Immingham Green Energy Terminal

Environmental Impact Assessment Scoping Report

Associated British Ports

26 August 2022

Document History

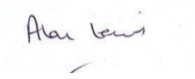
Document Ref	**60673509_EIA_SCOPING**		
Revision	P 1.0		
Author	Alan Lewis		
Signed		**Date**	26/08/2022
Approved By	Richard Lowe		
Signed		**Date**	26/08/2022
Document Owner	AECOM		

Table of contents

Tables

Plates

Appendices

1 Introduction

1.1 Background to this Report

1.1.1 The Immingham Green Energy Terminal (hereafter 'the Project') is a proposal by Associated British Ports ('ABP') (hereafter 'the Applicant') to construct and facilitate the operation by multiple users of a multi-user liquid bulk jetty, which would be located on the eastern side of the Port of Immingham (hereafter 'the Port).

1.1.2 The Project is situated on the south bank of the Humber Estuary in the Yorkshire and Humber region of England (and centred on National Grid Reference (NGR) E520783 N415271). The Project location is shown on **Figure 1.1** in **Appendix A**.

1.1.3 The objectives of the Project are as follows:

a. To provide essential port infrastructure, capacity and resilience to support the growth and strategic needs and demands of the energy sector within the industrial cluster of Immingham and the Humber Enterprise Zone.

b. To provide capacity to (i) receive a range of liquid bulk products including ammonia (to produce green hydrogen) to help decarbonise the United Kingdom's (UK) transport sector and (ii) support carbon dioxide (CO_2) imports and exports to facilitate carbon capture and storage, both of which will assist transition towards net zero.

c. To deliver and operate new port infrastructure in a safe, efficient and sustainable manner by making effective use of available infrastructure, land, water, transport and utility connections which exist in and around the Port of Immingham.

d. To minimise adverse impacts on the environment and safeguard the health, safety and amenity of local residents.

e. To enhance both the local and regional economy through direct investment in and around the Port of Immingham and by partnering with the supply chain, providing opportunities for training, upskilling, apprenticeships and local employment.

1.1.4 The jetty is proposed to be operated by ABP as a common user terminal facility, providing port capacity for multiple customers. It is proposed that these uses could be a range of different liquid bulk product that could be discharged / loaded and that are compatible with green ammonia from a health and safety perspective. Ammonia is a liquid bulk product likely to use the terminal as part of the transition to net zero as is CO_2. Specific proposals are being developed for an import hub for liquified CO_2 from carbon capture and storage projects elsewhere in the UK and European Union (EU) that could form one such use of the jetty. This would allow CO_2 to be shipped in vessels to Immingham and discharged to a proposed pipeline network running from Immingham to the North Sea, to provide access to sub-marine storage in former gas fields.

1.1.5 These proposals are at an early stage and are subject to a separate DCO application by Harbour Energy and are not the subject of this application.

1.1.6 The Project would initially be used as a conduit for the import of green ammonia (NH_3) from NEOM in Saudi Arabia to be converted to green hydrogen. To facilitate this, an associated processing facility would be constructed as part of the Project, which would be owned and operated by Air Products (AP). AP would be the first ABP customer to use the jetty and other customers with other proposed developments or uses will come forward in due course.

1.1.7 In summary, the Project would consist of the following key components:

a. On the marine side:

   i A new approach trestle, jetty platform, berthing and mooring dolphins with link walkways.

   ii Topside infrastructure for the handling of liquid bulks, including loading arms and pipework.

b. On the land side:

   i Pipework, pipelines and utilities between the processing facility and the jetty.

   ii Refrigerated ammonia storage.

   iii Hydrogen production units (converters) that convert ammonia feed to produce the hydrogen.

   iv Hydrogen liquefiers to liquify the hydrogen for temporary storage and road transport.

   v Loading bays to fill road tankers with hydrogen which would then be distributed to hydrogen filling stations throughout the UK.

1.1.8 The associated processing facility would directly support the aims of the UK Government's British energy security strategy (Ref 1-1) with the production and delivery of low-carbon ("green") hydrogen, contributing to decarbonisation of transport and the UK's journey to net zero, helping to improve Britain's energy security and supporting the Levelling Up agenda.

1.1.9 Further information on the Project is provided in **Chapter 2 The Project**.

1.2 Nationally Significant Infrastructure Project

1.2.1 The Project would comprise the construction of a single approach trestle and jetty capable of receiving and discharging tanker vessels transporting liquid bulks associated with the energy sector.

1.2.2 The jetty would be capable of receiving and discharging a very large gas carrier vessel; with maximum dimensions of approximately 225 metres (m) in length, approximately 37m beam and 14m draft and which has a capacity when fully laden of approximately 55,000 tonnes.

1.2.3 Taking into account a maximum three-day discharge period per vessel, an approximate capacity of 55,000 tonnes per vessel and an adjustment for delays from weather and maintenance, this would result in a minimum annual import capacity of in excess of 5.6 million tonnes.

1.2.4 On this basis, the proposed "harbour facility" constitutes a Nationally Significant Infrastructure Project (NSIP) as identified in s14(1)(j) and under Part 3, s24(2) and s24(3)(c) of the Planning Act 2008 (hereafter 'the PA2008') (Ref 1-2) as it comprises:

a. "The alteration of harbour facilities" (i.e. the existing Port of Immingham) – s24(2);

b. "The harbour facilities are in England" – s24(2)(a); and

c. "The effect of the alteration is expected to be to increase by at least the relevant quantity per year the quantity of material the embarkation or disembarkation of which the facilities are capable of handling" – s24(2)(b); where

d. "The relevant quantity is… in the case of facilities for cargo ships, 5 million tonnes" – s24(3)(c).

1.2.5 The jetty and topside infrastructure (including the associated pipework on the jetty) would comprise the NSIP (i.e. the principal development). The pipeline and site areas for the transfer, storage and processing of the ammonia would comprise associated development for the purpose of the PA2008.

1.2.6 The DCO Order Limits will include all works proposed as part of the DCO, including those comprising the NSIP itself and any associated development (as defined by Section 115 of the PA2008 (Ref 1-2) and the accompanying *Guidance on associated development applications for major infrastructure projects* document) (Ref 1-3).

1.3 Development Consent Order Application

1.3.1 The Applicant intends to make an application for a Development Consent Order (DCO) to the Planning Inspectorate (the Inspectorate) for the Project.

1.3.2 The Inspectorate will examine the DCO application and make a recommendation to the Secretary of State (SoS) on whether development consent for the Project should be granted or refused.

1.4 The need for an Environmental Impact Assessment

1.4.1 The Project is subject to mandatory Environmental Impact Assessment (EIA) procedures, as set out within paragraph 8(2) of Schedule 1 of *The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017* (Ref 1-4) (hereafter 'the EIA Regulations'), as it comprises *'Trading ports, piers for loading and unloading connected to land and outside ports (excluding ferry piers) which can take vessels of over 1,350 tonnes'*.

1.5 Purpose of the EIA Scoping Report

1.5.1 This EIA Scoping Report accompanies a request by the Applicant made under Regulation 10(1) of the EIA Regulations (Ref 1-4) for a written Scoping Opinion from the SoS for Transport, administered by the Inspectorate on behalf of the SoS, as to the extent of issues to be considered in the EIA.

1.5.2 This EIA Scoping Report has been prepared taking account of the Inspectorate's *Advice Note Seven: Environmental Impact Assessment Process, Preliminary Environmental Information and Environmental Statements* (Ref 1-4) and contains the information stipulated in Regulation 10(3) of the EIA Regulations (Ref 1-4).

1.5.3 The purpose of the EIA Scoping Report is to:

a. Provide a summary of the Project and the alternatives considered during its development to date.

b. Set out the Applicant's proposed scope of work and methodologies to be applied in carrying out the EIA.

c. Set out the content of the ES and the anticipated likely significant environmental effects that will be identified through the EIA.

1.5.4 A list of abbreviations and a glossary of terms is provided in **Appendix B**.

1.6 The Applicant

1.6.1 ABP was established in 1981 following the privatisation of the British Transport Docks Board. It is the largest ports group in the UK, owning and operating 21 ports and other transport-related businesses across England, Wales and Scotland.

1.6.2 On the Humber, ABP owns and operates four ports, namely the Port and the ports of Hull, Grimsby and Goole, which together constitute the largest ports complex in the UK. Of these, the Port is the largest and busiest of ABP's four Humber ports.

1.6.3 ABP's statutory undertaking at Immingham, the 'statutory port estate', as shown in **Plate 1.1**, covers some 480 hectares (ha). The majority of the port estate falls within the administrative boundary of North East Lincolnshire Council (NELC), although the western part of the Port falls within the administrative boundary of North Lincolnshire Council.

1.6.4 As well as the internal dock, the Port has twenty 'in-river' berths. The Port handles a wide variety of cargoes, ranging from bulk liquids and solid fuels to unitised cargoes in the form of containers ("lo-lo") and trailers ("ro-ro"). Since the 1960s, however, the Port's marine capability has increasingly been serviced from jetties located in the river, thereby eliminating the need for vessels to pass through the lock gates into the Port's enclosed dock.

1.6.5 The Port comprises a number of discrete operational areas handling a very diverse trade base including liquid fuels, solid fuels, ores, and ro-ro freight being handled from existing in-river jetties. These include the Eastern and Western Jetties, the Immingham Oil Terminal, the Immingham Gas Terminal, Immingham Outer Harbour and the Humber International Terminal ("HIT"). Other traffic and commodities including the lo-lo container freight, break-bulk cargo animal feed and grain are handled mainly at berths within the Port's internal dock and are then discharged to an array of storage compounds for onward distribution.

1.6.6 The infrastructure at the Port is the product of incremental expansion. This has enabled ABP, as the port operator, to increase the quantity of cargo imported/

exported and to expand the range and type of cargoes accommodated. The volumes processed through the Port have risen from 26 million tonnes to 50 million tonnes during the period 1981 – 2020.

1.7 Air Products

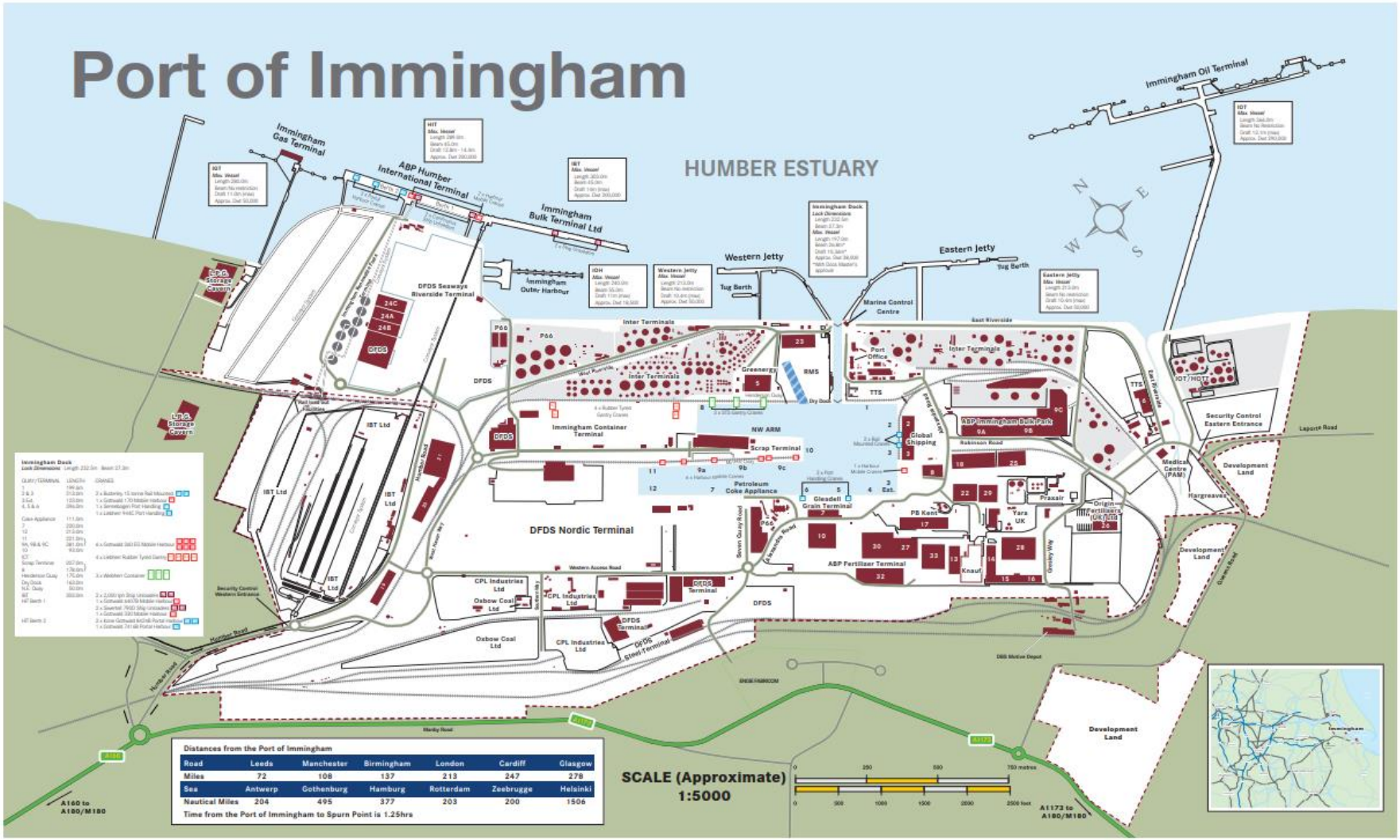
1.7.1 AP is a world-leading industrial gases company in operation for nearly 80 years, and more than 60 years in the UK and Ireland with over 1000 employees and significant operating facilities including 35 production facilities across the UK and Ireland in addition to a number of hydrogen refuelling stations and hydrogen, nitrogen and oxygen plants. Focused on serving energy, environment and emerging markets, the company provides essential industrial gases, related equipment and applications expertise to customers in dozens of industries, including refining, chemical, metals, electronics, manufacturing, and food and beverage. AP is also the global leader in the supply of liquified natural gas process technology and equipment. The company develops, engineers, builds, owns and operates some of the world's largest industrial gas projects, including gasification projects that sustainably convert abundant natural resources into syngas for the production of high-value power, fuels and chemicals.

1.7.2 In 2020, AP announced the signing of an agreement for a world-scale green hydrogen-based ammonia production facility powered by renewable energy. The project is sited in NEOM in the north-west corner of the Kingdom of Saudi Arabia, and will produce green ammonia for export to global markets. AP plans to invest in a new green hydrogen production facility at Immingham, supported by a downstream distribution network. The plan is to import renewable (green) ammonia to convert into green hydrogen to fuel heavy duty transport, such as heavy goods vehicles (HGVs) and buses. This is one of the most challenging and polluting sectors to decarbonise and a priority for meeting net zero in the UK.

1.7.3 Ammonia (NH_3) is used as an energy carrier for Hydrogen (H_2) due to it having a higher energy density in both gaseous and liquid form. H_2 can be transported from the locations of production (e.g. Neom) in the form of refrigerated NH3 more efficiently due to its energy density of up to ~13 MJ/L as compared to ~8.5 MJ/L for H2. NH_3 can be maintained in liquid form at ambient temperatures and is kept refrigerated at -33 deg C rather than at -253 deg C as pure liquid H_2. As a result, less energy is required to maintain the shipped NH_3 in refrigerated liquid form, and therefore a greater amount of hydrogen-based energy can be shipped much more efficiently, using less equipment and fewer ships

1.7.4 AP and ABP will enter into an agreement in respect of the alteration of the existing harbour facility and construction of associated landside development at the Port and the grant of interests in land to AP to facilitate the delivery of ammonia and its storage and processing to produce green hydrogen.

Plate 1-1 Port of Immingham Plan



1.8 Competent Expert Evidence

1.8.1 Regulation 14(a) and (b) of the EIA Regulations requires that an ES is prepared by 'competent experts' and that the ES is accompanied by a statement outlining the relevant expertise or qualifications of such experts.

1.8.2 This EIA Scoping Report has been prepared and coordinated by AECOM on behalf of the Applicant. AECOM is one of the founding members of the EIA Quality Mark, a voluntary scheme operated by the Institute of Environmental Management and Assessment (IEMA) through which AECOM's EIA activity is independently reviewed to ensure it delivers excellence in EIA practice.

1.8.3 A Statement of Competence will be included within the ES, detailing the relevant expertise and qualifications of the specialists involved in undertaking the EIA and production of the ES.

1.9 Structure of this EIA Scoping Report

1.9.1 The EIA Scoping Report is structured as follows:

a. Chapter 1: introduces the purpose of this EIA Scoping Report and provides an overview of the Project.

b. Chapter 2: provides the background to, and the need for, the Project, a description of the surrounding land and its land uses alongside a description of the components of the Project, and an overview of the alternatives considered.

c. Chapter 3: provides an overview of the legislative and consenting framework applicable to the Project.

d. Chapter 4: presents the general methodology that would be applied to the EIA, the proposed content and structure of the ES, and details other assessments to be undertaken.

e. Chapters 5 to 23: outline the technical scope for each of the environmental topics that would be assessed within the EIA.

f. Chapter 24: presents the technical scope of the cumulative and in-combination effects assessment.

g. Chapter 25: sets out the proposed structure of the ES.

h. Chapter 26: provides a summary of the scope of the EIA.

1.9.2 The EIA Scoping Report is also supported by the following appendices:

a. Appendix A: Figures.

b. Appendix B: Abbreviations and Glossary of Terms.

c. Appendix C: Preliminary Ecological Appraisal.

1.10 References

Ref 1-1 Department for Business, Energy & Industrial Strategy (2022). British Energy Security Strategy.

Ref 1-2 The Stationery Office Limited (2008). Planning Act 2008.

Ref 1-3 Department for Communities and Local Government (2013). Planning Act 2008: Guidance on Associate Development Applications for Major Infrastructure Projects.

Ref 1-4 The Stationery Office Limited (2017). The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. The Planning Inspectorate (2020). Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements (Version 7).

2 The Project

2.1 Project Location

2.1.1 The Project is located in North-East Lincolnshire on the south bank of the Humber Estuary. to the east of the Port. **Figure 1.1** in **Appendix A** illustrates the Project's location, which is approximately centred on National Grid Reference (NGR) E520783 N415271.

2.1.2 The landside works fall within the administrative boundary of NELC, whilst that part of the Project that extended seaward and falls beyond the local authority's boundary will take place in the bed of the Humber Estuary which is owned by the Crown Estate and over which ABP, in its capacity as the Humber Conservancy Commissioner, has the benefit of a long lease. The Project in its entirety covers an area of approximately 102.52 ha.

2.2 Application Site and Surrounding Area

2.2.1 As illustrated on **Figure 2.1** in **Appendix A**, the Project is split up into the following areas:

a. Jetty

b. East Site.

c. West Site.

d. Pipeline.

e. Temporary Construction Areas.

2.2.2 Further information regarding the proposed works in each Project area is presented within **Section 2.4**.

2.2.3 A plan of the existing Port is shown in **Plate 1.1** in **Chapter 1 Introduction**. The area surrounding the Port has significant industrial presence, being dominated by industrial works. The nearest major residential area is the town of Immingham approximately 1km from the western edge of the West Site.

2.2.4 The Port lies immediately adjacent to the main deep-water shipping channel which serves the Humber Estuary, thereby enabling access to the Port by some of the largest vessels afloat today. The Port is also well located for onward / inward transport of goods by road throughout the UK. It enjoys easy and quick access for road haulage to the M180 Motorway – and from there to the M1 or the A1, via the M18. In addition, the Port has its own rail terminal, with some 25% of all rail freight in the UK originating from the Port. This primarily connects to local power stations and steel works moving circa 10 million tonnes of cargo per annum.

2.2.5 The Jetty area extends seawards into the Humber Estuary and is located to the east of the existing Immingham Oil Terminal jetty. This area falls within the boundaries of the Humber Estuary Special Area of Conservation (SAC), Special Protection Area (SPA) and Ramsar Site, which collectively form the Humber European Marine Site (EMS).

2.2.6 The East Site comprises two parcels of land, which are bisected by Laporte Road. The first parcel of land consists of an area of hardstanding to the north of Laporte Road which is in use by ABP as a storage area. The second parcel of land is a triangular shaped area of brownfield land that is currently covered by gravel and various stockpiles, which is accessed via Queens Road (A1173) and lies to the south of Laporte Road. The Associated Petroleum Terminals works complex is situated to the north / north-east of the East Site, whilst to the south are various industrial complexes. To the west and north-west is the Port and associated industrial complexes and the 'Immingham Dock East Gate' Port entry point from Queens Road. To the east the East Site is bound by a narrow woodland belt which is subject to a Tree Preservation Order (TPO), and through which a bridleway passes connecting users to a coastal access path that follows the River Humber east to Grimsby.

2.2.7 The West Site is formed by three former agricultural fields, which are bounded by linear hedgerows and drainage ditches. The northern boundary of the West Site is defined by Kings Road (also A1173) and an electrical sub-station is situated to the north-west and is demarcated by a wire fence. Queens Road runs along the eastern boundary with residential and commercial properties adjacent to the site. A short tarmac access road has been constructed from Kings Road into the West Site and a series of overhead power cables run across the middle and southern boundary of the site, with a mains water and gas pipe also along the southern boundary.

2.2.8 The Pipeline area connects the West Site to the East Site and extends to the Jetty. It crosses an area that has mostly already been impacted by industrial development alongside Queens Road and crosses the Grimsby Docks Branch Line and Laporte Road. At the eastern end, the Pipeline continues through a section of woodland between Laporte Road and the Humber Estuary.

2.3 Development Consent Order Site Boundary

2.3.1 The land potentially required for the Project is illustrated on **Figure 2.2** in **Appendix A**.

2.3.2 For the purposes of scoping, the extents of this land (referred to as 'the DCO site boundary') currently capture what the Applicant believes to be the reasonable worst case in terms of the extents of land required to construct and operate the Project.

2.3.3 Refinement of the Project design will continue following EIA scoping through to completion of the detailed design and this will lead to optimisation of the DCO site boundary in the period up to application.

2.4 Description of the Project

Project Objectives and Overview

2.4.1 The objectives of the Project are:

a. To provide essential port infrastructure, capacity and resilience to support the growth and strategic needs and demands of the energy sector within the industrial cluster of Immingham and the Humber Enterprise Zone.

b. To provide capacity to (i) receive a range of liquid bulk products including ammonia (to produce green hydrogen) to help decarbonise the United Kingdom's (UK) transport sector and (ii) support carbon dioxide (CO_2) imports and exports to facilitate carbon capture and storage, both of which will assist transition towards net zero.

c. To deliver and operate new port infrastructure in a safe, efficient and sustainable manner by making effective use of available infrastructure, land, water, transport and utility connections which exist in and around the Port of Immingham.

d. To minimise adverse impacts on the environment and safeguard the health, safety and amenity of local residents.

e. To enhance both the local and regional economy through direct investment in and around the Port of Immingham and by partnering with the supply chain, providing opportunities for training, upskilling, apprenticeships and local employment.

2.4.2 The Project entails the construction of a jetty and topside infrastructure that would facilitate the import of liquid bulks associated with the energy sector.

2.4.3 The Project would also deliver the first facility able to benefit from the new jetty, which is a green hydrogen production facility, receiving imports of green ammonia from NEOM in Saudi Arabia, to be converted to green hydrogen to supply the UK's hydrogen for mobility (H_2^fM) market.

2.4.4 Ammonia is commonly used by the chemical industry but due to its potential risks and toxicity if there were to be an accidental leak, it is not transported by land, by road or by pipeline, over a long distance but rather converted, at close proximity to the ammonia storage before being transported at its point of use. The same logic applies to this Project. In addition, the ammonia is transported in an insulated pipeline as a low temperature liquid, similar to Liquid Nitrogen Gas (LNG). To minimise the heat leak and product boil off the pipeline needs to be as short as possible.

Construction and Operational Phasing

2.4.5 Subject to consent being granted for the DCO application there would be a phased approach to the construction of the Project, with the construction of the jetty, and first phase of the processing facility, being expected to start in the third quarter of 2024.

2.4.6 Following completion of the first phase of the processing facility, a further five phases would be constructed incrementally to increase the processing capacity as the market for green hydrogen increases.

2.4.7 For the purposes of scoping, a development scenario has been defined for the Project. This scenario is based on a six-phase construction timeline commencing in the third quarter of 2024, through to full completion of all phases in 2034.

2.4.8 It is anticipated that each phase of the Project would involve construction of different components within each area of the DCO site boundary, as presented in **Table 2.1** together with indicative construction timelines for each phase.

2.4.9 An indicative Project phasing plan is illustrated in **Figure 2.3** in **Appendix A**.

Table 2.1 Anticipated Project components within each area

Phase	Jetty	Pipeline Area	West Site	East Site
Phase 1 Construction: 2024 - 2026	Jetty structures Jetty topside infrastructure	NH_3 pipeline H_2 pipeline Utilities and cabling	One liquefier Tanker loading bays Administrative offices Other supporting facilities	NH_3 tank One converter
Phase 2 Construction: 2027 - 2028			One converter One liquefier	
Phase 3 Construction: 2029 - 2030			One liquefier	One converter
Phase 4 Construction: 2031 - 2032			One liquefier One converter	
Phase 5 Construction: 2032 - 2033			One liquefier	One converter
Phase 6 Construction: 2033 - 2034			One liquefier One converter	

Marine Infrastructure (the principal development)

Jetty

2.4.10 A new in-river jetty, including topside infrastructure, is proposed within the Jetty area as shown in **Figure 2.1** in **Appendix A,** that would have capacity to facilitate the handling and import and export of bulk liquids and cargos. This could include products such as liquefied CO_2 for the purpose of carbon capture and storage via connection to proposed CO_2 transport infrastructure being developed close to the Port. The associated processing facility, to be operated by AP, would be the first user of the jetty facility for the import of green ammonia to be converted to green hydrogen.

2.4.11 The proposed marine infrastructure would consist of:

a. An open piled approach trestle which would extend from the river frontage in a northerly direction leading to the jetty structures, with an overall length of approximately 1.1km.

b. The jetty would comprise structures including an (un)loading platform, berthing dolphins (likely two) and mooring dolphins (likely six) linked by high level walkways to facilitate operational and maintenance access. This would be a new jetty located to the east of the existing Immingham Oil Terminal jetty.

c. Appropriate topside infrastructure installed on the jetty to unload vessels including marine loading arms, piping, maintenance access, wastewater collection and drainage, water curtains and supporting utilities for handling bulk shipments of anhydrous ammonia. The pipework would run from the jetty along the trestle to a connection point at landfall to the landside pipework.

d. A small capital dredge would be required to ensure accessibility and safe mooring for vessels at all states of the tide. It is envisaged that the required dredge depth would be approximately 15.5m below Chart Datum; however, this would be confirmed through the Project design process.

e. Any dredge berth pocket would be optimised to include side slopes to ensure its stability, and it is envisaged that the dredged arisings (comprising of alluvial and glacial materials) if not suitable for beneficial reuse, would be disposed at licensed sites within the estuary. Maintenance dredging may be required.

Landside Infrastructure (associated development)

2.4.12 It is anticipated that the landside infrastructure would consist of the necessary infrastructure to facilitate the associated green hydrogen production facility to serve the first user of the principal development. The landscape infrastructure would consist of:

a. Pipework and pipelines required to link the jetty and unit operations.

b. A control building would be provided on the landside, at the foot of the jetty, to accommodate personnel operating the jetty.

c. Ammonia storage: the refrigerated liquid ammonia would be stored in a large tank at nearly atmospheric pressure at -33°C thus providing the safety means of storage.

d. Hydrogen (H_2) production: the liquid ammonia would then be transformed back into hydrogen and nitrogen (N_2) (nitrogen makes up 78% of the composition of ambient air) using a processing unit called a converter. The core of the process would be a catalytic bed through which the ammonia would undertake conversion into nitrogen and hydrogen. This reaction is endothermic i.e. it takes heat to take place, so the catalytic bed sits within a furnace.

e. Hydrogen liquefaction and storage: the hydrogen is a gaseous form is then turned into liquid through a hydrogen liquefier, so it is easier to safely store and transport. The liquid hydrogen would be stored in horizontal storage vessels.

f. Hydrogen export: road tanker loading bays for both liquid and gaseous hydrogen for distribution to the points of use throughout the UK.

2.4.13 The proposed works within each area of the landside areas shown in **Figure 2.1** in **Appendix A** are described below.

Pipeline

2.4.14 Two pipeline corridors are proposed within the Pipeline area.

2.4.15 An ammonia (NH_3) pipeline would be required from the jetty to the East Site to deliver refrigerated liquid ammonia to the storage tank. The pipeline would include the main ammonia unloading insulated line and a cool down line. The pipeline would have emergency shutdown valves, thermal relief, expansion loops, and leak detection as required. The pipeline would be above-ground and stacked vertically on a supporting rack / structure to minimise land take within the Long Strip woodland within this area, which is subject to a TPO.

2.4.16 A hydrogen (H_2) pipeline from the East Site would be installed to connect the ammonia converter(s) to the West Site. A nitrogen pipeline would also be required within this corridor to supply nitrogen from the generator on the West Site to be used as a utility on the East Site. It is likely that a large majority of this pipeline would be underground and a cathodic protection system would be installed to protect the pipeline(s) from corrosion.

East Site

2.4.17 The East Site would comprise an ammonia storage tank and converters for the production of hydrogen from ammonia and would be linked to the jetty through an ammonia pipeline as well as communications and utilities links.

2.4.18 Offloaded refrigerated liquid ammonia from the jetty facility would be transferred to a storage tank(s) at the East Site. The storage location would include a refrigeration (boil-off gas) system, storage flare, and supply pumps for the ammonia converter.

2.4.19 Access to the East Site is proposed from via two entrances, one from Queens Road and the other from Laporte Road.

2.4.20 The East Site would receive nitrogen that is generated at the West Site via a connection pipeline. Power would also be supplied from the West Site and potable water would be supplied by a connection to the local main water network.

2.4.21 A plan illustrating indicative site components of the East Site is shown in **Figure 2.4** in **Appendix A**. This information will continue to be developed through the design process and further details will be presented in the ES.

West Site

2.4.22 The West Site would comprise a number of converters and hydrogen liquefiers to facilitate the temporary storage of the hydrogen and its subsequent road transport. A site-wide cooling water system would be required for the Project at the West Site. A nitrogen supply to the East Site would be provided via pipeline connection from the generator on the West Site. In addition, the West Site would also accommodate tanker loading bays, administrative offices and other supporting facilities.

2.4.23 The West Site would include a 33kV grid power connection and access is proposed via two entrances, one from Kings Road and the other from the A1173.

2.4.24 A plan illustrating indicative site components of the West Site is shown in **Figure 2.5** in **Appendix A**. This information will continue to be developed through the design process and further details will be presented in the ES.

Overview of Marine Facilities Construction Approach

2.4.25 At this stage, the design of the jetty topsides is not yet finalised. It is likely that the jetty topside's piping, mechanical equipment, electrical and control systems would be fabricated off-site and installed on the jetty head via a jack up barge. Depending on the design, the piping running along the jetty structure may be installed by either a jack up barge or using small lifting equipment from the jetty structure. Over water working would be strictly controlled.

2.4.26 In the marine environment the structures would rest upon an open piled network of steel tubular piles. In driving these piles, a four-step process is envisaged involving vibro and percussive piling techniques. The deck for the approach trestle and jetty would be supported by either steel or pre-stressed concrete beams with an in-situ concrete deck. The topside pipework would be fabricated off-site in modules and floated and/or craned into position. The high-level walkways between dolphins would be fabricated off-site and lifted into position. The exact construction methodology and sequencing for the marine works is being developed.

2.4.27 It has been determined that dredging would be required for the Project; however, the exact capital dredge methodology has not yet been defined. The majority of the material in situ is likely to be firm with an average density of circa 1,350 kg/m^3 at the surface with the density increasing with depth. One of the options being considered is that material would be removed via backhoe. Some material may also be removed by trailer suction hopper dredger (TSHD) where possible, with dredged material being disposed of within the estuary, at either Clay Huts disposal site (HU060) or Holme Channel disposal site (HU056), subject to the dredge material being deemed suitable for disposal at sea by the MMO.

Overview of Landside Facilities Construction Approach

Pipelines

2.4.28 The pipelines would comprise a combination of above ground sections and below ground sections and would involve below ground / above ground cables and other services. There may be some areas where open trenching would be

required. Any above ground sections of pipeline would be fenced off to restrict public access.

2.4.29 The pipeline installation would involve clearing of areas, preparation for pipeline installation, installation of piles and foundations and either Horizontal Directional Drilling (HDD) or open trench.

2.4.30 It is not possible for the Project to take place without crossing Queens Road and Laporte Road and a railway line. It is envisaged that HDD would be used for the necessary pipeline crossings. Back filling and reinstatement would follow once the pipeline works are completed.

2.4.31 The pipeline route would be marked with marker posts which would be set to ensure visibility. Cathodic protection posts would also be installed along the pipeline route.

2.4.32 Part of the pipeline connecting the East Site to the Jetty is situated within a woodland area protected by a TPO and some removal of trees in this area is likely to be unavoidable. The Applicant would select construction techniques and processes that seek to minimise encroachment into, and loss of, trees within the area by reducing the width of the necessary construction areas where practicable, for example by the vertical stacking of pipes on a supporting rack / structure in this location.

2.4.33 It is likely the bridleway through the TPO area would be closed to the public during Project construction to protect the public for safety reasons. Appropriate stakeholder consultation would be carried out to ensure users are aware of the closures. The bridleway would be reopened once the Phase 1 construction works are completed.

East and West Sites

2.4.34 The East and West Sites would require civil, mechanical and piping (M&P), and electrical and control (E&C) construction works.

2.4.35 Civil works would involve piling in the areas where the ground needs strengthening. Piling design is not yet complete but at this stage it is anticipated that this would likely be Continuous Flight Augering (CFA) to reduce noise and vibration during piling activities. The exact piling technique to be employed would be confirmed during the detailed design and further information would be presented in the ES.

2.4.36 The Project would use modularisation to reduce the on-site works and maximise the works completed in specialised fabrication facilities where practicable. M&P works would involve installation of large equipment and modules and would require heavy equipment such as cranes and transport vehicles. Coatings would be applied off-site with only coating touch up applied at site. An on-site fabrication facility would support the erection of steel and piping systems to complete any on-site modifications.

2.4.37 The E&C works would include the installation of modular electrical and control buildings which would be constructed off-site and assembled on site. There would also be buildings constructed on site in a "traditional" manner such as

control buildings. The Project would be connected to the electricity transmission network via overhead and underground electricity transmission cables.

Ammonia Storage Tanks

2.4.38 The ammonia storage tank would be situated on the East Site and would be constructed by a specialist tank contractor. The tank is likely to be built by transporting large sections to site via the Port and then transported by road to the East Site for installation.

Temporary Construction Compounds and Laydown Areas

2.4.39 Construction compound and laydown areas would be required during construction. The construction compound would contain offices welfare facilities, parking and storage facilities. In addition, laydown areas would also be required on a temporary basis for materials handling and storage for plant and materials. Indicative locations for these facilities are indicated on **Figure 2.1** in **Appendix A**.

Site Access

2.4.40 Site access would be required for the delivery of construction materials and plant, and for general construction traffic. Due to the phased approach to the construction of the Project, multiple entrances / exits would be required. Access is proposed to be gained from the following roads:

a. Kings Road.

b. Queens Road.

c. Laporte Road.

d. A1173.

2.4.41 The creation of site accesses would require modifications to the existing roads to create new and temporary site entrances / exits. These would be designed to minimise traffic disruption. Studies will be carried out to determine the optimum highways design for the necessary changes to the road systems and any temporary traffic restrictions while road work is being carried out. The studies will also inform the Project on the sequence of road works to reduce their impact.

2.4.42 Traffic management measures would be agreed with the local highways authority and employed during construction to ensure the safe movement of materials to working areas and laydown areas, reduce delays on other road users, and minimise interference with local traffic.

Construction Environmental Management

2.4.43 A Construction Environmental Management Plan (CEMP) will be prepared for the Project, which will describe the specific mitigation measures to be followed by the appointed construction contractor to reduce potential nuisance impacts. The CEMP will identify all the procedures to be adhered to throughout construction and would be adopted by the appointed contractor during the construction phase.

Decommissioning

2.4.44 The landside elements of the Project have a design life of up to approximately 25 years and when appropriate, this infrastructure would be decommissioned.

2.4.45 Decommissioning would be undertaken safely, in line with specific procedures and subject to risk assessment and permit to work schemes, and with regard to the environmental legislation at the time of decommissioning. The required licences and permits would also be acquired.

2.4.46 Decommissioning of the landside elements of the Project would likely involve leaving underground pipelines in situ and making them safe. All above ground infrastructure associated with the Project would likely be dismantled and all materials removed would be reused or recycled where possible or disposed of in accordance with relevant waste disposal regulations at the time of decommissioning. Land would be restored to a satisfactory state. If required and appropriate, refurbishment or replacement of specific plant would be performed to extend the life of the Project.

2.4.47 The Project does not make any provision for the decommissioning of the marine facilities of the Project. This is because the marine facilities would, once constructed, become part of the fabric of the Port estate and would, in simple terms, continue to be maintained so that it can be used for port-related activities to meet a long-term need. All plant or equipment on the jetty topside that is associated with the landside element of the Project would likely remain in situ and repurposed.

2.4.48 An Outline Decommissioning Strategy will be produced, which will detail measures envisaged to be implemented to avoid or reduce impacts during the decommissioning of the landside elements. Details will be included within the ES, and assessment work undertaken where necessary.

2.4.49 The Outline Decommissioning Strategy will be submitted with the application and secured in the DCO. At the appropriate point in time, a detailed Decommissioning Plan would be developed by the Applicant in accordance with the Outline Decommissioning Strategy, which would address the relevant statutory requirements at the time; address any extant commitments with landowners/ statutory authorities; and take account of any developed technology and good practice.

2.5 The Need for the Immingham Green Energy Terminal

2.5.1 UK Government policy on ports, as set out in the *National Policy Statement for Ports* (NPSfP) (Ref 2-1), acknowledges the essential role of ports in the UK economy. The Government believes that there is a compelling need for substantial additional port capacity over the next 20 to 30 years to be met by a combination of development already consented and developments for which applications have yet to be received.

2.5.2 Specifically in relation to energy, the NPSfP identifies that ports have a vital role in the import and export of energy supplies and that port handling needs for energy can be expected to change as the mix of our energy supplies changes. The Government makes it clear that ensuring security of energy supplies through

UK ports will be an important consideration and critically, that *"ports will need to be responsive… to changes in different types of energy supplies needed".*

2.5.3 In this respect, the NPSfP highlights that the UK ports industry is market-led, specifically making it clear that it is the Government's policy to *"allow judgements about when and where new development might be proposed to be made on the basis of commercial factors by the port industry or port developers operating within a free market environment"*.

2.5.4 For this reason, Government policy is not to dictate where port development should occur but rather to enable port development to be responsive to changing commercial demands by accepting that the market is the best mechanism for achieving this.

2.5.5 The Project would deliver the marine infrastructure needed at the Port – a facility of recognised national importance – in response to a demand to support the future transportation of liquid bulks associated with the energy sector that would support the transition to net zero. Specifically, the Project would initially be used as a conduit for the import of green ammonia to be converted to green hydrogen. The Project would therefore directly support the Government aspiration of seeing *"port development, wherever possible supporting sustainable development by providing additional capacity for the development of renewable energy".*

2.5.6 As part of their commitment to tackling climate change, the Government has set legally binding targets to become net-zero in all greenhouse gases by 2050 for England and Wales. Through the *Energy White Paper: Powering our Net Zero Future* (Ref 2-2) the Government has shown clear commitment to earmarking hydrogen as a priority area in the Net Zero Innovation Portfolio and the intention to invest in new hydrogen technologies and set a target of 5GW of low-carbon hydrogen production capacity by 2030.

2.5.7 The *UK Hydrogen Strategy* (Ref 2-3) sets out the Government's approach to develop a thriving low carbon hydrogen sector in the UK and recognises that *"Hydrogen is one of a handful of new, low carbon solutions that would be critical for the UK's transition to net zero. As part of a deeply decarbonised, deeply renewable energy system, low carbon hydrogen could be a versatile replacement for high-carbon fuels used today - helping to bring down emissions in vital UK industrial sectors and providing flexible energy for power, heat and transport."*.

2.5.8 With a focus on providing secure, clean and affordable domestic energy in the long-term, the Government produced the *British Energy Security Strategy* (Ref 2-4) in April 2022. The Strategy addresses the UK's vulnerability to international energy prices and highlights the importance of reducing the UK's dependence on imported oil and gas. Through this strategy (Ref 2-4), the Government identifies that the UK is well placed to exploit all forms of low carbon hydrogen production and commits to doubling its hydrogen production ambition to 10GW by 2030.

2.5.9 The associated processing facility could contribute volume equivalent of up to 300MW of hydrogen production capacity towards the Government's 10GW production ambition by 2030. It would improve the UK's energy security and contribute to the transition to net zero. AP aims to make a significant investment

in the UK to deliver green hydrogen, for which the associated processing facility would be its anchor project.

2.5.10 Green hydrogen helps to decarbonise transport, and this project would contribute to the UK's net zero priorities. In total, this facility could eliminate up to 580,000 tonnes of greenhouse gas emissions each year – the equivalent of taking 20,000 diesel HGVs off UK roads. Alongside this, the proposals would create 1,400 new direct jobs in the North East Lincolnshire area (approximately 650 in sectors such as construction and engineering throughout the build, and a further 750 ongoing jobs in the operation and maintenance of the new Air Products facility), in addition at least another 1,600 jobs would be created in the supply chain.

2.6 Project Alternatives

2.6.1 Part 14(d) of the EIA Regulations (Ref 2-5) requires the ES to contain at least *"a description of the reasonable alternatives studied by the Applicant, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment"*.

2.6.2 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, including the option of 'doing nothing'. In addition, the ES will set out the legislative and policy context against which the consideration of alternatives has taken place, and in particular, will be guided by the principles contained within Section 4.9 of the NPSfP (Ref 2-1 including:

a. The consideration of alternatives in order to comply with policy requirements will be carried out in a proportionate manner.

b. Whether there is a realistic prospect of an alternative delivering the same infrastructure capacity (including the energy security and climate change benefits) in the same timescale as the proposed development.

c. Where suggested alternatives would mean that the primary objectives of the application could not be achieved, they will be excluded on the grounds that they are not important and relevant to the decision.

2.6.3 Where, at the time of the DCO application, alternatives still exist for any particular element of the Project, the EIA will consider and assess the 'worst case' impacts, in accordance with the principles outlined in the Inspectorate's *Advice Note Nine: Rochdale Envelope* (Ref 2-6). A full description of the Project design evolution and assessment of reasonable alternatives will be presented in detail in the ES, which will also include an explanation of the selection of the Port for the location of the green hydrogen processing facility by AP.

Location of the NSIP

2.6.4 The expansion of the Port of Immingham, as defined by its current operational boundaries, is constrained by existing infrastructure, including on the marine side by existing jetties and on the landside by both operational buildings and

structures and an extensive network of pipelines and other services, both above and below ground. The proposed Immingham Eastern Ro-Ro Terminal Development (IERRT Development) (Planning Inspectorate Ref TR030007) have been accommodated within the port itself by the relatively short jetty requirement (a function of the shallow draft requirement of the related vessels) and adjacent landside requirements which do not require extensive pipework or other services.

2.6.5 In order to develop a new deep water jetty to support the import and export of liquid bulk products associated with the Net Zero agenda, including but not limited to Green Ammonia, it was therefore necessary to locate the jetty outside the existing operational port site, but as close to it as possible to benefit from the existing highways infrastructure and the existing port services, whilst also with sufficient land to support the establishment of a new pipeline corridor and terrestrial storage and production facilities.

2.6.6 This development requires a deep-water berth and deep sea channel to accommodate vessels with a 14m draught. This would then place the ideal jetty location to the immediate east of the Immingham Oil Terminal Jetty as the berth needs to be close to the eastern extent of the Port; the deep-water channel moves away from the south bank of the estuary to the east at this point. There is no space to accommodate the new deep-water berth within the Port to the west of the proposed jetty location and to the west of the existing Port estate, the channel is not deep enough and would therefore require significant dredging and ongoing maintenance to maintain the required depth. That is not a preferable option to the proposed location to the east of the Port for operational and environmental reasons.

2.6.7 The proposed jetty location, just to the east of the existing boundary of the Port, is therefore considered to be the best available, given:

a. The need to reach the deep-water channel and minimise interfaces with other vessels.

b. The constrained nature of the existing Port, both on the marine and land sides, particularly to support large, deep draught vessels.

c. The need for space on the adjacent land side to support a pipeline corridor, storage and production facilities.

d. The need to make best use of existing infrastructure and services, associated with the Port

Location of the Associated Development

2.6.8 The associated development is sited on the closest available land to the location of the proposed jetty (the NSIP). This location enables the minimum transfer distances for the transportation of ammonia by pipeline to the processing facility to be achieved, as detailed in **Section 2.4** of this chapter.

2.7 References

Ref 2-1 Department for Transport (2012) National policy statement for ports.

Ref 2-2 HM Government (2020). Energy White Paper: Powering our Net Zero Future.

Ref 2-3 HM Government (2021). UK Hydrogen Strategy.

Ref 2-4 Department for Business, Energy & Industrial strategy (2022). British energy security strategy.

Ref 2-5 The Stationery Office Limited (2017). The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.

Ref 2-6 The Planning Inspectorate (2018). Advice Note Nine: Rochdale Envelope (Version 3).

3 Legislative and Consenting Framework

3.1 Introduction

3.1.1 This chapter provides a summary of the key legislation, policy and guidance against which the Project will be assessed, and which have been considered when defining the scope of the EIA. Where specific aspects of these policies are directly relevant to specific environmental topics, these are addressed further in Chapters 5 to 23. Full explanations of the relevant legislation, policy and guidance will be provided in the ES.

3.1.2 The DCO application will be accompanied by a Planning Statement, which will consider the compatibility of the Project with planning policy.

3.2 Withdrawal of the UK from the EU

3.2.1 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 3-1) (the 'Withdrawal Act'), broadly, EU-derived domestic legislation and certain EU legislation continue to have effect in domestic law.

3.2.2 In exercise of the powers in the Withdrawal Act, the Government made *The Environmental Assessments and Miscellaneous Planning (Amendment) (EU Exit) Regulations 2018* (Ref 3-2). These regulations provide for the EIA Regulations (Ref 3-3) 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 3-3) 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.

3.3 Legislation

The Planning Act 2008

3.3.1 The PA2008 (Ref 3-4) is the primary legislation that establishes the legal framework for applying for, examination and determination of applications for DCOs for NSIPs.

3.3.2 Section 120 of the PA2008 (Ref 3-4) allows other types of consents to be included in a DCO. At this stage, consideration is being given to the requisite consenting and approval processes to be included within the DCO and further information on this is provided in **Section 3.6**. As part of the EIA process, pre-application discussions will be held with relevant stakeholders to seek to agree a position with them on which legislation/ consents can be disapplied through the DCO.

The EIA Regulations

3.3.3 The requirement for an EIA originates from the EU Council Directives 85/ 337/ EEC on the assessment of the effects of certain public and private projects on

the environment (Ref 3-5) (the 'EIA Directive) (as amended by Directive 2011/ 92/ EU (Ref 3-6) and 2014/ 52/ EU (Ref 12-4). This is directly transposed into English law for NSIPs by the EIA Regulations (Ref 3-3).

3.3.4 The EIA Regulations (Ref 3-3) identify which projects are likely to have significant environmental effects and would therefore require an EIA, and as described in **Chapter 1 Introduction**, the Project has been identified as an EIA Project. The EIA Regulations (Ref 3-3) 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 Project.

3.3.5 Further details on the approach to the EIA are outlined in **Chapter 4 The EIA Process**.

3.4 Policy Context

National Policy Statements

3.4.1 Section 104 of the PA2008 (Ref 3-4) requires the SoS, when determining DCOs, to have regard to the provisions of National Policy Statements (NPSs) where relevant. NPSs are produced by the UK Government and comprise the Government's objectives for the development of NSIPs.

3.4.2 NPSs relevant to the Project are presented in the following sections.

National Policy Statement for Ports

3.4.3 The *National Planning Policy Statement for Ports* (NPSfP) (Ref 3-8) provides the framework for decisions on proposals for new port development.

3.4.4 The NPSfP (Ref 3-8) highlights the Government's recognition of the essential role ports perform in the national economy and the need for new infrastructure. The DCO application will set out the Project within the context of the NPSfP (Ref 3-8).

3.4.5 In particular, Section 3 ‘Government Policy and the Need for New Infrastructure’ recognises the vital role that ports play in the import and export of energy supplies. Section 4 'Assessment Principles' of the NPSfP (Ref 3-8) sets out the key considerations the decision maker should take into account when making decisions on port developments. Section 5 'Generic Impacts' of the NPSfP (Ref 3-8) sets out general impacts relating to port development, split by topic.

3.4.6 The requirements of the NPSfP have been considered as part of the EIA scoping exercise.

Overarching National Policy Statement for Energy (EN-1)

3.4.7 The *Overarching National Policy Statement for Energy* (EN-1) (Ref 3-9) sets out national policy for the development of major energy infrastructure and aids the Inspectorate in their decisions on applications that fall within the scope of this NPS. NPS EN-1 (Ref 3-9) requires the Inspectorate to take account of adverse environmental, social and economic impacts and weigh these against the benefits of the development scheme.

3.4.8 Specifically, Part 3 covers the need for NSIPs for energy and the role these play in diversifying the UKs energy mix and national economy. Part 3.8 although not specifically mentioning hydrogen, is relevant to hydrogen infrastructure due to the similarity of the structures involved.

3.4.9 Part 4 'Assessment Principles' sets out the general policies the Inspectorate should consider when reaching a decision on new energy infrastructure. Part 5 'Generic Impacts' covers the particular environmental impacts during construction and operation of a development scheme that should be given weight during the decision-making process.

3.4.10 The requirements of NPS EN-1 (Ref 3-9) have been considered as part of the EIA scoping exercise.

UK Marine Policy Statement

3.4.11 The *UK Marine Policy Statement* (MPS) (Ref 3-10) provides the framework for preparing Marine Plans and is key when making decisions directly affecting the marine environment. It contributes to the achievement of sustainable development in the UK marine area.

3.4.12 Paragraph 2.1.1 of the MPS (Ref 3-10) states that the UK vision for the marine environment is for "*…clean, healthy, safe, productive and biologically diverse oceans and seas*".

3.4.13 The MPS (Ref 3-10) provides the high-level policy context within which national and sub-national Marine Plans would be developed, ensuring that marine resources are used in a sustainable way in line with high level marine objectives to:

a. Promote sustainable economic development.

b. Enable the UK's move towards a low-carbon economy, in order to mitigate the causes of climate change and ocean acidification and adapt to their effects.

c. Ensure a sustainable marine environment which promotes healthy, functioning marine ecosystems and protects marine habitats, species and our heritage assets.

d. Contribute to the societal benefits of the marine area, including the sustainable use of marine resources to address local social and economic issues.

3.4.14 This was followed up by a set of high-level marine objectives published in April 2009 and set out in Chapter 3 of the MPS (Ref 3-10). The process of marine planning must contribute to the achievement and integration of these policy objectives.

Draft National Policy Statement for Energy (EN-1)

3.4.15 The *Draft Overarching National Policy Statement for Energy (EN-1)* (Ref 3-11) was published in September 2021. Changes included within the draft EN-1 (Ref 3-11) compared to the requirements of NPS EN-1 (Ref 3-9) include a greater

focus on local impacts. It also includes a section on carbon emissions, which outlines new obligations for NSIPs. The updated EN-1 is yet to be approved.

The Energy White Paper: Powering our Net Zero Future

3.4.16 The *Energy White Paper: Powering our Net Zero Future* (Ref 3-12) was presented to Parliament in December 2020. At its core is a commitment to achieve net zero and tackle climate change, and a clear commitment from the UK Government to invest in new clean energy, with a target of 5GW of low-carbon hydrogen production capacity by 2030 being set.

British Energy Security Strategy

3.4.17 The UK government published the *British Energy Security Strategy* (Ref 3-12) in April 2022, which focuses on providing secure, clean and affordable British energy for the long term.

3.4.18 It states that the UK is "*going to produce vastly more hydrogen, which is easy to store, ready to go whenever we need it, and is a low carbon superfuel of the future*". It also outlines that the UK Government "*fully support hydrogen as a relatively frictionless way to decarbonise our lives in the near-term*" and commits to doubling its hydrogen production ambition to 10GW by 2030.

National Planning Policy Framework

3.4.19 Paragraph 5 of the National Planning Policy Framework (NPPF) (Ref 3-14) states that whilst it does not contain specific policies for NSIPs, it may be considered as 'important and relevant' in the decision-making process in accordance with s104 of the PA2008 (Ref 3-4). It sets out the Government's planning policies for England and how they should be applied. At the heart of the NPPF is a presumption in favour of sustainable development and to deliver this, the framework sets out the Government's economic, environmental and social planning policies for England and how these should be applied.

3.4.20 The NPPF is supported by the National Planning Practice Guidance (NPPG), which is a web-based resource.

3.4.21 Relevant content from the NPPF (Ref 3-14) and NPPG has been referenced directly in the environmental topic chapters of this EIA Scoping Report.

3.5 Local Planning Policy

North East Lincolnshire Local Plan 2013 to 2032

3.5.1 Local planning policy contained within Development Plans for the local authority administrative areas can be material considerations in the determination of NSIP applications and provide an indication of local environmental sensitives.

3.5.2 The Project falls within the administrative boundary of North East Lincolnshire Council (NELC). NELC formally adopted the *North East Lincolnshire Local Plan 2013 to 2032* (the Plan) (Ref 3-15) and relevant adopted policies are listed in **Table 3.1**.

Table 3.1 North East Lincolnshire Local Plan Policies

Policy	Summary
Policy 6	Infrastructure
Policy 7	Employment Allocations – Operational Port Areas
Policy 9	Habitat Mitigation – South Humber Bank
Policy 22	Good Design in New Developments
Policy 31	Renewable and Low Carbon Infrastructure
Policy 32	Energy and Low Carbon Living
Policy 33	Flood Risk
Policy 34	Water Management
Policy 39	Conserving and Enhancing the Historic Environment
Policy 40	Developing a Green Infrastructure Network
Policy 41	Biodiversity and Geodiversity
Policy 42	Landscape
Policy 43	Green Space and Recreation

East Inshore and East Offshore Marine Plans

3.5.3 The *East Inshore and East Offshore Marine Plan* (Ref 3-16), together with the Marine Policy Statement, underpin a new planning system for England's seas. This was adopted in April 2014 and provides a clear approach to managing the East Inshore and East Offshore areas, its resources and the activities and interactions that occur in this area.

3.5.4 The marine elements of the Project are located within the East Inshore Marine Plan. Relevant adopted policies to the Project are detailed in **Table 3.2**.

Table 3.2 East Inshore and East Offshore Adopted Marine Plan

Policy	Summary
Policy EC1	Economic Benefits
Policy EC2	Employment Benefits
Policy EC3	Offshore Wind and Energy Generation
Policy SOC2	Heritage Assets
Policy SOC3	Terrestrial and Marine Character

Policy	Summary
Policy ECO1	Cumulative Effects
Policy ECO2	Release of Hazardous Substances
Policy BIO1	Biodiversity Protection
Policy BIO2	Biodiversity and Geological Enhancement
Policy MPA1	Marine Protected Area network
Policy CC1	Climate Change
Policy CC2	Minimising Carbon Emissions
Policy GOV2	Co-existence in the Marine Environment
Policy GOV2	Displacement and Mitigation
Policy DEF1	Ministry of Defence Danger and Exercise Areas
Policy PS3	Ports and Shipping
Policy DD1	Dredging and Disposal Areas
Policy FISH1	Fishing Activity
Policy FISH2	Impacts on Fish Population
Policy AQ1	Sustainable Aquaculture Development Sites
Policy TR2	Recreational Activity

3.6 Other Consents and Notifications

Disapplication of Legislative Provisions

3.6.1 Consideration is being given to the requisite consenting and approval processes to be included within the DCO. As part of the EIA process, pre-application discussions will be held with relevant stakeholders to seek to agree a position within them on which legislation/ consents can be disapplied through the DCO.

3.6.2 At this stage in the Project development process, the requirement to seek the disapplication of legislative provisions for a marine licence has been identified. S149A of the PA2008 (Ref 3-4) enables DCOs for projects which affect the marine environment to include provisions which deem marine licences. The Project would include works below Mean Water High Springs (MWHS), including removals and deposits at sea, and therefore the Applicant will be seeking a deemed marine licence, in consultation with the Marine Management Organisation (MMO), as part of the DCO.

Other Consents and Notifications

3.6.3 Given the nature of the Project, there will be a requirement to obtain a range of other consents and approvals outside of the DCO process.

3.6.4 At this stage, a likely requirement for the following consents and approvals has been identified:

a. Protected species licences.

b. Hazardous Substances Consent.

c. Control of Major Accidents and Hazards (COMAH) notification.

d. An Environmental Permit for the processing facility.

3.7 References

Ref 3-1 The Stationery Office Limited (2020). European Union (Withdrawal Agreement) Act 2020.

Ref 3-2 The Stationery Office Limited (2018). The Environmental Assessment and Miscellaneous Planning (Amendment) (EU Exit) Regulations 2018.

Ref 3-3 The Stationery Office Limited (2017). The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.

Ref 3-4 The Stationery Office Limited (2008). Planning Act 2008.

Ref 3-5 European Commission (1985). Council Directive of 27 June 1985 of the assessment of the effects of certain public and private projects on the environment (85/ 337/ EEC).

Ref 3-6 European Commission (2011). Directive 2011/ 92/ EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment.

Ref 3-7 European Commission (2014). Directive 2014/ 52/ EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/ 92/ EU on the assessment of the effects of certain public and private projects on the environment.

Ref 3-8 Department for Transport (2012). The National Planning Policy Statement for Ports.

Ref 3-9 Department of Energy & Climate Change (2011). Overarching National Policy Statement for Energy (EN-1).

Ref 3-10 The Stationery Office Limited (2011). UK Marine Policy Statement.

Ref 3-11 Department for Business, Energy & Industrial Strategy (2021). Draft Overarching National Policy Statement for Energy (EN-1).

Ref 3-12 Department for Business, Energy & Industrial Strategy (2020). Powering our Net Zero Future.

Ref 3-13 Department for Business, Energy & Industrial strategy (2022). British energy security strategy.

Ref 3-14 Ministry of Housing, Communities and Local Government (2021). National Planning Policy Framework.

Ref 3-15 North East Lincolnshire Council (2018). North East Lincolnshire Local Plan.

Ref 3-16 Maritime Management Organisation (2016). East Inshore and East Offshore Marine Plans.

4 The EIA Process

4.1 Approach to EIA Scoping

Overarching Approach

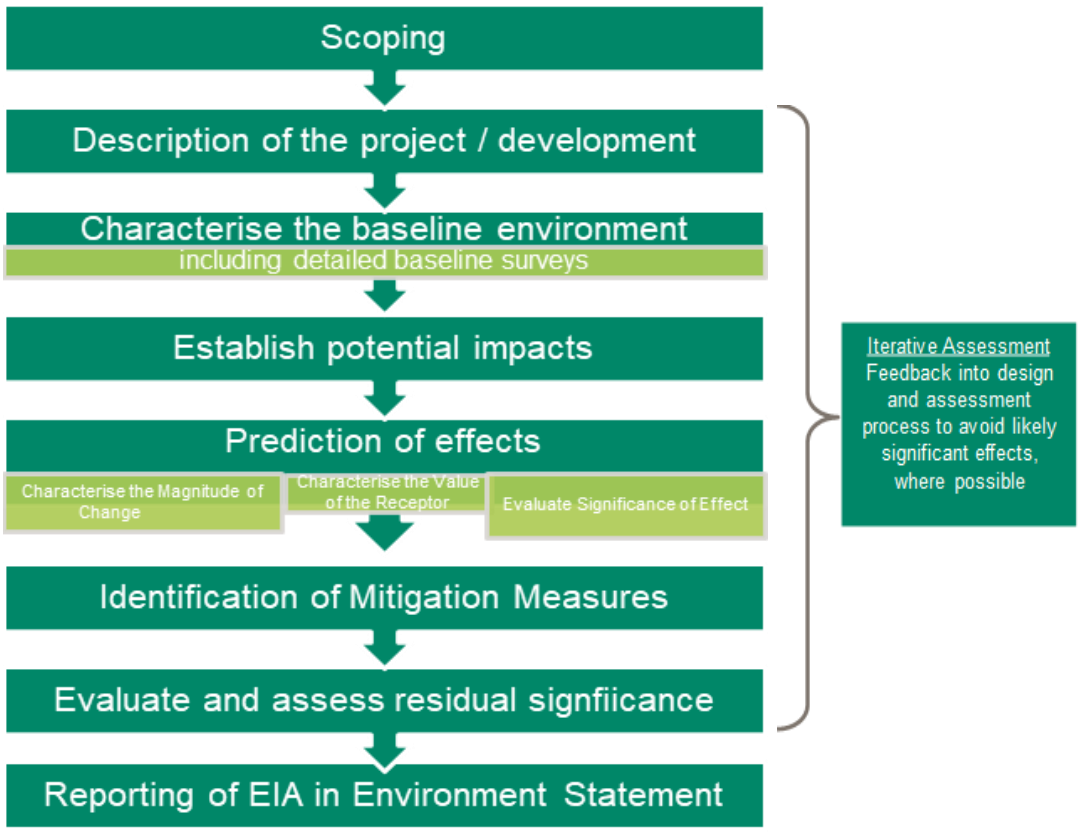
4.1.1 EIA is a process for identifying the likely significant environmental effects (positive and negative) of a proposed project to inform the decision-making process for development consent to be granted.

4.1.2 EIA aims to be a systematic, analytical, impartial, consultative and iterative process of identifying, evaluating and mitigating the likely significant environmental effects of a project. It promotes the early identification and evaluation of the likely significant effects and enables appropriate mitigation (that is, measures to avoid, reduce or offset significant adverse effects) to be identified and incorporated into the design of the development, or commitments to be made to environmentally sensitive construction methods and practices.

4.1.3 Typically, a number of design iterations take place in response to environmental constraints being identified and consultee feedback received during the EIA process prior to the final design being defined. This will be particularly important for the Project as the design and layout are still being refined, and changes are likely to be made following submission of this EIA Scoping Report.

4.1.4 The EIA process involves the main steps illustrated in **Plate 4.1**.

Plate 4-1 Overview of the EIA Process



4.1.5 The EIA scoping process establishes which aspects of the environment are likely to be significantly affected by a project and involves identifying:

a. The people and environmental resources (collectively known as 'receptors') that could be significantly affected by the Project.

b. The work required to take forward the assessment of these potentially significant effects.

4.1.6 Consultees are encouraged to provide confirmation of agreement to the proposed scope of the EIA for this Project in terms of what is included and excluded ('scoped in' and 'scoped out'), the methodology and the receptors identified.

4.1.7 The approach taken in preparation of this EIA Scoping Report has been informed by the Inspectorate's *Advice Note Seven* (Ref 4-1) and reflects that the EIA Regulations (Ref 4-2) require an ES to focus on aspects of the environment likely to be subject to significant effects. Accordingly, this EIA Scoping Report seeks to, where appropriate, scope out aspects/ matters from further assessment with suitable justification provided. This will streamline the assessment to focus on key likely significant effects and ensure the EIA for the Project is proportionate in accordance with IEMA's *Delivering Proportionate EIA* (Ref 4-3) guidance document.

4.1.8 For the purposes of the EIA, the full capacity of the jetty as the NSIP would be assessed and landside components of the associated development would be assessed in terms of the capacity for which they are being designed. Further details of the approach will be provided within the ES.

4.2 Rochdale Envelope Parameters and Managing Design Uncertainty

4.2.1 In certain places the DCO site boundary, as illustrated on **Figure 2.2** in **Appendix A**, may be wider than that of the eventual draft Order Limits that will be applied for within the DCO application. This is because refinement of the DCO site boundary and Project design will continue from completion of EIA scoping through to completion of detailed design.

4.2.2 Design uncertainty will be addressed within the EIA by adopting a precautionary approach to identifying significant environmental effects, through the establishment of a series of maximum development extents known as a 'Rochdale Envelope'. The details of the approach to assessment will be explained in the ES.

4.2.3 The Rochdale Envelope arises from UK case law (Ref 4-4). It is an established principle that allows a number of parameters to be set so as to limit the potential scope of a project. Its adoption allows robust EIA to be undertaken by defining a reasonable worst-case scenario that decision-makers can consider when determining the acceptability or otherwise of the environmental effects of a development project.

4.2.4 The principle is founded on the assumption that, as long as the technical and engineering parameters of a project fall within the limits of the envelope, and the EIA has considered the likely significant effects of a project coming forward within

that envelope (based on the reasonable worst-case scenario), then flexibility within those parameters is deemed to be permissible within the terms of any consent granted for the project.

4.2.5 In establishing the reasonable worst-case scenario, it must be considered whether development according with one or other of the parameters would have a more significant adverse effect that the alternative, and where a range of parameters is provided, the development according with the parameter likely to have the most significant adverse effect is assessed in the EIA (which can differ depending on the environmental resource or receptor being assessed).

4.2.6 Advice published by the Inspectorate (Ref 4-5) fully endorses the approach of assessing design uncertainty, whilst still meeting the requirements of the EIA Regulations (Ref 4-2).

4.2.7 In line with this approach, parameters will be established across aspects relating to the design and construction of the Project to manage design uncertainty and provide flexibility for deviation where needed. For example, flexibility may be needed to enable minor design refinements to be made during construction by the appointed contractor within the overall parameters of any consent granted.

4.2.8 These parameters will form part of the project description within the ES and may include matters such as defining the maximum extent of land required to mitigate environmental effects, and the identification of horizontal and vertical limits of deviation within which the design of the Project can be adjusted if necessary.

4.2.9 This approach to managing uncertainty within defined parameters and limits will ensure that any design changes that may arise post submission of the DCO application would not be of an order that renders the content of the ES inadequate or invalid.

4.3 Defining the Study Area

4.3.1 The study area (or 'the spatial scope') for each environmental aspect, the area over which changes to the environment are predicted to occur as a consequence of the Project, depend on the nature of the potential effects and the location of receptors that could be affected. Study areas take account of:

a. The physical area of the Project.

b. The nature of the baseline environment.

c. The manner and extent to which environmental effects may occur.

4.3.2 Each individual technical assessment in **Chapters 5 – 23** defines the study area to be considered and provides a rationale to support its selection, including consideration of the current baseline conditions such as the presence of any sensitive features and/ or designations within, or adjacent to, the proposed study area. The study area of each assessment may be refined in response to comments from consultees or as a consequence of further assessment work. Study areas will be confirmed in the ES.

4.4 Temporal Scope

4.4.1 The temporal scope covers the time period over which changes to the environment and the resultant effects are predicted to occur, and are typically defined as either being temporary or permanent:

a. Permanent – these are effects that would remain even when the Project is complete, although these effects may be caused by environmental changes that are permanent or temporary.

b. Temporary – these are effects that are related to environmental changes associated with a particular activity and that would cease when that activity finishes.

4.4.2 The assessment will have regard to the Project programme and will evaluate the environmental effects of the phased approach to construction and operation summarised in **Table 2.1** of **Chapter 2 The Project**. Further information on the phased development of the Project will emerge as the design progresses, and the Applicant will review this to identify and confirm the worst-case construction and operational scenarios to be modelled and assessed in the EIA.

4.4.3 As stated in **Section 2.4** of **Chapter 2 The Project**, consideration of effects from decommissioning of the Project will be considered within the ES where necessary.

4.5 Characterisation of the Baseline Environment

4.5.1 To assess the potential environmental effects resulting from the Project, it is necessary to first establish the environmental conditions that currently exist within the vicinity of the DCO site boundary.

4.5.2 Appropriate understanding of the baseline for each technical environmental discipline will be collated through some or all of the following:

a. Review of secondary sources (desk-based, i.e. review of existing documentation and literature; data searches and available data sets such as GroundSure or EnviroCheck).

b. Review of primary baseline studies (field).

c. Stakeholder consultation.

4.5.3 The key data sources to be used to establish baseline conditions is described in each technical assessment chapter herein (**Chapters 5 to 23**) and will be reported in the ES.

4.5.4 The ES will include an outline of the likely evolution of the existing baseline without the implementation of the Project, based on available information on future plans and knowledge of historic land uses. The future baseline scenario will be clearly set out and described within the ES in the description of the Project, and in each relevant technical chapter.

4.6 Environmental Effects

4.6.1 Environmental effects are the consequence of impacts. By way of example, an impact arising from a new pipeline project could be represented by the loss of mature woodland to accommodate a new section of pipeline, the effect (or consequence) of which could be the opening of new views in which this infrastructure becomes a focus point.

4.6.2 For an effect to occur there has to be a pathway between the impact and the resource or receptor.

4.6.3 In the EIA, effects will be formulated as a function of the importance, value or sensitivity of an environmental resource or receptor, and the magnitude of impact (or change) predicted. A combination of professional judgement, defined thresholds, established criteria and standards will be used in their definition.

4.6.4 The significance criteria presented in **Section 4.7** will be used to report the significance of effects, the assignment of which will rely on reasoned argument, professional judgement, established thresholds and guidelines, and the views of relevant organisations.

4.6.5 Account will be taken of the role environmental measures, as discussed in **Section 4.8**, in reducing the significance of adverse effects.

4.7 Significance Criteria

4.7.1 For consistency, the methodology described in this section will be applied across the assessed environmental topics when preparing the ES to ensure the identified environmental effects are assessed and evaluated in a comparable manner.

4.7.2 Variations from this approach will be applicable to specific environmental topics where other prevailing standards, thresholds and/ or established criteria exist that require application. Where this is the case, an outline is provided in the technical assessment chapters (**Chapters 5 - 23**) of this EIA Scoping Report and further detail and justification will be provided within the individual assessment methodologies presented within the ES.

4.7.3 **Table 4.1** presents the generic guidelines for the sensitivity (or importance/ value) resource or receptor that will be applied in the EIA.

Table 4.1 Generic Guidelines for the Assessment of Sensitivity

Sensitivity (or importance / value)	Typical Descriptors
High	The resource or receptor has a very low capacity to accommodate the proposed form of change without fundamentally altering its present character; possesses key characteristics which contribute significantly to the distinctiveness, rarity and character of the site or receptor; is of international or national importance.
Medium	The resource or receptor has a low capacity to accommodate the proposed form of change without significantly altering its present character; possesses key

Sensitivity (or importance / value)	Typical Descriptors
	characteristics which contribute significantly to the distinctiveness and character of the site or feature; is of regional or county importance.
Low	The resource or receptor has some tolerance to accommodate the proposed change without detriment to its character; possesses characteristics which are locally significant; is either not designated or is designated at a local or district level.
Very Low	The resource or receptor is generally tolerant and can accommodate the proposed change without detriment to its character; resource or receptor characteristics do not make a significant contribution to local distinctiveness; is not designated.

4.7.4 **Table 4.2** presents the generic magnitude of impact (or change) criteria that will be applied in the EIA.

Table 4.2 Generic Guidelines for Determining the Magnitude of Impact (or change)

Magnitude of Impact (or change)	Typical Descriptors
High	The total loss or major change / substantial alteration to key elements / features of the current (pre-development) baseline conditions, such that the character/ composition/ attributes of the would be fundamentally changed post-development.
Medium	Loss or alteration to one or more key elements / features of the current (pre-development) baseline conditions, such that the character/ composition / attributes of the baseline will be materially changed post-development.
Low	Noticeable or small-scale change in character / composition/ attributes of the current (pre-development) baseline conditions. Change arising would be discernible/ detectable but not material post-development.
Very Low	Very small-scale change or barely discernible changes in character / composition / attributes of the current (pre-development) baseline conditions post-development.

4.7.5 Having established the magnitude of change and the sensitivity of the receptor, the significance of an effect can be assessed. Development proposals affect different environmental elements to varying degrees and not all of these are of sufficient concern to warrant detailed investigation or assessment within the EIA process. The EIA Regulations (Ref 4-2) identify those environmental resources that warrant investigation as those that are *"likely to be significantly affected by development"* (Schedule 4(4)).

4.7.6 The identification of effect significance typically requires the application of professional judgement; however the overarching significance matrix that will be used in the EIA is shown in **Table 4.3**. The generic definitions that will be used to

determine the level of effect significance are shown in **Table 4.4**. Reference is made to:

a. 'Major' effects, which would always be determined as being significant.

b. 'Moderate' effects can be significant based on specific scenarios and professional judgement.

c. 'Minor' or 'negligible' effects, which would always be deemed as 'not significant'

Effects can be beneficial or adverse.

Table 4.3 Generic Significance Evaluation Matrix

		Magnitude of Change			
		Very Low	**Low**	**Medium**	**High**
Sensitivity of Receptor	**High**	Minor (not significant)	Moderate (potentially significant)	Major (significant)	Major (significant)
	Medium	Minor (not significant)	Minor (not significant)	Moderate (potentially significant)	Major (significant)
	Low	Negligible (Not significant)	Minor (not significant)	Minor (not significant)	Moderate (potentially significant)
	Very Low	Negligible (Not significant)	Negligible (Not significant)	Minor (not significant)	Minor (not significant)

Table 4.4 Generic Significance of Effect Description

Significance Category	Indicative Description
Major	Very large or large change in environmental conditions. Effects, both negative and positive, which are likely to be important considerations at a national to regional level because they contribute to achieving national or regional objective, or which are likely to result in exceedance of statutory objectives or breaches of legislation. These effects are considered to be very important considerations and are likely to be material in the decision-making process.
Moderate	Intermediate change in environmental conditions. Effects are likely to be important considerations at a regional or local level and important in informing the decision-making process.
Minor	Small change in environmental conditions that are unlikely to be critical in the decision-making process.

Significance Category	Indicative Description
Negligible	No discernible change in environmental conditions. An effect that is likely to have a neutral or negligible influence.

4.7.7 In subsequent chapters of this EIA Scoping Report the general criteria described above have been made more specific for each environmental topic based on relevant standards and guidelines. Further explanation of the approach to assessing impacts and effects, and the specific criteria to be used for each topic is set out, with any deviation from this standard approach noted.

4.8 Environmental Measures

4.8.1 In accordance with Regulation 14(2)(c) of the EIA Regulations (Ref 4-2), the ES will include a description of the "*measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment*".

4.8.2 For each environmental topic the EIA process will systematically identify impacts and effects and take into consideration environmental measures that the Project would adopt. These environmental measures include avoidance, best practice and design commitments as follows:

a. *Embedded Mitigation Measures:* modifications to the location, design or operation of a development made during the pre-application phase that are an inherent part of the Project and do not require additional action to be taken.

b. *Standard Mitigation Measures:* measures comprising management activities and techniques, which would be implemented during construction of the Project to limit impacts through adherence to good site practice and achieving legal compliance.

c. *Additional Mitigation Measures:* these comprise measures over and above any embedded and standard mitigation measures, for which the EIA has identified a requirement to further reduce significant environmental effects.

4.8.3 When such measures form an integral part of the Project design and/ or the approach to its construction, the assessment of likely significant effects will only report the post-mitigation effects within the ES.

4.8.4 Where additional mitigation measures are identified, the ES will report both pre- and post-mitigation effects in order to demonstrate their efficacy in further reducing the significance of effects and will explain how such measures will be secured.

4.8.5 Following the identification of environmental measures, the assessment of effect significance will be re-evaluated to determine whether there is likely to be a residual effect and if it remains significant. Residual effects assessed as Moderate or Major after consideration of environmental mitigation measures normally require additional analysis and consultation to further mitigate them,

where feasible. Where further mitigation is not possible a significant residual effect may remain.

4.8.6 A separate Register of Environmental Actions and Commitments (REAC) document will be prepared to summarise the environmental measures committed to within the ES.

4.8.7 The DCO will contain a requirement for the Applicant to prepare a draft CEMP, which will contain the REAC as well as other effective, site-specific procedures, details of identified monitoring and auditing of mitigation as required. A draft CEMP will be prepared and submitted with the DCO application. This document will then be further developed once the contractor is appointed. The requirement within the DCO will ensure that those measures included in the draft CEMP are legally secured for implementation.

4.9 Cumulative Effects Assessment

4.9.1 The effects of a development project may not be significant on their own; however, when combined with effects associated with other nearby development projects, these could become significant. In addition, the potential effects from a single project may not be significant in isolation; however, several effects from the project could combine resulting in an effect which could become significant (e.g. noise, air quality and visual effects upon the same receptor). Such potential cumulative effects can be negative or positive in nature.

4.9.2 The EIA will identify cumulative effects resulting from the combination of different activities within the Project, and from activities associated with other development plans and projects in the surrounding area.

4.9.3 Details of the proposed methodology for the cumulative effects assessment are presented in **Chapter 24 Cumulative Effects and In-Combination Assessment**.

4.10 Transboundary Effects

4.10.1 The EIA Regulations (Ref 4-2) require an ES to consider the transboundary effects of a development (paragraph 5 of Schedule 4). Given the nature of the Project and its proposed location, significant transboundary effects are considered unlikely. However, the transboundary screening matrix will be completed as detailed in the Inspectorate's *Advice Note Twelve* (Ref 4-6) and included in the ES.

4.11 Consultation and Engagement

4.11.1 The Project has a wide range of stakeholders with differing interests that will require varied levels of consultation. Specific communication activities therefore need to be focussed to meet the needs of specific individuals and groups. This requires an understanding of the stakeholders and their interests in the Project.

Pre-application Consultation

4.11.2 Section 42 of the PA2008 (Ref 4-7) requires the Applicant to carry out pre-application consultation with a range of prescribed consultees. The key

stakeholders to be consulted as part of the pre-application process include (but are not limited to):

a. Prescribed statutory bodies.

b. Local authorities.

c. Landowners/ land interests.

d. Local communities.

e. Other key interest groups.

4.11.3 In addition to statutory consultation with prescribed consultees, as best practice, applicants are also encouraged to engage in non-statutory consultation with all potentially affected parties to enable them to gain a better understanding of the Project. Local knowledge and understanding is important, and the Applicant will seek to engage with consultees through both formal consultation and informal engagement prior to submission of the DCO application.

4.11.4 Statutory and non-statutory consultation and engagement will help to inform the preparation of key materials as part of the EIA in support of the pre-application DCO process. This will include the Preliminary Environmental Information (PEI) Report that will be used to support statutory consultation and the ES to be submitted alongside the DCO application.

4.11.5 A Consultation Report will form part of the DCO application and will summarise how pre-application consultation was undertaken and set out how feedback received was considered by the Applicant.

Technical Engagement

4.11.6 In addition to the stages of pre-application consultation, the Applicant will hold informal engagement with the key prescribed consultees, as appropriate, to refine the Project and the EIA and to assist in the development of any required mitigation or other environmental measures. Specific information on this is presented in the environmental topic chapters (**Chapters 5** - **23**).

4.11.7 A summary of technical stakeholder engagement will be summarised within the individual technical chapters within the ES. In addition, the Applicant will seek to agree draft Statements of Common Ground with key stakeholders to set out matters that have been agreed prior to submission of the DCO application.

4.12 Assumptions and Limitations

4.12.1 Each technical chapter of the ES will set out any assumptions made and limitations encountered whilst undertaking and reporting the respective assessments.

4.13 Other Assessment Requirements

4.13.1 At this stage in the process, the need to undertake a range of other assessments to inform the EIA, and/ or other consent requirements has been identified.

Habitat Regulations Assessment

4.13.2 In accordance with Council Directive 92/ 43/ EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (the 'Habitats Directive') (Ref 4-8) and Directive 2009/ 147/ ES of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (the 'Birds Directive') (Ref 4-9), 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 4-10) and remain in place following the UK's exit from the EU.

4.13.3 When considering the merits of the DCO application, the SoS must consider the potential for a likely significant effect (LSE) on a European site. European sites are defined as SACs, candidate SACs, Sites of Community Importance (SCI) and SPAs. UK policy extends the requirements pertaining to European sites to include Ramsar sites and potential SPAs, which include proposed extensions or alterations to existing SPAs.

4.13.4 If it is concluded that the Project has the potential for a LSE on a European site an Appropriate Assessment of the implications of the proposals in light of the site's conservation objectives will be required. An Appropriate Assessment will take account of the LSE of the Project on the protected areas, either alone or in combination with other plans and projects. The screening, any Appropriate Assessment and any subsequent assessment form part of what is known as the Habitats Regulations Assessment (HRA) process.

4.13.5 To facilitate the HRA process, the Applicant will provide information within the DCO application to enable an Appropriate Assessment to be undertaken and will liaise with Natural England and other relevant parties on its preparation, as required.

Flood Risk Assessment

4.13.6 A Flood Risk Assessment (FRA) will be submitted with the DCO application. The FRA will assess the flood risk both to and from the Project and demonstrate how that flood risk would be managed over the Project's lifetime. The FRA will give due regard to climate change and will form an appendix to the ES.

Marine Plan and Policy Conformance Assessment

4.13.7 As the Project falls within the area covered by the East Inshore Marine Plan (Ref 4-11) a marine plan and policy conformance assessment will be required to support the application for a deemed marine licence for the Project.

4.13.8 This assessment will be undertaken to review the Project against the vision, objectives and policies of the East Inshore Marine Plan and will be informed by the information provided in the ES.

Navigational Risk Assessment

4.13.9 Given the nature of the Project, a Navigational Risk Assessment (NRA) will be undertaken to meet the requirements of the Port Marine Safety Code (PMSC) and will be provided within the DCO application.

4.13.10 In reviewing the application, navigational risk will be a consideration by the Harbour Authority in its role as Statutory Harbour Authority (SHA). As part of the NRA process, a hazard identification workshop will be held with relevant navigational stakeholders for the area to identify the potential impacts associated with the Project.

4.13.11 The NRA will determine the likely risk to navigational safety and, if necessary, establish risk control measures to reduce that risk to be 'as low as reasonably practicable'.

4.13.12 The outputs from the NRA will inform **Chapter 11 Marine Transport and Navigation** and will form an appendix to the ES.

Water Framework Directive Assessment

4.13.13 A Water Framework Directive assessment (WFD) (Ref 4-12) will be submitted with the DCO application and will consider activities in the marine environment up to 1 nautical mile out to sea.

4.13.14 A WFD Assessment will be undertaken for the Project and form an appendix to the ES. The assessment will involve up to three stages:

a. Screening – excludes any activities that do not need to go through the scoping or impact assessment stages.

b. Scoping – identifies the receptors that are potentially at risk from an activity and the need for impact assessment.

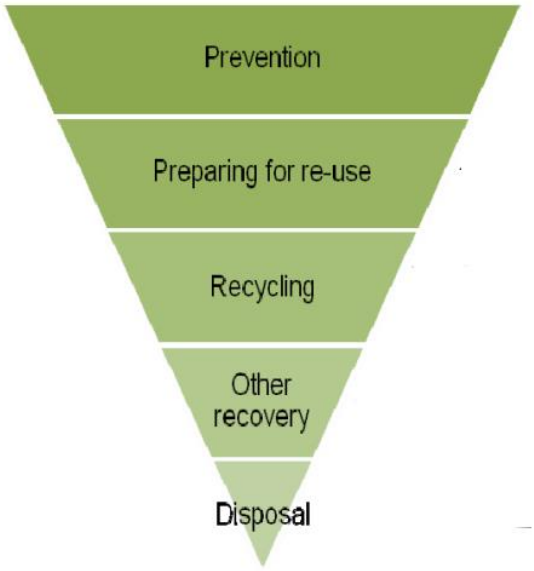
c. Impact assessment – considers the potential impacts of activities, identifies ways to avoid or minimise impacts, and shows if activities may cause deterioration or jeopardise the water body achieving good status.

Waste Hierarchy Assessment

4.13.15 Defra outline in the Guidance on Applying the Waste Hierarchy (Ref 4-13) document that *"the waste hierarchy" ranks waste management options according to what is best for the environment. It gives top priority to preventing waste in the first place. When waste is created, it gives priority to preparing it for re-use, then recycling, then recovery, and last of all disposal (e.g. landfill)."*

4.13.16 The Project will undergo a Waste Hierarchy Assessment (WHA) to determine the Best Practical Environmental Option (BPEO) for dealing with dredge arisings. This assessment will involve an evaluation of the dredge and disposal methods likely to be involved and will follow the waste hierarchy outlined in **Plate 4-2**.

Plate 4-2 Waste Hierarchy Waste Management Options



4.13.17 The impacts of any waste generated by the landside facilities will also be evaluated as part of the ES.

4.14 References

Ref 4-1 The Planning Inspectorate (2020). Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements (Version 7).

Ref 4-2 UK Government (2017). The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.

Ref 4-3 IEMA (2017). Delivering Proportionate EIA.

Ref 4-4 R.V. Rochdale MBC ex parte Milne (No. 1); and R. V. Rochdale MBC ex parte Tew [1999] and R. v. Rochdale MBC ex parte Milne (No. 2) [2000].

Ref 4-5 Advice Note Nine: Rochdale Envelope (2012).

Ref 4-6 The Planning Inspectorate (2020). Advice Note Twelve: Transboundary Impacts and Process.

Ref 4-7 UK Government (2008). Planning Act 2008.

Ref 4-8 The European Community (1992). Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (the 'Habitats Directive')

Ref 4-9 European Parliament (2009). Directive 2009/147/EC of the European Parliament and of the Council.

Ref 4-10 UK Government (2017). The Conservation of Habitats and Species Regulations 2017.

Ref 4-11 Maritime Management Organisation (2016). East Inshore and East Offshore Marine Plans.

Ref 4-12 Environment Agency (2017) Water Framework Directive assessment: estuarine and coastal waters.

Ref 4-13 Department for Environment, Food and Rural Affairs (Defra) (2011). Guidance on applying the Waste Hierarchy.

5 Air Quality

5.1 Introduction

5.1.1 This section sets out the proposed scope and methodology to be used to assess the potential air quality impacts and effects of the Project on human receptors and air quality sensitive habitats. The chapter also details the datasets to be used to inform the assessment, provides an overview of baseline conditions, sets out the likely significant effects to be considered within the assessment, and discusses how these likely significant effects would be assessed for the purpose of the EIA.

5.2 Baseline Environment and Study Area

Study Area

5.2.1 The study area is the area over which potentially significant direct and indirect air quality effects of the Project may occur during construction, operation and decommission. The study area has been defined by applying industry-standard guidance where possible.

5.2.2 The study area for the construction phase dust assessment would be informed by the distances provided in the screening criteria set out in the Institute of Air Quality Management guidance (IAQM) (Ref 5-1). The study area would include human health receptors within 350m of the DCO site boundary and within 50m of roads used by construction traffic within 500m of the entrance(s) into the site, as well as sensitive ecological habitats (designated sites) within 50m of the DCO site boundary and within 50m of roads used by construction traffic within 500m of the site entrance(s). The distances cited by the IAQM guidance take account of the exponential decline in both airborne concentrations and the rate of deposition with distance from the source of emissions.

5.2.3 For the assessment of emissions from road traffic during Project construction and operation, the study area would include appropriate road links having regard to the outputs from the traffic and transport assessment. The network would cover, as a minimum, all roads expected to be significantly affected by the construction and operation of the Project. Such roads would be determined by comparing the change in traffic flows anticipated as a result of construction and operation of the Project against the screening criteria provided in the IAQM and Environmental Protection UK guidance (Ref 5-2) for local roads and the screening criteria provided in the Design Manual for Roads and Bridges (DMRB) LA105 (Ref 5-3) for the Strategic Road Network.

5.2.4 The study area for the road traffic emissions assessment would include the closest air quality sensitive receptors adjacent to the roads on which traffic flow is most affected by the Project. This would depend on the routes to be taken by construction and operational phase Project-related traffic, which would be identified by the traffic and transport assessment (refer to **Chapter 10 Traffic and Transport**).

5.2.5 Receptors would include human health sensitive locations and air quality sensitive nature conservation sites. The Project is located in the vicinity of a number of sites of international nature conservation importance (refer to **Chapters 7-9**). The air quality impact due to the Project at nature conservation sites would be considered within the assessment, where there is air quality sensitive habitat located close enough to the DCO site boundary to be impacted upon by on-site emissions, or where sensitive habitat designations remote from the DCO site boundary are located within 200m of an affected road link. 200m being the distance beyond which the DMRB standards suggests that air quality impacts are negligible.

5.2.6 The air quality ES chapter would, through further desk-based analysis and assessment, refine the study area for the purposes of the impact assessment.

Current Baseline

5.2.7 A desk-based study would be undertaken to inform the baseline characterisation on which the air quality impact assessment would be based. This would include the following key data sources:

a. Defra's Pollution Climate Mapping (PCM) Model Compliance Link Outputs (Ref 5-4).

b. Defra's Background Pollutant Concentration Maps (Ref 5-5).

c. Local Air Quality Management Data (Ref 5-6) (Ref 5-7).

d. Baseline and future baseline traffic data.

5.2.8 North East Lincolnshire Council (NELC) undertake monitoring of air quality in their administrative area as part of their Local Air Quality Management duties. This includes the monitoring of nitrogen dioxide (NO_2) at two automatic monitoring sites and 30 passive monitoring sites. Of those monitoring sites, four are located at Immingham, including one of the automatic monitoring sites. In 2019, when conditions were not affected by the Covid-19 pandemic, NO_2 concentrations ranged from 16.5 µg/ m^3 to 24.5 µg/ m^3 at roadside locations in the town and 13.5 µg/ m^3 at an urban background location.

5.2.9 North Lincolnshire Council also undertake monitoring of air quality within their administrative area, some of which is located adjacent to the A160, at South Killingholme, between the Port of Immingham and the A180/ M180. This monitoring includes one automatic monitoring site and four passive monitoring sites. In 2019, NO_2 concentrations ranged from 17 µg/ m^3 to 29 µg/ m^3 at roadside locations in the town and 15 µg/ m^3 to 18 µg/ m^3 at urban background locations.

5.2.10 Both councils have current Air Quality Management Areas (AQMA) declared. One is located adjacent to the A180 through Grimsby and was designated due to elevated NO_2 concentrations, whilst another is located at Scunthorpe and was

designated due to elevated concentrations of particulate matter[1] (PM_{10}). Immingham itself has historically had an AQMA, close to the Port of Immingham on Kings Road, due to elevated concentrations of PM_{10}. However, this AQMA has been revoked to reflect PM_{10} concentrations that are now well below the relevant air quality objectives.

Future Baseline

5.2.11 In addition to describing the existing baseline environment, the air quality ES chapter would seek to explain what the environmental change, in air quality terms, would likely be in the future if the Project were not to go ahead.

5.2.12 The Project is sited adjacent to the operational Port of Immingham. The Port has been in active use for port purposes for a number of decades and would continue to be active into the future. The current land uses across the site include brownfield and greenfield land.

5.3 Planned Surveys

5.3.1 The need for a baseline NO_2 survey would be considered once the likely traffic impacts of the Project are defined. Where possible, the air quality assessment would be based on existing data. Where this is not possible, a baseline NO_2 diffusion tube survey may be required to supplement existing data.

5.4 Identification of Potential Effects

5.4.1 The Project has the potential to affect air quality receptors during construction, operation and decommission. The air quality ES chapter would set out the assessment of the likely air quality changes that would be generated by the Project, both beneficial and adverse, during these phases of the Project's life cycle.

5.4.2 Potential cumulative effects on air quality could arise as a result of other nearby developments in the area. These would be considered as part of the cumulative and in-combination assessment to be presented within the ES.

Construction

5.4.3 The potential air quality impact pathways during the Project construction phase are as follows:

a. Impacts to nearby pathways health and amenity, and to ecological systems as a result of fugitive emissions of dust and fine particulate matter (PM_{10}) associated with construction activities.

b. Impacts to nearby resident's health and to ecological systems from exhaust emissions from on-site construction plant and/ or construction vehicles travelling to and from the Project.

[1] PM_{10} describes inhalable particles, with diameters that are generally 10 micrometers (µm) and smaller

c. Impacts to nearby resident's health and to ecological systems due to emissions to air from vessels when the Project is under construction.

Operation

5.4.4 The potential Project impact pathways during the Project operational phase are as follows:

a. Impacts to nearby resident's health and to ecological receptors from on-site energy generation plant emissions, required to generate heat for the furnaces and or process plant emissions; including those associated with Selective Catalytic Reduction and the emergency flare.

b. Impacts to nearby resident's health and to ecological systems due to emissions to air from vessels when the Project is operational.

c. Impacts to nearby resident's health and to ecological systems from changes in road traffic emissions when the Project is operational.

Decommissioning

5.4.5 The potential impacts arising from decommissioning of the landside infrastructure are uncertain due to future conditions and working practices being unknown. Emissions arising from the decommissioning of this infrastructure are considered likely to be no worse than those associated with the Project construction and operation phases as they would mainly be associated with on-site equipment used for deconstruction. The landside plant and equipment would largely comprise metals that are easy to reuse or recycle. Such metals should not require decontamination before re-use, whilst the modular nature of the construction materials makes it easier to decommission.

5.4.6 The DCO application would not make any provision for the decommissioning of the marine infrastructure or plant or equipment on the jetty topside. This is because the development would, once constructed, become part of the fabric of the Immingham port estate and would, in simple terms, continue to be maintained so that it can be used for port related activities to meet a long-term need. This is discussed further in **Section 2.4** of **Chapter 2 The Project** of this EIA Scoping Report.

5.5 Design, Mitigation and Enhancement Measures

5.5.1 There are a number of measures that can be considered to reduce the impact of emissions to air from the Project. These include but are not limited to the following:

a. The planning of construction site layout to maximise the distance of potentially dust generating construction activity from the nearest dust sensitive receptors.

b. The consideration of construction traffic routes to avoid highly residential areas.

c. Adherence to best practice construction methods to be detailed in the CEMP (refer to **Section 4.8 of Chapter 4 The EIA Process**).

d. The design of the operational Project to maximise the distance between sources of emissions to air and the nearest air quality sensitive receptors.

e. The compliance of vessels using the Project with appropriate emissions standards.

f. The release of emissions to air, where possible, from a height that would encourage optimal dispersion.

5.6 Assessment Methodology

5.6.1 The following sections provide an explanation of the air quality assessment work proposed.

Construction Phase

5.6.2 The assessment of dust and PM_{10} impacts during Project construction would be undertaken having regard to the methodology set out in the guidance from the IAQM on the assessment of dust from demolition and construction (Version 1.1) (2014) (Ref 5-8). This guidance provides an approach for assessing and defining the risk of impacts of emissions of dust and PM_{10} from construction activities.

5.6.3 The assessment would be undertaken to determine the level of risk of dust and PM_{10} impacts, and should it prove necessary, provide recommendations for appropriate mitigation measures that would be employed during the Project construction works to ensure that effects would not be significant.

5.6.4 An assessment of exhaust emissions from on-site plant during the construction phase would be undertaken. This would have regard to the IAQM guidance (Ref 5-8). However, the IAQM guidance reports that "*Experience of assessing the exhaust emissions from on-site plant (also known as non-road mobile machinery or NRMM) and site traffic suggest that they are unlikely to make a significant impact on local air quality, and in the vast majority of cases they would not need to be quantitively assessed*." (Paragraph 4.1). It is considered that this is likely to be the case in respect of the Project.

5.6.5 An assessment of the impact of emissions from construction road traffic generated by the Project would be undertaken having regard to guidance produced by the Environmental Protection UK (EPUK) and the IAQM – Guidance on Land-Use Planning and Development Control: Planning for Air Quality v1.2 (Ref 5-2).

5.6.6 The volume of construction traffic, once determined in sufficient detail, would be screened against the criteria set out in the guidance. If the volume of traffic is below the thresholds specified in the guidance, the air quality effect can be judged to be insignificant. If the thresholds are exceeded, a more detailed air quality assessment would be undertaken, for example using the Advanced Dispersion Modelling System (ADMS) - Roads dispersion model.

5.6.7 An assessment of air emissions from vessel movements during the construction phase would be undertaken in accordance with published screening criteria. Should the screening criteria set out in Defra's Local Air Quality Management

Technical Guidance (LAQM.TG16) (Ref 5-9) be exceeded, a more detailed air quality assessment would be undertaken.

Operational Phase

5.6.8 An assessment of on-site sources would consider emissions from vessel energy plant, when vessels are docked at the facility, and emissions from on-site energy plant and process emissions. Emissions include combustion gasses associated with energy plant and ammonia associated with on-site processes. Impacts would be quantified at representative worst-case receptors for human health and nature conservation. Dispersion modelling of on-site sources would be undertaken to quantity the impact of combined emissions at sensitive locations with reference to industry standard guidance, including that published by Defra (Ref 5-9) and the Environment Agency (Ref 5-10). This may also involve the modelling of multiple emission release heights from stacks and/ or vents, should mitigation be required, to encourage optimal dispersion and reduce impacts at sensitive receptor locations. The approach would be agreed with relevant stakeholders, including dispersion modelling and best-practice methods. On-site emission impacts would need to be modelled and quantified to inform the HRA for the Project due to the proximity of the Humber Estuary SAC.

5.6.9 An assessment of the air quality impact of emissions from operational road traffic generated by the Project would be undertaken with regard to the guidance produced by the EPUK and the IAQM – Guidance on Land-Use Planning and Development Control: Planning for Air Quality v1.2 (Ref 5-2). The potential for air quality impacts on the Strategic Road Network (SRN) would be considered with reference to National Highways DMRB guidance (LA105) (Ref 5-3).

5.6.10 Peak traffic movements associated with the Project may potentially exceed defined criteria. This would be considered as part of the assessment process.

5.6.11 Should the guidance criteria be exceeded, an assessment of road traffic emissions during the operational phase would be undertaken. The approach would be agreed with the appropriate stakeholders and would likely include dispersion modelling with use of ADMS software.

5.6.12 The effect of air quality impacts at individual human health sensitive receptor locations would be determined following EPUK and IAQM Guidance on Land-Use Planning and Development Control Planning for Air Quality (Ref 5-2). The overall significance of the effects would be determined using professional judgement, based on the number and nature of the predicted impacts at individual receptor locations across the study area. Impacts at nature conservation receptors would be quantified as part of the air quality assessment, but the determination of effect significance would be reported by the Nature Conservation (Terrestrial Ecology) ES chapter.

Relevant Legislation, Policy and Technical Guidance

5.6.13 The potential effects of the Project on air quality would be considered in the respective topic-specific ES chapter, which would cross-reference, as appropriate, relevant policy, legislation and guidance, including the following:

a. Clean Air Strategy (Ref 5-11).
b. The National Policy Statement for Ports (NPSfP) (Ref 5-12).
c. The UK Marine Policy Statement (Ref 5-13).
d. UK Marine Strategy (Ref 5-14).
e. East Inshore and East Offshore Marine Plans (Ref 5-15).
f. National Planning Policy Framework (NPPF) (Ministry of Housing, Communities & Local Government (MHCLG)), 2021 (Ref 5-16) and relevant Planning Practice Guidance (Ref 5-17).
g. IAQM/ Environmental Protection UK (EPUK) Guidance on Land-Use Planning and Development Control: Planning for Air Quality (Ref 5-2).
h. Air Quality Standards Regulations 2016 (as amended) (Ref 5-18).
i. IAQM Guidance on the Assessment of Dust from Demolition and Construction (Ref 5-19).
j. Relevant local policy.

5.7 Consultation

5.7.1 To date no consultation with regards to the air quality assessment has been held. However, it is intended that consultation with relevant stakeholders, such as local planning authorities and Natural England, would occur following the submission of the EIA Scoping Report and receipt of the Scoping Opinion.

5.8 Summary

5.8.1 This chapter sets out the proposed scope and methodology of the air quality assessment for the Project. It has set out the baseline conditions for the study area, outlined the assessment methodology and identified potential air quality impacts of the Project.

