

D = decommissioning

Table 1A.2: Screening Matrix for Humber Estuary SAC

QUALIFYING FEATURES	LIKELY EFFECTS OF PROPOSED DEVELOPMENT											
EFFECT	AIR QUALITY			AIR QUALITY IN-COMBINATION EFFECTS			WATER QUALITY			WATER QUALITY IN-COMBINATION EFFECTS		
STAGE OF PROPOSED DEVELOPMENT	C	O	D	C	O	D	C	O	D	C	O	D
Estuaries	NA	NA	NA	NA	NA	NA	×a	×a	×a	×a	×a	×a
Mudflats and sandflats not covered by seawater at low tide	NA	NA	NA	NA	NA	NA	×a	×a	×a	×a	×a	×a
Sandbanks which are slightly covered by seawater all the time	NA	NA	NA	NA	NA	NA	×a	×a	×a	×a	×a	×a
Coastal lagoons	NA	NA	NA	NA	NA	NA	×a	×a	×a	×a	×a	×a

QUALIFYING FEATURES	LIKELY EFFECTS OF PROPOSED DEVELOPMENT											
EFFECT	**AIR QUALITY**			**AIR QUALITY IN-COMBINATION EFFECTS**			**WATER QUALITY**			**WATER QUALITY IN-COMBINATION EFFECTS**		
Salicornia and other annuals colonizing mud and sand	NA	NA	NA	NA	NA	NA	×a	×a	×a	×a	×a	×a
Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)	×b	✓c	×b	×b	✓c	NA	×a	×a	×a	×a	×a	×a
STAGE OF PROPOSED DEVELOPMENT	**C**	**O**	**D**	**C**	**O**	**D**	**C**	**O**	**D**	**C**	**O**	**D**
Embryonic shifting dunes	×b	✓c	×b	×b	✓c	×b	NA	NA	NA	NA	NA	NA
Shifting dunes along the shoreline with European marram grass (white dunes)	×b	✓c	×b	×b	✓c	×b	NA	NA	NA	NA	NA	NA
Fixed coastal dunes with herbaceous vegetation (grey dunes)	×b	✓c	×b	×b	✓c	×b	NA	NA	NA	NA	NA	NA
Dunes with common sea buckthorn	×b	✓c	×b	×b	✓c	×b	NA	NA	NA	NA	NA	NA
River lamprey	NA	NA	NA	NA	NA	NA	×a	×a	×a	×a	×a	×a
Sea lamprey	NA	NA	NA	NA	NA	NA	×a	×a	×a	×a	×a	×a
Grey seal	NA	NA	NA	NA	NA	NA	×a	×a	×a	×a	×a	×a

a. Standard environmental measures to control pollution to the drains during construction, operation and decommissioning will adequately minimise risk to local surface water bodies (

b. Habitat type not within the zone of influence of dust emissions during construction/ decommissioning and therefore no pathway for likely significant effects.

c. Emissions to air of nutrient nitrogen and NOx will result in increases in the critical levels and loads respectively at the nearest part of the SAC. LSE screening concluded that there would was the potential for a likely significant effect on the SAC and this pathway is taken forward for Stage 2 Appropriate Assessment.

Table 1A.3: Screening Matrix for Humber Estuary SPA

QUALIFYING FEATURES	LIKELY EFFECTS OF PROPOSED DEVELOPMENT											
EFFECT	LOSS OF FUNCTIONALLY LINKED HABITAT			LOSS OF FUNCTIONALLY LINKED HABITAT IN COMBINATION EFFECTS			VISUAL DISTURBANCE			VISUAL DISTURBANCE IN COMBINATION EFFECTS[9]		
STAGE OF PROPOSED DEVELOPMENT	C	O	D	C	O	D	C	O	D	C	O	D
Populations of European importance of breeding, passage and over-wintering birds: *Botaurus stellaris*; great bittern (non-breeding) *Botaurus stellaris*; great bittern (breeding) *Tadorna tadorna*; common shelduck (non-breeding)	✓a	×	×	✓a	×	×	✓b	×c	×c	×c	×c	×c

[9] The in-combination effects LSE screening considers noise and visual disturbance together, as the two relevant projects (Stallingborough Link Road and Sustainable Transport Fuels Facility) consider this together in their respective HRAs. The relevant LSE screening outcome is therefore included in the noise/ visual column rather than in this column.

QUALIFYING FEATURES	LIKELY EFFECTS OF PROPOSED DEVELOPMENT											
EFFECT	**LOSS OF FUNCTIONALLY LINKED HABITAT**			**LOSS OF FUNCTIONALLY LINKED HABITAT IN COMBINATION EFFECTS**			**VISUAL DISTURBANCE**			**VISUAL DISTURBANCE IN COMBINATION EFFECTS[9]**		
Circus aeruginosus; Eurasian marsh harrier (breeding) *Circus cyaneus*; hen harrier (non-breeding) *Recurvirostra avosetta*; pied avocet (non-breeding) *Recurvirostra avosetta*; pied avocet (breeding) *Pluvialis apricaria*; European golden plover (non-breeding) *Calidris canutus*; red knot (non-breeding) *Calidris alpina alpina*; dunlin (non-breeding) *Philomachus pugnax*; ruff (non-breeding) *Limosa limosa islandica*; black-tailed godwit (non-breeding) *Limosa lapponica*; bar-tailed godwit (non-breeding)												

QUALIFYING FEATURES	LIKELY EFFECTS OF PROPOSED DEVELOPMENT											
EFFECT	**LOSS OF FUNCTIONALLY LINKED HABITAT**			**LOSS OF FUNCTIONALLY LINKED HABITAT IN COMBINATION EFFECTS**			**VISUAL DISTURBANCE**			**VISUAL DISTURBANCE IN COMBINATION EFFECTS[9]**		
Tringa totanus; common redshank (non-breeding) *Sterna albifrons*; little tern (breeding) Waterbird assemblage												
Populations of European importance of Annex I breeding waterbirds: Bittern Marsh harrier Avocet Little tern	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

QUALIFYING FEATURES	LIKELY EFFECTS OF PROPOSED DEVELOPMENT																	
EFFECT	WATER QUALITY			WATER QUALITY IN COMBINATION EFFECTS			AIR QUALITY			AIR QUALITY IN COMBINATION EFFECTS			NOISE DISTURBANCE			NOISE/ VISUALDISTURBANCE IN COMBINATION EFFECTS[10]		
STAGE OF PROPOSED DEVELOPMENT	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Populations of European importance of breeding, passage and over-wintering birds: *Botaurus stellaris*; great bittern (non-breeding) *Botaurus stellaris*; great	×d	× d	× d	× d	× d	×d	NA	NA	NA	NA	NA	NA	✓e	×f	×	✓g	✓g	×

[10] The in-combination effects LSE screening considers noise and visual disturbance together, as the two relevant projects (Stallingborough Link Road and Sustainable Transport Fuels Facility) consider this together in their respective HRAs.

QUALIFYING FEATURES	LIKELY EFFECTS OF PROPOSED DEVELOPMENT																	
EFFECT	WATER QUALITY			WATER QUALITY IN COMBINATION EFFECTS			AIR QUALITY			AIR QUALITY IN COMBINATION EFFECTS			NOISE DISTURBANCE			NOISE/ VISUALDISTURBANCE IN COMBINATION EFFECTS[10]		
bittern (breeding) *Tadorna tadorna*; common shelduck (non-breeding) *Circus aeruginosus*; Eurasian marsh harrier (breeding) *Circus cyaneus*; hen harrier (non-breeding) *Recurvirostra avosetta*; pied avocet (non-breeding) *Recurvirostra avosetta*; pied avocet (breeding) *Pluvialis apricaria*;																		

QUALIFYING FEATURES	LIKELY EFFECTS OF PROPOSED DEVELOPMENT																	
EFFECT	WATER QUALITY			WATER QUALITY IN COMBINATION EFFECTS			AIR QUALITY			AIR QUALITY IN COMBINATION EFFECTS			NOISE DISTURBANCE			NOISE/ VISUALDISTURBANCE IN COMBINATION EFFECTS[10]		
European golden plover (non-breeding) *Calidris canutus*; red knot (non-breeding) *Calidris alpina alpina*; dunlin (non-breeding) *Philomachus pugnax*; ruff (non-breeding) *Limosa limosa islandica*; black-tailed godwit (non-breeding) *Limosa lapponica*; bar-tailed godwit (non-breeding) *Tringa totanus*; common redshank (non-breeding)																		

QUALIFYING FEATURES	LIKELY EFFECTS OF PROPOSED DEVELOPMENT																	
EFFECT	**WATER QUALITY**			**WATER QUALITY IN COMBINATION EFFECTS**			**AIR QUALITY**			**AIR QUALITY IN COMBINATION EFFECTS**			**NOISE DISTURBANCE**			**NOISE/ VISUALDISTURBANCE IN COMBINATION EFFECTS[10]**		
Sterna albifrons; little tern (breeding) Waterbird assemblage																		
Populations of European importance of Annex I breeding waterbirds: Bittern Marsh harrier Avocet Little tern	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

a. Loss of habitat will be addressed through Policy 9 of NE Lincs Local Plan with drawdown from the SHG strategic mitigation at Cress Marsh. Impacts on this feature will therefore be avoided, however this has not been taken into account in the Stage 1 screening due to the *People over Wind* ruling. This pathway is therefore screened into the Stage 2 Appropriate Assessment. This is also the case for the two developments identified in Table 6.1 as having the potential to result in likely significant effects in combination with the Proposed Development, which will also pay into the SHG strategic mitigation scheme at Cress Marsh.

b. Paragraph 10.6.29 of the ES Volume I, Chapter 10: Ecology (Document Ref. 6.2.10) states that there is minimal risk of visual disturbance to birds within the SAC/ Ramsar as the seawall provides substantial screening to birds on the mudflats.However, there is a risk of visual disturbance to birds using the fields to the south that is functionally linked. This pathway is therefore screened into the Stage 2 Appropriate Assessment.

c. Reasonable to assume that waterbirds are habituated to presence of existing power station; Proposed Development operation not significantly different to this.

d. Standard environmental measures to control pollution to the drains during construction, operation and decommissioning will adequately minimise risk to local surface water bodies (consequently minimising risk to the Humber Estuary too).

e. Piling activity (drop hammer piling) during construction results in peak noise above ambient levels at the nearest part of the SAC/ Ramsar, and at the nearest parts of the fields to the north and south (Field 37) that are used by SPA/ Ramsar birds and therefore functionally linked to the designated site. Mitigation measures are proposed (to be secured by DCO requirement). This pathway is therefore screened into the Stage 2 Appropriate Assessment

f. Predicted operational noise levels are within ambient range at the nearest part of the SPA/ Ramsar, and the fields to the north and south which are functionally linked.

g. Table 6.1 identifies two developments that could potentially result in likely significant effects in combination with the Proposed Development. This pathway is therefore screened into the Stage 2 Appropriate Assessment

Table 1A.4: Screening Matrix for Humber Estuary Ramsar Site

QUALIFYING FEATURES	LIKELY EFFECTS OF PROPOSED DEVELOPMENT											
EFFECT	LOSS OF FUNCTIONALLY LINKED HABITAT			LOSS OF FUNCTIONALLY LINKED HABITAT IN COMBINATION EFFECTS			VISUAL DISTURBANCE			VISUAL DISTURBANCE IN COMBINATION EFFECTS[11]		
STAGE OF PROPOSED DEVELOPMENT	C	O	D	C	O	D	C	O	D	C	O	D
Internationally important populations of non-breeding wildfowl and waders: Common shelduck Golden plover Red knot Dunlin Black-tailed godwit Bar-tailed godwit Common redshank	✓a	×	×	✓a	×	×	✓b	×f	×f	✓b	×f	×f

[11] The in-combination effects LSE screening considers noise and visual disturbance together, as the two relevant projects (Stallingborough Link Road and Sustainable Transport Fuels Facility) consider this together in their respective HRAs. The relevant LSE screening outcome is therefore included in the noise/ visual column rather than in this column.

QUALIFYING FEATURES	LIKELY EFFECTS OF PROPOSED DEVELOPMENT																	
EFFECT	WATER QUALITY			WATER QUALITY IN COMBINATION EFFECTS			AIR QUALITY			AIR QUALITY IN COMBINATION EFFECTS			NOISE DISTURBANCE			NOISE/ VISUAL DISTURBANCE IN COMBINATION EFFECTS[12]		
Stage of Proposed Development	**C**	**O**	**D**	**C**	**O**	**D**	**C**	**O**	**D**	**C**	**O**	**D**	**C**	**O**	**D**	**C**	**O**	**D**
Estuarine habitats including dune systems, humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes and coastal/ brackish lagoons	×c	×c	×c	×c	×c	×c	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Grey seal	×c	×c	×c	×c	×c	×c	NA	NA	NA	NA	NA	NA	×e	×e	×e	×e	×e	×e
Natterjack toad	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

[12] The in-combination effects LSE screening considers noise and visual disturbance together, as the two relevant projects (Stallingborough Link Road and Sustainable Transport Fuels Facility) consider this together in their respective HRAs..

