

# **RWE**

## **Stallingborough Combined Cycle Gas Turbine and Carbon Capture Plant**

**The Environmental Impact Assessment Scoping  
Report**

**The Planning Act 2008**

**The Infrastructure Planning (Environmental Impact  
Assessment) Regulations 2017 – Regulation 10  
(Application for a Scoping Opinion)**

**Applicant: RWE Generation UK PLC**

**Project Reference: EN010161**

**February 2024**

# Glossary

<b>Abbreviation</b>	<b>Description</b>
AADT	Annual Average Daily Traffic
ADMS	Atmospheric Dispersion Modelling System
AGI	Above Ground Installation
AILs	Abnormal Indivisible Loads
ALC	Agricultural Land Classification
APIS	Air Pollution Information System
AQMA	Air Quality Management Area
ASNW	Ancient Semi Natural Woodland
ATC	Automatic Traffic Counts
BAT	Best Available Techniques
BBPP	Breeding Bird Protection Plan
BGL	Below Ground Level
BGS	British Geological Survey
BMHW	Below Mean High Water
BMV	Best and Most Versatile
BNG	Biodiversity Net Gain
CCA	Civil Contingency Act
CCC	Committee for Climate Change
CCGT	Combined Cycle Gas Turbine
CCP	Carbon Capture Plant
CCR	Carbon Capture Readiness
CCRA	Climate Change Resilience Assessment
CCS	Carbon Capture & Storage
CCUS	Carbon Capture Utilisation and Storage
CDOIF	Chemical and Downstream Oil Industries Forum
CEFAS	Centre for Environment, Fisheries and Aquaculture Science
CEMP	Construction Environmental Management Plan
CH <sub>4</sub>	Methane
CHP	Combined Heat and Power
CIFA	Chartered Institute for Archaeologists
CL:AIRE	Contaminated Land: Applications in Real Environments
CLJSPC	Central Lincolnshire Joint Strategic Planning Committee
CNMP	Construction Noise Management Plan
CO <sub>2</sub>	Carbon Dioxide
COMAH	Control of Major Accident Hazards
CSM	Conceptual Site Model
CTMP	Construction Traffic Management Plan
DBA	Desk-Based Assessment
DCO	Development Consent Order
DECC	Department for Energy and Climate Change
DEFRA	Department for the Environment, Food and Rural Affairs
DESNZ	Department for Energy Security and Net Zero
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges

<b>Abbreviation</b>	<b>Description</b>
DowCop	Development of Waste Codes of Practice
DPD	Development Plan Documents
DrWPA	Drinking Water Protected Area
DTM	Digital Terrain Model
EA	Environment Agency
EcIA	Ecological Impact Assessment
eDNA	Environmental DNA
EfW	Energy from Waste
EEA	European Environment Agency
EIA	Environmental Impact Assessment
EIA Regula- tions	The Infrastructure Planning (Environmental Impact Assessment) Regula- tions 2017
EMFs	Electromagnetic Fields
ES	Environmental Statement
ESSSI	Estuary Site of Special Scientific Interest
EUNIS	European University Information Systems organisation
EWP	Energy White Paper
CEMP	Construction Environmental Management Plan
FRA	Flood Risk Assessment
GB	Great Britain
GBTS	Great Britain Tourism Study
GCN DLL	Great Created Newt District Level Licensing
GGRs	Greenhouse Gas Removals
GHG	Greenhouse Gases
GI	Ground Investigation
GW	Gigawatts
GWDTE	Groundwater Dependent Terrestrial Ecosystem
ha	Hectares
HER	Historic Environment Record
HFCs	Hydrofluorocarbons
HGV	Heavy Goods Vehicle
HIA	Health Impact Assessment
HIS	Habitat Suitability Index
HLC	Humber Low Carbon Cluster
HPI	Habitats of Principal Importance
HRA	Habitats Regulations Assessment
HRSG	Heat Recovery Steam Generator
HSE	Health and Safety Executive
HSI	Habitat Suitability Index
HUDU	Healthy Urban Development Unit
HV	High Voltage
IAMMWG	Inter-Agency Marine Mammal Working Group
IAQM	Institute of Air Quality Management
ICCI	In-Combination Climate Change Impact
ICE	Inventory of Carbon and Energy
IDB	Internal Drainage Board
IED	Industrial Emissions Directive

<b>Abbreviation</b>	<b>Description</b>
IEMA	Institute of Environmental Management and Assessment
IMD	Index of Multiple Deprivation
INECP	Integrated National Energy and Climate plan
INNS	Invasive Non-Native Species
kV	Kilovolt
LCA	Landscape Character Area
LCA	Local Character Areas
LCC	Lincolnshire County Council
LCRM	Land Contamination: Risk Management
LGS	Local Geological Sites
LHA	Local Highway Authorities
LiDAR	Light Detection and Radar
LIR	Local Impact Reports
LNR	Local Nature Reserve
LOAEL	Lowest Observed Adverse Effect Level
LoD	Limits of Deviation
LSOA	Lower Super Output Areas
LWS	Local Wildlife Site
MA&D	Major Accidents and Disasters
MAGIC	Multi-Agency Geographical Information for the Countryside
MAOD	Metres above Ordnance Datum
MCA	Marine Character Area
MCZ	Marine Conservation Zone
MHWM	Mean High Water Mark
MHWS	Mean High Water Springs
MMO	Marine Management Organisation
MPS	Marine Policy Statement
MSA	Mineral Safe Guarding Area
MSAs	Minerals Safeguarding Areas
MtCO <sub>2e</sub>	Metric Tons of Carbon Dioxide-equivalent
MU	Management Units
MW	Megawatt
MWe	Megawatts Electrical Output
N <sub>2</sub> O	Nitrous Oxide
NCA	National Character Area
NELC	North East Lincolnshire Council
NELLCA	North East Lincolnshire Landscape Character Assessment, Sensitivity and Capacity Study 2015
NERC	Natural Environment and Rural Communities
NERC	Natural Environment Research Council
NF <sub>3</sub>	Nitrogen Trifluoride
NH	National Highways
NHBC	National Housing Building Council
NHLE	National Heritage List for England
NIC	National Infrastructure Commission
NLC	North Lincolnshire Council
NM	Nautical Mile

<b>Abbreviation</b>	<b>Description</b>
NNR	National Nature Reserve
NO <sub>2</sub>	Nitrogen Dioxide
NOEL	No Observed Effect Level
NO <sub>x</sub>	Oxides of nitrogen
NPPF	National Planning Policy Framework
NPS	National Policy Statement
NPSE	Noise Policy Statement for England
NRHE	National Record of the Historic Environment
NSIP	Nationally Significant Infrastructure Project
NSR	Noise Sensitive Receptors
NTS	Non-Technical Summary
NVZ	Nitrate Vulnerable Zone
ONS	Office for National Statistics
OS	Ordnance Survey
OSPAR	Oslo and Paris Conventions Regions
PAS	Publicly Available Standard
PC	Process contributions
PEA	Preliminary Ecological Appraisal
PEI	Preliminary Environmental Information
PEIR	Preliminary Environmental Information Report
PFCs	Perfluorocarbons
PHE	Public Health England
PIA	Personal Injury Accident
PINS	Planning Inspectorate
PPG	Planning Practice Guidance
PPV	Peak Particle Velocity
PRoW	Public Right of Way
PWS	Public Water Supplies
RBMP	River Basin Management Plan
RFSW	Risk of Flooding from Surface Water
SAC	Special Area of Conservation
SCANS	Small Cetacean Abundance in the European Atlantic and North Sea
SCR	Selective Catalytic Reduction
SF <sub>6</sub>	Sulphur hexafluoride
SFRA	Strategic Flood Risk Assessments
SHG	South Humber Gateway
SLR	Sea Level Rise
SMS	Strategic Mitigation Site
SMU	Seal Management Units
SNIC	Sites of Nature Conservation Importance
SOAEL	Significant Observed Adverse Effect Level
SoCC	Statement of Community Consultation
SoS	Secretary of State
SPA	Special Protection Area
SPI	Species of Principal Importance
SPZ	Source Protection Zone
SRN	Strategic Road Network

<b>Abbreviation</b>	<b>Description</b>
SSC	Suspended Sediment Concentrations
SSSI	Site of Special Scientific Interest
SuDS	Sustainable Urban Drainage System
TA	Transport Assessment
TIFALARP	Tolerable if As Low As Reasonably Practicable
TWh	Terawatt Hours
UK	The United Kingdom of Great Britain and Northern Ireland
UNDRR	United Nations Office for Disaster Risk Reduction
VOR	Very High Frequency Omni-Directional Range
VP	Vantage Point
WFD	Water Framework Directive
WFDA	Water Framework Directive Assessment
WHO	World Health Organisation
WLDC	West Lindsey District Council
WRAP	Waste Resources Action Plan's
WRAP	Waste and Resources Action Programme
ZOI	Zone of Influence
ZTV	Zone of Theoretical Visibility

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# 1. Introduction

## 1.1 Background

- 1.1.1 AECOM Ltd ('AECOM') has been commissioned by RWE Generation UK Plc (hereafter referred to as 'the Applicant') to prepare this Environmental Impact Assessment (EIA) Scoping Report to support an application for a scoping opinion under Regulation 10(1) ('Application for scoping opinion') of The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 ('the EIA Regulations'). The Applicant intends to develop a Combined Cycle Gas Turbine generating plant (CCGT) with a gross electrical output capacity of up to 900 megawatts of electrical output (MWe) fitted with carbon capture plant (CCP) and associated natural gas pipeline and electrical grid connection (referred to as 'the Proposed Development'). The Proposed Development will also include infrastructure for the abstraction of cooling water from the Humber Estuary and the discharge of treated water into the Humber Estuary. The Proposed Development will be the subject of a Development Consent Order (DCO) application under the Planning Act 2008 ('the 2008 Act') (hereafter referred to as 'the Application').
- 1.1.2 The location of the Proposed Development in the context of the wider area is shown in Figure 1A and the indicative Site and Main Site boundaries are shown on a smaller scale in Figure 1B (Appendix A). The indicative locations of each element of the Proposed Development are provided in Figure 1C (Appendix A).
- 1.1.3 At this stage the final technology selection for the CCGT and CCP is subject to ongoing technical studies and will be influenced by future UK Government policy. The design parameters set out in this report therefore incorporate a necessary degree of flexibility to allow for the future selection of the preferred technology in the light of prevailing policy and market conditions. It is considered that sufficient information is available at this stage to define the scope of the EIA.
- 1.1.4 A feasibility study is currently being undertaken to determine the route of a high voltage (HV) electricity cable that will be required to connect the Proposed Development to a National Grid substation. The existing National Grid Grimsby West Substation has been identified as a potential connection point (as shown on Figure 1C in Appendix A) until further information is available regarding potential other substations that may be planned by National Grid as part of the Grimsby to Walpole upgrade and available for connection<sup>1</sup>. However, discussions regarding other connection points are underway with National Grid and the full detail of any optionality and potential environmental effects if such option(s) are taken forward will be set out in the ES. There are also two natural gas pipeline corridor options being considered which travel northwest across the Site to supply natural gas, which are subject to further feasibility studies. The extent of the route corridors has been established at this options appraisal stage to provide flexibility in the

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<sup>1</sup> National Grid infrastructure projects: Grimsby to Walpole: <https://www.nationalgrid.com/electricity-transmission/network-and-infrastructure/infrastructure-projects/grimsby-to-walpole>  
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routing to avoid environmental, planning and land constraints, as well as physical features given the volume of existing utilities known in the vicinity of the Site.

- 1.1.5 It is intended that the captured carbon dioxide (CO<sub>2</sub>) from the Proposed Development will be transported to a storage site under the North Sea off the east coast of the UK. The Harbour Energy Viking Carbon Capture & Storage (CCS) Transportation and Storage Scheme (hereafter referred to as ‘the Viking CCS scheme’) is a new 55 km onshore CO<sub>2</sub> pipeline which is proposed to cross through the Proposed Development Site (refer to Figure 8A). The Applicant is a capture partner of the Viking CCS scheme and therefore the Applicant’s preferred option is for transport via a new CO<sub>2</sub> pipeline that connects the Proposed Development to the Viking CCS scheme to be achieved via a separate consent. However, other delivery partners are being considered for the transport of the CO<sub>2</sub> and the full details of any optionality and potential environmental effects if such option(s) are taken forward will be set out in the ES.
- 1.1.6 The Viking CCS DCO application<sup>2</sup> (Planning Inspectorate reference EN070008) has been accepted by the Planning Inspectorate on 17 November 2023 for examination and is anticipated to be consented around Q2 2025, prior to submission of the Applicant’s DCO application. The Viking CCS scheme will therefore be considered as a Tier 1 scheme following Planning Inspectorate (PINS) Advice Note 17: Cumulative Effects Assessment (Ref 1-1) as part of the cumulative assessment within the Applicant’s ES. The new CO<sub>2</sub> pipeline will also be considered as part of the cumulative assessment as further information regarding its delivery (including location corridor and potential tie-in points) becomes available.
- 1.1.7 This EIA Scoping Report considers the environmental context of the Proposed Development Site (herein referred to as ‘the Site’) and surrounding areas and provides an explanation of the likely significant effects of the Proposed Development. Where impacts are considered to have the potential to cause likely significant environmental effects, these are identified and the proposed approach to be used to characterise the impacts and understand the likely significance of their effects is outlined. This report also identifies environmental topics where no likely significant effects are anticipated, and which it is proposed can be scoped out of the EIA.
- 1.1.8 The EIA is an iterative process that feeds into the engineering design process to seek to mitigate likely significant environmental effects where they are predicted to occur. The final outline design iteration, along with the findings of the EIA will be reported in an Environmental Statement (ES), in accordance with the EIA Regulations and will be submitted with the DCO Application in accordance with Regulation 5 (2)(a) of the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (as amended) (‘APFP Regulations’).

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<sup>2</sup> The scope of the Viking CCS DCO Application comprises the onshore elements including receipt of CO<sub>2</sub> at the Immingham Facility, its onshore transportation in a new 55 km onshore pipeline to the Theddlethorpe Facility, and onward transportation through the existing Lincolnshire Offshore Gas Gathering System (LOGGS) pipeline prior to offshore connection.  
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## 1.2 Definitions

1.2.1 For the purposes of this report, the following definitions have been used (see Figure 1C in Appendix A):

- ‘The Proposed Development’ refers to the CCGT fitted with CCP and all associated infrastructure.
- The ‘Main Site’ is a term to reflect the CCGT and CCP site only (see Figure 1A in Appendix A). Part of the Main Site is identified as a ‘Strategic Mitigation Site’ in North East Lincolnshire Council’s (NELC) Local Plan (see paragraph 2.1.22.1.2 and Figure 1D in Appendix A).
- ‘The Site’ is a term used to describe the whole site of the Proposed Development, as shown on Figure 1A and Figure 1B, including the Main Site as well as the gas pipeline route corridor, electrical grid connection route corridor, the off-site laydown area, and all other associated development (including the potential abstraction and discharge locations area) (see Figure 1A in Appendix A).
- The ‘gas pipeline route corridors’ is a term used to describe the area within which a new natural gas pipeline is proposed to connect the Main Site to National Grid’s Gas Transmission’s Feeder 9 Pipeline (see paragraph 3.1.4 and Figure 1C in Appendix A).
- The ‘electrical grid connection route corridor’ is a term used to describe the area within which a new HV electricity cable is proposed to connect the Proposed Development to the National Grid Grimsby West Substation or potential other substation that may be planned as part of the Grimsby to Walpole upgrade and available for connection (see paragraph 4.2.3 and Figure 1C in Appendix A).
- The proposed ‘off-site laydown area’ is a term used to describe the Grimsby Combined Heat and Power (CHP) plant (see paragraph 3.5.63.5.6 and Figure 1C in Appendix A).
- The ‘potential abstraction and discharge location area’ is a term used to describe the area required for the ‘abstraction and discharge pipeline(s)’ and associated infrastructure within the marine environment to facilitate the cooling water process proposed (see Figure 1C in Appendix A).

## 1.3 Strategic Context

- 1.3.1 Decarbonisation and the need to move to low carbon generation is the key challenge for the UK’s power industry to reach the Net Zero 2050 targets and in 2021 the UK Government pledged a commitment to decarbonise the UK’s electricity system by 2035.
- 1.3.2 The Committee on Climate Change (CCC) has a stated need to invest in and deploy carbon capture and negative emissions technology at scale in order to reach the UK’s target of net zero by 2050 (CCC, 2019).
- 1.3.3 The development of clean gas generation projects would form an important part of a robust and comprehensive energy network that ensures the UK has stable and secure generation whenever it is needed.

## 1.4 The Applicant

- 1.4.1 The Applicant and its affiliate companies are one of Europe’s largest energy companies, supplying 15% of the UK’s electricity. They have invested extensively to drive pioneering low carbon and renewable energy projects across the UK. These include offshore and onshore wind farms, solar, low carbon CCGT plants, green hydrogen, battery storage, biomass, and innovative carbon capture projects. The Applicant’s dedication to clean energy and modern infrastructure continues to contribute significantly to the UK’s position as a leader in the global energy transition.

## 1.5 Consenting Regime

### **Nationally Significant Infrastructure Project**

- 1.5.1 Part 3, Section 14 of the 2008 Act defines the types of development that constitute a ‘nationally significant infrastructure project’ (NSIP) and require development consent under Section 31. In the ‘field’ of energy these include generating stations, electric lines, underground gas storage facilities, LNG facilities, gas reception facilities, gas transporter pipelines and other forms of pipeline.
- 1.5.2 The Proposed Development falls within the definition of an NSIP under Section 14(1)(a) and 15(2) of the 2008 Act as an onshore ‘generating station exceeding 50 MW’.
- 1.5.3 In addition, if the electrical connection between the Main Site and the National Grid Grimsby West substation (or potential other substation that may be planned as part of the Grimsby to Walpole upgrade) is above ground, then it will also constitute a NSIP under Section 14(1)(b) and 16 of the 2008 Act as it will be more than 2 km in length and have a nominal voltage of more than 132 kilovolts (kV). Should the electrical connection be underground, then this element of the Proposed Development will not form an NSIP in its own right. The natural gas pipeline to the Main Site will not comprise an NSIP under Section 20 (gas transporter pipelines) of the 2008 Act as it will not be more than 40 km in length nor will it comprise an NSIP under Section 21 (other pipelines) as it will be less than 16 km in length. The other elements of the Proposed Development do not represent NSIPs in their own right.

### **Requirements for a Development Consent Order**

- 1.5.4 The Applicant is required to seek a DCO to construct and operate the Proposed Development under Section 31 of the 2008 Act. Section 37 of the 2008 Act also governs the form, content and accompanying documents that are required as part of a DCO application. The requirements are implemented through the APFP Regulations which state that an application must be accompanied by an ES, where a development is considered to be ‘EIA development’ under the EIA Regulations.
- 1.5.5 Section 115(1)(b) of the 2008 Act sets out that development consent may be granted for development, which is ‘associated development’, which is development that is not an NSIP in its own right but is functionally related to the NSIP. Further guidance is provided in “Guidance on associated development

applications for major infrastructure projects” (the “Guidance”) prepared by the Department for Communities and Local Government in April 2013. The Guidance sets out that it is for the Secretary of State (SoS) to decide on a case-by-case basis whether or not associated development should be treated as associated development, taking into account the core principles outlined below.

- 1.5.6 The definition of “associated development” requires a direct relationship between associated development and the principal development. Associated development should therefore either support the construction or operation of the principal development or help address its impacts.
- 1.5.7 Associated development should not be an aim in itself but should be subordinate to the principal development.
- 1.5.8 Development should not be treated as associated development if it is only necessary as a source of additional revenue for the applicant, in order to cross-subsidise the cost of the principal development. This does not mean that the applicant cannot cross-subsidise, but if part of a proposal is only necessary as a means of cross-subsidising the principal development then that part should not be treated as associated development.
- 1.5.9 Associated development should be proportionate to the nature and scale of the principal development. However, this core principle should not be read as excluding associated infrastructure development (such as a network connection) that is on a larger scale than is necessary to serve the principal development if that associated infrastructure provides capacity that is likely to be required for another proposed major infrastructure project. When deciding whether it is appropriate for infrastructure which is on a larger scale than is necessary to serve a project to be treated as associated development, each application will have to be assessed on its own merits. For example, the SoS will have regard to all relevant matters including whether a future application is proposed to be made by the same or related developer as the current application, the degree of physical proximity of the proposed application to the current application, and the time period in which a future application is proposed to be submitted.
- 1.5.10 It is anticipated that the potential cooling water infrastructure pipelines leading into the Humber Estuary, the natural gas supply pipeline, underground HV electricity cable and CCP are likely to be classed as associated development.
- 1.5.11 The Application will be submitted to PINS which will appoint an Examining Authority to examine the DCO Application and make a recommendation to the SoS for the Department for Energy Security and Net Zero (DESNZ) pursuant to the 2008 Act, who will subsequently determine whether or not a DCO should be granted for the Proposed Development.

### **Requirement for an Environmental Impact Assessment**

- 1.5.12 Regulation 3(1) of the EIA Regulations defines the meaning of ‘EIA development’ (with reference to Schedules 1 and 2 to the EIA Regulations). Schedule 1 to the EIA Regulations, which describes developments for which an EIA is necessary, includes:

*“thermal power stations, and other combustion installations, with a heat output of 300 megawatts or more” and;*

*“23. Installations for the capture of carbon dioxide streams for the purposes of geological storage pursuant to Directive 2009/31/EC from installations referred to in this Schedule, or where the total yearly capture of carbon dioxide is 1.5 megatonnes or more”.*

- 1.5.13 EIA is compulsory for Schedule 1 developments given that the type and/or the scale of the development is likely to have the potential for significant effects on the environment.
- 1.5.14 Given its capacity and the nature of the proposed activities, the Proposed Development will therefore be ‘EIA development’ and consequently a formal EIA screening opinion is not being sought from the SoS.
- 1.5.15 As the Applicant proposes to provide an ES with the Application for a DCO, this report constitutes the Applicant’s notification under Regulation 8 (1b) of the EIA Regulations.
- 1.5.16 Having determined that an ES will be included as part of the Application for development consent, which will present the details of the EIA of the Proposed Development, in accordance with Regulation 10(1) of the EIA Regulations, the Applicant is applying to the SoS for their opinion as to the scope and level of detail of the information to be provided in the ES.
- 1.5.17 A description of the existing land-use within and in proximity to the Site and an overview of the Proposed Development is presented in Sections 2 and 3 of this report.

### **Marine Licence**

- 1.5.18 Given that the potential abstraction and discharge locations are within the marine environment, the application for a DCO for the Proposed Development will need to consider the need to obtain a Marine Licence. The Marine and Coastal Access Act (MCAA) 2009 states that a Marine Licence is required for construction work undertaken beneath Mean High Water Spring (MHWS) tide level. Consultation regarding the Marine Licence and any associated assessment requirements will be held with the Marine Management Organisation (MMO) and other key stakeholders (e.g., the Environment Agency and Natural England) as the EIA/DCO application progresses.

## **1.6 Objectives of Scoping**

- 1.6.1 The scoping phase of the EIA process provides a framework for identifying potential environmental impacts arising from the Proposed Development, establishing the likely significant environmental effects, and distinguishing the priority issues to be addressed within the ES. Scoping also allows stakeholders an early opportunity to comment on the proposed methodology for the EIA and the structure and content of the ES.

- 1.6.2 This Scoping Report has been prepared in accordance with the relevant legislative provisions and Advice Notes published by PINS.
- 1.6.3 Table 1.1 presents a list of information that should be included in a request for a Scoping Opinion, as prescribed by Regulation 10(3) of the EIA Regulations and further described in Regulation 8(3) of the EIA Regulations. The final column of Table 1.1 sets out where the required information is set out in this scoping report.

**Table 1.1 Information Required for a Request for Scoping Opinion**

<b>Description of Information Required (Regulation 10(3))</b>	<b>Supplementary Descriptions (Regulation 8(3))</b>	<b>Section in Scoping Report where presented</b>
A plan sufficient to identify the land	-	Figure 1A and Figure 1B (Appendix A)
A description of the Proposed Development, including its location and technical capacity	A description of the physical characteristics of the whole development; and a description of the location of the development, with particular regard to the environmental sensitivity of geographical areas likely to be affected.	Section 2, Section 3 and Figure 1C (Appendix A)
An explanation of the likely significant effects of the development on the environment	...resulting from: the expected residues and emissions and the production of waste, where relevant; and the use of natural resources, in particular soil, land, water and biodiversity.	Section 6
Such other information or representations as the person making the request may wish to provide or make		

- 1.6.4 Table 1.2 presents the information highlighted in paragraph 4.2 (and associated Insert 2) of PINS Advice Note 7 ‘Environmental Impact Assessment: Preliminary Environmental Information and Environmental Statements’ regarding the content of a Scoping Report, including signposting to the location in this report where the information is presented.

**Table 1.2 Information provided in the Scoping Report (based on PINS Advice Note 7 (Ref 1-2))**

<b>Description of Information Required</b>	<b>Section in Scoping Report where the Information is Presented</b>
<b>The Proposed Development</b>	
<ul style="list-style-type: none"> <li>an explanation of the approach to addressing uncertainty where it remains</li> </ul>	<ul style="list-style-type: none"> <li>Section 3</li> </ul>

Description of Information Required	Section in Scoping Report where the Information is Presented
<p>in relation to elements of the Proposed Development, e.g., design parameters;</p> <ul style="list-style-type: none"> <li>referenced plans presented at an appropriate scale to clearly convey the information and all known features associated with the Proposed Development;</li> </ul>	<ul style="list-style-type: none"> <li>Figure 1A, Figure 1B and Figure 1C (Appendix A)</li> </ul>
<p><b>EIA Approach and Topic Areas</b></p> <ul style="list-style-type: none"> <li>an outline of the reasonable alternatives considered and the reasons for selecting preferred option;</li> <li>a summary table depicting each of the aspects and matters that are requested to be scoped out allowing for quick identification of issues;</li> <li>a detailed description of the aspects and matters proposed to be scoped out of further assessment with justification provided;</li> <li>results of desktop and baseline studies where available and where relevant to the decision to scope in or out aspects or matters;</li> <li>aspects and matters to be scoped in, the report should include details of the methods to be used to assess impacts and to determine significance of effect, e.g., criteria for determining sensitivity and magnitude;</li> <li>any avoidance or mitigation measures proposed, how they may be secured and the anticipated residual effects.</li> </ul>	<ul style="list-style-type: none"> <li>Section 4 (Consideration of Alternatives)</li> <li>Section 9 (Summary)</li> <li>Section 7 (Matters to be scoped out)</li> <li>Section 6 ('Baseline Conditions' sub-section of each of the environmental topic sections) and Section 8 (EIA Process)</li> <li>Section 6 (Potential Significant Environmental Issues for each environmental topic and 'Impact Assessment' sub-sections)</li> <li>Section 6 ('Scope for Mitigation' sub-section of each environmental topic section)</li> </ul>



Description of Information Required	Section in Scoping Report where the Information is Presented
<p><b>Information sources</b></p> <ul style="list-style-type: none"> <li>• references to any guidance and best practice to be relied upon;</li> <li>• evidence of agreements reached with consultation bodies (for example the statutory nature conservation bodies or local authorities);</li> <li>• an outline of the structure of the proposed ES.</li> </ul>	<ul style="list-style-type: none"> <li>• Section 6 ('Legislation, Policy and Guidance' sub-section of each of the environmental topic sections)</li> <li>• Consultation with stakeholders has commenced but evidence of agreements is not available at the time of writing.</li> <li>• Section 8.2 (Structure of the ES)</li> </ul>

Source: Advice Note Seven.

## 1.7 Structure of Scoping Report

1.7.1 The remainder of the report is structured as follows:

- Section 2 – Description of the Existing Environment: provides a description of the Site (including the Main Site) and the surrounding area, together with any potentially significant environmental sensitivities/receptors within the vicinity of the Site;
- Section 3 – The Proposed Development: outlines the key elements of the Proposed Development, the infrastructure to be developed and the function of the operational plant;
- Section 4 – Consideration of Alternatives: details the alternatives that have been considered during development of the Proposed Development design;
- Section 5 – Legislation and Policy Context: identifies the key documents relating to national and local planning policy in the area, together with a summary of some of the principal planning policies or provisions as relevant to the need for Proposed Development;
- Section 6 – Potentially Significant Environmental Issues: provides a discussion of how the Proposed Development may interact with the different aspects of the receiving environment, together with a description of the proposed assessment methodologies, guidance, and best practice to be adopted for the EIA of the Proposed Development;
- Section 7 – Aspects to be Scoped Out: provides a summary of the issues proposed to be scoped out of the EIA and reasoning why;
- Section 8 – Environmental Impact Assessment Process: provides an overview of the approach to be taken in the EIA and outline structure for the proposed ES;
- Section 9 – Summary: provides a summary of matters proposed to be scoped in and out of the EIA;

- Section 10 – References;
- Appendix A – Figures, referenced within this report:
  - Figure 1A: Site Location Plan;
  - Figure 1B: Indicative Site and Main Site Boundaries;
  - Figure 1C: Indicative Site Layout;
  - Figure 1D: Components of the Main Site;
  - Figure 2A: Statutory Designated Ecological Sites;
  - Figure 2B: Non-Statutory Designated Ecological Sites;
  - Figure 2C: Water Receptors within 5 km of the Site;
  - Figure 2D: Designated Heritage Assets within 1 km, 3 km and 5 km of the Site;
  - Figure 2E: Other Constraints within 5 km of the Site;
  - Figure 6A: Study Area Deprivation;
  - Figure 6B: Wider Impact Area Deprivation;
  - Figure 6C: Risk of Flooding from Surface Water;
  - Figure 6D: Local Road Network;
  - Figure 6E: HGV routing for the Main Site and Proposed Off-Site Laydown Area;
  - Figure 6F: HGV routing for the Potential Gas Pipeline Installation;
  - Figure 6G: HGV routing for the Potential Electrical Grid Connection Installation;
  - Figure 6H: Proposed Automatic Traffic Count Locations;
  - Figure 6I: Noise Sensitive Human Receptors around the Main Site;
  - Figure 6J: Marine Ecology Indicative Study Area and Designated Sites;
  - Figure 6K: Terrestrial Ecology Survey Areas; and
  - Figure 8A: Other Developments to be Considered in Cumulative Impact Assessment.

## 2. Description of the Existing Environment

### 2.1 The Site and Main Site

2.1.1 The Main Site of the Proposed Development is located just off Hobson Way on the south bank of the Humber Estuary (DN418BZ) and is approximately 35.7 hectares in size. It is situated between South Humber Bank Power Station to the north and Oldfield Drain to the South with Lenzing Fibers just beyond. The village of Stallingborough is approximately 3.5 km to the west. The Humber Estuary is located immediately to the east separated from the Main Site by concrete sea wall flood defences (see Figure 1D in Appendix A).

2.1.2 Figure 1C (Appendix A) shows the Main Site indicative boundary within which the CCGT and CCP elements of the Proposed Development will be located. The natural gas pipeline route corridor, electrical grid connection route corridor and potential abstraction and discharge locations area will connect into the CCGT at the Main Site. Figure 1C also identifies the following elements of the Main Site:

- The Main Site Strategic Mitigation Site: Approximately half of the Main Site (the eastern area closest to the Humber Estuary in green hatching on Figure 1C), which is currently part of an arable field, is identified within NELC's Local Plan as a proposed strategic mitigation area. The Local Plan states that Policy 9 "supports a strategic approach to provision against which all developers within the Mitigation Zone will be required to make appropriate contributions in lieu of meeting site specific requirements". For avoidance of doubt, the mitigation areas assigned by Policy 9 are not sites designated under any legislative provision (see non-statutory designations shown on Figure 2B). This policy is not accompanied by land rights and the Main Site Strategic Mitigation Site is within the legal control of the Applicant.
- The rest of the Main Site: This comprises an arable field which meets the Humber Estuary at its eastern edge. It lies on the industrialised coastal strip between Immingham Dock in the north, and the Port of Grimsby in the south. The Main Site is surrounded on all three landward sides by former, existing, and/or consented developments. The sea wall and a small habitat area on the seaward side of the wall is also under the Applicant's land ownership.

2.1.3 As described in Section 1.2, 'the Site' includes the location of the Main Site as well as route corridors being considered for the natural gas pipeline, grid connection cable, off-site laydown area and abstraction/discharge infrastructure. The Site is indicative at this stage as the land required for the Proposed Development will be subject to appraisal and refinement as the preparation of the Application progresses. The final layout that will be incorporated within the proposed DCO

order limits will be determined through ongoing studies of potential constraints / opportunities and discussions with relevant stakeholders.

- 2.1.4 The CCGT and CCP will be located on the Main Site within the administrative boundary of NELC, however the natural gas pipeline route corridor and grid connection route corridors potentially cross into the administrative boundaries of West Lindsey District Council (WLDC) and North Lincolnshire Council (NLC).

## 2.2 History of the Main Site

- 2.2.1 The Main Site comprises an arable field that has been in agricultural use since at least the late 19<sup>th</sup> century and benefits from consent for the construction and operation of a biomass-fuelled electricity generating station. The original consent was granted in June 2008 under section 36 of the Electricity Act 1989 (local planning reference DC/303/07/IMM) (s36). In February 2010, a s36 application was submitted for an extension of time until 2011 (local planning reference DC/421/11/IMM). At the same time, a further s36 application was submitted for an amendment to the scheme, and in May 2012 the SoS granted this amendment with a further extension of time until May 2015 (local planning reference DC/151/10/IMM). These permissions were not implemented, and the land has continued to be used as an arable field to date.

- 2.2.2 All the environmental receptors are listed and described in the 'Baseline Conditions' sub-sections of each topic in Section 6: Potential Significant Environmental Issues.

## 2.3 Local Topography and Surrounding Land-Use of the Site

- 2.3.1 The Main Site lies on the partly industrialised coastal strip between Immingham Dock in the north, and the Port of Grimsby in the south. The Main Site is surrounded on all three landward sides by former, existing, and/or consented developments. Land within the Main Site is generally low lying at elevations below 5 m Above Ordnance Datum (AOD) and with very shallow gradients.
- 2.3.2 At its eastern boundary, the Main Site incorporates the concrete sea wall which separates the landward part of the site from the Humber Estuary. The sea wall is currently subject to a programme of sea defence improvement works being undertaken by the Environment Agency (planning reference DM/1071/22/FUL). This will involve revetment reinforcement by way of placing rock armour on the seaward side, and upgrade of the existing land drainage outfalls.
- 2.3.3 Various industrial units and a large pond are located beyond the southern boundary of the Main Site to the south of the Oldfield Drain. They are surrounded by grassland, scrub and woodland that have established in part over derelict post-industrial land, which itself was superimposed on former grazing marsh.
- 2.3.4 To the north, the Main Site is bound by the South Humber Bank Power Station, which is a CCGT facility that was initially constructed in 1994. Further

development has been consented within the grounds of that facility, comprising a separate energy from waste (EfW) power station known as the 'South Humber Bank Energy Centre' (consented under a DCO, PINS Reference: EN010107).

- 2.3.5 To the west, the Main Site meets the recently constructed Humber Bank Link Road (planning reference DM/0094/18/FUL). Beyond this to the west is former arable and industrial land, which now supports a complex of post-industrial habitat and drainage ditches, and has been granted planning consent for construction of a Waste-to-Sustainable Fuels Plant by Velocys 'Altalto' (planning reference DM/0664/19/FUL).
- 2.3.6 The rest of the Site is predominantly arable land which is interspersed with permanent pasture and some small woodland areas. The settlements of Stallingborough, Great Coates, Healing and Habrough are within the Site, although the gas pipeline route corridor and electrical grid connection route corridor will avoid villages and hamlets. Other built-up areas are predominantly clusters of industrial processes and commercial units. The A180 is the main road crossing between the northwest and the southeast of the Site. Other main roads within the Site include the A1136, B1210, and A1173. The Site also comprises the potential abstraction and discharge locations area within the marine environment. A description of baseline environmental conditions is provided for each technical topic in Section 6 of this document.

## 2.4 Environmental Receptors

- 2.4.1 A number of environmental receptors have been identified within and in the vicinity of the Site. Some of the receptors are described below under each environmental discipline (note that this is not intended to be an exhaustive list at this stage and will be developed as the EIA progresses and the Preliminary Environmental Information Report (PEIR) is produced). All distances are approximate and given as the shortest distance between the receptor and the closest point to either the Main Site or the Site (see Figure 1C in Appendix A). All environmental receptors considered within this EIA Scoping process are described in the 'Baseline Conditions' sub-sections of each topic in Section 6: Potential Significant Environmental Issues.

### **Residential**

- 2.4.2 The nearest settlement is Grimsby which is located approximately 1.5 km southeast from the Main Site at its closest point. The villages of Healing and Stallingborough are also both approximately 2 km southwest of the Main Site.
- 2.4.3 Poplars Farm is located approximately 1.2 km west of the Main Site, and three isolated residential properties are located approximately 1.2 km southwest of the Main Site. Meadows Farm is located on Marsh Lane approximately 1.5 km southwest of the Main Site.
- 2.4.4 Other settlements nearby include Immingham (3.8 km) and Habrough (8.0 km) northwest of the Main Site; Laceby (5.5 km), Keelby (6.8 km), Irby (8.5 km) and Brocklesby (8.8 km) southwest of the Main Site; and Beelsby (11 km); and Waltham (9 km) southeast of the Main Site.

## Traffic and Transport

- 2.4.5 Vehicular access to the Main Site is obtained from Hobson Way/ Energy Park Way, situated immediately to the west. This road is adopted and currently terminates at a roundabout on Hobson Way where it joins Energy Park Way. The Main Site has access to the primary road network to the northwest via several intermediate roads, Kiln Lane and the A1173 which lead to a grade separated junction with the A180(T). Access to the Main Site may also be gained from the north and Immingham docks via the A1173 or Laporte Road (see Figure 1C in Appendix A).
- 2.4.6 The closest Public Right of Way (PRoW) to the Main Site includes a bridleway along the sea wall within the Main Site boundary. A network of PRoW intersects the Site predominantly connecting the settlements of Healing, Stallingborough, Habrough and Immingham. All PRoW crossed by the Site will be assessed within the ES once the connection corridors have been narrowed.
- 2.4.7 Two rail lines cross the Site; both are understood to be linked to the Barton Line. These are the operational passenger line between Great Coates Station and Healing Station which is located 2 km southwest from the Main Site; and another section of the line 0.2 km southwest from the Main Site.

## Ecology

- 2.4.8 The nearest statutory and non-statutory nature conservation designations to the Site are illustrated in Figure 2A and Figure 2B, respectively, and listed below.
- The Humber Estuary Special Protection Area (SPA) is located directly adjacent to the Main Site (east of the sea wall) (see Figure 2A in Appendix A). The SPA is designated for its wintering assemblage of water birds, and for its populations of 10 species of wintering bird, five species of passage bird and four species of breeding bird.
  - The Humber Estuary Special Area of Conservation (SAC) is also located directly adjacent to the Main Site (see Figure 2A in Appendix A). It is designated for its Annex I estuary and mudflat habitats, and is also important for its populations of grey seal (*Halichoerus grypus*), river lamprey (*Lampetra fluviatilis*) and sea lamprey (*Petromyzon marinus*).
  - The Humber Estuary Ramsar site also located directly adjacent to the Main Site is designated as a representative example of a near-natural estuary and dependent species (see Figure 2A in Appendix A). These include internationally important bird populations and assemblages, grey seal, natterjack toad (*Bufo calamita*), and migratory populations of river lamprey and sea lamprey.
  - The Humber Estuary Site of Special Scientific Interest (SSSI), also located directly adjacent to the Main Site (see Figure 2A in Appendix A), is designated for its nationally to internationally important estuary, sand dune and standing water habitats. It also supports nationally and internationally important assemblage of breeding, wintering and passage birds, grey seals, and river and sea lamprey.
  - Local Wildlife Sites (LWS) (see Figure 2B in Appendix A) – There are ten non-statutory LWS designations within the Site. See Table 6.826.13.8 for further details.

- NELC's Local Plan presents a number of Strategic Mitigation Sites (see paragraph 2.1.2). The nearest Strategic Mitigation Sites are shown on Figure 2B (Appendix A) and listed in Table 6.83.

### **Hydrology and Flood Risk**

2.4.9 Figure 2C (Appendix A) illustrates that the Main Site is located directly adjacent to the Humber Estuary to the west and Oldfleet Drain, a main river that discharges into the Humber Estuary to the south. New Cut Drain, another main river that discharges into the Humber Estuary is also present approximately 1.9 km south of the Main Site. North Beck Drain, a Main River, also crosses the Site.

2.4.10 The Main Site is situated in Flood Zone 3a (high risk), as well as the majority of the Site east of Stallingborough village. However, the Main Site and much of the Site in Flood Zone 3a is protected from tidal flood events by tidal flood defences which consist of earth embankments reinforced with rock or stone revetments and concrete sea or wave walls. Flood defences are also present along the Oldfleet Drain located along the southern boundary of the Main Site. The southern part of the Site is located in Flood Zone 1 (low risk).

### **Geology and Hydrogeology**

2.4.11 The local geology of the Site is characterised by bedrock of Flamborough Chalk formation overlain by superficial deposits. These comprise Tidal Flat Deposits underlain by Glacial Till and Glaciofluvial deposits. The Environment Agency classifies the underlying superficial geology as Secondary A aquifer and the underlying Flamborough Chalk as a Principal aquifer. The Chalk is underlain at depth by the Lower Greensand Group which is classified as a Secondary A aquifer.

2.4.12 The Main Site is not located in a Source Protection Zone (SPZ) however several SPZs are located in the Site, with the closest located approximately 880 m southeast (SPZ 3 – Total Catchment) from the Main Site (see paragraph 6.9.23).

### **Cultural Heritage**

2.4.13 Figure 2E (Appendix A) illustrates that there are no World Heritage Sites, or registered battlefields on or within 1 km of the Site. There are two Scheduled Monuments within the Site; these include the site of a medieval settlement, post-medieval manor house and gardens at Stallingborough (NHLE1020423); and two moated sites at Healing Hall (NHLE1010947). Grade I listed Brocklesby Park (NHLE 1000971) Registered Park and Garden is located within the gas pipeline route corridor.

2.4.14 There are two Grade I listed buildings within the Site including Newsham Bridge (NHLE1063419) located within Brocklesby Park Registered Park and Garden (NHLE 1000971) near Habrough which lies within the gas pipeline route corridor and the Church of St Nicholas (NHLE1379843) located within Great Coates. There are two Grade II\* listed buildings located within the Site including the Church of St Peter and St Paul (NHLE 1346978) located north of Stallingborough. The remaining five assets comprise The Church of St Edmond (NHLE1146937); Former Heavy Anti-Aircraft Gun site (NHLE1403222); Gateway to House (NHLE1165475); Main Stable Block (NHLE1063413) and Newsham Lodge

(NHLE1166070). Other Grade II listed buildings also occur across the Site area, although none are located within 2 km of the Main Site.

- 2.4.15 Iron Age and Roman settlements have been recorded along the former coastline at Immingham and extending to the south, through the route corridors, towards Stallingborough. A Saxon settlement has been recorded at Stallingborough and archaeological and historical evidence shows that many of the small villages in proximity to the pipeline route corridors have origins in the medieval period including, again, at Stallingborough where the medieval settlement is designated as a Scheduled Monument (see paragraph 6.3.11 for more details on Scheduled Monuments within the study area).
- 2.4.16 The gas pipeline route corridors pass through a landscape that is principally 20<sup>th</sup> century enclosure, with some survival of Parliamentary Planned Enclosure fields, and pockets of Private Enclosure. Designed landscape is relatively well-preserved with the most prominent feature being the Grade I listed Brocklesby Park. Settlement is generally concentrated in villages around a historic core with isolated farmsteads, some of which are listed buildings and indicative of the area's agricultural heritage, in the surrounding fields (see paragraph 6.3.13 for more information on listed buildings).

### **Landscape**

- 2.4.17 The Main Site sits within the 'Humber Estuary National Character Area' (NCA) which is centred on the Humber Estuary and is characterised as a low-lying estuarine landscape, with extensive stretches of intertidal habitats including mudflats, salt marsh and reedbeds, coastal dunes and wetlands along the side of the estuary.
- 2.4.18 The Site forms part of a larger area of flat or low-lying ground adjacent to the River Humber. The area is generally open in character with extensive views. While there are areas used for agricultural purposes, the area is characterised largely by industrial installations that dominate the landscape and diminish the rural appearance of the landscape.
- 2.4.19 Other environmental constraints not described specifically in this section are presented in Figure 2E (Appendix A) and the technical sections of this report (Section 6).



# 3. The Proposed Development

## 3.1 Overview

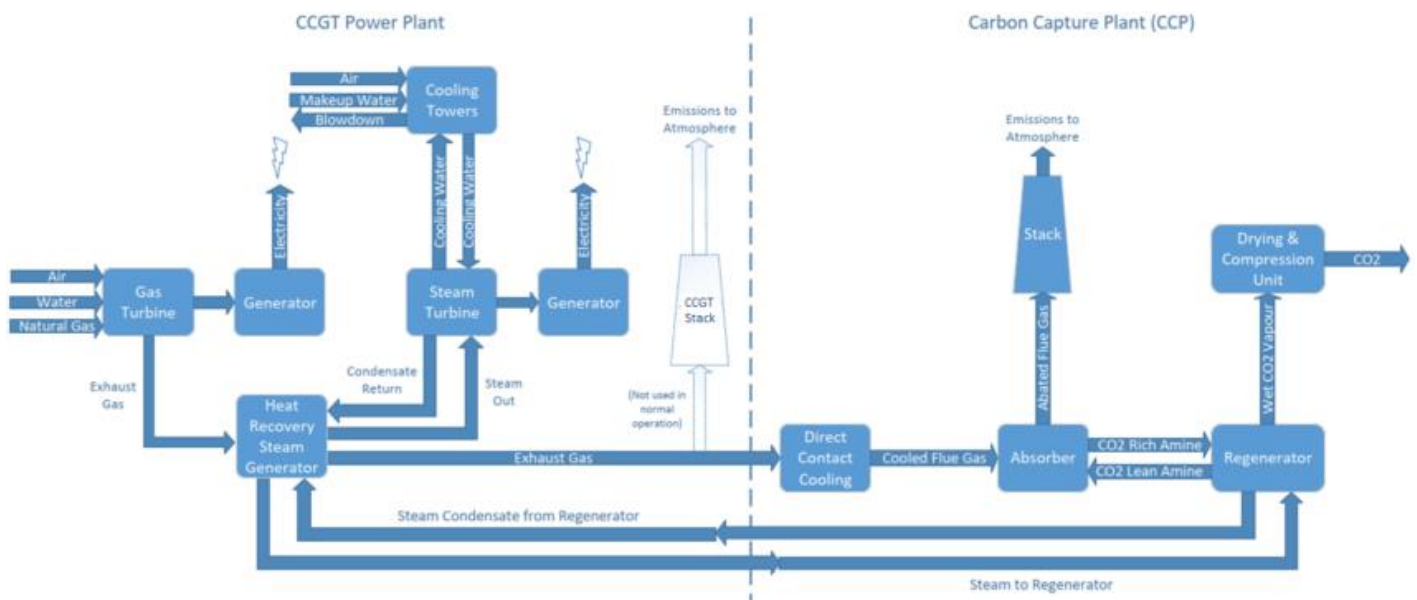
- 3.1.1 The Proposed Development comprises the construction, operation and maintenance of a CCGT generating plant fitted with CCP with a capacity of up to 900 Mwe to be located on the south bank of the Humber Estuary near Stallingborough, North Lincolnshire.
- 3.1.2 At this stage in the design of the Proposed Development, the final technology selection for the CCGT and CCP cannot be made, as it will be determined by various technical and economic considerations and will be influenced by future UK Government policy. The design of the Proposed Development, therefore, incorporates a necessary degree of flexibility in the choice of technology, to allow for the future selection of the preferred technology in the light of prevailing policy and market conditions once a DCO is granted.
- 3.1.3 The ‘Rochdale Envelope’ approach will be used in the ES to assess the reasonable worst-case low carbon technology option. However, it is not expected that the final vendor selection for the CCGT and CCP would be made until the detailed design stage of the Proposed Development, where construction details (e.g. construction methods and characteristics of the materials etc.) will be selected, which occurs after Final Investment Decision and post the granting of any DCO. Therefore, the Rochdale Envelope that is applied will always need to retain some flexibility to allow different vendor equipment to be selected at a later date.
- 3.1.4 It is currently assumed that a new natural gas pipeline will be required to transfer gas using a hot tap tie-in point from National Grid Gas Transmission’s Feeder 9 Pipeline to the Main Site. Two pipeline corridor routing options are currently being considered. Option A (circa 12.7 km long) and Option B (circa 11.4 km long) both cross the Site from the northwest near Ulceby towards the Main Site (see Figure 1C in Appendix A).
- 3.1.5 Option A and Option B for the proposed gas pipeline corridors follow the same route from the Main Site to Stallingborough Road, travelling north of Stallingborough village. The route traverses predominantly agricultural land which contains three named drains (Oldfleet Drain, Middle Drain and North Beck Drain) and is located in a Flood Zone 3 due to its close location to the Humber Estuary.
- 3.1.6 From Stallingborough, Option A then crosses Roxton Road, the A18, Immingham Road, Killingholme Road and the A160. Option A then travels north of Habrough village, across the A180 to Ulceby. This section of the route is located within Flood Zone 1.

- 3.1.7 From Stallingborough, Option B crosses a railway line, Roxton Road, B1210 Brocklesby and Newsham Lane. Option B then travels south of Habrough village. This section of the route is largely located in Flood Zone 1, with the exception of a small section at the end of the route which is located in Flood Zone 2 and Flood Zone 3. This section of the route is also within 100 m of an area of Ancient and Semi-Natural Woodland.
- 3.1.8 A new HV electrical grid connection will be required to connect the Main Site to the National Grid Grimsby West Substation, approximately 3.7 km from the Main Site (or potential other substation that may be planned as part of the Grimsby to Walpole upgrade); the route to National Grid Grimsby West Substation is subject to ongoing feasibility work (see Figure 1C in Appendix A for the grid connection route corridor under consideration). The decision on whether the connection will be underground cabled, above ground or a combination of both has not yet been taken. It is anticipated that a decision will be made prior to DCO Application submission.
- 3.1.9 The Proposed Development is expected to require a number of local service provisions for water, local electricity distribution (e.g. for construction and/or as a back-up supply) and telecommunications. Connections are expected to be terminated within the Main Site. The exact connection locations, connection routes and details of the services are yet to be defined but are currently expected to be within the Site. It is expected that any connections would be considered by the service provider within the consenting arrangements for their undertakings.
- 3.1.10 The layout of the Main Site is not fixed at this stage and alternative designs may be sought prior to the detailed design stage. The assessments to be included within the EIA and presented in the ES will therefore consider and assess the reasonable 'worst-case' impacts and effects, for each scoped in topic (including where there is optionality), in accordance with the Rochdale Envelope approach outlined in PINS Advice Note 9. Potential areas that could be subject to change include:
- Number and heights/ dimensions of carbon dioxide absorber columns and associated stacks (depending on the solvent used and construction logistics).
  - Type, location and number of cooling towers.
  - Orientations of plant and interfaces with CO<sub>2</sub> connection, gas and electrical grid connection infrastructure.
  - Cooling water infrastructure including intakes and outfall structures and piping.
  - The use of the Strategic Mitigation Site for construction purposes such as laydown and fabrication/workshops purposes.
  - Building dimensions, orientations and enclosures designs.
  - The extent of ancillary process plant equipment.
  - Storage tank numbers and sizes.
  - CCGT exhaust "bypass" stack dimensions (required for startup, shutdown and unabated operation).
  - Screening solution and fish return lines.

## 3.2 Combined Cycle Gas Turbine Unit and Ancillary Infrastructure

- 3.2.1 In a CCGT power station, a gas fuel (typically natural gas) is combusted to drive a gas turbine, which is connected to a generator producing electricity. As an amount of usable heat remains in the gas turbine exhaust, this is passed into a Heat Recovery Steam Generator (HRSG, a type of boiler) to make steam to generate additional electricity via a steam turbine.
- 3.2.2 The waste gases from the heat recovery boiler are released into the atmosphere via an exhaust stack, following appropriate treatment.
- 3.2.3 The exhaust steam from the steam turbine is condensed (cooled) back into water which is returned to the HRSG to continue the process. This cooling would likely be achieved through the use of either a once-through cooling system or a hybrid wet/ dry cooling tower(s), both options using water abstracted from the Humber Estuary, although final design decisions are yet to be made.
- 3.2.4 The Proposed Development is anticipated to consist of one CCGT unit with a total output of up to 900 Mwe. The electrical efficiency of a modern CCGT power station is considerably higher than that of a conventional coal, biomass or oil-fired generating plant, or many of the existing UK fleet of gas fired power stations.
- 3.2.5 A schematic showing the power generation process including CCP associated with the Proposed Development can be seen in Plate 3.1.

**Plate 3.1 Power Generation and Carbon Capture Process Schematic**



- 3.2.6 In addition to the electrical generating plant, the following infrastructure is anticipated to be required:

- the provision of new gas pipework to convey gas fuel (natural gas) to the CCGT unit including a new pipeline to supply gas from National Grid's Gas Transmission's Feeder 9 Pipeline;
- an Above Ground Installation (AGI) adjacent to the CCGT to receive the gas fuel;
- new cooling water infrastructure to provide make-up water for the hybrid towers or for a once through cooling system (this will require offshore water intake and outfall structures within the potential abstraction and discharge locations area);
- Infrastructure to remove oxides of nitrogen ( $\text{NO}_x$ ) from the CCGT exhaust gas stream, consisting of a catalyst chamber, associated pipework and fans and reagent storage vessels;
- electricity transmission infrastructure located within the Site to connect the CCGT to the National Grid electricity transmission system through the existing National Grid Grimsby West Substation (or potential other substation that may be planned as part of the Grimsby to Walpole upgrade);
- ancillary infrastructure which may include:
  - an auxiliary boiler;
  - workshop and stores;
  - electrical, control room and administration building;
  - water treatment plant, fire pumps and laboratory;
  - cooling water pump house (with location to be confirmed within the Main Site or within the potential abstraction and discharge locations area);
  - above ground raw and fire water tank;
  - above ground demineralised water tank;
  - back-up diesel generators, comprising skid-mounted units;
  - wastewater treatment plant;
  - access roads and car parking;
  - local infrastructure connections (e.g. power, water etc. as required); and
  - onshore screening and fish handling will be required unless adequate screening can be provided offshore.

## 3.3 Carbon Capture Plant and Ancillary Infrastructure

3.3.1 The Proposed Development will be fitted with a CCP to facilitate the capture of  $\text{CO}_2$  produced through the combustion of natural gas in the CCGT. The Applicant proposes that this would be facilitated through a method of post-combustion amine stripping, however the technology choice is not fixed at this stage and alternative options may be sought.

3.3.2 Post-combustion carbon capture involves capturing and cooling the exhaust gases from the CCGT and passing them through absorber column(s), containing a liquid amine based chemical solvent, to absorb the  $\text{CO}_2$  and remove it from the exhaust

gases which are then released into the atmosphere. The CO<sub>2</sub> rich solvent is heated and passed to a stripper column to liberate the CO<sub>2</sub> gas. The lean solvent is returned to the absorber column(s) to repeat the cycle.

3.3.3 The liberated CO<sub>2</sub> gas is then cooled and compressed for onward transfer. The Applicant's preferred option is for CO<sub>2</sub> to be transported by a pipeline connecting on site into the Viking CCS scheme CO<sub>2</sub> Transport and Storage (T&S) infrastructure for subsequent conditioning and transport to offshore geological storage site (see paragraph 1.1.5 for details).

3.3.4 The CCP is likely to consist of the following principal infrastructure:

- exhaust gas cooling and conditioning plant;
- absorber column(s) and associated stack(s);
- heat exchangers;
- solvent reclaimer tower(s);
- reboiler;
- cooling provision either through an air-cooled condenser array or additional hybrid cooling towers and associated infrastructure;
- chemical and waste storage facilities (including for hazardous materials);
- CO<sub>2</sub> cooling and compression plant;
- effluent treatment plant; and
- ducting and pipework.

## 3.4 Electrical Grid Connection Route Corridor

3.4.1 A new HV electrical connection will be required to connect the Proposed Development to the National Grid Grimsby West Substation (or potential other substation that may be planned as part of the Grimsby to Walpole upgrade).

3.4.2 A wide route corridor is being considered at this options appraisal stage to provide flexibility in the routing to avoid environmental, planning and land constraints, as well as physical features given the volume of existing utilities known in the vicinity of the Proposed Development due to the industrial nature of the area (see Figure 1C in Appendix A).

3.4.3 A feasibility study is being undertaken to determine whether the cable route will be above or below ground or a combination of both.

3.4.4 The corridor will be narrowed and proposed Order Limits would encompass the land Limits of Deviation (LoD), covering the maximum parameters within which the overhead line (OHL) or any underground cable sections would be installed. The LoD are often applied to the horizontal alignment but may also include the maximum height above ground and maximum depth below ground. The assessment within the ES would be based on the maximum LoD as defined in the draft DCO. This would provide flexibility regarding any deviations in the alignment during detailed design.

## 3.5 Associated Development

### Natural Gas Pipeline Route Corridors

- 3.5.1 A new natural gas pipeline will be required to supply gas from the National Grid Feeder 9 Pipeline to the Main Site. Two pipeline corridor routing options are currently being considered (Option A and Option B) (see Figure 1C in Appendix A). A similar approach will be followed in relation to LoD and draft Order Limits for the purposes of the ES as described in paragraph 3.4.4 above.

### Abstraction and Discharge Pipelines

- 3.5.2 The CCGT and CCP will require water for cooling as part of the operational processes, as well as water for other processes and domestic needs. It is currently anticipated that process cooling water would be abstracted from the Humber Estuary. The volumes required will depend on the technology selected.
- 3.5.3 Other water sources (e.g. from industrial supplies) will also be investigated for construction, process and domestic requirements.

### Laydown Areas

- 3.5.4 Temporary laydown areas will be required during construction of the Proposed Development for purposes including storing and handling of equipment and materials, site offices, batch concrete facilities, welfare facilities and car parking, environmental/ waste handling area and vehicle wheel wash areas. Laydown requirements at this stage are indicative and will be subject to further assessment prior to submission of the DCO Application.
- 3.5.5 The eastern section of the Main Site identified as a Strategic Mitigation Site (see Figure 1C in Appendix A) by NELC in their Local Plan, is being considered for use as a temporary construction laydown area during the construction phase. The land is currently an arable field and would provide suitable laydown within the Main Site for storage of plant, equipment and other construction material (see paragraph 2.1.22.1.2 for a description of the Main Site). Following construction, this area would then be developed into strategic mitigation and would remain so during the operation of the Proposed Development. Any proposed use of the Strategic Mitigation Site area for temporary construction purposes would be subject to consultation and engagement with NELC.
- 3.5.6 The Grimsby CHP plant owned by the Applicant is a proposed off-site temporary laydown area option for the Proposed Development. The Applicant proposes to demolish the existing plant at the Grimsby CHP plant site prior to the DCO Application for the Proposed Development being submitted, with an expected demolition before the end of 2024. Demolition of infrastructure is being progressed under separate notification/ consent by the Applicant and does not form part of the DCO Application.
- 3.5.7 The off-site laydown area, shown in Figure 1C (Appendix A), is 1.5 km southeast from the Main Site. Plant and equipment from the laydown area are proposed to be transferred to the Main Site by road along Moody Way and Hobsons Way.

## 3.6 Access

- 3.6.1 Access to the Main Site during the construction phase for heavy goods vehicle (HGV) construction traffic and workers as well as during the operational phase would be from Hobson Way/ Energy Park Way to the west of the Main Site which link to the Strategic Road Network (SRN) as described in Section 6.10.
- 3.6.2 Immingham Docks is expected to be used for the shipborne delivery of large plant and equipment (abnormal indivisible loads – (AIL)) during construction of the Proposed Development. These AIL would be transported to the Main Site using the existing road network which is deemed suitable for large loads. The Site includes this road network which is subject to ongoing logistics assessment work to determine any modifications that may be required to existing infrastructure to allow conveyance of the largest AIL. Powers for such works may be sought in the DCO and where this is the case, the ES will assess the impacts and effects of any modifications.
- 3.6.3 Consultation with relevant organisations will be undertaken (e.g. Network Rail) to ensure that any routes proposed for AIL are viable and avoid damage to assets.
- 3.6.4 A Construction Traffic Management Plan (CTMP) and a Construction Workers' Travel Plan (CWTP) will be prepared to accompany the DCO Application with the aim to control the impacts on the existing highway network during the peak construction phase as far as reasonably practicable (see section 6.10, paragraphs 6.10.5 and 6.10.8 for further details).

## 3.7 Preparation of the Site

- 3.7.1 The Main Site is located on arable agricultural land within a mixed industrial/rural setting. As described in Section 6.9, given the history of industrial development on neighbouring plots of land, it is possible that subsurface contamination could be present which has the potential to have affected soil and controlled water (groundwater and surface water) quality.
- 3.7.2 Accordingly, for the Main Site, and other areas that require site preparation/ excavation, a Phase 1 desk-based assessment will be completed to identify and assess the ground conditions, potential for land contamination and existing ground hazards and will include a preliminary Conceptual Site Model (CSM) that will identify the potential for land contamination and potential contaminant linkages. The result of this Phase 1 desk study will inform any soil and groundwater investigation that would be undertaken prior to commencing construction. The design and extent of this investigation would be based on the final design and would be conducted to also provide the necessary information to inform the Environmental Permit that is required from the Environment Agency for the operation of the Proposed Development.
- 3.7.3 Any changes required to existing site levels at the Main Site to support the construction and/or operation of the Proposed Development will be investigated, reported and assessed within the ES. Cut and fill volumes are intended to be

balanced across the Site to minimise waste arisings. However depending upon ground conditions, some import/ export of materials may be necessary to provide a suitable foundation platform for the Main Site.

## 3.8 Construction Staffing and Vehicle Numbers

- 3.8.1 For the construction phase it is anticipated that there will be a maximum of 2,000 workers at the peak of construction, with around 600 HGVs accessing the site per day (1,200 two-way movements). It would not be expected that all construction workers accessing the site would travel as a single occupancy car trip, with many choosing to car share, as such a ratio of 1.5 will be assumed, resulting in a daily number of construction worker car trips of 1,334 in and 1,334 out (2,668 two way).
- 3.8.2 The above is based upon the best available information at this scoping stage and will be reviewed and updated as further information is available as the Proposed Development evolves.

## 3.9 Construction Programme and Management

- 3.9.1 Subject to being granted development consent and following a final investment decision, it is anticipated that construction of the Proposed Development could commence in 2028 and last approximately three years.
- 3.9.2 The ES will provide details of the proposed construction activities and their anticipated duration, along with an indicative programme of each phase of the works, including an outline of the construction approach anticipated for each element of the Proposed Development.
- 3.9.3 The ES will be supported by a framework Construction Environmental Management Plan (CEMP), which will describe the specific measures to be followed to control and reduce impacts on the environment during the construction phase. The Framework CEMP will be developed taking into account the environmental assessments including mitigation measures presented in the ES and will include, but not be limited to impacts from:
- construction traffic (including parking and access requirements);
  - earthworks;
  - noise and vibration;
  - dust generation; and
  - waste generation.
- 3.9.4 Contracts with companies involved in the construction works will incorporate environmental control, health and safety regulations and current guidance with the intention that construction activities are sustainable and that all contractors involved with the construction stages are committed to agreed best practice and



meet all relevant environmental legislation including Control of Pollution Act 1974 (COPA), Environment Act 1995 and Hazardous Waste (England and Wales) Regulations 2005.

- 3.9.5 It is anticipated that all construction works will adhere to the Construction (Design and Management) Regulations 2015 (CDM).

### **Site Restoration / Reinstatement**

- 3.9.6 Assuming that construction of the Proposed Development commences in 2028 and lasts 3 years, restoration and reinstatement activities for land that is temporarily disturbed could commence from 2031 although earlier reinstatement/ restoration may be possible in the gas pipeline and grid connection route corridors.

- 3.9.7 Following construction, plant and equipment will be removed and existing ground reinstated. Topsoil would be reinstated where this has been stored during construction following topsoil stripping. The overall objective will be to leave the areas of the Site required for construction with no residual environmental and/ or safety risks and return the land to a condition suitable for re-use. Landscaping and ecological management will be provided. Technical work will be undertaken as part of the DCO process to quantify the change in biodiversity units predicted to arise from the Proposed Development, and to determine the Biodiversity Net Gain (BNG) that can be achieved via habitat enhancement and creation (see paragraph 6.13.24).

### **Shipping and navigation**

- 3.9.8 Shipping and navigation have been identified as a potential receptor during the construction phase due to potential interactions between existing vessel traffic and the works proposed within the marine environment using marine plant, during the installation phase of the potential abstraction and discharge infrastructure (see Figure 1C in Appendix A). It is therefore necessary to consider the potential interactions and understand whether there will be potential for likely significant effects on shipping and navigation, as well as identifying possible mitigation measures and to minimise risk that the Proposed Development could adversely affect vessel traffic.

- 3.9.9 Given that many design elements of the Proposed Development are yet to be confirmed, the embedded and good practice measures have not been finalised at this stage. However, any measures will be discussed and agreed with statutory consultees and stakeholders throughout the EIA process.

- 3.9.10 A qualitative desk-based assessment of navigational risk (both during and post-construction) will be undertaken and any control measures will be informed by engagement with the MMO, the Harbour Authority (Associated British Ports), Trinity House and any other stakeholders, as required.

- 3.9.11 It is anticipated that the Proposed Development will not result in loss or restricted access to commercial fishing grounds, displacement of commercial fishing activities, or obstruction of navigation routes to commercial fishing grounds, but this will be reviewed as part of the assessment of navigational risk. The Applicant will seek to work with relevant commercial fishing organisations to manage

potential interactions during installation works for the abstraction and discharge infrastructure.

## 3.10 Operation

- 3.10.1 The Proposed Development will be designed to operate 24 hours per day, 7 days per week with programmed offline periods for maintenance.
- 3.10.2 Access to the Proposed Development during the operational phase would be from Hobson Way/ Energy Park Way.
- 3.10.3 Operation of the Proposed Development is anticipated to create up to circa full-time 50 operational roles, with operative staff working shift systems. Staff are anticipated to work a shift pattern, likely between 07:00 – 19:00 and 19:00 – 07:00. Administrative staff are anticipated to work an office-hour pattern between 08:30 and 18:00.
- 3.10.4 The Proposed Development will comply with the Environmental Permitting (England and Wales) Regulations 2016 (as amended) under its Environmental Permit so that any impacts of emissions to air, soil, surface and groundwater, to the environment and human health will be minimised and avoided where possible.

## 3.11 Decommissioning

- 3.11.1 At the end of its anticipated ‘design life’, the Proposed Development would be assessed for ongoing viability, and if no longer viable, it would be decommissioned. The ES will confirm an anticipated ‘design life’ for the Proposed Development and, in relevant chapters, will consider and assess the potential for operational effects to continue beyond this timeframe. If the operating life were to be extended, the Proposed Development would be upgraded in line with legislative requirements at that time.
- 3.11.2 At the end of its operating life, the most likely scenario is that the Proposed Development would be shut down and all above ground structures removed from the Main Site. The Main Site would then be suitably remediated as required to facilitate re-use.
- 3.11.3 A Decommissioning Plan (including Decommissioning Environmental Management Plan (DEMP)) would be produced and agreed with the Environment Agency as part of the Environmental Permitting and site surrender process. The DEMP would consider in detail all potential environmental risks on the Site and contain guidance on how risks can be removed or mitigated. This would include details of how surface water drainage should be managed on the CCGT and CCP site during the decommissioning.

# 4. Consideration of Alternatives

## 4.1 Main Site

- 4.1.1 The EIA Regulations require that an ES should include an outline of the reasonable alternatives that have been studied by the Applicant and an indication of the main reasons for its choices, taking into account differences in environmental effects. Under the EIA Regulations there is no requirement to assess alternatives, only a requirement to provide a review of those alternatives that have actually been considered.
- 4.1.2 For the Main Site, alternative layouts are being evaluated. It is proposed that other project alternatives will be considered including:
- the selection of the Main Site location;
  - the layout of the Proposed Development including the choice and configuration of the CCGT units;
  - the low carbon technology to be selected;
  - construction laydown areas;
  - gas pipeline connection and electrical grid connection points at the Main Site; and
  - the cooling technology and water source to be implemented.
- 4.1.3 Where alternatives are examined and assessed during the pre-application process, details of the options and reasons for selection (or otherwise) will be included within the ES for the Proposed Development. Where, at the time of DCO Application, alternatives still exist for any particular element of the Proposed Development, the assessments to be included within the EIA and presented in the ES will consider and assess the ‘worst-case’ impacts and effects, in accordance with the Rochdale Envelope approach outlined in PINS Advice Note 9.

## 4.2 Associated Development

### Natural Gas Pipeline Route Corridors

- 4.2.1 Two gas pipeline route corridor options are currently being considered (Option A and Option B). A feasibility study is currently being undertaken to determine the preferred route with the intention being to select this prior to submission of the DCO Application. The alternative route options studied and reason for final choice will be presented in the ES.
- 4.2.2 The Site boundary presented in this Scoping Report allows for flexibility in the choice of routing for the gas pipeline (see Figure 1C in Appendix A).

### **Electrical Grid Connection Route Corridor**

- 4.2.3 A new HV electrical grid connection will be required to connect the Proposed Development to the National Grid Grimsby West Substation (or potential other substation that may be planned as part of the Grimsby to Walpole upgrade). The route is yet to be finalised and is subject to an ongoing feasibility study. The alternative route options that have been considered and reason for final choice will be presented in the ES.
- 4.2.4 The Site boundary presented in this Scoping Report remains indicative and allows for flexibility in the choice of routeing for the electrical grid connection (see Figure 1C in Appendix A).

### **Abstraction and Discharge Pipelines**

- 4.2.5 It is currently anticipated that cooling water would be abstracted from the Humber Estuary. The locations for abstraction and discharge infrastructure are currently being investigated but these elements of the Proposed Development (and therefore draft Order Limits) are anticipated within the Humber Estuary. A cooling water feasibility study will be carried out which will determine whether hybrid or once through cooling represents best available technique (BAT).
- 4.2.6 Impacts on the marine environment during construction and operation of the Proposed Development would be assessed as part of the ES and the environmental permit process.

### **Laydown Areas**

- 4.2.7 The use of the Main Site Strategic Mitigation Site (see Figure 1C in Appendix A) as a construction laydown is an alternative under consideration and will require consultation with NELC.
- 4.2.8 An off-site laydown area option for the Proposed Development is currently proposed at the Grimsby CHP. The suitability of this site will be established as plans to demolish the existing structures on site develop, with an expected demolition before the end of 2024.

# 5. Legislation and Policy Context

## 5.1 Introduction

- 5.1.1 The DCO Application will be accompanied by a Planning Statement which will assess the compliance of the Proposed Development with relevant planning policy contained in the Overarching National Policy Statements (NPS) for Energy (EN-1) and energy specific NPS including EN-2: NPS for Natural Gas Electricity Generating Infrastructure, EN-4: NPS for Natural Gas Supply Infrastructure and Gas and Oil Pipelines, and EN-5: NPS for Electricity Networks Infrastructure applicable at the time.
- 5.1.2 This section of the Scoping Report provides a summary of the key planning legislation, policy and guidance against which the Proposed Development will be assessed and which have been considered when defining the scope of the EIA. Where aspects of these policies are directly relevant to specific environmental topics, these will be addressed further in the PEIR and thereafter in the ES submitted with the application for a DCO.

## 5.2 Legislation

### **Withdrawal of the UK from the European Union**

- 5.2.1 UK legislation is influenced by a variety of international agreements (including European Union (EU) directives, regulations and agreements), which are outlined in this chapter. Following the UK leaving the EU under the terms of the *European Union (Withdrawal Agreement) Act 2020* (Ref 5-1) (the 'Withdrawal Act'), broadly, EU-derived domestic legislation and certain EU legislation continue to have effect in domestic law.
- 5.2.2 In exercise of the powers in the Withdrawal Act, the Government made *The Environmental Assessments and Miscellaneous Planning (Amendment) (EU Exit) Regulations 2018* (Ref 5-2). These regulations provide for the EIA Regulations to be amended to ensure they function correctly after the UK exited the EU. In particular, the amendments update references to the EIA Regulations (Ref 5-3) to EU law, Member States and related terms to reflect the UK leaving the EU. The regulations do not make substantive changes to the way the EIA regime operates following the UK leaving the EU.

### **The Planning Act 2008**

- 5.2.3 The 2008 Act (Ref 5-4) is the primary legislation that establishes the legal framework for applying for and, the examination and determination of DCO applications for NSIPs. The Proposed Development is defined as an NSIP under Section 14(1)(a) "*the construction or extension of a generating station*" and Section 15(2) of the PA 2008 as it comprises the construction of an onshore generating

station wholly in England that will result in the generating station having a capacity of more than 50 MW. If the HV electricity cable between the Main Site and the National Grid Grimsby West Substation (or potential other substation that may be planned as part of the Grimsby to Walpole upgrade) is above ground then it will also constitute a NSIP under Section 16(1) of the 2008 Act as it will be more than 2 km in length and have a nominal voltage of more than 132 kV.

### **Associated Development**

- 5.2.4 The cooling water infrastructure, the natural gas supply pipeline, an underground electrical connection cable and CCP are likely to be classed as associated development.
- 5.2.5 Guidance on the matter outlines the principle that (i) there must be a direct relationship between the associated development and the principal development and advises that the *“Associated development should therefore either support the construction or operation of the principal development”*. There are components of the Proposed Development which are considered to clearly support the principle of development. These comprise the cooling water infrastructure, the natural gas supply pipeline, underground electrical connection cable and CCP. Equally without the CCGT, the associated development would not be constructed, further demonstrating that the associated development supports the principal development.
- 5.2.6 The Guidance principle (ii) requires that the associated development be subordinate to the principal development. Since the associated development supports the operation of the principal development, it would not be constructed without it being in place. Further the associated development will be sized to align with what is required to operate the CCGT. The routes for the associated development such as the new natural gas supply pipeline and HV electricity cable will be driven by an optioneering process for the most appropriate route to connect existing gas supply pipework to the Main Site and subsequently the Main Site to the National Grid Grimsby West Substation (or potential other substation that may be planned as part of the Grimsby to Walpole upgrade). As such compliance is also achieved with associated development guidance principle (iv) that requires that *“Associated development should be proportionate to the nature and scale of the principal development”*. As the associated development is scaled by route selection taking into account other factors, and what is required in order to operate the CCGT and CCP, then it can be seen that the associated development is proportionate to the principal development.
- 5.2.7 The Guidance principle (iii) is not relevant as the associated development is not cross subsidising the principal development.

### *Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009*

- 5.2.8 The 2008 Act is supplemented by The APFP Regulations (Ref 5-5) which provide further detail on certain matters for NSIP projects. This includes detailed information relating to prescribed consultees, publicising an application for statutory consultation, information to be submitted with an application and

notifying persons of an accepted application. The requirements of these regulations must be met.

### **The Environmental Impact Assessment (EIA) Regulations**

- 5.2.9 Schedule I of the EIA Regulations. Identify which projects are likely to have significant environmental effects and would therefore require an EIA. As described in Section 1 of this Scoping Report, the Proposed Development is considered to be an EIA project, under schedule 1 of the EIA Regulations in (2) thermal power stations and (23) Installations for the capture of carbon dioxide streams.
- 5.2.10 The EIA Regulations also set out a procedure for assessing, consulting and informing the decision-making process for such projects and require the provision of an ES, which would be submitted alongside the DCO Application for the Proposed Development. Further details on the approach to the EIA are outlined in Section 8: EIA Process.