5.8.2 The scope of the air quality assessment is summarised in **Table 5.1**.

Table 5.1 Summary of Scope for the Air Quality Assessment

Element	Phase	Scoped In	Scoped Out	Justification
Dust emissions	Construction	✓	x	Proximity of air quality sensitive receptors to the DCO site boundary[1]
Site plant emissions		✓	x	
Vessel emissions		✓	x	
Road Traffic emissions		✓	x	Likely change in traffic flows on local road network and proximity of air quality sensitive receptors to those roads[2]

Element	Phase	Scoped In	Scoped Out	Justification
Energy plant/ process emissions	Operation	✓	x	Proximity of air quality sensitive receptors to the DCO site boundary [1]
Vessel emissions		✓	x	Proximity of air quality sensitive receptors to the DCO site boundary [3]
Road Traffic emissions		✓	x	Likely change in traffic flows on local road network and proximity of air quality sensitive receptors to those roads[2]
Dust emissions	Decommissioning	x	✓	Due to uncertainties in future conditions and likelihood that decommission impact would be no worse than those reported for construction and operation.
Site plant emissions		x	✓	
Vessel emissions		x	✓	
Road traffic emissions		x	✓	

[1] Qualitative assessment method proposed in line with industry-standard guidance and/ or due to limited likelihood of significant effects occurring.

[2] Quantitative assessment where traffic impacts exceed limits set out in relevant guidance.

[3] Quantitative assessment likely to be required to inform HRA.

5.9 References

Ref 5-1 Holman et al (2014). IAQM Guidance on the Assessment of Dust from Demolition and Construction. Institute of Air Quality Management, London.

Ref 5-2 Institute of Air Quality Management and Environmental Protection UK (2017). Guidance from Environmental Protection UK and the Institute of Air Quality Management for the Consideration of Air Quality within the Land-Use Planning and Development Control Processes.

Ref 5-3 Highways England (2019). Design Manual for Roads and Bridges – LA105 Air Quality.

Ref 5-4 Department for Environment, Food and Rural Affairs (2020). 2020 NO_2 Projections Data (2018 reference year).

Ref 5-5 Department for Environment, Food and Rural Affairs (2018). Background Mapping data for local authorities – 2018.

Ref 5-6 North East Lincolnshire Council (2020). Annual Status Report 2020.

Ref 5-7 North East Lincolnshire Council (2020). Air Quality Action Plan.

Ref 5-8 Institute of Air Quality Management (2014). Guidance on the Assessment of Dust from Demolition and Construction (Version 1.1).

Ref 5-9 Department for Environment, Food and Rural Affairs (2021). Local Air Quality Management Technical Guidance Note LAQM TG (16). Available online: https:// laqm.defra.gov.uk/ documents/ LAQM-TG16-April-21-v1.pdf

Ref 5-10 Environment Agency 2022), Air emissions risk assessment for your environmental permit

Ref 5-11 Department for Environment, Food and Rural Affairs (2019). Clean Air Strategy 2019.

Ref 5-12 Department for Transport (2012). National Policy Statement for Ports.

Ref 5-13 Department for Environment, Food and Rural Affairs (2011). UK Marine Policy Statement.

Ref 5-14 Department for Environment, Food and Rural Affairs (2019). UK Marine Strategy.

Ref 5-15 Marine Management Organisation (2016). East Inshore and East Offshore Marine Plans.

Ref 5-16 Ministry of Housing, Communities & Local Government (2021). National Planning Policy Framework – updated 2021.

Ref 5-17 Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government (2021). Planning Practice Guidance – Updated 2019.

Ref 5-18 Air Quality Standards Regulations 2016 (as amended).

Ref 5-19 Institute of Air Quality Management (IAQM) (2014) Guidance on the Assessment of Dust from Demolition and Construction

6 Noise and Vibration

6.1 Introduction

6.1.1 This section sets out the proposed scope and methodology to be used to assess the potential noise and vibration impacts and effects of the Project on human receptors. The chapter also details the datasets to be used to inform the assessment, provides an overview of baseline conditions, sets out the likely significant effects to be considered within the assessment, and discusses how these likely significant effects would be assessed for the purpose of the EIA.

6.1.2 The potential noise and vibration impacts upon terrestrial ecology receptors are considered in **Chapter 7 Nature Conservation (Terrestrial Ecology)**.

6.1.3 The potential effects of airborne and underwater noise on ecological receptors are considered in **Chapter 8 Nature Conservation (Marine Ecology)**.

6.2 Baseline Environment and Study Area

Study Area

6.2.1 The study area covers the spatial extents over which potential direct and indirect noise and vibration effects of the Project may occur during construction, operation and decommissioning.

6.2.2 The study area for the assessment is defined by the locations of nearby noise sensitive receptors (NSRs) with the potential to be affected by the anticipated Project impacts. For construction noise and vibration on-site, considering NSRs up to 300m and 100m of the DCO site boundary respectively should be adequate to capture all significant effects. For operational noise on-site, the study area extending to NSRs up to 500m from the DCO site boundary should be adequate. For road traffic noise, NSRs within 50m of the roads which would be used by vehicles associated with Project construction and operational activities define the study area.

6.2.3 The airborne noise and vibration ES chapter would, through further desk-based analysis and assessment, refine the study area for the purposes of the impact assessment where necessary to capture likely significant effects.

Current Baseline

6.2.4 The nearest human NSRs to the DCO site boundary have been identified as the residential properties detailed in **Table 6.1**. Where additional residential and non-residential receptors are identified during the EIA, these will be added to the assessment.

Table 6.1 Identified Human Noise Sensitive Receptors

NSR	Description	Approximate distance and direction from DCO site boundary (m)
1	Residential properties on Queens Road (numbers 1-31, although not all are residential NSRs)	Immediately adjacent to western area of the DCO site boundary
2	Residential properties at Somerton Road, Dunster Walk, Ings Lane, Oakham Walk, and Kendal Road (eastern extent of Immingham residential urban area)	460m west of the DCO site boundary
3	Residential properties at Chestnut Avenue, Waterworks Street and Spring Street (eastern extent of Immingham residential urban area)	480m north-west of the DCO site boundary

6.2.5 From existing knowledge of the DCO site boundary, the typical sources contributing to the baseline sound environment at NSR1 would be road traffic and industrial/ commercial/ port activities. More specifically, sound sources would comprise road traffic on Queens Road outside the front of the properties, more distant road traffic from the A1173 to the west, industrial/ commercial activities from premises to the north side of the Queens Road and more general distant sound from industrial premises including power production, manufacturing, waste and port facilities in the wider area.

6.2.6 At NSR2 and NSR3, sources likely to influence/ dominate the baseline sound environment would be road traffic on the A1173 to the east and the more distant industrial/ commercial premises to the east of the A1173 (associated with power production, manufacturing, waste and port facilities).

Future Baseline

6.2.7 In addition to describing the existing baseline environment, the airborne noise and vibration ES chapter would seek to explain what the environmental change, in noise and vibration terms, would likely be if the Project were not to go ahead.

6.2.8 Much of the DCO site boundary bounds the operational Port, which has been in active use for port purposes for a number of decades. The A1173 provides a major route for traffic to and from the A180 to the south and A160 to the north-west. Queens Road provides key access to the Port and other industrial premises to the east and south off the A1173. In the absence of the Project, the sound environment at NSRs in the vicinity would continue to be influenced/ dominated by road traffic noise and port/ commercial/ industrial activity.

6.3 Planned Surveys

6.3.1 An increased understanding of the existing sound environment at NSRs around the DCO site boundary would be developed through sound measurements and the collection of traffic count data (refer to **Chapter 18 Traffic and Transport**).

6.3.2 Based upon the NSRs (1 – 3) identified in **Table 6.1** above, it is considered likely that baseline sound surveys would be undertaken at three locations to collect data representative of the typical sound environment in the vicinity of these NSRs. Ideally, and subject to the availability of safe and secure monitoring locations at each NSR location, a minimum of five days of baseline data would be collected covering weekday and weekend periods. Such surveys would be largely unattended other than during periods of equipment set up and collection, during which typical sound sources would be observed. Where safe and secure locations are not available, shorter-term attended sound surveys may be required.

6.3.3 NELC would be consulted regarding the scope and methodology of baseline sound surveys.

6.4 Identification of Potential Effects

6.4.1 During Project construction, noise and vibration emissions from works on-site and traffic on local roads have the potential to impact NSRs.

6.4.2 Once operational, the main sources of noise associated with the Project would be from operational site activities, including road traffic, vessel movements and mechanical plant. Further details of potential noise and vibration impacts are detailed below.

Construction

6.4.3 During Project construction, noise and vibration emissions have the potential to impact NSRs in the vicinity.

6.4.4 The potential impact pathways during the construction phase are as follows:

a. Potential noise and vibration impacts associated with construction activities on-site.

b. Potential noise impacts associated with traffic movements on local highways.

6.4.5 Assessment of construction noise and vibration would be assessed during the EIA at identified NSRs.

Operation

6.4.6 Once operational, noise emissions from the Project have the potential to impact NSRs in the vicinity.

6.4.7 The potential impact pathways during the operational phase are as follows:

a. Potential noise impacts from import and transfer of ammonia by sea vessel and landside pipelines to the ammonia conversion and hydrogen production activities.

b. Potential noise impacts from mechanical plant associated with the ammonia conversion and hydrogen production activities.

c. Potential noise impacts associated with traffic movements on the local highways associated with the export of liquified hydrogen product.

d. Potential noise from operations related to the import and transfer of ammonia and other liquid bulks by sea vessel and landside pipelines to the East and West Sites, where NSRs are identified in the vicinity.

6.4.8 The assessment of operational noise would focus on the landside operations in closest proximity to the NSRs at Queens Road (NSR1) and the residential areas further to the west (NSR2 and NSR3), namely operations at the West Site and road traffic. Sound from operations within the pipeline route area around the eastern end of Queens Road, east of NSR1, would be assessed where potentially significant sound sources are required to operate in this area. However, where this pipeline route area is confirmed during the EIA to comprise inherently relatively quiet operations, further assessment would be scoped out of the EIA in consultation with NELC.

Decommissioning

6.4.9 During Project decommissioning of the landside infrastructure, noise and vibration emissions have the potential to impact NSRs in the vicinity of the DCO site boundary in a similar manner as during the construction phase.

6.4.10 The potential impact pathways during the decommissioning phase are as follows:

a. Potential noise and vibration impacts associated with decommissioning activities on the landside.

b. Potential noise impacts associated with traffic movements on the local highway.

6.4.11 An assessment of decommissioning noise and vibration associated with the removal of landside infrastructure would be assessed during the EIA at identified NSR.

6.4.12 The DCO application would not make any provision for the decommissioning of the marine infrastructure or plant or equipment on the jetty topside. This is because the development would, once constructed, become part of the fabric of the Immingham port estate and would, in simple terms, continue to be maintained so that it can be used for port related activities to meet a long-term need. This is discussed further in **Section 2.4** of **Chapter 2 The Project**.

6.5 Design, Mitigation and Enhancement Measures

6.5.1 Where it is identified during the EIA that potentially significant or other adverse noise and vibration effects are likely as a result of the Project (as initially designed), mitigation measures would be considered to avoid significant adverse effects and minimise/ mitigate adverse effects where possible, in accordance with the requirements of Noise Policy Statement for England (NPSE) (Ref 6-1). Such measures may include (but not be limited to):

a. Use of a range of standard and other best practice mitigation measures to minimise noise and vibration during construction and decommissioning. Construction phase noise and vibration mitigation requirements would be detailed in the CEMP.

b. Limits on noise emissions from operational plant and equipment at source.

c. Acoustic barriers/ screens or earth bunds to reduce transmission of noise from the DCO site boundary to NSRs.

d. Recommendation for provision of a package of sound insulation to nearby NSRs, as a last resort, where other applied mitigation measures are unlikely to be adequate.

6.5.2 The exact mitigation requirements would depend on the findings of noise and vibration assessment.

6.6 Assessment Methodology

Key National Noise Policy Driving Assessment Methodology

Noise Policy Statement for England (NPSE)

6.6.1 The NPSE (Ref 6-1) seeks to clarify the underlying principles and aims in existing policy documents, legislation and guidance that relate to noise. The NPSE (Ref 6-1) applies to all forms of noise, including environmental noise, neighbour noise and neighbourhood noise.

6.6.2 The NPSE is supported by three aims:

a. "avoid significant adverse impacts on health and quality of life;

b. mitigate and minimise adverse impacts on health and quality of life; and

c. where possible, contribute to the improvements of health and quality of life."

6.6.3 The long-term policy vision and aims are designed to enable decisions to be made regarding what is an acceptable noise burden to place on society.

6.6.4 The 'Explanatory Note' within the NPSE provides further guidance on defining 'significant adverse effects' and 'adverse effects' using the concepts:

a. No Observed Effect Level (NOEL): the level below which no effect can be detected. Below this level no detectable effect on health and quality of life due to noise can be established.

b. Lowest Observable Adverse Effect Level (LOAEL): the level above which adverse effects on health and quality of life can be detected.

c. Significant Observed Adverse Effect Level (SOAEL): the level above which significant adverse effects on health and quality of life occur.

6.6.5 The NPSE recognises that it is not possible to have uniform objective noise-based measures that define the SOAEL, LOAEL and NOEL that are applicable to all sources of noise in all situations. The levels are likely to be different for different noise sources, receptors and times of the day.

National Planning Policy

6.6.6 National Policy Statements (NPS) are, where in place, the primary basis for the assessment and determination of applications for Nationally Significant Infrastructure Projects (NSIP), such as the Proposed Development. Section 5.11 of the Overarching National Policy Statement (NPS) for Energy (EN-1)

(Department of Energy & Climate Change (DECC) 2011) refers to the Government's policy on noise within the Noise Policy Statement for England (NPSE) and sets out requirements for noise and vibration assessment for NSIPs.

6.6.7 *With regards to decision making, NPS EN-1 states:*

"The project should demonstrate good design through selection of the quietest cost-effective plant available; containment of noise within buildings wherever possible; optimisation of plant layout to minimise noise emissions; and, where possible, the use of landscaping, bunds or noise barriers to reduce noise transmission." (Paragraph 5.11.8)

6.6.8 Section 9.5 describes the impact avoidance measures identified as relevant to the Proposed Development.

Defining Magnitude of Impact

Noise from Construction Activities

6.6.9 Noise generating activities associated with Project construction works would be assessed using the data and procedures given in BS 5228-1 (Ref 6-2), where suitable and sufficient information regarding likely operations are available. The ABC method would then be used as a basis to define criteria that constitutes a potential significant noise effect at residential receptors.

6.6.10 Where suitable and sufficient information is not available upon which to base a reasonable and robust quantitative assessment of construction noise, the EIA would provide qualitative assessment of likely effects and focus upon the recommendation of appropriate measures to avoid significant adverse noise effects and minimise/ mitigate other adverse effects during the construction phase.

Noise from Construction Traffic on Existing Roads

6.6.11 The noise impacts of construction traffic along existing roads would be assessed with reference to the DMRB LA111 Noise and Vibration Revision 2 (LA111) (Ref 6-3).

6.6.12 The change in noise level for relevant links would be predicted based on the Calculation of Road Traffic Noise (CRTN) Basic Noise Level (BNL) methodology (Ref 6-4).

6.6.13 Predictions would be undertaken for both "with" and "without" construction traffic scenarios for each road link in the construction traffic model, using 18-hour Annual Average Weekday Traffic (AAWT) traffic flows from the transport assessment in accordance with the CRTN methodology.

Vibration from Construction Activities

Impacts on Humans – Annoyance

6.6.14 Vibration due to construction activities has the potential to result in adverse impacts at nearby NSRs. The transmission of ground-borne vibration is highly dependent on the nature of the intervening ground between the source and

receptor and the activities being undertaken. BS 5228-2: 2009+A1:2014 'Code of Practice for Noise and Vibration Control on Construction and Open Sites - Vibration' (Ref 6-5) provides data on measured levels of vibration for various construction works, with particular emphasis on piling. Impacts are considered for both damage to buildings and annoyance to occupiers.

6.6.15 Vibration levels from plant and equipment activities would be estimated based on library measurement data from BS 5228 Part 2 (Ref 6-5) and TRL Report 429 'Groundborne Vibration Caused by Mechanised Construction Works' (2000) (Ref 6-6) and construction vibration would be assessed based on guidance from BS 5228 Part 2.

6.6.16 Given the significant distance from the West Site to residential NSRs represented by NSR2 and NSR3, significant vibration effects are not expected to result from the proposed construction works (or decommissioning works) and therefore further assessment has been scoped out of the assessment.

Impacts on Buildings

6.6.17 Buildings and structures may be damaged by high levels of vibration. The closest point between the existing NSRs and the DCO site boundary is <5m and therefore there is the potential for significant effects depending upon the construction works required in the vicinity of existing buildings.

6.6.18 BS 7385-2: 1993 'Evaluation and Measurement for Vibration in Buildings – Part 2: Guide to Damage Levels from Ground Borne Vibration' (Ref 6-7) provides guidance on vibration levels likely to result in cosmetic damage and is referenced in BS 5228-2: 2009+A1:2014 (Ref 6-5). Guide values for transient vibration, above which cosmetic damage could occur, are provided.

6.6.19 These values for construction vibration building damage would be applied within the impact assessment where activities of a significant producing nature are likely to be required during Project construction.

Noise from Project Operation (on-site sound sources)

6.6.20 Noise emissions from the operational Project would be predicted using spreadsheets and/ or noise modelling software (as appropriate), and information regarding the operating conditions and levels of sound generated by the mechanical/ process plant on-site.

6.6.21 The assessment would be undertaken using a combination of methods, depending upon the applicability of the method relative to the sound source, as set out below.

BS 4142

6.6.22 An assessment of potential noise impact at nearby NSR would be undertaken, where applicable, using the guidance in BS 4142:2014+A1:2019 'Methods for Rating and Assessing Industrial and Commercial Sound' (Ref 6-8).

6.6.23 A key aspect of the BS 4142 assessment procedure is a comparison between the background sound level in the vicinity of residential locations and the rating level of the sound source under consideration.

6.6.24 The standard allows for corrections to be applied based upon the presence or expected presence of tonality, impulsivity and other sound characteristics (neither tonal nor impulsive but still distinctive).

6.6.25 Once any adjustments have been made, the background sound level and the rating level are compared. The standard states that:

a. *"Typically, the greater the difference, the greater the magnitude of impact.*

b. *A difference of around +10 decibel (dB) or more is likely to be an indication of a significant adverse impact, depending on the context.*

c. *A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.*

d. *The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound would have an adverse impact or a significant 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, depending on the context."*

6.6.26 Importantly, as suggested above, BS 4142 requires that the rating level of the noise source under assessment be considered in the context of the environment when defining the overall significance of the effects.

IEMA 'Guidelines for Environmental Noise Impact Assessment

6.6.27 The IEMA Guidelines for Environmental Noise Impact Assessment (Ref 6-9) would be used to assess the impact of changes in ambient sound level at NSRs due to the operation of the Project, where relevant, to provide additional context regarding the potential operational noise effects.

Noise from Operation of the Project (road traffic noise)

6.6.28 Noise from road traffic during the operational phase of the Proposed Development will be assessed using guidance provided in DMRB LA 111 (Ref 6-3), as set out in **Paragraphs 6.6.11 – 6.6.13** above under the header "Noise from construction traffic on existing roads.

Defining Significance of Effects

Sensitivity/ Value of Receptors

6.6.29 Noise and vibration effects would be classified based on the relevant magnitude of the impact (as outlined above for the various potential impacts during construction and operation) and the sensitivity or value of the affected receptor. The scale of receptor sensitivity presented in **Table 6.2** is based on both professional judgement and industry practice.

Table 6.2 Sensitivity/ Value of NSRs

Sensitivity/ Value of Resource/ Receptor	Description	Example of Receptor Usage
Very high	Receptors where noise or vibration would significantly affect the function of a receptor	Auditoria/ studios Specialist medical/ teaching centres, or laboratories with highly sensitive equipment
High	Receptors where people or operations are particularly susceptible to noise or vibration	Residential Quiet outdoor areas used for recreation Conference facilities Schools/ educational facilities in the daytime Hospitals/ residential care homes Libraries
Medium	Receptors moderately sensitive to noise or vibration where it may cause some distraction or disturbance	Offices Restaurants/ retail Sports grounds when spectator or noise is not a normal part of the event and where quiet conditions are necessary (e.g. tennis, golf)
Low	Receptors where distraction or disturbance of people from noise or vibration is minimal	Residences and other buildings not occupied during working hours Factories and working environments with existing high noise levels Sports grounds when spectator or noise is a normal part of the event

Classification of Effects

6.6.30 Impacts are defined as changes arising from the Project, and consideration of the result of these impacts on environmental receptors enables the identification of associated effects, and their classification (major, moderate, minor and negligible, and adverse, neutral or beneficial). Each effect would be classified both before and after mitigation measures have been applied.

6.6.31 The following terminology would be used in the assessment to define effects:

a. Adverse: detrimental or negative effects to an environmental resource or receptor.

b. Neutral: effects to an environmental resource or receptor that are neither adverse nor beneficial.

c. Beneficial: advantageous or positive effect to an environmental resource or receptor.

6.6.32 The noise or vibration effect resulting from each individual potential impact type detailed above would be classified according to the relevant magnitude of the impact and the sensitivity or value of the affected NSR using the matrix presented in **Table 6.3**. Where necessary the context of the acoustic environment would also be considered in determining the classification of effects.

Table 6.3 Classification of Noise and Vibration Effects

Sensitivity/ Value of Resource/ Receptor	Magnitude of Impact			
	High	**Medium**	**Low**	**Negligible**
Very high	Major	Major	Moderate	Minor
High	Major	Moderate	Minor	Negligible
Medium	Moderate	Minor	Negligible	Negligible
Low	Minor	Negligible	Negligible	Negligible

6.6.33 Where adverse or beneficial effects are identified, these would be assessed against the following significance scale, derived using the matrix presented in **Table 6.3**:

a. Negligible: imperceptible effect of no significant consequence.

b. Minor: slight, very short or highly localised effect of no significant consequence.

c. Moderate: limited effect (by extent, duration or magnitude), which may be considered significant.

d. Major: considerable effect (by extent, duration or magnitude) of more than local significance or in breach of recognised acceptability, legislation, policy or standards.

6.6.34 For the purposes of EIA, negligible and minor effects would be considered to be not significant, whereas moderate and major effects would be considered to be significant.

Relevant Legislation, Policy and Technical Guidance

6.6.35 The potential effects of the Project on airborne noise and vibration would reference relevant policy, legislation and guidance, as appropriate, including:

a. Environmental Noise (England) Regulations 2006 (as amended 2008, 2009, 2010) (Ref 6-10).

b. Environmental Protection Act 1990 (Ref 6-11).

c. Control of Pollution Act 1974 (Ref 6-12).

d. NPPF (Ref 6-13).

e. Noise Policy Statement for England (NPSE) (Ref 6-14).

f. National Policy Statement for Ports (NPSfP) (Ref 6-15).

g. Planning Practice Guidance on Noise (Ref 6-16).

h. North East Lincolnshire Local Development Plan 2013 to 2032 (adopted 2018) (Ref 6-17).

i. DMRB Design Manual for Roads and Bridges LA111 Noise and vibration – Version 2 (Ref 6-3).

j. BS 5228:2009+A1:2014: 'Noise and Vibration Control on Construction and Open Sites – Part 1: Noise' (Ref 6-18).

k. BS 5228:2009+A1:2014: 'Noise and Vibration Control on Construction and Open Sites – Part 2: Vibration' (Ref 6-5).

l. BS 4142:2014+A1:2019: 'Methods for Rating and Assessing Industrial and Commercial Sound' (Ref 6-19).

m. BS 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings' (Ref 6-20).

n. 'Calculation of Road Traffic Noise' (CRTN) (Ref 6-21).

o. The Institute of Environmental Management and Assessment (IEMA) 'Guidelines for Environmental Noise Impact Assessment' (Ref 6-9).

p. Overarching National Policy Statement (NPS) for Energy (EN-1) (Ref 6-22).

6.7 Consultation

6.7.1 NELC Environmental Protection Department would be consulted regarding the scope and methodology of the noise and vibration assessment, including proposed monitoring requirements.

6.8 Summary

6.8.1 This chapter has set out the likely character of baseline sound at the closest identified residential NSRs within a study area around the Project, and the potential impacts that may occur during construction, operation and decommissioning of the Project.

6.8.2 Further assessment of baseline conditions and potential effects would be undertaken during the EIA and reported in the ES through further, more detailed, desk and site-based work, and through consultation with NELC, as the Project design progresses.

6.8.3 **Table 6.4** identifies the potential noise and vibration effects of the Project and whether further assessment is scoped in or out of the EIA.

Table 6.4 Summary of Scope for the Noise and Vibration Assessment

Element	Phase	Scoped In	Scoped Out	Justification
Effects on residential NSRs due to noise from on-site works on	Construction/ Decommissioning	✓	x	Proximity of nearest NSRs

Element	Phase	Scoped In	Scoped Out	Justification
the West Site and Pipeline Area				
Effects on residential NSRs due to noise and vibration from works in the East Site and at the new Jetty	Construction/ Decommissioning	x	✓	Large distance to identified sensitive receptors
Effects on residential NSRs due to vibration annoyance from on-site works	Construction/ Decommissioning	✓	x	Proximity of nearest receptors
Effects on existing nearby buildings due to vibration from on-site works	Construction/ Decommissioning	✓	x	Proximity of nearest existing buildings
Effects on residential NSRs due to noise from road traffic on existing highways	Construction/ Decommissioning	✓	x	Proximity of nearest NSRs
Effects on residential NSRs due to noise from operations on the West Site and Pipeline Route Area	Operation	✓	x	Proximity of nearest NSRs
Effects on residential NSRs due to noise and vibration from operations in the East Site and at the new Jetty	Operation	✓	x	Scoped in as a conservative approach although due to the large distance to identified sensitive receptors significant effects are not currently expected.
Effects on residential NSRs due to vibration from on-site operations	Operation	✓	x	Proximity of nearest NSRs although assessment would be scoped out where such sources are not identified during the EIA
Effects on existing nearby buildings due to vibration	Operation	x	✓	No sources of vibration expected, that could significantly affect buildings although assessment would be scoped

Element	Phase	Scoped In	Scoped Out	Justification
from on-site operations				back in where such sources are identified during the EIA
Effects on residential NSRs due to noise from road traffic on existing highways	Operation	✓	x	Proximity of nearest NSRs

6.9 References

Ref 6-1 Department for Environment, Food and Rural Affairs (Defra) (2010). Noise Policy Statement for England.

Ref 6-2 British Standards Institute (BSI) (2014a). BS 5228:2009+A1:2014: Code of practice for noise and vibration control on construction and open site– Part 1: Noise'.

Ref 6-3 Highways England (2020). Design Manual for Roads and Bridges LA111 Noise and vibration – Version 2.

Ref 6-4 Department of Transport (1998). CRTN Basic Noise Level (BNL) methodology.

Ref 6-5 British Standards Institute (BSI) (2014). BS 5228:2009+A1:2014: Code of practice for noise and vibration control on construction and open site – Part 2: Vibration'.

Ref 6-6 TRL Report 429 'Groundborne Vibration Caused by Mechanised Construction Works' (2000).

Ref 6-7 British Standards Institute (BSI) (1993). BS 7385-2:1993.

Ref 6-8 British Standards Institute (BSI) (2019). BS 4142:2014+A1:2019: 'Methods for rating and assessing industrial and commercial sound'.

Ref 6-9 Institute of Environmental Management and Assessment (IEMA) (2014). Guidelines for Environmental Noise Impact Assessment.

Ref 6-10 Environmental Noise (England) Regulations 2006 (as amended 2008, 2009, 2010).

Ref 6-11 Environmental Protection Act 1990.

Ref 6-12 Control of Pollution Act 1974.

Ref 6-13 Ministry of Housing, Communities and Local Government (MHCLG) (2021). National Planning Policy Framework.

Ref 6-14 Defra (2010). Noise Policy Statement for England.

Ref 6-15 DfT (2012). National Policy Statement for Ports (NPSfP).

Ref 6-16 MHCLG (2019). Planning Practice Guidance on Noise.

Ref 6-17 North East Lincolnshire Local Development Plan 2013 to 2032 (adopted 2018).

Ref 6-18 British Standards Institute (BSI) (2014). BS 5228:2009+A1:2014: 'Noise and Vibration Control on Construction and Open Sites – Part 1: Noise'.

Ref 6-19 British Standards Institute (BSI) (2019). BS 4142:2014+A1:2019: 'Methods for rating and assessing industrial and commercial sound'.

Ref 6-20 British Standards Institute (BSI) (2014). BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings'.

Ref 6-21 Department of Transport/ Welsh Office (1998). 'Calculation of Road Traffic Noise' (CRTN).

Ref 6-22 Department of Energy and Climate Change (2011) Overarching National Policy Statement for Energy EN-1.

7 Nature Conservation (Terrestrial Ecology)

7.1 Introduction

7.1.1 This section sets out the proposed scope of the nature conservation (terrestrial ecology) impact assessment for the Project. The chapter also details the datasets to be used to inform the assessment, provides an overview of baseline conditions, sets out the likely significant effects to be considered within the assessment, and discusses how these likely significant effects would be assessed for the purpose of the EIA.

7.1.2 Given that the Project would be located partly within, and partly on land adjacent to the Humber Estuary Special Area of Conservation (SAC), Special Protection Area (SPA), Ramsar and Site of Special Scientific Interest (SSSI), collectively referred to as the Humber Estuary European Marine Site (EMS), the following separate sections of this EIA Scoping Report consider impacts on these designations:

a. **Chapter 8 Nature Conservation (Marine Ecology)**: this chapter considers potential interactions between the Project and the designated marine and intertidal habitat features of the Humber Estuary EMS.

b. **Chapter 9 Ornithology**: this chapter considers potential impacts on the qualifying bird interest of the Humber Estuary SPA/ Ramsar and SSSI, including marine, coastal and supporting terrestrial habitats. The proposed assessment would consider passage, overwintering and breeding bird species (including non-SPA/ Ramsar breeding birds).

7.2 Baseline Environment and Study Area

Study Area

7.2.1 For the purposes of scoping, the desk study area is defined as land within the DCO site boundary and up to a 2km radius. However, this may be extended as necessary for certain ecological receptors where the zone of influence is identified as being greater than 2km from the DCO site boundary (e.g. for air quality impacts).

7.2.2 The field survey area would include all terrestrial land within the DCO site boundary (subject to access). Part of the DCO site (the West Site) located off Kings Road has already been subject to a Preliminary Ecological Appraisal (PEA), undertaken in early spring 2022 (see **Appendix C**). Since the PEA was undertaken, the Project design has progressed and as such the development boundary and scope of the Project is now larger. Consequently, a programme of Phase 1 Habitat surveys and other protected species surveys is ongoing to cover all areas of land now within the DCO site boundary.

7.2.3 The Project areas (excluding the jetty) are split as follows for the purposes of the terrestrial ecology assessment (see **Figure 2.1** in **Appendix A**):

a. West Site: disused arable land off Kings Road, Immingham.

b. East Site: comprising the Queen's Road Triangle site and existing storage area off Laporte Road.

c. Pipeline Area: interconnecting habitat between the jetty and West and East Sites crossing woodland (Long Strip).

7.2.4 Temporary construction compounds would also be assessed. The temporary construction compounds would be sited and off Laporte Road, which comprises approximately 15 ha of cultivated arable land adjacent to the Humber Estuary, and approximately 0.9 ha of land off Queens Road that is currently in use for port-related storage.

7.2.5 The potential zone of influence, as defined by the Chartered Institute of Ecology and Environmental Management (CIEEM) guidance and outlined below, seeks to consider the potential distance from the activities being conducted to facilitate the construction (or operation) of the Project, and the designated sites, habitats or species present that may be affected by those activities e.g. the terrestrial habitats within which Great Crested Newt may disperse from a breeding pond. The study and survey areas proposed (see above) are considered sufficient to collate ecological baseline data to inform the ecological impact assessment (EcIA) for the Project and to account for the potential effects likely to occur within the relevant zone of influence for each ecological feature. The EcIA will be presented in the Nature Conservation (Terrestrial Ecology) chapter of the ES.

Desk Study

7.2.6 The PEA for the West Site (see **Appendix C**) included a desk-based study, for which data were obtained from the following key data sources:

a. Natural England website (www.naturalengland.org.uk) for information on statutory designated sites of nature conservation interest by using the tool 'Nature on the Map' and to confirm reasons for designation and their condition.

b. Natural England Priority Habitat Inventory for records of priority habitats within 2km of the Project.

c. Multi Agency Geographical Information for the Countryside (MAGIC) website for statutory designated sites within 2km of the Project.

d. Lincolnshire Ecological Records Centre (LERC) for non-statutory designated sites, and for records of protected and notable species records within 2km of the Project.

e. Local Authority Planning Portal for any relevant ecological records pertaining to the DCO site boundary and its immediate surrounds.

7.2.7 The desk study area might need to be extended as necessary for certain ecological receptors where the zone of influence is identified as being greater than 2km from the DCO site boundary. The potential requirement for updates will be determined by the findings of the ecological surveys which are being undertaken between summer and autumn 2022.

Designated Sites

7.2.8 The nearest statutory designated site to the Project is the Humber Estuary EMS which encompasses the Humber Estuary SPA, SAC, Ramsar and SSSI designations. Direct and indirect impacts on the designated habitats and features (including subtidal and intertidal habitats, marine species and ornithology features) would be considered within the Nature Conservation (marine ecology) and Ornithology chapters of the ES respectively. No further consideration is therefore given to the Humber Estuary EMS in this chapter of the EIA Scoping Report.

7.2.9 The desk study identified one non-statutory designated site within 2km of the DCO site boundary, namely the Laporte Road Brownfield Site Local Wildlife Site (LWS), which is located approximately 1.1km east of the Project.

Field Surveys

7.2.10 The PEA undertaken to date was limited to a Phase 1 Habitat survey of the West Site, a summary of which is provided below. The Project boundary has increased since the original PEA was undertaken, and therefore the ecology baseline data would be updated and any further protected species surveys undertaken as necessary. Further details on the survey scope are provided below.

Habitats

7.2.11 A Phase 1 Habitat survey of the West Site was undertaken on 21st March 2022 and habitats were mapped in accordance with the Joint Nature Conservation Committee (JNCC) (Ref 7-1) survey methodology. The PEA report is provided as **Appendix C**.

7.2.12 The West Site of the Project is located just to the south and east of the main Immingham Dock complex, off Kings Road. The West Site comprises three distinct fields separated by ditches/ hedgerows and was formally cultivated until its abandonment from agricultural production approximately 10 years ago. Some initial development enabling work has been undertaken in the northern portion of West Site to create a new access road off Kings Road and interconnecting roads/ pavements/ drainage infrastructure (approximately five years ago in relation to previous planning consent on this site).

7.2.13 The habitat is dominated by tall swarded poor semi-improved grassland and tall ruderals dominated by false oat-grass (*Arrhenatherum elatius*) with tall fescue (*Schedonorus arundinaceus*), tufted hair-grass (*Deschampsia cespitosa*) and meadow foxtail (*Alopecurus pratensis*). Some areas of goat wouldow (*Salix caprea*) scrub have become established in the western and eastern parts of the DCO site boundary. The former arable field boundaries are marked by overgrown species-poor hawthorn (*Crateagus monogyna*) hedgerows and ditches choked with common reed (*Phragmites australis*).

7.2.14 The other areas of land within the DCO site boundary that have not yet been subject to detailed habitat survey for this application are summarised below:

a. East Site: Queens Road Triangle – this is an area of brownfield land off Queens Road that has been in very limited use in the past for ad hoc

overflow parking and storage of construction arisings/ equipment. The central area comprises crushed hardstanding that has become colonised with ephemeral/ short perennial vegetation, surrounded by young self-seeded silver birch (*Betula pendula*) and areas of dense bramble scrub.

b. East Site: Laporte Road storage area – an area of hardstanding in existing occasional use for port-related storage surrounded by a narrow shelterbelt of mature conifers.

c. Pipeline area: Long Strip Woodland – a narrow band of mature woodland dominated by pedunculate oak (*Quercus robur*) and ash (*Fraxinus excelsior*), with an understorey of mature hawthorn, elder (*Sambucus nigra*) and some areas of denser bramble scrub.

d. Laydown Area comprising arable land off Laporte Road – a large arable field cultivated for winter wheat, fronting the Humber Estuary.

e. Laydown Area comprising existing area of hardstanding used for port-related storage off Queens Road.

7.2.15 These areas are subject to ongoing Phase 1 habitat survey and protected species surveys.

Protected Species

7.2.16 A summary of the known protected species constraints and/ or an appraisal of the habitats within the DCO site boundary to support protected species is provided in **Table 7.1**. This is based on the PEA of the West Site, which included a Phase 1 Habitat survey and a review of aerial photography for the other parts of the Project that have not yet been subject to habitat surveys.

7.2.17 Desk study data collected as part of the West Site PEA are similarly applicable to the wider site area, given that a central grid reference was used and the search areas including land within 2km of the DCO site boundary, and have therefore been used to inform the protected species site appraisal and thus the scope of protected species surveys required.

Table 7.1 Protected Species DCO Site Boundary Appraisal

Species	Desk Study Records	West Site	East Site	Pipeline Area	Laydown Area of Laporte Road	Laydown Area off Queens Road
Badger	No records from study area.	Potentially suitable habitat in woodland and dense scrub for foraging/ commuting, but given lack of known records of the species, presence on anything other than a transient occasional basis is unlikely.	Potentially suitable habitat in scrub for foraging/ commuting, but given lack of known records of the species, presence on anything other than a transient occasional basis is unlikely.	Potentially suitable habitat in woodland but given lack of known records of the species, presence on anything other than a transient occasional basis is unlikely.	Arable habitat generally unsuitable for this species, further surveys to confirm whether there are any field signs of badger.	No suitable habitat.
Bats	No records from study area.	Majority of habitats are of low quality for foraging/ commuting bats due to the open nature of the land and the lack of botanical species diversity to provide large numbers of insect prey. No potentially suitable roosting habitat within the DCO site boundary.	Majority of habitats are of low quality for foraging/ commuting bats due to the open nature of the land and the lack of botanical species diversity to provide large numbers of insect prey. Shelterbelt conifers unlikely to be suitable for roosting bats.	Long Strip woodland may be of higher value to foraging/ commuting bats as it provides a sheltered habitat corridor. Some of the mature trees within the woodland may be suitable for roosting bats.	Arable habitat of low suitability for foraging/ commuting bats.	No suitable habitat.

Species	Desk Study Records	West Site	East Site	Pipeline Area	Laydown Area of Laporte Road	Laydown Area off Queens Road
Otter	One record in study area (location withheld). Likely to be present in Humber Estuary.	Ditches within the DCO site boundary are small and regularly dry out and would therefore not provide sufficient food for otter.	No suitable habitat.	The larger drain behind the flood embankment may be suitable for otter and has good connectivity to the nearby Estuary. Coastal/ intertidal habitat within the Estuary may be used by otter.	The large drain to the east of the field may be suitable for otter and has good connectivity to the nearby Estuary. Coastal/ intertidal habitat within the Estuary may be used by the otter.	No suitable habitat.
Water vole	One record from Kings Road area approximately 50m from the DCO site boundary.	The majority of the ditches within the DCO site boundary are small and regularly dry out and would therefore be sub-optimal for water vole.	No suitable habitat.	The larger drain behind the flood embankment may be suitable for water vole and is well connected to the wider drainage network that may also support water vole colonies.	The large drain to the east of the field may be suitable for water vole.	No suitable habitat.
Great Crested Newt	No records within study area.	No ponds within the DCO site boundary. Ditches within the DCO site boundary are regularly dry in late spring and are therefore unsuitable	No ponds within the DCO site boundary. Ditch to the east (along the western boundary of Long Strip Woodland) of the woodland is dry along most of its	No ponds within the DCO site boundary. Ditch to the west of Long Strip Woodland is dry along most of its length and is unsuitable for	No ponds within the DCO site boundary. Two lagoons within petroleum storage site to the north-west are within 250m of the DCO site boundary and may	No ponds within the DCO site boundary or within 250m.

Species	Desk Study Records	West Site	East Site	Pipeline Area	Laydown Area of Laporte Road	Laydown Area off Queens Road
		for breeding Great Crested Newt.	length and is unsuitable for breeding Great Crested Newt.	breeding Great Crested Newt. Three lagoons within adjacent petroleum storage site are located within 250m north-west of the DCO site boundary and may be suitable for Great Crested Newt. Stagnant area of ditch at base of flood embankment may also be suitable.	be suitable for Great Crested Newt. Stagnant areas of ditch at base of flood embankment may also be suitable.	
Reptiles	No records within study area.			Habitats within the DCO site boundary are sub-optimal for reptiles as they lack the mosaic of scrub/ grassland/ bare ground and varied topography that is favoured by reptiles. As there are no known populations within the wider area, it is concluded that reptiles are likely to be absent from the DCO site.		
Terrestrial invertebrates	Ten recent records of notable species including white-letter hairstreak.	Elm (*Ulmus* spp.) the larval foodplant of white-letter hairstreak was not recorded at or adjacent to the DCO site boundary.	None of the habitats appear to be of particular importance for terrestrial invertebrates given the low floristic	Woodland associated with Long Strip may be suitable for invertebrates.	Arable habitat is unlikely to support rare/ notable invertebrates.	No suitable habitat.

Species	Desk Study Records	West Site	East Site	Pipeline Area	Laydown Area of Laporte Road	Laydown Area off Queens Road
		None of the habitats appear to be of particular importance for terrestrial invertebrates given the low floristic diversity of the rank grassland and scrub.	diversity of the rank grassland and scrub.			

Future Baseline

7.2.18 In the short term, in the absence of the Project, and assuming a continuation of port operations associated with the Queens Road and Laporte Road sites, it is concluded that the limited suite of semi-natural habitats recorded would not change significantly. It is therefore reasonable to conclude that there would continue to be negligible potential for protected species to occur within that part of the Project footprint.

7.2.19 In the medium to long term, in the absence of the Project and other development, the habitats within the West Site would be expected to become further overgrown and encroached by the invading willow scrub, reducing the prevalence of grassland habitat. These habitats may provide additional nesting opportunities for breeding birds, and roosting opportunities for bats.

7.2.20 Similarly, in the absence of the Project within the East Site: Queens Road Triangle, pioneer vegetation communities on the bare substrate areas would become further established and increase its ecological value in terms of the niches and habitats provided for botanical species and invertebrates. Over an approximate 5 – 15 year timeframe it is reasonable to assume that a mosaic of habitats may become sufficiently well established to meet all the criteria for open mosaic habitat (OMH) UK Priority Habitat. Similarly, areas of scrub and trees would mature further and may provide additional nesting opportunities for breeding birds, and roosting opportunities for bats.

7.2.21 The woodland within Long Strip are not expected to change significantly over the short-medium term in the absence of the Project, as it is not subject to any previous management / commercial timber extraction. Biodiversity enhancement works have taken place previously and maintenance is carried out as required to maintain clear access to the Bridleway. Given the presence of mature ash, it is at potential risk of losing specimens to ash dieback disease, which is spreading in the UK. This may result in the loss of some specimens and an opening up of the canopy layer, which may encourage the development of more diverse ground flora species. The presence of additional deadwood may also attract a greater diversity of terrestrial invertebrates and fungi to increase the biodiversity of the woodland.

7.2.22 The continuation of agricultural cultivation of the arable field north of Laporte Road is not anticipated to result in any changes to the ecological baseline of the habitats.

7.3 Planned Surveys

7.3.1 A summary of the scope of the ecology surveys that are ongoing and would be completed in the 2022 survey season to inform the EcIA are provided in **Table 7.2**.

Table 7.2 Terrestrial Ecology Survey Scope and Schedule

Survey	Survey Scope	Survey Area Extent	Timing	Comments
Phase 1 Habitat Survey	Phase 1 Habitat Survey in accordance with the published method (Ref 7-1). Assessment of possible presence of protected, priority or otherwise notable species and, where relevant, the likely importance of habitat features for such species. Record of Invasive Non-Native Species (INNS) of plants. Incidental records of protected or priority species or their field signs.	All habitats within the DCO site boundary not surveyed to date.	Summer 2022	Ongoing
Woodland ground flora survey	Walkover survey to record detailed botanical species listed within woodland habitats.	Pipeline Area (Long Strip Woodland)	May/ June 2022	Ongoing
Badger	Walkover survey to record any field signs of badger such as setts, latrines, or footprints.	All habitats within the DCO site boundary not surveyed to date.	Summer 2022	Desk study data indicates that this species is unlikely to be present in the survey area.
Bats – foraging/ commuting	Monthly walked bat activity transects in accordance with standard methods (Ref 7-2).	Pipeline Area (Long Strip Woodland) East Site (Queens Road Triangle)	June, July, August and September 2022	Ongoing
	Monthly deployment of remote static bat detectors for a minimum of 5 days per deployment.	Pipeline Area (Long Strip Woodland) East Site (Queens Road Triangle)	June, July, August and September 2022	Ongoing
Otter	Presence/ absence survey for field signs.	Pipeline Area: main ditch adjacent to flood embankment. Laydown Area off Laporte Road: main drain along eastern boundary.	September 2022	All other ditches within the DCO site boundary are unsuitable for otter on anything other than a transient occasional basis.

Survey	Survey Scope	Survey Area Extent	Timing	Comments
Water vole	Presence/ absence survey based on *Strachan et al*. 2014 (Ref 7-3).	All ditches within the DCO site boundary.	September 2022	Ditches within the DCO site boundary are generally of low suitability for water vole, but there are local records of this species.
Great Crested Newt (GCN)	Habitat Suitability Index (HSI) assessment in accordance with *Oldham et al.,* 2000 (Ref 7-4).	All ponds within 250m where accessible.	June 2022	Ditches containing standing water would also be appraised for their potential suitability for Great Crested Newts.
	Environmental DNA (eDNA) sampling	All ponds within 250m where accessible.	June 2022	As no ponds are directly impacted, it is not proposed to undertake further field work in the event that eDNA sampling returns a positive result for Great Crested Newt.
Terrestrial Invertebrates	Habitat site appraisal by invertebrate specialist.	West Site East Site (Queens Road Triangle) Pipeline Area (Long Strip Woodland)	June 2022	Further species-specific surveys may be scoped in depending on the outcome of the habitat appraisal. However, given the low botanical species-diversity of the sites, it is considered unlikely that any rare/ notable species would be present.

7.3.2 Surveys for the following protected species have been scoped out:

a. Bat foraging/ commuting activity at the West Site: the habitats comprise mainly open tall-swarded grassland with some areas of dense scrub. Given

the open and exposed nature of the West Site, it is considered unlikely that the habitats would be utilised on anything other than an occasional and transient basis by small numbers of foraging/ commuting common species of bats. Further bat surveys of this habitat are therefore scoped out.

b. Bat roosting: there are a large number of mature oak and ash trees within Long Strip woodland, some of which may have features of suitability for roosting bats. However, it is assumed that all mature trees would be avoided by the Project and therefore there is no requirement for survey of specific trees at this stage. If, as the Project design evolves it becomes necessary to remove/ prune any mature trees, further assessment work for bats would be undertaken to inform mitigation/ licensing requirements as necessary.

c. Reptiles: none of the habitats within the DCO site boundary have been found to be suitable for reptiles, as they lack the diverse habitat mosaic and varied topography favoured by species of reptiles for basking, refuge and hibernation. The ditches are mainly dry and therefore unsuitable for grass snake, with the exception of the main drain at the foot of the flood embankment. When considered in context with the lack of known reptile populations in this part of the county, it is reasonable to conclude that they are likely absent. The low risk of presence of grass snake on the main drain at the foot of the flood embankment can be addressed through a precautionary approach/ method statement for vegetation clearance during Project construction.

7.4 Identification of Potential Effects

7.4.1 The potential ecological effects would be assessed for the construction, operational and decommissioning phases of the Project. At this stage, based on the PEA and desk study undertaken to date, it is identified that the Project has the potential to result in effects on ecological features as detailed below in **Table 7.3**. Predicted significant effects would be subject to more detailed assessment in the ES.

7.4.2 No international statutory designated sites would be directly impacted by the terrestrial elements of Project. The marine elements of the Project on the Humber Estuary SPA/ SAC/ Ramsar/ SSSI are considered in **Chapters 8 Nature Conservation (Marine Ecology)** and **Chapter 9 Ornithology**. No other statutory designated sites have been identified within the Project potential zone of influence.

7.4.3 The nearest LWS to the Project is the Laporte Road Brownfield Site LWS, which is approximately 2km from the DCO site boundary. There is no potential for direct impacts on this LWS, as there is no habitat connectivity between the LWS and the Project. The potential for indirect impacts (e.g. as a result of changes in air quality or hydrology), would be examined in the EcIA.

Table 7.3 Potential Direct and Indirect Ecological Effects Resulting from the Project

Development Phase	Impact	Potential Effect
Construction	Permanent land take	Loss of habitat. Loss/ fragmentation of habitat supporting protected and notable species. Killing/ injury of protected and notable species e.g. GCN populations within 250m. Fragmentation of habitats (loss of wildlife corridors).
	Temporary land take within construction compound	Loss of habitat. Loss/ fragmentation of habitat supporting protected and notable species. Killing/ injury of protected and notable species e.g. GCN populations within 250m. Fragmentation of habitats (loss of wildlife corridors).
	Noise/ vibration	Disturbance to protected and notable species e.g. roosting/ foraging bats.
	Lighting	Disturbance/ disruption to bat flight lines and foraging habitat. Disturbance/ disruption to nocturnal foraging animals e.g. badger
	Changes in hydrology	Damage to habitats with hydrological connectivity to habitats within the Project
	Surface water pollution	Damage to habitat supporting protected and notable species.
	Dust emissions	Damage to habitats due to dust smothering.
Operation	Noise/ visual	Disturbance to protected and notable species e.g. roosting/ foraging bats.
	Lighting	Disturbance/ disruption to bat flight lines and foraging habitat. Disturbance/ disruption to nocturnal foraging animals e.g. badger.

Development Phase	Impact	Potential Effect
	Emissions to air	Acid/ nitrogen deposition resulting in damage, Laporte Road Brownfield Site LWS and UK Priority habitats.
Decommissioning	As for construction with the exception of permanent land take. .	See above.

7.5 Design, Mitigation and Enhancement Measures

7.5.1 This section describes the typical measures that would be considered to mitigate for any potential adverse ecological effects that could arise from the Project. Four common forms of mitigation are recognised as follows and would be taken into consideration by the EcIA:

a. Avoidance: Avoidance and prevention of adverse effects through the design of the Project and sensitive programming of works, for example re-aligning the pipeline to retain important ecological features.

b. Reduction: Mitigation to reduce the scale and severity of effects, for example the use of wildlife proof fencing or restricting construction access in areas of ecological interest.

c. Compensation/ replacement: Compensation to offset adverse ecological effects through on-site habitat creation, for example provision of bat boxes/ houses to replace bat roosts lost by the Project or replanting hedgerows/ reseeding grassland.

d. Enhancement: Enhancement and improvement of existing conditions, for example plant species chosen to enhance diversity and ecological interest of the area.

7.5.2 Applicable mitigation measures would be detailed once the definition of baseline conditions is completed, and the impact assessment concluded. Potential impacts, where they cannot be avoided, may be mitigated through a range of concepts including:

a. Careful Project design e.g. careful lighting design around structures/ buildings to ensure minimal incidental illumination of unnecessary areas.

b. Adherence to measures detailed in the CEMP which would ensure controls on polluting activities and dust generating activities during the construction phase.

c. Controls on noise generation and propagation where necessary (during both Project construction and operation).

d. Implementation of European Protected Species Mitigation (EPSM) licences where necessary, including translocation of Great Crested Newts (for example) and creation of alternative habitat features (e.g. bat roosts), if required.

7.6 Assessment Methodology

7.6.1 Potential impacts on important ecological features would be assessed in accordance with CIEEM guidance (Ref 7-5). The aims of the EcIA would be to:

a. Identify relevant ecological features (i.e. designated sites, habitats, species or ecosystems) which may be impacted as a consequence of the Project.

b. Provide a scientifically rigorous and transparent assessment of the likely ecological impacts and resultant effects of the Project, which may be beneficial (i.e. positive) or adverse (i.e. negative).

c. Facilitate scientifically rigorous and transparent determination of the consequences of the Project in terms of national, regional and local policies relevant to nature conservation and biodiversity, where the level of detail provided is proportionate to the scale of the development and the complexity of its potential impacts.

d. Set out the steps to be taken to adhere to legal requirements relating to the relevant ecological features concerned.

7.6.2 It is not necessary in the assessment to address all habitats and species with potential to occur in the zone of influence of the Project. Instead, the focus would be on those that are 'relevant[2]'. CIEEM guidance makes it clear that there is no need to "*carry out detailed assessment of ecological features that are sufficiently widespread, unthreatened and resilient to project impacts and would remain viable and sustainable*". This does not mean that efforts should not be made to safeguard wider biodiversity, and requirements for this would be considered. The NPSfP, at paragraph 5.1.16, emphasises the need to build in beneficial biodiversity features as part of good design. However it is noted that there is no legal requirement to consider Biodiversity Net Gain (BNG) as it is not applicable to NSIPs at present.

7.6.3 To support the EcIA, there is a need to determine the scale at which the ecological features identified through the desk studies and field surveys are of value. The value of each ecological feature would be defined with reference to the geographical level at which it matters, and the results of this assessment would be used to identify the relevant features requiring impact assessment. The frames of reference that would be used for this assessment, based on CIEEM guidance, are:

a. International (generally this is within a European context, reflecting the general availability of good data to allow cross-comparison).

b. National (Great Britain but considering the potential for certain ecological features to be more notable (of higher value) in an England context relative to Great Britain as a whole).

[2] 'Relevant' features are habitats, species, ecosystems and their functions and processes that are of conservation importance and could potentially be affected by the Project.

c. Regional (East of England).

d. County (North East Lincolnshire).

e. District (Immingham).

f. Local (ecological features that do not meet criteria for valuation at a District or higher level, but that have sufficient value to merit retention or mitigation).

g. Negligible (common and widespread ecological features of such low priority that they do not require retention or mitigation at the relevant location to otherwise maintain a favourable nature conservation status).

7.6.4 Development to directly or indirectly impact them, would be taken forward to impact assessment and would be the 'relevant ecological features' for the purposes of the EcIA.

7.6.5 In line with the CIEEM guidelines, the terminology used within the EcIA would draw a clear distinction between the terms 'impact' and 'effect'. For the purposes of the EcIA, these terms are defined as follows:

a. Impact: actions resulting in changes to an ecological feature; for example, demolition activities leading to the removal of a building utilised as a bat roost.

b. Effect: outcome resulting from an impact, acting upon the conservation status or structure and function of an ecological feature; for example, killing/ injury of bats and reducing the availability of breeding habitat as a result of the loss of a bat roost may lead to an adverse effect on the conservation status of the population concerned.

7.6.6 For each ecological feature only those characteristics relevant to understanding the ecological effect of the Project and determining the effect significance are described. The determination of the significance of effects would be made based on the predicted effect on the structure and function, or conservation status, of relevant ecological features, as follows:

a. Not significant - no effect on structure and function, or conservation status.

b. Significant - structure and function, or conservation status is affected.

7.6.7 For significant effects (both adverse and beneficial) this would be qualified with reference to the geographic scale at which the effect is significant (e.g. an adverse effect significant at a national level).

7.6.8 The CIEEM approach described above broadly accords with the EIA methodology described in **Chapter 4 The EIA Process** of this EIA Scoping Report. However, a matrix approach would not be used to classify effects, as this deviates from CIEEM guidance. In order to provide consistency of terminology in the EcIA with other ES chapters, the findings of the CIEEM assessment would be translated into the classification of effects scale used in other chapters of the ES as outlined in **Table 7.4**.

Table 7.4 Relating CIEEM Assessment Terms to those used in other ES Chapters

Effect Classification	Terminology used in Other ES Chapters	Equivalent CIEEM Assessment
Significant (beneficial)	Major beneficial	Beneficial effect on structure/ function or conservation status at regional, national or international level.
	Moderate beneficial	Beneficial effect on structure/ function or conservation status at District or County level.
Not significant	Minor beneficial	Beneficial effect on structure/ function or conservation status at Site or Local level.
	Negligible	No effect on structure/ function or conservation status.
	Minor adverse	Adverse effect on structure/ function or conservation status at Site or Local level.
Significant (adverse)	Moderate adverse	Adverse effect on structure/ function or conservation status at District or County level.
	Major adverse	Adverse effect on structure/ function or conservation status at Regional, National or International level.

7.6.9 Any significant adverse effects would be mitigated, whilst ecological enhancements may be recommended where appropriate to meet planning policy objectives. Following the implementation of any mitigation and compensation, as appropriate, any residual effects on ecological features would be identified.

Habitat Regulations Assessment

7.6.10 All information required to inform a HRA for the Project would be presented in accordance with **Chapter 8 Nature Conservation (Marine Ecology)** or **Chapter 9 Ornithology**.

7.7 Consultation

7.7.1 Consultation would be undertaken with NELC, the Environment Agency, the Marine Management Organisation (MMO) and Natural England in respect of ecological matters.

7.8 Summary

7.8.1 A summary of the scope for the nature conservation (terrestrial ecology) assessment is presented in **Table 7.5**.

Table 7.5 Summary of Scope for the Nature Conservation (Terrestrial Environment) Assessment

Element	Phase	Scoped In	Scoped Out	Justification
Direct and indirect impacts on Humber Estuary EMS	Construction, Operation and Decommissioning	x	✓	Impacts on designated marine ecology features would be assessed in accordance with **Chapter 8**. Impacts on designated ornithology features would be assessed in accordance with **Chapter 9**.
Direct impacts on LWS	Construction Decommissioning	x	✓	There are no local designated sites that would be directly impacted by the project construction activities.
Indirect impacts on LWS	Construction Decommissioning	✓	x	Potential for indirect impacts resulting from changes in air quality and hydrology would be assessed.
Permanent land take	Construction	✓	x	Potential for loss/ fragmentation of habitat supporting protected and notable species would be assessed
Temporary land take within construction and decommissioning compounds	Construction Decommissioning	✓	x	Potential for loss/ fragmentation of habitat supporting protected and notable species would be assessed
Noise/ visual disturbance	Construction, Operation and Decommissioning	✓	x	Potential for disturbance to protected and notable species (e.g. bats) would be assessed.
Lighting disturbance	Construction, Operation and Decommissioning	✓	x	Potential for disturbance to nocturnal species (e.g. bats) would be assessed.
Hydrology/ water	Construction Decommissioning	✓	x	Potential for damage to habits supporting protected/ notable species would be assessed
Air quality	Construction Decommissioning	✓	x	Potential for dust smothering to habitats during site clearance works would be assessed.
	Operation	✓	x	Potential for acid/ nitrogen deposition resulting in damage

Element	Phase	Scoped In	Scoped Out	Justification
				to Laporte road Brownfield Site LWS would be assessed

7.9 References

Ref 7-1 Joint Nature Conservation Committee (2010). Handbook for Phase 1 Habitat Survey: A Technique for Environmental Audit. JNCC.

Ref 7-2 Collins, J (Ed) (2016). Bat Surveys for Professional Ecologists. Good Practice Guidelines 3rd Edition. Bat Conservation Trust, London.

Ref 7-3 Strachan, R., Dean, M., Gow, D. and Andrews, R. (2016). The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series). Eds Fiona Mathews and Paul Chanin. The Mammal Society, London.

Ref 7-4 Oldham, R.S., Keeble, J., Swan, M.J.S. & Jeffcote, M, (2000). Evaluating the suitability of habitat for the great crested newt (Triturus cristatus). Herpetological Journal 10 (4), 143-155.

Ref 7-5 CIEEM (2019). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, version 1.1 updated September 2019. Chartered Institute of Ecology and Environmental Management, Winchester.

8 Nature Conservation (Marine Ecology)

8.1 Introduction

8.1.1 This section sets out the proposed scope of the nature conservation (marine ecology) assessment for the Project. Specifically, this includes consideration of potential effects on benthic habitats and species (including non-native species), fish and marine mammals. Coastal waterbirds utilising marine habitats are considered separately in **Chapter 9 Ornithology**.

8.1.2 The chapter also details the datasets to be used to inform the assessment, provides an overview of baseline conditions, sets out the likely significant effects to be considered within the assessment, and discusses how these likely significant effects would be assessed for the purpose of the EIA.

8.1.3 There are no classified commercial shellfish (bivalve) beds in the Humber Estuary (Ref 8-1) and the areas around the Project and dredged sediment disposal sites do not support other commercial shellfisheries (such as crab/ lobsters using creels or the collection of whelks). On this basis, commercial shellfisheries have, therefore, been scoped out of the assessment. Relevant fauna which are considered shellfish species (such as cockles or clams), however, would be considered within the benthic habitats and species assessment.

8.2 Baseline Environment and Study Area

Data Sources

8.2.1 A desk-based study would be undertaken to inform the baseline characterisation on which the impact assessment would be based. This would include the following key data sources.

Nature Conservation Sites

a. MAGIC Interactive Map (http:// www.magic.gov.uk): Information on the boundaries of designated sites (Ref 8-2).

b. Natural England Conservation Advice for Marine Protected Areas: Humber Estuary SAC (Ref 8-3) (Natural England, 2021a) and Humber Estuary Special Protection Area (SPA) (Ref 8-4).

Benthic habitats and species

a. Project Specific Surveys: Subtidal samples would be collected to characterise the infaunal benthic assemblage within and near to the Project footprint. The proposed scope and methods of the surveys are described in more detail in the section on ‘Planned Surveys.

b. Recent Port of Immingham Benthic Surveys (Ref 8-5) between the Immingham Oil Terminal and Eastern Jetty. This included ten intertidal stations sampled in September 2021 using a 0.01m² hand-held core and ten

subtidal stations that were sampled in September 2021 using a 0.1m² Day Grab. In addition, six stations were sampled at dredge disposal sites HU060 and HU056 in September 2021 using a 0.1m² Day Grab (four within each of the disposal sites and two nearby to each of the disposal sites) (Ref 8-5).

c. Able Marine Energy Park Benthic Surveys: The results of intertidal benthic surveys (undertaken in 2015 and 2016) using a 0.01m² core sample and a subtidal survey in 2016 using a 0.1m² Day Grab in the North Killingholme area (Ref 8-6).

d. Humber Estuary SAC Intertidal Sediment Survey: Ecological survey work undertaken in 2014 to monitor and assess the intertidal mudflat and sandflat communities of the Humber Estuary (Ref 8-7).

e. Immingham Outer Harbour (IOH) Benthic Surveys: Intertidal sampling at 14 stations (using a Day Grab (0.06m²) or Van Veen Grab (0.03m²)) and subtidal sampling at 17 stations in the Port of Immingham area in 2009 (Ref 8-8).

f. South Humber Channel Marine Studies: Benthic sampling in the intertidal (using a 0.01m² core from 36 stations) and subtidal (0.1m² Hamon grab from 30 stations) between the Humber Sea Terminal and Immingham Port undertaken in 2010 (Ref 8-9).

g. HU056 Disposal Site Monitoring: Benthic invertebrate samples collected at five sites within the disposal sites and at six locations nearby (triplicate samples at all locations) in 2017.

h. Clay Huts Disposal Site Benthic Monitoring: Benthic invertebrate samples collected from four stations in 2008 from within and near to the Clay Huts disposal sites (Ref 8-8).

Fish

a. South Humber Channel Marine Studies: Fish surveys in the intertidal (four double-ended fyke nets) and subtidal (eight beam trawls) between the Humber Sea Terminal and Port of Immingham undertaken in 2010 (Ref 8-9).

b. Review of fish population data in the Humber Estuary: A review of available data to describe the fish populations in the Humber Estuary (Ref 8-10).

c. Environment Agency Transitional and Coastal Waters (TraC) Fish Monitoring: The results of the most recently available WFD fish monitoring for the nearest sites to the Project (seine netting/ bream trawls at Foulholme Sands and otter trawls at Burcom). These sites are located approximately 3-5 km from the Project with data available up to 2017 for Foulholme Sands and 2019 for Burcom (Ref 8-11).

d. Centre for Environment, Fisheries and Aquaculture Science (Cefas) Spawning and Nursery Grounds of Selected Fish Species in UK waters: Distribution maps of the main spawning and nursery grounds for 14 commercially important species (cod, haddock, whiting, saithe, Norway pout,

blue whiting, mackerel, herring, sprat, sandeels, plaice, lemon sole, sole and Norway lobster) (Ref 8-12).

e. Fish Atlas of the Celtic Sea, North Sea, and Baltic Sea: The study provides an overview of information collected from internationally coordinated and national surveys and presents data and information on the recent distribution and biology of demersal and small pelagic fish in these ecoregions (Ref 8-13).

Marine Mammals

a. Donna Nook Seal Counts: The latest pup counts available from the Lincolnshire Wildlife Trust for winter 2021/ 22 and 2020/ 21. Sea Watch Foundation Review of Marine Mammals in the Humber Estuary Region: Information on cetacean status and distribution in the area derived from survey data and the national sightings database maintained by the Sea Watch Foundation with sightings data from 2000 onwards analysed (Ref 8-14). Records of marine mammal sightings from the Lincolnshire Environmental Records Centre (Ref 8-15) and National Biodiversity Network (Ref 8-16).

b. At-sea Distribution Data for Grey and Harbour Seals: The latest habitat-based predictions of at-sea distribution for grey and harbour seals in the British Isles (including the Humber Estuary region) estimated using data from animal-borne telemetry tags by the Sea Mammal Research Unit (SMRU) (Ref 8-17).

c. Distribution maps of cetacean and seabird populations in the North-East Atlantic: Distribution maps of cetaceans and seabirds based on survey data in the North-East Atlantic between 1980 and 2018 collated and standardised (Ref 8-18).

d. Donna Nook Telemetry Data. The results of the tagging of 11 grey seals from the Donna Nook colony to understand the movements of grey seals in the region (Ref 8-19).

e. Special Committee on Seals Annual Report: Information on the status of seals around the UK coast is reported annually by the SMRU advised Special Committee on Seals (SCOS) (Ref 8-20).

f. The Identification of Discrete and Persistent Areas of Relatively High Harbour Porpoise Density in the Wider UK Marine Area: The report presents the results of 18 years of survey data in the Joint Cetacean Protocol (JCP), undertaken to inform the identification of discrete and persistent areas of relatively high harbour porpoise density in the UK marine area (Ref 8-21).

g. Small Cetaceans in European Atlantic Waters and the North Sea (SCANS) III Data: Cetacean surveys to estimate the abundance of cetacean species in shelf and oceanic waters of the European Atlantic undertaken in 2016. Teams of observers searched along 60,000km of transect line, recording thousands of groups of cetaceans from 19 different species. The survey

(SCANS-III) is the third in a series that began in 1994 (SCANS) and continued in 2005 (SCANS-II) (Ref 8-22).

Study Area

8.2.2 The study area covers the area over which potential direct and indirect effects of the Project may occur during construction and operation. The direct effects on nature conservation and marine ecology receptors are those that occur within the footprint of the Project, such as the direct disturbance to benthic habitats and associated species as a result of construction. Indirect effects are those that may arise outside this footprint, such as the potential noise disturbance effects on fish during construction.

8.2.3 The study area for the nature conservation and marine ecology topic is focused on the Port of Immingham area and proposed disposal sites (if required) with data for the wider Humber Estuary region presented where relevant to provide contextual information and to ensure the area of potential effects (e.g. noise disturbance) are fully considered.

8.2.4 The nature conservation (marine ecology) ES chapter would, through further analysis and assessment, refine the study area for the purposes of the impact assessment.

Current Baseline

Nature Conservation Sites and Protected Species

8.2.5 The DCO site boundary falls within the boundaries of the Humber Estuary SAC, SPA and Ramsar site (collectively forming the Humber European Marine Site (EMS); **Figure 8.1** in **Appendix A**). For the Humber Estuary SAC, the primary reason for designation is the presence of two broad scale habitats, “Estuaries” and “*Mudflats and sandflats not covered by seawater at low tide*”. These broad scale habitats support other more specific habitats which are qualifying features, but not a primary reason for designation.

8.2.6 These are:

a. Sandbanks which are slightly covered by sea water all the time.
b. Coastal lagoons (identified as a priority feature).
c. Salicornia and other annuals colonizing mud and sand.
d. Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*).
e. Embryonic shifting dunes.
f. Shifting dunes along the shoreline with *Ammophila arenaria* (‘white dunes’).
g. Fixed coastal dunes with herbaceous vegetation (‘grey dunes’) (identified as a priority feature).
h. Dunes with *Hippopha rhamnoides*.

8.2.7 Alongside the habitats that the SAC is designated for, there are also three mobile species listed on Annex II of the EU Habitats Directive (92/ 43/ EEC) that are included in the designation. The three species are:

a. Sea lamprey (*Petromyzon marinus)*.

b. River lamprey (*Lampetra fluviatilis)*.

c. Grey seal (*Halichoerus grypus)*.

8.2.8 Qualifying features of the Humber Estuary SPA and Humber Estuary Ramsar site are shown in **Table 8.1** and **Table 8.2** respectively.

Table 8.1 Qualifying features of the Humber Estuary SPA

Internationally Important Populations of Regularly Occurring	
Annex 1 Species	
Breeding Species	**Population**
Bittern† (*Botaurus stellaris*)	2 calling males (10.5 % of the GB population)
Marsh Harrier (*Circus aeruginosus*)	10 breeding females (6.3 % of the GB population)
Avocet (*Recurvirostra avosetta*)	64 pairs (8.6 % of the GB population)
Little Tern (*Sternula albifrons*)	51 pairs (2.1 % of the GB population)
Wintering Species	**Population**
Bittern†	4 (4.0 % of the GB population)
Hen harrier (*Circus cyaneus*)	8 (1.1 % of the GB population)
Bar-tailed Godwit (*Limosa lapponica*)	2,752 (4.4 % of the GB population)
Golden Plover (*Pluvialis apricaria*)	30,709 (12.3 % of the GB population)
Avocet (*Recurvirostra avosetta*)	54 (1.7 % of the GB population)
On passage Species	**Population**
Ruff (*Calidris pugnax*)	128 (1.4 % of the GB population)
Migratory Species	
Wintering Species	**Population**
Teal† (*Anas crecca*)	2,322 (<1 % of the population)
Wigeon† (*Mareca Penelope*)	5,044 (<1 % of the population)
Mallard† (*Anas platyrhynchos*)	2,456 (<1 % of the population)
Turnstone† (*Arenaria interpres*)	629 (<1 % of the population)
Common Pochard† (*Aythya ferina*)	719 (<1 % of the population)
Greater Scaup† (*Aythya marila*)	127 (<1 % of the population)

Internationally Important Populations of Regularly Occurring	
Brent Goose† (*Branta bernicla*)	2,098 (<1 % of the population)
Goldeneye† (*Bucephala clangula*)	467 (<1 % of the population)
Sanderling† (*Calidris alba*)	486 (<1 % of the population)
Dunlin (*Calidris alpina*)	22,222 (1.7 % of the Northern Siberia/ Europe/ Western Africa population)
Red Knot (*Calidris canutus*)	28,165 (6.3 % of the North-eastern Canada/ Greenland/ Iceland/ North-western Europe population)
Ringed Plover† (*Charadrius hiaticula*)	403 (<1 % of the population)
Oystercatcher† (*Haematopus ostralegus*)	3503 (<1 % of the population)
Black-tailed Godwit (*Limosa*)	1,113 (3.2 % of the Icelandic Breeding population)
Curlew† (*Numenius arquata*)	3,253 (<1 % of the population)
Grey Plover† (*Pluvialis squatarola*)	1,704 (<1 % of the population)
Shelduck (*Tadorna tadorna*)	4,464 (1.5 % of the North-western Europe population)
Redshank (*Tringa tetanus*)	4,632 (3.6 % of the Eastern Atlantic Wintering population)
Northern Lapwing† (*Vanellus vanellus*)	22,765 (<1 % of population)
On passage Species	**Population**
Sanderling†	818 (<1 % of the population)
Dunlin	20,269 (1.5 % of the Northern Siberia/ Europe/ Western Africa population)
Red Knot	18,500 (4.1 % of the North-eastern Canada/ Greenland/ Iceland/ North-western Europe population)
Ringed Plover†	1,766 (<1 % of the population)
Black-tailed Godwit	915 (2.6 % of the Icelandic Breeding population)
Whimbrel† (*Numenius phaeopus*)	113 (<1 % of the population
Grey Plover†	1,590 (<1 % of the population)
Greenshank† (*Tringa nebularia*)	77 (<1 % of the population)

Internationally Important Populations of Regularly Occurring	
Redshank	7,462 (5.7 % of the Eastern Atlantic Wintering population)
Internationally Important Assemblage of Waterfowl	**Population**
Waterfowl assemblage	153,934 waterfowl
† Species with this symbol do not represent a population that is > 1 % of the international threshold but are included in the wildfowl assemblage.	

Table 8.2 Qualifying Marine Features of the Humber Estuary Ramsar Site

Ramsar Criterion	
Criterion 1 – natural wetland habitats that are of international importance	
The site is a representative example of a near-natural estuary with the following component habitats: dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish/ saline lagoons.	
Criterion 3 – supports populations of plants and/ or animal species of international importance	
The Humber Estuary Ramsar site supports a breeding colony of grey seals *Halichoerus grypus* at Donna Nook. It is the second largest grey seal colony in England and the furthest south regular breeding site on the east coast.	
Criterion 5 – Bird Assemblages of International Importance	
Wintering waterfowl	153,934 waterfowl (5-year peak mean 1998/ 99-2002/ 3)
Criterion 6 – Bird Species/ Populations Occurring at Levels of International Importance	
Species	**Spring/ Autumn Population (5-year peak mean 1996-2000)**
Golden Plover	17,996 (2.2 % of the Iceland and Faroes/ East Atlantic population)
Red Knot	18,500 (4.1 % of the West and Southern African wintering population)
Dunlin	20,269 (1.5 % of the West Siberia/ West Europe population)
Black-tailed Godwit	915 (2.6 % of the Iceland/ West Europe population)
Redshank	7,462 (5.7 % of the population)
Species	Wintering Population (5-year peak mean 1996/ 7-2000/ 1)

Ramsar Criterion	
Shelduck	4,464 (1.5 % of the North-western Europe Population)
Golden Plover	30,709 (3.8 % of the Iceland and Faroes/ East Atlantic population)
Red Knot	28,165 (4.1 % of the West and Southern African wintering population)
Dunlin	22,222 (1.7 % of the West Siberia/ West Europe population)
Black-tailed Godwit	1,113 (3.2 % of the Iceland/ West Europe population)
Bar-tailed Godwit	2,752 (2.3 % of the West Paleartic population)
Criterion 8 – Internationally important source of food for fishes, spawning grounds, nursery and/ or migration path	
The Humber Estuary acts as an important migration route for both river lamprey *Lampetra fluviatilis* and sea lamprey *Petromyzon marinus* between coastal waters and their spawning areas.	

8.2.9 The Humber Estuary SSSI also overlaps with the extent of the DCO site boundary. This is designated for its nationally important habitat assemblage (intertidal mudflats and sandflats, and coastal saltmarsh), geological interest, importance to breeding, wintering and passage birds, breeding grey seal and the presence of river and sea lamprey.

8.2.10 The Holderness Inshore Marine Conservation Zone (MCZ) is the nearest MCZ to the Project (located approximately 20km away). The MCZ is designated for intertidal sand and muddy sand as well as a variety of subtidal rock and sedimentary habitats.

8.2.11 The nearest Local Nature Reserve (LNR) is Cleethorpes Sands LNR (located approximately 12km south-east of the Project) which supports a variety of intertidal and coastal habitats.

Protected Species

8.2.12 The Wildlife and Countryside Act 1981 (as amended) (WACA) protects various animals, plants, habitats in the UK. Relevant protected WACA species recorded in the Humber Estuary region include:

a. The tentacled lagoon worm (*Alkmaria romijni*).
b. The lagoon sand shrimp (*Gammarus insensibilis*).
c. Twaite shad (*Alosa fallax*) and allis shad (*Alosa alosa*).
d. Cetacean (whale and dolphin) species.
e. All bird species.

8.2.13 Marine species are also protected from being killed, injured or disturbed both inside and outside designated sites under the provisions of the European Habitats Directive. Of particular relevance to the Humber Estuary, this includes:

a. Common seal (*Phoca vitulina*) and grey seal (*Halichoerus grypus*) (listed in Annex II and V).

b. Bottlenose dolphin (*Tursiops truncates*) and harbour porpoise (*Phocoena phocoena*) (listed in Annex II and IV).

c. Sea lamprey (*Petromyzon marinus*) (listed in Annex II) and river lamprey (*Lampetra fluviatilis*) (listed in Annex II and V).

d. Twaite shad A. (*fallax*) and allis shad A. (*alosa*) (listed in Annex II and V).

e. Atlantic salmon (*Salmo salar*) (listed in Annex II and V).

8.2.14 Seals are also protected under the Conservation of Seals Act 1970 (taking effect in England, Scotland, Wales).

8.2.15 In addition, some marine fauna and habitats are listed as priority species and habitats of principle importance in England, as required under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 (England). Species of principle importance which are of relevance to the Humber Estuary include commercial fish (such as cod (*Gadus Morhua*) and herring (*Clupea harengus*)), migratory fish (such as lampreys, European smelt (*Osmerus eperlanus*), Atlantic salmon and European eel (*Anguilla nguilla*)). Habitats of principle importance of relevance to the Humber Estuary include intertidal mudflats and coastal saltmarsh.

8.2.16 European eels are also afforded protection as part of the Eels (England and Wales) Regulations 2009. The regulations which apply to all freshwater and estuarine waters of England and Wales gives powers to statutory bodies to implement measures for the recovery of European eel stocks including improving access, habitat quality and fishing pressure.

8.2.17 European smelt are an MCZ Feature of Conservation Importance (FOCI).

Benthic Habitats and Species

Humber Estuary Overview

8.2.18 The Humber Estuary supports a wide variety of marine habitats including intertidal mudflats and sandflats, intertidal seagrass beds, coastal lagoons, saltmarsh, reedbeds, subtidal sandbanks and mixed sediment habitats (Ref 8-23, Ref 8-24 and Ref 8-7).

8.2.19 The intertidal area of the Humber Estuary is extensive, covering approximately 10,000 ha, of which more than 90 % is mudflat and sandflat (Ref 8-25). The largest areas of mudflat occur in the outer Humber Estuary at Spurn Bight and Pyewipe, at Foul Holme and Skitter Sand in the mid-Humber Estuary and across most of the Estuary width in the inner estuary above the Humber Bridge. This habitat changes from moderately exposed sandy shores at the mouth of the Humber Estuary to sheltered muddy shores within the main body of the Estuary and up into the tidal rivers. The mid and upper Humber Estuary is characterised

by fringing reedbeds (*Phragmites australis*) on the upper shore while saltmarshes are present along the north bank and on the Lincolnshire coast east of Cleethorpes (Ref 8-25, Ref 8-3 and Ref 8-7).

8.2.20 The subtidal area of the Estuary is approximately 16,800 ha in extent (Ref 8-25). The subtidal environment of the Humber Estuary is highly dynamic and varies according to the composition of the bottom sediments, salinity, sediment load and turbidity and dissolved oxygen. Many of these factors vary with the season or state of the tide. Subtidal sand (including muddy sand) is the predominant subtidal sediment type in the Humber Estuary. The high mobility of sediments and high turbidity means that this habitat is typically relatively impoverished with a limited fauna characterised by very low densities of opportunistic species and species adapted to these conditions (Ref 8-3, Ref 8-4 and Ref 8-25).

8.2.21 Invasive marine species known to occur in the Humber Estuary region include slipper limpet (*Crepidula fornicate*), Chinese mitten crab (*Eriocheir sinensis*), Pacific oyster (*Magallana gigas*) and acorn barnacle (*Austrominius modestus*) (Ref 8-24, Ref 8-9 and Ref 8-5).

Immingham Area

8.2.22 Subtidal benthic surveys undertaken in the Port of Immingham area in 2021 (see the data sources section above for further details) predominantly recorded mud or sandy mud with most sample stations relatively impoverished (<10 taxa and <10,000 organisms per m^2). The faunal samples were predominantly characterised by nemotodes, the mudsnail (*Corophium volutator*), polychaetes (such as *Streblospio shrubsolii, Polydora cornuta, Tharyx* spp. And *Nephtys* spp.), oligochaetes (*Tubificoides* spp.) and barnacle (*Amphibalanus improvises*).

8.2.23 Intertidal benthic surveys undertaken in the Port of Immingham area in 2021 (see the data sources section above for further details) recorded nematodes, the oligochaetes (*Tubificoides benedii* and *Enchytraeidae* spp.), the mud shrimp (*Corophium volutator*), the mudsnail (*Peringia ulvae*), Baltic tellin (*Limecola balthica*) as well as the polychaetes *Hediste diversicolor* and *Pygospio elegans*. These characterising species dominated the assemblage and contributed almost entirely to the total abundances of organisms recorded at most of the sites surveyed.

8.2.24 The species recorded in both the subtidal and intertidal surveys are considered commonly occurring estuarine species characteristic of this area of the Humber Estuary (Ref 8-8, Ref 8-9 and Ref 8-6).

Disposal Sites

8.2.25 At present, subject to confirming a requirement for the disposal of dredge arisings and identifying alternative beneficial disposal options, it is envisaged that the majority of material would be deposited at either the Clay Huts disposal site (HU060) or Holme Channel disposal site (HU056).

8.2.26 Benthic surveys undertaken in 2021 within and near to Clay Huts disposal site (HU060) recorded predominantly sand habitat with the samples characterised by a wide range of species, but typically in low abundances including nematodes,

barnacle (*Amphibalanus improvises*), polychaetes (such as *Pygospio elegans* and *Arenicola* spp.) and the amphipod (*Corophium volutator*). Benthic sampling at the Holme Channel disposal site (HU056) recorded sand, gravelly sand and sandy gravel habitat with a highly impoverished assemblage characterised by low abundances of a few species (the amphipod (*Corophium volutator*), mysid shrimp (*Gastrosaccus spinifer*), bryozoan (*Electra monostachys*) and springtails (*Collembola* spp.)) (Ref 8-5).

Fish

Humber Estuary Overview

8.2.27 The Humber Estuary contains a varied fish fauna, totalling over 80 species with the majority common to most UK estuaries. The Humber Estuary fish assemblage comprises resident, nursery, seasonal and migratory species, typical of estuarine fish communities (Ref 8-10 and Ref 8-26).

8.2.28 The Humber Estuary is considered to be a nursery ground for a variety of commercially important species including cod (*Gadus morhua*), herring (*Clupea harengus*), plaice (*Pleuronectes platessa*), sole (*Solea solea*) and whiting (*Merlangius merlangus*), as well as a spawning ground for sole (Ref 8-12 and Ref 8-13). Other commonly occurring estuarine and marine species recorded in the Humber Estuary include flounder (*Platicthys flesus*), gobies (*Pomatoschistus* sp.), dab (*Limanda*), sprat (*Sprattus sprattus*), sandeels (*Ammodytes* sp.), 3-spined stickleback (*Gasterosteus aculeatus*), sea bass (*Dicentrarchus labrax*), sand smelt (*Atherina presbyter*) and grey mullet species (such as thick lipped grey mullet (*Chelon labrosus*) and thin-lipped grey mullet (*Liza ramada*)) (Ref 8-10, Ref 8-11 and Ref 8-9).

8.2.29 Diadromous migratory fish (species migrating between freshwater and seawater) which occur in the Humber Estuary include salmonids (Atlantic salmon (*Salmo salar*) and sea trout (*Salmo trutta*)), lampreys (river lamprey (*Lampretra fluviatilis*) and sea lamprey (*Petromyzon marinus*)), European eel (*Anguilla nguilla)*, shads (allis shad (*Alosa alosa*) and twaite shad (*Alosa fallax*)) and European smelt (*Osmerus eperlanus*). Of these species, European eel, European smelt and river lamprey have been the species most commonly recorded in sampling in the Humber Estuary (Ref 8-10).

8.2.30 In general, the abundance and diversity of fish increases towards the mouth of the estuary. The outer reaches are characterised by a community dominated by inshore marine species such as whiting, dab, plaice and sole. The middle and upper reaches of the estuary support more euryhaline species including flounder, European eel, gobies and sprat (Ref 8-27 and Ref 8-26).

8.2.31 The Humber Estuary is considered to support a fish assemblage typical of other estuaries in Northwestern Europe. However, a higher fish diversity than recorded in other estuaries in the UK has been found which may be due to the large catchment area and high fluvial flow which could allow freshwater taxa to actively or passively occur in greater numbers into the estuary (Ref 8-28). Freshwater species recorded in the upper Humber Estuary include roach (*Rutilus rutilus*), common bream (*Abramis brama*) and silver bream (*Blicca bjoerkna*) (Ref 8-10).

Immingham Area

8.2.32 Intertidal fyke net and subtidal beam trawl surveys were undertaken in May/ June 2010 at stations between the Humber Sea Terminal and the Port of Immingham (see the data sources section above for further detail).

8.2.33 The intertidal sampling (fyke netting) catch was dominated by flatfish species (flounder and sole) which consisted of 1+group flounder (born the year before) and mostly 0+ group sole, which suggested the area is used as a flatfish nursery. Single individuals of pollock, five-bearded rockling (*Ciliata Mustela*) and sand goby (*Pomatoschistus minutus*) were also recorded (due to the small size of sand goby, this fish is normally misrepresented in fyke net catches).

8.2.34 Sand gobies and sole were the most abundant species recorded in the subtidal sampling (beam trawls) with other species recorded in lower abundances including whiting, five-bearded rockling (*Ciliata Mustela*) and river lamprey. Sole caught in the subtidal survey were significantly larger than the specimens from the fyke nets. This is consistent with earlier research by Cefas that analysed annual 2m beam trawl and 1.5m push net survey data from the period 1981 to 1995 and found that 0-group sole were highest in the 2 to 5.9 m depth band (Ref 8-29).

8.2.35 The results of the most recently available Environment Agency TraC fish monitoring for the sites nearest the Project (seine netting/ beam trawls at Foulholme Sands and otter trawls at Burcom) have been summarised. These monitoring sites are located approximately 3-5 km from the Project with data up to 2017 available for Foulholme Sands and up to 2019 for Burcom. In summary, the most abundant species recorded in the surveys since 2013 were sand gobies, the flatfish species plaice and Dover sole, the pelagic species herring and the gadoids whiting and cod. Other species recorded included the diadromous European smelt, flounder, 3-spined stickleback, dab and sprat. The results are consistent with data for the wider Humber Estuary region (described above) which suggests that these species are some of the most commonly occurring species in the region.

8.2.36 While these surveys do not overlap specifically with the Project, they are considered broadly representative of the fish assemblage that could be present within the dredge footprint and surrounding local area. This is because the surveys have used a variety of techniques to target different habitats within both the intertidal and subtidal. The TrAC surveys are also relatively contemporary and cover a range of seasons.

Marine Mammals

Humber Estuary Overview

8.2.37 The most commonly occurring marine mammals recorded in the Humber Estuary region are seals with populations of both grey seal (*Halichoerus grypus*) and common (harbour) seal (*Phoca vitulina*) occurring. Further information about the abundance and distribution of these species is provided below followed by a description of cetacean (whale, dolphin and porpoise) species occurring in the region.

8.2.38 The intertidal area at Donna Nook is the main haul out site in the region and is an important breeding ground for grey seals. This colony is located over 25 km from the Project at the mouth of the Humber Estuary. In 2018, there were an estimated 68,050 grey seal pups born in Britain (Ref 8-20) with approximately 3% of the pup production occurring at Donna Nook. Breeding occurs once a year between October and December and the vast majority of seals in this colony breed at Donna Nook, with a few seals breeding on Skidbrooke Ridge, south of Donna Nook. Peak grey seal pup numbers in winter 2021/ 22 and 2020/ 21 at Donna Nook consisted of 2,122 and 2,214 seals respectively with numbers having increased substantially in recent years from under 100 pups born annually in the 1980s.

8.2.39 The intertidal mudflats also provide an important habitat throughout the year for grey seals to haul out or rest, particularly during the spring when all grey seals (except young born the previous year) are moulting. Aerial seal counts undertaken in August 2019 recorded 5,265 grey seals hauled out at Donna Nook. Total numbers at this colony have increased from the low hundreds recorded in the late 1990s and early 2000s to counts over 5,000 seals in more recent years (Ref 8-20).

8.2.40 Tagging studies have shown that most feeding activity of grey seals occurs within 100km of haul out sites, but they also frequently undertake longer movements (Ref 8-20). Seals tagged at Donna Nook were recorded undertaking wide ranging movements in the outer Humber Estuary and approaches as well as more widely in the North Sea (Ref 8-19). This is reflected in high predicted at-sea densities of grey seals in the approaches to the Humber Estuary (Ref 8-17).

8.2.41 The Humber Estuary region also supports a small population of common seal. As per the grey seal, Donna Nook is also the key haul out site for common seals. A total of 128 common seals were recorded in 2019 as part of annual aerial monitoring in the region in August 2019. Since the 1990s numbers have generally fluctuated between 100 and 400 counts annually (Ref 8-20). Harbour seals typically forage within 40 to 50 km of haul out sites (Ref 8-20).

8.2.42 While over ten species of cetacean have been recorded in the southern and central North Sea, only harbour porpoise (*Phocoena phocoena*) is considered as regularly occurring throughout most of the year (Ref 8-14, Ref 8-30 and Ref 8-18).

8.2.43 Near to the Humber Estuary, high densities of harbour porpoise have been recorded offshore from the Lincolnshire coast and the Holderness Coast (Ref 8-22 and Ref 8-21). Harbour porpoise are also frequently recorded foraging in the Humber Estuary region with over 2,000 sightings since 2000 (Ref 8-14, Ref 8-16 and Ref 8-15). Peak sightings and numbers occur in August, September and October. Although porpoises in the North Sea can give birth in any month of the year, breeding is typically seasonal with most births in June or July and a peak in mating in August (Ref 8-14).

8.2.44 Other cetacean species recorded in the region more rarely in the Humber Estuary include bottlenose dolphin (*Tursiops truncates*), common dolphin (*Delphinus delphis*), white-beaked dolphin (*Lagenorhynchus albirostris*) killer

whale (*Orcinus orca*) and minke whale (*Balaenoptera acutorostrata*) (Ref 8-14 and Ref 8-15).

Immingham Area

8.2.45 Marine mammal survey data or sighting records for the Immingham area are limited. However, given that seals (particularly grey seals) are regularly recorded foraging in the Humber Estuary, this species would be expected to occur relatively frequently in this area. For example, approximately 10 to 15 grey seals were observed hauling out on mudflat at Sunk Island (on the north bank of the Humber Estuary) during the Port of Immingham benthic surveys in September 2021 as detailed in ABPmer (2022) (Ref 8-5). This haul out site is located approximately 4km north-east from the Project and around 3 – 4 km from the potential dredge disposal sites (including transit routes). No seal haul out sites are known to occur nearer to the Project.

8.2.46 Harbour porpoises have also been regularly recorded foraging in this section of the Humber Estuary (Ref 8-14). This includes observations of a harbour porpoise foraging approximately 2km from the Project in the mid-channel, offshore from Immingham during the project specific benthic surveys as detailed in Ref 8-5.

Future Baseline

8.2.47 If the Project were not to take place, nature conservation and marine ecology receptors, namely protected sites, benthic ecology, fish and shellfish, marine mammals and coastal waterbirds, would continue to be influenced by natural and human-induced variability, ongoing cyclic patterns and trends. The future baseline would also be influenced by climate change, ocean acidification and increases in non-native species. These could lead to changes in distribution, abundance, health and reproduction in marine species, potentially affecting future populations.

8.3 Planned Surveys

8.3.1 Site specific fish or marine mammal surveys are not considered to be necessary for the Project given that the existing available data sources are adequate for the purposes of characterising these receptors in the study area as part of the EIA and HRA.

8.3.2 A subtidal benthic survey has been undertaken in July 2022 to characterise the benthic fauna. A total of 8 stations have been sampled within the vicinity of the marine infrastructure. The location of these stations is shown in **Figure 8.2** in **Appendix A**.

8.3.3 The benthic samples have been collected using a 0.1m² Day Grab or Hamon Grab for macrofauna analysis (faunal composition, abundance and biomass). An additional sample was taken at each station for determination of Particle Size Analysis (PSA) and Total Organic Carbon (TOC).

8.3.4 Samples were sieved and fixed on the vessel and sent to an accredited National Marine Biological Analytical Quality Control (NMBAQC) laboratory within five

hours of collection. The results of this survey will be available to inform the subsequent assessments.

8.4 Identification of Potential Effects

8.4.1 The Project has the potential to affect nature conservation and marine ecology receptors through direct and indirect effects during both construction and operation. The nature conservation and marine ecology chapters in the ES would set out the assessment of the likely changes to be generated by the Project, both beneficial and adverse and during both the construction and operational phases.

8.4.2 Potential cumulative effects on marine ecology receptors could arise as a result of other coastal and marine developments in the area, as well as ongoing activities, including maintenance dredging and disposal activities. These would be considered as part of the cumulative and in-combination assessment to be presented in the ES.

Construction

Scoped In

8.4.3 The potential impact pathways during Project construction are as follows:

a. Benthic habitats and species
   - i Direct loss of intertidal and subtidal habitats and species as a result of the piles.
   - ii Direct changes to benthic habitats and species as a result of capital dredging and dredge disposal.
   - iii Indirect changes to benthic habitats and species as a result of changes to hydrodynamic and sedimentary processes during capital dredging and dredge disposal.
   - iv Changes in water and sediment quality during capital dredging and dredge disposal.
   - v Underwater noise and vibration disturbance during piling, capital dredging and dredge disposal.
   - vi Introduction and spread of non-native species through the use of marine plant and introduction of new infrastructure.

b. Fish
   - i Direct loss or changes to fish populations and habitat as a direct result of capital dredging and dredge disposal.
   - ii Changes in water and sediment quality during capital dredging and dredge disposal.
   - iii Underwater noise and vibration disturbance during construction.

c. Marine mammals
   - i Underwater noise and vibration disturbance during construction.

Scoped Out

8.4.4 The following pathways during the construction phase are proposed to be scoped out of the EIA:

a. All marine ecology receptors (benthic habitats and species, fish and marine mammals)

i **Changes to seabed habitats and species as a result of sediment deposition during piling:** Piling has the potential to result in the localised resuspension of sediment as a result of seabed disturbance. The amount of sediment that settles out of suspension back onto the seabed as result of piling is expected to be negligible and benthic habitats and species are not expected to be sensitive to this level of change. This impact pathway has, therefore, been scoped out of the assessment for benthic habitats and species, as well as for other marine ecology receptors (fish and marine mammals) in terms of changes to supporting habitat and prey resources.

ii **Indirect changes to seabed habitats and species as a result of changes to hydrodynamic and sedimentary processes due to the presence of piles:** The pile structures have the potential to result in changes to hydrodynamic and sedimentary processes (e.g. flow rates, accretion and erosion patterns). However, such effects are anticipated to be negligible and highly localised (which would be confirmed by the physical processes assessment) and marine habitats and species are not expected to be sensitive to this level of change. This impact pathway has, therefore, been scoped out of the assessment for benthic habitats and species as well as for other marine ecology receptors (fish and marine mammals) in terms of changes to supporting habitat and prey resources. The physical processes assessment (as described in more detail in **Chapter 15 Physical Processes**) would determine the scale/ magnitude of these indirect changes and confirm if this impact pathway requires any further consideration in the nature conservation and marine ecology assessment at the PEI Report/ ES stage.

iii **Changes in water and sediment quality during piling:** The expected negligible, highly localised and temporary changes in suspended sediment levels (and related changes in sediment bound contaminants and dissolved oxygen) associated with bed disturbance during piling is considered unlikely to produce adverse effects in any marine species. This impact pathway has, therefore, been scoped out of the assessment for all marine ecology receptors (fish and marine mammals).

b. Fish

i **Indirect changes to seabed habitats and species as a result of changes to hydrodynamic and sedimentary processes due to the capital dredge and disposal:** The capital dredge and disposal has the potential to result in changes to hydrodynamic and sedimentary processes (e.g. water levels, flow rates, changes to tidal prism,

accretion and erosion patterns). However, the scale of the predicted changes are unlikely to cause anything more than negligible changes to fish habitats (feeding, spawning and nursery areas). This impact pathway has, therefore, been scoped out of the assessment for fish.

c. Marine mammals

i **Direct loss or changes in marine mammal foraging habitat:** There is the potential for impacts to marine mammals as a result of changes to marine mammal foraging habitat and prey resources. However, the footprint of the Project only covers a highly localised area that constitutes a negligible fraction of the known ranges of local marine mammal populations. This impact pathway has, therefore, been scoped out of the assessment.

ii **Visual disturbance of hauled out seals:** The nearest established breeding colony for grey seals is located over 25km away at Donna Nook. Approximately 10 to 15 grey seals were also observed hauling out on mudflat at Sunk Island (on the north bank of the Humber Estuary) during benthic surveys undertaken at the Port of Immingham in September 2021as detailed in Ref 8-5. This haul out site is located approximately 4km north-east from the Project and around 3-4 km from the possible dredge disposal sites (including transit routes). No seal haul out sites are known to occur nearer to the Project. Seals hauled out on the intertidal habitats of Sunk Island (located on the opposite bank to the Project) are considered to be out of the zone of influence of any potential visual disturbance effects as a result of dredging, dredge disposal or construction activity (Ref 8-31, Ref 8-32, Ref 8-33 and Ref 8-34). The potential for disturbance to hauled out seals has, therefore, been scoped out of the assessment.

iii **Collision risk during construction:** Vessels involved in construction and dredging activity would be mainly stationary or travelling at low speeds, making the risk of collision low. In general, incidents of mortality or injury of marine mammals caused by vessels remain a relatively rare occurrence in UK waters (Ref 8-35 and Ref 8-36). Furthermore, the region is already characterised by heavy shipping traffic. Marine mammals foraging within the Humber Estuary routinely need to avoid collision with vessels and are, therefore, considered well adapted to living in an environment with high levels of vessel activity. This impact pathway has, therefore, been scoped out of the assessment.

iv **Water quality impacts during piling, capital dredging and dredge disposal:** The expected negligible, highly localised and temporary changes in suspended sediment levels and related changes in sediment bound contaminants and dissolved oxygen associated with bed disturbance during piling is considered highly unlikely to produce adverse effects in any marine mammal species. The potential for accidental spillages would also be negligible during construction through following established industry guidance and protocols. The

plumes resulting from dredging and dredge disposal would be expected to have a relatively minimal and local effect on suspended sediment concentrations (SSC) in the vicinity of the Project. Marine mammals in the Humber Estuary are well adapted to highly turbid conditions and, therefore, not sensitive to the scale of changes in SSC anticipated during capital dredging (Ref 8-37). Any temporary and localised changes in water column contamination levels are considered unlikely to produce any lethal and sub-lethal effects in these highly mobile species (the concentrations required to produce these effects are generally acquired through long-term, chronic exposure to prey species in which contaminants have bioaccumulated) (Ref 8-37). The potential for water quality impacts to marine mammals during construction has, therefore, been scoped out of the assessment.

Operation

Scoped In

8.4.5 The potential impact pathways during the operational phase are as follows:

a. Benthic habitats and species
    i Direct changes to benthic habitats and species as a result of sediment removal and deposition during operation (specifically maintenance dredging, dredge disposal (if required) and due to operational berth vessel movements).
    ii Indirect changes to benthic habitats and species as a result of changes to hydrodynamic and sedimentary processes during operation.
    iii Changes in water and sediment quality during operation (as a result of maintenance dredging and dredge disposal).
    iv Underwater noise and vibration disturbance during operation.
    v Introduction and spread of non-native species.
b. Fish
    i Changes to fish populations and fish habitat during operation (as a result of maintenance dredging, and dredge disposal if required).
    ii Changes in water and sediment quality during operation (as a result of maintenance dredging and dredge disposal if required).
    iii Underwater noise and vibration disturbance operation.
c. Marine Mammals
    i Underwater noise and vibration disturbance during operation.