QUALIFYING FEATURES	LIKELY EFFECTS OF PROPOSED DEVELOPMENT																	
EFFECT	WATER QUALITY			WATER QUALITY IN COMBINATION EFFECTS			AIR QUALITY			AIR QUALITY IN COMBINATION EFFECTS			NOISE DISTURBANCE			NOISE/ VISUAL DISTURBANCE IN COMBINATION EFFECTS[12]		
Internationally important populations of non-breeding wildfowl and waders: Common shelduck Golden plover Red knot Dunlin Black-tailed godwit Bar-tailed godwit Common redshank	×c	×c	×c	×c	×c	×c	NA	NA	NA	NA	NA	NA	✓d	×f	×f	×f	×f	×f
Migrating river lamprey and sea lamprey	×c	×c	×c	×c	×c	×c	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

a. Loss of habitat will be addressed through Policy 9 of NE Lincs Local Plan with drawdown from the SHG strategic mitigation at Cress Marsh. Impacts on this feature will therefore be avoided, however this has not been taken into account in the

Stage 1 screening due to the *People over Wind* ruling. This pathway is therefore screened into the Stage 2 Appropriate Assessment. This is also the case for the two developments identified in Table 6.1 as having the potential to result in likely significant effects in combination with the Proposed Development, which will also pay into the SHG strategic mitigation scheme at Cress Marsh.

b. There is minimal risk of visual disturbance to birds within the SAC/ Ramsar as the seawall provides substantial screening to birds on the mudflats. However, there is a risk of visual disturbance to birds using the fields to the north and south that are functionally linked. This pathway is therefore screened into the Stage 2 Appropriate Assessment.

c. Standard environmental measures to control pollution to the drains during construction phase will adequately minimise risk to local surface water bodies (consequently minimising risk to the Humber Estuary too) during construction, operation and decommissioning.

d. Piling activity (drop hammer piling) during construction results in peak noise above ambient levels at the nearest part of the SAC/ Ramsar, and at the nearest parts of the fields to the north and south (Field 37) that are used by SPA/ Ramsar birds and therefore functionally linked to the designated site. This pathway is therefore screened into the Stage 2 Appropriate Assessment

e. Feature is not within the zone of influence and is therefore screened out. The nearest grey seal breeding colony is over 30 km to the east at Donna Nook.

f. Reasonable to assume that waterbirds are habituated to presence of existing power station; Proposed Development operation not significantly different to this.

APPENDIX 2: PLANNING INSPECTORATE HRA INTEGRITY MATRICES

2A.1 Where Likely Significant Effects (LSE) upon the sites were identified in the screening stage, the sites have been subject to further assessment in order to establish if the NSIP could have an adverse effect on their integrity. Evidence for the conclusions reached on integrity is detailed within the footnotes to the matrices below, with references to mitigation as necessary.

Matrix Key

✓ = Adverse effect on integrity cannot be excluded

× = Adverse effect on integrity can be excluded

C = construction

O = operation

D = decommissioning

Table 2A.1: Integrity Matrix for Humber Estuary SAC

QUALIFYING FEATURES	**ADVERSE EFFECT ON INTEGRITY**											
EFFECT	**AIR QUALITY**			**AIR QUALITY IN COMBINATION EFFECTS**			**WATER QUALITY**			**WATER QUALITY IN COMBINATION EFFECTS**		
STAGE OF PROPOSED DEVELOPMENT	**C**	**O**	**D**	**C**	**O**	**D**	**C**	**O**	**D**	**C**	**O**	**D**
Embryonic shifting dunes		× [a]			× [b]							
Shifting dunes along the shoreline with European marram grass (white dunes)		× [a]			× [b]							

QUALIFYING FEATURES	ADVERSE EFFECT ON INTEGRITY											
EFFECT	AIR QUALITY			AIR QUALITY IN COMBINATION EFFECTS			WATER QUALITY			WATER QUALITY IN COMBINATION EFFECTS		
Fixed coastal dunes with herbaceous vegetation (grey dunes)		✗ a			✗ b							
Dunes with common sea buckthorn		✗ a			✗ b							
Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)		✗ a			✗ b							

a. Emissions to air of nutrient nitrogen and NOx will result in increases in the critical levels and loads respectively at the nearest part of the SAC. However, the Stage 2 Appropriate Assessment concluded that the increases would result in **no adverse effects on the integrity of the SAC**.

b. The in-combination assessment for air quality concluded that there would be no adverse in-combination air quality effects on the Humber Estuary SAC/ SPA/ Ramsar, and it is considered that the assessment is sufficient to conclude that there would be **no adverse in-combination effects on the integrity of the SAC**.

Table 2A.2: Integrity Matrix for Humber Estuary SPA

QUALIFYING FEATURES	ADVERSE EFFECT ON INTEGRITY											
EFFECT	LOSS OF FUNCTIONALLY LINKED HABITAT			LOSS OF FUNCTIONALLY LINKED HABITAT IN COMBINATION EFFECTS			VISUAL DISTURBANCE			VISUAL DISTURBANCE IN COMBINATION EFFECTS[13]		
STAGE OF PROPOSED DEVELOPMENT	C	O	D	C	O	D	C	O	D	C	O	D
Populations of European importance of breeding, passage and over-wintering birds: *Botaurus stellaris*; great bittern (non-breeding) *Botaurus stellaris*; great bittern (breeding)	✕[a]			✕[a]			✕[b]					

[13] The in-combination effects appropriate assessment considers noise and visual disturbance together, as the two relevant projects (Stallingborough Link Road and Sustainable Transport Fuels Facility) consider this together in their respective HRAs. The relevant LSE screening outcome is therefore included in the noise/ visual column rather than in this column.

QUALIFYING FEATURES	ADVERSE EFFECT ON INTEGRITY											
EFFECT	LOSS OF FUNCTIONALLY LINKED HABITAT			LOSS OF FUNCTIONALLY LINKED HABITAT IN COMBINATION EFFECTS			VISUAL DISTURBANCE			VISUAL DISTURBANCE IN COMBINATION EFFECTS[13]		
Tadorna tadorna; common shelduck (non-breeding) *Circus aeruginosus*; Eurasian marsh harrier (breeding) *Circus cyaneus*; hen harrier (non-breeding) *Recurvirostra avosetta*; pied avocet (non-breeding) *Recurvirostra avosetta*; pied avocet (breeding) *Pluvialis apricaria*; European golden plover (non-breeding) *Calidris canutus*; red knot (non-breeding)												

QUALIFYING FEATURES	ADVERSE EFFECT ON INTEGRITY											
EFFECT	LOSS OF FUNCTIONALLY LINKED HABITAT			LOSS OF FUNCTIONALLY LINKED HABITAT IN COMBINATION EFFECTS			VISUAL DISTURBANCE			VISUAL DISTURBANCE IN COMBINATION EFFECTS[13]		
Calidris alpina alpina; dunlin (non-breeding) *Philomachus pugnax*; ruff (non-breeding) *Limosa limosa islandica*; black-tailed godwit (non-breeding) *Limosa lapponica*; bar-tailed godwit (non-breeding) *Tringa totanus*; common redshank (non-breeding) *Sterna albifrons*; little tern (breeding) Waterbird assemblage												

QUALIFYING FEATURES	ADVERSE EFFECT ON INTEGRITY																	
EFFECT	WATER QUALITY			WATER QUALITY IN COMBINATION EFFECTS			AIR QUALITY			AIR QUALITY IN COMBINATION EFFECTS			NOISE DISTURBANCE			NOISE/ VISUALDISTURBANCE IN COMBINATION EFFECTS[14]		
STAGE OF PROPOSED DEVELOPMENT	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Populations of European importance of breeding, passage and over-wintering birds: *Botaurus stellaris*; great bittern (non-breeding) *Botaurus stellaris*; great bittern (breeding)													×[c]			×[d]	×[d]	

[14] The in-combination effects appropriate assessment considers noise and visual disturbance together, as the two relevant projects (Stallingborough Link Road and Sustainable Transport Fuels Facility) consider this together in their respective HRAs..

QUALIFYING FEATURES	ADVERSE EFFECT ON INTEGRITY																	
EFFECT	WATER QUALITY			WATER QUALITY IN COMBINATION EFFECTS			AIR QUALITY			AIR QUALITY IN COMBINATION EFFECTS			NOISE DISTURBANCE			NOISE/ VISUALDISTURBANCE IN COMBINATION EFFECTS[14]		
Tadorna tadorna; common shelduck (non-breeding)																		
Circus aeruginosus; Eurasian marsh harrier (breeding)																		
Circus cyaneus; hen harrier (non-breeding)																		
Recurvirostra avosetta; pied avocet (non-breeding)																		
Recurvirostra avosetta; pied avocet (breeding)																		
Pluvialis apricaria; European golden plover (non-breeding)																		

QUALIFYING FEATURES	ADVERSE EFFECT ON INTEGRITY																	
EFFECT	WATER QUALITY			WATER QUALITY IN COMBINATION EFFECTS			AIR QUALITY			AIR QUALITY IN COMBINATION EFFECTS			NOISE DISTURBANCE			NOISE/ VISUALDISTURBANCE IN COMBINATION EFFECTS[14]		
Calidris canutus; red knot (non-breeding) *Calidris alpina alpina*; dunlin (non-breeding) *Philomachus pugnax*; ruff (non-breeding) *Limosa limosa islandica*; black-tailed godwit (non-breeding) *Limosa lapponica*; bar-tailed godwit (non-breeding) *Tringa totanus*; common redshank (non-breeding) *Sterna albifrons*; little tern (breeding)																		

QUALIFYING FEATURES	ADVERSE EFFECT ON INTEGRITY																	
EFFECT	WATER QUALITY			WATER QUALITY IN COMBINATION EFFECTS			AIR QUALITY			AIR QUALITY IN COMBINATION EFFECTS			NOISE DISTURBANCE			NOISE/ VISUALDISTURBANCE IN COMBINATION EFFECTS[14]		
Waterbird assemblage																		

a. Loss of habitat will be addressed through Policy 9 of NE Lincs Local Plan with drawdown from the SHG strategic mitigation at Cress Marsh. Impacts on this feature will therefore be avoided, however this has not been taken into account in the Stage 1 screening due to the People over Wind ruling. This pathway is therefore screened into the Stage 2 Appropriate Assessment. With this mitigation in place, it is concluded that there will be **no adverse effect on the integrity of the SPA**. This is also the case for the two developments identified in Table 6.1 as having the potential to result in likely significant effects in combination with the Proposed Development, which will also pay into the SHG strategic mitigation scheme at Cress Marsh. The Stage 2 Appropriate Assessment has concluded that there will be **no adverse in-combination effects on the integrity of the SPA**.

b. There is minimal risk of visual disturbance to birds within the SAC/ Ramsar as the seawall provides substantial screening to birds on the mudflats. However, there is a risk of visual disturbance to birds using the field to the south that is functionally linked. the Stage 2 Appropriate Assessment has concluded that there will be **no adverse effect on the integrity of the SPA alone or in-combination**.

c. Piling activity (drop hammer piling) during construction results in peak noise above ambient levels at the nearest part of the SAC/ Ramsar, and at the nearest parts of the fields to the north and south (Field 37) that are used by SPA/ Ramsar birds and therefore functionally linked to the designated site. Mitigation measures are proposed (to be secured by DCO requirement). The Stage 2 Appropriate Assessment therefore concludes that there will be **no adverse effect on the integrity of the SPA**.

d. Table 6.1 identifies two developments that could potentially result in likely significant effects in combination with the Proposed Development. However, any displacement of birds will be offset by the mitigation habitat delivered at Cress Marsh, and therefore it is concluded in the Stage 2 Appropriate Assessment that there will be **no adverse in-combination effect on the integrity of the SPA**.

Table 2A.3: Integrity Matrix for Humber Ramsar site

QUALIFYING FEATURES	ADVERSE EFFECT ON INTEGRITY											
EFFECT	LOSS OF FUNCTIONALLY LINKED HABITAT			LOSS OF FUNCTIONALLY LINKED HABITAT IN COMBINATION EFFECTS			VISUAL DISTURBANCE			VISUAL DISTURBANCE IN COMBINATION EFFECTS[15]		
STAGE OF PROPOSED DEVELOPMENT	C	O	D	C	O	D	C	O	D	C	O	D
Internationally important populations of non-breeding wildfowl and waders Common shelduck Golden plover Red knot Dunlin Black-tailed godwit Bar-tailed godwit Common redshank	×[a]			×[a]			×[b]			×[b]		

QUALIFYING FEATURES	ADVERSE EFFECT ON INTEGRITY																	
EFFECT	WATER QUALITY			WATER QUALITY IN COMBINATION EFFECTS			AIR QUALITY			AIR QUALITY IN COMBINATION EFFECTS			NOISE DISTURBANCE			NOISE/ VISUAL DISTURBANCE IN COMBINATION EFFECTS[16]		
STAGE OF PROPOSED DEVELOPMENT	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Internationally important populations of non-breeding wildfowl and waders Common shelduck Golden plover Red knot Dunlin													×[c]			×[d]		

[15] The in-combination effects appropriate assessment considers noise and visual disturbance together, as the two relevant projects (Stallingborough Link Road and Sustainable Transport Fuels Facility) consider this together in their respective HRAs. The relevant LSE screening outcome is therefore included in the noise/ visual column rather than in this column.