### **Water Framework Directive**

- 5.2.11 The Water Framework Directive (“WFD”), EC Directive 2000/60/EC (Ref 5-6) aims to protect and enhance the quality of the water environment across all EU member states. England and Wales have adopted the WFD as national law by the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (Ref 5-7). Following the departure of the UK from the EU, these Regulations continue to apply until they are revoked or superseded by new legislation.
- 5.2.12 A WFD Assessment (WFDa) will be carried out as part of the EIA where the Proposed Development interacts directly or indirectly with WFD designated watercourses and water bodies. The findings of the WFDa will be used to assess the compliance of the Proposed Development with national planning policy for water quality objectives.

### **Habitat Regulations Assessment**

- 5.2.13 In accordance with Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (Ref 5-8) and Directive 2009/147/ES of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (Ref 5-9), a network of protected sites has been designated by EU member states for the protection of Europe’s most valuable and threatened habitats and species. These areas are known as European sites. The Conservation of Habitats and Species Regulations 2017 (SI 2017 No. 1012) (the ‘Habitats Regulations’) transpose the EU Directives into UK law (Ref 5-10) and remain in place following the UK’s exit from the EU.
- 5.2.14 As part of the decision-making process, the SoS must undertake an Appropriate Assessment where the Proposed Development, when taken alone or with existing and known future plans or projects, is considered to have likely significant effects (LSE) on certain ‘qualifying’ features that have been designated for nature conservation purposes. The Appropriate Assessment must determine whether the Proposed Development will have an adverse effect on the integrity of the designated sites. The Humber Estuary includes a number of European designated

sites for nature conservation including the Humber Estuary SPA, SAC and Ramsar site.

- 5.2.15 An assessment under the Habitats Regulations comprising HRA screening, followed, where relevant by Appropriate Assessment will therefore be undertaken. The HRA will consider the need to apply the precautionary principle<sup>3</sup> to Habitats sites and be undertaken in accordance with guidance published by PINS (Ref 5-11) and the UK Government (Ref 5-12) and other good practice guidance. The Applicant will provide information within the DCO Application to enable an Appropriate Assessment to be undertaken by the SoS.

### **The Climate Change Act 2008 (2050 Target Amendment Order)**

- 5.2.16 The Climate Change Act 2008 (2050 Target Amendment) Order 2019 (June 2019) (Ref 5-13) enshrines in law the Government's commitment to achieve 'net zero' for greenhouse gas emissions by 2050. This is in line with the recommendations of the CCC. In 2022, the CCC report titled Mission Zero, an Independent Review of the Net Zero (2023) (Ref 5-14) outlined that CCS will be necessary to help achieve this target by 2050 while also safeguarding jobs and the economy. It highlights that Carbon Capture Utilisation and Storage (CCUS) is crucial to the delivery of zero greenhouse gas emissions and that it is of strategic importance to the economy. The report outlines that Net Zero must involve capturing emissions from processes which still use fossil fuels and storing this carbon. Paragraph 395 of the 2023 report outlines that:

*"While the continued use of fossil fuels is necessary to maintain our security of energy supply, CCUS can be deployed to help decarbonise the energy system".*

- 5.2.17 Its importance is supported by the CCC, who have described CCUS as a necessity not an option.
- 5.2.18 The Energy Act 2023 (Ref 5-15) was passed as legislation on 26 October 2023 and provides the legislative framework for implementing targets set out by the UK Government in the updated British Energy Security Strategy (Ref 5-16). The Energy Act 2023 seeks to strengthen energy security and deliver the Government's net zero obligations.

## **5.3 Policy Context**

### **Overview**

- 5.3.1 Section 104(2) of the 2008 Act sets out that when deciding an application, the SoS must have regard to (a) any NPS which has effect in relation to development of the description to which the application relates. Section 104(3) goes on to state that the SoS must decide the application in accordance with any relevant NPS unless the subsection (4) to (8) applies.
- 5.3.2 In making decisions on applications for NSIPs, Section 104(2)(d) also states that the SoS must also have regard to any other matters that they consider to be both

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<sup>3</sup> The Precautionary Principle has been defined by the United Nations Educational, Scientific and Cultural Organisation (2005) as: 'When human activities may lead to morally unacceptable harm [to the environment] that is scientifically plausible but uncertain, actions shall be taken to avoid or diminish that harm. The judgement of plausibility should be grounded in scientific analysis.' February 2024



‘important and relevant’ to their decision. Paragraphs 4.1.10 to 4.1.15 of ‘Overarching National Policy Statement for Energy (EN-1)’ (November 2023) provides some clarification on the other matters that the SoS may consider both important and relevant. It confirms that these may include development plan documents or other documents in the local development framework. The NPSs are produced by the Government pursuant to specific legislative requirements under the 2008 Act to set out policy for nationally significant development in a particular sector and to provide the framework for the decisions on applications for NSIPs in that sector.

- 5.3.3 The first suite of NPSs for the energy sector were prepared and came into force during 2011 with updated draft versions being published for consultation in 2021 and March 2023. A final version of the NPSs was published on 23 November 2023 and were designated (adopted) by parliament as the Energy NPSs on 17 January 2024. These adopted Energy NPSs therefore have legal effect. In accordance with Section 104(3) of the 2008 Act, the application for a DCO for the Proposed Development should be determined in accordance with the relevant policies in the November 2023 Energy NPS documents.
- 5.3.4 The Proposed Development includes a CCGT. As such, it is considered that there are two NPSs that are relevant, these are:
- The November 2023 Overarching NPS for Energy (‘EN-1, 2023’) (Ref 5-17).
  - The November 2023 NPS for Natural Gas Electricity Generating Infrastructure (‘EN-2, 2023’) (Ref 5-18).
- 5.3.5 The Proposed Development also includes a natural gas supply pipeline and HV electricity cable to an existing (or proposed new) substation and so the following NPS documents are also relevant:
- The November 2023 NPS for Natural Gas Supply Infrastructure and Gas and Oil Pipelines (‘EN-4, 2023’) (Ref 5-20).
  - The November 2023 NPS for Electricity Networks Infrastructure (‘EN-5, 2023’) (Ref 5-21).
- 5.3.6 Section 104(2)(aa-d) of the 2008 Act sets out other documents that the SoS must have regard to when deciding an application for development consent. This includes the appropriate marine policy documents, any local impact reports (LIR) submitted by relevant local authorities (typically following acceptance of an application), any relevant matters prescribed in relation to the Proposed Development and, as set out above, any other matters that the SoS identifies ‘important and relevant’ to the decision.
- 5.3.7 At this scoping stage, other matters that are considered to be important and relevant include the UK Government energy and climate change policy including national infrastructure plans and assessments. While the NPSs are the primary policy against which the DCO Application would be determined, other matters that the SoS may identify as both important and relevant may include the policies within the National Planning Policy Framework (‘NPPF’), Planning Practice Guidance (‘PPG’) (Ref 5-22) and local development plan documents including (but

not limited to) the NELC Local Plan 2013 to 2032 (adopted 2018) and the NLC Core Strategy 2006-2026 (adopted 2011) (Ref 5-23) and the saved policies in the NLC North Lincolnshire Local Plan (adopted 2003) (Ref 5-24).

### **2023 National Policy Statements**

- 5.3.8 EN-1, 2023 considers decarbonising the power sector in section 2.4 and while the increase in renewable energy to produce electricity is cited as playing a key role, paragraphs 2.4.4 and 2.4.5 outline the Government's support for CCUS. Further to this, Section 2.5 of EN-1, 2023 recognises that the UK has highly diverse and flexible source of gas supply and energy mix which ensures that households, businesses and heavy industry get the energy they need.
- 5.3.9 EN-1 recognises that the UK needs a diverse mix of electricity infrastructure to come forward to deliver secure, reliable, affordable and a net zero energy supply and that CCGT generating stations using natural gas equipped with CCS can reduce emissions and provide flexible energy generation.
- 5.3.10 EN-1 recognises in section 3.5 the urgent need for new CCS infrastructure to transition to a net zero economy. To support this urgent need for new CCS infrastructure, CCS technologies, pipelines and storage infrastructure are considered to be Critical National Infrastructure.
- 5.3.11 Section 4.2 of EN-1, 2023 is clear *"that there is a critical national priority (CNP) for the provision of nationally significant low carbon infrastructure", including "... natural gas fired generation which is carbon capture ready"*.
- 5.3.12 Section 4.2 of EN-1, 2023 applies a policy presumption that, subject to any legal requirements (including under section 104 of the Planning Act 2008), the urgent need for CNP Infrastructure to achieving our energy objectives, together with the national security, economic, commercial, and net zero benefits, will in general outweigh any other residual impacts not capable of being addressed by application of the mitigation hierarchy.

### **Marine Policy Documents**

#### *UK Marine Policy Statement (MPS)*

- 5.3.13 The Proposed Development will include pipelines as part of the cooling water infrastructure leading into the Humber Estuary to extract water for cooling before it is returned to the estuary. The SoS must take the policies and objectives of the MPS into account when determining the application.
- 5.3.14 The UK Marine Policy Statement ('MPS') came into force in March 2011 (Ref 5-25) and provides the framework for preparing Marine Plans and is key when making decisions affecting the marine environment. It sets out a series of high-level marine objectives in order to achieve clean, healthy, safe, productive and biologically diverse oceans and seas. Chapter 3 of the MPS sets out the policy objectives for the key activities that take place in the marine environment. Section 3.3 of the MPS specifically considers Energy Production and Infrastructure Development and acknowledges that:

*"A secure, sustainable and affordable supply of energy is of central importance to the economic and social wellbeing of the UK. The marine environment will make an*

*increasingly major contribution to the provision of the UK's energy supply and distribution... and that Contributing to securing the UK's energy objectives, while protecting the environment, will be a priority for marine planning."*

- 5.3.15 The relevant policies and objectives from this plan will be considered where appropriate during the EIA process and in the Planning Statement submitted with the DCO Application.

*East Inshore and East Offshore Marine Plan*

- 5.3.16 The SoS must also take the East Inshore and East Offshore Marine Plan (Ref 5-26) into account in determining the DCO Application. Marine plans address the key issues for the area, setting a vision and objectives. Detailed policies set out how these will be achieved and how issues will be managed or mitigated. The policies inform decision-making for any activity or development which is in or impacts on a marine area.

- 5.3.17 The East Inshore and East Offshore Marine Plan was published in 2014 and provides guidance for sustainable development along the east coast from Flamborough Head to Felixstowe. The relevant policies and objectives from this plan will be considered where relevant during the EIA process and in the Planning Statement submitted with the DCO Application.

**Other national policy**

- 5.3.18 Other national policy may also be considered 'relevant' and 'important' to the decision-making process by the SoS under section 104(2)(d) of the 2008 Act. Other national policy and strategy documents that have been prepared by the Government are set out below.

*Powering Up Britain (2023)*

- 5.3.19 Powering up Britain, published by DESNZ in March 2023 (Ref 5-27), is a policy paper that sets out how the Government will enhance the UK's energy security and deliver on net zero commitments. It sets out the Government's commitments to further development of industrial carbon capture, waste, CCUS enabled hydrogen, power CCUS and engineered greenhouse gas removals (GGRs).

- 5.3.20 It sets out: *"An effective planning system is needed to support both large scale nationally significant infrastructure like offshore wind, nuclear power and CCUS, and support local decisions on renewable and low carbon energy. That is why in order to support our net zero and energy security goals the government is committed to ensuring faster, fairer and more effective planning regimes, including through changes to the National Planning Policy Framework – generally for local plan-making and decisions, the energy NPSs – specifically for nationally significant decisions, and Electricity Act planning."*

*Powering Up Britain Energy Security Plan (2023)*

- 5.3.21 The Powering Up Britain Energy Security Plan sets out the steps that the Government is taking to ensure the UK is more energy independent, secure and resilient. It reiterates that delivering energy security creates economic opportunities for the UK, protects and creates jobs, in addition to helping to boost economic prosperity, attract future investment and support the UK's industrial heartlands.

5.3.22 With regards to CCUS, it states that:

*“CCUS is an emerging sector that is a central pillar of Government’s plan to deliver net zero. It is the key to unlocking decarbonisation of industrial sectors, delivering engineered greenhouse gas removals, and enabling low-carbon hydrogen production and flexible low carbon electricity generation to complement renewables. CCUS forms part of the most cost-effective route to net zero, and represents a significant economic opportunity, with the potential to support up to 50,000 jobs in our industrial heartlands and across the supply chain, and deliver £4-5 billion in Gross Value Added by 2050 through exports.”*

*Powering Up Britain The Net Zero Growth Plan (2023)*

5.3.23 Powering Up Britain The Net Zero Growth Plan alongside the Powering Up Britain: Energy Security Plan, sets out how the Government aims to enhance the UK’s energy security, capture the economic opportunities of the transition, and deliver on the Government’s net zero commitments.

*British Energy Security Strategy (2022)*

5.3.24 The British Energy Security Strategy in April 2022 (Ref 5-28) focuses on providing secure, clean and affordable energy for the long term. The Strategy reiterates the ambition for investing in CCS including a 2025 ambition to see up to 1 gigawatt (GW) of CCUS – enabled operational or in construction by 2025. The strategy also highlights the need to reuse existing infrastructure and use the North Sea reserve for CO<sub>2</sub> storage. The Strategy also seeks to achieve “20 to 30MT CCUS target” by 2030, assisted through a £1 billion commitment to delivering four CCUS clusters by 2030.

*Carbon Budget Delivery Plan*

5.3.25 The Carbon Budget Delivery Plan (Ref 5-29) sets out the package of Government’s proposals and policies to enable the fourth, fifth and sixth carbon budgets to be met. The plan is a long-term plan for a transition taking place over the next 15 years to enable the UK to reach net zero by 2050. The plan sets out the policy for CCUS and decarbonisation readiness including the commitment to establish four industrial clusters.

*The Energy White Paper: Powering our Net Zero Future (December 2020)*

5.3.26 The Energy White Paper: Powering our Net Zero Future (Ref 5-30) (‘EWP’) builds on the Prime Minister’s Ten Point Plan for a Green Industrial Revolution (Ref 5-31). At the core of the EWP, is the commitment to achieve Net Zero and tackle climate change. The EWP seeks to put in place a strategy for the wider energy system that transforms energy, supports a green recovery and creates a fair deal for consumers. As with the Ten Point Plan, the EWP confirms the Government’s support for CCUS and new hydrogen technologies.

5.3.27 The key commitments of the EWP include the deployment of CCUS, which is fundamental to the decarbonisation of energy intensive industries and can help secure their long-term future, and investment in the development of industrial clusters to facilitate the deployment of CCUS. The EWP also recognises that the UK is in a strong position to be a global leader in CCUS technology.

*National Planning Policy Framework (NPPF)*

5.3.28 The NPPF was originally published in March 2012 and most recently updated in December 2023 by the Department for Levelling Up, Housing and Communities (DLUHC). It sets out the Government's planning policies for England and forms the basis for applications to be considered under the Town and Country Planning Act (TCPA) 1990 ('TCPA 1990'). Whilst the NPPF does not contain specific policies for NSIPs, paragraph 5 confirms that matters that can be considered to be both important and relevant to NSIPs may include the NPPF and the policies within it. The Proposed Development will therefore have regard to the relevant policies of the NPPF as part of the overall framework of national policy.

5.3.29 At the heart of the NPPF is the commitment to achieve sustainable development, through ensuring three interdependent objectives: economic, social and environmental. The environmental objective focuses on protecting and enhancing our natural, built and historic environment, which includes moving towards a low carbon economy (paragraph 8), this is reiterated in chapter 14 of the NPPF which offers support for renewable and low carbon energy and associated development.

*National Infrastructure Strategy (2020)*

5.3.30 The National Infrastructure Strategy (November 2020) (Ref 5-32) sets out the Government's plans to deliver improvements to the quality of the UK's infrastructure, to help level up and contribute to net zero emissions by 2050. The Strategy also seeks to encourage private investment by providing clarity to the Government's plans and also accelerate and improve delivery through wide-ranging reforms to the planning system and the greater use of cutting-edge construction technology. Levelling up the UK is a key aim of the Strategy, creating regional powerhouses through backing new green growth clusters in traditional industrial areas, with CCS, offshore wind, port infrastructure and low carbon hydrogen.

*The ten-point plan for a green industrial revolution*

5.3.31 The Government's ten-point plan (2020) sets out the Government's approach to support green jobs and accelerate the path to net zero through significant government investment and incentives for private sector investment. Point 8 seeks to drive investment in CCS.

5.3.32 The Ten Point Plan sets out the Government's aim to capture 10 Mt of CO<sub>2</sub> a year by 2030, and invest up to £1bn to support the establishment of CCUS in four industrial clusters, creating 'SuperPlaces' in areas such as the North East, the Humber, North West, Scotland and Wales.

*Clean Growth – The UK Carbon Capture Usage and Storage deployment pathway – An Action Plan*

5.3.33 'Clean Growth – The UK Carbon Capture Usage and Storage deployment pathway – An Action Plan' (Department for Business, Energy & Industrial Strategy (BEIS), 2018) (5-126) ('the Action Plan') (Ref 5-33) was published by the Government in 2018. The Executive Summary (pages 5 and 6) confirms that the Government's vision is for the UK to become a global leader in CCUS. The Action Plan is aimed at enabling the development of the first CCUS facility in the UK, with commissioning in the mid-2020s, which would support the ambition of being able to deploy CCUS

at scale during the 2030s, subject to the costs coming down sufficiently. It goes on to state (page 6):

*“Through our Clean Growth Strategy we re-affirmed our commitment to the domestic deployment of CCUS subject to cost reductions. This Plan sets out our next steps to progress this commitment.”*

- 5.3.34 The Action Plan goes on to state that this can only be achieved through close Government and Industry partnership (page 14). The CCC is quoted as recognising the importance of CCUS to cost reductions *“as well as its crucial role in enabling deeper emissions reduction.”*

#### *Net Zero – Opportunities for the Power Sector*

- 5.3.35 ‘Net Zero – Opportunities for the Power Sector’ (National Infrastructure Commission (NIC), 2020) (Ref 5-34) states that decarbonising the power sector is integral to achieving the goal of net zero by 2050.

- 5.3.36 The NIC provides impartial advice to the Government on infrastructure needs and solutions. It sets out recommendations from the National Infrastructure Assessment 1 (2018) (Ref 5-35) to deliver at least 50% renewable generation by 2030 as part of the transition to a highly renewable generation mix. Its terms of reference are set by the Government, and while NIC recommendations do not constitute government policy, the Government is required to formally respond to the recommendations, and they may form the evidence base for future policy.

- 5.3.37 Core to the NIC recommendations as set out on page 7 of the Net Zero – Opportunities for the Power Sector report, is:

*“a highly renewable power system, combined with flexible technologies including hydrogen powered generation, could be substantially cheaper than alternatives that rely heavily on a fleet of nuclear power plants.”*

- 5.3.38 Page 18 of the report acknowledges that there will be a mix of technologies in net zero power systems, including unabated thermal (with low running hours) and at least 18 GW of gas CCS capacity by 2050, generating 23 terawatt hours (TWh) of electricity. By 2050 it is expected that this will primarily play a peaking role in the electricity system.

#### **National Infrastructure Assessment 2 (National Infrastructure Commission)**

- 5.3.39 The National Infrastructure Assessment 2 (NIC2) is a study which is carried out once every five years. The first assessment was published in 2018 and the second assessment was published in October 2023.

- 5.3.40 The NIC2 sets out that it is critical the Government establishes effective business models that incentivise investment in large scale hydrogen and gas with carbon capture and storage power stations to be deployed by 2030. The NIC2 also outlines that the UK can have a low carbon and resilient economy with infrastructure that supports economic growth and protects the natural environment.

- 5.3.41 The NIC2 provides support for the use of fossil fuel energy generation fitted with carbon capture and storage and sets out that the Government will need to accelerate the deployment of flexible technologies that can provide electricity if the sun isn't shining or the wind isn't blowing. It is stated that the "*Government should coordinate and support the delivery of hydrogen and carbon capture and storage infrastructure across the country to facilitate decarbonisation where electrification is not a viable option*".
- 5.3.42 NIC2 also outlines that electricity supply needs to match demand at all times and that a blend of renewable and nuclear generation will not always be sufficient. It is acknowledged in NIC2 that shortfalls in supply can be addressed by using more flexible energy sources such as gas fired power stations with CCS.
- 5.3.43 NIC2 specifically states that: Government should support multiple large-scale hydrogen and gas with CCS power stations to deploy by 2030, with a view to rapidly increasing deployment from then onwards. This will require an increase in current ambition on timescales and volumes. A business model to support gas generation with CCS has already been developed and the same will be required for hydrogen fired generation.

## 5.4 Local Planning Policy

- 5.4.1 Policies in Local Plans are prepared, examined and adopted for the purpose of guiding decision making on TCPA 1990 applications, and not applications made under the 2008 Act. They can nevertheless provide local context and policies that influence the content of the LIR prepared by local authorities which provide detail of the likely impacts of the project at a local level and to which the SoS must have regard to in decision making (section 104(2)(b) of the 2008 Act). Local Plans may also be important and relevant under section 104(2)(d) of the 2008 Act.
- 5.4.2 The Site lies mainly within the administrative areas of NELC, with short sections of the gas supply pipeline or electrical grid connection potentially being located within the administrative area of NLC or WLDC. The statutory development plans for NELC, NLC and WLDC are set out below. The statutory development plans for East Riding and East Lindsey are also considered relevant for certain topics as set out in this report.

### **NELC Development Plan**

- North East Lincolnshire Local Plan (adopted 2018).

### **NLC Development Plan**

- North Lincolnshire Core Strategy (adopted 2011);
- Employment and Land Allocations (adopted 2017) – adopted March 2016 (Ref 5-36); and
- Saved Policies of North Lincolnshire Local Plan (Local Development Frameworks Government Office for Yorkshire and The Humber, 2007) – adopted May 2003, saved September 2007.

### **Central Lincolnshire Development Plan**

- The Central Lincolnshire Local Plan (CLLP) 2018-2040 was adopted by the Central Lincolnshire Joint Strategic Planning Committee on 13 April 2023 and now replaces the 2017 version of the CLLP as the development plan for the City of Lincoln, West Lindsey, and North Kesteven District Councils.

### **East Riding Development Plan**

- The Local Plan Update, which is a draft update to the Local Plan (adopted 2016) and has been submitted to the Planning Inspectorate for examination.

### **East Lindsey Development Plan**

- East Lindsey Local Plan Core Strategy (adopted 2018).

### **Emerging Policy**

- 5.4.3 NLC is preparing a new Local Plan to 2036. Once adopted, it will replace the current North Lincolnshire Local Plan, the Core Strategy and the Housing and Employment Land Allocations Development Plan Documents (DPD). The Council undertook their Regulation 18 'Preferred Options' between February and March 2020.



# 6. Potential Significant Environmental Issues

## 6.1 Air Quality

6.1.1 This section sets out the proposed scope and methodology for the assessment of effects of the Proposed Development on air quality.

### **Baseline Conditions**

6.1.2 The Environment Act 1995 (Ref 6-1) requires local authorities to review air quality within their district or borough in order to determine where pollutant levels identified in the Air Quality Framework Directive may be in excess of the standards.

6.1.3 NELC monitors concentrations of nitrogen dioxide (NO<sub>2</sub>) within their administrative area, with a focus on the Air Quality Management Area (AQMA) in Grimsby. Published reports (Ref 6-3) indicate that annual mean concentrations of NO<sub>2</sub> remain below the annual mean limit value for NO<sub>2</sub>. NELC does not monitor other pollutants within their administrative area, indicating that concentrations are of low risk of exceedance of their respective air quality standard.

6.1.4 NELC has declared an AQMA within their administrative area. The AQMA is situated in Grimsby, approximately 5 km southeast from the Main Site and 3.8 km from the Site (refer to Figure 2E). The AQMA was declared due to the exceedance of the NO<sub>2</sub> annual mean. It is of note that this location is not in close proximity to the Main Site. The presence of the AQMA indicates that there are areas within the local authority's administrative area where concentrations of NO<sub>2</sub> could be above the relevant National Air Quality Standard.

6.1.5 Baseline, or existing, background air quality at the Site will be determined using data from nearby representative automatic monitoring stations, supplemented with published local authority air quality monitoring, Department for the Environment, Food and Rural Affairs (DEFRA) air quality monitoring and background air quality maps, and where appropriate, data published by the UK Air Pollution Information System (APIS) for ecological sites.

6.1.6 Any additional monitoring considered necessary at roadside locations to provide information for the purpose of roads traffic model verification or at nearby sensitive ecological receptors (NO<sub>x</sub> and ammonia (NH<sub>3</sub>)) will be agreed with stakeholders including Natural England, NELC and the Environment Agency and described in the ES.

6.1.7 The air quality study area is defined based on the potential impacts described in paragraphs 6.1.31 to 6.1.34, and with reference to guidance set out in paragraph 6.1.12 and is set as follows:

- For a Dust Risk Assessment for fugitive emissions of particulate matter during the construction phase, the following distances will apply based on Institute of Air Quality Management (IAQM) guidance (Ref 6-2):
  - 250 m from the Site boundary and 50 m from access roads up to 250 m from the Site entrance for potential impacts to human health and amenity;
  - 50 m from the Site boundary and 50 m from access roads up to 250 m from the Site entrance for potential impacts on relevant ecological sites.
- For potential impacts due to changes in pollutant concentrations associated with changes in road traffic flows, the study area for potential impacts on sensitive receptors will be 200 m from the road centreline of all road links included within the Traffic and Transport assessment of the ES;
- For operational emissions from the Proposed Development stack(s), the study area for potential impacts on statutory designated ecological receptors will be 15 km from the release point; and
- For operational emissions from the Proposed Development stack(s), the study area for potential impacts on human health and non-statutory designated ecological receptors will be 2 km from the release point.

6.1.8 Sensitive ecological receptor sites within the air quality study area include the Humber Estuary SSSI, SPA, SAC and Ramsar. Other sites which may be included in the assessment are other identified designated and non-designated ecological sites, including North Killingholme Haven Pits SSSI, Swallow Wold SSSI and Tetney Blow Wells SSSI. Other sites include locally designated nature sites, including ancient woodland, LWS and Local and National Nature Reserves (LNRs and NNRs). These sites will be identified, reviewed and included in the assessment where they are considered sensitive to air quality impacts. A list of ecological receptors to be included in the assessment will be reported in the PEIR.

6.1.9 Human health receptors include locations in Grimsby, Healing, Stallingborough. Other locations within the study area will be determined through a review or mapping and aerial photography, and included within the assessment where appropriate. A list of human health receptors to be included in the assessment will be reported in the PEIR.

### **Legislation, Policy and Guidance**

6.1.10 The principal legislation within the United Kingdom governing air quality are:

- Air Quality Standards Regulations 2010, including further amendments (Ref 6-4);
- The Air Quality (England) Regulations 2000 (Ref 6-5);
- The Air Quality (Amendment) (England) Regulations 2002 (Ref 6-6);
- The Environment Act (2021) (Ref 6-7);
- The Environmental Targets (Fine Particulate Matter) (England) Regulations 2022 (Ref 6-8); and
- Industrial Emissions Directive (IED) (Ref 6-9).

6.1.11 The following policy documents refer to air quality matters, and will be referred to within the assessment where relevant:

- The NPPF;
- The PPG;
- Air Quality Strategy for England (2023) (Ref 6-10);
- Overarching NPS for Energy (EN-1, 2023);
- NPS for Natural Gas Electricity Generating Infrastructure (EN-2, 2023);
- Clean Air Strategy 2019 (Ref 6-11);
- Air quality plan for nitrogen dioxide (NO<sub>2</sub>) in UK (Ref 6-12);
- Environmental Improvement Plan 2023: First Revision of the 25 Year Environment Plan (Ref 6-13);
- NELC Local Plan; and
- NELC Air Quality Strategy (Ref 6-14).

6.1.12 There is currently no statutory guidance on the methodology for air quality impact assessments. Several bodies have published their own guidance relating to air quality and development control, and those guidance documents used in this assessment are set out below. Where other guidance documents not listed below may be required (e.g. new publications, or updates to existing publications), these will be set out in the assessment where relevant.

- Local Air Quality Management (LAQM) Technical Guidance (Ref 6-15);
- Environment Agency Guidance: Air emissions risk assessment for your environmental permit (Ref 6-16);
- IAQM Guidance on the Assessment of Dust from Demolition and Construction (Ref 6-17);
- IAQM Land-Use Planning & Development Control: Planning for Air Quality (Ref 6-18);
- IAQM A guide to the assessment of air quality impacts on designated nature conservation sites (Ref 6-19);
- Large Combustion Plant (LCP) BAT Reference document (2017) (Ref 6-20);
- Environment Agency (Air Quality Modelling and Assessment Unit) (2021). AQMAU recommendations for the regulation of impacts to air quality from amine-based post-combustion carbon capture plant. AQMAU-C2025-RP01;
- Environment Agency (2021). BAT Review for New Build and Retrofit Post-Combustion Carbon Dioxide Capture Using Amine-Based Technologies for Power and CHP Plants Fuelled by Gas and Biomass as an Emerging Technology under the IED for the UK, and the associated Summary BAT Guidance; and
- BAT Conclusions (2017) (Ref 6-21).

### **Impact Assessment Methodology**

6.1.13 The assessment will be undertaken in line with the relevant legislation, policy and guidance documents set out above.

6.1.14 The following potential impacts may be associated with the Proposed Development:

- emission of pollutants to air from the CCGT stack(s) and CCP stack(s) during operation;
- emission of pollutants to air from vehicles associated with construction, operation and decommissioning; and
- construction dust and mobile plant exhaust emissions generated during construction and decommissioning.

- 6.1.15 The Proposed Development, when operational, will emit known pollutants to air, via one or more stacks. These will include the combustion products oxides of nitrogen (including NO<sub>2</sub>) and carbon monoxide (CO), for which Air Quality Objectives have been set as part of the National Air Quality Strategy, as well as CO<sub>2</sub> and potentially additional trace pollutants. Amines and amine degradation products may be released from the CCP. The CCGT will be designed to comply with the requirements of the IED, the LCP BAT Reference document and BAT Conclusions, and in line with Environment Agency guidance. Emissions from the CCP will be controlled in accordance with the use of BAT recognising that currently there is no formal published Environment Agency guidance on appropriate BAT-AELs (Achievable Emission Levels) for post combustion carbon capture plants.
- 6.1.16 The potential for the use of Selective Catalytic Reduction (SCR) and the use of absorption solvent to be used within the capture plant may also result in small emissions of ammonia ('ammonia slip') and/ or amines and amine degradation products. These pollutants will be assessed for potential human health and habitats effects, recognising the nitrogen deposition potential of ammonia and also the lessons learned from the previous carbon capture projects in England and Scotland. Environmental Assessment Levels (EALs) will be used to assess the potential impact of amine and amine degradation product emissions to atmosphere.
- 6.1.17 An atmospheric impact assessment will be undertaken for the main point source emissions, utilising air dispersion modelling to assess the impact to air quality potentially brought about through the generation and dispersion of emissions from the Proposed Development. The study will be desk-based and will assess the predicted concentrations of emitted combustion pollutants that are potentially hazardous to human health and designated habitats sites, at identified receptors (such as residential homes, schools, designated nature sites) within the study area, as well as the potential effect on the nearest AQMA.
- 6.1.18 The modelling will be based on Emission Limit Values (ELV) set by the IED, the BAT-AEL's or plant performance guarantees as appropriate and with the plant at full operating load, thereby presenting a reasonable worst-case scenario in the ES. Should it be deemed appropriate to model lower loads, justification for this will be provided and the load clearly stated in the assessment. The modelling and assessment will be undertaken with regard to published government and non-governmental guidance, as appropriate.
- 6.1.19 The atmospheric dispersion modelling study of operational emissions will be undertaken using the Atmospheric Dispersion Modelling System (ADMS) model,

currently version 6.0. ADMS is widely used by industry and the regulatory authorities.

- 6.1.20 The dispersion modelling study will be used to determine the most appropriate height for the CCGT stack(s) and the CCP stack(s) based on the resultant maximum short term and long term ground level concentrations predicted. The ES will explain the assumptions that have been made in the air quality assessment regarding the number, placement, and diameter of the stack(s).
- 6.1.21 The Proposed Development would introduce additional vehicle movements in the study area that require screening to determine the potential for impacts on local air quality. The IAQM guidance sets out indicative criteria to trigger the initiation of an assessment of air quality of a proposed development, including changes in traffic flows measured using Annual Average Daily Traffic (AADT) flows. The criteria vary, dependent on whether or not the site is located within or may have an impact upon an AQMA. These criteria, together with other relevant criteria, would be considered and agreed with NELC, for the purposes of the assessment.
- 6.1.22 Where the need for detailed modelling of road transport cannot be screened out using the published criteria, the assessment would utilise local traffic data attained during the proposed Traffic and Transport assessment (see Section 6.10: Traffic, Transport and Access), including worst-case peak traffic numbers, fleet composition, and average vehicle speeds, to calculate emission fluxes for NO<sub>2</sub>, particulate matter of 10 micrometres (µm) diameter or less (PM<sub>10</sub>) and particulate matter of 2.5µm diameter or less (PM<sub>2.5</sub>) from each road source. The worst-case traffic scenarios would be modelled using designated HGV routes, both with and without the Proposed Development. It is not anticipated that vehicles will pass through the Grimsby AQMA during either the construction or operation of the Proposed Development, and the AQMA will not be included in the road traffic assessment. A Framework CTMP and a CWTP will be prepared to accompany the DCO Application, with the aim to control and reduce the impacts during the peak construction phase as far as reasonably practicable.

#### *Assessment Criteria*

- 6.1.23 Appropriate assessment criteria will be derived from criteria published in the guidance documents stated in paragraph 6.1.12.
- 6.1.24 For fugitive emissions of dust during the construction phase, the dust risk assessment will determine the likely risk of significant dust effects in line with published guidance on nearby sensitive receptors and outline appropriate measures to control dust emissions to ensure no significant effects are likely.
- 6.1.25 For road traffic emissions, potential impacts and the associated effects will be assessed using criteria set out in guidance published by the IAQM. Predicted impacts will be assessed against the total concentration to determine the likely effect. The predicted effect will be used to determine the likely significance.
- 6.1.26 For operational emissions, the Environment Agency has published guidance on assessing air emissions from industrial development. Process contributions (PC) can be screened out as unlikely to give rise to significant effects where:

- the short-term PC is less than 10% of the short-term environmental standard; and
  - the long-term PC is less than 1% of the long term environmental standard.
- 6.1.27 Where this criteria is met, no further assessment is considered to be required. Where these criteria are not met, the Predicted Environmental Concentrations (PEC – PC plus background concentration) can be screened out as unlikely to give rise to significant effects where:
- the short-term PC is less than 20% of the short term environmental standards minus twice the long term background concentration; and
  - the long-term PEC is less than 70% of the long term environmental standards.
- 6.1.28 Where these criteria are not met, the PEC will be compared against the relevant air quality standard, and an assessment of significance will be made considering the likelihood of the Proposed Development to give rise significant effects. The short-term PEC does not need to be calculated for ecological sites, and only the short-term PC will be used for the initial screening of potential impacts.
- 6.1.29 For non-statutory designated nature conservation designations, PCs can be screened out as unlikely to give rise to significant effects where both the short- and long-term PCs are less than 100% of the relevant environmental standard for protected conservation areas.
- 6.1.30 For ecological receptors where the PC or PEC cannot be screened out, an assessment of the potential for likely significant effects on the relevant sensitive ecological receptor sites will be undertaken within the Terrestrial Ecology and Ornithology ES chapters (see sections 6.13: Terrestrial Ecology and 6.14: Ornithology).

## **Potential Impacts**

### *Construction*

- 6.1.31 During the construction phase, there is the potential for significant effects on human health and amenity and ecological receptors from uncontrolled emissions of dust from construction activities. The assessment of construction dust will consider the risk from controlled construction activities and will outline examples of mitigation as good site practice and industry standards in use to control fugitive emissions during construction activities.
- 6.1.32 Changes in road traffic flows on the surrounding road network due to the increase in construction vehicles accessing the Site have the potential to lead to impacts on sensitive receptors. The predicted construction traffic movements will be considered against the screening criteria to determine the risk of likely significant effects, and detailed dispersion modelling will be undertaken where such a risk cannot be screened out.

### *Operation*

- 6.1.33 During the operation of the Proposed Development, there is the potential for emissions from the stacks to give rise to significant effects at sensitive receptor locations. Operational sources included within the assessment will be detailed in the ES, including appropriate emission parameters for each source. The

assessment will include a comparison of operational process contributions to relevant air quality standards, and assessment of the likely significance of operational emissions on air quality at reported receptor locations.

- 6.1.34 Changes in road traffic flows on the surrounding road network due to the increase in operational vehicles accessing the Site have the potential to lead to impacts on sensitive receptors which may have a significant effect where vehicle movements are above the screening criteria set out in IAQM guidance. It is considered unlikely that operational vehicle movements set out in sub-section 3.10 of this report will be above the screening criteria (of an AADT movements of 500 Light Duty Vehicles or 100 Heavy Duty Vehicles) that could give rise to likely significant effects at sensitive receptors. It is proposed that operational vehicle emissions should be scoped out of the assessment.

### **Scope for Mitigation**

- 6.1.35 Where specific embedded mitigation is required, such measures will be set out within the ES that have been used to determine the conclusions of the assessment.
- 6.1.36 The assessment will include examples of appropriate control measures for fugitive dust emissions during the construction phase. Such measures are considered to be good site practice and are widely used on construction sites across the UK. The IAQM guidance sets out examples of such control measures, and reference will be made to those measures that are considered to be appropriate to the Proposed Development to minimise the potential for likely significant effects due to construction dust emissions.
- 6.1.37 The assessment will include a determination of an appropriate release height for relevant operational stacks to minimise potential impacts. The assessment will consider indicative proposed layouts and building massing, as determined by the Rochdale Envelope, to include building downwash effects in the assessment of release height.
- 6.1.38 Where further mitigation measures are required to reduce likely significant effects, these measures will be reported in the assessment, noting that any mitigation measures included for the purpose of avoiding or minimising risk to a Habitats site cannot be considered during HRA screening and so pre- and post-mitigation scenarios may need to be reported.

## **6.2 Climate Change**

- 6.2.1 This section sets out the proposed scope and methodology for the assessment of effects of the Proposed Development on the climate and of the impact of climate change on the Proposed Development. This has been informed by an overview of the environmental baseline conditions, along with the anticipated key issues likely to be associated with the Proposed Development.
- 6.2.2 Consideration will be given to the three aspects of climate change assessment identified below in Table 6.1.

**Table 6.1 Definition of the elements of the climate change assessment**

<b>Assessment Type</b>	<b>Definition</b>
Lifecycle greenhouse gas (GHG) impact assessment	Impact of GHG emissions arising from the Proposed Development on the climate, including how it will affect the UK meeting its national carbon budgets.
Climate change resilience assessment (CCRA)	The resilience of the Proposed Development to climate change impacts, including how the design will consider projected impacts of climate change.
In-combination climate change impact (ICCI) assessment	The combined impact of the Proposed Development and potential climate change on receptors in the receiving environment.

**Baseline Conditions**

*Potential Receptors*

*Lifecycle GHG Impact Assessment*

6.2.3 The receptor for GHG emissions is the global climate; as the effects of GHG emissions are not geographically constrained, all GHG emissions have the potential to result in a cumulative effect in the atmosphere. To assess the impact of GHG emissions from the Proposed Development, the UK carbon budgets and any relevant sectoral/local carbon budgets will be used as a proxy for the climate. In alignment with the Institution of Environmental Management and Assessment (IEMA) GHG assessment guidance, the carbon budgets will also be used to contextualise GHG emissions from the construction, operation and decommissioning of the Proposed Development and to determine the level of significance.

*CCRA*

6.2.4 The receptor for the CCRA is the Proposed Development itself and associated users.

*ICCI*

6.2.5 The receptors for the ICCI assessment are as defined by the technical specialists in the applicable technical sections of this report (sections 6.1 to 6.15).

*Establishment of Baseline and Definition Surveys*

*Lifecycle GHG Impact Assessment*

6.2.6 The baseline for the GHG assessment will be established by identifying existing GHG emissions sources from the Site.

6.2.7 The GHG baseline will be established by quantifying any GHG emissions from the Site, which will comprise GHG emissions from sources within the boundary of the Proposed Development (i.e. assuming that the Proposed Development does not progress).

6.2.8 The future baseline for the GHG assessment will include the GHG emissions associated with any operational emissions from existing infrastructure in the business-as-usual scenario. As no construction is planned as part of the business-as-usual scenario, the future baseline for construction is therefore considered zero in terms of GHG emissions. Where data is available for operational activities, this will be used to quantify carbon emissions. Where data is unavailable, benchmarks, estimates, or approximations will be used based on professional judgement.



### CCRA

- 6.2.9 The current baseline for the CCRA and ICCI will be based on climate data obtained from the Met Office (Ref 6-22) website recorded at the closest meteorological station to the Proposed Development (Cleethorpes, approximately 5 km from the Proposed Development) for the period 1981-2010, as listed in Table 6.2.
- 6.2.10 The future baseline for the CCRA is determined using United Kingdom Climate Projection data (2018) (UKCP18) for the project site.

### ICCI

- 6.2.11 The baseline for the ICCI assessment will align with that determined for the CCRA
- 6.2.12 No surveys are required for the climate change assessment. All of the necessary information will be accessed from desk-based sources.

### *Summary of Existing Baseline*

#### *Lifecycle of GHG Impact Assessment*

- 6.2.13 For the GHG assessment, the existing baseline is the 'business as usual' scenario where no proposed works are undertaken, and the site is left in-situ.

### *CCRA and ICCI Assessment*

- 6.2.14 For the CCRA and ICCI assessments the existing baseline is presented in Table 6.2 and is based on historic climate data from the closest weather station to the Proposed Development (Cleethorpes) for the period 1981-2010.

**Table 6.2 Historic Climate Data**

Climate Variable	Month	Value
Average annual maximum daily temperature (°C)	-	13.6
Warmest month on average (°C)	August	20.69
Coldest month on average (°C)	January	1.72
Mean annual rainfall (mm)		587.94
Wettest month on average (mm)	November	60.18
Driest month on average (mm)	February	37.99

### *Future Baseline*

#### *Lifecycle GHG Impact Assessment*

- 6.2.15 The future baselines for the assessment of the impact of the Site on climate is a projected 'business as usual' scenario where the Proposed Development is not constructed and the Site is left in situ.
- 6.2.16 The Site is currently actively farmed by a tenant farmer and is under cereal. The future baseline would therefore consist of the emissions associated with agricultural practice and the potential carbon sequestration of farmland.
- 6.2.17 The future baseline for the CCR and ICCI assessments is based on UKCP18 [Ref 6-23]) data from the Met Office for the 25 km grid square in which the Proposed Development is located. The future baseline for the Proposed Development and surrounding environment is displayed in Table 6.3.

**Table 6.3 Climate Change Baseline and Projection Data**

<b>Climate Variable</b>	<b>Baseline (1981-2010)</b>	<b>Climate Change Projection (Regional Climate Projection) RCP8.5 (2020-2049)</b>	<b>Climate Change Projection RCP8.5 (2050-2079)</b>	<b>Climate Change Projection RCP8.5 (2070-2099)</b>
<b>Temperature</b>				
Mean annual maximum daily temperature (°C)	13.6	+1.04 (+0.49 to +1.62)  (14.64)	+2.29 (+1.24 to +3.4)  (15.89)	+3.49 (+2.04 to +5.02)  (17.09)
Mean annual minimum daily temperature (°C)	6.58	+0.98 (+0.4 to +1.59)  7.56	+2.22 (+1.1 to +3.44)  8.8	+3.39 (+1.83 to +5.09)  9.97
Mean summer maximum daily temperature (°C)	19.82	+1.37 (+0.28 to +2.37)  21.19	+3.06 (+1.18 to +4.99)  22.88	+4.71 (+2.1 to +7.42)  24.53
Mean winter minimum daily temperature (°C)	1.84	+0.94 (+0.11 to +1.87)  2.78	+2.14 (+0.59 to +3.86)  3.98	+3.14 (+1.05 to +5.54)  4.98
Number of frost days per annum	30.6	-	-	-
Warmest Month on Average (°C)	August (20.69)	-	-	-
Coldest Month on Average (°C)	January (1.72)	-	-	-
<b>Rainfall</b>				
Mean annual rainfall (mm)	587.94	+0.5% (-6.63 to +7.52)  590.9	-1.7% (-10.94 to +7.75)  577.8	-1.6% (-13.08 to +10.2)  578.7
Mean summer rainfall (mm)	154.43	-4% (-21.43 to +14.36)  148.2	-19.6% (-42.23 to +2.95)  124.1	-29.4% (-53.48 to -3.46)  109.1
Mean winter rainfall (mm)	139.52	+4.13% (-4.29 to +13.37)  145.3	+10.92% (-2.71 to +27.14)  154.8	+17.59 (-0.92 to +38.88)  164.1
Wettest month on average (mm)	November (60.18)	-	-	-
Driest month on average (mm)	February (37.99)	-	-	-
<b>Other</b>				
Sea level rise (m)	Compared to a 1995-	+0.12	+0.34	+0.54

Climate Variable	Baseline (1981-2010)	Climate Change Projection (Regional Climate Projection) RCP8.5 (2020-2049)	Climate Change Projection RCP8.5 (2050-2079)	Climate Change Projection RCP8.5 (2070-2099)
	2014 baseline			
Storms	The number of very intense storms is projected to increase over the North Atlantic region in the future (2041-2060), under RCP8.5, projections suggest that the winter track of these storms may extend further south and over Ireland more often.			

## Legislation Policy and Guidance

### Legislation

6.2.18 Legislation which is relevant to the assessment of effects on the Climate and the assessment of climate change impacts is presented in Table 6.4.

**Table 6.4 Legislation Relevant to Climate Change**

Legislation	Legislation details
United Nations Framework Convention on Climate Change (UNFCCC) Paris Agreement	The Paris Agreement (Ref 6-24) is a legally binding agreement within the UNFCCC dealing with GHG emissions mitigation, adaptation and finance starting in the year 2020. It requires all signatories to strengthen their climate change mitigation efforts to keep global warming to well below 2 °C this century and to pursue efforts to limit global warming to 1.5 °C.
Climate Change Act 2008 and Climate Change Act (2050 Target Amendment)	In June 2019, the Climate Change Act was amended, requiring the Government to reduce the UK's net emissions of GHGs by 100% (net zero) relative to 1990 levels by 2050.
Carbon Budget Order 2021 (Ref 6-25)	The Sixth Carbon Budget, the first to align with the amended carbon reduction target, was published by the CCC for consideration by the Government in December 2020. In April 2021, the Government accepted the CCC's 965 MTCO <sub>2e</sub> recommendation and laid the Carbon Budget Order 2021 before Parliament. The new target was enshrined in law at the end of June 2021 and will incorporate the UK's share of international aviation and shipping emissions.

### Policy

6.2.19 Policy Relating to Climate Change and relevant to the assessment of effects of the Proposed Development is presented in Table 6.5.

**Table 6.5 Policy relevant to Climate Change**

Policy	Policy details
NPS for Energy (Ref 5-17) EN-1, 2023	The NPS (NPS) sets out the national policy for energy infrastructure. This considers the large-scale infrastructure which will be required to ensure the UK can provide a secure, reliable and affordable supply of energy.

Policy	Policy details
National Planning Policy Framework (NPPF)	<p>The NPPF sets out the Government’s planning policies for England. Policies of relevance to climate change and sustainability assessment presented include those relating to achieving sustainable development and meeting the challenge of climate change.</p> <p>Paragraph 152 of the NPPF states that: <i>“the planning system should support the transition to a low carbon future in a changing climate, taking full account of flood risk. It should help to shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, including the conversion of existing buildings; and support renewable and low carbon energy and associated infrastructure”</i>.</p>
Our Green Future: Our 25-year Plan to Improve the Environment (Ref 6-26)	<p>‘Our Green Future: Our 25-year Plan to Improve the Environment 2019’ sets out government action to help the natural world regain and retain good health. It aims to deliver cleaner air and water in our cities and rural landscapes, protect threatened species and provide richer wildlife habitats.</p>
Net Zero Strategy: Build Back Greener (Ref 6-27)	<p>The UK Government has published a Net Zero Strategy: Build Back Greener, which outlines its plans to achieve net zero emissions by 2050. The strategy includes the following key elements:</p> <ul style="list-style-type: none"> <li>• Reducing emissions in power generation: The Government plans to increase the use of renewable energy sources, such as wind and solar power, to generate electricity, and to phase out the use of unabated coal power by 2024.</li> <li>• Promoting energy efficiency: The strategy includes measures to improve the energy efficiency of homes and buildings, such as by requiring new buildings to be more energy efficient and providing funding for energy efficiency upgrades.</li> <li>• Encouraging sustainable transport: The Government plans to promote the uptake of electric vehicles and to increase investment in public transport, cycling, and walking infrastructure.</li> <li>• Supporting industry to reduce emissions: The strategy includes measures to support industries such as steel and cement to reduce their emissions, including through the development of new low-carbon technologies.</li> <li>• Preserving and enhancing natural habitats: The Government plans to protect and restore natural habitats such as woodlands, peatlands, and wetlands, which can store carbon and help to mitigate climate change.</li> </ul>

Policy	Policy details
Transport Decarbonisation Plan, Decarbonising Transport: a better, greener Britain (Ref 6-28)	<ul style="list-style-type: none"> <li>• Encouraging innovation and research: The strategy includes measures to support innovation and research in low-carbon technologies, such as hydrogen and carbon capture and storage.</li> <li>• Overall, the Net Zero Strategy: Build Back Greener reflects the UK Government’s commitment to achieving net zero emissions by 2050 and to building a greener, more sustainable economy.</li> </ul> <p>The UK Government has published a Transport Decarbonisation Plan titled “<i>Decarbonising Transport: a better, greener Britain</i>”, which outlines its plans to reduce transport emissions in order to achieve its goal of net zero emissions by 2050. The plan includes the following key elements:</p> <ul style="list-style-type: none"> <li>• Promoting sustainable travel: The Government plans to encourage more walking, cycling and public transport use by investing in infrastructure, such as cycle lanes and bus priority measures.</li> <li>• Encouraging uptake of zero-emission vehicles: The Government aims to phase out the sale of new petrol and diesel cars and vans, and promote the uptake of zero-emission vehicles, such as electric cars and hydrogen-powered buses and trains.</li> <li>• Decarbonising road freight: The plan includes measures to reduce emissions from road freight, such as encouraging the uptake of zero-emission heavy goods vehicles and promoting more efficient logistics.</li> <li>• Decarbonising aviation and maritime: The Government aims to support the development of low-carbon aviation and maritime technologies, such as sustainable aviation fuels and hydrogen-powered ships.</li> <li>• Supporting innovation and research: The plan includes measures to support innovation and research in low-carbon transport technologies, such as electric and hydrogen-powered aircraft and trains.</li> </ul> <p>Overall, the Transport Decarbonisation Plan reflects the UK Government’s commitment to reducing transport emissions and achieving its goal of net zero emissions by 2050.</p>
Towards Net Zero Emissions (Ref 6-29)	<p>Towards Net Zero Emissions is the energy industry’s commitment to the climate, customers and jobs and is a joint statement made by Energy UK on behalf of the energy industry. The statement outlines the industry’s commitment to achieving net zero emissions by 2050 and includes the following key elements:</p> <ul style="list-style-type: none"> <li>• The energy industry has led the decarbonisation of the UK economy. We want to continue that leadership with an ambition to create a net zero power system in the</li> </ul>

Policy	Policy details
	<p>2030s, while keeping bills affordable for customers and maintain security of supply. This power system will underpin the decarbonisation of the wider economy.</p> <ul style="list-style-type: none"> <li>• As we develop the net zero power system in the 2030s the industry believes there should be no further investment in new, unabated gas generation without clear plans to access carbon capture and storage technologies, or to utilise low or zero carbon gas.</li> <li>• The speed and cost of delivering on our ambition depends on government action in the coming months and years. Government needs to decide on how to allocate costs for the transition fairly, and set out markets and policies that enable capital and deliver infrastructure change at pace.</li> <li>• Customers, society and our environment will benefit as we massively increase the supply of low carbon electricity and grow sources of hydrogen. A net zero power system underpins the decarbonisation of homes, transport systems, and the wider economy. We cannot deliver Net zero without investing in a net zero power system.</li> <li>• We believe that reducing the UK’s greenhouse gas emissions is an economic opportunity. We will continue to invest billions into UK infrastructure, and we will also support the training, upskilling, and deployment of skilled workers in long-term jobs across the country. The UK energy industry supported over 700,000 jobs and invested £12bn in the UK in 2020.</li> <li>• By delivering a net zero power system in the 2030s, our industry will look to tackle the remaining 12% share of total UK emissions that come from power generation. However, decarbonising the power sector will also support wider emissions reduction, with the deployment of more technologies like electric vehicles (EVs) powered by a low carbon system will help reduce emissions within sectors that currently account for nearly half of the UK’s total emissions.</li> <li>• We believe that a net zero power system in the 2030s will include a diverse range of domestic low carbon generation, storage, and other technologies, even while we expect renewables to generate the largest proportion of our electricity. The diversity of domestic sources along with a flexible, smarter energy system</li> </ul>

Policy	Policy details
	<p>also offers the chance to reduce the UK’s dependency on imported gas.</p> <p>Overall, the statement reflects the commitment of the UK energy industry to achieving net zero emissions by 2050 and outlines the industry’s plans to promote the transition to a low-carbon energy system.</p>
British Energy Security Strategy	<p>The British Energy Security Strategy, which was published in 2021, sets out the UK Government’s plan to ensure secure, affordable and clean energy for the country. The strategy includes several climate-related sections, including:</p> <ul style="list-style-type: none"> <li>• <b>Achieving net zero emissions:</b> The Government has committed to achieving net zero emissions by 2050, and the strategy outlines the role that clean energy technologies, such as renewable energy and CCUS, will play in reaching this goal.</li> <li>• <b>Investing in low-carbon energy:</b> The strategy includes measures to promote investment in low-carbon energy sources, such as offshore wind and nuclear power, and to phase out unabated coal power by 2024.</li> <li>• <b>Promoting energy efficiency:</b> The Government plans to improve the energy efficiency of homes and buildings, which will help to reduce energy demand and lower emissions.</li> <li>• <b>Supporting innovation and research:</b> The strategy includes measures to support innovation and research in low-carbon energy technologies, such as hydrogen and CCUS.</li> <li>• <b>International cooperation:</b> The Government aims to work with international partners to promote the transition to a low-carbon energy system and to support developing countries in their efforts to reduce emissions and adapt to the impacts of climate change.</li> </ul> <p>Overall, the British Energy Security Strategy reflects the Government’s commitment to addressing the climate crisis by promoting the transition to a low-carbon energy system, supporting innovation and research in clean energy technologies, and working with international partners to tackle global emissions.</p>

*Guidance*

6.2.20 Guidance which is relevant to the assessment of effects on Climate Change is presented in Table 6.6.

**Table 6.6 Guidance Relevant to Climate Change**

<b>Guidance</b>	<b>Guidance Detail</b>
IEMA: Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance (Ref 6-30)	The approach to assessing the significance of GHG emissions from the Proposed Development would be undertaken in accordance with this guidance.
IEMA: Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation (Ref 6-31)	The approach for assessing the significance of climate change risks on the Proposed Development would be undertaken in accordance with this guidance.
The GHG Protocol (Ref 6-32)	The GHG Protocol is a widely-used standard for measuring and managing GHG emissions. The protocol provides guidance on how to identify, measure, report and verify GHG emissions from various sources, such as energy use, transportation, and waste.
Publicly Available Standard (PAS) 2080: 2023 Carbon Management in Buildings and Infrastructure (Ref 6-33)	PAS 2080 provides guidance on how to manage carbon emissions and promote sustainability in infrastructure projects. The standard outlines a framework for the management of GHG emissions throughout the project lifecycle, from planning and design to construction and operation.
DESNZ Emissions Factors (Ref 6-34)	The DESNZ's Emissions Factors are a set of factors developed by the UK Government's DESNZ to calculate GHG emissions from various sources, such as electricity and fuel consumption. The factors take into account the emissions associated with the production and distribution of energy, as well as the emissions associated with combustion or use of the energy source.
Inventory of Carbon and Energy (Ref 6-35)	The Inventory of Carbon and Energy (ICE) provides embodied energy and CO <sub>2</sub> emissions data for a wide range of materials and building components. The ICE database enables calculation of the embodied energy and CO <sub>2</sub> emissions associated with a building or construction project, taking into account the materials used, manufacturing processes, and transportation.
Think Hazard (Ref 6-36)	Think Hazard is an online tool developed by the United Nations Office for Disaster Risk Reduction (UNDRR) that provides information on natural hazards such as floods, earthquakes, and landslides.

## **Impact Assessment Methodology**

### *Assessment Criteria*

- 6.2.21 This section provides a summary of the assessment methodology. This includes the GHG Impact Assessment, CCRA and ICCI Assessment. The scope of assessment considers the impacts and resultant effects during the construction, operation and decommissioning of the Proposed Development.

### *Lifecycle GHG Impact Assessment*

#### *Study Area*

- 6.2.22 The study area for the GHG assessment will include:



- Direct GHG emissions arising as a result of Site clearance, construction, maintenance, operational activities within the boundary of the Site; and
- Indirect GHG emissions occurring off-site that are significantly related to the Site, such as embodied carbon in materials, transportation, waste processing and waste disposal.

#### *Assessment Criteria*

- 6.2.23 The aim of the GHG impact assessment is to understand the impact of the Proposed Development on the climate over its lifetime.
- 6.2.24 The assessment will adopt a project lifecycle approach to quantify GHG emissions at each lifecycle stage and identify 'hot spots' of GHG emissions likely to generate the largest amount of GHG emissions) to enable priority areas for mitigation to be identified. This approach is consistent with the principles set out in IEMA guidance.
- 6.2.25 In line with the GHG Protocol guidelines (Ref 6-37), the lifecycle GHG impact assessment will be reported as tonnes of CO<sub>2</sub> equivalent (tCO<sub>2</sub>e) and will consider the seven Kyoto Protocol gases:
- CO<sub>2</sub>;
  - Methane (CH<sub>4</sub>);
  - Nitrous oxide (N<sub>2</sub>O);
  - Sulphur hexafluoride (SF<sub>6</sub>);
  - Hydrofluorocarbons (HFCs);
  - Perfluorocarbons (PFCs); and
  - Nitrogen Trifluoride (NF<sub>3</sub>).
- 6.2.26 Expected GHG emissions arising from the construction and operation phases will be quantified using a calculation-based methodology as per the following equation and aligned with the GHG Protocol:
- $$\text{Activity data} \times \text{GHG emissions factor} = \text{GHG emission}$$
- 6.2.27 The resulting carbon footprint will be compared to the existing baseline conditions to identify the impact of the Proposed Development.
- 6.2.28 If relevant GHG activity data are unavailable, GHG emissions will be estimated based on benchmarks or approximations. Where quantification is not possible the assessment will be qualitative. Any assumptions, inclusions and exclusions that inform the GHG emissions calculation will be clearly described.
- 6.2.29 The DESNZ 2023 Conversion Factors for Company Reporting and embodied carbon data from the ICE V3.0 will be used as the main sources of emissions factors for calculating GHG emissions.
- 6.2.30 The global climate will be identified as the receptor for the purposes of the GHG assessment. The sensitivity of the climate to GHG emissions is 'high'. The rationale is as follows:

- GHG emission impacts could compromise the CCC’s sectoral construction and net-zero pathways and therefore the ability to meet its future carbon reduction trajectory;
- GHG emission impacts could compromise the UK’s ability to reduce its GHG emissions and therefore the ability to meet its future legally binding carbon budgets;
- The extreme importance of limiting global warming to below 2 °C above industrial levels, while pursuing efforts to limit such warming to 1.5 °C as set out in the Paris Agreement and a recent report by the Intergovernmental Panel on Climate Change (IPCC) (Ref 6-38) highlighted the importance of limiting global warming below 1.5 °C; and
- Disruption to global climate is already having diverse and wide-ranging impacts to the environment, society, economic and natural resources. Known effects of climate change include increased frequency and duration of extreme weather events, temperature changes, rainfall and flooding, and sea level rise and ocean acidification. These effects are largely accepted to be negative, profound, global, likely, long-term to permanent, and are transboundary and cumulative from many global actions.

*Magnitude of Impact*

- 6.2.31 In line with IEMA GHG assessment guidance, the Proposed Development emissions will be compared against existing carbon budgets.
- 6.2.32 Emissions from the Proposed Development will be considered in the context of the UK carbon budgets (Ref 6-39). The UK carbon budgets are in place to restrict the amount of GHG emissions the UK can legally emit in a five-year period. The UK is currently in the 4<sup>th</sup> carbon budget period, which runs from 2023 to 2027, as detailed in Table 6.7. The 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> carbon budgets reflect the previous 80% reduction target by 2050. The 6<sup>th</sup> Carbon Budget is the first to align with the legislated 2050 net zero commitment. The Carbon Budget Delivery Plan provides updated data and targets and refers to power generation rather than electricity supply.
- 6.2.33 It is noted that the contribution of most individual projects to national-level budgets will be small, so the UK context will have limited value. This GHG emissions assessment therefore uses the IEMA guidance to assess the likely significance of effects with the UK carbon budgets being used to provide context to the GHG emissions Table 6.7.

**Table 6.7 UK Carbon Budgets and indicative carbon budgets based upon the CCC’s balanced net-zero pathway**

Carbon budget	Indicative CCC’s Power Budget based upon the Carbon Budget Delivery Plan (MtCO <sub>2</sub> e)	UK Carbon Budget (MtCO <sub>2</sub> e)	Indicative Carbon Budgets based upon the CCC’s balanced net-zero pathway (MtCO <sub>2</sub> e)
3 <sup>rd</sup> (2018-2022)	-	2,544	-
4 <sup>th</sup> (2023-2027)	143	1,950	-
5 <sup>th</sup> (2028-2032)	63	1,752	-

<b>Carbon budget</b>	<b>Indicative CCC's Power Budget based upon the Carbon Budget Delivery Plan (MtCO<sub>2</sub>e)</b>	<b>UK Carbon Budget (MtCO<sub>2</sub>e)</b>	<b>Indicative Carbon Budgets based upon the CCC's balanced net-zero pathway (MtCO<sub>2</sub>e)</b>
6 <sup>th</sup> (2033-2037)	42	965	-
7 <sup>th</sup> (2038-2042)	23	-	526
8 <sup>th</sup> (2043-2047)	12.4	-	195
9 <sup>th</sup> (2048-2050)	4	-	17

6.2.34 In order to illustrate the Proposed Development trajectory towards net zero by 2050, it is recommended that the CCC balanced net zero pathway is utilised post-2037, in the absence of any nationally legally binding carbon budgets after using the subsequent 6<sup>th</sup> carbon budget. Beyond 2050, it is expected that the UK will remain at net zero.

6.2.35 The CCC balanced net-zero pathway is recommended to be divided into 5-year periods post-2037 to match the previous 1-6 legally binding UK National carbon budgets. The proposed Carbon Budget periods derived from the net-zero pathway encompass the 7<sup>th</sup>, 8<sup>th</sup>, and 9<sup>th</sup> indicative budget periods up to 2050 in line with the UK's 1.5-degree trajectory as detailed in Table 6.7. The data for these are from the Sixth Carbon Budget Dataset (Ref 6-40).

6.2.36 However, it should be noted that the supplementary carbon budgets beyond 2037 have not been formally adopted by the Government or ratified by Parliament and can only be used as an indicative measure to contextualise the Proposed Development's progress toward the national net-zero trajectory.

#### Significance of Effects

6.2.37 The IEMA guidance states that there are currently no agreed methods to evaluate quantified levels of GHG significance, that the application of the standard EIA significance criteria is not considered to be appropriate for climate change mitigation assessments, and that professional judgement is required to contextualise a project's GHG emission impacts.

6.2.38 IEMA guidance on 'Assessing Greenhouse Gas Emissions and Evaluating their Significance' states mitigation should be considered from the outset and throughout the project's lifetime whilst also helping to deliver proportionate EIAs. Once the magnitude of emissions is determined, mitigation measures should be proposed. Any mitigation measures that are committed to within a proposed development need to be included within the assessment.

6.2.39 IEMA guidance describes five distinct levels of significance which are not solely based on whether a project emits GHG emissions alone, but how the project makes a relative contribution towards achieving a science-based 1.5°C aligned transition towards net zero. The different levels of significance are plotted against the UK's net zero compatible trajectory as presented in Table 6.8, to determine a project's likely significance.

6.2.40 A project’s impact can shift from significant adverse to non-significant effects by incorporating mitigation measures that substantially improve on business-as-usual and meet or exceed the science-based emissions trajectory of ongoing but declining emissions towards net zero.

**Table 6.8 Definition of levels of significance**

<b>Significance Level</b>	<b>Effects</b>	<b>Description</b>	<b>Example in the guidance</b>
Significant	Major adverse	A project that follows a ‘business-as-usual’ or ‘do minimum’ approach and is not compatible with the UK’s net zero trajectory, or accepted aligned practice or area-based transition targets. It is down to the practitioner to differentiate between the ‘level’ of significant adverse effects e.g. ‘moderate’ or ‘major’ adverse effects.	The project’s HG impacts are not mitigated or are only compliant with do-minimum standards set through regulation, and do not provide further reductions required by existing local and national policy for projects of this type. A project with major adverse effects is locking in emissions and does not make a meaningful contribution to the UK’s trajectory towards net zero.
	Moderate adverse		The project’s GHG impacts are partially mitigated and may partially meet the applicable existing and emerging policy requirements but would not fully contribute to decarbonisation in line with local and national policy goals for projects of this type. A project with moderate adverse effects falls short of fully contributing to the UK’s trajectory towards net zero.
Not significant	Minor adverse	A project that is compatible with the budgeted, science based 1.5°C trajectory (in terms of rate of emissions reduction) and which complies with up-to-date policy and ‘good practice’ reduction measures to achieve that. It may have residual emissions but is doing enough to align with and contribute to the relevant transition scenario, keeping the UK on track towards net zero by 2050 with at least a 78% reduction by 2035 and thereby potentially avoiding significant adverse effects.	The project’s GHG impacts would be fully consistent with applicable existing and emerging policy requirements and good practice design standards for projects of this type. A project with minor adverse effects is fully in line with measures necessary to achieve the UK’s trajectory towards net zero.

Significance Level	Effects	Description	Example in the guidance
	Negligible	A project that achieves emissions mitigation that goes substantially beyond the reduction trajectory, or substantially beyond existing and emerging policy compatible with that trajectory and has minimal residual emissions. This project is playing a part in achieving the rate of transition required by nationally set policy commitments.	The project's GHG impacts would be reduced through measures that go well beyond existing and emerging policy and design standards for projects of this type, such that radical decarbonisation or net zero is achieved well before 2050. A project with negligible effects provides GHG performance that is well 'ahead of the curve' for the trajectory towards net zero and has minimal residual emissions.
Significant	Beneficial	A project that causes GHG emissions to be avoided or removed from the atmosphere. Only projects that actively reverse (rather than only reduce) the risk of severe climate change can be judged as having a beneficial effect.	The project's net GHG impacts are below zero and it causes a reduction in atmospheric GHG concentration, whether directly or indirectly, compared to the without-project baseline. A project with beneficial effects substantially exceeds net zero requirements with a positive climate impact.

### CCRA

#### Study Area

6.2.41 The Study Area for the CCRA is the Site itself and surrounding areas.

#### Assessment Criteria

6.2.42 The following section presents the criteria used to assess the impact of climate change on the Proposed Development.

#### Sensitivity

6.2.43 The receptor for the CCRA is the Proposed Development itself, including workers, infrastructure and visitors. The receptor is considered to be sensitive to the impacts of climate change.

#### Assessment Approach

6.2.44 The CCRA will identify potential climate change impacts on the Proposed Development and associated receptors, and consider their potential consequence and likelihood of occurrence, taking account of the measures incorporated into the design of the Proposed Development.

6.2.45 For construction and operation of the Proposed Development, potential climate change impacts will be identified using relevant projections from UKCP18. The CCRA will consider their potential consequence to receptors and likelihood of occurrence, taking account of the measures incorporated into the design of the Proposed Development.

6.2.46 The following key terms and definitions relating to the CCRA will be used:

- Climate hazard – a weather or climate related event, which has potential to do harm to environmental or community receptors or assets, for example, increased winter precipitation;
- climate change impact – an impact from a climate hazard which affects the ability of the receptor or asset to maintain its function or purpose; and
- consequence – any effect on the receptor or asset resulting from the climate hazard having an impact.

6.2.47 The likelihood of a climate impact occurring is based on likelihood of the hazard occurring combined with the vulnerability of the Proposed Development, using professional judgement and in discussion with the design team. Embedded mitigation measures will also be taken into account and a likelihood rating will be assigned as described in Table 6.9.

6.2.48 Following the identification of climate hazards, the likelihood and consequences will be assessed according to Table 6.9 and Table 6.10, respectively. The categories and descriptions provided below are based on the IEMA climate change resilience and adaptation guidance.

**Table 6.9 Categories for the likelihood of the climate-related impact occurring**

Likelihood category	Description
High	Likelihood of climate hazard occurring is high and impact is always/ almost always going to occur.
Moderate	Likelihood of climate hazard occurring is high and impact occurs often or the likelihood of climate hazard occurring is moderate and impact is likely to occur always/ almost always.
Low	Likelihood of climate hazard occurring is high, but impact rarely occurs or the likelihood of climate hazard occurring is moderate and impact sometimes occurs or the likelihood of climate hazard occurring is low and impact is likely to occur always/ almost always.
Negligible	All other eventualities – highly unlikely but theoretically possible.

**Table 6.10 Description of Consequences**

Consequence of impact	Description
High	Significant disruption to construction and operations, unable to deliver services, resulting in high financial losses.
Moderate	Disruption to construction and operations and ability to deliver services, resulting in some financial losses/ cost implications.
Low	Minor disruption to construction and operations but does not significantly impact ability to deliver services.
Negligible	Negligible disruption to construction and operations, does not impact ability to deliver services.

#### Significance of Effects

6.2.49 The CCRA will assess the likely significance of effects by evaluating the combination of the likelihood of the climate-related impact occurring and the consequence, as per the risk assessment matrix in Table 6.11. The assessment has taken into account confirmed design and mitigation measures (referred to as embedded mitigation).

**Table 6.11 Likely significance of effect matrix (where ‘S’ is significant and ‘NS’ is not significant)**

		<b>Likelihood of climate-related impact occurring</b>			
		<b>Negligible</b>	<b>Low</b>	<b>Moderate</b>	<b>High</b>
<b>Measure of consequence</b>	<b>Negligible</b>	NS	NS	NS	NS
	<b>Low</b>	NS	NS	NS	S
	<b>Moderate</b>	NS	NS	S	S
	<b>High</b>	NS	S	S	S

*ICCI Assessment*

*Study Area*

6.2.50 The study area for the ICCI assessment will be determined by the EIA topic assessments, as described in other technical sections of this report (sections 6.1 to 6.15).

6.2.51 The ICCI assessment will consider how the resilience of various receptors in the surrounding environment (such as local waterways or local heritage assets etc.) are affected by the Proposed Development in combination with future climatic conditions, as sourced from UKCP18 projections. The impacts are considered for the construction, operation, and decommissioning phases of the Proposed Development.

*Sensitivity*

6.2.52 The sensitive receptors for the ICCI Assessment will be defined by technical specialists of the appropriate disciplines (see sections 6.1 to 6.15).

*Assessment Approach*

6.2.53 The likelihood of an ICCI occurring is based on likelihood of the hazard occurring combined with the vulnerability of the Proposed Development, using professional judgement of the technical specialists responsible for preparing the applicable technical assessments and in discussion with the design team. Embedded mitigation measures will also be taken into account and a likelihood rating will be assigned as described in Table 6.12 and Table 6.13.

6.2.54 The likelihood of a climate risk occurring and the likelihood of an impact to a receptor will then be combined to determine the likelihood of an ICCI occurring. This criterion is illustrated in Table 6.12.

**Table 6.12 Level of likelihood of the climate-related impact occurring**

<b>Level of likelihood of climate impact occurring</b>	<b>Definition of likelihood</b>
<b>High</b>	Likelihood of climate hazard occurring is high and impact is always/ almost always going to occur.
<b>Moderate</b>	Likelihood of climate hazard occurring is high and impact occurs often or the likelihood of climate hazard occurring is moderate and impact is likely to occur always/ almost always.
<b>Low</b>	Likelihood of climate hazard occurring is high but impact rarely occurs or the likelihood of climate hazard occurring is moderate and impact sometimes occurs or the likelihood of climate

<b>Level of likelihood of climate impact occurring</b>	<b>Definition of likelihood</b>
	hazard occurring is low and impact is likely to occur always/ almost always.
<b>Negligible</b>	All other eventualities – highly unlikely but theoretically possible.
6.2.55	Once the likelihood of an ICCI has been identified, the assessment then considers how this will affect the significance of the identified effects.
6.2.56	The ICCI consequence criteria are defined in Table 6.13 below and are based on the change to the significance of the impact already identified by the environmental discipline. To assess the consequence of an ICCI each discipline has assigned a level of consequence to an impact based on the criteria description and their discipline assessment methodology.

**Table 6.13 Consequence criteria for ICCI assessment**

<b>Consequence</b>	<b>Consequence criteria</b>
<b>High</b>	The climate change parameter in-combination with the effect of the Proposed Development causes the likely significance of the effect of the Proposed Development on the resource/receptor, as defined by the topic, to increase from negligible, low, or moderate to major.
<b>Moderate</b>	The climate change parameter in-combination with the effect of the Proposed Development causes the likely significance of effect defined by the topic to increase from negligible or low, to moderate.
<b>Low</b>	The climate change parameter in-combination with the effect of the Proposed Development causes the likely significance of effect defined by the topic, to increase from negligible to low.
<b>Negligible</b>	The climate change parameter in-combination with the effect of the Proposed Development does not alter the likely significance of the effect defined by the topic.

**Significance of Effects**

6.2.57 The likely significance of effects will be determined using the matrix in Table 6.11. Where an effect has been identified as moderate or high it will be classed as a likely significant ICCI effect. If likely significant ICCI effects are assessed, then appropriate additional mitigation measures (secondary mitigation) would be identified.

**Assumptions and Limitations**

6.2.58 It is assumed that necessary quantitative data will be available to inform the GHG assessment. Where quantitative data is not available, reasonable assumptions will be made.

6.2.59 Where it is neither possible to quantify the required data nor to use reasonable assumptions, a qualitative statement will be made on the environmental impact based on professional experience and expertise.



## Potential Impacts

### *Lifecycle GHG Impact Assessment*

6.2.60 Activities related to the Proposed Development that could result in GHG emissions are presented in Table 6.14.

**Table 6.14 GHG lifecycle scoping outcomes**

<b>Lifestyle Stage</b>	<b>Activity</b>	<b>Rationale for scoping conclusion</b>
Pre-construction stage	Enabling works, Land clearance, Disposal of any waste generated during the enabling works.	GHG emissions are expected to arise from: <ul style="list-style-type: none"> <li>• fuel use for works equipment and vehicles.</li> <li>• fuel use for worker commuting.</li> <li>• loss of carbon sink.</li> <li>• disposal of waste.</li> <li>• fuel consumption of transportation of waste.</li> </ul>
Production stage	Raw material extraction and manufacturing of products required to build the Proposed Development.	<ul style="list-style-type: none"> <li>• Embodied GHG emissions.</li> </ul>
Construction Process stage	On-site construction activity; Transport of construction materials (where these are not included in embodied GHG emissions); Transport of construction workers; Disposal of any waste generated during the construction processes.	<ul style="list-style-type: none"> <li>• GHG emissions from energy (electricity, fuel, etc.) consumption for plant and vehicles, generators on site.</li> <li>• Fuel consumption from transport of materials to site (where these are not included in embodied GHG emissions).</li> <li>• GHG emissions from fuel use for worker commuting.</li> <li>• GHG emissions from disposal of waste.</li> <li>• GHG emissions from fuel consumption of transportation of waste.</li> </ul>

Lifestyle Stage	Activity	Rationale for scoping conclusion
Operation Stage	Operation of Proposed Development; Maintenance.	<ul style="list-style-type: none"> <li>• GHG emissions from operation of the Proposed Development, including residual emissions (post capture plant) from the combustion of natural gas, and also indirect emissions from the upstream natural gas supply chain. It is assumed that the fuel supply to the Proposed Development is sourced from the existing UK natural gas network.</li> <li>• Potential GHG emissions avoided due to the beneficial impact of the Proposed Development on the carbon intensity of power generation in the UK as well as supporting the decarbonization path to net zero.</li> <li>• Fuel use for maintenance activities.</li> </ul>
Decommissioning	Removal and or renewal of the full Proposed Scheme	The emissions from decommissioning need to be taken into account.