Scoped Out

8.4.6 The following pathways during the operational phase are proposed to be scoped out of the EIA:

a. Marine mammals

i **Visual disturbance of hauled out seals:** The nearest established breeding colony for grey seals is located over 25km away at Donna Nook. Approximately 10 to 15 grey seals were also observed hauling out on mudflat at Sunk Island (on the north bank of the Humber Estuary) during the benthic surveys undertaken at the Port of Immingham in September 2021 as detailed in Ref 8-5. This haul out site is located approximately 4km north-east from the Project and around 3-4 km from the proposed dredge disposal sites (including transit routes). No seal haul out sites are known to occur nearer to the Project. Seals hauled out on the intertidal habitats of Sunk Island (located on the opposite bank to the Project) are considered to be out of the zone of influence of any potential visual disturbance effects as a result of maintenance dredging and vessel operations (Ref 8-31, Ref 8-32, Ref 8-33 and Ref 8-34). The potential for disturbance to hauled out seals has, therefore, been scoped out of the assessment.

ii **Collision risk during operation:** Vessels using the berths during operation would be typically approaching at slow speeds (2-4 knots) and maintenance dredging/ dredge disposal would be mainly stationary or travelling at low speeds (2-6 knots), maintenance dredging/ dredge disposal would be mainly stationary or travelling at low speeds (2-6 knots), making the risk of collision very low. In general, incidents of mortality or injury of marine mammals caused by vessels remain a relatively rare occurrence in UK waters (Ref 8-35 and Ref 8-36). Furthermore, the region is already characterised by heavy shipping traffic. Marine mammals foraging within the Humber Estuary routinely need to avoid collision with vessels and are, therefore, considered well adapted to living in an environment with high levels of vessel activity. This impact pathway has, therefore, been scoped out of the assessment.

iii **Water quality impacts during maintenance dredging and dredge disposal:** The plumes resulting from maintenance dredging would be expected to have a relatively minimal and local effect on SSC. Marine mammals in the Humber Estuary are well adapted to highly turbid conditions and, therefore, not sensitive to the scale of changes in SSC anticipated during capital dredging (Ref 8-37). Any temporary and localised changes in water column contamination levels are considered unlikely to produce any lethal and sub-lethal effects in these highly mobile species (the concentrations required to produce these effects are generally acquired through long-term, chronic exposure to prey species in which contaminants have bioaccumulated) (Ref 8-37). The potential for water quality impacts to marine mammals during piling has, therefore, been scoped out of the assessment.

Decommissioning

8.4.7 The DCO would not make any provision for the decommissioning of the marine infrastructure or plant or equipment on the jetty topside. This is because the development would, once constructed, become part of the fabric of the

Immingham port estate and would, in simple terms, continue to be maintained so that it can be used for port related activities to meet a long-term need. This is discussed further in **Section 2.4** of **Chapter 2 The Project** of this EIA Scoping Report.

8.5 Design, Mitigation and Enhancement Measures

8.5.1 Mitigation measures would be considered as part of the assessment to reduce potential impacts, as far as possible to environmentally acceptable levels. This would include consideration of primary (inherent) mitigation which considers modifications to the location or design of the development made during the pre-application phase that are an inherent (or embedded) part of the project such as minimising the development footprint.

8.5.2 The assessment would also consider standard best practices to manage commonly occurring environmental effects (such as the implementation of biosecurity measures) and where required the use of secondary mitigation which would alter the risk of exposure and, hence, would require significance to be re-assessed and thus the residual impact (i.e. with mitigation) to be identified (Ref 8-38). Mitigation measures would be further developed if required through ongoing engagement with statutory authorities as part of the statutory consultation process.

8.6 Assessment Methodology

8.6.1 The significance of impact pathways would be assessed for the purposes of the ES using the proposed impact assessment methodology (as described in more detail in **Chapter 4 The EIA Process**). In accordance with published guidance, the assessment would include a detailed evaluation of the importance/ value and sensitivity of relevant marine ecology receptors within the DCO site boundary, as well as details of proposed mitigation measures to avoid or reduce any significant adverse effects.

8.6.2 It is recognised that there are important linkages between the nature conservation and marine ecology topic and other EIA topics. For example, the assessment of indirect impacts on nature conservation and marine ecology receptors would be informed by the outcomes of the physical processes (as described in more detail in **Chapter 15 Physical Processes**) and water and sediment quality assessments (as described in more detail in **Chapter 16 Marine Water and Sediment Quality**).

8.6.3 Information would also be provided to enable the competent authority to undertake an Appropriate Assessment (AA), assessing the effects of the Project on the interest features of European/ Ramsar sites. This HRA would be provided as a technical appendix to the ES.

Underwater Noise Modelling

8.6.4 Underwater noise modelling would be undertaken to assess the potential effects of underwater noise associated with the Project (i.e. piling, dredging and vessel movements). In accordance with good practice guidance (Ref 8-39), a simple logarithmic spreading model would be used to predict the propagation of sound

levels with range. This model is represented by a logarithmic equation and would incorporate factors for noise attenuation and absorption losses based on empirical data from shallow water estuarine and coastal environments similar to the Humber Estuary. The advantage of this model is that it is simple to use and quick to provide first order calculations of the received (unweighted) levels (sound pressure level - SPL) with distance from the source due to geometric spreading.

8.6.5 Following advice from the MMO and Cefas on another recent ABP project on the Humber Estuary, the received levels associated with the Project activities are proposed to be modelled in the sound exposure level (SEL) metric, where there is considered to be a better understanding of both source levels and propagation loss, and then translated to the peak SPL metric using equation (1) in Lippert et al. (2015) (Ref 8-40).

8.6.6 Although the logarithmic spreading model generally represents a simplistic model of propagation loss, its use is an established approach in EIAs that has been widely accepted by UK regulators for recent port and waterfront developments. In terms of fish, the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) in the United States recommends the use of the practical spreading model to developers and has incorporated this model in their pile driving calculation spreadsheet to assess the potential impacts of pile driving on fish (Ref 8-41). In terms of marine mammals, NOAA (2022) (Ref 8-42) has developed a user spreadsheet tool for assessing the potential effects of different types of noise activities on marine mammals which is based on the simple logarithmic spreading model. The proposed piling and dredging works would be in very shallow water and, therefore, the propagation of noise would be limited. Overall, therefore, a simple logarithmic spreading model based on conservative assumptions is considered proportionate and appropriate to use for this underwater noise assessment.

8.6.7 A range of available published criteria would then be used to assess the potential physiological and behavioural effects of underwater noise on key sensitive receptors in the study area (or zone of influence), including fish and marine mammals (Ref 8-43, Ref 8-44, Ref 8-45, Ref 8-46 and Ref 8-47).

8.6.8 The potential significance of these effects would then be assessed in the context of the physical nature of the location, the spatiotemporal variability of underwater noise generated by the Project, and the baseline (ambient noise) environment. The latest available scientific literature of vibration (particle motion) effects on benthic invertebrates and fish would be reviewed to inform the underwater noise assessment.

Relevant Legislation, Policy and Technical Guidance

8.6.9 The potential effects of the Project on nature conservation and marine ecology receptors would be considered in the respective topic-specific ES chapter, which would cross-reference, as appropriate, relevant policy, legislation and guidance, including:

a. The Habitats Directive (92/ 43/ EEC).

b. The Birds Directive (2009/ 147/ EC).
c. The Marine and Coastal Access Act 2009 (MCAA).
d. The Wildlife and Countryside Act (WCA) 1981, as amended.
e. The Countryside and Rights of Way Act (CRoW) 2000.
f. The Natural Environment and Rural Communities (NERC) Act 2006.
g. The Habitats Regulations, which implement the Birds Directive (2009/ 147/ EC) and Habitats Directives (92/ 43/ EEC).
h. The Water Framework Regulations, which implement the European WFD (2000/ 60/ EC).
i. NPSfP (Ref 8-48).
j. UK Marine Policy Statement (Ref 8-49) as required by Section 44 of the Marine and Coastal Access Act 2009.
k. East Inshore and East Offshore Marine Plans (Ref 8-50).
l. UK Biodiversity Action Plan (Ref 8-51), superseded by the UK Post-2010 Biodiversity Framework (Ref 8-52).
m. Lincolnshire Local Biodiversity Action Plan.
n. UK Marine Strategy (Ref 8-53).
o. Advice Note Ten: Habitat Regulations Assessment relevant to Nationally Significant Infrastructure Projects (Ref 8-54).
p. Relevant local policy.

8.7 Consultation

8.7.1 Key consultees for this topic would include the MMO, Natural England, the Environment Agency and the Cefas. Further requirements for consultation would be identified as necessary during the subsequent assessment phase.

8.8 Summary

8.8.1 A summary of the proposed scope of the nature conservation (marine ecology) assessment is provided in **Table 8.3**.

Table 8.3 Summary of scope for the nature conservation (marine ecology) assessment

Receptor	Element	Phase	Scoped In	Scoped Out	Justification
Benthic habitats and species	Direct loss of intertidal and subtidal habitats and species as a result of the piles	Construction	✓	x	Piling would result in the small loss of subtidal and intertidal habitat.
	Direct changes to benthic habitats and	Construction	✓	x	Capital dredging causes the direct physical removal of

Receptor	Element	Phase	Scoped In	Scoped Out	Justification
	species as a result of capital dredging and dredge disposal				marine sediments from the dredge footprint, resulting in the modification of existing marine habitats. Capital dredging and dredge disposal also has the potential to result in localised physical disturbance and smothering of seabed habitats and species.
	Indirect changes to benthic habitats and species as a result of changes to hydrodynamic and sedimentary processes during capital dredging and dredge disposal (if required)	Construction	✓	x	The capital dredge and dredge disposal has the potential to result in changes to hydrodynamic and sedimentary processes (e.g. water levels, flow rates, changes to tidal prism, accretion and erosion patterns) which could affect marine invertebrates.
	Changes in water and sediment quality during capital dredging and dredge disposal (if required)	Construction	✓	x	Changes in water quality during capital dredging and disposal could impact benthic habitats and species through an increase in SSC and the release toxic contaminants bound in sediments.
	Underwater noise and vibration disturbance during piling, capital dredging and dredge disposal	Construction	✓	x	Underwater noise generated by piling and dredging activity has the potential to affect benthic species.
	Introduction and spread of non-native species	Construction	✓	x	Non-native species have the potential to be transported into the local area as a result of construction activity.
Fish	Direct loss or changes to fish populations and habitat as a direct result of capital dredging and dredge disposal (if required)	Construction	✓	x	Dredging has the potential to result in the direct uptake of fish and fish eggs by the action of the dredger. In addition, capital dredging and disposal has the potential to result in seabed disturbance and smothering of seabed habitats and species. These changes have the potential to impact on fish species through potential changes in prey resources and

Receptor	Element	Phase	Scoped In	Scoped Out	Justification
					the quality of foraging, nursery and spawning habitats.
	Indirect changes to seabed habitats and species as a result of changes to hydrodynamic and sedimentary processes due to the capital dredge and disposal (if required)	Construction	x	✓	The capital dredge and disposal has the potential to result in changes to hydrodynamic and sedimentary processes. However, the scale of the predicted changes are unlikely to cause anything more than negligible changes to fish habitats (feeding, spawning and nursery areas). This impact pathway has, therefore, been scoped out of the assessment for all marine ecology receptors (fish and marine mammals).
	Changes in water and sediment quality during capital dredging and dredge disposal (if required)	Construction	✓	x	Changes in water quality during capital dredging and disposal could impact fish species through an increase in SSC and the release of toxic contaminants bound in sediments.
	Underwater noise and vibration disturbance during construction	Construction	✓	x	Underwater noise generated by piling and dredging activity has the potential to affect fish species.
Marine mammals	Direct loss or changes in marine mammal foraging habitat	Construction	x	✓	There is the potential for impacts to marine mammals as a result of changes to marine mammal foraging habitat and prey resources. However, the footprint of the Project only covers a highly localised area that constitutes a negligible fraction of the known ranges of local marine mammal populations. This impact pathway has, therefore, been scoped out of the assessment.
	Underwater noise and vibration disturbance during construction	Construction	✓	x	Underwater noise generated by piling and dredging activity has the potential to affect marine mammal species.

Receptor	Element	Phase	Scoped In	Scoped Out	Justification
	Visual disturbance of hauled out seals	Construction	x	✓	The potential for disturbance to hauled out seals has been scoped out of the assessment on the basis of the distance between breeding populations and haul out sites to the proposed works.
	Collision risk during construction	Construction	x	✓	Vessels involved in construction and dredging activity would be mainly stationary or travelling at low speeds, making the risk of collision low. This impact pathway has, therefore, been scoped out of the assessment.
	Water quality impacts during piling, capital dredging and dredge disposal	Construction	x	✓	The expected negligible, highly localised and temporary changes in suspended sediment levels (and related changes in sediment bound contaminants and dissolved oxygen) associated with bed disturbance during piling is considered unlikely to produce adverse effects in any marine species. This impact pathway has, therefore, been scoped out of the assessment for all marine ecology receptors (fish and marine mammals).
All marine ecology receptors (benthic habitats and species, fish and marine mammals)	Changes to seabed habitats and species as a result of sediment deposition during piling	Construction	x	✓	Piling has the potential to result in the localised resuspension of sediment as a result of seabed disturbance. The amount of sediment that settles out of suspension back onto the seabed as result of piling is expected to be negligible and benthic habitats and species are not expected to be sensitive to this level of change. This impact pathway has, therefore, been scoped out of the assessment for benthic habitats and species, as well as for other marine ecology receptors (fish and marine mammals) in terms of

Receptor	Element	Phase	Scoped In	Scoped Out	Justification
					changes to supporting habitat and prey resources.
	Indirect changes to seabed habitats and species as a result of changes to hydrodynamic and sedimentary processes due to the presence of the piles	Construction	x	✓	The pile structures have the potential to result in changes to hydrodynamic and sedimentary processes (e.g. flow rates, accretion and erosion patterns). However, such effects are anticipated to be negligible and highly localised (which would be confirmed by the physical processes assessment) and marine habitats and species are not expected to be sensitive to this level of change. This impact pathway has, therefore, been scoped out of the assessment for benthic habitats and species as well as for other marine ecology receptors (fish and marine mammals) in terms of changes to supporting habitat and prey resources.
	Changes in water and sediment quality during piling	Construction	x	✓	The expected negligible, highly localised and temporary changes in suspended sediment levels (and related changes in sediment bound contaminants and dissolved oxygen) associated with bed disturbance during piling is considered unlikely to produce adverse effects in any marine species. This impact pathway has, therefore, been scoped out of the assessment for all marine ecology receptors (fish and marine mammals).
Benthic habitats and species	Direct changes to benthic habitats and species as a result of sediment removal and deposition during operation (specifically maintenance dredging, dredge disposal and due to	Operation	✓	x	Maintenance dredging causes the direct physical removal of marine sediments from the dredge footprint, resulting in the modification of existing marine habitats. Maintenance dredging, dredge disposal and operational berth movements also has the potential to result in localised physical disturbance and smothering of

Receptor	Element	Phase	Scoped In	Scoped Out	Justification
	operational berth vessel movements)				seabed habitats and species. This impact pathway has, therefore, been scoped into the assessment.
	Indirect changes to benthic habitats and species as a result of changes to hydrodynamic and sedimentary processes during operation	Operation	✓	x	Maintenance dredging and dredge disposal has the potential to result in changes to hydrodynamic and sedimentary processes (e.g. water levels, flow rates, changes to tidal prism, accretion and erosion patterns). Hydrodynamic and bathymetric changes caused by the dredging could affect the quality of marine habitats and change the distribution of marine species. This impact pathway has, therefore, been scoped into the assessment.
	Changes in water and sediment quality during operation (as a result of maintenance dredging and dredge disposal)	Operation	✓	x	Changes in water quality during maintenance dredging and disposal could impact benthic habitats and species through an increase in SSC and the release toxic contaminants bound in sediments.
	Introduction and spread of non-native species	Operation	✓	x	Non-native species have the potential to be transported into the local area on the hulls of vessels during operation. Non-native invasive species also have the potential to be transported via vessel ballast water.
Fish	Changes to fish populations and fish habitat during operation (as a result of maintenance dredging and dredge disposal)	Operation	✓	x	Dredging has the potential to result in the direct uptake of fish and fish eggs by the action of the dredger. In addition, capital dredging and disposal has the potential to result in seabed disturbance and smothering of seabed habitats and species. These changes have the potential to impact on fish species through potential changes in prey resources and the quality of foraging, nursery and spawning habitats. This

Receptor	Element	Phase	Scoped In	Scoped Out	Justification
					impact pathway has, therefore, been scoped into the assessment.
	Changes in water and sediment quality during operation (as a result of maintenance dredging and dredge disposal)	Operation	✓	x	Changes in water quality during maintenance dredging and disposal could impact fish species through an increase in SSC and the release of toxic contaminants bound in sediments. This impact pathway has, therefore, been scoped into the assessment.
	Underwater noise and vibration disturbance operation	Operation	✓	x	Underwater noise generated by vessel operations and maintenance dredging activity has the potential to affect fish species.
Marine mammals	Underwater noise and vibration disturbance operation	Operation	✓	x	Underwater noise generated by vessel operations and maintenance dredging activity has the potential to affect marine mammal species.
	Visual disturbance of hauled out seals	Operation	x	✓	The potential for disturbance to hauled out seals has been scoped out of the assessment on the basis of the distance between breeding populations and haul out sites to the proposed works.
	Collision risk during operation	Operation	x	✓	Vessels using the berths during operation would be typically approaching at slow speeds (2-4 knots) and maintenance dredging/ dredge disposal would be mainly stationary or travelling at low speeds (2-6 knots), making the risk of collision very low. This impact pathway has, therefore, been scoped out of the assessment.
	Water quality impacts during maintenance dredging and dredge disposal (if required)	Operation	x	✓	The plumes resulting from maintenance dredging would be expected to have a relatively minimal and local effect on SSC. The potential for water quality impacts to

Receptor	Element	Phase	Scoped In	Scoped Out	Justification
					marine mammals during piling has, therefore, been scoped out of the assessment.

8.9 References

Ref 8-1 Cefas (2021). Shellfish Classification Zones of England and Wales.

Ref 8-2 Natural England. (2020). Multi-Agency Geographic Information for the Countryside (MAGIC) Interactive Map.

Ref 8-3 Natural England. (2021a). Natural England Conservation Advice for Marine Protected Areas: Humber Estuary SAC.

Ref 8-4 Natural England. (2021b). Natural England Conservation Advice for Marine Protected Areas: Humber Estuary SPA.

Ref 8-5 ABPmer, (2022). Immingham Eastern Ro-Ro Terminal, Preliminary Environmental Information Volume 1 Main Text, ABPmer Report No. R. 3783.

Ref 8-6 Able UK Limited. (2021). Able Marine Energy Park (Material Change 2 – Tr030006). Updated Environmental Statement: Chapter 10: Aquatic Ecology.

Ref 8-7 Franco, A. Leighton, A. Bailey, M. Thomson, A and Musk, W. (2015). Humber Estuary SAC Intertidal Sediment Survey. IECS Report No. YBB249-F-2015. A report to Natural England.

Ref 8-8 ABPmer for Associated British Ports, January 2022ABPmer. (2009). Humber Estuary: Environmental Management and Monitoring Plan: Data 2009. R. 1587.

Ref 8-9 Institute of Estuarine and Coastal Studies (IECS). (2010). South Humber Channel Marine Studies: Intertidal and Subtidal Benthic & Fish Surveys 2010: Report to Yorkshire Forward.

Ref 8-10 Environment Agency. (2013). Review of fish population data in the Humber Estuary. A report by the University of Hull for the Environment Agency.

Ref 8-11 Environment Agency. (2021). TraC Fish Counts for all Species for all Estuaries and all years.

Ref 8-12 Ellis, J.R., Milligan, S.P., Readdy, L., Taylor, N. and Brown, M.J. (2012). Spawning and nursery grounds of selected fish species in UK waters. Sci. Ser. Tech. Rep., Cefas Lowestoft, 147, 56.

Ref 8-13 Heessen, H.J., Daan, N., and Ellis, J.R. (Eds.). (2015). Fish atlas of the Celtic Sea, North Sea, and Baltic Sea: Based on international research-vessel surveys. Wageningen Academic Publishers.

Ref 8-14 Evans, P.G.H and Bertulli, C.G (2021). Cetaceans in the Humber Estuary Region. A report by the Seawatch Foundation to ABPmer.

Ref 8-15 Lincolnshire Environmental Records Centre (LERC). (2021). LERC Search Summary Report.

Ref 8-16 NBN. (2021). NBN Atlas.

Ref 8-17 Carter, M.I., Boehme, L., Duck, C.D., Grecian, J., Hastie, G.D., McConnell, B.J., Miller, D.L., Morris, C., Moss, S., Thompson, D. and Thompson, P. (2020). Habitat-based predictions of at-sea distribution for grey and harbour seals in the British Isles: Report to BEIS, OESEA-16-76, OESEA-17-78.

Ref 8-18 Waggitt, J.J., Evans, P.G.H., Andrade, J., Banks, A.N, Boisseau, O., Bolton, M., Bradbury, G., et al. (2020). Distribution maps of cetacean and seabird populations in the North-East Atlantic. Journal of Applied Ecology, 57: 253-269. doi: 10.1111/ 1365-2664.13525.

Ref 8-19 Russell, D.J.F. (2016). Movements of grey seal that haul out on the UK coast of the southern North Sea. Report for the Department of Energy and Climate Change (OESEA-14-47).

Ref 8-20 Special Committee on Seals (SCOS). (2021). Scientific Advice on Matters Related to the Management of Seal Populations: 2020.

Ref 8-21 Heinänen, S. and Skov, H. (2015). The identification of discrete and persistent areas of relatively high harbour porpoise density in the wider UK marine area, JNCC Report No. 544 JNCC, Peterborough.

Ref 8-22 Hammond, P.S., Lacey, C., Gilles, A., Viquerat, S., Boerjesson, P., Herr, H., Macleod, K., Ridoux, V., Santos, M., Scheidat, M. and Teilmann, J. (2021). Estimates of cetacean abundance in European Atlantic waters in summer 2016 from the SCANS-III aerial and shipboard surveys. Wageningen Marine Research.

Ref 8-23 Humber Nature Partnership. (2015). Humber Management Scheme 2015.

Ref 8-24 Natural England. (2015). Site Improvement Plan Humber Estuary. Planning for the Future Improvement Programme for England's Natura 2000 Sites (IPENS).

Ref 8-25 English Nature. (2003). The Humber Estuary European Marine Site.

Ref 8-26 Elliott, M. and Marshall, S. (2000). The Biology of Fishes of the Humber Estuary, UK. Coastal Zone Topics: Process, Ecology & Management, 4, pp.85-96.

Ref 8-27 Marshall, S. and Elliott, M. (1997). The structure of the fish assemblage in the Humber estuary, United Kingdom. Oceanographic Literature Review, 10(44), p.1171.

Ref 8-28 Waugh, A., Elliott, M. and Franco, A. (2019). Debunking paradigms in estuarine fish species richness. Marine Ecology Progress Series, 613, pp.125-138.

Ref 8-29 Rogers, S.I., Millner, R.S. and Mead, T.A. (1998). The distribution and abundance of young fish on the east and south coast of England (1981 to 1997). Science Series, Technical Report, CEFAS, Lowestoft, 108, p.130.

Ref 8-30 Department of Energy and Climate Change (DECC). (2016). UK Offshore Energy Strategic Environmental Assessment 3: Future Leasing for Offshore Wind Farms and Licensing for Offshore Oil & Gas and Gas Storage. Department for Energy and Climate Change.

Ref 8-31 Wilson, S.C. (2014). The impact of human disturbance at seal haul-outs. A literature review for the Seal Conservation Society.

Ref 8-32 Mathews, E. A., Jemison, L. A., Pendleton, G. W., Blejwas, K. M., Hood, K. E., & Raum-Suryan, K. L. (2016). Haul-out patterns and effects of vessel disturbance on harbor seals (Phoca vitulina) on glacial ice in Tracy Arm, Alaska. Fishery Bulletin, 114(2).

Ref 8-33 Henry, E., & Hammill, M. O. (2001). Impact of small boats on the haulout activity of harbour seals (Phoca vitulina) in Metis Bay, Saint Lawrence Estuary, Quebec, Canada. Aquatic Mammals, 27(2), 140-148.

Ref 8-34 Strong P and Morris SR. (2010). Grey seal (Halichoerus grypus) disturbance, ecotourism and the Pembrokeshire Marine Code around Ramsey Island. J. Ecotourism 9(2): 117–132.

Ref 8-35 ABP Research (1999) Good Practice Guidelines for Ports and Harbours Operating Within or Near UK European Marine Sites. English Nature, UK Marine SACs Project. ABP Research & Consultancy Ltd, pp 120.

Ref 8-36 Cetacean Strandings Investigation Programme (CSIP). (2020). Annual Report for the period 1st January – 31st December 2018 (Contract number ME6008).

Ref 8-37 Todd, V.L., Todd, I.B., Gardiner, J.C., Morrin, E.C., MacPherson, N.A., DiMarzio, N. A., and Thomsen, F. (2015). A review of impacts of marine dredging activities on marine mammals. ICES Journal of Marine Science, 72(2), pp.328-340.

Ref 8-38 Institute of Environmental Management and Assessment. (2016). Environmental Impact Assessment Guide to: Delivering Quality Development.

Ref 8-39 National Physics Laboratory. (2014). Good Practice Guide for Underwater Noise Measurement. Guide No. 133.

Ref 8-40 Lippert, T., Galindo-Romero, M., Gavrilov, A.N. and von Estorff, O. (2015). Estimation of peal pressure level from sound exposure level. Part II: Offshore impact pile driving noise. Lippert et al.: JASA Express Letters.

Ref 8-41 NMFS (2022). Section 7 Consultation Guidance: Pile Driving Noise Calculator (Excel spreadsheet download).

Ref 8-42 NOAA (2022). User Manual and User Spreadsheet Tool - 2018 Acoustic Technical Guidance.

Ref 8-43 Popper, A.N., Hawkins, A.D., Fay, R., Mann, D., Bartol, S., Carlson, Th., Coombs, S., Ellison, W.T., Gentry, R., Halvorsen, M.B., Lokkeborg, S., Rogers, P., Southall, B.L., Zeddies, D.G. and Tavolga, W.N. (2014). Sound exposure guidelines for fishes and sea turtles: A technical report prepared by ANSI-Accredited standards committee S3/ SC1 and registered with ANSI. Springer, ASA Press. ISBN 2196-1212. (e-book ISBN 978-2-219-06659-2).

Ref 8-44 Hawkins A. D., and Popper, A. N. (2017). A sound approach to assessing the impact of underwater noise on marine fishes and invertebrates. ICES Journal of Marine Science, Volume 74, Issue 3, 1 March 2017, Pages 635–651.

Ref 8-45 NOAA. (2018). 2018 Revisions to: Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0): Underwater Thresholds for Onset of Permanent and Temporary Threshold Shifts. U.S. Dept. of Commer., NOAA. NOAA Technical Memorandum NMFS-OPR-59, p.167.

Ref 8-46 Southall, B.L., Bowles, A.E., Ellison, W.T., Finneran, J.J., Gentry, R.L., Greene Jr, C.R., Kastak, D., Miller, J.H., Nachigall, P.E., Richardson, W, J., Thomas, J.A and Tyack, P.L. (2007). Marine mammal noise exposure criteria: initial scientific recommendations. Aquatic Mammals 33, pp.411–521.

Ref 8-47 Southall, B.L., Finneran, J.J., Reichmuth, C., Nachtigall, P.E., Ketten, D.R., Bowles, A.E., Ellison, W.T., Nowacek, D.P. and Tyack, P.L. (2019). Marine mammal noise exposure criteria: updated scientific recommendations for residual hearing effects. Aquatic Mammals, 45(2).

Ref 8-48 Department for Transport (DfT). (2012). National Policy Statement for Ports.

Ref 8-49 HM Government. (2011). UK Marine Policy Statement.

Ref 8-50 Department for Environment, Food and Rural Affairs (Defra). (2014). East Inshore and East Offshore Marine Plans.

Ref 8-51 HMSO. (1994). Biodiversity - The UK Action Plan.

Ref 8-52 JNCC. (2012). UK Post-2010 Biodiversity Framework.

Ref 8-53 Department for Environment, Food and Rural Affairs. (2019). Marine strategy part one: UK updated assessment and Good Environmental Status.

Ref 8-54 Planning Inspectorate. (2017). Advice Note Ten: Habitat Regulations Assessment relevant to Nationally Significant Infrastructure Projects.

9 Ornithology

9.1 Introduction

9.1.1 This chapter sets out the proposed scope of the ES chapter that would report the findings of the ornithology assessment of the Project. The chapter also details the datasets to be used to inform the assessment, provides an overview of baseline conditions, sets out the likely significant effects to be considered within the assessment, and discusses how these likely significant effects would be assessed for the purpose of the EIA.

9.1.2 This chapter is focused on coastal waterbirds utilising intertidal and subtidal habitats for roosting and feeding, and any supporting terrestrial habitats used for high tide feeding, roosting and loafing. Breeding birds utilising terrestrial habitats (including waterbirds) are also considered within this chapter.

9.2 Baseline Environment and Study Area

Data Sources

9.2.1 A desk-based study would be undertaken to inform the baseline characterisation on which the impact assessment would be based. This would include the following key data sources:

a. Nature conservation sites

   i Natura 2000 standard data forms or information sheets for each designation: Information on the species and habitats listed in the original citations.

   ii MAGIC Interactive Map: Information on the boundaries of designated sites (Ref 9-1).

   iii Natural England Conservation Advice for Marine Protected Areas: Humber Estuary SAC (Ref 9-2) and Humber Estuary SPA (Ref 9-3).

b. Coastal waterbirds

   i Immingham Outer Harbour (IOH) Ornithology Surveys: Pre and post consent monitoring of coastal waterbirds as part of the IOH development. These surveys which overlap with the Project area have been undertaken between October and March twice a month. The surveys started in winter 1997/ 98 and have been ongoing annually since then. During each survey, either five counts (October and March) or four counts (November to February) are undertaken every two hours after high water. The most recent 5-years of data (2017/ 18 to 2021/ 22) would be analysed. In addition, the 2021/ 22 survey season started in August rather than October. The surveys have been continued on a monthly basis in 2022 rather than stopping in March as per previous years. On this basis, the results from the passage periods would also be presented.

ii Wetland Bird Survey (WeBS) Core Counts Data: Core count data for data for 'Immingham Docks - Sector K' (ID 38905) which overlaps with the Project. The most recent 5-years of data available from the British Trust for Ornithology (BTO) (2016/ 17 to 2020/ 21) would be analysed. In addition, estuary wide WeBS data for the Humber Estuary for the period 2015/ 16 to 2019/ 20 would also be reviewed to provide contextual information (Ref 9-4).

iii Natural England Designated Sites Portal: Background information on the ecology of Special Protection Area (SPA) qualifying bird species in the Humber Estuary (Ref 9-3).

iv Population Trends for Species in the Humber Estuary: Information on long-term trends in the population status of waterbirds in the Humber Estuary is available for the period up to 2016/ 2017 from the latest WeBS 'Alerts Report' (Ref 9-5). This is an information source describing waterbird numbers on protected areas and has an 'alert system' where species that have undergone major declines in numbers are identified.

v BTO Research Report Analysing WeBS data for the Humber Estuary: Population trends of waterbird species in different parts of the Humber Estuary for the period 2000/ 01 to 2016/ 17 (Ref 9-6).

vi Wintering bird records within 1km of the DCO site boundary held by LERC.

vii Results of wintering bird survey of terrestrial land within the West Site area pertaining to a planning application on that site from 2013 (Planning Reference: DM/1027/13/OUT).

c. Breeding birds (non-SPA/ Ramsar species)

i Breeding bird records within 1km of the DCO site boundary held by LERC.

ii Results of breeding bird survey of terrestrial land within the West Site area pertaining to a planning application on that site from 2013 (Planning Reference: DM/ 1027/13/OUT).

Study Area

9.2.2 The study area is the area over which potential direct and indirect effects of the Project may occur during construction and operation. The direct effects on ornithology receptors are those that occur within the footprint of the Project, such as the direct disturbance to supporting habitats and associated species as a result of the Project. Indirect effects are those that may arise outside this footprint, such as the potential noise and visual disturbance effects on waterbirds during construction.

9.2.3 The study area for coastal waterbirds is focused on the Port of Immingham area and proposed disposal sites (if required) with data for the wider Humber Estuary region presented where relevant to provide contextual information and to ensure the area of potential effects (e.g. noise disturbance) are fully considered. The study area for coastal waterbirds includes any terrestrial habitats adjacent to/ in

close proximity to the Estuary that may support these species over the high tide period when intertidal habitats are reduced.

9.2.4 The study area for breeding birds (non-SPA/ Ramsar species) includes terrestrial habitats within the DCO site boundary that have been identified as having the potential to support nesting species; the scrub/ grassland within the West Site and the scrub/ woodland within the East Site.

9.2.5 The ornithology ES chapter would, through further analysis and assessment, refine the study area for the purposes of the impact assessment.

Current Baseline

Nature Conservation Sites and Protected Species

9.2.6 The Project falls within the boundaries of the Humber Estuary Special Area of Conservation (SAC), SPA and Ramsar site (collectively forming the Humber European Marine Site (EMS) – refer to **Figure 9.1 in Appendix A**).

9.2.7 Qualifying features of the Humber Estuary SPA and Humber Estuary Ramsar site are shown in **Table 9.1** and **Table 9.2** respectively.

Table 9.1 Qualifying Features of the Humber Estuary SPA

Internationally Important Populations of Regularly Occurring	
Annex 1 Species	
Breeding Species	**Population**
Bittern† (*Botaurus stellaris*)	2 calling males (10.5 % of the GB population)
Marsh Harrier (*Circus aeruginosus*)	10 breeding females (6.3 % of the GB population)
Avocet (*Recurvirostra avosetta*)	64 pairs (8.6 % of the GB population)
Little Tern (*Sternula albifrons*)	51 pairs (2.1 % of the GB population)
Wintering Species	**Population**
Bittern†	4 (4.0 % of the GB population)
Hen harrier (*Circus cyaneus*)	8 (1.1 % of the GB population)
Bar-tailed Godwit (*Limosa lapponica*)	2,752 (4.4 % of the GB population)
Golden Plover (*Pluvialis apricaria*)	30,709 (12.3 % of the GB population)
Avocet (*Recurvirostra avosetta*)	54 (1.7 % of the GB population)
On passage Species	**Population**
Ruff (*Calidris pugnax*)	128 (1.4 % of the GB population)

Internationally Important Populations of Regularly Occurring	
Migratory Species	
Wintering Species	**Population**
Teal† (*Anas crecca*)	2,322 (<1 % of the population)
Wigeon† (*Mareca Penelope*)	5,044 (<1 % of the population)
Mallard† (*Anas platyrhynchos*)	2,456 (<1 % of the population)
Turnstone† (*Arenaria interpres*)	629 (<1 % of the population))
Common Pochard† (*Aythya ferina*)	719 (<1 % of the population)
Greater Scaup† (*Aythya marila*)	127 (<1 % of the population)
Brent Goose† (*Branta bernicla*)	2,098 (<1 % of the population)
Goldeneye† (*Bucephala clangula*)	467 (<1 % of the population)
Sanderling† (*Calidris alba*)	486 (<1 % of the population)
Dunlin (*Calidris alpina*)	22,222 (1.7 % of the Northern Siberia/ Europe/ Western Africa population)
Red Knot (*Calidris canutus*)	28,165 (6.3 % of the North-eastern Canada/ Greenland/ Iceland/ North-western Europe population)
Ringed Plover† (*Charadrius hiaticula*)	403 (<1 % of the population)
Oystercatcher† (*Haematopus ostralegus*)	3503 (<1 % of the population)
Black-tailed Godwit (*Limosa limosa*)	1,113 (3.2 % of the Icelandic Breeding population)
Curlew† (*Numenius arquata*)	3,253 (<1 % of the population)
Grey Plover† (*Pluvialis squatarola*)	1,704 (<1 % of the population)
Shelduck (*Tadorna tadorna*)	4,464 (1.5 % of the North-western Europe population)
Redshank (*Tringa tetanus*)	4,632 (3.6 % of the Eastern Atlantic Wintering population)
Northern Lapwing† (*Vanellus vanellus*)	22,765 (<1 % of population)
On passage Species	**Population**
Sanderling†	818 (<1 % of the population)
Dunlin	20,269 (1.5 % of the Northern Siberia/ Europe/ Western Africa population)

Internationally Important Populations of Regularly Occurring	
Red Knot	18,500 (4.1 % of the North-eastern Canada/ Greenland/ Iceland/ North-western Europe population)
Ringed Plover†	1,766 (<1 % of the population)
Black-tailed Godwit	915 (2.6 % of the Icelandic Breeding population)
Whimbrel† (*Numenius phaeopus*)	113 (<1 % of the population
Grey Plover†	1,590 (<1 % of the population)
Greenshank† (*Tringa nebularia*)	77 (<1 % of the population)
Redshank	7,462 (5.7 % of the Eastern Atlantic Wintering population)
Internationally Important Assemblage of Waterfowl	**Population**
Waterfowl assemblage	153,934 waterfowl
† Species with this symbol do not represent a population that is > 1 % of the international threshold but are included in the wildfowl assemblage.	

Table 9.2 Qualifying Marine Features of the Humber Estuary Ramsar Site

Ramsar Criterion	
Criterion 1 – natural wetland habitats that are of international importance	
The site is a representative example of a near-natural estuary with the following component habitats: dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish/ saline lagoons.	
Criterion 3 – supports populations of plants and/ or animal species of international importance	
The Humber Estuary Ramsar site supports a breeding colony of grey seals *Halichoerus grypus* at Donna Nook. It is the second largest grey seal colony in England and the furthest south regular breeding site on the east coast.	
Criterion 5 – Bird Assemblages of International Importance	
Wintering waterfowl	153,934 waterfowl (5-year peak mean 1998/ 99-2002/ 3)
Criterion 6 – Bird Species/ Populations Occurring at Levels of International Importance	
Species	**Spring/ Autumn Population (5-year peak mean 1996-2000)**
Golden Plover	17,996 (2.2 % of the Iceland and Faroes/ East Atlantic population)

Red Knot	18,500 (4.1 % of the West and Southern African wintering population)
Dunlin	20,269 (1.5 % of the West Siberia/ West Europe population)
Black-tailed Godwit	915 (2.6 % of the Iceland/ West Europe population)
Redshank	7,462 (5.7 % of the population)
Species	Wintering Population (5-year peak mean 1996/ 7-2000/ 1)
Shelduck	4,464 (1.5 % of the North-western Europe Population)
Golden Plover	30,709 (3.8 % of the Iceland and Faroes/ East Atlantic population)
Red Knot	28,165 (4.1 % of the West and Southern African wintering population)
Dunlin	22,222 (1.7 % of the West Siberia/ West Europe population)
Black-tailed Godwit	1,113 (3.2 % of the Iceland/ West Europe population)
Bar-tailed Godwit	2,752 (2.3 % of the West Paleartic population)
Criterion 8 – Internationally important source of food for fishes, spawning grounds, nursery and/ or migration path	
The Humber Estuary acts as an important migration route for both river lamprey (*Lampetra fluviatilis*) and sea lamprey (*Petromyzon marinus*) between coastal waters and their spawning areas.	

9.2.8 The Humber Estuary Site of Special Scientific Interest (SSSI) also overlaps with the extent of the Project. This is designated for its nationally important habitat assemblage (intertidal mudflats and sandflats, and coastal saltmarsh) geological interest, importance to breeding, wintering and passage birds, breeding grey seal and the presence of river and sea lamprey.

9.2.9 The nearest Local Nature Reserve (LNR) is Cleethorpes Sands LNR (located approximately 13km south-east of the Project) which supports a variety of intertidal and coastal habitats.

Protected Species

9.2.10 The Wildlife and Countryside Act 1981 (as amended) (WACA) protects various animals, plants, habitats in the UK including bird species. In addition, all naturally occurring wild bird species, their eggs, nests and habitats are strictly protected under the Birds Directive.

9.2.11 Some marine fauna and habitats are listed as priority species and habitats of principle importance in England, as required under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 (England). Species of principle importance which are of relevance to the Humber Estuary include various species of waterbird. Habitats of principle importance of relevance to the Humber Estuary include supporting habitat for waterbirds including intertidal mudflats and coastal saltmarsh.

Coastal Waterbirds

Humber Estuary Overview

9.2.12 The Humber Estuary is a site of national and international importance for its wader and wildfowl (ducks and geese) populations, regularly supporting over 130,000 waterbirds during winter and passage periods (Ref 9-4 and Ref 9-6).

9.2.13 The most abundant wading bird species recorded in the Humber Estuary are Golden Plover and Knot (5-year mean peak for 2015/ 16 to 2019/ 20 of 31,237 and 22,500 birds respectively). Other wading birds occurring in large numbers include Dunlin (5-year mean peak of 15,954 birds), Oystercatcher, Black-tailed Godwit, Grey Plover, Curlew, Avocet and Bar-tailed Godwit (Ref 9-4). Important areas for feeding and roosting waders include the Pyewipe frontage on the south bank and Paull Holme, Cherry Cobb, Foulholme, Spurn and Sunk Island Sands on the north bank of the estuary. In the inner section of the Humber Estuary, sites such as Blacktoft Sands, Alkborough and Read's Island Flats are considered important (Ref 9-3).

9.2.14 The most abundant wildfowl bird species recorded in the Humber Estuary are Pink-footed Goose and Shelduck (5-year mean peak of 14,345 and 4,515 birds respectively). Other commonly occurring wildfowl include Teal, Dark-bellied Brent Geese, Wigeon, Greylag Goose and Mallard (Ref 9-4). Pink-footed Goose are recorded in large numbers at Read's Island with Dark-bellied Brent Geese and Wigeon, principally in areas along the southern shore from Cleethorpes to Saltfleetby (Ref 9-3).

9.2.15 Black-headed Gull (5-year mean peak of 11,217 birds) as well as Herring Gull and Common Gull (occurring in lower numbers) are widespread in the Humber Estuary.

9.2.16 Diving birds occurring in the Humber Estuary include Common Scoter and Goldeneye (5-year mean peak of 682 and 329 birds respectively) with Cormorants and Tufted Duck also occurring in relatively large numbers.

9.2.17 Sandwich Tern (5-year mean peak of 686 birds) and Common Tern (5-year mean peak of 486 birds) are regularly recorded, particularly in passage periods. Little Tern also breed at a few locations in the Humber Estuary area.

Immingham Area

9.2.18 Coastal waterbird surveys of the foreshore in the area of Project (between Immingham Oil Terminal Jetty to Oldfleet Drain - 'Sector C' in **Figure 9.2** in **Appendix A**) have recorded 24 bird species with approximately ten species considered regularly occurring (seen annually over the latest five monitoring

periods). The results of surveys for the last five years of surveys (2017/ 18 to 2021/ 22) are briefly summarised below.

9.2.19 The most numerous wading bird species recorded foraging within the area over this period were Black-tailed Godwit and Dunlin (5-year mean peaks of 1,361 and 519 birds respectively). Other wading birds regularly recorded but in lower numbers included Bar-tailed Godwit, Redshank, Turnstone, Oystercatcher and Curlew. Shelduck were the most abundant wildfowl species recorded foraging (5-year mean peak of 131 birds). Lower numbers of other ducks such as Teal and Mallard were also recorded.

9.2.20 With respect to roosting birds, Black-tailed Godwit was the most numerous species recorded (5-year mean peaks of 514 birds). Other species regularly recorded roosting included Shelduck and Curlew (5-year mean peak of 32 and 27 birds, respectively) as well as Knot, Redshank and Turnstone.

9.2.21 To provide coverage of passage periods, surveys were undertaken in August and September 2021 (autumn migratory period) and in April and May 2022 (spring migratory period). The number of birds using Sector C was generally higher in the autumn migration than the spring (peak counts of 222 Dunlin and 160 Black-tailed Godwit recorded in the autumn and 400 and 581 Black-tailed Godwit and Dunlin in the spring respectively). However, none of the peak counts during the passage period exceeded the winter mean peaks for the last five years.

Terrestrial Habitats (Coastal Waterbirds)

9.2.22 The habitat within the West Site is dominated by tall-swarded grassland having been abandoned from agricultural cultivation approximately ten years ago. Consequently, the habitats within the West Site are not suitable for high tide roosting/ loafing/ feeding waterbirds from the nearby Humber Estuary SPA/ Ramsar. This is because there is insufficient scanning distance for birds to observe approaching ground-based predators, and they therefore typically avoid taller swarded grassland. This conclusion is supported by the findings of a limited suite of wintering bird surveys undertaken to coincide with the high tide period in February and March 2022, which did not record any SPA/ Ramsar waterbird species (see **PEA Report** at **Appendix C**). Previous wintering bird surveys of these fields were undertaken for the 2013 Drax planning application also did not record any SPA/ Ramsar waterbirds, and the habitats were concluded to be unsuitable for waterbirds.

9.2.23 There is no suitable terrestrial habitat for coastal waterbirds within the Pipeline Area or East Site; these habitats comprise scrub/ woodland that are not suitable for high tide roosting, loafing or feeding waterbirds.

9.2.24 The large arable field adjacent to the Estuary within the temporary compound area off Laporte Road may be suitable for coastal waterbirds, particularly given its proximity to intertidal feeding habitats at Immingham.

Breeding Birds (SPA/ Ramsar Species)

9.2.25 There is no suitable habitat within the DCO site boundary for breeding SPA/ Ramsar species Bittern, Marsh Harrier or Avocet. Marsh Harrier has been

previously recorded overflying the DCO site boundary in 2013 (for planning application DM/1027/13/OUT) but there are no extensive areas of reedbed/ marsh habitat that would be suitable nesting habitat; the reedbed habitat within the DCO site boundary is restricted to narrow bands within/ on the margins of the ditches.

Breeding Birds (non-SPA/ Ramsar Species)

9.2.26 The LERC desk study returned a number of records of breeding species within the study area, including 5 species listed on Annex I of the EC Birds Directive, 13 species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended), 15 Species of Principal Importance (SPI), and respectively 16 Red List and 7 Amber List species included in the Birds of Conservation Concern 5 (BoCC 5). The records also include 14 species of bird that are priority species in Lincolnshire listed on the Lincolnshire BAP.

9.2.27 Previous breeding bird surveys of the West Site in 2013 for planning application DM/1027/113/OUT recorded the following breeding species on the West Site:

a. Grassland habitat: ground nesting skylark (*Alauda arvensis*) and meadow pipit (*Anthus pratensis*).

b. Ditches: reed warbler (*Acrocephalus scirpaceus*), sedge warbler (*Acrocephalus schoenobaenus*) and reed bunting (*Emberiza schoeniclus*).

c. Boundary hedgerows: blackcap (*Sylvia atricapilla*), chiffchaff (*Phylloscopus collybita*), wouldow warbler (*Phylloscopus trochilus*), whitethroat (*Sylvia communis*), lesser whitethroat (*Sylvia curruca*), tree sparrow (*Passer montanus*), yellowhammer (*Emberiza citrinella*), linnet (*Carduelis cannabina*) and song thrush (*Turdus philomelos*).

Future Baseline

9.2.28 If the Project were not to take place, ornithology receptors, would continue to be influenced by natural and human-induced variability, ongoing cyclic patterns and trends. The future baseline would also be influenced by climate change, ocean acidification and increases in non-native species. These could lead to changes in distribution, abundance, health and reproduction in waterbird species, potentially affecting future populations.

9.3 Planned Surveys

Coastal Waterbirds (Intertidal and Marine Habitats)

9.3.1 The IOH Ornithology Surveys which overlap with the footprint of the Project on the foreshore will remain ongoing using the same approach as currently undertaken (see the data sources section above). On this basis no project specific surveys are considered to be required.

Coastal Waterbirds (Terrestrial Habitats)

9.3.2 In addition to surveys of the intertidal/ marine environment, passage/ wintering surveys of the large arable field north of Laporte Road within the boundary of the

temporary construction compound will be undertaken to establish whether the habitat is functionally linked to the Humber Estuary SPA/ Ramsar:

a. Wintering bird surveys: surveys undertaken twice per month between October and March inclusive; hourly counts undertaken two hours either side of high water (as daylight allows).

b. Passage bird surveys: surveys undertaken twice per month between April and August inclusive; hourly counts undertaken two hours either side of high water.

Breeding Birds (Non-SPA/ Ramsar Species)

9.3.3 Breeding bird surveys have been undertaken on the West Site area between March and June 2022. Additional breeding bird surveys would be undertaken on the East Site (scrub/ woodland) and the temporary compound off Laporte Road between March and June 2023.

9.4 Identification of Potential Effects

9.4.1 The Project has the potential to affect ornithology receptors through direct and indirect effects during both construction and operation. The Project DCO would not make any provision for the decommissioning of the marine infrastructure above and below water level. This is because the development would, once constructed, become part of the fabric of the Immingham port estate and would, in simple terms, continue to be maintained so that it can be used for port related activities to meet a long-term need. This is discussed further in **Section 2.4** of **Chapter 2 The Project** of this EIA Scoping Report.

9.4.2 The ornithology chapter in the ES would set out the assessment of the likely changes to be generated by the Project, both beneficial and adverse and during both the construction and operational phases.

9.4.3 Potential cumulative effects on ornithology receptors could arise as a result of other coastal and marine developments in the area, as well as ongoing activities, including maintenance dredging and disposal activities. These would be considered as part of the cumulative and in-combination assessment to be presented within the ES.

Construction

Scoped In

9.4.4 The potential impact pathways during the construction phase are as follows:

a. Direct loss to intertidal feeding and roosting coastal waterbird habitat within the boundary of the Humber Estuary SPA/ Ramsar/ SSSI as result of the piles.

b. Direct loss of terrestrial habitats supporting coastal waterbirds that are functionally linked to the Humber Estuary SPA/ Ramsar/ SSSI.

c. Direct loss of breeding bird (non-SPA/ Ramsar) habitats.

d. Airborne noise and visual disturbance to coastal waterbirds using intertidal and marine habitats within the boundary of the Humber Estuary SPA/ Ramsar/ SSSI.

e. Airborne noise and visual disturbance to coastal waterbirds in terrestrial habitats outside the boundary of the Humber Estuary SPA/ Ramsar/ SSSSI that are functionally linked to the designated site.

Scoped Out

9.4.5 The following pathways during the construction phase are proposed to be scoped out of the EIA:

a. **Direct changes to waterbird bird foraging habitat as a result of the capital dredge and dredge disposal:** The footprint of the possible capital dredge and dredge disposal sites do not overlap with the intertidal and would not cause any direct changes to intertidal feeding and roosting habitat. Capital dredging and dredge disposal at sea has the potential to cause impacts to seabed habitats which could cause changes to the prey resources available for seabirds and other diving birds. However, the seabed in the vicinity of the berth pockets and at the disposal sites are highly dynamic and subject to regular physical disturbance as a result of maintenance dredging and strong tidal currents. These areas are likely to provide a limited prey resource and are also not known to support large populations of diving birds/ seabirds. This impact pathway has, therefore, been scoped out of the assessment.

b. **Indirect changes to intertidal feeding and roosting habitat as a result of the capital dredging (if required):** The capital dredge and disposal has the potential to result in changes to hydrodynamic and sedimentary processes (e.g. water levels, flow rates, changes to tidal prism, accretion and erosion patterns). However, given that the dredge is approximately 1km from the intertidal zone, the predicted changes to intertidal habitats are unlikely to be of a scale that would cause anything more than negligible changes to intertidal feeding and roosting habitat. This impact pathway has, therefore, been scoped out of the assessment.

c. **Changes to seabed habitats and species as a result of sediment deposition during piling**: Piling has the potential to result in the localised resuspension of sediment as a result of seabed disturbance. The amount of sediment that settles out of suspension back onto the seabed as result of piling is expected to be negligible and benthic habitats and species are not expected to be sensitive to this level of change. This impact pathway has, therefore, been scoped out of the assessment for coastal waterbirds in terms of changes to supporting habitat and prey resources.

d. **Indirect changes to seabed habitats and species as a result of changes to hydrodynamic and sedimentary processes due to the presence of the piles:** The pile structures have the potential to result in changes to hydrodynamic and sedimentary processes (e.g. flow rates, accretion and erosion patterns). However, such effects are anticipated to be negligible and highly localised (which would be confirmed by the physical processes

assessment) and marine habitats and species are not expected to be sensitive to this level of change. This impact pathway has, therefore, been scoped out of the assessment for coastal waterbirds in terms of changes to supporting habitat and prey resources.

e. **Noise and visual disturbance during capital dredge disposal:** During dredge disposal, there is the potential for the dredging vessels to cause noise and visual disturbance. However, the area is subject to high levels of vessel movements as a result of the regular disposal of maintenance dredge arisings and shipping. These areas are also not known to support large populations of diving birds/ seabirds. In addition, any potential disturbance stimuli caused by the capital dredge disposal would be highly temporary and localised with any birds that might be temporarily flushed able to return to feeding following cessation of the capital dredge disposal activity. This impact pathway has, therefore, been scoped out of the assessment.

Operation

Scoped In

9.4.6 The potential impact pathways during the operational phase are as follows:

a. Direct changes to foraging and roosting habitat as a result of the physical presence of marine infrastructure.

b. Airborne noise and visual disturbance during operation.

Scoped Out

9.4.7 No pathways during the operational phase are proposed to be scoped out of the EIA.

Decommissioning

9.4.8 The DCO would not make any provision for the decommissioning of the marine infrastructure above and below water level or plant or equipment on the jetty topside. This is because the development would, once constructed, become part of the fabric of the Immingham port estate and would, in simple terms, continue to be maintained so that it can be used for port related activities to meet a long-term need. This is discussed further in **Section 2.4** of **Chapter 2 The Project** of this EIA Scoping Report.

9.4.9 The impacts of the decommissioning phase of the landside infrastructure are limited to the potential for noise and visual disturbance to coastal waterbirds using intertidal mudflat habitats and functionally linked terrestrial land.

9.5 Design, Mitigation and Enhancement Measures

9.5.1 Mitigation measures would be considered as part of the assessment to reduce potential impacts, as far as possible to environmentally acceptable levels. This would include consideration of primary (inherent) mitigation which considers modifications to the location or design of the development made during the pre-

application phase that are an inherent (or embedded) part of the project such as minimising the development footprint.

9.5.2 The assessment would also consider standard best practices to manage commonly occurring environmental effects (such as the implementation of biosecurity measures) and where required the use of secondary mitigation which would alter the risk of exposure and, hence, would require significance to be re-assessed and thus the residual impact (i.e. with mitigation) to be identified (Ref 9-7). Mitigation measures would be further developed if required through ongoing engagement with statutory authorities as part of the statutory consultation process.

9.6 Assessment Methodology

9.6.1 The significance of the impact pathways would be assessed for the purposes of the ES using the proposed impact assessment methodology (as described in more detail in **Chapter 4 The EIA Process**). In accordance with published guidance, the assessment would include a detailed evaluation of the importance/ value and sensitivity of relevant ornithology receptors at the site, as well as details of any proposed mitigation measures to avoid or reduce any significant adverse effects.

9.6.2 It is recognised that there are important linkages between the ornithology topic and other EIA topics. For example, the assessment of potential airborne noise and visual disturbance would be informed by the noise and vibration assessment (as described in more detail in **Chapter 6 Noise and Vibration**) and indirect impacts on ornithology receptors would be informed by the outcomes of the physical processes (as described in more detail in **Chapter 15 Physical Processes**).

9.6.3 Information would also be provided to enable the competent authority to undertake an Appropriate Assessment (AA), assessing the effects of the Project on the interest features of European/ Ramsar sites. This HRA would be provided as a technical appendix to the ES.

Relevant Legislation, Policy and Technical Guidance

9.6.4 The potential effects of the Project on ornithology receptors would be considered in the respective topic-specific ES chapter, which would cross-reference, as appropriate, relevant policy, legislation and guidance, including:

a. The Habitats Directive (92/ 43/ EEC).
b. The Birds Directive (2009/ 147/ EC).
c. The Marine and Coastal Access Act 2009 (MCAA).
d. The Wildlife and Countryside Act (WCA) 1981, as amended.
e. The Countryside and Rights of Way Act (CRoW) 2000.
f. The Natural Environment and Rural Communities (NERC) Act 2006.
g. The Habitats Regulations, which implement the Birds Directive (2009/ 147/ EC) and Habitats Directives (92/ 43/ EEC).

h. The Water Framework Regulations, which implement the European WFD (2000/ 60/ EC).

i. NPSfP (Ref 9-8).

j. UK Marine Policy Statement as required by Section 44 of the Marine and Coastal Access Act 2009.

k. East Inshore and East Offshore Marine Plans (Ref 9-9).

l. UK Biodiversity Action Plan (Ref 9-10), superseded by the UK Post-2010 Biodiversity Framework (Ref 9-11).

m. Lincolnshire Local Biodiversity Action Plan.

n. UK Marine Strategy (Ref 9-12).

o. Advice Note Ten: Habitat Regulations Assessment relevant to Nationally Significant Infrastructure Projects (Ref 9-13).

p. Relevant local policy.

9.6.5 The terrestrial elements of the Project fall within the boundary of the South Humber Gateway Strategic Mitigation Delivery Plan (Ref 9-14). The ES will consider the plan and conclude whether the terrestrial land within the DCO site boundary is functionally linked to the Humber Estuary SPA/ Ramsar.

9.7 Consultation

9.7.1 Key consultees for this topic would include the Marine Management Organisation (MMO), Natural England and the Environment Agency. Further requirements for consultation would be identified as necessary during the subsequent assessment phase.

9.8 Summary

9.8.1 Potential effects during the construction and operation phase that are scoping in or out of assessment are summarised in **Table 9.3**.

Table 9.3 Summary of Scope for the Ornithology Assessment

Element	Phase	Scoped In	Scoped Out	Justification
Direct loss to intertidal feeding and roosting habitat as a result of the piles	Construction	✓	x	Piling would result in the small loss of intertidal habitat. This impact pathway has, therefore, been scoped into the assessment.
Direct changes to waterbird foraging habitat as a result of the capital dredge and dredge disposal	Construction	x	✓	The footprint of the capital dredge and dredge disposal sites do not overlap with the intertidal and would not cause any direct changes to intertidal feeding and roosting habitat. Capital dredging and dredge disposal at sea has the potential to cause impacts to seabed habitats which could cause changes to the prey resources

Element	Phase	Scoped In	Scoped Out	Justification
				available for seabirds and other diving birds. However, the seabed in the vicinity of the berth pockets and at the disposal sites are highly dynamic and subject to regular physical disturbance as a result of maintenance dredging and strong tidal currents. These areas are likely to provide a limited prey resource and are also not known to support large populations of diving birds/ seabirds. This impact pathway has, therefore, been scoped out of the assessment.
Indirect changes to intertidal foraging and roosting habitat as a result of the capital dredge and dredge disposal	Construction	x	✓	The capital dredge and disposal has the potential to result in changes to hydrodynamic and sedimentary processes (e.g. water levels, flow rates, changes to tidal prism, accretion and erosion patterns). However, the scale of the predicted changes on intertidal habitats are unlikely to be of a scale that would cause anything more than negligible changes to intertidal feeding and roosting habitat. This impact pathway has, therefore, been scoped out of the assessment.
Changes to seabed habitats and species as a result of sediment deposition during piling	Construction	x	✓	Piling has the potential to result in the localised resuspension of sediment as a result of seabed disturbance. The amount of sediment that settles out of suspension back onto the seabed as result of piling is expected to be negligible and benthic habitats and species are not expected to be sensitive to this level of change. This impact pathway has, therefore, been scoped out of the assessment for coastal waterbirds in terms of changes to supporting habitat and prey resources.
Indirect changes to seabed habitats and species as a result of changes to hydrodynamic and sedimentary processes due to the presence of the piles	Construction	x	✓	The pile structures have the potential to result in changes to hydrodynamic and sedimentary processes (e.g. flow rates, accretion and erosion patterns). However, such effects are anticipated to be negligible and highly localised (which would be confirmed by the physical processes assessment) and marine habitats and species are not expected to be sensitive to this level of change. This impact pathway has, therefore, been scoped out of the assessment for coastal waterbirds in terms

Element	Phase	Scoped In	Scoped Out	Justification
				of changes to supporting habitat and prey resources.
Direct loss of terrestrial habitats that are functionally linked to the Humber Estuary SPA/ Ramsar	Construction	✓	x	Large arable field within temporary construction area off Laporte Road may be suitable for high tide feeding, roosting and loafing waterbirds. No other terrestrial habitats within the DCO site boundary are suitable for coastal waterbirds.
Direct loss of breeding bird (non-SPA/ Ramsar) habitats	Construction	✓	x	This pathway may be scoped out following completion of breeding bird surveys, if no protected/ notable species or assemblages of species are recorded.
Airborne noise and visual disturbance to coastal waterbirds using intertidal and marine habitats within Humber Estuary SPA/ Ramsar	Construction Decommissioning	✓	x	During construction and decommissioning, there is the potential for airborne noise and visual disturbance to affect coastal waterbirds.
Airborne noise and visual disturbance to coastal waterbirds using functionally linked terrestrial habitats outside the boundary of the Humber Estuary SPA/ Ramsar	Construction Decommissioning	✓	x	During construction and decommissioning, there is the potential for airborne noise and visual disturbance to affect coastal waterbirds using functionally linked land.
Noise and visual disturbance during capital dredge disposal	Construction	x	✓	During dredge disposal, there is the potential for the dredging vessel to cause noise and visual disturbance. However, the area is subject to high levels of vessel movements as a result of the regular disposal of maintenance dredge arisings and shipping. These areas are also not known to support large populations of diving birds/ seabirds. In addition, any potential disturbance stimuli caused by the capital dredge disposal would be highly temporary and localised with any birds that might be temporarily flushed able to return to feeding following cessation of the capital dredge disposal activity. This impact pathway has, therefore, been scoped out of the assessment.

Element	Phase	Scoped In	Scoped Out	Justification
Direct changes to foraging and roosting habitat as a result of the physical presence of marine infrastructure	Operation	✓	x	Marine infrastructure associated with the Project (such as the raised jetty structure) could potentially cause direct damage or reduced functionality to waterbird feeding and roosting habitat. It should be noted that this pathway relates to potential changes to foraging and roosting habitat as a result of the physical presence of marine infrastructure rather than the direct loss of intertidal mudflat habitat due to the infrastructure (i.e. the piles) which would be assessed in the construction phase. It should also be noted that this pathway specifically relates to the structures themselves rather than human activity on the infrastructure which is assessed in the disturbance pathway below. However, it is acknowledged that such effects are likely to be interrelated to some extent.
Airborne noise and visual disturbance	Operation	✓	x	During operation, there is the potential for airborne noise and visual disturbance to affect coastal waterbirds. This impact pathway has, therefore, been scoped into the assessment.

9.9 References

Ref 9-1 Natural England. (2020). MAGIC Interactive Map.

Ref 9-2 Natural England. (2021a). Natural England Conservation Advice for Marine Protected Areas: Humber Estuary SAC.

Ref 9-3 Natural England. (2021b). Natural England Conservation Advice for Marine Protected Areas: Humber Estuary SPA.

Ref 9-4 Frost, T.M., Calbrade, N.A., Birtles, G.A., Hall, C., Robinson, A.E., Wotton, S.R., Balmer, D.E. and Austin, G.E. (2021). Waterbirds in the UK 2019/ 20: The Wetland Bird Survey. BTO/ RSPB/ JNCC. Thetford.

Ref 9-5 Woodward, I.D., Frost, T.M., Hammond, M.J., and Austin, G.E. (2019a). Wetland Bird Survey Alerts 2016/ 2017: Changes in numbers of wintering waterbirds in the Constituent Countries of the United Kingdom, Special Protection Areas (SPAs), Sites of Special Scientific Interest (SSSIs) and Areas of Special Scientific interest (ASSIs). BTO Research Report 721. BTO, Thetford.

Ref 9-6 Woodward, I.D., Calbrade, N.A and Austin G.E. (2018). Analysis of Wetland Bird Survey (WeBS) Data for The Humber Estuary SSSI, SAC, SPA and Ramsar site: Third appraisal – sector-level trends to winter 2016/ 17.

Ref 9-7 Institute of Environmental Management and Assessment. (2016). Environmental Impact Assessment Guide to: Delivering Quality Development.

Ref 9-8 Department for Transport. (2012). National Policy Statement for Ports.

Ref 9-9 Department for Environment, Food and Rural Affairs. (2014). East Inshore and East Offshore Marine Plans.

Ref 9-10 HMSO. (1994). Biodiversity - The UK Action Plan.

Ref 9-11 JNCC. (2012). UK Post-2010 Biodiversity Framework.

Ref 9-12 Department for Environment, Food and Rural Affairs. (2019). Marine strategy part one: UK updated assessment and Good Environmental Status.

Ref 9-13 Planning Inspectorate. (2017). Advice Note Ten: Habitat Regulations Assessment relevant to Nationally Significant Infrastructure Projects.

Ref 9-14 North East Lincolnshire Council (2020) South Humber Gateway Strategic Mitigation Delivery Plan.

10 Traffic and Transport

10.1 Introduction

10.1.1 This chapter sets out the proposed scope and methodology to assess the traffic and transportation impacts of the Project landside infrastructure elements. The chapter also details the datasets to be used to inform the assessment, provides an overview of baseline conditions, sets out the likely significant effects to be considered within the assessment, and discusses how these likely significant effects would be assessed for the purpose of the EIA.

10.1.2 Marine traffic impacts are considered in **Chapter 11 Marine Transport and Navigation**.

10.1.3 The objectives of this chapter are to:

a. Describe the baseline environment in relation to traffic and transport.

b. Outline the methods and assessment to be undertaken for inclusion within the ES.

c. Identify any potential effects on users of the local transport network that may arise as a result of the Project and any potential mitigation measures.

10.2 Baseline Environment and Study Area

Study Area

10.2.1 The Project would be located in the vicinity of the Port, which is owned and operated by ABP, in an area that has significant industrial presence.

10.2.2 The traffic and transport study area would include the anticipated routes serving the Project. As a minimum, it is anticipated that the following links would likely be used by construction and operational vehicles to access the Project:

a. A180.

b. A1173.

c. Queens Road.

d. Kings Road.

Current Baseline

10.2.3 This section describes the main data sources from which information would be obtained to inform the traffic and transportation baseline and subsequent assessment of environmental effects. The main data considered fundamental to the assessment of traffic and transport effects would be traffic flow data and personal injury accident data (PIA).

10.2.4 The PIA data would be obtained from the Highway Authority for the most recent five-year period. This would provide information on each collision, including severity as well as factors which attributed to the collision.

10.2.5 It is anticipated that Automated Traffic Counts (ATCs) and Manual Classified Counts (MCCs) would be required to obtain traffic flow data, which would be undertaken on the local highway network in the vicinity of the DCO site boundary. These would be commissioned using an external traffic survey company.

10.2.6 The Average Annual Weekday Traffic (AAWT) flows would be derived from the ATC data to enable the baseline traffic flows to be established at the required design years.

Future Baseline

10.2.7 The future baseline would be established by growthing the 2022 ATC data to all future scenarios (as agreed with the Highway Authority and in line with the proposed construction and operational periods) using appropriate factors (based on the local Middle Layer Super Output Area (MSOA)) using the industry standard software TEMPro. This would provide a robust estimate as to the future baseline traffic levels during the proposed phases of construction.

10.2.8 A consideration of any committed and cumulative developments within the area would also be taken into account.

10.3 Planned Surveys

10.3.1 ATCs would be undertaken during a neutral month in 2022 and would provide two-way traffic flows, classified by vehicle type, including HGVs. In line with transport analysis guidance (TAG) Unit M1.2 (Ref 10-1) neutral periods are defined as Monday to Thursday from March through to November (excluding August) and avoiding the weeks before/ after Easter. Surveys may be carried out outside these months if the conditions being surveyed are representative. The ATCs would be in place for one full week accounting for each individual day.

10.3.2 The locations and timings of the surveys would be agreed with the Highway Authority.

10.3.3 The ATC locations that have been selected, subject to Highway Authority agreement, would provide a basis for the analysis and incorporate local routes within the corridor close to potential sensitive receptors, and routes along local strategic links, to provide a robust baseline for assessment.

10.3.4 Alongside this, three MCCs would also be performed at the following locations:

a. Kings Road/ A1173 roundabout.

b. A1173/ Kiln Lane roundabout.

c. A1173/ A180 roundabout.

10.3.5 These locations would be surveyed for one day in the AM peak (0700-1000) and PM peak (1600-1900) and would provide fully classified turning counts to be used for modelling purposes.

10.3.6 The proposed ATC/ MCC locations are shown on the **Figure 10.1** in **Appendix A** (as shown by the blue circles). Due to the location of the Project no seasonal surveys would be undertaken.

10.4 Identification of Potential Effects

Construction

10.4.1 The Project would be constructed and become operational in incremental phases, as shown by **Table 2.1** in **Chapter 2 The Project**. Assessment scenarios would be agreed with the Highway Authority prior to undertaking the assessment.

10.4.2 During the construction phase there would be temporary increases in traffic flows on parts of the road network that would be used by construction vehicles to access the construction areas. The network of roads affected would be relatively local to the DCO site boundary centred around the A180, A1173, Kings Road and Queens Road. It is noted that the area currently is associated with heavy industrial use with a potentially high baseline of HGV traffic.

10.4.3 A key change from the baseline position is the number and percentage of HGVs using local roads due to construction activities. Traffic generation for each phase of the development would be provided so that it could be used for assessment purposes and inform the future baseline.

10.4.4 Other aspects of the construction phase could lead to a significant traffic effect, such as:

a. Significant severance to communities caused by a large increase in traffic for a longer period.

b. Increased risk of road traffic accidents caused by a large increase in traffic for a longer period.

c. Temporary road closures, diversions and widening.

d. Construction traffic using temporary bell mouths and site entrances for access to construction areas.

e. Temporary closures or diversions of Public Rights of Way (PRoW) and other public access routes.

10.4.5 Traffic associated with the different aspects of the Project and phases (split by vehicles/ HGVs) would be added to the network to form the proposed future year scenarios dependant on the construction/ operational phase up to 2035 with several intermittent year to account for the stages construction/ operation at the site. This information would be based on the information presented by the Applicant and then any further years would also be accounted for if required using the same methodology. This would then be used to form the basis for impact assessment.

Operation

10.4.6 At this stage the number of staff required to operate the facility is subject to confirmation. Information regarding vehicle numbers accessing the Project during the operation phase would become available during the assessment as such the Applicant would liaise with the Highway Authority to determine the assessment parameter requirements once this information is available. This would be subject to ongoing review. At this stage, given the overlap between the construction and

operational phases, it is likely this would be included as part of the assessment however as previously stated this would be confirmed once more detail is provided.

Decommissioning

10.4.7 The number of vehicle flows associated with the Project decommission phase of the landside infrastructure are uncertain. Therefore, given the unknowns associated with the operation of the highway network at the time of decommissioning, any assessment undertaken at this time would not be accurate. As such, it is not proposed to undertake any traffic assessment of this phase as the traffic impact is likely to be less than that of the construction period. This is discussed further in **Section 2.4** of **Chapter 2 The Project** of this EIA Scoping Report.

10.5 Design, Mitigation and Enhancement Measures

10.5.1 Given the potential for significant traffic and transport effects due to the Project, it is likely that mitigation would be required to reduce the potential impacts.

10.5.2 Mitigation by design (e.g. design of access and egress routes) and the use of travel planning and HGV management during the construction phase would be specified and detailed in an Outline Construction Traffic Management Plan (CTMP) which would be submitted with the DCO application.

10.5.3 The CTMP may indicate the need to require HGV movements to be restricted to periods of the day and the working week. At this stage it is envisaged that such periods could be restricted to 07:00-19:00 Monday to Friday and 08:00-13:00 Saturday, with no working on Sundays for landside. For marine-side working hours would be 07:00 – 19:00 Monday to Sunday and dredging would be 24hrs Monday to Sunday.

10.5.4 The potential need for minor highway improvements at sensitive locations to reduce the impact of the construction traffic would be investigated.

10.5.5 The assessment of routes from the A road network to the Project would determine the feasibility of routes and where mitigation works are required.

10.5.6 It is anticipated that all mitigation would be set out within any outline highway designs where required for route improvements between the A road network and the Project. Swept path analysis would be presented to support these designs. Temporary diversion or other mitigation measures for footpaths and cycle paths would be proposed where necessary. Mitigation for any HGV movements would be included within the CTMP which would seek to minimise impacts as far as is possible.

10.6 Assessment Methodology

10.6.1 The methodology for assessing the impact of development-generated traffic would be based on that outlined in the Institute of Environmental Assessment's (IEA, now known as IEMA) 'Guidelines for the Environmental Assessment of Road Traffic' (Ref 10-2).

10.6.2 The IEMA guidelines state that a link on the highway network should be included within the study if one of the following 'rules of thumb' is met:

a. Rule 1 - Traffic flows increase by more than 30% (or HGV flows increase by more than 30%); or

b. Rule 2 - Traffic flows in sensitive areas increase by more than 10%.

10.6.3 Alongside this, all routes that experience additional traffic would be reported as part of the impact assessment.

10.6.4 The IEMA guidelines recommend that several environmental effects may be considered important when considering traffic from an individual development. The assessment would consider the following:

a. Severance.

b. Pedestrian delay.

c. Pedestrian amenity.

d. Fear and Intimidation.

e. Accidents and safety.

10.6.5 The Highway Authority would be consulted with regard to the proposed traffic surveys, proposed construction routes, as well as other elements to be included by the assessment – this includes the assessment scenarios.

10.6.6 The type of traffic which is anticipated to be generated by the Project would be categorised as follows: primarily general traffic, large goods vehicles (LGVs), heavy goods vehicles (HGVs) and Abnormal Indivisible Loads (AILs). The vehicle routing and movement associated with the Project construction would be considered and would be discussed with the Highway Authority.

10.6.7 Once the proposed routing and volumes of the proposed construction traffic have been identified, it would be necessary to identify those receptors that may be impacted, due to the increase in vehicle movements. This would be undertaken by identifying the percentage increase in vehicular activity, along the identified construction routes following the collection of traffic data. The ATCs would be used to derive baseline AAWT for individual links, subdivided into 24 hour and 18 hour counts for total traffic and HGVs.

10.6.8 Typically, when assessing the impacts of traffic effects, there are a range of particular groups and locations which may be sensitive to changes in traffic conditions compliant with the 'rules of thumb' previously outlined. These are outlined in the IEMA guidance as 'Affected Parties' as follows:

a. People at home.

b. People in workplaces.

c. Sensitive groups including children, elderly and disabled.

d. Sensitive locations e.g. hospitals, churches, schools, historic buildings.

e. People walking.

f. People cycling.

g. Open spaces, recreational sites, shopping areas.

h. Sites of ecological/ nature conservation value.

i. Sites of tourist/ visitor attraction.

10.6.9 The IEMA guidance states that this list of affected parties is not exhaustive. One affected party that is not on the list but would be considered in the assessment is 'other road users'. All of the affected parties have one thing in common which is that their potential exposure to changes in traffic volumes comes about through their proximity to a construction traffic route.

10.6.10 It is important to note that the IEMA methodology does not consider the duration of effect, especially whether it is temporary (construction only) or permanent (operational traffic). As such, effects identified by this methodology as being significant, may not actually be significant if the effect is temporary or infrequent (occurring only occasionally during construction).

10.6.11 To calculate the trip distribution of construction workers travelling to and from the Project each day, a simple gravity model would be developed. Construction traffic associated with Project construction would be distributed onto the local highway network to calculate the resultant percentage increase on each link.

10.6.12 Assessments would be undertaken at the peak of construction, and this may cover more than one year as the peak year for traffic volumes can vary along various routes depending on which section of the Project they serve.

10.6.13 As detailed above, the assessment of operational phase traffic and transportation effects have been scoped in to the assessment. Information regarding vehicle numbers accessing the Project during the operational phase would become available during the assessment and as such, assessment parameters would be discussed with the Highway Authority once this information is available.

10.6.14 The IEMA guidance also outlines impact magnitude criteria as detailed in **Table 10.1**.

Table 10.1 Impact Magnitude Criteria (Traffic and Transport)

Magnitude	Description
High	Total loss or major alternation to key elements/ features of the baseline conditions such that post development character/ composition of baseline condition would be fundamentally changed.
Medium	Loss or alteration to one or more key elements/ features of the baseline conditions such that post development character/ composition of the baseline condition would be materially changed.
Low	Minor shift away from baseline conditions. Changes arising from the alteration would be detectable but not material; the underlying character/ composition of the baseline condition would be similar to the pre-development situation.
Negligible	Very little change from baseline conditions. Change is barely distinguishable, approximating to a "no change" situation.

10.6.15 Key factors influencing the magnitude of impacts include:

a. The physical or geographical scale of the impact - note that this is relative to the scale of the receptor or the resource affected.

b. The duration of the impact - would it be short term, lasting for a few days or weeks, or long term, lasting for several years.

c. The frequency of the impact - would it occur hourly, daily, monthly or would it be permanent lasting for the duration of the development.

d. The reversibility of the effect - can it be reversed following completion of construction of the development.

10.6.16 IEMA guidance further sets out guidance in relation to the magnitude of change based on HGV construction traffic, pedestrians/ cyclists, severance and road safety. **Table 10.2** outlines the impact thresholds that would be used to inform the assessment.

Table 10.2 Magnitude of Change (Traffic and Transport)

Magnitude	Description	Illustrative Criteria
High	HGV Construction Traffic	High number of construction vehicles using roads over a protracted period of time. More than a 40% increase for more than 6 months.
	Pedestrians/ Cyclists	Limited or no facilities for pedestrians and cyclists with limited crossing facilities and low-quality linkages to the local facilities.
	Severance	Increase in total traffic flows of 90% and above (or increase in HGV flows over 10% based on the sensitivity of the receptors).
	Road Safety	High increase in traffic at known collision locations.
Medium	HGV Construction Traffic	Moderate number of construction vehicles using roads over a protracted time period. 16-39% increase for more than 6 months; or More than 40% increase for 3-6 months.
	Pedestrians/ Cyclists	Few facilities for pedestrians and cyclists with limited crossing facilities and linkages to the local facilities.
	Severance	Increase in total traffic flows of 60-89% (or increase in HGV flows over 10% based on the sensitivity of the receptors).
	Road Safety	Moderate increase in traffic at known collision locations.
Low	HGV Construction Traffic	Small number of construction vehicles using roads over a short period of time. 6-15% increase for more than 6 months;

Magnitude	Description	Illustrative Criteria
		31-39% for 3-6 months; or >40% increase for less than 3 months.
	Pedestrians/ Cyclists	Facilities for pedestrians and cyclists with safe and convenient crossing facilities and good linkages to the local facilities.
	Severance	Increase in total traffic flows of 30-59% (or increase in HGV flows of over 10% based on the sensitivity of the receptors).
	Road Safety	Minor increase in traffic at known collision locations.
Negligible	HGV Construction Traffic	Occasional construction vehicles using roads over a short period of time. 5% or less increase for more than 6 months; or Between 6-30% increase for 3- 6 months; or Between 31-40% for less than 3 months.
	Pedestrians/ Cyclists	Dedicated facilities for pedestrians and cyclists with safe and convenient crossing facilities and good linkages to the local facilities.
	Severance	Increase in total traffic flows of 29% or under (or increase in HGV flows under 10%).
	Road Safety	Negligible increase in traffic at known collision locations.

Significance of Effect

10.6.17 Having established the magnitude of change and the sensitivity of the receptor, the significance of the effect can then be assessed using the matrix as shown in **Table 10.3**.

Table 10.3 Significance of Effects Matrix (Traffic and Transport)

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

10.6.18 Moderate and major levels of significance are considered to be significant in EIA terms, whilst negligible or minor impacts are not considered to be significant. This significance of effect would be applied to all relevant links within the study area and would be used to form the basis of the final impact assessment for each assessed scenario.

Relevant Legislation, Policy and Technical Guidance

10.6.19 The potential effects of the Project on traffic and transport would reference relevant policy, legislation, and guidance, as appropriate, including:

a. IEMA's Guidelines for the Environmental Assessment of Road Traffic (Ref 10-2).

b. National Planning Policy Framework (NPPF) – 2021.

10.7 Consultation

10.7.1 North East Lincolnshire Highway Authority would be the main consultee in relation to the traffic and transport assessment, alongside National Highways as related to the potential impacts on the A180.

10.8 Summary

10.8.1 This chapter of the EIA Scoping Report relates to the traffic and transport elements of the Project. It has outlined the assessment methodology, survey requirements and discussed potential mitigation measures proposed to reduce the impact of the Project during the construction period.

10.8.2 It is anticipated that the proposed construction phases alongside the operational phases would be assessed within the ES, with no assessment of decommissioning aspect of the Project being required, although this would be subject to ongoing review.

Table 10.4 Summary of Scope for the Traffic and Transport Assessment

Element	Phase	Scoped In	Scoped Out	Justification
Construction	Various	✓	x	Likely impact during construction requires to be quantified across all assessment years.
Operation	Various	✓	x	Given the overlap between the construction and operational phases the cumulative

Element	Phase	Scoped In	Scoped Out	Justification
				impact requires to be quantified.
Decommissioning	Closing	x	✓	Number of vehicles and future baseline cannot be predicted at this time.

10.9 References

Ref 10-1 Department for Transport (2020) TAG Unit M1.2 Data Sources and Surveys, London: Department for Transport.

Ref 10-2 Institute of Environmental Management and Assessment (IEMA) (1993) Guidelines for the Environmental Assessment of Road Traffic.

11 Marine Transport and Navigation

11.1 Introduction

11.1.1 This section sets out the proposed scope and methodology of the marine transport and navigation assessment of the Project. The chapter also details the datasets to be used to inform the assessment, provides an overview of baseline conditions, the likely significant effects to be considered within the assessment, and discusses how these likely significant effects would be assessed for the purpose of the EIA.

11.2 Baseline Environment and Study Area

Data Sources

11.2.1 A desk-based study would be undertaken to inform the baseline characterisation on which the assessment would be based. This would include consideration of the following key data sources:

a. Accident and Incident data from ABP as the Statutory Harbour Authority, the Marine Accident Investigation Branch (MAIB) and the Royal National Lifeboat Institution (RNLI).

b. Vessel Simulation Study and Swept Path Analysis.

c. Weather and environmental based ephemeral and almanac data.

d. Automatic Identification System (AIS) data from a range of sources including the Marine Management Organisation (MMO) up to the year 2019 and third party data supplies for the years 2020 and 2021.

e. Vessel movement statistics from ABP's Port Management Information system.

f. Navigational features and charted information from United Kingdom Hydrographic Office (UKHO) Admiralty Charts.

Study Area

11.2.2 The study area is the area over which potential direct and indirect effects of the Project may occur during construction and operation. The location of the Project is shown on **Figure 11.1** in **Appendix A**.

11.2.3 The study area for the marine transport and navigation topic is considered to be the area comprising the Humber Estuary bounded on the west the Humber Bridge and at the east by the Statutory Harbour Authority (SHA) area. This study area has been selected to encompass the marine works associated with the Project, the main route to and from the Project location, and to also consider the total utilisation of the Humber Estuary to determine the implications on vessel traffic management. The size of study area is required as the Project would establish new vessel services for the area which means that there are potentially significant effects on other vessel traffic transiting the main navigation channel.

11.2.4 As part of the exercise leading to the finalisation of the marine transport and navigation ES chapter, a further desk-based analysis and assessment would be undertaken to refine the study area for the purposes of the assessment.

Current Baseline

Commercial Navigation

11.2.5 The Humber Estuary is one of the busiest waterways in the UK. The Estuary handles around 40 thousand commercial shipping movements a year, bound for 27 principal dock, jetty, and river locations (including anchorages). The major Humber Ports of Hull, Goole, Grimsby and Immingham (combined) account for the majority of cargo handled on the River Humber, namely 9.2 million tonnes, 1.0 million tonnes and 45.6 million tonnes of cargo respectively in 2017 (Ref 11-5).

11.2.6 Beyond the Estuary there is a north-south coastal route used mainly by commercial vessels on passage to/ from ports in this area. The vessels using this route normally transit at depths greater than 15m Chart Datum (CD) to avoid the approach channels to the Humber Estuary. Vessels approaching the Humber Estuary are regulated by an International Maritime Organisation (IMO) adopted traffic separation scheme to deconflict vessels that are approaching and leaving the estuary. This scheme incorporates three defined channels forming an intersection area prior to the main estuary approach channel. The three defined channels are termed New Sand Hole, Sea Reach and Rosse Reach. The Humber Estuary is accessed via one main channel approach which passes close to Spurn Head.

11.2.7 Once vessels have entered the Humber Estuary, two principal routes are available. Ships with a deep draught proceed towards Immingham or Hull transit through the Sunk Dredged Channel which is marked by buoyage. Ships with lesser draughts have the option of using the centre of the estuary between the anchorage areas of Hawke, Haile and Bull along the Bull Channel. Within the Humber Estuary the vast majority is open water, with spring tide stream flows up to 5.0 knots.

11.2.8 To regulate the flow of shipping into the Humber Estuary, the transit of large vessels is managed through the use of the ‘Humber Passage Plan’. This applies to any vessel of over 40,000 tonnes deadweight, whether laden, part laden or light, or any vessel with a draught of 11m or more and gas carriers of over 20,000m^3 capacity. The plan has been prepared by ABP to facilitate the safe movement of large vessels on the Humber.

Recreational Navigation

11.2.9 The Humber Estuary has approximately 1,000 permanent berths for recreational craft, which are used predominantly on a weekend during summer months. There are also around 120 visitor’s berths which represents an increase in activity in the estuary. The final category is that of those who launch from public slipways around the estuary which include smaller sailing vessels, owners of personal watercraft and small un-powered watercraft.

11.2.10 Established recreational vessel destinations in the Humber Estuary includes: Hull Marina which has accommodation for 310 boats and 20 visitors; Goole Boathouse which offers 140 moorings and South Ferriby marina which provides accommodation for 100 boats plus 20 visiting vessels. In addition, there are various creeks around the estuary providing further capacity, namely Tetney Haven (Humber Mouth Yacht Club) where small numbers of moorings are available, Stone Creek (located on the north side of the river opposite Immingham), Hessle Haven and Barrow Haven, which both provide anchorages. The yacht havens of Brough and Winteringham (Humber Yawl Club) also provide limited mooring for small vessels and visiting yachts and motor cruisers.

11.2.11 There are no recreational sailing clubs operating at the Port of Immingham. The closest clubs are at Grimsby, namely the Grimsby and Cleethorpes Yacht Club who use Royal and Alexandra Docks and have 51 berths for permanent boats and the Cruising Association who use Grimsby Fish Dock with 150 berths for permanent boats and 25 visiting craft berths. In addition, there are 65 berths in Alexandra Dock South Marina. There is a slipway on Cleethorpes Sea front used for the launching of personal power craft, small un-powered watercraft and day sailing craft.

Statutory Authorities

11.2.12 ABP is the Statutory Harbour Authority (SHA) for the Port of Immingham and for the wider Humber Estuary. In this capacity, ABP has a set of duties, powers and responsibilities which includes the management and regulation of the safety of navigation and marine operations in the SHA areas.

11.2.13 ABP is also the Competent Harbour Authority (CHA) with respect to pilotage for the Port of Immingham and the Humber Estuary. ABP, as the CHA, issues Pilotage Directions that prescribe which vessels require a Pilot when navigating within the CHA area. Pilotage is provided and managed by Humber Estuary Services (HES) on behalf of all of the Humber Ports. A Pilotage Exemption Certificate (PEC) process is also operated for deck officers meeting the necessary standard.

11.2.14 A Vessel Traffic Service (VTS) within the meaning of MGN 401 (Ref 11-2) is provided for the Humber Estuary. Humber VTS maintains a vessel traffic picture through the Automatic Identification System (AIS) and Radar providing information on weather, vessel movements and marine safety to vessels navigating in the VTS area. All sea-going vessels are required to report to Humber VTS when entering the VTS area and at designated reporting points identified on navigational charts.

11.2.15 ABP is the Local Lighthouse Authority (LLA) by virtue of the Merchant Shipping Act 1995. As LLA, ABP is responsible for the provision and maintenance of Aids to Navigation (AtoN). ABP is required to report any defects to AtoN and consult on any proposed changes, additions or removal of AtoN with Trinity House Lighthouse Authority as the General Lighthouse Authority for England and Wales.

11.2.16 Both the Port of Immingham and HES have committed to meeting the requirements of the Port Marine Safety Code (PMSC). The PMSC requires that ports operate an effective Marine Safety Management System (MSMS) which is

based on comprehensive and continuously updated set of risk assessments. The MSMS details how the ports fulfil their duties as SHAs and meet the marine safety requirements prescribed by the PMSC.

11.3 Planned Surveys

11.3.1 There are no planned surveys to inform the marine transport and navigation assessments for the Project as sufficient baseline data is already available (see **Paragraph 11.2.1**). The outputs of the hydrodynamic surveys that would be undertaken to inform the physical processes assessment (refer to **Chapter 15 Physical Processes**) would be used to inform vessel simulation studies for the Project.

11.4 Identification of Potential Effects

11.4.1 The Project has the potential to affect commercial and recreational navigation during both construction and operational phases. The marine transport and navigation ES chapter would set out the assessment of the likely effects created by the Project.

11.4.2 Potential cumulative effects on marine transport and navigation could also arise as a result of other coastal and marine developments in the area, as well as ongoing activities, including maintenance dredging and disposal activities. These would be considered as part of the cumulative and in-combination assessment to be presented within the ES.

11.4.3 The sections below consider the potential marine transport and navigation impact pathways during Project construction and operation, and whether defined potential significant effects may result.

Construction

Scoped In

11.4.4 The potential marine transport and navigation impact pathways during Project construction are as follows:

a. Contact of works craft with Port infrastructure: manoeuvring of craft in close proximity to marine structures has the potential for contact with infrastructure during Project construction.

b. Collision due to displacement of Humber Estuary main channel shipping and/ or increase in vessel density as a result of channel restrictions during the construction of the Project.

c. Collision of passing vessels with works craft: as passing vessels (commercial, recreational or fishing) are manoeuvring around or in close proximity to the works there is the potential for collision with craft associated with the Project.

d. Collision of ships/ tugs whilst berthing large vessel on the adjacent Immingham Oil Terminal with works craft: as ships/ tugs, manoeuvring to berth or in close proximity to the works there is the potential for collision with craft associated with the Project.

e. Collision during navigation: vessel collision (commercial or recreational or fishing) with works craft whilst transiting to/ from the jetty or during activities within the disposal site (if required).

f. Collision during towage operations: if materials for the Project are transported to the jetty through the use of barges, there is potential for collision with commercial or recreational vessels in the area.

g. Payload related incidents: if lifting operations are required from barges/ vessels associated with the Project, there is potential for incidents to arise from dropped items or affected vessel stability.

11.4.5 A separate Navigational Risk Assessment (NRA) would be required for the Project. As part of the NRA process, a hazard identification workshop would be held to identify the potential impacts associated with the Project. Each of these impacts would be assessed and those which are significant would be taken through to inform the marine transport and navigation chapter of the ES. At this stage no impact pathways are proposed to be scoped out.

Operation

Scoped In

11.4.6 The following potential marine transport and navigation impact pathways have been identified as part of the Project's operation:

a. Collision due to increased commercial vessel movements: vessels transiting within the Project area in collision with other Port traffic (commercial, dredging, recreational or fishing).

b. Collision due to increased maintenance dredging movements (if required): dredging vessels on transit to/ from the dredge pocket or during dispersal operations in collision with other marine traffic (commercial, recreational or fishing).

c. Collision with passing traffic: vessels manoeuvring at the berth in collision with passing traffic (commercial, recreational or fishing).

d. Allision with the Project: manoeuvring vessel, dredging vessel or tug in contact with the jetty as a result of collision avoidance, adverse weather, nature of the operation or interaction with a passing vessel.

e. Mooring breakout with vessel alongside: There is potential for a vessel to break its moorings and leave the berth due to stress of weather, passing vessel or mooring equipment failure.

11.4.7 A separate NRA would be required for the Project. As part of the NRA process, a hazard identification workshop would be held to identify the potential impacts associated with the Project. Each of these impacts would be assessed and those which are significant would be taken through to inform the marine transport and navigation chapter of the ES. At this stage, therefore, no impact pathways are proposed to be scoped out.

11.4.8 The Project's implications for the storage and utilisation of hazardous substances as assessed under the COMAH regulations would be addressed in the major

accidents and disasters ES chapter. Similarly, the socio-economic implications of the project on other port users would be assessed within the socio-economics ES chapter.

Decommissioning

11.4.9 The DCO would not make any provision for the decommissioning of the marine infrastructure or plant or equipment on the jetty topside. This is because the development would, once constructed, become part of the fabric of the Immingham port estate and would, in simple terms, continue to be maintained so that it can be used for port related activities to meet a long-term need. This is discussed further in **Section 2.4** of **Chapter 2 The Project** of this EIA Scoping Report.

11.5 Design, Mitigation and Enhancement Measures

11.5.1 Within the PMSC, 'as low as reasonably practicable' (ALARP) is an industry wide concept applying to both health and safety and port marine safety. The core concept is that of 'reasonably practicable' which involves weighing up risk against the effort, time and money needed to control it. The PMSC specifically references ALARP in respect of the MSMS and NRAs.

11.5.2 From the NRA process, a set of mitigation measures or mitigation controls would be identified, which would be implemented either directly into the Project design, or via management practices. The overall objective is to maintain risk levels within a limit that is deemed ALARP (Ref 11-3). By virtue of the marine environment, these controls would be embedded within the background navigational environment, and include:

a. Harbour Authority MSMS, which includes plans and processes to manage marine emergencies.

b. Vessel traffic management and the reactive response to marine emergencies (following notification by the contractor/ operator). The Harbour Authority would respond to a marine emergency with a range of resources including personnel, vessels, equipment and expert marine opinion. This does not, however, remove any responsibility from the contractor/ operator in ensuring the safety of its own marine operations.

c. Professional/ trained mariners application of:

   i IMO conventions of Safety of Life at Sea.

   ii International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).

   iii Convention on the International Regulations for Preventing Collisions at Sea (COLREGS), 1972.

   iv Ensuring compliance with The International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) guidance on Aids to Navigation (AtoN).

11.6 Assessment Methodology

11.6.1 The data sources which would be used to gather the baseline information for the NRA and to inform the ES are noted in the data sources section above.

11.6.2 In order to assess the potential impacts of the Project upon commercial shipping and recreational navigation, relative to the baseline, a combination of analytical methods and expert judgement would be used. This would include qualitative assessments of data along with consideration of the existing evidence base and empirical evaluation.

11.6.3 An NRA would be required to support the DCO application for the Project. The NRA outputs would inform the marine transport and navigation ES chapter and the NRA would be provided as an appendix to the ES. To provide local stakeholder input, a hazard identification workshop would be arranged which would bring together relevant navigational stakeholders for the area to discuss the potential impacts on navigational safety associated with the Project.

11.6.4 Following the risk assessment process and full consideration of navigation hazards brought about by the Project, the need to have further controls would be decided upon. Decisions relating to further controls would be finalised by an appropriate authority (the ABP Duty Holder) to determine whether an ALARP state has been met for each risk. This would determine whether the Project 's residual impacts have been reduced to an ALARP state in the context of a cost-benefit analysis as defined and applied within the guidance in the PMSC.

11.6.5 The outputs of the NRA will be used to inform a judgement on significance of effects arising from the Project, which would be reported in the respective ES chapter.

Relevant Legislation, Policy and Technical Guidance

11.6.6 Potential effects of the Project on commercial and recreational navigation would be considered in the topic-specific ES chapter, which would cross-reference, as appropriate, relevant policy, legislation and guidance, including:

a. NPSfP (Ref 11-4).

b. UK Marine Policy Statement (Ref 11-5) as required by Section 44 of the Marine and Coastal Access Act 2009.

c. East Inshore and East Offshore Marine Plans (Ref 11-6).

d. Department for Transport (DfT) Port Marine Safety Code (Ref 11-3).

e. The Port Marine Safety Code’s (PMSC) Guide to Good Practice (Ref 11-7).

11.7 Consultation

11.7.1 A hazard identification workshop would be arranged to bring together relevant navigational stakeholders for the area to discuss the potential impacts on navigational safety associated with the Project.

11.8 Summary

11.8.1 A summary of the scope of the proposed scope of the marine transport and navigation assessment is provided in **Table 11.1**. This illustrates that at present no marine transport and navigation aspects have been scoped out of the assessment prior to the NRA.

Table 11.1 Summary of Scope for the Marine Transport and Navigation Assessment

Element	Phase	Scoped In	Scoped Out	Justification
Contact of works craft with Port infrastructure	Construction	✓	x	No pathways can be scoped out prior to completion of the respective NRA.
Collision due to displacement and/ or increase in vessels	Construction	✓	x	No pathways can be scoped out prior to completion of the respective NRA.
Collision of passing vessels with works craft	Construction	✓	x	No pathways can be scoped out prior to completion of the respective NRA.
Collision of ships/ tugs whilst berthing large vessel on the adjacent Immingham Oil Terminal with works craft	Construction	✓	x	No pathways can be scoped out prior to completion of the respective NRA.
Collision during navigation with works craft whilst transiting to/ from the Jetty or during activities within the disposal site (if required)	Construction	✓	x	No pathways can be scoped out prior to completion of the respective NRA.
Collision during towage operations	Construction	✓	x	No pathways can be scoped out prior to completion of the respective NRA.
Payload related incidents	Construction	✓	x	No pathways can be scoped out prior to completion of the respective NRA.
Collision due to increased commercial vessel movements	Operation	✓	x	No pathways can be scoped out prior to completion of the respective NRA.
Collision due to increased maintenance dredging movements (if required)	Operation	✓	x	No pathways can be scoped out prior to completion of the respective NRA.
Collision of vessels manoeuvring at the	Operation	✓	x	No pathways can be scoped out prior to completion of the respective NRA.

Element	Phase	Scoped In	Scoped Out	Justification
berth with passing traffic				
Vessel contact with the quay	Operation	✓	x	No pathways can be scoped out prior to completion of the respective NRA.
Mooring breakout with vessel alongside	Operation	✓	x	No pathways can be scoped out prior to completion of the respective NRA.

11.9 References

Ref 11-1 Department for Transport. (2021a). Port freight annual statistics: 2020. DfT, July 2021.

Ref 11-2 Maritime and Coastguard Agency. (2022). MGN 401 (M+F) Amendment 3 Navigation: Vessel Traffic Services (VTS) and Local Port Services (LPS) in the UK. [Online] Available at: https:// www.gov.uk/ government/ publications/ mgn-401-mf-amendment-3-navigation-vessel-traffic-services-vts-and-local-port-services-lps-in-the-uk

Ref 11-3 DfT (2016) Department for Transport (DfT) Port Marine Safety Code.

Ref 11-4 Department for Transport. (2012). National Policy Statement for Ports. [Online] Available at: https:// www.gov.uk/ government/ publications/ national-policy-statement-for-ports

Ref 11-5 HM Government (2011) UK Marine Policy Statement.

Ref 11-6 Defra (2014) East Inshore and East Offshore Marine Plans.

Ref 11-7 DfT (2018) The Port Marine Safety Code's (PMSC) Guide to Good Practice.

12 Landscape and Visual Impact

12.1 Introduction

12.1.1 This section sets out the proposed scope and methodology of the landscape/ seascape and visual impact assessment of the Project. The chapter also details the datasets to be used to inform the assessment, provides an overview of baseline conditions, sets out the likely significant effects to be considered within the assessment, and discusses how these likely significant effects would be assessed for the purpose of the EIA.

12.2 Baseline Environment and Study Area

Study Area

12.2.1 The study area is the area over which potential direct and indirect effects of the Project may occur during construction and operation.

12.2.2 A study area of 2.5km from the outer extent of the Project has been identified for the initial landscape/ seascape and visual impact review.

12.2.3 The extent of the study area has been informed by an understanding of the likely maximum parameters of the Project and consideration of the existing land use and context. The study area would be subject to ongoing review and would be confirmed in the ES.

Current Baseline

12.2.4 An initial desk-based study has been undertaken to gain an understanding of the landscape/ seascape and visual baseline. Key data sources have included:

a. Ordnance Survey mapping and aerial photography.

b. National Character Area profiles (Ref 12-1).

c. Regional and local landscape character assessments, including:

   i North Lincolnshire Landscape Character Assessment, Sensitivity and Capacity Study (Ref 12-2).

   ii North East Lincolnshire Landscape Character Assessment (Ref 12-3).

   iii Seascape Character Area Assessment East Inshore and East Offshore Marine Plan Areas (Ref 12-4).

12.2.5 The existing landscape/ seascape and visual baseline is heavily influenced by the existing industrial presence located around the deep-water-port. This includes several deep water jetties for bulk cargo and terminals for oil and gas. The area is dominated by industrial works, particularly installations relating to the petrochemical industry such as Lindsey Oil Refinery.

12.2.6 The Project is located within an area characterised as an industrial landscape type. The generally flat topography and relatively open nature of the landscape further emphasises the influence of Project on the character and views.