[16] The in-combination effects appropriate assessment considers noise and visual disturbance together, as the two relevant projects (Stallingborough Link Road and Sustainable Transport Fuels Facility) consider this together in their respective HRAs..

QUALIFYING FEATURES	ADVERSE EFFECT ON INTEGRITY																	
EFFECT	WATER QUALITY			WATER QUALITY IN COMBINATION EFFECTS			AIR QUALITY			AIR QUALITY IN COMBINATION EFFECTS			NOISE DISTURBANCE			NOISE/ VISUAL DISTURBANCE IN COMBINATION EFFECTS[16]		
Black-tailed godwit Bar-tailed godwit Common redshank																		
Estuarine habitats including dune systems, humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes and coastal/ brackish lagoons.								×e	×f									

a. Loss of habitat will be addressed through Policy 9 of NE Lincs Local Plan with drawdown from the SHG strategic mitigation at Cress Marsh. Impacts on this feature will therefore be avoided, however this has not been taken into account in the Stage 1 screening due to the People over Wind ruling. This pathway is therefore screened into the Stage 2 Appropriate Assessment. With this mitigation in place, it is concluded that there will be **no adverse effect on the integrity of the Ramsar**. This is also the case for the two developments identified in Table 6.1 as having the potential to result in likely significant effects in combination with the Proposed Development, which will also pay into the SHG strategic mitigation

scheme at Cress Marsh. The Stage 2 Appropriate Assessment has concluded that there will be **no adverse in-combination effects on the integrity of the Ramsar.**

b. There is minimal risk of visual disturbance to birds within the SAC/ Ramsar as the seawall provides substantial screening to birds on the mudflats. However, there is a risk of visual disturbance to birds using the field to the south that is functionally linked. However the assessment in the ES concludes that this will not be significant, and therefore the Stage 2 Appropriate Assessment has concluded that there will be **no adverse in-combination effect on the integrity of the Ramsar alone or in-combination**. .

c. Piling activity (drop hammer piling) during construction results in peak noise above ambient levels at the nearest part of the SAC/ Ramsar, and at the nearest parts of the fields to the north and south (Field 37) that are used by SPA/ Ramsar birds and therefore functionally linked to the designated site. Mitigation measures are proposed (to be secured by DCO requirement). The Stage 2 Appropriate Assessment therefore concludes that there will be **no adverse in-combination effect on the integrity of the Ramsar**.

d. The cumulative combined (in-combination) noise and vibration assessment concludes that the construction of the Proposed Development at the same time as the construction or use of the other developments would not result in a significant in-combination noise effect on functionally linked fields to the north and south of the Proposed Development. As described above the other developers will commit to commuting sums of money to enable mitigation habitat to be created. With this mitigation providing alternative bird habitat, and taking into account the proposed contributions to the SHG strategic mitigation scheme, there is therefore **no potential for cumulative adverse in-combination effects on the Humber Estuary Ramsar**.

e. Emissions to air of nutrient nitrogen and NOx will result in increases in the critical levels and loads respectively at the nearest part of the SAC. However, the increases are not at a level that would be expected to result in adverse effects on vegetation. The Stage 2 Appropriate Assessment conclusion is therefore **no adverse effects on the integrity of the Ramsar**.

f. The appropriate assessment has concluded that there would be no adverse in-combination air quality effects on the Humber Estuary designated site, and it is considered that there would be **no adverse in-combination effects on the integrity of the Ramsar**.

APPENDIX 3: KEY ES CHAPTER TEXT CROSS REFERENCED IN TABLE 5.1 LIKELY SIGNIFICANT EFFECTS DURING CONSTRUCTION AND TABLE 5.3 LIKELY SIGNIFICANT EFFECTS DURING DECOMMISSIONING.

The following paragraphs have been extracted from the ES for ease of reference. Where references are made to sections or paragraphs in the text below this is referring to sections within the ES Chapter not this HRA Report. Where other specific sections not included here are referenced the reader should refer back to the ES Chapter from which the text originated.

Extracts from ES Chapter 7: Air Quality (Document Ref. 6.2.7)

Section 7.6: Likely Impacts and Effects

Assessment of Construction Dust

7.6.8 The Humber Estuary Ramsar site, SPA and SAC is greater than 50 m from the construction works associated with the Proposed Development, therefore an assessment of demolition and construction dust on ecological receptors has been screened out.

Extracts from ES Chapter 8: Noise and Vibration (Document Ref. 6.2.8)

Section 8.6: Likely Impacts and Effects

Construction Noise Effects

8.6.14 At Receptor R3 (Humber Estuary), predicted noise levels during all but one construction activity (drop hammer piling) fall below the daytime ambient noise level of 58 dB LAeq so no impact is predicted. During drop hammer piling works, noise levels at R3 are predicted to exceed the daytime ambient noise level by up to 4 dB. In addition, the type of noise being emitted by drop hammer piling (regular impulsive high noise levels) may be considered as more disturbing to birds. Considering the position of the birds (on mudflats behind the existing flood defence embankment), the EcIA considers the effect on birds to be minor adverse (not significant) (see Chapter 10: Ecology).

8.6.15 At the ecological Receptor areas R4 (field to the south of the Site) and R5 (field to the north of the Site), noise from construction works varies across each area depending on the proximity to the Site. At the parts of these fields (R4 and R5) closest to the Site, daytime ambient noise levels are exceeded by up to 21 dB. At the parts of these fields (R4 and R5) furthest from the Site, noise levels are predicted to fall below daytime ambient noise levels. The greatest noise impact at Receptor areas R4 and R5 is predicted to occur during piling works. The EcIA in Chapter 10: Ecology concludes that the majority of waterbirds will be located towards the central and eastern parts of the southern field (R4) where the effect of piling noise on birds at R4 is assessed to be moderate adverse (significant) if piling takes place within the winter months when the highest aggregations of waterbirds are present in the field (September to March inclusive). Mitigation of this potential effect is discussed further in Section 8.7 below, Chapter 10: Ecology Section 10.7, and the Habitats Regulations

Assessment Report (Document Ref 5.8). The EcIA concludes that the effect on waterbirds using the fields to the north of the Site (R5), where the predicted piling noise levels are lower, will be minor adverse (not significant) even if piling takes place within the winter months (see Chapter 10: Ecology).

Construction Vibration

8.6.20 It has been assumed for the purposes of a worst case assessment that drophammer piling will be required. This type of piling produces much higher levels of groundborne vibration compared to other piling methods. However, given the significant distance to residential receptors (>500 m), no significant vibration (medium or high magnitude impacts) is expected to result from the construction of the Proposed Development at residential receptors. Vibration effects upon residential receptors are therefore not expected to exceed the LOAEL.

8.6.21 Sensitive receptors at the Humber Estuary and the fields located to the south and north of the Site may be adversely affected from vibration during piling. Estimated vibration levels at the Humber Estuary and ecological Receptor areas R4 (field south of the Site) and R5 (field north of the Site) are given in Table 8.25 below.

Table 8.25 Predicted vibration levels at ecological areas from drop-hammer piling

RECEPTOR	DISTANCE FROM PILING WORKS (M)	ESTIMATED VIBRATION LEVEL PPV MMS^{-1}	MAGNI-TUDE OF IMPACT	RECEP-TOR SENSI TIV-ITY	CLASSIFIC-ATION OF EFFECT
R3 – Humber Estuary	500	0.34	Low	High	Minor adverse
R4 – field south of Site	100 - 615	<0.34 to 2.7	Low to Medium	High	Minor to moderate adverse
R5 – field north of Site	75 to 490	<0.34 to 4.3	Low to Medium	High	Minor to moderate adverse

8.6.22 The classification of vibration effects described in Table 8.25 above and discussed below is based on standards and guidance for human receptors in the absence of standards or guidance for assessment of vibration effects on ecological receptors.

8.6.23 The estimated vibration levels at the Humber Estuary are predicted to result in a low magnitude of impact, resulting in a minor adverse (not significant) effect. Although vibration levels may just be perceptible, vibration will be caused

along the Estuary from the breaking of waves and will likely mask vibration incident along the Humber Estuary.

8.6.24 At Receptors R4 (field south of the Site) and R5 (field north of the Site), vibration levels at the closest part of the field to the piling works are estimated to result in a moderate adverse (significant) effect, and at locations further from the construction works, the significance of effect is estimated to be minor adverse (not significant). The effects of vibration from piling on birds using these fields will be the same as described for piling noise in paragraphs 8.6.14 and 8.6.15 above, and the mitigation is the same (see Section 8.7 and Chapter 10: Ecology Section 10.7).

Extracts from ES Chapter 10: Ecology (Document Ref. 6.2.10)

Section 10.5: Development Design and Impact Avoidance

Construction: Measures to Avoid Impacts on the Humber Estuary SPA/ Ramsar

10.5.3 The calculation of the sum of money required for the application of Policy 9 to the Proposed Development (to contribute towards the SHG strategic mitigation land that has been delivered at Cress Marsh, which is part of a wider package of 120 ha of strategic mitigation land to be delivered in the SHG region for the SHIIP) was undertaken for the Consented Development. The same will apply to the Proposed Development as the area of land to be lost is the same. This ensures that the loss of functionally linked land within the footprint of the Proposed Development will not result in adverse effects on the integrity of the Humber Estuary SPA/ Ramsar, and is therefore compliant with the Habitat Regulations see HRA Report (Document Ref. 5.8).

10.5.4 The total sum of money to be commuted to NELC to contribute to the SHG mitigation scheme is calculated as follows: Site Area^3 x £11,580. The financial contribution for the Consented Development was secured by a Section 106 agreement and this provision would be varied via a deed of variation to ensure that the financial contribution would also be secured for the Proposed Development (although the sum would only need to be paid once, for either the Consented Development or the Proposed Development, as explained above).

10.5.5 In addition, a close board fence approximately 2.5 m in height will be installed along part of the southern boundary of the Site (see Figure 4.2 in ES Volume II, Document Ref. 6.3), to provide visual screening during construction and operation to the adjacent field to the south (Field 37). This field has been identified as a key high tide roost for SPA/ Ramsar waterbirds, and the eastern portion of the field is allocated as part of the SHG strategic mitigation package for the SHIIP (referred to in the SHIIP documents as 'Mitigation Site C').

Section 10.6: Likely Impacts and Effects

Construction

10.6.4 The following potential source-receptor pathways have been scoped out of the impact assessment:

- dust smothering of habitats within the Humber Estuary SAC/ SSSI – there are no terrestrial SAC/ SSSI habitats within the zone of influence of fugitive dust emissions during the construction phase, which is reasonably expected to be very small (see Chapter 7: Air Quality). The nearest terrestrial habitat within the designations (coastal saltmarsh) is approximately 500 m from the Main Development Area, and at this distance no dust smothering would be anticipated;
- noise/ visual disturbance to SPA/ Ramsar qualifying breeding bird species (bittern, marsh harrier, avocet and little tern) – there is no suitable habitat for the qualifying species of breeding birds within the potential zone of influence of noise and visual disturbance arising from the construction of the Proposed Development. There is therefore no pathway by which these features could be affected by the construction of the Proposed Development;
- noise/ visual disturbance to birds within the SHG mitigation area at Cress Marsh, which is approximately 500 m south-west of the Main Development Area – all construction activities will be on the eastern side of the SHBPS, which provides screening of the construction works to waterbirds using the Cress Marsh mitigation area.
- vibration impacts on the Humber Estuary SPA/ Ramsar – this pathway was scoped out of assessment based on distance and baseline conditions (see Chapter 8: Noise and Vibration); and
- air quality impacts on intertidal and subtidal habitats in the SAC/ SSSI – intertidal habitats are not susceptible to the effects of changes in air quality arising from construction (through dust deposition and smothering of habitats) because of their regular tidal inundation. Subtidal habitats have similarly been scoped out.

10.6.5 Impacts during the construction period that have potential to result in significant effects on relevant ecological features, and which were screened into the impact assessment, are considered further below:

- potential effects on Humber Estuary SAC/ SPA/ Ramsar/ SSSI (loss of functionally linked habitat for wintering birds, noise/ vibration and visual disturbance and surface water pollution);
- loss of semi-improved neutral grassland;
- potential effects on aquatic invertebrates (loss/ damage to habitat and surface water pollution);
- potential effects on Schedule 1 breeding birds (disturbance), specifically peregrine falcon;
- potential effects on water vole (loss/ damage to habitat, noise and visual disturbance); and
- potential effects on otter (loss/ damage to habitat, noise and visual disturbance).

Potential Effects on Humber Estuary SAC/ SPA/ Ramsar/ SSSI During Construction: Loss of High Tide Roosting/ Loafing/ Feeding Habitat that is Functionally Linked to the SPA/ Ramsar

10.6.6 Although the habitat within the Site boundary has been demonstrated to support low numbers of SPA/ Ramsar waterbirds, and there have been no recorded aggregations above 1% of the Humber Estuary threshold, a precautionary approach has been applied to the Proposed Development because it lies within the Mitigation Zone to which Policy 9 is applicable. This states that *"…proposals which adversely affect the Humber Estuary SPA/ Ramsar site due to the loss of functionally linked land will normally be required to provide their own mitigation in order to comply with the requirements of the Habitats Regulations"*.