*CCRA*

6.2.61 Potential climate impacts to the Proposed Development are presented in Table 6.15.

**Table 6.15 Potential impacts related to Climate Change risk**

<b>Climate Parameter</b>	<b>Potential impact</b>
Extreme weather events	The Proposed Development may be vulnerable to extreme weather events such as heatwaves, drought, wildfires, cold spells and storm damage to structures and assets.
Sea level rise (SLR)	The Proposed Development is located within Flood Zone 3 (Ref 6-41), which comprises land assessed as having a high probability of flooding from 1% or greater probability of flooding from rivers or 0.5% or greater probability of flooding from the sea. Therefore, a flood risk assessment is required to be carried out to assess the Proposed Development’s risk to sea, groundwater and surface water flooding taking into account existing flood defences.
Temperature	Increased temperatures may increase the cooling requirements of the Proposed Development and could impact the structural integrity of buildings and materials and the reduction of plant efficiency.
Precipitation	The Proposed Development may be vulnerable to changes in precipitation, for example, damage to structures, materials and any drainage systems during periods of heavy precipitation.
Wind	There is currently no evidence to suggest that climate change is increasing high wind events. The UK Climate report states there are “ <i>no compelling trends in storminess when considering maximum gust speeds over the last five decades (Ref 6-42)</i> ”. However, the effects of increased wind strength will be considered qualitatively due to the lack of credible data.

*ICCI*

6.2.62 The ICCI assessment will consider how the resilience of various receptors in the surrounding environment (such as local waterways or local heritage assets etc.) are affected by the Proposed Development in combination with future climatic conditions. Potential ICCI are presented in Table 6.16.

**Table 6.16 Potential ICCI**

<b>Climate Parameter</b>	<b>Rationale for Scoping Conclusion</b>
Extreme weather events	Discipline receptors might be vulnerable to the in-combination impact of extreme weather events such as heatwaves, wildfires, storm damage to structures and assets and environmental impacts from the Proposed Development.
Sea level rise (SLR)	The Proposed Development is located within Flood Zone 3. Therefore, discipline receptors might be vulnerable to the in-combination impact of sea level rise environmental impacts from the Proposed Development.
Temperature	Increased temperatures may increase the cooling requirements of the Proposed Development and could impact the structural integrity of buildings and materials. Therefore, discipline receptors might be vulnerable to the in-combination impact of temperature changes and environmental impacts from the Proposed Development.
Precipitation	Discipline receptors might be vulnerable to the in-combination impact to changes in precipitation, for example, damage to structures, materials and any drainage systems during periods of heavy precipitation and environmental impacts from the Proposed Development.
Wind	There is currently no evidence to suggest that climate change is increasing high wind events as previously described. . However, the

Climate Parameter	Rationale for Scoping Conclusion
	effects of increased wind strength in-combination with the Proposed Development will be considered qualitatively by disciplines.

### Scope for Mitigation

#### *Lifecycle GHG Impact Assessment*

6.2.63 The scope for mitigating climate change effects on and from the Proposed Development will be determined following completion of the lifecycle GHG impact assessment. Mitigation will focus on measures to reduce GHG emissions from the construction and operation of the Proposed Development, to align with the Government’s target to achieve net zero emissions by 2050, and remain so thereafter. Any emissions beyond this date should thus be balanced by removals. For example, this may include utilising low-carbon energy sources for the operation of the Proposed Development and defining design principles with the purpose of reducing embodied carbon associated with materials.

#### *CCRA and ICCI*

6.2.64 The scope for mitigating measures for the CCRA and ICCI will be informed by the design team and other relevant ES technical chapters. These will focus on measures to increase the resilience of the Proposed Development and receptors in the surrounding environment to climate change impacts and will be informed by the design team and other relevant ES technical assessments. For example, this may include designing surface water drainage systems to make sure flows up to the 1 in 100-year return period can be contained and managed within the Proposed Development.

## 6.3 Cultural Heritage

6.3.1 This section of the Scoping Report presents an initial baseline for archaeology and cultural heritage for the Proposed Development and identifies the need for additional surveys to gather appropriate information to characterise the baseline and set out the study area. In addition, the section provides an overview of the assessment methodology to be followed for the environmental assessment and identifies the potential likely significant effects.

6.3.2 Archaeology and cultural heritage comprises above and below-ground archaeological assets, buildings or structures of historic interest, historic landscape features, including historically important hedgerows, and any other elements that are of cultural heritage interest.

6.3.3 This section is supported by Figure 2D and Figure 2E (Appendix A) which shows the location of designated heritage assets.

### Baseline Conditions

#### *Study Area*

6.3.4 The study area is defined as the area within which cultural heritage assets may experience effects as a result of the Proposed Development during construction, operation and / or decommissioning. Effects to heritage assets may arise as a result of physical impacts to their fabric or through change to their setting.

6.3.5 For the purposes of this Scoping Report, an initial study area of 1 km surrounding the Site has been used to capture data relating to designated and non-designated heritage assets (refer to Figure 2D). The study area provides the necessary context for establishing the likely effects arising from the Proposed Development and the potential impacts upon cultural heritage assets, including those arising from changes within their settings. A wider study area for the PEIR and ES will be applied as described below.

#### *Marine archaeology*

6.3.6 It is anticipated that offshore infrastructure will be installed as part of the Proposed Development, which could result in impacts to marine archaeology assets. An assessment of the impact of offshore infrastructure on archaeology will be made within the study area (see 'Potential abstraction and discharge location area' on Figure 1C in Appendix A). This will include desk-based study of the known marine archaeology resource, the study area for which will be agreed with Historic England. The requirement for additional surveys will be considered following desk-based study and consultation with Historic England.

#### *Approach to Defining the Baseline*

6.3.7 A number of data sources have been consulted during the preparation of this section to define the preliminary baseline conditions for archaeological and cultural heritage assets.

6.3.8 These data sources include:

- National Heritage List for England (NHLE) for information relating to designated heritage assets;
- NELC Historic Environment Record (HER) for information relating to non-designated heritage assets, sites and historic landscape;
- NLC HER for information relating to non-designated heritage assets, sites and historic landscape;
- Heritage Gateway for information relating to non-designated heritage assets;
- Lincolnshire Heritage Explorer map, maintained by Lincolnshire County Council (LCC), for information relating to heritage assets and archaeological fieldwork events;
- Archaeology Data Service, for information relating to heritage assets and previous fieldwork events;
- Existing archaeological investigation reports relating to the Main Site; and
- Other available online sources.

#### *Summary of Archaeological and Historical Baseline*

6.3.9 The following provides a summary of the cultural heritage baseline conditions. Heritage assets referenced in the summary baseline are identified by either their HER identification number for non-designated assets, which is prefixed by 'MNL' for NELC HER and by 'MLI' for NCL HER and Lincolnshire Council HER, or by their NHLE reference number for designated assets.

6.3.10 There are no World Heritage Sites or registered battlefields within the 1 km study area used for this Scoping Report.

- 6.3.11 There are two Scheduled Monuments within the study area, these include the site of a medieval settlement, post-medieval manor house and gardens at Stallingborough (NHLE1020423); and two moated sites at Healing Hall (NHLE1010947).
- 6.3.12 There is one Registered Park and Garden within the study area, the Grade I listed Brocklesby Park (NHLE 1000971) is located within the route corridor for gas pipeline Option B.
- 6.3.13 There are a total of eight Grade I listed buildings in the study area, the closest of which is Newsham Bridge (NHLE1063419) located within Brocklesby Park Registered Park and Garden (NHLE 1000971) which lies partly within the route corridor for gas pipeline Option B. The remaining seven Grade I assets comprise six churches: Church of St Andrew (NHLE130011); Church of St Nicholas (NHLE1379843); Church of St Michael (NHLE1379845); Church of St Lawrence (NHLE1161566); Church of St Bartholomew (NHLE1063367) and the Church of All Saints (NHLE1165503); and a shop and farmhouse formerly a medieval manor (NHLE1359820).
- 6.3.14 There are a total of six Grade II\* listed buildings located within the study area, the closest of which is The Church of St Peter and St Paul (NHLE 1346978) and the Former Heavy Anti-Aircraft Gun site (NHLE1403222); both located within the Site. The remaining four assets comprise The Church of St Edmond (NHLE1146937); Gateway to House (NHLE1165475); Main Stable Block (NHLE1063413) and Newsham Lodge (NHLE1166070) located within the study area.
- 6.3.15 A total of 43 Grade II buildings have been identified within the study area, the closest of which is a gravestone 0.5 m from the west nave of the Church of St Peter and St Paul (NHLE 1310015) located approximately 260 m south of the Site.
- 6.3.16 There are no Protected Wreck sites on or within 1 km of the Site.
- 6.3.17 There are two conservation areas within the study area comprising Great Coates and Cottagers Plot.
- 6.3.18 The Main Site has been the subject of desk based assessment (Ref 6-43) geophysical survey (Ref 6-44), field walking survey (Ref 6-45), trial trench evaluation (Ref 6-46) and open area archaeological investigation (Ref 6-47) as part of a previous project for development of a biomass generation station (planning application number DC/303/07/IMM), see paragraph 2.2.1. The investigations recorded a multi-phased late Roman rural site in the saltmarsh close to the coastline. Two main alignments of ditch systems were revealed dating from the 3<sup>rd</sup> to 4<sup>th</sup> centuries. Environmental evidence indicated cultivation of cereal crops in the vicinity and the processing of grain at the site. No evidence of salt working or metal working was found. The site produced the largest assemblage of Roman pottery found in North East Lincolnshire indicating the potential presence of occupation in the vicinity. The North East Lincolnshire HER also identifies two potential Bronze Age barrows (MNL4586) (MNL4587), a medieval flood defence feature (MNL4578) late post-medieval sluice (MNL386) and an undated field boundary (MNL4588) within the Main Site boundary.

- 6.3.19 The North East Lincolnshire HER covers the Main Site and most of the Study Area. The HER identifies a high number of non-designated assets within the study area related to all periods. The following assets are identified on the current alignment of the proposed gas pipelines and electricity connection: Old Fleet Drain (MNL897); Mawmbridge Drain (MNL896); Wybers Wood covert (MNL1562); enclosure, creaks and trackways near Eleanor House (MNL1219); three historic railway branches (MNL1302)(MNL2087)(MNL3087); five roads marked on historic maps (MNL3515) (MNL3511) (MNL3496) (MNL3506) (MNL3488); cropmarks of unknown date (MNL1234); ridge and furrow (MNL2232) (MNL2233) (MNL2234) (MNL2235) (MNL2238); the historic settlement of Habrough (MNL205); and the historic settlement of Stallingborough (MNL371). Other non-designated assets include asset types such as findspots, buildings and farmsteads, cropmark enclosures dispersed across the study area and a concentration of post-medieval and early modern features related to the development of Immingham Dock.
- 6.3.20 Non-designated heritage assets recorded within the study area lying within the area covered by Lincolnshire HER include Alder Wood, Brocklesby (MLI50663), which the HER indicates may be a potential ancient woodland candidate; cropmarks of undated ditches and a possible double ditched enclosure at Brocklesby (MLI 90896); cropmarks of medieval boundaries (MLI53776).
- 6.3.21 Non-designated assets within the study area on the North Lincolnshire HER include a Historically Important Hedgerow (MLS21325); an open field system of ridge and furrow (MLS201040) at South Killingholme; a Late Iron Age enclosure and palaeochannel initially visible as cropmarks and later confirmed by geophysical survey, trial trenching and excavation (MLS1611); various cropmarks indicating the presence of ditches and enclosures (MLS1608, MLS1609, MLS20779, MLS21320, MLS21318) some of possible Iron Age or Roman date.
- 6.3.22 The potential impacts upon designated and non-designated heritage assets will be assessed and presented within a Cultural Heritage ES chapter. The production of the ES Chapter will be informed by a desk-based assessment (DBA), site walkover survey and consultation.

*Desk-based assessment*

- 6.3.23 A cultural heritage DBA will be prepared in conformance with industry standards and best practice guidelines, namely the Chartered Institute for Archaeologists (CIfA) Standard and Guidance for Historic Environment Desk-Based Assessment (Ref 6-48), and Historic England's Good Practice Advice in Planning Notes 2 (Ref 6-49), 3 (Ref 6-50) and 12 (Ref 6-51). The DBA will be produced in accordance with any responses received as part of the scoping phase and consultation on the Proposed Development. The DBA will inform the archaeology and cultural heritage chapter and form an appendix to the PEIR and ES chapters. It will also confirm whether any additional survey work is required to better determine the nature, extent and origin of buried archaeological remains, including deposits that may contain palaeo-environmental data, within the construction footprint of the Proposed Development.

- 6.3.24 A general study area comprising 500 m from the Site boundary for non-designated assets and 2 km for designated assets will be used to gather detailed information on the cultural heritage baseline for the assessment in the ES. The 500 m study area will capture detail about known heritage assets and will allow proportionate and sufficient archaeological context to be gathered to understand the potential for previously unknown heritage assets to be present. Considering the nature of the Proposed Development and its likely visibility level within the landscape, the 2 km study area is assessed to be sufficient for identifying heritage assets that may experience temporary or permanent changes to their setting.
- 6.3.25 Where deemed necessary, a wider study area may be used to identify assets whose setting may change as a result of the construction and/ or operation of the Proposed Development. The wider study area will be informed by the site walkover, setting assessment, and the Zone of Theoretical Visibility (ZTV) although some assets beyond the ZTV may be considered where elements of their setting extend closer to, or include, the Proposed Development.
- 6.3.26 Desk-based research will use the following data sources:
- NLC HER for spatial and non-spatial data for non-designated heritage assets and previous archaeological investigations;
  - NELC HER for spatial and non-spatial data for non-designated heritage assets and previous archaeological investigations;
  - LCC HER and Heritage Explorer map for spatial and non-spatial data for non-designated heritage assets and previous archaeological investigations;
  - The NHLE held by Historic England, for spatial and non-spatial data on designated heritage assets;
  - Relevant local authority conservation area appraisal and management documents;
  - Historic Landscape Characterisation (HLC) mapping undertaken by local planning authorities;
  - National Record of the Historic Environment (NRHE) held by Historic England;
  - Additional aerial photographs held by Historic England, local authorities and other appropriate repositories and other readily available remote sensing results such as light detection and radar (LiDAR) data;
  - Geological mapping and existing borehole information held by the British Geological Survey to identify the presence of peat deposits and assess palaeo-environmental potential;
  - Additional data from geotechnical ground investigations carried out for the Proposed Development to identify the presence of peat deposits and help assess palaeo-environmental potential;
  - Documentary, cartographic and other resources as deposited within local studies libraries, county libraries and archives, including historic Ordnance Survey maps, tithe, estate and other maps, and other relevant primary sources held at local authority archives, together with local studies libraries; and
  - Additional data sources recommended as part of the scoping response.



#### *Site walkover survey*

6.3.27 A combined archaeological and built heritage walkover survey will be carried out across the footprint of the Site (once connection corridors are narrowed for the ES stage) to assess known heritage sites and to determine the potential for previously unrecorded heritage assets to be present. The site walkover will also include visits to heritage assets within the study area so that an assessment of their baseline setting can be carried out.

#### *Consultation and further surveys*

6.3.28 Consultation will be carried out, as necessary, with the Historic Environment Advisors and conservation officers for NELC, NLC and WLDC to ensure, as far as practicable, that risks to cultural heritage assets are recognised in the assessment process as early as possible. Consultation will also be carried out with Historic England if potential impacts to designated assets, or non-designated assets of high value, were anticipated.

6.3.29 These discussions will also be used to inform the scope of any further archaeological surveys that may be required pre-application. These further surveys would be part of a staged approach of archaeological evaluation, with the results of one stage informing the scope of the next and may include but not be limited to:

- Hand auger survey and/ or monitoring of any geotechnical ground investigations to establish the geoarchaeological baseline conditions of the Proposed Development and to assess the potential for deposits containing palaeo-environmental data to be present;
- Archaeological geophysical survey to identify potential archaeological anomalies within the footprint of the Proposed Development; and
- Archaeological trial trench evaluation (only if deemed appropriate) to confirm the results of the geophysical survey and to characterise the nature, extent and preservation level of archaeological remains in order to understand their heritage value.

#### **Legislation, Policy and Guidance**

6.3.30 The potential effects of the Proposed Development upon heritage assets will be considered in the ES chapter in the context of relevant legislation, planning policy and guidance, including:

- Ancient Monuments and Archaeological Areas Act 1979 (Ref 6-52);
- Planning (Listed buildings and Conservation Areas) Act 1990 (Ref 6-53);
- NPS for Natural Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4, 2023));
- Hedgerow Regulations 1997 (Ref 6-54);
- Overarching NPS for Energy (EN1, 2023);
- The NPPF;
- North East Lincolnshire Local Plan Policy 39;
- North Lincolnshire Core Strategy Policies CS1, CS6 and CS16;

- Saved policies of the North Lincolnshire Local Plan 2003 Policies HE5, HE8 and HE9;
- NLC Local Plan Preferred Options Policy HE1;
- The PPG;
- Guidance published by Historic England and the CifA, including the Code of Conduct; and
- IEMA Principles of Cultural Heritage Impact Assessment in the UK (2021) (Ref 6-55).

### Impact Assessment Methodology

6.3.31 The methodology for assessing the impacts of the Proposed Development will broadly follow the criteria set out below.

#### *Assessing the value of heritage assets*

6.3.32 The value of a heritage asset (its heritage significance) is guided by its designated status but is derived also from its heritage interest which may be archaeological, architectural, artistic or historic (NPPF Annex 2, Glossary). Using professional judgement and the results of consultation, heritage assets are also assessed on an individual basis and regional variations and individual qualities are taken into account where applicable.

6.3.33 The value of a heritage asset (its heritage significance) is guided by its designated status but is derived also from its heritage interest which may be archaeological, architectural, artistic or historic (NPPF Annex 2, Glossary).

6.3.34 Each heritage asset relevant to the assessment will be assigned a value in accordance with the criteria in Table 6.17. This table provides guidance, but professional judgment will be applied in all cases regarding the appropriate category for individual heritage assets. Where it is assessed that an asset is of greater or lower value than noted in the guidance table, justification will be provided.

**Table 6.17 Criteria for assigning value of heritage assets**

<b>Value</b>	<b>Criteria</b>
High	World Heritage Sites. Scheduled Monuments. Grade I and II* listed buildings. Registered battlefields. Grade I and II* registered parks and gardens. Conservation areas of demonstrable high value. Non-designated heritage assets (archaeological sites, historic buildings, monuments, parks, gardens or landscapes) that can be shown to have demonstrable national or international importance. Well preserved historic landscape character areas, exhibiting considerable coherence, time-depth or other critical factor(s).
Medium	Grade II listed buildings. Conservation areas. Grade II registered parks and gardens. Non-designated heritage assets (archaeological sites, historic buildings, monuments, park, gardens or landscapes) that can be shown to have demonstrable regional importance.

Value	Criteria
	Averagely preserved historic landscape character areas, exhibiting reasonable coherence, time-depth or other critical factor(s). Historic townscapes with historic integrity in that the assets that constitute their make-up are clearly legible.
Low	Locally listed buildings. Non-designated heritage assets (archaeological sites, historic buildings, monuments, park, gardens or landscapes) that can be shown to have demonstrable local importance. Assets whose values are compromised by poor preservation or survival of contextual associations to justify inclusion into a higher grade. Historic landscape character areas whose value is limited by poor preservation and/ or poor survival of contextual associations.
Negligible	Assets identified on national or regional databases, but which have no archaeological, architectural, artistic or historic value. Assets whose values are compromised by poor preservation or survival of contextual associations to justify inclusion into a higher grade. Landscape with no or little significant historical merit.

*Assessing the Magnitude of Change*

6.3.35 Having identified the value of the heritage asset, the next stage in the assessment is to identify the level and degree of impact to an asset arising from the development as shown in Table 6.18. Impacts may arise during construction or operation and can be temporary or permanent. Impacts can occur to the physical fabric of the asset or may arise from changes within its setting.

**Table 6.18 Level and degree of impact**

Magnitude of impact	Description of impact
High	Changes such that the heritage value of the asset is totally altered or destroyed. Comprehensive change to elements of setting that would result in harm to the asset and our ability to understand and appreciate its heritage significance.
Medium	Change such that the heritage value of the asset is significantly altered or modified. Changes such that the setting of the asset is noticeably different, affecting significance and resulting in changes in our ability to understand and appreciate the heritage value of the asset.
Low	Changes such that the heritage value of the asset is slightly affected. Changes to the setting that have a slight impact on significance resulting in changes in our ability to understand and appreciate the heritage value of the asset.
Negligible	Changes to the asset that hardly affect heritage value. Changes to the setting of an asset that have little effect on significance and no real change in our ability to understand and appreciate the heritage value of the asset.

*Assigning the Significance of Effect*

6.3.36 The likely significance of an environmental effect is typically a function of the value (Table 6.17) of a receptor and the magnitude (Table 6.18) of an impact. An indicative matrix for the determination of significance is provided in Table 6.19. Effects can be neutral, adverse or beneficial.

**Table 6.19 Significance of effect**

		Magnitude of Change			
		Very Low	Low	Medium	High
Sensitivity (value) of Receptor	High	Negligible/ Minor	Moderate	Major	Major
	Medium	Negligible	Minor	Moderate	Major
	Low	Negligible	Negligible	Minor	Moderate
	Very Low	Negligible	Negligible	Negligible	Negligible/ Minor

6.3.37 The ES will report on the likely significance of effects in accordance with EIA methodology. Only major and moderate effects will be considered to be significant.

**Potential impacts**

*Construction*

6.3.38 Temporary construction impacts that would last for all or part of the construction phase of the Proposed Development are likely to include the following:

- The presence and movement of construction plant that may alter the setting of heritage assets, including change arising from noise and dust; and
- The presence of construction compounds which may change the setting of heritage assets as a result of noise or light intrusion.

6.3.39 Permanent construction impacts that would last beyond the construction phase are likely to include:

- Physical impacts to known and previously unknown buried archaeological assets and key components of the historic landscape arising from construction activities within the permanent footprint of the Proposed Development.

6.3.40 The construction of the Proposed Development has the potential to result in likely significant effects to non-designated heritage assets within the Site. This includes potential permanent impacts to buried archaeological remains.

6.3.41 The construction of the Proposed Development may result in temporary changes to the settings of designated heritage assets located within the study area including the two Scheduled Monuments: medieval settlement, post-medieval manor house and gardens at Stallingborough which is a scheduled monument (NHLE1020423); two moated sites at Healing Hall (NHLE1010947); and the Grade II\* listed Church of St Peter and St Paul (NHLE1346978).

6.3.42 Potential impacts to heritage assets arising from the construction of the Proposed Development will be included in the ES.

*Operation*

6.3.43 The presence of the CCGT and CCP has the potential to result in changes in the settings of heritage assets through visual intrusion in long range views, depending on the height of the proposed infrastructure which is yet to be finalised. There is also potential for the operation of the completed CCGT and CCP to introduce noise and light intrusion and an increase in traffic movement associated with operation,

routine maintenance and repair. Therefore, impacts arising from the operational Proposed Development will be assessed in the ES.

- 6.3.44 The presence of new infrastructure associated with the gas pipeline and electrical grid connection, the final locations of which are to be determined, have the potential to result in changes to the settings of heritage assets. As such, impacts arising from the operational Proposed Development will be assessed in the ES.

### **Scope for Mitigation**

- 6.3.45 Mitigation by design will be built into the Proposed Development to minimise impacts to heritage assets and their setting, as far as possible, with particular consideration given to the listed buildings located within the study area. Mitigation options will be developed and refined during the impact assessment process and agreed with stakeholders including Historic England and the Historic Environment Advisors and conservation officers for the relevant local planning authorities.
- 6.3.33 The development of mitigation will follow guidance published by the CifA and may include detailed design to avoid or reduce impacts to heritage assets, or a programme of archaeological investigation and recording in advance of, or during, construction. Additional mitigation measures such as enlisting an archaeological watching brief would be implemented where required. Further details will be provided within the ES.

## **6.4 Human Health**

- 6.4.1 This section of the Scoping Report sets out the proposed scope and methodology for the human health assessment of the Proposed Development. This has been informed by an overview of the environmental baseline conditions, along with the anticipated key issues likely to be associated with the Proposed Development.
- 6.4.2 Other relevant EIA technical topics will also inform the health assessment. These are as follows:
- Section 6.1: Air Quality;
  - Section 6.2: Climate Change;
  - Section 6.5: Socio-economics and Tourism;
  - Section 6.6: Landscape and visual;
  - Section 6.10: Traffic, Transport and Access; and
  - Section 6.12: Noise and Vibration.

### **Baseline Conditions**

- 6.4.3 This section covers the key human health indicators that are relevant to this section. This will form the basis of establishing the sensitivity of the study area and receptors to the impacts resulting from the Proposed Development.

### *Study Area*

- 6.4.4 Four separate geographies have been considered in the analysis of baseline conditions:

- The study area, consisting of 2021 Lower Super Output Areas (LSOAs)<sup>4</sup> from NLC and NELC;
- The Wider Impact Area consists of NLC, NELC, and WLDC. The Main Site is located within NELC, however the gas pipeline route corridor and grid connection route corridor cross into WLDC and NLC. Although WLDC resides within LCC, LCC is not considered as a part of the Wider Impact Area in its entirety on the basis that, whilst the gas pipeline route corridor and grid connection route corridor has the potential to be cross into the district, any impacts would be localised in effect to the immediate surroundings;
- The regional comparator, Yorkshire and the Humber; and
- The national comparator, England.

6.4.5 For the ‘study area’, a best fit approach has been taken, whereby the closest fit of LSOA have been chosen to represent the local area of the Proposed Development. This means that there are not any LSOAs from West Lindsey within the ‘study area’. However, West Lindsey has been included within the Wider Impact Area.

#### *Data Sources*

6.4.6 The data used to inform the baseline study consists of multiple sources:

- 2021 Census (Office for National Statistics (ONS) (Ref 6-56);
- Office for Health Improvement & Disparities (2023) (Ref 6-57), Index of Multiple Deprivation (IMD) and the English Indices of Deprivation (2019) (Ref 6-58); and
- Google MapsRef 6-59.

#### *Health Baseline*

6.4.7 For a general overview of the demographic character of the study area and how it compares to the Wider Impact Area, Yorkshire and the Humber and England, see Section 6.5: Socio Economics and Tourism. Within the chapter there are details on population size and Table 6.20 includes a breakdown of the populations’ age demographics.

**Table 6.20 Age Demographics**

<b>Age Range</b>	<b>Study Area (%)</b>	<b>Wider Impact (%)</b>	<b>Yorkshire and the Humber (%)</b>	<b>England (%)</b>
<b>0 - 14</b>	16	17	17	17
<b>15 - 64</b>	62	61	64	64
<b>65+</b>	22	21	19	18

*Source: ONS (2023), Census 2021. Note: totals may not equal 100% due to rounding.*

#### *General Health*

6.4.8 The 2021 Census provides estimates on how usual residents classify their state of general health. The majority of the study area (81.6%) reports their health to be ‘very good’ or ‘good’, which is slightly above that in the wider impact area (78.5%) and Yorkshire and the Humber (80.5%) (Ref 6-60). This is however, slightly below the national average (82.2%)Ref 6-61. Data from the 2021 Census on self-reported health is presented in Table 6.21 below.

<sup>4</sup> LSOAs are a type of small geographical area that typically have a population of approximately 1,000 people. The study area contains the following LSOAs: E01013308, E01013175, E01013180, E01013146, E01013148, E01013173, E01035474 and E01035475. February 2024

**Table 6.21 Self reported health (%)**

Category	Study Area (%)	Wider Impact Area (%)	Yorkshire and the Humber (%)	England (%)
<b>Very good health</b>	46.8	43.0	46.2	48.5
<b>Good health</b>	34.8	35.5	34.3	33.7
<b>Fair health</b>	13.6	15.3	13.7	12.7
<b>Bad health</b>	3.7	4.9	4.5	4.0
<b>Very bad health</b>	1.0	1.4	1.3	1.2

Source: ONS (2023), Census 2021: TS037 – General Health Ref 6-60

#### Life expectancy

6.4.9 The Office for Health Improvements & Disparities produce public health outcome frameworks for different regions across the UK, providing information on life expectancy data. Data is not available at the LSOAs level; therefore, it is only possible to compare the wider impact area with its regional and national comparators.

6.4.10 The life expectancies for both males and females in the wider impact area is in line with that of the regional average in Yorkshire and the Humber and the national average. Data on life expectancies across the wider geographies is outlined in Table 6.22 below.

**Table 6.22 Life expectancy**

Life expectancy at birth (2018-20)	Study Area	Wider Impact Area	Yorkshire and the Humber	England
Males	Not available	78.6	78.0	78.7
Females	Not available	82.1	82.0	82.8

Source: Office for Health Improvement & Disparities (2023), Public health outcomes framework (Ref 6-57)

#### Long-term Illness or Disability

6.4.11 The 2021 Census provides data on the extent to which a physical or mental disability limits residents' day-to-day activities (Ref 6-61). Residents that report that their day-to-day activities are limited a lot or a little are considered disabled under the Equality Act (Ref 6-62). Whereas residents that report not having a mental or physical condition that limits day-to-day activities, or any long term mental or physical health conditions at all, are considered not disabled under the Equality Act.

6.4.12 The study area has a comparable number of people classified as disabled in its population when compared to the national average. In all, 17.1% of the study area's population report that their day-to-day activities are limited either a lot or a little by a physical or mental condition which aligns closely to that within England at 17.3%. The study area has less people classified as disabled in its population than the wider impact area (20.1%) and Yorkshire and the Humber (18.6%). This and further information on disability from the 2021 Census is set out in detail in Table 6.23.

**Table 6.23 Disability (%)**

Category	Study Area (%)	Wider Impact Area (%)	Yorkshire and the Humber (%)	England (%)
Day-to-day activities limited a lot	7.3	8.9	8.1	7.3
Day-to-day activities limited a little	9.8	11.2	10.5	10.0
Has long term physical or mental health condition but day-to-day activities are not limited	7.4	6.7	6.9	6.8
No long term physical or mental health conditions	75.6	73.4	74.4	75.9

Source : ONS (2023), 2021 Census, TS038 – Disability

### Unpaid Care

6.4.13 A carer is anyone, including children and adults, who looks after a family member, partner or friend who needs help because of their illness, frailty, disability, a mental health problem or an addiction and cannot cope without their support. The care they give is unpaid. Unpaid carers who provide high levels of care for sick, or disabled relatives and friends, are more than twice as likely to suffer from poor health, compared to people without caring responsibilities.

6.4.14 Based on 2021 Census data on unpaid care, the rate of provision of some amount of unpaid care a week in the study area is 9.9% (Ref 6-63Ref 6-63Ref 6-63). This rate of provision is slightly higher when compared to all other geographical comparators. At a more granular level of analysis, providing nine hours or less unpaid care a week is the most prevalent level of provision amongst the study area’s population. Here, 3.4% of the study area’s population provided this level of unpaid care a week, which is somewhat higher when compared to 2.9% in the wider impact area, 3.1% in Yorkshire and the Humber, and 3.1% in England.

6.4.15 The second most prevalent level of unpaid care provision is 50 or more hours a week. The study area recorded a lower proportion of its population providing this (2.7%) than both in the wider impact area (3.3%) and Yorkshire and the Humber (2.9%) areas, whilst being comparable to the level across England (2.6%). Therefore, overall, the study area appears to have a higher proportion of its population providing some amount of unpaid care than its wider geographical comparators, but in general the provision is for fewer hours. This is set out in detail in Table 6.24.

**Table 6.24 Proportion of resident populaton providing unpaid care**

Category	Study Area (%)	Wider Impact Area (%)	Yorkshire and the Humber (%)	England (%)
Provides 9 hours or less unpaid care a week	3.4	2.9	3.1	3.1
Provides 10 to 19 hours unpaid care a week	1.6	1.3	1.2	1.2



Category	Study Area (%)	Wider Impact Area (%)	Yorkshire and the Humber (%)	England (%)
Provides 20 to 34 hours unpaid care a week	1.0	1.0	0.9	0.8
Provides 35 to 49 hours unpaid care a week	1.2	1.2	1.1	1.0
Provides 50 or more hours unpaid care a week	2.7	3.3	2.9	2.6
Proportion of population providing some amount of unpaid care a week	9.9	9.7	9.2	8.7

Source: ONS (2023), 2021 Census, TS039 – Provision of unpaid care (Ref 6-63).

### Adult Health Indicators

6.4.16 Office for Health Improvement and Disparities publishes local authority health profiles on an annual basis, detailing health outcomes against 32 different indicators. The study area falls into the local authorities of NLC and NELC, which is considered the Wider Impact Area. Overall, the wider impact area has slightly worse health than the average in Yorkshire and the Humber and across England. There is a higher prevalence of smoking in its population, a higher percentage of adults classified as overweight or obese, and a higher proportion of the population that are physically inactive. A high-level review of some key indicators in adult health are as follows:

- The rate for alcohol-related harm hospital admissions in the wider impact area is lower, and therefore better, than the regional and national averages. There were approximately 485 alcohol-related harm admissions per 100,000 in the wider impact area in 2021/22, compared to 533 in Yorkshire and the Humber and 494 in England;
- The smoking prevalence in adults (18+) is notably higher in the Wider Impact Area (18.6%) than Yorkshire and the Humber (13.1%) and England (12.7%);
- The percentage of adults (18+) classified as overweight or obese in the Wider Impact Area is notably higher (73%) than in Yorkshire and the Humber (66.5%) and England (63.8%); and
- A higher proportion of the Wider Impact Area are physically inactive than in the populations of Yorkshire and the Humber and England. Data on physical activity levels is outlined in Table 6.25 below.

**Table 6.25 Physical Activity Levels (%)**

Activity Level	Study Area (%)	Wider Impact Area (%)	Yorkshire and the Humber (%)	England (%)
Percentage of physically active adults	Not available	28.8	23.6	22.3

Activity Level	Study Area (%)	Wider Impact Area (%)	Yorkshire and the Humber (%)	England (%)
Percentage of physically inactive adults	Not available	61.5	66.1	67.3

(Source: OHID (2023), Public Health Framework (Ref 6-57))

### Deprivation

6.4.17 There are wider determinants of health that should be considered in the assessment of the impact of the Proposed Development on the study area, and the extent to which the study area is multiply-deprived is important in this. For information on the baseline deprivation conditions of the Study Area compared to the Wider Impact Area, Yorkshire and the Humber, and England see Section 6.5: Socio Economics and Tourism. Figure 6A and Figure 6B demonstrates the pattern of deprivation in the Study Area and Wider Impact Area, respectively.

### Future Baseline

6.4.18 The Human Health chapter of the ES will explain what the environmental change, in terms of human health, would likely be in the future if the Proposed Development were not to go ahead. It is expected that the future baseline would be representative of the conditions and trends set out in the current Baseline section of this section. In the absence of the Proposed Development, the impact on human health is not anticipated to be materially different.

### Legislation, Policy and Guidance

6.4.19 There is no principal legislation within the United Kingdom governing human health. The following national policy documents refer to human health matters, and will be referred to within the assessment where relevant:

- NPS for Energy (EN-1, 2023);
- NPS for Natural Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4, 2023) (Ref 5-20); and
- The NPPF.

6.4.20 The following guidance documents refer to human health matters, and will be referred to within the assessment where relevant:

- The PPG;
- National Health Service (NHS) Long Term Plan (2019) (Ref 6-64);
- IMEA Guide to Effective Scoping of Human Health in EIA (2022) (Ref 6-65);
- IMEA Determining Significance for Human Health in EIA Guidance (2022) (Ref 6-66);
- NHS Healthy Urban Development Unit (HUDU) Rapid Health Impact Assessment (HIA) Tool (2019) (Ref 6-67);
- Spatial Planning for Health: An evidence resource for planning and designing healthier places (2017) (Ref 6-68); and
- Public Health England (PHE) (now the UK Health Security Agency) Strategy 2020 to 2025 (Ref 6-69).

6.4.21 The following local policy documents refer to human health matters, and will be referred to within the assessment where relevant:

- Joint Health and Wellbeing Strategy (Ref 6-70);
- North Lincolnshire Local Development Framework (2011); (Ref 6-71);
- North East Lincolnshire Economic Strategy (2021); (Ref 6-72)
- North East Lincolnshire Local Plan; and
- Central Lincolnshire Local Plan (2023) (Ref 6-73).

### **Impact Assessment Methodology**

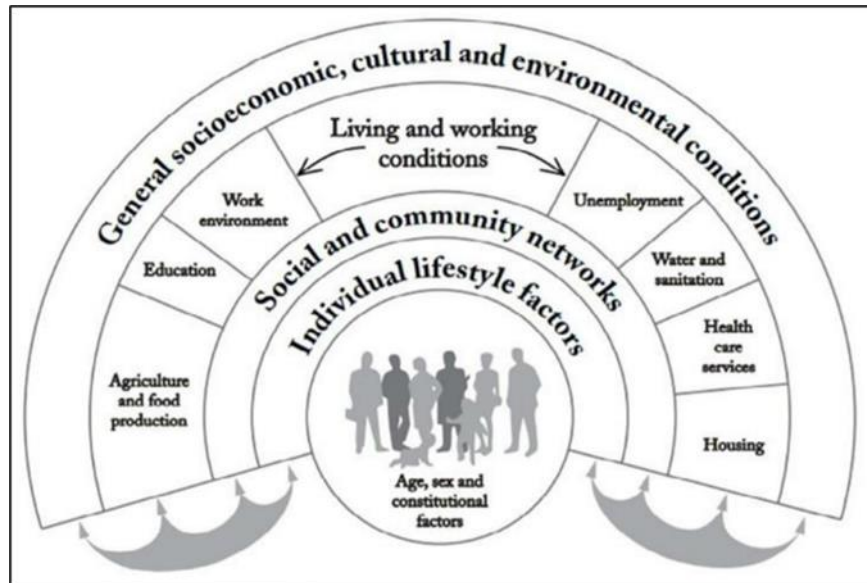
6.4.22 IEMA guidance “*Determining Significance for Human Health in Environmental Impact Assessment*” forms the basis of the approach adopted to assess impacts on human health in this section (Ref 6-66). In addition, consideration has been given to NHS England’s HUDU Rapid HIA Tool to inform the identification of relevant health determinants and mapping of health pathways (the route through which changes to health determinants would be expected to lead to changes in health outcomes).

6.4.23 This assessment adopts the World Health Organisation (WHO) definition of health as a “*state of complete physical, mental and social wellbeing not merely the absence of disease or infirmity*” (Ref 6-74Ref 6-74). Public health therefore encompasses general wellbeing not just the absence of illness.

6.4.24 The health and wellbeing of individuals is determined by a broad range of individual constitutional and behavioural factors (or “determinants”), as well as broader environmental, social, and economic factors. Some factors are direct and obvious, others are indirect.

6.4.25 Dahlgreen and Whitehead’s model of the main determinants of health (Ref 6-75Ref 6-75) illustrated the breadth of possible influences on health, as shown in Plate 6.1. At the centre of the illustration are factors that are largely fixed, including individual age, sex, constitutional and genetic factors. Outside of this are factors generally described as the wider or broader determinants of health. The model emphasises interactions between the layers. Moving outwards from the centre, individual lifestyle choices are embedded in social norms and community networks, and in living and working conditions, which in turn are shaped by and related to the wider socioeconomic and cultural environment.

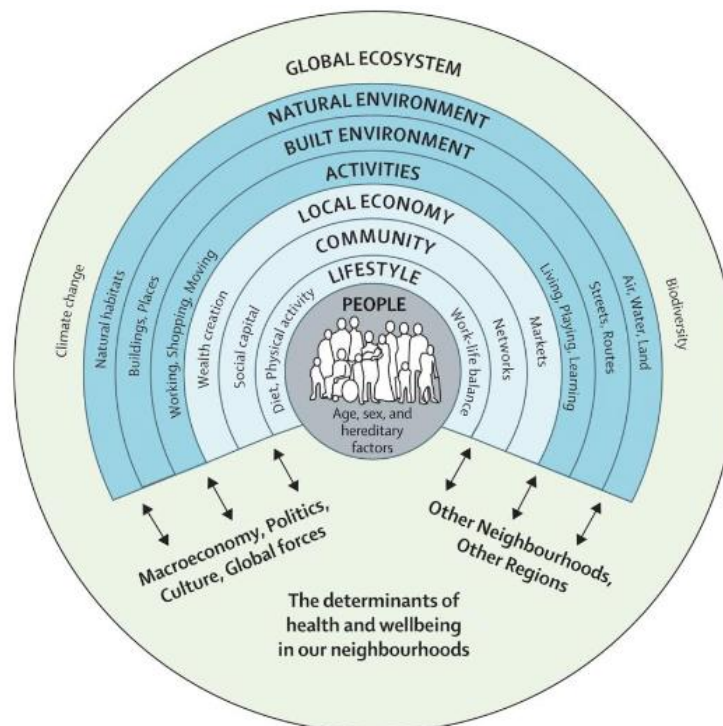
Plate 6.1 Determinants of health



Source: Dahlgreen and Whitehead (2021), *The Dahlgreen-Whitehead model of health determinants*

6.4.26 This model has been developed to show elements of the built environment and communities that are the most significant determinants of health, as shown Plate 6.2 (Ref 6-76).

Plate 6.2 Determinants of health in neighbourhoods



Source: Barton and Grant (2006), *A health map for the local human habitat*

6.4.27 Within a population there can also be health inequalities, defined by the WHO as “differences in health status or in the distribution of health determinants between different population groups. For example, differences in mobility between elderly people and younger populations or differences in mortality rates between people from different social classes”.

6.4.28 Drawing on the IEMA guidance, “*Guide to Effective Scoping of Human Health*” this assessment considers the following human health determinants of relevance to the Proposed Development:

- Transport modes, access and connections, including: community connectivity such as access to services, facilities and open space; prioritisation of walking and cycling; and road and route safety;
- Employment and income, including provision of economic opportunities and resources that protect and promote good health;
- Air quality;
- Noise and vibration; and
- Climate change.

*Assessment Criteria*

6.4.29 The specific magnitude and sensitivity criteria applied for the human health assessment, as summarised below, will reflect the IEMA guidance, “*Determining Significance for Human Health in Environmental Impact Assessment*”, released in 2022. Best practice principles for assessing impacts on human health are also provided in NHS England’s HUDU Rapid HIA Toolkit 2019 which alongside IEMA guidance, will also be drawn on to identify potential impacts in this section.

6.4.30 The sensitivity of population health is driven by a number of factors which are set out in Table 6.26 and are based on guidance set out in the IEMA guidance.

**Table 6.26 Human Health Sensitivity Criteria – Population Health**

<b>Sensitivity level</b>	<b>Sensitivity criteria</b>
High	High levels of deprivation (including pockets of deprivation); reliance on shared re-sources (between the population and the Proposed Development); existing wide inequalities between the most and least healthy; a community whose outlook is predominantly anxiety or concern; people who are prevented from undertaking daily activities; dependents; peoples with very poor health status; and/or people with a limited capacity to adapt.
Medium	Moderate levels of deprivation; few alternatives to shared resources; existing widening inequalities between the most and least healthy; a community whose outlook is predominantly uncertainty with some concern; people who are highly limited from undertaking daily activities; people providing or requiring a lot of care; people with poor health status; and/or people with a limited capacity to adapt.
Low	Low levels of deprivation; many alternatives to shared resources; existing narrowing inequalities between the most and least healthy; a community whose outlook is predominantly ambivalence with some concern; people who are slightly limited from undertaking daily activities; people providing or requiring some care; people with fair health status; and/or people with a high capacity to adapt.
Very Low	Very low levels of deprivation; no shared resources; existing narrow inequalities be-tween the most and least healthy; a community whose outlook is predominantly support with some concern; people who are not limited from undertaking daily activities; people who are independent (not a carer or dependent); people with good health status; and/or people with a very high capacity to adapt.

Source: Adapted from: IEMA *Guide to Determining Significance for Health (Table 7.1)*.

6.4.31 Magnitude of impact is driven by a number of factors which are set out in Table 6.27, based on guidance set out in the IEMA guidance.

**Table 6.27 Human Health Magnitude of Impact Criteria**

Magnitude level	Magnitude Criteria
High	High exposure or scale; long-term duration; continuous frequency; severity predominantly related to morbidity (physical or mental health) or very severe illness/injury outcomes; majority of population affected; permanent change' substantial service quality implications.
Medium	Low exposure or medium scale; medium-term duration; frequent events; severity predominantly related to moderate changes in morbidity or moderate change in quality of life; large minority of population affected; gradual reversal; small service quality implications.
Low	Very low exposure or small scale; short-term duration; occasional events; severity predominantly related to minor change in morbidity or moderate change in quality of life; small minority of population affected; rapid reversal; slight service quality implications.
Very Low	Negligible exposure or small scale; very short-term duration; one off frequency; severity predominantly relates to minor change in quality of life; very few people affected; immediate reversal once activity complete; no service quality implications.

Source: Adapted from: IEMA Guide to Determining Significance for Health (Table 7.2).

6.4.32 Human health effects reflect the relationship between the sensitivity of the relevant population health, and the magnitude of the impact, as set out in Table 6.28.

**Table 6.28 Impact Assessment and Significance**

Magnitude of Impact	Sensitivity of Receptor			
	High	Medium	Low	Very Low
<b>High</b>	Major	Major/moderate	Moderate/minor	Minor/negligible
<b>Medium</b>	Major/moderate	Moderate	Minor	Minor/negligible
<b>Low</b>	Moderate/minor	Minor	Minor	Negligible
<b>Very Low</b>	Minor/negligible	Minor/negligible	Negligible	Negligible

Source: Adapted from: IEMA Generic indicative EIA significance matrix (Table 7.3).

6.4.33 The assessment aims to be objective and to quantify effects as far as possible. However, some effects can only be evaluated on a qualitative basis. Effects will be defined as follows:

- Beneficial classifications of significance indicate an advantageous effect on human health, which may be minor, moderate or major in effect;
- Adverse classifications of significance indicate a disadvantageous effect on human health, which may be minor, moderate or major in effect;
- Negligible classifications of significance indicate imperceptible effects on human health; and
- No effect classifications of significance indicate that there are no effects on human health.

6.4.34 In accordance with the methodology set out in the IEMA guidance, the following criteria will be applied:

- 'Moderate' or 'Major' likely effects will be classed 'significant';
- 'Minor' likely effects will be classed as 'not significant', although they may be a matter of local concern; and
- 'Negligible' likely effects will be classed as 'not significant'.

**Potential impacts**

6.4.35 The assessment will consider the potential consequences for health and wellbeing from the construction, operation and decommissioning phases of the Proposed Development. It will draw upon the assessment findings of the following environmental topics:

- Air Quality (see Section 6.1 of this Scoping Report);
- Noise and Vibration (see Section 6.12 of this Scoping Report);
- Traffic, Transport and Access (see Section 6.10 of this Scoping Report);
- Socio-Economics and Tourism (see Section 6.5 of this Scoping Report); and
- Landscape (see Section 6.6 of this Scoping Report).

6.4.36 The Proposed Development may generate a range of health effects, some of which would be temporary, whilst others would be permanent, during construction, operation, and decommissioning. The anticipated key determinants likely to be associated with the Proposed Development are:

- Access to healthcare and other social infrastructure such as schools and community facilities;
- Access to open space (including PRoW) and recreational facilities, and opportunities for physical activity and active travel;
- Road and route safety;
- Changes to the economic environment, in terms of employment and income, and education and training opportunities;
- Air quality;
- Noise and vibration;
- Landscape and visual amenity;
- Flood risk, drainage, surface water;
- Community identity and social participation; and
- Climate change and climate change resilience.

6.4.37 A consideration of source-pathway-receptor linkages assists in identifying where there is potential for health effects to be both likely and significant.

6.4.38 Table 6.29 sets out a summary of the health determinants scoped into the assessment, and the source, pathway, and receptor links relevant to each and at what project phase.

**Table 6.29 Health determinants scoped into human health assessment – Source-Pathway-Receptor links**

<b>Source</b>	<b>Pathway</b>	<b>Receptor</b>	<b>Project Phase</b>
Potential changes to access to healthcare and wider community services, e.g. from temporary or permanent closures / diversions or amenity impacts on PRow or impacts on the local road network.	Potential adverse impacts on access to health services including use of GP services and other social infrastructure such as schools.	Human receptors living within local communities and using services within the study area.	Construction and decommissioning.
Potential changes in access to open spaces, PRow and opportunities for recreation and physical activity, e.g. due to temporary or permanent closures / diversions, increases in road traffic or amenity impacts on routes.	Potential adverse impacts on open spaces, PRow, recreational facilities and opportunities for physical activity and active travel which could impact human health.	Human receptors who are users of local open spaces, PRow and the local road network for cycling or walking.	Construction, operation and decommissioning.
Potential temporary or permanent increases in traffic on the local road network.	Potential adverse impacts on road safety, which could impact human health.	Human receptors who are users of the local road network.	Construction, operation and decommissioning.
Potential temporary or permanent increase in employment, education and training opportunities, directly related to the Proposed Development, or within the wider supply chain.	Potential beneficial economic impacts arising from employment, education and training opportunities for those working on the Proposed Development, or within the wider supply chain, which could impact human health.	Human receptors who could potentially benefit from employment, education and training opportunities, directly related to the Proposed Development, or within the wider supply chain.	Construction, operation and decommissioning.
Potential temporary changes in local air quality including increased dust and particulate matter emissions arising from the construction and decommissioning of the Proposed Development.	Potential adverse human health impacts arising from increased exposure to dust and particulate matter emissions arising from the Proposed Development.	Human receptors likely to be at risk of possible direct and indirect air quality impacts from the Proposed Development.	Construction and decommissioning.



Source	Pathway	Receptor	Project Phase
Potential temporary or permanent changes in noise levels arising from the Proposed Development.	Potential adverse human health impacts arising from increased exposure to noise arising from the Proposed Development.	Human receptors likely to be at risk of possible direct and indirect noise impacts from the Proposed Development.	Construction, operation and decommissioning.
Potential temporary or permanent changes to GHG emissions and potential temporary or permanent changes to CCR including extreme weather events, flood risk, sea level rise (SLR), temperature change and rainfall change.	Potential human health impacts arising from increased or reduced exposure to GHG emissions arising from the Proposed Development as well as potential adverse human health impacts arising from increased on Site risk of extreme weather events, flood risk, SLR, temperature change or rainfall change.	Human receptors likely to be exposed to increased or reduced GHG emissions arising from the Proposed Development. Human receptors likely to be exposed to increased risk of extreme weather events, flood risk, SLR, temperature change or rainfall change on the Site.	Construction, operation and decommissioning.
Potential temporary or permanent changes to landscape and visual receptors as a result of the Proposed Development.	Potential adverse human health impacts arising from landscape and visual amenity impacts which may affect people's mental health and enjoyment of the local landscape.	Human receptors likely to experience significant visual effects as a result of the Proposed Development.	Construction, operation, and decommissioning.
Potential temporary or permanent changes in exposure levels to radiation.	Potential adverse human health impacts arising from impacts from exposure to electromagnetic fields.	Human receptors likely to be exposed to radiation in the form of electromagnetic fields.	Construction, operation, and decommissioning.

*Summary of elements Scoped In and Scoped Out*

6.4.39 Table 6.30 below provides a summary of the elements proposed to be scoped in to the assessment of effects on human health. There are no elements proposed to be scoped out.

**Table 6.30 Elements scoped in of the assessment of human health**

Element	Scoped in
Access to healthcare and other social infrastructure services.	Scoped in, there is the potential for restrictions to the accessibility of public healthcare services and other community services and facilities, including due to increases in traffic during construction, operation, and decommissioning.

<b>Element</b>	<b>Scoped in</b>
Access to open space, PRow, recreational facilities and opportunities for physical activity and active travel.	Scoped in, there may be some disruption to the accessibility of recreational routes (including PRow) and open space within and beyond the Site boundary. This would impact physical activity levels.
Road and route safety.	Scoped in, there may be impacts to accidents and safety.
Employment and income and education and training opportunities, including provision of economic opportunities and resources that protect and promote good health.	Scoped in, there is potential for effects on work, income and training due to employment generation associates with the Proposed Development's construction, operation, and decommissioning phases.
Air quality	Scoped in, there may be air quality impacts associated with on-site activities and traffic during the construction, operation, and decommissioning phases.
Noise and vibration	Scoped in, there may be noise and vibration impacts associated with onsite activities and traffic during the construction, operation, and decommissioning phases.
Landscape and visual amenity	Scoped in, there may be amenity impacts associated with onsite activities and infrastructure during the construction, operation, and decommissioning phases.
Flood risk, drainage, and surface water	Scoped in, there may be impacts to the drainage and surface water as well as increases in flood risk associated with onsite activities and infrastructure during the construction, operation and decommissioning.
Community identity and social participation	Scoped in, there may be impacts to the community and social cohesion and engagement associated with onsite activities and traffic during the construction, operation and decommissioning phases.
Climate change – greenhouse gas emissions	Scoped in, there may be climate change impacts related to greenhouse gas emissions from onsite activities and traffic during the construction and decommissioning phases. There also may be climate change resilience impacts during the operational phase.
Radiation – potential exposure to Electromagnetic Fields (EMFs)	Scoped in, the Proposed Development will include an electrical transmission connecting to the National Grid Grimsby West Substation or other available connection in the vicinity. An assessment of effects will be undertaken to confirm alignment with relevant guidance set out in <i>“Power Lines: Demonstrating compliance with EMG public exposure guidelines, A Voluntary Code of Practice 2012”</i> (Ref 6-77Ref 6-77).

*Assumptions, Limitations and Uncertainties*

6.4.40 The human health assessment will be partly based on professional judgement and consider both the adverse and beneficial impacts that the Proposed Development

may have on surrounding receptors. It provides an indication of human health effects on people and the local community.

- 6.4.41 It should be noted that it is not always possible to determine the catchment area for community facilities. Residents of an area may utilise facilities located within different districts or regions without regard for statutory boundaries.

### **Scope for Mitigation**

- 6.4.42 Mitigation and measures for the construction and operational phases (some of which may have already been considered through the development of the proposals) will be considered and key indicators for monitoring human health impacts will be established wherever applicable.

## **6.5 Socio Economics and Tourism**

- 6.5.1 This section of the Scoping Report addresses the potential effects of the construction, operation and decommissioning of the Proposed Development on socio-economic, recreation and tourism factors. This section considers:

- the present-day and future baseline socio-economic, recreation and tourism conditions in the Site;
- the relevant policy at a national, regional and local level for the Proposed Development;
- the potential effects of the Proposed Development (including workers accommodation) on socio-economic conditions, recreation and tourism during the construction phase;
- the potential effects of the Proposed Development on socio-economic, recreation and tourism during the operational phase; and
- the potential effects of the decommissioning of the Proposed Development.

### **Baseline Conditions**

- 6.5.2 This section covers the key socio-economic, tourism and recreational indicators that are relevant to this section. This will form the basis of establishing the sensitivity of the study area to the impacts resulting from the Proposed Development.

### *Study Area*

- 6.5.3 This analysis for the baseline uses four separate geographies:

- The study area, consisting of 2021 LSOAs<sup>5</sup> from North Lincolnshire and North East Lincolnshire;
- The Wider Impact Area, consisting of the Local Authorities of NLC, NELC and West Lindsey Council;
- The regional comparator, Yorkshire and the Humber; and
- The national comparator, England.

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<sup>5</sup> LSOAs are a type of small geographical area that typically have a population of approximately 1,000 people. The Study Area contains the following LSOAs: E01013308, E01013175, E01013180, E01013146, E01013148, E01013173, E01035474 and E01035475. February 2024

- 6.5.4 Where data is not available for the geographic areas covered above, alternative appropriate comparator areas have been used as a proxy.
- 6.5.5 For the ‘study area’, a best fit approach has been taken, whereby the closest fit of LSOA have been chosen to represent the local area of the Proposed Development. This means that there are not any LSOAs from West Lindsey within the ‘study area’. However, West Lindsey has been included within the Wider Impact Area.

*Data Sources*

6.5.6 The data used to inform this baseline study consists of multiple sources:

- 2021 Census (Office for National Statistics (ONS));
- The IMD and the English Indices of Deprivation (2019);
- The Business Register and Employment Survey (BRES, ONS) (Ref 6-78);
- VisitBritain tourism data (Ref 6-79);
- Google Maps;
- Regional Gross Value Added data by industry (ONS) (Ref 6-80); and
- GB Domestic Overnight Tourism Survey (Ref 6-81).

*Demographics*

6.5.7 The 2021 Census shows that the population of the study area is 12,504, approximately 3% of the Wider Impact Area’s total population of 421,802. The study area and the Wider Impact Area have the highest 65+ population age proportion (22%), compared to England’s 18% and Yorkshire and the Humber’s 19%. The study area also has the lowest 0 -14 age cohort (16%); the other three comparators all have a 0-14 population of 17%. These statistics can be found in Table 6.31; they are also visually represented in Plate 6.3.

**Table 6.31 Population Cohorts**

<b>Age Range</b>	<b>Study Area</b>	<b>Wider Impact Area</b>	<b>Yorkshire and the Humber</b>	<b>England</b>
<b>0-14</b>	16%	17%	17%	17%
<b>15-64</b>	62%	61%	64%	64%
<b>65+</b>	22%	22%	19%	18%

*Source: Census 2021, Office for National Statistics (ONS). Note: totals may not equal 100% due to rounding.*

### Plate 6.3 Population Cohorts

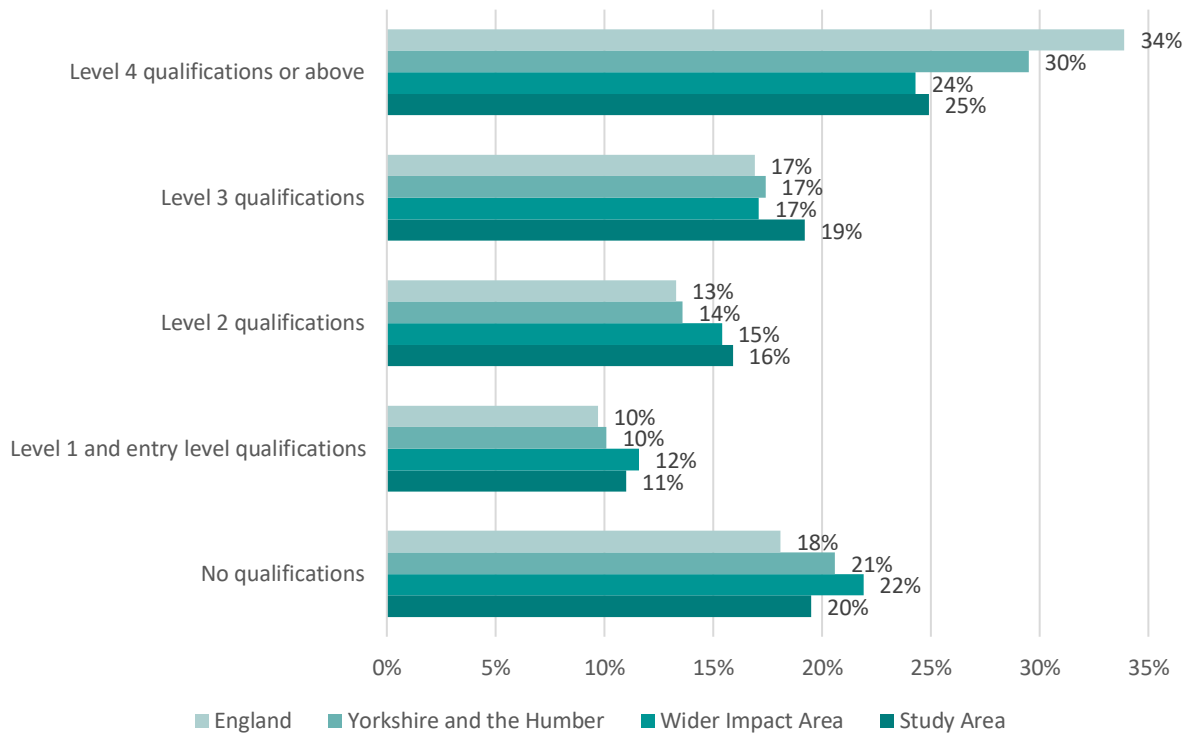


Source: Census 2021, ONS.

#### Qualifications

6.5.8 As shown in Plate 6.4, the study area has the highest population proportion with Level 2 (16%) and Level 3 (19%) qualifications, but the second-lowest proportion of Level 4+ qualifications (25%). Overall, the Wider Impact Area has the highest proportion of no qualifications (22%) and level 1 qualifications (12%) in the four geographies, as well as the lowest proportion of level 4+ qualifications (24%). In comparison, England has the lowest proportion of no qualifications (18%) and highest proportion of level 4+ qualifications (34%).

## Plate 6.4 Qualifications



Source: Census 2021, ONS.

### Education

6.5.9 The study area is located nearby local educational facilities. A list of schools in the local authorities of North Lincolnshire, North East Lincolnshire and West Lindsey can be found in Table 6.32.

**Table 6.32 Schools in North Lincolnshire and North East Lincolnshire**

North Lincolnshire	North East Lincolnshire	West Lindsey
Baysgarth School	East Halton Primary School	Faldingworth Community Primary School
Winteringham Primary School	North Thoresby Primary Academy	Tealby School
Sir John Nelthorpe School	North Cotes C of E Primary School	De Aston School
Alkborough Primary School	Caistor Grammar School	Nettleton Community Primary School
Burton-Upon-Stather Primary School	Caistor Yarborough Academy	Caistor Yarborough Academy
Messingham Primary School	Stanford Junior and Infant School	Waddingham Primary School
Outwood Academy Foxhills	Humberston Park Special School	Osgodby Primary School
Crosby Primary School	Humberston Academy	Kelsey Primary School
The St Lawrence Academy	Beacon Academy	Willoughton Primary School
Scunthorpe C of E Primary School	Cleethorpes Academy	Normanby by Spital Primary School

North Lincolnshire	North East Lincolnshire	West Lindsey
St Hugh's School	Woodlands Academy	Hemswell Cliff Primary School
St Luke's Primary School	Yarborough Academy	Kisimul School Blythe House
Westcliffe Primary School	Grange Primary School	Queen Elizabeth's High School, Gainsborough
Priory Lane Community School	Cambridge Park Academy	Lincolnshire Consortium of Grammar Schools
St Peter and Saint Paul Church of England Primary School	Sevenhills Academy	Frances Olive Anderson C Of E Primary School
Melior Community Academy	St Martin's Preparatory School	
Lincoln Gardens Primary School	St. James School	
Holme Valley Primary School	Welholme Academy	
Frederick Gough School	Weelsby Academy	
	William Barcroft Junior School	
	Stallingborough Church of England Primary School	

Source: Google Maps (2023)

### *Economic Activity*

- 6.5.10 2021 Census data shows that, in the study area, 59.4% of the population are economically active, which is the largest proportion of the four comparator areas, as shown in Table 6.33. Of the economically active proportion in the study area, 13.3% are part-time and 37.2% full-time employed, the highest for both sub-categories among the four comparator areas.
- 6.5.11 Unemployment rates differ between the four geographies; the study area has the lowest unemployment rate, at 1.8%, which is lower than for the Wider Impact Area (2.6%), Yorkshire and the Humber (2.7%) and England (2.9%). Overall, the study area performs well in terms of economic activity, with the highest proportion of economically active people and the lowest unemployment rate.

**Table 6.33 Economic Activity**

Economic activity status (% of Population)	Study Area	Wider Impact Area	Yorkshire and the Humber	England
<b>Economically active (excluding full-time students)</b>	59.4%	55.4%	56.2%	58.6%
<b>Part-time Employment</b>	13.3%	12.6%	12.4%	11.9%
<b>Full-time Employment</b>	37.2%	33.0%	33.0%	34.3%
<b>Self-employed</b>	7.0%	7.3%	8.0%	9.5%

<b>Economic activity status (% of Population)</b>	<b>Study Area</b>	<b>Wider Impact Area</b>	<b>Yorkshire and the Humber</b>	<b>England</b>
<b>Unemployed</b>	1.8%	2.6%	2.7%	2.9%
<b>Economically Inactive</b>	38.9%	42.9%	41.4%	39.1%

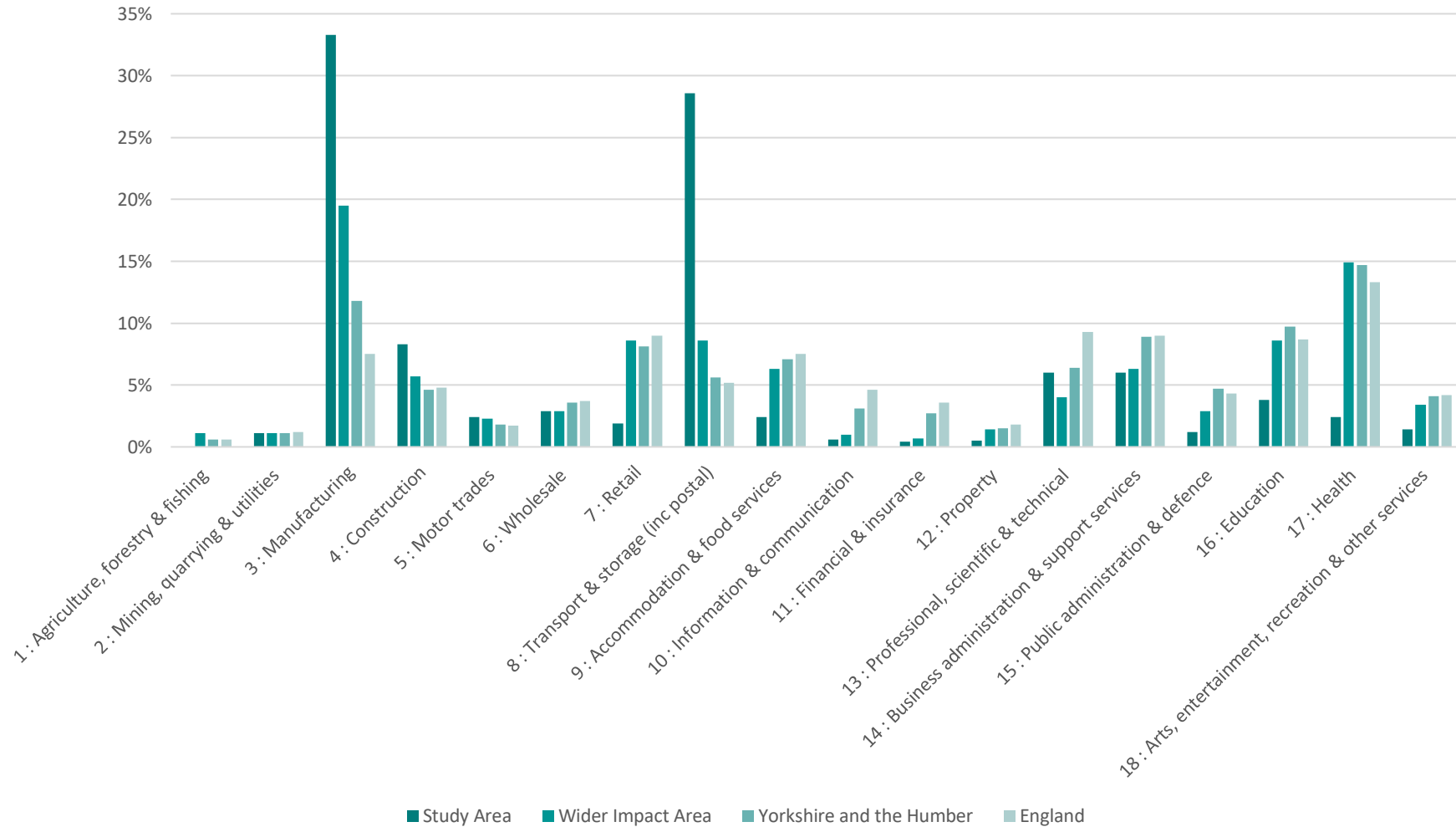
Source: Census 2021, ONS

#### *Employment by Industry*

6.5.12 The largest employment industry in the study area is Manufacturing (Sector C, 33.3%), followed by Transport and Storage (Sector H, 28.6%) (Ref 6-78). These two industries are the largest contributors to the study area for employment; the third largest industry is Construction (Sector F) which contributes to 8.3% of employment. All three industries have a greater proportion of employment in the study area than nationally. As shown comparatively in Plate 6.5, 7.5% of employment in England is in Manufacturing, 5.2% in Transport and Storage, and 4.8% in Construction. Overall, the study area is more concentrated in these industries compared to the other three geographies, where employment is more diversified.



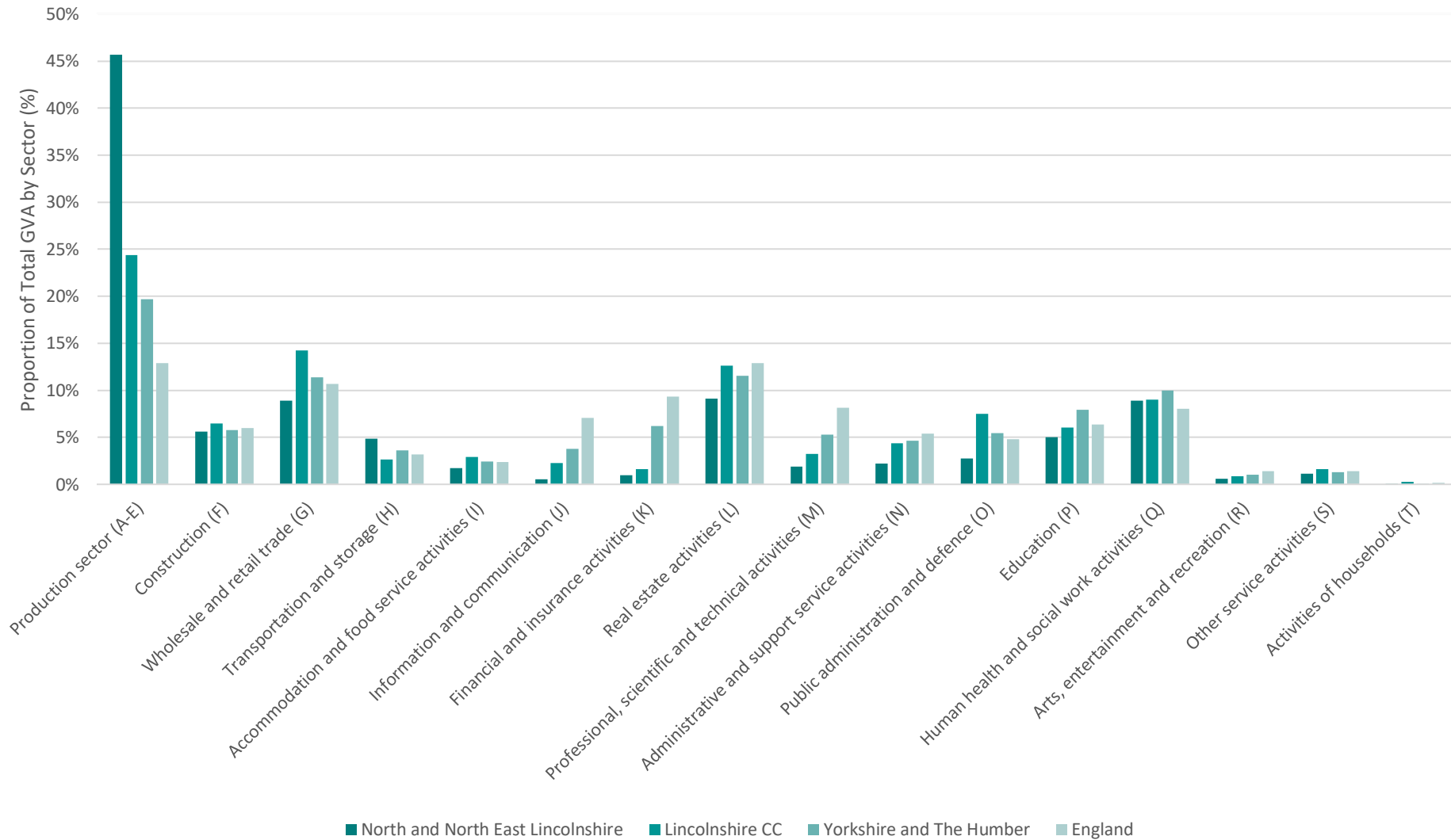
Plate 6.5 Employment by Industry



*Gross Value Added (GVA) by Industry*

- 6.5.13 Data for GVA is limited, and as such data for the study area is unavailable. In addition, data for West Lindsey is only available through LCC; West Lindsey is a part of this geography and thus it is included here as a comparator. North Lincolnshire and North East Lincolnshire are also paired together as part of this dataset.
- 6.5.14 In terms of GVA, North Lincolnshire and North East Lincolnshire is dominated by sectors A-E: Agriculture, forestry and fishing (Sector A); Mining and quarrying (B); Manufacturing (C); Electricity, gas, steam and air conditioning supply (D); and Water supply sewerage and waste management I. A total of 46% of output in North Lincolnshire and North East Lincolnshire is in these industries, compared to only 26% in LCC, 13% in England and 20% in Yorkshire and the Humber (Ref 6-82). The second largest industries by GVA in North Lincolnshire and North East Lincolnshire were Wholesale and retail trade (G, 9%), which is a lower GVA proportion than for LCC (14%), Yorkshire and the Humber and England (both 11%). Real estate activities (L) also made up for 9% in North Lincolnshire and North East Lincolnshire, which is lower than the national proportion (13%), the regional proportion (12%) and LCC (13%). Human health and social work activities (Q), also representing 9% of GVA for the Wider Impact Area, has a lower proportion than for Yorkshire and the Humber (10%), the same as in LCC (9%) and higher than in England (8%). A full breakdown of the share of GVA by industry in all three geographic areas can be found in Plate 6.6.

Plate 6.6 GVA by industry



### Tourism

6.5.15 Data on tourism is generally limited at a local authority level and was not released for 2020 and 2021 because of the effects of the COVID-19 pandemic. However, data is available up to the year 2019, as shown in Table 6.34. Between 2017-2019, 230,000 tourists took trips to North East Lincolnshire, which was higher than the 145,000 total tourism trips to North Lincolnshire and the 87,000 to West Lindsey in the same period (Ref 6-79). Both North East Lincolnshire (17%) and North Lincolnshire (10%) represented substantial proportions of the overall trips to Humberside<sup>6</sup>, whilst West Lindsey represented 4% of overall trips to Lincolnshire<sup>7</sup>. Through this, North East Lincolnshire generated a total spend of £32m, in comparison to £16m in North Lincolnshire, which represented approximately 16%, and 8% of Humberside’s total spend respectively. Expenditure in West Lindsey was £11m during this period, accounting for 3% of total spend in Lincolnshire.

**Table 6.34 Tourism Activity 2017-2019**

	West Lindsey	North East Lincolnshire	North Lincolnshire	Humberside	Lincolnshire	England
<b>Total trips (000s)</b>	87.7	229.7	145.3	1,387.7	2280.3	99,030.0
<b>Total nights (000s)</b>	314.7	750.3	317.3	4,248.7	7758.3	295,168.0
<b>Total spend (£m)</b>	£10.7	£32.0	£16.0	£206.0	£343.7	£19,281.3

Source: Destination-specific research, Visit Britain (2017-2019)

6.5.16 Data from the Great Britain Tourism Study (GBTS) shows that 10.1 million tourism trips to Yorkshire and the Humber were taken in 2022, representing 9.4% of total trips in England (Ref 6-79). From this, Yorkshire and the Humber generated a tourism spend of £2.5bn, which represented 9.2% of the £27.6bn total spend in England.