12.2.7 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 DCO site boundary and immediate context are of an industrial seascape character, heavily influenced by the existing large scale port and movement of large ships.

12.2.8 Visual receptors are relatively limited, with the main concentration being residents in the nearby settlement of Immingham. Existing views from most locations include the structures and infrastructure associated with the working port and other adjacent industrial development.

12.2.9 The potential impact on existing trees and woodland would form part of the assessment. TPO information, a review of aerial photography, site visits, and an arboricultural survey (including recommended protection measures) would enable definition of baseline conditions.

Future Baseline

12.2.10 The DCO site forms a part of the operational Port and has been in active use since its construction in 1912 for port purposes for a number of decades. The Port was utilised during the First and Second World Wars and then expanded for industrial purposes, namely oil and gas industries, in 1969 (refer to **Chapter 13 Historic Environment (Terrestrial)**). The current use of part of the DCO site is for bulk cargo, steel sections, lorry and automotive storage. In the absence of the Project, those parts of the DCO site would continue to be utilised for port activity. As such, the future landscape/ seascape and visual baseline is anticipated to be similar the existing baseline as described above.

12.3 Planned Surveys

12.3.1 An initial site visit would be undertaken, together with a review of the full landscape/ seascape and visual planning policy context relevant to the DCO site. Technical details regarding the maximum potential height of the tallest elements and massing of the proposed built structures of the Project would then enable the definition of the study area within which landscape/ seascape or visual impacts have the potential to be significant. Variations of these factors could impact the size of the study area and adjustments could be made accordingly.

12.4 Identification of Potential Effects

12.4.1 The following potential impacts may be associated with the Project:

a. Temporary changes to landscape and seascape character and views from sensitive receptors in the vicinity of the Project during construction and decommissioning.

b. Permanent changes to landscape and seascape character and views from sensitive receptors in the vicinity of the Project during operation.

12.4.2 Given the existing industrial character of the DCO site and the immediate surrounding area, it is considered that landscape and seascape effects during the Project operational phase would be insignificant. It is thus proposed to scope the landscape/ seascape assessment out for the operational stage of the Project.

12.5 Design, Mitigation and Enhancement Measures

12.5.1 Design measures to reduce the landscape and visual impacts of the Project would be considered (such as the development dimensions and layout, lighting design etc.). In addition, good practice construction methodologies would be adhered to in accordance with the CEMP which would assist in managing potential impacts during Project construction. Such measures would be detailed in the ES.

12.5.2 Where the assessment indicates the need for mitigation as a result of significant effects on landscape and seascape character or visual amenity, these would also be outlined within the ES.

12.6 Assessment Methodology

12.6.1 The proposed method of landscape / seascape and visual impact assessment has been devised to address the specific impacts likely to result from the Project. The methodology draws upon the following established best practice guidance:

a. 'Guidelines for Landscape and Visual Impact Assessment' (GLVIA3) (Ref 12-5).

b. 'An approach to Seascape Character Assessment' (Natural England) (Ref 12-11).

c. 'Technical Guidance Note (TGN) 06/ 2019: Visual Representation of Development Proposals' (Ref 12-6).

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

a. Landscape / seascape impacts relate to the degree of change to physical characteristics or components of the landscape / seascape, which together form the character of that area e.g. landform, vegetation, buildings and coastal features.

b. Visual impacts relate to the degree of change to an individual receptor's view of that landscape / seascape e.g. local residents, users of public footpaths or motorists passing through the area.

12.6.3 The assessment of impacts on built heritage, including impacts on the setting of listed buildings and structures, would be addressed by the cultural heritage assessment (see **Chapter 13 Historic Environment (Terrestrial)**).

12.6.4 A detailed study of the existing landscape and seascape components, character and views of the DCO site and the identified study area would be carried out in consideration of the following:

a. Site context (including industrial heritage).

b. Topography.

c. Vegetation including green infrastructure.

d. Roads, public rights of way and access.

e. Settlement and land-use.

f. Landscape and seascape character.

g. Representative views.

12.6.5 This would be supported by figures and photographs as appropriate. The planning context with respect to landscape / seascape character and visual amenity would also be assessed, taking into account relevant European, national, regional and local planning policies. The baseline study would form the basis of the assessment of the predicted impacts of the Project.

12.6.6 Up to ten representative views would be identified within the Zone of Theoretical Visibility (ZTV) for the Project. The ZTV would be refined 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:

a. Receptor function/ activity.

b. Distance from the DCO site boundary.

c. Topography and elevation.

d. Degree and period of exposure.

e. Designation of the viewing place.

f. Distribution of receptors.

12.6.7 Visual representations of the Project for agreed representative views (visual receptors) would be produced in line with the guidance within the Landscape Institute Advice Note 06/ 2019 (Ref 12-6).

Relevant Legislation, Policy and Technical Guidance

12.6.8 The following policy, legislation and guidance is considered to be relevant when assessing the potential effects of the Project with respect to landscape/ seascape and visual impacts:

a. The NPSfP (Ref 12-7).

b. The NPPF (Ref 12-8).

c. The National Planning Practice Guidance: Sections on Design and the Natural Environment (Ref 12-9).

d. North East Lincolnshire Local Plan (Ref 12-10) (2018), Policy 22: Good Design in New Developments, and Policy 42: Landscape.

12.7 Consultation

12.7.1 The location of representative views and photomontages would be agreed in consultation with NELC and other key stakeholders.

12.8 Summary

12.8.1 A landscape / seascape and visual impact assessment would be undertaken due to the potential for adverse impacts on landscape / seascape and visual amenity due to the Project. The assessment would consider both landscape / seascape

and visual amenity during the construction stage, and visual amenity during the Project operational phase. However, it is proposed to scope the landscape / seascape assessment out for the operation stage of the Project given the existing industrial character of the area forming the DCO site and the immediate surrounding area. A summary of scope of the landscape / seascape and visual impact assessment is provided in **Table 12.1**.

Table 12.1 Summary of Scope for the Landscape and Visual Impact Assessment

Element	Phase	Scoped In	Scoped Out	Justification
Landscape/ seascape	Construction	✓	x	Potential for adverse impacts on landscape character.
Landscape/ seascape	Operation	x	✓	No potential for adverse impacts on landscape character as a result of the existing industrial nature of the area.
Visual amenity	Construction	✓	x	Potential for adverse impacts on visual amenity.
Visual amenity	Operation	✓	x	Potential for adverse impacts on visual amenity.

12.9 References

Ref 12-1 Natural England (2013). National Character Area profiles.

Ref 12-2 North Lincolnshire Council (1999). North Lincolnshire Landscape Character Assessment, Sensitivity and Capacity Study.

Ref 12-3 North East Lincolnshire Council (2015). North East Lincolnshire Landscape Character Assessment.

Ref 12-4 MMO (2012). East Inshore and East Offshore Marine Plan Areas.

Ref 12-5 IEMA (2013) 'Guidelines for Landscape and Visual Impact Assessment' (GLVIA3).

Ref 12-6 Landscape Institute (2019). 'Technical Guidance Note (TGN) 06/ 2019: Visual Representation of Development Proposals'.

Ref 12-7 DfT (2012) The NPSfP.

Ref 12-8 MHCLG (2021) The National Planning Policy Framework.

Ref 12-9 MHCLG (2019) The National Planning Practice Guidance: Design and the Natural Environment.

Ref 12-10 North East Lincolnshire Local Plan (2018), Policy 22: Good design in new developments, and Policy 42: Landscape.

13 Historic Environment (Terrestrial)

13.1 Introduction

13.1.1 This section describes scope and methodology of the historic environment (terrestrial) assessment for the Project. The chapter also details the datasets to be used to inform the assessment, provides an overview of baseline conditions, sets out the likely significant effects to be considered within the assessment, and discusses how these likely significant effects would be assessed for the purpose of the EIA.

13.1.2 The historic environment comprises above and below-ground archaeological assets, buildings or structures of historic interest, historic landscape features, and any other elements that are of cultural heritage interest. This chapter is supported by **Figure 13.1** included in **Appendix A**. The historic environment (marine) is considered in **Chapter 14 Historic Environment (Marine)**.

13.2 Baseline Environment and Study Area

Study Area

13.2.1 The study area comprises the area within which cultural heritage assets may experience effects as a result of the Project during construction and/ or operation. Effects to heritage assets may arise as a result of physical impacts to their fabric or through changes to their setting.

13.2.2 For the purpose of this EIA Scoping Report, a study area of 1.6km from an approximate centre of the DCO site boundary has been used to capture information relating to archaeology and cultural heritage. For designated heritage assets, a slightly larger 2km study area has been used. The study area provides the necessary context for establishing the likely impacts arising from the Project and the potential effects to cultural heritage assets. The study area would be subject to ongoing review and would be confirmed in the ES.

Current Baseline

13.2.3 There are no World Heritage Sites, scheduled monuments, Grade I or II* listed buildings, conservation areas, registered parks and gardens, registered battlefields or protected wreck sites within the 2km study area for designated heritage assets.

13.2.4 There is one Grade II listed building located within the study area, namely the Immingham War Memorial [NHLE1455139] which is located at the junction with Humberville Road. The asset is located at a sufficient distance from the Project site within the urban area of Immingham town centre, that the Project is not considered to form any aspect of its setting, nor does it contribute to the ability to interpret its significance. There is no potential for visual intrusion from the Project, due to the density of urban development surrounding the asset. Therefore, the Project would not affect the asset's significance or heritage interest.

13.2.5 NELC maintains local lists of historic assets of special interest (the Historic Environment Record (HER)). The draft local list for Immingham and the Villages

includes a Roman settlement [MNL4490] and Immingham Police Station [MNL4726] located approximately 1.57km to the north-west of the DCO site boundary on Humberville Road. As for the Immingham War Memorial, these assets would not be impacted by the Project due to the density of urban development surrounding them.

13.2.6 Two non-designated rows of terraced housing (ACM1) on the Queens Road, of limited historic and architectural interest, have the potential to be impacted by the Project through changes to their setting.

13.2.7 The earliest evidence of prehistoric date is a pair of ditches [MNL4182]. These were found to contain flintwork of Neolithic (4,000 – 2,500 BC) or Bronze Age (2500 BC – 700 BC) origin and may have been dug to flank a trackway. This suggests prehistoric occupation in the area.

13.2.8 A high-status Roman settlement and industrial site (AD43 to 410) has been recorded at Stallingborough Interchange [MNL4490, MNL4763]. Undated cropmarks of rectangular ditched enclosures [MNL4607] could form part of the Roman landscape.

13.2.9 There are no assets of early medieval date (410 to 1066) within the study area.

13.2.10 There is evidence for medieval (1066 to 1540) settlement activity within the study area. A possible deserted medieval settlement near Mauxhall Farm is visible on aerial photography, including ridge and furrow cultivation features, trackways and possible building platforms [MNL326]. Ridge and furrow is also recorded at Stallingborough [MNL2235]. Alluvial layers show that the site was prone to flooding. The areas in which no archaeological evidence has been found correspond to those areas most prone to flooding and were perhaps farmed rather than inhabited.

13.2.11 Aerial photography has recorded the remains of post-medieval (1540 to 1900) field boundaries and narrow ridge and furrow cultivation features at Harborough Marsh [MNL4648, MNL4653, MNL4658, MNL4659, MNL4660]. They also record the presence of either singular or a series of drainage ditches [MNL1793, MNL4603, MNL4604, MNL4606, MNL4620]. A series of historic roads and trackways of post-medieval date are recorded on the early Ordnance Survey (OS) maps which may have their origins in the medieval period. These include North Moss Lane [MNL3507], Kiln Lane [MNL3508] and Laporte Road [MNL3509], amongst others.

13.2.12 Several woodland features are shown on historic OS maps, including Long Strip [MNL1797] and Fox Covert [MNL1799]. Other landscape features are also recorded, including an osier (wouldow plantation) at Reeds Meer [MNL2684], a mere at Stallingborough [MNL2685], and a blow well (spring), also at Stallingborough [MNL4299].

13.2.13 Aerial photographs and historic OS maps record historic flood defences across the study area, including at Immingham [MNL4682], Kiln Lane Trading Estate [MNL2086, MNL4608], and at Harborough Marsh [MNL4650]. Historic OS maps also record the presence of several features associated with coastal navigation and transportation, including Stallingborough Ferry [MNL3131] and the site of a

coastguard station [MNL1790]. The maps show several buildings that reflect the rural and coastal character of the area prior to the development of the docks.

13.2.14 Immingham Dock was established by the Humber Commercial Railway and Dock Company in association with the Great Central Railway [MNL272]. A temporary settlement or workers' village was established at Immingham comprising a series of corrugated tin huts, known as Tin Town, for the dock construction workers [MNL1077].

13.2.15 Construction of the dock began in 1906 and was complete by 1912. Features that are associated with the historic development and operation of the docks include a coaling stage [MNL3097] and a former grain store [MNL4429]. In addition, there are several records relating to the use and expansion of the transportation infrastructure associated with the dock and port at Immingham. During World War I the dock was a submarine base for British D-class submarines. This was later used for cruise ships in the 1930s.

13.2.16 There are numerous features relating to World War II activity in and around the docks at Immingham, including gun emplacements [MNL1501, MNL1534], anti-landing obstacles [MNL4630, MNL4631, MNL4632, MNL4633, MNL4634, MNL4640, MNL4641, MNL4655, MNL4679], barrage balloon sites [MNL4651, MNL4684, MNL4675], and other buildings and installations [MNL4644, MNL4689]. Evidence of German bombing raids is also represented by several lines of small circular hollows on aerial photographs [MNL4623, MNL4643, MNL4645].

13.2.17 In the second half of the 20th century the docks expanded with the construction of east and west jetties and the addition of several deep-water jetties for bulk cargo. Immingham Oil Terminal jetty was constructed in 1969 on the banks of the Humber, west of the dock entrance, whilst the Immingham Bulk Terminal was commissioned in 1970 for the export of coal and the import of steel. In 1985 the Immingham Gas Jetty was opened.

13.2.18 There are several undated cropmark sites recorded on the HER, including an area of enclosures or natural features [MNL4106], a sub-circular feature, possibly a prehistoric ring ditch or another natural feature [MNL4622], and linear features to the south of Kiln Lane Industrial Site [MNL4400]. Undated peat deposits located [MNL4439] were recorded in a historic geological borehole alongside North Beck Drain [MNL1796].

13.2.19 Geophysical survey within part of the DCO site boundary did not identify any significant archaeological features [ENL301]. However, various anomalies were detected which likely relate to buried paleoenvironmental features (former tidal channels and pools), although it is possible some could relate to possible medieval salt production sites. Recent former land boundaries, land drains, services and ground disturbance were also identified.

The Project is located in the coastal marsh character zone, which is dominated by industrial works, particularly installations related to the petrochemical industry and docks at Immingham. Only the western part of the DCO site boundary retains any historic character. This is related to post-medieval agriculture and 19th century tree belts.

Future Baseline

13.2.20 No changes to the existing historic environment baseline as described above are anticipated in the absence of the Project.

13.3 Planned Surveys

13.3.1 An archaeological walkover survey to assess known sites and to determine the potential for previously unrecorded heritage assets would be undertaken across the DCO site.

13.3.2 Further archaeological evaluation may be required, including geophysical survey or evaluation trenching, although parts of the Project site have already been surveyed.

13.3.3 Further archaeological evaluation and detailed setting assessments would be undertaken as part of the assessment process, the scope of which would be informed by the desk-based analysis of information, the outcomes of any geophysical survey, and through consultation with relevant bodies (see **Section 13.7**).

13.4 Identification of Potential Effects

13.4.1 There are a number of designated and non-designated built heritage assets within the study area which may be affected by the Project during the construction phase. Such effects could consist of:

a. Physical effects on a heritage asset.

b. Effects upon the significance of a heritage asset due to changes to its setting.

13.4.2 There is potential for previously unrecorded archaeological deposits to survive within the DCO site boundary. These remains could potentially be affected during excavation works required during construction.

13.4.3 While there is the potential for the Project to have impacts on the setting of heritage assets within the study area, any resultant effects are not considered likely to be significant due to the location of the Project and intervening buildings.

13.4.4 No additional impacts are anticipated during the Project operational phase.

13.5 Design, Mitigation and Enhancement Measures

13.5.1 The results of the historic environment baseline assessment would be taken into account during the design of the Project. If it is not possible to avoid heritage assets, mitigation would include (but not be limited to) detailed landscape/ topographic survey, archaeological excavation and recording of features being removed and archaeological monitoring/ watching brief. The exact mitigation requirements would depend on the results of further assessment and evaluation and would be agreed with the Local Planning Authority. Construction phase mitigation requirements would be confirmed in the ES and detailed in the CEMP.

13.6 Assessment Methodology

13.6.1 The assessment of potential effects as a result of the Project on cultural heritage would be undertaken using the methodology set out below.

13.6.2 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). Each identified heritage asset would be assigned a value in accordance with the criteria set out in **Table 13.1**. Using professional judgement and the results of consultation, heritage assets would also be assessed on an individual basis and regional variations and individual qualities taken into account where applicable.

Table 13.1 Criteria for Assessing the Value of Heritage Assets

Asset value	Description
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 Conservation areas Non-designated heritage assets (archaeological sites, historic buildings, monuments, parks, gardens or landscapes) that can be shown to have demonstrable regional importance 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

Asset value	Description
	Historic landscape character areas whose value is limited by poor preservation and/ or poor survival of contextual associations
Very Low	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

13.6.3 Having identified the value of the heritage asset, the next stage in the assessment would be to identify the level and degree of impact to an asset arising from the Project. Impacts may arise during construction and can be temporary, reversible, or permanent. Impacts can occur to the physical fabric of the asset or affect its setting. The contribution of the setting to the significance of any affected assets would be subject to assessment.

13.6.4 The level and degree of impact (impact rating) would be assigned with reference to a four-point scale as set out in **Table 13.2**. The assessment of the level and degree of impact would be made in consideration of any Project design mitigation (embedded mitigation). If no impact is identified, no impact rating would be given and no resulting effect reported.

Table 13.2 Factors Influencing the Assessment of Magnitude of Impacts

Magnitude of Impact	Description of impact
High	Changes such that the significance of the asset is totally altered or destroyed Comprehensive change to, or total loss of, elements of setting that would result in harm to the asset and our ability to understand and appreciate its significance.
Medium	Change such that the significance 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 significance of the asset.
Low	Changes such that the significance 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 significance of the asset.
Very Low	Changes to the asset that hardly affect significance. 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 significance of the asset.

13.6.5 An assessment to classify the effect, taking into consideration any embedded mitigation, would be determined using the matrix at **Table 13.3** which takes account of the value of the asset (refer to Table **13.1**) and the magnitude of impact (refer to **Table 13.2**). Effects can be neutral, adverse or beneficial.

Table 13.3 Assessment of Effect

Heritage value (significance)	Magnitude of impact			
	High	Medium	Low	Very Low
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Minor
Low	Moderate	Minor	Minor	Negligible
Not significant	Neutral	Neutral	Neutral	Neutral

13.6.6 The ES would report the significance of effect in accordance with EIA methodology. Major and moderate effects would be considered to be significant. Within the NPPF, impacts affecting the value of heritage assets are considered in terms of harm and there is a requirement to determine whether the level of harm amounts to 'substantial harm' or 'less than substantial harm'. There is no direct correlation between the significance of effect to be reported in the ES and the level of harm caused to heritage significance. A major (significant) effect on a heritage asset would, however, more often be the basis by which to determine that the level of harm to the significance of the asset would be substantial. A moderate (significant) effect is unlikely to meet the test of substantial harm and would therefore more often be the basis by which to determine that the level of harm to the significance of the asset would be less than substantial. A minor or negligible (not significant) effect would still amount to less than substantial harm, which triggers the statutory presumptions against development within Regulation 3 of the Infrastructure Planning (Decisions) Regulations 2010; however, a neutral effect is classified as no harm. In all cases determining the level of harm to the significance of the asset arising from development impact is one of professional judgement taken on a case by case basis.

13.6.7 The assessment would be undertaken in accordance with guidance set out by Chartered Institute for Archaeologists (CIfA) and Historic England, in particular CIfA's Standard and Guidance for Historic Environment Desk-Based Assessment and the Code of Conduct.

13.6.8 *Principles of Cultural Heritage Impact Assessment in the UK* is a guide to good practice in cultural heritage impact assessment published jointly by the Institute of Environmental Management and Assessment (IEMA), the Institute of Historic Building Conservation (IHBC) and CIfA. The document provides guidance on understanding cultural heritage assets and evaluating the consequences of change and would be considered when undertaking the assessment.

Sources of Information

Desk-based Sources

13.6.9 Sources of historic environment information that would be consulted include the following:

a. National Heritage List for England (NHLE) database.

b. North East Lincolnshire HER.

c. Various online resources including the British Geological Survey (BGS) Geology of Britain Viewer and the local planning portal for the Local Plan and other planning information.

d. Published and unpublished literature (including a detailed review of reports for previous fieldwork carried out within the proximity to the DCO site boundary).

e. Existing geotechnical data.

f. Available Light Detection and Ranging (LiDAR) data and aerial photography.

g. Documentary, cartographic and other resources as deposited within the local archives.

h. Local planning authority plans, guidance and lists.

13.6.10 A desk-based assessment has already been produced and this would form an appendix to the ES.

Fieldwork Data

13.6.11 As indicated above, a staged programme of archaeological evaluation would be undertaken to determine the presence or absence of archaeological remains within the DCO site boundary and, if remains are present, assess their significance. This would also inform the need for any mitigation measures. The results of the archaeological evaluation would be reported in the ES.

Relevant Legislation, Policy and Technical Guidance

13.6.12 Legislation, planning policy and guidance relating to cultural heritage and pertinent to the Project are detailed below.

Legislation

a. Planning (Listed Buildings and Conservation Areas) Act 1990 (Ref 13-1).

b. Ancient Monuments and Archaeological Areas Act 1979 (Ref 13-2) (amended by the National Heritage Act 1983 (Ref 13-3) and 2002 (Ref 13-4).

National Planning Policy

a. NPPF (Ref 13-5) with particular reference to Section 16: Conserving and Enhancing the Historic Environment.

b. NPS Overarching National Planning Statement for Energy (EN-1) (Ref 13-6) with particular reference to Section 5.8: Historic Environment.

c. NPS for Ports (Ref 13-7) with particular reference to Section 5.12: Historic Environment.

National Guidance

a. Planning Practice Guidance, Section 16: Conserving and enhancing the historic environment (Ref 13-8).
b. Historic Environment Good Practice Advice in Planning Note 2. Managing Significance in Decision Taking in the Historic Environment (Ref 13-9).
c. Historic Environment Good Practice Advice in Planning Note 3. The Setting of Heritage Assets. Historic England (2nd edition, 2017) (Ref 13-10).
d. Historic Environment Statement of Heritage Significance: Analysing Significance in Heritage Assets. Historic England Advice Note 12. (Ref 13-11).
e. CIfA Standard and Guidance for Historic Environment Desk-Based Assessment (Ref 13-12).
f. CIfA Code of Conduct (Ref 13-13).
g. IEMA, IHBC and CIfA Principles of Cultural Heritage Impact Assessment in the UK (Ref 13-13).

Local Planning Policy

a. The North East Lincolnshire Local Plan 2013 to 2032 (Ref 13-14), adopted in 2018.

13.7 Consultation

13.7.1 Consultation would be undertaken with the following bodies as part of the historic environment assessment process:

a. The Archaeological Officer for North East Lincolnshire.
b. The relevant Conservation Officers.
c. Historic England.

13.8 Summary

13.8.1 Archaeology, built heritage and historic landscape are scoped into the assessment due to the archaeological potential of land within the DCO site boundary, the potential impacts from the Project of two non-designated terraces (ACM1), and its potential impacts to historic landscape character areas on the western fringe of the proposed development area. A summary of the scope of the historic environment (terrestrial) assessment is provided in **Table 13.4**.

Table 13.4 Summary of Scope for the Historic Environment (Terrestrial) Assessment

Element	Phase	Scoped In	Scoped Out	Justification
Archaeology	Construction	✓	x	Archaeological potential within the Project boundary.

Element	Phase	Scoped In	Scoped Out	Justification
Archaeology	Operation and Decommissioning	x	✓	Project operation and decommissioning would not result in impacts additional to those experienced during construction.
Built heritage	Construction and operation	✓	x	Due to potential impacts from the proposed development upon the setting of two non-designated rows of terraced housing on Queens Road only.
Historic landscape	Construction and operation	✓	x	Due to potential impacts to historic landscape character area on the western fringe of the development area there would be no impact on the historic landscape.

13.9 References

Ref 13-1 The Stationery Office (1990). Planning (Listed Buildings and Conservation Areas) Act (1990).

Ref 13-2 The Stationery Office (1979). Ancient Monument and Archaeological Areas Act (1979) (as amended).

Ref 13-3 The Stationery Office (1983). National Heritage Act.

Ref 13-4 The Stationery Office (2002). National Heritage Act (as amended).

Ref 13-5 Ministry of Housing, Communities and Local Government (MHCLG) (2021) National Planning Policy Framework (NPPF).

Ref 13-6 Department of Energy and Climate Change (2011) Overarching National Policy Statement for Energy EN-1.

Ref 13-7 DfT (2012). National Policy Statement for Ports (NPSfP).

Ref 13-8 Ministry of Housing, Communities & Local Government (2019) Planning Practice Guidance: Historic Environment.

Ref 13-9 Historic England (2015) Historic Environment Good Practice Advice in Planning Note 2 – Managing Significance in Decision Taking.

Ref 13-10 Historic England (2017) Historic Environment Good Practice Advice in Planning Note 3 – The Setting of Heritage Assets (second edition).

Ref 13-11 Historic England (2019), Statements of Heritage Significance: Analysing Significance in Heritage Assets. Historic England Advice Note 12.

Ref 13-12 CIfA, Standard and guidance for historic environment desk-based assessment, 2020.

Ref 13-13 CifA, Code of Conduct, 2019.

Ref 13-14 North East Lincolnshire District Council, (2018). Local Plan 2013 to 2032.

14 Historic Environment (Marine)

14.1 Introduction

14.1.1 This section sets out the proposed scope and methodology of the marine archaeology assessment of the Project. The chapter also details the datasets to be used to inform the assessment, provides an overview of baseline conditions, sets out the likely significant effects to be considered within the assessment, and discusses how these likely significant effects would be assessed for the purpose of the EIA.

14.2 Baseline Environment and Study Area

Data Sources

14.2.1 A desk-based study would be undertaken to inform the current baseline characterisation with regard to marine archaeology. This would include consideration of the following data sources:

a. North East Lincolnshire Historic Environment Records (HER) for known maritime and aircraft wrecks, coastal installations, archaeological sites, and events records.

b. National Record of the Historic Environment (NRHE) terrestrial and marine cultural heritage assets maintained by Historic England.

c. The United Kingdom Hydrographic Office (UKHO) wreck database for information regarding live wrecks, salvaged wrecks and dead wrecks.

d. Various online resources including the British Geological Survey (BGS) Geology of Britain Viewer and the local planning portal for the Local Plan and other planning information.

e. Published and unpublished literature (including a detailed review of reports for previous fieldwork carried out within the proximity to the Project boundary).

f. Existing geotechnical, geophysical and geoarchaeological data.

g. Available Light Detection and Ranging (LiDAR) and aerial photography.

14.2.2 The baseline summary for seabed prehistory would be based on a review of geological mapping of seabed sediments, solid geology and bathymetry from published BGS sources. This would be enhanced by review of existing geotechnical, geophysical and geoarchaeological data.

Study Area

14.2.3 The study area is the area over which potential direct and indirect effects of the Project may occur during construction and operation. Direct effects on marine heritage receptors are those confined to within the footprint of the Project i.e. the marine infrastructure construction works, dredge and disposal of dredge arisings (if required). Indirect effects are those that may arise due to wider changes in the

estuary flow and sedimentary regime and any change to the estuary morphology as a result of the Project.

14.2.4 The study area for the marine archaeology topic would comprise the footprint of the marine infrastructure works associated with the Project and a 2km buffer zone. This would be used to capture relevant data on designated and non-designated marine archaeological assets, and to provide the necessary context for understanding archaeological potential and heritage significance of assets that may be affected by the Project.

14.2.5 The marine archaeology ES chapter may, through further desk-based analysis and assessment, refine the study area for the purposes of the impact assessment.

Current Baseline

Marine Heritage Receptors

14.2.6 Marine archaeological and cultural heritage receptors located within the study area can be characterised as comprising four fundamental categories:

a. Seabed prehistory.

b. Maritime archaeology.

c. Aviation archaeology.

d. Intertidal heritage receptors.

14.2.7 The marine archaeological and cultural heritage receptors listed in the NRHE and the UKHO wreck database that are located within the study area are listed in **Table 14.1** shown on **Figure 14.1** in **Appendix A**.

Table 14.1 Marine Heritage Features

WA ID	External References	Type	Description	BNG Easting	BNG Northing
2001	8508	Mound/ Foul ground	A submerged obstruction that was struck by a vessel in 1957. Measured 17.5 m by 10.7 m and 1 m in height. Amended dead in 2013.	521230.08	416776.18
2002	65126	Obstruction	Octagonal obstruction shown on aerial photography.	520764.56	415966.47
2003	8505	Dolphin/ Foul ground	Remains of a Dolphin damaged or destroyed in 1973 following a collision. Dispersed to seabed level in 1984.	520884.09	416594.75

WA ID	External References	Type	Description	BNG Easting	BNG Northing
2004	65124	Obstruction	Rectangular obstruction shown on aerial photography	520823.53	415903.05
2005	65128	Obstruction	Octagonal obstruction shown on aerial photography.	520825.61	415994.01
2006	8506	Foul ground	Has been lifted.	523600.72	416696.8
2007	67016	Dolphins/ Poles/ Posts/ Piles	Lifted in 1975.	520920.45	416595.69
2008	65127	Obstruction	Octagonal obstruction shown on aerial photography.	520787.57	416015.3
2009	65125	Obstruction	Cigar shaped obstruction shown on aerial photography.	520833.4	415905.16
2010	8576	Wreck	Possible remains of craft recorded between 1991 and 1999. No details are known and it was listed as dead in 2004.	520807.84	415999.12
2011	61506	Obstructions	Pipes/ Tubes/ Diffusers	522244.82	415234.72
2012	79895	Foul ground	Observed in bathymetry in 2013. Measures 2 x 1 m with a height of 0.5 m.	521180.78	416806.46
2013	8509	Wreck	Wreck of GOLDBELL. Has been lifted.	524054.58	416923.94
2014	8507	Wreck	A sailing vessel, HVITVEIS, with auxiliary oil engine that sunk with a cargo of coal in 1915.	522073.49	416695.93
2015	98703	Wreck	Unknown wreck shown in ABP Humber survey in 2021.	523984.91	415716.17
2016	73629	Wreck	Shown on Humber 8, April 2009 Edition.	520831.84	416009.01
2017	66974	Wreck	A light float (No. 9 (Clay Huts) Light Float) that was lifted in 1929.	521037.47	417062.5

WA ID	External References	Type	Description	BNG Easting	BNG Northing
WA = Wessex Archaeology					

14.2.8 Maritime archaeological sites can be considered to comprise two broad categories: i) the remains of vessels that have been lost as a result of stranding, foundering, collision, enemy action and other causes, and ii) those sites that consist of vessel-related material. Wreck related debris includes (but is not limited to) equipment lost overboard or deliberately jettisoned, such as fishing gear, ammunition and anchors or the only surviving remains of a vessel such as its cargo or a ballast mound.

14.2.9 Shipwrecks on the seabed provide an insight on the types of vessels used in the past, the nature of shipping activity in the wider area and the changing usage of the marine environment through different periods. Such remains are considered more likely in sediments which promote the preservation of wreck sites (e.g. finer grained sediments that are not subject to high levels of mobility), particularly where such sediments have seen limited, recent disturbance.

14.2.10 There are six records of wrecks in the defined study area. WA **2014, 2015** and **2016** are wrecks still considered to be located on the seabed. WA **2010** was a wreck that was listed as dead in 2004 i.e. it has not detected by repeated surveys, although wreck material still may exist at this location. WA **2013** and **2017** are wrecks which have been lifted, and therefore there is possibly no wreck material remaining at these locations, although some debris may remain. Most of these wrecks date to the 20th century, although some are unknown wrecks which may date to other periods. There is the potential for further unknown wreck material to exist. However, the Port of Immingham was constructed in the early 20th century. This suggests that there is lower potential for pre-20th century wreck material to survive within the Project area, both due to a relatively smaller level of maritime activity prior to the construction of the Port and due to the extensive dredging that has taken place on the adjacent seabed both during construction and since.

14.2.11 Intertidal heritage receptors comprise of other heritage assets located below mean high water springs (MHWS) and above MLWS. Examples of these include the jetties and dolphins associated with the 20th century port, although these are not all located in the intertidal zone (WA **2002**, **2003, 2004, 2005, 2007, 2008** and **2009)**.

14.2.12 There are also a number of anomalies in the area that are as yet unidentified. WA **2012** is an anomaly that was observed in bathymetry in 2013 and measures 2m by 1m with a height of 0.5m. WA **2001** consists of a submerged obstruction that was struck by a vessel in 1957. This measured 17.5m by 10.7m with 1m in height, but was amended to dead in 2013, although archaeological material still may exist at this location. Further obstructions include WA **2006** and **2011**.

14.2.13 Marine aviation archaeology receptors comprise the remains or associated remains of military and civilian aircraft that have been lost at sea. Evidence is divided into three primary time periods based on major technological advances in aircraft design, namely: pre-1939; 1939-1945; and post-1945. Although there are

currently no known aircraft crash sites located within the study area, there is the potential for the discovery of previously unknown aircraft material. There is particularly high potential for the discovery aircraft from 1939-1945. There were numerous airfields in the vicinity of the Project during the Second World War, with Royal Air Force (RAF) Goxhill and RAF North Killingholme being particularly proximate. Further, the RAF Air Sea Rescue Services are known to have attempted numerous rescues of aircrew from crashed aircraft in the Humber Estuary during the Second World War (Ref 14-1). The remains of crashed military aircraft are protected under the Protection of Military Remains Act 1986 and cannot be disturbed without a licence.

Future Baseline

14.2.14 In the absence of the Project, future baseline conditions for marine archaeology assets are anticipated to remain unchanged from those as described above. The DCO site boundary has been in use as a commercial port since the early 20th century and would continue in use as an operational port.

14.3 Planned Surveys

14.3.1 An archaeological assessment of geophysical survey data in the vicinity of the proposed works would be undertaken. This would comprise multibeam bathymetry, sidescan sonar and magnetometry surveys. Archaeological assessment of geotechnical data would also be undertaken which would include coring, boreholes and grab samples surveys. An intertidal walkover survey would also be undertaken to inform the marine historic environment in the intertidal zone.

14.4 Identification of Potential Effects

14.4.1 The Project has the potential to affect marine archaeology assets or deposits of archaeological importance during both construction and operation phases. The marine archaeology ES chapter would set out the assessment of the likely changes to be generated by the Project, both beneficial and adverse and during both the construction and operational phases.

14.4.2 Potential cumulative effects on marine archaeology assets and deposits of archaeological importance could also arise as a result of other coastal and marine developments in the area, as well as ongoing activities, including maintenance dredging and disposal activities. These would be considered as part of the cumulative and in-combination assessment to be presented within the ES.

14.4.3 The sections below consider the potential marine archaeology effects during Project construction and operation, and whether defined impact pathways have the potential to result in significant effects.

Construction

Scoped In

14.4.4 The potential impact pathways during the Project construction phase are as follows:

a. Direct impacts to known and potential marine archaeology assets and deposits of archaeological importance as a result of construction and capital dredging (if required).

Scoped Out

14.4.5 The following pathways are proposed to be scoped out of the EIA:

a. Setting of marine archaeological and cultural heritage receptors: it is unlikely, given the existing industrial character of the DCO site, for there to be any material additional impacts on the setting of known and unknown heritage receptors during construction or operation of the Project. A setting assessment is, therefore, proposed to be scoped out of the EIA.

b. Disposal of dredged material has been scoped out as this activity would take place at licensed marine disposal sites that have been characterised for this purpose. However, any heritage conditions associated with the use of such sites would be adhered to.

Operation

Scoped In

14.4.6 The potential impact pathways during the Project operational phase are as follows:

a. Indirect impacts to known and potential marine archaeology assets and deposits of archaeological importance due to changes in physical processes as a result of additional construction and maintenance dredging (if required).

Scoped Out

14.4.7 The following pathways are proposed to be scoped out of the EIA:

a. Setting of marine archaeological and cultural heritage receptors: it is unlikely, given the existing industrial character of the DCO site boundary, for there to be any material additional impacts on the setting of known and unknown heritage receptors during construction or operation of the Project. A setting assessment is, therefore, proposed to be scoped out of the EIA.

b. Disposal of dredged material has been scoped out as this activity would take place at licensed marine disposal sites that have been characterised for this purpose. However, any heritage conditions associated with the use of such sites would be adhered to.

Decommissioning

14.4.8 The Project would not make any provision for the decommissioning of marine infrastructure or plant or equipment on the jetty topside. This is because the Project would, once constructed, become part of the fabric of the Immingham port estate and would, in simple terms, continue to be maintained so that it can be used for port related activities to meet a long-term need. This is discussed further in **Section 2.4** of **Chapter 2 The Project** of this EIA Scoping Report.

14.5 Design, Mitigation and Enhancement Measures

14.5.1 Typically, adequate and appropriate mitigation is required to ensure that the archaeological value of the baseline is maintained. International best practice and government policy favours preservation in situ of the archaeological resource.

14.5.2 Mitigation measures would be secured through a Written Scheme of Investigation (WSI), but the exact mitigation design would not be finalised until the assessment in the ES has been undertaken. Mitigation measures could include the use of Archaeological Exclusion Zones (AEZs), further investigation of anomalies (such as through unexploded ordnance (UXO) surveys), and the implementation of a Protocol for Archaeological Discoveries. Measures to be undertaken during the construction phase would be detailed in the CEMP.

14.6 Assessment Methodology

14.6.1 A Desk-Based Assessment (DBA) would be prepared in accordance with industry standards and best practice guidelines, namely the Assessment and Management of Marine Archaeology in Port and Harbour Development (Ref 14-2) and the CIfA Standard and Guidance for Historic Environment Desk-Based Assessment (Ref 14-3), and any responses received as part of the scoping phase and consultation. The DBA would form an appendix to the ES and would inform the marine archaeology ES chapter. This DBA would include the analysis of geophysical and geotechnical datasets.

14.6.2 The EIA documents would be prepared following standard industry practice and guidance for marine archaeology, including but not limited to the following:

a. The Assessment and Management of Marine Archaeology in Port and Harbour Development (Ref 14-2).

b. Dredging and Port Construction: Interactions with Features of Archaeological or Heritage Interest (Ref 14-4).

c. Conservation Principles, Policies and Guidance for the Sustainable Management of the Historic Environment (Ref 14-5).

d. Our Seas – A Shared Resource: High Level Marine Objectives (Ref 11-7).

e. Model Clauses for Archaeological Written Schemes of Investigations (Ref 14-7).

f. Ships and Boats: Prehistory to Present: Designation Selection Guide (Ref 14-8).

14.6.3 The EIA would follow the methodology set out in **Chapter 4 The EIA Process**. Marine heritage receptors cannot typically adapt, tolerate, or recover from physical impacts resulting in material damage or loss caused by development. Consequently, the sensitivity of each receptor would be predominantly quantified only by its importance.

14.6.4 The importance of marine heritage receptors would be established using criteria based on *Conservation Principles, Policies and Guidance for the Sustainable Management of the Historic Environment* (Ref 14-5) and *Ships and Boats: Prehistory to Present: Designation Selection Guide* (Ref 14-8).

Relevant Legislation, Policy and Technical Guidance

14.6.5 The potential effects of the Project on marine archaeology would be considered in the ES chapter, which would cross-reference, as appropriate, relevant policy, legislation and guidance, including the following:

a. The Marine and Coastal Access Act 2009.
b. Ancient Monuments and Archaeological Areas Act 1979.
c. Merchant Shipping Act 1995.
d. Protection of Wrecks Act 1973.
e. Protection of Military Remains Act 1986.
f. NPSfP (Ref 14-9).
g. UK Marine Policy Statement (Ref 14-10) as required by Section 44 of the Marine and Coastal Access Act 2009.
h. NPPF (Ref 14-11).
i. East Inshore Marine Plan.
j. Relevant local policy.

14.7 Consultation

14.7.1 Key consultees for marine archaeology include the Marine Management Organisation (MMO), the Crown Estate, Historic England and NELC.

14.8 Summary

14.8.1 A summary of the proposed scope of the marine historic environment assessment is provided in **Table 14.2**. This indicates that the assessment would consider direct impacts upon marine archaeology during the construction phase, as well as indirect impacts during Project operation. Impacts associated with the setting of marine archaeological and cultural heritage receptors would be scoped out of the assessment, as would direct and indirect impacts to known and potential marine archaeology assets as a result of disposal of dredge arisings.

Table 14.2 Summary of Scope for the Historic Environment (Marine) Assessment

Element	Phase	Scoped In	Scoped Out	Justification
Known and potential marine archaeology assets and deposits of archaeological importance	Construction	✓	x	Direct impacts as a result of marine infrastructure construction works and dredging.
	Operation	✓	x	Indirect impacts due to changes in physical processes as a result of marine infrastructure

Element	Phase	Scoped In	Scoped Out	Justification
				construction works and dredging.
	Construction/ Operation	x	✓ Setting of marine archaeological and cultural heritage receptors	It is unlikely, given the existing industrial character of the DCO site for there to be any material additional impacts on the setting of known and unknown heritage receptors during construction or operation of the Project. A Setting Assessment is, therefore, proposed to be scoped out of the ES.
	Construction/ Operation	x	✓ Direct and indirect impacts to known and potential marine archaeology assets as a result of disposal of dredge arisings.	Disposal of dredged material has been scoped out as this activity would take place at licensed marine disposal sites that have been characterised for this purpose.

14.9 References

Ref 14-1 Wessex Archaeology (2008) Aircraft Crash Sites at Sea: A Scoping Study, Archaeological Desk-based Assessment.

Ref 14-2 Cooper, V. and Gane, T. (2016) The Assessment and Management of Marine Archaeology in Port and Harbour Development.

Ref 14-3 Chartered Institute for Archaeologists (CIfA) (2014). Standard and guidance for historic environment desk-based assessment. Updated 2020.

Ref 14-4 PIANC (2014) Dredging and Port Construction: Interactions with Features of Archaeological or Heritage Interest.

Ref 14-5 English Heritage (2008) Conservation principles, policies and guidance for the sustainable management of the historic environment. London: English Heritage.

Ref 14-6 Defra (2009) Our Seas – A shared resource: High level marine objectives.

Ref 14-7 Crown Estate and Wessex Archaeology (2010) Model Clauses for Archaeological Written Schemes of Investigations.

Ref 14-8 English Heritage (2012) Ships and Boats: Prehistory to Present: Designation Selection Guide.

Ref 14-9 Department for Transport (2012) National Policy Statement for Ports.

Ref 14-10 HM Government (2011) UK Marine Policy Statement.

Ref 14-11 Ministry of Housing, Communities and Local Government (2021) National Planning Policy Framework

15 Physical Processes

15.1 Introduction

15.1.1 This section sets out the proposed scope and methodology of the physical processes assessment of the Project. The chapter also details the datasets to be used to inform the assessment, provides an overview of baseline conditions, sets out the likely significant effects to be considered within the assessment, and discusses how these likely significant effects would be assessed for the purpose of the EIA.

15.2 Baseline Environment and Study Area

Data Sources

15.2.1 A desk-based study would be undertaken to inform the baseline characterisation regarding physical processes on which the impact assessment would be based. This would include the following key data sources:

a. Hydrodynamic data scheduled to be collected by ABPmer during 2022 at the location of the Project.

b. Available hydrodynamic data across the wider study area, including within the vicinity of the Port.

c. Bathymetric survey data collected by ABPmer in the vicinity of the proposed marine works in July 2022, along with repeat bathymetric surveys conducted throughout the wider study area by ABP.

d. Site-specific marine sediment samples to be collected in 2022 within the boundaries of the Project marine infrastructure works area for particle size analysis (PSA) (a sediment sampling plan request would also be submitted to the MMO to support any application for dredging as part of the project).

e. Historic marine surface sediment samples (2001) collected in the area of Immingham Outer Harbour (IOH) for PSA analysis.

f. Numerical modelling tools developed specifically for the Project and covering the assessment of hydrodynamic, wave and sediment transport impacts for the proposed works (jetty construction and potential for dredging and disposal).

g. Various ABPmer reports covering project work for ABP in and around the Immingham region.

h. Guidance documents relevant to the study, including Environment Agency Coastal Flood Boundary datasets for extreme events; UK Climate Projections (UKCP18) for influence of future climate change.

Study Area

15.2.2 The study area is the area over which potential direct and indirect effects of the Project may occur during construction and operation. The direct effects on physical processes are those confined to within the marine footprint of the Project

i.e. the jetty, dredge and disposal of dredge material (if required). Indirect effects are those that may arise due to wider changes in the estuary flow and sedimentary regime and any change to the estuary morphology as a result of the Project.

15.2.3 The study area for the physical processes topic is considered to be the DCO site boundary and the adjacent Immingham coastline, the existing jetties across the near-field and the central part of the Humber Estuary, generally between Sunk Channel and Halton Middle. Within the far-field region, as illustrated in **Figure 15.1** in **Appendix A**, the study area includes the wider Humber Estuary from the mouth to at least the Hull Bend. Should any of the dredge disposal options (if required) necessitate it, the study area may be extended in order that the full extent of potential impact is considered within the assessment.

15.2.4 The physical processes ES chapter would, through further desk-based analysis and assessment, including numerical modelling, refine the study area for the purposes of the impact assessment as necessary.

Current Baseline

General Setting

15.2.5 The Humber is one of the largest estuaries in the UK and drains more than one fifth of the land area of England, some 23,690km² (Ref 15-1). The main tributaries include the Rivers Trent, Ouse, Don and Aire. Additional freshwater inputs to the Humber include the Rivers Calder, Hull, Derwent, Swale, Ure, Nidd and Wharfe. At over 30,000ha, the Humber Estuary is the largest macro tidal coastal plain estuary on the British North Sea Coast.

15.2.6 Although the name Humber applies only to the 62km reach between Spurn Point and Trent Falls; the estuary - as defined by its physical properties - is much more extensive, reaching over 100km inland to Cromwell Weir on the River Trent and Naburn Lock on the River Ouse. Today the estuary area is significantly smaller than its original extent following the deceleration of the Holocene sea level rise (circa 6,000 years Before Present (BP)), due to the formation of saltmarshes and intertidal flats, followed by their latter reclamation by man over historical times.

Bathymetry and Morphology

15.2.7 In plan shape, the Humber Estuary has a meandering funnel shape widening towards the mouth, where a southerly orientated spit has formed in response to littoral drift processes and antecedent geological controls. The funnel shape is demonstrated by the exponential decrease in estuary area, width, and depth from the mouth to the head.

15.2.8 The estuary can be divided into three regions as illustrated in **Figure 15.1** in **Appendix A**:

a. The Inner Humber (Trent Falls to Humber Bridge).

b. The Middle Humber (Humber Bridge to Grimsby).

c. The Outer Humber (Grimsby to Spurn Point).

15.2.9 In the Inner Humber, downstream of Trent Falls, where the Rivers Trent and Ouse merge, the estuary is characterised by a number of extensive intertidal banks composed of sand/ silt. These banks include Winteringham Middle Sand, Redcliff Middle Sand, Hessle Sand and Barton Ness Sand.

15.2.10 The Middle Humber is similar in its characteristics to the Inner Humber, having a number of banks and channels which have a preferred configuration. In the northernmost section, the main channel is aligned close to the Hull Waterfront, but westwards, where it meets Hessle Sand, a secondary channel develops along the southern shore. Downstream the reach is dominated by Skitter and Foul Holme Sands.

15.2.11 The Outer Humber is dominated by a three-channel system at the mouth, a large submerged sandbank (the Middle Shoal), and a single deep channel leading to the Middle Humber. The three channels are Haile Channel, Bull Channel and Hawke Channel. Upstream, Hawke Channel is extensively dredged and the resulting channel, known as Sunk Dredged Channel (SDC), provides shipping access to the ports of Immingham and Hull. The presence of boulder clay deposits in the Outer Humber provides a geological constraint that influences the position of some of the sand banks, intertidal areas and Spurn Point itself. The Outer Humber contains a number of disposal grounds for dredge spoil.

15.2.12 The Humber Estuary has a macro tidal range, fast flows and a high background suspended sediment content. This means the bed of the estuary is very dynamic in its morphology, both in the short term and on longer time scales, particularly in areas where there are no constraints, either geological or man-made. This dynamism manifests itself in cyclical variations in the positions of channels and banks throughout different regions of the estuary, with many of these regions showing an interconnectivity of process. The dominant influences on morphological change are tides, waves and freshwater flows, tidal surges and biological activity.

15.2.13 These influences produce changes in suspended sediment concentrations (SSC), deposition rates, bed composition and ultimately channel/ bank configurations. The dynamic nature of the Humber is illustrated by the interactions existing between the various bank systems in the Inner and Middle Humber. Channel migration in the Inner Humber releases sand, which forms banks off Barton and New Holland in the upper Middle Humber. Furthermore, there is a sediment exchange between Barton Ness Sand and Skitter Sand within the Middle Humber region, which ultimately helps determine the shape and levels across Halton Flats.

15.2.14 Between Immingham and Grimsby, the estuary is at its deepest, and relatively speaking, its most stable location. The main channel varies between 10 and 20 m below CD and is bounded by steep ‘hard sides’ thought to comprise boulder clay, which are relatively in-erodible to current day hydrodynamics. On the south side of the channel a relatively wide and gently sloping shallow subtidal ‘ledge’ forms Burcom Shoal and Stallingborough Flats. Behind this is the intertidal Pyewipe mudflat, which has accreted above the ‘ledge’ predominantly due to the construction of the Grimsby Dock System. To the north, near Hawkins Point, the

intertidal area is narrow compared to the areas up and down estuary. This is due to human intervention through the reclamation of Sunk Island in this area.

15.2.15 Across the area of the proposed marine infrastructure, the near field bathymetry is influenced by the deeper approaches to the Port of Immingham and the relatively shallower subtidal region behind the existing jetties (**Figure 15.2** in **Appendix A**). Bed elevation within the approaches to Immingham, the Sunk Channel and on the berths at Immingham Oil Terminal (IOT) reaches around -20mCD. Within the vicinity of the proposed marine infrastructure, bed levels range from around -15mCD (metres chart datum) offshore, sloping up towards the land along the Immingham foreshore. The intertidal area adjacent to the Project is around 80m in width, narrowing slightly to the south.

15.2.16 A review of historical bathymetric charts extending both up and down estuary of the Project shows that in the 1930s, the channel up estuary was considerably deeper than present day, with depths of the order of -16mCD centred about 1km from the shoreline. The channel has consistently in-filled until about 1990, resulting in a depth of around -7mCD. During the last 15 years, depths have been relatively stable, although variations between -6m and 7m CD have occurred.

Tides and Water Levels

15.2.17 The Humber Estuary is macro tidal with a mean spring tidal range of 5.7m at Spurn increasing to 7.4m at Saltend, then decreasing to 6.9m at Hessle which is 45km inland. Tides are semi diurnal with a slight diurnal inequality, amounting to a 0.2m difference in high water spring tides at Immingham. Standard tidal levels at Immingham are provided in **Table 15.1**.

15.2.18 The Humber tides are driven by the amphidromic system centred off the west coast of Denmark in the central North Sea. As the tide passes south of North Shields, it enters shallow water conditions which amplify the tidal range. This amplified tidal range drives the Humber tidal system so that the macro tidal range within the estuary is a product of the general morphology of the east coast as well as the estuary itself.

Table 15.1 Standard Tide Levels for Immingham

Tidal level		Immingham	
		mCD	mODN
Highest Astronomical Tide	HAT	8.00	4.10
Mean High Water Springs	MHWS	7.30	3.40
Mean High Water Neaps	MHWN	5.80	1.90
Mean Sea Level	MSL	4.18	0.28
Mean Low Water Neaps	MLWN	2.60	-1.30
Mean Low Water Springs	MLWS	0.90	-3.00

Lowest Astronomical Tide	LAT	0.10	-3.80
Mean Spring Tidal Range (MHWS – MLWS)		**6.40 m**	
Mean Neap Tidal Range (MHWN – MLWN)		3.20 m	
Note: Conversion from mCD to mODN at Immingham = -3.90 m.			

Surge Levels

15.2.19 Current extreme predictions determined by the Environment Agency for Immingham are considered to be the most up-to-date and appropriate for this review (Ref 15-2). These are provided in **Table 15.2** for a baseline year of 2017.

Table 15.2 Predicted Extreme Water Levels for the Port of Immingham

Return Period (Years)	Annual Exceedance Probability (%)	Extreme Water Level (mODN)
1	100	4.15
2	50	4.25
5	20	4.40
10	10	4.51
20	5	4.62
25	4	4.66
50	2	4.77
75	1.3	4.85
100	1	4.90
150	0.67	4.97
200	0.5	5.03
250	0.4	5.06
300	0.33	5.10
500	0.2	5.20
1,000	0.1	5.34
10,000	0.01	5.85

Source: Environment Agency, 2018

15.2.20 The maximum water level currently recorded at Immingham occurred on 5 December 2013 at 19:00 hours with a level of 5.216m Ordnance Datum Newlyn

(ODN) compared to the prediction of 3.689m ODN, therefore, the meteorological surge effect was 1.527m.

Sea Level Rise

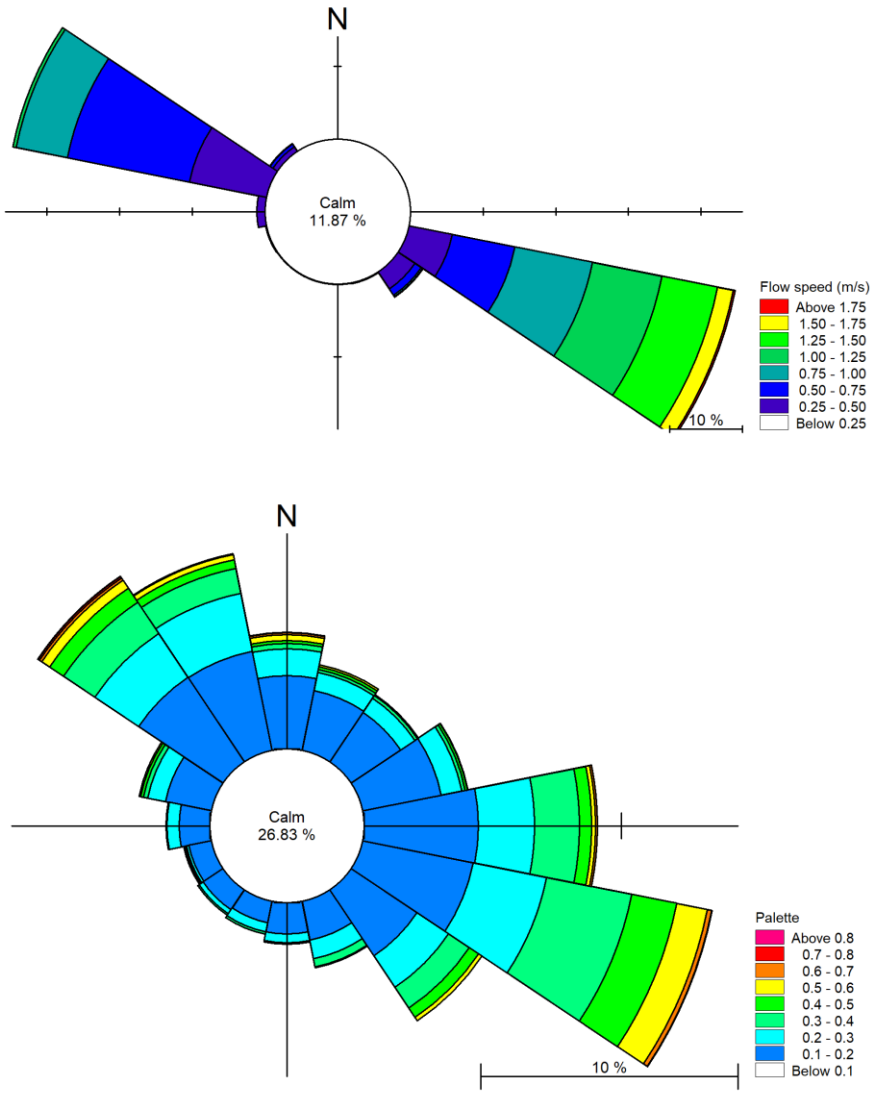
15.2.21 The above data do not allow for sea level rise in the future. Given an engineering design standard of 50 years from 2023, using the latest UK Climate Projections (UKCP) 18 relative sea level research and assuming a Representative Concentration Pathway (RCP) 8.5 95%ile scenario would add 0.57m to the water levels provided in **Table 15.2.**

Flows

15.2.22 Measured flow speed data has been collected in proximity to the Project (just to the north-west of the IOT jetty) between November 2019 and June 2020. **Plate 15-1** shows a current rose of the data collected by the AWAC bed frame over the full deployment period.

15.2.23 The data reveals the flow regime fronting Immingham is generally rectilinear, with flows aligned approximately east-southeast on the ebb to west-northwest on the flood. Peak flows above 1.8m/s are recorded during the ebb tide, with slightly slower flows on the flood phase of the tide. A survey campaign for the Project is planned for later in 2022, which would collect hydrodynamic data in the vicinity of the proposed marine works.

Plate 15-1 Current rose (top) and wave rose (bottom), based on measured data collected between November 2019 and June 2020 to the northwest of the IOT Jetty



Waves

15.2.24 The wave climate in the vicinity of the proposed marine infrastructure is generally protected from large waves approaching from the North Sea by a combination of sheltering effects (from Spurn Head and the various banks and channels within the outer parts of the Humber Estuary).

15.2.25 Measured data from an AWAC bed frame deployment in the vicinity of the Project (to the north-west of the IOT jetty) has been collected between November 2019 and June 2020. The data from this survey is used to provide the wave rose shown in **Plate 15-1**. This reveals that the wave regime at the Project location is dominated by waves approaching from the north-west and the south-east (coincident with the longest fetch lengths at the site). Waves with Hs of above 0.7m are observed from both of these main approach directions, with a peak Hs value during the deployment, of 0.84m. A survey campaign for the Project is

planned for later in 2022, which would collect wave data in the vicinity of the proposed marine infrastructure.

Geology and Sediments

15.2.26 The Humber lies in a complex of solid and superficial geology which can be simplified into three groups: the pre-Quaternary, the glacial (or Quaternary) and Post Glacial (or Holocene).

15.2.27 The estuary upstream of the Humber Bridge represents an older estuary system formed in the last interglacial (120,000 to 80,000 years BP) with the estuary mouth at this time being located near the current Bridge. Downstream of this point, the estuary is more recent in geological terms, the channel having formed in immediate post glacial times as melt water cut down through glacial till deposits. During the post glacial period of sea level rise, the former river channel underwent marine transgression and became subject to estuarine sedimentation.

15.2.28 The bed sediments within the vicinity of the study area are understood to be a mixture of muds and sands. Previous sampling in the Immingham area has also identified the potential for chalk outcrops at depth.

15.2.29 Measurements of SSC in the Immingham area, collected between November 2019 and June 2020 in the vicinity of the Project, show that during ebb tides SSC can vary from a few hundred mg/ I to over 1,000 mg/ I, whilst the range of SSC on the flood is generally of the order of three times greater. The SSC are also generally higher on spring tides and during the winter months, compared to summer months.

Future Baseline

15.2.30 Hydrodynamic and sedimentary processes would continue to be influenced by natural and human-induced variability, ongoing cyclic patterns and trends (e.g. ongoing maintenance dredging and disposal) with or without the Project.

15.2.31 The future baseline would also be influenced by climate change and, in particular, increased rates of mean sea level rise (SLR). As described above, using the latest UKCP18 relative sea level research and assuming a RCP 8.5 95%ile scenario would add 0.57m to the water levels provided in **Table 15.2** in 2073 (assuming an engineering design standard of 50 years). Equivalent projections of change for Immingham up to 2100 are 0.99m (based on UKCP18 RCP8.5 95%ile climate change scenario). Water levels in the future, as now, would also be affected by unpredictable surge and weather-related events.

15.3 Planned Surveys

15.3.1 Hydrodynamic and grab sampling surveys are scheduled to be undertaken later in 2022. These would provide information on local hydrodynamics, waves, sediment load and particle size distribution of bed material within the Project marine infrastructure works area. The data gathered from these surveys would, along with existing data (as listed above), be used to inform the subsequent impact assessment.

15.4 Identification of Potential Effects

15.4.1 The physical processes assessment would consider the likely changes arising from the Project, both beneficial and adverse and during both the construction and operational phases.

15.4.2 Potential cumulative effects on physical processes could also arise as a result of other coastal and marine developments in the area, as well as ongoing activities, including maintenance dredging and disposal activities. Where relevant, these would be considered as part of the cumulative and in-combination assessment to be presented within the ES.

15.4.3 The sections below consider the potential physical processes effects during Project construction and operation, and whether defined impact pathways have the potential to result in significant effects.

Construction

Scoped In

15.4.4 The potential physical processes impact pathways during the Project construction phase are as follows:

a. Increased SSC and potential sedimentation over the extent of the disturbance plume as a result of the construction of the new jetty (piling) and capital dredging works (if required).

b. Increased SSC and potential sedimentation as a result of the deposit of capital dredge material at a licensed offshore disposal site (if required).

c. Changes in seabed bathymetry and composition as a result of deposition of dredged/ disposal material (if required) within the area of the respective plumes.

Scoped Out

15.4.5 At the current stage there is considered to be insufficient evidence to exclude any potential construction pathways from further assessment within the EIA.

Operation

Scoped In

15.4.6 The potential physical processes impact pathways during the Project operational phase are as follows:

a. Local changes to hydrodynamic regime (flow speed and direction) as a result of the jetty (piling) and capital dredging (if required).

b. Local changes to the wave regime, as a result of the jetty (piling) and capital dredging (if required).

c. Associated local changes to the sediment transport pathways, as a result of localised changes to the driving hydrodynamic (and wave) forcing.

d. Increased SSC and potential sedimentation in the area of dispersal plume as a result of maintenance dredging (if required).

e. Increased SSC and potential sedimentation as a result of deposition of maintenance dredge material at a licensed disposal site (if required).

f. Changes in seabed bathymetry and composition as a result of deposition of dredged/ disposed maintenance dredge material (if required).

Scoped out

15.4.7 At the current stage there is considered to be insufficient evidence to exclude any potential operation pathways from further assessment within the EIA.

Decommissioning

15.4.8 The DCO would not make any provision for the decommissioning of the marine infrastructure or plant or equipment on the jetty topside. This is because the development would, once constructed, become part of the fabric of the Immingham port estate and would, in simple terms, continue to be maintained so that it can be used for port related activities to meet a long-term need. This is discussed further in **Section 2.4** of **Chapter 2 The Project** of this EIA Scoping Report.

15.5 Design, Mitigation and Enhancement Measures

15.5.1 The Project footprint and alignment of the marine infrastructure would be designed to minimise potential changes to the physical processes of the estuary, whilst ensuring operational viability and safety. The requirement for mitigation measures would be defined in the ES, taking account of the physical processes impact assessment.

15.6 Assessment Methodology

15.6.1 The methods adopted for the assessment of the physical processes changes would be slightly different to those adopted for other environmental topics. This is because whilst the Project has the potential to cause changes to hydrodynamic and sedimentary processes, these changes are not, in themselves, generally recognised as environmental features/ receptors and, therefore, do not equate to ‘effects’. The effects would instead be the consequence of these changes on other environmental features. For example, ‘changes’ in the transport and deposition of sediment may ‘effect’ the structure and function of marine habitats and their associated species.

15.6.2 It should be noted, therefore, that it is intended that the assessment undertaken in relation to this topic, would apply the same impact assessment methodology as described in **Section 4.6** of **Chapter 4 The EIA Process** and would assess the potential ‘exposure to change’ resulting from the impact pathways that have been scoped into the assessment. The consequent significance of effects resulting from physical processes changes on other environmental features/ receptors would be assessed in other topic-specific ES chapters, including **Chapter 8 Nature Conservation (Marine Ecology)**, **Chapter 16 Marine Water**

and Sediment Quality and **Chapter 17 Water Quality, Coastal Protection, Flood Risk and Drainage**.

15.6.3 It is recognised, however, that physical processes changes may potentially impact on physical environmental receptors, such as the local coastline and the nearshore sandbank and channel system, along with existing berth and jetty infrastructure. For these physical receptors, therefore, an assessment of effect significance would be undertaken following the methodology presented in **Section 4.6** of **Chapter 4 The EIA Process**. In accordance with published guidance and an established approach that has been used in numerous previous EIAs, the assessment would include an evaluation of the importance/ value and sensitivity of relevant physical processes receptors.

15.6.4 Numerical modelling tools and conceptual analyses would be used to predict coastal processes, hydrodynamic and sedimentary effects by comparing the baseline and future environmental conditions created by the Project. This would include predicting the changes to tidal water levels and currents, SSC and erosion and accretion patterns, and waves. The models would also allow for the fate of sediment plumes from marine construction and maintenance dredging and disposal activities (if required) to be simulated.

15.6.5 Changes in hydrodynamic and sedimentary processes would be considered in the context of climate change (specifically sea level rise) over the engineering design period of the Project by assessing the effects under projected future sea levels. The existing geotechnical information would also be analysed to optimise the construction and dredging methods and minimise changes in physical processes during construction and operation. Some existing ground investigation data does exist which would be used to inform the specifications of any project specific ground investigation (GI) works. Ultimately this data would be required in order to inform the specifics of the marine infrastructure and in particular the diameter, number and driven depth of the steel tubular piles.

15.6.6 The modelling would be completed using existing models of the Humber Estuary, with updates to ensure mesh resolution and model performance across the primary study area remains suitable. ABPmer hold existing models using a range of modelling software products, including Deltares Delft3D suite and the Danish Hydraulic Institute (DHI) software package MIKE21FM (Flexible Mesh). Both of these modelling tools have previously been developed specifically for oceanographic, coastal and estuarine applications within the Humber region. The selected modelling tools would be subject to update with latest available bathymetric and topographic data, along with a further verification stage using local measurements.

15.6.7 Following the refinement of the models to replicate the baseline conditions, the models would be updated to include a representation of the marine elements of the Project, namely the jetty, the dredge footprint and the dredge disposal site(s) (if required). The models would also be updated to include a representation of any other coastal and marine developments that may overlap or interact with the Project to allow the potential for cumulative effects to be assessed.

15.6.8 There is sufficient available information and data sources to support the numerical modelling and conceptual analyses and no further field survey work is

considered necessary (with the exception of the hydrodynamic and grab sampling surveys (described above) and subsequent GI surveys to inform the engineering design).

Relevant Legislation, Policy and Technical Guidance

15.6.9 The potential effects of the Project on physical processes would be considered in the topic-specific ES chapter, which would cross-reference, as appropriate, relevant policy, legislation and guidance, including:

a. The Planning Act 2008.
b. The Marine and Coastal Access Act 2009 (MCAA).
c. The Habitats Regulations, which implement the Birds and Habitats Directives.
d. The Water Framework Regulations, which implement the European WFD (2000/ 60/ EC).
e. The Waste (England and Wales) Regulations 2011, which implement Directive 2008/ 98/ EC on waste (Waste Framework Directive).
f. NPSfP (Ref 15-3).
g. UK Marine Policy Statement (Ref 15-4) (HM Government, 2011) as required by Section 44 of the Marine and Coastal Access Act 2009.
h. East Inshore and East Offshore Marine Plans (Ref 15-5).
i. UK Marine Strategy (Ref 15-6).
j. Relevant local policy.

15.7 Consultation

15.7.1 Key consultees for the physical processes assessment would include the Marine Management Organisation (MMO), along with Centre for Environment, Fisheries and Aquaculture Science (Cefas) as their technical advisors, and the Environment Agency.

15.8 Summary

15.8.1 A summary of the scope of the proposed scope of the physical processes assessment is provided in **Table 15.3**. This illustrates that at present, no elements have been scoped out of the assessment.

Table 15.3 Summary of Scope for the Physical Processes Assessment

Element	Phase	Scoped In	Scoped Out	Justification
Increased SSC and potential sedimentation over the extent of the disturbance plume as a result of the construction of the new jetty (piling) and capital dredging works	Construction	✓	x	Construction works have the potential to increase SSC and sedimentation.
Increased SSC and potential sedimentation as a result of the deposit of capital dredge material at a licensed offshore disposal site	Construction	✓	x	Construction works have the potential to increase SSC and sedimentation.
Changes in seabed bathymetry and composition as a result of deposition of dredged/ disposal material within the area of the respective plumes	Construction	✓	x	Construction works have the potential to change seabed bathymetry and composition.
Local changes to hydrodynamic regime (flow speed and direction) as a result of the jetty (piling) and maintenance dredging	Operation	✓	x	Operation phase has the potential to alter local hydrodynamics.
Local changes to the wave regime, as a result of the jetty (piling) and maintenance dredging	Operation	✓	x	Operation phase has the potential to alter local waves.
Associated local changes to the sediment transport pathways, as a result of localised changes to the driving hydrodynamic (and wave) forcing	Operation	✓	x	Changes to hydrodynamics and waves have the potential to alter local sediment transport pathways.
Increased SSC and potential sedimentation in the area of dispersal plume as a result of maintenance dredging	Operation	✓	x	Operation phase has the potential to increase SSC and sedimentation.

Element	Phase	Scoped In	Scoped Out	Justification
Increased SSC and potential sedimentation as a result of deposition of maintenance dredge material at a licensed disposal site	Operation	✓	x	Operation phase has the potential to increase SSC and sedimentation.
Changes in seabed bathymetry and composition as a result of deposition of dredged/ disposed maintenance dredge material	Operation	✓	x	Operation phase has the potential to change seabed bathymetry and composition.

15.9 References

Ref 15-1 Townend, I. H., Pethick. J., Balson, P., Roberts, B. & Young. R. (2000). The geomorphology of the Humber Estuary. In 35th MAFF Conference of River and Coastal Engineers, MAFF, London. pp. 3.4.1–3.4.11.

Ref 15-2 Environment Agency. (2018). Coastal flood boundary conditions for the UK: update 2018. Technical summary report. SC060064/ TR6.

Ref 15-3 DfT (2012) National Policy Statement for Ports.

Ref 15-4 HM Government. (2011). UK Marine Policy Statement. HMSO, London.

Ref 15-5 Defra. (2014). East Inshore and East Offshore Marine Plans.

Ref 15-6 Defra. (2019). Marine Strategy Part One: UK updated assessment and Good Environmental Status October 2019.

16 Marine Water and Sediment Quality

16.1 Introduction

16.1.1 This section sets out the proposed scope and methodology of the marine water and sediment quality assessment of the Project. The chapter also details the datasets to be used to inform the assessment, provides an overview of baseline conditions, sets out the likely significant effects to be considered within the assessment, and discusses how these likely significant effects would be assessed for the purpose of the EIA.

16.2 Baseline Environment and Study Area

Data Sources

16.2.1 A desk-based study would be undertaken to inform the baseline characterisation on which the water and sediment quality impact assessment would be based. This would include the following key data sources:

a. 'Catchment Data Explorer' website (Ref 16-1).

b. Water body summary table within the Environment Agency (Ref 16-2) 'Clearing the Waters for All' guidance.

c. Multi-Agency Geographic Information for the Countryside (MAGIC) website (Ref 16-3).

d. 'Find a bathing water' website (Ref 16-4).

e. List of Shellfish Water Protected Areas in England (Ref 16-5).

f. 'Check for Drinking Water Safeguard Zones and NVZs' website (Ref 16-6).

g. 'Urban waste water treatment: updated sensitive areas maps 2019' (Ref 16-7).

h. Site-specific marine sediment samples to be collected in 2022 within the boundaries of the Project marine infrastructure works area for particle size analysis (PSA) and chemical contamination analysis (in this context a sediment sampling plan request would be submitted to the Marine Management Organisation (MMO)).

Study Area

16.2.2 The study area is the area over which potential direct and indirect effects of the Project may occur during construction and operation. The direct effects on water and sediment quality are those that may arise due to accidental releases during construction. Indirect effects are those that may arise due to sediment that is disturbed into the water column during the marine works resulting in changes in water quality through changes in the levels of dissolved oxygen or the release of sediment-bound contaminants.

16.2.3 The study area for the water and sediment quality topic is considered to be the Project marine infrastructure works area and the adjacent Immingham coastline, the existing jetties across the near-field and the central part of the Humber

Estuary, generally between Sunk Chanel and Halton Middle. Within the far-field region, the study area includes the wider Humber Estuary from the mouth to at least the Hull Bend. Should any of the dredge disposal options necessitate it, the study area may be extended in order that the full extent of potential impact is considered within the assessment.

16.2.4 The water and sediment quality ES chapter would, through further analysis and assessment (including numerical modelling), refine the study area for the purposes of the impact assessment, as necessary.

Current Baseline

Water Quality

16.2.5 Water quality standards and objectives are implemented through a range of legislation including the Water Environment (WFD) (England and Wales) Regulations 2017 (as amended), known as the Water Framework Regulations, the Bathing Water Regulations 2013 (as amended), and the UK Marine Strategy. The standards and objectives were established through the WFD which provided for holistic management of all water bodies including rivers, estuaries, groundwater, lakes, and coastal waters to 1nm offshore.

16.2.6 Domestic legislation derived from the WFD integrates and requires protection of designated shellfish waters, through The Water Environment (Water Framework Directive) (England and Wales) (Amendment) Regulations 2016; bathing waters, through the Bathing Water Regulations; nature conservation sites, through the Conservation of Habitats and Species Regulations 2017 (as amended); and eutrophication, through the Nitrate Pollution Prevention Regulations 2015 (as amended).

16.2.7 The Environment Agency published River Basin Management Plans (RBMPs), which set out measures through which compliance with WFD objectives would be achieved. The Humber River Basin District RBMP identifies the Humber Lower water body (ID: GB530402609201) within and surrounding the Project (including Humber Estuary disposal sites) (Ref 16-1) (refer to **Figure 16.1** in **Appendix A**). It is recorded as a heavily modified water body (HMWB) due to coastal protection use, flood protection use, and navigation use. This means ‘ecological potential’ is applied rather than ‘ecological status’. The current (2019) overall status of this waterbody is ‘moderate’, with an ecological potential of ‘moderate’, and a chemical status of ‘fail’. The reason for the ‘fail’ chemical status is based on priority substances Cypermethrin and Dichlorvos, and priority hazardous substances Polybrominated diphenyl ethers (PBDE), perfluorooctane sulphonate (PFOS), Benzo(b)fluoranthene, Benzo(g-h-i)perylene, Mercury and Its Compounds, and Tributyltin Compounds. Surface water bodies overlapping the landside works are detailed in **Chapter 17 Water Quality, Coastal Protection, Flood Risk and Drainage**.

16.2.8 Cleethorpes designated bathing waters is located approximately 11.5km south-east of the Project, whilst the Humberston Fitties is located approximately 15km to the south-east. Cleethorpes was assessed as having ‘excellent’ bathing water quality in 2019 (Ref 16-4) having improved from a ‘good’ classification in 2016

and 2017. Humberston Fitties was assessed as having 'good' bathing water quality in 2019 (Ref 16-4), having deteriorated from a 'excellent' classification in 2016, 2017 and 2018.

16.2.9 There are no Shellfish Water Protected Areas in the vicinity of the Project (Ref 16-6). The nearest is the West Wash Shellfish Water Protected Area, located over 65km to the south.

16.2.10 The landside extent of the Project is located on land included in the North Beck Drain Nitrate Vulnerable Zone (NVZ), covering Immingham as well as South Killingholme and Healing, as designated under the Nitrates Directive (Ref 16-5) (refer to **Figure 16.1** in **Appendix A**).

16.2.11 There are no sensitive areas designated under the Urban Waste Water Treatment Directive (91/ 271/ EEC) in the vicinity of the Project (Ref 16-7).

16.2.12 The main watercourses in the vicinity of the DCO site boundary (within 5km) are South Killingholme Haven which drains to the north-west corner of the Port of Immingham (but is defined as part of the Humber Estuary water body), North Killingholme main drain, Habrough Marsh drain and the Humber Estuary itself.

Sediment Quality

16.2.13 The UK has not adopted formal quantitative Environmental Quality Standards (EQS) for sediments. In the absence of any quantified UK standards, therefore, common practice for characterising baseline sediment quality conditions is to compare against the Cefas Guideline Action Levels for the disposal of dredged material (Ref 16-8).

16.2.14 Cefas Guideline Action Levels are used as part of a 'weight of evidence' approach to assessing material suitability for disposal at sea. Cefas guidance indicates that, in general, contaminant levels below Action Level 1 (AL1) are of no concern and are unlikely to influence the licensing decision. Material with contaminant levels above Action Level 2 (AL2), however, is generally considered unsuitable for disposal at sea, whilst dredged material with contaminant levels between AL1 and AL2 requires further consideration before a decision can be made as to disposal. As a consequence, the Action Levels should not be viewed as pass/ fail thresholds, whilst it is also recognised that these guidelines are not statutory requirements.

16.2.15 Borehole logs were collected in 2001 to inform the dredge and disposal of material for the development of IOH (Ref 16-9). These were taken to the west of the Project between Immingham Bulk Terminal and Western Jetty. Four borehole samples were analysed for trace metals, organotins, polycyclic aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs) (BH206, BH209, BH210 and BH212).

16.2.16 Considering all contaminants and samples together, the sediments within the top 4m of the alluvium in the area of the IOH dredge were considered to have slight to moderate levels of contamination. The levels were approximately in line with that experienced throughout the estuary during the time they were sampled. Anthropogenic pollution of heavy metals and organochlorides/ organotins have only been in existence for the last 200 years and from port activity at Immingham

since the early 1900s. Pollution inputs to the estuary were likely to have been highest in the 1950s through to the 1970s, with a general trend towards cleaner sediments since the early 1990s (Ref 16-9).

16.2.17 Recent sediment sampling has also been undertaken in the vicinity of the proposed marine works in October 2021. Sediment samples were collected from ten stations, including subsurface samples, and tested for trace metals, organotins, PAHs, PCBs, PBDEs and organochloride pesticides (OCPs). The results showed that contaminant concentrations were generally low, with most values below the respective AL1 or marginally exceeding AL1. There were no instances where the concentration exceeded the respective AL2 (or a sample concentration was close to exceeding this threshold). In general, concentrations were also typically higher in surface samples compared to those obtained at depth, supporting the conclusions drawn from the borehole logs collected for the IOH development summarised above.

Future Baseline

16.2.18 If the Project were not to take place, water and sediment quality would continue to be influenced by natural and human-induced variability, ongoing cyclic patterns and trends (e.g. ongoing maintenance dredging and disposal, and existing discharge licences in the area). The future baseline would also be influenced by climate change, such as changes in sea temperature.

16.3 Planned Surveys

16.3.1 Site-specific marine sediment samples would be collected in 2022 within vicinity of the proposed marine infrastructure works. This would be conducted in line with a sediment sample plan that would be requested from the MMO. Sediments would be tested for PSA and a suite of chemical contaminants as specified in the sediment sample plan.

16.4 Identification of Potential Effects

16.4.1 The water and sediment quality chapter of the ES would set out the assessment of the likely changes to be generated by the Project, both beneficial and adverse and during both the construction and operational phases.

16.4.2 Potential cumulative effects on water and sediment quality could also arise as a result of other coastal and marine developments in the area, as well as ongoing activities, including maintenance dredging and disposal activities. These would be considered as part of the cumulative and in-combination assessment to be presented within the ES.

16.4.3 The sections below consider the potential water and sediment quality effects during Project construction and operation, and whether defined impact pathways have the potential to result in significant effects.

Construction

Scoped In

16.4.4 The potential water and sediment quality impact pathways during the Project construction phase are as follows:

a. Changes to dissolved oxygen concentrations as a result of increased SSC during piling, capital dredging and disposal activities (if required).

b. Changes to chemical water quality as a result of potential sediment-bound contaminants being released during piling, capital dredging and disposal activities (if required).

c. Redistribution of sediment-bound contaminants during piling, capital dredging and disposal activities (if required).

Scoped Out

16.4.5 The following water and sediment quality impact pathways are proposed to be scoped out of the EIA:

a. **Changes to levels of contaminants in water (including accidental spillages) during construction**: The proposed works would not directly introduce contaminants to the marine environment and good practice measures, such as those described in Guidance for Pollution Prevention: Works and Maintenance in or Near Water (GPP5), would be used to minimise and mitigate the potential for accidental spillages during dredging and disposal. The potential risk of spillages would be minimised and mitigated through the application of environmental best practice management measures to be specified in the CEMP. This impact pathway has, therefore, been scoped out of further assessment in the EIA.

Operation

Scoped In

16.4.6 The potential water and sediment quality impact pathways during the Project operational phase are as follows:

a. Changes to dissolved oxygen concentrations as a result of increased SSC during the maintenance dredging and disposal activities (if required).

b. Changes to chemical water quality as a result of potential contaminants in the seabed sediment being released during maintenance dredging and disposal activities (if required).

c. Redistribution of sediment-bound contaminants during maintenance dredging and disposal activities (if required).

16.4.7 Potential cumulative effects on water and sediment quality could arise as a result of other coastal and marine developments in the area, as well as ongoing activities, including maintenance dredging and disposal activities. These would be considered as part of the cumulative and in-combination assessment to be presented within the ES.

Scoped Out

16.4.8 The following water and sediment quality impact pathways are proposed to be scoped out of the EIA:

a. **Changes to levels of contaminants in water (including accidental spillages) during operation:** The proposed works would not directly introduce contaminants to the marine environment and good practice measures, such as those described in Guidance for Pollution Prevention: Works and maintenance in or near water (GPP5), would be used to minimise and mitigate the potential for accidental spillages during dredging and disposal. The potential risk of spillages would be minimised and mitigated through the application of environmental best practice management measures. This impact pathway has, therefore, been scoped out of further assessment in the EIA.

Decommissioning

16.4.9 The DCO application would not make any provision for the decommissioning of the marine infrastructure or plant or equipment on the jetty topside. This is because the development would, once constructed, become part of the fabric of the Immingham port estate and would, in simple terms, continue to be maintained so that it can be used for port related activities to meet a long-term need. This is discussed further in **Section 2.4** of **Chapter 2** of this EIA Scoping Report.

16.5 Design, Mitigation and Enhancement Measures

16.5.1 The footprint and alignment of the marine infrastructure would be designed to minimise potential changes to the physical processes of the estuary, whilst ensuring operational viability and safety. Consideration of alternative beneficial use of dredge sediment and dredge disposal options would also be undertaken within a Waste Hierarchy Assessment. Furthermore, as noted above, good practice measures would be used to minimise and mitigate the potential for accidental spillages during Project construction, and the potential risk of spillages would be minimised and mitigated through the application of environmental best practice management measures (to be defined in the CEMP).

16.6 Assessment Methodology

16.6.1 A desk-based review of the Environment Agency's Water Quality Data Archive, and other historic developments and sample data would be undertaken to support a detailed understanding of water and sediment quality in the study area. This would include a review of contaminant concentrations, both dissolved in water and sediment bound.

16.6.2 A sediment contamination survey of the proposed dredge area would be undertaken to characterise the dredge material and to support any application to dispose of dredge material at an existing licensed disposal site. A sediment sample plan request would be submitted to the MMO to confirm the suite of contaminants, number of samples, sample locations, replicates and any sampling with depth required, taking account of available guidelines for the management of dredge material to be disposed at sea (Ref 16-10).

16.6.3 Contaminant concentrations in sediment samples would be compared to Cefas Guideline ALs to determine their suitability for disposal at sea. Contaminant concentrations in sediments would also inform the assessment of potential changes to dissolved concentrations in the water column and predicted redistribution of contaminants as a result of the Project.

16.6.4 The outputs of the physical processes assessment (**Chapter 15 Physical Processes**) would be used to inform the water and sediment quality assessment. Incremental changes to dissolved contaminant concentrations, in addition to background concentrations, would be compared to EQS values to consider potential ecological impacts, based on maximum allowable concentrations (MAC; short-term) and thresholds for annual averages (AA; long-term). The outputs of the physical processes assessment would also support an assessment of changes to dissolved oxygen concentrations.

16.6.5 A WFD assessment would be undertaken to determine the potential implications of the Project on the objectives of the relevant water bodies (**Section 4.13** of **Chapter 4 The EIA Process**). This assessment would be based on the information and analysis provided within the ES in relation to changes in physical processes, water and sediment quality, and impacts on nature conservation and marine ecology receptors. The WFD assessment would be provided as an appendix to the ES following the format specified in the latest *Clearing the Waters for All* guidance (Ref 16-2).

Relevant Legislation, Policy and Technical Guidance

16.6.6 The potential effects of the Project on water and sediment quality would be considered in the topic-specific ES chapter, which would cross-reference, as appropriate, relevant policy, legislation and guidance, including:

a. The Marine and Coastal Access Act 2009 (MCAA).
b. The Habitats Regulations, which implement the Birds Directive (2009/ 147/ EC) and Habitats Directives (92/43/EEC).
c. The Water Framework Regulations, which implement the WFD (2000/ 60/ EC).
d. Bathing Waters Directive (2006/7/EC).
e. Nitrates Directive (91/676/EEC).
f. Urban Waste Water Treatment Directive (91/271/EEC).
g. Shellfish Waters Directive (2006/113/EC; now subsumed within the WFD)[3].
h. NPSfP (Ref 16-11).

[3] This Directive was repealed by the WFD in 2013. The rules set down, particularly in regard to microbiology and physical-chemistry parameters of relevance to River Basin Management Plans, were integrated in the WFD.

i. UK Marine Policy Statement (Ref 16-12) (HM Government, 2011) as required by Section 44 of the Marine and Coastal Access Act 2009.

j. East Inshore and East Offshore Marine Plans (Ref 16-13).

k. UK Marine Strategy (Ref 16-14).

l. Advice Note Eighteen: The Water Framework Directive (Ref 16-15).

m. Relevant local policy.

n. The Environment Agency's "Clearing the Waters for All" guidance (Ref 16-2).

16.7 Consultation

16.7.1 Key consultees for the water and sediment quality assessment include the MMO, along with Cefas as their technical advisors, and the Environment Agency.

16.8 Summary

16.8.1 A summary of the proposed scope of the marine water and sediment quality assessment is provided in **Table 16.1**. This indicates that changes to levels of contaminants in water (including accidental spillages) during construction and operation have been scoped out of the EIA.

Table 16.1 Summary of Scope for the Marine Water and Sediment Quality Assessment

Element	Phase	Scoped In	Scoped Out	Justification
Changes to dissolved oxygen concentrations as a result of increased SSC during piling, capital dredging and disposal activities	Construction	✓	x	Construction works have the potential to increase SSC and reduce dissolved oxygen concentrations.
Changes to chemical water quality as a result of potential sediment-bound contaminants being released during piling, capital dredging and disposal activities	Construction	✓	x	Construction works have the potential to disturb sediments and release sediment-bound contaminants into the water column.
Redistribution of sediment-bound contaminants during piling, capital dredging and disposal activities	Construction	✓	x	Construction works have the potential to redistribute sediments and sediment-bound contaminants.
Changes to levels of contaminants in water (including accidental	Construction	x	✓	Proposed works would not directly introduce contaminants to the environment, and pollution risks

Element	Phase	Scoped In	Scoped Out	Justification
spillages) during construction				would be managed by environmental best practice management.
Changes to dissolved oxygen concentrations as a result of increased SSC during the maintenance dredging and disposal activities	Operation	✓	x	Operational dredging and disposal activities have the potential to increase SSC and reduce dissolved oxygen concentrations.
Changes to chemical water quality as a result of potential contaminants in the seabed sediment being released during maintenance dredging and disposal activities	Operation	✓	x	Operational dredging and disposal activities have the potential to disturb sediments and release sediment-bound contaminants into the water column.
Redistribution of sediment-bound contaminants during maintenance dredging and disposal activities	Operation	✓	x	Operational dredging and disposal activities have the potential to redistribute sediments and sediment-bound contaminants.
Changes to levels of contaminants in water (including accidental spillages) during operation	Operation	x	✓	Project would not directly introduce contaminants to the environment, and pollution risks would be managed by environmental best practice management.

16.9 References

Ref 16-1 Environment Agency. (2020a). Catchment Data Explorer.

Ref 16-2 Environment Agency. (2016). Water Framework Directive assessment: estuarine and coastal waters.

Ref 16-3 Natural England. (2020). MAGIC Interactive Map.

Ref 16-4 Environment Agency. (2021). Find a bathing water.

Ref 16-5 Environment Agency. (2020b). Check for drinking water safeguard zones and NVZs.

Ref 16-6 Department for Environment, Food and Rural Affairs. (2016). Water Framework Directive. List of Shellfish Water Protected Areas in England. March 2016. Department for Environment, Food and Rural Affairs.

Ref 16-7 Department for Environment, Food and Rural Affairs. (2019a). Urban waste water treatment: updated sensitive areas maps 2019.

Ref 16-8 Marine Management Organisation. (2014). Marine Licensing: sediment analysis and sample plans.

Ref 16-9 ABP Research & Consultancy Ltd. (2001). Immingham Outer Harbour, Environmental Statement, August 2001, ABP Research & Consultancy Ltd, Research Report No. R.903.

Ref 16-10 OSPAR Commission. (2014). OSPAR Guidelines for the management of dredged material at sea. OSPAR 2014-06.

Ref 16-11 Department for Transport. (2012). National Policy Statement for Ports.

Ref 16-12 HM Government. (2011). UK Marine Policy Statement.

Ref 16-13 Department for Environment, Food and Rural Affairs. (2014). East Inshore and East Offshore Marine Plans.

Ref 16-14 Department for Environment, Food and Rural Affairs. (2019b). Marine strategy part one: UK updated assessment and Good Environmental Status.

Ref 16-15 Planning Inspectorate. (2017). Advice Note Eighteen: The Water Framework Directive.

17 Water Quality, Coastal Protection, Flood Risk & Drainage

17.1 Introduction

17.1.1 This section sets out the proposed scope and methodology of the water quality, coastal protection, flood risk and drainage assessment of the Project. The chapter also details the datasets to be used to inform the assessment, provides an overview of baseline conditions, sets out the likely significant effects to be considered within the assessment, and discusses how these likely significant effects would be assessed for the purpose of the EIA.

17.1.2 Whilst this section covers water quality, this pertains to onshore surface water only. Aspects relating to offshore water quality are addressed in **Chapter 16 Marine Water and Sediment Quality**, whilst groundwater aspects are covered in the **Chapter 20 Ground Conditions and Land Quality**.

17.2 Baseline Environment and Study Area

Data Sources

17.2.1 A desk-based study would be undertaken to inform the baseline characterisation regarding water quality, coastal protection, flood risk and drainage on which the impact assessment would be based. This would include the following key data sources:

a. Catchment Data Explorer website (Ref 17-1).

b. Multi-Agency Geographic Information for the Countryside (MAGIC) website (Ref 17-2).

c. Flamborough Head to Gibraltar Point Shoreline Management Plan (Ref 17-3).

d. Humber Flood Risk Management Strategy (Ref 17-4) (note that this Strategy is currently being updated and would be incorporated into the assessment should the update be completed and made publicly available).

e. Environment Agency Flood Maps for Planning (https:// flood-map-for-planning.service.gov.uk) (Ref 17-5).

f. Environment Agency Long-term Information Service Check the long term flood risk for an area in England – GOV.UK (www.gov.uk) (Ref 17-6).

Study Area

17.2.2 For the purposes of the water quality assessment, a study area of approximately 1km around the DCO site boundary (**Figure 17.1** in **Appendix A**) has been considered in order to identify surface water bodies that could reasonably be affected by the Project. However, since watercourse flow and water quality impacts may propagate downstream, where relevant the assessment would also consider a wider study area based on professional judgement.

17.2.3 As coastal protection, flood risk and drainage impacts can also impact upstream and downstream, the chapter and flood risk assessment (FRA) considers a wider study area, where relevant. Professional judgement around hydrological linkages would be applied to identify the extent to which such features are considered.

17.2.4 The study area will be subject to ongoing review and would be confirmed in the ES.

Current Baseline

Water Quality

17.2.5 The following key water environment receptors in location the vicinity of the Project:

a. The Humber Estuary (Humber Estuary TraC Operational Catchment) and in particular the Lower Humber (GB530402609201) which forms the eastern boundary of the DCO site boundary. The review of this waterbody is considered in **Chapter 16 Marine Water and Sediment Quality**.

b. North Beck Drain, Middle Drain and Habrough Marsh Drain (a North East Lindsey internal drainage board (IDB) watercourse skirts the southern and western perimeters of the port estate flowing from south to north) are all located in the vicinity of the DCO site boundary (part of Becks Northern Operational Catchment).

c. On-shore WFD water bodies: North Beck Drain (GB104029067575) and North Lincolnshire Chalk Unit waterbody (GB40401G401500). The conditions of these waterbodies are Moderate ecological status and Poor overall status respectively. These classifications by the Environment Agency are based on 'lowest' category, which for the surface water body is ecological status and for groundwaters is around resources. A summary of WFD data for 2019 is shown in **Table 17.1**.

d. Various ecological sites.

e. Humber Estuary (Ramsar, SPA and SAC).

f. On-shore limited conservation value apart from small patches of Priority Habitat (Coastal and Floodplain Grazing Marsh and Good quality semi-improved grassland: Non- Priority).

17.2.6 There are a number of large source protection zones (SPZ) local to the DCO site, including an SPZ1 (inner zone) – lying very close to the edge of the Immingham Docks site. The other SPZs are located west of the coastal strip (presumably designed to minimise saline intrusion).

17.2.7 Lying further to the west of the coastal (west of A180) are various Drinking Water Safeguard Zones (Groundwater) associated with catchments of these SPZs. There are no similar Drinking Water Safeguard Zones (Surface Waters) in the vicinity.

Table 17.1 Summary of WFD for On-shore Water Bodies (2019)

Classification Item	North Beck Drain (GB104029067575)
Ecological	Moderate
Biological quality elements	
Invertebrates	
Physico-chemical quality elements	
Ammonia (Phys-Chem)	
Hydromorphological Supporting Elements	Supports good
Supporting elements (Surface Water)	Moderate
Specific pollutants	High
Chromium (VI)	High
Chemical	Fail
Priority hazardous substances	Fail
Priority substances	Good
Other Pollutants	Does not require assessment
Classification Item	**North Lincolnshire Chalk Unit waterbody (GB40401G401500)**
Overall Water Body	Poor
Quantitative	Poor
Quantitative Status element	Poor
Quantitative Dependent Surface Water Body Status	Poor
Quantitative Groundwater Dependent Terrestrial Ecosystems (GWDTEs) test	Good
Quantitative Saline Intrusion	Good
Quantitative Water Balance	Good
Chemical (GW)	Poor
Chemical Status element	Poor
Chemical Dependent Surface Water Body Status	Good
Chemical Drinking Water Protected Area	Poor
Chemical GWDTEs test	Good

Chemical Saline Intrusion	Good
General Chemical Test	Poor
Supporting elements (Groundwater)	
Prevent and Limit Objective	Active
Trend Assessment	Upward trend

17.2.8 The area surrounding the DCO site boundary is drained via a network of small land drainage ditches that convey surface water from the surrounding greenfield areas located between the Project and the Humber Estuary.

17.2.9 The smaller land drains and North East Lindsey IDB drains, whilst shown on the Digital Rivers Network Map, do not have ecological and chemical classification under the WFD.

Coastal Protection

17.2.10 Although the DCO site boundary is shown as not benefitting from flood defences on the Environment Agency's flood maps, there are tidal flood defences in place along the entire south bank of the Humber Estuary. These tidal flood defences provide protection against a flood event with a 0.5% chance of occurring in any year, based on Still Water Tidal Water Levels.

17.2.11 ABP owns and is responsible for the flood defences along the frontage of Immingham Docks. The flood defences along the wider Humber Estuary south bank frontage are maintained by the Environment Agency. However, the Environment Agency is responsible for inspecting the condition of all flood defences, including those maintained by ABP, and thus inspections are regularly undertaken to ensure that any potential defects are identified early.

Flood Risk - Tidal and Fluvial Sources

17.2.12 The Environment Agency Flood Map for Planning for fluvial and tidal flooding on the Environment Agency website, accessed on 28th June 2022, show the DCO site boundary is located entirely in Flood Zone 3 (high risk of flooding) when the presence of flood defences is not taken into account – refer to **Figure 17.1** in **Appendix A**.

17.2.13 Definitions of the Environment Agency flood zones, as defined in Table 1 of the National Planning Policy Guidance (Ref 17-7) (NPPG) are presented in **Table 17.2**.

Table 17.2 Environment Agency Flood Zone Definitions

Flood Zone	Definition	Risk of flooding
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	Definition	Risk of flooding
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 has to flow or be stored in times of flood.	Very High

17.2.14 As the DCO site boundary is afforded protection from defences up to and including the 0.5% Annual Exceedance Probability (AEP) flood event still water levels, the primary risk of flooding from the Humber Estuary is a residual risk from overtopping and from a failure of the defences. However, the likelihood of either events occurring is considered to be low.

17.2.15 Tide-locking is a common problem in watercourses where defences occur. Habrough Marsh Drain (Ordinary Watercourse) and North Beck Drain (Main River) are both gravity drainage systems with a flapped outfall to the Humber to prevent the incoming tide from entering the channel when water levels in the estuary are high. When high tides prevent the watercourses from discharging into the Humber Estuary, water levels within the drains would increase temporarily until the tidal level has decreased sufficiently to allow the outfall to operate again. Areas of the DCO site boundary located directly adjacent to Habrough Marsh Drain and the North Beck Drain are at residual risk of fluvial flooding during tide-locking events.

Flooding from Artificial Sources

17.2.16 The Environment Agency has produced maps based on mathematical modelling showing the extent of flooding in the unlikely event of large reservoir breaching in England and Wales. The Environment Agency Long-Term Flood Risk Map shows the DCO site boundary is not at risk of flooding from reservoir failure.

Groundwater Flooding

17.2.17 There are no historical flood records for groundwater flooding within the DCO site boundary or the wider Port of Immingham area. Limited historical ground investigation (GI) records indicated the presence of perched/ shallow groundwater within the study area. Therefore, given the limited information on groundwater and potential for groundwater flooding in the area, the baseline assessment for the risk of flooding from groundwater sources is assessed as a medium risk. This would be assessed further when site-specific GI data becomes available.

Surface Water (Pluvial) Flooding

17.2.18 The Environment Agency Risk of Flooding from Surface Water (RoFSW) maps (accessed online 28th June 2022) indicate areas at risk from surface water flooding when rainwater does not drain away through the normal drainage systems or soak into the ground, but instead lies on or flows over the ground. The RoFSW flood map for the DCO site boundary is presented as **Figure 17.1** in **Appendix A**.

17.2.19 The risk of surface water is defined as very low, low, medium and high by the Environment Agency, with these risks being defined in **Table 17.3**.

Table 17.3 Definition of Risk from Surface Water Flooding

Risk of flooding	Definition
Very Low	Each year, the area has a chance of flooding of less than 1 in 1000 (0.1%).
Low	Each year, the area has a chance of flooding of between 1 in 1000 (0.1%) and 1 in 100 (1%).
Medium	Each year, the area has a chance of flooding of between 1 in 100 (1%) and 1 in 30 (3.3%).
High	Each year, the area has a chance of flooding greater than 1 in 30 (3.3%).

17.2.20 The RoFSW for the area shows the DCO site boundary is generally at very low to low risk of flooding from surface water sources.

Drainage

17.2.21 Anglian Water asset mapping shows there is no surface water drainage infrastructure within the DCO site boundary and that drainage of surface water within the wider Port of Immingham is privately owned by ABP.

17.2.22 Surface water from hard standing areas is generally discharged (at a restricted flow rate) directly to North East Lindsey IDB adjacent watercourses and ultimately to the Humber Estuary or, directly to the Humber Estuary as an unrestricted discharge.

17.2.23 A 600mm diameter Anglian Water foul sewer main and the Immingham Sea Outfall are located in proximity to the DCO site boundary. In addition, package sewage treatment plants (owned by ABP) provide treatment of effluent on-site within the Port before being discharged to the Humber Estuary.