10.6.7 To ensure Habitats Regulations compliance for the Proposed Development, it has been assumed that the land within the Proposed Development boundary is 'functionally linked' to the Humber Estuary SPA/ Ramsar. This policy has therefore been applied to the Site and the Proposed Development. Taking into account this embedded mitigation, the Proposed Development is assessed to give rise to a neutral effect on the Humber Estuary SPA/ Ramsar as a result of the loss of functionally linked habitat

Potential Effects on Humber Estuary SAC/ SPA/ Ramsar/ SSSI During Construction: Noise Disturbance to Qualifying SPA/ Ramsar Wintering Bird Assemblage at Pyewipe Mudflats

10.6.8 A noise impact assessment has been completed, and baseline monitoring and noise modelling undertaken to determine whether the Proposed Development would result in any construction phase noise impacts on waterbirds in the nearest part of the Humber Estuary SPA/ Ramsar (see Chapter 8: Noise and Vibration), which is at the Pyewipe mudflats (represented by Receptor R3 on Figure 8.1 in ES Volume II, Document Ref. 6.3). The dB LAeq,1h values provide an 'average' of noise levels expected to occur in any one hour as a result of each activity. Such 'continuous equivalent noise levels' form the basis of most noise assessment protocols, but are of limited relevance when considering the effect of noise on waterbirds because waterbirds are perceived to be more susceptible to being disturbed by short, sharp 'peaks' of noise e.g. during piling (IECS, 2009). Therefore, for piling activities, the LAmax values have been predicted at the nearest sensitive receptors to provide an indication of the likely 'peak' noise events so that they can be compared to the ambient conditions.

10.6.9 Ambient noise levels at noise receptor R3 (on the seawall at the edge of the Humber Estuary SPA/ Ramsar boundary) were recorded at 47 – 53 dB LAeq,T (see Table 8.14 in Chapter 8: Noise and Vibration). The main sources of noise at this location were found to be waves breaking along the shoreline and birdsong. Occasional vehicle usage along the top of the sea wall (motorbikes and quad bikes) resulted in an increase in ambient noise, with a peak noise range of 51.3 – 77.7 dB LAFMax15 min.

10.6.10 Predicted noise levels for the majority of construction activities at R3 were predicted to be within the range 47 – 52 dB LAeq,1hr, which is within the ambient range at the nearest part of Pyewipe mudflats. There will therefore be no discernible change in the noise levels reaching the Humber Estuary SPA/ Ramsar during the majority of the construction phase of the Proposed Development.

10.6.11 The noisiest construction activity that potentially could be used is drop hammer piling, which the modelling predicts will result in noise levels of 62 dB LAeq,1hr at R3, which represents an exceedance in the ambient noise level by up to 4 dB. In addition, the type of noise being emitted by drop hammer piling (regular impulsive high noise levels) may be considered as more disturbing to birds. An estimation of the peak noise from drop hammer piling activity results in predicted levels of 75 dB LAmax at the nearest part of the Estuary. This is significantly higher than the ambient noise level at the measured location on the edge of the Estuary, although as discussed above it is reasonable to assume that there would be some attenuation due to the topography of the seawall, and the fact that the mudflats are below the level of the measured receptor location.

10.6.12 Previous studies such as IECS (1999) and ERM (1996) have demonstrated that birds occupying mudflats elsewhere in the Estuary, such as the Salt End and Pyewipe mudflats, are relatively tolerant of piling noise levels (e.g. marine piling to construct new jetties). Based on bird behaviour and noise monitoring studies undertaken by Xodus Group during construction piling for the Grimsby River Terminal (Xodus Group 2012), the significance criteria for disturbance to birds are summarised below:

- ≤ 65 dB LAmaxF – negligible;
- > 65 to ≤ 75 dB LAmaxF – minor adverse;
- > 75 to ≤ 85 dB LAmaxF – moderate adverse; and
- > 85 dB LAmaxF – major adverse.

10.6.13 The significance levels in the Xodus study were determined based on the visible responses of waterbirds to noise stimuli and included a variety of behaviours including a ‘heads-up’ response, physical movement on the ground away from the disturbance source and taking flight.

10.6.14 Predicted noise levels across the nearest mudflats are within the range 52-62 dB LAeq,1hr, depending on the piling technique used which represents an exceedance in the ambient noise level by up to 4 dB. However, the peak noise clearly results in a much greater increase in baseline noise levels to which waterbirds may be more susceptible. It is therefore reasonable to conclude that noise impacts (taking into account the regular impulsive nature of drop hammer piling noise, and thus its higher likelihood of disturbance to birds) would result in a minor adverse effect on waterbirds at Pyewipe Mudflats that is not significant.

10.6.15 If CFA piling was to be undertaken instead of drop hammer piling, noise levels will be reduced to 50 dB LAeq,1h at R3, falling below the ambient noise level at this location. Peak noise levels will also be reduced significantly due to CFA piling not producing regular, impulsive high peak noise levels. There will therefore be no discernible change in the noise levels reaching the Humber Estuary SPA/ Ramsar during the majority of the construction phase of the Proposed Development if CFA piling is used.

Potential Effects on Humber Estuary SAC/ SPA/ Ramsar/ SSSI During Construction: Noise/ Vibration Disturbance to Qualifying SPA/ Ramsar Wintering Bird Assemblage in Adjacent Field to the South

10.6.16 The noise impact assessment also considers the potential for noise and vibration impacts during construction on the fields to the south of the Proposed Development (i.e. field 37), which although outside the boundary of the Humber Estuary SPA/ Ramsar is considered to be functionally linked due to the important aggregations of wintering waterbirds present (see Chapter 8: Noise and Vibration).

10.6.17 Baseline noise levels were monitored along the southern edge of the Proposed Development at location LT3. This therefore represents the nearest part of the field 37 to the Proposed Development, and is considered to be the worst case for assessment of effects on this receptor because in reality, the majority of waterbirds will be orientated towards the centre of the field/ towards the eastern edge that borders the Estuary (for predator avoidance reasons).

10.6.18 Noise at this location was generally dominated by noise from the SHBPS, as well as noise from the associated cooling water pumping station and the adjacent chemical plant (Synthomer). Ambient noise levels were in the range 47 – 53 $L_{Aeq,T}$ and 49 – 65 dB L_{AFmax}.

10.6.19 Predicted noise levels arising from construction at this location are in the range 42 – 73 dB $L_{Aeq,1hr}$, at the nearest modelled receptors (on the boundary fence), with the noisiest activity assessed, as expected, being the drop hammer piling. This represents an increase of up to 20 dB on the ambient noise levels, which is a significant increase. However, this would be the worst case scenario, with the modelled receptors being right on the boundary fence. In reality, most waterbirds would be located towards the central and eastern portions of this field (closer to the Estuary), and would therefore be further away from the noise source. The estimated noise levels at various points across the field have therefore been examined to establish the proportion of the field that would be subject to construction noise levels in excess of ambient levels. Vibration associated with drop hammer piling is also assessed in Section 8.6 of Chapter 8: Noise and Vibration in ES Volume I and the same approach has been applied to the assessment of effects on birds.

10.6.20 In the centre of field 37, noise from the drop hammer piling activities is predicted to be 62 dB LAeq,1hr, which is still in excess of the ambient noise level. Peak noise resulting from drop hammer piling is estimated to be 76 dB LAmax, which is within the 'moderate adverse' disturbance threshold based on the Xodus study considered earlier in this assessment. At even the furthest

receptors, estimated peak noise levels are in the range 69 – 70 dB LAmax, which would be expected to also result in 'minor adverse' disturbance. For all other construction activities, noise will have attenuated to within the ambient range at this distance from the Proposed Development, and it is reasonable to conclude that the other construction activities would not result in the disturbance or displacement of waterbirds feeding, roosting and loafing in field 37.

10.6.21 In the absence of mitigation, it is therefore assessed that piling noise and vibration associated with construction will likely result in disturbance to birds feeding, roosting and loafing in field 37, if this takes place within the winter months when the highest aggregations of waterbirds are present in the field (September to March inclusive). This may result in displacement of birds within this field i.e. birds choose to move further away from the source of the noise but remain within the field (e.g. moving further south and east), or displacement of birds from this field entirely. This may result in increased energy expenditure as birds are spending more time flying between the mudflats and high tide roosts, and reduced feeding time as they are using more time and energy to find high tide roosting, loafing and feeding sites. This may have adverse effects on body condition and winter survival rates.

10.6.22 It is therefore assessed that in the absence of mitigation, drop hammer piling noise and vibration has the potential to cause moderate disturbance to waterbirds in field 37, and this is assessed as giving rise to a moderate adverse effect on the qualifying wintering bird assemblage of the Humber Estuary SPA/ Ramsar, which is significant. Mitigation is discussed in Section 10.7.

10.6.23 However, if CFA piling is used instead of drop hammer piling, noise levels will be reduced significantly (44 - 59 dB LAeq,1h). Peak noise levels will also be reduced significantly due to CFA piling not producing regular, impulsive high peak noise levels. There will therefore be no discernible change in the noise levels reaching the qualifying SPA/ Ramsar wintering bird assemblage in the field to the south of the Main Development Area during the majority of the construction phase of the Proposed Development if CFA piling is used.

Potential Effects on Humber Estuary SAC/ SPA/ Ramsar/ SSSI During Construction: Noise/ Vibration Disturbance to Qualifying SPA/ Ramsar Wintering Bird Assemblage in Adjacent Fields to the North

10.6.24 Fields to the north of the Proposed Development on the north side of South Marsh Road (fields 30 and 31) have also been scoped into the noise and vibration impact assessment, because they are considered to be functionally linked to the Humber Estuary SPA/ Ramsar due to the aggregations of wintering birds they support. These fields are expected to experience typically higher ambient noise levels than those to the south, as a result of HGV and other vehicle movements along South Marsh Road and Hobson Way, which runs along the western boundary of field 30.

10.6.25 The central point of these two fields is approximately 400 m north-west for the nearest part of the Proposed Development. For all construction activities except the drop hammer piling, noise levels will have attenuated to within the

ambient range at this distance from the works, and would therefore not be reasonably expected to displace waterbirds in fields 30 and 31. Vibration from drop hammer piling also decreases with distance from the piling location.

10.6.26 For drop hammer piling, the predicted noise level at the centre of the fields is 59 dB $L_{Aeq,1hr}$, which is slightly higher than the ambient noise level. Peak noise levels are estimated to be 72 dB L_{Amax} at this location, which is within the threshold for 'minor adverse' disturbance effects based on the Xodus study previously referred to in this chapter. This may result in some localised displacement of waterbirds within the field, should the drop hammer piling activity overlap with the wintering period when birds are present. However, it is considered that the noise levels are not sufficiently high to result in complete displacement from the fields, particularly given that the southern and western extents of these fields (particularly field 30) are subject to relatively high ambient noise levels as a result of traffic along Hobson Way and South Marsh Road.

10.6.27 It is assessed that, in the absence of mitigation, drop hammer piling noise and vibration has the potential to cause minor disturbance to waterbirds in fields 30 and 31, and this is assessed as giving rise to a minor adverse effect on the qualifying wintering bird assemblage of the Humber Estuary SPA/ Ramsar, which is not significant.

10.6.28 However, if CFA piling is used instead of drop hammer piling, noise levels will be reduced significantly (42 - 62 dB $L_{Aeq,1h)}$. Peak noise levels will also be reduced significantly due to CFA piling not producing regular, impulsive high peak noise levels. There will therefore be a slight increase above ambient in the noise levels reaching the qualifying SPA/ Ramsar wintering bird assemblage in the field to the north of the Main Development Area during the majority of the construction phase of the Proposed Development with CFA piling, however this is within the threshold for negligible disturbance effects based on the Xodus study previously referred to in this chapter.

Potential Effects on Humber Estuary SAC/ SPA/ Ramsar/ SSSI During Construction: Visual Disturbance to Qualifying SPA/ Ramsar Wintering Bird Assemblage at Pyewipe Mudflats

10.6.29 Given the distance of the Proposed Development from the Pyewipe mudflats, and the fact that construction will be set against the backdrop of the adjacent SHBPS, waterbirds feeding, roosting or loafing within the boundary of the SPA/ Ramsar. Furthermore, the substantial flood embankment wall will provide screening of construction activities to birds present on the mudflats/ shoreline. It is assessed that the Proposed Development will not result in any visual disturbance to waterbirds within the boundary of the Humber Estuary SPA/ Ramsar.

Potential Effects on Humber Estuary SAC/ SPA/ Ramsar/ SSSI During Construction: Visual Disturbance to Qualifying Wintering Bird Assemblage in Adjacent Field to the South

10.6.30 The nature and scale of the construction activities associated with the Proposed Development will be set against the backdrop of the SHBPS, and will therefore not represent a significant change in the type of structures already present in habitats adjacent to fields used by waterbirds. Regardless of this, it is difficult to predict with any degree of certainty what the response of waterbirds will be to changes in the visual environment. It is reasonable to assume that such birds are resilient to changes that do not directly affect habitats within which they are feeding, roosting and loafing, because they are present in a dynamic and highly commercial environment associated with the busy Humber Estuary. This includes the presence of tall structures such as power stations, bulk handling facilities, jetties and cranes, and the movement of large commercial vessels in and out of the nearby ports of Immingham and Grimsby.