6.5.17 In addition, Table 6.35 displays some of the prominent visitor attractions located in the proximity of the study area. Humberside Airport, a key gateway for international tourists to the area, is located approximately 11 km from the study area.

**Table 6.35 Visitor Attractions**

Visitor Attractions	Approximate Distance to Site (km)
Immingham Docks	2.5
Immingham Museum	2.1
Immingham Swimming Pool	2.1
Homestead Park	1.3
Grimsby Fishing Heritage Centre	9.0
Time Trap Museum	9.0
Pelham Hotel	2.0
Ashbourne Hotel	6.0

<sup>6</sup> Humberside is used as a comparator in the absence of Yorkshire and the Humber data for this dataset. This region consists of East Riding of Yorkshire, Kingston upon Hull, North East Lincolnshire and North Lincolnshire.

<sup>7</sup> Lincolnshire is used as a comparator in the absence of Yorkshire and the Humber data. This region consists of Boston, East Lindsey, Lincoln, North Kesteven, South Holland, South Kesteven, West Lindsey and Lincolnshire (LAA unspecified).

Visitor Attractions	Approximate Distance to Site (km)
Greenman Pub	5.5
Thornton Hunt Inn	7.6
Wooton Hall	9.0

Source: GoogleMaps (2023)

### *Deprivation*

6.5.18 The IMD shows that the study area varies widely in terms of deprivation. Some areas of Immingham lie in the less deprived 7<sup>th</sup> decile, whilst other parts are in the most deprived 1<sup>st</sup> decile, which represents the top 10% most deprived LSOAs in England. In the Wider Impact Area, the variation is starker; some areas of the Wider Impact Area in the east and the south lie in the 10<sup>th</sup> decile whilst neighbouring areas are in the 1<sup>st</sup> decile. In the local authority of North Lincolnshire, 11.2% of LSOAs were in the top 10% most deprived decile. However, in the Local Authority of North East Lincolnshire, 30.5% of LSOAs were in the top 10% most deprived decile.

6.5.19 The range of deprivation decile scores for the study area and Wider Impact Area can be seen in the IMD Maps in Figure 6A and Figure 6B, respectively (in Appendix A).

### **Legislation, Policy and Guidance**

6.5.20 A summary of the relevant national, and local legislation and planning policy to socio-economics, recreation and tourism is provided in this section.

#### *National*

##### *Overarching NPS for Energy (EN-1) (2023)*

6.5.21 The NPS EN-1, 2023 sets out national policy for energy infrastructure. Part of EN-1, Assessment Principles, sets out the general policies for the submission and assessment of applications relating to energy infrastructure. The construction operation and decommissioning of energy infrastructure may have socio-economic impacts, which the NPS states should be included in an assessment by the Applicant. These impacts include:

- “the creation of jobs and training opportunities. Applicants may wish to provide information on the sustainability of the jobs created, including where they will help to develop the skills needed for the UK’s transition to Net Zero;
- the contribution to the development of low-carbon industries at the local and regional level as well as nationally;
- the provision of additional local services and improvements to local infrastructure, including the provision of educational and visitor facilities;
- any indirect beneficial impacts for the region hosting the infrastructure, in particular in relation to use of local support services and supply chains;
- effects (positive and negative) on tourism and other users of the area impacted;
- the impact of a changing influx of workers during the different construction, operation and decommissioning phases of the energy infrastructure. This could change the local population dynamics and could alter the demand for services and facilities in the settlements nearest to the construction work (including community facilities and physical infrastructure such as energy, water, transport and waste). There could also be effects on social cohesion depending on how populations and service provision change as a result of the development; and

- cumulative effects-- if development consent were to be granted to for a number of projects within a region and these were developed in a similar timeframe, there could be some short-term negative effects, for example a potential shortage of construction workers to meet the needs of other industries and major projects within the region.”

6.5.22 The NPS also states that: *“Socio-economic impacts may be linked to other impacts, for example visual impacts considered in Section 5.10 but may also have an impact on tourism and local businesses. Applicants are encouraged, where possible, to demonstrate that local suppliers have been considered in any supply chain... Applicants should consider developing accommodation strategies where appropriate, especially during construction and decommissioning phases, that would include the need to provide temporary accommodation for construction workers if required.”.*

#### *NPS for Natural Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) (2023)*

6.5.23 The NPS for Natural Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4, 2023) taken in conjunction with the *“Overarching NPS for Energy”* (EN-1, 2023), provides the primary policy for applications relating to natural gas supply infrastructure and gas and oil pipelines. The policies set out in EN-4 are additional to the EN-1 policies on generic impacts; the impacts concerned in EN-4 are specific to gas supply infrastructure and oil and gas pipelines, where further consideration is necessary above the EN-1 general impacts. Overall, EN-4 and EN-1 taken together can be used to inform assessments relating to impacts on socio-economic receptors.

#### *National Planning Policy Framework (2023)*

6.5.24 The NPPF explains that the planning system has three overarching objectives; two of which are relevant to socio-economics:

- A social objective: to support communities by ensuring that a sufficient number of homes can be provided to meet the needs of present and future generations, as well as by fostering well-designed, beautiful and safe places with accessible services which support community health, social and cultural wellbeing.
- An economic objective: to help build a strong and competitive economy, ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and productivity, along with identifying and coordinating the provision of infrastructure.

6.5.25 In addition to these objectives, the NPPF sets out more priorities with relevance to socio-economics, recreation and tourism:

- *“Planning policies and decisions should help create the conditions in which businesses can invest, expand and adapt. Significant weight should be placed on the need to support economic growth and productivity, taking into consideration both local business needs and wider opportunities for development.*
- *Planning Policies should set out a clear economic vision and strategy which positively and proactively encourages sustainable economic growth, having regard to Local Industrial Strategies and other local policies for economic development and regeneration.*
- *Plans should not be made to build on recreational land/buildings unless an assessment is undertaken which shows that the loss from Proposed Developments is replaced by an equivalent or better provision.”*

6.5.26 These will be considered with respect to the expected socio-economic impacts of the Proposed Development.

#### National Planning Practice Guidance (2019)

6.5.27 The PPG published in 2019 by the UK Government, sets out England’s planning policies and where they should be applied. Guidance is provided for many topics including housing, green belt, environmental impact assessments, and climate change. The PPG for Housing and economic land availability assessment sets out the required assessment methodology to:

- “Identify sites and broad locations with potential for development;
- Assess their development potential; and
- Assess their suitability for development and the likelihood of development coming forward (the availability and achievability).”

6.5.28 The PPG also states that *“Development potential is a significant factor that affects the economic viability of a site / broad location and its suitability for a particular use. Therefore, assessing achievability (including viability) and suitability can usefully be carried out in parallel with estimating the development potential”*. This methodology will be considered within the assessment of effects for the Proposed Development.

#### The UK’s Integrated National Energy and Climate Plan (2020)

6.5.29 To realise the opportunities presented by the transition to net-zero, the UK Government has placed Clean Growth as one of the four *“Grand Challenges”* in the Industrial Strategy. The Integrated National Energy and Climate Plan (INECP) published by BEIS (now DESNZ) in 2020 sets out the Government’s targets relative to climate change. Two of the aims are related to socio-economics (Ref 6-82):

- *“Support the growth of the UK low-carbon economy: Between 2015 and 2030, the UK low-carbon economy could grow more than four times faster than the rest of the economy, supporting up to 2 million jobs.*
- *Invest in the UK workforce: ensure people have the right skills to deliver the net-zero transition and thrive in the high-value jobs that it will create. Substantial spending commitments to develop relevant skills in STEM, digital and technical industries have been proposed to the education system.”*

6.5.30 The ambitions for a low-carbon economy are supported by the Proposed Development, which focuses on clean energy generation through CCGT and CC systems, which work alongside other developments in the region.

#### Regional

#### Greater Lincolnshire LEP Strategic Economic Plan 2014-2030

6.5.31 The Greater Lincolnshire Local Enterprise Partnership (LEP) Strategic Economic Plan, published by the Greater Lincolnshire LEP in 2014 (refreshed in 2016) aims to realise the economic potential within Greater Lincolnshire and deliver sustainable economic growth (Ref 6-83). By 2030, the Plan targets to create 13,000 new jobs, help 22,000 new businesses and increase the value of the Greater Lincolnshire economy by £3.2 billion. Of the key drivers for success, the following are relevant to socio-economics:

- *“To drive the growth of the area’s defining and strongest sectors which offer the most competitive advantage:*
  - *agri-food;*

- *advanced manufacturing and engineering;*
- *the low carbon economy, with a particular focus on renewable energy; and*
- *visitor economy.*
- *To promote Greater Lincolnshire as a place for sustainable growth through improved transport infrastructure to connect us with national and international markets, enabling wider enjoyment of our world-class heritage sites, culture and strong communities.*
- *To recognise the need for new housing for the existing local population and potential movers to the area and support balanced housing and economic development through promoting the area's capacity to deliver high-quality growth."*

6.5.32 The Proposed Development will support these objectives through the expected positive employment impacts generated, which will be part of the low carbon economy in Greater Lincolnshire.

#### *Local*

#### **Central Lincolnshire Local Plan (2023)**

6.5.33 The Central Lincolnshire Local Plan was adopted in 2023 by WLDC, as part of the Central Lincolnshire Joint Strategic Planning Committee (CLJSPC), determining the planning policies and allocations for the growth and regeneration of Central Lincolnshire County over the next 20 years, of which West Lindsey is a part of. To achieve the Council's vision, a set of overarching objectives have been created, three of which are relevant to socio-economics:

- 1- Housing: 'To ensure that the housing stock meets the housing needs of the Central Lincolnshire area and appropriate infrastructure is provided to support sustainable communities';
- 14- Employment: 'To create and improve access to high quality employment, training and learning opportunities for everyone within the Central Lincolnshire area'; and
- 15- Local Economy: 'To encourage and support a competitive, diverse and stable economy and to protect and enhance Central Lincolnshire's hierarchy of centres to meet the needs of residents and visitors'.

#### **West Lindsey Economic Growth Strategy 2014-2034**

6.5.34 The West Lindsey Economic Growth Strategy 2014-2034, published by WLDC, sets out the overall vision for the growth and prosperity of the District over the 20-year period (Ref 6-84). This vision is split into 8 components, four of which are relevant to socio-economics:

- 'A thriving micro business sector with the highest number of global micro-businesses for a rural district of its size';
- 'A strong visitor economy with an extensive leisure and cultural offer which complements the natural environment and built character of the area; attracting corporate and leisure visitors from around the world as well as serving the needs of the local community';
- 'A highly skilled and productive workforce, with local jobs and training options to match their needs'; and



- ‘A balanced housing market providing a range of quality housing in appropriate locations to support economic growth’.

#### North Lincolnshire Local Development Framework (2011)

6.5.35 The North Lincolnshire Local Development Framework, published by NLC in 2011, aims to transform economic and social conditions across North Lincolnshire through the creation of 10,000 jobs on the South Humber Bank and the provision of 15,700 homes by 2026. The Plan has 10 objectives, three of which are relevant to socio-economics:

- *“Objective 2: To secure North Lincolnshire’s major growth potential in the Yorkshire and the Humber region based on the benefits of the unique opportunities provided by the South Humber Bank ports, Humberside Airport, Doncaster Robin Hood Airport and the area’s transport network.”*
- *“Objective 4: To create a strong, competitive and diverse economy by encouraging business growth and employment opportunities supported by the delivery of strategic employment sites and improvement of the range and level of skills by developing a higher education sector.”*

6.5.36 The Proposed Development will support the objectives of North Lincolnshire through the generation of employment, which in turn will support objectives for economic growth and a strong, competitive and diverse economy in the local authority.

#### North Lincolnshire Economic Growth Plan (2023-2028)

6.5.37 The North Lincolnshire Economic Growth Plan (Ref 6-85) published by NLC in 2023, is designed to capitalise on the strength of the North Lincolnshire economy to enable existing businesses to create new well-paid, high-skilled jobs and attract inward-investment. The plan has three priorities which are relevant to socio-economics:

- *“Priority 1: A place where people, places and products are connected globally to deliver sustainable economic growth. “*
- *“Priority 2: A place where businesses and residents make positive changes to create a cleaner, greener, healthier and more sustainable future for North Lincolnshire.”*
- *“Priority 3: A place which enables and encourages businesses, residents and communities to achieve their full potential.”*

6.5.38 The Proposed Development will support this through the generation of employment opportunities for the local area and represents investment into the local economies of both North Lincolnshire and North East Lincolnshire.

#### North East Lincolnshire Economic Strategy (2021)

6.5.39 The North East Lincolnshire Economic Strategy was produced in 2021 by NELC, showcasing the Council’s approach to economic growth and development for a wide range of stakeholders. The Economic Strategy has four main objectives for the North East Lincolnshire economy, three of which are relevant to socio-economics:

- **Business Growth:** To strengthen the core business foundations where there is the most potential to add value;
- **A Green Economy:** To be the centre of the UK renewables industry, with a thriving low carbon economy powered by sustainable energy, where our businesses and communities embrace a low carbon future to protect the environment for future generations; and

- Skills: To create an environment where businesses flourish, and our residents have access to the necessary skills to adjust to a changing business environment.

6.5.40 The Proposed Development supports economic growth in the renewable energy sector through the development of CCGT and CCP systems which are low carbon and able to generate at times of reduced wind and solar power, which in turn supports the objectives of North East Lincolnshire's Economic Strategy.

#### North East Lincolnshire Local Plan 2013-2032 (Adopted 2018)

6.5.41 The North East Lincolnshire Local Plan was published with a focus on creating opportunities for the local community through economic growth. The Plan aims to help deliver 8,800 new jobs, in which a significant proportion of these will be focused around five key economic sectors: Ports and logistics; Chemicals; Food processing; Renewable energy; and Visitor economy/services/retail. Evidence shows that more than 13,000 homes will be needed to meet the demands of North East Lincolnshire's population. Three of the policies outlined in the Plan are of relevance to socio-economics:

- Population: Meet development needs and facilitate economic development by supporting population growth, retaining working age population and providing for a generally ageing population;
- Economy: Support environmentally responsive local economic growth by promoting conditions that sustain an increase in the number of better paid jobs; removing barriers to investment and access to jobs; and raising skills. Promote rural regeneration and diversification, including a strengthened tourism offer; and
- Social and health inequality: Narrow the gap in terms of social and health inequality by addressing issues of housing choice, providing accessible employment and training opportunities, promoting healthier lifestyles, providing healthcare and community facilities, improving educational attainment and cultural facilities; and establishing protecting and maintaining a network of accessible good quality open space, sport and recreation facilities.

6.5.42 The goals of the local plan are supported by the Proposed Development, which is expected to support local employment in the renewable energy sector. This will provide employment opportunities for local people, which will support improved socio-economic outcomes and help to retain the working age population.

#### Impact Assessment Methodology

6.5.43 The Proposed Development could have beneficial and adverse socio-economic and land use impacts that will need to be assessed. The approach to assessing the socio-economics effects will be based on a proven and robust approach used for assessments of a similar nature.

6.5.44 The socio-economic assessment will consider existing site conditions, policy context and the baseline situation relating to the site against established national and local policy standards and best practice benchmarks.

6.5.45 The ES chapter will include a review of relevant policy at the local and national levels to identify the key issues of relevance to the Proposed Development. This will include socio-economic policy justification for the Proposed Development and the

contribution of these activities to the socio-economic policy objectives of national, regional and local public bodies.

6.5.46 The chapter will also include a socio-economics baseline assessment reviewing existing data outlining the relevant local policy context and a description of the existing socio-economic conditions in the local study area including demographic data, labour market indicators, skills and unemployment and the local economic structure.

6.5.47 The assessment will consider the likely direct, indirect and cumulative impacts associated with socio-economics during construction and operation phases. It will draw on other assessments where necessary.

*Assessment Criteria*

6.5.48 For socio-economics there is no accepted definition of what constitutes a likely significant (or not significant) socio-economic effect. It is recognised that ‘significance’ reflects the relationship between the scale of impact (magnitude) and the sensitivity (or value) of the affected resource or receptor. As such the significance criteria for socio-economic effects will be assessed using the expert judgment of authors with professional experience in socio-economics, and relies on the following considerations:

- The sensitivity of a given receptor: the assessment takes account of the qualitative (rather than quantitative) ‘sensitivity’ of each receptor, particularly their ability to respond to change based on the given impacts of the Proposed Development.
- The magnitude of the impact: this entails consideration of the size of the impact, for example, on people, businesses, users of PRow, private properties, employees and development land in the context of the area in which impacts will be experienced.

6.5.49 These factors have then been combined to determine the consequent likely significance of the effect.

6.5.50 The sensitivity of socio-economic receptors is assessed as high, medium, low or very low. Socio-economic receptors for this assessment include:

- agricultural, industrial and development land;
- users of PRow;
- private assets (including resident and business premises);
- users of education and community facilities; and
- construction and decommissioning employees using temporary accommodation.

6.5.51 The criteria for assessing and classifying levels of receptor sensitivity used within the assessment are defined in Table 6.36, based on professional judgement.

**Table 6.36 Sensitivity classification**

<b>Level of Sensitivity</b>	<b>Description</b>
High	There are limited/no comparable and accessible alternatives to the receptor that exist within the relevant catchment area; and/or receptors have limited ability to absorb the change.

<b>Level of Sensitivity</b>	<b>Description</b>
Medium	There are limited comparable and accessible alternatives to the receptor within the relevant catchment area; and/or receptors have limited ability to absorb the change.
Low	Receptors are able to relatively easily absorb the change; and/or there are some comparable and accessible alternatives to the receptor that exist within the relevant catchment area.
Very low	Receptors are able to relatively easily absorb the change; and/or there are many comparable and accessible alternatives to the receptor that exist within the relevant catchment area.

6.5.52 The magnitude of the socio-economic impacts associated with the Proposed Development will be assessed as being high, medium, low or very low – refer to Table 6.37. The receptors detailed in the receptor sensitivity criteria are also considered for the magnitude criteria. This has been determined with regard to:

- Extent of change – the absolute number of people affected and the size of area in which the impact will be experienced (i.e. the level of change to baseline conditions including the proportion of the existing workforce);
- Scale of the impact – the relative magnitude of each impact in its relevant market context (for example, the impacts on local employment will be considered in the context of the overall size of the local labour market); and
- Duration of impact – more weight is given to long-term, permanent changes than to short-term, temporary ones. Temporary to short-term impacts are those associated with the construction works. Medium to long-term impacts are those associated with the operation of the Proposed Development.

**Table 6.37 Magnitude classification**

<b>Level of Magnitude</b>	<b>Description</b>
High	An impact that is expected to have considerable adverse or beneficial socio-economics effects. Such impacts will typically affect large numbers of businesses, workers or residents.
Medium	An impact that will typically have a noticeable effect on a moderate number of businesses, workers or residents, and will lead to a small change to the study area’s baseline socio-economic conditions.
Low	An impact that is expected to affect a small number of businesses, workers or residents or an impact that may affect a larger number of receptors but does not materially alter the study area’s baseline socio-economic conditions.
Very low	An impact which has very little change from baseline conditions where the change is barely distinguishable, approximating to a ‘no change’ situation.

6.5.53 To determine the overall significance of effects of the Proposed Development, effects will be defined in line with the following:

- Beneficial – advantageous or positive effect to an environmental resource or receptor;
- Negligible – imperceptible effect to an environmental resource or receptor;

- Adverse – detrimental or negative effects to an environmental resource or receptor; and
- No effect – no discernible effects on a receptor.

6.5.54 Duration of effect is also considered, with more weight given to permanent changes than to temporary ones. Permanent effects are generally those associated with the completed Proposed Development. Temporary effects are those associated with the construction works. For the purposes of this assessment, short-term effects are of one year or less, medium-term effects of one to five years and long-term effects for durations over five years.

6.5.55 Where an effect is assessed as being beneficial or adverse, the effect will be classified as Major, Moderate, Minor or Negligible. The assessment of significance is informed by considering the sensitivity of the receptor and the magnitude of impact as set out in Table 6.38. For the purposes of this assessment, only Moderate and Major likely effects are considered ‘significant’.

**Table 6.38 Significance of effects matrix**

Magnitude of Impact	Sensitivity of receptor				
	Negligible	Low	Medium	High	Very High
High	Minor	Moderate	Moderate	Major	Major
Medium	Negligible	Minor	Moderate	Moderate	Major
Low	Negligible	Negligible	Minor	Moderate	Moderate
Negligible	Negligible	Negligible	Negligible	Minor	Minor

6.5.56 The assessment will be carried out using a number of recognised data sources, and wherever possible the impacts of the socio-economic assessment will be appraised against relevant national standards such as those provided by HM Treasury and Homes and Communities Agency (now Homes England). Where relevant standards do not exist, professional experience and expert judgement will be applied and justified.

### Potential impacts

6.5.57 It is anticipated that the potential effects during the construction and operation phases could include the following:

- Direct and indirect employment creation;
- The potential for the promotion/ provision of training and apprenticeship opportunities, upskilling locally unemployed and potential wider economic benefits;
- Temporary disruption to traffic on the local and strategic road networks;
- Temporary disruption to PRoW;
- Impacts on businesses either direct (land take) or indirect via in combination effects identified by other discipline assessments; and
- Any land use impacts (such as effect on planned or proposed developments).

### Scope for Mitigation

6.5.58 Mitigation and measures for the construction and operational phases (some of which may have already been considered through the development of the proposals) will be considered and key indicators for monitoring socio-economic impacts will be established wherever applicable.

## 6.6 Landscape and Visual

### Baseline Conditions

- 6.6.1 This section sets out the proposed scope and methodology for the assessment of effects of the Proposed Development on landscape and visual amenity.
- 6.6.2 An initial desk-based study has been undertaken to gain an understanding of the landscape (including seascape) and visual baseline.
- 6.6.3 The Main Site and the eastern sections of the gas pipeline route corridors lie within the Humber Estuary National Character Area (NCA) 41 (Ref 6-86). This NCA focuses on the low-lying estuarine landscape, with extensive stretches of intertidal habitats including mudflats, salt marsh and reedbeds, coastal dunes and wetlands along the side of the estuary.
- 6.6.4 The western sections of the gas pipeline route corridors lie within Lincolnshire Coast and Marshes NCA 42 (Ref 6-87). This NCA mainly consists of a wide coastal plain bound by the Lincolnshire Wolds to the west.
- 6.6.5 The seascape of the Humber varies in quality and character along its length, with expansive areas of tidal mudflats and saltmarsh contrasting with more developed and industrial areas. The Main Site boundary and immediate context are of an industrial seascape character and lie within the Marine Character Area (MCA): East and described within the National Seascape Character Assessment for England (Ref 6-88).
- 6.6.6 At a regional scale, the area in which the Site is located is characterised within the North East Lincolnshire Landscape Character Assessment, Sensitivity and Capacity Study (Ref 6-89) and within the Seascape Character Area Assessment East Inshore and East offshore marine plan areas (Ref 6-90). Local Landscape Character Areas (LCAs) and MCAs relevant to the Site on a regional scale, are:
- Humber Estuary;
  - Lincolnshire Coast and Marshes; and
  - Humber Waters.
- 6.6.7 An initial site visit will be undertaken together with a review of the full landscape and visual planning policy context in the vicinity of the Site. A ZTV will be produced based on the tallest elements of the Proposed Development which will then enable the definition of a study area within which landscape or visual impacts have the potential to be significant.
- 6.6.8 Visual representations of the Proposed Development for agreed representative views (visual receptors) will be produced in line with the guidance within the Landscape Institute Advice Note 06/2019 (Ref 6-91).
- 6.6.9 The location of representative views and photomontages will be agreed in consultation with NELC, NLC and other key stakeholders.
- 6.6.10 Following an initial desk-based study, potential viewpoints have been identified from:

- recreational receptors using the proposed England Coast Path, PRow between the villages of Healing, Stallingborough and Immingham and PRow along the north coast of the Humber Estuary;
- residential receptors within the study area including from the edge of South Killingholme, Immingham, Stallingborough, Healing, Great Coates and the north western edge of Grimsby; and
- Local road users within the study area.

6.6.11 An initial study area comprising a 5 km buffer from the Main Site boundary and 1 km buffer from the Site will be further refined following the production of a ZTV and is outlined in further detail in the impact methodology section below.

### **Legislation, Policy and Guidance**

6.6.12 Relevant national, regional, and local planning legislation and guidance relating to the landscape and visual assessment are as follows:

- The NPPF;
- National Design Guide: Planning practice guidance for beautiful, enduring and successful places (Ref 6-92);
- The PPG: Natural Environment (Ref 6-93);
- North Lincolnshire Local Plan Publication Draft Addendum (Ref 6-94);
- North East Lincolnshire Local Plan;
- East Riding Local Plan (Ref 6-96); and
- The North Lincolnshire Local Development Framework Development Plan Documents (DPDs) – Core Strategy.

### **Impact Assessment Methodology**

6.6.13 The proposed method of landscape and visual impact assessment has been devised to address the specific impacts likely to result from a development of the scale and nature of the Proposed Development. The methodology draws upon the following established best practice guidance:

- ‘Guidelines for Landscape and Visual Impact Assessment’ (Ref 6-97);
- ‘Technical Guidance Note (TGN) 06/2019: Visual Representation of Development Proposals’;
- ‘Technical Guidance Note (TGN) 04/2021: Assessing landscape value outside national designations’ (Ref 6-98); and
- ‘Technical Guidance Note (TGN) 04/2020: Infrastructure’ (Ref 6-99).

#### *Assessment Criteria*

6.6.14 The EIA process requires that a clear distinction is drawn between landscape and visual impacts, as follows:

- landscape impacts relate to the degree of change to physical characteristics or components of the landscape or seascape, which together form the character of that landscape, e.g. landform, vegetation, buildings and coastal features; and
- visual impacts relate to the degree of change to an individual receptor’s view of that landscape or seascape, e.g. local residents, users of public footpaths, boat users, or motorists passing through the area.

- 6.6.15 The assessment of impacts on built heritage, including impacts on the setting of listed buildings and structures, will be addressed by the cultural heritage assessment (see Section 6.7: Cultural Heritage).
- 6.6.16 The assessment will first establish and describe the existing baseline conditions and the value of each identified landscape and visual receptor. It will then assess the sensitivity, magnitude of impact and likely significance of effects resulting from the Proposed Development.
- 6.6.17 The sensitivity of the landscape receptor is a combination of the value of the landscape (undertaken as part of the baseline study) and the susceptibility to change of the receptor to the specific type of development being assessed. Sensitivity of visual receptors is defined through appraisal of the viewing expectation, or value placed on the view as identified in the baseline study, and its susceptibility to change.
- 6.6.18 A detailed study of the existing landscape components, character and views of the Site and an identified study area will be carried out in consideration of the following:
- site context (including industrial heritage);
  - topography;
  - vegetation including green infrastructure;
  - roads, public rights of way and access;
  - settlement and land-use;
  - landscape character; and
  - representative views.
- 6.6.19 This will be supported by figures, annotated viewpoint photographs, wireframes and photomontages as appropriate. The planning context with respect to landscape character and visual amenity will also be assessed, taking into account relevant national, regional and local planning policies. The baseline study will form the basis of the assessment of the predicted impacts of the Proposed Development.
- 6.6.20 Up to ten representative views will be identified within the ZTV for the main building envelope (comprising the CCGT, CCP and any relevant ancillary infrastructure likely to impact landscape and visual), gas pipeline route corridors and grid connection route corridor and related infrastructure e.g. AGIs. The building envelope will be agreed with the Applicant's design team as part of the design parameters to be adopted for the ES, utilising the Rochdale Envelope principles to ensure a worst-case assessment is included within the EIA. The ZTV will be produced using a bare ground Digital Terrain Model (DTM) and be reviewed in the field against the following criteria in order to determine the selection of representative views which form the basis of the visual assessment:
- receptor function/ activity;
  - distance from the Site;
  - topography and elevation;
  - degree and period of exposure;
  - designation of the viewing place; and
  - distribution of receptors.



6.6.21 The viewpoints considered are likely to include the following receptor types:

- residential receptors;
- PRow users;
- recreational users of the study area;
- road users; and
- commercial/business users.

### **Potential impacts**

6.6.22 The following potential impacts may be associated with the Proposed Development:

- temporary changes to landscape character and views from sensitive receptors in the vicinity of the Proposed Development during construction and decommissioning; and
- permanent changes to landscape character and views from sensitive receptors in the vicinity of the Main Site and associated above ground infrastructure.

#### *Construction*

##### *Landscape Character*

6.6.23 The following potential impacts may be associated with the Proposed Development:

- temporary physical effects on the landscape fabric as a result of the movement and scale of plant and activities associated with the construction of the Main Site, natural gas pipelines and electrical grid connection including construction compound(s), temporary accommodation and access tracks; and
- temporary effects on landscape character within the study area as a result of the above construction operations.

#### *Visual Amenity*

6.6.24 Temporary disruption to views from residential and recreational receptors and road users due to the construction plant and activities associated with the construction of the Main Site, natural gas pipeline and electrical grid connection including the construction compound(s), temporary accommodation and access tracks.

#### *Operation*

##### *Landscape Character*

6.6.25 Long term effects on the physical landscape fabric including loss of existing landscape elements due to the introduction of structures for the Proposed Development.

6.6.26 Long term effects on landscape character within the study area as a result of the introduction of structures associated with the Proposed Development.

#### *Visual Amenity*

6.6.27 Long term changes to views from residential and recreational receptors and road users due to the introduction of structures associated with the Proposed Development.

### **Scope for Mitigation**

6.6.28 The mitigation of landscape and visual effects will be intrinsic within the Proposed Development which will adopt design principles and standard construction or operational measures including:

- seeking to substantially retain and manage existing established vegetation within the Site, as far as reasonably practicable, to ensure its continued presence to aid the screening of low level views into the Site;
- use of suitable materials in the construction of structures to reduce reflection and glare and to assist with breaking up the massing of the buildings and structures;
- selection of finishes for the buildings and other infrastructure would be informed by the finishes of the adjacent developments and agreed with relevant consultees at the detailed design stage in order to minimise the visual impact of the Proposed Development; and
- lighting required during the construction and operation stages of the Proposed Development would be designed to reduce unnecessary light spill outside of the Site, in accordance with an Outline Lighting Strategy that will accompany the Application for development consent.

6.6.29 A landscaping strategy, incorporating (but not limited to) these measures, will be submitted as part of the Application for development consent.

6.6.30 As described in Section 3, a number of technical parameters have yet to be finalised for the Proposed Development, in order to maintain flexibility as the design progresses. Therefore, the Rochdale Envelope approach will be applied to the assessment and a worst-case scenario assessed that allows for later choice of technology, dimensions and configuration of any buildings. The likely worst-case for assessment will be reported in the PEI Report.

6.6.31 Where the assessment indicates the need for additional mitigation as a result of likely significant effects on landscape character or visual amenity, these will be outlined within the ES. A Landscaping and Biodiversity Management Strategy will be prepared to accompany the DCO Application.

## 6.7 Major Accidents and Disasters

6.7.1 This section sets out the proposed scope and methodology of the assessment of Major Accidents and Disasters (hereafter referred to as 'MA&D') in respect of the Proposed Development.

6.7.2 The topic of MA&Ds was introduced into the EIA Regulations as a result of EU Directive 2014/ 52/ EU (Ref 6-100). The Directive requires the assessment of potentially significant adverse effects of a development on the environment deriving from its vulnerability to risks of relevant major accidents and/ or disasters.

6.7.3 For the purpose of this Scoping Report, the following definitions from the 'Major Accidents and Disasters in EIA, An IEMA Primer' guidance document (Ref 6-101) will be applied:

*"A major accident is an event (for instance, train derailment or major road traffic accident) that threatens immediate or delayed serious environmental effects to human health, welfare and/ or the environment and requires the use of resources beyond those of the client or its appointed representatives (i.e. contractors) to manage."*

*“A disaster is a man-made/ external hazard (such as an act of terrorism) or a natural hazard (such as an earthquake) with the potential to cause an event or situation that meets the definition of a major accident.”*

### **Baseline Conditions**

- 6.7.4 This section provides a summary of the current baseline conditions used to inform and develop an appropriate scope of work for assessing MA&D.
- 6.7.5 The study area for assessment of MA&D is not defined within regulatory guidance or standardised methodology. Therefore, for the purpose of this Scoping Report, potential MA&D have been identified through the use of professional judgement and previous assessments of similar, comparable projects.
- 6.7.6 The principal data sources used to inform the current baseline conditions presented in this Scoping Report comprise:
- European Commission’s Overview of Natural and Man-made Disaster Risks the European Union may face (Ref 6-102);
  - Cabinet Office National Risk Register of Civil Emergencies (Ref 6-103); and
  - European Commission’s Major Accident Reporting System (Ref 6-104).
- 6.7.7 Whilst the Main Site falls within NELC, the gas pipeline route corridor and grid connection route corridor may fall within NLC or WLDC (the latter within the non-metropolitan county of Lincolnshire). Consequently, the Community Risk Register for Lincolnshire (Ref 6-105) has informed the baseline conditions and identification of existing MA&D hazards and threats relevant to the Proposed Development.
- 6.7.8 No technical stakeholder engagement has been undertaken to date with respect to the scope or assessment methodology for this section. Moreover, no specific engagement will be undertaken as part of the MA&D assessment.

#### *Existing Site Conditions*

- 6.7.9 The Main Site currently comprises agricultural (arable) land which is undeveloped. A review of historical mapping indicates that the Main Site is located in an area which has historically been used for agriculture.

#### *Infrastructure and Industrial Sites*

- 6.7.10 A number of man-made features and existing hazard sources have been identified within close proximity to the Site.
- 6.7.11 Grimsby is the nearest urban area to the Site and is located approximately 2 km southeast of the Site and has a population of around 86,000, based on the 2021 census<sup>8</sup>. Stallingborough is the nearest village to the Site with a population of around 1,300, based on the 2021 census<sup>9</sup>.
- 6.7.12 The Proposed Development is situated in an industrial area which contains a number of sites which are regulated in accordance with The Control of Major Accident

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<sup>8</sup> [Grimsby \(North East Lincolnshire, Yorkshire and the Humber, United Kingdom\) - Population Statistics, Charts, Map, Location, Weather and Web Information \(citypopulation.de\)](#)

<sup>9</sup> [Stallingborough \(Parish, United Kingdom\) - Population Statistics, Charts, Map and Location \(citypopulation.de\)](#)

Hazards (COMAH) Regulations (2015), as detailed on the Health and Safety Executive (HSE) public information search<sup>10</sup>. These sites include:

- Synthomer (UK) Limited which is a lower tier COMAH site for the manufacture, production and/or disposal of chemicals (registered approximately 100 m north of the Main Site);
- BOC Limited which is an upper tier COMAH site (registered approximately 1 km northwest of the Main Site);
- Air Products Ltd which is a lower tier COMAH site (registered approximately 1.5 km northwest of the Main Site);
- Tronox Chemical Manufacturer which is an upper tier COMAH that produces titanium dioxide (registered approximately 1.6 km northwest of the Main Site);
- Solenis UK Industries Limited which is an upper tier COMAH site for the manufacture/production and/or disposal of chemicals (registered approximately 1.85 km southeast of the Main Site);
- Grimsby Manufacturing Facility which is an upper tier COMAH site and produces flocculants and polymers (registered approximately 2.1 km southeast of the Main Site)
- Immingham Main Terminal which is an upper tier COMAH site for the storage and/or distribution of fuel (registered approximately 2.6 km north of the Main Site); and
- Immingham Dock which has a number of upper and lower tier COMAH sites located within the dock (registered from approximately 3.2 km northwest of the Main Site).

6.7.13 Furthermore, there are a number of commercial and non-COMAH industrial buildings along Hobson Way, Energy Park Way, South Marsh Road and the A180.

6.7.14 There are no major airports within 10 km of the Main Site. The closest major airport is Humberside Airport which is located approximately 12.9 km west of the Main Site. Ottringham Very High Frequency Omni-Directional Range (VOR) Airstrip is located approximately 11 km northeast of the Main Site.

#### *Natural Features and Protected Environmental Sites*

6.7.15 Information on natural features and protected areas in the vicinity of the Proposed Development is provided within the relevant chapters of this Scoping Report. This section provides a brief outline of the natural features and protected environmental sites.

6.7.16 The Main Site is located adjacent west of the Humber Estuary which is designated as a Ramsar Site, SSSI, SPA and SAC. To the south of the Main Site lies Oldfleet Drain which drains into the Humber Estuary. Due to the Main Site's close proximity to the Humber Estuary, it is located entirely within Flood Zone 3 (with flood defences).

6.7.17 To the east of the Main Site lies an area of mudflat and coastal saltmarsh which are regarded as habitats of principal importance under Section 41 of the Natural Environment and Rural Communities (NERC) Act (2006).

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<sup>10</sup> HSE, Public Information Search (<https://notifications.hse.gov.uk/COMAH2015/Search.aspx>)

6.7.18 Key natural hazards pertinent to the MA&D assessment for the Proposed Development are summarised as follows:

- increased temperature/ low rainfall;
- flooding;
- ground instability;
- storms;
- drought;
- earthquakes;
- heatwave;
- cold and snow;
- winter average temperature increase;
- wildfire;
- lightning and electrical storms;
- events of reduced visibility (e.g. due to volcanic ash, dust sand or fog); and
- extreme humidity (high and low).

*Baseline of Gas Pipeline Options*

6.7.19 The following man-made features and existing hazard sources have been identified within proximity of the proposed gas pipeline options identified in paragraph 3.2.6:

- Both gas pipeline corridors Options A and B traverse around 200 m to the north of the village of Stallingborough which contains a number of sensitive residential receptors including, residential properties, Stallingborough C of E Primary School and St Peters and St Pauls Church.
- Both Options pass close to Habrough; Option A to the north and Option B to the south.
- Both Options A and B route within 1 km of a railway line and run parallel to the railway line to the northwest of Stallingborough.
- Option A is located within 100 m of two petrol stations (Ascona Luxmore West Service Station and SPAR- Luxmore Services Eastbound) which are situated on the A180.

**Legislation, Policy and Guidance**

6.7.20 Legislation, policy and guidance relevant to the assessment of MA&D of the Proposed Development are:

- Directive 2014/52/EU Assessment of the Effects of Certain Public and Private Projects on the Environment amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment ('EIA Directive');
- Directive 2012/18/EU of the European Parliament of the Council on the control of major-accident hazards involving dangerous substances (Ref 6-106);
- The NPPF;
- The PPG;
- The Infrastructure Planning (EIA) Regulations 2017;
- Land Use Planning Public Safety Advice (HSE) (Ref 6-107);

- The Planning (Hazardous Substances) Regulations 2015 (Ref 6-108);
- The Pipeline Safety Regulations 1996 (Ref 6-109);
- British Standard 61508 / 61511 – functional Safety of Electrical / Electronic / Programmable Electronic Safety-related Systems (Ref 6-110);
- Health and Safety at Work etc. Act 1974 (Ref 6-111);
- Lifting Operations and Lifting Equipment Regulations 1998 (LOLER) (Ref 6-112);
- Construction (Design and Management) (CDM) Regulations 2015 (Ref 6-113);
- The Management of Health and Safety at Work Regulations 1999 (Ref 6-114);
- The Workplace (Health, Safety and Welfare) Regulations 1992 (Ref 6-115);
- Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) 2002 (Ref 6-116);
- Environmental Permitting Regulations (EPR) 2016 (Ref 6-117);
- The COMAH Regulations 2015 (Ref 6-118);
- Control of Substances Hazardous to Health Regulations 2002 (COSHH) (Ref 6-119);
- The Regulatory Reform (Fire Safety) Order 2005 (Ref 6-120); and
- The Building Regulations 2010 (Ref 6-121).

6.7.21 Policy relevant to the assessment of MA&D of the Proposed Development includes:

- North East Lincolnshire Local Plan 2013-2032 (Ref 2-1); and
- East Riding Local Plan (Ref 6-96).

6.7.22 There is no specific guidance available which sets out the approach for undertaking a MA&D assessment within EIA. However, there is a considerable amount of information and guidance available to aid in the identification and control of major hazards:

- Chapter 4 of the Cabinet Office's Emergency Preparedness guidance on part 1 of the Civil Contingency Act (CCA) (hereafter referred to as the 'CCA risk assessment framework') (Ref 6-122);
- Chemicals and Downstream Oil Industries Forum (CDOIF) Guidelines, Environmental Risk Tolerability for COMAH Establishments (Ref 6-123);
- European Commission's 2017 Guidance on EIA (Ref 6-124);
- PINS Annex G (the HSE) to Advice Note eleven: Working with public bodies in the infrastructure planning process (Ref 6-125);
- European Commission's Overview of Natural and Man-made Disaster Risks the European Union May Face (Ref 6-126);
- Reducing Risks Protecting People: HSE's decision-making process (Ref 6-127);
- HSE Major Hazard Regulatory Model: Safety Management in Major Hazard Sectors (Ref 6-128);
- DEFRA's The Green Leaves III Guidelines for Environmental Risk Assessment (Ref 6-129);
- The International Standards Organization's ISO 31000:2018 Risk Management – Guidelines (Ref 6-130);
- Guidance on the Interpretation of Major Accidents to the Environment for the purposes of COMAH Regulations (Ref 6-131); and

- MA&D in EIA: A Primer.

### **Impact Assessment Methodology**

6.7.23 The IEMA primer on the assessment of MA&D in EIA states “*Not all potential events will fall into the scope of a major accidents and/or disasters assessment*” and suggests that “*the assessment will typically focus on low likelihood but potentially high consequence events*”. This is supported by the fact that events with a high likelihood and high consequence would be unacceptable for any development and would therefore be managed or designed out and low risk and low consequence events would not have the potential to result in a major accident.

6.7.24 Following the principles of the IEMA primer on the assessment of MA&D in EIA, MA&D assessment criteria is based upon the risk assessment process, which considers the consequences and likelihood of a risk event occurring. Reference has been made to the guidance provided by the CDOIF Guideline, Environmental Risk Tolerability for COMAH Establishments and the guidance provided as part of the civil contingencies act to develop a project-specific assessment criteria.

#### *Assessment Criteria*

6.7.25 To establish assessment criteria for the MA&D assessment, the CCA risk assessment framework was compared against the requirements of the EIA Regulations to identify if the CCA risk assessment framework on its own would be sufficient to meet the requirements of the EIA Regulations.

6.7.26 It was considered that the receptors and assessment criteria provided within the CCA risk assessment framework were not sufficient to ensure compliance with the requirements of the EIA Regulations on their own, as the framework considered all environmental receptors in one category and did not provide a mechanism for taking into account mitigation.

6.7.27 As such, assessment criteria has been developed in accordance with the CDOIF Guidelines on Environment Risk Tolerability for COMAH Establishments, which is a common approach adopted in MA&D assessments in recent applications for NSIPs. However, for clarity, throughout the assessment criteria adopted for the ES, reference is also made to the criteria provided within the CCA risk assessment framework to allow for consistency with future emergency planning at a local level.

6.7.28 In line with CDOIF Guidelines, the assessment characterises hazards or threats against the following categories in order to assign a tolerability and a risk classification to each hazard or threat:

- severity of harm;
- duration;
- consequence; and
- probability.

6.7.29 The severity of harm and consequence of a risk event are determined on the basis of a reasonably foreseeable worst-case scenario of the event in the absence of mitigation. The probability of the risk event occurring is determined whilst considering proposed embedded or ‘primary’ mitigation measures. This is because mitigation would reduce

the likelihood of the maximum severity of harm, duration, consequence and frequency of a risk event occurring.

*Severity of Harm*

- 6.7.30 The criteria used in the MA&D assessment for determining the severity of harm of a hazard or threat are set out in Table 6.39 which is based on CDOIF Guidelines and the criteria within the CCA risk assessment framework. Any risk events where the severity of harm is identified as ‘no serious damage’ for the reasonably foreseeable worst-case consequence are scoped out of this MA&D assessment.



**Table 6.39 Assessment of severity of harm**

Assessment Terminology		No Serious Damage		Severe		Major		Catastrophic	
Receptors (CCA cat)	Receptors (CDOIF cat).	CCA ref.	CDOIF ref.	CCA ref.	CDOIF ref.	CCA ref.	CDOIF ref.	CCA ref.	CDOIF ref.
		Insignificant	No Serious Damage	Minor or Moderate	Severe	Significant	Major	Catastrophic	Catastrophic
Health	People (including workers, members of the public).	Insignificant number of injuries or impact on health.	Small number of minor injuries.	<p>Small number of people affected, no fatalities, and small number of minor injuries with first aid treatment</p> <p>Or</p> <p>Moderate number of fatalities with some casualties requiring hospitalisation and medical treatment and activation of MAJAX<sup>11</sup>, the automated intelligent alert notification system, procedures in one or more hospitals.</p>	Substantial number of people requiring medical attention.	<p>Significant number of people in affected area impacted with multiple fatalities, multiple serious or extensive injuries.</p> <p>Significant hospitalisation and activation of MAJAX procedures across a number of hospitals.</p>	Multiple life changing injuries, potential loss of life in low numbers.	Very large numbers of people in affected area(s) impacted with significant numbers of fatalities, large number of people requiring hospitalisation with serious injuries with longer-term effects.	Potential loss of life in high numbers and substantial number of life changing injuries.
Social		Insignificant number of persons displaced and personal support required.		<p>Minor damage to properties.</p> <p>Minor displacement of a small number of people for &lt;24 hours and minor</p>		<p>Significant damage that requires support for local responders with external resources.</p> <p>100 to 500 people in danger and</p>		Extensive damage to properties and built up environment in affected area requiring major demolition.	

<sup>11</sup> MAJAX – refers to major accident.

<b>Assessment Terminology</b>		<b>No Serious Damage</b>		<b>Severe</b>		<b>Major</b>		<b>Catastrophic</b>	
<b>Receptors (CCA cat)</b>	<b>Receptors (CDOIF cat).</b>	<b>CCA ref.</b>	<b>CDOIF ref.</b>	<b>CCA ref.</b>	<b>CDOIF ref.</b>	<b>CCA ref.</b>	<b>CDOIF ref.</b>	<b>CCA ref.</b>	<b>CDOIF ref.</b>
		<b>Insignificant</b>	<b>No Serious Damage</b>	<b>Minor or Moderate</b>	<b>Severe</b>	<b>Significant</b>	<b>Major</b>	<b>Catastrophic</b>	<b>Catastrophic</b>
		Insignificant disruption to community services, including transport services.		personal support required.  Minor localised disruption to community services or infrastructure <24 hours  Or  Damage that is confined to a specific location, or to a number of locations, but requires additional resources.  Localised displacement of >100 people for 1-3 days, or Localised disruption to infrastructure and community services.		displaced for longer than 1 week.  Local responders require external resources to deliver personal support or Significant impact on, and possible breakdown of, delivery of some local community services.		General and widespread displacement of more than 500 people for prolonged duration and extensive personal support required.  Serious damage to infrastructure causing significant disruption to, or loss of, key services for prolonged period. Community unable to function without significant support.	
Economic		Insignificant impact on local economy		Negligible impact on local economy and cost easily absorbed  Or		Significant impact on local economy with medium-term loss of production.		Serious impact on local and regional economy with some long-	

Assessment Terminology		No Serious Damage		Severe	Major	Catastrophic			
Receptors (CCA cat)	Receptors (CDOIF cat).	CCA ref.	CDOIF ref.	CCA ref.	CDOIF ref.	CCA ref.	CDOIF ref.	CCA ref.	CDOIF ref.
		Insignificant	No Serious Damage	Minor or Moderate	Severe	Significant	Major	Catastrophic	Catastrophic
				Limited impact on local economy with some short-term loss of production, with possible additional clean-up costs.		Significant extra clean-up and recovery costs.		term, potentially permanent, loss of production with some structural change Extensive clean-up and recovery costs.	
Environment	Designated Land/Water Sites (Nationally important) (e.g. <i>National Nature Reserve (NNR)</i> , <i>SSSI</i> , <i>Marine Nature Reserve (MNR)</i> )	Insignificant impact on environment or Minor impact on environment with no lasting effects.	<0.5 ha or <10%	Limited impact on environment with short-term or long-term effects.	>0.5 ha or 10-50% of site area, associated linear feature or population.	Significant impact on environment with medium-to long-term effects.	>50% of site area, associated linear feature or population.	Serious long term impact on environment and/or permanent damage.	N/A
	Designated Land/Water Sites (Internationally important) (e.g. SAC,	Insignificant impact on environment or Minor impact on environment	<0.5 ha or <5% (<5% linear feature or population).	Limited impact on environment with short-term or long-term effects.	>0.5 ha or 5-25% of site area or 5-25% of associated linear	Significant impact on environment with medium-to long-term effects.	25-50% of site area, associated linear feature or population.	Serious long term impact on environment and/or permanent damage.	>50% of site area, associated linear feature or population.

Assessment Terminology		No Serious Damage		Severe	Major		Catastrophic		
Receptors (CCA cat)	Receptors (CDOIF cat).	CCA ref.	CDOIF ref.	CCA ref.	CDOIF ref.	CCA ref.	CDOIF ref.	CCA ref.	CDOIF ref.
		Insignificant	No Serious Damage	Minor or Moderate	Severe	Significant	Major	Catastrophic	Catastrophic
	SPA, Ramsar)	with no lasting effects.			feature or population.				
	Other Designated Land (e.g. Area of Outstanding Natural Beauty (now National Landscape), National Park, etc.)	Insignificant impact on environment or Minor impact on environment with no lasting effects.	<10 ha or <10%	Limited impact on environment with short-term or long-term effects.	10-100 ha or 10-50% of land.	Significant impact on environment with medium-to long-term effects.	>100 ha or >50% of land.	Serious long term impact on environment and/or permanent damage.	N/A
	Scarce Habitat	Insignificant impact on environment or Minor impact on environment with no lasting effects.	<2 ha or <10%	Limited impact on environment with short-term or long-term effects.	2-20 ha or 10-50% of habitat.	Significant impact on environment with medium-to long-term effects.	>20 ha or >50% of habitat.	Serious long term impact on environment and/or permanent damage.	N/A
	Widespread Habitat – Non designated Land	Insignificant impact on environment	<10 ha	Minor impact on environment with no lasting effects Or Limited impact on environment with short-term or long-term effects.	Contamination of 10-100 ha of land, preventing growing of crops, grazing of domestic animals or renders the	Significant impact on environment with medium-to long-term effects.	100-1000 ha (applied as per text under ‘Severe’).	Serious long term impact on environment and/or permanent damage.	>1000 ha (applied as per text under ‘Severe’).

Assessment Terminology		No Serious Damage		Severe	Major	Catastrophic			
Receptors (CCA cat)	Receptors (CDOIF cat).	CCA ref.	CDOIF ref.	CCA ref.	CDOIF ref.	CCA ref.	CDOIF ref.	CCA ref.	CDOIF ref.
		Insignificant	No Serious Damage	Minor or Moderate	Severe	Significant	Major	Catastrophic	Catastrophic
					area inaccessible to the public because of possible skin contact with dangerous substances. Alternatively, contamination of 10 ha or more of vacant land.				
	Widespread Habitat – Non designated Water	Insignificant impact on environment or Minor impact on environment with no lasting effects.	n/a	Minor impact on environment with no lasting effects Or Limited impact on environment with short-term or long-term effects.	Contamination of aquatic habitat which prevents fishing or aquaculture, or renders is inaccessible to the public.	Significant impact on environment with medium-to long-term effects.	N/A	Serious long term impact on environment and/or permanent damage.	N/A
	Groundwater Source of Drinking Water	Insignificant impact on environment or Minor impact on environment with no lasting effects.	Interruption of drinking water supply <1000 person-hours or for England & Wales only <1 ha SPZ .	Minor impact on environment with no lasting effects Or Limited impact on environment with short-term or long-term effects.	Interruption of drinking water supplied from a ground or surface source (where persons	Significant impact on environment with medium-to long-term effects.	>1 x 10 <sup>7</sup> person-hours interruption of drinking water (a town of ~100,000 people losing	Serious long term impact on environment and/or permanent damage.	>1 x 10 <sup>9</sup> person-hours interruption of drinking (~1 million people losing supply for 1 month) or for England & Wales

Assessment Terminology		No Serious Damage		Severe	Major	Catastrophic			
Receptors (CCA cat)	Receptors (CDOIF cat).	CCA ref.	CDOIF ref.	CCA ref.	CDOIF ref.	CCA ref.	CDOIF ref.	CCA ref.	CDOIF ref.
		Insignificant	No Serious Damage	Minor or Moderate	Severe	Significant	Major	Catastrophic	Catastrophic
					affected x duration in hours [at least 2] >1,000) or For England & Wales only 1-10 ha of SPZ where drinking water standards are breached.		supply for month) or for England & Wales only 10-100 ha SPZ drinking water standards breached.		only >100 ha SPZ drinking water standards breached.
	Groundwater – non Drinking Water Source	Insignificant impact on environment or Minor impact on environment with no lasting effects.	<1 ha	Minor impact on environment with no lasting effects Or Limited impact on environment with short-term or long-term effects.	1-100 ha of aquifer where water quality standards are breached (or hazardous substance is discernible).	Significant impact on environment with medium-to long-term effects.	100-10,000 ha.	Serious long term impact on environment and/or permanent damage.	>10,000 ha.
	Groundwater strata	Insignificant impact on environment or Minor impact on environment with no lasting effects.	Where the groundwater is a pathway for another receptor assess against relevant criteria for the receptor.	Minor impact on environment with no lasting effects Or Limited impact on environment with short-term or long-term effects.	Where the groundwater is a pathway for another receptor assess against relevant criteria.	Significant impact on environment with medium-to long-term effects.	Where the groundwater is a pathway for another receptor assess against relevant criteria.	Serious long term impact on environment and/or permanent damage.	Where the groundwater is a pathway for another receptor assess against relevant criteria for the receptor.

Assessment Terminology		No Serious Damage		Severe		Major		Catastrophic	
Receptors (CCA cat)	Receptors (CDOIF cat).	CCA ref.	CDOIF ref.	CCA ref.	CDOIF ref.	CCA ref.	CDOIF ref.	CCA ref.	CDOIF ref.
		Insignificant	No Serious Damage	Minor or Moderate	Severe	Significant	Major	Catastrophic	Catastrophic
	Soil or sediment (i.e. as receptor rather than purely a pathway).	Insignificant impact on environment or Minor impact on environment with no lasting effects.	Contamination not leading to environmental damage (as per Environmental Liability Directive), or not significantly affecting overlying water quality.	Minor impact on environment with no lasting effects Or Limited impact on environment with short-term or long-term effects.	Contamination of 10-100 ha of land etc. as per Widespread Habitat; Contamination sufficient to be deemed environmental damage (Environmental Liability Directive).	Significant impact on environment with medium-to long-term effects.	Contamination of 100-1,000 ha of land, as per Widespread Habitat; Contamination rendering the soil hazardous to humans (e.g. skin contact) or the living environment but remediation available.	Serious long term impact on environment and/or permanent damage.	Contamination of >1,000 ha of land, as per Widespread Habitat; Contamination rendering the soil immediately hazardous to humans (e.g. skin contact) or the living environment and remediation difficult or impossible.
	Built environment (Under CDOIF, this is limited to Grade 1 / Cat A Listed buildings, scheduled 127 monuments,	Insignificant impact on environment or Minor impact on environment with no lasting effects.	Damage below a level at which designation of importance would be withdrawn.	Minor impact on environment with no lasting effects Or Limited impact on environment with short-term or long-term effects.	Damage sufficient for designation of importance to be withdrawn.	Significant impact on environment with medium-to long-term effects.	Feature of built environment subject to designation of importance entirely destroyed.	Serious long term impact on environment and/or permanent damage.	N/A

Assessment Terminology		No Serious Damage		Severe	Major	Catastrophic			
Receptors (CCA cat)	Receptors (CDOIF cat).	CCA ref.	CDOIF ref.	CCA ref.	CDOIF ref.	CCA ref.	CDOIF ref.	CCA ref.	CDOIF ref.
		Insignificant	No Serious Damage	Minor or Moderate	Severe	Significant	Major	Catastrophic	Catastrophic
	conservation area, etc).								
	Particular species (Note – these criteria apply nationally – i.e. England, Wales, Scotland).	Insignificant impact on environment or Minor impact on environment with no lasting effects.	Loss of <1% of animal or <5% of plant ground cover in a habitat.	Minor impact on environment with no lasting effects Or Limited impact on environment with short-term or long-term effects.	Loss of 1-10% of animal or 5-50% of plant ground cover.	Significant impact on environment with medium-to long-term effects.	Loss of 10-90% of animal or 50-90% of plant ground cover.	Serious long term impact on environment and/or permanent damage.	Total loss (>90%) of animal or plant ground cover.
	Marine	Insignificant impact on environment or Minor impact on environment with no lasting effects.	<2 ha littoral or sublittoral zone, <100 ha of open sea benthic community, <100 dead sea birds (<500 gulls), <5 dead/significantly impaired sea mammals.	Minor impact on environment with no lasting effects Or Limited impact on environment with short-term or long-term effects.	2-20 ha littoral or sublittoral zone, 100-1,000 ha of open sea benthic community, 100-1000 dead sea birds (500-5,000 gulls), 5-50 dead/significantly impaired sea mammals.	Significant impact on environment with medium-to long-term effects.	20-200 ha littoral or sub-littoral zone, 100-10,000 ha of open sea benthic community, 1,000-10,000 dead sea birds (5,000-50,000 gulls), 50-500 dead/significantly impaired sea mammals.	Serious long term impact on environment and/or permanent damage.	>200 ha littoral or sublittoral zone, >10,000 ha of open sea benthic community, >10,000 dead sea birds (>50,000 gulls), >500 dead/significantly impaired sea mammals.



Assessment Terminology		No Serious Damage		Severe	Major	Catastrophic			
Receptors (CCA cat)	Receptors (CDOIF cat).	CCA ref.	CDOIF ref.	CCA ref.	CDOIF ref.	CCA ref.	CDOIF ref.	CCA ref.	CDOIF ref.
		Insignificant	No Serious Damage	Minor or Moderate	Severe	Significant	Major	Catastrophic	Catastrophic
Fresh and estuarine water habitats.	Insignificant impact on environment or Minor impact on environment with no lasting effects.		Impact below that of Severe.	Minor impact on environment with no lasting effects Or Limited impact on environment with short-term or long-term effects.	Water Framework Directive (WFD) Chemical or ecological status lowered by one class for 2-10 km of watercourse or 2-20 ha or 10-50% area of estuaries or ponds. Plus interruption of drinking water supplies.	Significant impact on environment with medium-to long-term effects.	WFD Chemical or ecological status lowered by one class for 10-200 km of watercourse or 20- 200 ha or 50-90% area of estuaries and ponds. Plus interruption of drinking water supplies.	Serious long term impact on environment and/or permanent damage.	WFD Chemical or ecological status lowered by one class for >200 km of watercourse or >200 ha or >90% area of estuaries and ponds. Plus interruption of drinking water supplies.

*Duration of Harm*

6.7.31 The criteria for the assessment of the duration of harm is also based on CDOIF and HSE Guidelines and are shown in Table 6.40.

**Table 6.40 Assessment of duration of harm**

<b>Receptor</b>	<b>Short Term</b>	<b>Medium Term</b>	<b>Long Term</b>	<b>Very Long Term or Permanent</b>
Population	Injury or impairment lasting up to 1 week	Injury or impairment lasting up to 4 months but no permanent consequences	Some permanent restriction to leisure and work activities	Death/fatality
Groundwater or surface water drinking water source (public or private)	N/A	N/A	Harm affecting drinking water source or SPZ <6 years	Harm affecting drinking water source or SPZ >6 years
Groundwater (except drinking water sources): WFD Hazardous / Non Hazardous Substances	WFD hazardous substances <3 months	WFD hazardous substances >3 months	WFD hazardous substances >6yrs	WFD hazardous substances >20 years
	WFD non-hazardous substances <1yr	WFD non-hazardous substances >1y	WFD non-hazardous substances >10 years	WFD non-hazardous substances >20 Years
Surface water (except drinking water sources – see above)	<1year	>1 year	>10 years	>20 years
Land	<3 years or <2 growing seasons for agricultural land	>3 years or >20 growing seasons for agricultural land	>20 years	>50 years
Built environment	Can be repaired in <3 years, such that its designation can be reinstated	Can be repaired in >3 years, such that its designation can be reinstated	Feature destroyed, cannot be rebuilt, all features except world heritage site	Feature destroyed, cannot be rebuilt, world heritage site
Marine	<1 year	>1 year	>10 years	>20 years

*Level of Consequence*

6.7.32 The level of consequence matrix for the MA&D assessment has been defined using CDOIF Guideline and is shown in Table 6.41. Level of consequence considers the severity of harm and the duration of the harm to separate hazards and threats into five categories ('Not a MA&D' and categories A to D). 'Not a MA&D' represents the lowest level of consequence and category 'D' the highest.

**Table 6.41 Assigning a level of consequence**

		<b>Duration</b>			
		<b>Short term</b>	<b>Medium term</b>	<b>Long term</b>	<b>Very long term or permanent</b>
<b>Severity of Harm</b>	<b>Catastrophic</b>	Not a MA&D	C	D	D
	<b>Major</b>	Not a MA&D	B	C	D
	<b>Severe</b>	Not a MA&D	A	B	C
	<b>No Serious Damage</b>	Not a MA&D	Not a MA&D	Not a MA&D	Not a MA&D

*Probability*

6.7.33 The probability of a risk event occurring has been assessed in accordance with the definitions presented in Table 6.42, which are derived from CDOIF and CCA guidelines.

**Table 6.42 Definitions of probability**

<b>Probability</b>	<b>Extremely Improbable</b>	<b>Extremely Remote</b>	<b>Remote</b>	<b>Rare</b>	<b>Unlikely</b>	<b>Likely</b>	
CDOIF Quantitative Definition	Less than 1 in 10,000,000 years	1 in 1,000,000 years to 1 in 10,000,000 years	1 in 100,000 years to 1 in 1,000,000	1 in 10,000 to 1 in 100,000 years	1 in 100 years to 1 in 10,000 years	Greater than 1 in 100 years	
CCA Quantitative Definition	>1 in 20,000 chance over 5 years			>1 in 2,000 chance over 5 years	>1 in 200 chance over 5 years	>1 in 20 chance over 5 years	>1 in 2 chance over 5 years
CCA Qualitative Descriptor	Negligible			Rare	Unlikely	Possible	Probable

*Classification of Risk*

6.7.34 Tolerability of a risk is identified by considering the degree of harm of a risk event and probability of the worst-case environmental consequence occurring. The criteria used to classify the risk of each risk event is presented in Table 6.43 and is supported by Table 6.44.

**Table 6.43 Classification of Risk**

Consequence	Probability					
	Extremely improbable	Extremely remote	Remote	Rare	Unlikely	Likely
<b>D</b>	Tolerable	TifALARP*	Intolerable	Intolerable	Intolerable	Intolerable
<b>C</b>	Tolerable	Tolerable	TifALARP*	Intolerable	Intolerable	Intolerable
<b>B</b>	Tolerable	Tolerable	Tolerable	TifALARP*	Intolerable	Intolerable
<b>A</b>	Tolerable	Tolerable	Tolerable	Tolerable	TifALARP*	Intolerable
<b>Not a MA&amp;D</b>	Not within the scope of MA&D assessment					

\*TifALARP – Tolerable if As Low As Reasonably Practicable

6.7.35 Following the classification of a risk, as presented in Table 6.43, a clear statement is made as to whether the risk is ‘significant’ or ‘not significant’. As a general rule, ‘intolerable risks’ are considered to be significant and ‘tolerable’ or ‘Tolerable if As Low As Reasonably Practicable (TifALARP)<sup>12</sup>’ risks are considered to be not significant. However, professional judgement is also applied, where appropriate.

**Potential impacts**

6.7.36 The potential for activities associated with the Proposed Development to alter existing or introduce new major accidents risk events to workers on site and resources or receptors within the study area has been considered and are presented in Table 6.44.

*Construction*

6.7.37 A number of potential accident scenarios could occur during construction of the Proposed Development including:

- Fire or explosion;
- Collapse or toppling of partially built structures, plant or equipment;
- Ground instability including collapse of excavations; and
- Leaks and spillages of chemicals or fuels resulting in contamination or release of hazardous substances to the environment.

*Operation*

6.7.38 Whilst initial COMAH assessments have classified the Proposed Development as Lower Tier, it should be noted, that whilst CO<sub>2</sub> is not currently defined as a dangerous substance under the COMAH Regulations or as a dangerous fluid under the Pipelines

<sup>12</sup> "ALARP" is short for "as low as reasonably practicable". Reasonably practicable involves weighing a risk against the trouble, time and money needed to control it. The ALARP principle is used to describe an expected level of residual risk involved with a system or set of operations, in case it is not possible to eliminate the risk. What this means, is that the applicant, overseen by regulatory authorities, is responsible for exercising good practice and judgement to ensure that necessary measures have been taken in order to reduce the levels of risk, such that the residual risk levels are 'as low as reasonably practicable'. Risks categorised 'tolerable if ALARP' would generally require further approval of the details for proposed mitigation by a regulatory body.

Safety Regulations, HSE regard CO<sub>2</sub> as having major accident hazard potential if released at or above its critical pressure.

6.7.39 The hazardous substances on the operational CCGT and CCP will include:

- Low, medium and high-pressure CO<sub>2</sub> – an asphyxiant which is potentially toxic in high doses;
- Natural gas, a highly flammable gas, which will be supplied via a new pipeline and be used as fuel gas for the gas turbine;
- Hydrogen, a highly flammable gas, will be stored on site;
- Amine solvents which are harmful liquids to be used in the carbon capture CO<sub>2</sub> absorption and regeneration system;
- Aqueous ammonia, a toxic liquid, which may be used in the treatment of exhaust gas emissions from the CCGT and in the treatment of water within the HRSG; and
- Other treatment chemicals as may be required for water treatment, wastewater treatment, solvent reclamation or other on-site processes.

**Table 6.44 Summary of potential impacts**

Activity/risk event	Resource/receptor
<b>MA&amp;D resulting from the vulnerability of the Proposed Development to natural disasters during construction and operation</b>	
Flooding from rivers, surface water, groundwater, reservoirs and sewers.	Workers, including temporary workers or visitors, on the Proposed Development. Local communities (including recreational users of nearby facilities). Terrestrial and aquatic receptors (including habitats, particular species and designated sites).
Storms resulting in the potential movement of debris and loose construction equipment.	Workers, including temporary workers or visitors, on the Proposed Development.
Low temperatures and heavy snow (extreme cold weather resulting in snow and ice), with increased risk of structural failure due to weight of snow and ice and loss of containment.	Workers, including temporary workers or visitors, on the Proposed Development.  Terrestrial and aquatic receptors (including habitats, particular species and designated sites).
Heatwave resulting in increased risk of overpressure of gas / CO <sub>2</sub> in pipelines and tanks.	Workers, including temporary workers or visitors, on the Proposed Development.  Terrestrial and aquatic receptors (including habitats, particular species and designated sites).
Drought	Workers, including temporary workers or visitors, on the Proposed Development.  Local communities (including recreational users of nearby facilities).  Terrestrial receptors (including habitats, particular species and designated sites).
Lightning and electrical storms (risk of cloud-to-ground lightning striking within site during operation and maintenance activities).	Workers, including temporary workers or visitors, on the Proposed Development.
Earthquake (tremors resulting in physical damage to structures occupied by or of fundamental importance to humans) and loss of containment.	Workers, including temporary workers or visitors, on the Proposed Development.  Terrestrial receptors (including habitats, particular species and designated sites).
Wildfire	Workers, including temporary workers or visitors, on the Proposed Development.  Terrestrial receptors (including habitats, particular species and designated sites).
Volcanic eruptions (The UK is in close proximity to a number of volcanoes in Europe, in particular Bárðarbunga and Eyjafjallajökull in Iceland, which erupt frequently and, due to prevailing winds, are	Workers, including temporary workers or visitors, on the Proposed Development.

Activity/risk event	Resource/receptor
<b>MA&amp;D resulting from the vulnerability of the Proposed Development to natural disasters during construction and operation</b>	
more likely to blow ash and gas towards the area of the Proposed Development.)	
Fire/explosion.	Workers, including temporary workers or visitors, on the Proposed Development.
Toxic/asphyxiant gas release.	Workers, including temporary workers or visitors, on the Proposed Development.
Toxic release of liquid or gaseous amine solvent.	Workers, including temporary workers or visitors, on the Proposed Development. Local communities (including recreational users of nearby facilities). Terrestrial and Aquatic receptors (including habitats, particular species and designated sites).
Ground or structural collapse as a result of activities at the Proposed Development.	Workers, including temporary workers or visitors, on the Proposed Development.
Impairment, interruption or severance of existing utilities' of utilities (electricity, gas, water and telecommunications) due to the construction works.	Workers, including temporary workers or visitors, on the Proposed Development.
Full or partial obstruction of emergency services, leading to a slow response time and subsequently limiting the ability for emergency response plans to be implemented.	Workers, including temporary workers or visitors, on the Proposed Development.
Absent or deficient safety and environmental management systems (e.g. inadequate planning, resources provision, procedures) could increase the risk of other risk events occurring.	Workers, including temporary workers or visitors, on the Proposed Development.
Explosion or structural collapse at neighbouring sites.	Workers onsite as well as the adjacent industrial sites. Construction plant and equipment Local communities ((including recreational users of nearby facilities). Aquatic, marine. Water and terrestrial land receptors (including habitats, particular species and designated sites).
Outbreak of disease including animal health-notifiable disease, emerging infectious disease and pandemic influenza.	Workers onsite as well as those at neighbouring industrial facilities.
Major accidents caused by malicious acts/vandalism against the Proposed Works	Workers onsite as well as those at neighbouring industrial facilities.

6.7.40 It is proposed that an assessment of MA&D will be scoped into the EIA and will be presented in the ES. In accordance with guidance provided by IEMA, the MA&D assessment will focus on the high consequence, low probability events and therefore will consider the activities and risk events identified in Table 6.44.



## Scope for Mitigation

6.7.41 The following information will inform the MA&D assessment of the Proposed Development:

- The potential for construction-related accidents, causing harm to construction workers, are not within the scope of the EIA, unless these could also cause harm to an environmental receptor including members of the public beyond the boundaries of the construction site. Existing legislation around safe working practices and CDM would ensure that such risks are mitigated appropriately without the need for further assessment.
- With regards to “disasters”, there are a number of potential impacts which will be assessed within other topic-specific sections of the ES. For example, extreme weather events may result in disasters such as flooding and pollution. The potential for flooding disasters will be covered by the Flood Risk Assessment as part of the Water Environment assessment. Pollution to groundwater resources and contaminated land will be considered within the Geology, Soils and Agriculture assessment. Accidental spillage of contaminants such as hydrocarbons and their subsequent release into the drainage system will also be considered in the Water Environment section. Events that could occur as a result of a flood (i.e. are triggered by a flood) will be considered within the MA&D assessment.
- Although minor earthquakes have occurred in the area of the Site (including a magnitude 3.9 earthquake on 9 June 2018), it is not located within an area which has a high risk of earthquakes and/or seismic activity. Refer to Section 6.9: Geology, Soils and Agriculture of this Scoping Report for further detail.
- The potential for other external hazards to impact the Proposed Development, such as earthquakes, landslides, mine collapse or sinkholes, will, where relevant, be covered within the design requirements of the Geology, Soils and Agriculture section, and will not require further assessment. However, the MA&D assessment will include a review of earthquake history with reference to the Geology, Soils and Agriculture assessment.
- All COMAH sites have their own processes around safety of workers in the event of an incident and consequently would have assessed their impact on surrounding receptors. It is also the responsibility of upper tier COMAH sites to review and update their off-site emergency plans and Safety Reports to take into consideration the potential impact of domino sites. It is therefore assumed that nearby sites would be notified of the works by the contractors and construction workers would be included in the relevant evacuation procedures, where appropriate, and therefore no additional measures would be required.
- It is assumed that existing safety precautions at neighbouring industrial sites, along with the implementation of a final CEMP at the Site, secured via requirement of the draft DCO, will mitigate the risk of domino effects occurring. If further specific mitigation is required as a result of the introduction of the Proposed Development, this will be reported in the ES, on the basis of information available at the time of assessment, as either embedded or additional mitigation. It is anticipated that additional controls will be identified through future COMAH licence applications in consultation with the HSE at that time.

## 6.8 Water Environment

6.8.1 This section presents the proposed approach to the assessment of the Proposed Development effects on the water environment. The water environment assessment will consider potential impacts on water quality and resources of surface and groundwater features, hydromorphology, flood risk and drainage. Aquatic ecology in water bodies on the terrestrial elements of the Site is covered in Section 6.13: Terrestrial Ecology and marine ecology is covered in Section 6.15: Marine Ecology.

### Baseline Environment

#### *Data sources*

- 6.8.2 To inform the scoping exercise, data, information and records relating to the flowing water features, resources and receptors was gathered from a number of publicly available online sources. At this stage the following key data sources are:
- EA Catchment Data Explorer (<https://environment.data.gov.uk/catchment-planning>) (Ref 6-132).
  - DEFRA, Multi-Agency Geographic Information for the Countryside (MAGIC) website (Ref 6-133).
  - EA Flood Maps for Planning (<https://flood-map-for-planning.service.gov.uk>) (Ref 6-134).
  - EA Long-term Information Service: Check the long-term flood risk for an area in England – GOV.UK (<https://www.gov.uk/check-long-term-flood-risk>) (Ref 6-135).
  - Shoreline Management Plan 3: Flamborough Head to Gibraltar Point (Ref 6-136).
  - Grimsby and Ancholme Catchment Flood Management Plan (Ref 6-137).
  - Humber Flood Risk Management Plan (Ref 6-138).
  - Humber Flood Risk Management Strategy (Ref 6-139).
  - North East Lincolnshire and North Lincolnshire Strategic Flood Risk Assessment. (Ref 6-140).
  - West Lindsey Strategic Flood Risk Assessment (Ref 6-141).
  - British Geological Survey (BGS) Geology Viewer (<https://geologyviewer.bgs.ac.uk/>) (Ref 6-142).
  - Groundwater Source Protection Zones (SPZs) (<https://www.gov.uk/guidance/groundwater-source-protection-zones-spzs>) (Ref 6-143).
  - Coal Authority Online Interactive Map (<https://mapapps2.bgs.ac.uk/coalauthority/home.html>) (Ref 6-144).
  - UK Topographic Map (<https://en-gb.topographic-map.com/map-cgt/United-Kingdom>) (Ref 6-145).
  - Online BGS GeoIndex website (<https://www.bgs.ac.uk/map-viewers/geindex-onshore/>) (Ref 6-146).
  - Cranfield University, Soilscales (<http://www.landis.org.uk/soilscales/>) (Ref 6-147).

- National Library of Scotland Georeferenced Maps website (<https://maps.nls.uk/geo/find/#zoom=5.0&lat=56.00000&lon=-4.00000&layers=102&b=1&z=0&point=0,0>).
- Meteorological Office website (Cleethorpes (North East Lincolnshire) UK climate averages – Met Office) (Ref 6-149).
- National River Flow Archive (National River Flow Archive ([ceh.ac.uk](http://ceh.ac.uk))) (Ref 6-150).
- Environment Agency Groundwater Dependent Terrestrial Ecosystems (England only) (Ref 6-151).
- Bathing water locations, DEFRA (Ref 6-152).

6.8.3 Additional information on water quality and resources (i.e. consented discharges, licensed abstractions and Private Water Supplies, and historic pollution incidents) will be added in the impact assessment in the ES. Information on ecological potential of water features will also be added at later stages of the assessment as survey results become available.

6.8.4 An initial site reconnaissance walkover was carried out on 26 September 2023 by AECOM. Weather conditions were heavy rain and cool, with low tide in the Humber Estuary. This, together with a desk-based review of available data has identified the water features plus associated designations in the study area, as discussed below.

6.8.5 Baseline conditions have been established for:

- Topography, land use, climate and geology;
- Surface water features;
- Groundwater features;
- Hydromorphology;
- Water resources;
- Water dependent ecological areas and relevant protected species; and
- Flood risk.