17.2.24 Given the generally undeveloped nature of the DCO site boundary, it is assumed that the land within drains via natural infiltration processes to the land drains located within and adjacent to the DCO site boundary. There is a possibility that historical drainage infrastructure is present beneath the East Site, however, it is not known whether the site drains via natural processes or via a piped system.

17.2.25 Tide-locking is a problem when drainage systems are prevented from discharging due to high river/ drain or estuary levels. Water levels within the drainage

systems would increase temporarily until the tidal level has decreased sufficiently to allow the system to discharge again.

Future Baseline

17.2.26 Generally, there is an improving trend in water quality and the environmental health of waterways in the UK since the commencement of significant investment in sewage treatment in the 1990s, the adoption of the WFD from 2003, and the application of ever more stringent planning policies. In terms of water quality impacts, the future baseline assumes that all WFD water bodies achieve their planned target status by 2027.

17.2.27 It is likely that through the action of new legislative requirements and more stringent planning policy and regulation, that the health of the water environment would continue to improve post-2027. However, there are significant challenges such as adapting to a changing climate (i.e. in general drier summers, wetter winters, and an increased frequency of significant storms are forecast for the UK) and the pressures of population/ economic growth that could have a retarding effect on the water environment if it is not managed carefully through the design of projects, mitigation, and the maintenance of mitigating solutions. However, it is difficult to forecast these changes with any certainty.

17.2.28 Sea level rise is something which would affect coastal developments in the future due to climate change. The extent to which coastal protection prevents the intrusion of sea water back to the land remains a future uncertainty for the Project.

17.3 Planned Surveys

17.3.1 A walkover survey would be undertaken to inform the nature of the watercourses on the DCO site boundary, and where project interactions are most likely. The walkover findings would support the impact assessment and the WFD assessment baselines.

17.4 Identification of Effects

17.4.1 Water quality is most likely to be impacted during the Project construction phase. However, there remains potential for accidental spillages to occur during both Project operation and decommissioning of the landside infrastructure.

17.4.2 The assessment would include consideration of the vulnerability of the Project to climate change. The Project would also need to take account of the potential future requirement for adaptation of the existing coastal defences. As an example, consideration would be given to access requirements for construction plant for maintenance work or improvements to the existing coast protection and flood defence structures.

17.4.3 Potential cumulative effects on water quality, coastal protection, flood defence and drainage could arise as a result of other coastal and marine developments in the area, as well as ongoing activities. These would be considered as part of the cumulative and in-combination assessment to be presented within the ES.

17.4.4 The sections below consider the potential water environment effects during Project construction, operation and decommissioning.

Construction

17.4.5 Potential water environment impacts associated with the Project construction include:

a. Contamination from suspended solids or other chemical contaminants that may find their way into site runoff, infiltrate to ground, or be spilt directly into waterbodies when there are works within or adjacent to them.

b. The effects of diffuse urban pollutants in surface water runoff (that may contain metals, hydrocarbons, and inert solids etc.).

c. The risk of pollution from chemical spillages or fire on the site.

d. Alteration in fluvial and overland flow paths, and potential increase in flood risk, as a result of storing construction materials in the floodplain.

e. Increased risk of blockage of drains as a result of increased material (sands, gravels etc.) transported in runoff from site.

f. Increase in flood risk (fluvial, surface water and drainage infrastructure) due to changes to the rate and volume of surface water runoff entering the identified watercourses due to earthworks and changes in land use.

Operation

17.4.6 The potential water environment impact pathways during the Project operational phase are as follows:

a. Potential operational pollution of surface watercourses from accidental spillages (see **Chapter 21 Major Accidents and Disasters**).

b. Any operational impacts on surface water courses from the site including surface water drainage.

b. Increased risk of fluvial flooding to the development and surrounding area due to loss of floodplain storage.

c. Increased risk of flooding from fluvial flooding to the development and surrounding area over its lifetime due to climate change effects (increasing peak river flows).

d. Increase in flood risk (fluvial, surface water and drainage infrastructure) due to an increase in surface water runoff from the development.

e. Increase in risk of sewer flooding due to surface water runoff from the development.

f. Increased risk of groundwater flooding (particularly to any below ground development) as a result of high water table and/ or groundwater recharge.

Decommissioning

17.4.7 The potential water environment impacts during the Project decommissioning phase of the landside infrastructure would be the same as those for the construction phase.

17.4.8 The DCO application would not make any provision for the decommissioning of the marine infrastructure or plant or equipment on the jetty topside. This is because the development would, once constructed, become part of the fabric of the Immingham port estate and would, in simple terms, continue to be maintained so that it can be used for port related activities to meet a long-term need. This is discussed further in **Section 2.4** of **Chapter 2 The Project** of this EIA Scoping Report.

17.5 Design, Mitigation and Enhancement Measures

17.5.1 Water environment constraints would be taken into account during the design of the Project, particularly with regard to the route of pipelines, the approach to the installation of any footings for above ground pipelines near to watercourses, and surface water drainage proposals.

17.5.2 Where the assessment indicates the need for mitigation as a result of significant effects on water quality, coastal protection, flood risk and drainage, these would be outlined within the ES.

17.5.3 With regard to Project construction, the CEMP would define a range of best practice construction site practices aimed at protecting the water environment.

17.6 Assessment Methodology

17.6.1 There is no standard guidance in place for the assessment of the likely significant effects on the water environment from developments of this type. Based on professional judgement and experience of other similar schemes, a qualitative assessment of the likely significant effects on surface water quality, coastal protection, flood risk and drainage receptors would be undertaken.

17.6.2 The classification and significance of effects would be determined using the principles of the guidance and the criteria set out in DMRB LA 113 (Ref 17-8) adapted to take account of hydromorphology. Although these assessment criteria were developed for road infrastructure projects, this method is suitable for use on any development project and it provides a robust and well tested method for predicting the significance of effects. The methodology also considers advice set out in DfT TAG Unit A3, Environmental Impact Appraisal (Ref 17-9).

17.6.3 Following DMRB LA 113 (Ref 17-8), the importance of the receptor (refer to **Table 17.4**) and the magnitude of impact (refer to **Table 17.5**) are determined independently and are then used to determine the overall classification and significance of effects (refer to **Table 17.6**).

17.6.4 Whilst other disciplines may consider ‘receptor sensitivity’, ‘receptor importance’ is considered here. This is because when considering the water environment, the availability of dilution means that there can be a difference in the sensitivity and importance of a water body. For example, a small drainage ditch of low

conservation value and biodiversity with limited other socio-economic attributes, is very sensitive to impacts, whereas an important regional scale watercourse, that may have conservation interest of international and national significance and support a wider range of important socio-economic uses, is less sensitive by virtue of its ability to assimilate discharges and physical effects. Irrespective of importance, all controlled waters in England are protected by law from being polluted.

Table 17.4 Defining the Importance/ Sensitivity of Water Receptors

Importance	General Criteria	Surface Water	Hydromorphology	Flood Risk
Very high	The receptor has little or no ability to absorb change without fundamentally altering its present character, is of very high environmental value, or of international importance.	Watercourse having a WFD classification as shown in a River Basin Management Plan (RBMP) and Q95 ≥ 1.0m^3/ s; Site protected/ designated under international or UK habitat legislation (SAC, SPA, SSSI, WPZ, Ramsar Site. Critical social or economic uses (e.g. public water supply and navigation).	Unmodified, near to or pristine conditions, with well-developed and diverse geomorphic forms and processes characteristic of river and lake type.	Floodplain or defence protecting more than 100 residential properties from flooding; Flood Zone 3a and/ or 3b; Essential Infrastructure or highly vulnerable development.
High	Receptor of national or regional importance with a low ability to absorb change without fundamentally altering its present character.	Watercourse having a WFD classification as shown in a RBMP and Q95 < 1.0m^3/ s; Major Cyprinid Fishery; Species protected under international or UK habitat legislation. Critical social or economic uses (e.g. water supply and navigation). Important social or economic uses such as water supply, navigation or mineral extraction.	Conforms closely to natural, unaltered state and would often exhibit well-developed and diverse geomorphic forms and processes characteristic of river and lake type. Deviates from natural conditions due to direct and/ or indirect channel, floodplain, bank modifications and/ or catchment development pressures.	Floodplain or defence protecting between 10 and 100 residential properties or industrial premises from flooding; Flood Zone 2; More vulnerable development.
Medium	Receptor of regional or local importance, with medium ability to absorb, adapt to or recover from change. The receptor is of regional or local importance and has medium capacity to absorb change, adapt to or recover from	Watercourse detailed in the Digital River Network but not having a WFD classification as shown in a RBMP. May be designated as a LWS and support a small/ limited population of protected species. Limited social or economic uses.	Shows signs of previous alteration and/ or minor flow/ water level regulation but still retains some natural features or may be recovering towards conditions indicative of the higher category.	Floodplain or defence protecting 10 or fewer industrial properties from flooding; Flood Zone 2; Less vulnerable development.

Importance	General Criteria	Surface Water	Hydromorphology	Flood Risk
	change without significantly altering its present character.			
Low	The receptor is of local importance and tolerant of change without detriment to its character (i.e. has some ability to absorb, adapt to or recover from change).	Surface water sewer, agricultural drainage ditch; non-aquifer WFD Class 'Poor' or undesignated in its own right. Low aquatic fauna and flora biodiversity and no protected species. Minimal economic or social uses.	Substantially modified by past land use, previous engineering works or flow/ water level regulation. Likely to possess an artificial cross-section would probably be deficient in bedforms and bankside vegetation. May also be realigned or channelised with hard bank protection, or culverted and enclosed. May be significantly impounded or abstracted for water 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.	Floodplain with limited constraints and low probability of flooding of residential and industrial properties; Flood Zone 1; Water compatible development.
Negligible	Receptor is resistant to change and is of little or no environmental value.	Not applicable.	Not applicable.	Not applicable.
Note 1: Professional judgement is applied when assigning an importance category to all water features. The WFD status of a watercourse is not an overriding factor and, in many instances, it may be appropriate to upgrade a watercourse which is currently at poor or moderate status to a category of higher importance to reflect its overall value in terms of other attributes and WFD targets for the watercourse. Likewise, a watercourse may be below Good Ecological Status, this does not mean that a poorer quality discharge can be emitted. All controlled waters are protected from pollution under the				

Importance	General Criteria	Surface Water	Hydromorphology	Flood Risk
Environmental Permitting (England and Wales) Regulations 2016 (Ref 17-29) and the Water Resources Act 1991 (as amended) (Ref 17-30), and future WFD targets also need to be considered. Note 2: Based on the water body 'Reach Conservation Status' presently being adopted for a major infrastructure project (and developed originally by Atkins) and developed from EA conservation status guidance (Ref 17-27 and Ref 17-28) as LA113 does not provide any criteria for morphology.				

Table 17.5 Determining Magnitude of Impact on Water Receptors

Level of Magnitude	Definition of Magnitude and Examples
Large Adverse	Results in a loss of attribute and/ or quality and integrity of the attribute. For example, loss of a fishery; decrease in surface water ecological or chemical WFD status or groundwater qualitative or quantitative WFD status. Change in flood risk to receptor from low or medium to high.
Medium Adverse	Results in impact on integrity of attribute, or loss of part of attribute. For example, partial loss of a fishery; measurable decrease in surface water ecological or chemical quality, or flow; reversible change in the yield or quality of an aquifer; such that existing users are affected, but not changing any WFD status. Change in flood risk to receptor from low to medium.
Small Adverse	Results in some measurable change in attribute's quality or vulnerability. For example, measurable decrease in surface water ecological or chemical quality, or flow; decrease in yield or quality of aquifer; not affecting existing users or changing any WFD status. Change in flood risk to receptor from no risk to low risk.
Negligible	Results in impact on attribute, but of insufficient magnitude to affect the use or integrity. For example, negligible change discharges to watercourse or changes to an aquifer which lead to no change in the attribute's integrity.
Small Beneficial	Results in some beneficial impact on attribute or a reduced risk of negative impact occurring. For example, measurable increase in surface water ecological or chemical quality; increase in yield or quality of aquifer not affecting existing users or changing any WFD status. Change in flood risk to receptor from low risk to no risk.
Medium Beneficial	Results in moderate improvement of attribute quality. For example, measurable increase in surface water quality or in the yield or quality of aquifer benefiting existing users but not changing any WFD status. Change in flood risk to receptor from medium to low.

No change	No loss or alteration of characteristics, features or elements; no observable impact in either direction.

Table 17.6 Matric for Assessing Significance of Effect on Water Receptors

Magnitude of Impact	Importance of Receptors				
	Very High	High	Medium	Low	Negligible
Large	Major	Major	Moderate or Major	Minor or Moderate	Negligible
Medium	Major	Moderate or Major	Moderate	Minor	Negligible
Small	Moderate or Major	Minor or Moderate	Minor	Negligible to Minor	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
No change	Negligible	Negligible	Negligible	Negligible	Negligible

Moderate and above effects are considered significant in EIA terms

Water Framework Directive Assessment

17.6.5 A WFD assessment would be undertaken to determine the potential implications of the Project on the objectives of the relevant water bodies. This assessment would be based on the information and analysis provided within the ES in relation to changes in physical processes, water and sediment quality, and impacts on marine and terrestrial ecological receptors. The WFD assessment would be provided as an appendix to the ES following the format specifies in the latest *Clearing the Waters for All* guidance.

Flood Risk Assessment (FRA)

17.6.6 An FRA would be prepared in accordance with the NPSfP, NPS EN-1 and NPPF due to the size (over 1ha) and location of the Project (in Flood Zone 3). The FRA would assess the flood risk both to and from the Project and demonstrate how that flood risk would be managed over the Project's lifetime, to satisfy the requirements of the Sequential Test and Exception Test. The FRA would give due regard to climate change. This would inform the design of the Project (including finished ground and floor levels) as well as the water environment impact assessment reported in the ES.

Relevant Legislation, Policy and Technical Guidance

17.6.7 The potential effects of the Project on water quality, coastal protection, flood defence and drainage receptors would be considered in the topic-specific ES chapter, which would cross reference, as appropriate, relevant policy, legislation and guidance, including:

a. National Policy Statement for Ports (NPSfP) (Ref 17-10).

b. Overarching National Policy Statement for Energy (EN-1) (Ref 17-11).

c. Draft Overarching National Policy Statement for Energy (Ref 17-12).
d. NPPF National Planning Policy Framework (Ref 17-13).
e. National Planning Practice Guidance.
f. Water Supply, Wastewater and Water Quality (Ref 17-14).
g. UK Marine Policy Statement (Ref 17-15).
h. East Inshore and East Off-shore Marine Plans (Ref 17-16).
i. The Water Framework Regulations, which implement the WFD (2000/60/EC).
j. Flood and Water Management Act (2010).
k. Flamborough Head to Gibraltar Point Shoreline Management Plan (Ref 17-3).
l. Flood Risk Assessments: climate change allowances (Ref 17-17).
m. Humber Flood Risk Management Strategy (Ref 17-4).
n. North East Lincolnshire Local Plan (Ref 17-18).
o. North and North East Lincolnshire Strategic Flood Risk Assessment (Ref 17-19).
p. North East Lincolnshire Preliminary Flood Risk Assessment (Ref 17-20).
q. North East Lincolnshire Local Flood Risk Management Strategy (Ref 17-21).
r. Grimsby and Ancholme Catchment Flood Management Plan (Ref 17-22).
s. North Lincolnshire Sustainable Drainage System (SuDS) and Flood Risk Guidance (Ref 17-23).
t. Preparing for Flooding. A guide for sites regulated under EPR and COMAH (June 2015) (Ref 17-24).
u. Operational Delivery Guide. Inspection of COMAH Operator Flood Preparedness. (Ref 17-25).
v. CIRIA 376, Containment systems for the prevention of pollution Secondary, tertiary and other measures for industrial and commercial premises. (Ref 17-26).
w. Water Act 2014.
x. Marine and Coastal Access Act 2009.
y. Environment Act 1995.
z. Land Drainage Act 1991.
aa. Water Resources Act 1991.
bb. Environment Protection Act 1990.
cc. Salmon and Freshwater Fisheries Act 1975 (as amended).
dd. Environmental Permitting (England and Wales) Regulations 2016.
ee. Control of Major Accident Hazards (COMAH) Regulations (2015).

ff. Environmental Damage (Prevention and Remediation) Regulations 2015.

gg. Bathing Water Regulations 2013.

hh. Eels (England and Wales) Regulation 2009.

ii. Groundwater (England and Wales) Regulations 2009.

jj. Control of Pollution (Oil Storage) (England) Regulations 2001.

kk. Control of Substances Hazardous to Human Health (COSHH) Regulations 2002.

17.7 Consultation

17.7.1 Consultation would be undertaken with the following bodies as part of the water environment assessment process:

a. The Environment Agency (South Humber and East Coast, Partnerships and Strategic Overview Team).

b. NELC (Flood Risk and Drainage Team).

c. North East Lindsey IDB.

d. Anglian Water.

17.8 Summary

17.8.1 A summary of the proposed scope of the water quality, coastal protection, flood risk and drainage assessment is provided in **Table 16.1** of **Chapter 16 Marine Water and Sediment Quality**.

Table 17.7 Summary of Scope for the Water Quality, Coastal Protection, Flood Risk and Drainage Assessment

Element	Phase	Scoped In	Scoped Out	Justification
Contamination of waterbodies from suspended solids or other chemical contaminants.	Construction and Decommissioning	✓	x	Potential for suspended solids and/ or contamination to migrate to local waterbodies when there are works within or adjacent to them.
The effects of diffuse urban pollutants in surface water runoff		✓	x	Pollution of waterbodies local to the site through diffuse urban pollutants in surface water runoff generated on site.
The risk of pollution from chemical spillages or fire on the site		✓	x	Pollution of local waterbodies in the event of a chemical spillage or a fire during the construction phase.

Element	Phase	Scoped In	Scoped Out	Justification
Alteration in fluvial and overland flow paths, and potential increase in flood risk, as a result of storing construction materials in the floodplain		✓	x	Storage of construction materials and equipment on site has the potential to alter flood flow paths, increasing the risk of flooding on and offsite, particularly from fluvial, tidal and surface water sources.
Increased risk of blockage of drains as a result of increased material (sands, gravels etc.) transported in runoff from site		✓	x	Increased risk of debris and suspended solids entering local waterbodies and the drainage system during construction potentially causing blockages and increasing the risk of flooding.
Potential operational pollution of surface watercourses from accidental spillages	Operation	✓	x	A pollution event on site has potential to impact water quality in local waterbodies.
Increased risk of fluvial flooding to the development and surrounding area due to loss of floodplain storage		✓	x	Development of a previously un-developed site has potential to push floodwater off-site increasing the risk of flooding to other developments/ areas.
Increased risk of flooding to the development from all sources due to climate change effects.		✓	x	The typical lifetime of a commercial/ industrial development is approximately 65-70 years. The risk of flooding would increase from all sources over this time period due to climate change impacts.
Increase in flood risk (fluvial, surface water and drainage infrastructure) due to an increase in surface water runoff from the Project.		✓	x	Changes in permeable surfacing to impermeable surfacing, without mitigation, would increase surface water run-off from the site with potential to increase flood risk from fluvial, surface water and drainage infrastructure sources.

Element	Phase	Scoped In	Scoped Out	Justification
Increased risk of groundwater flooding due to below ground development)		✓	x	The presence of below ground structures can change the flow paths of groundwater and potentially increase the risk of flooding both on and off-site.

17.9 References

Ref 17-1 Environment Agency. (2020a). Catchment Data Explorer.

Ref 17-2 Natural England. (2020). Multi-Agency Geographic Information for the Countryside (MAGIC) Interactive Map. Available at: https:// magic.defra.gov.uk/ (accessed July 2021).

Ref 17-3 Various Authors including Lead Authority East Riding of Yorkshire Council, (2011). Flamborough Head to Gibraltar Point Shoreline Management Plan.

Ref 17-4 Environment Agency (2008) Humber Flood Risk Management Strategy.

Ref 17-5 Environment Agency (2022) Flood Maps for Planning.

Ref 17-6 Environment Agency (2022) Long-term Information Service Check the long term flood risk for an area in England.

Ref 17-7 Department for Levelling Up, Housing & Communities (2021) National Planning Practice Guidance. Flood Risk and Coastal Change.

Ref 17-8 Highways England (n.d.) Design Manual for Roads and Bridges Sustainability & Environment Appraisal LA 113 Road drainage and the water environment.

Ref 17-9 Department of Transport (2022) Transport Analysis Guidance Unit A3, Environmental Impact Appraisal.

Ref 17-10 Department for Transport. (2012). National Policy Statement for Ports.

Ref 17-11 Department for Business, Energy and Industrial Strategy. (2011) Overarching National Policy Statement for Energy (EN-1).

Ref 17-12 Department for Business, Energy and Industrial Strategy, (2021) Draft Overarching National Policy Statement for Energy (September 2021).

Ref 17-13 Department for Levelling Up, Housing & Communities (2021) National Planning Policy Framework.

Ref 17-14 Department for Levelling Up, Housing & Communities (2021) National Planning Practice Guidance. Water supply, wastewater and water quality.

Ref 17-15 HM Government. (2011). UK Marine Policy Statement.

Ref 17-16 Department for Environment, Food and Rural Affairs. (2014). East Inshore and East Offshore Marine Plans.

Ref 17-17 Environment Agency (2022) Flood Risk Assessments: climate change allowances.

Ref 17-18 North East Lincolnshire Council (2018) North East Lincolnshire Local Plan.

Ref 17-19 North Lincolnshire and North East Lincolnshire Councils (2011) North and North East Lincolnshire Strategic Flood Risk Assessment.

Ref 17-20 North East Lincolnshire Council (2011) North East Lincolnshire Preliminary Flood Risk Assessment.

Ref 17-21 North East Lincolnshire Council (2015) North East Lincolnshire Local Flood Risk Management Strategy.

Ref 17-22 Environment Agency (2009) Grimsby and Ancholme Catchment Flood Management Plan.

Ref 17-23 North Lincolnshire (2017) North Lincolnshire Sustainable Drainage System (SuDS) and Flood Risk Guidance (North Lincolnshire Council, 2017).

Ref 17-24 Environment Agency (2015) Preparing for Flooding. A guide for sites regulated under EPR and COMAH (June 2015).

Ref 17-25 Health and Safety Executive (2018) Operational Delivery Guide. Inspection of COMAH Operator Flood Preparedness. (COMAH).

Ref 17-26 CIRIA (2014) CIRIA 376, Containment systems for the prevention of pollution Secondary, tertiary and other measures for industrial and commercial premises.

Ref 17-27 Environment Agency (1998) River Geomorphology: a practical guide.

Ref 17-28 Environment Agency (1998) Geomorphological approaches to river management.

Ref 17-29 The Stationary Office Limited (2016) Environmental Permitting (England and Wales) Regulations 2016.

Ref 17-30 The Stationary Office Limited (1991) Water Resources Act 1991.

18 Climate Change

18.1 Introduction

18.1.1 This section details the scope and methodology of the climate change assessment for the Project. The chapter also details the datasets to be used to inform the assessment, provides an overview of baseline conditions, sets out the likely significant effects to be considered within the assessment, and discusses how these likely significant effects would be assessed for the purpose of the EIA.

18.1.2 To align with the requirements of the 2017 EIA Regulations (Ref 18-1) and IEMA guidance for assessing climate change mitigation (Ref 18-2) and adaptation (Ref 18-3), consideration has been given to the three aspects of climate change assessment as detailed in **Table 18.1**.

Table 18.1 Definition of the Elements of the Climate Change Assessment

Assessment Type	Definition
Lifecycle greenhouse gas (GHG) impact assessment	Impact of GHG emissions arising from the Project on the climate, including how it would affect the ability of the UK to meet its carbon reduction targets (Ref 18-4).
Climate change resilience (CCR) review	The resilience of the Project to climate change impacts, including how the design would consider projected impacts of climate change.
In-combination climate change impact (ICCI) assessment	The combined impact of the Project and potential climate change on the receiving environment.

18.2 Baseline Environment and Study Area

18.2.1 Each of the aspects in **Table 18.1** has different baseline parameters that require consideration as discussed in the following sub-sections.

Study Areas

18.2.2 The study area for the GHG impact assessment includes:

a. Direct GHG emissions arising as a result of construction, maintenance and operational activity associated with the DCO site boundary.

b. Indirect GHG emissions occurring offsite such as embodied carbon in construction materials, transportation of construction materials and workers, as well as waste disposal. It also includes GHG emissions from transportation of final product, and waste and workers associated with the operation of the Project.

18.2.3 The study area for the CCR review comprises the DCO site boundary (temporary and completed works).

18.2.4 The study area for the ICCI assessment would be determined by consideration other technical disciplines, as described in other technical chapters of the EIA Scoping Report.

Baseline

Lifecycle GHG Impact Assessment

18.2.5 The baseline for the lifecycle GHG impact assessment is a 'business as usual' scenario where the Project does not go ahead.

18.2.6 The baseline comprises existing carbon stock and sources of GHG emissions associated with existing site activities taking place within the boundary of the Project.

CCR Review

18.2.7 The baseline for the CCR review considers how resilient the Project is to current and projected future climate hazards. The CCR review would provide commentary on how the Project would be resilient to climate change within the context of current and predicted future climate conditions.

18.2.8 The existing baseline for the CCR review would be based on historic climate data obtained from the Met Office recorded by the closest meteorological station to the Project (namely Cleethorpes located approximately 10 miles from the Project) for the period 1981-2010 (Ref 18-5) (refer to **Table 18.2**).

Table 18.2 Historic Climate Data for the Climate Station: Cleethorpes (1981-2010)

Climatic Variable	Month	Value
Average annual maximum daily temperature (°C)	-	13.6
Warmest month on average (°C)	July, August	20.7
Coldest month on average (°C)	January	7.4
Mean annual rainfall levels (mm)	-	587.9
Wettest month on average (mm)	November	60.2
Driest month on average (mm)	February	38.0

ICCI Assessment

18.2.9 The existing baseline for the ICCI assessment would be based on historic climate data obtained from the Met Office recorded by the closest meteorological station to the Project (namely Cleethorpes located approximately 10 miles from the Project) for the period 1981-2010 (Ref 18-5) (refer to **Table 18.2**). This climate data would be assessed in combination with the baseline data for each of the environmental disciplines undertaking impact assessments and reported in the ES.

Future Baseline

18.2.10 The future baseline would be based on future UK Climate Projection 2018 (UKCP18) data from the Met Office (Ref 18-6) for the 25km grid square in which the DCO site is located.

18.2.11 This projection data provides probabilistic indications of how global climate change is likely to affect areas of the UK using pre-defined climate variables and time periods.

18.2.12 For the purpose of the assessment, UKCP18 probabilistic projections for pre-defined 30-year periods for the following average climate variables would be obtained and analysed. These figures would be expressed as temperature/ precipitation anomalies in relation to the 1981-2010 baseline:

a. Mean annual temperature.
b. Mean summer temperature.
c. Mean winter temperature.
d. Maximum summer temperature.
e. Minimum winter temperature.
f. Mean annual precipitation.
g. Mean summer precipitation.
h. Mean winter precipitation.
i. Sea Level Risk (SLR).

18.2.13 The ICCI assessment considers the existing and projected future climate conditions for the geographical location and assessment timeframe. It identifies the extent to which identified receptors in the surrounding environment are potentially vulnerable to and affected by these factors. The receptors for the ICCI assessment are those that would be impacted by the Project. These impacts are assessed by the technical specialists responsible for preparing other technical chapters of the ES.

18.3 Identification of Potential Effects

Lifecycle GHG Impact Assessment

18.3.1 The identified 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 Project, the UK carbon budgets (Ref 18-4) would be used as a proxy for the climate (in the absence of sector-based or local emissions budgets) and would help contextualise the level of significance of GHG emissions associated with the Project.

18.3.2 The impact of the Project would be defined as the increase of GHG emissions to the global atmosphere. Increasing GHG emissions contribute to global warming and global climate change. Disruption to the 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.

18.3.3 In order to assess the potential impacts of GHG emissions arising from the Project, likely activities and their associated GHG emissions sources have been estimated. Potential activities related to the Project that could cause GHG emission impacts (during construction, operation and decommissioning) are presented in Table 18.3.

Table 18.3 Potential Sources of GHG Emissions

Lifecycle Stage	Activity	Primary Emission Sources
Pre-construction (including demolition)	On-site pre-construction activity i.e. enabling works, demolition of existing structures etc.	GHG emissions from fuel consumption from construction plant and vehicles, generators on site, and worker commuting.
	Transportation and disposal of earthworks/ waste	GHG emissions from transportation and disposal of earthworks/ pre-construction waste.
	Land clearance	GHG emissions associated with the loss of carbon stock.
Product manufacture	Raw material extraction and manufacturing of products/ materials	Embodied GHG emissions associated with product and material manufacture.
	Transport of products/ materials to site	GHG emissions from fuel consumption of transportation of products and materials to site.
Construction	On-site construction activity	Energy (electricity, fuel, etc.) consumption from plant and vehicles, generators on site, and material consumption.
	Transport of construction workers	Energy (electricity, fuel, etc.) consumption from worker commuting.
	Transportation and disposal of earthworks/ waste	GHG emissions from transportation and disposal/ treatment of earthworks/ construction waste.
Operation	Operations of Project	GHG emissions from energy use, provision of potable water, and treatment of wastewater, additional traffic and transportation of final product and transportation of workers.

Lifecycle Stage	Activity	Primary Emission Sources
	Transportation and disposal of waste	GHG emissions from transportation and disposal of waste.
	Maintenance activities	GHG emissions associated with replacement materials/ products and their respective transportation emissions.
	Emissions displacement	Avoided or displaced emissions through use of any renewable energy systems or offsetting.
	Vessel emissions within UK waters	GHG emissions associated with the UK's share of international shipping emissions[4].
	Landscaping	Changes in GHG emissions/ sinks from landscaping and re-vegetation.
Decommissioning	Removal and or renewal of the full Project	GHG emissions arising from fuel consumption for plant and vehicles and disposal of materials.

18.3.4 On the basis of the information presented in **Table 18.3**, the GHG assessment is scoped into the EIA. However, a number of emission sources at the following lifecycle stages would be scoped out of the EIA, namely:

a. Operation: Emissions from maintenance activities during the operation stage are likely to be minimal in proportion to the overall footprint.

b. Decommissioning of marine infrastructure: the DCO would not make any provision for the decommissioning of marine infrastructure or plant or equipment on the jetty topside. This is because the Project would, once constructed, become part of the fabric of the Immingham port estate and would, in simple terms, continue to be maintained so that it can be used for port related activities to meet a long-term need. This is discussed further in **Section 2.4** of **Chapter 2 The Project** of this EIA Scoping Report.

CCR Review

18.3.5 The receptor for the CCR review is the Project itself and its vulnerability to future climate conditions. Climate parameters to be considered in the CCR review during construction and operation of the Project include those identified in **Table 18.4**.

[4] The UK Government has recently passed into law the sixth carbon budget, for years 2033-37 (Ref 18-19); which incorporates the UK's share of international aviation and shipping emissions.

18.3.6 The potential impacts for the CCR review have been determined based on the UKCP18 projections (Ref 18-6).

Table 18.4 Climatic Parameters for the CCR Review

Climate Parameter	Scoped in or Out	Rationale for Scoping Conclusion
Extreme weather events	In	The Project may be vulnerable to extreme weather events such as storm damage to structures and assets.
Sea level rise (SLR)	In	The DCO site boundary is located in an area susceptible to sea level rise and it may be affected by sea level rises and flooding.
Temperature change	In	Increased temperatures may increase cooling requirements of the Project and could impact on structural integrity of buildings and materials.
Rainfall change	In	The Project may be vulnerable to changes in precipitation, for example, pressure on water supply during periods of reduced rainfall, and damage to structures and drainage systems during periods of heavy precipitation.
Wind change	Out	There is currently no evidence to suggest that climate change is increasing high wind events. The UK Climate report (Ref 18-9) states there are "*no compelling trends in storminess when considering maximum gust speeds over the last five decades*".

18.3.7 On the basis of the information presented in **Table 18.4**, the CCR review is scoped in to the EIA. However, the following climatic parameter would be scoped out of the EIA:

a. Wind: the impacts of wind on the Project are likely to be no worse relative to baseline conditions.

18.3.8 Climate change adaptation, resilience measures and enhancements (if required) would be described within the relevant sections of the ES. Details on how future climate change effects have influenced the EIA process and resulting design process would also be described.

ICCI Assessment

18.3.9 The ICCI assessment identifies how the resilience of various receptors in the surrounding environment (such as local waterways or local heritage assets etc.) are affected by the Project in combination with the future climatic conditions.

18.3.10 The impacts are assessed for the construction and operation of the Project. UKCP18 projections (Ref 18-6) for the geographical location and lifetime of the Project, and the receptors identified by technical specialists, would be used when undertaking this assessment.

18.3.11 The ICCI climate parameters relevant to the Project are detailed in **Table 18.5**.

Table 18.5 Scoping of Climatic Parameters for the ICCI Assessment

Climate Parameter	Scoped in or Out	Rationale for Scoping Conclusion	Example Disciplines Assessing the Issue/ Risk
Extreme weather events	In	In combination with sea level rise, the likelihood and severity of acute coastal impacts such as erosion, loss of habitats, destabilisation and damage to infrastructure could increase. These impacts may be exacerbated by climate change. The construction of the Project may cause an increased risk of erosion and destabilisation.	Other Technical ES Disciplines, such as **Water Quality, Coastal Protection, Flood Risk and Drainage**.
SLR	In	The Project is located in an area susceptible to SLR. The impact of the Project combined with sea level rise may impact receptors in the surrounding environment e.g. Exacerbate coastal erosion.	Other Technical ES Disciplines, such as **Water Quality, Coastal Protection, Flood Risk and Drainage**.
Temperature change	In	Fluctuating levels of temperature may lead to an increase in likelihood and severity of heat waves which might have a negative impact on biodiversity. The Project's operational activities may be impacted by increased temperatures and heatwaves.	Other Technical ES Disciplines such as **Landscape and Visual Impact and Ecology**.
Rainfall change	In	Climate change may lead to an increase in substantial precipitation events that could lead to flash flooding, including both pluvial and fluvial flooding. Climate change may also lead to periods of decreased precipitation resulting in water scarcity.	Other Technical ES Disciplines, such as **Water Quality, Coastal Protection, Flood Risk and Drainage**, **Landscape and Visual Impact** and **Nature Conservation.**
Wind change	Out	There is currently no evidence to suggest that climate change is increasing high wind events. The UK Climate report (Ref 18-7) states there are "no compelling trends in storminess when considering maximum gust speeds over the last five decades".	N/ A

18.3.12 The following climatic parameters are proposed to be scoped out of the ICCI assessment:

a. Wind: There is currently no evidence to suggest that climate change is increasing high wind events. The UK Climate report (Ref 18-7) states there are *"no compelling trends in storminess when considering maximum gust*

speeds over the last five decades". This parameter would not require analysis within the ICCI assessment.

18.3.13 During preparation of the ICCI assessment technical specialists for all environmental disciplines in the ES will be consulted in order to classify the sensitivity of their respective receptors to the climate data. There is no criteria for this sensitivity assessment, and instead this relies on the professional judgement of technical specialists.

18.4 Design, Mitigation and Enhancement Measures

18.4.1 The scope for mitigating climate change effects on and from the Project would be determined following completion of the lifecycle GHG impact assessment and CCR review. These would focus on measures for reducing GHG emissions from the construction and operation of the Project to align with the UK Government's target to achieve net zero emissions by 2050 and increase the resilience of the Project to climate change impacts.

18.4.2 The Clean Maritime Plan (Ref 18-8) and the ABP Climate Change Adaptation Report (Ref 18-9) would also be considered when determining any mitigation requirements.

18.4.3 The mitigation measures for CCR would be informed by the design team and other relevant ES technical chapters. For example, this may include designing the surface water drainage system to make sure flows up to the 1 in 100-year return period with additional allowances for climate change are contained and managed within the DCO site boundary.

18.5 Assessment Methodology

Lifecycle GHG Impact Assessment

18.5.1 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.

18.5.2 As previously discussed, the baseline is the 'business as usual' scenario where the Project is not implemented.

18.5.3 The lifecycle GHG impact assessment would take a project lifecycle approach that would identify GHG emissions hotspots (i.e. emissions sources likely to generate the largest amount of GHG emissions), and correspondingly enables the identification of priority areas for mitigation. This approach is consistent with the principles set out in IEMA guidance (Ref 18-2) and PAS: 2080 (Ref 18-10).

18.5.4 In line with the World Business Council for Sustainable Development (WBCSD) and World Resources Institute (WRI) GHG Protocol guidelines (Ref 18-11), the lifecycle GHG impact assessment would be reported as tonnes of carbon dioxide equivalent (tCO_2e) and would consider the seven Kyoto Protocol gases:

a. Carbon dioxide (CO_2).

b. Methane (CH_4).

c. Nitrous oxide (N_2O).

d. Sulphur hexafluoride (SF_6).

e. Hydrofluorocarbons (HFCs).

f. Perfluorocarbons (PFCs).

g. Nitrogen Trifluoride (NF_3).

18.5.5 Expected GHG emissions arising from the construction activities, embodied carbon in materials and operational emissions of the Project design would be quantified using a calculation-based methodology as per the following equation and aligned with the GHG Protocol (Ref 18-11):

Activity data x GHG emissions factor = GHG emissions

18.5.6 A set of standard data quality principles would be applied so that the results from the GHG assessment are as accurate and representative as possible. This would include the selection of emission factors that are representative of the UK construction industry. GHG activity data would be gathered directly from the Project engineering and design teams to enable consistency and completeness of data collection.

18.5.7 The Department for Business, Energy and Industry Strategy' 2021 emissions factors (Ref 18-12) and embodied carbon data from the Inventory of Carbon and Energy V3.0 (ICE) (Ref 18-13) would be used as the source of emissions factors for calculating GHG emissions. The resulting carbon footprint would be compared to the existing baseline condition to identify the impact of the Project.

Significance Criteria

18.5.8 The assessment methodology for the lifecycle GHG impact assessment differs from the general EIA methodology as presented in **Section 4.6** of **Chapter 4 The EIA Process**.

18.5.9 The sensitivity of the climate to GHG emissions is considered to be 'high'. The rationale is as follows:

a. 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 (Ref 18-4).

b. 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 (Ref 18-14) and a recent report by the Intergovernmental Panel on Climate Change (IPCC) (Ref 18-15) highlighted the importance of limiting global warming below 1.5°C.

c. 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.

18.5.10 IEMA guidance (Ref 18-2) states that there are currently no agreed methods to evaluate 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.

18.5.11 The guidance continues to explain that *"the crux of significance therefore is not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050"*.

18.5.12 **Table 18.6** presents the different significance levels as per the IEMA guidance. The guidance emphasises that "*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, results in a significant adverse effect*". It is down to the practitioner to differentiate between the level of significant adverse effects e.g. moderate or major adverse effects.

18.5.13 Moderate and major adverse impacts are considered to be significant, while all other significance levels are deemed to be not significant.

Table 18.6 Significance Levels and Definitions as per Box 3 in IEMA Guidance (Ref 18-2)

Significance Levels	Definition	Significant?
Major Adverse	The project's GHG 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.	Yes
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.	Yes
Minor adverse	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.	No
Negligible	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.	No

Significance Levels	Definition	Significant?
Beneficial	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.	No

18.5.14 As noted previously, it is down to the practitioner's professional judgement on how best to contextualise a project's GHG impact. In GHG accounting, it is considered good practice to contextualise emissions against pre-determined carbon budgets. The UK has a defined national carbon budget and budgets set by devolved administrations, which have been determined as being compatible with net zero and international climate commitments.

18.5.15 To assess the impact of GHG emissions from the Project, the UK carbon budgets (Ref 18-4) would be used as a proxy for the climate (Ref 18-11). 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 3rd carbon budget period, which runs from 2018 to 2022. The 3rd, 4th and 5th carbon budgets reflect the previous 80% reduction target by 2050. The 6th carbon budget aligns with the legislated 2050 net zero commitment.

18.5.16 It is noted that the contribution of most individual projects to national-level budgets would be small and so the UK context would have limited value. This GHG emissions assessment therefore uses the IEMA guidance to assess the significance of effects (**Table 18.6**), with the UK carbon budgets being used to provide context to the GHG emissions (refer to **Table 18.7**).

Table 18.7 Relevant Carbon Budgets

Carbon Budget	National Carbon Budget ($MtCO_2e$)
3rd (2018-2022)	2,544
4th (2023-2027)	1,950
5th (2028-2032)	1,725
6th (2033-2037)	965

CCR Review

18.5.17 The identification and assessment of CCR within EIA is an area of emerging practice. There is no single prescribed format for undertaking such assessments; therefore, the approach adopted to undertaking and reporting the assessment has drawn on good practice from other similar developments and studies, and is aligned with existing guidance such as that published by IEMA (Ref 18-3).

18.5.18 The receptor for the CCR review is the Project itself, including workers, infrastructure, visitors and residents.

18.5.19 The CCR review considers the impact of climate on the Project by identifying likely changes to the climate and potential climate hazards over the life of the Project. The assessment will consider climate projections up to 2060 i.e. 25 years from 2035 (when the development is fully operational).

18.5.20 The baseline for the CCR review considers how resilient the Project is to current and projected future climate hazards. The current baseline would be developed by using historic Met Office data obtained from a meteorological station closest to the Project (Cleethorpes, located approximately 10 miles from the Project) (Ref 18-5).

18.5.21 The CCR review would provide commentary on how the Project would be resilient against the predicted future climate baseline. This would be completed in liaison with the Project design team and the other EIA technical disciplines by considering the UKCP18 projections (Ref 18-6) for the geographical location and timeframe of the Project (from construction through to operation).

18.5.22 The CCR review would be undertaken to identify potential climate change impacts on the Project and its associated receptors, and to consider their potential consequence and likelihood of occurrence, taking account of the measures incorporated into the design of the Project.

18.5.23 Climate change projections for the DCO site during the construction phase would be examined against receptors (including the Project itself and workers, infrastructure, visitors and residents) during this stage. Construction phase receptors include the workforce, plant, machinery and materials.

18.5.24 Receptors when the Project is complete and occupied may include the Project's assets and their operation, maintenance and refurbishment (e.g. pavements, structures, earthworks and drainage, technology assets, etc.) and end-users (e.g. staff and commercial operators etc).

18.5.25 The following key terms and definitions relating to the CCR review would be used:

a. Climate event – a weather or climate related event, for example increased winter precipitation.

b. Climate hazard – a weather or climate related event, which has potential to do harm to environmental or community receptors or assets.

c. Climate change impact – an impact from a climate hazard which affects the ability of the receptor or asset to maintain its function or purpose.

d. Consequence – any effect on the receptor or asset resulting from the climate hazard having an impact.

18.5.26 The likelihood of a climate event occurring would be determined by the UKCP18 climate projections (Ref 18-6). The criteria which would be used to determine the likelihood of a climate change hazard occurring as a result of a climate event are detailed in **Table 18.8**. The event is defined as the climate event (such as heatwave), while the hazard is defined as an impact on the Project caused by the climate event (such as overheated electrical equipment).

Table 18.8 Likelihood of a Climate Change Hazard Occurring

Likelihood of event	Description (probability of occurrence)
Very likely	90-100% probability that the hazard would occur.
Likely	66-90% probability that the hazard would occur.
Possible, about as likely as not	33-66% probability that the hazard would occur.
Unlikely	0-33% probability that the hazard would occur.
Very unlikely	0-10% probability that the hazard would occur.

Significance Criteria

18.5.27 Following identification of climate hazards, the likelihood and consequences of impacts occurring as a result of climate events and hazards would be assessed according to **Table 18.9** and **Table 18.10** respectively. The likelihood of an impact occurring takes into considered the likelihood of a climate change hazard occurring and the frequency of the impact occurring. The categories and descriptions provided below are based on the IEMA climate change resilience and adaptation guidance (Ref 18-3).

18.5.28 The ES would present mitigation measures (based on any identified by the relevant technical disciplines) to demonstrate how the Project would be adapted to increase its resilience to future climate conditions.

18.5.29 The CCR review would assess the 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 18.11**. The assessment would take into account confirmed design and mitigation measures.

Table 18.9 Likelihood of an Impact Occurring

Likelihood of impact	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 18.10 Description of Consequences of an Impact Occurring

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.

Table 18.11 Significance of Effect Matrix (where 'S' is significant and 'NS' is not significant)

		Likelihood of an impact occurring Likelihood of an impact occurring (Table 18-9)			
		High	**Moderate**	**Low**	**Negligible**
Consequence of impact (Table 18.10)	**High**	High (S)	High (S)	Low (NS)	Low (NS)
	Moderate	High (S)	Moderate (S)	Low (NS)	Low (NS)
	Low	Moderate (S)	Low (NS)	Low (NS)	Negligible (NS)
	Negligible	Low (NS)	Low (NS)	Negligible (NS)	Negligible (NS)

Relevant Legislation, Policy and Technical Guidance

18.5.30 The guidance, policy and legislation which are relevant for the climate change assessment includes:

a. United Nations Framework Convention on Climate Change (UNFCCC) Paris Agreement (Ref 18-14).

b. EU Directive 2014/ 52/ EU on the assessment of the effects of certain public and private projects on the environment (Ref 18-16).

c. Climate Change Act 2008 (Ref 18-17) and Climate Change Act (2050 Target Amendment) (Ref 18-18).

d. Committee on Climate Change, Reducing UK emissions, 2020 Progress Report to Parliament (Ref 18-20).

e. National Planning Policy Framework (NPPF) 2021 (Ref 18-20).

f. National Planning Practice Guidance (NPPG) – Climate Change 2019 (Ref 18-22).

g. Our Green Future: Our 25-year Plan to Improve the Environment 2019 (Ref 18-23).

h. Decarbonising Transport: A Better Greener Britain (Ref 18-24).

i. The National Policy Statement for Ports (NPSfP) (Ref 18-25).

j. IEMA: Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance (Ref 18-2).

k. IEMA: Environmental Impact Assessment Guide to: Climate Chance Resilience and Adaptation (Ref 18-3).

l. North East Lincolnshire Council – The Carbon Roadmap (Ref 18-26).

m. Climate Local Agreement (Ref 18-27).

n. North East Lincolnshire Council – Climate Emergency (Ref 18-28).

18.6 Consultation

18.6.1 Statutory consultation with stakeholders would be undertaken at an EIA-wide level, with any comments related to climate being considered in the EIA.

18.7 Summary

18.7.1 A summary of the scope for the climate assessment is presented in **Table 18.12**.

Table 18.12 Summary of Scope for the Climate Assessment

Element	Phase	Scoped In	Scoped Out	Justification
Lifecycle GHG Impact Assessment	Pre-construction (including demolition)	✓	x	On-site pre-construction activity e.g. enabling works, demolition of existing structures, etc.; transportation and disposal of earthworks/ waste; land clearance.
	Construction	✓	x	Product manufacture; On-site construction activity; Transportation of materials, workers and waste disposal.
	Operation	✓	x	Operational activity; transportation and disposal of operational waste; transportation of final product; emissions displacement; landscaping. Scoped out: Maintenance activities (emissions from maintenance during the operational stage are likely to be minimal in proportion to the overall Project GHG footprint).
	Decommissioning	✓	✓	Scoped in: Given the 25 year design life of the landside development, the landside infrastructure decommissioning will be scoped in to

Element	Phase	Scoped In	Scoped Out	Justification
				the assessment, which includes GHG emissions arising from fuel consumption for plant and vehicles and disposal of materials. Scoped out: The DCO would not make any provision for the decommissioning of marine infrastructure. This is because the Project would, once constructed, become part of the fabric of the Immingham port estate and would, in simple terms, continue to be maintained so that it can be used for port related activities to meet a long-term need.
CCR Review	Construction	✓	✓	Scoped in: Extreme weather events; Temperature Change; Precipitation Change; Sea level rise Scoped out: Wind (the impacts of wind on the Project are likely to be no worse relative to baseline conditions).
	Operation			
ICCI Assessment	Construction	✓	x	The inclusion of a separate ICCI assessment has been scoped into the Climate Change chapter through engagement with other disciplines in the ES to classify the sensitivity of their respective receptors to the identified climate projections.

18.8 References

Ref 18-1 Her Majesty's Stationery Office (HMSO) (2017). The Town and Country Planning (Environmental Impact Assessment) Regulations 2017.

Ref 18-2 Institute of Environmental Management and Assessment (IEMA) (2022). Assessing Greenhouse Gas Emissions and Evaluating their Significance – 2nd Edition.

Ref 18-3 Institute of Environmental Management and Assessment (IEMA) (2020). Environmental Impact Assessment Guide to: Climate Change Resilience & Adaptation.

Ref 18-4 UK Government. (2021). The Carbon Budget Order 2021.

Ref 18-5 Met Office (2020). Historic Climate Data.

Ref 18-6 Met Office (2018). UK Climate Projections (UKCP) 2018.

Ref 18-7 Met Office (2020). State of the UK Climate.

Ref 18-8 Department for Transport (2019). Clean Maritime Plan.

Ref 18-9 Associated British Ports (2016). Climate Change Adaptation Report.

Ref 18-10 BSI (2016). Guidance Document for PAS 2080.

Ref 18-11 World Resources Institute (WRI) & World Business Council for Sustainable Development (WBCSD) (2004). The GHG Protocol: A Corporate Accounting and Reporting Standard.

Ref 18-12 Department for Business, Energy and Industrial Strategy (2021). Greenhouse gas reporting: conversion factors 2021.

Ref 18-13 ICE Database (2019). Embodied Carbon.

Ref 18-14 UNFCC (2015). Paris Agreement.

Ref 18-15 IPCC (2018). Global warming of 1.5°C - Special Report.

Ref 18-16 European Union (2014). Directives.

Ref 18-17 Department for Business, Energy and Industrial Strategy 2019). The Climate Change Act 2008.

Ref 18-18 Department for Business, Energy and Industrial Strategy (2019). Climate Change Act (2050 Target Amendment)

Ref 18-19 The Committee on Climate Change (2020). The Sixth Carbon Budget, The UK's path to Net Zero.

Ref 18-20 Committee on Climate Change, Reducing UK emissions, 2020 Progress Report to Parliament

Ref 18-21 Ministry of Housing, Communities and Local Government (2021). National Planning Policy Framework.

Ref 18-22 Ministry of Housing, Communities and Local Government (2019). National Planning Policy Guidance: Climate Change.

Ref 18-23 UK Government (2018). A Green Future: Our 25 Year Plan to Improve the Environment.

Ref 18-24 Department for Transport (2021). Decarbonising Transport: A Better, Greener Britain.

Ref 18-25 Department for Transport (2012). National Policy Statement for Ports.

Ref 18-26 North East Lincolnshire Council (2021). Net Zero Carbon Roadmap.

Ref 18-27 Local Government Association (2012). Climate local agreement.

Ref 18-28 North East Lincolnshire Council (2019). Climate Emergency.

19 Materials and Waste

19.1 Introduction

19.1.1 This section details the scope and methodology of the materials and waste assessment for the Project. The chapter also details the datasets to be used to inform the assessment, provides an overview of baseline conditions, sets out the likely significant effects to be considered within the assessment, and discusses how these likely significant effects would be assessed for the purpose of the EIA.

19.1.2 This chapter follows the methodology set out in the IEMA guide to Materials and Waste in Environment Assessment, Guidance for a Proportionate Approach (referred from in this Chapter as the IEMA Guidance) (Ref 19-1).

19.1.3 For the purpose of this EIA Scoping Report, materials and waste comprise:

a. The consumption of materials (key construction materials only).

b. The generation and management of waste.

19.1.4 Materials are defined in the IEMA Guidance materials as "*physical resources that are used across the lifecycle of a development. Examples include key construction materials such as concrete, aggregate, asphalt and steel*."

19.1.5 Other material assets considered include built assets such as landfill void capacity and allocated/ safeguarded mineral and waste sites.

19.1.6 Waste is defined as per the Waste Framework Directive (Waste FD) (Ref 19-2) as "*any substance or object which the holder discards or intends or is required to discard*".

19.2 Baseline Environment and Study Area

19.2.1 The study areas for the assessment of impacts related to materials and waste have been defined in line with the IEMA guidance. Two types of study area are defined in the IEMA Guidance – a 'Project Study Area' relevant to waste generation, material use and impacts on allocated/ safeguarded sites; and an 'Expansive Study Area' relevant to management of waste and availability of materials. Within this section, study areas are defined for the following:

a. Construction and operational waste generation.

b. Use of construction materials (key construction materials only).

c. Non-hazardous, inert and hazardous construction waste management.

d. Non-hazardous, inert and hazardous operational waste management.

e. Availability of key construction materials.

f. Impact on allocated/ safeguarded mineral and waste sites.

g. Presence of Mineral Safeguarding Areas (MSAs).

Study Areas

Project Study Area

19.2.2 The Project study area for construction and operational waste generation and use of construction and operational materials (key construction materials only) comprises the DCO 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.

19.2.3 The Project study area for the impacts on allocated/ safeguard mineral and waste sites is defined by the DCO site boundary. Impacts on allocated/ safeguarded waste sites are not included in the IEMA guidance, however are included for completeness.

19.2.4 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.

Expansive Study Area

19.2.5 The expansive study area for non-hazardous waste management comprises the East Midlands and Yorkshire and the Humber. The study area includes the following sub-regions as outlined in the Environment Agency's 2020 Waste Summary Tables for England - Version 2:

a. Lincolnshire, Derbyshire, Leicestershire, Northamptonshire and Nottinghamshire.

b. Former Humberside, North Yorkshire, South Yorkshire, West Yorkshire.

19.2.6 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. The study area has been determined to comprise the wider region within which landfill capacity is located i.e. East Midlands region and the Yorkshire and the Humber region since the Project is located close to the northern border of the East Midlands and waste could be managed in either region.

19.2.7 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. 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 19-3). Planning for hazardous waste management is also undertaken at a national level.

19.2.8 The expansive study area for availability of key construction materials (aggregates, asphalt, concrete and steel) is national (United Kingdom (UK) or Great Britain (GB) or East Midlands region and the Yorkshire and the Humber region dependent on baseline information availability). Regional information on availability of key construction materials is included in the baseline where available.

Current Baseline

Regional and National Availability of Key Construction Materials

19.2.9 At the time of writing the exact quantities of key construction materials required for the Project are undefined as the design is in early stage of development.

19.2.10 UK and GB data and regional data has been used to establish a quantitative national baseline of the consumption for key constructional materials. **Table 19.1** summarises national consumption in 2018 for aggregates, asphalt, concrete and 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 Project. Regional data, construction material sales by region are provided for the regions surrounding the Project is presented in **Table 19.2**. It is assumed that the majority of key construction materials e.g. aggregates, asphalt and concrete would be sourced regionally, taking into account the proximity principle and value for money. Other materials such as steel may be sourced at a national level.

Table 19.1 National Consumption for Key Construction Materials

Material	National consumption (million tonnes, year)	Baseline data year	Data description
Steel	17	2018	UK total consumption (Ref 19-4)
Aggregates **of which:**	251	2018	Minerals and mineral products sales in Great Britain (Ref 19-5)
Crushed rock	117.3		
Sand and gravel - land won	48.9		
Sand and gravel - marine	13.7		
Recycled and secondary	71		
Asphalt	25.4		
Concrete **of which:**	86.2		
Ready-Mixed Concrete	54.2		
Concrete products	32		

Table 19.2 Construction Material Sales by Region

Construction material	East Midlands	Yorkshire and the Humber
Crushed rock (million tonnes)	26.5	11.5
Sand and gravel (million tonnes)	6.1	2.3
Ready-mixed concrete (million m^3)	1.4	1.2
Asphalt (million tonnes)	2.8	2.1

19.2.11 Potential recycled contents for the main construction materials are outlined in **Table 19.3**. These "good practice" rates are derived from Waste and Resources Action Programme's (WRAP's) Designing Out Waste Tool for Civil Engineering (Ref 19-6).

Table 19.3 Potential Recycled Content

Material type	Potential recycled content (% by weight)
Concrete	16
Asphalt	25
Aggregates	50
Steel reinforcement	100
Structural steel	60

19.2.12 There is no publicly available information on any potential long-term changes to this national demand by the time of construction of the Project. 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. As such, the future baseline is assumed to be the same as the current baseline as outlined in **Table 19.1** and **Table 19.2**.

Allocated/ Safeguarded Mineral and Waste Sites and MSAs

19.2.13 As outlined in the North East Lincolnshire Local Plan 2013 to 2032 (adopted 2018) (Ref 19-7) "*the area features some mineral deposits of economic importance, however, no primary extraction occurs in the Borough*". However, "*significant existing and planned infrastructure identified on the Policies Map, that supports the supply of minerals in the Borough would be safeguarded against development that would unnecessarily sterilise or prejudice its use, including development of incompatible land uses nearby. This includes strategic rail freight links, sites for concrete batching, manufacture of coated materials and concrete products, and sites associated with the handling, processing, and distribution of substitute, recycled and secondary aggregate material*."

19.2.14 There are no active mineral extraction *"sites in North East Lincolnshire contributing to primary aggregate production and the Council's call for sites has not identified any potential minerals sites."* Therefore, there are no allocated/ safeguarded mineral sites within the DCO site boundary.

19.2.15 Three sites producing secondary and recycled aggregates are listed in the North East Lincolnshire Local Plan, these sites are not within close proximity of the Project. There are no concrete batching/ aggregate sites within close proximity of the Project as outlined on the Minerals Safeguarding Area and Waste Sites Policy Map (Ref 19-7).

19.2.16 North East Lincolnshire safeguard the existing waste management facilities identified on the Policies Map (Minerals and Waste) from the encroachment of incompatible development unless the planning permission has expired and/ or it can be demonstrated that the site is no longer required. The Council would seek to ensure that new development in proximity to a waste site is not incompatible with the waste management facility and would not prejudice its ongoing operation. The details of waste sites adjacent or within the Project are presented in **Table 19.4**.

Table 19.4 Safeguarded Waste Sites Within or Adjacent to the Project

North East Lincolnshire Local Plan reference	Operator	Site location	Details
WM05	Grimsby Operations Ltd	Household Waste Recycling Centre, Queens Road, Immingham	Adjacent to DCO site boundary.
WM07	Integrated Waste Management Ltd	Queens Road, Immingham	Access road to the permitted landfill is within the DCO site boundary.

19.2.17 Three other safeguarded waste sites are within 1km of the Project as presented in **Table 19.5**.

Table 19.5 Other Safeguarded Waste Sites Within 1km of the Project

North East Lincolnshire Local Plan reference	Operator	Site location
WM03	Associated British Ports	Immingham Dock Olive Residue Storage
WM08	Selvic Shipping Services Ltd and FBM Metals (UK) Ltd (licence name F B M Metals (UK) Ltd and F B M Holdings Ltd	Kiln Lane Treatment Plant, Netherlands Way, Stallingborough
WM09	SJP Trading Ltd (licence name Stokesley Metals Ltd)	Huckers Yard, Netherlands Way, Stallingborough

19.2.18 North East Lincolnshire has designated MSAs for sand and gravel and blown sand, however these areas are not within close proximity of the Project.

Landfill Capacity

19.2.19 **Table 19.6** presents remaining landfill capacity at the end of 2020 as outlined on the Environment Agency's 2020 Waste Summary Tables for England – Version 2 for the non-hazardous and inert waste expansive study area (East Midlands and Yorkshire and the Humber) and the hazardous waste study area (England).

19.2.20 Merchant landfills are operated for commercial purposes accepting waste from construction projects and operating businesses. Merchant landfills are therefore considered to form the baseline. In contrast, restricted landfills are sites that deal with their own produced waste (i.e. not operating for commercial purposes) and therefore additional capacity is excluded from the baseline. Some non-hazardous landfill have a Stable Non-Reactive Hazardous Waste Cell (SNRHW) e.g. for asbestos.

Table 19.6 Landfill Capacity (2020) in East Midlands, Yorkshire and The Humber, and England

Landfill type	Sub-Region			
	East Midlands	Yorkshire and the Humber	Total in East Midlands and Yorkshire and the Humber	England
	Capacity ('000s m^3)			
Hazardous merchant	962	2,387	3,349	15,571
Non-hazardous with SNRHW cell	16,438	1,243	17,681	66,969
Non-hazardous	14,912	25,598	40,510	137,457
Inert	20,780	25,040	45,820	140,192

19.2.21 The Environment Agency published landfill capacity trends for 2004 to 2020 in 2021. **Plate 19.1** presents the historic trend for remaining landfill capacity for the East Midlands and Yorkshire and the Humber. **Plate 19.2** presents the historic trend for remaining landfill capacity for England. Data is only available for "Inert" (inert landfill only) and "Non-Inert" (non-hazardous landfill sites, non-hazardous landfill sites with a SNHRW cell and merchant hazardous landfill sites) therefore the categories do not align with the 2020 landfill capacity data which is split by hazardous, non-hazardous and inert.

Plate 19-1 Historic Trend for Landfill Void Capacity in East Midlands and Yorkshire and the Humber

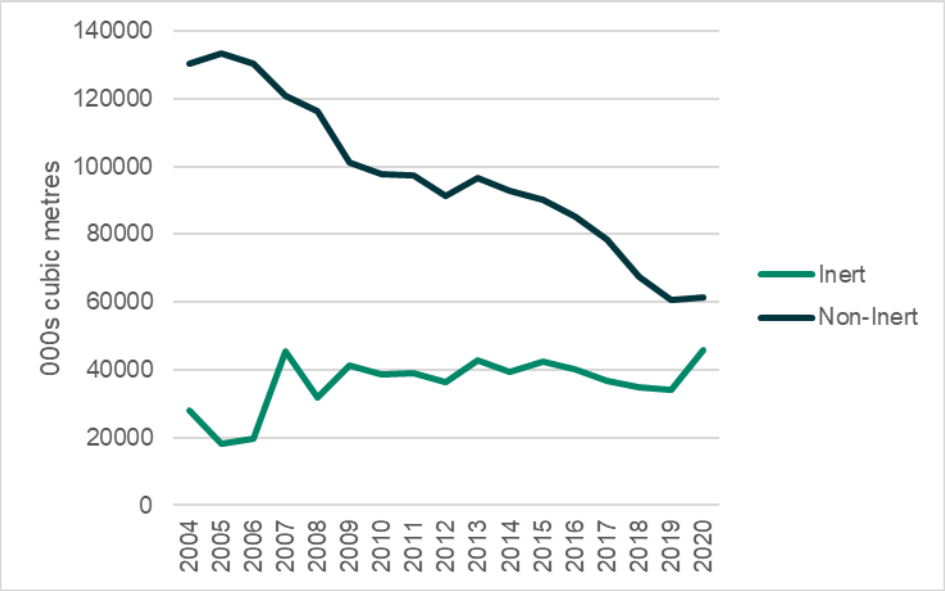
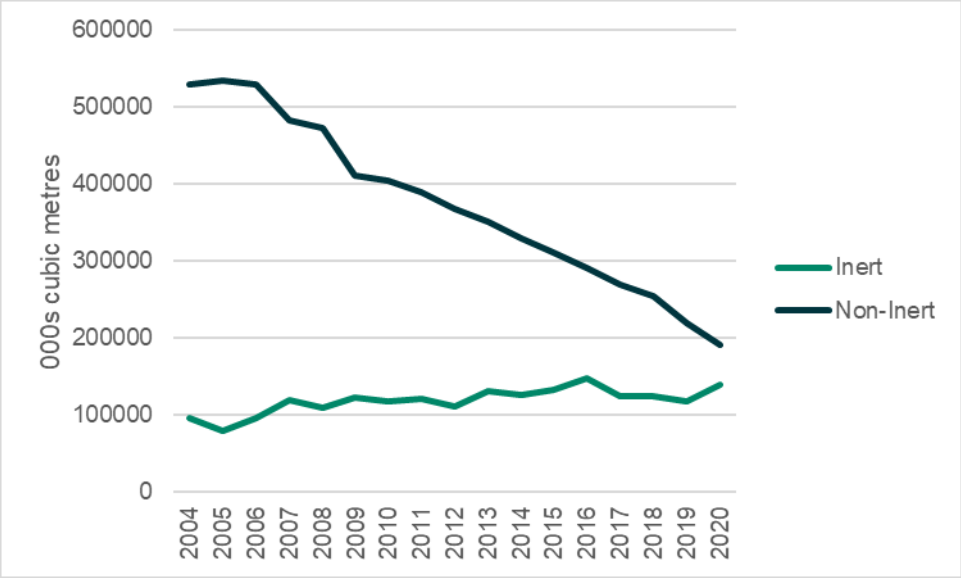


Plate 19-2 Historic Trend for Landfill Void Capacity in England



19.2.22 There is no publicly available information on any potential changes to this landfill capacity by the time of the construction of the Project. Due the cyclic nature of inert landfill capacity it is not realistic to forecast future landfill capacity since this may result in an increase in landfill capacity. Therefore, inert landfill capacity is assumed to be the same as the current baseline as outlined in **Table 19.6**. For non-inert landfill (which includes hazardous waste) capacity using the current rate of decline of landfill capacity and forecasting into the future would lead to the inevitable conclusion that there would be no void space remaining. However, this is not a credible scenario: if there is still a need for landfill, then the waste

planning authority would need to consent new landfill capacity to replace that which has been used up. Therefore, non-hazardous and hazardous landfill capacity is assumed to same as the current baseline as outlined in **Table 19.6**.

Waste Management Infrastructure

19.2.23 Capacity of other types of waste infrastructure is publicly available (e.g. Environmental Permitting Regulations - Waste Sites (Ref 19-8), however the permitted capacity is not necessarily representative of the actual operational capacity of the infrastructure. Therefore, inputs data are collated from the Environment Agency's Waste Data Interrogator 2020 – Waste Received (Excel) – Version 4 (Ref 19-8) and presented in **Table 19.7**. Inputs are not totalled since the double counting of waste in the Waste Data Interrogator cannot be discounted. Double counting results from the same waste making multiple movements through multiple facilities e.g. transfer station to treatment facility with residues going to incineration.

Table 19.7 Summary of Waste Inputs by Facility Type

Facility type	East Midlands (tonnes received)	Yorkshire and the Humber (tonnes received)
Landfill	3,566,637	3,752,838
MRS	772,038	1,735,514
On/ In Land	779,942	1,320,598
Transfer	4,245,297	4,975,660
Treatment	7,229,890	12,866,230
Combustion	138,035	297,010
Incineration	997,400	2,647,529
Mining	6,826	-
Storage	166,157	331,485
Processing	220,498	653,844

19.2.24 The IEMA guidance (page 14) (Ref 19-1) *"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.

Historic Landfills

19.2.25 Historic landfills are potentially relevant to this assessment since excavations in historic landfill can give rise to waste that would require management. The

Environment Agency's Historic Landfill Sites spatial data (Ref 19-9) does not present any historic landfills in close proximity to the Project. There is one historic landfill to the north of the DCO site boundary (Dock South East, Immingham). First waste inputs were in 1986 and the licence was surrendered in 1990. The landfill was licensed to accept inert and industrial waste.

Targets

19.2.26 The national target for recovery of construction and demolition waste is 70% by weight, as set out in the Waste FD and the Waste Management Plan for England (Ref 19-10). The target specifically excludes naturally occurring materials with European Waste Catalogue (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.

19.2.27 A good practice landfill diversion target of 90% has been achieved and exceeded by major UK developments as outlined in the IEMA Guidance. In 2018, the UK generated 67.8 million tonnes of non-hazardous construction and demolition (C&D) waste, of which 62.6 million tonnes was recovered. This represents a recovery rate of 92.3% (Ref 19-10).

19.2.28 Standard, good and best practice recovery rates by material are provided by WRAP (Ref 19-11). Recovery rates for key construction materials and other construction wastes relevant to the Project are provided in **Table 19.8**.

Table 19.8 Standard, Good and Best Practice Recovery Rates by Material

Material	Standard practice recovery (%)	Good practice recovery (%)	Best practice recovery (%)
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.	

Future Baseline

19.2.29 As outlined in the relevant sections above, no future baseline is set for materials and waste.

19.3 Planned Surveys

19.3.1 No surveys are required in relation to materials and waste.

19.4 Identification of Potential Effects

19.4.1 The sensitive receptors for this assessment of impacts are:

a. Landfill void capacity in the expansive study areas of East Midlands and 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*."

b. 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*."

19.4.2 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."*

19.4.3 The sensitivity of receptors and magnitude of impacts materials and waste would be assessed through the following:

a. Materials

   i Establishing the baseline for national and regional consumption of key materials (construction materials) by weight.

   ii Assessing the sensitivity of materials as related to the availability and types of materials to be consumed by the Project in construction.

   iii Establishing the quantities of key construction materials required for the construction of the Project.

   iv Comparing the total quantities of key construction materials with the most recent national demand (utilising a percentage approach).

b. Waste

   i Establishing the baseline landfill void capacity in the expansive study areas.

   ii Assessing the sensitivity of landfill void capacity.

iii Establishing the quantities of construction, demolition and excavation waste to be generated during the construction of the Project.

iv Establishing the quantities of operational waste to be generated during the operation of the Project.

v Comparing the total waste arising from the construction and operation of the Project against the landfill void capacity (utilising a percentage approach).

19.5 Design, Mitigation and Enhancement Measures

19.5.1 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 would be described. These are measures that are inherent in the design and construction of the Project (also known as '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.

19.5.2 The Project would aim to prioritise waste prevention, followed by preparing for re-use, recycling and recovery and lastly disposal to landfill as per the waste hierarchy.

19.5.3 The following mitigation measures would be considered and implemented where applicable during the design phases and subsequent construction phase:

a. Design for reuse and recovery: identifying, securing and using materials that already exist on site, or can be sourced from other projects.

b. 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.

c. Design for off-site construction: maximising the use of pre-fabricated structure and components, encouraging a process of assembly rather than construction.

d. 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.

e. Design for waste and material asset efficient procurement: identify and specify materials that can be acquired responsibly, in accordance with a recognised industry standard.

f. Engineering plan configurations and layouts that show how the most effective use of materials and arisings can be achieved.

19.6 Assessment Methodology

19.6.1 This section outlines the methodology that would 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.

Scope of the Assessment

19.6.2 The assessment of materials and waste would consider the following:

a. 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.

b. 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.

c. 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.

d. 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.

19.6.3 The following matters would be scoped out of the assessment of materials and waste:

a. Waste arising from extraction, processing and manufacture of construction components and products.

b. Other environmental impacts associated with the management of waste from the Project (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 chapters.

c. Direct impacts on safeguarded/ allocated mineral sites. The Project site does not pass through any such sites, therefore this aspect is scoped out of the assessment.

d. Direct impacts on MSAs. The DCO site does not pass through any MSAs.

e. Materials arising from marine dredging: it is assumed that dredged materials would not be brought onshore for disposal and the effects associated would be addressed separately in other relevant chapters within the ES including:

   i Chapter 8 Nature Conservation (Marine)

   ii Chapter 9 Ornithology

   iii Chapter 11 Marine Transport and Navigation

iv Chapter 14 Historic Environment (Marine)

v Chapter 15 Physical Processes

vi Chapter 16 Marine Water and Sediment Quality

f. 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.

g. Effects associated with decommissioning: landside elements would be decommissioned at the end of design life, and all materials removed would be reused or recycled where possible or disposed of in accordance with relevant waste disposal regulations at the time of decommissioning. An outline of the approach will be provided within the ES, which will detail measures envisaged to be implemented to avoid or reduce impacts during the decommissioning of the landside elements. It is not possible to assess waste and material resources effects of decommissioning at the present time, since waste infrastructure, technologies and good practices are likely to be substantially different to those currently in place: specific measures would be addressed as part of a future detailed Decommissioning Plan which would be developed by the Applicant at the appropriate point in time.

19.6.4 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 and waste generation during the construction and operation of the Project is scoped into the assessment.

19.6.5 **Table 19.17** provides a summary of scope for the materials and waste assessment.

Assessment Criteria

Sensitivity

19.6.6 The sensitivity of materials relates to the availability and type of construction material to be consumed by the Project. The IEMA guidance criteria described within **Table 19.9** would be used to determine the sensitivity of materials.

Table 19.9 Materials Receptors Sensitivity

Effects	Criteria for materials receptor sensitivity
Negligible	On balance, the key materials required for the construction of the Project are forecast (through trend analysis and other information) to be free from known issues regarding supply and stock *And/ or* 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 Project are forecast (through trend analysis and other information) to be generally free from known issues regarding supply and stock.

Effects	Criteria for materials receptor sensitivity
	And/ or 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 Project are forecast (through trend analysis and other information) to suffer from some potential issues regarding supply and stock. *And/ or* 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 Project are forecast (through trend analysis and other information) to suffer from known issues regarding supply and stock. *And/ or* 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 Project are forecast are known to be insufficient in terms of production, supply and/ or stock. *And/ or* 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.***	

19.6.7 The sensitivity of waste relates to availability of landfill capacity in the absence of the Project. 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.

19.6.8 The criteria described within **Table 19.10** and **Table 19.11** would be used to determine the sensitivity of landfill capacity.

Table 19.10 Inert and Non-hazardous Landfill Capacity Sensitivity

Effects	Criteria for inert and non-hazardous landfill capacity sensitivity
Negligible	Across construction and/ or operation phases, the baseline/ future baseline (i.e. without the Project) of regional inert and non-hazardous landfill capacity expected to remain unchanged, or is expected to increase through a committed change in capacity.

Effects	Criteria for inert and non-hazardous landfill capacity sensitivity
Low	Across construction and/ or operation phases, the baseline/ future baseline (i.e. without the Project) 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 Project) 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 Project) 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 Project) of regional inert and non-hazardous landfill capacity is: expected to reduce very considerably (by >10%); end during construction or operation; is already known to be unavailable; or, would require new capacity or infrastructure to be put in place to meet forecast demand.

Table 19.11 Hazardous Landfill Capacity Sensitivity

Effects	Criteria for hazardous landfill capacity sensitivity
Negligible	Across the construction and/ or operation phases, the baseline/ future baseline (i.e. without the Project) 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 Project) 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 Project) 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 Project) 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 Project) of regional (or where justified, national) hazardous landfill capacity is: expected to reduce very considerably (by >1%); end during construction or operation: is already known to be unavailable; or, would require new capacity or infrastructure to be put in place to meet forecast demand.

Magnitude

19.6.9 The magnitude of impact describes the degree of variation from the baseline conditions as result of the Project. 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 Project. The criteria used to assess the magnitude of impact for materials are provided within **Table 19.12**.

Table 19.12 Materials Magnitude of Impacts

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.*	

19.6.10 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 of the Project on the baseline landfill capacity. The criteria used to assess the magnitude of impact for resources and waste are provided within **Table 19.13** and **Table 19.14**.

Table 19.13 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 would reduce expansive study area landfill capacity baseline# by <1%.
Minor	Waste generated by the development would reduce expansive study area landfill capacity baseline# by 1-5%.
Moderate	Waste generated by the development would reduce expansive study area landfill capacity baseline# by 6-10%.
Major	Waste generated by the development would reduce expansive study area landfill capacity baseline# by >10%.
# forecast as the worst case scenario, during a defined construction and/ or operational phase.	

Table 19.14 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 would reduce expansive study area landfill capacity baseline# by <0.1%.
Minor	Waste generated by the development would reduce expansive study area landfill capacity baseline# by <0.1-0.5%.
Moderate	Waste generated by the development would reduce expansive study area landfill capacity baseline# by <0.5-1%.
Major	Waste generated by the development would reduce expansive study area landfill capacity baseline# by >1%.
# forecast as the worst case scenario, during a defined construction and/ or operational phase.	

Significance

19.6.11 **Table 19.15** describes the effect thresholds used in determining the significance of potential effects and **Table 19.6** shows the significance of the effects.

Table 19.15 Effect Thresholds

		Magnitude of impact				
		No change	**Negligible**	**Minor**	**Moderate**	**Major**
Sensitivity of Receptor	**Very High**	Neutral	Slight	Moderate or large	Large or very large	Very large
	High	Neutral	Slight	Slight or moderate	Moderate or large	Large or very large
	Medium	Neutral	Neutral or slight	Slight	Moderate	Moderate or large
	Low	Neutral	Neutral or slight	Neutral or slight	Slight	Slight or moderate
	Negligible	Neutral	Neutral	Neutral or slight	Neutral or slight	Slight

Table 19.16 Significance of Effect

Effect	Materials	Waste
Neutral	Not significant	Not significant
Slight		
Moderate	Significant	Significant
Large		
Very large		

Relevant Legislation, Policy and Technical Guidance

19.6.12 The materials and waste assessment would be undertaken taking into account relevant legislation, planning policy and guidance as set out in national, regional and local planning policy including:

a. Waste FD.
b. The Environmental Protection Act (1990) (Ref 19-14).
c. The Hazardous Waste (England and Wales) Regulations (2005) (Ref 19-15).
d. The Waste (England and Wales) Regulations (2011) (Ref 19-16).
e. The Environmental Permitting (England and Wales) Regulations (Ref 19-17).
f. The Environment Act 2021 (Ref 19-18).
g. National Policy Statements: Overarching National Policy Statement for Energy (EN-1) (Ref 19-19) and National Policy Statement for Ports (Ref 19-20).
h. NPPF (2021) (Ref 19-21).
i. National Planning Policy Guidance for Minerals (2014) (Ref 19-22).
j. National Planning Policy Guidance for Waste (2015) (Ref 19-23).
k. National Planning Policy for Waste (2014) (Ref 19-24).
l. The Waste Management Plan for England (2021) (Ref 19-10).
m. A Green Future: Our 25 Year Plan to Improve the Environment (Ref 19-25).
n. Our Waste, Our Resources, A Strategy for England (Resources and Waste Strategy for England) (2018) (Ref 19-26).
o. NELC Local Plan (Ref 19-7).
p. Contaminated Land: Applications in Real Environments (CL:AIRE) Definition of Waste: Development Industry Code of Practice (DoWCoP), v2 (Ref 19-13).
q. Waste and Resources Action Programme (WRAP) Designing Out Waste: A Design Team Guide for Civil Engineering (Ref 19-6).

19.7 Consultation

19.7.1 Some future consultation may be required with the Environment Agency and local authorities.

19.8 Summary

19.8.1 This chapter presents an initial baseline for materials and waste, an overview of the assessment methodology to be followed during the environmental assessment and identifies the potential effects of the Project. A summary of the proposed scope of the materials and waste assessment is provided in **Table 19.17**.

Table 19.17 Summary of Scope of the Materials and Waste Assessment

Element	Phase	Scoped In	Scoped Out	Justification
Changes in demand for materials	Construction	✓	x	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 and waste generation during the construction of the Project is scoped into the assessment.
Changes in available landfill capacity	Construction	✓	x	
Direct impacts on safeguarded mineral sites	Construction	x	✓	The DCO site boundary does not pass through any such sites.
Direct impacts on safeguarded waste sites	Construction	✓	x	The DCO site boundary includes and is adjacent to two safeguarded waste sites.
Direct impacts on MSAs	Construction	x	✓	The DCO site boundary does not pass through any such areas.
Waste arising from extraction, processing and manufacture of construction components and products	Construction	x	✓	It is assumed that waste arising from the extraction, processing and manufacture of construction components and products that would be used during the Project are being produced in manufacturing facilities with their own waste management plans, facilities, and supply chain. These manufacturing facilities and their supply chains, which are potentially in different regions of the UK or the world, and therefore

Element	Phase	Scoped In	Scoped Out	Justification
				are outside of the geographical scope of this assessment.
Other environmental impacts associated with the management of waste from the Project 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.	Construction	x	✓	The impacts are addressed separately in other relevant chapters.
Changes in demand for materials	Operation	x	✓	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
Changes in available landfill capacity	Operation	✓	x	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, waste generation during the operation of the Project is scoped into the assessment.
Changes in demand for materials and available landfill capacity	Decommissioning	x	✓	Landside elements would be decommissioned at the end of design life, and all materials removed would be reused or recycled where possible or disposed of in accordance with relevant waste disposal regulations at the time of decommissioning. It is not possible to assess waste and material resources effects of decommissioning at the present time, since waste infrastructure, technologies and good practices are likely to be substantially different to those currently in place: specific measures would be addressed as part of a detailed Decommissioning Plan which

Element	Phase	Scoped In	Scoped Out	Justification
				would be developed by the Applicant at the appropriate point in time.

19.9 References

Ref 19-1 IEMA (2020). Guide to: Materials and Waste in Environment Impact Assessment, Guidance for a Proportionate Approach.

Ref 19-2 European Union (2008). Directive 2008/ 98/ EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives (2008/ 98/ EC).

Ref 19-3 Defra (2010). The Strategy for Hazardous Waste Management in England.

Ref 19-4 Make UK (2019). A new deal for steel: laying the foundations for a vibrant UK steel industry (published July 2019).

Ref 19-5 MPA (2020). Profile of the UK Mineral Products Industry (2020 Edition).

Ref 19-6 WRAP (undated). Designing Out Waste Tool for Civil Engineering (no longer available online).

Ref 19-7 North East Lincolnshire Council (2018a). North East Lincolnshire Local Plan 2013 to 2032.

Ref 19-8 Environment Agency (2022). 2020 Waste Data Interrogator – Waste Received (Excel) – Version 4.

Ref 19-9 Environment Agency (2021). Historic Landfill Sites.

Ref 19-10 Department for Environment, Food & Rural Affairs (2021a). The Waste Management Plan for England.

Ref 19-11 WRAP (2007). Waste Recovery Quick Wins. Improving Recovery Rates without Increasing Costs.

Ref 19-12 Defra (2011). Guidance on Applying the Waste Hierarchy.

Ref 19-13 Contaminated Land: Applications in Real Environments (CL:AIRE), (2011). Definition of Waste: Development Industry Code of Practice (DoWCoP), Version 2.

Ref 19-14 Her Majesty's Stationary Office (HMSO) (1990). Environmental Protection Act 1990.

Ref 19-15 HMSO (2005). Hazardous Waste (England and Wales) Regulations 2005.

Ref 19-16 HMSO (2011). Waste (England and Wales) Regulations 2011.

Ref 19-17 HMSO (2016). The Environmental Permitting (England and Wales) Regulations 2016.

Ref 19-18 HMSO (2021). The Environment Act 2021.

Ref 19-19 Department of Energy and Climate Change (DECC) (2011). Overarching National Policy Statement for Energy (EN-1).

Ref 19-20 Department for Transport (2012). National Policy Statement for Ports.

Ref 19-21 Ministry of Housing, Communities & Local Government (2021). Revised National Planning Policy Framework (NPPF).

Ref 19-22 Ministry of Housing, Communities & Local Government (2014). Planning Policy Guidance for Minerals.

Ref 19-23 Ministry of Housing, Communities & Local Government (2015). Planning Policy Guidance for Waste.

Ref 19-24 Ministry of Housing, Communities & Local Government (2014). National Planning Policy for Waste.

Ref 19-25 Department for Environment, Food & Rural Affairs (2018a). A Green Future: Our 25 Year Plan to Improve the Environment.

Ref 19-26 Department for Environment, Food & Rural Affairs (2018b). Our Waste, Our Resources: A Strategy for England (Resources and Waste Strategy for England).

20 Ground Conditions and Land Quality

20.1 Introduction

20.1.1 This section presents the scope and methodology of the ground conditions and land quality assessment for the Project. The chapter also details the datasets to be used to inform the assessment, provides an overview of baseline conditions, sets out the likely significant effects to be considered within the assessment, and discusses how these likely significant effects would be assessed for the purpose of the EIA.

20.1.2 The chapter describes the data acquisition and collation method which would be followed to determine existing ground conditions with respect to geology, hydrogeology and hydrology for the identified study areas and potential impacts and effects for the Project. The chapter is supported by **Figures 20.1** to **20.7** in **Appendix A**:

a. **Figure 20.1** Superficial Deposits
b. **Figure 20.2** Bedrock Geology
c. **Figure 20.3** Ground Water Features
d. **Figure 20.4** West Site Constraints Plan
e. **Figure 20.5** East Site Constraints Plan
f. **Figure 20.6** Source Protection Zone
g. **Figure 20.7** Ecological Designations

20.2 Baseline Environment and Study Area

Study Area

20.2.1 The following sections provide a summary of existing ground conditions within the DCO site boundary, based on the sources of information identified in **Section 20.6**. The study area for this chapter is defined by a 500m buffer around the DCO site boundary. The delineation of the study area takes into consideration the Source-Pathway-Receptor approach, which identifies the potential 'source' or 'cause' of effect (such as excavations/ cuts and other activities from the Project), the identified potential 'receptors' (water features/ water bodies such as aquifers, licensed abstraction boreholes etc.) within the vicinity of the DCO site boundary that could potentially be affected, and the 'pathways' or 'mechanisms' (such as the unsaturated and saturated zone of the underlying geology, road drainage and other hydraulically connected systems to the Project) that can allow an effect to occur or through which an effect can be transmitted from a source to a receptor. The delineation also takes into consideration the nature of the underlying geology (pathway) and hydrogeology (receptor) beneath the DCO site boundary.

20.2.2 In general, the receptors and potential sources of contamination have been identified within the DCO site boundary or within approximately 500m of the DCO site boundary, as interaction between the site and receptors, or potential sources of contamination beyond 500m would generally not occur as a result of the

ground conditions present in and around the DCO site boundary. Where relevant for specific subtopics, such as groundwater Source Protection Zones (SPZs) (**Figure 20.6** in **Appendix A**), the study area extends to beyond 500m either side of the DCO site boundary 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 500m study area.

Current Baseline

Made Ground

20.2.3 Made Ground is anticipated to be present beneath the onshore part of the DCO site boundary (i.e. in the West Site, Pipeline area and the East Site) (refer to **Figure 20.1** in **Appendix A**). The thickness and composition of the Made Ground is yet to be determined; however, it is unlikely to form a suitable founding material due to its likely variable nature. It is therefore expected that it would at relatively shallow depths require excavation and replacement with compacted engineering fill.

20.2.4 Areas of deeper Made Ground/ Artificial Ground are indicated to be present as Warp and Fill and noted to extend to 8 - 14 m below ground level (bgl). As excavation of thick Made Ground to significant depths is unlikely to be practicable, deep foundations, soil stabilisation or ground improvement techniques may need to be considered. A detailed assessment of the Made Ground would need to be undertaken to categorise its suitability for ground improvement.

Superficial Geology (Tidal Flat Deposits)

20.2.5 The Tidal Flat Deposits forms part of the superficial geology (**Figure 20.1** in **Appendix A**) present within the study area. Normally they comprise unconsolidated and sometimes consolidated soft silty clay, with layers of sand, gravel and peat.

20.2.6 If the anticipated underlying superficial Tidal Flat Deposits are proven at or close to the surface, they are likely to have a very soft to soft consistency, which would not be a suitable bearing stratum. As with the Made Ground if shallow depths are encountered, excavation and replacement with engineering fill would be a suitable option. If substantial deposits of soft, compressible material are encountered, consideration may need to be made for the use of deep piled foundations or other ground stabilisation/ improvement techniques in order to provide adequate bearing capacity for founding.

Superficial Geology (Glacial Till)

20.2.7 The Glacial Till is also present in the study area, comprising a heterogenous mixture of clay, sand, gravel, and boulders varying widely in size and shape (diamicton).

20.2.8 If Glacial Till Deposits are proven close to the surface, and have a firm to stiff consistency or better, the use of traditional spread foundations for lightly loaded structures is likely to be suitable subject to bearing resistance and settlement

tolerance assessment. An allowance for over-excavation and replacement should be considered to remove any soft or highly variable material, which may be in the form of naturally occurring local lenses of silt, clay and organic material within the Glacial Till or compressible materials.

20.2.9 If competent Glacial Till is recorded beneath any very soft to soft strata it would be possible to use piled foundations taking the load through the poor constancy strata into this competent material, this would be dependent upon the ground conditions and the frictional resistance generated by the superficial deposits. It should be noted that piles have the potential to create contaminant pathways into the underlying aquifers. Detailed geotechnical assessment would be required to assess the suitably of the option, and it would be dependent upon design loads and equipment sensitivity to movement.

20.2.10 The Tidal Flat Deposits and the Glacial Till form the main superficial geology beneath the study area. Historical BGS borehole records indicated the combined thickness of the superficial geology varies beneath the study area and could be up to 33m thick in some places beneath land within the DCO site boundary.

20.2.11 Where excavation of superficial materials is required, an assessment of the potential impact on groundwater quality and quantity would be undertaken with adequate groundwater dewatering and control measures proposed to reasonably mitigate any significant effects. The mitigation measures would form part of the CEMP.

Bedrock Geology (Chalk Bedrock)

20.2.12 The bedrock geology (**Figure 20.2** in **Appendix A**) underlying the study area comprise the Flamborough and Burnham Chalk Formations. The Flamborough Chalk consist of white, well-bedded, flint-free chalk with common marl seams while the Burnham Chalk Formation beneath the western margins of the study area consist of white, thinly-bedded chalk with common tabular and discontinuous flint bands; sporadic marl seams. The full thickness of the Chalk beneath the study area is unknown but has been proven up to a thickness of about 40m in the area, as indicated in some BGS historical borehole records. The Chalk is overlain by the superficial deposits beneath the Project Site. Findings from the detailed GI would be used to confirm the thicknesses of the superficial geology and where necessary, that of the bedrock geology in order to inform the detailed design, construction and operation of the Project.

20.2.13 The construction of both bored and driven piles would be technically feasible within the DCO site boundary However, the suitability of driven piles should be considered from an environmental/ nuisance issue. Piles may encounter a variety of obstructions including boulders within the Glacial Till, obstructions from existing or historical underground structures and foundations, variable rock head level and variable properties of rock, such as weathered horizons meaning the rock acts more as a stiff clay. All these potential features should be taken into consideration when determining suitable foundation options at detailed design stage.

20.2.14 If contamination is identified within the DCO site boundary, a piling risk assessment should be carried out during the detailed design stage in accordance

with the Environment Agency Guidance “Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention” and “Piling in Layered Ground: risks to groundwater and archaeology” (Ref 20-1).

Soils

20.2.15 The soil is described as loamy and clayey soils of coastal flats with naturally high groundwater for all areas within the DCO site boundary according to ‘Soilscapes’ (Ref 20-2). It is described as lime rich to moderate fertility, with habitats of wet brackish coastal flood meadows, with landcover of Arable and grassland.

20.2.16 The Natural England agricultural land classification is described as Grade 3 Good to Moderate on the Yorkshire & The Humber Region map (Ref 20-3). Grade 3 Land is defined as *“Land with moderate limitations which affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. Where most demanding crops are grown, yields are generally lower or more variable than on land in Grades 1 and 2.”* The land has not been subdivided into Grades 2a or 3b.

20.2.17 It should be noted that the agricultural soils would be affected by the Project, either due to temporary and/ or permanent physical removal or sealing of soil resources during both construction and operation. This would only relate to a relatively small proportion of the site.

Previous Ground Investigation

20.2.18 British Geological Survey (BGS) GeoIndex online resources (Ref 20-4) record ground investigation data from many boreholes drilled within and surrounding the DCO site boundary. The strata encountered in these exploratory locations generally correlate with information obtained from BGS mapping data. Strata encountered are summarised in **Table 20.1**.

Table 20.1 State Encountered

Stratum Type	Description	Approximate thickness (m)
Made Ground	Made Ground deposits within the West Site are shown to generally comprise stiff to firm, yellow/ grey silty CLAY. The origin for the described material is assumed to be re-worked Glacial Till. The composition of the Made Ground encountered throughout the remainder of the DCO site boundary is unknown.	0 - 8
Superficial	Tidal Flat Deposits: Soft to very soft dark grey silty organic CLAY. Glacial Till: Firm to stiff slightly fissured grey brown slightly gravelly CLAY.	10 - 30
Bedrock	Flamborough Chalk Formation: Hard white thickly bedded flint free CHALK with common flint nodules.	Not Known

Stratum Type	Description	Approximate thickness (m)
	Burnham Chalk Formation: White thinly bedded CHALK with common discontinuous flint bands and sporadic marl seams.	

Ground Conditions Summary

20.2.19 **Table 20.2** provides a summary of the ground conditions present in each section of the DCO site boundary.

Table 20.2 Ground Conditions Summary

Section	Stratum Type
Jetty	Made Ground: Unknown Superficial Deposits: Unknown Bedrock: Flamborough Chalk Formation
Pipeline	Made Ground: Present Superficial Deposits: Tidal Flat Deposits & Glacial Till Bedrock: Flamborough Chalk Formation
East Site	Made Ground: Present Superficial Deposits: Tidal Flat Deposits & Glacial Till Bedrock: Flamborough Chalk Formation
West Site	Made Ground: Present Superficial Deposits: Tidal Flat Deposits & Glacial Till Bedrock: Flamborough Chalk Formation

Groundwater

20.2.20 Based on the existing borehole logs and the 2017 investigation (Ref 20-6) it is noted that groundwater was encountered within the Made Ground and Tidal Flat Deposits (see **Figure 20.1** in **Appendix A**). There is potential for groundwater to be encountered within permeable layers of the Glacial Till (**Figure 20.1** in **Appendix A**). It is therefore recommended that any works should follow the safe digging procedures in accordance with HSG47 (Ref 20-7). A summary of the recorded groundwater information is presented **Table 20.3**.

Table 20.3 Summary of Groundwater Information

Location	Geological Unit	Strike Depth (m bgl)	Strike Depth (m AOD)	Monitored Depth (m bgl)	Monitored Depth (AOD)
East Site	Made Ground	6no strikes between 0.8m and 1.0m bgl.	6no strikes between 0.6 and 0.8m AOD.	Monitored across three weekly visits between 20/ 03/ 2017 and 03/ 04/ 2017, 22no strikes between 0.1 and 2.0m bgl.	Monitored across three weekly visits between 20/ 03/ 2017 and 03/ 04/ 2017, 22no strikes between -0.4 and 1.6m AOD.
	Tidal Flat Deposits	Non recorded	Non recorded	Monitored across three weekly visits between 20/ 03/ 2017 and 03/ 04/ 2017, 8no. strikes between 1.4 and 4.4m bgl.	Monitored across three weekly visits between 20/ 03/ 2017 and 03/ 04/ 2017, 8no strikes between 0m AOD and -2.6m AOD.
West Site	Made Ground	2no. strikes between 0.6 – 1.2	Unknown	Non recorded	
	Tidal Flat Deposits		Non recorded		

20.2.21 There is no ground investigation data available related to groundwater on the Pipeline areas of the DCO site boundary. However, it is anticipated that groundwater conditions will be similar to that encountered within the East Site.

20.2.22 It should be noted that groundwater within the Chalk bedrock (**Figure 20.2** in **Appendix A**) has not been encountered during the recent GI (Ref 20-6) or within existing borehole logs. However, as both the Flamborough and Burnham Chalk aquifers are classified as Principal Aquifers by the Environment Agency, groundwater is expected. BGS historical borehole records, hydrogeological map of the area and several springs in the area indicate confining groundwater may be present in the Chalk with the potential for artesian flow. Accordingly, groundwater control measures should be implemented to mitigate any potential impacts on the resources arising from construction activities (e.g. deep excavation and piling activities etc.) and or operational activities likely to intercept groundwater in the Chalk aquifers.

20.2.23 Groundwater in the Chalk plays a fundamental role in the environment and is used for public water supply in the area. Accordingly, groundwater needs to be adequately protected and as a number of SPZs have been identified within the study area (**Figure 20.6** in **Appendix A**).

Geological Sites of Special Scientific Interest (SSSI) and Regionally Important Geological Sites

20.2.24 A review of currently available information from MAGIC and relevant local council websites have not identified any geological SSSIs, Regionally Important Geological Sites (RIGS) or Local Geological Sites within the DCO site boundary. Further information on RIGs and Local Geological Sites would be requested from Natural England, local councils and local geological societies during consultation and included reported in the ES as applicable.

20.2.25 It should be noted that the Jetty is located within a SSSI, although not a geological SSSI.

Coal Mining and Shallow Mining

20.2.26 The Coal Authority online interactive map (Ref 20-8) indicates that the DCO site boundary (Jetty only) is situated within a surface coal resource area. Further review suggests that the DCO site boundary is not within 500m of a Coal mining reporting area or a development high risk area.

Mineral Sites and Designations

20.2.27 The DCO site boundary is within NELC jurisdiction. No mineral safeguarding has been identified within the DCO site boundary. There are no active extraction sites with 500m of the DCO site boundary.

Hydrogeology

Aquifer Classifications

20.2.28 Aquifer classification maps on DEFRA's 'MAGIC' mapping portal (Ref 20-9) indicate the aquifer classifications are present underlying the DCO site boundary – refer to **Table 20.4**.

Table 20.4 Aquifer Classification

Stratum Type	Stratum	Aquifer Classification	Definition (Environment Agency)
Superficial	Tidal Flat Deposits	Secondary Undifferentiated	Secondary undifferentiated are aquifers where it is not possible to apply either a Secondary A or B definition because of the variable characteristics of the unit type. These have only a minor value.
	Glacial Till	Unproductive	Unproductive strata are largely unable to provide usable water supplies and are unlikely to have surface water and wetland

Stratum Type	Stratum	Aquifer Classification	Definition (Environment Agency)
			ecosystems dependent on them.
Bedrock	Flamborough Chalk Formation	Principal	Principal aquifers provide significant quantities of drinking water, and water for business needs. They may also support rivers, lakes and wetlands.
	Flamborough Chalk Formation	Principal	Principal aquifers provide significant quantities of drinking water, and water for business needs. They may also support rivers, lakes and wetlands.

Other Hydrogeological Classifications and Features

20.2.29 Additional hydrogeological classifications and features have been identified and are summarised in **Table 20.5**.

Table 20.5 Hydrogeological Classifications

Section	Description of other Hydrogeological Classifications and Features
Jetty	**Source Protection Zones** There are no Source Protection Zones within this section of the DCO site boundary. **Drinking Water Safeguard Zones** There are no Drinking Water Safeguard Zones (Surface Water or Ground Water) within this section of the DCO site boundary. **Nitrate Vulnerable Zones 2021 to 2024 (pre appeals)** There are no Nitrate Vulnerable Zones within this section of the DCO site boundary.
Pipeline	**Source Protection Zones** This section of the DCO site boundary contains two Source Protection Zone: Zone II – Outer Protection Zone, present surrounding Queen Street Immingham Zone I – Inner Protection Zone, present surrounding Queen Street Immingham **Drinking Water Safeguard Zones** There are no Drinking Water Safeguard Zones (Surface Water or Ground Water) within this section of the DCO site boundary. **Nitrate Vulnerable Zones 2021 to 2024 (pre appeals)** This section is within a Nitrate Vulnerable Zone detailed as Surface Water S359 –North Beck Drain NVZ.

Section	Description of other Hydrogeological Classifications and Features
East Site	**Source Protection Zones** This section of the DCO site boundary contains two Source Protection Zone: Zone II – Outer Protection Zone, present surrounding Queen Street Immingham Zone I – Inner Protection Zone, present surrounding Queen Street Immingham **Drinking Water Safeguard Zones** There are no Drinking Water Safeguard Zones (Surface Water or Ground Water) within this section of the DCO site boundary. **Nitrate Vulnerable Zones 2021 to 2024 (pre appeals)** This section is within a Nitrate Vulnerable Zone detailed as Surface Water S359 - North Beck Drain NVZ.
West Site	**Source Protection Zones** This section of the DCO site boundary contains two Source Protection Zone; Zone II – Outer Protection Zone, present surrounding Queen Street Immingham Zone I – Inner Protection Zone, present surrounding Queen Street Immingham **Drinking Water Safeguard Zones** There are no Drinking Water Safeguard Zones (Surface Water or Ground Water) within this section of the DCO site boundary. **Nitrate Vulnerable Zones 2021 to 2024 (pre appeals)** This section is within a Nitrate Vulnerable Zone detailed as Surface Water S359 - North Beck Drain NVZ.

Current and Historic Potentially Contaminative Land Uses

20.2.30 A summary of current land use of the DCO site boundary is summarised in **Table 20.6**.

Table 20.6 Current Land Uses

Section	Description of current land use
Jetty	Current land use within this section of the DCO site boundary and surrounding study area is predominately marine. According to North East Lincolnshire Council data there are no brownfield sites within 500m of this section of the DCO site boundary.
Pipeline	Current land use within this Section of the DCO site boundary and surrounding study area is predominately agricultural. The DCO site boundary in this section does not cross any major roads, although does cross Laporte Road which is a minor road. According to North East Lincolnshire Council data there are no brownfield sites within 500m of this section of the DCO site boundary.