10.6.31 As a precaution, a c.2.5 m high close board fence will be installed along part of the southern boundary of the Site (see Figure 4.2 in ES Volume II, Document Ref. 6.3) during the establishment of the construction site to provide visual screening from vehicle and personnel movements to any waterbirds feeding, roosting or loafing in the field.

10.6.32 Visual impacts on waterbirds feeding, roosting and loafing in the field to the south are, with this mitigation in place, therefore assessed as giving rise to a neutral effect on the qualifying wintering bird assemblage of the Humber Estuary SPA/ Ramsar.

Potential Effects on Humber Estuary SAC/ SPA/ Ramsar/ SSSI During Construction: Surface Water Pollution to Habitats

10.6.33 The ditches within the Site boundary currently capture surface water run-off and divert it to either Oldfleet Drain (to the south of the Site) or Middle Drain (to the north of the Site), from where it is discharged into the Humber Estuary. In the absence of mitigation, there is therefore the potential for contaminated surface water run-off to enter the drainage system and ultimately the Estuary. These pathways are considered in Chapter 14: Water Resources, Flood Risk & Drainage.

10.6.34 However, potential pollution (with sediment or contaminants) arising from surface water run-off from within the Site during construction will be controlled through the adoption of standard best practice construction methods to meet environmental requirements. This may include temporary measures to attenuate surface water run-off (e.g. SuDS, containment lagoon or similar), the use of drip trays beneath plant and/ or bunding of fuel or oil tanks and the use of double skinned fuel or oil tanks to minimise the risk of spillage. These measures will be detailed in the CEMP, and a pollution plan will be prepared to deal with an accidental pollution event. These are measures which are put in place as standard on similar construction projects and are not included here specifically to avoid an effect on the Humber Estuary.

10.6.35 It is reasonable to conclude that, with these measures in place, there is a negligible risk of surface water pollution to the Estuary during the construction phase. This is assessed as a neutral effect on the Humber Estuary SAC/ SPA/

Ramsar/ SSSI designated habitats, and the ecology features they support (waterbirds, sea lamprey, river lamprey and grey seal).

10.6.91 The extent of habitat loss that is likely to be required during decommissioning is likely to be much less than at construction (i.e. no further habitat loss), and the resulting effects on ecological features are therefore likely to be reduced. As described in Section 10.9, appropriate pre-works surveys and mitigation or impact avoidance measures will be implemented for the decommissioning phase as necessary.

10.6.92 In a number of cases impacts associated with the decommissioning phase of the Proposed Development are likely to be of a similar nature to those associated with the construction phase, because the decommissioning methodology will be of a similar impact level to that of construction in terms of noise, vibration, and air quality. As a result the potential effects on ecological features are not anticipated to differ significantly from those predicted at construction.

Extracts from ES Chapter 14: Water Resources, Flood Risk and Drainage (Document Ref. 6.2.14)

Section 14.6: Likely Impacts and Effects

Construction: Potential Impact C – Pollution of surface watercourses within or near the Proposed Development Site during construction due to spillages or polluted surface water runoff entering the watercourse

14.6.18 Humber Estuary (considered 'High' importance (see Table 14.)) receives water indirectly via the land drains and then then Middle Drain and Middle Drain pumping station and Oldfleet Drain and its tidal flapped outfall. Therefore, the nature of the effect of the construction activity on the Humber Estuary is assessed as 'Negligible': with low probability, reversible and short term adverse effects on the water quality. Given the likely character of the Humber Estuary is 'High' and the nature of the effects is 'Negligible', the likely significance of the effects from this construction activity is 'Negligible'.

APPENDIX 4: KEY ES CHAPTER TEXT CROSS REFERENCED IN TABLE 5.2: LIKELY SIGNIFICANT EFFECTS DURING OPERATION

The following paragraphs have been extracted from the ES for ease of reference. Where references are made to sections or paragraphs in the text below this is referring to sections within the ES Chapter not this HRA Report. Where other specific sections not included here are referenced the reader should refer back to the ES Chapter from which the text originated.

Extracts from ES Chapter 7: Air Quality (Document Ref. 6.2.7)

Section 7.6: Likely Impacts and Effects

Impacts on Ecological Receptors

7.6.32 The impact of process contributions of point source emissions at ecological receptors has been determined from the maximum model output at discrete receptor locations. The process contribution to Critical Level values (predicted from operation of the plant at BAT-AEL ELVs) have been compared with Critical Level and Critical Load values at each of the identified sensitive ecological receptors. As described at paragraph 7.3.40, Critical Levels are atmospheric concentrations and Critical Loads relate the pollutant deposition on the ground.

7.6.33 The significance of effects associated with emissions from the Proposed Development on designated nature conservation sites (in particular nitrogen oxides, ammonia (having impact through nutrient nitrogen and acid deposition) and sulphur dioxide) are discussed in Chapter 10: Ecology. In summary:

- in terms of NOx and nutrient nitrogen deposition, at the closest sensitive receptor within the Humber Estuary designated site (an area of saltmarsh approximately 400 m south-east of the Site), the PC is predicted to exceed the 1% increase threshold, triggering further assessment, but the total NOx and nutrient nitrogen deposition levels do not exceed the Critical Levels so no significant effects are anticipated;
- the 1% increase threshold is not exceeded for NOx or nutrient nitrogen deposition at any of the other assessed receptor locations within the Humber Estuary designated site, so no further assessment was required and significant effects are not predicted; and
- no exceedances of the 1% increase threshold are identified for acid deposition or sulphur dioxide at any of the assessed receptor locations within the Humber Estuary designated site, so no significant effects are predicted.

7.6.34 The assessment concludes that the Proposed Development will not give rise to significant adverse air quality effects on sensitive habitats within the Humber Estuary SPA/ SAC/ Ramsar site/ SSSI.

Extracts from ES Chapter 8: Noise and Vibration (Document Ref. 6.2.8)

Section 8.6: Likely Impacts and Effects

Operational Noise Levels at Ecological Sites

8.6.39 Predicted operational noise levels at ecological sites close to the Proposed Development (R3- Humber Estuary, R4- field to south of the Site and R5- field to north of the Site) during the three operational scenarios are given in Tables 8.30 to 8.32. A noise contour map illustrating predicted noise levels at the Humber Estuary and the fields to the north and south of the Site during the worst-case night-time hour of 06:00 – 07:00 are given in Figure 8.2 in ES Volume II (Document Ref. 6.3).

Table 8.30: Predicted operational noise levels: R3 – Humber Estuary

RECEPTOR R3	PREDICTED NOISE LEVELS FROM OPERATION $L_{AEQ,1H}$ DB		
	SCENARIO 1: WORST-CASE HOUR – DAY (09:00 – 10:00)	SCENARIO 2: WORST-CASE HOUR – NIGHT (06:00 – 07:00)	SCENARIO 3: TYPICAL-CASE HOUR – NIGHT (23:00 – 06:00)
Predicted noise level $L_{Aeq,T}$ dB	47	47	46
Ambient noise level $L_{Aeq,T}$ dB	53	52	54
Ambient + Predicted $L_{Aeq,T}$ dB	54	53	55
Increase in ambient dB	+1	+1	+1

Table 8.31: Predicted operational noise levels: R4 – field to south of the Site

RECEPTOR R4	PREDICTED NOISE LEVELS FROM OPERATION $L_{AEQ,1H}$ DB		
	SCENARIO 1: WORST-CASE HOUR – DAY (09:00 – 10:00)	SCENARIO 2: WORST-CASE HOUR – NIGHT (06:00 – 07:00)	SCENARIO 3: TYPICAL-CASE HOUR – NIGHT (23:00 – 06:00)
Predicted noise level $L_{Aeq,T}$ dB	45-61	45-62	44-56
Ambient noise level $L_{Aeq,T}$ dB	48	50	50
Ambient + Predicted $L_{Aeq,T}$ dB	50-61	51-63	51-57
Increase in ambient dB	+2 to +13	+1 to +13	+1 to +7

Table 8.32: Predicted operational noise levels: R5 – field to north of the Site

RECEPTOR R5	PREDICTED NOISE LEVELS FROM OPERATION $L_{AEQ,1H}$ DB		
	SCENARIO 1: WORST-CASE HOUR – DAY (09:00 – 10:00)	SCENARIO 2: WORST-CASE HOUR – NIGHT (06:00 – 07:00)	SCENARIO 3: TYPICAL-CASE HOUR – NIGHT (23:00 – 06:00)
Predicted noise level $L_{Aeq,T}$ dB	41-59	41-60	40-58
Ambient noise level $L_{Aeq,T}$ dB*	48	50	50
Ambient + Predicted $L_{Aeq,T}$ dB	49-60	51-60	50-59
Increase in ambient dB	+1 to +12	+1 to +10	0 to +9

* For a worst-case assessment, ambient noise levels at this Receptor are assumed to be the same as at R4.

8.6.40 At Receptor R3 (Humber Estuary), predicted noise levels are 5 dB below the weekend ambient noise level of 52 dB LAeq during the worst-case hour at night (06:00 – 07:00). This results in an increase in the ambient level of no more than 1 dB. The assessment in Chapter 10: Ecology therefore concludes that there will be no effect on Receptor R3.

8.6.41 At the closest parts of Receptors R4 (field to the south of the Site) and R5 (field to the north of the Site), noise impacts from the operation of the Proposed Development are predicted to be greater due to proximity.

8.6.42 The increase in the ambient noise level across the fields to the south of the Site (R4) is predicted to be between 1 dB and 7 dB during the night (when there are fewer HGV movements) and between 2 dB and 13 dB during the day. During the worst-case night-time hour (06:00 – 07:00) when the number of HGVs entering and leaving the Site is predicted to be at its highest, the ambient noise level is predicted to increase from between 1 and 13 dB. As discussed in Chapter 10: Ecology Section 10.6 (see paragraph 10.6.75), based on studies of the waterbird behaviour, waterbirds will tend to use parts of the field closest to the Estuary and away from field boundary features, which are further away from the Main Development Area; at these locations the noise levels will be similar to ambient levels, so the effect on waterbirds at R4 is considered to be neutral (not significant).

8.6.43 At Receptor R5 (the field north of the Site), noise from the operation of the Proposed Development is predicted to increase the ambient noise level between 1 and 9 dB during the night (when there are fewer HGV movements). During the day and the worst-case night-time hour of 06:00-07:00 (when there are a much larger number of HGV movements), ambient levels are expected to increase by between 1 and 12 dB. This is due to all vehicles entering and leaving the Site travelling from South Marsh Lane. As waterbirds will tend to use parts of the field away from field boundary features and therefore further away from the Main Development Area (see Chapter 10: Ecology Section 10.6 paragraph 10.6.73), at these locations the noise impact will be similar to ambient levels, so the effect on waterbirds is assessed in Chapter 10: Ecology to be neutral (not significant).

8.6.44 With regards to L_{AFmax} levels during operation of the Proposed Development, it is not expected that significant L_{AFmax} events will occur at the Site which will be audible along the Humber Estuary or at the fields located to the north and south of the Site (Receptors R4 and R5). The events that are likely to result in the highest L_{AFmax} levels are the tipping of waste into the bunker when it is delivered and the placing of waste into the shredder. As these activities are undertaken within the fuel reception hall and fuel bunker parts of the building, L_{AFmax} levels from these activities are unlikely to be audible at the Humber Estuary (R3) but may be just perceptible at the ecological Receptor areas to the north and south of the Site (R4 and R5).

Extracts from ES Chapter 10: Ecology (Document Ref. 6.2.10)

Section 10.5: Development Design and Impact Avoidance

Operation

10.5.16 Domestic foul drainage will be discharged to foul sewer, tankered off-site, or treated on-site using a package treatment plant which discharges to one of the surface water ditches within the Main Development Area (which ultimately discharges to the Humber Estuary). If treated foul drainage is discharged to surface water, the volume will be small and this is not considered to represent a potential adverse operational effect on the ditch habitats and the protected species they support (water vole).

Section 10.6: Likely Impacts and Effects

Operation

10.6.55 The following potential source-receptor pathways have been scoped out of the impact assessment:

- noise/ visual disturbance to Humber Estuary SPA/ Ramsar qualifying breeding bird species (bittern, marsh harrier, avocet and little tern) - there is no suitable habitat for the qualifying species of breeding birds within the potential zone of influence of noise and visual disturbance arising from the operation of the Proposed Development. There is therefore no pathway by which these features could be affected by the Proposed Development;
- visual disturbance to qualifying Humber Estuary SPA/ Ramsar wintering bird species feeding on mudflats – the nearest mudflats are approximately 175 m from the Proposed Development, and the cooling water pumping station and substantial flood embankment and seawall lies between the mudflats and the Proposed Development. The type and scale of buildings associated with the Proposed Development are not significantly different from those already present on the SHBPS site, and therefore there would be no discernible visual change in the baseline environment; and
- air quality impacts on intertidal and subtidal habitats in the Humber Estuary SAC/ SSSI – intertidal habitats are not susceptible to the effects of changes in air quality arising from stack emissions during operation (increased nitrogen and acid deposition) because of their regular tidal inundation. Subtidal habitats have similarly been scoped out.