#### *Study Area*

6.8.6 For the purposes of this scoping assessment the study area is up to 1 km from the Site (see Figure 2E in Appendix A). This has been determined by the distance of the proposed cooling water discharge outfall that may be located approximately 1 km offshore, plus an additional 0.5 km for possible transport of the discharge plume in the Estuary (i.e. a 1.5 km study area has been used for works in the Humber Estuary). The study area is the zone within which receptors are identified and will be kept under constant review. Should dispersion modelling from the cooling water outfall be required, a wider zone of influence from the point of discharge will be considered. However, any impact is expected to be retained within the Humber Estuary water body.

6.8.7 The study area also contains the gas pipeline and electrical grid connection route corridors, as well as site access options from Immingham Port, from where larger components of the CCGT/CCP are proposed to be delivered. This study area is sufficient to identify surface and groundwater features that could reasonably be affected by the Proposed Development (i.e. there is a direct or indirect pathway between the Proposed Development and the water feature).

- 6.8.8 Consideration has also been given to any attributes of surface water (including the Humber Estuary and freshwater watercourses) or groundwater features, including water dependent ecological sites outside this study area. This is because there is the potential for impacts such as water pollution to propagate downstream. Professional judgement will be applied to identify the extent to which such features are included. At present attributes of terrestrial watercourses have been considered up to 3 km downstream of the Proposed Development. As all of the aforementioned water features discharge into the Humber Estuary. The Humber Estuary is considered to be the ultimate receptor of the Proposed Development. Overall, this approach is consistent with the guidance within the Design Manual for Roads and Bridges (DMRB), Volume 11: Section 3, Part 10 – Road Drainage and the Water Environment, LA113 (Ref 6-153), which is a nationally accepted approach for water environment impact assessment. The lower and middle Estuary are considered to be within the study area, accounting for tidal movement.
- 6.8.9 The gas pipeline corridors follow the same route from the Main Site to Stallingborough Road, travelling north of Stallingborough village. This section of the routes crosses three named drains (Oldfleet Drain, Middle Drain and North Beck Drain).
- 6.8.10 An electrical grid connection is also proposed however the route is yet to be finalised and so it has not been possible to consider in this scoping appraisal, although it is expected that it will be within the Site (as defined in paragraph 1.2.1 and potential impacts will be similar to that for the gas pipeline). The grid connection will connect the Proposed Development to the National Grid Grimsby West Substation (or potential other substation that may be planned as part of the Grimsby to Walpole upgrade).
- 6.8.11 In general, the groundwater receptors and potential sources of contamination have been identified within the Site boundary or within approximately 1 km of the Site, as interaction between the Site and receptors, or potential sources of contamination beyond 1 km would generally not occur as a result of the ground conditions present in and around the Site. Where relevant for specific subtopics, such as groundwater SPZs, the study area extends to beyond 1 km either side of the Site particularly where a receptor (e.g. an aquifer) within the study area is likely to be impacted and is in hydraulic continuity with a water feature outside the defined 1 km study area.

*Topography, Land Use, and Climate*

- 6.8.12 The Site is characterised by low level, slightly undulating topography with elevations shown on Ordnance Survey (OS) mapping of between 8 mAOD and -1 mAOD.
- 6.8.13 The land use within the study area is a mixture of agricultural land and residential areas. To the north of the Main Site is the existing South Humber Bank Power Station. Other industrial facilities are located along the banks of the Humber in the wider environs from the Main Site.
- 6.8.14 Based on the Meteorological Office website, the nearest weather station is located at Cleethorpes, approximately 5 km to the southeast of the Main Site. Using data from this weather station, it is estimated that the study area experiences an average of 601 mm of rainfall per year, with it raining more than 1 mm on 118 days per year, which are both lower than the UK average.

*Surface Water Features*

- 6.8.15 The study area is contained within the Becks Northern WFD Operational Catchment within the Louth Grimsby and Ancholme Management Catchment. In total the study area overlies four different surface WFD water bodies within this Operational Catchment. To the northeast of the Main Site is the Humber Estuary, which is a transitional and coastal WFD water body.
- 6.8.16 The watercourses potentially impacted by the Proposed Development are presented in Table 6.45.

**Table 6.45 Watercourses Potentially Impacted by the Proposed Development**

<b>Watercourse</b>	<b>WFD Water Body</b>	<b>Watercourse type</b>	<b>Relevance to Proposed Development</b>	<b>Scope In/Out</b>
Humber Estuary	HUMBER LOWER Water Body	Transitional Water	Watercourses discharge into the Humber. Cooling water/process water discharges into the Estuary.	In
North Beck Drain	North Beck Drain Water Body	Main River	Crosses the Site. The Main Site is within this water body, with the WFD monitored watercourse discharging into the Humber 2.8 km to the northwest. There is the potential for overbridging of the watercourse at TA 21314 14963, though details of this are to be confirmed.	In
Mawmbridge Drain	Mawmbridge Drain Water Body	Main River	Crosses the Site. The WFD monitored watercourse discharges into the Humber estuary 1 km to the southeast of the Main Site.	In
Lacey Beck / River Freshney	Lacey Beck / River Freshney Catchment (to N Sea) Water Body	Main River	Flows 100 m south of the Site. The watercourse is outside the Site however the catchment falls within it.	In
Skitter Beck / East Halton Beck	Skitter Beck / East Halton Beck Water Body	Main River	Crosses the Site.	In
Oldfleet Drain	Mawmbridge Drain Water Body	Main River	Crosses the Site. This watercourse forms the southeastern boundary of the Main Site.	In
Middle Drain	North Beck Drain Water Body	Ordinary Watercourse	Crosses the Site. This watercourse discharges into the Humber 750 m to the northwest of the Main Site. There is the potential for overbridging of the watercourse at TA 22203 13704, though details of this are yet to be confirmed.	In
Sweedale Croft Drain	Mawmbridge Drain Water Body	Ordinary Watercourse	Crosses the Site.	In

- 6.8.17 There is a pond located within the study area next to Oldfleet Drain, on the southwest corner of the Main Site (NGR TA230127). This does not appear to be hydrologically connected to Oldfleet Drain or any other water body and may have been constructed as a drainage pond for the neighbouring site. This will be investigated during a future site walkover.
- 6.8.18 Sweedale Croft Drain runs alongside Mawmbridge Drain, to the south of the Main Site and crosses the electrical grid connection corridor. It is within the Mawmbridge Drain WFD classified water body.
- 6.8.19 A large part of the area is managed by the North East Lindsey Drainage Board; who are included as a proposed consultee in section 6.8.64.

*Water Quality and Flow Data*

- 6.8.20 Five water quality monitoring sites have been used to WFD classify North Beck drain, two have been used to WFD classify Mawmbridge Drain. These are shown in Table 6.46 along with the determinands measured.

**Table 6.46 WFD water quality monitoring locations (Ref 6-134)**

<b>Monitoring Site name</b>	<b>WFD Waterbody</b>	<b>Determinands</b>	<b>Location</b>
N Killingholme Drn u/s S. Kill. STW [Sewerage Treatment Works]	North Beck Drain	dissolved oxygen (DO), ammonia, biochemical oxygen demand (BOD), temperature.	North Beck Drain Tributary, 8.5 km south of the Main Site
N Killingholme Main Drn d/s Killing'm SW	North Beck Drain	chromium (VI), copper, iron, lead & its compounds, nickel and its compounds, zinc	North Beck Drain Tributary, 8.5 km south of the Main Site
S Kill. Drn. Prosper Rd	North Beck Drain	DO, ammonia, BOD, temperature.	North Beck Drain Tributary, 7 km south of the Main Site
144201	Mawmbridge Drain	phytobenthos	Mawmbridge Drain, 2 km from main site
Mawmbridge Drain. 25 m u/s pumping station	Mawmbridge Drain	temperature, zinc, ammonia, phosphate, DO, BOD	Mawmbridge Drain, 2 km from Main Site

- 6.8.21 There are no flow gauges within the study area (Ref 6-151). The nearest is located on Waithe Beck at Brigsley (station 29001). This is located approximately 3 km south of the southerly end of the electrical grid connection corridor, in the Becks Northern Operational Catchment.

*Hydromorphology*

- 6.8.22 The study area covers four separate surface WFD water bodies all within the Becks Northern operational catchment, and the Humber Lower Transitional Water Body:
- 'Lacey Beck / River Freshney Catchment (to N Sea) Water Body' (GB104029067530).
  - 'Mawmbridge Drain Water Body' (GB104029067540).
  - 'North Beck Drain Water Body' (GB104029067575).

- Skitter Beck / East Halton Beck Water Body' (GB104029067655).
- 'Humber Lower Transitional Water Body' (GB530402609201).

- 6.8.23 The main watercourses within each of these water bodies flow into the Humber Estuary (although the nature of the confluence and whether this is controlled by a structure will be confirmed following a future walkover, where relevant to do so). At the coast, where watercourses discharge, there are wide areas of tidal flat deposits consisting of clay and silt showing the extent of historic tidal activity in the region (Ref 6-134). These deposits typically extend 1 – 2.5 km in-shore of the Estuary. Further inland superficial deposits are composed generally of till of Devensian age. The River Freshney, East Halton Beck, and Laceby Beck also possess narrow corridors of alluvium deposits. These consist of clay, silt, and gravel and are unconsolidated detrital material deposited by rivers. The presence of these deposits suggest that the watercourses have historically been capable of migrating through the landscape, leaving a trail of deposits in their wake.
- 6.8.24 Soils in the study area follow the pattern of superficial deposits. In the area covered by tidal flat deposits around the coast, soils are loamy and clayey with naturally high groundwater and suitable habitat for wet brackish coastal flood meadows. Further inland, where there are till deposits, these give way to slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils (Ref 6-147).
- 6.8.25 The 'Laceby Beck / River Freshney Catchment (to N Sea) Water Body' is classified as heavily modified for its hydromorphological designation and is of Poor ecological potential. Physical modification, as a result of land drainage and flood protection, and diffuse and point sources of pollution arising from sewage discharge and poor soil management are given as reasons for the waterbody not achieving good status. The 'Laceby Beck / River Freshney Water Body' catchment occupies the land to the south of the Site, with the monitored watercourse flowing 100 m to the south. Aerial imagery and OS mapping shows the extent of modification, with embankments present along both banks of the watercourse as it flows through the suburbs of Grimsby (between TA 24008 09111 and TA 25275 10366). Drainage channels are common across the catchment with much of the floodplain of the channel given over to agriculture and arable farming (Ref 6-135). Historic mapping shows very little change in the river since the availability of historic mapping in the late 19<sup>th</sup> century meaning that modifications are long-standing and suggesting the watercourse has very little natural character remaining (Ref 6-136).
- 6.8.26 The 'Mawmbridge Drain Water Body' catchment (GB104029067540) underlies the Site with Mawmbridge Drain itself flowing through the Site. The waterbody is classified as heavily modified for its hydromorphological designation and is of Moderate ecological status (2022 Cycle 3 classification) (Ref 6-132). In addition, when last monitored for Chemical Status, this water body was failing to meet Good Status due to the Priority Hazardous Substances mercury and its compounds and polybrominated diphenyl ethers (PBDE). Physical modification is listed as a reason for the waterbody not achieving good potential, though no further details are given on this Mawmbridge Drain and its surrounding catchment have been extensively modified in the past; OS mapping, for example, shows that the channel is straightened and appears to run along designated field margins. Historic mapping shows very little

change in the river since the early 1900s, suggesting that much of the modification occurred prior to this date (Ref 6-136).

- 6.8.27 The 'North Beck Drain Water Body' (GB104029067575) catchment underlies the Site with North Beck Drain flowing directly across the Site (Ref 6-132). The waterbody is classified as heavily modified for its hydromorphological designation and is of Moderate ecological status (2022 Cycle 3 classification). In addition, when last monitored for Chemical Status, this water body was failing to meet Good Status due to the Priority Hazardous Substances mercury and its compounds and polybrominated diphenyl ethers (PBDE). One of the reasons for the water body not achieving good potential is listed as physical modification, though no further details are given on this (Ref 6-132). OS mapping also indicates this, particularly in the downstream section, with the channel embanked for around 2.3 km between TA 19259 12845 and TA 20897 14640. It is then culverted underneath a railway and is then embanked again from TA 20970 14671 until it flows out into the Humber Estuary at TA 21555 15284 (Ref 6-135). In addition to the railway, North Beck Drain also passes under multiple highways such as Laporte Road (TA 21318 14963), the A1173 (TA 20039 13593), and the A180 (TA 19238 12790). These structures have essentially pinned the watercourse in place since their construction, which pre-dates the earliest available historic mapping from 1900 (Ref 6-136).
- 6.8.28 The Skitter Beck / East Halton Beck (GB104029067655) occupies the most northwesterly part of the Site with Skitter Beck present within the north of the Site (Ref 6-132). The waterbody is classified as heavily modified for its hydromorphological designation and has Bad ecological status. One of the reasons for the water body not achieving Good Potential is physical modification as a result of land drainage and flood protection. Another issue relates to point and diffuse sources of pollution from sewage and poor livestock management. Historic mapping shows the channel to be artificially straightened and modified prior to the availability of historic mapping in the late 19<sup>th</sup> century (Ref 6-136).
- 6.8.29 In addition to the monitored WFD watercourses, the Site is covered by a network of smaller watercourses (Ref 6-132). The most relevant of these are Oldfleet Drain, Middle Drain, and Sweedale Croft Drain. Middle Drain and Sweedale Croft Drain are Ordinary Watercourses, part of the 'Mawmbridge Drain [WFD] Water Body'. OS Mapping suggests both watercourses have been heavily modified with embankments along both banks and have been straightened alongside field boundaries. Middle Drain is an Ordinary Watercourse and part of the North Beck Drain Water Body. It has also been heavily modified, with evidence of channel straightening and embankment construction.
- 6.8.30 All the watercourses within the Site discharge into the Humber Lower Transitional Water Body, which has a hydromorphological designation of Heavily Modified.
- Geology and Hydrogeology*
- 6.8.31 The following sections provide a summary of existing ground conditions within the DCO Site boundary.



### *Current Baseline*

6.8.32 The geology underlying the study area has been taken from the British Geological Survey (BGS) and summarised as follows from the BGS Geindex site:

- The superficial deposits within the study area comprise of Beach and Tidal Flat deposits; tidal flat deposits; associated with Humber Estuary; Diamicton Till; Alluvium, Head, and Glaciofluvial Deposits.
- The bedrock underlying the study area is comprised of: Flamborough Chalk Formation, Burnham Chalk Formation and Welton Chalk Formation.

### *Superficial Deposits*

6.8.33 Superficial deposits overlie the whole of the study area. They consist of Beach and Tidal Flat Deposits, Tidal Flat Deposits, Diamicton Till, and Head classified as Secondary (Undifferentiated) aquifer classification (Ref 6-135) defined by the Environment Agency as *“aquifers where it is not possible to apply either a Secondary A or B definition because of the variable characteristics of the rock type”*. Alluvium related to the North Beck Drain and Glaciofluvial Deposits are also present and designated as Secondary A aquifers defined by the EA as *“aquifers comprise permeable layers that can support local water supplies and may form an important source of base flow to rivers”*. The Tidal Flat Deposits, Glacial Till and interbedded Glaciofluvial Deposits form the main superficial geology beneath the study area. BGS borehole records indicate the combined thickness of the superficial geology varies beneath the study area and could be up to 33 m thick in some places beneath the Site.

### *Bedrock Deposits*

6.8.34 The bedrock beneath the study area consists of the Flamborough Chalk Formation, Burnham Chalk Formation and the Welton Chalk Formation. The Chalk formations are designated as Principal Aquifers defined by the EA as *“aquifers providing significant quantities of drinking water, and water for business needs. They may also support rivers, lakes and wetlands”*. The Chalk is underlain at depth by the Lower Greensand Group which is classified as a Secondary A aquifer.

6.8.35 The Flamborough Chalk, underlying the east of the study area consists of white, well-bedded, flint-free chalk with common marl seams. The Burnham Chalk Formation underlying the west of the study area consist of white, thinly bedded chalk with common tabular and discontinuous flint bands, sporadic marl seams. The Welton Chalk Formation outcrops for a small portion of the study area within the vicinity of Alder Wood. Welton Chalk Formation is described as white massive or thickly bedded chalk with common flint nodules. The full thickness of the Chalk beneath the study area is unknown but has been proven up to a thickness of at least 40 m in the area and has been encountered at depths of up to approximately 20 m below ground level (bgl), based on publicly available borehole logs. The Chalk is overlain by the superficial deposits beneath the study area.

### *Groundwater*

6.8.36 Based on the BGS borehole logs, it is noted that groundwater was encountered within the Made Ground and Tidal Flat Deposits. There is potential for groundwater to be encountered within permeable layers of the glacial deposits.

6.8.37 The Chalk is classified as a Principal Aquifer by the Environment Agency, so groundwater is expected. BGS borehole records, hydrogeological maps of the area and

several springs in the area indicate confining groundwater may be present in the Chalk with the potential for artesian flow. Groundwater is classified under the WFD. The study area lies within the North Lincolnshire Chalk Unit WFD groundwater body (ID GB40401G401500) (Ref 6-132). This groundwater body has a Poor overall status (which is also the target status) under the 2019 Cycle 3 WFD, with a Poor quantitative status and a Poor chemical status due to groundwater abstraction and poor nutrient management respectively.

- 6.8.38 The Humber Estuary is a designated SSSI that is also a designated Groundwater Dependent Terrestrial Ecosystem (GWDTE) (Ref 6-151).

#### Water Resources

- 6.8.39 There are no published data for surface water and groundwater abstractions in the area.
- 6.8.40 There are numerous SPZs within the study area indicating groundwater abstractions from the Chalk aquifer. These consist of six areas of SPZ 1, six areas of SPZ 2 and a large area of SPZ 3. SPZ 1 'Inner Zone' is classified as a "zone of 50 day travel time of pollutant to source with a 50 m minimum radius". SPZ 2 'Outer Zone' is classified as a "zone of 400-day travel time of a pollutant to source which has a 250-500 m minimum radius". SPZ 3 'Total Catchment' is classified as an area around a "supply source that all groundwater ends up at the abstraction point" (Ref 6-143).
- 6.8.41 There are no designated bathing or shellfish waters in the Humber Estuary within or near the study area (Ref 6-152).
- 6.8.42 The study area is within a Nitrate Vulnerable Zone (NVZ) and so is designated as being at risk from agricultural nitrate pollution. The area is located within NVZ S359 (North Beck Drain NVZ) for surface water and within NVZ G80 (Lincolnshire Chalk) for groundwater.
- 6.8.43 The area is not located within a Drinking Water Protected Area (DrWPA) for surface water. The whole of England is generally considered to be within a groundwater DrWPA.
- 6.8.44 There are four Drinking Water Safeguard Zones for groundwater within the study area: Healing (GWSGZ0283), Little London (GWSGZ0284), Habrough (GWSGZ0281) and Thornton Curtis (GWSGZ0286). These are established to reduce and prevent pollution of water abstracted for drinking water supplies.

#### Water Dependent Designated Ecological Sites and Protected Species

- 6.8.45 There are a number of statutory designated sites for nature conservations within the study area (see Table 6.47).

**Table 6.47 Sites of Ecological Importance (Ref 6-135)**

Feature Name	Description and Location
Statutory designated sites for nature conservation – within circa 1 km	Humber Estuary (Ramsar Site, marine SAC, a marine SPA, Natura Site and a SSSI.) North Beck Drain is classed as a chalk river with high certainty.

Feature Name	Description and Location
Protected habitats and species within 1 km	<p>There are intertidal mudflats and sandflats classed as priority habitats on the Humber Estuary shoreline which are currently in unfavourable recovering conservation status. There are marine protected subtidal sand and mudbanks that are slightly covered in seawater all of the time indicating very shallow protected areas all across the Humber. There is also an intertidal substrate foreshore classification of mud (foreshore) and gravel (backshore).</p> <p>There is a small area of priority habitat classified as coastal saltmarsh next to Oldfleet Drain as it meets the tidal barrier just outside the southeast corner of the Main Site, within the study area.</p> <p>Deciduous woodland (ID PHID52358339_041282792), approximately 100 metres to the southeast of the Site.</p> <p>Deciduous woodland (PHID52248389_041233595), approximately 500 metres to the southwest of the Site.</p> <p>The Site is located within a National Habitat Network, Network Expansion Zone and Network Enhancement Zone 1.</p> <p>The Humber has the following Annex I habitats related to its SAC status:  1110 Sandbanks which are slightly covered by sea water all the time.  1150 Coastal lagoons.  1310 Salicornia and other annuals colonizing mud and sand.  1330 Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>).  2110 Embryonic shifting dunes.  2120 Shifting dunes along the shoreline with <i>Ammophila arenaria</i> ("white dunes").  2130 Fixed coastal dunes with herbaceous vegetation ("grey dunes").  2160 Dunes with <i>Hippopha rhamnoides</i>.  The following Annex II species are also present in the Humber:  1095 Sea lamprey <i>Petromyzon marinus</i>.  1099 River lamprey <i>Lampetra fluviatilis</i>.  1364 Grey seal <i>Halichoerus grypus</i>.  Priority species for Country Stewardship targeting include the redshank whose habitat includes marine and intertidal habitats.  The shore of the Humber next to the Site is designated as an Important Bird Area. It is also designated as a SPA seabird foraging area.  There have been sightings of marine mammals listed as UK Priority Species in the Humber including the Atlantic white-sided dolphin, the bottle-nosed dolphin and the harbour porpoise.</p>

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*Flood Risk*

*Tidal and Fluvial Sources*

- 6.8.46 The Main Site is located entirely in Flood Zone 3a (as shown in Table 6.48), associated with tidal flooding from the Humber Estuary, although benefits from tidal flood defences.
- 6.8.47 The proposed gas pipeline route corridors and the proposed grid connection route corridor are partially located within the tidal Flood Zone 3a (predominantly to the east towards the coast). The remaining sections of the proposed gas pipeline route corridors, to the east of Stallingborough, and the proposed grid connection route corridor south of the railway and to the east of Healing are located predominantly in Flood Zone 1 (as shown in Table 6.48).

- 6.8.48 The proposed access route from the Port of Immingham to the Main Site, along the existing Laporte Road and Hobson Way (see Figure 2C in Appendix A), is located predominantly within the tidal Flood Zone 3a with existing crossings over Habrough Marsh Drain (Ordinary Watercourse), Middle Drain (Ordinary Watercourse) and North Beck Drain (Main River) located within localised areas of the fluvial Flood Zone 3a associated with these watercourses.
- 6.8.49 The proposed gas and grid connection route corridors cross numerous watercourses and water features. The EA's Flood Map for Planning indicates fluvial floodplains located along the banks of the rivers and watercourses crossed by the indicative connection corridor routes.
- 6.8.50 Definitions of the EA Flood Zones, as defined in Table 1 of the PPG, are presented in Table 6.48.

**Table 6.48 EA Flood Zone Definitions (Ref 6-134)**

<b>Flood Zone</b>	<b>Definition</b>	<b>Risk of Flooding</b>
Flood Zone 1	Land that has a low probability of flooding (less than 1 in 1,000 annual probability of river or sea flooding (<0.1%)).	Low
Flood Zone 2	Land that has a medium probability of flooding (between 1 in 100 and 1 in 1,000 annual probability of river flooding (0.1-1%), or between 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.1-0.5%)).	Medium
Flood Zone 3a	Land that has a high probability of flooding (1 in 100 year or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%)).	High
Flood Zone 3b (Functional Floodplain)	This zone comprises land where water from rivers or the sea has to flow or be stored in times of flood. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. Functional floodplain will normally comprise: land having a 3.3% or greater annual probability of flooding, with any existing flood risk management infrastructure operating effectively; or land that is designed to flood (such as a flood attenuation scheme), even if it would only flood in more extreme events (such as 0.1% annual probability of flooding). Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the EA. (Not separately distinguished from Zone 3a on the Flood Map).	Very High

- 6.8.51 The Main Site, potential proposed off-site laydown area at the Applicant's former CHP site, proposed gas pipeline route corridors and the proposed grid connection route corridor benefit from the presence of tidal flood defences along the south bank of the Humber Estuary. Flood defences are also present along the Oldfleet Drain located along the southern boundary of the Main Site. Further information on the location,

condition and standard of protection provided by these flood defences will be requested from the EA to inform the assessment.

6.8.52 Northeast Lindsey Internal Drainage Board (IDB) is operational within the study area and, with the exception of Environment Agency Main Rivers, has flood risk management responsibilities over the Ordinary Watercourses within the study area. Any works required in or adjacent to these watercourses should be undertaken in compliance with the IDB byelaws.

6.8.53 The study area is located within three EA Flood Map for Planning (Rivers and Sea) areas, Northeast Lincolnshire Lead Local Flood Authority (LLFA), North Lincolnshire LLFA and West Lindsey LLFA. As such, all three LLFAs Strategic Flood Risk Assessments (SFRAs) have been used, together with Environment Agency mapping, to outline the baseline flood risk from surface water, groundwater, sewers and artificial sources (see Figures 2C and Figure 6C in Appendix A).

#### *Surface Water Flooding*

6.8.54 The Environment Agency Risk of Flooding from Surface Water (RFSW) map indicates that the study area is generally at very low to low risk of flooding from surface water sources as a result of flood defences. Isolated areas of surface water flooding are likely attributed to areas of topographic low spots where surface water tends to pool rather than soaking away. Areas of more extensive surface water flooding have been identified at the following locations:

- Land north of Healing, located between the railway line and the A180 predominantly at low risk of surface water flooding with depths between 0-900 mm during a 1 in 1000 probability flood event. Flooding in this area is more likely associated with fluvial flooding from Oldfleet Drain and/or Mawmbridge Drain.
- Land north of Stallingborough and northeast of Little London at low, medium and high risk of surface water flooding with maximum flood depths in places in excess of 900 mm during a 1 in 1000 probability flood event. Flooding in this area is more likely associated with fluvial flooding from Middle Drain and/or North Beck Drain.
- Land at Immingham Grange to the south of the A180 at low, medium and high risk of surface water flooding with depths in excess of 900 mm during a 1 in 1000 probability flood event. Flooding in this area is more likely associated with fluvial flooding from ordinary watercourses in the area.
- Land to the southwest of Habrough, to the south of Newsham Lane, at low, medium and high risk of surface water flooding with depths between 300 – 900 mm during a 1 in 1000 probability flood event. Flooding in this area is more likely associated with fluvial flooding from tributaries of New Beck Drain.
- Land to the south of the A1173 Manby Road between Immingham and Houlton's Culvert, is at low to medium risk of surface water flooding with depths between 300-900 mm during a 1 in 1000 probability flood event. Flooding in this area is more likely associated with fluvial flooding the upper reach of Habrough Marsh Drain and small associated tributaries/land drainage.

### Groundwater Flooding

- 6.8.55 The Northeast and North Lincolnshire SFRA states “Groundwater flooding is most likely to occur in low-lying areas underlain by permeable rocks, or aquifers”, however, there are no historical flood records for groundwater flooding within the study area.
- 6.8.56 As discussed in the Geology and Hydrogeology section 6.8.32, based on the BGS borehole logs, there is potential for groundwater to be encountered within permeable layers of the Made Ground, tidal flat deposits and glacial till. In addition, BGS borehole records, hydrogeological map of the area and the presence of several springs in the area indicate confining groundwater may be present in the Chalk with the potential for artesian flow.

### Sewer Flooding

- 6.8.57 Mapping in the Northeast and North Lincolnshire SFRA indicates that flooding from sewer infrastructure occurs predominantly in the urban areas within the study area. Historical records show incidences of sewer flooding in Habrough, Stallingborough, Healing and within the industrial developments to the north of Kiln Lane in Immingham. Sewer records from Anglian Water are not available at the time of writing; therefore potential sewer flooding to and from the Proposed Development has not been assessed at this stage.

### Flooding from Artificial Sources

- 6.8.58 The Environment Agency’s Risk of Flooding from Reservoirs map shows the study area is not located in an area within a reservoir modelled breach outline. In addition, there are no canals located in proximity to the study area. Flood defences are located in proximity to the Main Site boundary, along Oldfleet Drain, and along the southern bank of the Humber Estuary. The Main Site proposed off-site laydown area and parts of the proposed gas pipeline route corridors and the proposed grid connection route corridor would be at risk of flooding should a breach in the tidal flood defences occur. This will be considered as part of the tidal flood risk assessment and thus no further consideration of flooding from artificial sources is proposed in the impact assessment.
- 6.8.59 There is a small pond in the neighbouring land to the southwest of the Main Site which may be a flood attenuation pond. This will be investigated further during a future site walkover survey. There is a second area of standing water on previously developed land to the east of Oldfleet Drain that cascades informally into the drain when water levels are high.

### Importance of Receptors

- 6.8.60 Table 6.49 provides a summary of the preliminary importance grades for each water feature or resource. Importance grades have been assigned using the criteria set out in Table 6.49. This will be reviewed in the PEIR as more information becomes available.

**Table 6.49 Preliminary Water Body Importance**

Receptor Name	Receptor Type	Importance (provisional)	Justification
The Humber Estuary	Water quality	Very High	The Humber Estuary has several designations (Ramsar, SAC, SPA, SSSI).
	Morphology	High	The Humber Estuary has several designations (Ramsar, SAC, SPA, SSSI).

<b>Receptor Name</b>	<b>Receptor Type</b>	<b>Importance (provisional)</b>	<b>Justification</b>
	Flood Risk	Very High	Flood defences along the Humber Estuary protect a significant area of the South Humber Bank from tidal flooding. Should a breach/overtopping of these defences occur the Flood Zone 2 and Flood Zone 3 extent includes a range of development types, including port development (water compatible), industrial/commercial (less vulnerable), residential (more vulnerable) and energy related development, including power stations etc, (essential infrastructure). Construction workers will be considered a very high importance receptor for construction phase impacts.
Oldfleet Drain	Water quality	High	Oldfleet Drain lies within the Mawmbridge Drain WFD Water Body catchment. There are no flow gauges in the watercourse. The nearest flow gauge is on Waithe Beck at Brigsley, a larger watercourse, which has a Q95 (flow exceeded 95% of the time) of 0.062 m <sup>3</sup> /s (i.e. <1.0 m <sup>3</sup> /s). It can be inferred that Oldfleet Drain also has flow <1.0 m <sup>3</sup> /s and so is a relatively minor watercourse, the quality of which is affected by local industry, road runoff, and agricultural runoff. It is a chalk river.
	Morphology	Medium	Old Fleet Drain is likely to be heavily modified, has substantial embankments along both banks, and has already been altered by culverting under motorway crossings. This will be corroborated after a site walkover.
	Flood risk	Very High	Majority of Flood Zone 2/3 is undeveloped and consists of open space (water compatible) and agricultural land (less vulnerable). However, upstream of the A180 there is an area of FZ2 extending into a residential property known as Meadows Farm (more vulnerable). Small areas of Flood Zone 3 extend into the residential areas of Healing (more vulnerable). The Main Site will also become the location of a power station which would be classed as essential infrastructure. Construction workers will be considered a very high importance receptor for construction phase impacts.
North Beck Drain	Water quality	High	North Beck Drain is a WFD waterbody, classified as being of Moderate ecological status, and Good ecological potential. There are no flow gauges in the watercourse. The nearest flow gauge is on Waithe Beck at Brigsley, a larger watercourse, which has a Q95 of 0.062 m <sup>3</sup> /s (i.e. <1.0 m <sup>3</sup> /s). It can be inferred that North Beck Drain also has flow <1.0 m <sup>3</sup> /s and so is a relatively minor

<b>Receptor Name</b>	<b>Receptor Type</b>	<b>Importance (provisional)</b>	<b>Justification</b>
			watercourse, the quality of which is affected by local industry, road runoff, and agricultural runoff. It is a Chalk river.
	Morphology	Medium	North Beck Drain is designated as heavily modified and has been altered by culverting under motorway and railway crossings in the area. This will be corroborated after a site walkover.
	Flood risk	Medium	Majority of Flood Zone 2/3 is undeveloped and consists of open space (water compatible) and agricultural land (less vulnerable). Construction workers will be considered a very high importance receptor for construction phase impacts.
Mawmbridge Drain	Water quality	High	Mawmbridge Drain is a WFD Waterbody catchment, classified as being of Moderate ecological status, and Good ecological potential. There are no flow gauges in the watercourse. The nearest flow gauge is on Waithe Beck at Brigsley, a larger watercourse, which has a Q95 of 0.062 m <sup>3</sup> /s (i.e. <1.0 m <sup>3</sup> /s). It can be inferred that Mawmbridge Drain also has flow <1.0 m <sup>3</sup> /s and so is a relatively minor watercourse, the quality of which is affected by local industry, road runoff, and agricultural runoff. It is a Chalk river.
	Morphology	Medium	Mawmbridge Drain is likely to be heavily modified, has substantial embankments along both banks, and has already been altered by culverting under road crossings. This will be corroborated after a site walkover.
	Flood Risk	Medium	Majority of Flood Zone 2/3 is undeveloped and consists of open space (water compatible) and agricultural land (less vulnerable). Construction workers will be considered a very high importance receptor for construction phase impacts.
Middle Drain	Water quality	Medium	Middle Drain is not itself a WFD waterbody but falls within the North Beck Drain WFD Water Body catchment. There are no flow gauges in the watercourse. By comparison with the other watercourses in the study area, we can infer that Middle Drain has flow <1.0 m <sup>3</sup> /s and so is a relatively minor watercourse, the quality of which is also affected by local industry, road runoff, and agricultural runoff. It is a Chalk river.
	Morphology	Medium	Middle Drain is likely to be heavily modified, has substantial embankments along both banks, and has already been altered by culverting under road crossings. This will be corroborated after a site walkover.



<b>Receptor Name</b>	<b>Receptor Type</b>	<b>Importance (provisional)</b>	<b>Justification</b>
	Flood risk	High	Majority of Flood Zone 2/3 is undeveloped and consists of open space (water compatible) and agricultural land (less vulnerable). However, in the upper catchment, small areas of Flood Zone 2 and Flood Zone 3 extend into the residential area of Stallingborough (more vulnerable). Construction workers will be considered a very high importance receptor for construction phase impacts.
Unnamed ordinary watercourses and IDB Drains	Water Quality	Medium	There are several unnamed drains in the study area without a WFD classification shown in a River Basin Management Plan (RBMP) with unknown flow rates, however it has currently been assumed that the rates are generally Q95 >0.001 m <sup>3</sup> /s to be conservative.
	Morphology	Medium	All unnamed ordinary watercourses are likely to be modified drainage channels due to the amount of land used for agriculture, though this will be corroborated after a site walkover.
	Flood Risk	Medium	Majority of Flood Zone 2/3 is undeveloped and consists of open space (water compatible) and agricultural land (less vulnerable). Construction workers will be considered a very high importance receptor for construction phase impacts.
Local ponds	Water quality	Low	There is a small pond next to the Site which is not hydrologically connected to any other waterbodies.
North Lincolnshire Chalk Unit WFD groundwater body	Groundwater	Very High	The bedrock aquifer is designated as a Principal Aquifer with use as local water supplies, and also as potential feeds to watercourses. The current Poor WFD quantitative status should not detract from the resource's importance.
Superficial aquifers	Groundwater	Medium	Superficial aquifers designated as Secondary Aquifers are potentially of local importance.
SPZ 1	Groundwater	Very High	SPZ are associated with public water supplies. There are three SPZ1 within the study area.
SPZ2	Groundwater	High	SPZ2 associated with several SPZ1 within the area.
SPZ3	Groundwater	Medium	SPZ3 associated with several SPZ1 within the area.
Groundwater flood risk	Flood Risk (Construction only)	Very High	This impact is associated with construction works only. Construction workers will be considered a very high importance receptor for construction phase impacts.
Sewer flood risk	Flood Risk	Not yet determined	Sewer records are not yet available and so it is not possible to provide a provisional importance grade for any land that may be at risk from sewer flooding.

*Further Work to Establish Baseline Conditions*

6.8.61 An initial desk study has been undertaken to inform this scoping assessment. Additional sources and consultations are proposed, and any new data or information will be used in the final baseline and appraisal of receptor importance. At this stage the following is proposed:

- Many of the watercourses within the study area are ungauged. Flow data is an important component of the criteria to determine the importance of a watercourse, with larger flows being associated with more important receptors. In the absence of data, the flow range will be estimated. However, in specific circumstances further desk based hydrological assessment may be undertaken to estimate the Q95 flow.
- Water quality data is not used for the determination of receptor importance but may be required to support more quantitative assessment of any process effluent discharges. Further desk study of available background water quality data will be undertaken. Where there are gaps in the data and no suitable proxy data sources, some targeted water quality monitoring may be required. Any such primary data collection would be discussed with the relevant statutory consultee. At this stage, no water quality monitoring is proposed, but this will be kept under review.
- The Proposed Development will require the construction and operation of a new water abstraction intake and outfall (potentially for both cooling & process water) in the Humber Estuary. Although the construction of the pipeline is expected to be undertaken using non-intrusive techniques (such as Horizontal Directional Drilling (HDD)) there will be the need to break out to the surface, which may temporarily disturb some sediment in the sub-tidal zone and there is the potential for release of drilling fluid. The potential placement of any rock armour around the outfall may also temporarily cause some disturbance when placed, and changes in flows around the rock armour have the potential to lead to some localised scour. Similarly, operation of the intake and outfall (and any future maintenance works) may have similar effects until an equilibrium is reached. To assess the risk from these activities, data on sediment quality in the vicinity of the proposed structures may be required. Requests for data will be made to various third parties at the PEIR stage. There remains the possibility that there is a need for either surface grab samples to be collected, or potentially retrieval of cores for systematic sampling at depth. This will depend on the risk of sediment disturbance which is currently unknown. At present, no primary sediment sampling is proposed but this will be kept under review. If sampling is required in the future, the scope would be discussed with the relevant statutory consultees.
- Intrusive Ground Investigation (GI) works are planned to take place in 2024. Site-specific GI data relating to geological descriptions, strata depths, groundwater levels, groundwater quality or aquifer properties will be therefore be provided, once available.
- Data on licensed water abstractions and Public Water Supplies (PWS) will be requested from the Environment Agency and local planning authorities at the PEIR stage. Depending on the results, there may be the need for further data collection (e.g. discussions with those who benefit from a PWS).
- A site walkover survey is proposed that encompass all watercourses and water features that may be impacted by the Proposed Development, where access is

possible. This will include consideration of hydrological connectivity with a possible attenuation pond near to the Main Site. Reasonable efforts will be made to observe the physical form and character/quality of all water features likely to be impacted; subject to relevant constraints e.g. access, vegetation and past development obscuring features, health and safety reasons etc. It may not be possible to identify small water features that are ephemeral or flow only intermittently following heavy rainfall.

- As part of the flood risk assessment (FRA) that will be prepared to accompany the DCO Application, a Product 4/Product 8 request for flood risk information will be sent to the Environment Agency.
- As there are no hydraulic modelling outputs for Ordinary Watercourses and local drainage ditches, the flood risk baseline will rely on mapping in the SFRAs and EA Risk of Surface Water Flooding (RSWF) maps which can be used as a proxy for fluvial flooding extents for small catchments.
- Consultation with the IDB will be undertaken with regards to flood risk information for the watercourses under their jurisdiction and to establish the requirements for surface water management should a surface water discharge from the Proposed Development to an IDB watercourse be required.

### **Legislation, Policy and Guidance**

6.8.62 National Policy Statements (NPS) comprise the Government's objectives for the development of nationally significant infrastructure in a particular sector and state, including how it must contribute to sustainable development and address any adverse impacts of development. The principal NPS with relevance to the Proposed Development is EN-1 Overarching Energy (2023). In particular, in accordance with NPS EN-1 (2023), applications for energy projects in Flood Zones 2 and 3 in England are to be accompanied by an FRA. Proposals for energy projects in Flood Zone 1 in England of 1 ha or greater or where sites are subject to other drainage issues must also be accompanied by an FRA.

6.8.63 The applicable national, regional, and local planning legislation and guidance includes:

- Environment Act 2021.
- Water Act 2014 (Ref 6-154).
- Floods and Water Management Act 2010 (Ref 6-155).
- MCAA 2009 (Ref 6-156).
- Water Resources Act 1991 (as amended) (Ref 6-157).
- Land Drainage Act 1991 (as amended) (Ref 6-158).
- Environmental Protection Act, 1990 (Ref 6-159).
- Water Environment (WFD) Regulations 2017.
- Environmental Permitting (England and Wales) Regulations (EPR) 2016.
- Environmental Damage (Prevention and Remediation) (England) Regulations 2015 (Ref 6-160).
- Groundwater (England and Wales) Regulations 2009 (Ref 6-161).
- Flood Risk Regulations 2009 (Ref 6-162).

- Contaminated Land (England) Regulations 2006 (Ref 6-163).
- Control of Pollution (Oil Storage) (England) Regulations 2001.
- The NPPF.
- The PPG.
- Non-Statutory Technical Standards for Sustainable Drainage Systems (Ref 6-164).
- NLC Local Plan and local planning policies.
- North East Lincolnshire Local Plan and local planning policies.
- WLDC Plan and local planning policies.
- The DMRB, LA113 Road Drainage and the Water Environment.
- Flood risk assessments: climate change allowances (Environment Agency)Ref 6-165.

### **Impact Assessment Methodology and Criteria**

#### *Proposed Consultation*

6.8.64 Consultation would be undertaken with the following organisations as part of the water environment assessment process:

- The Environment Agency (South Humber and East Coast, Partnerships and Strategic Overview Team).
- The Humber Nature Partnership.
- NELC.
- North East Lindsey IDB.
- WLDC.
- NLC.
- Anglian Water.
- The Coal Authority.
- Natural England.
- LCC.
- MMO and their technical advisors CEFAS.
- ABP Humber (port and Harbour Authority).

#### *Assessments to be carried out during the EIA*

##### **General Assessments**

6.8.65 A qualitative surface and groundwater impact assessment will be undertaken to assess impacts from the construction and operation of the Proposed Development and where necessary, propose mitigation measures to minimise the risk of significant adverse effects on water features, and compliance with the Water Environment (WFD) (England and Wales) Regulations 2017 and planning policy. This will be based on a source-pathway-receptor approach. It will consider construction and operation phases, including abstraction of water from the Humber Estuary, potential discharges of surface water, access routes (and any works to existing watercourse crossings), cooling and process water (noting that it is currently proposed that any amine-contaminated water is to be intercepted via the on-site drainage system and taken off-site for disposal at a suitable waste facility). Consideration of foul water will also be included, although the current assumption is that this will be discharged to the nearest public sewer. The need for quantitative assessment (e.g. H1 Risk Assessment

or more detailed modelling) is to be determined at a later stage when further details are available on the Proposed Development. The scope of any modelling will be discussed with the Environment Agency as well as potential discharges of surface water, cooling and process water.

- 6.8.66 A sediment risk assessment may be required depending on the risk that fine sediment and any residual contamination may be released during works to construct and operate the proposed water abstraction intake and cooling water outfall within the Humber Estuary. The scope of assessment is uncertain at this stage pending further desk study of what background data is available and the nature of the proposed works. A sediment quality desk-based screening has been proposed as part of the aquatic ecology scope of works; this will focus on reviewing available sampling data and screening against action levels to determine whether further sampling or assessment is needed. Assessments may need to cover both quality impacts and physical impacts (e.g. scour). The scope of the assessment will be defined at a later stage, in consultation with relevant statutory consultees.
- 6.8.67 A qualitative assessment of the risk to the physical form of watercourses from the construction of the proposed gas pipeline and grid connection crossings will be undertaken. A Watercourse Crossing Register will be created with a unique crossing reference for each watercourse that may be affected (noting that the precise locations are unlikely to be known when the DCO is submitted but will be within the Order Limits). A design optioneering exercise will be undertaken to determine a preferred option for each crossing. It is anticipated that intrusive crossings will be limited to the smaller and less important watercourses, with non-intrusive options proposed for larger, more important watercourses. The Environment Agency and the LPAs and IDB (as LLFAs) will be consulted on the Watercourse Crossing Register.

#### Water Framework Directive Assessment

- 6.8.68 A WFD assessment will be carried out with the aim of avoiding deterioration or prevention of improvement to any WFD waterbody, taking into account the conservation objectives of any relevant Protected Areas. The assessment will consider both freshwater, groundwater and transitional waterbodies. It will be undertaken in accordance with PINS Advice Note Eighteen: The Water Framework Directive and the Clearing the Waters for All guidance (Ref 6-166). At this stage, it is proposed that a WFD screening and scoping assessment will be undertaken, which will be consulted on before any further detailed WFD impact assessment is undertaken, if required. The WFD assessment will be informed by and supported by quantitative water quality assessments, sediment studies and aquatic/marine ecology surveys.

#### Flood Risk Assessment

- 6.8.69 A site-specific FRA will be undertaken to support the proposals. The FRA will assess the risk of flooding pre- and post-development from all sources (fluvial, tidal, pluvial, groundwater, sewer and artificial sources) for the operational lifetime of the Proposed Development, giving due regard to sea level, peak flow and peak rainfall climate change allowances.
- 6.8.70 Mitigation measures will be outlined where necessary so that the Proposed Development does not increase flood risk to the area or its vicinity and that the

location of the site satisfies the Sequential and Exception Tests as set out in the PPG Section 14 Flood Risk and Coastal Change. A fundamental part of the FRA for the Proposed Development will be the assessment of coastal and fluvial flood risk, due to the proximity of the Humber Estuary and various drains/watercourses to the Site. To provide a robust assessment of this risk, the FRA will be informed by fluvial and tidal hydraulic modelling data including the Flood Hazard, Depth and Velocity Maps, which will be requested from the Environment Agency. This information will be used to assess the potential flood risk impact from options under consideration and establish the mitigation measures that may be needed for the Proposed Development to comply with EN-1 i.e. Proposed Development is safe for its lifetime without increasing flood risk elsewhere and designed and constructed to remain operational in times of flood. Close liaison with the project team and key stakeholders will be undertaken to agree the approach to mitigation so that it is considered acceptable.

- 6.8.71 The design of drainage systems aims to prevent increases in flood risk downstream, during storms up to and including the 1 in 100 (1%) annual probability design flood, over the lifetime of the Proposed Development.

#### Determination of Effect Significance

- 6.8.72 The assessment will be prepared in accordance with guidance presented within DMRB, LA113 Road Drainage and the Water Environment.
- 6.8.73 The DMRB guidance provides a methodology for identifying the potential impacts of construction and operation on the water environment and whether these impacts would result in a likely significant effect (adverse or beneficial). Although initially developed for highway projects the assessment criteria are generic and can be applied to any type of development. These criteria are used nationally and are considered a robust approach to the determination of effect significance.
- 6.8.74 In line with the DMRB guidance, the receptors will be defined as very high, high, medium or negligible, in accordance with the criteria shown in Table 6.50. The magnitude of impacts identified will be assessed using the criteria in Table 6.51. The likely significance of effects is based on the matrices provided in Table 6.52. Overall, likely effects that are moderate or major are considered significant for the purposes of the EIA.

**Table 6.50 Criteria to Estimate the Importance of Water Environment Receptors**

Importance <sup>1</sup>	Type of Receptor			
	Groundwater	Surface Water	Morphology <sup>2</sup>	Flood Risk <sup>3</sup>
<b>Very High</b>	Principal aquifer providing a regionally important resource and/or supporting a site protected under international and UK legislation Ecology and Nature Conservation Groundwater locally supports GWDTE SPZ 1	Watercourse having a WFD classification shown in a RBMP and Q95 > 1.0 m <sup>3</sup> /s. Site protected/designated under international and UK legislation Ecology and Nature Conservation.	Unmodified, near to or pristine conditions, with well-developed and diverse geomorphic forms and processes characteristic of river type.	Essential infrastructure or highly vulnerable development.
<b>High</b>	Principal aquifer providing locally important resource or supporting river ecosystem. Groundwater supports a GWDTE SPZ2	Watercourse having a WFD classification show in a RBMP and Q95 m3/s <1.0 m <sup>3</sup> /s. Species protected under international or UK legislation Ecology and Nature Conservation.	Conforms closely to natural, unaltered state and would often exhibit well-developed and diverse geomorphic forms and processes characteristic of river type, with abundant bank side vegetation. Deviates from natural conditions due to direct and/or indirect channel, floodplain, and/or catchment development pressures.	More vulnerable development.
<b>Medium</b>	Secondary aquifer providing water for agricultural or industrial use with limited connection to surface water. SPZ3	WFD not having a WFD classification shown in a RBMP and Q95 >0.001 m <sup>3</sup> /s.	Shows signs of previous alteration and / or minor flow regulation but still retains some natural features or may be recovering towards conditions indicative of the higher category.	Less vulnerable development.
<b>Low</b>	Unproductive strata	Watercourses not having a WFD classification shown in a RBMP and Q95 <0.001 m <sup>3</sup> /s.	Substantially modified by past land use, previous engineering works or flow regulation and likely to possess an artificial cross-section (for example trapezoidal) and would probably be deficient in bedforms and bankside vegetation. Could be realigned or channelised with hard bank protection, or culverted and enclosed. May be significantly impounded or abstracted for water	Water compatible development.

Importance <sup>1</sup>	Type of Receptor			
	Groundwater	Surface Water	Morphology <sup>2</sup>	Flood Risk <sup>3</sup>
			resources use. Could be impacted by navigation, with associated high degree of flow regulation and bank protection, and probable strategic need for maintenance dredging. Artificial and minor drains and ditches would fall into this category.	

*1 Professional judgement is applied when assigning an importance category to all water features. All controlled waters are protected from pollution under the Environmental Permitting (England and Wales) Regulations 2016 and the Water Resources Act 1991 (as amended), and future WFD targets also need to be considered. Based on the water body 'Reach Conservation Status' presently being adopted for HS2 (and developed originally by Atkins) and developed from the Environment Agency conservation status guidance (Ref 14-5 Ref 14-6).*

*2 LA113 provides advice on hydromorphological assessment but does not provide criteria for determining hydromorphological receptor importance (Ref 14-7).*

*3 Vulnerable development, less vulnerable development and water compatible development are defined in the NPPF (Ref 14-8)*



**Table 6.51 Criteria to determine the magnitude of impact**

<b>Magnitude of Impact</b>	<b>Criteria</b>
Major Adverse	Results in a loss of attribute and/or quality and integrity of the attribute.
Moderate Adverse	Results in effect on integrity of attribute, or loss of part of attribute.
Minor Adverse	Results in some measurable change in attribute's quality or vulnerability.
Negligible	Results in effect on attribute, but of insufficient magnitude to affect the use or integrity.
Minor beneficial	Results in some beneficial effect on attribute or a reduced risk of negative impact occurring.
Moderate beneficial	Results in moderate improvement of attribute quality.
Major beneficial	Results in major improvement of attribute quality.
No Change	

**Table 6.52 Criteria to determine the likely significance of effect**

<b>Importance of the Resource/Sensitivity of Receptor</b>	<b>Magnitude of Potential Change/Impact</b>				
	<b>Major</b>	<b>Moderate</b>	<b>Minor</b>	<b>Negligible</b>	<b>No Change</b>
<b>Very High</b>	Very Large	Large or Very Large	Moderate or Large	Slight	Neutral
<b>High</b>	Large or Very Large	Moderate or Large	Slight or Moderate	Slight	Neutral
<b>Medium</b>	Moderate or Large	Moderate	Slight	Neutral or Slight	Neutral
<b>Low</b>	Slight or Moderate	Slight	Neutral or Slight	Neutral or Slight	Neutral

**Potential Impacts**

**Construction**

6.8.75 The potential effects of construction of the Proposed Development on surface water receptors include:

- Potential temporary impacts on water quality due to deposition or spillage of soils, sediments, oils, fuels, or other construction chemicals events (including 'frac-out' (unintentional return of drilling fluids when using HDD) leading to spillage of drilling fluids during shallow trenchless crossing operations), or through mobilisation of contamination following disturbance of contaminated ground or groundwater, or through uncontrolled site run-off:
  - On the Humber Estuary, North Beck Drain and Oldfleet Drain from works at the Main Site.
  - On North Beck Drain, Middle Drain, Mawmbridge Drain and other unnamed watercourses from excavations and installation of the proposed gas pipeline.

- To Oldfleet Drain Mawmbridge Drain, Sweedale Croft Drain and other unnamed watercourses during excavations and installation of the proposed electrical grid connection.
  - Potential temporary impacts on water levels and sediment dynamics if construction site runoff is discharged in an uncontrolled manner or if temporary crossings reduce conveyance:
    - Within North Beck Drain, Middle Drain, Oldfleet Drain and Mawmbridge Drain from the Main Site and/or gas pipeline routes.
    - Oldfleet Drain, Mawmbridge Drain and Sweedale Croft Drain watercourses due to runoff from the electrical grid connection.
  - Potential for physical impacts to Oldfleet Drain depending on Main Site layout and design.
  - Potential disturbances to sediments as well as water quality impacts if existing contamination present in the Humber Estuary due to construction of cooling water intake and outfall.
  - Potential impacts on any water abstractions (if confirmed any are present).
  - Potential morphological impacts to watercourses where they may be crossed using intrusive techniques (noting that a Watercourse Crossing Register and decisions on the preferred crossing methods has not yet been made):
    - For the proposed gas pipeline route corridors this may include: Oldfleet Drain, Middle Drain, North Beck Drain and multiple unnamed watercourses.
    - For the proposed grid connection route corridor this may include: Oldfleet Drain, Mawmbridge Drain, and Sweedale Croft Drain.
  - Potential impact upon receiving watercourses as a result of hydrostatic testing of the new gas pipeline (e.g., if a biocide is used for this), which requires a source of clean water and a discharge point.
- 6.8.76 The potential impacts of construction of the Proposed Development on groundwater receptors could include:
- Contamination of groundwater and soil could result from leakage and spills of fuels, oils, chemicals and concrete during construction affecting watercourses indirectly via site runoff or directly where works are close to and within a water body.
  - Construction and excavations which require dewatering could have a potential effect on groundwater quality and groundwater flow and levels as a result of groundwater abstraction and associated discharges.
  - Related to the above, subsurface structures and excavations could have an effect on groundwater quality and in turn, watercourses if situated nearby and connected to groundwater.
  - The development of artesian conditions, which would necessitate the control of groundwater levels during the construction process.
- 6.8.77 The potential effects of construction of the Proposed Development on flood risk could include:
- Increase in volume and rate of surface water runoff from new impervious areas including compacted ground on the Main Site leading to an impact on flood risk.

- Loss of floodplain volume due to encroachment on the floodplain.
- High groundwater levels will need to be managed for flood risk during foundation / deep excavation.
- Siltation and blockages within the drainage systems causing failure or improper function, which could impact hydrology through flooding.

#### Operation

6.8.78 During operation and maintenance, the following potential impacts on surface water may occur as a result of the Proposed Development:

- Impact on surface water quality in the Humber Estuary as a result of process water discharges.
- Entry of contaminated runoff into Oldfleet Drain as a result of chemical spills (e.g., from the chemical storage area or fire water if needed etc.), and subsequent water quality impacts on the Humber Estuary.
- Hydromorphological impacts including changes to physical form (for example the placement of new structures or any permanent culverting), hydraulic processes and sediment dynamics (for example constriction of flows, flood plain disconnection or scour risk), which together underpin habitats in watercourses and their floodplains.
- Impacts on surface water abstractions (if identified).
- Impact on NVZ designation of the study area if any discharges to freshwater watercourses contain elevated levels of nitrogen.
- Impact on water resources for other users and on protected habitats and species, as well as the sourcing of raw water sourced from the Humber Estuary, will be considered where relevant.

6.8.79 During operation and maintenance, the following potential impacts on groundwater may occur as a result of the Proposed Development:

- Contamination of groundwater as a result of chemical spills in the chemical storage area and its subsequent runoff.
- Migration of contaminants following preferential pathways provided by the foundations of structures to non-contaminated soils, geology and groundwater.
- Impediment and alteration of groundwater flow regime arising from foundations and subsurface structures, resulting in groundwater mounding up the hydraulic gradient and reduced groundwater levels down hydraulic gradient.
- Potential impact on groundwater resources should an alternative water supply be required (i.e. groundwater abstraction). At present, water supply is anticipated to be sourced from either the estuary or from Anglian Water.

6.8.80 During operation and maintenance, the following potential impacts on flood risk may occur as a result of the Proposed Development:

- Potential increase in volume and rate of surface water runoff from new impervious areas on the proposed Main Site leading to an impact on flood risk and scour risk in receiving watercourses upstream and downstream.
- During a fluvial event, flood paths and levels could be altered and there could be an increased flood risk to the surrounding area. As such, flood compensation could also be required.

- Potential for flood paths and levels to be altered and increased flood risk to the surrounding area should a breach of the tidal flood defences occur (residual flood risk).
- Increased surface water runoff from new impermeable areas could result in higher flow along Oldfleet Drain if runoff is not appropriately attenuated. This, in turn, could increase flood risk in the area. Runoff should be treated in accordance with the Sustainable Urban Drainage System (SuDS) hierarchy.

### Scope for Mitigation

- 6.8.81 Where reasonably practicable, likely significant adverse effects will be avoided through embedded design measures. However, where this is not reasonably practicable, additional mitigation, or potentially compensation measures may be required. These will be determined and developed as part of an iterative design and impact assessment process. Construction phase impacts will likely be mitigated through the implementation of standard construction techniques and mitigation measures, as are described in a wide range of good practice publications which will be listed in the ES (e.g. C811 Environmental good practice on site guide (fifth edition) (CIRIA, 2023)).

## 6.9 Geology, Soils and Agriculture

### Baseline Conditions

#### *Study Area*

- 6.9.1 Impacts from the Proposed Development on soils, geological features and Mineral Safeguarding Areas (MSA), will typically occur directly within the Site where construction activity would take place or interface directly with these receptors. However, for the purposes of determining the wider geological context, geodiversity and to support the conceptual understanding of the ground model including pathways for contaminant migration, the soils and geology baseline will consider a 250 m buffer from the Site.
- 6.9.2 For the purposes of determining the local baseline conditions with respect to land contamination, a study area that also extends 250 m from the Site. This will be extended for hydrogeology to 1 km from the Site. This is appropriate to assess the hydrogeological setting, and any influence that potential contaminated land might have on the Proposed Development or local receptors. The study area is shown on Figure 2E.
- 6.9.3 Within the Site, there is a section in the northeast that extends offshore (the potential abstraction and discharge locations). For this area, there will be no contaminated land sites or soils, but it is described within the geology section.
- 6.9.4 It should be noted that some of the potential impacts and effects relating to hydrogeology (for example, groundwater flood risk, assessing groundwater as a water resource, as well as its behaviour in response to dewatering) are addressed within Section 6.8: Water Environment.

*Geology of the Main Site and Proposed Off-site Laydown Area*

- 6.9.5 The BGS Map Sheet 81 (Patrington, 1:50,000 scale, including parts of Sheets 82 and 80 (Ref 6-168)), and the BGS GeoIndex website (Ref 6-169) indicate that Made Ground is present across the proposed off-site laydown area and in the study area around the proposed off-site laydown area. Made Ground is also mapped adjacent to the north and in proximity to the south of the Main Site.
- 6.9.6 The natural strata comprise superficial Tidal Flat Deposits over the entire Main Site and proposed off-site laydown area study areas; these are underlain by Glacial Till and fluvioglacial deposits. Beach and Tidal Flat Deposits are mapped along the coastline, immediately east of the Main Site. The published superficial geology at the Main Site and the proposed off-site laydown area and their study areas are indicated to overlie the Flamborough Chalk Formation.
- 6.9.7 Based on a review of selected historical BGS borehole records from the Main Site (GeoIndex, Ref 6-169; boreholes Ref. TA21SW443 and TA21SW442, located in the eastern and southeastern portion of the Main Site), the geology is characterised by 2 to 3 m depth of Made Ground, described as clay with fragments of coal, chalk, concrete, and slag. This is underlain by natural strata predominantly comprising clay up to approximately 19 m bgl and overlying sand. The maximum investigated depth was 20 m bgl; bedrock was not encountered.
- 6.9.8 Historical BGS borehole records referenced TA21SE360, which is located in the eastern portion of the proposed off-site laydown area (GeoIndex, Ref 6-169), confirms the presence of Made Ground (brick rubble) up to a depth of approximately 0.45 m, underlain by soil and brown Warp (artificially induced Alluvium) up to approximately 5 m depth; these overlie gravel and clay in turn overlying chalk, which was encountered at a depth of 28 m bgl.

*Geology of the Site including the Proposed Gas Pipeline Options and Grid Connection*

- 6.9.9 The BGS Map Sheet 81 (Patrington, 1:50,000 Series, including parts of Sheets 82 and 90, (Ref 6-168), the BGS Map Sheet 90 (Grimsby, 1:50,000 scale, including Sheet 91 Saltfleet (Ref 6-170)) and the GeoIndex website indicate that the Site, including the gas pipeline route corridors and the grid connection route corridor are predominantly underlain by Till deposits, with Tidal Flat Deposits outcropping in the eastern portion (including around the proposed grid connection) approximately between the River Humber and the villages of Immingham, Stallingborough and Healing. Localised areas of Lacustrine Deposits, Glaciofluvial Deposits (Devensian) and Alluvium are also mapped along the gas pipeline route corridors and the grid connection route corridor, or in their proximity. The western / southwestern extent of the Site and study area is underlain by Glaciofluvial Deposits, Alluvium and localised Head and Lacustrine Deposits.
- 6.9.10 Made Ground is mapped within the Site and study area in the industrial estate east of Immingham and in a small area to the south of Habrough. Although not mapped, it is possible that Made Ground is also present in other discrete parts of the Site, for example along roadways and railway.
- 6.9.11 The Flamborough Chalk underlies the superficial deposits in the eastern portion of the Site (including the potential abstraction and discharge locations area and gas

pipeline route corridors and the grid connection route corridor); east of Immingham, Stallingborough and Healing. Burnham Chalk underlies the superficial deposits in the western portion of the Site. The Welton Chalk Formation is present in the northwesternmost extent of the Site (south of the Brocklesby Interchange on the A180 road).

- 6.9.12 For the purposes of this scoping report, selected historical BGS borehole records have been used to describe geology encountered across the gas pipeline route corridors and the grid connection route corridor only. This information will be reviewed as the design of the Proposed Development progresses.
- 6.9.13 Selected historical BGS borehole records<sup>13</sup> available on GeoIndex (Ref 6-169) do not report the presence of Made Ground along the proposed gas pipeline options. It is noted, however, that some of the publicly available borehole records are dated (pre-1900 to the 1970s) and might be antecedent to more recent developments (for example, the construction of the A180 road); therefore, the presence of Made Ground cannot be excluded. Historical BGS borehole records record topsoil underlain by sand, gravel and clay deposits. Chalk is encountered at approximately 17 m bgl in the eastern portion of the gas pipeline route corridors but is recorded at greater depths in the central and western portions (up to 33 m bgl)<sup>14</sup>.
- 6.9.14 Information from historical BGS borehole records is limited for the grid connection route corridor<sup>15</sup>, but suggest the presence of clay up to at least 2.7 m bgl (record referenced TA21SW181).

#### *Geological Sites*

- 6.9.15 DEFRA's Magic Map (Ref 6-171) indicates that there are no SSSI designated specifically for their geological importance within the study area. Further consultation will be required with NELC, NLC and WLDC to establish if there are any designated Local Geological Sites (LGS) present within the study area.

#### *Soils*

- 6.9.16 The Soilscape for England published by the National Soil Resources Institute (Ref 6-172) describes the soils within the eastern area of the Site and study area as Soilscape 21: "*Loamy and clayey soils of coastal flats with naturally high groundwater*". Soils in the majority of the western half of the Site and study area are described as Soilscape 18: "*Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils*". The southwestern extent of the Site and study area are described as Soilscape 8: "*Slightly acid loamy and clayey soils with impeded drainage*".
- 6.9.17 The agricultural soils in the majority of the Site and study area are indicated to be Grade 3 'Good to Moderate' (based on the published Provisional Agricultural Land Classification (ALC)). Some of the western / southwestern-most extents of the Site and study area are classified as Grade 2 'Very Good'. The proposed off-site laydown area and small areas of the study area in the north (around Immingham) and southeast (around Great Coates) is classified as 'Urban'. There is very little post 1988 ALC (England) information available in the Site, with only the southern-most extent of the proposed grid connection classified as Grades 2, 3a (Good), 3b (Moderate) and

<sup>13</sup> BGS Borehole Ref. TA21SW138, TA21SW155, TA11SE120, TA11SE255, TA11SW239, TA11SE21/A, TA11SW62.

<sup>14</sup> It is noted that BGS Map Sheet 81 indicates that chalk is found at shallower depths in the western portion of the study area.

<sup>15</sup> BGS Borehole Ref. TA21SW181

Other. ALC Grade 1, 2 and 3a are considered to provide the Best and Most Versatile (BMV) agricultural land.

*Mineral Safeguarding Areas*

- 6.9.18 The North East Lincolnshire Local Plan designates MSAs where an economic mineral resource exists. When non-mineral developments are planned on, or in proximity of, an MSA, the presence of a potential mineral resource is taken into consideration in the planning process.
- 6.9.19 No MSAs or buffer zones are located within The Site or the study area with the exception of isolated small areas designated as MSAs for Sand and Gravel; these are located west of Habrough, between Keelby and Stallingborough, south of Great Coates and in proximity of Aylesby.
- 6.9.20 The NLC Local Plan and the WLDC Local Plan (Ref 6-173) do not define any MSA within the Site.

*Aquifer Designation and Source Protection Zones*

- 6.9.21 The Environment Agency aquifer classification for the underlying superficial geology in the 1 km study area is:
- The Beach and Tidal Flat Deposits, the Head deposits and the Till as Secondary (Undifferentiated) aquifers;
  - The Tidal Flat Deposits as unproductive strata;
  - The Alluvium and the Glaciofluvial Deposits as Secondary A Aquifers;
  - The Lacustrine Deposits as a Secondary B Aquifer; and
  - The Burnham, Flamborough and Welton Chalk bedrock formations as Principal Aquifers.
- 6.9.22 The extent to which groundwater is used as a local resource has not yet been identified. Chalk is expected at around 22+ m bgl however the boreholes records reviewed (20-22 m deep) do not encounter bedrock.
- 6.9.23 The Main Site is not located in a SPZ however several SPZs are located in the Site, with the closest located approximately 880 m southeast (SPZ 3 – Total Catchment) from the Main Site. The proposed off-site laydown area is located within an SPZ 2 (subsurface activity) and is adjacent to an SPZ 1 (subsurface activity). With the exception of the northeastern area, the majority of the Site is within an SPZ 3 (Total Catchment). Access routes from Immingham Port north of the Main Site cross three areas of SPZ 1 and their associated SPZ 2 and 3. SPZ 2 (Outer Protection Zones) and SPZ 1 (Inner Protection Zones) are also located in the western and southern area of the Site and are crossed by, or are in close proximity to, the gas pipeline route corridor near Healing, Little London and Habrough.
- 6.9.24 There are drinking water safeguard zones (groundwater) in the southern area of the Site (in close proximity to the south of the gas pipeline route corridors and west of the grid connection route corridor), extending southwest from Healing and Little London. The western area of the Site crosses the drinking water safeguard zone (groundwater) which extends southwest from Habrough.

6.9.25 Only limited information on groundwater levels is available in the historical BGS borehole records across the Site. Borehole logs indicate groundwater was struck at 19 m bgl (within the superficial deposits) at the Main Site, rising to 11.5 m bgl. In proximity of the grid connection route corridor, existing boreholes indicate water was struck at 1.4 m bgl. Along the gas pipeline route corridors, water was struck at depths between 6 m and 10 m bgl; there is limited data on resting levels, but these were recorded as high as 1.5 m below well top. At the proposed off-site laydown area, the resting level of water was recorded at approximately 6.86 m, but no indication was provided on if this was 'below' or 'above' well top. The same historic borehole log indicated that the water level was depressed to 10.7 m below well top, when pumping at 26,000 gallons per hour.

#### *Surface Water Courses*

6.9.26 The main surface water receptor is the estuary of the River Humber, which is adjacent to the east of the Main Site. An unnamed drain is located within the Main Site, flowing parallel to the eastern boundary. Oldfleet Drain defines the southern boundary of the Main Site, and additional drains are located within 250 m of the Main Site, together with small ponds.

6.9.27 Drains are located between 200 m and 250 m of the proposed off-site laydown area (north and west).

6.9.28 In the central area of the Site, North Beck Drain and its tributary, Middle Drain, flow northwards towards the Humber Estuary; the gas pipeline route corridors cross these watercourses north of Stallingborough. In the eastern area of the Site is Mawmbridge Drain, which flows northeast towards the Humber Estuary; the grid connection route corridor crosses this watercourse. New Beck Drain is located within the western area of the Site. River Freshney/Lacey Beck flows towards the Humber Estuary south of the Site. There are numerous other unnamed drains / watercourses within the Site and the 250 m study area.

#### *Ecological / Sensitive Sites*

6.9.29 The main ecological site within 25 m of the Site is the Humber Estuary. This is defined as a SPA, SAC, a SSSI, and a Ramsar site. It is located adjacent to the east to the Main Site and extends across the whole coastline.

6.9.30 The whole Site is located within a NVZ (for surface water and groundwater).

#### *Potential Sources of Contamination*

6.9.31 Publicly available resources including historical aerial photos on Google Maps, Google Earth Pro (Ref 6-174), National Library of Scotland (Ref 6-175) and Groundsure's Enviro Data Viewer (Ref 6-176) were reviewed to identify potential contamination sources at the Site. Note that publicly available historical mapping is very limited and therefore only historical aerial maps and photos between 1886 and 1968, and since the early 2000s have been viewed to identify potential sources of contamination.

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<sup>16</sup> If 'above' well top, this may have been demonstrating artesian well conditions. According to the BGS 'Geology of the country around Grimsby and Patrington'. Memoir for 1:50 000 geological sheets 90 and 91 and 81 and 82 (England and Wales) (Ref 1-9), it indicates the following;

*"In the past, the Chalk aquifer, both north and south of the Humber, was overdeveloped, causing saline intrusion in some coastal areas. However, reduction in the licensed abstraction has now reduced outflows to approximately the same quantity as recharge. Despite this, 75 per cent of the discharge is by pumping and the extensive artesian conditions that existed in coastal areas prior to 1940 are rare today."*

Therefore, this indicates that artesian conditions are unlikely to exist today.



- 6.9.32 The Main Site has consisted of agricultural land since 1886 (although note the aforementioned gaps in historical mapping). The area south of the Main Site has been industrialised at least from 1966 and to the north at least from the early 2000s, comprising the South Humber Bank Power Station to the north, and manufacturing industries to the north and south. There is potential for contaminative activities in this area to have affected soil and controlled water (groundwater and surface water) quality. There are three landfills located within 250 m of the Main Site; these are detailed in paragraph 6.9.35.
- 6.9.33 It is understood that the proposed off-site laydown area has potential radiological contamination which relates to the feedstock for titanium dioxide manufacturing, ilmenite, and the process wastes such as scales and sediments. Given the previous industrial use of the proposed off-site laydown area, and the presence of manufacturing and chemical companies in the vicinity (including Synthomer, Novartis and Dunlop Oil & Marine), the potential presence of contaminated soil / groundwater within the proposed off-site laydown area cannot be excluded.
- 6.9.34 The Site, including the gas pipeline route corridors and the grid connection route corridor predominantly cross undeveloped land, historically and currently used for agriculture. It is noted that the Luxmore Service Station containing fuel storage and dispensing facilities on the east and west bound carriageway of the A180 is in proximity to the gas pipeline route corridors. Other potential sources of contamination are the railway line, which is crossed by the gas pipeline route corridors northwest of Little London, and existing roadways. In the north of the Site is the North Moss Lane Industrial Estate, and Millennium Inorganic Chemicals is located in the study area of the Site. In the southeast of the Site and study area is 'Europarc', a light industrial / commercial area.
- 6.9.35 A number of current and historical landfills are recorded within 250 m of the Site; the following landfills are located in proximity of the Main Site or the proposed gas pipeline route corridors, grid connection and off-site laydown area.
- Historic landfills:
    - No. 3 Landfill. Located adjacent to the south of the Main Site, operated by Acordis UK Ltd; first and last input date unknown;
    - Courtaulds No. 2 Landfill. Located approximately 150 m south of the Main Site. Appears to be three licences operated by Courtaulds Limited (first input dated 1970, last input dated 1980), 'unknown' operator (first input 1995, last input date unknown) and Acordis UK Ltd (first and last input date unknown); and
    - Marsh Lane landfill. Located approximately 60 m west of the northern extent of the proposed grid connection route corridor; operator and last input are unknown.
  - Authorised landfills:
    - Landfill No. 4. Located approximately 140 m south of the Main Site, operated by Acordis UK Ltd; receiving industrial waste (factory curtilage); licence issued 1995.

6.9.36 There are other current and historic landfills within the Site; particularly in the northern area, around Immingham.

#### *Site Walkover*

6.9.37 A site walkover was carried out on 30 October 2023 to identify current potential contamination sources as well as possible indicators of contamination at the Main Site and proposed off-site laydown area. Furthermore, a site walkover was completed at identified 'key' potentially contaminative locations across the gas pipeline route corridors and the grid connection route corridor; from the baseline research undertaken, this included only the petrol station located along the A180 carriageway.

6.9.38 The Main Site comprised of recently ploughed agricultural land. The topography across the Main Site was relatively flat with a sloping elevation off-site along the eastern boundary. There was a ditch running along the eastern boundary of the Main Site separating it from the sea wall, the difference in elevation was approximately 2 m. There were no current construction works ongoing at the section of sea wall bordering the Main Site at the time of the site walkover. Oldfleet Drain flowed openly along the southern boundary of the Main Site before becoming culverted in the southeast corner. There was some evidence of fly tipped rubbish around the main access gate off Hobson Way, there were no other indications of sources of contamination noted. The surrounding area to the Main Site comprised of industrial facilities with a variety of above ground infrastructure (e.g., tanks, buildings etc) visible, to the north and south, with the Humber Estuary and sea wall to the east and unused land to the west. The land to the northwest had been used previously as there was evidence of a layer of gravel and access tracks however, the land to the southwest was unused agricultural land.

6.9.39 Access to the proposed off-site laydown area was limited to what could be viewed from Moody Lane as access was not available at the time of the site visit. The proposed off-site laydown area appeared to be being used as an operational compound, although further details on its use were not available due to access constraints. There were numerous buildings as well as car parking facilities. A large amount of the ground cover appeared to be hardstanding. No visual signs of contamination were noted (viewing from southern boundary only). The surrounding land uses comprised other industrial and / or commercial facilities. Due to access constraints and only viewing from public roads, no specific details of operations were identified. There was an operational petrol station situated on the A180 Motorway which is within the gas pipeline route corridors. There were no visual signs of contamination identified.