Section	Description of current land use
East Site	Current land use within this Section of the DCO site boundary and surrounding study area is a mix of areas in port use, including cargo storage areas as well as a woodland strip and agricultural land. Although some stockpiling of unknown material is shown to have occurred on site historically. The DCO site boundary in this section also crosses the Laporte Road. According to North East Lincolnshire Council there are no brownfield sites within 500m of this section of the DCO site boundary.
West Site	Current land use within this Section of the DCO site boundary and surrounding study area is predominately agricultural. The DCO site boundary in this section does not cross any major or minor roads although it is located adjacent to the A1173. According to North East Lincolnshire Council there are no brownfield sites within 500m of this section of the DCO site boundary.

Current and Historic Landfills

20.2.31 Recorded current and historic landfills (Ref 20-9 and Ref 20-4) identified surrounding and within the study area are summarised in **Table 20.7**.

Table 20.7 Landfill Summary

Section	Landfill Type	Description
Jetty	There are no current or historic landfills located within the DCO site boundary or within 500m of the DCO site boundary.	N/A
Pipeline	There are no current or historic landfills present within the DCO site boundary. A large active landfill site which includes capped areas and a former gypsum deposit area is located 200m south west with North Beck Drain beyond. An EA historical landfill has been identified 320m north west of the DCO site boundary.	Site Name: Dock South East Site Reference: 55/00/0062, 2000 Location: Approx. 320m North West
East Site	There are no current or historic landfills present within the DCO site boundary. An EA historical landfill has been identified 325m west of the DCO site boundary.	Site Name: Dock South East Site Reference: 55/00/0062, 2000 Location: Approx. 325m West
West Site	There are no current or historic landfills present within the DCO site boundary. A large active landfill Site which includes capped areas and a former gypsum storage area is located 50m to the south with North Beck Drain beyond (approx. 600m). An EA historical landfill has been	Site Name: Dock South East Site Reference: 55/00/0062, 2000 Location: Approx. 280m North

Section	Landfill Type	Description
	identified 280m north of the DCO site boundary.	

Ground Gas

20.2.32 Ground gas including methane and carbon dioxide may be present associated with the natural strata and Made Ground deposits, where present, throughout the DCO site boundary. Ground gas may also be associated with recorded landfills, as well as unregistered infilled land (e.g. backfilled sand and chalk pits).

Radon

20.2.33 Published radon data from UK Health and Security Agency indicates that the entire study area is in the lowest band of radon potential, with less than 1% of homes above the Action Level.

Unexploded Ordnance Potential

20.2.34 The regional unexploded bomb (UXB) risk mapping published by Zetica (Ref 20-10) show the DCO site boundary lies within a zone that experiences a low risk of UXB. Defined as an area having a bombing density of 15 bombs per 1,000 acre or higher. Zetica identify the area to the west of the West Site as a strategic target due to utilities and the docks to the north-west as a Luftwaffe target. A Pre-Desk-Study-Assessments from Zetica for the DCO site boundary, identified a low risk.

Future Baseline

20.2.35 In the absence of the Project, future baseline conditions for ground conditions and land quality are anticipated to remain unchanged from those as described above.

20.3 Planned Surveys

20.3.1 A more detailed desk-based analysis of the potential for ground contamination at the Project site would be undertaken. This would include a review of historical maps, local authority records, and publicly available data together with a site walkover inspection

20.3.2 Site walkover inspections would be conducted as part of the review of geology and hydrogeology baseline environment. These surveys would be undertaken following review of the available environmental data and would serve as a ground truthing exercise, targeting those parts of the study area where potential higher risk factors have been identified. The surveys would look to identify on-site features that may not be directly identifiable from the environmental data set or may be used to confirm (or not) the presence of features identified in the desk-based review. Typical features that would be assessed during the site walkover surveys include:

a. Description of site industrial processes/ potential contaminative processes.

b. Ground cover and indicative vegetation health.

c. Local changes in ground level (gradients, slopes, embankments, retaining walls etc.).

d. Evidence of ground disturbance or instability (slopes/ depressions etc.).

e. Surface water courses.

f. Evidence of water logging/ flooding/ poor drainage.

g. Presence and condition of on-site structures with the potential to result in ground contamination (e.g. storage tanks).

h. An Agricultural Land Classification survey may be required to determine the subdivision of land classified as Grade 3 into either Grade 3a or 3b.

20.3.3 It is envisaged that the desktop analysis would be informed by the following sources:

a. Environment Agency mapping and resources.

b. British Geological Survey (BGS) GeoIndex Map Viewer.

c. The UK Soil Observatory.

d. The MAGIC interactive natural environment map Viewer.

e. Historical Ordnance survey maps.

f. Database search i.e. Envirocheck or Groundsure Report.

g. Unexploded Ordnance (UXO) Desk Study.

h. Any other relevant ABP site survey reports or historical records.

i. Ground Investigation (GI) survey which is planned for the concept design phase.

20.3.4 The desk-based information would be used to devise a Conceptual Site Model (CSM), as described in the government guidance on managing land contamination (Ref 20-11), where any plausible linkages between the contamination source and sensitive receptors would be qualitatively assessed.

20.3.5 The CSM would take account of the information gathered at the desk-based assessment and consider the potential pollutant linkages between any contaminative sources, the migration pathways and the sensitive receptors. Where a plausible linkage is concluded to be present in the CSM, the linkage would be assessed qualitatively as to the potential level of risk and then where considered to be a greater than low risk, assessed further by means of additional investigation followed by a generic quantitative risk assessment.

20.4 Identification of Potential Effects

20.4.1 This section highlights the potential impacts likely to arise and effects as related to ground conditions and land quality during the Project construction, operation and decommissioning. The most sensitive receptors are considered to be the underlying aquifers, human health and uncontaminated soils and geology.

Construction Phase

20.4.2 During the Project construction the following effects could occur if appropriate mitigation is not implemented:

a. Chemical spillages and leaks from plant and machinery, and from chemicals and other contaminants stored on site causing pollution of ground or groundwater.

b. Changes in subsoil structure and reduction of subsoil quality due to compaction or erosion during storage.

c. Compaction of subsoil due to construction vehicle movements degrading soil quality and causing potential water logging.

d. Requirement for dewatering, which may reduce flow to groundwater supported sites, abstractions and surface water bodies and change soil hydrology locally.

e. Disturbance of underlying and surrounding geology.

f. Disturbance of potentially contaminated soils, sediments and waters posing a risk to construction workers and groundwater.

g. Importation of contaminated aggregates posing a potential risk to human health and underlying geology and groundwater.

h. Trenchless techniques whereby excavations/ drilling creates a pathway for drilling fluids or other fluids used during construction to reach sensitive groundwater receptors (e.g. Principal Aquifers or abstractions) or sensitive surface water receptors.

i. Potential temporary/ permanent loss of best and most versatile agricultural land.

Operational Phase

20.4.3 The Project is not likely to have significant effects on the underlying geology and groundwater during the operational phase. However, the foundations of structures may provide a preferential pathway for contaminants to migrate to non-contaminated soils, geology and groundwater. In addition, there is potential for aggressive ground contaminants posing a risk to the structures. It is assumed that the Project would comply with the requirements of its Environmental Permit.

Decommissioning Phase

20.4.4 Decommissioning of the Project's land-side structures is not likely to have significant effects on the underlying geology and groundwater. However, there remains the risk of the following adverse effects:

a. Chemical spillages and leaks from plant and machinery, and from chemicals and other contaminants stored on site.

b. Requirement for dewatering to remove structures, reducing flow to groundwater abstractions and surface water bodies, and changes to soil hydrology.

20.4.5 The DCO application would not make any provision for the decommissioning of the marine infrastructure or plant or equipment on the jetty topside. This is because the development would, once constructed, become part of the fabric of the Immingham port estate and would, in simple terms, continue to be maintained so that it can be used for port related activities to meet a long-term need. This is discussed further in Section 2.4 of **Chapter 2 The Project** of this EIA Scoping Report.

20.5 Design, Mitigation and Enhancement Measures

20.5.1 The Project would be designed to prevent adverse effects on soils, geology and hydrogeology, during all phases of the development. A CEMP would be prepared and implemented which would contain a range of good site practices and management that would appropriately manage potential impacts upon soils, geology and hydrogeology.

20.5.2 Desk study has identified potential areas, within the DCO site boundary, of soil and/ or groundwater contamination. There is a requirement to undertake ground investigation and risk assessment of potential contaminant linkages. If areas within the DCO site boundary are shown to pose a risk to the Project and/ or identified sensitive receptors, remedial measures would be implemented. A remediation strategy would be devised and discussed with the regulatory authorities (local authorities and the Environment Agency) prior to any remedial works. Contaminated material that is considered to pose a risk would be remediated in line with the remediation strategy or disposed of appropriately.

20.5.3 An understanding of groundwater throughout the DCO site boundary would be obtained from GI and monitoring. A more detailed hydrogeological assessment would be undertaken where 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 would be developed prior to construction (in consultation with the Environment Agency) 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 would consider the effects of any draw down or impacts on nearby abstractions or resources.

20.6 Assessment Methodology

20.6.1 The baseline and potential effects would be established by a review of the following information:

a. Environmental database information (such as Landmark Envirocheck or Groundsure).

b. Records and geo-environmental data held by local authorities relating to current and historical contaminative land uses, including waste sites.

c. Records and geo-environmental data held by local authorities relating to RIGS and quarrying/ mining sites and/ safeguarding areas.

d. Records held by local authorities of water abstractions and Private Drinking Water supplies.

e. Site walkover of areas of interest such as potential sources of contamination.

f. Ground investigation information being derived for the Project.

20.6.2 Using this information and consultation with statutory consultees, a combination of qualitative and quantitative risk assessment would be undertaken to assess the potential effects of the existing ground conditions on the Project, and the potential effects of the development on the geology and hydrogeology.

20.6.3 In relation to potential ground contamination, the risk assessment would be based on the source-pathway-receptor methodology outlined in Land Contamination Risk Management (LCRM) (Ref 20-11) and promoted by Defra and the Environment Agency. For there to be a risk, not only must there be contaminants present on the site (source), there must also be a receptor and a viable pathway which allows the source to impact on the receptor.

20.6.4 The overall assessment methodology is summarised in **Chapter 4 The EIA Process**. However, the assessment of the significance of the potential effects on geology and hydrogeology would be based on guidance in the DMRB LA 109 Geology and Soils (geology) (Ref 20-12) and DMRB LA 113 Road Drainage and the Water Environment (groundwater) (Ref 20-13).

Sensitivity

20.6.5 The sensitivity of the receptor reflects the quality of receptor and its ability to absorb an effect without perceptible change. Sensitivity would be is defined in accordance with **Table 20.8**.

Table 20.8 Sensitivity of Receptors

Sensitivity/ Value	Description/ Criteria	Typical Examples
Very High	Geology Very rare and of international importance with no potential for replacement	United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Sites; SSSIs and Geological Conservation Review (GCR) of international importance and or UNESCO Global Geoparks.
	Soils Soils directly supporting an EU designated site or agricultural land.	SAC, SPA, Ramsar; and/ or Agricultural Land Classification (ALC) grade 1 & 2 or Landscape Character Area (LCA) grade 1&2
	Contamination Human health: very high sensitivity.	Very high sensitivity land use (e.g. residential).
	Surface water	Watercourse having a WFD classification shown in a RBMP and Q95 ≥ 1. 0 m3/ s.

Sensitivity/ Value	Description/ Criteria	Typical Examples
	Relevant sensitivity criteria from Table 3.70 in Road drainage and water environment LA113 (Ref 20-13).	Site protected/ designated under EC or UK legislation (SAC, SPA, SSSI, Ramsar site, salmonid water)/ Species protected by EC legislation.
	<u>Groundwater</u> Relevant sensitivity criteria from Table 3.70 in Road drainage and water environment LA113 (Ref 20-13).	Principal aquifer providing a regionally important resource and/ or supporting a site protected under EC and UK legislation Groundwater locally supports GWDTE SPZ1
High	<u>Geology</u> Rare and of national importance with little potential for replacement.	Rare and of national importance with little potential for replacement (e.g. geological SSSI, ASSI, National Nature Reserves (NNR)). Geology meeting national designation citation criteria which is not designated as such.
	<u>Soils</u> Soils directly supporting an EU designated site or agricultural land.	Soils directly supporting a UK designated site (e.g. SSSI); and/ or ALC grade 3a, or LCA grade 3.1.
	<u>Contamination</u> Human health: very high sensitivity;	High sensitivity land use such as public open space.
	<u>Surface water</u> Relevant sensitivity criteria from Table 3.70 in Road drainage and water environment LA113 (Ref 20-13).	Watercourse having a WFD classification shown in a RBMP and Q95 <1.0m3/ s. Species protected under EC or UK legislation.
	<u>Groundwater</u> Relevant sensitivity criteria from Table 3.70 in Road drainage and water environment LA113 (Ref 20-13).	Principal aquifer providing locally important resource or supporting a river ecosystem. Groundwater supports a GWDTE. SPZ2.
Medium	<u>Geology</u> Of regional importance with limited potential for replacement. Geology meeting regional designation citation	RIGS

Sensitivity/ Value	Description/ Criteria	Typical Examples
	criteria which is not designated as such.	
	Soils Soils supporting non-statutory designated sites.	Local Nature Reserves (LNR), LGS's, Sites of Nature Conservation Importance (SNCIs)); and/ or 2) ALC grade 3b or LCA grade 3.2.
	Contamination Human health: medium sensitivity;	Medium sensitivity land use such as commercial or industrial.
	Surface water Relevant sensitivity criteria from Table 3.70 in Road drainage and water environment LA113 (Ref 20-13).	Watercourses not having a WFD classification shown in a RBMP and Q9 5 >0.001m3/ s.
	Groundwater Relevant sensitivity criteria from Table 3.70 in Road drainage and water environment LA113 (Ref 20-13).	Aquifer providing water for agricultural or industrial use with limited connection to surface water. SPZ3
Low	Geology Of local importance/ interest with potential for replacement	Non designated geological exposures, former quarry's/ mining sites
	Soils Soils supporting non-designated notable or priority habitats	ALC grade 4 & 5 or LCA grade 4.1 to 7
	Contamination Human health: Low sensitivity;	Low sensitivity land use such as highways and rail.
	Surface water Relevant sensitivity criteria from Table 3.70 in Road drainage and water environment LA113 (Ref 20-13).	Watercourses not having a WFD classification shown in a RBMP and Q9 5 ≤0.001m3/ s.
	Groundwater	Unproductive strata

Sensitivity/ Value	Description/ Criteria	Typical Examples
	Relevant sensitivity criteria from Table 3.70 in Road drainage and water environment LA113 (Ref 20-13).	
Negligible	Geology No geological exposures, little/ no local interest.	
	Soils Previously developed land formerly in 'hard uses' with little potential to return to agriculture.	
	Contamination Human health: Undeveloped surplus land/ no sensitive land use proposed.	
	Surface water and groundwater There is no sensitivity rating for negligible described in LA113 (Ref 20-13).	

Magnitude

20.6.6 The magnitude of a potential impact considers the scale of the predicted change to the baseline condition taking into account its duration (i.e. the magnitude may be moderated if they are temporary rather than permanent, short term rather than long term). Definitions for impact magnitude are described in **Table 20.9**. It is unlikely that any effects on geology and soils would be beneficial, so the examples of magnitude all relate to adverse effects.

Table 20.9 Magnitude of Impacts

Magnitude	Criteria	Typical Examples
Major (LA109)	Geology Loss of geological feature/ designation and/ or quality and integrity, severe damage to key characteristics, features or elements.	Destruction of features at a protected site; i.e. SSSIs of international importance; or Global Geoparks.
	Soils Physical removal or permanent sealing of soil resource or agricultural land.	N/ A
	Contamination Human Health: significant contamination identified.	Contamination levels significantly exceed background levels

Magnitude	Criteria	Typical Examples
		and relevant screening criteria (e.g. category 4 screening levels) SP1010 with potential for significant harm to human health. Contamination heavily restricts future use of land.
Major adverse (LA113)	Surface water: relevant sensitivity criteria from Table 3.71 in Road drainage and water environment LA113 (Ref 20-13).	Failure of both acute-soluble and chronic-sediment related pollutants in Highways England Water Risk Assessment Tool (HEWRAT) and compliance failure with EQS values. Calculated risk of pollution from a spillage ≥2% annually (spillage assessment). Loss or extensive change to a fishery. Loss of regionally important public water supply (spillage assessment). Loss or extensive change to a fishery. Loss of regionally important public water supply. Loss or extensive change to a designated nature conservation site. Reduction in water body WFD classification.
	Groundwater: relevant sensitivity criteria from Table 3.71 in Road drainage and water environment LA113 (Ref 20-13)	Loss of, or extensive change to, an aquifer. Loss of regionally important water supply. Potential high risk of pollution to groundwater from routine Runoff - risk score >250 (Groundwater quality and runoff assessment). Calculated risk of pollution from spillages ≥2% annually (Spillage assessment). Loss of, or extensive change to GWDTE or baseflow contribution to protected surface water bodies. Reduction in water body WFD classification. Loss or significant damage to major structures through subsidence or similar effects.
Major Beneficial (LA113)	-	Removal of existing polluting discharge, or removing the likelihood of polluting discharges occurring to a watercourse. Improvement in water body WFD classification.

Magnitude	Criteria	Typical Examples
		Removal of existing polluting discharge to an aquifer or removing the likelihood of polluting discharges occurring. Recharge of an aquifer. Improvement in water body WFD classification.
Moderate (LA109)	Geology Partial loss of feature/ designation, potentially adversely affecting integrity; partial loss of/ damage to key characteristics, features or elements.	Partial loss of features at a protected site; i.e. SSSIs; National Nature Reserves.
	Soils 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.)	N/ A
	Contamination Human health: contaminant concentrations exceed background levels and are in line with limits of relevant screening criteria (e.g. category 4 screening levels) SP1010.	Significant contamination can be present. Control/ remediation measures are required to reduce risks to human health/ make land suitable for intended use.
Moderate adverse (LA113)	Surface water: relevant sensitivity criteria from Table 3.71 in Road drainage and water environment LA113 (Ref 20-13).	Failure of both acute-soluble and chronic-sediment related pollutants in HEWRAT but compliance with EQS values. Calculated risk of pollution from spillages ≥1% annually and <2 % annually. Partial loss in productivity of a fishery. Degradation of regionally important public water supply or loss of major commercial/ industrial/ agricultural supplies. Contribution to reduction in water body WFD classification.
	Groundwater: relevant sensitivity criteria from Table 3.71 in Road drainage and water environment LA113 (Ref 20-13).	Partial loss or change to an aquifer. Degradation of regionally important public water supply or loss of significant commercial/ industrial/ agricultural supplies.

Magnitude	Criteria	Typical Examples
		Potential medium risk of pollution to groundwater from routine runoff - risk score 150-250. Calculated risk of pollution from spillages ≥1% annually and <2 % annually. Partial loss of the integrity of GWDTE. Contribution to reduction in water body WFD classification. Damage to major structures through subsidence or similar effects or loss of minor structures.
Moderate beneficial (LA113)	Surface water: relevant sensitivity criteria from Table 3.71 in Road drainage and water environment LA113 (Ref 20-13).	HEWRAT assessment of both acute-soluble and chronic-sediment related pollutants becomes pass from an existing site where the baseline was a fail condition. Calculated reduction in existing spillage by 50% or more (when existing spillage risk >1% annually). Contribution to improvement in water body WFD classification.
	Groundwater: relevant sensitivity criteria from Table 3.71 in Road drainage and water environment LA113 (Ref 20-13).	Calculated reduction in existing spillage risk by 50% or more (when existing spillage risk is >1% annually). Contribution to improvement in water body WFD classification. Improvement in water body catchment abstraction management Strategy (CAMS) (or equivalent) classification. Support to significant improvements in damaged GWDTE.
Minor (LA109)	<u>Geology</u> 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.	Minor measurable change of features at Geological sites; i.e. RIGS.
	<u>Soils</u> Temporary loss/ reduction of one or more soil function(s) and restriction to current or approved future use.	Through degradation, compaction, erosion of soil resource.
	<u>Contamination</u> Human health: contaminant concentrations are below relevant screening criteria (e.g.	Significant contamination is unlikely with a low risk to human health.

Magnitude	Criteria	Typical Examples
	category 4 screening levels) SP1010.	Best practice measures can be required to minimise risks to human health.
Minor adverse (LA113)	Surface water: relevant sensitivity criteria from Table 3.71 in Road drainage and water environment LA113 (Ref 20-13).	Failure of either acute soluble or chronic sediment related pollutants in HEWRAT. Calculated risk of pollution from spillages ≥0.5% annually and < 1% annually. Minor effects on water supplies.
	Groundwater: relevant sensitivity criteria from Table 3.71 in Road drainage and water environment LA113 (Ref 20-13).	Potential low risk of pollution. to groundwater from routine runoff - risk score <150 Calculated risk of pollution from spillages ≥0.5% annually and <1% annually. Minor effects on an aquifer, GWDTEs, abstractions and structures.
Minor beneficial (LA113)	Surface water: relevant sensitivity criteria from Table 3.71 in Road drainage and water environment LA113 (Ref 20-13).	HEWRAT assessment of either acute soluble or chronic-sediment related pollutants becomes pass from an existing site where the baseline was a fail condition. Calculated reduction in existing spillage risk by 50% or more (when existing spillage risk is <1% annually).
	Groundwater: relevant sensitivity criteria from Table 3.71 in Road drainage and water environment LA113 (Ref 20-13).	Calculated reduction in existing spillage risk by 50% or more to an aquifer (when existing spillage risk <1% annually). Reduction of groundwater hazards to existing structures. Reductions in waterlogging and groundwater flooding.
Negligible (LA109)	Geology Very minor loss or detrimental alteration to one or more characteristics, features or elements of geological feature/ designation. Overall integrity of resource not affected.	Very minor change of features at sites of local importance, i.e. non-designated geological sites.
	Soils No discernible loss/ reduction of soil function(s) that restrict current or approved future use.	N/ A
	Contamination Human health: contaminant concentrations substantially below levels outlined in	No requirement for control measures to reduce risks to human health/ make land suitable for intended use.

Magnitude	Criteria	Typical Examples
	relevant screening criteria (e.g. category 4 screening levels) SP1010	
Negligible (LA113)	Surface water: relevant sensitivity criteria from Table 3.71 in Road drainage and water environment LA113 (Ref 20-13).	No risk identified by HEWRAT (pass both acute-soluble and chronic-sediment related pollutants). Risk of pollution from spillages <0.5%.
	Groundwater: relevant sensitivity criteria from Table 3.71 in Road drainage and water environment LA113 (Ref 20-13).	No measurable impact upon an aquifer and/ or groundwater receptors and risk of pollution from spillages <0.5%.

Significance

20.6.7 The significance of environmental effect is typically a function of the sensitivity of a receptor and the magnitude of an impact. The matrix for the determination of effect significance is provided in **Table 20.10**, taken from DMRB LA104 (Ref 20-14). Effects can be beneficial, adverse or negligible and their significance major, moderate, minor or negligible.

Table 20.10 Significance Evaluation Matrix

		Magnitude of Change (degree of change)				
		No change	Negligible	Minor	Moderate	Major
Sensitivity of Receptor	Very high	Neutral	Slight	Moderate or large	Large or very large	Very large
	High	Neutral	Slight	Slight or moderate	Moderate or large	Large or very large
	Medium	Neutral	Neutral or slight	Slight	Moderate	Moderate or large
	Low	Neutral	Neutral or slight	Neutral or slight	Slight	Slight or moderate
	Negligible	Neutral	Neutral	Neutral or slight	Neutral or slight	Slight
Note: where two significance categories are given, evidence should be provided to support the reporting of a single significance category.						

20.6.8 Any effect predicted to be neutral, or slight is considered to be not significant, whereas effects assessed as moderate, large or very large are considered to be significant.

Relevant Legislation, Policy and Technical Guidance

20.6.9 The following legislation, policy and technical guidance is of geology and hydrogeology assessment:

a. The Water Framework Directive (2000/60/EC).
b. The Groundwater Directive (2006/118/EC).
c. Classification Labelling & Packaging (CLP) Regulation (2008/1272/EC), replacing The Dangerous Substances Directive (67/548/EEC) in 2016.
d. The Priority Substances Directive (2008/105/EC).
e. Environmental Protection Act, 1990.
f. The Environment Act, 1995.
g. The Contaminated Land (England) Regulations, 2006 SI 1380.
h. Groundwater (England and Wales) Regulations, 2009 SI 2902.
i. Environmental Damage (Prevention and Remediation) (England) Regulations, 2015 SI 810.
j. The Water Act 2003.
k. The Water Resources Act 1991 (as amended).
l. The Land Drainage Act 1991 (as amended).
m. The Environmental Permitting (England and Wales) Regulations 2016 SI 1154.
n. The Water Environment (Water Framework Directive) Regulations 2017 SI 407.
o. National Planning Policy Framework (NPPF) 2021.
p. North Lincolnshire Council Local Plan.
q. North East Lincolnshire Council Plan.

20.7 Consultation

20.7.1 Consultees as follows would be contacted during the geology and hydrogeology assessment:

a. Environment Agency.
b. Coal Authority.
c. Natural England.
d. English Heritage.
e. Immingham Town Council.
f. Lincolnshire Council.
g. NELC.
h. Crown Estate.

i. The Port Authority.

j. Marine Management Organisation (MMO).

20.8 Summary

20.8.1 This chapter has identified baseline conditions and the potential effects of the Project on geology and hydrogeology characteristics within the study area. Further assessment of baseline conditions and potential effects would be undertaken as part of the ES through more detailed desk study, site walkovers, and consultation as the Project design progresses.

20.8.2 **Table 20.11** provides a summary of ground conditions and land quality assessment and which aspects are scoped in and out of the EIA.

Table 20.11 Summary of Scope for the Ground Conditions and Land Quality Assessment

Element	Phase	Scoped In	Scoped Out	Justification
Geology	Construction	✓	x	Potential for effects on geological receptors and for effects on the Project from land contamination.
Geology	Operation	✓	x	Potential for effects on geological receptors and for effects on the Project from land contamination.
Hydrogeology	Construction	✓	x	Potential for effects on hydrogeological receptors and for effects on the Project from land contamination.
Hydrogeology	Operation	✓	x	Potential for effects on hydrogeological receptors and for effects on the Project from land contamination.
Soils	Construction	✓	x	Potential for effects on soils.
Soils	Operation	x	✓	Any effects would have occurred during construction of the Project.
Human Health	Construction	✓	x	Potential effects on human health receptors and for the Project from land contamination.
Human Health	Operation	✓	x	Potential effects on human health receptors and for the Project from land contamination.

20.9 References

Ref 20-1 Environment Agency. (2006) Piling in Layered Ground: Risks to Groundwater and Archaeology [Accessed June 2022].

Ref 20-2 Cranfield Soil and Agrifood Institute, Soilscapes. [Accessed February 2022].

Ref 20-3 Natural England. Regional Agricultural Land Classification Maps. [Accessed July 2022].

Ref 20-4 British Geological Survey, GeoIndex Onshore. [Accessed February 2022].

Ref 20-5 Bing Maps, OS Maps. [Accessed February 2022].

Ref 20-6 AECOM, Phase 2 Environmental Assessment, Yarborough Estate, Immingham, 10th May 2017, Prepared for ABP.

Ref 20-7 Health and Safety Executive (2014) Avoiding danger from underground services.

Ref 20-8 The Coal Authority, Interactive Map Viewer. [Accessed June 2022].

Ref 20-9 MAGIC Map Application. [Accessed February 2022].

Ref 20-10 Zetica UXO Risk Map. [Accessed February 2022].

Ref 20-11 Environment Agency. (2021) Land Contamination Risk Management (LCRM) [Accessed June 2022].

Ref 20-12 Design Manual for Roads and Bridges (DMRB), LA109 Geology and Soils.

Ref 20-13 Design Manual for Roads and Bridges (DMRB), LA113 Road Drainage and Water Environment.

Ref 20-14 Design Manual for Roads and Bridges (DMRB), LA104 Environmental assessment and monitoring

Ref 20-15 Groundsure Enviro Data Viewer. [Accessed February 2022].

21 Major Accidents and Disasters

21.1 Introduction

21.1.1 The topic of Major Accidents and Disasters (MA&Ds) was introduced into the EIA Regulations as a result of EU Directive 2014/ 52/ EU, including to assess potentially significant adverse effects of a development on the environment deriving from its vulnerability to risks of relevant major accidents and/ or disasters. The requirement to incorporate an assessment of MA&Ds was subsequently included within Schedule 5 of EIA Regulations (Ref 21-1).

21.1.2 In the context of EIA, the following definitions are provided within the document Major Accidents and Disasters in EIA, An IEMA Primer, published by IEMA (Ref 21-2):

a. 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.

b. 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.

21.1.3 The Project would store quantities of dangerous substances in excess of the qualifying quantities established within the Control of Major Accident Hazard (COMAH) Regulations 2015 (Ref 21-3). These Regulations define a major accident as follows:

a. An occurrence such as a major emission, fire, or explosion resulting from uncontrolled developments in the course of the operation of any establishment to which these Regulations apply and leading to serious danger to human health or the environment (whether immediate or delayed) inside or outside the establishment and involving one or more dangerous substances.

21.1.4 Major accidents and disasters can be caused by both anthropogenic and natural hazards, which would be defined to a large extent by the hazardous substances which would be present at the Project, and by its geographic location. The objective of the scoping assessment is to establish if there are likely to be potentially significant major accident and disaster scenarios which could apply to the Project. The methodology to establish credible scenarios is described in this chapter, which involves a review of the properties of hazardous substances present, activities during construction and operation, geographic location and the sensitivity and proximity to receptors.

21.1.5 Credible scenarios identified at the scoping stage would be subject to further detailed analysis carried out to support a full EIA.

21.2 Baseline Environment and Study Area

Current Baseline

21.2.1 The Project location is in an area which has historically been used for industrial purposes and is located alongside a number of sites which store significant quantities of materials which could be hazardous to the environment, such as hydrocarbon fuels. Consequently, there is the need for the current environmental baseline to reflect this usage.

21.2.2 The study area for assessment of MA&Ds is not defined within regulatory guidance or standardised methodology, however a typical area based on experience and judgement has been considered which includes nearby major hazard sites, pipelines other sites whose land use planning zones may encroach on any part of the Project.

21.2.3 The following sites and associated distances were taken into consideration for setting the initial study area, in order to capture the potential adverse consequences caused by other events on the Project. These sites can be seen in **Figure 2.1** in **Appendix A**.

Infrastructure and Industrial Sites

21.2.4 The Environment Agency Humber 2100+ strategy refers to the Humber Estuary as the UK's 'Energy Estuary', as it is connected to around 25% of UK energy whether through direct generation or in the import and export of fuels. The Humberside area consists of critical road, rail and pipeline infrastructure and is an important industrial area. There are an average of 40,000 ship movements per year in the Humber Estuary and it is the largest port complex in the country.

21.2.5 Import of significant quantities of liquid and gaseous fuels is carried out via the Port of Immingham, located directly adjacent to the Project and comprises loading and offloading jetties, bulk storage of oil and fertiliser storage. Caverns for storage of liquefied petroleum gas (LPG) are located approximately 3.5km in a westerly direction.

21.2.6 Immingham is an industrial area containing a number of sites which are regulated in accordance with the COMAH Regulations. These sites include:

a. The Humber Refinery which is located approximately 4km in a westerly direction and processes crude oil to produce gasoline, diesel and aviation fuels.

b. Air Products operate a facility for storage of industrial gases including oxygen, hydrogen and nitrogen approximately 1.5km from the Project in an easterly direction. BOC also operate an upper tier COMAH facility for gas manufacture approximately 2km from the Project.

c. There are major accident hazard pipelines located in the study area which are used to transport gas and petroleum products, including a high pressure gas pipeline operated by National Grid approximately 4km in a south-easterly direction. National Grid also operate 400 kV overhead power lines in the vicinity of the Project.

21.2.7 There are no major airports within 10km of the Project. The closest airport is Humberside, approximately 12km in a south-westerly direction.

21.2.8 Immingham is the nearest town to the Project, with a population of around 11,000, located approximately 1.5km in a south-westerly direction. A number of residential and commercial properties are present on Queens Road adjacent to the West Site as illustrated on **Figure 2.1** in **Appendix A**. The conurbations of Grimsby (south-east) and Hull (north-west) have populations of around 134,000 and 260,000 respectively.

Natural Features and Protected Environmental Sites

21.2.9 Information on natural features and protected areas in the environ of the Project is provided in detail within the relevant chapters of this EIA Scoping Report. Key features pertinent to MA&D are summarised in the following sections.

21.2.10 The UK experiences very low levels of seismic activity and there are no significant events recorded by the British Geological Survey (BGS) for Humberside. The nearest seismic monitoring location is sited approximately 10km south of Humberside Airport.

21.2.11 The Humber Estuary is a protected environment area and is designated a Ramsar Site. The estuary is directly adjacent to the Project and contains areas which are designated as Special Areas of Conservation (SAC) and Sites of Special Scientific Interest (SSSI). The wetland areas of the estuary support internationally important numbers of waterfowl in the winter including golden plovers, and the second largest colony of grey seals in the UK.

21.2.12 The Humber Estuary is tidal and situated on low-lying land, therefore at risk of tidal flooding. Significant investment has been made in flood defences for this area; however, continued efforts are required to combat the potential impacts of climate change. Currently, the Environment Agency flood risk level in the area of the Project is low to medium from rivers and the sea.

21.2.13 There are no scheduled monuments, listed buildings or other significant heritage assets in the vicinity of the Project.

Future Baseline

21.2.14 A future baseline environment in the absence of the Project is likely to mean the current use of the DCO site boundary for port activities would continue. Existing facilities in this area already include industrial gas manufacturing, storage of highly flammable substances and offloading of gases from Very Large Gas Carriers (VLGCs) via jetties in the Humber Estuary and it is likely that the overall risk associated with these activities would be unchanged. The major accidents categories such as fire and explosion would be largely unchanged.

21.3 Planned Surveys

21.3.1 The assessment of major accidents and disasters can be undertaken using existing information and the results of assessments and surveys undertaken by others such as flood risk assessment, therefore no site survey work is required.

21.4 Identification of Potential Effects

Potential Effects

21.4.1 The environmental features which may be affected by the Project are predominantly associated with the Humber Estuary as discussed in **Section 21.2**.

21.4.2 Population and human health receptors include persons present on site during construction and operation. Off-site, these include the nearby town of Immingham which includes vulnerable locations such as residential properties, hospitals, care homes and schools. The population of nearby residential areas is detailed in Section 21.2.8.

21.4.3 This section contains a summary of the hazardous properties of substances present on site during the lifecycle of the Project. The control and mitigation measures associated with these substances is presented in **Section 21.5**.

Hazardous Substances - Construction

21.4.4 The hazardous substances present during the Project construction phase include cement, concrete and diesel fuel oil for mobile power generators and other vehicles.

21.4.5 Cement and mixed concrete can cause harm to people and is classified as an irritant to skin as contact can cause alkali burns. This substance can harm the eyes and the respiratory system via inhalation of dust. If cement or wet concrete enters drains or watercourses, there is the potential to cause harm to the environment via an increase in pH of water.

Hazardous Substances – Operation

21.4.6 When operational, the Project would receive consignments of refrigerated liquid anhydrous ammonia delivered via ship to an offloading jetty where it would be transferred for storage in tanks onshore prior to use. Hydrogen gas would then be produced by the conversion of ammonia, which would then be liquefied for filling into bulk road tankers which would deliver hydrogen to users.

21.4.7 Utility services supporting production include nitrogen, compressed air, natural gas which is used as a source of energy, and electrical power supplies. Cooling water would be circulated in a closed loop and wastewater treated on site prior to discharge to the local sewerage system. Water would also be stored for the purposes of firefighting. Small quantities of substances would be used to treat water on site; however quantities of these materials would be trivial.

21.4.8 Anhydrous ammonia is classified as a flammable gas and if released can form explosive mixtures in air. It can cause harm to people and is toxic if inhaled, causes severe skin burns, eye damage and respiratory irritation. Ammonia is toxic to the environment if released to water and is incompatible with certain substances such as oxidants and sodium hypochlorite (bleach) which reacts with ammonia to release chlorine gas. The most common fatalities and injuries associated with ammonia are inhalation and burns. Industrial accidents have

occurred worldwide as a result of an ammonia release, such as a leak at a Petronas plant in Malaysia in 2016 and CF Fertilisers plant in Canada in 2015.

21.4.9 Hydrogen is an extremely flammable gas, with a wide flammable range (4% to 77% by volume) and can form explosive mixtures in air.

21.4.10 Natural gas is classified as extremely flammable and can form explosive mixtures in air.

21.4.11 Ammonia, hydrogen, natural gas can all cause asphyxiation if inhaled in high concentrations.

Hazardous Substances – Jetty and Marine Operations

21.4.12 The vessels used to deliver ammonia would be VLGCs, powered by marine fuel oil (MFO), a liquid hydrocarbon mixture similar to diesel. If released, MFO is toxic to the aquatic environment, is classified as a flammable liquid and vapour and is harmful to people.

21.4.13 VLGC vessels would contain ballast water which provides stability. This water can be contaminated with biological material, therefore if released could be harmful to the environment. The vessel would also contain grey water from washing and black water from toilet facilities.

21.4.14 Jetty loading systems typically contain hydraulic oils, which are synthetic, non-flammable fluids. If released to water, these could potentially cause harm by forming a film on the surface which inhibits oxygen transfer.

Accident and Disaster Categories and Credible Scenarios

Accidents and Disaster Categories

21.4.15 Pertinent accident and disaster categories (**Table 21.1**) are identified by considering the hazardous substances and properties defined in the baseline information, potentially hazardous activities carried out during the lifecycle of the Project, geographic location and receptors defined within the study area. Credible event scenarios are then derived from each of the categories to determine MA&Ds applicable to the Project.

Table 21.1 Major Accidents and Disasters Categories

Ref.	Hazard Category	Impact/ Receptor	Credible Major Accident or Disaster Scenario
-	Operational Activities Process equipment failure, malfunction, disturbance etc., resulting in loss of containment. Consequences depend on substance released which are considered below - fire/ explosion/ toxic release.	See below.	See below.

Ref.	Hazard Category	Impact/ Receptor	Credible Major Accident or Disaster Scenario
1	Fire Significant loss of containment of ammonia, hydrogen or natural gas which immediately finds a source of ignition. Potential for harm to people. Potential for harm to the environment via release of contaminated firewater. Potential for domino effect, escalation to COMAH sites.	Potential significant impact at: Human health population (onsite & offsite). Humber Estuary	Yes
2	Explosion Significant loss of containment of ammonia, hydrogen or natural gas which accumulates, and ignition is delayed. Potential for harm to people. Potential for domino effect, escalation to other areas onsite and offsite including COMAH installations.	Potential significant impact at: Human health population (onsite & offsite). Humber Estuary	Yes
3	Toxic Release Significant loss of containment of ammonia gas. Rainout and/ or dissolution in air to form ammonium hydroxide. Potential for harm to people. Potential for harm to the environment.	Potential significant impact at: Human health population. Humber Estuary	Yes
4	Loss of Containment (marine substances) A release of marine fuel oil, black/ grey/ ballast water. If fuel released, potential for fire if ignited causing harm to people Potential for harm to the environment if released to estuary.	Potential significant impact at: Human health (persons on board vessel and at jetty). Humber Estuary.	Yes
5	Transport of Dangerous Goods (by sea) Accidents involving ammonia vessels at sea, during berthing etc. causing loss of containment. Potential for harm to people. Potential for harm to the environment.	Potential significant impact at: Human health (persons on board vessel and at jetty). Humber Estuary.	Yes
6	Transport of Dangerous Goods (by road)	Potential significant impact at:	Yes

Ref.	Hazard Category	Impact/ Receptor	Credible Major Accident or Disaster Scenario
	Collisions/ accidents involving road tankers containing hydrogen causing loss of containment, potential subsequent fire and/ or explosion. Potential for harm to people.	Human health population (offsite).	
-	Loss of Containment (construction substances) A release of construction materials, hydraulic fluids, diesel (power generation).	Local, limited impact onsite.	No
7	Construction Activities Crane impact with high voltage (HV) overhead electrical transmission towers. Underground cable strike. Underground high pressure gas main strike. Potential for harm to people in contact with HV electricity. Potential for fire/ explosion.	Potential significant impact at: Human health (onsite – HV). Human health (offsite – gas). Loss of electrical power to local area. Loss of natural gas energy supply to local area.	Yes
-	Construction Activities Structural collapse, excavation collapse, collisions from construction vehicles. Potential for harm to people (construction workers).	Local, limited impact onsite.	No
-	Malicious Damage/ Conflicts/ Arson Various scenarios resulting in loss of containment. Consequences considered above - fire/ explosion/ toxic release.	Potential significant impact at: Human health population Humber Estuary.	Yes (as fire/ explosion/ toxic release, Scenarios 1,2,3)
-	Seismic Event/ Landslide Structural damage including process equipment and pipework causing loss of containment, consequences considered above.	Potential significant impact at: Human health population (onsite & offsite). Humber Estuary	Yes (as fire/ explosion/ toxic release, Scenarios 1,2,3)
8	Storms/ Flooding/ Climate Change Floodwater causing asset damage leading to loss of containment, consequences considered above.	Potential significant impact at:	Yes

Ref.	Hazard Category	Impact/ Receptor	Credible Major Accident or Disaster Scenario
	Lightning strike causing ignition of highly flammable gas.	Human health population (onsite & offsite). Humber Estuary	

Credible Scenarios

21.4.16 The potential impacts from the major accident and disaster scenarios identified in **Table 21.1** are discussed below without taking into consideration measures to prevent these accidents or mitigate their consequences.

Credible scenarios involving fire following a release of flammable gas

21.4.17 Credible scenarios involving fire following a release of flammable gas have been identified as potential major accident event.

21.4.18 Loss of containment of flammable gas from equipment or pipework could occur as a result of accidental damage, equipment failure, a dropped object or other mechanisms. Immediate ignition of the gas mixture with air would result in either a flash fire or jet fire depending on the pressure of gas released. If persons are near to the source of release, there is the potential for serious harm up to and including fatal injuries. Persons offsite are unlikely to be affected by the fire, however, local residents in Immingham may be alarmed and a plume containing products of combustion could be visible. Emergency services may advise local residents to close doors and windows and remain indoors. Escalation of the fire to other installations at the Port of Immingham could initiate emergency plans at these sites causing a significant disruption to critical facilities along with harm to persons on these sites and damage to assets.

21.4.19 There is also the potential for fire at the jetty area and onboard to vessels delivering ammonia to the Project, for example, failure of power generators causing a fuel oil fire. In this scenario, there is the potential for harm to people in the area and therefore a safe haven would be created at the jetty area for persons present on the vessel or jetty to shelter in the event of an emergency.

21.4.20 There is the potential for a fire to cause direct harm to the environment as a result of exposure to thermal radiation, such as damage to trees and other protected habitats in the environ of the Project.

Credible scenarios involving explosions following a release of flammable gas

21.4.21 Credible scenarios involving explosions following a release of flammable gas have been identified as a potential major accident.

21.4.22 Release of a flammable gas into an area with limited ventilation such as confined process equipment modules, where ignition is delayed, could cause in an explosion. This can result in serious harm to anyone exposed to the blast overpressure and/ or debris, up to and including fatal injuries. There is the

potential to cause damage to assets on neighbouring facilities as a result of an explosion which could initiate a domino impact.

21.4.23 The overpressure at offsite areas as a result of an explosion would be unlikely to cause significant harm to local residents.

Credible scenarios involving a release of toxic gas (ammonia)

21.4.24 Credible scenarios involving a release of toxic gas (ammonia) have been identified as a potential major accident event.

21.4.25 Ammonia is the only toxic gas present at the Project. A release of ammonia which does not find an active source of ignition could cause serious harm to anyone exposed, up to and including fatal injuries. Minor emissions, for example, failure of a seal on pumps and valves have the potential to cause significant harm if a person(s) is within the immediate vicinity. The probability of a catastrophic release of ammonia with the potential for gas to reach offsite areas is extremely low, but this material could cause harm even at very low concentrations.

21.4.26 In the event of a major fire, the products of combustion could contain toxic gases such as oxides of nitrogen which has the potential to cause harm to people onsite and potentially offsite.

Credible scenarios involving a release of ammonia

21.4.27 Credible scenarios involving a release of ammonia have been identified as a potential major accident to the environment.

21.4.28 The primary process substances at the Project are gaseous, however only natural gas (methane) is defined as a greenhouse gas (GHG). There are no sources of ozone depleting gases.

21.4.29 A release of ammonia gas which formed an aqueous solution in water has the potential to cause acute harm to the environment as this solution is classified as toxic to aquatic organisms even at low concentrations. Firewater containing ammonia and other products of combustion could cause significant harm to the local environment if allowed to reach watercourses and/ or groundwater.

21.4.30 Accidental releases of hydrogen (unignited) and nitrogen would disperse without causing direct harm to the environment.

Credible scenarios caused by construction activities

21.4.31 Credible scenarios caused by construction activities have been identified as a potential major accidents.

21.4.32 During construction of the Project, activities would be carried out in proximity to HV electricity and major accident hazard pipelines. Accidental contact with HV electricity can result in serious harm to anyone exposed, up to and including fatal injuries.

21.4.33 Damage to oil pipelines or high pressure gas pipelines resulting in accidental release could result in serious harm to people up to and including fatal injuries. There is the potential for harm to the environment in the event of a release of hydrocarbon fluids such as gasoline, diesel or aviation fuel. A significant release

could result in pollution of ground, groundwater, watercourses and other receptors.

Credible scenarios caused by a loss of containment of fluids from marine vessels

21.4.34 Credible scenarios caused by a loss of containment of fluids from marine vessels have been identified as a potential major accident.

21.4.35 A release of marine fuel oil could cause a significant adverse impact to the environment via harm to the watercourse, to waterfowl and the estuarine habitat. Accidental release of ballast/ grey/ black water could also result in significant adverse impacts including reducing available oxygen to the aquatic environment.

Credible scenarios caused by natural disasters

21.4.36 The credible natural disaster scenarios identified for the Project are primarily flooding from tidal river sources.

21.4.37 Floodwater has the potential to cause damage to process systems resulting in an accidental loss of containment which could initiate an event such as a fire as described in earlier sections.

21.4.38 At the end of the operational life of the Project, there are a number of factors which must be considered to safely carry out decommissioning and disposal of process equipment and pipework which has contained dangerous substances. These include ensuring systems are ‘gas-free’ via the removal of the inventory and venting systems until no remaining gas can be detected.

Domino Effects

21.4.39 Proximity of the Project to neighbouring industrial facilities has the potential to increase the risk of domino effects.

21.4.40 The COMAH Regulations include the term “domino effects”, which means an increase in the risk or consequences of a major accident because of one or more factors such as geographical position, proximity to other COMAH establishments and/ or inventories of dangerous substances.

21.4.41 A site such as the Project could potentially become a member of a domino group with other upper tier COMAH establishments in the area. The COMAH Regulations require duty holders to consider these areas and developments that could be the source of or increase the risk or consequences of a major accident and of domino effects. These would be considered in detail during the EIA stage incorporating information from the regulatory authorities.

21.5 Design, Mitigation and Enhancement Measures

21.5.1 The project would initially be used as a conduit for the import of green ammonia to be converted to green hydrogen at the associated ammonia processing facility that would be constructed as part of the Project. Hydrogen is highly flammable, therefore the potential for fire and explosion cannot be entirely eliminated so must be carefully controlled and the risk reduced to ALARP. Production of hydrogen from non-hydrocarbon sources requires ammonia, which is a

commonly used industrial material, but is toxic therefore the associated risk cannot be eliminated. Similarly to hydrogen, the risks are to be managed by applying safety and environmental control measures. A summary of the key measures which would be applied during the design, construction and operation of the Project is contained within **Table 21.2**. This is not intended to be an exhaustive list and presents typical measures to illustrate the controls which would be considered in further detail within the EIA and the engineering development of the Project.

21.5.2 Enhancement measures are not directly applicable to the assessment of major accidents and disasters which are to be eliminated where practical and where not, controlled and mitigated.

Table 21.2 Design and Mitigation Measures

Initiating Event	Principal Design Measures	Operational and Management Key Controls
Scenarios 1, 2, 3 **Loss of containment which can result in fire, explosion or toxic gas release**	Specification, construction and installation of equipment and pipework would be to industry codes and standards to reduce the potential for a loss of containment. Fully welded connections rather than flanged are preferred for gaseous systems. Legislative compliance, including pressure system regulations. Certification of equipment by notified bodies. Control systems would be installed to continuously monitor process parameters including pressure and temperature. Mechanical and electrical equipment to be ATEX certified where required to reduce the risk of an active source of ignition. Fire and gas detection and alarm systems. Passive and active fire suppression systems. Flare system for safe disposal of gas in the event of a process upset.	Design and operation of the facility by experienced, qualified personnel. Engineering design hazard and operability risk assessments. Quantified Risk Assessment (QRA) carried out to demonstrate ALARP. Maintenance and inspection. Emergency planning and response procedures including regular live tests.
Scenario 4 **Loss of Containment (marine substances)**	The fuel systems onboard would be designed to the appropriate maritime engineering standards. These include the technical integrity of the storage systems, leakage detection and containment. Fuel leaks would be readily detected and isolated to minimise the loss of containment.	As above and including an oil spillage plan produced prior to operation as required by international MARPOL Annex 1 Regulation 26.

Initiating Event	Principal Design Measures	Operational and Management Key Controls
	Onshore facilities at the port are to be used for treatment and disposal of ballast/ grey/ black water.	
Scenario 5 **Transport of dangerous goods (by sea)**	The design and operation of the VLGC would incorporate safety features, primarily the robust design of the ship and cargo tanks, which typically incorporate a double-hull construction. Lloyds Register publish a list of standards for these ships, contained in 'The Rules and Regulations for the Construction and Classification of Ships for the Carriage of Liquefied Gases in Bulk', published July 2020. Control systems including Emergency Shutdown systems, would be designed, and installed according to engineering design standards, such as those published by International Electrotechnical Commission (IEC). These systems minimise the potential for human error and mitigate the consequences should an error be made, by a fast, safe shutdown of the transfer systems.	As above and including a Navigation Risk Assessment (NRA) to be developed in consultation with stakeholders including the Port operator.
Scenario 6 **Transport of dangerous goods (by road)**	Design, construction, maintenance and repair of road vehicles in accordance with The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009.	Training and management of specialist drivers as required by this legislation.
Scenario 7 **Construction Activities**	Engineering design of equipment and containment systems during construction. Compliance with Construction (Design and Management) 2015 Regulations (CDM) Regulations. Security controls including guards and closed-circuit television (CCTV) to prevent unauthorised access to the Project. Engineering drawings, specialist equipment and techniques used to detect underground services prior to construction work.	A comprehensive Construction Environmental Management Plan (CEMP) would be developed for the project. Exclusion zones to be established around overhead and underground services.
Scenario 8 **Storms/ Flooding/ Climate Change**	Flood risk assessments to be carried out to inform the addition of flood protection measures if required. Design and construction of drainage systems in accordance with civil engineering codes and standards.	Routine inspection and maintenance of drainage systems.

Initiating Event	Principal Design Measures	Operational and Management Key Controls
	Engineering design of jetty and other systems to allow for potential increase in tidal range and potential climate change impacts.	

21.6 Assessment Methodology

21.6.1 The assessment of MA&Ds involves the following steps where the objective is to identify the most important impacts rather than conduct a full analysis, therefore a qualitative, high-level analysis is considered appropriate:

a. Collation and review of baseline information pertaining to the hazardous properties and consequences of substances which are expected to be present during the construction and operation of the Project. The hazardous properties of substances would be informed by their classification in accordance with the Classification, Labelling and Packaging (CLP) Regulations (Ref 21-4).

b. Determining the study area and assessment of the location of the Project in relation to the sensitivity of the environment and potential for natural disasters such as seismic and climate change impacts. The location of residential areas would be identified and considered within the study area.

c. An assessment of potential impacts to and from neighbouring industrial facilities which includes sites regulated by the COMAH Regulations and Pipeline Safety Regulations.

d. Assessment of the potential magnitude of impacts which result from credible MA&Ds scenarios to identify those which may be significant.

e. Establish the key measures to eliminate risk where possible and where not, the appropriate mitigating measures to reduce and manage risks. Mitigating measures include engineering design and procedural controls.

f. Analysis and qualitative consideration of the significance of any residual risks after mitigation.

Relevant Legislation, Policy, Information and Guidance

21.6.2 Table 21.3 identifies the legislation, policy and other documentation of relevance to the assessment of effects with respect to major accidents and disasters.

Table 21.3 Legislation Relevant to Major Accidents and Disasters

Legislation Description	Relevance to Assessment
The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (Ref 21-1) The EIA Regulations 2017 require that the effects of a project, where these are likely to have a significant effect on the environment, are taken	Regulation 5 Environmental impact assessment process Paragraph 4 The effects to be identified, described and assessed under paragraph (2) include, where

Legislation Description	Relevance to Assessment
into account in the decision-making process for that project. These regulations indicate the process and requirements for the provision of adequate environmental information to enable the EIA process.	relevant, the expected significant effects arising from the vulnerability of the Project to major accidents or disasters that are relevant to that development. This chapter of the EIA Scoping Report contains a description of the potential types of significant major accident and disaster events pertinent to the Project.
The Control of Major Accident Hazards (COMAH) Regulations 2015 (as amended) (Ref 21-3) The COMAH Regulations 2015 (as amended) implement the Seveso III Directive and are applicable to operators of establishments which store quantities of dangerous substances equal to or in excess of the qualifying quantities listed in Schedule 1. The COMAH Regulations require that businesses take all necessary measures to prevent major accidents involving dangerous substances and are enforced by the Competent Authority comprising the Health and Safety Executive (HSE) and Environment Agency (EA) acting in cooperation.	Part 2 General duties of operators 5.—(1) Every operator must take all measures necessary to prevent major accidents and to limit their consequences for human health and the environment. Notifications 6.—(1) Within a reasonable period of time prior to the start of construction of a new establishment the operator must send to the competent authority a notification containing the information set out in Part 2 Section 6. The inventory of substances at the Project would be in excess of the qualifying quantities listed in Schedule 1 of the COMAH Regulations, therefore this legislation is applicable. The EIA Scoping Report contains a high level identification of major accidents and disasters which would form part of the ongoing programme of work to be carried out by the Operator to demonstrate that risks associated with the Project are reduced to ALARP.
The Planning (Hazardous Substances) Regulations 2015 (Ref 21-6) The Planning (Hazardous Substances) Regulations 2015 applies to facilities which would like to hold quantities of hazardous substances at or above defined limits. These facilities must obtain hazardous substance consent. These Regulations amend planning procedures in relation to sites where hazardous substances are held and to land near those sites. Applications for HSC are made to the local planning authority. The HSE is a statutory consultee for HSC applications.	Section 5 Applications for hazardous substances consent 5.—(1) Subject to paragraph (2) and regulation 23 (application of the Act to hazardous substances authorities), an application for hazardous substances consent must include details of – (vii) the vicinity of the land to which the application relates, where such details are relevant to the risks or consequences of a major accident; and (viii) the measures taken or proposed to be taken to limit the consequences of a major accident. The inventory of substances at the Project would be in excess of the qualifying quantities listed in Schedule 1 of the Hazardous Substances Regulations, therefore this legislation is applicable, and the EIA Scoping Report contains

Legislation Description	Relevance to Assessment
	information which would be included with an application for hazardous substances consent.
Health and Safety at Work etc. Act 1974 (HSWA) and regulations made thereunder (Ref 21-7) The HSWA is the primary legislative instrument covering workplace health and safety in Great Britain. The HSWA establishes the obligations to ensure, so far as is reasonably practicable (SFAIRP), that persons are not exposed to risks to their health and safety. The HSE, along with local authorities, are responsible for enforcing the HSWA.	Section 1 Preliminary The provisions of this Part shall have effect with a view to— (a) securing the health, safety and welfare of persons at work. (b) protecting persons other than persons at work against risks to health or safety arising out of or in connection with the activities of persons at work. (c) controlling the keeping and use of explosive or highly flammable or otherwise dangerous substances, and generally preventing the unlawful acquisition, possession and use of such substances. This chapter of the EIA Scoping Report contains a high-level description of mitigation measures to manage the identified risks to health and safety of persons working at the Project, in neighbouring facilities and other persons which may be affected by these operations. Mitigation measures described in this chapter would include the primary containment systems for dangerous substances such as hydrogen and ammonia and security systems to prevent unauthorised access to operational areas where they are present.
Construction (Design and Management) (CDM) 2015 Regulations (Ref 21-8) The CDM Regulations place specific duties on those undertaking defined roles during construction activities, such as clients, designers and contractors. These duties are to ensure health and safety is managed throughout the life of a construction project.	The CDM Regulations apply specific requirements for the management of health and safety during construction projects. This chapter of the EIA Scoping Report includes the principles of how the Project would comply with CDM to manage risks which have the potential to be a major accident, such as the development of a Construction Environmental Management Plan.

21.6.3 Guidance and information relevant to the assessment of MA&D is provided in the following:

a. Major Accidents and Disasters in EIA: A Primer. September 2020 – IEMA. This document contains definitions of key terms and provides guidance on an assessment methodology to EIA practitioners, through screening, scoping and assessment stages.

b. Environmental Impact Assessment of Projects, Guidance on Scoping (Directive 2011/ 92/ EU as amended by 2014/ 52/ EU) – European Commission (Ref 21-9). This document contains guidance on aspects to be

considered during Scoping, the assessment of significant effects and the questions to be considered at this stage.

21.7 Consultation

21.7.1 It has been identified in this chapter that the environment in the vicinity of the Project contains major accident hazard establishments and pipelines. Therefore, the existing level of risk is to be considered in detail during development of the EIA in discussion with the regulatory authorities including the HSE.

21.8 Summary

21.8.1 A total of eight credible MA&D scenarios have been identified at this scoping stage for further analysis during the EIA and engineering design stages of the Project as set out in **Section 21.5**. The engineering systems and equipment associated with risk reduction pertinent to MA&D scenarios would be considered within the design phases, from the initial concept through to detailed engineering design. The operational and management controls to further mitigate consequences of MA&D would also be defined during these stages. A summary of the key engineering, operational and management mitigation measures are contained in **Section 21.5**

21.9 References

Ref 21-1 UK Government (2017). The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.

Ref 21-2 Institute of Environmental Management and Assessment (IEMA) (2020). Major Accidents and Disasters in EIA, An IEMA Primer.

Ref 21-3 The Control of Major Accident Hazard (COMAH) Regulations 2015.

Ref 21-4 The Classification, Labelling and Packaging (CLP) Regulations ((EC) No 1272/2008).

Ref 21-5 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.

Ref 21-6 The Planning (Hazardous Substances) Regulations 2015.

Ref 21-7 Health and Safety at Work etc. Act 1974 (HSWA) and regulations made thereunder.

Ref 21-8 Construction (Design and Management) (CDM) 2015 Regulations.

Ref 21-9 Environmental Impact Assessment of Projects, Guidance on Scoping (Directive 2011/ 92/ EU as amended by 2014/ 52/ EU).

22 Socio-Economics

22.1 Introductions

22.1.1 This chapter considers the scope and methodology of the socio-economics assessment for the Project. The chapter also details the datasets to be used to inform the assessment, provides an overview of baseline conditions, sets out the likely significant effects to be considered within the assessment, and discusses how these likely significant effects would be assessed for the purpose of the EIA.

22.2 Baseline Environment and Study Area

Study Area

22.2.1 A study area for the assessment of socio-economic effects would be established as part of the EIA process, with these varying based on the anticipated spatial area of impact as determined either by guidance, aggregation of statistical data, or from professional experience or other EIA disciplines where relevant.

22.2.2 The potential economic and employment impacts arising from the Project are considered relative to a study area that represents the principal labour market catchment area for the Project and would be derived based on analysis of commuter patterns. Based on the type of activities required in construction and operation of the Project, the relevant catchment area is likely to be a Travel to Work Area (which for the Project would be Grimsby Travel to Work area). The assessment of impacts on other receptors would consider those within the DCO site boundary, and the immediately adjacent land. The relevant study areas for each of the effects confirmed to be scoped into the assessment would be set out in the ES and presented on a map to aid interpretation.

Current Baseline

22.2.3 Current baseline conditions have been determined by a desk-based review of available information. The main desk-based sources of information that have been reviewed to inform the baseline description of the study areas are all published by the Office of National Statistics (ONS) and include:

a. 2011 Census data (Ref 22-1)[5].
b. 2019 English Indices of Deprivation (Ref 22-2).
c. ONS UK Business Register and Employment Survey (Ref 22-3).
d. Annual Population Survey (Ref 22-4).
e. ONS Regional Gross Value Added (income approach) (Ref 22-5).

[5] The first results for the 2021 Census are targeted for release on June 28th, 2022, according to ONS. As chapter submission precedes this, text here to be updated to reflect when and what was released noting that this first release may be limited.

f. ONS Population Estimates – Local Authority based by five year age band (Ref 22-6).

g. ONS Population Projections – Local Authority based by single year of age (Ref 22-7).

h. ONS Annual Population Survey (Ref 22-4).

22.2.4 The DCO site boundary is located within the NELC authority. This section of the EIA Scoping Report establishes an outline of the baseline conditions within the local authority area.

22.2.5 Within the North East Lincolnshire area, the population has reduced from 159,700 in 2011 to 159,400 in 2020. This represents a marginal reduction of 0.19% (Ref 22-6).

22.2.6 The English Indices of Deprivation (2019) ranks North East Lincolnshire as the 66th most deprived area in the country, out of 317 local authorities. In North East Lincolnshire, 32 out of the 105 Lower Super Output Areas[6] (LSOAs) (30.5%) in the borough are within the 10% most deprived in England. In contrast, only three LSOAs (2.3% of the total) in the North East Lincolnshire area are within the top 10% least deprived in the country (Ref 22-2).

22.2.7 Gross Value Added (GVA) per head for North and North East Lincolnshire[7] is calculated to be £22,404 and is slightly higher than that of Yorkshire and the Humber (£21,748), whilst below the national average for England, which stands at £27,949. These figures are provisional estimates for 2017. The top three sectors which contribute the most towards GVA in North East Lincolnshire are manufacturing, public administration; education; health; transport; accommodation and food (Ref 22-5).

22.2.8 In 2021, the Annual Population Survey showed that 23.6% of working aged residents in North East Lincolnshire had a degree level qualification or higher (National Vocational Qualification [NVQ] Level 4+). This is lower than the rate recorded for Yorkshire and the Humber (37.9%) and for England and Wales (42.9%). The proportion of residents in North East Lincolnshire with no qualifications (12.1%) is considerably higher than recorded in Yorkshire and the Humber (7.8%) and for England and Wales (6.5%) (Ref 22-4).

22.2.9 The broad industrial groups that employ the most people in North East Lincolnshire are health (17.6%), manufacturing (16.2%) and retail (10.3%). This is similar at the regional level, where the largest sectors in Yorkshire and Humber consist of health (13.3%), manufacturing (11.0%) and professional, scientific and technical activities (9.4%) (Ref 22-3).

[6] Lower Layer Super Output Areas are a geographic hierarchy designed to improve the reporting of small area statistics in England and Wales. Lower Layer Super Output Areas are built from groups of contiguous Output Areas and have been automatically generated to be as consistent in population size as possible, and typically contain from four to six 'Output Areas'.
[7] Data for 'North and North East Lincolnshire' has been used in the absence of data for 'North East Lincolnshire' in this instance.

22.2.10 Employment within the construction broad industrial group (which includes employment construction activities, relevant to the construction and decommissioning phase of the Project) is slightly lower than the wider geographies, representing 4.5% of total employment in North East Lincolnshire, compared to 4.8% in Yorkshire & Humber and 5.2% in England & Wales.

22.2.11 Employment within the mining, quarrying and utilities broad industrial group (which includes employment from the generation of energy) is similar across all geographies, representing 1.3% of total employment in North East Lincolnshire and 1.2% in both Yorkshire & Humber and across England & Wales.

22.2.12 In 2021, approximately 92,700 people were of employment age (16 to 64 year olds) in North East Lincolnshire. The economic activity rate among these was 74.7%. This is lower than the rate for Yorkshire and Humber (77.4%) and the England and Wales rate (78.6%). In 2021, the unemployment rate for 16-64 year olds in North East Lincolnshire was 3.1%. This is below the rate for Yorkshire and the Humber (4.5%) and England and Wales (4.6%) (Ref 22-6).

22.2.13 As set out in **Chapter 12 Landscape and Visual Impact**, the Project is located within an area characterised as an industrial landscape type. The DCO site forms a part of the operational Port and has been in active use for port purposes for a number of decades, since 1912. Part of the DCO site is for currently used for bulk storage, steel and trailers. In the absence of the Project, those parts of the DCO site would continue to be utilised for port activity.

22.2.14 The DCO site boundary is adjacent to a community recycling facility, a chemical plant, freight business and an existing power station. From an initial desktop review of the DCO site boundary, there is also a development site located to the north of Queens Road (opposite the community centre). To the north-west of the DCO site boundary, there is the larger industrial/ commercial area at the Port of Immingham, which is host to a number of businesses, particularly warehouses and those in the engineering, technical and energy sectors, and a ferry, cargo and container port.

22.2.15 There are two PRoW that are located adjacent to the DCO site boundary (Ref 22-8). The closest PRoW is public footpath 36 (part of England's Coast Path) that skirts the northern edge of the DCO site boundary, and public footpath 32 which begins adjacent to the DCO site boundary at Queens Road.

Residential Premises

22.2.16 The closest residential premises are located on Queens Road immediately adjacent to the western area of the DCO site boundary and bordering the West Site. Residential premises are also located approximately 500m to the west of the DCO site boundary in the town of Immingham.

Business Premises

22.2.17 There are several industrial businesses in close proximity to the DCO site boundary, including Polynt Composites UK Ltd (a chemical plant), Polynt Composites (composites materials manufacturer) and PD Ports (delivery company) to the south-east of the DCO site boundary, and Port Equipment

Engineering Ltd (a mechanical engineering firm), Drury Engineering Services Ltd (a welder), Nippon Gases UK Ltd (Energy company) and a warehouse for Origin Fertilisers UK Ltd to the north-west of the DCO site boundary. Around the Immingham Docks area, further to the north-west of the DCO site boundary, there are a number of other companies in similar industries.

22.2.18 To the north of the West Site there is a collection of other businesses on Queens Road including G.P. Shipping Ltd (a shipping firm), Windsor Materials Handling (a forklift rental service), Boyers Industrial Turning Services Ltd (precision engineers), Painting and Labour Services Ltd (home cleaning), FCC Environment Ltd (a waste management service). Also located on Queens Road and within the DCO site boundary are a number of businesses including Oceaneering (engineering services), Integrated Waste Management Ltd (waste management services), Queens Road café, Leonardos (café), DJ Cars (Taxi service) and P&H insulation services (an insulation contractor).

Education

22.2.19 There are four schools located in close proximity to the DCO site boundary, namely the Canon Peter Hall Church of England (CofE) Primary School, Oasis Academy Immingham, Eastfield Primary Academy and Pilgrim Academy.

22.2.20 **Table 22.1** provides a list of educational facilities within 2km of the DCO site boundary and their approximate distance from it.

Table 22.1 Educational Facilities in the Study Area

Educational facility	Approximate distance from Project
The Canon Peter Hall CofE Primary School	1.8km
Oasis Academy Immingham	2km
Eastfield Primary Academy	2km
Pilgrim Academy	2km

Source: Department for Education, Get information about Schools, available here: get-information-schools.service.gov.uk

Communities Facilities

22.2.21 There are a range of community facilities within proximity of the Project. **Table 22.2** illustrates a range of facilities within 2km of the DCO site boundary and their distance from the Project. There are no police or fire stations within close proximity, the closest police station is 4km away, whilst the closest fire station is located approximately 44km away.

Table 22.2 Community Facilities in the Study Area

Receptor	Description	Approximate distance from the Project
Community Recycling Centre	Household waste recycling centre	0.02km
Bert Boyden Community Centre	Local community centre	1km
Immingham Museum	Local museum	1.31km
Immingham Swimming Pool	Indoor swimming pool	1.33km
Supermarket (Tesco)	Large supermarket	1.41km
Supermarket (Aldi)	Large supermarket	1.23km
Immingham Family Hub (Children's Centre)	Family day care service	1.5km

Tourism

22.2.22 There are no tourism attractions in proximity to the DCO site boundary. The area is primarily industrialised or agricultural land, with some residential premises located 500m away from the Project. It is recognised that the England Coast Path, a PRoW designated as a National Trail, is in close proximity to the Scheme and consideration of effects on users of this, including as tourists, will be undertaken as part of the assessment of effects on PRoWs. There are no other tourism amenities which are likely to be impacted by the Project.

Future Baseline

22.2.23 In the absence of the Project, the future baseline is anticipated to be largely the same as the existing baseline for socio-economics. However, the population within North East Lincolnshire is projected to decrease from 159,364 in 2020 to 158,738 in 2040 which represents a decrease of -0.4%. In Yorkshire and the Humber and England as a whole, there is expected to be increases of +5.8% and +8.1% respectively (Ref 22-7).

22.2.24 **Table 22.3** illustrates the population projections broken down by age group. It shows that by 2040, both the 0 to 15 year old and the 16 to 64 year old population would make up a lower proportion of the total population across all geographies. Instead, there would be a larger share of the 65 and over age group.

Table 22.3 Population Projections by Age Breakdown

		2020	2025	2030	2035	2040
North East Lincolnshire	Aged 0 to 15 (%)	19.4%	18.6%	17.4%	16.7%	16.8%
	Aged 16 to 64 (%)	59.7%	58.7%	57.5%	56.3%	55.4%
	Aged 65+ (%)	20.9%	22.6%	25.1%	26.9%	27.8%
Yorkshire and the Humber	Aged 0 to 15 (%)	19.0%	18.5%	17.6%	17.2%	17.3%
	Aged 16 to 64 (%)	62.1%	61.3%	60.5%	59.6%	58.8%
	Aged 65+ (%)	18.9%	20.2%	21.8%	23.2%	23.8%
England	Aged 0 to 15 (%)	19.2%	18.5%	17.6%	17.1%	17.1%
	Aged 16 to 64 (%)	62.3%	61.7%	60.9%	59.9%	59.1%
	Aged 65+ (%)	18.5%	19.7%	21.5%	22.9%	23.8%

Source: ONS Population Projections, Local Authority based by single year of age (Ref 22-7).

22.2.25 In terms of the local economy, the proportion of the population in North East Lincolnshire which is of working age is expected to reduce (from 59.7% in 2020 to 55.4% in 2040). This is however a similar picture reflected at both the regional (Yorkshire and Humber) and national (England) scale. Business and community facilities may open and close (especially given the proximity of the DCO site boundary to an existing industrial area), however, it is not expected that there would be any perceptible changes to the local economic baseline assessment and the Project should be assessed against current baseline conditions and policies. These changes are not considered to constitute significant changes to baseline.

22.3 Planned Surveys

22.3.1 The assessment would be desk-based, but would be informed by site walkovers conducted for other assessments.

22.4 Identification of Potential Effects

22.4.1 The following sections summarise the potential socio-economic impacts identified at this scoping stage. These have been informed by experience working on other EIA projects, and by the advice provided in the NPSfP, which advises on the receptors to be considered in the socio-economic assessment of port-related schemes such as this.

Construction

22.4.2 Employment creation – this could include temporary employment opportunities, both directly at work sites and indirectly in the supply chain, arising from construction of the Project; and the possibility of training and apprenticeship

opportunities. It is proposed to scope this into the assessment due to the scale and duration of the construction activities.

22.4.3 GVA creation – this could include the growth added through direct and indirect employment opportunities. It is proposed to scope this into the assessment due to the scale and duration of the construction activities.

22.4.4 Private assets – these could include impacts on residential properties, business premises, community facilities and development land during the construction stage. It is proposed to scope this into the assessment due to the Project's proximity to these receptors and inclusion in the DCO site boundary.

22.4.5 Effects on tourism – this could include impacts on tourism facilities on users. As there are no tourism receptors in proximity to the Project, it is unlikely there would be any impact experienced by tourists. As such it is proposed to scope effects on tourism out of the assessment.

22.4.6 Effects on PRoW – this could include impacts on users of footpaths, bridleways, byways and National Cycle Routes from disruption to or diversion of journeys. As there are two PRoW in proximity to the Project it is proposed to scope this into the assessment.

22.4.7 Impact of a changing influx of workers – this is suggested for inclusion by the NPSP as if there is a large contingent of construction workers travelling or moving to an area for the construction of a scheme, this could place pressure on local amenities such as community facilities and physical infrastructure. It is proposed to scope this into the assessment due to the scale and duration of the construction activities.

Operation

22.4.8 Employment creation - this could include creation of long-term employment opportunities, both direct and indirect, once the Project is operational including consideration of any existing employment uses on-site. It is proposed to scope this into the assessment due to the likely scale of employment created.

22.4.9 Private assets – The Project could include impacts on residential properties, business premises, community facilities and development land during the operation of the Project. It is proposed to scope this into the assessment due to the Project's proximity to these receptors.

22.4.10 Effects on tourism – this could include impacts on tourism facilities on users from the operation of the Project. As there are no tourism receptors in proximity to the Project, it is unlikely there would be any impact experienced by tourists. As such it is proposed to scope this out of the assessment.

22.4.11 Effects on PRoW – this could include impacts on users of footpaths, bridleways, byways and National Cycle Routes including permanent disruption to or diversion of journeys. Although, there are two PRoW in proximity to the Project it is proposed to scope this out of the assessment as user experience during Project operation would be as it is currently.

22.4.12 Impact of a changing influx of workers – due to the potential for impact of workers on facilities or physical infrastructure, it is proposed to scope this into the assessment.

Decommissioning

22.4.13 The impact of decommissioning of landside infrastructure is anticipated to be comparable with those experienced during the construction stage and as such the same effects as construction are scoped in for the assessment of effects arising from the decommissioning stage.

22.4.14 The DCO application would not make any provision for the decommissioning of the marine infrastructure or plant or equipment on the jetty topside. This is because the development would, once constructed, become part of the fabric of the Immingham port estate and would, in simple terms, continue to be maintained so that it can be used for port related activities to meet a long-term need. This is discussed further in **Section 2.4** of **Chapter 2 The Project** of this EIA Scoping Report.

22.5 Design, Mitigation and Enhancement Measures

22.5.1 Mitigation would be considered to reduce the impact of any significant adverse socio-economic effects. This would be made clearer once the final design of the Project is known, and the socio-economic assessment has been undertaken.

22.6 Assessment Methodology

Determining significance of effects

22.6.1 To facilitate the impact assessment process and ensure consistency in the terminology of significance, a standard assessment methodology has been applied. The socio-economic assessment would determine:

a. The sensitivity of receptors.

b. The magnitude of impacts.

c. The consequent significance of effects.

Receptor Sensitivity

22.6.2 The sensitivity of socio-economic receptors would be assessed as being high, medium, low or very low. Socio-economic receptors generally include economic entities and users of social infrastructure provision. For example, individuals who would potentially benefit from employment generation (either directly, indirectly) or induced (secondary) impacts, for example due to construction workers spending money at local businesses.

22.6.3 The criteria for assessing levels of receptor sensitivity are defined in **Table 22.4**. These are based on professional judgement and have been applied to EIAs for projects similar to the Project.

Table 22.4 Classification of Receptor Sensitivity for Socio-economics

Level of sensitivity	Description
High	There are limited/ no comparable and accessible alternatives that exist within the relevant catchment area; and/ or Receptors have limited ability to absorb the change.
Medium	There are limited comparable and accessible alternatives within the relevant catchment area: and/ or Receptors have some ability to absorb the change.
Low	Receptors are able to relatively easily absorb the change: and/ or There are some comparable and accessible alternatives that exist within the relevant catchment area.
Very low	Receptors are able to relatively easily absorb the change: and/ or There are many comparable accessible alternatives that exist within the relevant catchment area

Impact Magnitude

22.6.4 The magnitude of the socio-economic impacts associated with the Project would be assessed as being high, medium, low or very low. This would be determined by:

a. Extent of change - the absolute number of people affected and the size of area in which the impact would be experienced i.e. the level of change to baseline conditions including the proportion of the existing workforce.

b. Scale of the impact - the relative magnitude of each impact in its relevant market context (for example, the effects on local employment would be considered in the context of the overall size of the local labour market).

c. Duration of impact - more weight is given to long-term, permanent changes than to short-term, temporary ones. Temporary to short-term impacts are considered to be those associated with the construction works. Medium to long-term impacts are those associated with the operation of the Project.

Effect Significance

22.6.5 The socio-economic effects of the Project would be defined as either:

a. Beneficial - an advantageous or beneficial effect on a receptor.

b. Negligible - an imperceptible effect on a receptor.

c. Adverse - a disadvantageous or negative effect on a receptor.

22.6.6 Where an effect is assessed as being beneficial or adverse, the effect would be classified as major, moderate, minor or negligible. The assessment of effect significance would be informed by the sensitivity of the receptor and the magnitude of impact as set out in **Table 22.5**. For the purposes of this assessment, only moderate and major impacts are considered to be significant.

Table 22.5 Classification of Effects

Magnitude of impacts	Sensitivity of receptor			
	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

Relevant Legislation, Policy and Technical Guidance

22.6.7 The following policy, legislation and guidance is relevant in assessing the potential effects of the Project with respect to socio-economic impacts:

a. The NPSfP (Ref 22-9).
b. The National Planning Policy Framework (NPPF) (Ref 22-10).
c. The National Planning Practice Guidance: (Ref 22-11).
d. North East Lincolnshire Local Plan (Ref 22-12).
e. North East Lincolnshire Economic Strategy (Ref 22-13).
f. North East Lincolnshire Economic Recovery Plan (Ref 22-14).
g. Greater Lincolnshire Local Enterprise Partnership (LEP) Strategic Economic Plan 2014-2030 (Ref 22-15).

22.6.8 The socio-economic impact assessment would also take into account relevant national standards, such as those provided by HM Treasury (Ref 22-16) and the Homes and Communities Agency (HCA) (Ref 22-17).

22.7 Consultation

22.7.1 Statutory consultation with stakeholders would be undertaken at an EIA-wide level, with any comments related to socio-economics being considered in the EIA.

22.8 Summary

22.8.1 The proposed scope of the socio-economics assessment for the Project is summarised in Table 22.6.

Table 22.6 Summary of Scope for the Socio-Economics Assessment

Element	Phase	Scoped In	Scoped Out	Justification
Employment	Construction and Decommissioning	✓	x	To assess the potential for significant effects.

Element	Phase	Scoped In	Scoped Out	Justification
Gross Value Added	Construction and Decommissioning	✓	x	To assess the potential for significant effects.
Private assets	Construction and Decommissioning	✓	x	To assess the potential for significant effects.
Effects on tourism	Construction and Decommissioning	x	✓	No tourism receptors.
Effects on PRoW	Construction and Decommissioning	✓	x	Two PRoW adjacent to the Project.
Impact of a changing influx of workers	Construction and Decommissioning	✓	x	To assess the potential for significant effects.
Employment	Operation	✓	x	To assess the potential for significant effects.
Private assets	Operation	✓	x	To assess the potential for significant effects.
Effects on tourism	Operation	x	✓	No tourism receptors.
Effects on PRoW	Operation	✓	x	No direct effects on PRoW so user experience during operation would be unchanged from baseline.
Impact of a changing influx of workers	Operation	✓	x	To assess the potential for significant effects.

22.9 References

Ref 22-1 Office for National Statistics (2011). 2011 Census data (Accessed June 2022).

Ref 22-2 Office for National Statistics (2019). 'The English Indices of Multiple Deprivation' (Accessed June 2022).

Ref 22-3 Office for National Statistics (2021). UK Business Register and Employment Survey (BRES) (Accessed June 2022).

Ref 22-4 Office for National Statistics (2021). Annual Population Survey.

Ref 22-5 Office for National Statistics (2018). Regional gross value added (income approach).

Ref 22-6 Office for National Statistics (2020). Population Estimates- Local Authority based by five year age band.

Ref 22-7 Office for National Statistics (2020). Population Projections -Local Authority based by single year of age.

Ref 22-8 North East Lincolnshire Council (2017) Online mapping.

Ref 22-9 Department for Transport (DfT) (2012). National Policy Statement for Ports.

Ref 22-10 Ministry of Housing, Communities and Local Government (2021). National Planning Policy Framework.

Ref 22-11 Ministry of Housing, Communities and Local Government (2019). The National Planning Practice Guidance.

Ref 22-12 North East Lincolnshire Council (2018). North East Lincolnshire Local Plan.

Ref 22-13 North East Lincolnshire Council (2016). North East Lincolnshire Economic Strategy.

Ref 22-14 North East Lincolnshire Council (2021). North East Lincolnshire Economic Recovery Plan.

Ref 22-15 Greater Lincolnshire Local Enterprise Partnership (2016). Greater Lincolnshire LEP Strategic Economic Plan 2014-2030.

Ref 22-16 HM Treasury (2020a). The Green Book: Appraisal and Evaluation in Central Government.

Ref 22-17 Homes and Communities Agency (HCA) (2014). Additionality Guide (4th Edition).

23 Human Health and Well-being

23.1 Introduction

23.1.1 This section sets out the proposed scope and methodology of the human health and well-being assessment for the Project. The chapter also details the datasets to be used to inform the assessment, provides an overview of baseline conditions, sets out the likely significant effects to be considered within the assessment, and discusses how these likely significant effects would be assessed for the purpose of the EIA.

23.1.2 The human health impact assessment would comprise all human health receptors in surrounding areas which may have potential to be impacted by the Project. It should be noted, however, 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, counties, or regions without regard for statutory boundaries.

23.2 Baseline Environment and Study Area

Study Area

23.2.1 The study area for human health is proposed to comprise of four wards as follows: Immingham, Wolds in North East Lincolnshire, Ferry in North Lincolnshire, and Caistor and Yarborough in West Lindsey. These have been identified based on their proximity to the Project conferring a high likelihood that they could experience effects arising from construction activities and traffic, and during Project operation and decommissioning. A map showing the study area would be set out within the ES.

23.2.2 The human health ES chapter would, through further desk-based analysis and assessment, define the study area for the purposes of the impact assessment.

Current Baseline

23.2.3 A human health profile of the study area surrounding the Project would be built up focussing on key indicators identified by the Office for Health Improvement and Disparities (OHID) at ward level, including a comparison of these to national averages (Ref 23-1). Indicators deemed relevant to likely health impacts of the Project for each area have been identified, with data relating to these and the national (England) average figure set out in **Table 23.1**.

Table 23.1 Human Health Profile

Health Indicator	Immingham	Wolds	Ferry	Caistor and Yarborough	England
Total population (2019)	11,834	7,656	11,485	5,466	56,286,961
Population aged under 16 (%) (2019)	19.1	18.4	17.1	15.5	19.2

Health Indicator	Immingham	Wolds	Ferry	Caistor and Yarborough	England
Population aged over 65 (%) (2019)	21.9	22.3	23.0	27.5	18.4
Unemployment (% of the working age population claiming out of work benefit 2019-20)	3.2	1.1	1.7	1.9	2.8
Long term unemployment (rate per 1,000 working age population, 2019-20)	1.0	1.1	1.0	1.6	3.2
Obese children (including severe obesity) during reception year	11.8	7.5	10.0	7.7	9.7
Estimated prevalence of obese adults aged over 16 (including overweight) by national quintile, where 1 = highest prevalence	1	1	1	1	n/ a
Emergency hospital admissions for all causes (SAR)	86.3	68.7	75.8	73.1	100.0
Emergency hospital admissions for Chronic Obstructive Pulmonary Disorder (COPD) (SAR)	126.1	45.5	79.3	76.4	100.0
Limiting long term illness or disability (%)	19.9	15.9	19.0	19.4	17.6

Source: Office for Health Improvement and Disparities, (Ref 23-1).

23.2.4 There are a number of healthcare facilities in the vicinity of the Project. The nearest hospitals are found in Grimsby, approximately 9km from the Project: (St. Hugh's Hospital and Diana, Princess of Wales Hospital). There is one General Practice (GP) surgery within close proximity to the Project. This is found at the Roxton Practice within Pilgrim Primary Care Centre in Immingham, approximately 2km from the Project. The latest GP data (June 2022) published by NHS Digital (Ref 23-2) indicates that the GP surgery has a total of 13.55 GPs (FTE) and provides care to 33,241 registered patients. This corresponds to 2,454 patients per GP, which exceeds the Royal College of General Practitioners target (Ref 23-3) of 1,800 patients per GP.

Future Baseline

23.2.5 In addition to describing the existing baseline environment, the human health and well-being chapter of the ES would seek to explain what the environmental change, in terms of human health and well-being, would likely be in the future if the Project 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 as detailed above. In the absence of the Project, the effect on health is not anticipated to be materially different.

23.3 Planned Surveys

23.3.1 The assessment would be desk-based, but would be informed by site walkovers conducted for other assessments.

23.4 Identification of Potential Effects

23.4.1 The Project may generate a range of health effects, some of which would be temporary, whilst others would be permanent. Potential effects during Project construction, operation and decommissioning phases are considered below.

Construction

23.4.2 The following temporary effects during the Project construction phase have been identified and would be scoped into the EIA:

a. Access to healthcare and other social services due to accessibility restriction and/ or increase in traffic - this is proposed to be scoped in due to the scale and duration of anticipated construction traffic arising from the Project compared with baseline conditions.

b. Emission of dust, noise, vibration, and odours - this is proposed to be scoped in due to the anticipated effects on local receptors typically resulting from construction activities.

c. Air/ noise pollution linked with traffic - this is proposed to be scoped in due to the scale and duration of anticipated construction traffic arising from the Project compared with baseline conditions.

d. Accessibility to open space and on active travel - this is proposed to be scoped in as whilst there are no PRoW intersected and no open spaces impacted, there are two PRoW in proximity to the DCO site boundary.

e. Access to employment and training, particularly for local residents - this is proposed to be scoped in due to the scale and duration of the construction activities.

f. Contribution to social cohesion and engagement with existing communities to encourage social interaction - this is proposed to be scoped in due to the anticipated impact of the changing influx of workers which could place pressure on local amenities such as community facilities and social infrastructure.

Operation

23.4.3 The following effects during the Project operational phase have been identified:

a. Access to healthcare and other social services due to accessibility restriction and/ or increase in traffic - this is scoped in due to the current uncertainty around operational vehicle movements meaning that the Project could potentially result in any material traffic impact on the local highway network.

b. Air/ noise pollution linked with traffic - this is scoped in due to the current uncertainty relating to operational vehicle movements meaning that the Project could potentially result in a material traffic impact on the local highway network.

c. Accessibility to open space and on active travel – although, there are two PRoW in proximity to the DCO site boundary, it is proposed to scope this out of the assessment as user experience during Project operation would be as it is currently, whilst there is no open space in proximity to the DCO site boundary.

d. Access to employment and training, particularly for local residents - this is scoped in due to the likely scale of employment created.

e. Contribution to social cohesion and engagement with existing communities to encourage social interaction – this is scoped in as the number of workers required for the operation phase is unknown at present. As such, the potential impact of the changing influx of workers is unclear, and has the potential to place pressure on the provision of community facilities or social infrastructure.

Decommissioning

23.4.4 The impact of decommissioning of landside infrastructure are anticipated to be comparable with those experienced in the construction stage. As such the same effects as for construction of landside infrastructure are scoped in for the assessment of effects arising from the decommissioning stage.

23.4.5 The DCO application would not make any provision for the decommissioning of the marine infrastructure or plant or equipment on the jetty topside. This is because the development would, once constructed, become part of the fabric of the Immingham port estate and would, in simple terms, continue to be maintained so that it can be used for port related activities to meet a long-term need. This is discussed further in **Section 2.4** of **Chapter 2 The Project** of this EIA Scoping Report.

23.5 Design, Mitigation and Enhancement Measures

23.5.1 Mitigation would be considered to reduce the impact of any adverse human health and well-being effects. This would be made clearer once the final Project design is known, and the human health assessment has been undertaken.

23.6 Assessment Methodology

23.6.1 There is no consolidated methodology or practice for the assessment of effects on human health. Best practice principles are provided in NHS England's Healthy Urban Development Unit's Rapid Health Impact Assessment (HIA) Toolkit 2019 (Ref 23-4) and would form the basis of the approach to be adopted to assess impacts on health and well-being. In addition, consideration would be given to the Health and Well-being checklist of the Wales Health Impact Assessment Support Unit (WHIASU) to help with the identification of which health determinants are relevant. Based on this, the impacts of the Project on human health and well-being would be assessed qualitatively using professional judgement, best practice and draw upon other assessments within the ES. Therefore, the methodology does not follow the proposed methodology outlined in **Chapter 4 The EIA Process**.

23.6.2 Due to the diverse nature of health determinants and outcomes which are assessed, the assessment of human health effects describes the likely qualitative health outcomes and it is not possible to quantify the severity or extent of the effects. The methodology set out in the Healthy Urban Development Unit (HUDU) Toolkit does not include a temporal scale of considerations of the effects. It does not provide a methodology for assessing the significance of outcomes or effects and as such none is proposed here. The potential health effects during Project construction, operation, and decommissioning are described using the criteria as outlined in **Table 23.2**. Where an impact is identified, actions would be proposed to mitigate any negative impact on health, or to realise opportunities to create health benefits. It should be noted that in many cases, mitigation would be embedded within the Project design and the implementation of this would be an underlying assumption of the assessment.

23.6.3 The assessment would consider the potential consequences for health and well-being from the construction, operation and decommissioning phases of the Project and draw upon the information reported within the following ES chapters:

a. **Chapter 5 Air Quality**.
b. **Chapter 6 Noise and Vibration**.
c. **Chapter 10 Traffic and Transport**.
d. **Chapter 22 Socio-economics**.

Table 23.2 Human Health Impact Categories

Impact Category	Impact Symbol	Description
Positive	+	A beneficial impact is identified
Neutral	0	No discernible health impact is identified
Negative	-	An adverse impact is identified
Uncertain	?	Where uncertainty exists as to the overall impact

Relevant Legislation, Policy and Technical Guidance

23.6.4 The following policy, legislation and guidance is relevant in assessing the potential health effects of the Project:

a. NPPF (Ref 23-6).
b. Overarching National Policy Statement for Energy (EN-1) (Ref 23-7).
c. Draft Overarching National Policy Statement for Energy (EN-1) (Ref 23-8).
d. NHS Long Term Plan 2019 (Ref 23-9).
e. Spatial Planning for Health: An evidence resource for planning and designing healthier places (Ref 23-10).
f. Public Health England Strategy 2020 to 2025 (Ref 23-11).
g. National Planning Practice Guidance (Ref 23-3).
h. NHS England's Healthy Urban Development Unit's Rapid Health Impact Assessment (HIA) Toolkit (Ref 23-4).
i. Wales Health Impact Assessment Support Unit (WHIASU) Health and Wellbeing Checklist.
j. Joint Health and Wellbeing Strategy for Lincolnshire (Ref 23-4).
k. North East Lincolnshire Local Plan 2013 to 2032 (Ref 23-12).
l. North Lincolnshire Local Development Framework (Ref 23-13).
m. Central Lincolnshire Local Plan (Ref 23-1).

23.7 Consultation

23.7.1 Statutory consultation with stakeholders would be undertaken at an EIA-wide level, with any comments related to human health and well-being being considered in the EIA.

23.8 Summary

23.8.1 A summary of the proposed scope of the human health and well-being assessment for the Project is provided in **Table 23.3**.

Table 23.3 Summary of Scope for the Human Health and Well-being Assessment

Element	Phase	Scoped In	Scoped Out	Justification
Access to healthcare services and other social infrastructure	Construction	✓	x	Possible adverse outcome.
Emission of dust, noise, vibration, and odours	Construction	✓	x	Possible adverse outcome.
Air/ noise pollution linked with traffic	Construction	✓	x	Possible adverse outcome.

Element	Phase	Scoped In	Scoped Out	Justification
Accessibility to open space and active travel	Construction	✓	x	Two PRoW adjacent to the DCO site boundary.
Employment and training, particularly for local residents	Construction	✓	x	Possible positive or adverse outcome.
Social cohesion	Construction	✓	x	Possible positive or adverse outcome.
Climate change	Construction	✓	x	Possible adverse outcome.
Access to healthcare services and other social infrastructure	Operation	✓	x	Possible adverse outcome.
Air/ noise pollution linked with traffic	Operation	✓	x	Possible adverse outcome.
Accessibility to open space and active travel	Operation	x	✓	No outcome expected as no direct effects on PRoW and no open space in the vicinity of the Project.
Employment and training, particularly for local residents	Operation	✓	x	Possible positive outcome.
Social cohesion	Operation	✓	x	Possible positive or adverse outcome.
Climate change	Operation	✓	x	Possible adverse outcome.
Access to healthcare services and other social infrastructure	Decommissioning	✓	x	Possible adverse outcome.
Emission of dust, noise, vibration, and odours	Decommissioning	✓	x	Possible adverse outcome.
Air/ noise pollution linked with traffic	Decommissioning	✓	x	Possible adverse outcome.
Accessibility to open space and active travel	Decommissioning	✓	x	Two PRoW adjacent to the DCO site boundary.
Employment and training, particularly for local residents	Decommissioning	✓	x	Possible positive outcome.
Social cohesion	Decommissioning	✓	x	Possible positive outcome.

Element	Phase	Scoped In	Scoped Out	Justification
Climate change	Decommissioning	✓	x	Possible adverse outcome.

23.9 References

Ref 23-1 Central Lincolnshire Joint Strategic Planning Committee (2017). Central Lincolnshire Local Plan.

Ref 23-2 NHS Digital (2022). General Practice Workforce June 2022.

Ref 23-3 Department for Levelling Up, Housing and Communities/ Ministry of Housing, Communities and Local Government (2021). Planning Practice Guidance.

Ref 23-4 NHS England (2019). Healthy Urban Development Unit's Rapid Health Impact Assessment (HIA) Toolkit.

Ref 23-5 Lincolnshire County Council (2018). Joint Health and Wellbeing Strategy for Lincolnshire.

Ref 23-6 Ministry of Housing, Communities and Local Government (2021). National Planning Policy Framework.

Ref 23-7 Department for Business, Energy and Industrial Strategy (2021). Overarching National Policy Statement for Energy (EN-1).

Ref 23-8 Department for Business, Energy and Industrial Strategy (2021). Draft Overarching National Policy Statement for Energy (EN-1).

Ref 23-9 NHS (2019). NHS Long Term Plan.

Ref 23-10 Public Health England (2017). Spatial Planning for Health An evidence resource for planning and designing healthier places.

Ref 23-11 Public Health England (2019). Public Health England Strategy 2020 to 2025.

Ref 23-12 North East Lincolnshire Council (2018). North East Lincolnshire Local Plan 2013 to 2032.

Ref 23-13 North Lincolnshire Council (2011). North Lincolnshire Local Development Framework.

24 Cumulative Effects and In-Combination Assessment

24.1 Introduction

24.1.1 This chapter of the EIA Scoping Report provides a summary of the proposed methodology for the assessment of cumulative effects arising from the Project. The requirement to consider cumulative effects is set out in Schedule 4 paragraph 5 of the EIA Regulations (Ref 24-1). A range of public sector and industry-led guidance is available on the approach to assessing cumulative effects, but at present there is no single, agreed industry standard method. As the Project is classified as an NSIP, the approach to the assessment of intra-project and inter-project effects would follow the guidance set out the Inspectorate's Advice Note Seventeen (Ref 24-2).

24.1.2 The cumulative effects assessment of the Project would consider the following types of effect:

a. **Combined effects:** these effects occur where a single receptor is affected by more than one source of effect from different aspects of the Project. An example of a combined effect could be where a local resident is affected by dust, noise and traffic disruption during the construction of the Project, with the result being a greater nuisance than each individual effect alone.

b. **Cumulative effects:** these effects occur as a result of a number of developments, which individually might not be significant, but when considered together could create a significant cumulative effect on a shared receptor when considered together with the Project.

24.1.3 The assessment would be based on the best available data relating to proposed and committed developments as set out in the Inspectorate's Advice Note Seventeen (Ref 24-2) which is in the public domain or has been provided to the Project team. The assessment would assume that publicly available information is accurate. The assessment would be reliant on collaboration with a range of statutory consultees, neighbouring authorities and other developers to identify changes in information which may be pertinent to the assessment.

24.1.4 Where there are specific limitations associated with available data, these would be highlighted within the assessment that would be presented in the ES.

24.2 Approach to Cumulative Effects Assessment

24.2.1 In conjunction with professional judgement, the Inspectorate's Advice Note Seventeen (Ref 24-2) would be used to inform the scope of the cumulative effects assessment, and to assist the identification and mitigation of likely significant effects.

Assessment of Combined Effects

24.2.2 The assessment of combined effects would consider whether a single environmental receptor or resource would likely be affected by more than one source of effect from different aspects of the Project. The assessment methodology would involve the identification of impact interactions associated

with the Project upon separate environmental receptors and resources, in order to understand the overall environmental effect of the Project.

24.2.3 Potential interactions would be identified by reviewing the topic conclusions within the environmental assessment topics identified in this EIA Scoping Report, in order to establish where individual impacts may combine and result in likely significant effects. The significance of intra-project effects upon the environmental receptors and resources would be determined using professional judgement, with input provided from those responsible for the production of the individual topic assessments.

Assessment of Cumulative Effects

24.2.4 In accordance with the approach contained within the Inspectorate's Advice Note Seventeen (Ref 24-2), the approach to cumulative assessment would follow a staged approach, as summarised in **Plate 24-1**.

Plate 24-1 Staged Approach to Cumulative Assessment

Stage 1: Establishing the long list of 'other existing development and/ or approach development'

24.2.5 This stage would involve establishing the Project's Zone of Influence (ZoI) associated with the topic areas assessed, within which a long list of other planned developments and development allocations would be identified.

24.2.6 Developments would be included on the initial long-list based on the following criteria:

a. Development currently under construction.

b. Approved applications which have not yet been implemented (covering the past five years and taking account of those that received planning consent over three years ago and are still valid but have not yet been completed).

c. Submitted applications not yet determined.

d. Refused applications, subject to appeal procedures not yet determined.

e. Developments on the National Infrastructure Planning Programme of Projects.

f. Development identified in the relevant Development Plan (and emerging Development Plans).

g. Development identified in other plans and programmes which set the framework for future development consents/ approvals, where such development is reasonably likely to come forward.

24.2.7 As the Stage 1 work progresses, the criteria used to help filter development would be clearly identified and set out within the ES.

Stage 2: Establishing a shortlist of 'other existing development and/ or approved development'

24.2.8 At Stage 2, any development of a nature or scale without the potential to result in cumulative impacts would be excluded, following discussion with the local planning authorities and consideration of the likely ZoI for each environmental topic. The justification for including or excluding developments from the long list would be provide in a matrix, modelled on the example given within Matrix 1 (Appendix 1) of the Inspectorate's Advice Note Seventeen (Ref 24-2).

Stage 3: Information Gathering

24.2.9 This stage would involve reviewing the available information relating to the shortlisted development(s), in order to establish the details of their likely environmental effects.

24.2.10 Information relating to other developments would be collected from the appropriate source (which may include the local planning authorities, the Inspectorate or directly from the applicant/ development) and would include, but not be limited to:

a. Proposed design and location information.

b. Proposed programme of demolition, construction, operation and/ or decommissioning.

c. Environmental assessments that set out baseline data and effects arising from 'other development'.

24.2.11 The criteria for determining the significance of any cumulative effect would be based upon:

a. The duration of effect i.e. would be temporary or permanent.

b. The extent of effect i.e. the geographical area of an effect.

c. The type of effect i.e. whether additive or synergistic.

d. The frequency of the effect.

e. The 'value' and resilience of the receptor affected.

f. The likely success of mitigation.

Stage 4: Assessment

24.2.12 Those developments which meet the inclusion criteria set out in the above stages would be incorporated into the final assessment, which would involve identifying where effects are likely to occur and assessing the significance of those effects on environmental receptors and resources, taking into account any mitigation measures.