Potential Effects on Humber Estuary SAC/ SPA/ Ramsar/ SSSI During Operation: Air Quality Impacts on Habitats - Nitrogen Oxides (NO_x)

10.6.63 The air quality impact assessment has modelled a number of receptors within the Humber Estuary SAC/ SPA/ Ramsar/ SSSI that are sensitive to NO_x emissions. The nearest to the Proposed Development is an area of saltmarsh habitat approximately 400 m south-east (receptors E1_1, E1_2 and E1_3 as shown on Figure 7.2 in ES Volume II (Document Ref. 6.3)). At these receptors, the process contribution resulting from the maximum annual mean NO_x emissions is 2.4%, 2.4% and 2.5% respectively of the Critical Level for the

Humber Estuary SAC/ SPA/ Ramsar. This therefore exceeds the screening threshold at which an adverse effect on the designated habitats (and therefore the species they support) may occur, and indicates that further assessment is required.

10.6.64 At this location, APIS data indicate that the background annual mean NO_x concentration at these receptors is 25.9 µg/m^3. The process contribution from the Proposed Development, although greater than 1%, results in total NO_x of 26.7 µg/m^3, which does not exceed the Critical Level for all vegetation types from the effects of NO_x of 30 µg/m^3. As most of the reported concentration of NO_x is due to the published background value used in the calculations, further analysis was undertaken using project-specific survey data, which concluded that the annual mean NO_x process contribution would be 2.5% of the Critical Level, resulting in total annual mean NO_x concentration of 18.6 µg/m^3.

Potential Effects on Humber Estuary SAC/ SPA/ Ramsar/ SSSI During Operation: Air Quality Impacts on Habitats - Nutrient Nitrogen (N) Deposition

10.6.65 The air quality impact assessment has concluded that the annual N deposition rate (kg N/Ha/year) process contribution at the nearest saltmarsh habitat would be 2.1% of the Critical Load at receptors E1_1, E1_2 and E1_3. As this is above the 1% screening threshold, it is therefore necessary to examine the output from the modelling in greater detail to establish whether this elevation in N deposition would result in any significant effects on the saltmarsh habitat.

10.6.66 The total annual N deposition predicted at these three receptors is 0.4 kg N/ha/yr, resulting from NOx and ammonia (NH_3), compared to the background deposition of 15.5 kg N/ha/yr. With the Proposed Development there would therefore be no exceedance of the Critical Load for this habitat type, which is 20 – 30 kg N/ha/yr. It is therefore assessed that N deposition resulting from the Proposed Development will result in a neutral effect on the Humber Estuary SPA/ SAC/ Ramsar/ SSSI that is not significant.

Potential Effects on Humber Estuary SAC/ SPA/ Ramsar/ SSSI During Operation: Air Quality Impacts on Habitats - Acid Deposition

10.6.67 For acid deposition (keq/Ha/year), the air quality impact assessment identified that there would be no exceedances of the 1% Critical Level screening threshold for potential adverse effects on sensitive habitat types within the Humber Estuary SAC/ SPA/ Ramsar/ SSSI. It is therefore concluded that there would be no significant effects on the Humber Estuary designated site as a result of acid deposition.

Potential Effects on Humber Estuary SAC/ SPA/ Ramsar/ SSSI During Operation: Air Quality Impacts on Habitats - Sulphur Dioxide (SO_2)

10.6.68 For sulphur dioxide, the air quality impact assessment identified that there would be no exceedances of the 1% Critical Level screening threshold for potential adverse effects on sensitive habitat types within the Humber Estuary SAC/ SPA/ Ramsar/ SSSI. It is therefore concluded that there would be no significant effects on the Humber Estuary designated site as a result of SO_2 emissions from the Proposed Development.

Potential Effects on Humber Estuary SAC/ SPA/ Ramsar/ SSSI During Operation: Surface Water Pollution to Habitats Supporting Marine Species

10.6.70 Potential pollution (sediment or contaminants) arising from surface water run-off and treated foul drainage discharge from within the Site during operation will be controlled through the drainage design. This is set out in Chapter 14: Water Resources, Flood Risk and Drainage (ES Volume I, Document Ref. 6.2).

10.6.71 There is therefore no surface water pathway by which the Proposed Development could impact on the Humber Estuary SAC/ SPA/ Ramsar/ SSSI designated habitats, and the marine ecology features they support (sea lamprey, river lamprey and grey seal).

Potential Effects on Humber Estuary SAC/ SPA/ Ramsar/ SSSI During Operation: Noise Disturbance to Qualifying SPA/ Ramsar Wintering Bird Assemblage at Pyewipe Mudflats

10.6.72 Predicted operational noise levels at receptor R3 (at the edge of the Humber Estuary SPA/ Ramsar boundary) are 5 dB below the ambient noise level of 52 dB L_{Aeq} during the worst case hour at night (06:00 – 07:00). This results in an increase in the ambient level at receptor R3 of no more than 1 dB, which is not significant.

10.6.73 With regards to L_{AFmax} levels during operation of the Proposed Development, it is not expected that significant L_{AFmax} events will occur at the Site which will be audible along the Humber Estuary. The activities that are likely to result in the highest L_{AFmax} levels are the tipping of waste into the bunker when it is delivered and the placing of waste into the shredder. As these activities are undertaken within the enclosed fuel reception hall and fuel bunker parts of the building, which are located at the furthest point of the building from the Estuary, L_{AFmax} levels from these activities are unlikely to be audible at the Estuary.

10.6.74 It is assessed that operational noise arising from the Proposed Development will result in a neutral effect on waterbirds feeding, roosting and loafing in the Pyewipe mudflats.

10.6.75 Noise associated with planned and unplanned outages and other maintenance activities, or operation of boiler safety valves or steam turbine bypass valves, has not been specifically modelled as part of the noise assessment presented in Chapter 8: Noise and Vibration, but noise from such activities (which do not include piling) are expected to be lower than construction noise effects, which are assessed in paragraphs 10.6.8 to 10.6.28 above.

Potential Effects on Humber Estuary SAC/ SPA/ Ramsar/ SSSI During Operation: Noise Disturbance to Qualifying SPA/ Ramsar Wintering Bird Assemblage in Adjacent Fields to North

10.6.76 At the nearest part of the northern fields to the Proposed Development operational noise is predicted to be up to 68 dB L_{Aeq}, which is above the ambient level for the 'worst case hour' between 06:00 and 07:00 (see Chapter 8: Noise and Vibration and the noise contours are shown on Figure 8.2 in ES Volume II (Document Ref. 6.3). However, as discussed above in respect of

the assessment for construction noise, it is reasonable to assume that waterbirds using these fields would not be using habitats close to boundary features (due to the requirement for scanning distances for predator avoidance), and are therefore more likely to be orientated towards the middle of the fields. In the centre of fields 30 and 31, operational noise levels will have attenuated with distance to around 50 dB L_{Aeq}, which is similar to ambient levels. No displacement of waterbirds would therefore be anticipated.

10.6.77 Noise associated with the operation of the Proposed Development is therefore assessed as giving rise to a neutral effect on the qualifying wintering bird assemblage of the Humber Estuary SPA/ Ramsar using the functionally linked fields to the north (fields 30 and 31).

Potential Effects on Humber Estuary SAC/ SPA/ Ramsar/ SSSI During Operation: Noise Disturbance to Qualifying SPA/ Ramsar Wintering Bird Assemblage in Adjacent Field to South

10.6.78 At the nearest part of the southern field to the Proposed Development, operational noise is predicted to be up to 62 dB L_{Aeq}, which is above the ambient level. However, as discussed above in respect of the assessment for construction noise, it is reasonable to assume that waterbirds using the fields would not be using habitats close to boundary features (due to the requirement for scanning distances for predator avoidance), and are therefore more likely to be orientated towards the middle of the field. Towards the centre of field 37, operational noise levels will have attenuated to around 50 dB L_{Aeq}, which is similar to ambient levels. No displacement of waterbirds would therefore be anticipated.

10.6.79 Noise associated with the operation of the Proposed Development is therefore assessed as giving rise to a neutral effect on the qualifying wintering bird assemblage of the Humber Estuary SPA/ Ramsar using the functionally linked field to the south (field 37).

Potential Effects on Humber Estuary SAC/ SPA/ Ramsar/ SSSI During Operation: Visual Disturbance to Qualifying Wintering Bird Assemblage in Adjacent Field to the South

10.6.80 The nature and scale of the operational activities associated with the Proposed Development will be set against the backdrop of the SHBPS, and will therefore not represent a significant change in the type of structures already present in habitats adjacent to fields used by waterbirds. Regardless of this, it is difficult to predict with any degree of certainty what the response of waterbirds will be to changes in the visual environment. It is reasonable to assume that such birds are resilient to any changes that do not directly affect habitats within which they are feeding, roosting and loafing, because they are present in a dynamic and highly commercial environment associated with the busy Humber Estuary. This includes the presence of tall structures such as power stations, bulk handling

10.6.81 It is therefore reasonable to assume that any SPA/ Ramsar waterbirds roosting/ loafing/ foraging in the field to the south of the Site are habituated to

the industrial nature of the surrounding area such that they would not be disturbed by the presence of tall chimney structures and other buildings on adjacent land. As a general precaution the c.2.5 m high close-boarded fence along the southern border of the Site will be retained for the operational lifespan of the Proposed Development to reduce potential visual disturbance on wintering birds from ground level activities (operational traffic and staff). Visual impacts on waterbirds feeding, roosting and loafing in the adjacent field to the south are therefore assessed as giving rise to a neutral effect on the qualifying wintering bird assemblage of the Humber Estuary SPA/ Ramsar.

Extracts from ES Chapter 14: Water Resources, Flood Risk and Drainage (Document Ref. 6.2.14)

Section 14.6: Likely Impacts and Effects

Operation: Potential Impact G – Pollution of surface watercourses within or near the Site during operation and maintenance of the Proposed Development, due to potential spillages, untreated foul drainage or polluted surface water runoff entering the watercourse

14.6.36 Humber Estuary (considered 'High' importance (see Table 14.)) receives water indirectly via the land drains and then Middle Drain and Middle Drain pumping station and Oldfleet Drain and its tidal flapped outfall. Therefore, the nature of the effect in operation and maintenance of the Proposed Development on the Humber Estuary is assessed as 'Negligible'; with low probability, reversible and long term adverse effects on the water quality. Given the likely character of the Humber Estuary is 'High' and the nature of the effects is 'Negligible', the likely significance of the effects from this activity is 'Negligible'.

APPENDIX 5: OTHER CROSS REFERENCED ES CHAPTER TEXT (ECOLOGY MITIGATION)

The following paragraphs have been extracted from the ES for ease of reference. Where references are made to sections or paragraphs in the text below this is referring to sections within the ES Chapter not this HRA Report. Where other specific sections not included here are referenced the reader should refer back to the ES Chapter from which the text originated.

Extracts from ES Chapter 10: Ecology (Document Ref. 6.2.10)

Section 10.7: Mitigation and Enhancement Measures

Humber Estuary SPA/ Ramsar Mitigation (Piling Noise and Vibration)

10.7.2 The assessment has concluded that there is the potential for significant adverse effects on waterbirds in the adjacent field to the south (field 37), which is functionally linked to the Humber Estuary SPA/ Ramsar, as a result of piling noise and vibration during construction. Although the piling activity will only be undertaken for a relatively short period of time (estimated at 2 to 4 months), it is not possible at this stage to determine whether this will overlap with the sensitive wintering bird period. It may therefore occur when birds are present and they could be disturbed or displaced.

10.7.3 At this stage, the mitigation measures to be employed have not been fixed; this is to enable sufficient flexibility for the contractor to determine the best available technique for noise abatement during piling works. For the purposes of this EcIA, it is assumed that mitigation will comprise:

- seasonal piling restrictions – piling will be restricted for two hours either side of high tide in the period September to March inclusive, to avoid the most sensitive winter months, and the time period when birds are most likely to be present in the fields (i.e. when they are pushed off the coastal mudflats at high tide); and/ or
- Continuous Flight Auger (CFA) piling – this technique is virtually vibration free, and one of the quietest forms of piling. If this technique is adopted, it will be possible to reduce construction noise reaching the fields to within ambient levels, and vibration disturbance effects would also be reduced.

Section 10.9: Residual Effects and Conclusions

Construction: Noise/ Vibration Disturbance

10.9.4 With mitigation, piling noise and vibration during construction will be reduced to within ambient levels (e.g. through seasonal restrictions or the use of CFA piling) in the field to the south of the Proposed Development that is considered to be also functionally linked to the Humber Estuary SPA/ Ramsar. Residual effects on waterbirds in this field, and thus the Humber Estuary, are therefore predicted to be minor adverse and not significant.