#### **Legislation, Policy and Guidance**

6.9.40 The assessment will be undertaken in accordance with European Union (EU) Directives; national Acts, regulations, policy and guidance; and local policy, legislation and guidance. Those which are considered relevant to this chapter are as follows:

- Environmental Liability Directive (2004/35/EC) (Ref 6-177);
- WFD (2000/60/EC);
- The Groundwater Directive (2006/118/EC) (Ref 6-178);
- The Environmental Quality Standards (EQS) Directive (2008/105/EC) (Ref 6-179);

- The Environmental Protection Act 1990 and Part 2A (the Contaminated Land Regime) (Ref 6-180);
- Environment Act 2021;
- The Water Act 2003;
- The Water Resources Act 1991;
- Environmental Damage (Prevention and Remediation) (England) Regulations 2015;
- The Building Act 1984 and the Building (Amendment) Regulations 2016 (Ref 6-181);
- The Environment Act 1995;
- The TCPA 1990 (Ref 6-182);
- EPR 2016;
- Hazardous Waste (England and Wales) (Amendment) Regulations 2016 (Ref 6-183);
- Anti-Pollution Works Regulations 1999 (Ref 6-184);
- The Control of Asbestos Regulations (CAR) 2012 (Ref 6-185); and
- CDM Regulations 2015 (Ref 6-186);
- Policy:
  - The NPPF;
  - NELC (2018), Local Plan 2013-2032 (adopted 2018), Adoption Statement and Sustainability Appraisal Post Adoption Statement (2018);
  - NLC (2011), North Lincolnshire Local Development Framework, Core Strategy (adopted 2011); and
  - Central Lincolnshire (2023), Central Lincolnshire Local Plan (adopted 2023).
- Guidance:
  - BS 10175 (2011 +A2 2017), Investigation of Potentially Contaminated Sites – Code of Practice (Ref 6-187);
  - BS 5930 (2015 + A1:2020), Code of practice for site investigations (Ref 6-188);
  - BS 8576 (2013), Guidance on investigations for ground gas. Permanent gases and Volatile Organic Compounds (VOCs) (Ref 6-189);
  - BS 8485 (2019), Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings (Ref 6-190);
  - CIRIA C665, Assessing risks posed by hazardous ground gases to buildings, 2007 (Ref 6-191);
  - Environment Agency Pollution Prevention for Business (2016) (Ref 6-192);
  - Environment Agency Guiding Principles for Land Contamination (2010) (Ref 6-193);
  - CIRIA C811, Environmental good practice on site guide. 5<sup>th</sup> edition;
  - Contaminated Land: Applications in Real Environments (CL:AIRE), Definition of Waste: Development Industry Code of Practice (2011) (Ref 6-195);

- CL:AIRE, Framework for Assessing the Sustainability of Soil and Groundwater Remediation (2010)(Ref 6-196);
- The Environment Agency's approach to groundwater protection (2018) (Ref 6-197);
- Environment Agency 'Guidance Note on Piling/Penetrative Ground Improvement Methods on Land Affected by Contamination' NC/99/73, 2001 (Ref 6-198);
- Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (2009)(Ref 6-199);
- Design Manual for Roads and Bridges (DMRB), LA109 Geology and Soils (2019) (Ref 6-200);
- DMRB, LA104 Environmental assessment and monitoring (2020) (Ref 6-201);
- DMRB, LA110 Material assets and waste (2019) (Ref 6-202);
- DMRB, LA113 Road drainage and the water environment (2020); and
- National House Building Council (NHBC), Environment Agency report R&D66 'Guidance for the Safe Development of Housing on Land Affected by Contamination' (Ref 6-203).

## **Impact Assessment Methodology**

### *Consultation*

6.9.41 No engagement has been undertaken to date with respect to the scope or assessment methodology for this chapter, however, the following statutory bodies will be consulted prior to completing the assessment:

- Environment Agency;
- Local Authorities (NELC, NLC, and WLDC);
- Local geology groups; and
- Natural England.

### *Study Area*

6.9.42 The applicable study area that will be used to establish the baseline is the same as that detailed within paragraphs 6.9.1 to 6.9.4.

### *Establishing the Baseline*

6.9.43 A Phase 1 desk-based assessment (equivalent to a Stage 1, Tier 1 assessment as defined under the Environment Agency's Land Contamination Risk Management (LCRM)) will be completed to identify and provide an assessment of any potential hazards and constraints to the Proposed Development deriving from the ground conditions, including the potential for land contamination and an outline of the ground hazards. It will include a ground model based on available geological and hydrogeological information. This will inform a preliminary Conceptual Site Model (CSM) that will identify the potential for land contamination and potential contaminant pathways to impact sensitive receptors and consider the mobilisation of contaminants associated with current and historical land use in and around the Site.

6.9.44 The results of the desk-based assessment and preliminary CSM will be used to assess data gaps and uncertainties and, if required, develop an initial scope for site investigation in order to quantitatively assess the levels of contamination across the

Site. Ground investigation would be intended to support the development of the design, confirm the ground model and also to quantitatively assess any potential land contamination risk to the Proposed Development. This tiered approach to assessment is consistent with the Environment Agency LCRM guidance (Ref 6-204). It is anticipated that the requirements for any intrusive investigation will be discussed and agreed in advance with the Environment Agency and relevant Local Authorities (NELC, NLC, and WLDC, as required).

- 6.9.45 An assessment of potential impacts on existing ground conditions will be undertaken as part of the EIA, including the potential for the Proposed Development to result in land contamination, as defined in Part 2A of the Environmental Protection Act (1990). Consideration will also be given to potential impacts associated with the construction and operation of the Proposed Development and how these will be prevented or minimised.

*Geology, Minerals and Agricultural Soils Impact Assessment Methodology*

- 6.9.46 The likely significance of effects of the construction (temporary) and operational (permanent) stages to geology, mineral resources, and agricultural soil will be assessed based on the sensitivity or importance of the resource and the magnitude of potential impact.
- 6.9.47 With regards to the agricultural land, given the limited post-1988 ALC data, a proportionate ALC soil survey will be undertaken to inform the agricultural land assessment at the Main Site.

*Contaminated Land Impact Assessment Methodology*

- 6.9.48 The approach to assessing the potential impacts of the Proposed Development from, and to land contamination, will be undertaken following a risk-based approach, which is consistent with LCRM. The assessment will be based on comparing the risk levels at baseline via the preliminary CSM (developed in the Phase 1 desk-based assessment) and the perceived risk levels for the construction (temporary) and operational (permanent) stages respectively, to determine the change in risk at each stage. Potential risks are determined and assessed based on the likelihood (or probability) and consequence using the principles given in the NHBC and Environment Agency report R&D66 (Ref 6-205) and LCRM. This provides guidance on development and application of the consequence and probability matrix to risk assessment and broad definitions of consequence and is widely used for a range of developments.
- 6.9.49 The likely significance of the effects of land contamination are assessed by comparing the difference in risk of each contaminant linkage at baseline to those at construction and operation stages. Where there is shown to be a decrease in contamination risk, the Proposed Development is assessed as having a beneficial effect on the environment in the long term. Reference will be made to DMRB LA109, LA104, LA110 and LA113, which although applicable to road schemes, do provide a suitable framework within which to conduct EIA for ground conditions on linear schemes (including this Proposed Development).

*Assessment Criteria*

- 6.9.50 Definitions of magnitude of impact, sensitivity or importance of the receptor and likely significance of effects are reported in the following section.

6.9.51 The magnitude of impact or how considerable the change to ground conditions is in comparison to the baseline conditions, as a result of the construction and operation of the Proposed Development is classified as either being: large adverse or beneficial, medium adverse or beneficial, small adverse or beneficial, negligible adverse or beneficial, or no impact. The criteria and their respective magnitude of impact classification which will be applied are detailed within Table 6.53 and based on the DMRB LA109 and LA113.

**Table 6.53 Magnitude of impact and descriptions**

<b>Magnitude of impact</b>	<b>Definition</b>	<b>Demonstrated in the construction and operation CSM as risk level changes defined as follows</b>
<b>Large</b>	<p><b>Geology and Mineral Resources</b> Loss of geological feature / designation and / or quality and integrity, severe damage to key characteristics, features, or elements.</p> <p><b>Soil</b> Physical removal or permanent sealing of &gt;20 ha of agricultural land.</p>	Not applicable
	<p><b>Contamination</b> Human health: significant contamination identified. Contamination levels significantly exceed background levels and relevant screening criteria (category 4 screening levels) within SP1010 with potential for significant harm to human health. Contamination heavily restricts future use of land; 2) surface water: refer to sensitivity criteria in LA113; and 3) groundwater: refer to sensitivity criteria in LA113.</p>	<p><b>Large adverse:</b> An increase in contamination risk of 4 or 5 risk levels in the risk matrix, e.g., land that has a very low contamination risk in the baseline becoming a high or very high risk. <b>Large beneficial:</b> A reduction in contamination risk of 4 or 5 risk levels in the risk matrix, e.g., land that has a very high contamination risk in the baseline becomes a low or very low risk.</p>
<b>Medium</b>	<p><b>Geology and Mineral Resources</b> Partial loss of geological feature / designation, potentially adversely affecting the integrity; partial loss of / damage to key characteristics, features, or elements.</p> <p><b>Soils</b> 1) Physical removal or permanent sealing of 1 ha – 20 ha of agricultural land. 2) Permanent loss/ reduction of one or more soil function(s) and restriction to current or approved future use (e.g., through degradation, compaction, erosion of soil resource).</p>	Not applicable
	<p><b>Contamination</b> 1) Human health: contaminant concentrations exceed background levels and are in line with limits of relevant screening criteria (category 4 screening levels) in SP1010. Significant contamination can be present. Control / remediation measures are</p>	<p><b>Medium adverse:</b> An increase in contamination risk of 2 or 3 risk levels in the risk matrix, e.g., land that has a low contamination risk in the baseline becomes a moderate or high risk.</p>

Magnitude of impact	Definition	Demonstrated in the construction and operation CSM as risk level changes defined as follows
Small	<p><b>Geology and Mineral Resources</b> Minor measurable change in geological feature / designation attributes, quality, or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features, or elements.</p> <p><b>Soils</b> Temporary loss/ reduction of one or more soil function(s) and restriction to current or approved future use (e.g., through degradation, compaction, erosion of soil resource).</p>	<p><b>Medium beneficial:</b> A reduction in contamination risk of 2 or 3 levels in the risk matrix, e.g., land that has a high contamination risk in the baseline becomes a moderate / low or low risk.</p>
Negligible	<p><b>Geology and Mineral Resources</b> Minor measurable change in geological feature / designation attributes, quality, or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features, or elements.</p> <p><b>Soils</b> No discernible loss/ reduction of soil function(s) that restrict current or approved future use.</p>	<p><b>Small adverse:</b> An increase in contamination risk of 1 risk level in the risk matrix, e.g., land that has a low contamination risk in the baseline becomes a moderate / low risk.</p> <p><b>Small beneficial:</b> A reduction in contamination risk of 1 risk level in the risk matrix, e.g., land that has a moderate / low contamination risk in the baseline becomes a low risk.</p>
	<p><b>Contamination</b> 1) Human health: contaminant concentrations substantially below levels outlined in relevant screening criteria (category 4 screening levels) in SP1010. No requirement for control measures to reduce risks to human health / make land suitable for intended use; 2) surface water; refer to sensitivity criteria in LA113; and</p>	<p><b>Negligible adverse:</b> An increase in contamination risk of none or 1 risk level in the risk matrix, e.g., land that has a low contamination risk in the baseline becomes a moderate / low risk, but only slightly worse.</p> <p><b>Negligible beneficial:</b> A reduction in contamination risk of none or 1 risk level in the risk</p>

Magnitude of impact	Definition	Demonstrated in the construction and operation CSM as risk level changes defined as follows
	3) groundwater: refer to sensitivity criteria in LA113.	matrix, e.g., land that has a moderate / low contamination risk in the baseline becomes a low risk, but only slightly better.
<b>No impact</b>	<p><b>Geology</b> No temporary or permanent loss/ disturbance of characteristics features or elements.</p> <p><b>Soils</b> No loss/reduction of soil function(s) that restrict current or approved future use.</p>	
	<p><b>Contamination</b> 1) Human health: reported contaminant concentrations below background levels; 2) surface water; refer to sensitivity criteria in LA113; and 3) groundwater: refer to sensitivity criteria in LA113.</p>	<b>No impact:</b> No change in contaminated land risks.

6.9.52 The criteria for assessing receptor sensitivity are defined in Table 6.54, based on the DMRB LA109 and LA113.

**Table 6.54 Receptor sensitivity**

Sensitivity / value	Description / criteria
<b>Very high</b>	<p><b>Geology</b> Very rare and of international importance with no potential for replacement (e.g., United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Sites, UNESCO Global Geoparks, SSSI and Geological Conservation Review (GCR) sites where citations indicate features of international importance). Geology meeting international designation citation criteria which is not designated as such.</p> <p><b>Mineral resources<sup>1</sup></b> Presence of significant mineral reserves and within a Mineral Buffer Zone or Safeguarding Zone.</p> <p><b>Soils</b> Soils directly supporting an EU designated site (e.g., SAC, SPA, Ramsar). ALC grade 1 &amp; 2.</p> <p><b>Contamination</b></p> <p><b>Human health:</b></p> <ul style="list-style-type: none"> <li>• Very high sensitivity land use such as residential or allotments.</li> </ul> <p><b>Surface water:</b></p> <ul style="list-style-type: none"> <li>• Watercourse having a WFD classification shown in a RBMP and <math>Q95 \geq 1.0 \text{ m}^3/\text{s}</math>.</li> <li>• Site protected / designated under EC or UK legislation (SAC, SPA, SSSI, Ramsar site, salmonid water).</li> <li>• Species protected by EC legislation Ecology and Nature Conservation.</li> </ul> <p><b>Groundwater:</b></p> <ul style="list-style-type: none"> <li>• Principal aquifer providing a regionally important resource and / or supporting a site protected under EC and UK legislation Ecology and Nature Conservation.</li> </ul>



Sensitivity / value	Description / criteria
<b>High</b>	<ul style="list-style-type: none"> <li>• Groundwater locally supports GWDTE.</li> <li>• SPZ 1.</li> </ul> <p><b>Geology</b> Rare and of national importance with little potential for replacement (e.g., geological SSSI, Area of Special Scientific Interest (ASSI), National Nature Reserves (NNR)). Geology meeting national designation citation criteria which is not designated as such.</p> <p><b>Mineral resources<sup>1</sup></b> Within a Mineral Consultation or Safeguarding Zone.</p> <p><b>Soils</b> Soils directly supporting a UK designated site (e.g., SSSI). ALC grade 3a.</p> <p><b>Contamination</b></p> <p><b>Human health:</b></p> <ul style="list-style-type: none"> <li>• High sensitivity land use such as public open space.</li> </ul> <p><b>Surface water:</b></p> <ul style="list-style-type: none"> <li>• Watercourse having a WFD classification shown in a RBMP and Q95 &lt;1.0 m<sup>3</sup>/s.</li> <li>• Species protected under EC or UK legislation Ecology and Nature Conservation.</li> </ul> <p><b>Groundwater:</b></p> <ul style="list-style-type: none"> <li>• Principal aquifer providing locally important resource or supporting a river ecosystem.</li> <li>• Groundwater supports a GWDTE.</li> <li>• SPZ 2.</li> </ul>
<b>Medium</b>	<p><b>Geology</b> Of regional importance with limited potential for replacement (e.g., Regionally Important Geological Site (RIGS)). Geology meeting regional designation citation criteria which is not designated as such.</p> <p><b>Mineral resources<sup>1</sup></b> Some mineral potential but not within a Mineral Consultation or Safeguarding Zone.</p> <p><b>Soils</b> Soils supporting non-statutory designated sites (e.g., Local Nature Reserve (LNR), LGSs, Sites of Nature Conservation Importance (SNICs)). ALC grade 3b.</p> <p><b>Contamination</b></p> <p><b>Human health:</b></p> <ul style="list-style-type: none"> <li>• Medium sensitivity land use such as commercial or industrial.</li> </ul> <p><b>Surface water:</b></p> <ul style="list-style-type: none"> <li>• Watercourses not having a WFD classification shown in a RBMP and Q95 &gt;0.001 m<sup>3</sup>/s.</li> </ul> <p><b>Groundwater:</b></p> <ul style="list-style-type: none"> <li>• Aquifer providing water for agricultural or industrial use with limited connection to surface water.</li> <li>• SPZ 3.</li> </ul>
<b>Low</b>	<p><b>Geology</b> Of local importance / interest with potential for replacement (e.g., non-designated geological exposures, former quarry's / mining sites).</p> <p><b>Mineral resources<sup>1</sup></b> Limited potential for mineral reserves and site not within a Mineral Consultation or Safeguarding Zone.</p> <p><b>Soils</b> Soils supporting non-designated notable or priority habitats.</p>

Sensitivity / value	Description / criteria
	ALC Grade 4 & 5. <b>Contamination</b> <b>Human health:</b> • Low sensitivity land use such as highways and rail. <b>Surface water:</b> • Watercourses not having a WFD classification shown in a RBMP and Q95 ≤0.001 m <sup>3</sup> /s. <b>Groundwater:</b> • Unproductive strata.
<b>Negligible</b>	<b>Geology</b> No geological exposures, little / no local interest. <b>Mineral resources<sup>1</sup></b> No mineral extraction potential. <b>Soils</b> Previously developed land formerly in 'hard uses' with little potential to return to agriculture. <b>Contamination</b> Human health: undeveloped surplus land / no sensitive land use proposed.

<sup>1</sup> Sensitivity of mineral receptors is not described as part of the referenced DMRB guidance. Therefore, professional judgment has been used.

6.9.53 The classification and likely significance of the effect resulting from the magnitude of impact and receptor sensitivity will be determined in accordance with the matrix shown in Table 6.55. Where Table 6.55 includes two classification categories, professional judgement will be used to support the reporting of a single classification.

**Table 6.55 Significance Matrix**

		Receptor sensitivity / value				
		Very high	High	Medium	Low	Negligible
Magnitude of Impact	Large	Major	Major or moderate	Moderate or minor	Minor or negligible	Negligible
	Medium	Major or moderate	Moderate or minor	Minor	Negligible	Negligible or no effect
	Small	Moderate or minor	Minor or negligible	Negligible	Negligible or no effect	Negligible or no effect
	Negligible	Negligible	Negligible	Negligible or no effect	Negligible or no effect	No effect
	No impact	No effect	No effect	No effect	No effect	No effect

6.9.54 Generally, major and moderate likely effects are considered to be significant, whilst minor, negligible and no effects are considered to be not significant. However, professional judgement will also be applied in reaching conclusions as to the likely significance of effects.

### Potential impacts

#### Construction (Temporary Impacts)

6.9.55 It is anticipated (prior to the full risk and impact assessment), that there may be some temporary adverse effects as follows during the construction phase from ground disturbance, the likely significance of which will be subject to assessment:

- disturbance of geological features of interest (if present);
- disturbance of surface soils which can result in compaction and degradation of excavated soils, particularly topsoil. The extent of significance would be influenced

by the final locations and construction methodology used. In addition, construction plant activities may also cause compaction of soils in the surrounding working area;

- potential loss of BMV agricultural land;
- removal or disturbance of minerals within the identified MSA;
- creation of preferential pathways and mobilisation of contaminants within soils on superficial and bedrock due to dewatering during construction (if required), open excavations, uncovered stockpiles and construction of underground structures including piling. These impacts are more likely in areas where significant contamination may be encountered;
- introduction of new sources of contamination, such as fuels and oils used in construction plant during construction;
- increases in dust, affecting ecological receptors, namely the Humber Estuary, and human health receptors; and
- introduction of human health receptors (construction workers). However, these receptors will be protected by Health & Safety legislation and are therefore scoped out.

*Operation (Permanent Impacts)*

6.9.56 There may be potential beneficial effects post-construction/operation phase due to the removal of contaminant sources during construction works.

6.9.57 Other than the potential beneficial effects resulting from remediation of contaminated land (post-construction/operation), it is anticipated that there will be no likely significant effects during the operation of the Proposed Development, as maintenance and operation of the Proposed Development will be in accordance with an Environmental Permit issued by the Environment Agency in accordance with the EPR, with other environmental and legislation and good practice.

**Scope for Mitigation**

6.9.58 Based on the assessment of the baseline conditions and the identification of any potential impacts, the assessment will make recommendations for mitigation measures. These may include the recommendation for parameters within an initial intrusive investigation (to address residual data gaps or better delineate identified potential contamination hotspots or plumes), quantitative risk assessment, remediation and validation. It will also make recommendations for mitigation measures to be employed by contractors, should any previously unidentified contamination be encountered during the construction phase. If unacceptable risks are identified or encountered during construction, and routeing through these areas is unavoidable, then remedial measures will be implemented.

6.9.59 The Proposed Development will be designed to avoid important geological features or resources, and sources of contamination, through careful routeing and site selection. The establishment of baseline conditions has included to date and will continue to include a desk study and engagement / information from stakeholders.

6.9.60 The main mitigation measure to prevent likely significant adverse effects on soils, geology and hydrogeology during the construction and operational phases of the Proposed Development will be to maintain good site practice and management through the development and adherence to a CEMP.

- 6.9.61 An understanding of groundwater throughout the Proposed Development will be obtained from ground investigation and monitoring. A more detailed hydrogeological assessment will be undertaken if trenchless techniques or dewatering is required in high sensitivity groundwater environments, or where dewatering is required to facilitate open cut installation. Where dewatering is required, a dewatering scheme will be developed prior to construction to demonstrate that there is an effective strategy to manage water arising from the operations and, where required, sufficient proposals to treat the water prior to controlled discharge. Any such assessment will consider the effects of any draw down or impacts on nearby abstractions or resources. This will be assessed in the Water Environment section of the ES (see scope in Section 6.8: Water Environment).

## 6.10 Traffic, Transportation and Access

- 6.10.1 This section sets out the proposed scope and methodology for the assessment of effects of the Proposed Development on traffic, transportation and access.

### **Baseline Conditions**

- 6.10.2 With reference to Figure 6D (Appendix A), the key roads in the local area are set out in this section.
- 6.10.3 The Main Site is located off the junction of Hobson Way / Energy Park Way and would be served via the existing four arm roundabout, which has been constructed with stubs only on the eastern and western arms, with the eastern arm being extended to serve the Main Site.
- 6.10.4 In addition, there is a proposed potential off-site laydown area located on Moody Lane further east on the outskirts of Grimsby. The proposed corridor for the natural gas pipeline runs west from the Main Site in parallel to the A180 towards Ulceby Skitter and South Killinghome.
- 6.10.5 The A180 and A160 both form part of the Strategic Road Network (SRN) under the control of National Highways (NH) and form a key regional road link from the ports at Immingham and Grimsby to the wider motorway network. The A160 forms a grade separated junction with the A180, which then becomes the M180 around 9 km to the west at the junction with the A15, which provides a link northwards into Kingston upon Hull.
- 6.10.6 Hobson Way is part of a route that runs north – south and links Immingham in the north with Grimsby in the south and is considered to be industrial in nature. The route starts with Laporte Road in the north which runs from Queens Road and Immingham Docks to a three-arm roundabout with Kiln Lane. It then becomes Hobson Way which runs from the Kiln Lane roundabout to the roundabout access with the Main Site. The route is then known as Energy Park Way which runs to a crossroads junction with Woad Lane, after which it becomes Moody Lane and provides a link into Grimsby and the A180.
- 6.10.7 In the vicinity of the Main Site, Hobson Way to the north is subject to a 40 mph speed limit and is around 6.5 m in width, with street lighting on both sides and a shared footway / cycleway on the western side. Energy Park Way to the south of the Main

Site is also around 6.5 m in width and subject to a 40 mph speed limit, with street lighting and a shared footway / cycle way on the eastern side only.

- 6.10.8 Kiln Lane to the north provides a route from Hobson Way to the A1173 and the A180 and is industrial in nature. It is around 6.5 m in width with a 40 mph speed limit and has street lighting along both sides, with the footway provision varying along its length, with some sections where no footway is provided. Kiln Lane has numerous industrial access junctions with a level crossing across the railway from Immingham into the industrial areas to the north of Grimsby.
- 6.10.9 Moody Lane is around 8 m in width with street lighting and a footway and is considered to be industrial in character and provides a link directly to the A180 at the Westgate Roundabout.
- 6.10.10 The traffic, transportation and access study area will comprise these main highway links and the public transport, cycle and walking provision within the immediate vicinity of these of these links as well as interfaces (where these are likely to occur) with any existing rail lines. No rail access is anticipated to be required for the Proposed Development. An initial desk-based baseline assessment will be undertaken to gather information on existing transport infrastructure, construction routes and restrictions, and will be used to provide an overview of the study area, as defined by the list of automatic traffic count (ATC) sites in paragraph 6.10.24, and the highway network and connections.
- 6.10.11 The following data sources are proposed to be used to inform the traffic and transport assessment:
- Review of any available and relevant traffic Count data, to determine the levels of base traffic on the network under consideration;
  - Personal Injury Accident (PIA) data for the most recent five-year period will be obtained for all roads within the proposed study area. This will provide information on each collision including severity as well as factors which attributed to the collision, which will help to identify principal areas of concern.
  - Travel mode share data from the 2021 Census; and
  - Newly commissioned traffic count and speed survey data where required.
- 6.10.12 There will be two elements of site-based work required to inform the baseline:
- ATCs will be undertaken at a number of locations in the vicinity of the Proposed Development where existing data is not available, to determine the baseline traffic conditions of the surrounding highway network. AADT flows will be derived from the ATC data to enable the baseline traffic flows to be established at the required design year. The extent of the traffic data and scope for any traffic surveys that may be required will be agreed with the relevant local highway authorities (LHAs), NELC, NLC and LCC as well as NH.
  - Site visit assessment – a site visit will be required to inform the assessment and clarify the high-level desktop-based assessments. Detailed notes and a photographic record will be undertaken on the site visit and consideration will be given to the identification of receptor locations.

6.10.13 Baseline traffic data will be collected within the study area for a period of 7 days to establish a baseline AADT. This will be used to predict the future baseline at the peak year of construction based upon TEMPRO growth factors, using a forecast based upon metrics around population, employment and housing. In addition, committed development sites will also be included to provide a cumulative assessment of the combined impact upon the highway network.

### **Legislation, Policy and Guidance**

6.10.14 The following policy and design guidance will be considered as part of the ES:

- IEMA Guidelines: Environmental Assessment of Traffic and Movement dated July 2023 (Ref 6-206).
- Department for Transport (DfT) Guidance, Travel Plans, Transport Assessments and Statements dated March 2014 (Ref 6-207).
- The NPPF.
- North East Lincolnshire Local Plan.
- North East Lincolnshire Local Transport Plan 2016 (Ref 6-208).
- Overarching NPS for Energy (EN-1).
- NPS for Natural Gas Electricity Generating Infrastructure (EN-2).

### **Impact Assessment Methodology**

6.10.15 It is proposed to assess the construction phase of the Proposed Development which is likely to be the representative worst-case. As set out in Section 3.10, during the operational phase, the creation of circa 50 operational roles is considered unlikely to have a likely significant effect upon the local highway network, (e.g. a severe impact as defined by paragraph 111 of NPPF).

6.10.16 The methodology for assessing the impact of development generated construction traffic will be based upon that outlined in the IEMA Guidelines: Environmental Assessment of Traffic and Movement dated July 2023. The IEMA Guidelines state that two broad rules of thumb are applied as criteria to assist in delimiting the scale and extent of the environmental impact:

- include highway links where traffic flows will increase by more than 30% (or the number of HGVs would increase by more than 30%); and
- include highway links of high sensitivity where traffic flows have increased by 10% or more.

6.10.17 The IEMA Guidelines then set out several specific traffic and movement related impacts, which will be considered as part of the assessment:

- severance of communities;
- non-motorised user delay;
- non-motorised amenity;
- fear and intimidation on and by road users;
- road user and pedestrian safety;
- Public Rights of Way, and
- hazardous / large Loads.

*Assessment Criteria*

6.10.18 The methodology for assessing the impact of the Proposed Development generated traffic during the construction phase will be based on that outlined in the IEMA guidelines, and this is set out as follows.

6.10.19 The general criteria for defining the importance or sensitivity of receptors are set out in Table 6.56 below.

**Table 6.56 Categorising the overall sensitivity of a highway link**

<b>Sensitivity</b>	<b>Description</b>
High	Highway Links and Junctions: Two sensitive users present (e.g. schools, play areas, care/retirement homes, disabled parking bays, hospitals, places of worship, historic buildings). Walk/Cycle Links including PRoW: Lightly trafficked highway with on-road pedestrian/cycle route.
Medium	Highway Links and Junctions (at least one of the following): One sensitive user present (e.g. schools, play areas, care/retirement homes, disabled parking bays, hospitals, places of worship, historic buildings). Many residential properties with direct frontage to highway link being used as construction route. Pedestrians using footways, PRoW and/ or crossings on highway link. Cyclists using on-road designated cycle routes along highway link. Walk/Cycle Links including PRoW: Heavily trafficked highway with off-road pedestrian/cycle route.
Low	Highway Links and Junctions (at least one of the following): Few residential properties with direct frontage to the highway link being used as a construction traffic route. Workplaces with direct frontage to highway link being used as construction route. Cyclists using off-road designated cycle routes along highway link. Walk/Cycle Links including PRoW: Lightly trafficked highway with off-road pedestrian/cycle route.
Very Low	Highway Links and Junctions: No receptors along link. Walk/Cycle Links including PRoW: Pedestrian/cycle route not running alongside highway.

6.10.20 Table 6.57 summarises the criteria that will be used to assess the magnitude of impact (based on increases i.e. ‘adverse’ effects), along with the thresholds that will be used to determine whether impacts are considered high, medium, low or very low. Depending on the baseline information available, the various thresholds identified for the proportional increases in traffic flow relate to daily flows. Within these tables, neither the sensitivity of receptors, nor the duration of impacts, is taken into consideration. These tables are formed using IEMA Guidance and professional judgement.

**Table 6.57 Impact Magnitude Criteria (Traffic and Transport)**

<b>Impact</b>	<b>Very Low</b>	<b>Low</b>	<b>Medium</b>	<b>High</b>
Severance	Increase in total traffic flows of 29% or under	Increase in total traffic flows of 30-59%	Increase in total traffic flows of 60%-89%	Increase in total traffic flows or HGV

<b>Impact</b>	<b>Very Low</b>	<b>Low</b>	<b>Medium</b>	<b>High</b>
	(or increase in HGV flows under 19%).	(or increase in HGV flows of between 20%-39%).	(or increase in HGV flows between 40%-89%).	flows of 90% and above.
Pedestrian Delay (including all non-motorised users)	Total traffic flows under 1,400 per hour.	Where traffic flows exceed 1,400 vehicles per hour the severity of the impact will be determined based on the thresholds identified above for severance.		
Non-motorised user amenity	Increase in total traffic flows of 49% or under.	Increase in total traffic flows of 50-69%.	Increase in total traffic flows of 70%-99%.	Increase in total traffic flows of 100% or above.
Fear and Intimidation	No change in step changes.	One step change in level, with <400 veh increase in average 18 hr AV two-way all vehicle flow; and/or. <500 HGV increase in total 18 hr HGV flow.	One step change in level, but with >400 veh increase in average 18 hr AV two-way all vehicle flow; and/or. >500 HGV increase in total 18 hr HGV flow.	Two step changes in level.
Road Safety	Increase in total traffic flows of 30% or under (or increase in HGV flows under 10%).	All links estimated to experience increases in total traffic flows above 30% or increases in HGV flows above 10% are analysed further on a case-by-case basis.		
Public Rights of Way Diversions and / or Closures	A temporary PRow diversion (no closure) with either no increase in pedestrian journey length or an increase in pedestrian journey length for one to five days.	A temporary PRow diversion (no closure) with an increase in pedestrian journey length for one to four weeks.	A short-term PRow closure (for less than four weeks in any 12-month period) without a diversion route; or A temporary PRow diversion (no closure) with an increase in pedestrian journey length for more than four weeks.	A short-term PRow closure (for more than four weeks in any 12-month period) without a diversion route.
Hazardous / Large Loads	Assessed on a case-by-case basis depending on the material being transported, the number of loads and the proposed routing.			

6.10.21 The likely significance of an effect on a highway link receptor will be based upon its sensitivity as determined from Table 6.56 and the magnitude of the impact from Table 6.57 and will be determine based upon the criteria shown below in Table 6.58.



**Table 6.58 Likely effects significance criteria**

Sensitivity or value of resource / receptor	Magnitude of Impact			
	High	Medium	Low	Very Low
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Very Low	Minor	Negligible	Negligible	Negligible

### Potential Impacts

#### Construction

- 6.10.22 During construction, the Main Site will be accessed via the existing roundabout on Hobson Way / Energy Park Way, with access to the proposed potential off-site laydown area to the east being from Moody Lane.
- 6.10.23 Construction worker vehicle trips will be distributed onto the local highway network based upon a gravity model of local population centres, with the majority assumed to reside within either Grimsby or Immingham.
- 6.10.24 As the exact location of the construction raw materials is currently unknown at this time, HGVs would be routed to avoid more sensitive residential locations and would be assumed for the purposes of assessment to travel on the following routes:
- Main Site and proposed off-site laydown area (see Figure 6E in Appendix A):
    - Hobson Way – Kiln Lane – A1173 to access the A180.
  - Immingham Docks to the Main Site (see Figure 6E in Appendix A):
    - Port access on Robinson Road – Laporte Road – Hobson Way.
    - Port access from Humber Road – A1173 – Queens Road – Laporte Road.
  - Proposed gas pipeline corridor route (Option A) (see Figure 6F in Appendix A):
    - Kiln Lane.
    - Hobson Way.
    - South Marsh Road.
    - A180.
    - A1173.
    - Stallingborough Road.
    - Habrough Road.
    - Killinghome Road.
    - A160.
    - A1077.
  - Proposed gas pipeline corridor route (Option B) (see Figure 6F in Appendix A):
    - Kiln Lane.
    - Hobson Way.
    - South Marsh Road.
    - A180.
    - A1173.

- Stallingborough Road.
  - B1210 Habrough Road.
  - Station Road.
  - Proposed electrical grid connection (see Figure 6G in Appendix A).
    - A180 – A1136 – Great Coates Road – Aylesbury Road.
- 6.10.25 Based upon the above, the extent of the ATCs proposed is shown on Figure 6H in Appendix A. The ATC locations proposed for the Main Site and electrical grid connection corridor are likely to remain as shown. The ATC locations proposed along the natural gas pipeline routes will be refined if required once a preferred route is selected following a feasibility study.
- 6.10.26 Any AILs to and from the Port of Immingham (see Figure 1B in Appendix A) will require further assessment and the anticipated routing of AILs will be assessed within the Traffic, Transportation and Access ES Chapter and set out in a Framework Construction Traffic Management Plan (CTMP) that will accompany the DCO Application.
- 6.10.27 As described in section 3.9, for the construction phase it is anticipated that there will be a maximum of 2,000 workers at the peak of construction, with around 600 HGVs accessing the site per day (1,200 two-way movements). It would not be expected that all construction workers accessing the site would travel as a single occupancy car trip, with many choosing to car share, as such a ratio of 1.5 will be assumed, resulting in a daily number of construction worker car trips of 1,334 in and 1,334 out (2,668 two way).
- 6.10.28 The above is indicative and based upon assumptions at this scoping stage. Traffic generation will be reviewed and assumptions updated as further information is available as the Proposed Development evolves.
- 6.10.29 During construction there will be temporary increases in traffic flows on the road network that will be used by construction vehicles to access both the Main Site as well as the proposed off-site laydown area. The network of roads affected will be relatively local to the site, with all construction HGVs assumed to use the A180, and construction workers distributed mainly towards Immingham and Grimsby. A key change from the baseline position is likely to be the number and percentage of HGVs using local roads.
- 6.10.30 Other aspects of the construction phase could have the potential for likely significant effects such as:
- severance to communities caused by an increase in traffic for a longer period;
  - increased levels of fear and intimidation and reduced levels of amenity for non-motorised users;
  - increased risk of road traffic accidents caused by an increase in traffic for a longer period, and
  - construction traffic using bell mouths and site entrances for access to construction areas.

### *Operation*

- 6.10.31 As described in section 3.10, once operational, up to circa 50 permanent operational roles would be created, and it is anticipated that staff would work a shift pattern, likely working between 07:00 – 19:00 and 19:00 – 07:00. Administrative staff are anticipated to work an office-hour pattern between 08:30 and 18:00. Conservatively assuming a car occupancy of one, this could equate to an additional circa 50 cars accessing the Site per day (100 two-way vehicle movements). Such operational traffic flows are not likely to give rise to significant effects on the highway network and it is not proposed to assess the operational phase within the ES Chapter.
- 6.10.32 It is also not proposed to undertake any assessment of the decommissioning phase due to the lifecycle of the Proposed Development, and the uncertainties over the ability to predict the baseline conditions at that time, with any impact likely to be similar to the construction phase.

### **Scope for Mitigation**

- 6.10.33 A Framework CTMP and a Construction Workers' Travel Plan (CWTP) will be prepared to accompany the DCO Application with the aim to reduce the impacts during the critical construction phase as far as is possible.
- 6.10.34 The CTMP would set out measures to control construction HGV traffic and these could potentially include the following:
- detailed construction routes for all HGVs;
  - restrictions on HGVs during certain times of the day such as at school drop off and pick up times; and
  - procedures for AILs and Hazardous Loads.
- 6.10.35 The CWTP would be aimed at construction workers and would set out measures to reduce the impact of workers travelling to and from site and could potentially include the following:
- targets for achieving a minimum level of car sharing amongst workers;
  - minibuses which would pick up workers from key local accommodation centres;
  - measures to manage the level of car parking on site; and
  - measures to encourage workers to travel by more sustainable mode of travel, wherever possible.
- 6.10.36 A final CTMP and CWMP would be secured by requirement of the draft DCO and prepared by the Contractor for agreement with the LHA/NH (where relevant) prior to starting on site.

## **6.11 Materials and Waste**

- 6.11.1 This section presents an initial baseline for material and waste relevant to the Proposed Development. In addition, this section provides an overview of the assessment methodology to be followed for the environmental assessment and identifies the potential effects provisionally identified.

- 6.11.2 This section follows the methodology set out in the IEMA guide to: Materials and Waste in Environmental Impact Assessment, Guidance for a Proportionate Approach (referred from herein as the '*IEMA Guidance*') (Ref 6-209).
- 6.11.3 For the purpose of this Scoping Report, materials and waste comprise:
- The consumption of materials (key construction materials only including concrete, aggregate, asphalt and steel); and
  - The generation and management of waste.
- 6.11.4 Materials are defined in the IEMA Guidance as "*physical resources that are used across the lifecycle of a development. Examples include key construction materials such as concrete, aggregate, asphalt and steel.*"
- 6.11.5 Other material assets considered include built assets such as landfill void capacity, waste management facilities and allocated/safeguarded mineral and waste sites.
- 6.11.6 Waste is defined as per the European Waste Framework Directive (E Waste FD) (Ref 6-210) as "*any substance or object which the holder discards or intends or is required to discard*".

### **Baseline Conditions**

#### *Study Areas*

- 6.11.7 The study areas for the assessment of impacts related to materials and waste are defined in line with the IEMA Guidance (Ref 6-209).
- 6.11.8 Within this section, study areas are defined for the following:
- construction and operational waste generation;
  - use of construction and operation materials (key construction materials only);
  - non-hazardous, inert and hazardous construction waste management;
  - non-hazardous, inert and hazardous operational waste management;
  - availability of key construction materials;
  - impact on allocated/safeguarded mineral and waste sites; and
  - presence of MSAs.

#### *Proposed Development Study Area*

- 6.11.9 The Proposed Development study area for construction and operational waste generation and use of construction and operation materials (key construction materials only) comprises the Site boundary. The study area is deemed to include the footprint of the proposed works, together with any temporary land requirements during the construction. This may include temporary offices, compounds and storage areas.
- 6.11.10 The Proposed Development study area for the impacts on allocated/safeguarded mineral and waste sites is defined by the Site boundary. Impacts on allocated/safeguarded waste sites are not included in the IEMA Guidance, however they are included for completeness and a high-level assessment of impacts on such sites will be considered in the assessment if appropriate. There are currently no allocated/safeguarded mineral or waste sites within the Site boundary.

- 6.11.11 Impacts on MSAs are not assessed in the materials and waste assessment in accordance with the IEMA Guidance. MSAs are included for context in the baseline, since MSAs are a planning consideration and further consultation and assessment in accordance with Mineral Planning Authority policies may be required at a later stage.
- 6.11.12 The Main Site is located within the administrative area of NELC, however the gas pipeline route corridor and grid connection route corridor crosses into those of WLDC (and WLDC/LCC) and also NLC.

#### Expansive Study Area

- 6.11.13 The expansive study area for non-hazardous and inert waste management is Yorkshire and the Humber (as defined by the Environment Agency). This is the region in which the Main Site is located. The expansive study area includes the following sub-regions as outlined in the EA's 2022 Waste Summary Tables for England – Version 2 (Ref 6-211); Former Humberside (including North East Lincolnshire and North Lincolnshire), North Yorkshire, South Yorkshire, West Yorkshire. The expansive study area for non-hazardous and inert waste management is defined based on professional judgement and informed by consideration of the proximity principle and value for money.
- 6.11.14 The expansive study area for hazardous waste management is England. The study area is defined based on professional judgement and informed by consideration of the proximity principle and value for money.
- 6.11.15 The proximity principle for hazardous waste in England is outlined in Principle 2 – Infrastructure Provision in the Strategy for Hazardous Waste Management in England *“We look to the market for the development of hazardous waste infrastructure, which implements the hierarchy for the management of hazardous waste and meets the needs of the UK to ensure that the country as a whole is self sufficient in hazardous waste disposal, facilities are put in place for hazardous waste recovery in England, and the proximity principle is met.”* (Ref 6-212). Planning for hazardous waste management is also undertaken at a national level.
- 6.11.16 The expansive study area for availability of key construction materials (aggregates, asphalt, concrete and steel) is national (United Kingdom (UK) or Great Britain (GB)) and the Yorkshire and Humber region (dependent on baseline information availability).

#### Current Baseline

##### Availability of Key Construction Materials

- 6.11.17 At the time of writing, the exact quantities of key construction materials required for the Proposed Development are unknown as the design is in development.
- 6.11.18 UK, GB and regional data has been used to establish a quantitative national baseline of the consumption for key constructional materials. Table 6.59 summarises national consumption in 2022 for aggregates, asphalt and concrete and national consumption in 2018 for steel (the most recent years for which data is available), which are the key construction materials expected to be used during the construction of the Proposed Development. Regional data is presented in Table 6.60. It is assumed that the majority of key construction materials would be sourced locally, taking into account the proximity principle and value for money.

**Table 6.59 National consumption and demand for key construction materials**

<b>Material</b>	<b>National consumption (million tonnes, year)</b>	<b>Baseline data year</b>	<b>Data description</b>
Steel	17	2018	UK total consumption (Ref 6-213)
Aggregates of which:	279.8	2022	Minerals and mineral products sales in Great Britain (Ref 6-214)
Crushed rock	148.2		
Sand and gravel – land won	47.7		
Sand and gravel – marine	14.3		
Recycled and secondary	69.6		
Asphalt	28.3		
Ready-mixed concrete	52.7		
Concrete products	24.8		

**Table 6.60 Construction material sales by region**

<b>Construction material</b>	<b>Yorkshire and the Humber</b>
Crushed rock (million tonnes)	9.2
Sand and gravel (million tonnes)	2.1
Ready-mixed concrete (million m <sup>3</sup> )	1.1
Ready-mixed concrete (million tonnes converted from m <sup>3</sup> above)	2.6
Asphalt (million tonnes)	1.9

6.11.19 There is no publicly available information on any potential long-term changes to this national and regional demand by the time of construction of the Proposed Development. Construction material demand such as ready mixed concrete is closely aligned to both the quantity of construction taking place and the general economy, therefore it is deemed inappropriate to forecast future demand as the demand is unlikely to be linear. It is therefore not possible to set a future baseline for resources. Therefore, future consumption is assumed to be the same as the current baseline as outlined in Table 6.59 and Table 6.60.

6.11.20 Potential recycled contents for the main construction materials are outlined in Table 6.61 These “good practice” rates are derived from the Waste Resources Action Plan’s (WRAP) Designing Out Waste Tool for Civil Engineering (Ref 6-215).

**Table 6.61 Potential Recycled Content**

<b>Material Type</b>	<b>Potential recycled content (% by weight)</b>
Concrete	16
Asphalt	25
Aggregates	50
Steel reinforcement	100
Structural steel	60

**Mineral Safeguarding Areas, Allocated/Safeguarded Mineral and Waste Sites**

6.11.21 The Site passes through an MSA for sand and gravel in North East Lincolnshire District.

6.11.22 The Site boundary does not pass through any allocated/safeguarded waste sites. There are other waste sites and waste applications in the Site but none are within the Main Site or proposed off-site laydown area (EA, Environmental Permitting Regulations – Waste Sites (Ref 6-216).

#### Landfill Capacity

6.11.23 Baseline information consists of current landfill capacity in Yorkshire and the Humber for non-hazardous waste and England for hazardous waste, as outlined in the EA’s 2022 Waste Summary Tables for England – Version 2 (Ref 6-211) and Table 6.62 Landfill Capacity (2022) in Yorkshire and the Humber and England.

6.11.24 For non-hazardous waste, total landfill capacity in Yorkshire and the Humber region (all types excluding non-hazardous restricted) at the end of 2022 was approximately 67 million m<sup>3</sup>.

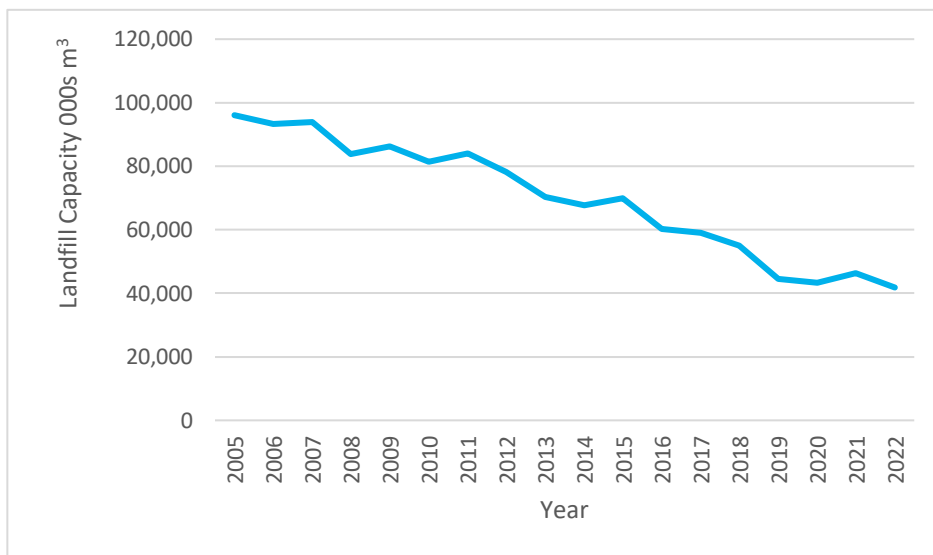
6.11.25 For hazardous waste, total merchant landfill capacity in England at the end of 2022 was approximately 7.9 million m<sup>3</sup>. Hazardous restricted sites are not included since that capacity may not be available to the Proposed Development. Restricted landfills only accept waste from a restricted set of sources and producers, commonly the site operator e.g. a manufacturing site.

**Table 6.62 Landfill Capacity (2022) in Yorkshire and the Humber and England**

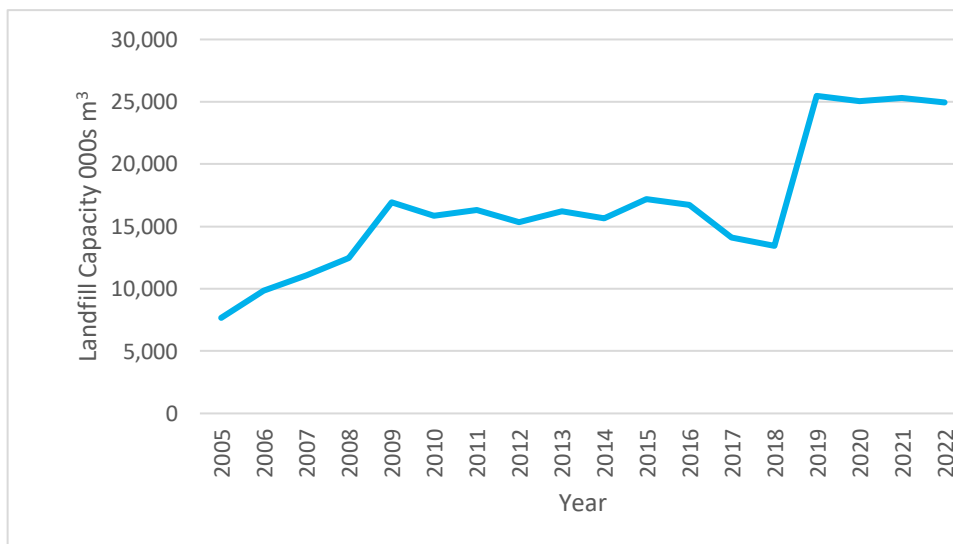
<b>Landfill Type</b>	<b>Yorkshire and the Humber Landfill Capacity (000s m<sup>3</sup>)</b>	<b>England Landfill Capacity (000s m<sup>3</sup>)</b>
Hazardous Merchant	Not applicable, hazardous waste assessed at the England level	7,922
Non-hazardous with Stable Non-reactive hazardous waste (SNRHW) cell	1,243	Not applicable, non-hazardous and inert waste assessed at the regional level
Non-hazardous	40,580	
Inert	24,928	
<b>Total</b>	<b>66,752</b>	

6.11.26 The EA has published landfill capacity data each year since 2005. The historic capacity trend for 2005-2022 for inert and non-hazardous waste in the Yorkshire and Humber region and for hazardous waste in England, is presented in Plate 6.7, Plate 6.8 and Plate 6.9.

**Plate 6.7 Historic Landfill Capacity Trend (2005-2022) for Non-hazardous Waste in Yorkshire and Humber ('000s m<sup>3</sup>)**

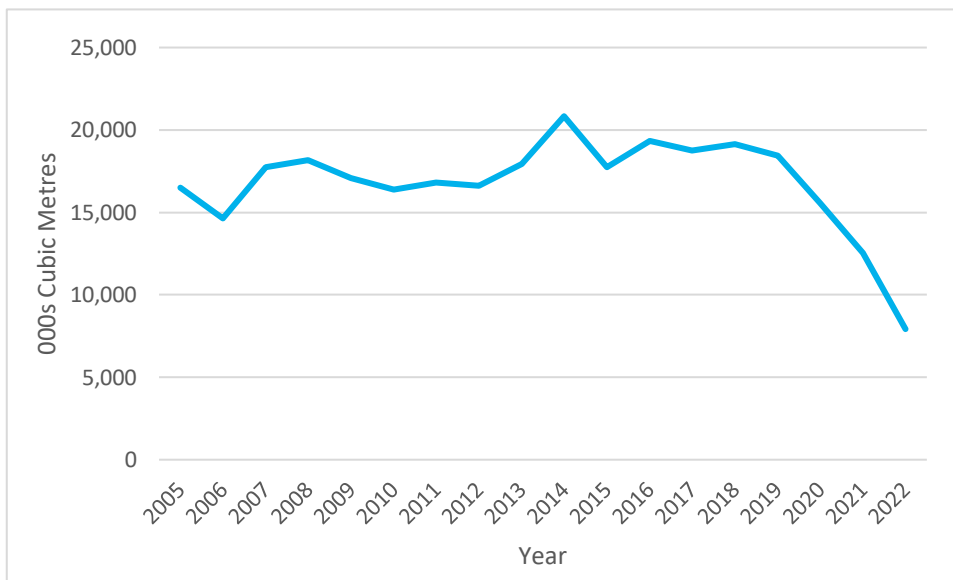


**Plate 6.8 Historic landfill Capacity Trend 2005-2022 for Inert Waste in Yorkshire and the Humber ('000s m<sup>3</sup>)**





**Plate 6.9 Historic Landfill Capacity Trend 2005-2022 for Hazardous Waste in England ('000s m<sup>3</sup>)**



#### Waste Management Infrastructure

6.11.27 Capacity of other types of waste infrastructure is publicly available (e.g. Environmental Permitting Regulations – Waste Sites (Ref 6-216), however the permitted capacity is not necessarily representative of the actual operational capacity of the infrastructure. Therefore, input data are collated for the expansive study areas from the EA’s Waste Data Interrogator 2022 – Waste Received (Excel) – Version 2 (Ref 6-217) and presented in 63. Inputs are not totalled since the double counting of waste in the Waste Data Interrogator cannot be discounted.

**Table 6.63 Summary of Waste Inputs by Facility Type 2022**

Facility Type	Yorkshire and the Humber (tonnes received)
Landfill	4,699,570
Metal Recycling Site	2,066,585
On/In Land	1,029,020
Transfer	5,349,356
Treatment	16,167,935
Combustion	126,603
Incineration	2,776,309
Storage	354,371
Processing	274,871

6.11.28 The IEMA Guidance (page 14) “does not consider waste processing and recovery facilities as sensitive receptors, rather: they are part of a system that has the potential to reduce the magnitude of adverse impacts associated with waste generation and disposal. Waste processing and recovery facilities are, hence, different to landfills, in that the latter are finite resources.” Therefore, a full list of waste management infrastructure is not included in the baseline.

#### National Hazardous Waste Management Facilities

6.11.29 Since some of the operational hazardous wastes likely to be generated by the Proposed Development will not be suitable for landfill disposal (e.g. liquid waste),

hazardous operational waste is compared to national hazardous waste management facility capacity in this assessment.

- 6.11.30 Liquid hazardous waste from the Proposed Development operation may be managed by high-temperature incineration or by physical-chemical treatment.
- 6.11.31 Due to the specialised nature of hazardous waste management, hazardous waste facilities typically receive wastes from a wide region, and therefore this assessment considers the national capacity for managing hazardous wastes.
- 6.11.32 The EA's 2022 Waste Summary Tables for England – Version 2 reported that the remaining merchant (non-restricted) hazardous landfill capacity in England was 7.9 million m<sup>3</sup> in 2022.
- 6.11.33 There are a number of high-temperature incinerators for hazardous waste in England (excluding facilities which manage only clinical waste and received less than 500 tonnes), as well as cement kilns which are permitted to accept hazardous waste. These facilities as reported in the EA's Waste Data Interrogator for 2022, and are shown in Table 6.64.

**Table 6.64 Hazardous Waste Incineration Facilities and Cement Kilns Accepting Hazardous Waste**

<b>Facility</b>	<b>Location</b>	<b>2021 Waste Received (Tonnes of Hazardous Waste)</b>
<i>Hazardous Waste Incinerators</i>		
Avonmouth Treatment Centre	Bristol	5,660
East Kent Waste Recovery Facility	Kent	4,442
Ellesmere Port Incinerator	Cheshire	66,817
Fawley HT Incinerator	Hampshire	30,677
Fine Environmental Services – Seal Sands	Tees Valley	8,008
Twinwoods Co-incinerator	Bedford	3,358
Avonmouth Treatment Centre	Bristol	5,660
Derriford Incinerator	Devon	2,821
Tradebe Heysham Limited	Lancashire	11,723
<i>Cement Kilns accepting Hazardous Waste</i>		
Cauldon Cement Plant	Staffordshire	14,811
Ketton Works	Rutland	24,022
Tunstead Cement and Lime Works	Derbyshire	8,790
Rugby Cement Plant	Rugby	22,366
Ribblesdale Cement Works	Ribble Valley	27,211
Whitwell Quarry Lime Works	Derbyshire	31,411
<b>Total</b>		<b>262,117</b>

- 6.11.34 The EA's Waste Data Interrogator for 2022 shows that the following quantities of liquid hazardous waste were treated by permitted facilities in England (excluding waste in European Waste Catalogue (EWC) Code Chapter 13 'Oil Wastes and Wastes of Liquid Fuels') – refer to Table 6.65. Inputs are totalled, however, double counting of waste in the Waste Data Interrogator cannot be discounted.

**Table 6.65 Hazardous Liquid Waste Treatment Facilities in England**

Facility Permit Type	2022 Waste Received (tonnes)
T05: Physico-chemical treatment installation	251,585
T06: Chemical treatment installation	100,465
T10: Haz waste treatment installation	174,904
T11: Haz waste transfer/treatment installation	45,932
<b>Total</b>	<b>572,886</b>

**Historic and Permitted Landfills**

6.11.35 As outlined in the EA's Permitted Waste Sites – Authorised Landfill Site Boundaries spatial data (Ref 6-221) two authorised landfills (Landfill No 4, Acordis UK Limited and Immingham Landfill Site, Integrated Waste Management Limited) are located within the Site but are not within the Main Site or off-site laydown area.

6.11.36 Historic landfills are potentially relevant to this assessment since excavations in historic landfill can give rise to waste that would require management. The EA's Historic Landfill Sites spatial data (Ref 6-219) identifies seven historic landfill in the Site. None of the landfills are within the Main Site or off-site laydown area. Some are in the vicinity of the gas pipeline route and grid connection route. Additional information on these landfill sites is presented in Table 6.66.

**Table 6.66 Historic Landfill**

Site Name	Site Address	Licence Holder	Licence Issued	Licence Surrendered	Waste Type
No. 3 Landfill	P O Box 24, Grimsby, Greatcoates Works, N E Lincs	Acordis UK Limited	20/04/1983	13/10/2008	Industrial
Great Coates	Grimsby	Acordis (formerly Courtaulds Limited)	No information, first input 1971	No information	Industrial
Courtaulds No 2 Landfill	Greatcoates Works, Grimsby, Lincolnshire	Courtaulds Limited	No information, first input 1970	No information, last input 1980	Industrial and inert
Courtaulds No 2 Landfill	No 2 Landfill, Grimsby, N E Lincs	Acordis UK Limited	10/07/1995	13/10/2008	Industrial
Marsh Lane	Stallingborough	No information	No information	No information	No information
Kiln Lane	Stallingborough	No information	No information	No information	No information
Western Roadtrip	Immingham Docks	British Transport Docks Board Lincolnshire	22/06/1977	26/01/1990	Inert, industrial, commercial, household

**Targets**

6.11.37 The national target for recovery of construction and demolition waste is 70% by weight, as set out in the E Waste FD and the Waste Management Plan for England (Ref 6-220). The target specifically excludes naturally occurring materials with EWC Code 17 05 04 (17 05 04 soil and stones other than those mentioned in 17 05 03\* (soils and

stone containing dangerous substances)). Recovery is deemed to include reuse, recycling and other recovery e.g. energy recovery.

6.11.38 A good practice landfill diversion target of 90% has been achieved and exceeded by major UK developments as outlined in the IEMA Guidance. In 2020, the UK generated 59.1 million tonnes of non-hazardous construction and demolition (C&D) waste, of which 54.8 million tonnes was recovered. This represents a recovery rate of 92.6% (Ref 6-221).

6.11.39 Standard, good and best practice recovery rates by material are provided by WRAP (Ref 6-222). Recovery rates for key construction materials and other construction wastes relevant to the Proposed Development are provided in Table 6.67.

**Table 6.67 Standard, Good and Best Practice Recovery Rates by Material**

<b>Material</b>	<b>Standard practice recovery (%)</b>	<b>Good practice recovery (%)</b>	<b>Best practice recovery (%)</b>
Metals	95	100	100
Packaging	60	85	95
Concrete	75	95	100
Inert	75	95	100
Plastics	60	80	95
Miscellaneous	12	50	75
Electrical equipment	Limited information	70	95
Cement	Limited information	75	95
Liquids and oils	100	100	100
Hazardous	50	Limited information, cannot be 100% since some hazardous waste e.g. asbestos must be landfilled.	

### **Legislation, Policy and Guidance**

6.11.40 The Legislation, Policy and Guidance section provides an overview of the relevant legislation, planning policy and technical guidance relevant to the materials and waste assessment.

#### *Legislation*

6.11.41 The following legislation is taken into account:

- E Waste FD;
- The Environmental Protection Act (1990) (Ref 6-223);
- The Hazardous Waste (England and Wales) Regulations (2005) as amended (Ref 6-224);
- The Waste (England and Wales) Regulations (2011) as amended (Ref 6-225);
- The EPR (2016) as amended; and
- The Environment Act 2021.

6.11.42 The Waste (England and Wales) Regulations 2011 (as amended) transpose the requirements of the E Waste FD in England and Wales and require the SoS to establish waste prevention programmes and waste management plans that apply the waste hierarchy. The waste hierarchy is defined in the E Waste FD and prioritises waste prevention, followed by preparing for reuse, recycling, recovery and finally disposal as means of management of waste.

6.11.43 The Waste (England and Wales) Regulations 2011 (as amended) require businesses to apply the waste hierarchy when managing waste, and also require that measures are taken to ensure that, by the year 2020 and beyond, at least 70% by weight of non-hazardous C&D waste is subjected to material recovery. The target specifically excludes naturally occurring materials with EWC Code 17 05 04 (17 05 04 soil and stones other than those mentioned in 17 05 03\* (soils and stone containing dangerous substances)).

6.11.44 The following considerations must also be taken into account:

- environmental protection principles of precaution and sustainability;
- proximity principle for treatment and disposal of waste to be as close to its source as possible;
- technical feasibility and economic viability;
- protection of resources; and
- overall environmental, human health, economic and social impacts.

*National Planning Policy*

6.11.45 The NPS that are considered to be of relevance to the Proposed Development include:

- Overarching NPS for Energy (EN-1).

6.11.46 The following national policies are also relevant to the Proposed Development:

- The NPPF;
- Guidance on the planning for mineral extraction in plan making and application process (2014) (Ref 6-226);
- National Planning Policy Guidance for Waste (2015) (Ref 6-227);
- National Planning Policy for Waste (2014) (Ref 6-228);
- The Waste Management Plan for England (2021);
- A Green Future: Our 25 Year Plan to Improve the Environment (2018);
- Our Waste, Our Resources, A Strategy for England (Resources and Waste Strategy for England) (2018) (Ref 6-229); and
- Environmental Improvement Plan (2023).

*Local Planning Policy*

6.11.47 The Main Site is located within the administrative area of NELC, however gas pipeline route corridor and grid connection route corridor cross into those of WLDC (and LCC) and also NLC. The following local planning documents are relevant to the Proposed Development:

- North East Lincolnshire Local Plan;
- North East Lincolnshire Policies Map (Ref 6-230);
- Central Lincolnshire Local Plan (covers West Lindsey Council);
- Lincolnshire Minerals and Waste Local Plan – Core Strategy and Development Management Policies (adopted 2016 relevant to West Lindsey) (Ref 6-231);
- Lincolnshire Minerals and Waste Local Plan – Site Locations (Ref 6-232);
- The North Lincolnshire Local Development Framework; and
- North Lincolnshire Local Plan Publication Draft (Ref 6-233).

6.11.48 Local Planning Policies relevant to materials and waste is detailed below.

#### North East Lincolnshire Local Plan 2013 to 2032

6.11.49 The North East Lincolnshire Local Plan sets out NELC's vision and strategy for the Borough until 2032 and the criteria for planning applications, guiding the decision-making process. The Local Plan also sets out the Council's approach to accommodating the future requirements in relation to the demands on the Borough's mineral resource and waste needs. Policies relevant to materials and waste include:

- Policy 44 – Safeguarding minerals and related infrastructure.
- Policy 45 – Future mineral extraction and Secondary Aggregates.
- Policy 47 – Future requirements for waste facilities.
- Policy 48 – Safeguarding waste facilities and related infrastructure.
- Policy 49 – Restoration and aftercare (waste).

6.11.50 The North East Lincolnshire Local Plan Policy Map shows the extent of MSAs for sand and gravel and blown sand and existing waste management facilities. The Site boundary passes through the MSA for sand and gravel. The Site boundary does not pass through any safeguarded mineral or waste sites.

#### Central Lincolnshire Local Plan (adopted 2023)

6.11.51 The Central Lincolnshire Local Plan is used to make decisions on planning applications across the City of Lincoln, North Kesteven and West Lindsey areas. The local plan replaced the Central Lincolnshire Local Plan adopted in 2017 which replaced the West Lindsey Local Plan 2006. There are no policies relevant to minerals and waste in this local plan. All planning policy for minerals and waste is covered in the Lincolnshire Minerals and Waste Plan below.

#### Lincolnshire Minerals and Waste Local Plan – Core Strategy and Development Management Policies

6.11.52 The first part of the Lincolnshire Minerals and Waste Local Plan is the Core Strategy and Development Management Policies document. This document sets out the key principles to guide the future winning and working of minerals and the form of waste management development in the County up to 2031. The plan also sets out the development management policies against which planning applications for minerals and waste development will be considered. Relevant policies include:

- Policy M11 – Safeguarding of Mineral Resources.
- Policy M12 – Safeguarding of Existing Mineral Sites and Associated Minerals Infrastructure.
- Policy W8 – Safeguarding Waste Management Sites.
- Policy DM1 – Presumption in favour of sustainable development.

6.11.53 The Lincolnshire Minerals and Waste Local Plan figures show safeguarded mineral resources, existing mineral sites and associated minerals infrastructure and safeguarded waste management sites:

- Lincolnshire Minerals and Waste Local Plan Figure 1: Lincolnshire MSAs Map shows the extent of Limestone, sand and gravel and windblown sand MSAs. The Site boundary does not coincide with through any MSAs.

- Lincolnshire Minerals and Waste Local Plan Figure 3: Lincolnshire Site Specific MSA Map shows the extent of site specific MSAs. The Site boundary does not coincide with any of these site specific MSAs.
- Lincolnshire Minerals and Waste Local Plan Figure 4: Key Diagram shows the extent of sand and gravel areas of search. The Site boundary does not coincide with any of these areas of search.
- Lincolnshire Minerals and Waste Local Plan Figure 6: Existing Minerals and Waste Sites West Lindsey District shows existing sites. The Site boundary does not coincide with any of these sites.

#### Lincolnshire Minerals and Waste Local Plan – Site Locations

6.11.54 The second part of the Lincolnshire Minerals and Waste Local Plan is the Site Locations document which includes specific proposals and policies for the provision of land for mineral and waste development. Relevant policies include:

- Policy SL1 – Mineral Site Allocations.
- Policy SL2 – Safeguarding Mineral Allocations.
- Policy SL4 – Waste Site and Area Allocations.

6.11.55 The Lincolnshire Minerals and Waste Local Plan ‘Figure 1: Site Locations Policies Map’ show the extent of allocated mineral sites, allocated waste sites and allocated waste areas. The Site boundary does not coincide with any of these sites.

#### The North Lincolnshire Local Development Framework

6.11.56 The North Lincolnshire Local Development Framework is a suite of Development Plan Documents (DPDs) which set out the local planning policy for the area. The most important part of the Local Development Framework, the Core Strategy, sets out a long term vision for North Lincolnshire and provides a blueprint for managing growth and development in the area up to 2026. Relevant policies include:

- CS20 – Sustainable Waste Management.
- CS21 – Minerals.

#### North Lincolnshire Local Plan Publication Draft

6.11.57 North Lincolnshire is preparing a new single Local Plan which is currently under examination and when adopted, will replace the current North Lincolnshire Local Development Framework (Core Strategy and the Housing and Employment Land Allocations DPDs). The new Local Plan “*will set out a clear vision and objectives for the future development of the area, addressing needs and opportunities in relation to housing, the economy, community facilities and infrastructure. It will also be a basis for safeguarding the environment, adapting to climate change and securing good design*”. Its policies and proposals will be used to guide decisions and investment on development and regeneration up to 2038. Relevant policies include:

- MIN2 – Mineral Safeguarding.
- MIN4 – Recycled and Secondary Aggregates.
- WAS1 – Waste Management Principles.
- WAS4 – Safeguarding Existing Waste Sites & Infrastructure.
- WAS6 – Waste Management in Development.
- WAS7 – Restoration and Aftercare.

6.11.58 The associated North Lincolnshire Policy Map shows the extent of waste sites and infrastructure, MSAs, and mineral sites and infrastructure. The Site boundary does not coincide with any of these areas or sites.

#### *Guidance*

6.11.59 The materials and waste assessment will be carried out in accordance with the following:

- IEMA Guidance (Ref 6-209);
- Contaminated Land: Applications in Real Environments (CL:AIRE) Definition of Waste: Development Industry Code of Practice (DoWCoP), v2 (2011) (Ref 6-234); and
- WRAP Designing Out Waste: A Design Team Guide for Civil Engineering.

#### **Impact Assessment Methodology**

6.11.60 This section outlines the methodology that will be employed for assessing the likely significant effects associated with materials and waste. The IEMA Guidance offers two methods for the assessment of waste. Method W1 – void capacity - has been selected as this is a more detailed methodology and is appropriate for larger and more complex projects.

6.11.61 The sensitive receptors for this assessment of construction impacts are:

- Landfill void capacity in the expansive study area of Yorkshire and the Humber (non-hazardous landfill void capacity) and England (hazardous landfill void capacity) – as defined in the IEMA Guidance *“landfill is a finite resource, and hence – through the ongoing disposal of waste – there is a continued need to expand existing and develop new facilities, This requires the depletion of natural and other resources which, in turn, adversely impacts the environment.”*
- Materials, national consumption of key construction materials – as outlined in the IEMA Guidance *“materials are, in their own right, sensitive receptors. Consuming materials impacts upon their immediate and (in the case of primary material) long-term availability; this results in the depletion of natural resources and adversely impacts the environment.”*

6.11.62 The IEMA Guidance *“does not consider waste processing and recovery facilities as sensitive receptors, rather: they are part of a system that has the potential to reduce the magnitude of adverse impacts associated with waste generation and disposal. Waste processing and recovery facilities are, hence, different to landfills, in that the latter are finite resources.”*

6.11.63 The assessment of materials and waste will consider the following:

- Waste producers have a legal duty of care to manage their waste in accordance with regulations and to ensure that any waste leaving the site where it is generated is transferred to a suitably licensed facility for further treatment or disposal.
- Facilities transferring, treating or disposing of waste must be either licensed or apply for an exemption from a license, and impacts arising from the operation of waste management facilities are considered as part of the planning and permitting process for these facilities themselves.



- As part of their planning function, Waste Planning Authorities (WPAs) are required to ensure that sufficient land is available to accommodate facilities for the treatment of all waste arising in the area, either within the WPA area, or through export to suitable facilities in other areas.
- Minerals Planning Authorities (MPAs) are similarly required to ensure an adequate supply of minerals, sufficient to meet the needs of national and regional supply policies, and local development needs.

*Methodology for Determining Construction Effects*

6.11.64 Materials will be used during the construction of the Proposed Development – the key construction materials expected to be used are steel, aggregates, asphalt and concrete.

6.11.65 Waste will be generated during construction of the Proposed Development. A large proportion of this waste will be recycled, with the remainder disposed off-site by a licensed waste contractor.

*Materials*

6.11.66 Effects upon materials during construction of the Proposed Development will be assessed by:

- establishing the baseline for national and regional consumption of key construction materials by weight;
- assessing the sensitivity of materials as related to the availability and types of materials to be consumed by the Proposed Development in construction;
- establishing the quantities of key construction materials required for the construction of the Proposed Development; and
- comparing the total quantities of key construction materials with the most recent national demand (utilising a percentage approach).

*Waste*

6.11.67 Effects upon waste during construction of the Proposed Development will be assessed by:

- establishing the baseline landfill void capacity in the expansive study areas;
- assessing the sensitivity of landfill void capacity;
- establishing the quantities of construction, demolition and excavation waste to be generated during the construction of the Proposed Development; and
- comparing the total waste arising from the construction of the Proposed Development against the landfill void capacity (using a percentage approach) assuming a worst case that waste goes to landfill.

*Methodology for Determining Operational Effects*

6.11.68 The sensitivity of receptors and magnitude of impacts for waste for operation will be assessed through the following:

- establishing the baseline landfill void capacity in the expansive study areas;
- assessing the sensitivity of landfill void capacity;
- establishing the quantities of operational waste to be generated during the operation of the Proposed Developments;
- comparing the total waste arising from the operation of the Proposed Developments against the landfill void capacity (utilising a percentage approach); and

- comparing operational hazardous waste arisings from the operation of the Proposed Developments against national hazardous waste management facility waste inputs (utilising a percentage approach).

*Assessment Criteria*

*Sensitivity*

6.11.69 The sensitivity of materials relates to the availability and type of construction material to be consumed by the Proposed Development. The IEMA Guidance criteria described within Table 6.68 will be used to determine the sensitivity of materials.

**Table 6.68 Materials Receptor Sensitivity**

<b>Effects</b>	<b>Criteria for materials receptor sensitivity</b>
Negligible	On balance, the key materials required for the construction of the Proposed Development are forecast (through trend analysis and other information) to be free from known issues regarding supply and stock. <i>And/or</i> are available comprising a very high proportion of sustainable features and benefits compared to industry-standard materials*.
Low	On balance, the key materials required for the construction of the Proposed Development are forecast (through trend analysis and other information) to be generally free from known issues regarding supply and stock. <i>And/or</i> are available comprising a high proportion of sustainable features and benefits compared to industry-standard materials.
Medium	On balance, the key materials required for the construction of the Proposed Development are forecast (through trend analysis and other information) to suffer from some potential issues regarding supply and stock. <i>And/or</i> are available comprising some sustainable features and benefits compared to industry-standard materials.
High	On balance, the key materials required for the construction of the Proposed Development are forecast (through trend analysis and other information) to suffer from known issues regarding supply and stock. <i>And/or</i> Comprise little or no sustainable features and benefits compared to industry-standard materials.
Very High	On balance, the key materials required for the construction of the Proposed Development are forecast are known to be insufficient in terms of production, supply and/or stock. <i>And/or</i> Comprise no sustainable features and benefits compared to industry-standard materials.

*\* Subject to supporting evidence, sustainable features and benefits could include, for example, materials or products that: comprise reused, secondary or recycled content (including excavated and other arisings); support the drive to a circular economy; or in some other way reduce lifetime environmental impacts.*

6.11.70 The sensitivity of waste relates to availability of landfill capacity in the absence of the Proposed Development. As outlined in the IEMA Guidance “*landfill capacity is recognised as an unsustainable and increasingly scarce option for managing waste*”. The sensitivity of landfill capacity is assessed based on a review of historic landfill void capacity trends where available and information from relevant policy documents.

6.11.71 The criteria described within Table 6.69 and Table 6.70 will be used to determine the sensitivity of landfill capacity.

**Table 6.69 Intert and non-hazardous landfill capacity sensitivity**

<b>Effects</b>	<b>Criteria for inert and non-hazardous landfill capacity</b>
Negligible	Across construction and/or operation phases, the baseline/future baseline (i.e. without the Proposed Development) of regional inert and non-hazardous landfill capacity expected to remain unchanged, or is expected to increase through a committed change in capacity.
Low	Across construction and/or operation phases, the baseline/future baseline (i.e. without the Proposed Development) of regional inert and non-hazardous landfill capacity is expected reduce minimally by <1% as a result of wastes forecast.
Medium	Across construction and/or operation phases, the baseline/future baseline (i.e. without the Proposed Development) of regional inert and non-hazardous landfill capacity is expected reduce noticeably by 1-5% as a result of wastes forecast.
High	Across construction and/or operation phases, the baseline/future baseline (i.e. without the Proposed Development) of regional inert and non-hazardous landfill capacity is expected reduce considerably: by 6-10% as a result of wastes forecast.
Very High	Across construction and/or operation phases, the baseline/future baseline (i.e. without the Proposed Development) of regional inert and non-hazardous landfill capacity: <ul style="list-style-type: none"> <li>• is expected to reduce very considerably (by &gt;10%);</li> <li>• is expected to end during construction or operation;</li> <li>• is already known to be unavailable; or,</li> <li>• would require new capacity or infrastructure to be put in place to meet forecast demand.</li> </ul>

**Table 6.70 Hazardous landfill capacity sensitivity**

<b>Effect</b>	<b>Criteria for hazardous landfill capacity sensitivity</b>
Negligible	Across the construction and/or operation phases, the baseline/future baseline (i.e. without the Proposed Development) of regional (or where justified, national) hazardous landfill capacity is expected to remain unchanged, or is expected to increase through a committed change in capacity.
Low	Across the construction and/or operation phases, the baseline/future baseline (i.e. without the Proposed Development) of regional (or where justified, national) hazardous landfill capacity is expected to reduce minimally by <0.1% as a result of wastes forecast.
Medium	Across the construction and/or operation phases, the baseline/future baseline (i.e. without the Proposed Development) of regional (or where justified, national) hazardous landfill capacity is: expected to reduce noticeably by 0.1-0.5% as a result of wastes forecast.
High	Across the construction and/or operation phases, the baseline/future baseline (i.e. without the Proposed Development) of regional (or where justified, national) hazardous landfill capacity is expected to reduce considerably by 0.5-1% as a result of wastes forecast.
Very High	Across the construction and/or operation phases, the baseline/future baseline (i.e. without the Proposed Development) of regional (or where justified, national) hazardous landfill capacity:

Effect	Criteria for hazardous landfill capacity sensitivity
	<ul style="list-style-type: none"> <li>is expected to reduce very considerably (by &gt;1%);</li> <li>is expected to end during construction or operation;</li> <li>is already known to be unavailable, or;</li> <li>would require new capacity or infrastructure to be put in place to meet forecast demand.</li> </ul>

#### Magnitude

6.11.72 The magnitude of impact describes the degree of variation from the baseline conditions as a result of the Proposed Development. The methodology for assessing the magnitude of impact from materials comprises a percentage-based approach that determines the influence of construction materials use on the baseline national demand from the construction of the Proposed Development. The criteria used to assess the magnitude of impact for materials are provided within Table 6.71.