24.2.13 The list of other relevant developments to be considered as part of the inter-project effects assessment would be developed in parallel with undertaking the EIA considering temporal scope, shared receptors and pathway effects. This would include:

a. Developments for which consent applications have been approved and construction has started.

b. Developments for which consent applications have been approved but construction has not yet started, but which may coincide with the Project.

c. Developments for which consent applications have been submitted but have yet to be determined, but which may coincide with the Project.

d. Developments which are identified in relevant local plans or other relevant plans and programmes and which could reasonably be expected to come forward in a similar timescale to the Project.

24.2.14 This would be documented in a matrix, in line with Matrix 2 (Appendix 2) of the Inspectorate's Advice Note Seventeen (Ref 24-2), which includes the following:

a. A brief description of the development.

b. An assessment of the cumulative effect with the Project.

c. Proposed mitigation applicable to the Project including any apportionment.

d. The likely residual cumulative effect.

24.3 References

Ref 24-1 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended).

Ref 24-2 The Planning Inspectorate Advice Note Seventeen. Cumulative Effects Assessment (2019)

25 Structure of the Environmental Statement

25.1 Introduction

25.1.1 The ES will consist of two volumes and a Non-Technical Summary (NTS). This section provides a summary of each document that would form the ES.

25.1.2 **ES Volume 1: Main Report** - this would form the main body of the ES, detailing the results of the environmental assessment, likely significant effects arising from the Scheme, and proposed mitigation measures. The ES would be divided into a number of background and technical chapters, each being supported with figures and tabular information. **ES Volume 1** would consider the environmental effects associated with a number of identified topics, which may receive significant environmental effects. It is currently proposed that the ES would contain the following chapters:

a. Chapter 1 Introduction
b. Chapter 2 The Project
c. Chapter 3 Need and Alternatives
d. Chapter 4 Legislative and Consenting Framework
e. Chapter 5 Environmental Impact Assessment Approach
f. Chapter 6 Air Quality
g. Chapter 7 Noise and Vibration
h. Chapter 8 Nature Conservation (Terrestrial Ecology)
i. Chapter 9 Nature Conservation (Marine Ecology)
j. Chapter 10 Ornithology
k. Chapter 11 Traffic and Transport
l. Chapter 12 Marine Transport and Navigation
m. Chapter 13 Landscape and Visual Impact
n. Chapter 14 Historic Environment (Terrestrial)
o. Chapter 15 Historic Environment (Marine)
p. Chapter 16 Physical Processes
q. Chapter 17 Marine Water and Sediment Quality
r. Chapter 18 Water Quality, Coastal Protection, Flood Risk and Drainage
s. Chapter 19 Climate Change
t. Chapter 20 Materials and Waste
u. Chapter 21 Major Accidents and Disasters
v. Chapter 22 Socio-Economics
w. Chapter 23 Human Health and Well-Being

x. Chapter 24 Cumulative Effects and In-Combination Assessment

25.1.3 **ES Volume 2 Figures** – this would present a complete set of all figures for reference that have been prepared to support the ES chapters provided in **ES Volume 1**.

25.1.4 **ES Volume 3 Technical Appendices** – this would contain a complete set of appendices for reference. These would comprise of background data, technical reports, tables, and surveys which would support the assessments provided in **ES Volume 1**.

25.1.5 **ES Non-Technical Summary (NTS)** – he NTS would be presented in a separate document and would provide a concise description of the Project, the considered alternatives, baseline conditions, the assessment methodology, potential environmental effects and mitigation measures. The NTS would be designed to provide the information regarding the Scheme in an accessible format which can be understood by a wider audience and to assist interested parties with their familiarisation with the Project.

26 Summary and Conclusions

26.1.1 This EIA Scoping Report supports a formal request to the Inspectorate under Regulation 10(3) of the EIA Regulations for a 'Scoping Opinion' as to the information to be provided within the ES that would form part of the DCO application. This report has identified the environmental effects that are considered to have a potential to be significant and proposes the approach to be used in assessments that would be undertaken for the EIA to characterise and understand the significance of these effects. The prescribed consultees are invited to consider the contents of this report and comment accordingly within the 42 day time period.

26.1.2 Based on the outcomes of the scoping exercise, this EIA Scoping Report sets out environmental topics scoped into the EIA and the level of assessment that would be undertaken. **Table 26.1** presents a summary of the topics proposed to be scoped into the EIA.

26.1.3 The scope of the EIA would be refined as necessary, following receipt and review of the Inspectorate's formal Scoping Opinion.

Table 26.1 Topics Scoped into EIA

EIA Topic	Proposed Scope of Assessment	Element Proposed to be Scoped Out	Rationale for Scoping Out
Air Quality	Qualitative assessment of dust emissions, site plant emissions, energy plant/ process emissions and a quantitative assessment of vessel emissions due to the proximity of air quality sensitive receptors to the DCO site boundary during construction and operation. Quantitative assessment of road traffic emissions due to the likely change in traffic flows on the local road network and proximity of air quality sensitive receptors to those roads during construction and operation.	Assessment during the decommissioning phase of dust emissions, site plant emissions, energy plant/ process emissions, vessel emissions and road traffic emissions.	Due to the uncertainties in future conditions and the likelihood that decommission impacts would be no worse than those assessed for construction and operation.
Noise and Vibration	Effects on residential NSRs due to noise and vibration from on-site works in the West Site and Pipeline area during construction and decommissioning and noise from road traffic during construction, operation and decommissioning. Effects on existing buildings due to vibration from on-site works during construction and decommissioning.	Effects on residential NSRs due to noise and vibration from works in the East Site and new jetty during construction, operation and decommissioning. Effects on existing nearby buildings due to vibration from on-site operations during the operational phase.	Due to the proximity of the nearest NSRs. Due to no sources of vibration expected that could significantly affect buildings during operation.

EIA Topic	Proposed Scope of Assessment	Element Proposed to be Scoped Out	Rationale for Scoping Out
Nature Conservation (Terrestrial Ecology)	Indirect impacts on LWS due to potential effects resulting from changes in air quality and hydrology during construction. Permanent land take during construction and temporary land take due to the potential for loss/ fragmentation of habitat supporting protected and notable species during construction and operation. Noise/ visual disturbance due to the potential for disturbance to protected and notable species i.e. bats during construction and operation. Lighting disturbance due to potential for disturbance to nocturnal species i.e. bats during construction, operation and decommissioning. Hydrology/ water due to the potential for damage to habitats supporting protected/ notable species during construction and decommissioning. Air quality due to the potential for dust smothering to habitats during site clearance works and the potential for acid/ nitrogen	Direct impacts on LWS during construction and decommissioning. Direct and indirect impacts on Humber Estuary EMS during construction, operation and decommissioning.	There are no local designated sites that would be impacted. Impacts on this ecological feature is considered in **Chapter 8 Nature Conservation (Marine Ecology)**.

EIA Topic	Proposed Scope of Assessment	Element Proposed to be Scoped Out	Rationale for Scoping Out
	deposition resulting in damage to Laporte Road Brownfield Site LWS during construction and operation.		
Nature Conservation (Marine Ecology)	Direct loss of intertidal and subtidal habitats and species and fish populations as a result of construction activities and during operation		
	Direct and indirect changes to benthic and seabed habitats and species as a result of capital dredging and dredge disposal (if required).	Indirect changes to seabed habitats and species due to changes from hydrodynamic and sedimentary processes from capital dredge, disposal and from the presence of piles during construction.	The scale of the predicted changes are unlikely to cause significant changes to fish habitats (feeding, spawning and nursery areas) or on marine ecology.
	Changes in water and sediment quality during capital dredging and dredge disposal during construction and operation (if required).		
	Underwater noise and vibration disturbance to marine mammals during piling, capital dredging and dredge disposal (if required) and during operation.	Direct loss or changes in marine mammal foraging habitat during construction.	The footprint of the Project covers a highly localised areas, that constitutes a small fraction of the known ranges of local marine populations.
	The introduction and spread of non-native species during construction and operation.		
	Changes to fish populations and fish habitat during operation (as a result		

EIA Topic	Proposed Scope of Assessment	Element Proposed to be Scoped Out	Rationale for Scoping Out
	of maintenance dredging and dredge disposal).		
	Direct changes to benthic habitats and species due to sediment removal during operation.	Visual disturbance of hauled out seals during construction and operation.	Due to the distance between breeding populations of seals and the haul out sites of the proposed works.
		Water quality impacts during piling, capital dredging and dredge disposal during construction.	Due to highly localised and temporary changes in suspended sediment levels is unlikely to produce significant effects on marine ecology.
		Changes to seabed habitats and species due to sediment deposition during piling during construction.	Due to the amount of sediment that will settle on the seabed from piling is considered to be negligible, therefore, no significant impacts on marine ecology.
		Collision risk during operation.	Low risk of collision due to slow speeds of the vessels (2-6 knots).

EIA Topic	Proposed Scope of Assessment	Element Proposed to be Scoped Out	Rationale for Scoping Out
		Water quality impacts during maintenance dredging and dredge disposal (if required) during operation.	Water quality impacts during maintenance activities considered to be minimal and localised.
Ornithology	Direct loss of intertidal feeding and roosting habitat as a result of construction activities. Direct loss of terrestrial habitats that are functionally linked to the Humber Estuary SPA/ Ramsar. Direct loss of breeding bird (non-SPA/ Ramsar habitats). Airborne noise and visual disturbance to coastal waterbirds using intertidal and marine habitats within Humber Estuary SPA/ Ramsar. Airborne noise and visual disturbance to coastal waterbirds using functionally linked terrestrial habitats outside the boundary of the Humber Estuary SPA/ Ramsar. Direct changes to foraging and rooting habitat as a result of the	Direct changes to waterbird foraging habitat during construction from the capital dredge and dredge disposal. Indirect changes to intertidal foraging and roosting habitat due to capital dredge and dredge disposal during construction. Changes to seabed habitats and species due to sediment deposition during piling in construction. Indirect changes to seabed habitats and species due to changes in hydrodynamic and sedimentary processes during construction from the present of piles.	The footprint of the capital dredge and dredge disposal sites do not overlap with the intertidal and therefore would not cause any direct changes. The scale of the predicted changes on intertidal habitats is considered to be minimal. The amount of sediment suspension onto the seabed is considered to be minimal. The effects from the hydrodynamic and sedimentary processed is minimal and localised, therefore, no impact on marine habitats and species.

EIA Topic	Proposed Scope of Assessment	Element Proposed to be Scoped Out	Rationale for Scoping Out
	physical presence of marine infrastructure.	Noise and visual disturbance during capital dredge disposal during construction from the dredging vessel.	Area is not known to support large populations of diving or seabirds. Potential disturbance would be temporary and localised.
Traffic and Transport	Temporary increases in traffic flows during construction phases due to: The potential for significant severance to communities caused by a large increase in traffic for a longer period. Increased risk of road traffic accidents caused by a large increase in traffic for a longer period. Temporary road closures, diversions and widening. Construction traffic using temporary bell mounts and site entrances for access to construction areas. Temporary closures or diversion of PRoW and other public access routes.	Assessments for the decommissioning phase due to uncertainties in relation to future traffic flows and transport infrastructure.	Scoped out due to uncertainties in relation to future traffic flows and transport

EIA Topic	Proposed Scope of Assessment	Element Proposed to be Scoped Out	Rationale for Scoping Out
	Increase in traffic flows associated with the operational phases. The overlap between the construction and operational phases.		
Marine Transport and Navigation	Contact work works craft with Port infrastructure. Collision due to displacement and/ or increase in vessels. Collision of passing vessels with works craft. Collision of ships/ tugs whilst berthing large vessel on the adjacent Immingham Oil Terminal with works craft. Collision during navigation with works craft whilst transiting to/ from the site or during activities within the disposal site (if required). Collision during towage operations. Payload related incidents. Collision due to increased commercial vessel movements.	None	N/ A

EIA Topic	Proposed Scope of Assessment	Element Proposed to be Scoped Out	Rationale for Scoping Out
	Collision due to increased maintenance dredging movements (if required). Collision of vessels manoeuvring at the berth with passing traffic. Vessel contact with the quay. Mooring breakout with vessel alongside.		
Landscape and Visual Impact	Potential for adverse impacts on landscape character during construction. Potential for adverse visual impacts on visual amenity during construction and operation	Assessment on landscape character during operation.	No adverse impact on landscape character due to the existing industrial nature of the area.
Historic Environment (Terrestrial)	The potential for previously unrecorded archaeological deposits to survive within the Site. These remains could potentially be affected during excavation works required during construction. Assessment of construction and operational phases on built heritage assets and the historic landscape.	Assessment on archaeology during operation and decommissioning. Direct and indirect impacts to known and potential archaeological assets from the disposal of dredge arising during construction and operation.	No additional impacts on archaeology considered significant during these phases. Disposal of dredge material would be at licenced marine disposal sites identified for this Project.

EIA Topic	Proposed Scope of Assessment	Element Proposed to be Scoped Out	Rationale for Scoping Out
Historic Environment (Marine)	The potential to affect marine archaeology assets or deposits of archaeological importance during both construction and operation phases.	Setting of marine archaeology and cultural heritage receptors during construction and operation. Direct and indirect impacts to known and potential archaeological assets from the disposal of dredge arisings.	Due to the existing industrial character of the area, additional impacts on the setting of known/ unknown heritage receptors is unlikely. Disposal of dredge material would be at licensed marine disposal sites identified for this Project.
Physical Processes	Increased SSC and potential sedimentation over the extent of the disturbance plume as a result of the construction of the new jetty (piling) and capital dredging works during construction. Increased SSC and potential sedimentation as a result of the deposit of capital dredge material at a licensed offshore disposal site during construction during construction. Changes in seabed bathymetry and composition as a result of deposition of dredged/ disposal material within the area of the respective plumes during operation.	Assessment of decommissioning of the marine infrastructure or plant equipment.	Due to the development being part of the fabric of Immingham Port Estate once constructed.

EIA Topic	Proposed Scope of Assessment	Element Proposed to be Scoped Out	Rationale for Scoping Out
	Local changes to hydrodynamic regime (flow speed and direction) as a result of the jetty (piling) and maintenance dredging during operation. Local changes to the wave regime, as a result of the jetty (piling) and maintenance dredging during operation. Associated local changes to the sediment transport pathways, as a result of localised changes to the driving hydrodynamic (and wave) forcing during operation. Increased SSC and potential sedimentation in the area of dispersal plume as a result of maintenance dredging during operation. Increased SSC and potential sedimentation as a result of deposition of maintenance dredge material at a licensed disposal site during operation. Changes in seabed bathymetry and composition as a result of deposition of dredged/ disposed maintenance dredge material during operation.		

EIA Topic	Proposed Scope of Assessment	Element Proposed to be Scoped Out	Rationale for Scoping Out
Marine Water and Sediment Quality	Changes to dissolved oxygen concentrations as a result of increased SSC during piling, capital dredging and disposal activities (if required). Changes to chemical water quality as a result of potential sediment-bound contaminants being released during piling, capital dredging and disposal activities (if required). Redistribution of sediment-bound contaminants during piling, capital dredging and disposal activities (if required). Changes to levels of contaminants in water (including accidental spillages) during construction. Changes to dissolved oxygen concentrations as a result of increased SSC during the maintenance dredging and disposal activities (if required). Changes to chemical water quality as a result of potential contaminants in the seabed sediment being released during maintenance	Changes to levels of contaminants in water (including accidental spillages) during construction and operation. Assessment of decommissioning of the marine infrastructure or plant equipment	Proposed works would not directly introduce contaminants. Due to the development being part of the fabric of Immingham Port Estate once constructed

EIA Topic	Proposed Scope of Assessment	Element Proposed to be Scoped Out	Rationale for Scoping Out
	dredging and disposal activities (if required). Redistribution of sediment-bound contaminants during maintenance dredging and disposal activities (if required). Changes to levels of contaminants in water (including accidental spillages) during operation.		
Water Quality, Coastal Protection, Flood Risk and Drainage	Contamination from suspended solids or other chemical contaminants during construction and decommissioning. The effects of diffuse urban pollutants in surface water runoff during construction and decommissioning. The risk of pollution from chemical spillages or fire on the site during construction and decommissioning. Alteration in fluvial and overland flow paths, and potential increase in flood risk, as a result of storing construction materials in the floodplain during construction and decommissioning.	None	N/A

EIA Topic	Proposed Scope of Assessment	Element Proposed to be Scoped Out	Rationale for Scoping Out
	Increased risk of blockage of drains as a result of increased material (sands, gravels etc.) transported in runoff from site during construction and decommissioning. Potential operational pollution of surface watercourses from accidental spillages. Increased risk of fluvial flooding to the development and surrounding area due to loss of floodplain storage during operation. Increased risk of flooding to the Project due to climate change effects during operation. Increase in flood risk (fluvial, surface water and drainage infrastructure) due to an increase in surface water runoff during operation. Increased risk of groundwater flooding during operation.		
Climate Change	GHG impact assessment during construction, and operation. GHG impact assessment during decommissioning for the landside element only.	GHC impact assessment during decommissioning of the marine infrastructure.	Due to the marine infrastructure being part of the fabric of Immingham Port Estate.

EIA Topic	Proposed Scope of Assessment	Element Proposed to be Scoped Out	Rationale for Scoping Out
	CCR review for extreme weather events, temperature change, precipitation change and sea level risk during construction and operation. ICCI Assessment during construction.	CCR review of wind during construction and operation.	Due to impacts of wind being no worse to the current baseline conditions.
Materials and Waste	Changes in demand for materials during construction and decommissioning. Changes in available landfill capacity during construction and operation. Direct impacts on safeguarded waste sites during construction.	Direct impacts on safeguarded mineral sites and MSAs during construction. Assessment of waste arising from extraction and the processing/ manufacture of construction component and products. Impacts associated with the management of waste on water resources, air quality, noise or traffic resulting from the generation, handing, on site temporary storage or off-site transport of materials and waste during construction. Changes in demand for materials during the operational phase.	The site does not pass through any safeguarded mineral sites or MSAs. Waste from the manufacture of construction components and products would be considered by the supply chain. Due to being addressed separately in other relevant technical chapters. Availability for materials during operation are considered negligible

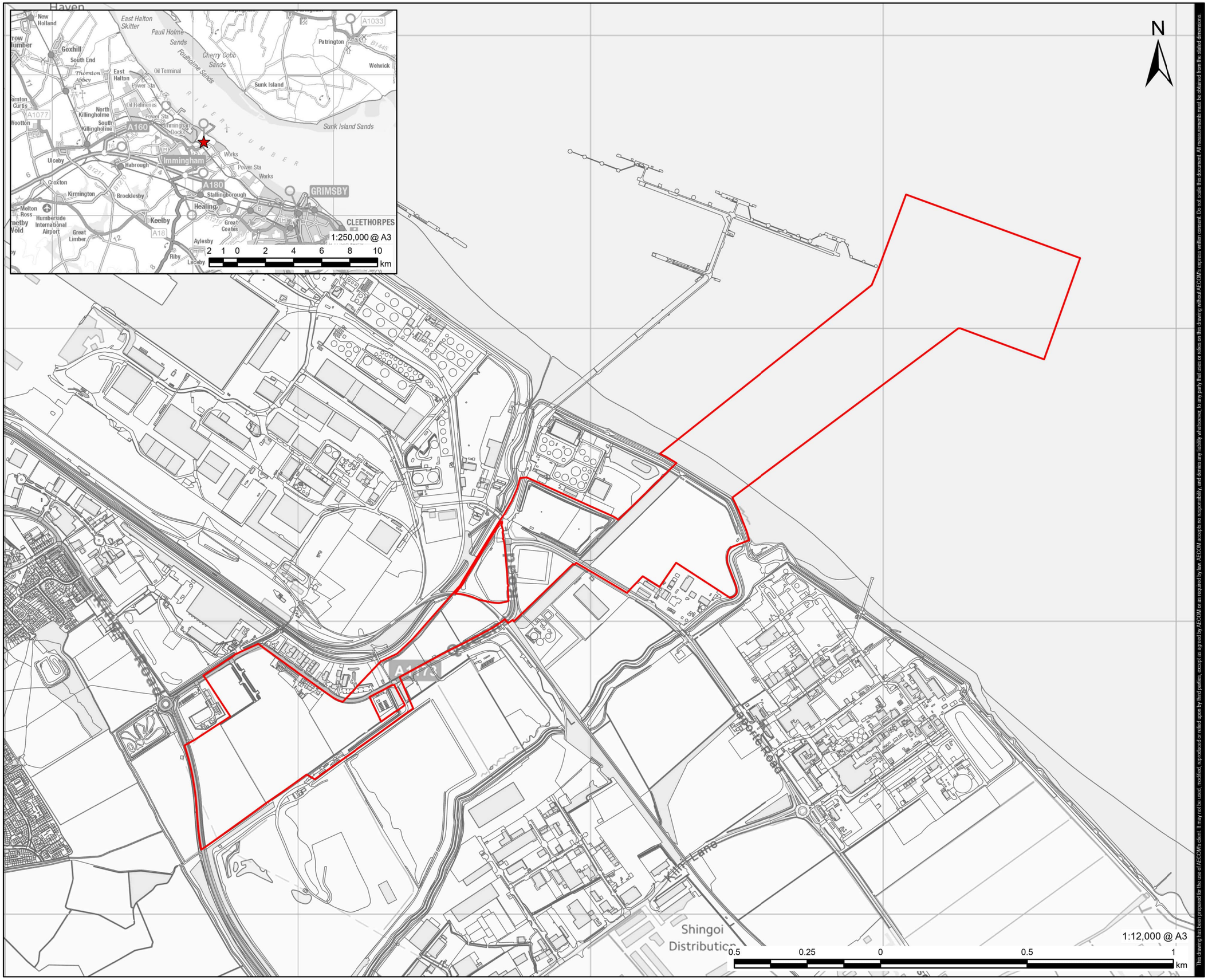
EIA Topic	Proposed Scope of Assessment	Element Proposed to be Scoped Out	Rationale for Scoping Out
		Changes in demand for materials and available landfill capacity during the decommissioning phase.	in relation to the scale and nature of the Project. Landside elements would be decommissioned at the end of design life, and all materials removed would be reused or recycled where possible or disposed of in accordance with relevant waste disposal regulations at the time of decommissioning. It is not possible to assess waste and material resources effects of decommissioning at the present time, since waste infrastructure, technologies and good practices are likely to be substantially different to those currently in place: specific measures would be addressed as part of a detailed Decommissioning Plan which would be developed by the Applicant at the appropriate point in time.
Ground Conditions and Land Quality	Potential for effects on soils during construction, geological receptors, hydrogeological receptors, human	Effects on soils during the operational phase.	Due to any effects on the soil would have occurred during the construction phase.

EIA Topic	Proposed Scope of Assessment	Element Proposed to be Scoped Out	Rationale for Scoping Out
	health during construction and operation.		
Major Accidents and Disasters	Qualitative assessment of the following: Loss of containment which can result in fire, explosion or toxic gas release. Loss of Containment (marine substances). Transport of dangerous goods (by sea). Transport of dangerous goods (by road). Construction Activities. Storms/ Flooding/ Climate Change.	None	N/ A
Socio-Economics	Assessment of the following: Employment during construction, operation and decommissioning. Gross value added during construction and decommissioning. Private assets during construction, operation and decommissioning.	Effects on tourism during construction, operation and decommissioning.	Due to there being no tourism receptors.

EIA Topic	Proposed Scope of Assessment	Element Proposed to be Scoped Out	Rationale for Scoping Out
	Effects on PRoW during construction, operation and decommissioning. Impact of changing influx of workers. during construction, operation and decommissioning.		
Human Health and Well Being	Access to healthcare services and social infrastructure during construction, operation and decommissioning. Emission of dust, noise, vibration and odour during construction and decommissioning. Air/ noise pollution linked with traffic during construction, operation and decommissioning. Accessibility to open space and active travel during construction and decommissioning. Employment and training particularly for local residents during construction, operation and decommissioning. Social cohesion during construction, operation and decommissioning.	Accessibility to open space and active travel during operation.	Due to their being no PRoW or open space in the vicinity of the Project.

EIA Topic	Proposed Scope of Assessment	Element Proposed to be Scoped Out	Rationale for Scoping Out
	Climate change during construction, operation and decommissioning.		

Appendix A Figures



AECOM

PROJECT

Immingham Green Energy Terminal

CLIENT

Associated British Ports

CONSULTANT

AECOM Limited
5th Floor
2 City Walk
Leeds, LS11 9AR
www.aecom.com

LEGEND

- Site Location
- Scoping Boundary

NOTES

ISSUE PURPOSE

SCOPING REPORT

PROJECT NUMBER

60673509

DEVELOPMENT CONSENT ORDER NO

TBC

FIGURE TITLE

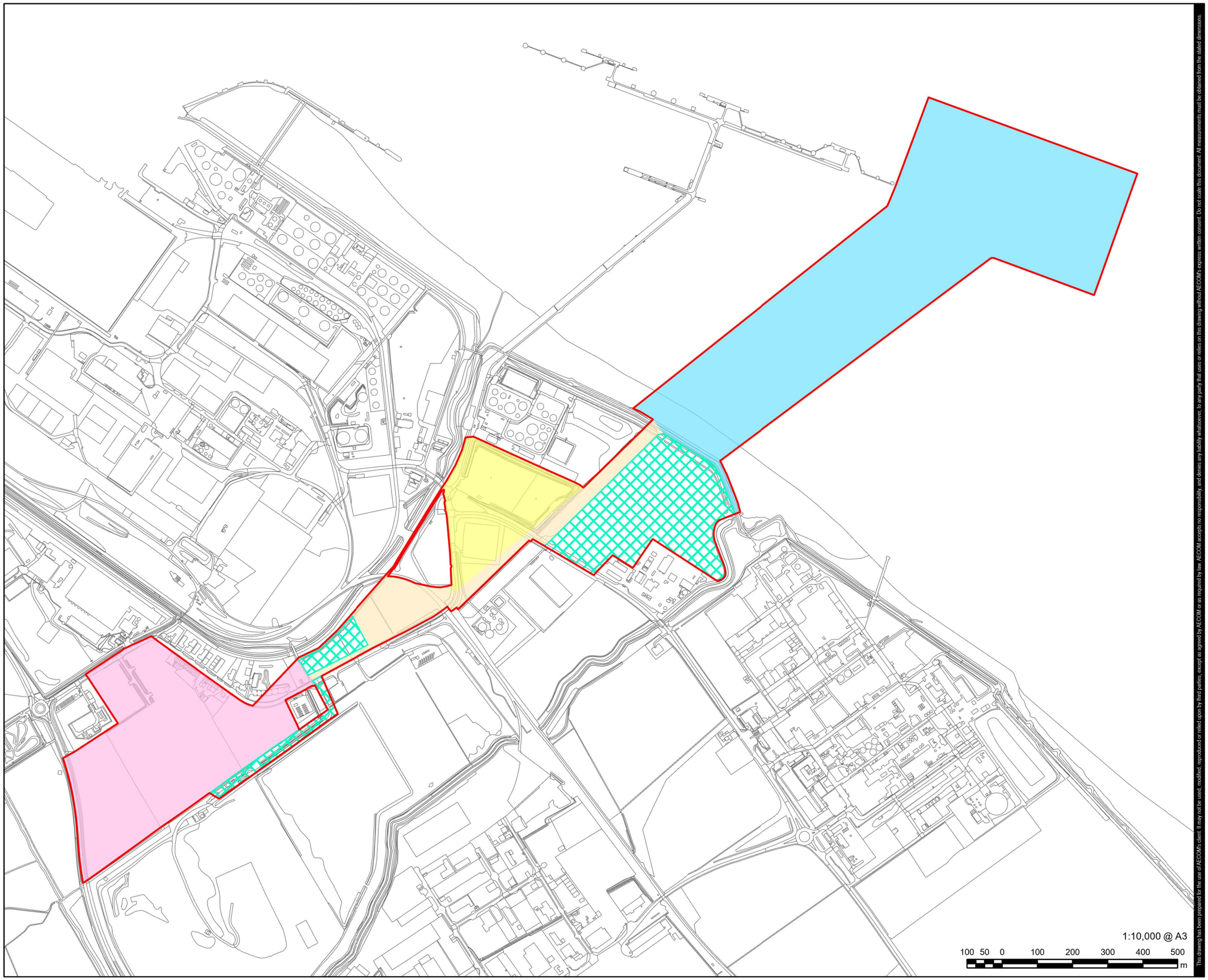
Site Location Plan

FIGURE NUMBER

Figure 1.1

Revision: 1 Drawn: AG Checked: LC Approved: CT Date: 2022-08-19

Filename: \\na.aecomnet.com\fs\EMEA\Leeds-UKLDS2\Legacy\UKLDS2PFPSW001\WIP\LE_Projects\Newproje\60673509 - AP Ammonia Terminal\400_Technical\GIS\02_Maps\Scoping Report\AIT_SR_CH02_Proposed_Dev.aprx



AECOM

PROJECT

Immingham Green Energy Terminal

CLIENT

Associated British Ports

CONSULTANT

AECOM Limited
5th Floor
2 City Walk
Leeds, LS11 9AR
www.aecom.com

LEGEND

- Scoping Boundary
- Temporary Construction Area
- East Site
- West Site
- Jetty
- Pipeline

NOTES

ISSUE PURPOSE

SCOPING REPORT

PROJECT NUMBER

60673509

DEVELOPMENT CONSENT ORDER NO

TBC

FIGURE TITLE

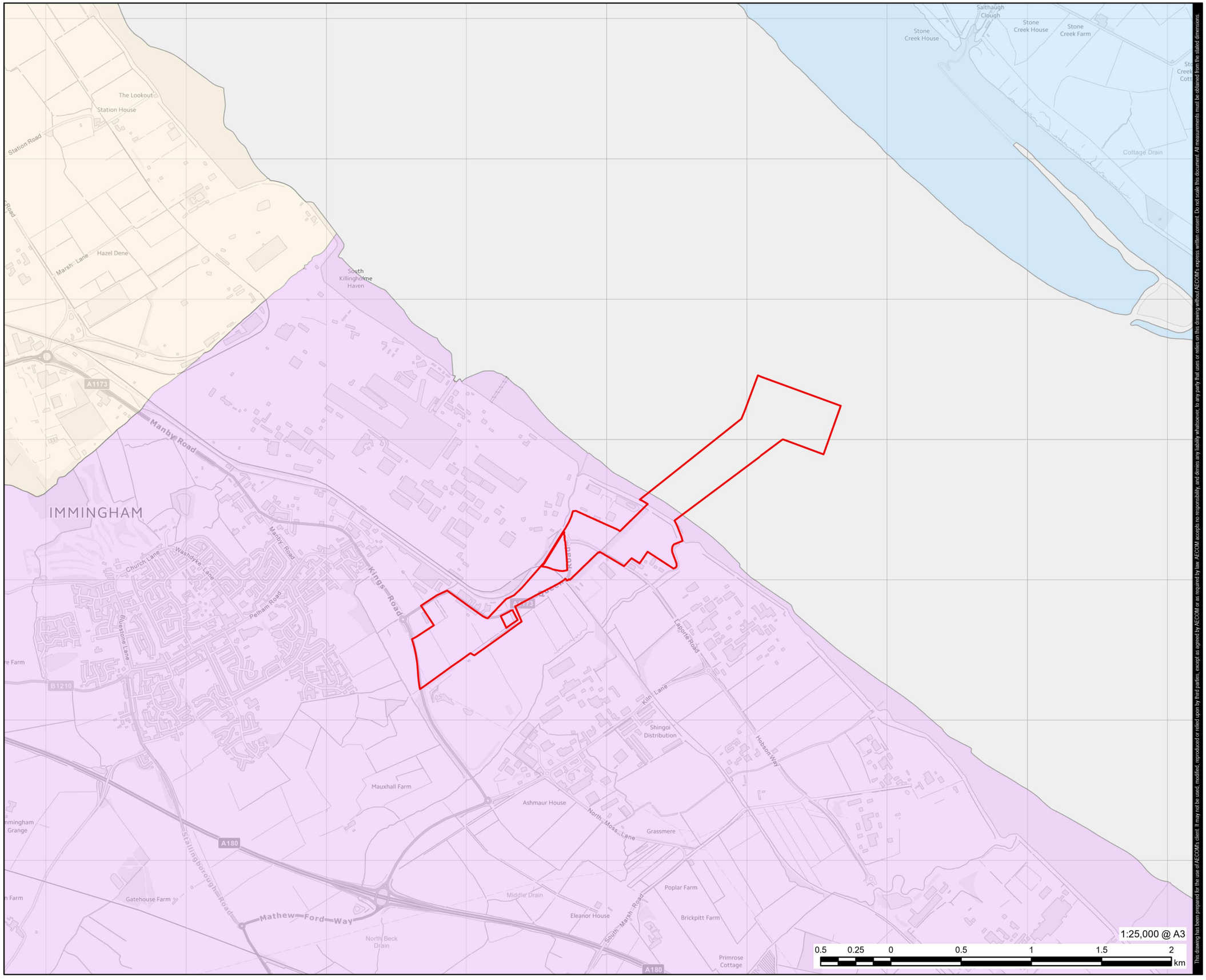
Site Plan

FIGURE NUMBER

Figure 2.1

Revision: 1 Drawn: AG Checked: LC Approved: CT Date: 2022-08-19

Filename: \\na.aecomnet.com\fs\EMEA\Leeds-UKLDS2\Legacy\UKLDS2PFPSW001\WIP\LE_Projects\Newproje\60673509 - AP Ammonia Terminal\400_Technical\GIS\02_Maps\Scoping Report\AIT_SR_CH02_Proposed_Dev.aprx



AECOM

PROJECT

Immingham Green Energy Terminal

CLIENT

Associated British Ports

CONSULTANT

AECOM Limited
5th Floor
2 City Walk
Leeds, LS11 9AR
www.aecom.com

LEGEND

- Scoping Boundary
- East Riding of Yorkshire Council
- North East Lincolnshire Council
- North Lincolnshire Council

NOTES

ISSUE PURPOSE

SCOPING REPORT

PROJECT NUMBER

60673509

DEVELOPMENT CONSENT ORDER NO

TBC

FIGURE TITLE

Scoping Boundary

FIGURE NUMBER

Figure 2.2

AECOM

PROJECT

Immingham Green Energy Terminal

APPLICANT

Associated British Ports

CONSULTANT

AECOM Limited
5th Floor
2 City Walk
Leeds, LS11 9AR
www.aecom.com

LEGEND

- Scoping Boundary
- Phase 1
- Phases 2 - 6

NOTES

ISSUE PURPOSE

SCOPING REPORT

PROJECT NUMBER

60673509

DEVELOPMENT CONSENT ORDER NUMBER

TBC

FIGURE TITLE

Project Phasing Plan

FIGURE NUMBER

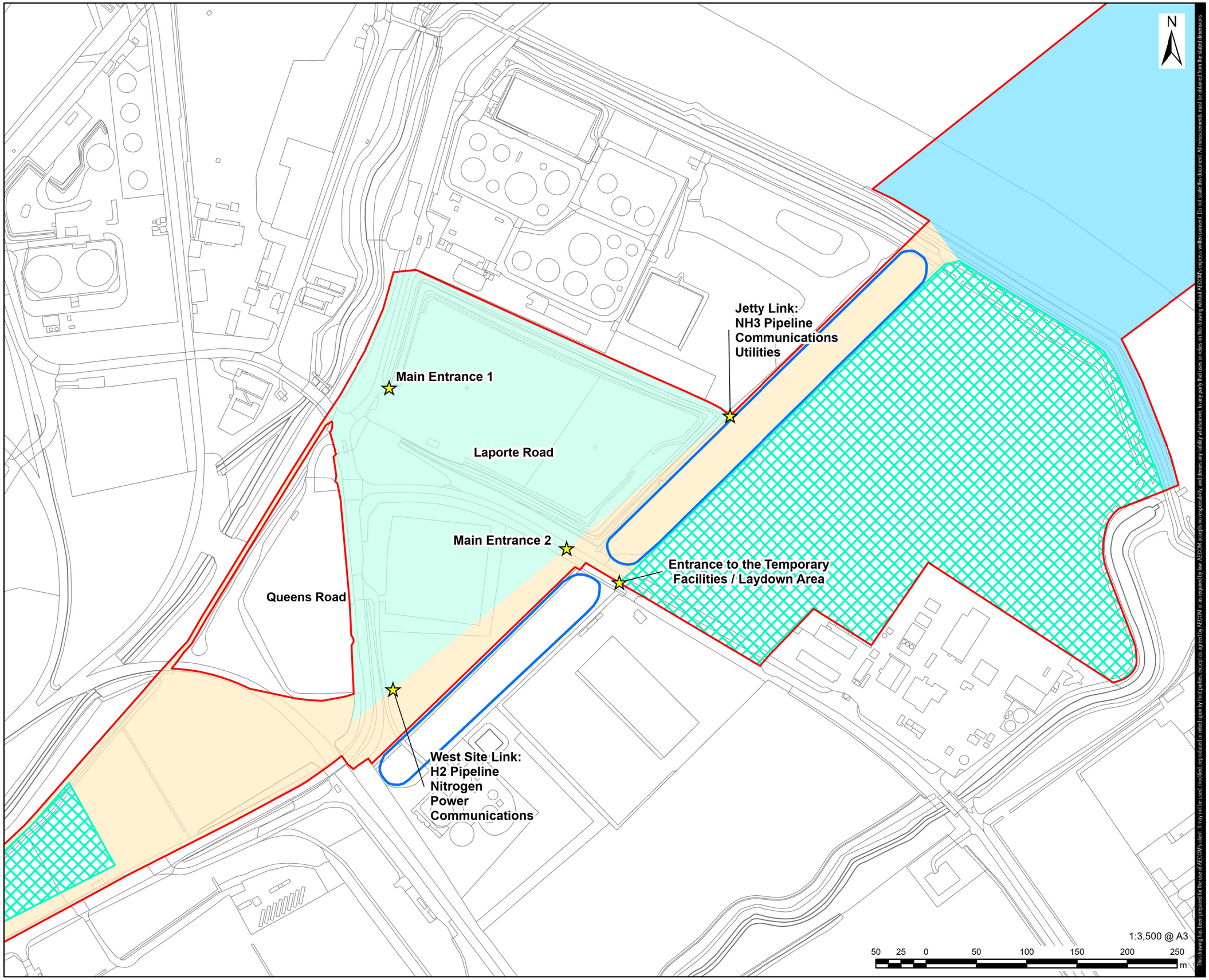
Figure 2.3

Revision: 1 Drawn: ER Checked: LC Approved: CT Date: 2022-08-19

Filename: \\na.aecomnet.com\ifs\EMEA\Leeds-UKLDS2\Legacy\UKLDS2PFPSW0001\WIP\LE_Projects\Newproje\60673509 - AP Ammonia Terminal\400_Technical\GIS\02_Maps\Scoping Report\AIT_SR_CH02_Proposed_Dev.aprx

Revision: 1 Drawn: ER Checked: LC Approved: CT Date: 2022-08-26

Filename: \\na.aecomnet.com\lfs\EMEA\Leeds-UKLDS2\Legacy\UKLDS2PFPSW001\WIP\LE_Projects\Newproje\60673509 - AP Ammonia Terminal\400_Technical\GIS\02_Maps\Scoping Report\AIT_SR_CH02_Proposed_Dev.aprx



AECOM

PROJECT

Immingham Green Energy Terminal

APPLICANT

Associated British Ports

CONSULTANT

AECOM Limited
5th Floor
2 City Walk
Leeds, LS11 9AR
www.aecom.com

LEGEND

- Scoping Boundary
- Temporary Construction Area
- East Site
- Jetty
- Pipeline
- Site Component
- Long Strip Tree Preservation Order (TPO)

NOTES

ISSUE PURPOSE

SCOPING REPORT

PROJECT NUMBER

60673509

DEVELOPMENT CONSENT ORDER NUMBER

TBC

FIGURE TITLE

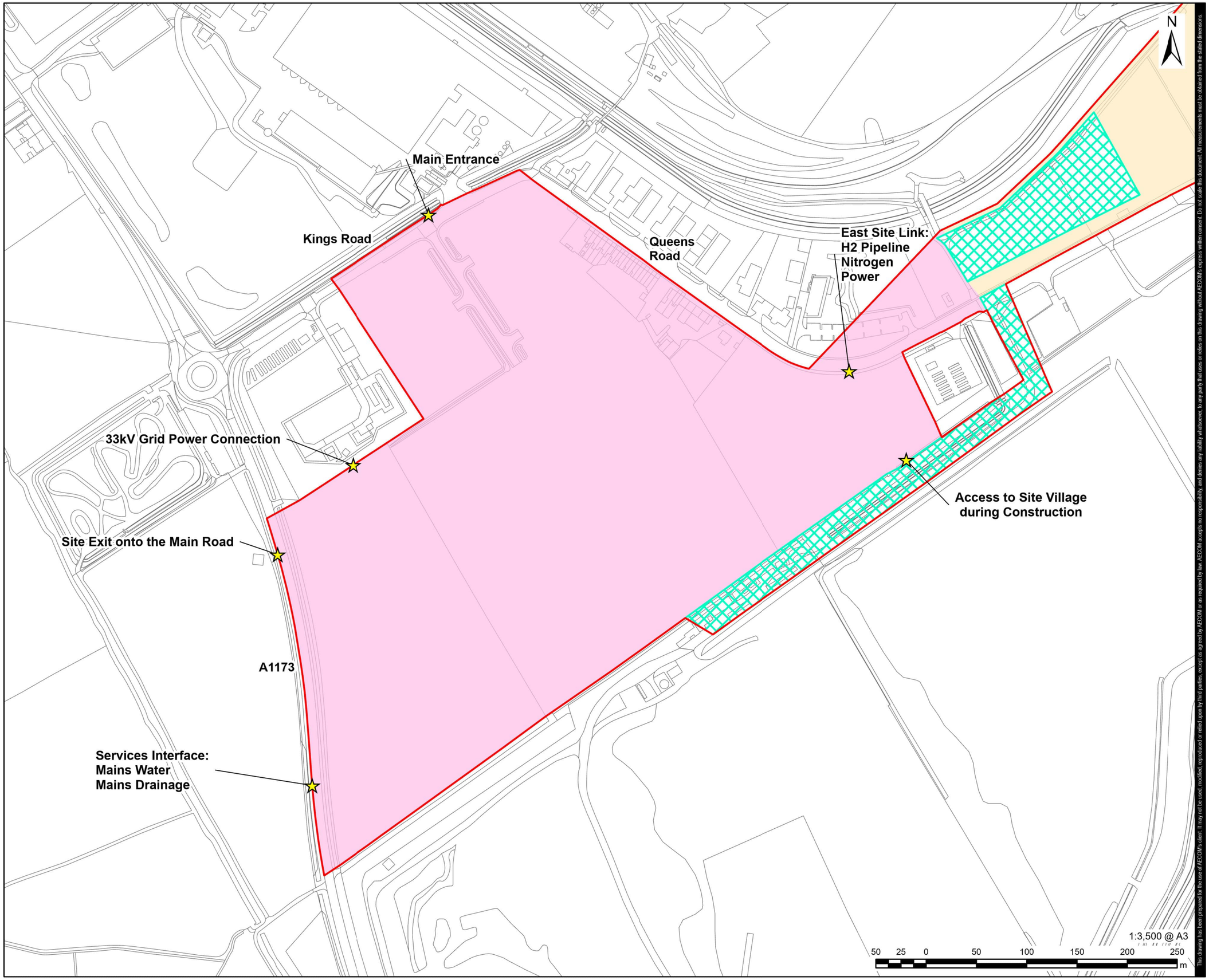
East Site Indicative Site Plan

FIGURE NUMBER

Figure 2.4

Revision: 1 Drawn: ER Checked: LC Approved: CT Date: 2022-08-19

Filename: \\na.aecomnet.com\ifs\EMEA\Leeds-UKLDS2\Legacy\UKLDS2FFPSW001WIP\LE_Projects\Newproje\60673509 - AP Ammonia Terminal\400_Technical\GIS\02_Maps\Scoping Report\AIT_SR_CH02_Proposed_Dev.aprx



AECOM

PROJECT

Immingham Green Energy Terminal

APPLICANT

Associated British Ports

CONSULTANT

AECOM Limited
5th Floor
2 City Walk
Leeds, LS11 9AR
www.aecom.com

LEGEND

- Scoping Boundary
- Temporary Construction Area
- West Site
- Pipeline
- Site Component

NOTES

ISSUE PURPOSE

SCOPING REPORT

PROJECT NUMBER

60673509

DEVELOPMENT CONSENT ORDER NUMBER

TBC

FIGURE TITLE

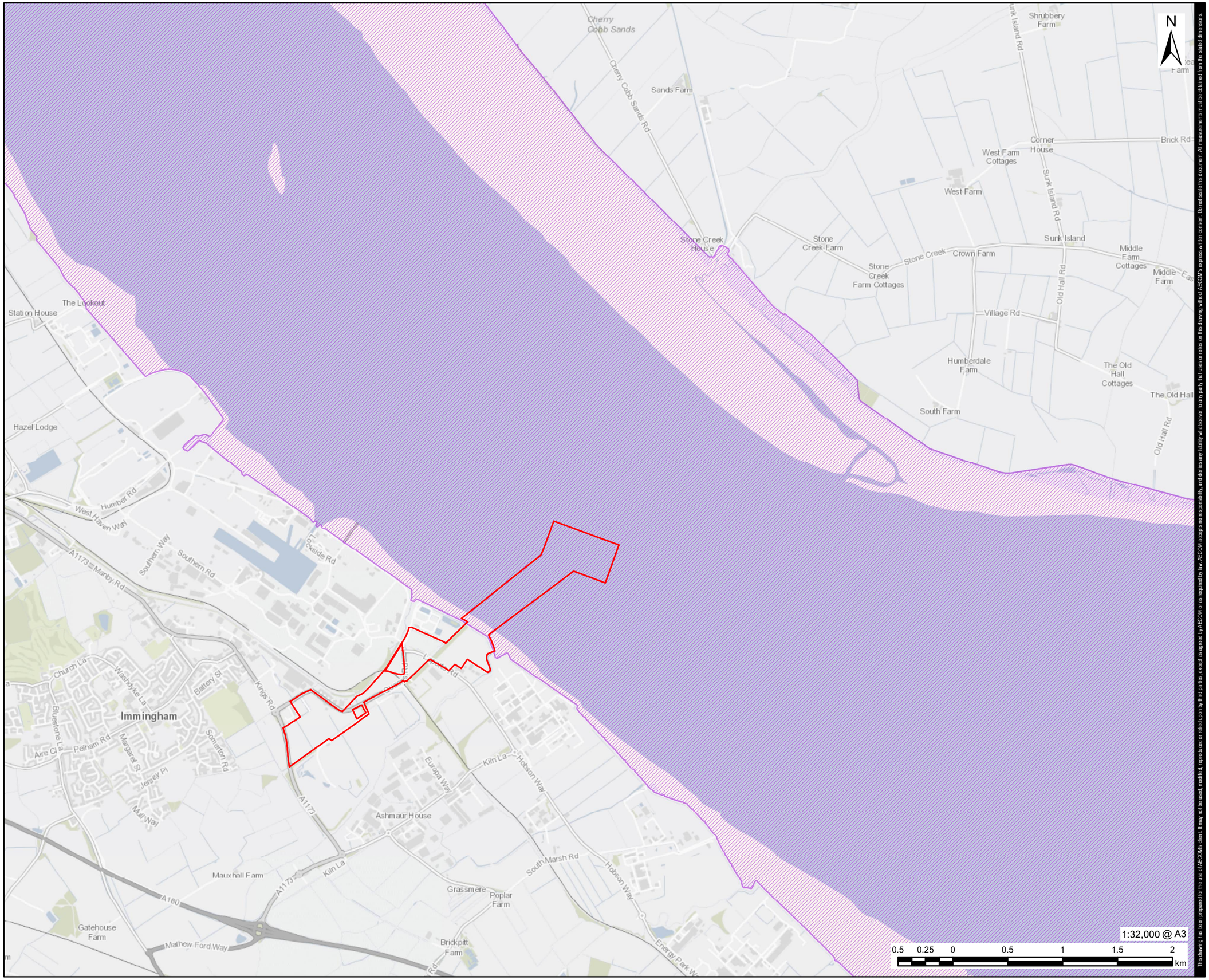
West Site Indicative Site Plan

FIGURE NUMBER

Figure 2.5

Revision: 1 Drawn: OR Checked: CB Approved: AP Date: 2022-08-19

Filename: O:\15163_Soleil\GIS\MXDs\01_Scoping\08_Nature_Conservation_Marine_Ecology\08_01_Designations.mxd



AECOM

PROJECT

Immingham Green Energy Terminal

APPLICANT

Associated British Ports

CONSULTANT

AECOM Limited
5th Floor
2 City Walk
Leeds, LS11 9AR
www.aecom.com

LEGEND

- Scoping Boundary
- Humber Estuary (Ramsar / SAC / SPA / SSSI)

NOTES

ISSUE PURPOSE

SCOPING REPORT

PROJECT NUMBER

60673509

DEVELOPMENT CONSENT ORDER NUMBER

TBC

FIGURE TITLE

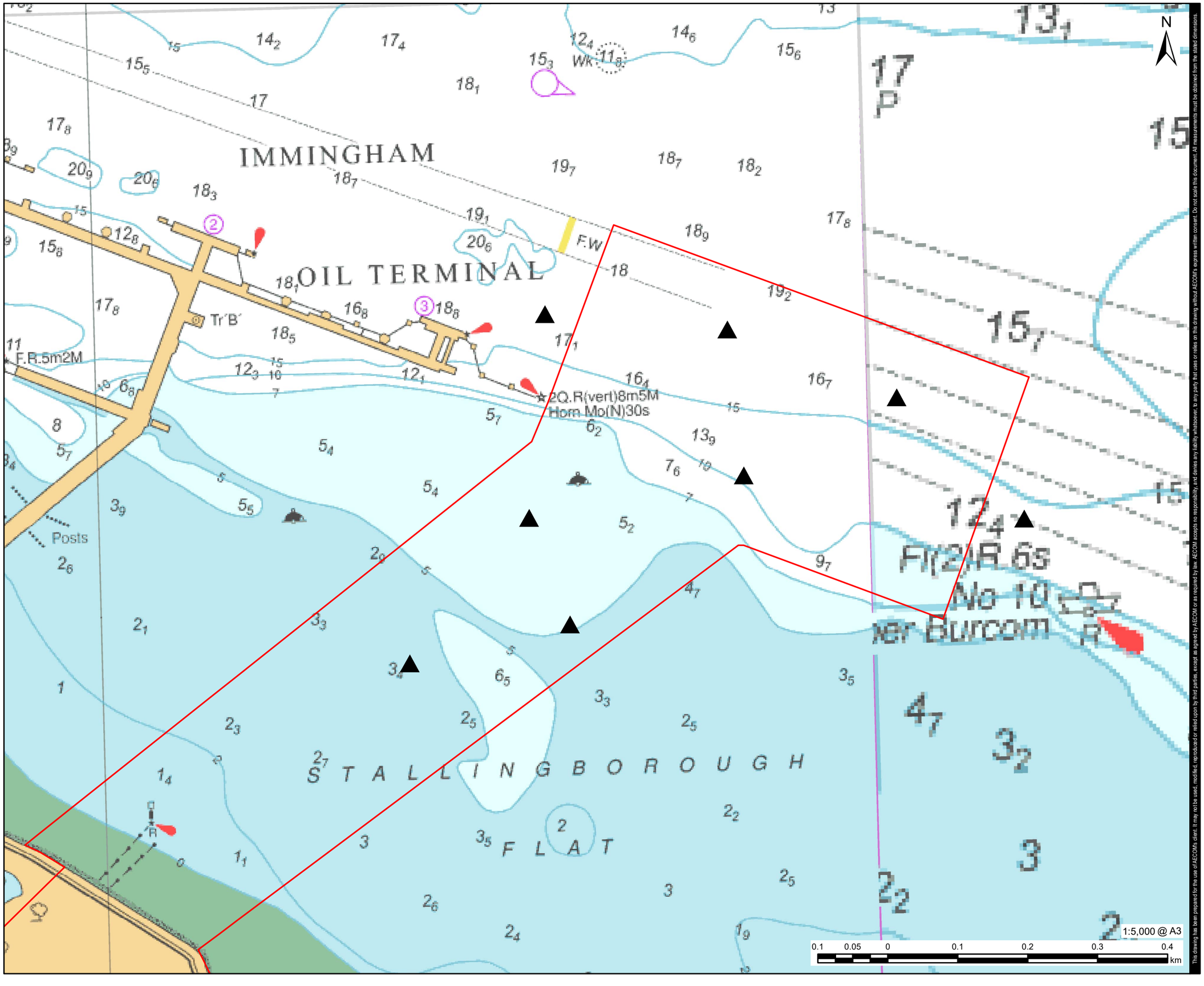
Humber Estuary Nature Conservation Designations

FIGURE NUMBER

Figure 8.1

Revision: 1 Drawn: OR Checked: CB Approved: AP Date: 2022-08-19

Filename: O:\5163_Soleil\GIS\MXDs\01_Scoping\08_Nature_Conservation_Marine_Ecology\08_02_Proposed_Benthic_Sampling_Locations.mxd



AECOM

PROJECT

Immingham Green Energy Terminal

APPLICANT

Associated British Ports

CONSULTANT

AECOM Limited
5th Floor
2 City Walk
Leeds, LS11 9AR
www.aecom.com

LEGEND

- Scoping Boundary
- Indicative benthic survey sampling locations

NOTES

ISSUE PURPOSE

SCOPING REPORT

PROJECT NUMBER

60673509

DEVELOPMENT CONSENT ORDER NUMBER

TBC

FIGURE TITLE

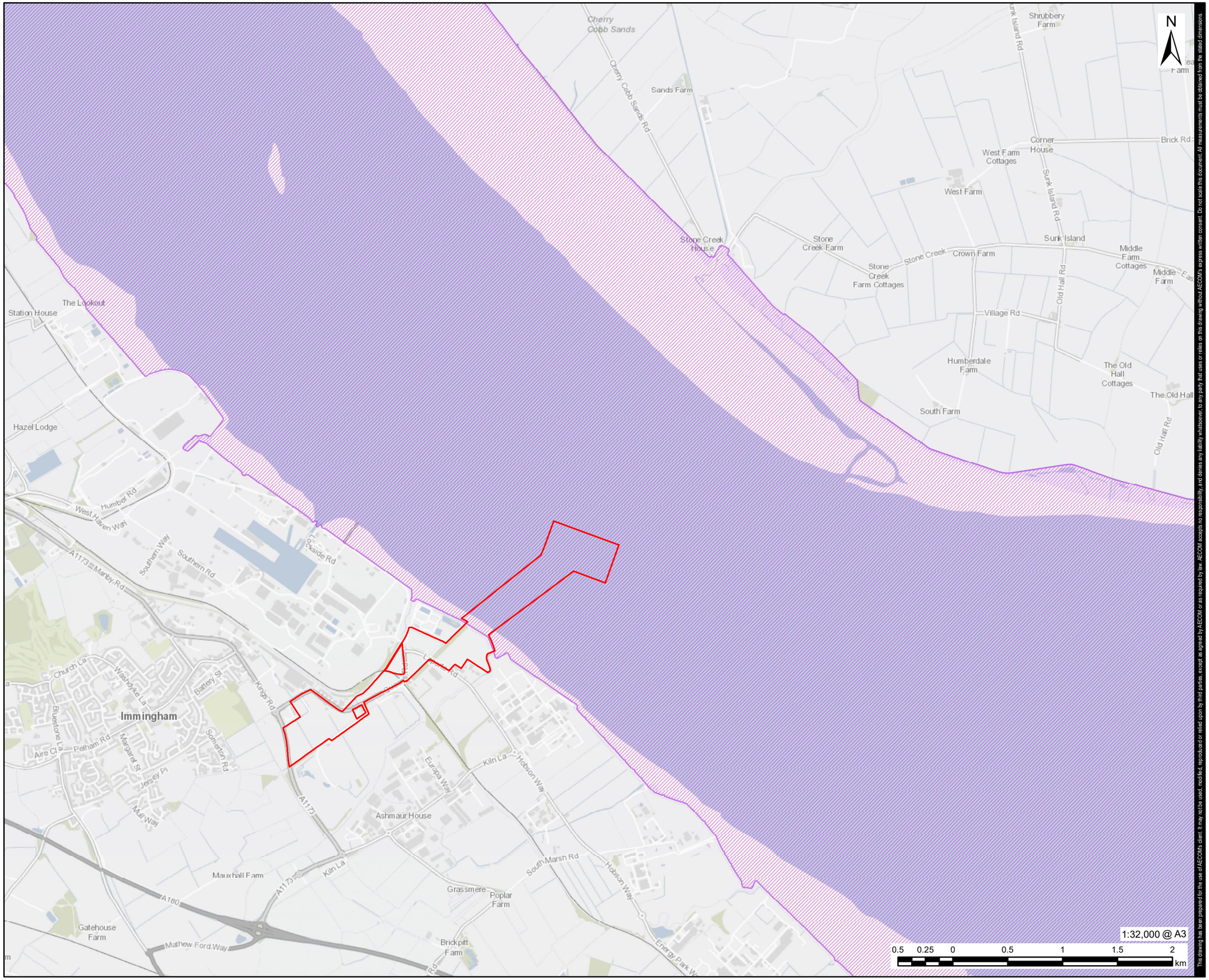
Proposed benthic survey sampling locations in proposed development footprint

FIGURE NUMBER

Figure 8.2

Revision: 1 Drawn: OR Checked: CB Approved: AP Date: 2022-08-19

Filename: O:\5163_Soleil\GIS\MXDs\01_Scoping\09_Ornithology\09_01_Designations.mxd



AECOM

PROJECT

Immingham Green Energy Terminal

APPLICANT

Associated British Ports

CONSULTANT

AECOM Limited
5th Floor
2 City Walk
Leeds, LS11 9AR
www.aecom.com

LEGEND

- Scoping Boundary
- Humber Estuary (Ramsar / SAC / SPA / SSSI)

NOTES

ISSUE PURPOSE

SCOPING REPORT

PROJECT NUMBER

60673509

DEVELOPMENT CONSENT ORDER NUMBER

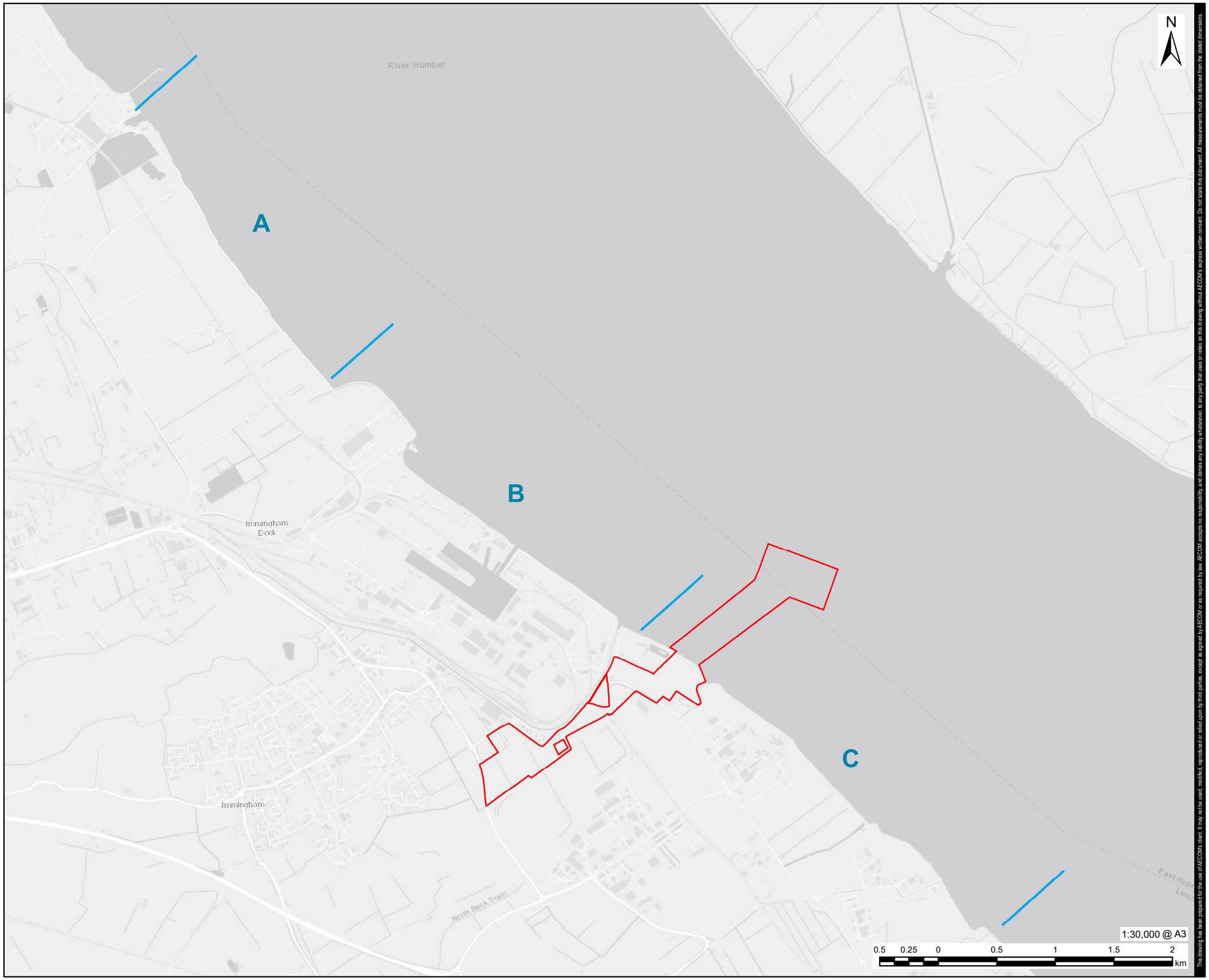
TBC

FIGURE TITLE

Humber Estuary Nature Conservation Designations

FIGURE NUMBER

Figure 9.1



Revision: 1 Drawn: OR Checked: CB Approved: AP Date: 2022-08-19

Filename: O:\5163_Soleil\GIS\MXDs\01_Scoping\09_Ornithology\09_02_Bird_Survey_Sectors.mxd

AECOM

PROJECT

Immingham Green Energy Terminal

APPLICANT

Associated British Ports

CONSULTANT

AECOM Limited
5th Floor
2 City Walk
Leeds, LS11 9AR
www.aecom.com

LEGEND

- Scoping Boundary
- ABP Bird Count Sectors

NOTES

Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community.

ISSUE PURPOSE

SCOPING REPORT

PROJECT NUMBER

60673509

DEVELOPMENT CONSENT ORDER NUMBER

TBC

FIGURE TITLE

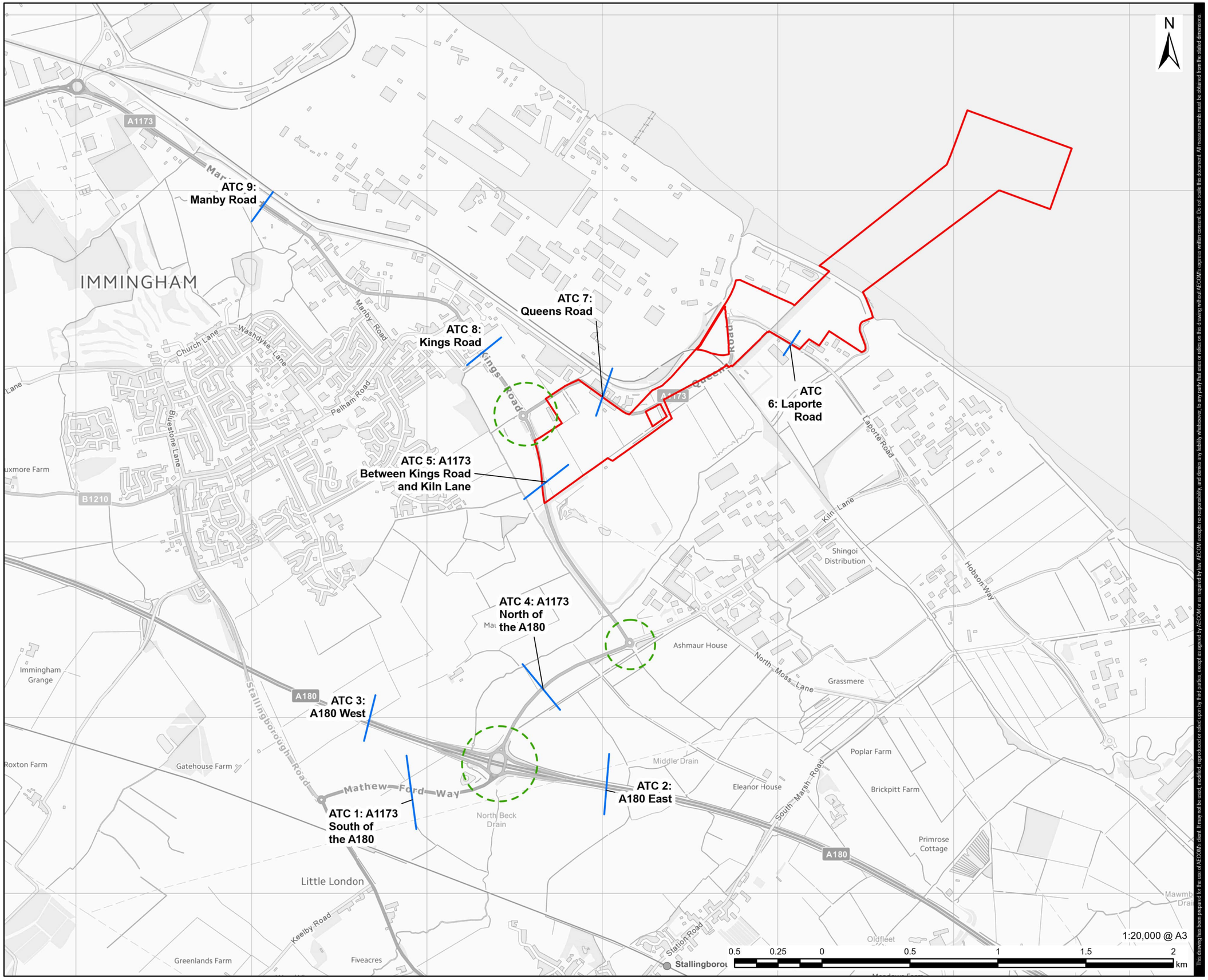
Pre and post consent monitoring locations of coastal waterbird surveys as part of the Immingham Outer Harbour development

FIGURE NUMBER

Figure 9.2

Revision: 1 Drawn: ER Checked: LC Approved: CT Date: 2022-08-19

Filename: \\na.aecomnet.com\lfs\EMEA\Leeds-UKLDS2\Legacy\UKLDS2PFPSW0011WIP\LE_Projects\Newproje\60673509 - AP Ammonia Terminal\400_Technical\GIS\02_Maps\Scoping Report\AIT_SR_CH10_Traffic_and_Transport.aprx



AECOM

PROJECT

Immingham Green Energy Terminal

CLIENT

Associated British Ports

CONSULTANT

AECOM Limited
5th Floor
2 City Walk
Leeds, LS11 9AR
www.aecom.com

LEGEND

- Scoping Boundary
- ATC Location
- MCC Location

NOTES

ISSUE PURPOSE

SCOPING REPORT

PROJECT NUMBER

60673509

DEVELOPMENT CONSENT ORDER NO

TBC

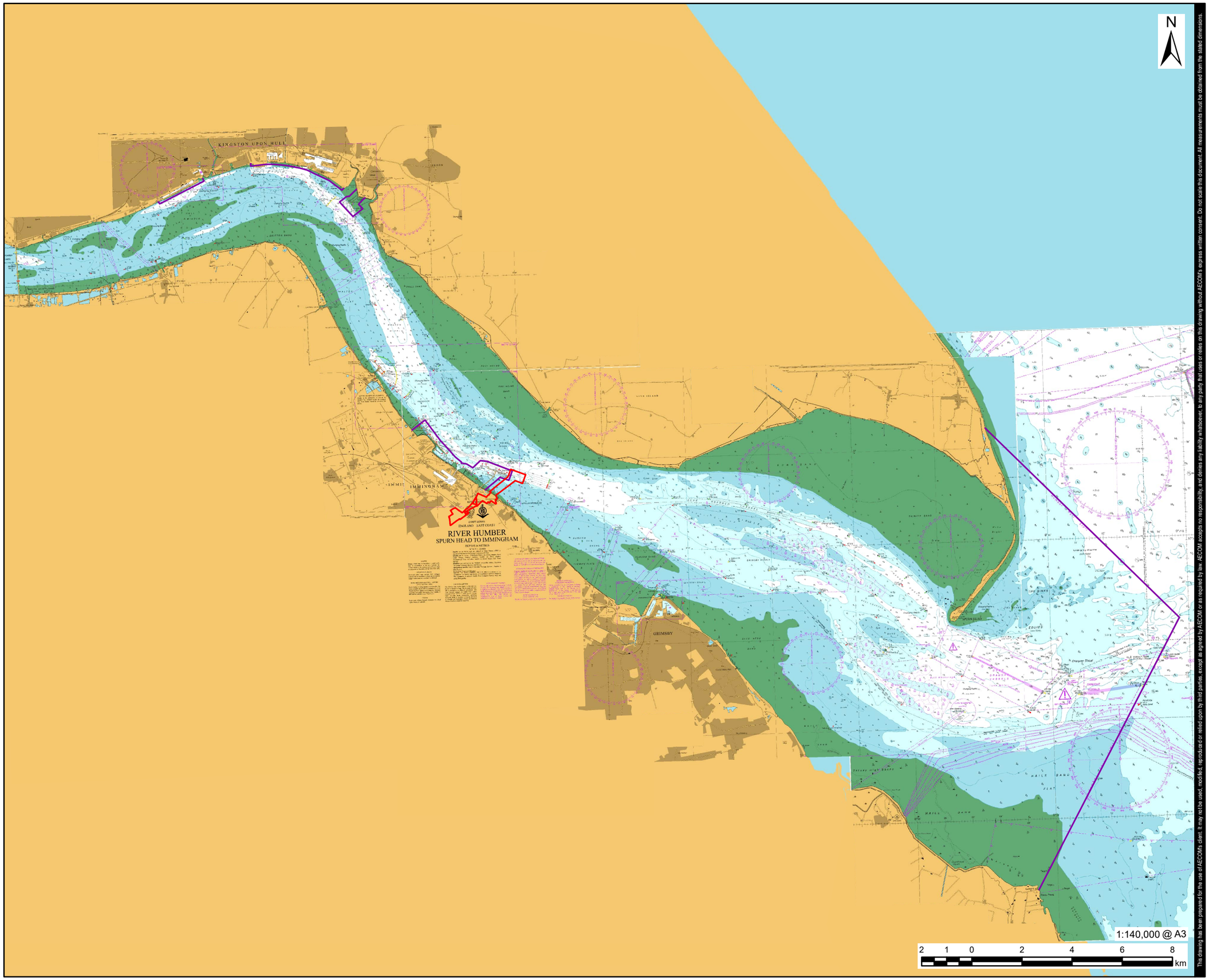
FIGURE TITLE

Proposed Traffic Survey Locations

FIGURE NUMBER

Figure 10.1

Revision: 1 Drawn: OR Checked: CB Approved: TA Date: 2022-08-19



AECOM

PROJECT

Immingham Green Energy Terminal

APPLICANT

Associated British Ports

CONSULTANT

AECOM Limited
5th Floor
2 City Walk
Leeds, LS11 9AR
www.aecom.com

LEGEND

- Scoping Boundary
- Statutory Harbour Authority (SHA)

NOTES

ISSUE PURPOSE

SCOPING REPORT

PROJECT NUMBER

60673509

DEVELOPMENT CONSENT ORDER NUMBER

TBC

FIGURE TITLE

Scheme Overview

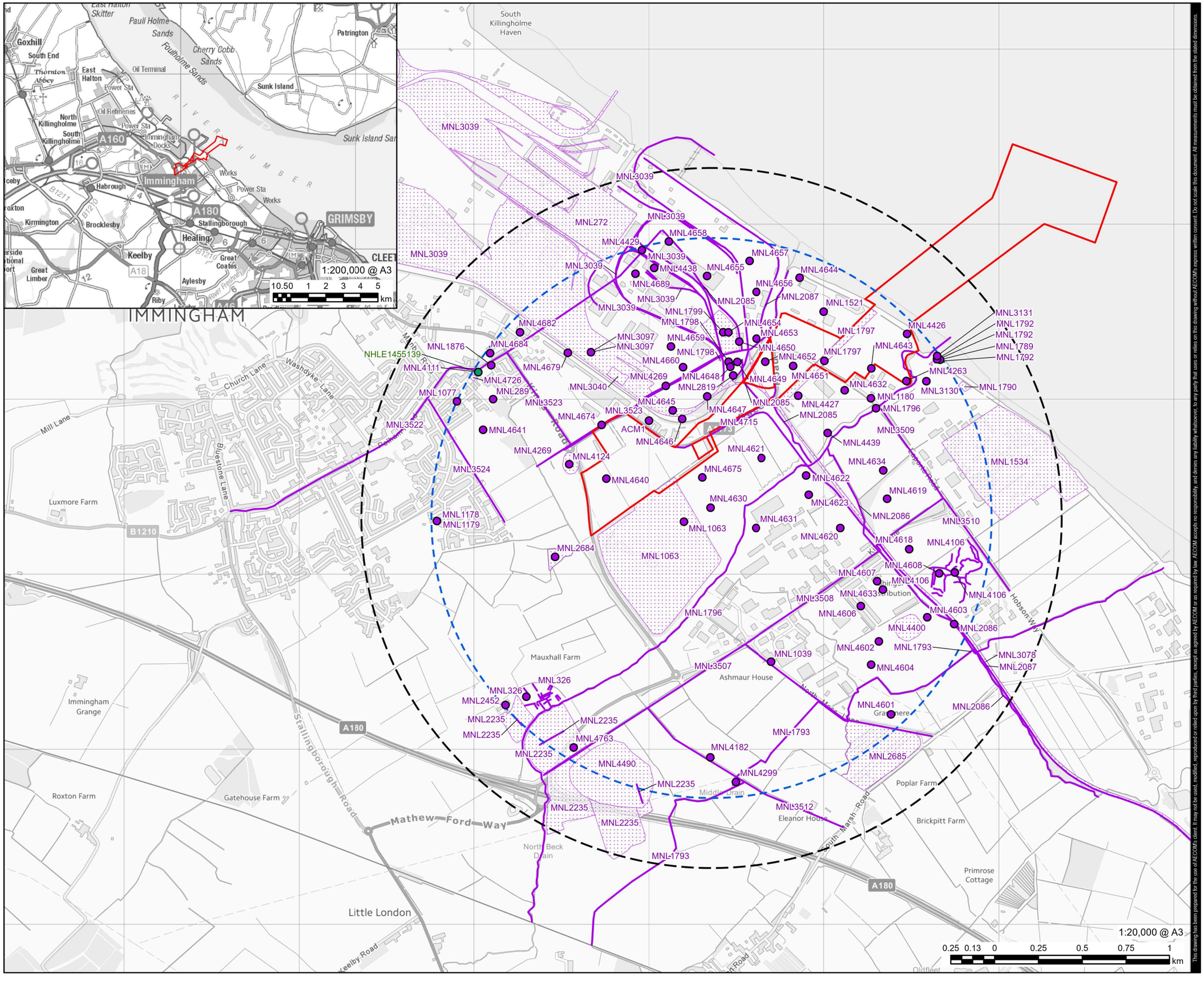
FIGURE NUMBER

Figure 11.1

Filename: O:\5163_Soleil\GIS\MXDs\01_Scoping\11_Marine_Transport_Navigation\11_01_Scheme_Overview.mxd

Revision: 1 Drawn: AG Checked: CT Approved: CT Date: 2022-08-19

Filename: \\na.aecomnet.com\fs\EMEA\Leeds-UKLDS2\Legacy\UKLDS2PFPSW0001\WIP\LE_Projects\Newprole\60673509 - AP Ammonia Terminal\400_Technical\GIS\02_Maps\Scoping Report\AIT_SR_CH13_Historic_Environment.aprx



AECOM

PROJECT

Immingham Green Energy Terminal

CLIENT

Associated British Ports

CONSULTANT

AECOM Limited
5th Floor
2 City Walk
Leeds, LS11 9AR
www.aecom.com

LEGEND

- Scoping Boundary
- 1.6km Study Area for Non-Designated Assets[1]
- 2km Study Area for Designated Assets[1]
- Historic England Designated Asset
- Heritage Assets (point)[2]
- Heritage Assets (polyline)[2]
- Heritage Assets (polygon)[2]

NOTES

[1] Study areas have been measured from an approximate centre of the DCO site boundary.

[2] Provided by North East Lincolnshire Council Historic Environment Record

ISSUE PURPOSE

SCOPING REPORT

PROJECT NUMBER

60673509

DEVELOPMENT CONSENT ORDER NO

TBC

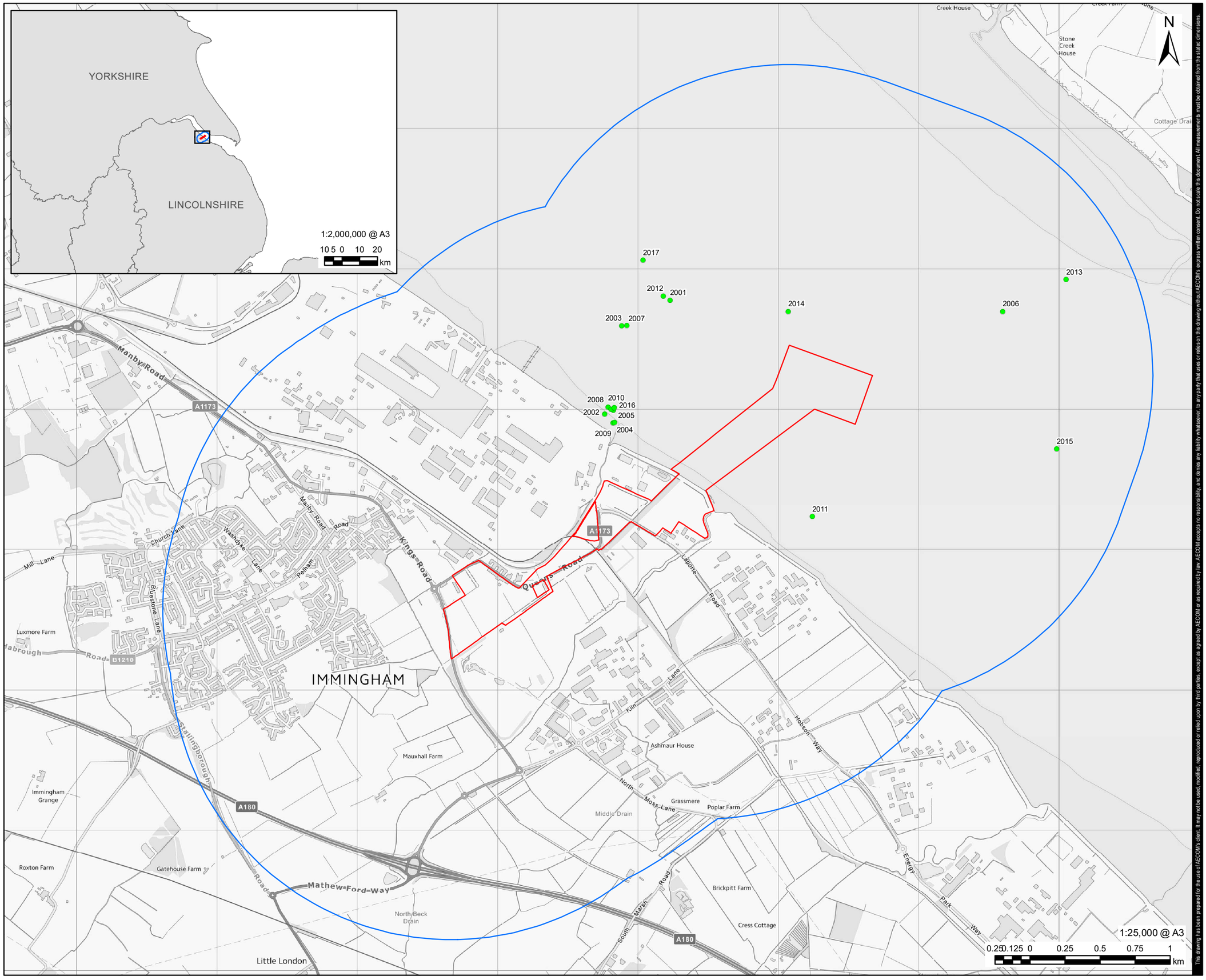
FIGURE TITLE

Location of Heritage Assets Within Study Area

FIGURE NUMBER

Figure 13.1

Revision: 0 Drawn: KF Checked: BM Approved: AB Date: 2022-08-24



AECOM

PROJECT

Immingham Green Energy Terminal

APPLICANT

Associated British Ports

CONSULTANT

AECOM Limited
5th Floor
2 City Walk
Leeds, LS11 9AR
www.aecom.com

LEGEND

- Scoping Boundary
- Scoping Boundary Buffer
- Marine Heritage Receptors

NOTES

ISSUE PURPOSE

SCOPING REPORT

PROJECT NUMBER

60673509

DEVELOPMENT CONSENT ORDER NUMBER

TBC

FIGURE TITLE

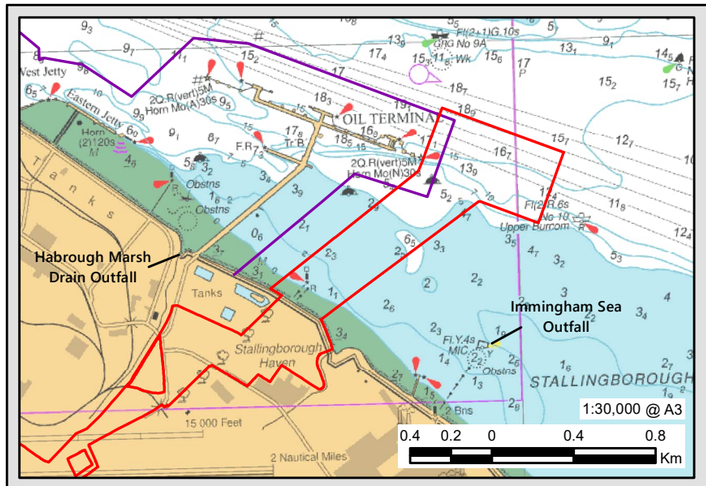
Marine Heritage Receptors

FIGURE NUMBER

Figure 14.1

Filename: T:\Projects\266160\GIS\Figs\MXD\Scoping\2022_06_30\266160_Scoping_Fig01.mxd

Revision: 1 Drawn: OR Checked: CB Approved: AF Date: 2022-08-19



N

Kingston Upon Hull
Hull Bend
Saltend
Winteringham Middle Sand
Hessle Sand
Hull Middle
Skitter Sand
Paull Sand
Trent Falls
Humber Bridge
Redcliffe Middle Sand
Barton Ness Sand
Halton Flat
Halton Middle
Foul Holme Sand
HU056 and HU060 disposal sites
Whitebooth Road
Hawkins Point
Sunk Sand
Sunk Dredged Channel
Middle Shoal
Hawke Channel
Stallingborough Flat
Bull Channel
Spurn Head
Grimsby
Cleethorpes
Haile Channel
Humberston

1:170,000 @ A3
2 1 0 2 4 6 8
km

AECOM

PROJECT

Immingham Green Energy Terminal

APPLICANT

Associated British Ports

CONSULTANT

AECOM Limited
5th Floor
2 City Walk
Leeds, LS11 9AR
www.aecom.com

LEGEND

- Scoping Boundary
- Statutory Harbour Authority (SHA)

NOTES

ISSUE PURPOSE

SCOPING REPORT

PROJECT NUMBER

60673509

DEVELOPMENT CONSENT ORDER NUMBER

TBC

FIGURE TITLE

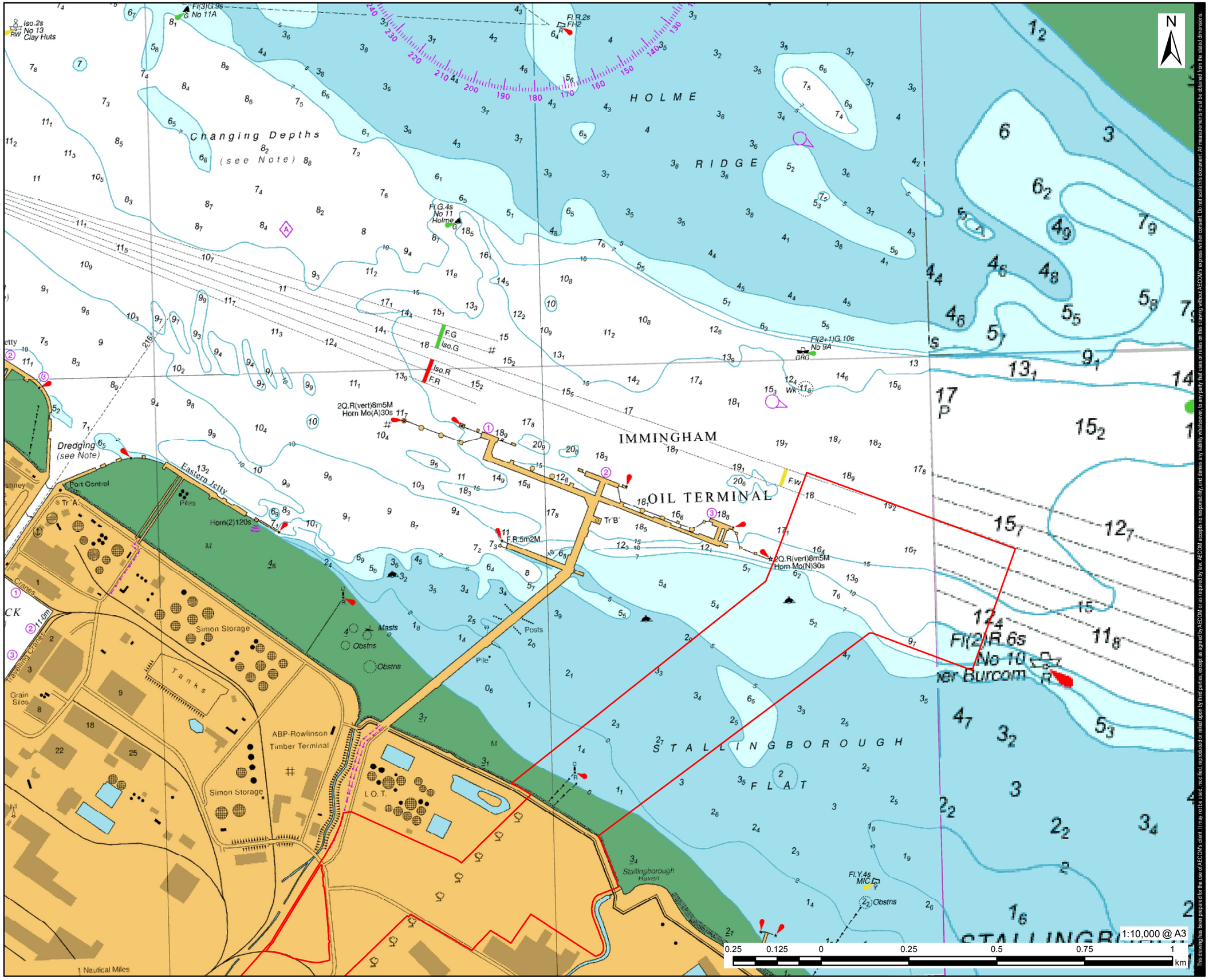
Scheme Overview

FIGURE NUMBER

Figure 15.1

Filename: O:\5163_Soleil\GIS\MXDs\01_Scoping\15_Physical_Processes\15_01_Regional_Setting.mxd

Revision: 1 Drawn: OR Checked: CB Approved: AF Date: 2022-08-19



Filename: O:\5163_Soleil\GIS\MXDs\01_Scoping\15_Physical_Processes\15_02_Scheme_Overview.mxd

AECOM

PROJECT

Immingham Green Energy Terminal

APPLICANT

Associated British Ports

CONSULTANT

AECOM Limited
5th Floor
2 City Walk
Leeds, LS11 9AR
www.aecom.com

LEGEND

Scoping Boundary

NOTES

ISSUE PURPOSE

SCOPING REPORT

PROJECT NUMBER

60673509

DEVELOPMENT CONSENT ORDER NUMBER

TBC

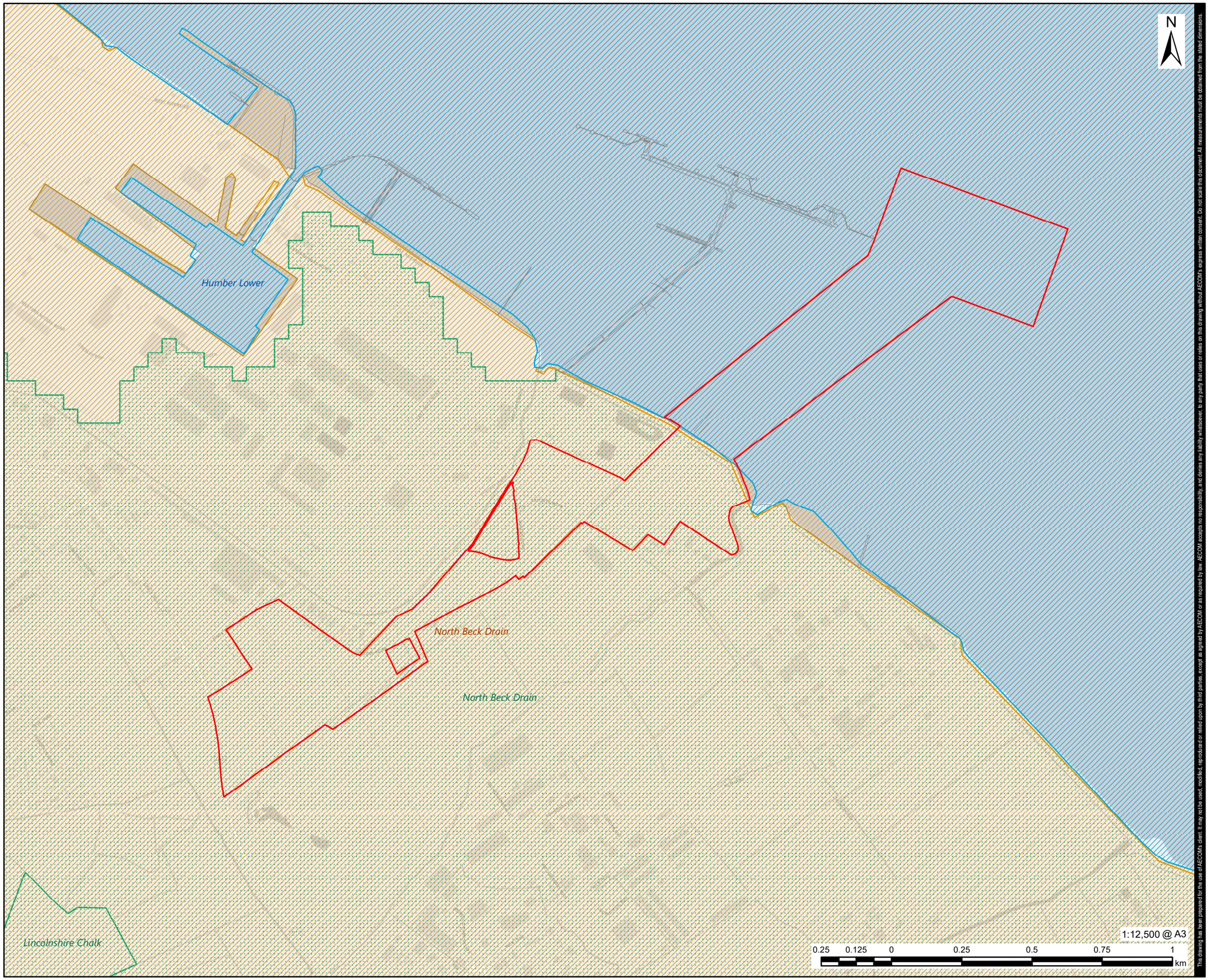
FIGURE TITLE

Admiralty chart of Humber Estuary surrounding Port of Immingham

FIGURE NUMBER

Figure 15.2

Revision: 1 Drawn: OR Checked: CB Approved: JO Date: 2022-08-19



AECOM

PROJECT

Immingham Green Energy Terminal

APPLICANT

Associated British Ports

CONSULTANT

AECOM Limited
5th Floor
2 City Walk
Leeds, LS11 9AR
www.aecom.com

LEGEND

- Scoping Boundary
- WFD Transitional Water Body
- WFD River Water Body Catchment
- Nitrate Vulnerable Zones (NVZ)

NOTES

ISSUE PURPOSE

SCOPING REPORT

PROJECT NUMBER

60673509

DEVELOPMENT CONSENT ORDER NUMBER

TBC

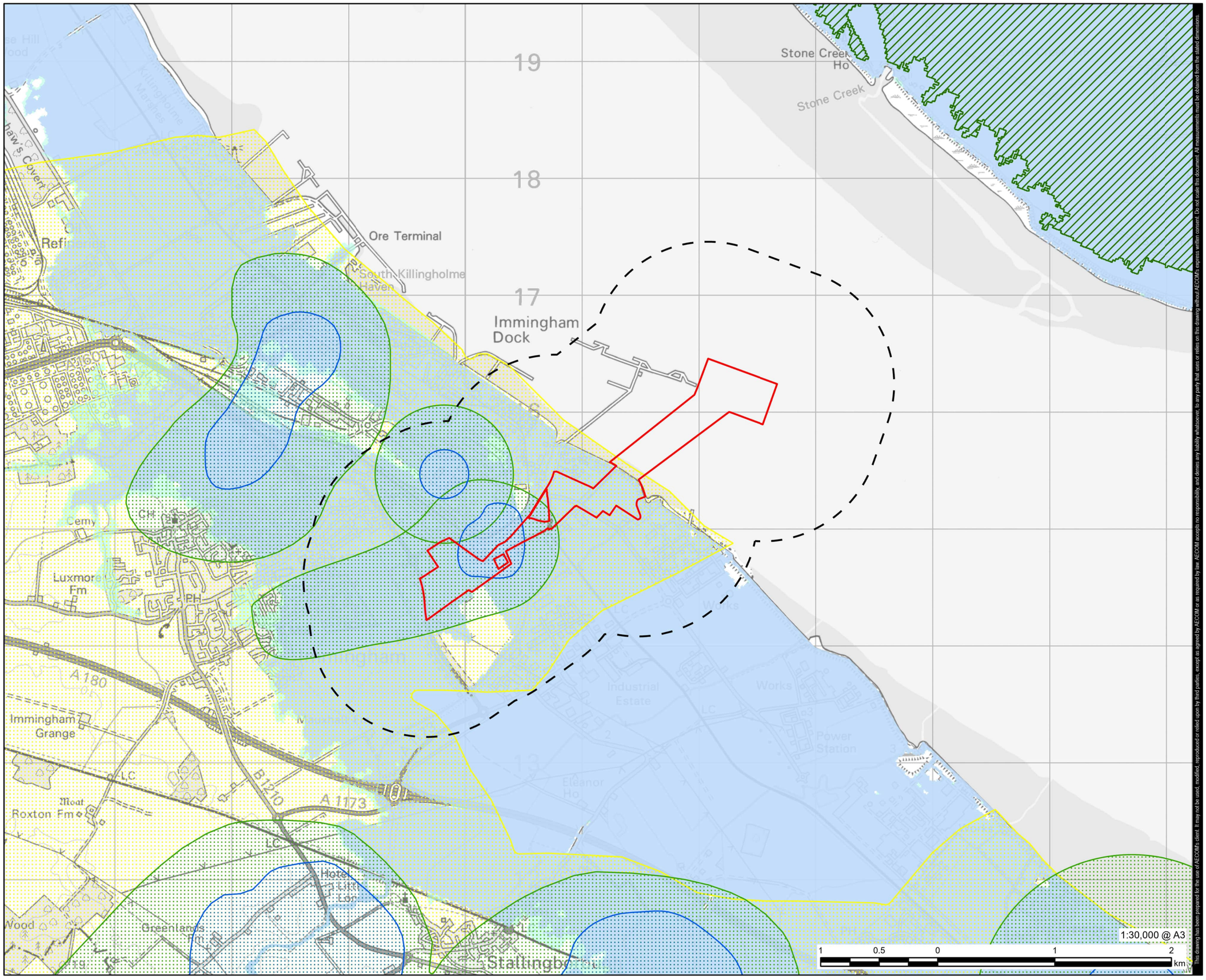
FIGURE TITLE

WFD waterbodies and sensitive receptors surrounding Immingham Green Energy Terminal

FIGURE NUMBER

Figure 16.1

Filename: O:\5163_Soleil\GIS\MXDs\01_Scoping\16_Water_Sediment\16_01_WFD.mxd



AECOM

PROJECT

Immingham Green Energy Terminal

CLIENT

Associated British Ports

CONSULTANT

AECOM Limited
5th Floor
2 City Walk
Leeds, LS11 9AR
www.aecom.com

LEGEND

- Scoping Boundary
- 1km Study Area
- Area Benefitting from Flood Defence
- Flood Zone 2
- Flood Zone 3

Source Protection Zone

- Zone I - Inner Protection Zone
- Zone II - Outer Protection Zone
- Zone III - Total Catchment

NOTES

ISSUE PURPOSE

SCOPING REPORT

PROJECT NUMBER

60673509

DEVELOPMENT CONSENT ORDER NO

TBC

FIGURE TITLE

Water Environment

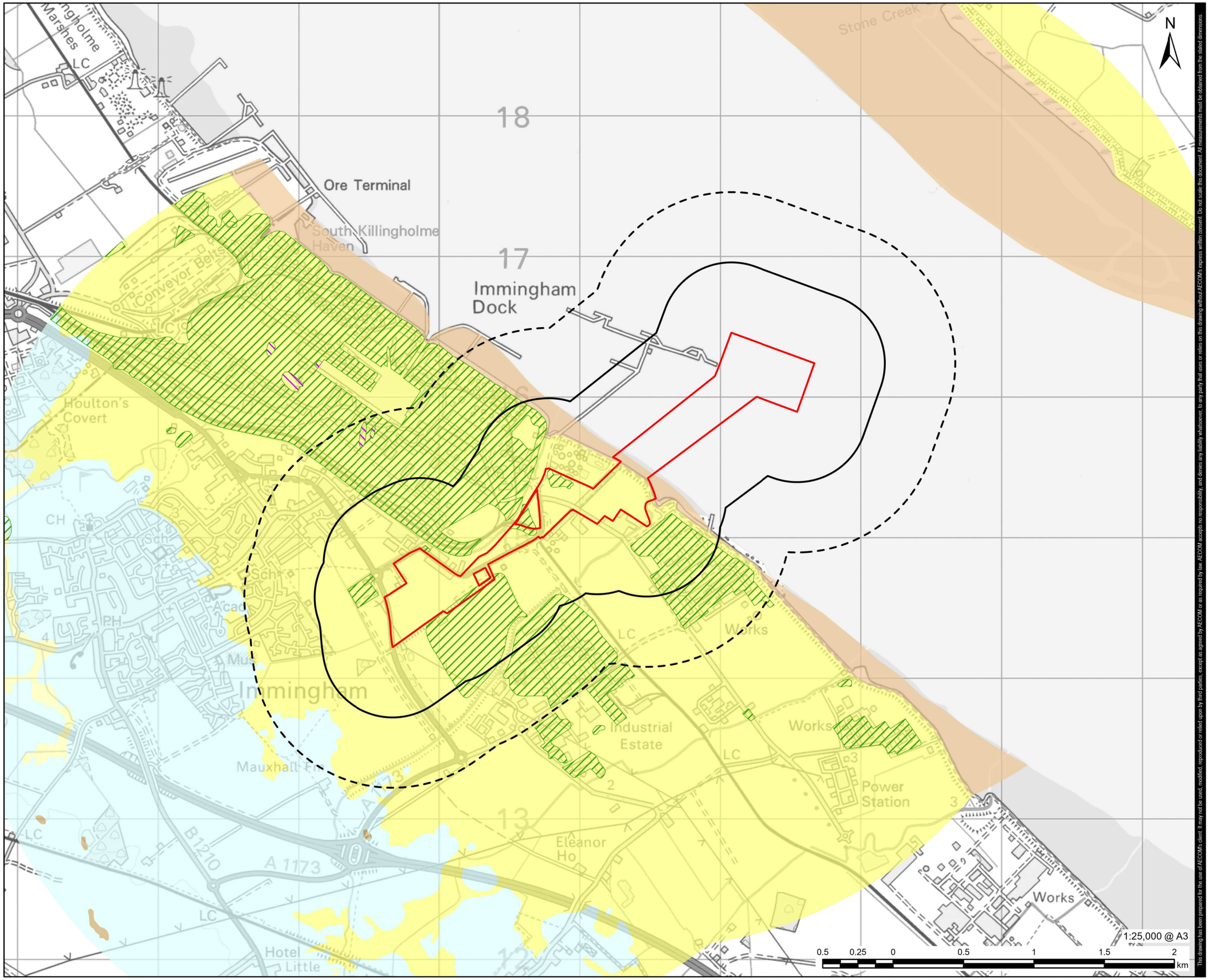
FIGURE NUMBER

Figure 17.1

Filename: \\na.aecomnet.com\ifs\EMEA\Leeds-UKLDS2\Legacy\UKLDS2PFPSW001\WIP\LE_Projects\Newproje\60673509 - AP Ammonia Terminal\400_Technical\GIS\02_Maps\Scoping Report\AIT_SR_CH17_Water_Quality_and_Flood_Risk.aprx Revision: 1 Drawn: ER Checked: LC Approved: NM Date: 2022-08-19

Revision: 1 Drawn: AG Checked: DF Approved: VB Date: 2022-08-19

Filename: \\na.aecomnet.com\fs\EMEA\Leeds-UKLDS2\Legacy\UKLDS2PFPSW001\WIP\LE_Projects\Newproje\60673509 - AP Ammonia Terminal\400_Technical\GIS\02_Maps\Scoping Report\AIT_SR_CH20_Ground_Conditions.aprx



AECOM

PROJECT

Immingham Green Energy Terminal

CLIENT

Associated British Ports

CONSULTANT

AECOM Limited
5th Floor
2 City Walk
Leeds, LS11 9AR
www.aecom.com

LEGEND

- Scoping Boundary
- 500m Study Area
- 1km Study Area

BGS Artificial Ground (50k):

- Infilled Ground - Artificial Deposit
- Made Grouund (Undivided) - Artificial Deposit

BGS Superficial Geology (50k):

- Beach and Tidal Flat Deposits (Undifferentiated) - Clay, Silt and Sand
- Alluvium - Clay, Silt, Sand and Gravel
- Tidal Flat Deposits - Clay and Silt
- Lacustrine Deposits - Sand, Silt and Clay
- Till, Devensian - Diamicton

NOTES

ISSUE PURPOSE

SCOPING REPORT

PROJECT NUMBER

60673509

DEVELOPMENT CONSENT ORDER NO

TBC

FIGURE TITLE

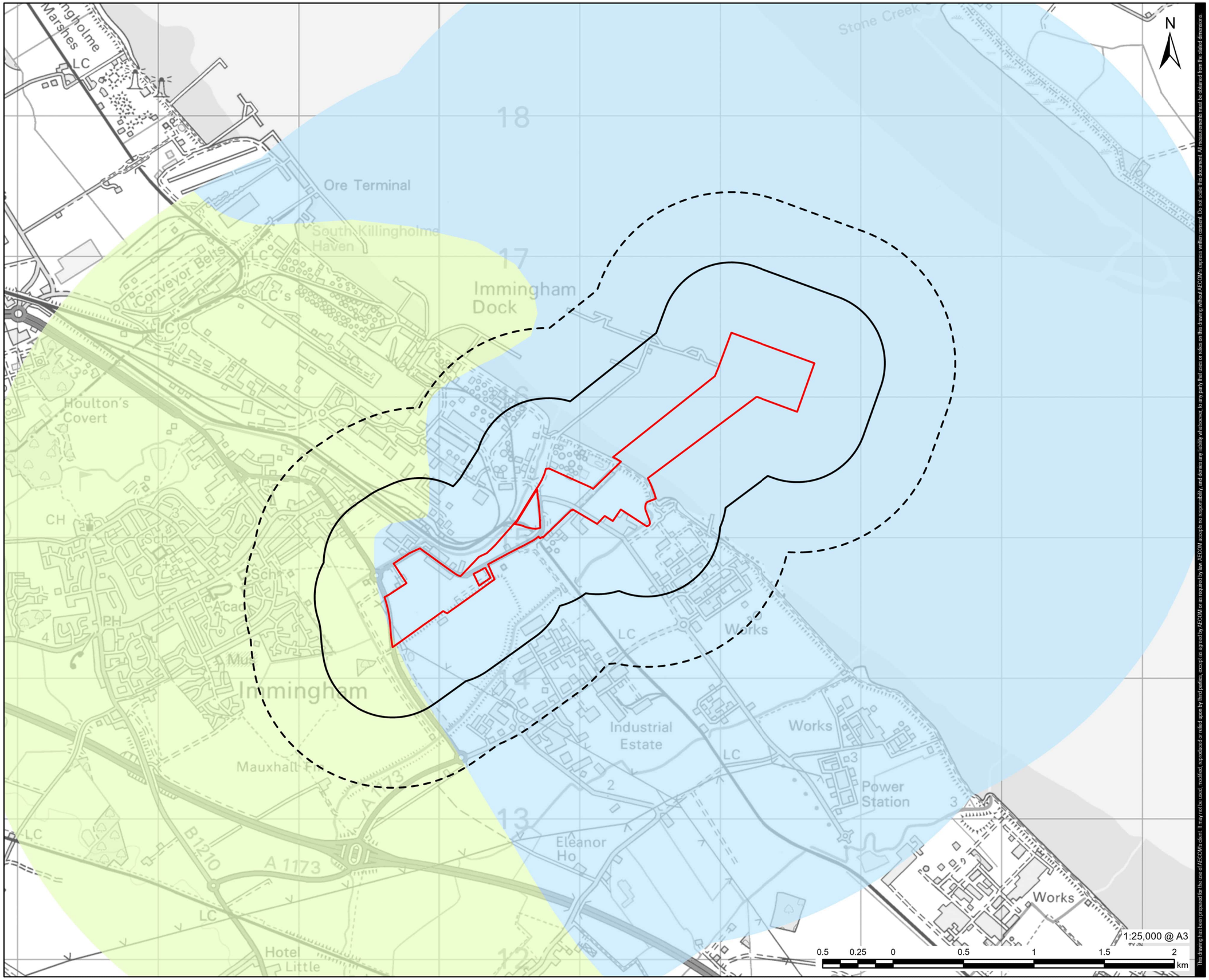
Superficial Geology and Artificial Ground

FIGURE NUMBER

Figure 20.1

Revision: 1 Drawn: AG Checked: DF Approved: VB Date: 2022-08-19

Filename: \\na.aecomnet.com\lfs\EMEA\Leeds-UKLDS2\Legacy\UKLDS2PFPSW0001\WIP\LE_Projects\Newproje\60673509 - AP Ammonia Terminal\400_Technical\GIS\02_Maps\Scoping Report\AIT_SR_CH20_Ground_Conditions.aprx



AECOM

PROJECT

Immingham Green Energy Terminal

CLIENT

Associated British Ports

CONSULTANT

AECOM Limited
5th Floor
2 City Walk
Leeds, LS11 9AR
www.aecom.com

LEGEND

- Scoping Boundary
- 500m Study Area
- 1km Study Area

BGS Bedrock Geology (50k):

- Flamborough Chalk Formation - Chalk
- Burnham Chalk Formation - Chalk

NOTES

ISSUE PURPOSE

SCOPING REPORT

PROJECT NUMBER

60673509

DEVELOPMENT CONSENT ORDER NO

TBC

FIGURE TITLE

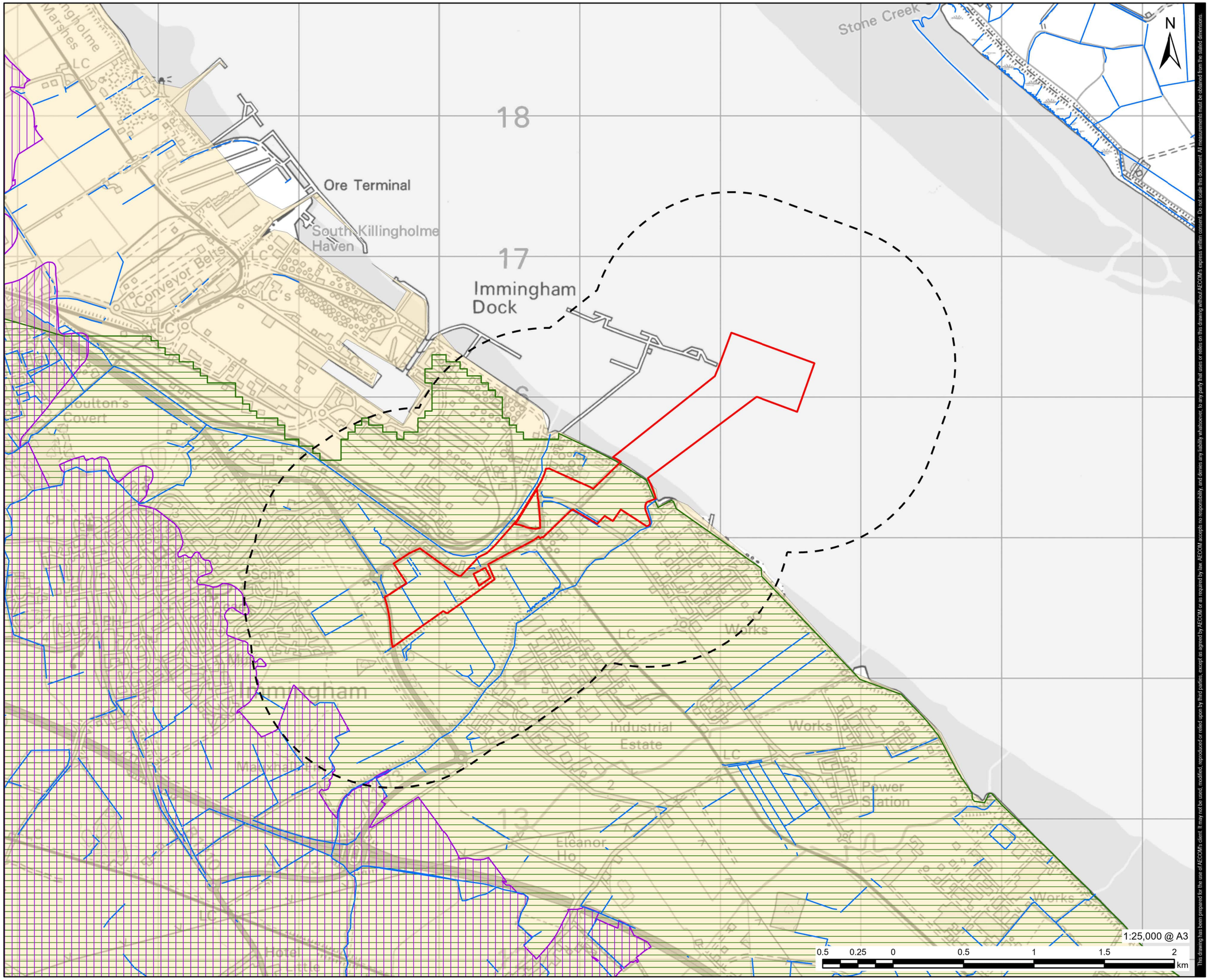
Bedrock Geology

FIGURE NUMBER

Figure 20.2

Revision: 1 Drawn: AG Checked: DF Approved: VB Date: 2022-08-19

Filename: \\na.aecomnet.com\fs\EMEA\Leeds-UKLDS2\Legacy\UKLDS2PFPSW001\WIPLLE_Projects\Newproje\60673509 - AP Ammonia Terminal\400_Technical\GIS\02_Maps\Scoping Report\AIT_SR_CH20_Ground_Conditions.aprx



This drawing has been prepared for the use of AECOM's client. It may not be used, modified, reproduced or relied upon by third parties, except as agreed by AECOM or as required by law. AECOM accepts no responsibility, and denies any liability whatsoever, to any party that uses or relies on this drawing without AECOM's express written consent. Do not scale this document. All measurements must be obtained from the stated dimensions.