APPENDIX 6: OTHER CROSS REFERENCED ES CHAPTER TEXT (IN-COMBINATION EFFECTS)

The following paragraphs have been extracted from the ES for ease of reference. Where references are made to sections or paragraphs in the text below this is referring to sections within the ES Chapter not this HRA Report. Where other specific sections not included here are referenced the reader should refer back to the ES Chapter from which the text originated.

Extracts from ES Chapter 17: Cumulative and Combined Effects (Document Ref. 6.2.17)

Section 17.5: Cumulative Air Quality Effects

Operational Cumulative Effects - Ecological Receptors: Proposed Development Stacks and Operational Road Traffic

17.5.12 The modelling results show that the predicted cumulative impacts cannot be screened out as insignificant at several ecological receptors, although total Critical Levels remain below the relevant criteria for all pollutants with the exception of E3_1 and E6_1 and 2 for annual mean oxides of nitrogen. At E3_1, the background concentration currently exceeds the criteria for annual mean oxides of nitrogen, while at E6 the Proposed Development's contribution to the change in annual mean oxides of nitrogen is 0.1%.

17.5.13 A cumulative Process Contribution (PC) of more than 1% of the long term Critical Load for nutrient nitrogen deposition has been predicted to occur at receptors E1, E6, E7, E8 and E9. At E1 and E6, the predicted deposition rates are not above the Critical Load, while at E7, E8 and E9 the background deposition rate is above the Critical Load. At these locations, the PC from the Proposed Development is approximately half of the cumulative PC.

17.5.14 A cumulative PC of more than 1% of the long term Critical Load for acid deposition has been predicted to occur at receptor, E4 within the Humber Estuary SAC (Acid Fixed Dunes) in an area which already exceeds the relevant standard, if all the identified developments are implemented.

17.5.15 At the acid fixed dunes, the cumulative PC from all the identified developments to acid deposition is 1.2% of the lower range Critical Load. The PC from the Proposed Development alone was 0.6% of the lower range Critical Load.

Section 17.8: Cumulative Ecology Effects

Construction: Losses of Functionally Linked Habitat

17.8.1 There is the potential for cumulative effects on waterbirds using functionally linked habitat surrounding the Estuary in the absence of mitigation, should multiple developments proceed that result in the loss of such habitat.

17.8.2 Only two of the developments considered on the cumulative effects shortlist (Table 17.5) were identified as potentially combining with the Proposed Development to result in a cumulative adverse effect through this pathway; these are the Stallingborough Link Road (Development Ref: 1) and the Sustainable

Transport Fuels Facility (Development Ref: 2), which will result in the loss of waterbird habitat to the south and west of the Proposed Development. Both of these are located in North East Lincolnshire, and Policy 9 of the NELC Local Plan stipulates that for developments affecting such habitats full mitigation is provided, through a commuted sum secured via legal agreement to draw down from a dedicated strategic mitigation scheme (South Humber Gateway) being delivered directly by NELC ahead of the construction of the relevant development.

17.8.3 The applicant for the Stallingborough Link Road, NELC, has committed to commuting a sum of money that will draw down 6.3 ha of mitigation habitat. The applicant for the Sustainable Transport Fuels Facility also proposes to mitigate for the loss of habitat within the development site in accordance with NELC Local Plan Policy 9. With mitigation, there will therefore be no cumulative adverse effects on the Humber Estuary SPA/ Ramsar with the Proposed Development, as a result of the loss of functionally linked habitat.

Construction: Noise and Vibration Disturbance to Functionally Linked Habitats

17.8.4 The cumulative noise and vibration assessment (see Section 17.6 above) concludes that the construction of the Proposed Development at the same time as the construction or use of the other developments (including the potential off-Site electrical and gas connections associated with the Proposed Development) would not result in a significant cumulative noise effect.

17.8.5 As described above the other developers will also be committed to commuting sums of money to enable mitigation habitat to be created. With this mitigation providing alternative bird habitat, and taking into account the proposed contribution to the SHG strategic mitigation scheme for the Proposed Development, there is therefore no potential for cumulative adverse effects the Humber Estuary SPA/ Ramsar as a result of construction disturbance to functionally linked habitat.

Operation: Changes in Air Quality

17.8.6 Cumulative effects on the Humber Estuary designated sites may occur where the cumulative PC exceeds the 1% screening threshold of the Critical Level and the Predicted Environmental Concentration (PEC) exceeds the relevant Critical Level/ Load. Unless both these criteria are exceeded, no likely significant effects on habitats within the designated sites would be predicted either because the relevant assessment threshold would not be breached, or because the other plans/ projects scoped into the cumulative effects assessment would collectively make an imperceptible contribution to emissions/ deposition.

Operation: Cumulative Emissions of Nitrogen Oxides (NOx)

17.8.7 The air quality assessment has identified that the cumulative process contribution of NOx at the nearest saltmarsh habitat to the Proposed Development (receptors E1_1, E1_2 and E1_3 in Chapter 7: Air Quality) is between 7.3 and 8.0%. This therefore exceeds the threshold for insignificance and indicates that further assessment is required.

17.8.8 On this basis, the total contribution from all developments to the habitat has been combined with the background concentration to determine total annual mean deposition rates. Using the background concentration from the APIS website, the cumulative PEC results in total annual mean NOx concentrations of 28.1 – 28.3 µg/m3 at these locations, which is slightly below the Critical Level for all vegetation types from the effects of NOx of 30 µg/m3. However, using a more precise background NOX concentration derived from NO2 project-specific measurement data recorded at the saltmarsh site itself (see Appendix 7A in ES Volume III, Document Ref. 6.4 for details), the total PEC is between 19.9 µg/m3 and 20.1 µg/m3, which is well below the Critical Level.

17.8.9 An additional saltmarsh habitat receptor within the Humber Estuary (receptor E3_1) slightly exceeds the 1% process contribution threshold (1.3%), although the total PEC results in a cumulative contribution of 45.1 µg/m3. However, as the baseline levels of NOx at this receptor are already exceeding the Critical Level (baseline level is 44.7 µg/m3), this small additional contribution is not reasonably considered to result in any adverse effects on the designated site, in combination with the other developments that have been assessed.

Operation: Cumulative Nutrient Nitrogen (N) Deposition

17.8.10 The air quality impact assessment has concluded that the annual N deposition rate (kg N/Ha/year) process contribution at the nearest saltmarsh habitat would be between 3.9% and 4.2% of the Critical Load at receptors E1_1, E1_2 and E1_3. As this is above the 1% insignificance screening threshold, it is therefore necessary to examine the output from the modelling in greater detail to establish whether this elevation in N deposition would result in any significant effects on the saltmarsh habitat.

17.8.11 The total cumulative annual N deposition predicted at these three receptors is 0.8 kg N/ha/yr, resulting from NOx and ammonia (NH3). When combined with the background deposition of 15.5 kg N/ha/yr the cumulative PEC for nitrogen deposition will remain below the Critical Load for saltmarsh; being a maximum of 16.3 kg N/ha/yr compared to a Critical Load range of 20 – 30 kg N/ha/yr. This is therefore assessed as a neutral cumulative effect on the Humber Estuary SPA/ SAC/ Ramsar/ SSSI (not significant).

17.8.12 Moreover, it is important to note that the experimental studies that underlie conclusions regarding the sensitivity of saltmarsh to nitrogen deposition, and the selection of 20 kg N/ha/yr as the minimum Critical Load have "… neither used very realistic N [nitrogen] doses nor input methods i.e. they have relied on a single large application more representative of agricultural discharge" (APIS website), which is far in excess of anything that would be deposited from atmosphere. For coastal saltmarshes such as those for which Humber Estuary SAC is partly designated, nitrogen inputs from air are not as important as nitrogen effects from other sources because the effect of any deposition of nitrogen from the atmosphere is likely to be dominated by much greater flushes of more readily utilized nitrogen from marine, fluvial or agricultural sources. This is reflected on APIS itself, which states regarding saltmarsh that "Overall, N deposition [from the atmosphere] is likely to be of low importance for these systems as the inputs are

probably significantly below the large nutrient loadings from river and tidal inputs". In addition, the nature of intertidal saltmarsh in this area means that there is flushing by tidal incursion twice per day. This is likely to further reduce the role of nitrogen from atmosphere in controlling botanical composition.

Operation: Cumulative Acid Deposition

17.8.13 For acid deposition (keq/Ha/year), the air quality impact assessment identified that at the nearest sensitive receptors (sand dune habitats at E4_1, E4_2, E4_3, E4_4 and E4_5, E4_6) the cumulative process contribution would slightly exceed the 1% insignificance screening threshold for potential adverse effects on sensitive habitat types within the Humber Estuary SAC/ SPA/ Ramsar/ SSSI (predicted to be between 1.1 and 1.2%). However, given the very small process contribution resulting from these developments, it is assessed that there would be no significant effects on the Humber Estuary designated site as a result of acid deposition in combination with the other developments as outlined in Table 17.5.

Operation: Cumulative Emissions of Sulphur Dioxide (SO2)

17.8.14 For SO2, the air quality impact assessment identified that there would be exceedances of the 1% Critical Level insignificance screening threshold at receptors E1_1, E1_2 and E1_3 (nearest saltmarsh habitat) within the Humber Estuary SAC/ SPA/ Ramsar/ SSSI of 2.4 – 2.7%. However, the PEC for sulphur dioxide is not exceeded, and therefore it is concluded that there will be a neutral effect on the Humber Estuary SAC/ SPA/ Ramsar/ SSSI in combination with developments as outlined in Table 17.5.

17.8.15 As a result of the Air Dispersion Modelling used to inform the air quality assessment (see Appendix 7A in ES Volume III, Document Ref. 6.4) and the cumulative air quality assessment undertaken, it is concluded that there would be no adverse cumulative air quality effects on the Humber Estuary SAC/ SPA/ Ramsar/ SSSI.

APPENDIX 7: CROSS REFERENCED ES CHAPTER TEXT (CHAPTER 10: ECOLOGY) WHERE RELEVANT TO OPERTIONAL CHANGES IN AIR QUALITY- 10.6.55 to 10.6.69)

The following paragraphs have been extracted from the ES for ease of reference. Where references are made to sections or paragraphs in the text below this is referring to sections within the ES Chapter not this HRA Report. Where other specific sections not included here are referenced the reader should refer back to the ES Chapter from which the text originated.

Extracts from ES Chapter 10: Ecology (Document Ref. 6.2.10)

Section 10.6: Impacts and Effects

Operation

10.6.53 This section describes the impacts and potential effects during the operational and maintenance phase of the Proposed Development on relevant ecological features in the absence of any mitigation, over and above that which is inherent to the design.

10.6.54 To enable a proportionate impact assessment, screening was undertaken of potential impacts of the operational phase that are likely to result in adverse or beneficial effects on relevant ecological features and that require further impact assessment. The relevant impacts are taken forward in the more detailed impact assessment that follows. Those impacts that are considered unlikely to result in significant effects are scoped out and not considered further.

10.6.55 The following potential source-receptor pathways have been scoped out of the impact assessment:

- noise/ visual disturbance to Humber Estuary SPA/ Ramsar qualifying breeding bird species (bittern, marsh harrier, avocet and little tern) - there is no suitable habitat for the qualifying species of breeding birds within the potential zone of influence of noise and visual disturbance arising from the operation of the Proposed Development. There is therefore no pathway by which these features could be affected by the Proposed Development;
- visual disturbance to qualifying Humber Estuary SPA/ Ramsar wintering bird species feeding on mudflats – the nearest mudflats are approximately 175 m from the Proposed Development, and the cooling water pumping station and substantial flood embankment and seawall lies between the mudflats and the Proposed Development. The type and scale of buildings associated with the Proposed Development are not significantly different from those already present on the SHBPS site, and therefore there would be no discernible visual change in the baseline environment; and
- air quality impacts on intertidal and subtidal habitats in the Humber Estuary SAC/ SSSI – intertidal habitats are not susceptible to the effects of changes in air quality arising from stack emissions during operation (increased nitrogen

and acid deposition) because of their regular tidal inundation. Subtidal habitats have similarly been scoped out.

10.6.56 Impacts during the operational period that have potential to result in significant effects on relevant ecological features, and which were screened into the impact assessment are considered further below:

- potential effects on Humber Estuary SAC/ SPA/ Ramsar/ SSSI (changes in air quality, noise and visual disturbance and surface water pollution);
- potential effects on Local Wildlife Sites (changes in air quality);
- potential effects on aquatic invertebrates (surface water pollution);
- potential effects on Schedule 1 breeding birds (disturbance);
- potential effects on water vole (noise and visual disturbance, surface water pollution to ditches); and
- potential effects on otter (noise and visual disturbance, surface water pollution to ditches).

Operation: Potential Effects on Humber Estuary SAC/ SPA/ Ramsar/ SSSI During Operation - Air Quality Impacts on Habitats

10.6.57 An air quality impact assessment has been undertaken and is presented in ES Chapter 7: Air Quality. The proposed stack heights are fixed at 102 m AOD to provide certainty to the assessment.