**Table 6.71 Materials Magnitude of Impact**

Effects	Criteria for materials magnitude of impacts
No change	Consumption of no materials is required.
Negligible	Consumption of no individual material type is equal to or greater than 1% by volume of the national* baseline availability.
Minor	Consumption of one or more materials is between 1-5% by volume of the national* baseline availability.
Moderate	Consumption of one or more materials is between 6-10% by volume of the national* baseline availability.
Major	Consumption of one or more materials is >10% by volume of the national* baseline availability.

*\*a national baseline is used in the absence of regional construction material consumption data.*

6.11.73 The methodology for assessing the magnitude of impact for waste comprises a percentage-based approach that determines the influence of waste generation from the construction Proposed Development on the baseline landfill capacity. The criteria used to assess the magnitude of impact for resources and waste are provided within Table 6.72 and Table 6.73.

**Table 6.72 Inert and Non-hazardous Waste Magnitude of Impact**

Effects	Criteria for waste magnitude of impacts
No change	Zero waste generation and disposal from the development.
Negligible	Waste generated by the development will reduce expansive Study Area landfill capacity baseline# by <1%.
Minor	Waste generated by the development will reduce expansive Study Area landfill capacity* baseline by 1-5%.
Moderate	Waste generated by the development will reduce expansive Study Area landfill capacity baseline* by 6-10%.
Major	Waste generated by the development will reduce expansive Study Area landfill capacity baseline by >10%.

*\*forecast as the worst-case scenario, during a defined construction and/or operational phase.*

**Table 6.73 Hazardous Waste Management Magnitude of Impact**

<b>Effects</b>	<b>Criteria for waste magnitude of impacts</b>
No change	Zero waste generation and disposal from the development.
Negligible	Waste generated by the development will reduce expansive Study Area landfill capacity baseline# by <0.1%.
Minor	Waste generated by the development will reduce expansive Study Area landfill capacity baseline# by <0.1-0.5%.
Moderate	Waste generated by the development will reduce expansive Study Area landfill capacity baseline* by <0.5-1%.
Major	Waste generated by the development will reduce expansive Study Area landfill capacity baseline# by >1%.

\*forecast as the worst-case scenario, during a defined construction and/or operational phase.

**Significance**

6.11.74 Table 6.74 describes the effect thresholds used in determining the effects and Table 6.75 shows the likely significance of the effect.

**Table 6.74 Effect Thresholds**

		<b>Magnitude of Impact</b>				
		<b>No Change</b>	<b>Negligible</b>	<b>Minor</b>	<b>Moderate</b>	<b>Major</b>
<b>Sensitivity of Receptor</b>	<b>Very High</b>	Neutral	Slight	Moderate or large	Large or very large	Very large
	<b>High</b>	Neutral	Slight	Slight or moderate	Moderate or large	Large or very large
	<b>Medium</b>	Neutral	Neutral or slight	Slight	Moderate	Moderate or large
	<b>Low</b>	Neutral	Neutral or slight	Neutral or slight	Slight	Slight or moderate
	<b>Negligible</b>	Neutral	Neutral	Neutral or slight	Neutral or slight	Slight

**Table 6.75 Likely Significance of Effect**

<b>Effect</b>	<b>Materials</b>	<b>Waste</b>
Neutral	Not significant	Not significant
Slight		
Moderate	Significant	Significant
Large		
Very Large		

**Summary**

6.11.75 Table 6.76 provides the proposed outline scope of the material and waste assessment.

**Table 6.76 Outline Scope of the Material and Waste Assessment**

<b>Proposed Development Phase</b>	<b>Potential Effects</b>	<b>Scope In/Out</b>
Construction	Changes in demand for materials	Scoped in
	Changes in available landfill void capacity	Scoped in
	Changes to allocated/safeguarded mineral site	Scoped out (considered in Planning Statement)
	Changes to allocated/safeguarded waste site	Scoped out
Operation	Changes in availability of materials	Scoped out
	Changes in available landfill void capacity	Scoped in
	Changes in available hazardous waste management facility capacity	Scoped in
Decommissioning	Changes in demand for materials	Scoped out
	Changes in available landfill capacity	Scoped out
	Changes to allocated/safeguarded mineral site	Scoped out
	Changes to allocated/safeguarded waste site	Scoped out

6.11.76 Due to the limitation on information available at this stage, and the uncertainty about the nature of mitigation(s) and the method by which mitigation(s) would be secured, material use (changes in demand for materials) and waste generation during the construction (changes in available landfill void capacity) and waste generation during operation (changes in available landfill void capacity and changes in available hazardous waste management facility capacity) of the Proposed Development is scoped into the assessment.

6.11.77 Changes to allocated/safeguarded mineral and waste sites are scoped out of the materials and waste assessment as these will be considered in the Planning Statement.

6.11.78 The following matters will also be scoped out of the assessment of materials and waste:

- Waste arising from extraction, processing and manufacture of construction components and products. This is based on the assumption that these products and materials are being developed in a manufacturing environment with their own waste management plans, facilities, and supply chain, which are potentially in different regions of the UK or the world and therefore outside of the geographical scope of this study. Such matters cannot be accurately predicted and assessed in the ES as they relate to procurement decisions that cannot be assured.
- Other environmental impacts associated with the management of waste from the Proposed Development e.g., on water resources, air quality, noise or traffic resulting from the generation, handling, on-site temporary storage or off-site transport of materials and waste are addressed separately in other relevant sections.
- Direct impacts on safeguarded/allocated waste sites. The Site does not intersect any such sites therefore this aspect is scoped out of the assessment.

- Direct impacts on MSAs. The Site intersects an MSA for sand and gravel in North East Lincolnshire; however impacts on MSAs are not assessed in the materials and waste assessment in accordance with the IEMA Guidance. MSAs are included for context in the baseline since MSAs are a planning consideration and further consultation and assessment in accordance with MPA policies may be required at a later stage and discussed in the Planning Statement.
- Effects on the availability of materials during operation. Forecast effects are (using professional judgement) considered negligible in relation to the scale and nature of the development.
- Effects associated with decommissioning as the Proposed Development has a long design life and such it is not considered possible to reliably forecast decommissioning requirements and infrastructure far in the future.

6.11.79 The sensitive receptors for this assessment of construction impacts are:

- Landfill void capacity in the expansive study area of Yorkshire and the Humber (non-hazardous landfill void capacity) and England (hazardous landfill void capacity) – as defined in the IEMA Guidance *“landfill is a finite resource, and hence – through the ongoing disposal of waste – there is a continued need to expand existing and develop new facilities, This requires the depletion of natural and other resources which, in turn, adversely impacts the environment.”*
- Materials, national consumption of key construction materials – as outlined in the IEMA Guidance *“materials are, in their own right, sensitive receptors. Consuming materials impacts upon their immediate and (in the case of primary material) long-term availability; this results in the depletion of natural resources and adversely impacts the environment.”*

6.11.80 The IEMA Guidance *“does not consider waste processing and recovery facilities as sensitive receptors, rather: they are part of a system that has the potential to reduce the magnitude of adverse impacts associated with waste generation and disposal. Waste processing and recovery facilities are, hence, different to landfills, in that the latter are finite resources.”*

6.11.81 The assessment of materials and waste will consider the following:

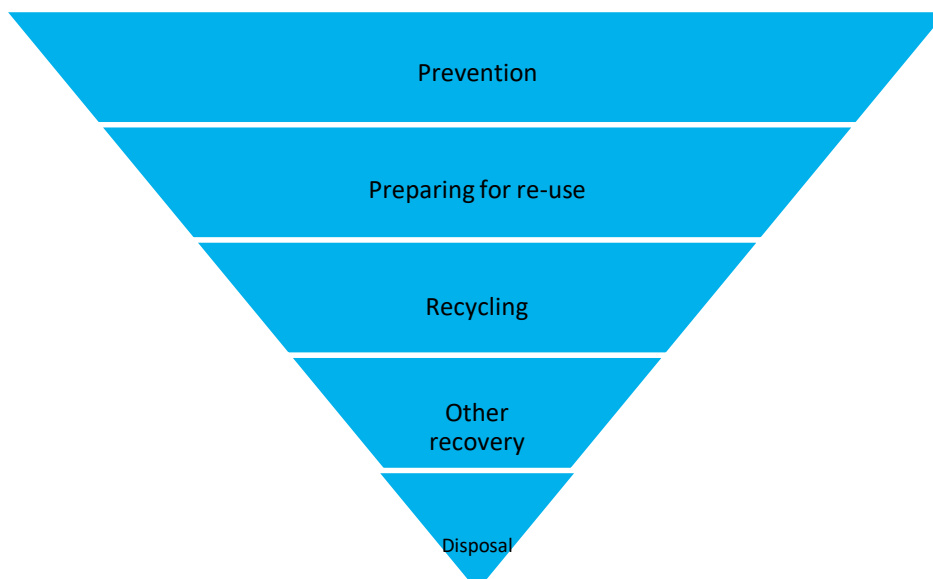
- Waste producers have a legal duty of care to manage their waste in accordance with regulations and to ensure that any waste leaving the site where it is generated is transferred to a suitably licensed facility for further treatment or disposal.
- Facilities transferring, treating or disposing of waste must be either licensed or apply for an exemption from a license, and impacts arising from the operation of waste management facilities are considered as part of the planning and permitting process for these facilities themselves.
- As part of their planning function, WPAs are required to ensure that sufficient land is available to accommodate facilities for the treatment of all waste arising in the area, either within the WPA area, or through export to suitable facilities in other areas.
- MPAs are similarly required to ensure an adequate supply of minerals, sufficient to meet the needs of national and regional supply policies, and local development needs.

## Scope for Mitigation

- 6.11.82 Throughout the EIA, where applicable, the way that likely environmental effects have been or would be avoided, prevented, reduced or offset through design and/or management measures will be described. These are measures that are inherent in the design and construction of the Proposed Development (i.e. 'embedded measures'). Other embedded measures are required regardless of any EIA assessment, as it is imposed, for example, as a result of legislative requirements and/or standard sectoral practices. Some of these embedded measures have been identified at the scoping stage and are described below.
- 6.11.83 The Proposed Development will aim to prioritise waste prevention, followed by preparing for reuse, recycling and recovery and lastly disposal to landfill as per the waste hierarchy (Plate 6.10).
- 6.11.84 The following mitigation measures will be considered and implemented where applicable during the design phases and subsequent construction work:
- Design for reuse and recovery: identifying, securing and using materials that already exist on site, or can be sourced from other projects.
  - Design for materials optimisation: simplifying layout and form to minimise material use, using standard design parameters, balancing cut and fill, maximising the use of renewable materials and materials with recycled content.
  - Design for off-site construction: maximising the use of pre-fabricated structure and components, encouraging a process of assembly rather than construction.
  - Design for the future (deconstruction and flexibility): identify how materials can be designed to be more easily adapted over an asset lifetime and how deconstructability and demountability of elements can be maximised at end of first life.
  - Design for waste and material asset efficient procurement: identify and specify materials that can be acquired responsibly, in accordance with a recognised industry standard.
  - Engineering plan configurations and layouts that show how the most effective use of materials and arisings can be achieved.



**Plate 6.10 The Waste Hierarchy from DEFRA's Guidance on applying the Waste Hierarchy, recreated by AECOM**



- 6.11.85 The construction of the Proposed Development would be subject to measures and procedures defined within a CEMP. The CEMP would include the implementation of industry standard practice and control measures for environmental impacts arising during construction, such as the control of dust and the approach to waste management on site. A Framework CEMP will be included alongside the ES, the construction contractor will use this document to produce their CEMP prior to works commencing on site. An Outline Site Waste Management Plan (OSWMP) will be included with the DCO Application, the construction contractor will use this document to produce their SWMP prior to works commencing on site.
- 6.11.86 A Materials Management Plan (MMP) will be developed under the CL:AIRE Definition of Waste: Development Industry Code of Practice by the construction contractor to support the reuse of excavated materials, minimise off-site disposal; and to demonstrate the necessary lines of evidence to support the proper reuse/off-site disposal of materials and ensure compliance with regulatory guidance.
- 6.11.87 Embedded measures will be considered prior to the assessment of effects to avoid considering assessment scenarios that are unrealistic in practice, i.e. do not take account of such measures even though they are likely to be standard practice and/or form part of the design of the Proposed Development. These will then be followed through the assessment to ensure that realistic likely environmental effects are identified. Where likely significant adverse effects are identified after considering these embedded measures, additional mitigation will be considered, developed and proposed, where reasonably practicable.
- 6.11.88 All additional mitigation will be described within the ES with the rationale for the inclusion of the identified embedded measures clearly stated.

## 6.12 Noise and Vibration

6.12.1 This section sets out the proposed scope and methodology for the assessment of effects of the Proposed Development on noise and vibration.

### Baseline Conditions

6.12.2 Existing ambient sound levels at the Main Site (including the Strategic Mitigation Site) have been measured by Spectrum Acoustic Consultants in February 2023 to assist in the project design (Ref 6-235). The data obtained from surveys will be used to assess impacts on noise sensitive receptors (NSR) including sensitive ecological receptors (see sections 6.13: Terrestrial Ecology and 6.14: Ornithology) shown in Figure 2A in Appendix A. Measurements and site observations indicate that current noise levels are dominated by the South Humber Bank Power Station to the northwest of the Main Site and from Lenzing Fibres to the south of the Main Site.

6.12.3 The nearest human NSR to the Main Site are approximately 1.2 km from the closest boundary of the Main Site and ambient noise measurements were undertaken close to these NSR in October/November 2023 (see NSR-1 and NSR-2 in Table 6.77 and Figure 6I in Appendix A).

**Table 6.77 Noise sensitive receptors**

Ref.	OS Grid Ref.	Description
NSR-1	521614 East 412990 North	Poplar Farm: Residence approximately 1.2 km west of the Site.
NSR-2	521989 East 412012 North	Cress Cottage: Residence approximately 1.2 km southwest of the Site.

6.12.4 All survey work in relation to establishing the baseline ambient sound environment (completed and planned) is undertaken by unattended measurements using sound analyser instrumentation installed at each of the defined NSR positions. Contiguous measurement samples are recorded for typically up to 2 weeks.

### Legislation, Policy and Guidance

#### *National and Regional Policy*

6.12.5 Section 5.12 of Overarching NPS for Energy (EN-1) (2023) relates to noise and vibration and retains the reference to the Noise Policy Statement for England (NPSE) 2010 (Ref 6-236). Paragraph 5.12.7 states that “*the nature and extent of the noise assessment should be proportionate to the likely noise impact.*”

6.12.6 At paragraph 5.12.15, with regards decision making, NPS EN-1 states “*The project should demonstrate good design through selection of the quietest or most acceptable cost-effective plant available; containment of noise within buildings wherever possible, taking into account any other adverse impacts that such containment might cause (e.g. on landscape and visual impacts; optimisation of plant layout to minimise noise emissions; and, where possible, the use of landscaping, bunds or noise barriers to reduce noise transmission).*”

6.12.7 Additional policy in relation to noise is provided in NPS EN-2, EN-4 and EN-5, including in relation to the temporary and permanent sources that have the potential to generate noise and how these should be assessed and mitigated, where appropriate.

- 6.12.8 The NPSE sets out the long-term vision of government noise policy which is to *“Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.”*
- 6.12.9 The aims of the NPSE are to (2.22-2.24):
- *“avoid significant adverse impacts on health and quality of life”;*
  - *“mitigate and minimise adverse impacts on health and quality of life”;* and
  - *“where possible, contribute to the improvement of health and quality of life...”*
- 6.12.10 These aims are developed by reference (2.20-2.21) to the concepts of:
- NOEL (No Observed Effect Level). This is the level below which no effect can be detected.
  - LOAEL (Lowest Observed Adverse Effect Level). This is the level above which adverse effects on health and quality of life can be detected.
  - SOAEL (Significant Observed Adverse Effect Level). This is the level above which significant adverse effects on health and quality of life occur.
- 6.12.11 It recognises that there is no universally applicable objective threshold for these concepts. Consequently, the NOEL, LOAEL and SOAEL are likely to be different for different noise sources and receptors and at different times (2.22).
- 6.12.12 The NPSE recognises that situations whereby noise exceeds the SOAEL should be avoided (2.23). Where the impact is between LOAEL and SOAEL reasonable steps should be taken to minimise and mitigate adverse effects on health and quality of life, but this does not mean that such adverse effects cannot occur (2.24). It is also implied that situations of NOEL would be acceptable in noise terms.
- 6.12.13 The NPPF 2023 sets out the Government’s planning policies for England and how these should be applied by establishing a framework within which locally prepared plans for development can be produced.
- 6.12.14 The NPPF requires (paragraph 180) prevention of new or existing development from contributing to, or being adversely affected by, unacceptable levels of noise pollution.
- 6.12.15 New development (paragraph 191) should be appropriate to its location taking into account the likely effects of pollution on health, living conditions and the natural environment. In doing so it is required to:
- *a) “mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life”;*
  - *b) “identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason”.*
- 6.12.16 Planning policies and decisions should also (paragraph 193) *“ensure that new development can be integrated effectively with existing businesses and community facilities [...]. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or ‘agent of change’) should be required to provide suitable mitigation before the development has been completed.”*

6.12.17 The North East Lincolnshire Local Plan Policy 5 states that all development proposals will be considered with regard to noise.

6.12.18 Policy 31 states *“Proposals for renewable and low carbon energy generating systems will be supported where any significant adverse impacts are satisfactorily minimised and the residual harm is outweighed by the public benefits of the proposal. Developments and their associated infrastructure will be assessed on their merits and subject to the following impact considerations, taking account of individual and cumulative effects: [...] B. local amenity, including noise, air quality, traffic, vibration, dust and visual impact;”*.

*Technical Guidance and Standards*

6.12.19 BS 4142 2014+A1:2019 ‘Methods for rating and assessing industrial and commercial sound’ (BSI, 2014) (Ref 6-237) provides methods for rating and assessing industrial and commercial sound. An initial estimate of the impact of sound on people inside or outside premises used for residential purposes is determined by comparing the Rating Level (sound level from the industrial/commercial source, with a correction applied for any acoustic features that characterise the sound) with the Background Sound Level ( $L_{A90}$  as measured in absence of the industrial/commercial source). The greater the difference by which the Rating Level exceeds the Background Sound Level, the greater the magnitude of impact. BS 4142 states *“a difference of around +10dB or more is likely to be an indication of a significant adverse impact [...]. A difference of around +5dB is likely to be an indication of an adverse impact [...]. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact”*. BS 4142 also advises that for each quantitative assessment, the context in which the sound is placed must be considered and the initial estimate of impact should be modified accordingly.

6.12.20 BS 5228-1 -2: 2009+A1:2014 ‘Code of Practice for Noise and Vibration Control on Construction and Open Sites’ (Ref 6-238) provides useful general advice together with a method for predicting noise from construction sites based on information provided on construction noise levels applicable to various plant and construction operations. Annex E provides informative guidance on assessing the significance of noise effects due to construction activity for projects of significant size. Two methods are provided, each based on the assessment of the change in the existing ambient sound level due to construction activity, combined with absolute cut-off values applicable to the daytime, evening and night-time periods. In areas where ambient sound levels are lower than the cut-off values, as commonly is the case in other than urban environments, the cut-off thresholds for significance of noise effects are  $L_{Aeq}$ , 65dB daytime (07:00-19:00), 55dB evening (19:00-23:00) and 45dB night-time (23:00-07:00).

6.12.21 BS 5228-2 (Ref 6-239) provides guidance on the measurement and assessment of vibration effects. Annex B sets out a range of vibration levels, in terms of the measured peak particle velocity (PPV), which provide an indication of potential effects. It is considered that providing appropriate warnings are given to residents, vibration levels of PPV 1.0 mms<sup>-1</sup> can be tolerated and therefore would have a low adverse impact. Levels of vibration of 10 mms<sup>-1</sup> are likely to be intolerable for any more than a very brief exposure to this level. By inference, some degree of adverse

impact would occur when vibration (either continuous, or for frequent periods) exceeds PPV 1.0 mms<sup>-1</sup>.

6.12.22 The WHO Guidelines for Community Noise (Ref 6-240) provide guideline values for community noise in specified environments, including:

- $L_{Aeq, 8hr}$  30dB for bedrooms at night.
- $L_{Aeq, 16hr}$  35 dB for living-rooms.
- $L_{Aeq, 8hr}$  45dB for outside bedrooms at night. Which represents a 15dB reduction that would typically be achieved between the inside and outside of a window, should this be partially open for ventilation.

6.12.23 The guideline levels provided in BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings' (Ref 6-241) generally reflects the WHO values, which can be particularly useful in establishing context for absolute noise levels. For outdoor living areas, WHO and BS 8233 indicate that  $L_{Aeq, 16hr}$  50dB represents a noise level below which few people would be moderately annoyed.

6.12.24 The Environment Agency provides appropriate guidance in relation to noise in the form of:

- Noise and Vibration Management: Environmental Permits 31 January 2022 (Ref 6-242).
- Noise impact assessments involving calculations or modelling 18 August 2022 (Ref 6-243).
- Method Implementation Document (MID) for BS 4142 27 December 2023 (Ref 6-244).

### **Impact Assessment Methodology**

6.12.25 Assessment of potential impact from the Proposed Development will take account of national and regional planning policy along with relevant standards and guidelines as described above.

6.12.26 The assessment methodology will contain the following key stages:

- identification and agreement with LPAs of NSRs and rating of sensitivity;
- establishing the current (baseline) ambient noise level at NSRs by completion of noise monitoring;
- quantitative assessment, to determine (by prediction) the magnitude of each of the identified main potential impacts;
- qualitative assessment, to allow consideration of other (lesser) potential impacts where a more detailed predictive-based assessment is considered impracticable, or unnecessary, and;
- evaluation of the likely significance of noise effects through the relationship of receptor sensitivity to noise and the magnitude and duration of noise impacts.

6.12.27 The potential impact of operational sound from the Proposed Development will be determined by quantitative assessment using the methodology described in BS 4142, comparing predicted sound levels (to include any applicable sound character corrections), with the existing baseline background sound level. Predictions will be made using a proprietary noise model, which takes account of sound propagation

corrections (including distance attenuation, ground effects, topographical screening and atmospheric absorption), as advised in EN ISO 9613 'Attenuation of sound during propagation outdoors' (Ref 6-245) and (Ref 6-246), to determine both numeric results and produce noise contour mapping. Predictions will be based on the sound emission of the individual equipment items and plant layout of an indicative scheme currently being considered for the Proposed Development, using a Rochdale Envelope approach.

- 6.12.28 A quantitative assessment of construction noise and vibration including disturbance impacts is likely to be required for sensitive ecological NSR given the environmental setting and for other human NSR, where relevant. Predictions would be completed in accordance with the methodology described in BS 5228-1 and based on the information provided in this Standard on typical activity noise levels applicable to various plant and construction operations most likely to be associated with construction of the Proposed Development. The likely significance of noise effects for human beings would then be determined by reference to the informative guidance included in Annex E of the Standard and reported in the Noise and Vibration Chapter of the ES. The likely significance of disturbance effects due to noise and vibration on sensitive ecological receptors would be reported in the relevant ES chapters (Terrestrial Ecology, Ornithology, Marine Ecology).

*Assessment Criteria*

- 6.12.29 The BS 4142 assessment methodology (covering operational sound) provides criteria for assigning the magnitude of impact, whereas BS 5228-1 can be used to directly determine the significance of construction noise effects, on residential receptors.
- 6.12.30 Where magnitude of impact is established by the relevant guidance document, the significance of any effects arising from these impacts is established taking account of various factors, in particular the sensitivity of the receptors.
- 6.12.31 A receptor of high sensitivity would be considered as having little ability to absorb change without fundamentally altering its present character. A receptor of medium sensitivity has a moderate capacity to absorb change without significantly altering its present character. A receptor of low sensitivity is tolerant of change without detriment to its character. A receptor of negligible sensitivity can accommodate change and is not sensitive to noise.
- 6.12.32 With this consideration, receptors where people are particularly susceptible to noise level change (increase), or to the introduction of perceptible levels of vibration, such as residential dwellings; hospitals and schools, would be classed as having high sensitivity. Receptors where people are temporarily exposed to noise and vibration, experiencing distraction or short-term disturbance, such as in public parkland and walkways, would be classed as having low, or medium sensitivity, dependent on context.
- 6.12.33 The matrix in Table 6.78 is designed to grade the significance of effects by combining the sensitivity of the receptor with the magnitude of impact determined at that receptor.

**Table 6.78 Magnitude of Impact Matrix**

Magnitude of Impact	Level of likely significance of effects relative to sensitivity of receptor		
	High	Medium	Low
High	Major	Moderate	Moderate
Medium	Moderate	Moderate	Minor
Low	Minor	Minor	Negligible
Negligible	Negligible	Negligible	Negligible

6.12.34 For the purpose of EIA and with reference to the matrix, moderate or major significance of effects are considered to represent a likely significant effect.

6.12.35 In relation to noise resulting from the operation of the Proposed Development, it is appropriate to consider the likely significance of effects following the design mitigation that has been considered by the predictive noise modelling.

### Potential Impacts

#### Construction

6.12.36 For the construction of the Proposed Development, the following potential impacts have been identified:

- vibration produced during on-site construction works;
- noise produced during on-site construction works;
- noise produced during short-term commissioning activities (e.g. steam blows);
- noise produced by additional HGV road traffic during construction works;
- noise produced during pipeline and grid connection construction works; and
- vibration produced during pipeline and grid connection construction works.

6.12.37 There is insufficient information at this stage regarding the construction design and management for the Proposed Development, which would include requirements for construction plant, equipment and transportation. However, with the closest residential receptor position being 1.2 km from the Main Site, this would provide an adequate buffer distance for the purpose of avoiding impacts and likely adverse significant effects from construction related noise and vibration.

6.12.38 The highest levels of ground vibration are commonly associated with ground preparation works, including foundation piling and ground compaction operations. Annex D of BS 5228-2 provides a summary of case history on vibration levels measured during piling and dynamic consolidation operations. However, for impact piling operations there is only data for up to 100 m, showing a Peak Particle Velocity (PPV) level of 1.4 mms<sup>-1</sup>. For dynamic consolidation a measurement at 250 m, produced a PPV level on the ground of 0.16 mms<sup>-1</sup>.

6.12.39 Based on the low PPV levels given for positions at considerably shorter distances, it would be a reasonable assumption that vibration produced by construction works would be unlikely to be transmitted as perceptible vibration at the closest NSR position (human beings) at 1.2 km. Therefore, there would be a negligible impact and the effect would be not significant.

6.12.40 It is considered adequate for vibration from construction works on the Main Site to be covered by qualitative assessment (as above) in relation to human beings and

therefore it is proposed that a quantitative vibration assessment is scoped out of the EIA. The 1.2 km separation distance to the closest sensitive receptor would provide an adequate buffer distance for the purpose of avoiding adverse impact and likely significant effect from construction and commissioning related noise at residential locations. The example calculation (Table 6.79), covering the prediction of noise during large project main civil construction works, to BS 5228-1 procedures and sound level data, supports this statement.

**Table 6.79 BS5228-1 Prediction of noise from main civils works on a large project**

Plant Type	BS 5228 Ref. No.	L <sub>wA</sub> (Tot)	Dist. (m)	Adjustments (dB)		Resulting Laeq,T	On-time		Activit y Laeq,T
				Dist.	Refl.n		%	dB	
		Step 2	Step 3	Step 4	Step 6	Step 7	8	10	11
<b>BS5228-1 Step 1</b>									
<b>Tower cranes (x4)</b>	C4.48	110	1600	-76	+3	37	50	-3	34
<b>Crawler cranes (telescopic) (x3)</b>	C.4.41	104	1600	-76	+3	31	50	-3	28
<b>Tracked excavators (x3)</b>	C.2.18	108	1600	-76	+3	35	50	-3	32
<b>Dumper trucks (x3)</b>	C.4.4	109	1600	-76	+3	36	50	-3	33
<b>Wheeled backhoe loaders (x3)</b>	C.4.14	100	1600	-76	+3	27	50	-3	24
<b>Concrete mixers (x2)</b>	C.4.18	106	1600	-76	+3	33	50	-3	30
<b>Concrete pumps (x2)</b>	C.4.30	110	1600	-76	+3	37	50	-3	34
<b>Hand tools (various) (x2)</b>	C.4.93	111	1600	-76	+3	38	50	-3	35
<b>Generators ((x3)</b>	C.6.39	98	1600	-76	+3	25	50	-3	22
<b>Lorry (x3)</b>	C.11.10	110	1600	-76	+3	37	50	-3	34
<b>Road Sweeper (x1)</b>	C.4.9	104	1600	-76	+3	31	50	-3	28
<b>Total Plant</b>									42

*Note: The above calculations assumes 50% hard ground and 50% soft ground between source and receiver.*

6.12.41 The predicted noise level at the closest residential receptor position, resulting from main civils construction works using typical plant and operations, is shown to be below Laeq,12hour 45dB and well below the BS 5228- 1 defined 65dB(A) significant effect threshold, applicable to normal daytime working hours (07:00-19:00).

6.12.42 In view of the large separation distance, it is considered adequate for noise from Main Site construction works at residential properties to be covered by qualitative assessment supported by brief predictions (as above) and therefore quantitative assessment of construction noise is proposed to be scoped out of the EIA for residential receptors.



- 6.12.43 Due to the proximity of the Strategic Mitigation Site and Humber Estuary SPA/Ramsar/SSSI to the Main Site, it is proposed to scope in a quantitative assessment of construction noise to these locations in order to enable an assessment on sensitive ecological receptors in the relevant ES chapters (Terrestrial Ecology, Ornithology, Marine Ecology). (see sections 6.13 and 6.14).
- 6.12.44 Additional HGV road traffic movements would be generated during some phases of the construction programme, particularly during the early ground preparation works where heavy excavation plant would be transported to site with any excess spoil then removed from site by lorry and import of clean fill for ground preparations, where necessary.
- 6.12.45 The increase in traffic movements would be temporary and controls including agreed construction traffic routes, times and numbers of traffic movements would be set out in the Framework CTMP, to be agreed with NELC.
- 6.12.46 Noise mitigation, to prevent likely significant adverse effects would therefore be built-in to the controls set out and agreed in the CTMP and therefore detailed quantitative assessment of construction traffic noise is proposed to be scoped out of the EIA.
- 6.12.47 The gas pipeline and electrical grid connection routes are not finalised yet and will be closer to noise sensitive receptors than the Main Site construction activities. It is therefore proposed that construction noise and vibration should be scoped in for the gas pipeline route corridor, electrical grid connection and potential abstraction and discharge location area.
- 6.12.48 Demolition noise and vibration associated with decommissioning of the plant is expected to have a similar impact to the construction stage in relation to noise, although details of specific methods to be used will not be available at this stage. It is therefore proposed to scope in a qualitative assessment of demolition noise but not a quantitative assessment.

#### *Operation*

- 6.12.49 For the operation of the Proposed Development, the following potential impacts have been identified:
- sound emission during operation; and
  - vibration produced during operation.
- 6.12.50 The potential impact of sound emission from the operation of the Proposed Development will be covered by quantitative assessment, using the methodology described in BS 4142, to include predictions of sound at defined receptors, based on equipment sound emission associated with the indicative scheme being considered for the Proposed Development. If the outcome of the feasibility study into the grid connection route corridor includes proposals for an overhead line, this will also be included in the operational noise assessment. The proposed methodology is included in more detail in paragraphs 6.12.22 (prediction) and 6.12.24 to 6.12.30 (assessment criteria).
- 6.12.51 There are no equipment items or components associated with the Proposed Development that would produce significant vibration during operation, even at the

foundation base of the equipment. There would be no perceptible ground vibration at the site boundary and consequently at the more distant residential receptor positions, so for EIA purposes it is proposed that this matter should be scoped out and not require detailed quantitative assessment.

6.12.52 A summary of the potential noise impacts and proposed scope of assessment of each impact is provided as follows:

- Construction vibration produced during on-site construction of the Proposed Development – qualitative assessment scoped in, quantitative assessment scoped out.
- Construction noise produced during on-site construction and commissioning of the Proposed Development at residential locations – qualitative assessment scoped in, quantitative assessment scoped out.
- Construction noise produced during on-site construction and commissioning of the Proposed Development at ecologically sensitive locations – quantitative assessment scoped in.
- Construction noise and vibration produced during the construction of gas pipeline, cooling water pipeline (if part of the design) and electrical powerline works at human receptors and ecologically sensitive locations – quantitative assessment scoped in
- Construction traffic noise caused by additional HGV road traffic movements during construction works – qualitative assessment scoped in, quantitative assessment scoped out.
- Decommissioning noise and vibration affecting residential and ecologically sensitive areas- qualitative assessment scoped in, quantitative assessment scoped out.
- Sound emission from the operation of the Proposed Development – quantitative assessment scoped in for residential and ecologically sensitive locations.

### **Scope for Mitigation**

#### *Construction*

6.12.53 The proposal is for construction noise and vibration to be managed and controlled through a Construction Noise Management Plan (CNMP), with this plan agreed with NELC and implemented prior to the commencement of works. This plan would include details of proposed working hours and mitigation strategy when further detail on the likely construction plant and processes are available.

6.12.54 As a general principle, construction noise and vibration would be controlled by adopting the ‘best practicable means’ (BMP) to noise and vibration control. In this respect, consideration would be given to the guidance provided in Section 8 (Control of Noise) of BS 5228-1, which details general methods for the control of noise at equipment source, including:

- avoid unnecessary revving of engines and switch off equipment when not required;
- keep temporary and internal haul roads well maintained;
- select quiet options for equipment, where these are available;

- consider modification of plant and equipment to improve sound reduction measures, particularly where ready-made kits are available (e.g., install better exhaust silencers, install acoustic canopies over engines); and
- provide good equipment maintenance.

6.12.55 BS 5228-1 also advises alternative approaches for reducing the transmission of noise between the site and sensitive receptors:

- locate noisy processes and equipment (such as temporary site generators) as far as is reasonably practicable from sensitive receptor locations;
- install temporary acoustic screens as close as possible to particularly noisy equipment items or processes, and
- make use of screening, such as that which may be provided by site buildings, earth bunds and other structures.

#### *Operation*

6.12.56 There are two main categories of mitigation that may be considered for the purpose of controlling operational sound emission from the Proposed Development:

- Embedded mitigation, which takes account of the selection of the site and the favourable positioning and orientation of plant, to make use of sound reduction by distance separation and screening from NSR.
- Design (or adaptive) mitigation that will be developed as the detailed design progresses, to further enhance or complement the effectiveness of the embedded mitigation. This would include consideration being given, where practicable, to mitigation associated with low-noise equipment selection, use of attenuators and acoustic barriers (which may be a wall, or earth bund or a combination of these structures).

6.12.57 With respect to embedded mitigation, the Main Site is favourably located approximately 1.2 km from the closest residential NSR (as taken from the closest boundary of the Main Site).

6.12.58 In line with the principle of applying BAT to minimise sound emission, design or adaptive mitigation will be developed through the detailed design process, which, dependent on feasibility and availability, would include for items of plant and equipment being selected with low-noise options, or fitted with suitable noise control treatment (e.g., attenuators or enclosures), to reduce sound emission to the environment.

6.12.59 During the detailed design process, additional mitigation, such as use of site boundary or inter-site acoustic barriers will also be reviewed by iterations of the predictive noise model, for the purpose of minimising sound emission as much as is practicable.

## **6.13 Terrestrial Ecology**

### **Baseline Conditions**

#### *Baseline Surveys*

6.13.1 The Site has been subject to a programme of ecological surveys, which commenced in February 2023 (and earlier in respect of ornithology, as described within Section 6.14: Ornithology). The proposed approach was set out in an 'Ecological Survey

Strategy' report (Ref 6-247), which was provided to Natural England in May 2023. The baseline terrestrial ecology survey work that has been scoped in is summarised within Table 6.80 below.

**Table 6.80 Baseline terrestrial ecological surveys scoped in**

<b>Survey scoped in</b>	<b>Survey scope with reference to key methodological guidance</b>	<b>Date surveys undertaken</b>
Preliminary Ecological Appraisal (PEA)	PEA (Ref 6-248) with desk study component (Ref 6-249).	From February 2023
Habitat survey	Application of UK Habitat (UKHab) Classification (Ref 6-250), or alternative habitat classification presented by the Biodiversity Metric 4.0 (or later) system (Ref 6-251).	From February 2023 (and on-going)
Badger	Searches for badger ( <i>Meles meles</i> ) setts and other field signs (Ref 6-252).	From February 2023 (and on-going)
Bats	Ground level tree assessment (GLTA) for bats; and activity surveys comprising manual/transect and static/automated surveys (Ref 6-253, Ref 6-254).	From February 2023 (and on-going)
Otter	Habitat suitability assessment for otter ( <i>Lutra lutra</i> ), with targeted field sign searches to determine presence/absence and identify potential presence of resting places / breeding sites (Ref 6-255).	From February 2023 (and on-going)
Water vole	Habitat suitability assessment for water vole ( <i>Arvicola amphibius</i> ), and targeted field sign searches to determine presence/absence (Ref 6-256) and assess relative population density.	From February 2023 (and on-going)
Great crested newt (GCN)	If great crested newt ( <i>Triturus cristatus</i> ) District Level Licensing (GCN DLL) is not pursued, then survey will comprise pond Habitat Suitability Index (HSI) assessment (Ref 6-257) with environmental DNA (eDNA) sampling (Ref 6-258), and surveys to determine GCN population size class (Ref 6-259).	I from February 2023 (and on-going); eDNA proposed from March 2024
Reptiles	Targeted reptile surveys to determine presence/absence (Ref 6-260).	June – August 2023
Invertebrates	Targeted entomological assessment of potential off-site laydown area (Ref 6-261).	June 2023
Wintering & breeding bird surveys	See Section 6.14: Ornithology.	

6.13.2 Specific surveys for fish have not been scoped in; however, the assessment will proceed on the assumption that European eel (*Anguilla anguilla*) could be present within Oldfleet Drain; and that sea lamprey (*Petromyzon marinus*) and river lamprey (*Lampetra fluviatilis*) will be present on the adjacent stretch of the Humber Estuary.

6.13.3 Survey for other protected species has been scoped out, either because the Site is located beyond the known current geographical distribution of a particular species

and/or due to lack of suitable habitat availability. Protected species that were scoped out include: beaver (*Castor fiber*), dormouse (*Muscardinus avellanarius*), red squirrel (*Sciurus vulgaris*), pine marten (*Martes martes*), natterjack toad (*Bufo calamita*), and white-clawed crayfish (*Austropotamobius pallipes*) (Ref 6-262).

- 6.13.4 Initially, geographical survey coverage was limited to the Main Site, for which full access was available; and a 500 m radius from the centre line of the proposed gas pipeline route corridors (see Figure 6K in Appendix A), where access was gained via PRow. Survey coverage was extended in April 2023 to include the proposed off-site laydown area in Grimsby, for which full access was granted; and land surrounding an initial potential route for the electrical grid connection, where access was also limited to PRow. The geographical scope of the initial desk study work was aligned with the original terrestrial ecology study area, with an additional 2 km buffer.
- 6.13.5 Much of the baseline ecological survey work undertaken up to September 2023 has therefore been constrained in geographical scope due to land access restrictions. However, the lack of comprehensive survey access is not considered to represent a constraint in respect of the classification of arable habitats (which dominate the Site). Where direct access has not been available for other habitat types, habitat classifications have been made either from the perimeter of a land parcel, or remotely using the best available information. The targeted faunal survey and assessment has been supported by survey data compiled from the desk study, and this has allowed for an initial assessment to be made of species presence/absence and likely distribution within the Site, despite limited land access being available prior to September 2023.
- 6.13.6 From November 2023, geographical survey coverage has been further expanded to include the parts of the Site that were not incorporated to the original terrestrial ecology study area. The study area expansion includes (i) the addition of a 500 m buffer around much of the original terrestrial ecology study area, (ii) alternative electrical grid connection route corridor land to the south of Stallingborough and Healing, and (iii) potential transport routes between Immingham Dock and the Main Site, to which 50 m buffers have been applied (50 m buffers extended to 250 m in respect of ponds only). During 2024, the habitat and protected species surveys summarised within Table 6.81 will be updated, and their geographical scope expanded to include the Site as shown in Figure 1B (Appendix A), unless technical studies narrow down the area requiring surveying. The geographical scope of the desk study is also being expanded to align with the Site shown in Figure 1B, to which a 2 km buffer has been applied.

#### *Nature Conservation Designations*

- 6.13.7 The Site lies to the southwest of the Humber Estuary and intersects with it to the east of the sea defence wall (at the eastern margin of the Main Site). The Humber Estuary is subject to a number of statutory ecological designations that recognise the importance of its coastal and estuarine habitats, and of the assemblages of vascular plants and faunal species which depend upon them. The locations of these designations are shown in Figure 2A (Appendix A), and the reasons for designation are summarised in Table 6.81 below.

**Table 6.81 Statutory nature conservation designations within the Site**

Designation name	Reasons for designation
Humber Estuary SPA	<p>The SPA qualifies under Article 4.1 and 4.2 of the EC Birds Directive by supporting internationally important populations of breeding, wintering and passage birds. The SPA also qualifies under Article 4.2 of by regularly supporting an assemblage of 20,000 wintering waterbirds.</p> <p>Further details are provided within Section 6.14: Ornithology.</p>
Humber Estuary SAC	<p>The SAC is designated primarily for the following Annex I habitats:</p> <ul style="list-style-type: none"> <li>• 1130 Estuaries.</li> <li>• 1140 Mudflats and sandflats not covered by seawater at low tide.</li> </ul> <p>The following Annex I habitats are also present as a qualifying feature, but not a primary reason for selection:</p> <ul style="list-style-type: none"> <li>• 1110 Sandbanks which are slightly covered by sea water all the time.</li> <li>• 1150 Coastal lagoons.</li> <li>• 1310 <i>Salicornia</i> and other annuals colonizing mud and sand.</li> <li>• 1330 Atlantic salt meadows (<i>Glaucopuccinellietalia maritimae</i>).</li> <li>• 2110 Embryonic shifting dunes.</li> <li>• 2120 Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes).</li> <li>• 2130 Fixed coastal dunes with herbaceous vegetation (grey dunes).</li> <li>• 2160 Dunes with <i>Hippophae rhamnoides</i>.</li> </ul> <p>The following Annex II species are present as a qualifying feature, but not a primary reason for selection:</p> <ul style="list-style-type: none"> <li>• 1095 Sea lamprey <i>Petromyzon marinus</i>.</li> <li>• 1099 River lamprey <i>Lampetra fluviatilis</i>.</li> <li>• 1364 Grey seal <i>Halichoerus grypus</i>.</li> </ul>
Humber Estuary Ramsar Site	<p>The site qualifies under Ramsar Criteria for supporting:</p> <ul style="list-style-type: none"> <li>• Criterion 1. Near-natural estuary with the following component habitats: dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish/saline lagoons).</li> <li>• Criterion 3. Colonies of natterjack toad (<i>Bufo calamita</i>) on dune slacks at Saltfleetby-Theddlethorpe; Breeding colony of grey seal (<i>Halichoerus grypus</i>) at Donna Nook.</li> </ul>

Designation name	Reasons for designation
Humber Estuary SSSI	<ul style="list-style-type: none"> <li>• Criterion 5. Wintering waterbird assemblages of international importance.</li> <li>• Criterion 6. Bird species/populations occurring at levels of international importance: bar-tailed godwit (<i>Limosa lapponica</i>), black-tailed godwit (<i>Limosa limosa</i>), common redshank (<i>Tringa totanus</i>), common shelduck (<i>Tadorna tadorna</i>), dunlin (<i>Calidris alpina</i>), golden plover (<i>Pluvialis apricaria</i>), knot (<i>Calidris canutus</i>).</li> <li>• Criterion 8. River lamprey (<i>Lampetra fluviatilis</i>) and sea lamprey (<i>Petromyzon marinus</i>) migration route.</li> </ul> <p>The SSSI is designated for the following features:</p> <ul style="list-style-type: none"> <li>• Habitats comprising: estuaries, moderately exposed sandy shores (with polychaetes and bivalves), saline coastal lagoons, sheltered muddy shores (including estuarine muds), standing waters, and wave exposed sandy shores (with burrowing crustaceans and polychaetes); as well as coastal geomorphology and geological features.</li> <li>• Aggregations of wintering birds comprising: avocet (<i>Recurvirostra avosetta</i>), bar-tailed godwit, bittern (<i>Botaurus stellaris</i>), black-tailed godwit, dark-bellied brent goose (<i>Branta bernicla</i>), curlew (<i>Numenius arquata</i>), dunlin, goldeneye (<i>Bucephala clangula</i>), greenshank (<i>Tringa nebularia</i>), grey plover (<i>Pluvialis squatarola</i>), knot, lapwing (<i>Vanellus vanellus</i>), oystercatcher (<i>Haematopus ostralegus</i>), pochard (<i>Aythya ferina</i>), redshank, ringed plover (<i>Charadrius hiaticula</i>), ruff (<i>Philomachus pugnax</i>), sanderling (<i>Calidris alba</i>), scaup (<i>Aythya marila</i>), shelduck, teal (<i>Anas crecca</i>), turnstone (<i>Arenaria interpres</i>), whimbrel (<i>Numenius phaeopus</i>), wigeon (<i>Anas penelope</i>).</li> <li>• Assemblages of breeding birds, associated with lowland open waters and their margins.</li> <li>• Swamp and saltmarsh habitats as defined by National Vegetation Classification (NVC) communities: S21, S26, S4, SD10, SD15, SD17, SD18, SD2, SD4, SD5, SD6, SD7, SD8, SD9, SM10, SM11, SM12, SM13a, SM13b, SM13c, SM13d, SM13f, SM14, SM15, SM16a, SM16b, SM16c, SM16e, SM2, SM24, SM28, SM6, SM8 and SM9.</li> </ul>

Designation name	Reasons for designation
	<ul style="list-style-type: none"> <li>• Vascular plant assemblage.</li> <li>• Invertebrate assemblage.</li> <li>• Faunal species: grey seal, river &amp; sea lamprey.</li> </ul>

6.13.8 Additionally, there are a number of other statutory designated sites within the wider study area (see paragraph 6.13.6) including North Killingholme Haven Pits SSSI, Swallow Wold SSSI and Tetney Blow Wells SSSI which are considered sensitive to operational emissions from the Proposed Development.

6.13.9 There are ten non-statutory designations within the Site (as summarised in Table 6.82 below), and a further 14 LWS designations within the wider study area (see paragraph 6.13.6). Where ancient woodland is present within the desk study area, it has also been made subject to an LWS designation, and the location of these designations is shown at Figure 2B (Appendix A).

**Table 6.82 Non-statutory LWS nature conservation designations within the Site**

Designation name	Reasons for designation
Alder Carr Wood LWS	Wet alder woodland. Includes Ancient Semi Natural Woodland (ASNW).
Alder Wood LWS	Broadleaved woodland with a stream and other wetland habitat. Includes ASNW.
Healing Cress Beds LWS	Former watercress beds, supporting wetland habitats surrounding grassland and scrub; and associated invertebrate interest.
Roxton Wood LWS	Broadleaved plantation woodland with wetter areas alongside ditches and wet flushes along rides.
Roxton Wood Road Verges LWS	Verge of herb-rich semi-natural neutral grassland with some species indicative of both calcareous and acid soils.
Stallingborough Meadow LWS	Semi-mature woodland with mown paths, small glades, damp grassland, and a pond.
Stallingborough Meadows East LWS	Neutral hay meadow, with damp ground and standing water.
Stallingborough Fish Ponds LWS	A mosaic of ponds surrounded by woodland, scrub, and damp grassland.
Sweedale Croft Drain LWS	Spring-fed drain with records for a very large population of the scarce plant opposite-leaved pondweed <i>Groenlandia densa</i> .
Thomas Wood LWS	Mixed and broadleaved woodland, some of which includes ASNW.

6.13.10 Tioxide West Field LWS comprises a post-industrial site with habitat mosaics and is located outside the Site, adjacent to the off-site potential laydown area.

6.13.11 The Site also includes a series of Humber Estuary Strategic Mitigation Sites (SMS), which are summarised in Table 6.83 below and shown in Figure 2B (Appendix A). These are sites which have been identified in the North East Lincolnshire Local Plan as suitable locations for mitigating the loss of land used by wintering waterbirds with a 'functional linkage' to the Humber Estuary SPA / Ramsar site, via creation (or retention) of wetland habitat (refer to Section 6.14: Ornithology for further detail).



**Table 6.83 Non-statutory Strategic Mitigation Sites (SMS) identified by North East Lincolnshire Local Plan**

SMS Name	SMS description
Main Site SMS	Located within the Main Site on the land near to the Humber Estuary. This SMS comprises land allocated to wetland habitat for strategic mitigation purposes in the NELC Local Plan; however, this land has not yet been developed for this purpose and remains under ongoing arable uses.
Oldfleet Pond SMS	Comprises ‘Strategic Retained Habitat’ located immediately to the south of the Main Site. Described in the Local Plan as retained “complementary grassland”; however, the grassland is currently subject to heavy encroachment by scrub, and also supports a large pond, fringed by woodland.
Cress Marsh (inland site) SMS	A large wetland SMS which is being delivered in two phases (Phase 1 and Phase 2), which are located 0.4 km and 0.2 km west of the Main Site, respectively. Phase 1 was constructed on behalf of NELC, under planning application reference DM/0099/18/FUL; it was completed in December 2018, and post-construction details are provided via planning reference DM/0105/19/CND. Phase 2 has not yet commenced (as of 16 October 2023).
Novartis Ings SMS	This wetland SMS is located 0.7 km southeast of the Main Site. It was constructed in 2022, pursuant to planning consent reference DM/1068/20/FUL, on land donated by the pharmaceutical company Novartis Grimsby.
Cristal/Tronox SMS	This SMS is located 0.7 km north of the Main Site. The wetland has not yet been constructed; no information is readily available via the NELC planning portal in relation to this land (as of 16 October 2023).
Tioxide SMS	This SMS is located 1.9 km south of the Main Site and 0.2 km north of the proposed off-site laydown area. Construction was completed circa September 2019; and the delivery, management and monitoring scheme for this SMS has been progressed by Associated British Ports (ABP) in relation to planning consent reference DM/0304/17/FUL.

### *Habitats*

- 6.13.12 The Main Site is dominated by an arable field that has been subject to arable cropping for at least 20 years (and according to Section 6.9, has been in agricultural use since at least 1886, subject to gaps in historical mapping). Other habitats present are limited to bramble scrub and ‘other neutral grassland’ located at the margins of the field, and a small wet area that is excluded from cropping (a temporary ‘non-Priority pond’).
- 6.13.13 The Main Site is bounded to the south by Oldfleet Drain; a watercourse that retains a semi-natural meandering form that has evaded canalisation. Oldfleet Drain is however subject to an intensive management programme (comprising in-channel vegetation cutting and de-silting, bankside vegetation mowing, and channel re-

profiling works), which is undertaken on an annual basis by the North East Lindsey IDB.

6.13.14 The Site comprises a predominantly open, flat, and low-lying landscape, which is overwhelmingly dominated by intensive arable land uses. However, smaller pockets of grassland, scrub and woodland are present; and ponds, hedgerows and individual trees are infrequent but widespread; as are small pockets of developed land. Where the landward part of the Site meets the Humber Estuary, artificial sea defences separate the terrestrial habitats on the western side from the intertidal and marine habitats to the east.

6.13.15 The habitats present within the Site include the following:

- Cropland (cereal and non-cereal crops).
- Grassland (modified grassland, other neutral grassland, tall forbs).
- Shrub (mixed scrub, bramble scrub, native hedgerows).
- Woodland (Lowland Mixed Deciduous Woodland, and other broadleaved/mixed woodland).
- Wetland (drains, ditches and ponds, with aquatic marginal vegetation).
- Urban (developed land, introduced shrub, ruderal/ephemeral vegetation); and
- Intertidal habitats (Intertidal Mudflat, and Coastal Saltmarsh).

6.13.16 Marine habitats, defined as those below the MHWS, are described in Section 6.15: Marine Ecology.

#### *Faunal Species*

6.13.17 The following protected species or species groups have been identified within or adjacent to the Site, as summarised in Table 6.84 below.

**Table 6.84 Summary of ecological features identified**

<b>Taxon</b>	<b>Survey findings summary</b>
Badger	No evidence of badgers has been recorded within the Main Site, and there are no known setts within 30 m. Setts identified elsewhere within the Site are typically associated with embankments and wooded habitats. Relatively low levels of badger activity have been recorded within the Site overall.
Bats	For bats, the open arable landscape offers sub-optimal conditions for foraging, particularly within the Main Site and towards the more exposed eastern/sea-ward side of the Site. However, landscape features such as hedgerows, discrete woodland blocks, and the Habrough – Grimsby railway corridor, are used for foraging and/or commuting by common and widespread species of bats. Trees identified as having the greatest relative potential to support roosting bats have typically been found within woodland blocks, although there are isolated trees within the landscape that offer some potential for roosting bats.
Otter	Otter field signs were recorded during surveys of Oldfleet Drain and North Beck Drain; however fresh evidence was recorded only on a single occasion adjacent to the Main Site itself. Desk study data also includes otter records for the drains ('main rivers') and roads in the eastern part of the Site. No holts have been identified to date.
Water vole	Water vole is present within the network of drains and drainage ditches within the Site, including the Oldfleet Drain where adjacent to the Main Site. Population densities appear to be suppressed by the intensive land management practices which are commonplace throughout the local area.

<b>Taxon</b>	<b>Survey findings summary</b>
Great crested newt	For great crested newt, the desk study revealed eDNA data for all ponds within 250 m of the Main Site, each of which tested negative for this species. However, positive records have been obtained by the desk study for ponds to the north and west of the Site.
Reptiles	Presence of reptiles has not been confirmed by the field surveys undertaken to date; however very low numbers of reptiles such as grass snake <i>Natrix helvetica</i> could conceivably be present within the Site.
Fish	Based on desk study data, the potential presence of European eel is assumed for the watercourses listed at Table 6.45; and the presence of sea and river lamprey is assumed for the adjacent stretch of Humber Estuary. See also Section 6.15: Marine Ecology.
Invertebrates	The proposed off-site laydown area was subject to a single survey visit, which assessed it as 'of low importance for invertebrate conservation within the county of Lincolnshire'.

### **Legislation, Policy and Guidance**

6.13.18 The ecological assessment is being undertaken within the context of relevant planning policies, guidance documents and legislative instruments. These are summarised below.

#### *Legislation*

- Conservation of Habitats and Species Regulations 2017 (as amended) (Ref 6-263);
- Wildlife and Countryside Act 1981 (as amended) (Ref 6-264);
- Environment Act 2021 (and forthcoming related secondary legislation) (Ref 6-265);
- NERC 2006 (Ref 6-266);
- The Hedgerows Regulations 1997; and
- The Protection of Badgers Act 1992 (Ref 6-267).

#### *Policy*

- NPS for Energy 2023 (Ref 5-17);
- The NPPF 2023, as supported by the Government Circular 06/2005. Within Chapter 15 of the NPPF, 'Conserving and enhancing the natural environment', paragraphs 174, 175, 179, 180 and 182 are most relevant to ecology;
- North East Lincolnshire Local Plan 2013 – 2032, within which the most relevant policies are Policy 9 'Habitat Mitigation – South Humber Bank' and Policy 41 'Biodiversity and Geodiversity';
- North Lincolnshire Local Development Framework 2011, within which the most relevant policies are Policy CS16 'North Lincolnshire's Landscape, Greenspace and Waterscape', and Policy CS17 'Biodiversity'; and
- West Lindsey District Council Local Plan, within which the most relevant policies are Policy S59 'Green and Blue Infrastructure Network', Policy S60 'Protecting Biodiversity and Geodiversity', Policy S61 'Biodiversity Opportunity and Delivering Measurable Net Gains', and Policy S66 'Trees, Woodland and Hedgerows'.

#### *Technical Guidance*

- UK Habitat (UKHab) Classification system;
- Standing advice on protected species surveys and various species-specific industry best practice guidance documents as listed in Table 6.80 above;

- Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Impact Assessment in the UK and Ireland; Terrestrial, Freshwater and Coastal (Ref 6-269);
- British Standard BS42020:2013 Biodiversity (Ref 6-270);
- DEFRA Statutory Biodiversity Metric tools and guidance; and
- The Habitats Regulations Assessment Handbook (Ref 6-271) and related industry best practice guidance documents.

### **Impact Assessment Methodology**

#### *Determination of the Baseline*

6.13.19 The baseline position is being established through on-going survey work as outlined above, which will enable the key ecological receptors and their sensitivity to be identified.

#### *Assessment Criteria*

6.13.20 The ecological assessment will follow industry standard guidance on Ecological Impact Assessment, as published by CIEEM (Ref 6-269).

6.13.21 Impacts on each ecological receptor will be assessed, taking into account the avoidance, mitigation and compensation measures embedded into the scheme design, or proposed as part of implementation. Residual effects will be identified, characterised and assessed in terms of significance at the relevant geographical scale, in accordance with the CIEEM approach.

6.13.22 The conclusions of the impact assessment process will be considered against the relevant legislative and policy background, including in terms of the extent to which the Proposed Development delivers a gain in biodiversity resources in accordance with applicable legislation, the NPPF and supporting Circular 06/2005 (Ref 6-272), and planning policy at the local levels, and with reference to ancillary policy documents (such as local biodiversity strategies) where relevant.

6.13.23 A report to inform a Habitat Regulations Assessment (HRA) will also be prepared by reference to best practice procedural guidance (Ref 6-271) and PINS Advice Note Ten: Habitats Regulations Assessment relevant to nationally significant infrastructure projects (see also Section 6.14: Ornithology).

6.13.24 Technical work will be undertaken to quantify the change in biodiversity units predicted to arise from the Proposed Development, and to determine the BNG that can be achieved via habitat enhancement and creation. Calculations will be prepared using the DEFRA Statutory Biodiversity Metric (Ref 6-251 (or as updated)), and related guidance documents published by Natural England (Ref 6-273). A BNG uplift of at least 10% in biodiversity units is being targeted, noting that BNG is currently expected to become mandatory for NSIPs from late November 2025.

### **Potential Impacts**

6.13.25 The key issues and potential likely impacts associated with the Proposed Development are described for the construction and operational phases below.

#### *Construction*

- permanent direct loss of semi-natural habitats during construction of the Proposed Development;

- temporary degradation of semi-natural habitat, for example arising via temporary construction laydown uses, or changes in water quality;
- potential for both permanent and temporary loss of features/habitat used by protected species, including badger, bats, otter, water vole, and great crested newt;
- temporary disturbance to protected species, including badger, bats, otter, water vole, and great crested newt; and
- creation of new semi-natural habitats as part of a long-term BNG delivery strategy.

#### *Operation*

- potential for permanent reduction in habitat condition arising from changes in air or water quality;
- potential for permanent on-going disturbance of protected species, including via increased levels of noise and/or artificial lighting; and
- long-term net-positive effects arising from the construction and maturation of enhanced and new habitats, including as part of a strategy to deliver BNG.

#### **Scope for Mitigation**

- 6.13.26 Proposals for mitigation will follow the ‘mitigation hierarchy’ as per guidance published by CIEEM (Ref 6-274), i.e. avoidance or reduction of impacts in the first instance and where reasonably practicable, with mitigation and/or compensation where unavoidable. Where beneficial effects and or opportunities for enhancement and betterment are identified, measures to maximise these will also be proposed.
- 6.13.27 Avoidance measures will include as far as reasonably practicable, the sensitive siting of the proposed CCGT and CCP and temporary construction/laydown areas, and pipeline/grid connection route selection. Where practicable, construction methods will be selected that minimise impacts on habitats and/or protected species (e.g. HDD in preference to open trenching). Mitigation measures are expected to include adoption of a CEMP, and seasonal timing restrictions within the construction programme, especially in respect of licensed mitigation for protected species. Where compensation is required (including to achieve BNG), consideration is to be given to locally-appropriate design of new habitats, and the potential for synergies with local biodiversity strategies.

## **6.14 Ornithology**

- 6.14.1 This section sets out the baseline conditions and proposed scope and methodology for the assessment of the effects of the Proposed Development on ornithological receptors.

#### **Baseline Conditions**

##### *Desk Study*

- 6.14.2 A desk study has been undertaken to provide information on the ecological interest of the study area and its surrounds, including the locations of any relevant statutory protected sites. A search was made for all statutory protected nature conservation sites within 5 km of the Site, and for internationally important ornithological sites SPAs, and Ramsar Sites within 20 km.
- 6.14.3 The following additional sources of information are being used for the desk study exercise:

- Natural England website – statutory designated site boundaries, including SSSI citation details;
- Joint Nature Conservation Committee website [www.jncc.gov.uk] – European protected site boundaries and designations (SPA/SAC/Ramsar);
- Wetland Bird Survey annual reports (Ref 6-275); and
- Information published in ESs for other developments in the region sourced from relevant planning portal websites.

6.14.4 As seen in Figure 2A (Appendix A) the Main Site lies adjacent to the Humber Estuary SPA/Ramsar/SSSI. Details of the qualifying features of the SPA are given in Table 6.85, Table 6.86 and Table 6.87.

**Table 6.85 Information on populations of internationally important species of birds under the Birds Directive (ARTICLE 4.1 QUALIFICATION (79/409/EEC) Internationally important populations of regularly occurring Annex 1 species using the Humber Estuary European marine site (Source: SPA citation).**

Species	Population (5-yr mean of peaks)	Period	International/national importance (% of flyway population)
Avocet	59 individuals – wintering	5 year peak mean 1996/97 – 2000/01	1.7%
Bittern	4 individuals – wintering	5 year peak mean 1998/99 – 2002/03	4.0%
Hen harrier	8 individuals – wintering	5 year peak mean 1997/98 – 2001/02	1.1%
Golden plover	30,709 individuals – wintering	5 year peak mean 1996/97 – 2000/01	12.3%
Bar-tailed godwit	2,752 individuals – wintering	5 year peak mean 1996/97 – 2000/01	4.4%
Ruff	128 individuals – passage	5 year peak mean 1996-2000	1.4%
Bittern	2 booming males – breeding	3 year mean 2000-2002	10.5%
Marsh harrier	10 females – breeding	5 year mean 1998-2002	6.3%
Avocet	64 pairs – breeding	5 year mean 1998 – 2002	8.6%
Little tern	51 pairs – breeding	5 year mean 1998-2002	2.1%

**Table 6.86 Information on populations of internationally important species of birds under the Birds Directive (ARTICLE 4.2 QUALIFICATION (79/409/EEC) Internationally important populations of regularly occurring migratory species) using the Humber Estuary European marine site.**

Species	Population (5-yr mean of peaks)	Period	International/national importance (% of flyway population)
Shelduck	4,464 individuals – wintering	5 year peak mean 1996/97 – 2000/01	1.5% Northwestern Europe (breeding)
Knot	28,165 individuals – wintering	5 year peak mean 1996/97 – 2000/01	6.3% islandica
Dunlin	22,222 individuals – wintering	5 year peak mean 1996/97 – 2000/01	1.7% alpina, Western Europe (non-breeding)
Black-tailed godwit	1,113 individuals – wintering	5 year peak mean 1996/97 – 2000/01	3.2% islandica

<b>Species</b>	<b>Population (5-yr mean of peaks)</b>	<b>Period</b>	<b>International/national importance (% of flyway population)</b>
Redshank	4,632 individuals – wintering	5 year peak mean 1996/97 – 2000/01	3.6% britannica
Knot	18,500 individuals – passage	5 year peak mean 1996 – 2000	4.1% islandica
Dunlin	20,269 individuals – passage	5 year peak mean 1996 – 2000	1.5% alpina, Western Europe (non-breeding)
Black-tailed godwit	915 individuals – passage	5 year peak mean 1996 – 2000	2.6% islandica
Redshank	7,462 individuals – passage	5 year peak mean 1996 – 2000	5.7% britannica
Shelduck	4,464 individuals – wintering	5 year peak mean 1996/97 – 2000/01	1.5% Northwestern Europe (breeding)
Knot	28,165 individuals – wintering	5 year peak mean 1996/97 – 2000/01	6.3% islandica

**Table 6.87 Information on populations of internationally important species of birds under the Birds Directive (ARTICLE 4.2 QUALIFICATION (79/409/EEC): Internationally important assemblage of waterbirds) using the Humber Estuary European marine site.**

<b>Importance</b>	<b>Population (5-year mean of peaks)</b>
Humber Estuary SPA supports large populations (>20,000) of wintering waterbirds	In the non-breeding season, the area regularly supports 153,934 individual waterbirds, including dark-bellied brent goose, shelduck, wigeon, teal, mallard, pochard, scaup, goldeneye, bittern, oystercatcher, avocet, ringed plover, golden plover, grey plover, lapwing, knot, sanderling, dunlin, ruff, black-tailed godwit, bar-tailed godwit, whimbrel, curlew, redshank, greenshank and turnstone.

6.14.5 The Humber Estuary Ramsar site largely coincides with the SPA. Its qualifying features include:

- range of important estuarine habitats;
- internationally important non-breeding waterbird assemblage;
- internationally important non-breeding populations of shelduck, golden plover, knot, dunlin, bar-tailed godwit, black-tailed godwit and redshank;
- important migration route for river lamprey and sea lamprey;
- breeding grey seals; and
- natterjack toad.

6.14.6 The Humber Estuary SSSI has been notified to protect the following nationally important features:

- estuary habitats including intertidal mudflats and sandflats and coastal saltmarsh;
- associated saline lagoons, sand dunes and standing waters;
- wintering waterfowl populations (22 species) and nine passage wader populations (nine species);
- assemblage of breeding birds of lowland open waters and their margins;
- breeding grey seals;
- river lamprey;
- sea lamprey;

- vascular plant assemblage; and
- invertebrate assemblage.

- 6.14.7 The North Killingholme Haven Pits SSSI is part of the Humber Estuary SPA/Ramsar site but has been notified as a SSSI distinct from the Humber Estuary SSSI. It is of particular importance for its roosting waterbirds at high tide (especially black-tailed godwit) and its breeding waterbirds (including avocet). It is also a Lincolnshire Wildlife Trust (LWT) reserve, and a LWS. It is located approximately 9 km northwest of the Main Site.
- 6.14.8 The Greater Wash marine SPA is located approximately 17 km east from the Main Site at its nearest point. Its qualifying features comprise three breeding bird species (Sandwich tern, common tern and little tern) and three non-breeding bird species (red-throated diver, little gull and common scoter). Given its qualifying features, distance from the Main Site and the nature of the Proposed Development, together with the clear lack of any ecological link, it would not be likely to be affected by the Proposed Development and is therefore proposed to be scoped out of the assessment.
- 6.14.9 Further information on the SPA/Ramsar sites will be provided in a separate report to inform a HRA report (to include a Likely Significant Effect Report and Report to Inform an Appropriate Assessment).
- 6.14.10 The Main Site contains an area of arable farmland that has been identified as a Strategic Mitigation Site (see paragraph 2.1.2). Options are currently being explored with consultees, including Royal Society for the Protection of Birds (RSPB), Natural England, NLC and NELC to deliver this mitigation most effectively, either locally or at an alternative site in the South Humber region.

#### *Field Surveys*

- 6.14.11 A range of baseline bird surveys are being undertaken at the Site. Specific surveys for the Main Site are being undertaken over a total of two years (comprising the 2022/23 and 2023/24 winter periods and the 2023 and 2024 breeding seasons), to collate two full years of baseline bird data to support to assessment. The rest of the Site will have surveys undertaken over at least one winter period. The scope and methodology for undertaking additional bird flight activity surveys will be discussed with RSPB and Natural England, should the feasibility study into the grid connection route corridor include proposals for an overhead line, in order to assess the potential impacts of bird collision with the HV cable.
- 6.14.12 The ornithological survey area was defined to include all locations within the potential zone of ornithological influence of the Proposed Development. This includes the Site, plus up to a 2 km buffer to include the adjacent Humber Estuary SPA/Ramsar/SSSI to provide additional contextual data.
- 6.14.13 Field surveys included the Main Site plus the gas pipeline route corridors and electrical grid connection route corridor, although only the main sector/field surveys are being carried out for the gas pipeline and grid connection route.
- 6.14.14 The following wintering bird surveys were undertaken during October 2022 to March 2023. The same survey protocol is proposed to be undertaken during the appropriate survey periods in 2023-24, as follows:



- Sector/field counts: counts of birds within the wintering bird survey area, repeated regularly through the day to account for changes in use by birds throughout a range of tidal conditions (i.e. 'through the tide' counts). Thirty-six surveys were undertaken over 12 days in the first winter survey period between October 2022 and March 2023.
- Nocturnal surveys: 24 night surveys were undertaken (2 per night over 12 survey nights, October 2022 – March 2023). During each night visit, the survey area was surveyed using a thermal imager. The survey method was essentially the same as that used during the daylight field surveys.
- Vantage Point (VP) surveys: these were carried out to determine bird flight activity within the Main Site to assess collision risk and potential disruption to flight lines. A total of 36 hours of VP surveys were carried out during the 2022/2023 autumn/winter period from the single VP location which was sufficient to provide visual coverage. A baseline Wintering Bird Report will be provided in the ES. The key autumn/wintering bird species recorded during the 2022-23 surveys were as follows:
  - **Whooper swan** – only five records in total, all birds migrating in a generally southerly direction over the survey area during the autumn.
  - **Pink-footed goose** – occasional flocks were recorded over-flying the survey area, mainly during the VP surveys, but there was no evidence of any regular movements across the survey area. The survey area did not hold any important feeding or roosting areas for this species – the only ground records were of 1-2 individuals on only three occasions.
  - **Shelduck** – this species was recorded in important numbers in the context of its SPA population. It was largely restricted to the intertidal habitat, apart from small numbers using the Novartis Ings SMS.
  - **Gadwall** – though not formally listed as an SPA qualifying or assemblage species, this species was recorded in the survey area in regionally important numbers (peak 180). The main area used by this species was the Oldfleet Pond SMS (the pond immediately to the south of the Main Site, though there were also records of larger flocks on the intertidal).
  - **Teal** – teal were regularly recorded across the terrestrial wetland habitats, with smaller numbers on the intertidal.
  - **Shoveler** – was another species seen regularly in regionally important numbers though not formally listed as an SPA species. It was recorded across the terrestrial wetlands, with the highest numbers on the Oldfleet Pond SMS (the pond adjacent to the southern edge of the Main Site).
  - **Marsh harrier** – there was only a single record of this species during the 2022-23 surveys, a single individual seen flying over just to the south of the Main Site. There was no evidence that the study area was important for this species at this time of year.
  - **Peregrine** – considerable flight activity of this species was observed during the VP surveys, primarily associated with the South Humber Bank Energy Centre's stacks adjacent to the Main Site. These were regularly used as a roost and had the potential to be a breeding site for this species.

- **Avocet** – found widely in intertidal habitats though not in any terrestrial habitat.
- **Ringed plover** – widely distributed across the intertidal habitats and the Novartis Ings SMS.
- **Golden plover** – this species was largely restricted to the southern part of the study area, including the intertidal zone and terrestrial fields.
- **Grey plover** was found predominantly in intertidal habitats, with one record of two birds roosting on the survey area and occasional flocks roosting at the Novartis Ings SMS.
- **Lapwing** – this species was only recorded in the terrestrial habitats, with the highest numbers seen in the southwest corner of the study area. The Novartis Ings SMS was also a regularly used site.
- **Knot** – this species was found mainly in the intertidal areas in the southern part of the study area. The only terrestrial record was of two birds roosting on the Novartis Ings SMS on 17/11/2022.
- **Dunlin** – this species was recorded widely across the intertidal habitats and roosted at the Novartis Ings SMS in substantial numbers.
- **Black-tailed godwit** – this species was found mainly in the southern part of the intertidal section of the study area, but also occurred at the Novartis Ings SMS in high numbers.
- **Bar-tailed godwit** – another predominantly intertidal species found mainly in the southern part of the study area, with smaller numbers also seen at the Novartis Ings SMS.
- **Curlew** – this species was found widely in the eastern part of the study area, on the intertidal and adjacent terrestrial habitats, including at the Novartis Ings SMS and on the fields within the survey area (peak 53 on the latter).
- **Redshank** – this species was seen mainly in the intertidal habitats but also with substantial numbers using the Novartis Ings SMS. There was a single record of a single individual using the survey area.
- **Common gull** – the main concentration of this species was found at the Novartis Ings SMS, where regionally important numbers were regularly roosting. There were regular flights across the survey area of birds moving between terrestrial feeding areas and roosts on the Humber Estuary.
- **Herring gull** – this species was also found in the highest numbers roosting at the Novartis Ings SMS, with frequent flights recorded over the survey area.
- **Great black-backed gull** – this species had a very similar distribution to herring gull, with highest numbers at the Novartis Ings SMS.
- **Little gull** – this species was only recorded on one survey (17/11/2022), feeding on the river (peak 28).
- **Black-headed gull** – peak numbers of this species were recorded at the Novartis Ings SMS, but it was also found widely over the survey area in both intertidal and terrestrial habitats. Large numbers were recorded over-flying the survey area.

- 6.14.15 Given the use of the Site by several SPA species, available survey data indicates that this area is land that is functionally-linked to the SPA, and will require assessment (and mitigation) as such.
- 6.14.16 Generally, the proposed gas pipeline and electrical grid connection route corridors supported few ornithological interest features. There were occasional records of several Humber Estuary SPA cited-species, including pink-footed geese, teal, mallard, marsh harrier, golden plover and lapwing. However, the numbers recorded were low/very low in the context of their SPA populations, and records were generally infrequent. From the results of the initial winter's surveys, the proposed pipeline route corridor survey area did not hold any important feeding or roosting areas for any of these species.
- 6.14.17 Breeding bird surveys were completed in 2023 and proposed to follow the same format in 2024. These surveys comprise the following elements:
- Walkover mapping surveys to determine the breeding populations of birds in the vicinity of the breeding bird survey area (the Site plus 500 m buffer). These are following the standard British Trust for Ornithology (BTO) Common Birds Census methodology, (Ref 6-276) for six visits at approximately fortnightly intervals between mid-April and mid-July. Access along the pipeline and grid connection routes was limited in 2023 surveys to public access areas.
  - Through the tide counts of the intertidal habitats adjacent to the site. Surveys are covering the whole tidal cycle. Surveys are being repeated at approximately hourly intervals through the tidal cycle.
  - VP surveys of flight activity are being carried out to identify any important flight routes that could be disrupted by the Proposed Development and obtain further data on the relationship between the Main Site and the Humber Estuary SPA. Two three-hour surveys are being undertaken per month, covering the tidal cycle.

### **Legislation, Policy and Guidance**

- 6.14.18 The following documents are considered relevant to the ornithological assessment.

#### *Legislation*

- The Wildlife and Countryside Act 1981, as amended;
- The Countryside and Rights of Way (CroW) Act 2000 (Ref 6-277);
- EU Council Directive 79/409/EEC and 2009/147/EC on the Conservation of wild birds (the 'Birds Directive');
- EU Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora (the 'Habitats Directive');
- EIA Directive 2011/92EU, as amended by 2014/52/EU (the EIA Directive);
- The Conservation of Habitats and Species Regulations 2017 (the 'Habitats Regulations'), which consolidate the Conservation of Habitats and Species Regulations 2010 with subsequent amendments and translates the Birds and Habitats Directives into UK Law; and
- Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.

#### *National Policy and Technical Guidance*

- NPS for Energy 2023.

- The NPPF 2023;
- ‘Guidelines for Ecological Impact Assessment in the UK and Ireland; Terrestrial, Freshwater and Coastal;
- Assessing Connectivity with SPAs (Ref 6-278);
- Birds of Conservation Concern (BoCC) 5: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man (Ref 6-279); and
- The UK Post-2010 Biodiversity Framework (Ref 6-280).

#### *Local Policy*

- North East Lincolnshire Local Plan, within which the most relevant policies are Policy 9 ‘Habitat Mitigation – South Humber Bank’ and Policy 41 ‘Biodiversity and Geodiversity’.
- North Lincolnshire Local Development Framework 2011, within which the most relevant policies are Policy CS16 ‘North Lincolnshire’s Landscape, Greenspace and Waterscape’, and Policy CS17 ‘Biodiversity’.
- WLDC Local Plan, within which the most relevant policies are Policy S59 ‘Green and Blue Infrastructure Network’, Policy S60 ‘Protecting Biodiversity and Geodiversity’, Policy S61 ‘Biodiversity Opportunity and Delivering Measurable Net Gains’, and Policy S66 ‘Trees, Woodland and Hedgerows’.

#### **Impact Assessment Methodology**

- 6.14.19 The likely significance of the potential effects of the Proposed Development will be classified by consideration of the value of the receptor and the magnitude of the potential effect, using professional judgement, as appropriate.
- 6.14.20 The assessment will include an evaluation of the identified ornithological features of the Proposed Development and its surrounds and the identification of any particularly sensitive areas. It will be carried out with reference to the assessment methodology produced by the CIEEM (2018, updated 2019) and with reference to Natural England standing advice.
- 6.14.21 The ornithology survey methodology was shared with RSPB and Natural England in May 2023 and June 2023, respectively. Natural England responded that the methodology was appropriate.
- 6.14.22 The following characteristics will be used to describe potential effects upon ornithological features:
- positive or negative;
  - extent;
  - magnitude;
  - duration;
  - timing;
  - frequency; and
  - reversibility.

**Table 6.88 Value (conservation importance) of species/communities.**

<b>Value</b>	<b>Definition</b>
<b>Very High</b>	Cited interest of a SPA, SAC, Ramsar site or SSSI. Cited means mentioned in the citation text for the protected site as a species for which the site is designated (SPAs) or notified SSSIs.
<b>High</b>	Other species that contribute to the integrity of a SPA, SAC, Ramsar site or SSSI, such as part of an assemblage where this is a notified feature. A local population of more than 1% of the national population of a species. Any ecologically sensitive species, e.g. rare birds with <300 breeding pairs in the UK. EU Birds/Habitats Directive Annex I, Wildlife and Countryside Act (W&C Act) Schedule 1 species (if not covered above).
<b>Medium</b>	Regionally important population of a species, either because of population size or distributional context. Other Red-Listed species.
<b>Low</b>	Any other species of conservation interest, e.g. species listed on the BoCC (Ref 6-279) not covered above.
<b>Negligible</b>	Green-listed species (Ref 6-279) of favourable conservation status.

**Table 6.89 Definition of terms relating to the magnitude of ecological effects**

<b>Magnitude</b>	<b>Definition</b>
<b>Very High</b>	Total loss or very major alteration to key elements/ features of the baseline conditions such that post-development character/ composition/ attributes will be fundamentally changed and may be lost from the Site altogether. Guide: >80 % of population/habitat lost.
<b>High</b>	Major alteration to key elements/ features of the baseline (pre-development) conditions such that post-development character/composition/attributes will be fundamentally changed. Guide: 20-80 % of population/habitat lost.
<b>Medium</b>	Loss or alteration to one or more key elements/features of the baseline conditions such that post-development character/ composition/ attributes of baseline will be partially changed. Guide: 5-20 % of population/habitat lost.
<b>Minor</b>	Minor shift away from baseline conditions. Change arising from the loss/ alteration will be discernible but underlying character/ composition/ attributes of baseline condition will be similar to pre-development circumstances/patterns. Guide: 1-5 % of population/habitat lost.
<b>Negligible</b>	Very slight change from baseline condition. Change barely distinguishable, approximating to the “no change” situation. Guide: <1 % of population/habitat lost.

6.14.23 The combined assessment of the magnitude of an impact and the value of the receptor will be used to determine whether or not an impact has the potential to result in an likely significant adverse effect. These two criteria are cross tabulated to assess the overall likely significance of effects (Table 6.90), though the final assessment will be subject to professional judgment.

**Table 6.90 Matrix of magnitude of impact and value used to test the likely significance of effects. The significance category of each combination is shown in each cell.**

MAGNITUDE OF IMPACT	VALUE				
		Very high	High	Medium	Low
Very high		Substantial	Substantial	Substantial/- Moderate	Moderate
High		Substantial	Substantial	Moderate	Slight
Medium		Substantial	Substantial/Moderate	Slight	Negligible
Low		Moderate	Slight	Slight	Negligible
Negligible		Slight	Negligible	Negligible	Negligible

Shaded cells indicate effects which would be classified as significant in terms of the EIA Regulations.

### Potential Impacts

#### Key Receptors

6.14.24 Key target species for the ornithological assessment will be selected using the following criteria:

- qualifying species of the Humber Estuary SPA, Ramsar site and SSSI;
- additional species that form part of the designated wintering waterfowl assemblage for the above;
- other bird species listed in Annex I of the EU Birds Directive;
- other bird species listed on Schedule 1 of the 1981 Wildlife & Countryside Act; and
- Red-Listed species on the BoCC list (Ref 6-279), or other national/international red lists.

#### Construction

6.14.25 The main potential effects of the construction of the Proposed Development upon ornithological features are considered to be:

- direct loss of terrestrial habitat through construction of project infrastructure;
- disturbance to birds (noise, vibration and visual);
- lighting and increased human presence during construction works;
- accidental pollution affecting water quality;
- bird collision associated with construction of any above ground installations (pylons) for the grid connection; and
- cumulative effects.

#### Operation

6.14.26 The main potential effects of the operation of the Proposed Development upon ornithological features are considered to be:

- disturbance to birds (noise and visual);
- operational lighting;
- bird collision associated with construction of any above ground installations (pylons) for the grid connection; and
- cumulative effects.

### Scope for Mitigation

- 6.14.27 The Proposed Development will likely require adoption of mitigation measures to avoid, reduce and offset ornithological effects in line with the South Humber Gateway (SHG) Mitigation Strategy. The eastern part of the Main Site lies within an area identified for the delivery of mitigation as part of that strategy (the Main Site SMS). It may be appropriate for measures implemented here to mitigate the Proposed Development, or off-site measures (or a combination of both).
- 6.14.28 Given the presence of Schedule 1 listed species (under the Wildlife and Countryside Act 1982) within the study area and the potential for habitat/features within the Site to support breeding Schedule 1 species, a Breeding Bird Protection Plan (BBPP) will need to be prepared and implemented.
- 6.14.29 Other suitable mitigation measures will be reported in the ES such as removal of vegetation outside the breeding season, controlled timing of noisy work, sensitive working practice/lighting etc.

## 6.15 Marine Ecology

- 6.15.1 This section sets out the proposed scope and methodology for the assessment of effects of the Proposed Development on marine ecology.

### Baseline Conditions

- 6.15.2 An initial assessment of baseline conditions for benthic ecology, fish and shellfish, and marine mammals likely to be present in the vicinity of the Site has been conducted in order to inform the assessment of potentially significant effects arising from the Proposed Development. The existing conditions for these receptor groups are discussed in the relevant sections below. This marine ecology section concerns all habitats and species, below mean high water springs (MHWS), that may be affected by the Proposed Development.

#### *Benthic Ecology* Study Area

- 6.15.3 The study area for benthic features will be determined based on calculations of a tidal excursion buffer in the ES. The tidal excursion buffer is considered to represent the maximum ZoI for impacts likely to affect benthic receptors based on tidal conditions and water movement. In the absence of calculations for a tidal excursion buffer at the scoping stage, a precautionary 15 km study area has been adopted for the purpose of scoping relevant benthic features see Figure 6J (Appendix A). The study area may be refined in the ES if tidal excursion calculations are provided.
- 6.15.4 The intertidal habitat of the Humber Estuary, including that present within the Site, is dominated by intertidal mud (European Union Nature Information System (EUNIS) biotope classification A2.317) and intertidal sand and muddy sand (A2.2) (Ref 6-281). These form extensive Annex I mudflats and sandflats, habitats specifically protected by the Humber Estuary SAC (Ref 6-282). This includes the internationally important mudflats at Pyewipe, which overlap with the potential water abstraction and

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<sup>17</sup> Intertidal and subtidal marine habitats are described and classified by the European Nature information System (EUNIS), with each habitat type ascribed a habitat code based on physical characteristics only for broadscale habitats and for physical and biological factors for more detailed biotopes. EUNIS classification system available from: <https://eunis.eea.europa.eu/habitats.jsp>.

discharge zones of the Proposed Development, see Figure 6J (Appendix A). In places, the mudflats and sandflats form semi-permanent islands in the Estuary. These habitats provide important food resources for fish and birds due to the richness of the invertebrate communities that can be found in these habitats, including marine worms and molluscs (Ref 6-283). Specific biotopes associated with these habitats in the Humber Estuary include '*Hediste diversicolor* and *Macoma balthica* in littoral sandy mud' (A2.312) and 'polychaetes in littoral fine sand' (A2.231).

- 6.15.5 Small areas of intertidal mixed sediments (A2.4) are present along the intertidal banks of the estuary and at the mouth of the estuary on the coast of Spurn Warren (Ref 6-281). A small area of intertidal seagrass beds (A2.61) can also be found on Spurn Warren, consisting of *Zostera* spp.
- 6.15.6 The Humber Estuary contains Annex I coastal lagoons adjacent to the intertidal areas of East Halton, Humberston Fitties and the Spurn (Ref 6-281) - see Figure 6J (Appendix A). Coastal lagoons are also present outside the estuary mouth near Easington, just over 13 km away from the Site. The lagoons in the Humber provide habitat for a diverse array of benthic species including the starlet sea anemone (*Nematostella vectensis*) and the tentacled lagoon worm (*Alkmaria romijni*) (Ref 6-283).

#### Subtidal

- 6.15.7 Subtidal benthic communities are those found on or in the seabed below mean low water springs (MLWS). A variety of physical factors contribute to the formation of habitat type, including depth, sediment type, hydrodynamics and supply of organic matter, all of which influence benthic community composition.
- 6.15.8 The subtidal regions of the Humber Estuary are characterised by Annex I sandbanks which are slightly covered by seawater at all times (Ref 6-281). These sandbanks consist of large areas of subtidal sand (A5.2) and subtidal mud (A5.3) interspersed with smaller areas of subtidal coarse sediment (A5.1), and subtidal mixed sediment (A5.4) (Ref 6-284). The sandbanks form sandbars in places which create semi-permanent islands (Ref 6-281). The area of sandbanks covers the majority of the subtidal zone of the estuary from the Estuary mouth to the River Trent confluence upstream of the Site. The sandbank habitat also overlaps with the Site where the potential abstraction and discharge area is located.
- 6.15.9 The sandbank sediments in the Estuary contain several different biotopes which are characterised by organisms including polychaetes, bivalves (e.g., *Mysella bidentata* and *Abra* spp.), sea cucumber species, sea pens (e.g. *Virgularia mirabilis*), brittle stars (*Amphiura* spp.) and tube building polychaetes (e.g. *Lagis koreni* and *Owenia fusiformis*) (Ref 6-285).

#### Designated Sites and Protected Species

- 6.15.10 Key protected sites for the conservation of benthic features within 15 km of the Site, and which are scoped in, are:
- Humber Estuary SAC;
  - Humber Estuary Ramsar;
  - Humber Estuary SSSI; and



- Holderness Inshore Marine Conservation Zone (MCZ).

6.15.11 The designated features of these sites, and their approximate distance from the Site are shown in Table 6.91. The locations of the designated sites are shown in Figure 6J (Appendix A).

**Table 6.91 Designated sites in the study area in place for the protection of benthic features**

<b>Designated site</b>	<b>Approximate distance from the Site (km)</b>	<b>Designated Features and Annex I habitat code (e.g. H1110)</b>
Humber Estuary SAC	0.0	<b><u>Annex I habitats that are a primary reason for selection of this site:</u></b> H1140 – Mudflats and sandflats not covered by seawater at low tide. <b><u>Annex I habitats that are qualifying feature, but not a primary reason for selection of this site:</u></b> H1110 – Sandbanks which are slightly covered by sea water all the time. H1150 – Coastal lagoons*.
Humber Estuary Ramsar	0.0	Intertidal mud and sand flats. Exposed muddy and sandy shores. Saline lagoons.
Humber Estuary SSSI	0.0	Intertidal mudflats and sandflats. Saline lagoons.
Holderness Inshore MCZ	14.7	Intertidal sand and muddy sand. Moderate energy circalittoral rock. High energy circalittoral rock. Subtidal coarse sediment. Subtidal mixed sediments. Subtidal sand. Subtidal mud.

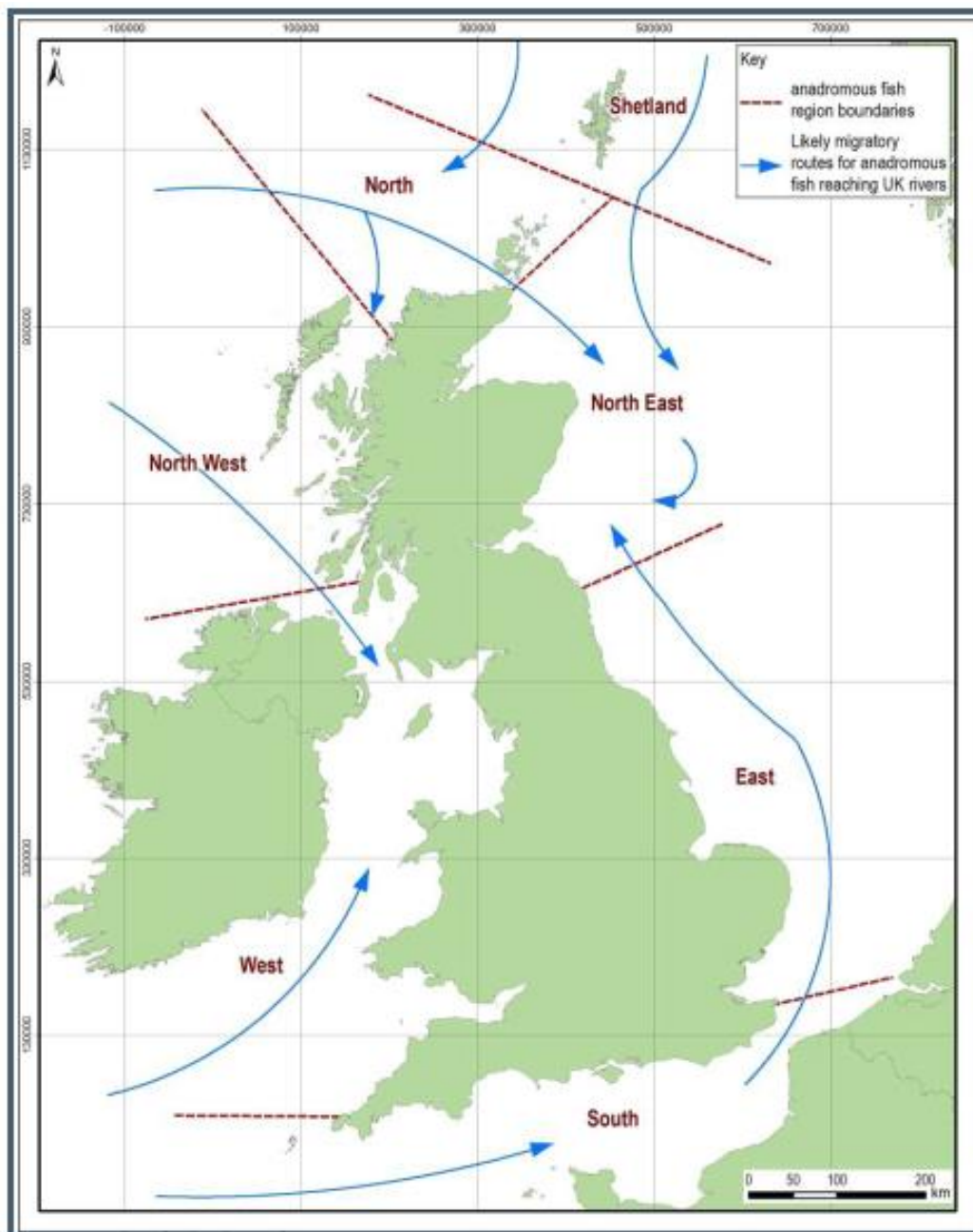
\*Also listed as a Habitat of Principle Importance within Section 41 of the NERC Act 2006.

*Fish and Shellfish*  
Study Area

6.15.12 The study area for fish and shellfish ecology will be determined based on calculations of the maximum tidal excursion distance around the Site. Calculations will be completed and presented in the ES. The tidal excursion distance is considered to encompass the maximum ZoI for impacts likely to affect fish and shellfish receptors based on tidal conditions and water movement. In the absence of these calculations at the scoping stage, a precautionary 15 km buffer around the Site has been adopted as the study area for fish and shellfish (see Figure 6J in Appendix A). This is based on available literature and is generally considered to be the tidal excursion distance in the Humber Estuary (Ref 6-286).

6.15.13 However, to determine if there are potential interactions between the Proposed Development and diadromous<sup>18</sup> fish with migratory routes outside of the main study area, a regional approach has been adopted. This is in accordance with guidance produced by ABPmer (Ref 6-287;Plate 6.11). Therefore, for the purpose of this report, disturbance is considered to occur where the survey area falls in front of a migratory route into a river. Any river designated for the protection of migratory fish, for which the likely migratory route overlaps the Site study area and therefore has an interaction, are also included.

**Plate 6.11 Location and extent of coastal regions to be used for screening migratory fish qualifying interests (Ref 6-287).**



<sup>18</sup> Diadromous fish are those which seasonally migrate between freshwater and seawater bodies.  
February 2024

**Migratory species**

- 6.15.14 The Proposed Development lies on the Humber Estuary which is an estuarine transitional habitat. The River Humber and its estuary offers important habitat for a number of diadromous fish species. Sea (or brown) trout (*Salmo trutta*), salmon (*Salmo salar*), river lamprey (*Lampetra fluviatilis*), sea lamprey (*Petromyzon marinus*) and European eel (*Anguilla anguilla*) are all known to be seasonally present in the River Humber as part of their annual migrations to and from spawning.
- 6.15.15 These species are all listed as species of principal importance (under Section 41 of the NERC Act 2006) and as Annex II species under the Habitats Directive (with the exception of European eel). Sea lamprey and river lamprey are also protected species as part of the Humber Estuary SAC, Ramsar, and SSSI (see Designated Sites and Protected Species).
- 6.15.16 Atlantic salmon are considered to spawn in the Humber region and tributaries from October to January, before smolting and migrating to sea between April and July (Ref 6-288 and Ref 6-289). Upstream migration to spawning locations occurs between April and September (see Table 6.92). Brown/sea trout follow a similar pattern, with spawning occurring from October to December and upstream migration between April and September (Ref 6-290).
- 6.15.17 River lamprey are considered to be present in the Estuary throughout the year, with numbers increasing during the summer and autumn migratory periods (Ref 6-291). River and sea lamprey spawn within tributaries of the River Ouse (which flows into the River Humber) (Ref 6-292). However, there are also reports of spawning within the Humber Estuary (Ref 6-293).

**Table 6.92 Seasonal migrations of diadromous fish species known to occur in the study area**

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Atlantic salmon ( <i>Salmo salar</i> )	Blue			Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Blue	Blue	Blue
Brown/sea trout ( <i>Salmo trutta</i> )				Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Blue	Blue	Blue
European eel ( <i>Anguilla anguilla</i> )				Yellow	Yellow	Yellow	Yellow					
Sea lamprey ( <i>Petromyzon marinus</i> )				Yellow	Yellow	Blue	Blue					
River lamprey ( <i>Lampetra fluviatilis</i> )			Blue	Blue			Yellow	Yellow	Yellow	Yellow	Yellow	Yellow

\*Spawning (blue); upstream migration (yellow)

### Pelagic species

6.15.18 A number of pelagic<sup>19</sup> species can be found in the study area, some of which are of commercial importance. Within the Estuary, whiting (*Merlangius merlangus*), herring (*Clupea harengus*), sprat (*Sprattus sprattus*), cod (*Gadus morhua*), Atlantic mackerel (*Scomber scombrus*), sand smelt (*Atherina presbyter*), and sea bass (*Dicentrarchus labrax*) are all known to be present (Ref 6-294,Ref 6-291).

### Demersal species

6.15.19 Several demersal<sup>20</sup> species are recorded in the study area, including flatfish species, such as flounder (*Platichthys flesus*), plaice (*Pleuronectes platessa*), dover sole (*Solea solea*), pacific dover sole (*Microstomus pacificus*), sandeel (*Ammodytidae* spp.), lemon sole (*Microstomus kitt*), dab (*Limanda limanda*) and sand goby (*Pomatoschistus minutus*) (Ref 6-294,Ref 6-291). The anglerfish (*Lophius piscatorius*) is also known to be present.

### Elasmobranchs

6.15.20 Several elasmobranchs<sup>21</sup> are known to occur in the study area including thornback ray (*Raja clavata*), spotted ray (*Raja montagui*), lesser spotted dogfish (*Scyliorhinus canicular*), spurdog (*Squalus acanthias*) and smooth-hound (*Mustelus mustelus*) (Ref 6-295).

6.15.21 Basking shark are not considered to frequent the North Sea. Despite rare sightings of this species from Spurn Head, approximately 14.3 km east of the Site (Ref 6-296), basking shark are unlikely to be regularly present within the study area and therefore are not considered further.

### Shellfish

6.15.22 Commercial fishing landings data in International Council for the Exploration of the Sea (ICES) rectangles 35F0, 36E9 and 36F0, which overlap with the study area, indicate the most commonly occurring shellfish species in the Humber Estuary and coastal transitional area are edible crab (*Cancer pagurus*), European lobster (*Homarus gammarus*), cockles (*Cerastoderma edule*), and to a lesser extent scallop (*Pectinidae* spp.), whelk (*Buccinum undatum*), velvet swimming crab (*Necora puber*), cuttlefish (*Sepia officinalis*) and brown shrimp (*Crangon crangon*) (Ref 6-297).

6.15.23 There are also ongoing efforts to restore native oyster (*Ostrea edulis*) populations in the Humber Estuary following a decline in the population due to disease, habitat loss and commercial development (Ref 6-298).

### Spawning and Nursery Grounds

6.15.24 Fisheries sensitivity maps produced by Coull et al. (Ref 6-299) and Ellis et al. (Ref 6-300) indicate that the Site is located within spawning grounds for herring, plaice (high intensity spawners), sandeel (*Ammodytidae* spp.), dover sole (*Solea solea*), lemon sole (*Microstomus kitt*), and sprat (Ref 6-299, Ref 6-300).

6.15.25 Herring and sandeel are both benthic spawners, reproducing by laying their eggs on the seabed. They are dependent on suitable habitat types for spawning at key times of the year (Table 6.93). Further consideration of herring and sandeel suitable habitat

<sup>19</sup> Pelagic fish are those living or occurring within the sea

<sup>20</sup> Demersal fish are those living and feeding on or near the bottom of the sea (or lakes)

<sup>21</sup> A type of fish with a skeleton made of cartilage and with no swim bladder

within the study area will be provided in the ES, considering sediment classifications by Reach et al. (Ref 6-301) and Latto et al. (Ref 6-302).

6.15.26 All other species with spawning grounds in the study area are broadcast spawners, releasing their eggs into the water column. Broadcast spawners are more sensitive to entrainment from water abstraction.

6.15.27 Nursery grounds present in the study area include high intensity grounds of cod, herring, and low intensity grounds of thornback ray, whiting, sandeel, plaice, sole, lemon sole and sprat (Ref 6-299, Ref 6-300).

**Table 6.93 Peak spawning times of species for which spawning grounds occur in the study area (Ref 6-299, Ref 6-300)**

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Herring (Banks/Dogger stock)								■	■			
Sandeel <i>Ammodytes</i> spp.	■	■									■	■
Lemon sole				■	■	■	■	■	■			
Sprat					*	*	■	■				
Plaice	*	*	■									■
Dover sole			■	*	■							

\* = peak spawning

#### Designated Sites and Protected Species

6.15.28 Key designated sites for the protection of fish and shellfish features within the study area of the Proposed Development and are scoped in, are:

- Humber Estuary SAC;
- Humber Estuary Ramsar;
- Humber Estuary SSSI;
- Holderness Inshore MCZ; and
- River Derwent SAC (upstream of River Humber).

6.15.29 The designated features of these sites, and their approximate distance from the Site are shown in Table 6.94. The locations of the designated sites are shown in Figure 6J (Appendix A).

**Table 6.94 Designated sites in the study area in place for the protection of fish and shellfish**

Designated site	Approximate distance from the Site (km)	Designated Features
Humber Estuary SAC	0.0	Sea lamprey and river lamprey
Humber Estuary Ramsar	0.0	Sea lamprey and river lamprey
Humber Estuary SSSI	0.0	Sea lamprey and river lamprey
Holderness Inshore MCZ	14.8	Protects subtidal habitat types which support European eel, dab, wrasse ( <i>Labrus</i> spp.), edible crab, velvet swimming

		crab, and European lobster (Ref 6-303;Ref 6-304;Ref 6-305).
River Derwent SAC	58.0	Sea lamprey and river lamprey

### Marine Mammals

#### Study Area

- 6.15.30 The Site falls within the ICES Greater North Sea Ecoregion (Ref 6-306). To account for the highly mobile and transient nature of marine mammals, and therefore the potential implications of local impacts on wider populations in the UK, the study area will also consider species specific marine mammal Management Units (MUs) which have been defined by the Inter Agency Marine Mammal Working Group (IAMMWG) (Ref 6-307). These are defined in part by ICES Greater North Sea Ecoregion, which the Site falls within (Ref 6-306).
- 6.15.31 The MUs defined by IAMMWG, which have been used to screen designated sites for each species, are as follows:
- Harbour porpoise (*Phocoena phocoena*) – North Sea MU (UK Exclusive Economic Zone (EEZ) portion only); and
  - Bottlenose dolphin (*Tursiops truncatus*) – Greater North Sea MU (UK EEZ portion only).
- 6.15.32 For other cetacean species<sup>22</sup> occurring in the North Sea, a single MU has been defined as the Celtic and Greater North Seas (CGNS) MU (Ref 6-307).
- 6.15.33 In the absence of MUs for grey seal (*Halichoerus grypus*) or harbour seal (*Phoca vitulina*), the screening of designated sites considered those within the relevant seal management units (SMUs), the Site falling within the southeast England SMU for both species (Ref 6-308). These have been used in preference to Oslo and Paris Conventions Regions (OSPAR), as the SMUs are based on expert knowledge and opinion of seal ecology in the UK, using the most pragmatic approach to the management of seals, without inferring discrete populations (Ref 6-308).
- 6.15.34 However, consideration has also been given to grey and harbour seal foraging distances away from haul-out sites (where they return to breed, moult and rest), which are up to 448 km and 273 km, respectively (Ref 6-309).

### Cetaceans

- 6.15.35 Cetacean species present within the Greater North Sea Ecoregion include harbour porpoise, bottlenose dolphin, white-beaked dolphin (*Lagenorhynchus albirostris*), and minke whale (*Balaenoptera acutorostrata*) which are all resident or commonly occur (Ref 6-306). Other, less common species include short-beaked common dolphin (*Delphinus delphinus*), Atlantic white-sided dolphin (*Lagenorhynchus acutus*), long-finned pilot whale (*Globicephala melas*), killer whale (*Orcinus orca*), Risso's dolphin (*Grampus griseus*) and humpback whale (*Megaptera novaeangliae*).
- 6.15.36 Cetacean distribution around the UK has been surveyed as part of the Small Cetaceans in European Atlantic waters and the North Sea (SCANS-III) surveys (Ref 6-310). The SCANS-III surveys provide abundance and density estimates in different survey

<sup>22</sup> Short-beaked common dolphin (*Delphinus delphis*), white-beaked dolphin (*Lagenorhynchus albirostris*), Atlantic white-sided dolphin (*Lagenorhynchus acutus*), Risso's dolphin (*Grampus griseus*), and minke whale (*Balaenoptera acutorostrata*)

blocks in waters surrounding the UK. The Site is located within survey block 'O'. Only three species were observed in high enough numbers in block O to determine population estimates. The density and abundance estimates for these three species observed in block O are provided in Table 6.95 and indicate that the area is important for harbour porpoise, with white-beaked dolphin and minke whale also likely to be present.

6.15.37 Although these species are more likely to be observed in the open ocean than in the estuary, they are known to occasionally venture into estuaries and therefore will be considered further in the ES. Bottlenose dolphin were not observed in block O during the SCANS-III surveys. Furthermore, there have been very few reported sightings of bottlenose dolphin within the Humber region, except for some passing individuals (Ref 6-308).

**Table 6.95 Density and abundance estimates of cetacean species observed in the SCANS-III survey block O (Ref 6-310,Ref 6-308).**

Species	Density (individuals/km <sup>2</sup> )	Abundance
Harbour porpoise	0.888	53,485
White-beaked dolphin	0.002	143
Minke whale	0.010	603

**Pinnipeds**

6.15.38 Two species of seal commonly occur in the Greater North Sea Ecoregion; the grey seal and the harbour seal (Ref 6-311). Both species are listed as Annex II species under the Habitats Directive.

6.15.39 The Humber Estuary and surrounding coastal area provides habitat for the largest grey seal breeding colony in England, which is located on the sandy south bank at Donna Nook Nature Reserve (approximately 19 km southeast from the Site; see Figure 6J (Appendix A) (Ref 6-293). Grey seals come ashore at Donna Nook in the autumn to breed (Ref 6-292).

6.15.40 The east coast of England is also home to a number of other breeding populations of grey seal (Ref 6-312) including colonies at the Wash, and Blakeney Point, 65 km and 104 km from the Site, respectively.

6.15.41 Key periods for grey seal haul outs are during the annual breeding season (between August and December) and the moult season (between December and April). In eastern England, pupping peaks between early November and mid-December (Ref 6-312).

6.15.42 The Humber Estuary also represents important habitat for harbour seals. Harbour seals are known to haul-out at Donna Nook, but in lower densities compared to grey seals (Ref 6-312). The largest colonies of harbour seals in the UK are located at the Wash and Blakeney Point haul-out sites, comprising 7% of the total UK population (Ref 6-313). These colonies are designated as part of the Wash and North Norfolk Coast SAC.

6.15.43 Hauling-out of harbour seals is seasonal, peaking in August to September during the moulting season, and decreasing in June to July during the pupping season (Ref 6-312).

6.15.44 Both grey seals and harbour seals are likely to be present in the study area and will be assessed in the ES.

#### Designated Sites and Protected Species

6.15.45 Key designated sites for the protection of cetacean and pinnipeds features within the appropriate study areas, which are scoped in, are:

- Humber Estuary SAC;
- Humber Estuary SSSI;
- Humber Estuary Ramsar;
- Southern North Sea SAC;
- The Wash and North Norfolk Coast SAC;
- The Wash Ramsar; and
- The Wash SSSI.

6.15.46 The designated features of these sites, and their approximate distance from the Site are shown in Table 6.96. The locations of the nearest designated sites (up to and including the Southern North Sea SAC) are shown in Figure 6J (Appendix A).

**Table 6.96 Designated sites in the study area in place for the protection of marine mammals**

Designated site	Approximate distance from Site (km)	Designated Features
Humber Estuary SAC	0.00	Grey seal (breeding)
Humber Estuary Ramsar	0.00	Grey seal (breeding)
Humber Estuary SSSI	0.00	Grey seal (breeding)
Southern North Sea SAC	30.3	Harbour porpoise
The Wash and North Norfolk Coast SAC	58.7	Harbour seal (breeding)
The Wash Ramsar	65.6	Grey seal and harbour seal (both breeding)
The Wash SSSI	65.6	Harbour seal (breeding)

#### *Further work to be undertaken*

6.15.47 An in-depth desktop study will be conducted in the ES, to establish the detailed baseline conditions for the Proposed Development. There are several key data sources which will be considered as part of this desktop study, including:

- EUSeaMap (EMODnet; (Ref 6-314): habitat mapping of the study area (using EUNIS biotope classifications);
- BGS Seabed Substrate (Folk 16 classifications) data: publicly available on European Marine Observation Data Network (EMODnet);
- European University Information Systems organisation (EUNIS) (European Environment Agency (EEA), Ref 6-285) for classifying benthic habitats;
- Environment Agency (Ref 6-291); transitional and coastal waters (TraC) Fish Counts for all species for all estuaries and all years;
- Spawning and nursery grounds for UK waters as identified by Coull *et al.* (Ref 6-297) and Ellis *et al.* (Ref 6-300);
- Herring and sandeel suitable sediment classifications as determined by Reach *et al.* (Ref 6-301) and Latto *et al.* (Ref 6-302);



- ICES International Herring Larvae Surveys (IHLS) (2008 – 2017; 10 years data) (Ref 6-315);
- Cefas salmon stocks and fisheries in England and Wales (Ref 6-316);
- Environment Agency salmonid and fisheries statistics for England and Wales (Ref 6-315);
- UK fleet landings by rectangle stock and estimated EEZ 2016-2020 (updated) (Ref 6-288);
- ICES publications and data;
- SCANS data (Ref 6-310);
- IAMMWG publications (Ref 6-307);
- Sea Mammal Research Unit (SMRU) and Special Committee on Seals research reports (SCOS) (Ref 6-308);
- Habitat-based predictions of at-sea distributions for grey and harbour seals in the British Isles (Ref 6-317);
- Sympatric Seals, Satellite Tracking and Protected Areas: Habitat-Based Distribution Estimates for Conservation and Management (Ref 6-317);
- Academic papers and online reports as available for the study area;
- Designated sites condition assessments as available; and
- Existing reference baseline data (where available and relevant) from other developments in the area e.g. the Viking CCS Pipeline DCO application (PINS Reference EN070008).

6.15.48 There is potential that project-specific benthic surveys will be required to inform the baseline characterisation for the Proposed Development. These may include intertidal Phase I Walkover surveys to determine the presence of intertidal habitats and species (such as areas of saltmarsh) and subtidal benthic grab sampling, including macrofaunal analysis, particle size analysis, and analysis of contaminants. Surveys will follow the Joint Nature Conservation Council (JNCC) (Ref 6-318) monitoring guidance for marine benthic habitats.

6.15.49 The requirement and scope for project-specific marine ecology surveys, will be determined as the project progresses, including the design aspects of the Proposed Development that may impact on marine ecology. As part of this, statutory consultation will also be undertaken with the MMO (and their advisors, Cefas), Natural England and the Environment Agency), for further advice on the scope and design of these surveys.

## **Legislation, Policy and Guidance**

### *Legislation*

6.15.50 Relevant legislation applicable to marine ecological features includes:

- MCAA Act 2009, which provides the legal mechanism to help ensure clean, healthy, safe and productive and biological diverse oceans and seas;
- The Conservation of Habitats and Species Regulations 2017 (as amended) (the Habitats Regulations), which transposes the Habitats Directive (92/43/EEC) into UK legislation out to the 12 nautical mile (NM) limit;

- The Marine Strategy Regulations 2010, which transpose the Marine Strategy Framework Directive (2008/56/EC) into UK legislation;
- The Wildlife and Countryside Act 1981 (as amended), which includes provisions relating to nature conservation;
- The Water Environment (WFD) (England and Wales) Regulations 2017, which transposes the EU Water Framework Directive (2000/60/EC) into UK legislation;
- NERC Act 2006, which lists habitats and species of principal importance (HPI and SPI) for the purpose of conservation of biodiversity and requires public authorities to consider what actions can be taken to further the general biodiversity objective for the conservation and enhancement of biodiversity;
- The Environment Act 2021, which sets clear statutory targets for the recovery of the natural world in four priority areas: air quality, biodiversity, water and waste, and includes the introduction of Biodiversity Net Gain (BNG);
- Conservation of Seals Act 1970 (as amended by the Conservation of Seals (England) Order 1999) (Ref 6-319), which provides protection and conservation for seals in England and adjacent territorial waters;
- The Salmon and Freshwater Fisheries Act 1975 (as amended) (Ref 6-320), which relates to the protection of salmon and freshwater fisheries, as well as preventing the obstruction of fish migratory routes;
- The Eels (England and Wales) Regulations 2009 (Ref 6-321), which implement Council Regulation (EC) No 1100/2007 (EC) No 1100/2007 establishing measures for the recovery of the stock of European eel including providing for the free passage of eels; and
- Invasive Alien Species (Enforcement and Permitting) Order 2019 (Ref 6-322), which brings EU legislation into UK law, for the implementation of management measures for invasive alien species.

#### *Policy*

6.15.51 Relevant national policy applicable to marine ecological features includes:

- UK Marine Policy Statement, which aims to achieve sustainable development in the UK marine area;
- NPS for Energy (EN-1, EN-2);
- The NPPF 2023; and
- Government's 25-Year Environmental Plan.

6.15.52 Relevant local policy and plans applicable to marine ecological features includes:

- NELC Plan, which includes outcomes for a high-quality environment and improving environmental sustainability (Ref 6-323);
- North East Lincolnshire Local Plan, including policies on Habitat Mitigation (Policy 9) and Biodiversity and Geodiversity (Policy 41);
- North Lincolnshire Local Development Framework Core Strategy, which includes policies to protect and enhance North Lincolnshire's waterscape, biodiversity and sustainable resource use;
- North Lincolnshire Local Plan, which is being prepared and will replace the current North Lincolnshire Local Development Framework Core Strategy (Ref 6-324);

- East Lindsey Local Plan Core Strategy, which includes policy to protect and enhance Biodiversity and Geodiversity (Strategic Policy 24); and
- East Riding Local Plan Update, which is a draft update to the Local Plan (adopted April 2016) and has been submitted to the Planning Inspectorate for examination. It includes policies to ensure developments conserve and enhance biodiversity and geodiversity (Policy ENV4) (Ref 6-325).

#### *Guidance*

6.15.53 Relevant guidance applicable to marine ecological features includes:

- CIEEM Guidelines for Ecological Impact Assessment in Britain and Ireland – Terrestrial, Freshwater, Coastal and Marine (Ref 6-326);
- Scoping guidelines on the Environmental Impact Assessment (EIA) of Carbon Capture, Transport and Storage projects (Environment Agency; Ref 6-327);
- Guidance on Safe Passage for Eels (Environment Agency; Ref 6-328)
- Screening for Intake and Outfalls: a best practice guide (Environment Agency; Ref 6-329);
- JNCC monitoring guidance for marine benthic habitats;
- Cefas Chemical Action Levels (Reviewed by the MMO in 2020, Ref 6-330; Ref 6-331);
- Canadian Sediment Quality Guidelines (CEQGs) (Ref 6-332);
- OSPAR background concentrations and background assessment concentrations and effect range low (ERL) and effect range median (ERM) concentrations for contaminants (Ref 6-333); and
- UK Offshore Operators Association (UKOOA) sediment quality guidelines for the UK North Sea (Ref 6-334).

### **Impact Assessment Methodology**

#### *Assessment Criteria*

6.15.54 The assessment of significance of effects for marine ecology receptors will be determined using criteria set out by the CIEEM Guidelines for Ecological Impact Assessment (EcIA). Professional judgement will also be implemented, with worst-case scenarios of all relevant impact pathways considered.

### **Potential impacts**

#### *Construction*

6.15.55 The potential likely significant effects resulting from the construction of the Proposed Development which have been scoped in for further consideration in the ES are shown in Table 6.97, as well as impact pathways scoped out due to there being no likely pathway for effect.

**Table 6.97 Potential impact pathways resulting from construction of the Proposed Development scoped in and out of further assessment**

Project Phase	Impact Pathway	Receptor	Scoped In	Scoped Out	Rationale
Construction	Direct loss and physical disturbance to marine habitats and species within the footprint of the Proposed Development	Benthic	✓		The construction of intake and discharge pipelines are proposed for abstraction and discharge of water in the intertidal area adjacent to the Site. Trenchless technologies are currently proposed for this aspect of the Proposed Development which would result in avoidance of disturbance. However habitat could be lost for both benthic and fish and shellfish receptors. Due to the presence of Annex I mudflats in the direct vicinity of the Proposed Development, this impact has been scoped in for further assessment.
		Fish and Shellfish	✓		
		Marine Mammals		✓	
	Temporary increase in suspended sediment concentrations (SSC) within the footprint of the Proposed Development	Benthic	✓		Any construction works in the marine environment are likely to occur on intertidal mudflats adjacent to the Proposed Development. Therefore, benthic receptors and fish (particularly benthic species) and shellfish are at risk of smothering from increased SSC and exposure to sediment-bound contaminants, which could cause adverse effects. These include clogging of feeding and respiratory apparatus and reduced vision during predator-prey interactions. Therefore, the impact on benthic and fish and shellfish receptors has been scoped in for further consideration.
		Fish and Shellfish	✓		
		Marine Mammals		✓	

Project Phase	Impact Pathway	Receptor	Scoped In	Scoped Out	Rationale
					to the highly mobile nature of marine mammals, they are not considered sensitive to smothering and deposition of suspended sediment. In the event that sediment-bound contaminants are released, they are expected to be diluted before reaching the closest seal haul-out site located approximately 19 km southeast at Donna Nook. Cetaceans are also not expected to frequently enter the Estuary. Therefore, the impact on marine mammals is proposed to be scoped out.
	Injury or disturbance as a result of underwater sound produced during construction activities	Benthic	✓		Whilst some piling can be undertaken during low tide, the propagation of underwater sound from construction activities into the marine environment cannot currently be ruled out and so the impact of underwater sound from project activities is scoped in for all marine ecological receptors.
		Fish and Shellfish	✓		
		Marine Mammals	✓		
	Temporary disturbance and displacement due to airborne sound and changes in visual stimuli including artificial light	Benthic		✓	Benthic receptors are not sensitive to airborne sound or visual disturbance. Therefore, this impact pathway is proposed to be scoped out.
		Fish and Shellfish		✓	Fish and shellfish receptors are not sensitive to airborne sound or visual disturbance. Therefore, this impact pathway is proposed to be scoped out.
		Marine Mammals	✓		Cetaceans are not considered sensitive to airborne sound or visual disturbance as they do not spend time above water. However, airborne noise and changes in visual stimuli have the potential to disturb breeding grey seals which are hauled-out at sites in the Humber Estuary. Due to the proximity of known breeding sites to the Proposed Development, this impact pathway is scoped in for further consideration.
	Introduction and spread of invasive non-native species (INNS) from vessels or introduced materials.	Benthic	✓		INNS have the potential to out-compete native species with possible detrimental impacts to native habitats via species loss, modifications to ecosystems and the introduction of disease and pathogens leading to
		Fish and Shellfish	✓		
		Marine Mammals	✓		

Project Phase	Impact Pathway	Receptor	Scoped In	Scoped Out	Rationale
					mortality. This pathway is scoped in for all marine ecology receptors.
	Alteration of water quality due to unplanned releases, accidental leaks and spills from vessels and plant	Benthic		✓	Vessels may be required for the Proposed Development for the placement of the water intake and outfall structures. However, use of vessels is likely to be minimal due to shallower water depths and therefore access limitations adjacent to the Proposed Development; the water intake point is likely to be located in depths of approximately 5 m during the ebb tide. Furthermore, vessel will adhere to industry best practice to prevent accidental leaks and spills, such as the International Regulations for Preventing Collisions at Sea (1972) and regulations relating to International Convention for the Prevention of Pollution from Ships (MARPOL Convention 73/78) with the aim of preventing and minimising pollution from ships.
		Fish and Shellfish		✓	
		Marine Mammals		✓	
					Therefore, the risk of leaks and spills from vessels and plant in the marine environment is not considered further. This impact pathway is proposed to be scoped out.
	Collision with project vessels	Benthic		✓	Vessels may be required for the Proposed Development for the placement of the water intake and discharge lines and structures. However, the presence of any marine mammals, particularly seals, is unlikely and if present in low numbers they are expected to already be habituated to vessel movements as the Humber is a busy estuary. Therefore, this impact pathway is proposed to be scoped out.
		Fish and Shellfish		✓	
		Marine Mammals		✓	

*Operation and Decommissioning*

- 6.15.56 The potential likely significant effects which could arise during the operational lifetime and decommissioning of the Proposed Development which have been scoped in for further consideration in the ES are shown in Table 6.98, as well as impact pathways proposed to be scoped out due to their being no likely pathway for effect.

**Scope for Mitigation**

- 6.15.57 At the scoping stage, it is not possible to provide recommended mitigation measures as the project design information is yet to be determined. This will be addressed in the ES.

**Table 6.98 Potential impact pathways resulting from operation and decommissioning of the Proposed Development scoped in and out of further assessment**

Project Phase	Impact Pathway	Receptor	Scoped In	Scoped Out	Rationale
Operation	Temporary disturbance and displacement due to airborne sound and changes in visual stimuli including artificial light	Benthic		✓	Benthic receptors are not sensitive to airborne sound or visual disturbance. Therefore, this impact pathway is proposed to be scoped out.
		Fish and Shellfish		✓	Fish and shellfish receptors are not sensitive to airborne sound or visual disturbance. Therefore, this impact pathway is proposed to be scoped out.
		Marine Mammals	✓		Cetaceans are not considered sensitive to airborne sound or visual disturbance as they do not spend time above water. However, airborne noise and changes in visual stimuli during operation of the Proposed Development have the potential to disturb breeding grey seals which are hauled-out at sites in the Humber Estuary. Due to the proximity of known breeding sites to the Proposed Development, this impact pathway is scoped in for further consideration.
	Alteration of water quality due to discharge of wastewater and cooling water into the marine environment.	Benthic		✓	The discharge of wastewater into the marine environment during operation of the Proposed Development could have a significant impact on benthic receptors, fish and shellfish and marine mammals by altering local water quality. There is the potential for several pollutants and chemicals to be discharged with wastewater from the Proposed Development, including nitrogen and other
		Fish and Shellfish		✓	
		Marine Mammals		✓	



Project Phase	Impact Pathway	Receptor	Scoped In	Scoped Out	Rationale	
					nutrients. In addition to the discharge of wastewater, there will also be cooling water discharge which is currently assumed to be separate. This could include discharges such as release of biocide. An Environmental Management Plan (EMP) should be developed for treatment of the water during operation to reduce the likelihood of adverse effects. Due to the potentially significant impacts of altered water quality, this impact pathway is scoped into the ES for all receptors listed.	
	Effects due to abstraction of water, including fish entrapment	Benthic	✓		Both benthic receptors (such as pelagic larvae) and fish and shellfish are at risk of injury and entrapment during abstraction of water for the Proposed Development. Measures will be implemented to reduce the risk of effects. However, it is not currently understood how this impact will be avoided. Therefore, this impact in relation to benthic and fish and shellfish receptors has been scoped in.	
		Fish and Shellfish	✓			
		Marine Mammals				✓
	Effects to benthic habitats and species from scour associated	Benthic			✓	The intake and outfall for the Proposed Development will be elevated from the seabed at a depth considered to avoid scour

Project Phase	Impact Pathway	Receptor	Scoped In	Scoped Out	Rationale
	with the abstraction and discharge of water				effects to benthic receptors. Therefore, this impact pathway proposed to be scoped out.
	Thermal effects from treated water discharge	Benthic	✓		The discharge of thermal cooling water effluent from operations can influence a variety of marine organisms including plankton, benthic habitats and species as well as fish, shellfish and INNS. Long-term effects can include changes in biological processes (e.g. growth, spawning, etc.), mortality, displacement and changes in species' community composition and distribution. The thermal front of the cooling water plume can also act as barrier to fish migration. This impact pathway will also consider thermal effects from wastewater discharge (which is currently considered to be part of a separate water stream), although this is likely to be negligible, particularly in the wider context of the cooling water effluent. Therefore, this impact in relation to benthic and fish and shellfish receptors has been scoped in.
		Fish and Shellfish	✓		
		Marine Mammals		✓	
		Benthic		✓	The placement of artificial structures in the marine environment may provide
	Fish and Shellfish		✓		

<b>Project Phase</b>	<b>Impact Pathway</b>	<b>Receptor</b>	<b>Scoped In</b>	<b>Scoped Out</b>	<b>Rationale</b>
	Introduction of INNS on new structures placed in the marine environment	Marine Mammals	✓		attachment surfaces for INNS and their introduction.

# 7. Aspects to be Scoped Out

## 7.1 Transboundary Effects

- 7.1.1 Schedule 4 Part 5 of the EIA Regulations requires a description of the likely significant transboundary effects to be provided in an ES where the Proposed Development is likely to have significant impacts on another European Economic Area (EEA) State.
- 7.1.2 Having considered the nature of the Proposed Development and its distance from other EEA states, potential pathways of effect to other EEA states have not been identified and an assessment of transboundary effects is proposed to be scoped out.

## 7.2 Aviation

- 7.2.1 It is proposed to scope out impacts on aviation based on the maximum height of the stacks and buildings associated with the Proposed Development as these are anticipated to be comparable to the heights of structures and stacks in the surrounding area. On this basis, the Applicant considers that a stand-alone chapter is not required.
- 7.2.2 The Civil Aviation Authority (CAA) will however be consulted on the Proposed Development to review any requirements for aviation lighting on the stack(s) and enable the Proposed Development to be charted in future. Should taller stacks or cranes be required than currently expected; the need for an aviation assessment will be reviewed accordingly.

# 8. EIA Process

## 8.1 EIA Methodology and Reporting

- 8.1.1 The ES will set out the process followed during the EIA including the methods used for the collection of data and for the identification and assessment of impacts. Any assumptions made will be clearly identified.
- 8.1.2 The EIA process is designed to be capable of, and sensitive to, changes that occur as a result of changes to the design, including any mitigation measures that are incorporated during the EIA. This will be particularly important for the Proposed Development as the design and layout is still being refined, and minor changes are likely to be made following submission of this EIA Scoping Report.
- 8.1.3 The EIA is based on a number of related activities, as follows:
- establishing existing baseline conditions;
  - consultation with statutory and non-statutory consultees throughout the DCO Application process;
  - consideration of relevant local, regional and national planning policies, guidelines and legislation relevant to EIA;
  - consideration of technical standards for the development of significance criteria;
  - review of secondary information, previous environmental studies and publicly available information and databases;
  - physical surveys and monitoring;
  - desk-top studies;
  - computer modelling;
  - reference to current legislation and guidance; and
  - specialist opinion.
- 8.1.4 Impacts will be considered on the basis of their magnitude, duration and reversibility.
- 8.1.5 Significance will be evaluated on the basis of the scale of the impact and the importance or sensitivity of the receptors, in accordance with standard assessment methodologies (major, moderate, minor and negligible). For the purpose of the EIA, moderate and major effects will be deemed 'significant'.
- 8.1.6 Where likely significant environmental effects are identified in the assessment process, measures to mitigate these effects will be put forward in the form of recommendations to be undertaken as part of the Proposed Development.
- Cumulative and combined effects**
- 8.1.7 In accordance with the EIA Regulations, cumulative and combined effects will be considered where appropriate and reported in a standalone chapter of the ES.
- 8.1.8 Cumulative impacts are those that accrue over time and space from a number of development activities. The impact of the Proposed Development will be

considered in conjunction with the potential impacts from other projects or activities which are both reasonably foreseeable in terms of delivery (e.g. have planning consent) and are located within a relevant geographical scope where environmental impacts could act together to create a more significant overall effect.

8.1.9 A number of other proposed developments have been identified in the vicinity of the Proposed Development that could potentially result in cumulative impacts during its construction and operation. Relevant projects within the Site boundary are listed in Table 8.1. All projects for consideration within 2 km of the Site are shown on Figure 8A. The status of all applications will be listed at the time of writing in the PEIR.

**Table 8.1 Other developments to be considered in Cumulative Impact Assessment**

<b>Application Reference</b>	<b>Brief description</b>	<b>Distance from Main Site</b>
South Humber Bank Energy Centre (EN010107) Energy from Waste Facility (DM/1070/18/FUL)	The construction and operation of an energy from waste plant and associated development including an electrical connection, landscaping and access.	0 km (adjacent to northern boundary of Main Site)
Lenzing Fibers Ltd Demolition and Extension Proposals (DM/0826/18/FUL)	Demolish existing storage building, re-siting of waste and ventilation equipment, erect extension to form store and guillotine room and relocate existing 'Aganto' temporary storage building within the site.	0 km (adjacent to southern boundary of Main Site)
The Velocys Sustainable Fuels Plant (DM/0664/19/FUL)	Development of a sustainable transport fuels facility, including various stacks, creation of new accesses, installation of pipelines, rail link, associated infrastructure and ancillary works.	0 km (adjacent to western boundary of Main Site)
Rock revetment repair and reinforcement (DM/1071/22/FUL)	Rock revetment repair and reinforcement along a 4.5 km section of the Humber Estuary, works to repair, reinstate and enable access to the gravity outfalls at Middle Drain, Oldfleet Drain and Mawmbridge Drain, associated landscape improvements, installation of temporary construction compounds and associated infrastructure.	0 km (within and adjacent to eastern boundary of Main Site)
Waste water treatment plant (DM/0850/21/FUL)	Erect waste water treatment plant with associated access, plant and equipment, install site office, car parking and temporary access with parking and contractors compound.	0.2 km south
Tyre pyrolysis plant (DM/1103/22/FUL)	Proposed tyre pyrolysis plant including 20m high flue, associated buildings, treatment and storage plant and tanks, conveyors, chillers, silo, ground mounted solar array, emergency flare, car parking, security fencing and landscaping.	0.3 km east
Residential Development at Rear of Stallingborough	Reserved matters application following outline application to erect 150 dwellings, play equipment, public open space and	2.3 km southwest

<b>Application Reference</b>	<b>Brief description</b>	<b>Distance from Main Site</b>
Road, Healing (DM/0198/20/REM)	infrastructure with appearance, landscaping, layout and scale to be considered.	
Stallingborough Interchange (DM/0105/18/FUL)	Hybrid application seeking outline consent with access, landscaping and scale to be considered for the development of a 62ha Business Park comprising up to 120,176 sq.m for B1 (Business), B2 (General Industrial) and B8 (Storage and Distribution), associated infrastructure and internal highways.	2.3 km west
Solar farm (DM/1145/19/FUL)	Construction and operation of an energy park comprising photovoltaic (PV) solar panels together with energy (battery) storage and associated infrastructure.	3.0 km west
Poultry unit (DM/0507/23/FUL)	Construction of free range egg (poultry) unit including the erection of building with associated feed bins, hardstandings, drainage attenuation pond, access road (to Wells Road) and associated landscaping	3.3 km southwest
Solar farm (DM/0899/21/FUL)	Installation of solar farm with associated works and infrastructure to include ground mounted solar panels, access tracks, inverters, transformers, storage units, substation compound, underground cables and conduits, temporary construction compound, perimeter fencing and planting scheme.	3.7 km southwest
Residential development with care facility (DM/0728/18/OUT)	Outline planning application for the development of up to 525 residential dwellings together with an extra care facility for the elderly with up to 80 units with access to be considered.	4.6 km west
Hornsea Project Four Offshore Wind Farm (Generation Stations) (EN010098)	Development of the Hornsea Project Four offshore wind farm within the western area of the former Hornsea known as Zone 4, under the Round 3 offshore wind licensing arrangements established by The Crown Estate.	4.6 km west
Viking CCS Pipeline	The Viking CCS scheme comprises a new 55 km (approx.) onshore underground pipeline from the point of receipt of dense phase CO <sub>2</sub> at Immingham to MLWS.	5.0 km west
VPI Immingham OCGT (EN010097)	The Project comprises the construction and operation of a new gas-fired power station of up to 299 MW gross output and associated development.	7.3 km northwest
Residential development with access (DM/0211/20/REM)	Reserved matters application following DM/0950/15/OUT to erect 118 dwellings with appearance, landscaping, layout and scale to be considered.	7.9 km west

<b>Application Reference</b>	<b>Brief description</b>	<b>Distance from Main Site</b>
A160-A180 Port of Immingham Improvement (TR010007)	Works to the A160 between the junction with the A180 at Brocklesby Interchange and the Port of Immingham. The project would widen the existing single carriageway section of the A160 to dual carriageway, with associated works to junctions along the length of the route.	8.9 km northwest

8.1.10 Consultation with NELC and other relevant local planning authorities will be undertaken in respect of identifying any additional proposals or planning applications submitted under the TCPA 1990 that may also have the potential to produce likely significant cumulative environmental effects. NSIP and projects submitted under other consenting regimes will also be considered in line with PINS Advice Note 17: Cumulative Effects Assessment.

8.1.11 Combined effects will also be assessed. The combination of predicted environmental impacts resulting from a single development on any one receptor that may collectively cause a greater effect (such as the combined effects of noise and air quality/ dust impacts during construction on local residents), are referred to as combined effects.

## 8.2 Structure of the ES

8.2.1 The ES will address the direct effects of the Proposed Development in addition to the likely indirect, cumulative, short, medium and long term, permanent, temporary, beneficial and adverse effects. The mitigation measures envisaged in order to prevent, reduce or where possible offset significant adverse effects will also be described. The concluding chapters will provide a summary of the cumulative and combined effects and likely significant residual environmental effects.

8.2.2 The ES will comprise the following set of documents:

- Non-Technical Summary (NTS): this document will provide a summary of the key issues and findings of the EIA in non-technical language;
- Volume I: Environmental Statement: this will contain the full text of the EIA;
- Volume II: Technical Appendices: these will provide the environmental studies conducted during the EIA including relevant data tables, figures and photographs; and
- Volume III: Figures.

## 8.3 Structure of the Technical Chapters

8.3.1 Technical chapters scoped in to the EIA will be structured based on the following sub-headings:



## **Introduction**

8.3.2 The Introduction will describe the format of the assessment presented within the chapter.

## **Legislation and planning policy context**

8.3.3 The Legislation and Planning Policy Context section of the technical chapters will provide an overview of the relevant legislation, planning policy and technical guidance relevant to the assessment.

## **Assessment methodology and significant criteria**

8.3.4 The methods used in undertaking the technical study will be outlined in this section with references to published standards (e.g. British Standards, Building Research Establishment), guidelines (e.g. DMRB and Institute of Environmental Management & Assessment guidelines) and relevant significance criteria.

8.3.5 The significance of effects before and after mitigation will be evaluated with reference to definitive standards, accepted criteria and legislation where available. Where it is not possible to quantify impacts, qualitative assessments will be carried out, based on available knowledge and professional judgment. Where uncertainty exists, this will be noted in the relevant technical assessment chapter.

8.3.6 Specific criteria for each technical assessment will be developed, giving due regard to the following:

- extent and magnitude of the impact;
- impact duration (whether short, medium or long term);
- impact nature (whether direct or indirect, reversible or irreversible);
- whether the impact occurs in isolation, is cumulative or interactive;
- performance against environmental quality standards where relevant;
- sensitivity of the receptor; and
- compatibility with environmental policies and standards.

8.3.7 For issues where definitive quality standards do not exist, significance will be based on the:

- local, district, regional or national scale or value of the resource affected;
- number of receptors affected;
- sensitivity of these receptors; and
- duration of the impact.

8.3.8 In order to provide a consistent approach to expressing the outcomes of the various studies undertaken as part of the EIA, and thereby enable comparison between effects upon different environmental components, the following terminology will be used throughout the ES to define effects:

- adverse – detrimental or negative effect to an environmental resource or receptor; or
- beneficial – advantageous or positive effect to an environmental resource or receptor; and
- negligible – imperceptible effect to an environmental resource or receptor; or

- minor – slight, very short or highly localised effect of no significant consequence; or
- moderate – more than a slight, very short or localised effect (by extent, duration or magnitude) which may be considered significant; or
- major – considerable effect (by extent, duration or magnitude) of more than local significance or in breach of recognised acceptability, legislation, policy or standards.

8.3.9 As indicated above, for the purpose of this EIA moderate and major effects will be deemed ‘significant’, and where possible mitigation measures will be identified to reduce the residual effects to ‘not significant’.

8.3.10 Each of the technical chapters will provide the criteria, including sources and justifications, for quantifying the different levels of residual effect. Where possible, this has been based upon quantitative and accepted criteria (for example, the National Air Quality Strategy objectives or noise assessment guidelines), together with the use of value judgement and expert interpretation to establish to the scale of an effect.

### **Baseline conditions**

8.3.11 In order to assess the potential impacts and effects of the Proposed Development, it is necessary to determine the environmental conditions that currently exist on site and in the surrounding area, for comparison. These are known as the ‘existing baseline conditions’. Baseline conditions are determined using the results of site surveys and investigations or desk-based data searches, or a combination of these, as appropriate.

8.3.12 ‘Future baseline conditions’, which are the likely future conditions in the study area in the absence of the Proposed Development, will also be considered and described. In particular, consideration will be given to future operation of the Viking CCS Pipeline (EN070008), the Velocys Sustainable Fuels Plant (DM/0664/19/FUL) and the EfW at South Humber Bank Energy Centre (PINS Reference: EN010107) (see Figure 8A in Appendix A).

8.3.13 For the purposes of assessment, each chapter will identify a reasonable ‘worst case scenario’ with regards these future baseline scenarios; for example, the traffic and transport assessment will assume the peak of any proposed construction traffic associated with nearby developments will coincide with peak construction traffic for the Proposed Development.

### **Development design and impact avoidance**

8.3.14 Measures that have been integrated into the Proposed Development in order to avoid or reduce adverse environmental effects will be described. Such measures may include refinement of the design and layout of the Proposed Development to avoid impacts on sensitive receptors, implementation of CEMPs, and adherence of relevant legislation, guidance and best practice. The assessment of impacts and effects will take account of these measures already being in place.

### **Likely impacts and effects**

- 8.3.15 This section will identify the likely impacts resulting from the Proposed Development. The magnitude of impacts is defined with reference to the relevant baseline conditions (existing or future, as appropriate), and effects are determined in accordance with the identified methodology.

### **Mitigation and enhancement measures**

- 8.3.16 The Mitigation and Enhancement Measures section will describe the measures that will be implemented by the Applicant to reduce any significant adverse effects identified by the assessment and enhance beneficial effects during construction and operation of the Proposed Development.

### **Monitoring**

- 8.3.17 The EIA Regulations make provision for post-consent monitoring of significant adverse effects on the environment in appropriate cases. Where post-consent monitoring is considered necessary to secure the success of mitigation measures, this will be described and included in the Schedule of Commitments (ES Volume II). The Applicant will work with the relevant responsible authorities to develop appropriate monitoring, where required.

### **Residual effects and conclusions**

- 8.3.18 Effects of the Proposed Development remaining following the implementation of available mitigation measures are known as 'residual effects'. These will be discussed for each of the potential effects, and their significance level identified.

## **8.4 Scoping**

- 8.4.1 The process of consultation is critical to the development of a comprehensive and balanced ES. The views of statutory and non-statutory consultees serve to focus the environmental studies and to identify specific issues that require further investigation. Consultation is an ongoing process, which enables mitigation measures to be incorporated into the Proposed Development design thereby limiting adverse effects and enhancing environmental benefits.
- 8.4.2 Following the publication of this EIA Scoping Report, non-statutory consultation on the Proposed Development will be undertaken, using a range of methods available to the Applicant which may include newsletters, a telephone line, Twitter, a project website and virtual or physical exhibitions. The website will be maintained throughout the construction and operational phases of the Proposed Development to provide up-to-date information.
- 8.4.3 As required by Section 47 of the 2008 Act, the Applicant will prepare a Statement of Community Consultation (SoCC). The SoCC will outline the methods and timescales for the statutory consultation with the local community. NELC and NLC will be fully consulted on the draft SoCC prior to publication.
- 8.4.4 The PEIR will be provided for statutory consultation, which will likely take place in early 2025. For the non-statutory consultation, a range of methods including newsletters and ongoing use of the Proposed Development website will be considered.

- 8.4.5 All responses received during consultation will be carefully considered and taken into account where possible in the development of the Proposed Development, in accordance with Section 49 of the 2008 Act. Details of any responses received during consultation and the account taken of those responses will be included in a Consultation Report, as required by Section 37 of the 2008 Act. This Consultation Report will be submitted with the DCO Application to the PINS and will be available for public review at that point.
- 8.4.6 The Consultation Report will demonstrate how the Applicant has complied with the consultation requirements of the 2008 Act and will be considered by PINS, both when determining whether to accept the Application, and then in examining the Application.

# 9. Summary

9.13.1 This EIA Scoping Report has identified the potential for significant effects to arise from the construction and operation of the Proposed Development. The following specialist assessments are proposed:

- Air Quality;
- Climate Change;
- Cultural Heritage;
- Human Health;
- Socio-economics and Tourism;
- Landscape and Visual Amenity;
- Major Accidents and Disasters;
- Water Environment (including Flood Risk Assessment);
- Geology, Soils and Agriculture;
- Traffic, Transportation and Access;
- Materials and Waste;
- Noise and Vibration;
- Terrestrial Ecology;
- Ornithology;
- Marine Ecology; and
- Cumulative and Combined Effects.

9.13.2 The detailed assessments for each of these topics will be undertaken in accordance with standard guidance and best practice and reported in the ES. Where significant effects are identified, mitigation measures will be described where possible to reduce the residual effects.

9.13.3 This EIA Scoping Report is now submitted to PINS with a formal request for a Scoping Opinion in accordance with Regulation 10(1) of the EIA Regulations 2017, as amended.

**Table 9.1 – Summary of matters to be scoped in and out**

<b>Topic</b>	<b>Scoped In</b>	<b>Scoped Out</b>
Air Quality	<p>Dust impacts on human and ecological receptors during construction and decommissioning.</p> <p>Traffic vehicle emissions on human and ecological receptors during construction and decommissioning.</p> <p>Operational emissions from stack(s) at the Main Site on human and ecological receptors.</p>	Operational traffic vehicle emissions on human and ecological receptors (see para 6.1.34).

Topic	Scoped In	Scoped Out
Climate Change	<p>GHG emissions associated with pre-construction and enabling, production of materials, construction, operation and decommissioning.</p> <p>Climate change resilience of the Proposed Development relating to extreme weather events, sea level rise, temperature change, precipitation change and wind change.</p> <p>ICCI.</p>	N/A
Cultural Heritage	<p>Construction plant and compounds that may alter the setting of heritage assets, including change arising from noise, light and dust.</p> <p>Permanent physical impacts of construction activities to buried archaeological asset and non-designated heritage assets.</p> <p>Temporary impacts of construction activities to the setting of non-designated and designated heritage assets.</p> <p>Operational impacts on the setting of heritage assets through noise, light and visual disturbance.</p>	N/A
Human Health	<p>Access to healthcare and other social infrastructure services during construction.</p> <p>Access to open space, PRow, recreational facilities and opportunities for physical activity and active travel during construction and operation.</p> <p>Road and route safety during construction and operation.</p> <p>Employment and income and education and training opportunities, including provision of economic opportunities and resources that protect and promote good health during construction.</p> <p>Human health impacts associated with air quality, noise and vibration, landscape and visual amenity, flood risk, drainage, and surface water impacts during construction and operation.</p> <p>Community identity and social participation during construction and operation.</p> <p>Climate change – greenhouse gas emissions during construction and operation.</p>	N/A

Topic	Scoped In	Scoped Out
Socio Economics and Tourism	Radiation – potential exposure to EMFs during operation.	N/A
	Direct and indirect employment creation during construction and operation.  The potential for the promotion/ provision of training and apprenticeship opportunities, upskilling locally unemployed and potential wider economic benefits during construction and operation.	
	Temporary construction traffic disruption on the local and strategic road networks.	
	Temporary disruption to PRoW during construction.	
	Impacts on businesses either direct (demolition/land take) or indirect via in-combination effects identified by other discipline assessments during construction and operation.	
	Any land use impacts (such as effect on planned or proposed developments) during construction and operation.	
Landscape and Visual	Temporary changes to landscape character and views from sensitive receptors during construction and decommissioning.	N/A
	Permanent changes to landscape character and views from sensitive receptors during operation.	
Major Accidents and Disasters	MA&D resulting from the vulnerability of the Proposed Development to natural disasters during construction and operation.	N/A
	MA&D resulting from vulnerability of the Proposed Development to major accidents from on-site sources (including MA&D risk introduced by the Project) during construction and operation.	
Water Environment	Effects of construction of the Proposed Development on surface water receptors, groundwater receptors, and flood risk.	N/A
	Effects of operation and maintenance of the development on surface water receptors, groundwater receptors, and flood risk.	
Geology, Soils and Agriculture	Temporary adverse effects during the construction phase from ground disturbance., including: • Disturbance of geological features of interest (if present);	Introduction of human health receptors (construction workers). These receptors will be protected by Health &

Topic	Scoped In	Scoped Out
	<ul style="list-style-type: none"> <li>• Disturbance of surface soils;</li> <li>• Potential loss of BMV agricultural land;</li> <li>• Removal or disturbance of minerals within the identified MSA;</li> <li>• Creation of preferential pathways and mobilisation of contaminants within soils on superficial and bedrock;</li> <li>• Introduction of new sources of contamination, such as fuels and oils used in construction plant during construction;</li> <li>• Increases in dust, affecting ecological receptors, namely the Humber Estuary, and human health receptors.</li> </ul> <p>Potential beneficial effects post-construction/operation phase due to the removal of contaminant sources during construction works.</p>	<p>Safety legislation and are therefore scoped out.</p> <p>Adverse effects due to the operation of the Proposed Development are scoped out, as its maintenance and operation will be in accordance with environmental legislation and good practice.</p>
Traffic, Transport and Access	<p>Construction traffic impacts from HGVs and construction workers including:</p> <ul style="list-style-type: none"> <li>• AILs;</li> <li>• Severance to communities caused by an increase in traffic for a longer period;</li> <li>• Increased levels of fear and intimidation and reduced levels of amenity for non-motorised users;</li> <li>• Increased risk of road traffic accidents caused by an increase in traffic for a longer period, and</li> <li>• Construction traffic using bell mouths and site entrances for access to construction areas.</li> </ul>	<p>Operational traffic effects. See paragraph 6.10.31.</p>
Materials and Waste	<p>Construction impacts including:</p> <ul style="list-style-type: none"> <li>• Changes in demand for materials.</li> <li>• Changes in available landfill void capacity.</li> </ul> <p>Operational impacts including:</p> <ul style="list-style-type: none"> <li>• Changes in availability of materials.</li> <li>• Changes in available landfill void capacity.</li> <li>• Changes in available hazardous waste management facility capacity.</li> </ul>	<p>Construction impacts including:</p> <ul style="list-style-type: none"> <li>• Changes to allocated/safeguarded mineral sites and waste sites (see paragraph 6.11.78).</li> </ul> <p>Operational impacts including:</p> <ul style="list-style-type: none"> <li>• Changes in availability of materials (see paragraph 6.11.78).</li> </ul> <p>Decommissioning impacts (see paragraph 6.11.78) including:</p> <ul style="list-style-type: none"> <li>• Changes in demand for materials.</li> <li>• Changes in available landfill capacity.</li> </ul>



Topic	Scoped In	Scoped Out
Noise and Vibration	<p>Construction impacts:</p> <ul style="list-style-type: none"> <li>• Qualitative assessment of noise and vibration produced during on-site construction works from the Main Site at human receptors.</li> <li>• Quantitative assessment of noise produced during on-site construction and commissioning of the Proposed Development at ecologically sensitive locations.</li> <li>• Quantitative assessment of noise and vibration produced during the gas pipeline, cooling water pipeline and grid connection construction works at human receptors and ecologically sensitive locations.</li> <li>• Qualitative assessment of noise produced by additional HGV road traffic during construction works at residential and ecologically sensitive locations.</li> </ul> <p>Operational impacts:</p> <ul style="list-style-type: none"> <li>• Quantitative assessment of sound emission from the operation of the Main Site at residential and ecologically sensitive locations.</li> <li>• Quantitative assessment of sound emission from the operation of the grid connection, should the feasibility study into the grid connection route corridor include proposals for an <i>overhead</i> line.</li> </ul> <p>Decommissioning impacts:</p> <ul style="list-style-type: none"> <li>• Qualitative assessment of decommissioning noise and vibration affecting residential and ecologically sensitive areas.</li> </ul>	<ul style="list-style-type: none"> <li>• Changes to allocated/safeguarded mineral site.</li> <li>• Changes to allocated/safeguarded waste site.</li> </ul> <p>N/A</p>
Terrestrial Ecology	<p>Construction impacts including:</p> <ul style="list-style-type: none"> <li>• Permanent direct loss of semi-natural habitats;</li> <li>• Temporary degradation of semi-natural habitat;</li> <li>• Permanent and temporary loss of features/habitat used by protected species, including badger, bats, otter, water vole, and great crested newt;</li> <li>• Temporary disturbance to protected species, including badger, bats, otter, water vole, and great crested newt; and</li> </ul>	<p>Survey for specific species (see paragraph 6.13.3).</p>

Topic	Scoped In	Scoped Out
	<ul style="list-style-type: none"> <li>• Creation of new semi-natural habitats as part of a long-term BNG delivery strategy.</li> </ul> <p>Operational impacts</p> <ul style="list-style-type: none"> <li>• Permanent reduction in habitat condition arising from changes in air or water quality;</li> <li>• Permanent on-going disturbance of protected species, including via increased levels of noise and/or artificial lighting; and</li> <li>• Long-term net-positive effects arising from the construction and maturation of enhanced and new habitats, including as part of a strategy to deliver BNG.</li> </ul>	
Ornithology	<p>Construction impacts:</p> <ul style="list-style-type: none"> <li>• Direct loss of terrestrial habitat;</li> <li>• Disturbance to birds (noise, vibration and visual);</li> <li>• Lighting and increased human presence during construction works;</li> <li>• Accidental pollution affecting water quality; and</li> <li>• Cumulative effects.</li> </ul> <p>Operational impacts:</p> <ul style="list-style-type: none"> <li>• Disturbance to birds (noise and visual);</li> <li>• Operational lighting; and</li> <li>• Cumulative effects.</li> </ul>	The Greater Wash marine SPA (see paragraph 6.14.8)
Marine Ecology	<p>Construction impacts:</p> <ul style="list-style-type: none"> <li>• Direct loss and physical disturbance to benthic organisms, fish and shellfish.</li> <li>• Temporary increase in SSC to benthic organisms, fish and shellfish.</li> <li>• Injury or disturbance as a result of underwater sound on benthic organisms, fish and shellfish and marine mammals.</li> <li>• Temporary disturbance and displacement due to airborne sound and changes in visual stimuli including artificial light on marine mammals.</li> <li>• Introduction and spread of INNS from vessels or introduced materials on benthic organisms, fish and shellfish and marine mammals.</li> </ul> <p>Operational impacts:</p> <ul style="list-style-type: none"> <li>• Temporary disturbance and displacement due to airborne sound and changes in visual stimuli including artificial light on marine mammals.</li> <li>• Alteration of water quality due to discharge of wastewater and cooling water into the marine environment on benthic organisms, fish and shellfish and marine mammals.</li> </ul>	<p>Construction impacts:</p> <ul style="list-style-type: none"> <li>• Direct loss and physical disturbance to marine mammals.</li> <li>• Temporary increase in suspended SSC to marine mammals.</li> <li>• Temporary disturbance and displacement due to airborne sound and changes in visual stimuli including artificial light on benthic organisms, fish and shellfish.</li> <li>• Alteration of water quality due to unplanned releases, accidental leaks and spills from vessels and plant on benthic organisms, fish and shellfish and marine mammals.</li> <li>• Collision with project vessels on benthic organisms, fish and shellfish and marine mammals.</li> </ul> <p>Operational impacts:</p> <ul style="list-style-type: none"> <li>• Temporary disturbance and displacement due to airborne</li> </ul>

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<b>Topic</b>	<b>Scoped In</b>	<b>Scoped Out</b>
	<ul style="list-style-type: none"><li>• Effects due to abstraction of water, including fish entrapment on benthic organisms, fish and shellfish.</li><li>• Thermal effects from treated water discharge on benthic organisms, fish and shellfish.</li><li>• Introduction of INNS on new structure placed in the marine environment on benthic organisms, fish and shellfish and marine mammals.</li></ul>	<p>sound and changes in visual stimuli including artificial light on benthic organisms, fish and shellfish.</p> <ul style="list-style-type: none"><li>• Effects due to abstraction of water, including fish entrapment on marine mammals.</li><li>• Effects to benthic habitats and species from scour associated with the abstraction and discharge of water.</li><li>• Thermal effects from treated water discharge on marine mammals.</li></ul> <p>For further details see paragraphs 6.15.55 and 6.15.56.</p>

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# 11. Appendix A

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