10.6.58 There are two measures of particular relevance when considering the potential for significant effects on habitats to result from changes in air quality arising from the Proposed Development. The first is the concentration of oxides of nitrogen (known as NOx) in the atmosphere. The main importance is as a source of nitrogen (N), which is then deposited on adjacent habitats either directly (known as dry deposition, including directly onto the plants themselves) or washed out in rainfall (known as wet deposition). The deposited nitrogen can then have a range of effects, primarily growth stimulation or inhibition, but also biochemical and physiological effects such as changes to chlorophyll content. NOx may also have some effects which are un-related to its role in total nitrogen intake (such as the acidity of the gas potentially affecting lipid biosynthesis) but the evidence for these effects is limited and they do not appear to occur until high annual concentrations of NOx are reached.

10.6.59 The guideline atmospheric concentration of NOx advocated by Government for the protection of vegetation is 30 micrograms per cubic metre (µgm-3), known as the Critical Level (Hall et al. 2006). This is driven by the role of NOx in N deposition and in particular in growth stimulation and inhibition. If the total NOx concentration in a given area is below the Critical Level, it is unlikely that N deposition will be an issue, unless there are other sources of nitrogen (e.g. ammonia). If it is above the Critical Level then local N deposition from NOx could be an issue and should be investigated.

10.6.60 The second important metric is a direct determination of the rate of the resulting N deposition, which is habitat specific because different habitats have varying

tolerance to nitrogen. For many habitats there are measurable effects in the form of published dose-response relationships for N deposition, which do not exist for NOx. Unlike NOx, the N deposition rate below which current evidence suggests that effects should not arise is different for each habitat. The rate (known as the Critical Load) is provided on the UK Air Pollution Information System website (www.apis.ac.uk) and is expressed as a quantity (kilograms) of nitrogen over a given area (hectare) per year (kg N/ha/yr). More recently, there has also been research compiled that investigates N dose-response relationships in a range of habitats (Caporn et al. 2016).

10.6.61 For completeness, rates of acid deposition were also calculated. Acid deposition derives from both sulphur and nitrogen. It is expressed in terms of kiloequivalents (keq) per hectare per year. The thresholds against which acid deposition is assessed are referred to as the Critical Load Function.

10.6.62 The effects of elevated Hydrogen Fluoride (HF) emissions have been discounted from the assessment for ecological receptors on the basis that habitats are not sensitive to this type of pollutant.

Operation: Potential Effects on Humber Estuary SAC/ SPA/ Ramsar/ SSSI During Operation - Air Quality Impacts on Habitats: Nitrogen Oxides (NOx)

10.6.63 The air quality impact assessment has modelled a number of receptors within the Humber Estuary SAC/ SPA/ Ramsar/ SSSI that are sensitive to NOx emissions. The nearest to the Proposed Development is an area of saltmarsh habitat approximately 400 m south-east (receptors E1_1, E1_2 and E1_3 as shown on Figure 7.2 in ES Volume II (Document Ref. 6.3)). At these receptors, the process contribution resulting from the maximum annual mean NOx emissions is 2.4%, 2.4% and 2.5% respectively of the Critical Level for the Humber Estuary SAC/ SPA/ Ramsar. This therefore exceeds the screening threshold at which an adverse effect on the designated habitats (and therefore the species they support) may occur, and indicates that further assessment is required.

10.6.64 At this location, APIS data indicate that the background annual mean NOx concentration at these receptors is 25.9 µg/m^3. The process contribution from the Proposed Development, although greater than 1%, results in total NOx of 26.7 µg/m^3, which does not exceed the Critical Level for all vegetation types from the effects of NOx of 30 µg/m^3. As most of the reported concentration of NOx is due to the published background value used in the calculations, further analysis was undertaken using project-specific survey data, which concluded that the annual mean NOx process contribution would be 2.5% of the Critical Level, resulting in total annual mean NOx concentration of 18.6 µg/m^3.

Nutrient Nitrogen (N) Deposition

10.6.65 The air quality impact assessment has concluded that the annual N deposition rate (kg N/Ha/year) process contribution at the nearest saltmarsh habitat would be 2.1% of the Critical Load at receptors E1_1, E1_2 and E1_3. As this is above the 1% screening threshold, it is therefore necessary to examine the output from the modelling in greater detail to establish whether this elevation in N deposition would result in any significant effects on the saltmarsh habitat.

10.6.66 The total annual N deposition predicted at these three receptors is 0.4 kg N/ha/yr, resulting from NOx and ammonia (NH_3), compared to the background deposition of 15.5 kg N/ha/yr. With the Proposed Development there would therefore be no exceedance of the Critical Load for this habitat type, which is 20 – 30 kg N/ha/yr. It is therefore assessed that N deposition resulting from the Proposed Development will result in a neutral effect on the Humber Estuary SPA/ SAC/ Ramsar/ SSSI that is not significant.

Acid Deposition

10.6.67 For acid deposition (keq/Ha/year), the air quality impact assessment identified that there would be no exceedances of the 1% Critical Level screening threshold for potential adverse effects on sensitive habitat types within the Humber Estuary SAC/ SPA/ Ramsar/ SSSI. It is therefore concluded that there would be no significant effects on the Humber Estuary designated site as a result of acid deposition.

Sulphur Dioxide (SO_2)

10.6.68 For sulphur dioxide, the air quality impact assessment identified that there would be no exceedances of the 1% Critical Level screening threshold for potential adverse effects on sensitive habitat types within the Humber Estuary SAC/ SPA/ Ramsar/ SSSI. It is therefore concluded that there would be no significant effects on the Humber Estuary designated site as a result of SO_2 emissions from the Proposed Development.

Operation: Potential Effects on Humber Estuary SAC/ SPA/ Ramsar/ SSSI During Operation - Air Quality Impacts on Habitats (Cumulative)

10.6.69 A cumulative air quality impact assessment has been undertaken and a summary is presented in Chapter 17: Cumulative and Combined Effects in ES Volume I (Document Ref. 6.2).

APPENDIX 8: RELEVANT CROSS REFERENCED TEXT FROM PEA (DOCUMENT REF. 6.4.15) PARAGRAPH 4.1.2

Section 4: Methods

4.1 Desk Study

4.1.2 A stratified approach was taken when defining the desk study area, based on the likely worst case zone of influence of the Proposed Development on different ecological features, and an understanding of the maximum distances typically considered by statutory consultees. Accordingly, the desk study identified any international nature conservation designations within 10 km of the Main Development Area17, other statutory nature conservations designations within 2 km of the Main Development Area, local non-statutory nature conservation designations within 2 km of the Main Development Area, and protected and notable habitats and species within 1 km of the Main Development Area.

[17] This has been extended to reflect the potential zone of influence considered for developments that may result in changes in air quality.

APPENDIX 9: FIGURE 10C.2 FROM PEA (DOCUMENT REF. 6.4.15)

THIS DRAWING IS TO BE USED ONLY FOR THE PURPOSE OF ISSUE THAT IT WAS ISSUED FOR AND IS SUBJECT TO AMENDMENT

LEGEND

- Order Limits
- 2km Study Area
- 10km Study Area

National designated sites within 2km

- Priority Habitat

Non-statutory designations within 2km

- Local wildlife site
- Site of nature conservation interest

Statutory designations within 10km

- RAMSAR
- Special area of conservation
- Special protection area
- Site of special scientific interest

Purpose of Issue
ENVIRONMENTAL STATEMENT

Client
EP WASTE MANAGEMENT LTD

Project Title
SOUTH HUMBER BANK ENERGY CENTRE DCO

Application Document Ref
STATUTORY AND NON-STATUTORY DESIGNATIONS

Drawn	Checked	Approved	Date
LC	LD	LK	12/03/2020

AECOM Internal Project No.	Scale @ A3
60580855	1:80,000

AECOM
One Trinity Gardens
Quayside
Newcastle upon Tyne
NE1 2HF
T +44 (0)191 224 6500
www.aecom.com

Drawing Ref
FIGURE 10C.2

Rev

0 2 4 6 8 10 km

N

File Name:\\ukitk2pfpsw001\LE_Projects\Newproje\60580855 - Project Kaala aka SHBEC\CAD_GIS\Workspace\EIA Drawings 2020\Appendix10C.2_Statutory_and_Non-statutory_Designations.mxd

APPENDIX 10: QUALIFICATIONS AND EXPERIENCE OF ECOLOGISTS CONTRIBUTING TO THE HRA

NAME	AECOM ROLE	QUALIFICATIONS/ MEMBERSHIPS	YEARS OF PROFESSIONAL EXPERIENCE	SUMMARY OF EXPERIENCE AND EXPERTISE	CONTRIBUTION TO EcIA (ES CHAPTER 10, APPENDICES AND HRAREPORT)
E. Checkley*	Senior Ecologist	BSc (Hons) Wildlife Conservation Graduate member CIEEM	5	Ecological survey and assessment and experienced across all fields of ecology (including habitats, bats, amphibians, water vole, dormouse, reptiles, otter, badger, aquatic macrophytes). Regularly completes PEA, EcIA and HRA for a range of projects across private and public sector.	PEA report (Document Ref. 6.4.15). Reptile survey report (Document Ref. 6.4.18). Aquatic macroinvertebrates and macrophyte survey report (Document Ref. 6.4.16). HRA Report (Document Ref. 5.8).
L. Deacon	Associate Ecologist	BSc (Hons) Biological Sciences PhD Microbial Ecology Chartered Environmentalist (CEnv) Full member CIEEM	20	Ecological survey and assessment and experienced across all fields of ecology (including habitats, reptiles, otter, water vole, amphibians, bats and badgers) Regularly completes PEA, EcIA and HRA for a range of projects	PEA report (Document Ref. 6.4.15). Ecology Chapter (Document Ref. 6.2.10). HRA Report (Document Ref. 5.8).

				across private and public sector. Environmental management and academic experience post-degree, including lecturing, research and publication in peer reviewed journals. Biodiversity net gain specialist.	
J. Atkinson	Associate Ecologist	BSc (Hons) Zoology Full member CIEEM	17	Experienced in Phase 1 Habitat surveys, scoping and surveying for a range of protected species (including breeding birds, wintering birds, reptiles, otter, water vole, amphibians, white-clawed crayfish, bats, badgers). Regularly completes PEA, EcIA and HRA for a range of projects across private and public sector.	Otter and water vole report (Document Ref. 6.4.17). Ecology Chapter (Document Ref. 6.2.10). HRA Report (Document Ref.5.8).
J. Riley	Habitats Regulation Assessment (HRA) Practice Area Lead	BSc (Hons) Biology MSc Crop Protection PhD Calcareous grassland	22	HRA specialist, lecturer and trainer (providing HRA training to local authorities and RTPI). Co-ordinates technical standards on HRA within	HRA Report (Document Ref. 5.8)

		restoration to hard rock quarries Chartered Environmentalist (CEnv)		AECOM and completes technical reviews. Led HRA work on numerous high profile projects including the Thames Tideway Tunnel, the expansion of Seabank Power Station, the expansion of the Army Training Estate at Salisbury Plain SAC/SPA, the undergrounding of powerlines across the New Forest SPA /SAC and dozens of projects on behalf of both applicants and local authorities. Part of the authorship team for the Institute of Air Quality Management guidance on assessing impacts on nature conservation sites and is currently working with the Chartered Institute of Ecology & Environmental Management on air quality impact assessment advice for	

				ecologists likely to be published later in 2020.	

*No longer at AECOM

APPENDIX 11: SUMMARY OF BASELINE BIRD RECORDS

Extracted from ES Volume I Chapter 10: Ecology (Document Ref. 6.2.10):

Table 10.7: Peak counts and importance of Site to wintering birds (Field 39)

SPECIES	PEAK COUNT ON SITE (2007/08)	HUMBER ESTUARY 5-YEAR MEAN PEAK COUNT	PERCENTAGE OF HUMBER ESTUARY POPULATION ON SITE	THRESHOLD FOR INTERNATIONAL IMPORTANCE
Turnstone	2	249	0.8%	1,400
Redshank	1	3,368	0.03%	2,400
Curlew	7	2,806	0.2%	8,400

Table 10.8: Peak counts and importance of Site to wintering birds (Field 37)

SPECIES	PEAK COUNT ON SITE (2006/07 – 2010/11)	HUMBER ESTUARY 5-YEAR MEAN PEAK COUNT	PERCENTAGE OF HUMBER ESTUARY POPULATION ON SITE	THRESHOLD FOR INTERNATIONAL IMPORTANCE
Curlew	75	2,806	**2.7%**	8,400
Golden plover	228	33,994	0.7%	9,300
Lapwing	510	11,702	**4.4%**	20,000
Ringed plover	17	1,089	**1.6%**	730
Black-tailed godwit	15	2,951	0.5%	610
Mallard	46	1,204	**3.8%**	20,000

Table 10.9: Peak counts and importance of Site to wintering birds (Fields 30 and 31)

SPECIES	PEAK COUNT ON SITE 2006/07 – 2010/11	HUMBER ESTUARY 5-YEAR MEAN PEAK COUNT	PERCENTAGE OF HUMBER ESTUARY POPULATION ON SITE	THRESHOLD FOR INTERNATIONAL IMPORTANCE
Curlew	41	2,806	**1.5%**	8,400
Golden plover	3,600	33,994	**10.6%**	9,300
Lapwing	1,130	11,702	**9.7%**	20,000
Ringed plover	16	1,089	**1.5%**	730
Mallard	6	1,204	0.5%	20,000