AECOM

PROJECT

Immingham Green Energy Terminal

CLIENT

Associated British Ports

CONSULTANT

AECOM Limited
5th Floor
2 City Walk
Leeds, LS11 9AR
www.aecom.com

LEGEND

- Scoping Boundary
- 1km Study Area
- Watercourse
- North Lincolnshire Chalk Unit Ground Water Body (Poor Condition)

Nitrate Vulnerable Zone:

- Lincolnshire Chalk
- North Beck Drain NVZ

NOTES

ISSUE PURPOSE

SCOPING REPORT

PROJECT NUMBER

60673509

DEVELOPMENT CONSENT ORDER NO

TBC

FIGURE TITLE

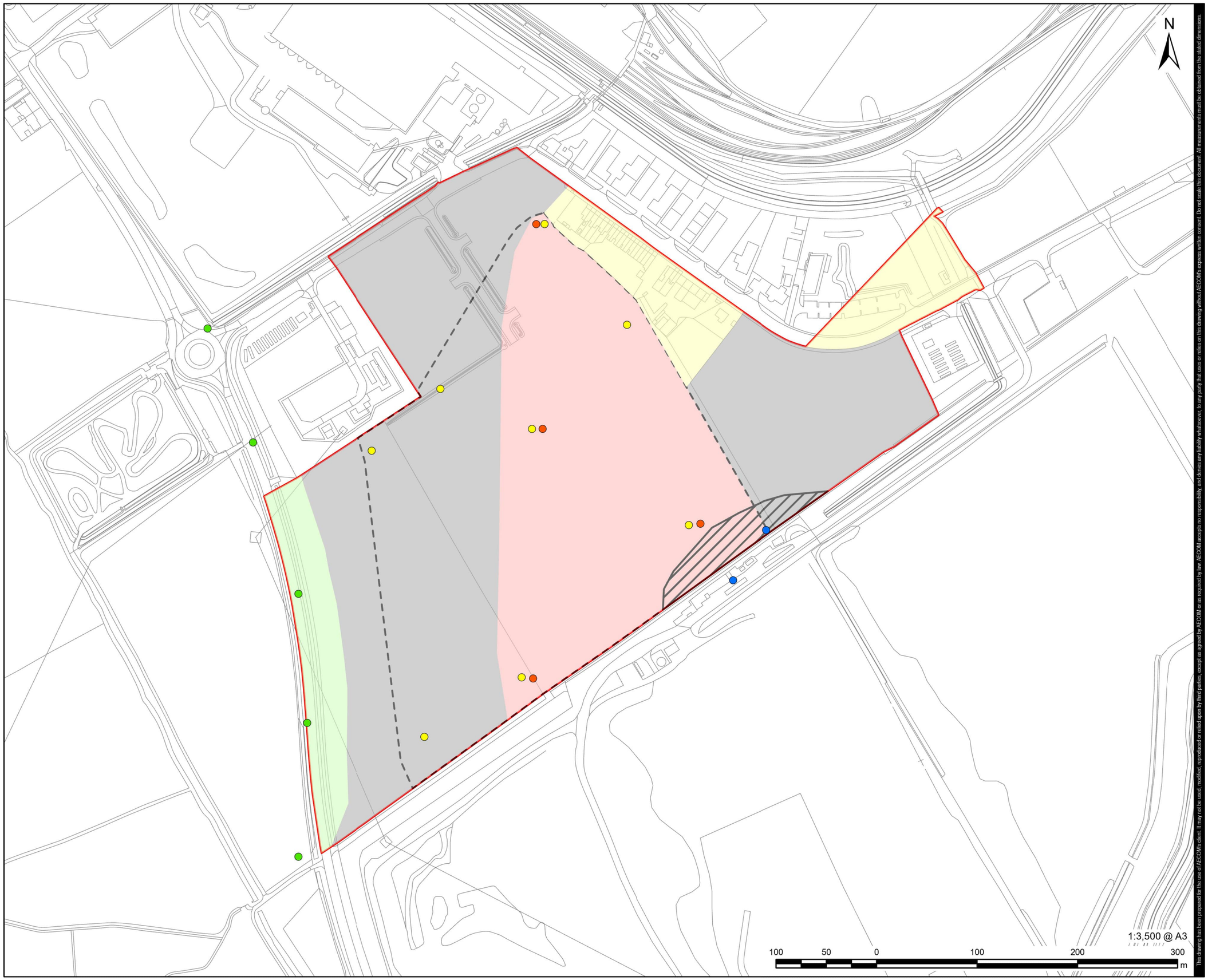
Ground Water Features

FIGURE NUMBER

Figure 20.3

Revision: 1 Drawn: ER Checked: AG Approved: VB Date: 2022-08-19

Filename: \\na.aecomnet.com\lfs\EMEA\Leeds-UKLDS2\Legacy\UKLDS2PFPSW0001\WIP\LE_Projects\Newproje\60673509 - AP Ammonia Terminal\400_Technical\GIS\02_Maps\Scoping Report\AIT_SR_CH20_Ground_Conditions.aprx



AECOM

PROJECT

Immingham Green Energy Terminal

CLIENT

Associated British Ports

CONSULTANT

AECOM Limited
5th Floor
2 City Walk
Leeds, LS11 9AR
www.aecom.com

LEGEND

- West Site Boundary
- 2017 GI boreholes indicating tidal flat deposits of very soft to soft consistency
- 2017 GI boreholes indicating very soft to soft material near the ground surface
- BGS borehole indicating deeper area of fill
- BGS borehole indicating very soft and soft material near the ground surface
- Known extent of made ground / re-worked ground <3.5m thick
- Known extent of soft and compressible tidal flat deposit based on 2017 GI
- Potential area of deeper "fill"
- Potential area of soft and compressible strata near the surface as indicated by 2017 GI
- Potential area of soft and compressible strata near the surface as indicated by BGS borehole logs
- Unknown extent of made ground

NOTES

ISSUE PURPOSE

SCOPING REPORT

PROJECT NUMBER

60673509

DEVELOPMENT CONSENT ORDER NO

TBC

FIGURE TITLE

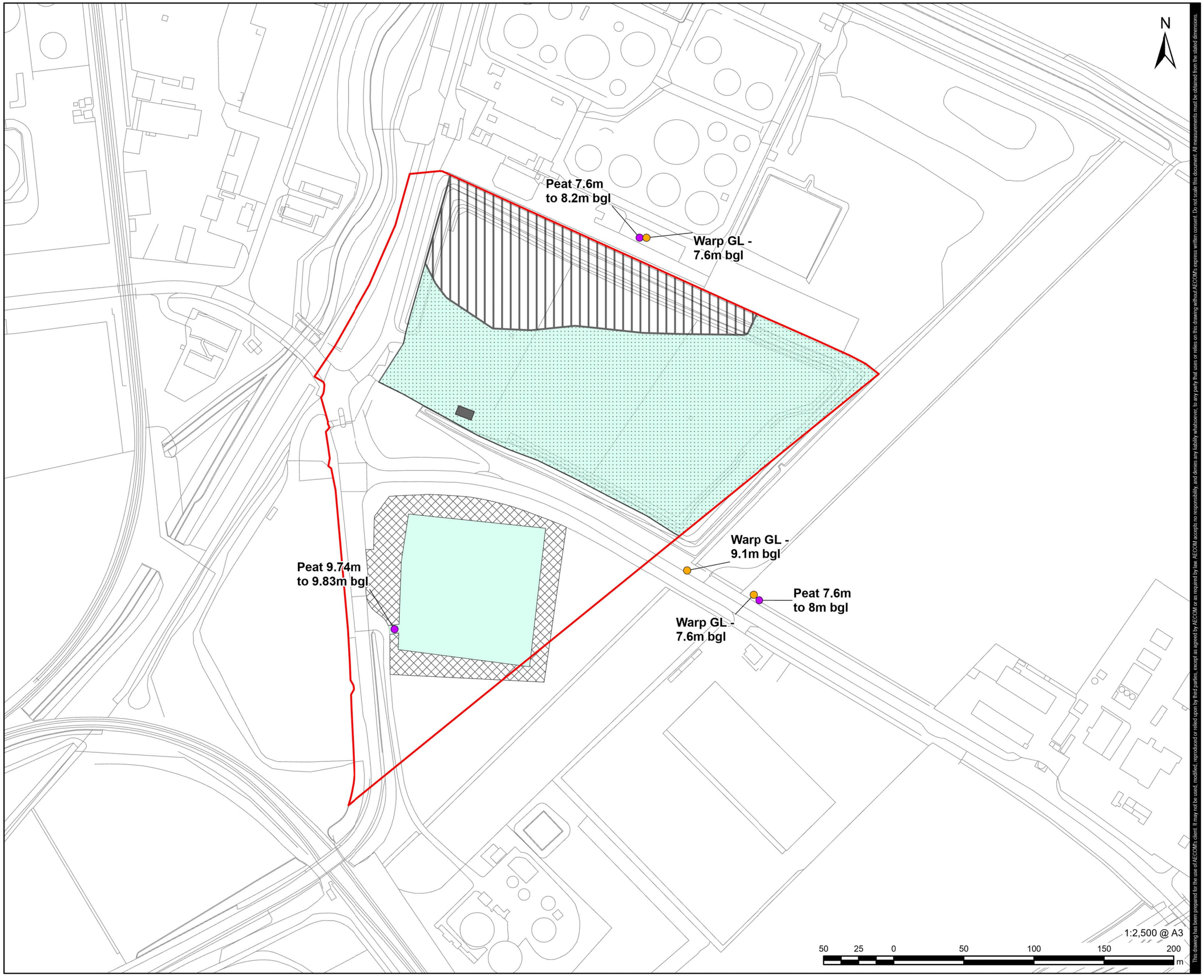
West Site Constraints Plan

FIGURE NUMBER

Figure 20.4

Revision: 1 Drawn: ER Checked: LC Approved: VB Date: 2022-08-19

Filename: \\na.aecomnet.com\fs\EMEA\Leeds-UKLDS2\Legacy\UKLDS2PFPSW001\WIP\LE_Projects\Newproje\60673509 - AP Ammonia Terminal\400_Technical\GIS\02_Maps\Scoping Report\AIT_SR_CH20_Ground_Conditions.aprx



AECOM

PROJECT

Immingham Green Energy Terminal

CLIENT

Associated British Ports

CONSULTANT

AECOM Limited
5th Floor
2 City Walk
Leeds, LS11 9AR
www.aecom.com

LEGEND

- East Site Boundary
- BGS borehole indicating area of made ground identified as warp
- BGS borehole presence of peat at depth
- Existing structure present on site
- Area of made ground as identified in published BGS geological mapping
- Lack of GI information available
- Area of land sloping inwards
- Unknown material - the site has been recently levelled, the composition of the material unknown, potential for obstructions

NOTES

ISSUE PURPOSE

SCOPING REPORT

PROJECT NUMBER

60673509

DEVELOPMENT CONSENT ORDER NO

TBC

FIGURE TITLE

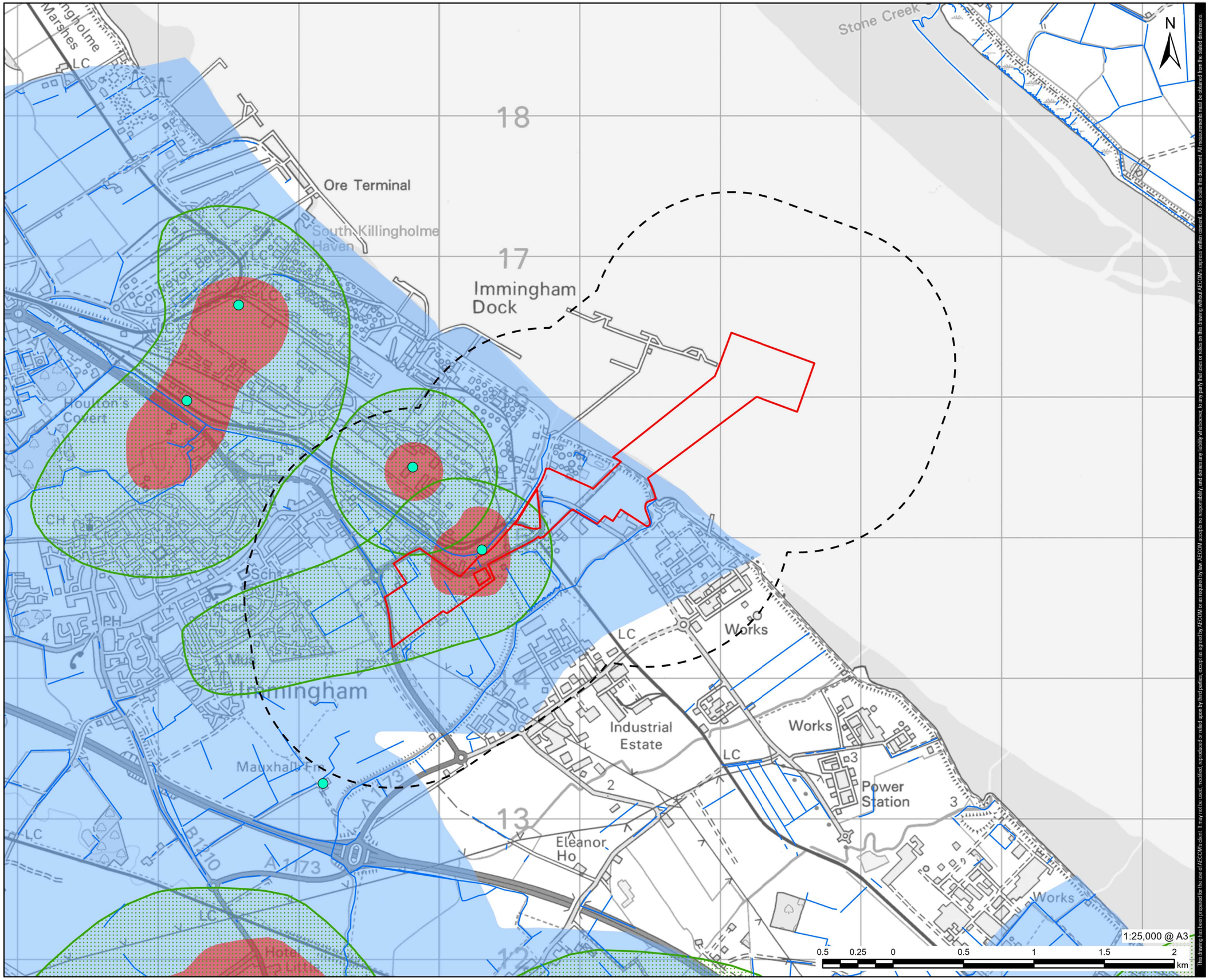
East Site Constraints Plan

FIGURE NUMBER

Figure 20.5

Revision: 1 Drawn: ER Checked: LC Approved: VB Date: 2022-08-19

Filename: \\na.aecomnet.com\lfs\EMEA\Leeds-UKLDS2\Legacy\UKLDS2PFPSW001\WIP\LE_Projects\Newproje\60673509 - AP Ammonia Terminal\400_Technical\GIS\02_Maps\Scoping Report\AIT_SR_CH20_Ground_Conditions.aprx



AECOM

PROJECT

Immingham Green Energy Terminal

CLIENT

Associated British Ports

CONSULTANT

AECOM Limited
5th Floor
2 City Walk
Leeds, LS11 9AR
www.aecom.com

LEGEND

- Scoping Boundary
- 1km Study Area
- Private Groundwater Supply (PWS) Borehole
- Watercourse
- Zone I - Inner Protection Zone
- Zone II - Outer Protection Zone
- Zone III - Total Catchment

NOTES

ISSUE PURPOSE

SCOPING REPORT

PROJECT NUMBER

60673509

DEVELOPMENT CONSENT ORDER NO

TBC

FIGURE TITLE

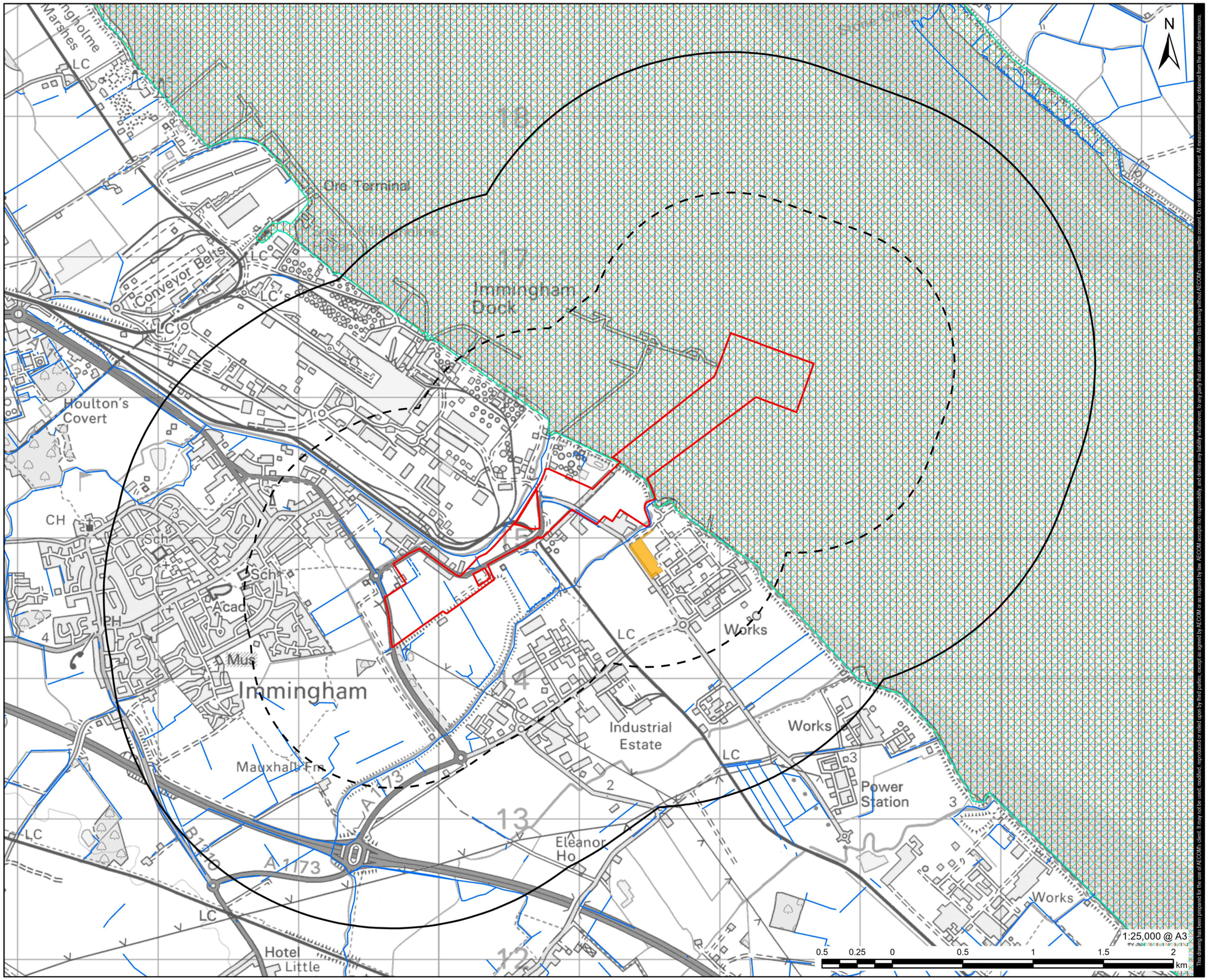
Source Protection Zones

FIGURE NUMBER

Figure 20.6

Revision: 1 Drawn: AG Checked: DF Approved: VB Date: 2022-08-19

Filename: \\na.aecomnet.com\fs\EMEA\Leeds-UKLDS2\Legacy\UKLDS2PFPSW001\WIP\LE_Projects\Newprole\60673509 - AP Ammonia Terminal\400_Technical\GIS\02_Maps\Scoping Report\AIT_SR_CH20_Ground_Conditions.aprx



AECOM

PROJECT

Immingham Green Energy Terminal

CLIENT

Associated British Ports

CONSULTANT

AECOM Limited
5th Floor
2 City Walk
Leeds, LS11 9AR
www.aecom.com

LEGEND

- Scoping Boundary
- 1km Study Area
- 2km Study Area
- Watercourse
- Special Area of Conservation
- Special Protection Area
- Site of Special Scientific Interest
- Ramsar
- Local Wildlife Site

NOTES

ISSUE PURPOSE

SCOPING REPORT

PROJECT NUMBER

60673509

DEVELOPMENT CONSENT ORDER NO

TBC

FIGURE TITLE

Ecological Designations

FIGURE NUMBER

Figure 20.7

Appendix B Abbreviations and Glossary of Terms

Term	Acronym	Meaning
A		
Abnormal Indivisible Load	AIL	Abnormal Indivisible loads are loads which cannot, without undue expense or risk or damage, be divided into two or more loads for the purpose of carriage on the road
Access		The means by which to approach or enter land, property and assets.
Acoustic Wave and Current Profiler	ACAW	The Acoustic Wave and Current profiler performs measurement of wave height, wave direction and the full current profile.
Additional mitigation		Mitigation measures which are over and above any embedded and standard mitigation measures, and which are required to further reduce the significance of an environmental effect.
Advanced Dispersion Modelling System	ADMS	The Advanced Dispersion Model is used to model the air quality of existing and proposed industrial installations.
Aggregate		Granular material (for example sand and gravel or crushed rock) that can be used for building and/ or civil engineering purposes (for example for concrete production).
Agricultural Land Classification	ALC	The system devised and introduced by the Ministry of Agriculture, Fisheries and Food to classify agricultural land according to the extent to which its physical or chemical characteristics impose long-term limitations on agricultural use. Land is graded between 1 (excellent quality) to 5 (very poor quality), with grade 3 subdivided into agricultural subgrades 3a and 3b.
Aids to Navigation	AtoN	Aids to Navigation is any sort of signal, markers or guidance equipment which aids the traveller in navigation.
Air Quality Action Plan		A plan that must be compiled by a local authority if they declare an air quality management area.

Term	Acronym	Meaning
Air Quality Management Area	AQMA	An area declared by a local authority which has been determined would exceed the relevant air quality strategy objective.
Air quality objective		Objectives are policy targets generally expressed as a maximum ambient pollutant concentration to be achieved. The objectives are set out in the UK Government's Air Quality Strategy for the key air pollutants.
Alluvial deposits		Natural materials deposited within and adjacent to rivers.
Alternatives		Different modes, design options and variations considered during project development that have potential to fulfil the project objectives.
Ambient noise		Ambient noise is the total sound in a given situation at a given time usually composed of sound from many sources, near and far.
Amenity		The benefits of enjoyment and well-being which are gained from a resource in line with its intended function. Amenity may be affected by a combination of factors such as: sound, noise and vibration; dust/ air quality; traffic/ congestion; and visual impacts.
Ammonia	NH_3	Ammonia is a compound of Nitrogen and Hydrogen.
Amphidromic System		Large scale circular rotational pattern of tides around a central point or node.
Annual Exceedance Probability	AEP	Flood frequency is expressed in terms of an annual exceedance probability, which is the inverse of the annual maximum return period. For example, the 100-year flood (a flood likely to occur once every 100 years) can be expressed as the 1% AEP flood, which has a 1% chance of being exceeded in any year.
Anthropogenic		Relating to, or resulting from the influence of human beings on nature
APFP Regulations		The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009.
Appropriate Assessment	AA	The assessment of the impact on the integrity of a European site of a project or plan, either alone or in combination with other projects or plans, with respect

Term	Acronym	Meaning
		to the site's structure and function and its conservation objectives.
Aquifer		An underground layer of water-bearing permeable rock, rock fractures or unconsolidated materials (gravel, sand or silt).
Arisings		Construction, demolition, excavation and other arisings generated from within a project boundary, during both construction, and operation and maintenance phases.
Arborist		An arborist is a professional in the practice of arboriculture, which is the cultivation, management, and study of individual trees, shrubs, vines, and other perennial woody plants in dendrology and horticulture.
Archaeological Exclusion Zone	AEZ	Archaeological Exclusion Zones are the principal means by which any sites or deposits of known or potential archaeological interest bare preserved *in situ*.
Assemblage		A group of species found in the same location.
As Low As Reasonably Practicable	ALARP	ALARP is a principle in the regulation and management of safety-critical and safety-involved systems. The principle is that the residual risk shall be reduced as far as reasonably practicable.
Associated British Ports	ABP	One of the UK's leading and best-connected ports groups, owning and operating 21 ports and other transport-related businesses across England, Wales and Scotland.
Automated Traffic Count	ATC	Automated Traffic Counts are a quick and inexpensive way of collecting, traffic volume, speed and classification.
Automatic Identification System	AIS	The Automatic Identification System is an automatic tracking system that uses transceivers on ships.
Average Annual Weekday Traffic Flows	AAWT	Average Annual Weekday Traffic Flow is the total volume of vehicle traffic, weekdays only, on a road or motorway for a year divided by the number weekdays in the year.

Term	Acronym	Meaning
Avoidance		The first stage in the mitigation hierarchy in which measures are assessed in advance of minimisation of impacts, and which are certain.
B		
Baseline conditions		The environment as it appears (or would appear) immediately prior to the implementation of the project together with any known or foreseeable future changes that would take place before completion of the project.
Base year (traffic data)		The outputs of the traffic model coinciding with the year the traffic data was collected.
Basic Noise Level	BNL	A measure of source noise.
Bathymetry		The measurement of depth of the water.
Bedrock		Rock that underlies loose deposits such as soil or alluvium.
Before Present	BP	A timescale used in scientific disciplines to specify when events occurred that were obtained through radiocarbon dating.
Below ground level	BGL	Term used to differentiate below ground from above ground.
Benthic Habitats		Habitats associated with the bottom of a body of water.
Berm		A flat strip of land, raised bank, or terrace bordering a river or canal.
Best Practical Environmental Option	BPEO	The Best Practicable Environmental Option is the idea that there is a unique, supremely beneficial method of disposing wastes in a cost-effective manner, in both the short and long term.
Biodiversity		The variability among living organisms from all sources, including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part of. This includes diversity within species, between species and of ecosystems.

Term	Acronym	Meaning
Biodiversity Net Gain	BNG	An approach that aims to leave biodiversity within the natural environment in a measurably better state than its condition prior to implementation of a project.
Birds of Conservation Concern 5	BoCC5	The fifth review of Birds of Conservation Concern, compiled by a coalition of the UKs leading bird conservation and monitoring organisations to review the status of all regularly occurring birds in the UK, Channel Islands and Isle of Man.
Borehole		A hole bored into the ground, usually as part of investigations, typically to test the depth and quality of soil, rock and groundwater. A borehole can also be used to dewater the ground.
Bridleway		A highway over which the public have the following, but no other, rights of way, that is to say, a right of way on foot and a right of way on horseback or leading a horse.
British Geological Survey	BGS	A body which aims to advance geoscientific knowledge of the United Kingdom landmass and its continental shelf by means of systematic surveying, monitoring and research
British Standard	BS	Standard produced by the British Standards Institution.
British Standards Institution		A group which produces British Standards across industry sectors and which is formally designated as the National Standards Body for the UK.
British Trust for Ornithology	BTO	The British Trust for Ornithology is an organisation founded in 1932 for the study of birds in the British Isles.
Buffer		Specified area or distance surrounding a site or feature of interest.
Built heritage		A structure or building of historic value. These structures are visible above ground level.
Bund		An embankment which acts as a visual or noise screen, or acts as a barrier to control the spillage of fluids.

Term	Acronym	Meaning
Businesses		Land and buildings for the purpose of commercial/ industrial enterprise.
C		
Calculation of Road Traffic Noise	CRTN	A technical memorandum that describes the procedures for calculating noise from road traffic.
Carbon budgets		UK greenhouse gas targets over defined periods of time.
Carbon Dioxide	CO_2	A colourless, odourless gas produced by burning carbon and organic compounds and by respiration.
Carbon emissions		Shorthand for emissions of any of the seven greenhouse gases that contribute to climate change.
Carbon footprint		The total greenhouse gas emissions associated with a particular policy or development.
Catchment		A drainage/ basin area within which precipitation drains into a river system and eventually into the sea.
Catchment Abstraction Management Strategy	CAMS	Catchment Abstraction Management Strategies set out how the Environment Agency will manage the water resources of a catchment and contribute to implementing the Water Framework Directive.
Celsius	°C	A scale of temperature.
Centre for Environment, Fisheries and Aquaculture Science	CEFAS	The Centre for Environment, Fisheries and Aquaculture Science is an executive agency of the United Kingdom government Department for Environment, Food and Rural Affairs.
Chart Datum	CD	A chart datum is the water level surface serving as origin of depths displayed on a nautical chart.
Chartered Institute for Archaeologists	CIfA	The leading professional body representing archaeologists working in the UK and overseas.
Chartered Institute of Ecology and Environmental Management	CIEEM	The leading professional membership body representing and supporting ecologists and environmental managers in the UK, Ireland and abroad.

Term	Acronym	Meaning
Church of England	CofE	The Church of England is the established Christian church in England.
Chronic Obstructive Pulmonary Disorder	COPD	Chronic obstructive pulmonary disease is the name for a group of lung conditions that cause breathing difficulties.
Circa		Meaning approximately, often used in a historic context in reference to a date.
Classification, Labelling and Packaging Regulations	CLP	The Classification, Labelling and Packaging Regulations ((EC) No 1272/ 2008) is based on the United Nations' Globally Harmonised System and its purpose is to ensure a high level of protection of health and the environment, as well as the free movement of substances, mixtures and articles.
Clay		An inorganic component of soil derived from the weathering of rock and comprising particles less than 0.002mm in equivalent diameter.
Climate		Long-term weather conditions prevailing over a region.
Climate change		This refers to a change in the state of the climate, which can be identified by changes in average climate characteristics which persist for an extended period, typically decades or longer.
Climate Change Resilience	CCR	The resilience of the Project to climate change impacts, including how the design would consider projected impacts of climate change.
Closed-circuit Television	CCTV	A type of video surveillance.
Combined effect		A type of cumulative effect which occurs when different types of activity combine to have an effect on a specific receptor or resource.
Committed development		A development that has full or outline planning permission or is allocated in an adopted development plan.
Community		A group of people living in the same place or having a particular characteristic in common.

Term	Acronym	Meaning
Community facilities		Facilities designed for the use and benefit to the local population, for example village greens, village halls, and healthcare and education facilities.
Compensation (environmental)		Offsetting measures applied where nothing can be done to reduce an environmental impact or effect.
Competent Expert(s)		The terms used in the EIA Regulations to describe a suitably qualified and experienced person (or persons) responsible for the preparation of the Environmental Statement, either whole or in part.
Competent Harbour Authority	CHA	Competent harbour authorities (CHA) in the United Kingdom are those harbour authorities that have been given statutory powers relating to the provision of pilotage in their waters.
Conductivity Temperature Depth	CTD	A CTD is an instrument cluster that measures conductivity, temperature, and depth.
Congestion		A situation where the volume of traffic is too great for the road, causing vehicles to slow down or stop, often caused by bottlenecks, traffic incidents and junction design.
Connectivity		A measure of the availability of the habitats needed for a particular species to move through a given area.
Conservation (ecology)		A series of measures required to maintain or restore the natural habitats and the populations of species of wild fauna and flora at a favourable status.
Conservation area		An area designated under section 69 of the Planning (Listed Buildings and Conservation Areas) Act 1990 as being of special architectural or historic interest and with a character or appearance which is desirable to preserve or enhance.
Conservation status		The sum of the influences acting on a natural habitat and its typical species that can affect its long-term natural.
Construction and Demolition Waste	CDW	Consists of unwanted material produced directly or indirectly as a result of the construction phase.
Construction compound		Construction compounds generally act as the points of entry to the worksites from the public highway. They may also be used for major stockpiling of

Term	Acronym	Meaning
		materials such as topsoil, be used to facilitate transfer of materials, and accommodate offices and welfare facilities.
Construction (Design and Management) 2015 Regulations	CDM	The Construction (Design and Management) 2015 Regulations aims to improve health and safety in the industry by helping to sensibly plan work so the risks involved are managed from start to finish.
Construction Environmental Management Plan	CEMP	A Construction Environmental Management Plan describes the specific mitigation measures to be followed by the appointed construction contractor to reduce potential nuisance impacts.
Construction materials		Primary, recycled/ secondary and renewable sources of materials required for constructing a project.
Construction plant		Portable construction machinery and equipment.
Construction Traffic Management Plan	CTMP	A plan which identifies clear controls on routes, vehicle types, vehicle frequency, vehicle quality and hours of site operation.
Consultation Report		A report which summarises all consultation responses received and explains how the applicant of a Nationally Significant Infrastructure Project has had regard to those responses.
Contaminated Land: Applications in Real Environments	CL:AIRE	CL:AIRE is an independent not-for-profit organisation established in 1999 to stimulate the regeneration of contaminated land in the UK.
Continuous Flight Augering	CFA	A continuous flight auger drill is used to excavate a hole and concrete is injected through a hollow shaft under pressure as the auger is extracted.
Contractor		A general term used to describe an individual or company appointed by a developer to construct or manage a project at a certain price or rate.
Control of Major Accidents and Hazards Regulations 2015	COMAH	The Control of Major Accidents and Hazards Regulations 2015 aims to prevent and mitigate the effects of major accidents involving dangerous substances which can cause serious damage/ harm to people and/ or the environment.
Control of Substances Hazardous to Human	COSHH	The Control of Substances Hazardous to Human Health Regulations 2002 is the law that requires

Term	Acronym	Meaning
Health Regulations 2002		employers to control substances that are hazardous to health and includes nanomaterials.
Controlled waters		Rivers, streams, estuaries, lakes, canals, ditches, ponds and groundwater as far out as the UK territorial limit. The statutory definition is provided in section 104 (1) of the Water Resources Act 1991 and section 30A (d) of the Control of Pollution Act 1974.
Convention on the International Regulations for Preventing Collisions at Sea 1972	COLREGS	The International Regulations for Preventing Collisions at Sea 1972 are published by the International Maritime Organization and set out, among other things, the navigation rules to be followed by ships and other vessels at sea to prevent collisions between two or more vessels.
Countryside and Rights of Way Act 2000	CRoW	The Countryside and Rights of Way Act gives greater freedom for people to explore open countryside as well as provisions designed to reform and improve rights of way in England and Wales. Additionally, the Act gives greater protection to wildlife and natural features by making provision for the conservation of biological diversity, and by improving protection for Sites of Special Scientific Interest in England and Wales and the enforcement of wildlife legislation as well as the introduction of provisions to allow the better management and protection of Areas of Outstanding Natural Beauty.
Cropmark		Cropmarks are a means through which sub-surface archaeological, natural and recent features may be visible from the air or a vantage point on higher ground or a temporary platform.
Cultural heritage		Historic monuments, historic groups of buildings and/ or historic sites.
Culvert		A tunnel (pipe or box shaped) that carries a stream or open drain under a road or railway.
Cumulative effect (or impact)		A cumulative impact (or effect) may arise as the result of: The combined impact of a number of different environmental topic-specific impacts from a single

Term	Acronym	Meaning
		environmental impact assessment project on a single receptor/ resource. The combined impact of a number of different projects within the vicinity (in combination with the environmental impact assessment project) on a single receptor/ resource.
D		
Dangerous substance		A substance which presents flammable, toxic or explosive hazards to people, or which is dangerous to the environment.
Danish Hydraulic Institute	DHI	An international water software development and engineering consultancy firm, with its headquarters in Denmark.
Decibel	dB	The scale used to measure noise is the decibel scale which extends from 0 to 140 decibels, corresponding to the intensity of the sound pressure level.
Decision-maker		The Secretary of State for Business, Energy and Industrial Strategy (BEIS).
Decommission		The act of ceasing operation of an asset to a non-active status.
Definition of Waste: Development Industry Code of Practice	DoWCoP	The Definition of Waste: Development Industry Code of Practice provides a clear, consistent and efficient process which enables the reuse of excavated materials on-site or their movement between sites.
Department for Business, Energy and Industrial Strategy		The Government department responsible for policy and regulations on business, energy and industry issues.
Department for Communities and Local Government	DCLG	A former government department (now the Ministry of Housing, Communities and Local Government).
Department for Environment, Foods and Rural Affairs	Defra	The Government department responsible for policy and regulations on environmental, food and rural issues. The department's priorities are to grow the rural economy, improve the environment and safeguard animal and plant health.

Term	Acronym	Meaning
Department for Transport	DfT	The Department for Transport is the United Kingdom government department responsible for the English transport network.
Deposition (dust)		The vertical passage of a substance (for example dust) to a surface or the ground.
Deposition (sediment)		The laying down of part, or all, of the sediment load of a stream on the bed, banks or floodplain which forms various sediment features such as bars, berms and floodplain deposits.
Designated habitats		Internationally, nationally and locally designated sites of ecological conservation importance on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity.
Design Manual for Roads and Bridges	DMRB	The Design Manual for Roads and Bridges contains information about current standards relating to the design, assessment and operation of motorway and all-purpose trunk roads in the United Kingdom.
Desk-based Assessment	DBA	A desk-based study to assess the likely archaeological potential of a particular site.
Detailed assessment		Detailed field surveys and/ or quantified modelling techniques to understand complex environmental effects.
Determination		The formal judgement as to whether a project requires statutory Environmental Impact Assessment or not.
Development Consent Order	DCO	The consent for a Nationally Significant Infrastructure Project required under the Planning Act 2008.
Development plan		Documentation which seeks to guide development and planning in a local authority area for a set period of time.
Development land		Land identified in national or local plans, policies or strategies for development (including intensification of existing uses) and land subject to planning permission.

Term	Acronym	Meaning
Diffusion tube		Passive devices used in air quality monitoring to measure weekly or monthly average pollutant concentrations.
Digital Terrain Model	DTM	A digital terrain model is a 3D representation of a terrain's surface.
Directive		Legal obligations imposed on European member states by the European Union.
Displacement		Loss of local economic activity as a direct consequence of a Project.
Disposal		Any operation which is not recovery, even where the operation has as a secondary consequence the reclamation of substances or energy.
Dissolved Oxygen	DO	The amount of gaseous oxygen dissolved in water.
Diurnal Inequality		The variation in height that is often observed between adjacent high waters and low waters.
Do Minimum		The conditions that would persist in the absence of the implementation of a construction or improvement project but on the basis that maintenance on the road network is ongoing.
Drinking Water Safeguard Zone		Designated areas in which the use of certain substances must be carefully managed to prevent the pollution of raw water sources that are used to provide drinking water.
Dust		All airborne particulate matter.
E		
Earth bund		A bund constructed to provide noise or landscape mitigation.
Earthworks		The removal or placement of soils and rocks such as in cuttings, embankments and environmental mitigation, including the in-situ improvement of soils/ rocks to achieve the desired properties.
Ecological feature		Habitats, species or ecosystems.

Term	Acronym	Meaning
Ecological Impact Assessment	EcIA	The process of identifying, quantifying and evaluating the potential impacts of defined actions on ecosystems or their components.
Ecological potential		Surface waters identified as heavily modified water bodies or artificial water bodies must achieve 'good ecological potential' (good potential is a recognition that changes to morphology could make Good Ecological Status very difficult to achieve).
Ecological status		The state of a water body, derived from a number of factors, including: the abundance of aquatic flora and fauna, nutrient availability, salinity, temperature and chemical pollution levels.
Ecosystem		Biological community of interacting organisms (for example plants and animals) and their environment.
Effect		Term used to express the consequence of an impact (expressed as the 'significance of effect').
Elements		Parts of environmental factors. For example, listed buildings are part of cultural heritage.
Embedded mitigation		Design measures which are integrated into a project for the purpose of minimising environmental effects.
Embodied carbon		Carbon emissions associated with energy consumption and chemical processes during the extraction, transport and/ or manufacture of construction materials or products.
Enabling works		Enabling works are preparations to make a building site ready for construction. It covers activities from site preparation, creation of access routes, and the installation of facilities like security fencing, ramps, and placing of signs.
Enclosure		Enclosure (sometimes inclosure) was the legal process in England of consolidating (enclosing) small landholdings into larger farms.
Enhancement		A beneficial measure that is over and above what is required to mitigate the adverse effects of a project.
Envirocheck		A provider of environmental data, reports and risk solutions for use in site-based assessments.

Term	Acronym	Meaning
Environment Agency	EA	Government agency established to protect and improve the environment and contribute to sustainable development in England. Responsibilities include: water quality and resources, flooding and coastal risk management and contaminated land.
Environmental assessment		A process by which information about environmental effects is collected, assessed and used to inform decision-making.
Environmental DNA	eDNA	DNA that is collected from a range of environmental samples including soil and water, rather than being directly sampled from a plant or animal.
Environmental factors		Population and human health; biodiversity; land, soil, water, air and climate; material assets, cultural heritage, and landscape; and the interaction between these factors.
Environmental Impact Assessment	EIA	The statutory process through which the likely significant effects of a development project on the environment are identified and assessed.
Environmental Impact Assessment Directive	EIA Directive	Directive 2014/ 52/ EU of the European Parliament and of the Council of 16 April 2014, amending Directive 2011/ 92/ EU on the assessment of the effects of certain public and private projects on the environment.
Environmental Impact Assessment Regulations	EIA Regulations	The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.
Environmental Management Plan	EMP	A document (or set of documents) that set out the mitigation needed to manage environmental effects associated with a project during its construction and operational phases.
Environmental Masterplan		Plan which illustrates the mitigation measures integrated into the design of the Scheme.
Environmental Protection UK	EPUK	Environmental Protection UK is a national charity that provides expert policy analysis and advice on air quality, land quality, waste and noise.
Environmental Quality Standard	EQS	The maximum permissible concentration of a potentially hazardous chemical.

Term	Acronym	Meaning
Environmental Statement	ES	A statutory document which reports the EIA process, produced in accordance with the EIA Directive as transposed into UK law by the EIA Regulations.
Erosion		The removal of sediment or bedrock from the bed or banks of a channel by flowing water occurring mostly during high flows and flood events. Forms various river features such as scour holes and steep outer banks.
Essential mitigation		Mitigation critical for the delivery of a project which can be acquired through statutory powers.
European Commission	EC	An executive branch of the European Union.
European Protected Species	EPS	Species of plants and animals (not birds) which are protected by European law.
European Protected Species Mitigation Licence	EPSM	European Protected Species Mitigation (EPSM) licences are required from the Regulatory Authority (Natural England) if an activity is reasonably likely to affect an European Protected Species in a manner that will result in an offence under the Conservation of Species and Habitats Regulations 2010 (as amended).
European Marine Site	EMS	European Marine Sites are areas at sea, partly or completely covered by tidal water, which are protected by European law.
European Site(s)		Habitats Directive or Birds Directive sites including: Special Protection Areas (SPAs), and potential SPAs (pSPAs). Special Areas of Conservation (SACs), and candidate or possible SACs (cSACs or pSACs). Ramsar sites.
European Union	EU	An economic and political union of 28 countries which operates an internal (or single) market which allows the free movement of goods, capital, services and people between member states.

Term	Acronym	Meaning
European Waste Catalogue	EWC	The European Waste Catalogue is a hierarchical list of waste descriptions established by Commission Decision 2000/ 532/ EC.
Evaluation		The determination of the significance of effects. Evaluation involves making judgements as to the value of the receptor/ resource that is being affected and the consequences of the effect on the receptor/ resource based on the magnitude of the impact.
Examining Authority	ExA	A panel of inspectors appointed by the Secretary of State who are responsible for examining Development Consent Order applications for Nationally Significant Infrastructure Projects.
Extreme weather		A weather event which is significantly different from the average or usual weather pattern.
F		
Fauna		The animals of a particular region, habitat, or geological period.
Features		Particularly prominent, eye-catching elements or characteristic components such as tree clumps, church towers, or wooded skylines.
Feature of Conservation Importance	FOCI	Features of Conservation Importance are marine features that are particularly threatened, rare, or declining species and habitats.
Fill		Material used to artificially raise the existing ground levels.
Flood risk		A combination of the probability (likelihood or chance) of a flood event happening, and the consequences (impact) if it occurred.
Flood Risk Assessment	FRA	The process of assessing potential flood risk to a site and identifying whether there are any flooding or surface water management issues that may warrant further consideration or may affect the feasibility of a project.
Flood Zone 1		Land outside the floodplain where there is little or no risk of flooding.

Term	Acronym	Meaning
Flood Zone 2		The area of the floodplain where there is a low to medium flood risk.
Flood Zone 3		The area of the floodplain where there is a high risk of flooding.
Floodplain		Land adjacent to a watercourse over which water flows or would flow in times of flood, but for defences in place.
Fluvial		A term that relates to rivers and streams and the processes that occur within them.
Formation (geological)		A group of related rock strata with some common properties.
Fragmentation (ecological)		The breaking up of a habitat, ecosystem or land use types into smaller parcels.
Full Time Equivalent	FTE	A unit of measurement equivalent to an individual's one unit of work, applicable in various contexts.
Future baseline		The likely evolution of the current state of the environment without implementation of the project.
G		
General Practice	GP	General Practices treat all common medical conditions and refer patients to hospitals and other medical services for urgent and specialist treatment.
Geological Conservation Review	GCR	GCR sites contain geological and geomorphological features of national and international importance.
Geology		The physical structure, substance and history of the earth (rocks and minerals).
Geomorphology		The structure, origin, and development of the topographical features of the earth's surface.
Geophysical survey		A process involving ground-based physical sensing techniques to determine the presence or absence of anomalies likely to be caused by archaeological features, structures or deposits.
Great Crested Newt	GCN	A newt in the family Salamandridae, found across Europe and parts of Asia, which are protected under

Term	Acronym	Meaning
		the Conservation of Habitats and Species Regulations 2017.
Greenhouse gas	GHG	Atmospheric gases that absorb and emit infrared radiation emitted by the Earth's surface, the atmosphere and clouds.
Green Infrastructure Network Area		An interconnected network of open, greenspaces that provide a range of ecosystem functions.
Gross Value Added	GVA	Gross value added is the measure of the value of goods and services produced in an area, industry or sector of an economy.
Ground Investigation	GI	An intrusive investigation undertaken to collect information relating to the ground conditions, normally for geotechnical or land contamination purposes.
Ground-borne vibration		Vibration generated by an event such as the pass-by vehicles in a tunnel, propagated through the ground or structure (i.e. not the air) into a receiving building.
Groundwater		Water found underground in porous geological strata and soils.
Groundwater Dependent Terrestrial Ecosystems	GWDTE	These ecosystems are wetlands which critically depend on groundwater flows. They are protected by the Water Framework Directive.
Groundwater source protection zone		Areas defined by the Environment Agency which show the risk from contamination/ pollution to groundwater that is extracted for drinking water.
Guidance for Pollution Prevention: Works and Maintenance in or Near Water	GPP5	GPPs provide environmental good practice guidance for the whole of the UK, GPP5 specifically relates to construction or maintenance works near, in, or over water.
Guidelines for Landscape and Visual Impact Assessment	GLVIA3	The third edition of Guidelines for Landscape and Visual Impact Assessment published in accordance with IEMA is a tool used to identify and assess the significance of, the effects of change resulting from development on the landscape.
H		
Habitat		The place or type of site where an organism or population naturally occurs. Often used in the wider

Term	Acronym	Meaning
		sense referring to major assemblages of plants and animals found together.
Habitats Regulations Assessment	HRA	An assessment of projects (or plans) potentially affecting European Sites in the UK, required under the Habitats Directive and Regulations. Also known as an assessment of implications on European Sites.
Habitat Suitability Index	HSI	A numerical index that represents the capacity of a given habitat to support a selected species.
Hazardous waste		Any waste that displays one or more of the hazardous properties listed in Annex III of the Waste Directive.
Health and Safety at Work Act 1974	HSWA	The Health and Safety at Work Act 1974 is the primary legislation covering occupational health and safety in Great Britain.
Health and Safety Executive	HSE	The Health and Safety Executive is a UK government agency responsible for the encouragement, regulation and enforcement of workplace health, safety and welfare.
Health determinants		Personal, social, economic and environmental factors which determine the health status of individuals and communities.
Health Impact Assessment	HIA	Health Impact Assessment is a practical approach used to judge the potential health effects of a policy, programme or project on a population.
Healthy Urban Development Unit	HUDU	These units help the NHS to engage and respond proactively to population growth and change.
Hectare	ha	A metric unit of measurement, equal to 2.471 acres or 10,000 square metres.
Heritage asset		A building, monument, site, place, area or landscape of historic value.
Highest Astronomical Tide	HAT	The elevation of the highest predicted astronomical tide expected to occur at a specific tide station over the National Tidal Datum Epoch.
Highways England Water Risk Assessment Tool	HEWRAT	This tool is an Excel application which assesses acute and chronic pollution impacts on aquatic ecology

Term	Acronym	Meaning
		associated with soluble and sediment-bound pollutants respectively.
Historic		Associated with past human activity.
Historic England		Executive non-departmental public body created under section 32 of the National Heritage Act 1983 to: • Secure the preservation of ancient monuments and historic buildings situated in England. • Promote the preservation and enhancement of the character and appearance of conservation areas situated in England. • Promote the public's enjoyment of, and advance their knowledge of, ancient monuments and historic buildings situated in England and their preservation.
Historic Environmental Record	HER	Historic Environment Records are sources of, and signposts to, information relating to landscapes, buildings, monuments, sites, places, areas and archaeological finds spanning more than 700,000 years of human endeavour.
Human health		A state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity
Health outcome		The health status of an individual, group or population, attributable to a planned intervention.
Health profile		Statistical picture of the baseline health conditions and trends within an area.
Heavily Modified Water Body	HMWB	Heavily Modified Water Bodies which as a result of physical alterations by human activity are substantially changed in character.
Heavy Goods Vehicle	HGV	A large truck for transporting goods.
High Voltage	HV	An electrical potential large enough to cause injury or damage.
Homes and Communities Agency	HCA	The Homes and Communities Agency was an executive non-departmental public body, sponsored

Term	Acronym	Meaning
		by the Department for Communities and Local Government.
Horizontal Directional Drilling	HDD	Horizontal Directional Drilling is a method of installing underground pipelines through trenchless methods.
Humber Estuary Services	HES	Humber Estuary Services provide pilotage on demand services. Any vessel over 60 metres in length requires a pilot unless covered by an exemption certificate to assist the safe navigation of vessels through the area.
Humber International Terminal	HIT	A terminal located within the Port of Immingham.
Hydrofluorocarbon	HFC	Hydrofluorocarbons (HFCs) are man-made organic compounds that contain fluorine and hydrogen atoms.
Hydrogen	H_2	A colourless, odourless and highly flammable gas.
Hydrogen for Mobility Project	H_2^fM	This project is a partnership of UK industry leaders and Government, working to make hydrogen-fuelled transport a reality.
Hydrology		The scientific study of the movement, distribution, and quality of water on Earth and other planets, including the water cycle, water resources and environmental watershed sustainability.
Hydrogeology		The nature, distribution and movement of groundwater in soils and rocks, including in aquifers.
Hydromorphology		The physical characteristics of the shape, boundaries and content of a water body.
I		
Immingham Oil Terminal	IOT	An oil terminal operating out of the Port of Immingham.
Immingham Outer Harbour	IOH	Immingham Outer Harbour is an area which partly makes up infrastructure located at the Port of Immingham.
Impact		Change that is caused by an action; for example, land clearing (action) during construction which results in habitat loss (impact).

Term	Acronym	Meaning
In-Combination Climate Change Impact Assessment	ICCI	The assessment of the combined impact of the Project and potential climate change on the receiving environment.
Inert waste		Waste: That does not undergo any significant physical, chemical or biological transformations. That does not dissolve, burn or otherwise physically or chemically react, biodegrade or adversely affect other matter with which it comes into contact in a way likely to give rise to environmental pollution or harm to human health. Where its total leachability and pollutant content and the ecotoxicity of its leachate are insignificant and, in particular, do not endanger the quality of any surface water or groundwater.
Institute of Air Quality Management	IAQM	The professional body for air quality practitioners.
Institute of Environmental Management and Assessment	IEMA	A professional body for practitioners working in the fields of environmental management and assessment.
Institute of Historic Building Conservation	IHBC	The IHBC is the professional body for building conservation practitioners and historic environment experts.
Integrity (ecological)		The coherence of a site's ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/ or the levels of populations of the species for which it [is or] was classified.
Intergovernmental Panel on Climate Change	IPCC	An intergovernmental body of the United Nations, dedicated to providing the world with an objective, scientific view of climate change, its natural, political and economic impacts and risks, and possible response options.

Term	Acronym	Meaning
Internal Drainage Board	IDB	A public body that manage water levels in an area, known as an internal drainage district, where there is a special need for drainage. IDBs undertake works to reduce flood risk to people and property, and manage water levels for agricultural and environmental needs within their district.
International Association of Marine Aids to Navigation and Lighthouse Authorities	IALA	The International Association of Marine Aids to Navigation and Lighthouse Authorities, previously known as International Association of Lighthouse Authorities, is an intergovernmental organization founded in 1957 to collect and provide nautical expertise and advice.
International Convention on Standards of Training, Certification and Watchkeeping for Seafarers	STCW	The 1978 STCW Convention was the first to establish basic requirements on training, certification and watchkeeping for seafarers on an international level.
International Electrotechnical Commission	IEC	The International Electrotechnical Commission is an international standards organisation that prepares and publishes standards for all electrical, electronic and associated technologies.
International Maritime Organization	IMO	The International Maritime Organization is a specialised agency of the United Nations responsible for regulating shipping.
Inspectorate		See Planning Inspectorate.
Invasive Non-Native Species	INNS	Non-native UK plants that are invasive, for example Japanese Knotweed.
Inventory of Carbon and Energy	ICE	The Inventory of Carbon and Energy is an embodied carbon database for building materials.
J		
Joint Cetacean Protocol	JCP	This survey was undertaken to inform the identification of discrete and persistent areas of relatively high harbour porpoise density in the UK marine area.

Term	Acronym	Meaning
Joint Nature Conservation Committee	JNCC	The JNCC are the public body that advises the UK Government and devolved administrations on UK-wide and international nature conservation.
K		
Key characteristics (landscape)		The combination of elements that are particularly important to the current character of the landscape and help to give an area its particularly distinctive sense of place.
Kilometre	km	A unit of measurement.
L		
LA10		The A-weighted sound level, in dB, that is exceeded 10% of the measurement period.
LA10,18hr		The noise level, in dB, that is exceeded 10% of the time between 0600 and 2400.
LAeq		The equivalent continuous sound level (LAeq) is the level of a notional steady sound, which at a given position and over a defined period of time, would have the same A-weighted acoustic energy as the fluctuating noise.
LAmax		The maximum A-weighted level measured during a given time period.
Lnight		A facade noise index derived from the LA10,18hr using the TRL conversion method PR/ SE/ 451/ 02.
Lnight,outside		For the purpose of night-time noise assessment, the Lnight,outside is the equivalent continuous sound level LAeq,8hr for the period 23:00 to 07:00 hours assessed outside a dwelling and is free-field.
Land Contamination Risk Management	LCRM	A guidance document published by the Environment Agency providing guidance on how to assess and manage the risk posed by land contamination.
Land use		What land is used for, based on broad categories of functional land cover, such as urban and industrial use and the different types of agriculture and forestry.

Term	Acronym	Meaning
Landfill capacity		The known, forecast or estimated remaining landfill void space, either regionally or nationally.
Landform		The shape and form of the land surface which has resulted from combinations of geology, geomorphology, slope, elevation and physical processes.
Landscape		An area, as perceived by people, whose character is the result of the action and interaction of natural and/ or human factors
Landscape character		A distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse.
Landscape character area	LCA	Areas of landscape that have a broadly consistent pattern of topography, land use and vegetation cover.
Landscape character assessment		Process of identifying and describing variation in character of the landscape - the unique combination of elements and features that make landscapes distinctive - to assist in managing change in the landscape.
Landtake		The extent of land required temporarily or permanently to construct and operate a project.
Large Goods Vehicle	LGV	A commercial truck with a gross weight over 3500 kilograms.
Laydown area		An area used for the temporary storage of construction equipment and supplies.
Light Detection and Ranging	LiDAR	An airborne mapping technique which accurately measures the height of the terrain and surface objects on the ground, through the use of a scanning laser that measures the distance between the aircraft and the ground.
Lincolnshire Ecological Records Centre	LERC	The Lincolnshire Ecological Records Centre holds more than 10 million species records covering data on birds, plants, insects and more.
Liquefied Petroleum Gas	LPG	Liquefied petroleum gas is a propane and butane mixture. It is a tri-carbon alkane that is in gaseous

Term	Acronym	Meaning
		form at atmospheric pressure but becomes a liquid at normal temperatures and low pressure.
Listed building		A building of special architectural or historic interest. Listed buildings are graded I, II* or II, with Grade I being the highest. Listing includes the interior as well as the exterior of the building.
Local Air Quality Management	LAQM	A key part in the UK Government's and the Devolved Administrations' strategies to achieve the air quality objectives.
Local authority (also local planning authority)		The body officially responsible for all the public services and facilities in a particular area, and which is empowered by law to exercise planning functions.
Local Biodiversity Action Plan	LBAP	A plan that identifies threatened species and habitats and seeks to protect and restore biological systems.
Local Enterprise Partnership	LEP	Local Enterprise Partnerships are locally-owned partnerships between local authorities and businesses, setup in 2011 by the Department for BEIS.
Local Geological Site	LGS	Non-statutory geological sites considered worthy of protection for their earth science or landscape importance. Formerly known as Regionally Important Geological Sites.
Local Lighthouse Authority	LLA	A Local Lighthouse Authority is a port, harbour, or other party providing navigational aids in a locality as part of its facilities.
Local Nature Reserve	LNR	A statutory designation made under Section 21 of the National Parks and Access to the Countryside Act 1949 by principal local authorities.
Local Wildlife Site	LWS	Non-statutory sites of nature conservation value that have been designated 'locally'. These sites are referred to differently between counties with common terms including site of importance for nature conservation, county wildlife site, site of biological importance, site of local importance and sites of metropolitan importance.
Long-term (noise)		Noise change based on the +15 year assessment (for example Do-minimum opening year scenario (DMOY)

Term	Acronym	Meaning
		against Do-minimum future year scenario (DMFY) and DMOY against Do-something future year scenario (DSFY)).
Lower Super Output Area	LSOA	Lower Super Output Areas are a geographic hierarchy designed to improve the reporting of small area statistics in England and Wales.
Lowest Astronomical Tide	LAT	The lowest tide level that can be expected to occur under average meteorological conditions and any combination of astronomical conditions.
Lowest Observable Adverse Effect Level	LOAEL	Level above which adverse effects on health and quality of life can be detected.
M		
Made ground		Land where natural and undisturbed soils have largely been replaced by man-made or artificial materials. It may be composed of a variety of materials including imported natural soils and rocks with or without residues of industrial processes (such as ash) or demolition material (such as crushed brick or concrete).
Magnitude		The size of something.
Main River		A river maintained directly by the Environment Agency. They are generally larger arterial watercourses.
Maintenance		Activities which do not change the nature of the asset.
Major accident		An accident resulting in significant harm to people or the environment.
Major Accidents and Disasters	MA&Ds	Major Accidents and Disasters was introduced into the EIA Regulations as a result of EU Directive 2014/ 52/ EU to assess potentially significant adverse effects of a development on the environment deriving from its vulnerability to risks of relevant major accidents and/ or disasters.
Major hazard site		An installation where the presence of one or more dangerous substances could lead to harm to people or the environment.

Term	Acronym	Meaning
Manual Classified Count	MCC	Manual Classified Counts are used to conduct traffic flow surveys when it is not possible to use automatic methods. Enumerators will conduct these surveys. This can include but not be limited to junction counts, car park monitoring and origin and destination surveys.
Marine Accident Investigation Branch	MAIB	The MAIB investigates marine accidents involving UK vessels worldwide and all vessels in UK territorial waters.
Marine and Coastal Access Act 2009	MCAA	The Act introduces a new system of marine management. This includes a new marine planning system, which makes provision for a statement of the Government's general policies, and the general policies of each of the devolved administrations, for the marine environment, and also for marine plans which will set out in more detail what is to happen in the different parts of the areas to which they relate.
Marine Conservation Zone	MCZ	Marine Conservation Zones are areas that protect a range of nationally important, rare or threatened habitats and species.
Marine Fuel Oil	MFO	A fraction obtained from the distillation of petroleum.
Marine Management Organisation	MMO	The Marine Management Organisation is an executive non-departmental public body in the United Kingdom established under the Marine and Coastal Access Act 2009, with responsibility for English waters.
Marine Policy Statement	MPS	The UK Marine Policy Statement provides the framework for preparing Marine Plans and is key when making decisions directly affecting the marine environment.
Marine Protection Area	MPA	Marine Protected Areas involve the protective management of natural areas according to pre-defined management objectives. They can be conserved for a number of reasons including economic resources, biodiversity conservation, and species protection.
Marine Safety Management System	MSMS	The Marine Safety Management System details how ports fulfil their duties as Statutory Harbour Authorities

Term	Acronym	Meaning
		(SHAs) and meet marine safety requirements prescribed by the Port Marine Safety Code (PMSC).
Maximum Allowable Concentrations	MAC	The threshold limit value of a pollutant, not to be exceeded. The threshold is based off dose-response effects of human or animal exposure for each substance.
Mean High Water Neaps	MHWN	The average throughout a year of the heights of two successive high waters during those periods of 24 hours when the range of the wide is least.
Mean Low Water Neaps	MLWN	The average height obtained from the two successive low waters during the same period.
Mean High Water Springs	MHWS	The height of Mean Water High Springs is the average throughout the year, of two successive high waters, during a 24-hour period in each month when the range of the tide is at its greatest.
Mean Low Water Springs	MLWS	The height of mean low water springs is the average height obtained by the two successive low waters during the same period.
Mean Sea Level	MSL	The average height of the sea over a longer time period.
Met Office		The United Kingdom's national weather service.
Methane	CH_4	The main constituent of natural gas, and the second most important greenhouse gas.
Metre	M	A unit of measurement.
Microgram	µg	One millionth of a gram.
Micron	µm	One millionth of a metre.
Middle Layer Super Output Area	MSOA	Middle Layer Super Output Areas are a geographic hierarchy designed to improve the reporting of small area statistics in England and Wales.
Mineral Planning Authority	MPA	Mineral Planning Authorities are required to ensure an adequate supply of minerals, sufficient to meet the needs of national and regional supply policies, and local development needs.

Term	Acronym	Meaning
Mineral Safeguarding Area	MSA	Areas defined by mineral planning authorities with known mineral resources that are of identified economic or conservation value.
Mineral site		Operational sites or sites identified within strategic planning documents for the extraction of minerals.
Mitigation		Measures intended to avoid, reduce and, where possible, remedy significant adverse environmental effects.
Modelling		The process of estimating changes within an area of interest under a specific set of conditions.
Monitoring		An assessment of the performance of the project, including mitigation measures. This determines if effects occur as predicted or if operations remain within acceptable limits, and if mitigation measures are as effective as predicted.
Multi-Agency Geographic Information Service	MAGIC	A website which provides geographic information about the natural environment.
N		
National Character Area		Areas of England defined by their unique combination of landscape, biodiversity, geodiversity, history and cultural an economic activity.
National Grid Reference	NGR	A system of geographic grid references, distinct from latitude and longitude.
National Heritage List for England	NHLE	A database of designated heritage assets.
National Marine Biological Analytical Quality Control Laboratory	NMBAQC	The NE Atlantic Marine Biological Analytical Quality Control Scheme provides a source of external Quality Assurance for laboratories engaged in the production of marine biological data.
National Marine Fisheries Service	NMFS	The National Marine Fisheries Service is a United States federal agency within the U.S. Department of Commerce's National Oceanic and Atmospheric Administration that is responsible for the stewardship of U.S. national marine resources.

Term	Acronym	Meaning
National Nature Reserve	NNR	National Nature Reserves were established to protect some of our most important habitats, species and geology, and to provide 'outdoor laboratories' for research.
National Oceanic and Atmospheric Administration	NOAA	The National Oceanic and Atmospheric Administration is an American scientific and regulatory agency within the United States Department of Commerce.
National Park		A large area of land which is protected by the Government because of its natural beauty, plants or animals, and which the public can usually visit.
National Planning Policy Framework	NPPF	A planning framework which sets out the Government's planning policies for England and how these are expected to be applied.
National Planning Practice Guidance	NPPG	This is a web-based resource used to support the National Planning Policy Framework.
National Policy Statement for England	NPSE	Statements prepared and designated by the Secretary of State under the Planning Act 2008, which establish national policy for Nationally Significant Infrastructure Projects, including energy, transport and water, waste water and waste and against which applications for Development Consent Orders are assessed.
National Policy Statement for Ports	NPSfP	The National Policy Statement for Ports provides the framework for decisions on proposals for new port development.
Nationally Significant Infrastructure Project	NSIP	A type of project listed in the Planning Act 2008, which must be consented by a Development Consent Order.
National Record of the Historic Environment	NRHE	A record of terrestrial and marine cultural heritage assets maintained by Historic England.
National Vocational Qualification	NVQ	A National Vocational Qualification is a work-based qualification that recognises the skills and knowledge a person needs to do a particular job.
Natura 2000		A network of core breeding and resting sites for rare and threatened species, and some rare natural habitat types which are protected in their own right.

Term	Acronym	Meaning
Natural England		Executive non-departmental public body constituted under the Natural Environment and Rural Communities Act 2006 (section 2(1)) to ensure that the natural environment is conserved, enhanced and managed for the benefit of present and future generations, thereby contributing to sustainable development.
Natural Environment and Rural Communities Act 2006 (England)	NERC	The act created Natural England and the Commission for Rural Communities and, amongst other measures, it extended the biodiversity duty set out in the Countryside and Rights of Way Act to public bodies and statutory undertakers to ensure due regard to the conservation of biodiversity.
Navigational Risk Assessment	NRA	A Navigational Risk Assessment identifies and assesses the hazards and risks affecting vessel navigation.
Net GHG emissions		The difference in greenhouse gas emissions between the do-minimum and do-something scenarios taking into consideration carbon reduction measures (i.e. mitigation measures).
Nitrate Vulnerable Zone	NVZ	Areas covering 62% of England designated as a result of the EU's Nitrates Directive in order to reduce the level of nitrates in surface and groundwater. Farmers with land in nitrate vulnerable zones have to follow mandatory rules to tackle nitrate loss from agriculture.
Nitrogen	N_2	Nitrogen is a colourless, odourless unreactive gas.
Nitrogen dioxide	NO_2	A gas produced when fuels are burned and is often present in motor vehicle and boiler exhaust fumes. It is an irritant to the respiratory system.
Nitrous Oxide	N_2O	Nitrous oxide is a chemical compound and an oxide of nitrogen.
Nitrogen Trifluoride	NF_3	Nitrogen trifluoride is an extremely strong and long-lived greenhouse gas.
No-observed effect level	NOEL	The level below which no effect can be detected.

Term	Acronym	Meaning
Non-road mobile machinery	NRMM	Any mobile machine, item of transportable industrial equipment, or vehicles which are fitted with an internal combustion engine and are not intended for transporting goods or passengers on roads.
Non-Technical Summary	NTS	This section of the Environmental Statement provides a summary of each document that makes up the Environmental Statement.
Noise		Unwanted sound.
Noise Sensitive Receptor	NSR	Receptors which are potentially sensitive to noise. These comprise mainly residential buildings, but also include educational buildings, hospitals and places of worship.
Non-hazardous waste		Waste that is neither classified as inert nor hazardous.
Non-statutory consultation		Engagement with members of the public, local groups or stakeholders which is not determined or governed by statutory requirements.
North East Lincolnshire Council	NELC	The site falls within the administrative boundary of the North East Lincolnshire Council.
North Lincolnshire Council	NLC	The site partially falls within the administrative boundary of the North Lincolnshire Council.
O		
Office for Health Improvement and Disparities	OHID	The Office for Health Improvement and Disparities focuses on improving the nation's health and on levelling up health disparities.
Office for National Statistics	ONS	The Office for National Statistics is the executive office of the UK Statistics Authority.
Open Mosaic Habitat	OMH	This is a mosaic of early successional vegetation communities on previously developed land i.e. brownfield land with a history of previous development. This can include areas of loose bare substrate, grassland, ruderals and / or standing water pools.
Operational		The functioning of a project on completion of construction.

Term	Acronym	Meaning
Order Limits		The extent of the area within which the Scheme may be carried out.
Ordinary Watercourse		Ordinary watercourses include every river, stream, ditch, drain, cut, dyke, sluice, sewer (other than a public sewer) and passage through which water flows and which does not form part of a main river.
Ordnance Datum Newlyn	ODN	See Ordnance Datum – Ordnance Datum Newlyn is located at the Newlyn Tidal Observatory.
Ordnance Survey		The national mapping agency for the UK.
Organochloride pesticides	OCP	Organochlorine pesticides are chlorinated hydrocarbons used extensively from the 1940s through the 1960s in agriculture and mosquito control.
Outfalls		The place where a river, drain or sewer empties into the sea, a river, or a lake.
P		
Particulate matter	PM10 or PM2.5	Discrete particles in ambient air, with diameters ranging between nanometres (billionths of a metre) to micrometres (millionths of a metre).
Particle Size Analysis	PSA	Particle size analysis is used to characterise the size distribution of particles in a given sample.
Pathways		The routes by which pollutants are transmitted through air, water, soils, plants and organisms to their receptors.
Pelagic		The water column of coasts, open oceans and lakes.
Perfluorocarbon	PFC	Perfluorocarbons (PFCs) are man-made compounds containing fluorine and carbon.
Perfluorooctane sulphonate	PFOS	Perfluorooctane sulfonate belongs to a large, diverse group of man-made substances known collectively as perfluoroalkyl and polyfluoroalkyl substances.
Personal Injury Accident Data	PIA	Typically, a map or list of recorded accidents that resulted in personal injury to one or more persons.
Pilotage Exemption Certificate	PEC	A Pilotage Exemption Certificate may be granted to the vessel's master, or mate, when they fulfil certain

Term	Acronym	Meaning
		criteria showing a capacity to safely manage his vessel in the waters in question.
Phase 1 habitat survey		A habitat classification and field survey technique to record semi-natural vegetation and other wildlife habitats.
Photomontage		Inserting an image of a project onto a photograph for the purposes of creating an illustrative representation of potential changes to existing views.
Planning Act 2008	PA 2008	An Act of Parliament in the UK intended to speed up the process of approving major new infrastructure projects.
Planning Inspectorate		An executive agency with responsibilities for planning appeals, national infrastructure planning applications, local plan examinations and other planning-related casework in England and Wales.
Planning Practice Guidance	PPG	A series of guidance documents which support the content of the National Planning Policy Framework.
Plans and programmes		Documents which are: Subject to preparation and/ or adoption by an authority at national, regional or local level or which are prepared by an authority for adoption, through a legislative procedure by Parliament or Government. Required by legislative, regulatory or administrative provisions.
Pollutant concentrations		Concentrations of pollutants normally reported as micrograms per cubic metre of air (µg/ m3).
Pollution Climate Mapping	PCM	A collection of models designed to fulfil part of the UK's EU Directive (2008/ 50/ EC) requirements to report on the concentrations of particular pollutants in the atmosphere.
Polybrominated diphenyl ethers	PBDE	Polybrominated diphenyl ethers are a group of man-made organobromine compounds.
Polychlorinated biphenyls	PCB	Polychlorinated biphenyls are highly carcinogenic chemical compounds, formerly used in industrial and consumer products, whose production was banned by United States federal law in 1978 and by the

Term	Acronym	Meaning
		Stockholm Convention on Persistent Organic Pollutants in 2001.
Polycyclic aromatic hydrocarbons	PAH	A polycyclic aromatic hydrocarbon is a chemical compound containing only carbon and hydrogen that is composed of multiple aromatic rings.
Population		All individuals located in a particular location (this can be local, regional or at a national scale).
Port Marine Safety Code	PMSC	This is a safety code for harbour authorities with statutory powers and duties in the UK and sets out a national standard for port marine safety.
Preferred option		The chosen design option that most successfully achieves the project objectives and becomes subject to further design and assessment.
Preliminary Ecological Appraisal	PEA	A Preliminary Ecological Appraisal is an assessment of the ecological features present, or potentially present, within a site and its surrounding zone of influence.
Preliminary Environmental Information	PEI	The information referred to in Part 1 of Schedule 4 of the EIA Regulations that has been reasonably compiled by the applicant and is reasonably required to assess the environmental effects of a project.
Preliminary Environmental Information Report	PEI Report	A report that compiles and presents the Preliminary Environmental Information gathered for a project.
Preliminary Sources Study Report	PSSR	A combination of desk study and site reconnaissance, the purpose of which is to develop an initial conceptual site model.
Priority habitats (and species)		Species and habitats defined as: Listed as a national priority for conservation (such as those listed as habitats and species of principal importance for the conservation of biodiversity). Listed as a local priority for conservation, for example in the relevant local Biodiversity Action Plan. Red Listed using International Union for the Conservation of Nature criteria or, where a more

Term	Acronym	Meaning
		recent assessment of the taxonomic group has not yet been undertaken, listed in a Red Data Book. Listed as Near Threatened or Amber Listed. Listed as a Nationally Rare or Nationally Scarce species or listed as a Nationally Notable species where a more recent assessment of the taxonomic group has not yet been undertaken. Endemic to a country or geographic location.
Principal Aquifer		Aquifers previously designated as major aquifer
Project		Construction works, installations, schemes, or interventions (in the natural surroundings and landscape) including those involving the extraction of mineral resources.
Protected species		Species of wild plants, birds and animals which are afforded protection through legislative provisions.
Public Rights of Way	PRoW	A highway where the public has the right to pass. It can be a footpath (used for walking), a bridleway (used for walking, riding a horse and cycling), or a byway that is open to all traffic (including motor vehicles).
Q		
Quantified Risk Assessment	QRA	A QRA is a formal and systematic method using measurable, objective data to determine an assets value, the probability of loss and other associated risks.
R		
Ramsar		Wetlands of international importance designated under the Ramsar Convention.
Reach		A stretch of a river used in the assessment of river water quality.
Reasonable alternatives		Different project design, technology, location, size and scale solutions considered by the developer.

Term	Acronym	Meaning
Receptor		A defined individual environmental feature usually associated with population, fauna and flora that has potential to be affected by a project.
Recovery (waste)		Any operation, the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy.
Recycling		Any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes.
Reference design		A term used to describe the design information upon which an Environmental Impact Assessment is based.
Regionally Important Geological Site	RIGS	Regionally Important Geological Sites are sites of regional and local importance for their geology that have not been designated a Site of Special Scientific Interest.
Register of Environmental Actions and Commitments	REAC	A register of environmental actions and commitments which is based on mitigation as defined in the Environmental Statement.
Remediation (contaminated land)		The process of removing a pollution linkage (i.e. by removing one or more of the elements in a source-pathway-receptor linkage) in contaminated land in order to render an acceptable risk. Usually this involves a degree of removal of contaminants and/ or blockage of pathways.
Representative Concentration Pathway	RCP	A greenhouse gas concentration (not emissions) trajectory adopted by the IPCC for its fifth Assessment Report in 2014
Resilience		The capacity of a project (or lack thereof) to withstand the adverse effects of climate change.
Resource		A defined but generally collective environmental feature usually associated with soil, water, air, climatic factors, landscape, material assets, including the architectural and archaeological heritage that has potential to be affected by a project.

Term	Acronym	Meaning
Restoration (ecological)		The re-establishment of a damaged or degraded system or habitat to a level similar to its original condition.
Re-use		Any operation by which products or components that are not waste are used again for the same purpose for which they were conceived.
Risk assessment		An assessment of the probability of a hazard occurring that could result in an impact.
Risk of Flooding from Surface Water Maps	RoFSW	Mapping of the long-term flood risk for areas in England from surface water.
River Basin Management Plan	RBMP	A regional plan that sets out how organisations, stakeholders and communities would work together to improve the water environment and fulfil the requirements of the Water Framework Directive.
Rochdale Envelope		An approach to consenting and Environmental Impact Assessment, named after a UK planning law case, which allows the promoters of projects to broadly define their schemes within agreed parameters to retain flexibility of design.
Royal Air Force	RAF	The Royal Air Force is the United Kingdom's air and space force.
Royal National Lifeboat Institution	RNLI	The Royal National Lifeboat Institution is a charity that saves lives at sea through lifeboat search and rescue, lifeguards, water safety education and flood rescue.
Runoff		The flow of water over the ground surface.
Routine runoff		The normal runoff from roads including any contaminants washed off the surface in rainfall events which can result in either acute or chronic impacts.
S		
Sand		Soil particles from 0.06mm-2.0mm in equivalent diameter. Fine sand particles are from 0.06mm-0.2mm; medium sand from 0.2mm-0.6mm; and coarse sand from 0.6mm-2.0mm.

Term	Acronym	Meaning
Scheduled Monument	SM	Nationally significant heritage assets protected by the Ancient Monuments and Archaeological Areas Act 1979.
Scoping		The process of identifying the issues to be addressed by the Environmental Impact Assessment process. It is a method of ensuring that an assessment focuses on the important issues and avoids those that are considered to be not significant.
Scoping Opinion		The written opinion of the relevant authority, following a request from the applicant as to the information to be provided in an Environmental Statement.
EIA Scoping Report		A report which records the outcomes of the scoping process and is typically submitted as part of a formal request for a Scoping Opinion.
Screening		The formal process undertaken to determine whether it is necessary to carry out a statutory Environmental Impact Assessment and publish an Environmental Statement in accordance with the EIA Regulations.
Sea Level Rise	SLR	Sea Level Rise is the increase in level of the world's oceans due primarily because of the effects of global warming.
Sea Mammal Research Unit	SMRU	The Sea Mammal Research Unit was established in 1978 by the Natural Environment Research Council (NERC). Under its Royal Charter, NERC is required to supply advice to the UK Government on matters relating to the management of seals in the UK and its sovereign waters. SMRU was created to ensure that NERC was able to fulfil these requirements.
Secretary of State	SoS	The head of a major government department, who is ultimately responsible for granting consent for relevant Nationally Significant Infrastructure Projects.
Sediment		Organic and inorganic material that has precipitated from water to accumulate on the floor of a water body, watercourse or trap.
Sense of place		The essential character and spirit of an area.

Term	Acronym	Meaning
Sensitive receptor		Can include residential properties, gardens, schools, hospitals, care homes, public open spaces, and public access.
Sensitivity		Term applied to specific receptors, combining judgements of the susceptibility of the receptor to specific type of change proposed and the value related to that receptor.
Sett (badger)		Any structure or place which displays signs indicating current use by a badger.
Setting (cultural heritage)		The surroundings in which a heritage asset is experienced.
Setting (landscape)		Contribution of the surroundings to the appearance of an area or feature and the interrelationship of the area or feature to the wider context and sense of place.
Severance (land)		The splitting of a land holding into more than one part, for example through the introduction of a new section of road.
Severance (walkers, cyclists and horse riders)		The extent to which members of communities are able (or not able) to move around their community and access services/ facilities.
Short-term (noise)		Noise change based on parallel assessment year (for example do-minimum opening year against do-something opening year scenario).
Significance (of effect)		A measure of the importance or gravity of the environmental effect, defined by generic significance criteria or criteria specific to an environmental topic.
Significant Observed Adverse Effect Level	SOAEL	The level above which significant adverse effects on health and quality of life occur.
Silt		Soil particles from 0.002mm to less than 0.06mm in equivalent diameter.
Simple Assessment		The collection and assessment of data and information that is readily available to reach an understanding of the likely environmental effects of a project. This informs the final design or need for further detailed assessment.

Term	Acronym	Meaning
Site of Biological Importance	SBI	A non-statutory designation used by some local planning authorities to protect locally valued sites of biological diversity described as local wildlife sites by the UK Government.
Site of Importance for Nature Conservation	SINC	Sites designated by local authorities for the purpose of conserving wildlife.
Site of Nature Conservation Interest	SNCI	Sites which contain features of substantive nature conservation value at a local level. They are designated through a Local Sites Partnership (LSP) using an agreed set of criteria.
Site of Special Scientific Interest	SSSI	Area of land notified by Natural England under section 28 of the Wildlife and Countryside Act 1981 as being of special interest due to its flora, fauna or geological or physiological features.
Small Cetaceans in European Atlantic Waters and the North Sea	SCANS	A series of large-scale surveys for cetaceans in European Atlantic waters was initiated in 1994 and continued in 2005 and 2007 with the purpose of providing estimates of abundance needed to put bycatch in a population context and to allow EU member States to discharge their responsibilities under the Habitats Directive.
So far as is reasonably practicable	SFAIRP	This involves weighing a risk against the trouble, time and money needed to control it.
Soil		An assemblage of mineral particles and/ or organic matter which includes variable amounts of water and air (and sometimes other gases).
Soil resource		The textures, structures and volume of different qualities of topsoil and subsoil that have a potential for beneficial reuse.
Sound Exposure Level	SEL	Sound exposure level is a measure of energy that takes into account both received level and duration of exposure.
Sound Pressure Level	SPL	The parameter by which sound levels are measured in air. It is measured in decibels. The threshold of hearing has been set at 0dB, while the threshold of pain is approximately 120dB. Normal speech is approximately 60dB at a distance of 1 metre and a change of 3dB in a time varying sound signal is

Term	Acronym	Meaning
		commonly regarded as being just detectable. A change of 10dB is subjectively twice, or half, as loud.
Source Protection Zone	SPZ	Zones defined by the Environment Agency to protect groundwater sources such as wells, boreholes and springs from potential contamination.
Spatial scope		The geographic area over which environmental impacts and effects could occur as a result of a project.
Special Area of Conservation	SAC	Sites designated under EU legislation for the protection of habitats and species considered to be of European interest.
Special Committee on Seals	SCOS	Under the Conservation of Seals Act 1970 and the Marine (Scotland) Act 2010, the Natural Environment Research Council (NERC) has a duty to provide scientific advice to government on matters related to the management of seal populations. NERC has appointed the Special Committee on Seals (SCOS) to formulate this advice.
Species of Principal Importance	SPI	Habitats and species of principal importance in England. Section 41 of the Act requires the Secretary of State to publish a list of habitats and species which are of principal importance for the conservation of biodiversity in England.
Special Protection Area	SPA	Sites designated under the European Directive on the Conservation of Wild Birds for the protection of birds in member states.
Stable Non-Reactive Hazardous Waste	SNRHW	A type of waste that can potentially include a range of monolithic solid waste (these being wastes in large blocky form) or granular solid wastes produced by treatment plants.
Stakeholder		An organisation or individual with a particular interest in a project.
Standard mitigation		Measures comprising standard techniques and activities which are implemented during the construction of a project to protect the environment and/ or mitigate adverse effects, for example the

Term	Acronym	Meaning
		covering of exposed materials to reduce dust emissions.
Statutory consultation		Engagement with stakeholders determined or governed by statutory requirements.
Statutory consultee		Organisations and bodies, defined by statute, which must be consulted on relevant planning matters.
Statutory Harbour Authority	SHA	A statutory body responsible for the management and running of a harbour. The powers and duties in relation to a harbour are set out in either local Acts of Parliament or a Harbour Order.
Sterilise		Substantially constrain/ prevent existing and potential future use and extraction of materials.
Study area		The spatial area within which environmental effects are assessed (i.e. extending a distance from the project footprint in which significant environmental effects are anticipated to occur).
Subsoil		Weathered soil layer extending between the natural topsoil and the unweathered basal layer (geological parent material) below, or similar material on which topsoil can be spread. Subsoil has lower organic matter and plant nutrient content than topsoil. In most cases topsoil requires a subsoil to perform one or a number of natural soil functions.
Sulphur hexafluoride	SF6	Sulphur hexafluoride is an extremely potent and persistent greenhouse gas that is primarily utilized as an electrical insulator and arc suppressant.
Sunk Dredged Channel	SDC	The sunk dredged channel is the deep water channel through the outer Humber that allows access to the ports.
Superficial deposit		A geological deposit that was laid down during the Quaternary period. Such deposits were largely formed by river, marine or glacial processes but can also include wind-blown deposits known as loess.
Surface water (or surface water body)		Waters including rivers, lakes, loughs, reservoirs, canals, streams, ditches, coastal waters and estuaries.

Term	Acronym	Meaning
Susceptibility (landscape)		Ability of a defined landscape or visual receptor to accommodate the specific proposed change without negative consequences.
Suspended Sediment Concentrations	SSC	Suspended sediment concentration is the total value of both mineral and organic material carried in suspension by a river.
Sustainable development		Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.
Sustainable drainage system	SuDS	Measures designed to control surface runoff close to its source, including management practices and control measures such as storage tanks, basins, swales, ponds and lakes. Sustainable drainage systems allow a gradual release of water and thereby reduce the potential for downstream flooding.
Swale		A low or hollow place, especially a marshy depression between ridges.
T		
Technical Guidance Note	TGN	Technical Guidance Notes aim to assist professionals with their respective assessments.
Temporal scope		The duration of time over which environmental impacts and effects could occur as a result of a project.
Till		Unsorted glacial sediment deposited directly by a glacier.
Tonnes of carbon dioxide equivalent	tCO_2e	A measure that allows the different greenhouse gases to be compared on a like-for-like basis relative to one unit of CO_2.
Topsoil		Natural topsoil or manufactured topsoil, usually covering the top 25cm in which plants can grow healthily.
Total Organic Carbon	TOC	Total Organic Carbon (TOC) is a measure of the total amount of carbon in organic compounds in pure water and aqueous systems.
Townscape		The landscape within the built-up area, including the buildings, urban open spaces, including green spaces

Term	Acronym	Meaning
		and the relationship between buildings and between buildings and open spaces.
Trailer Suction Hopper Dredger	TSHD	Trailer suction hopper dredgers are oceangoing vessels that can collect sand and silt from the seabed and transport it over large distances.
Transboundary effects		The term used to describe the significant environmental effects of a project which extend beyond the boundary of the European Economic Area State within which it would be implemented.
Transitional and Costal Waters	TraC	The transitional zone of water between river and sea.
Translocation		The transporting and release of species or habitats from one location to another. For example, if an area of land is required permanently for a new development, species can be moved from that site to a suitable alternative location.
Transport Analysis Guidance	TAG	Transport analysis guidance provides information on the role of transport modelling and appraisal.
Tree Preservation Order	TPO	An order made by a local planning authority, under the Town and Country Planning Act 1990, in respect of trees or woodlands. The principal effect of a tree preservation order is to prohibit the cutting down, uprooting, topping, lopping, willful damage or willful destruction of trees without the local planning authority's consent.
Turbidity		Turbidity is the measure of relative clarity of a liquid and is a measurement of the amount of light that is scattered by the material in the water.
U		
United Kingdom	UK	-
UK Biodiversity Action Plan	UKBAP	The UK Government’s response to the Convention on Biological Diversity.
UK Climate Projections	UKCP18	A set of tools and data that shows how the UK climate may change in the future, published by the Met Office in 2018.

Term	Acronym	Meaning
Unexploded Bomb	UXB	Explosive bombs that did not explode when deployed and thus still pose a risk of detonation.
Unexploded Ordnance	UXO	Explosives that did not explode when deployed and thus still pose a risk of detonation.
United Kingdom Hydrographic Office	UKHO	The UK Hydrographic Office is a world-leading centre for hydrography, specialising in marine geospatial data to support safe, secure and thriving oceans.
United Nations Educational, Scientific and Cultural Organization	UNESCO	A specialised agency of the United Nations aimed at promoting world peace and security through international cooperation in education, arts, sciences and culture.
United Nations Framework Convention on Climate Change	UNFCCC	The United Nations Framework Convention on Climate Change established an international environmental treaty to combat dangerous human interference with the climate system.
Unproductive strata		Layers of rock or superficial deposits with low permeability or porosity that have a negligible significance for water supply.
Utilities		The term utilities refers to the set of services provided by these organisations consumed by the public: Coal, electricity, natural gas, water, sewage, telephone, and transportation. Broadband internet services (both fixed-line and mobile) are increasingly being included within the definition.
V		
Value (landscape)		Relative value or importance of a landscape's quality, special qualities including perceptual aspects such as scenic beauty, tranquillity, or wildness, cultural associations or other conservation issues.
Very Large Gas Carrier	VLGC	These carriers are a sub-class of generic gas carriers that target a considerably higher volume of gas transport.
Vessel Traffic Service	VTS	A vessel traffic service is a marine traffic monitoring system established by harbour or port authorities.
Vibration		A to-and-fro motion which oscillates about a fixed equilibrium position.

Term	Acronym	Meaning
Viewpoint		A place from which something can be viewed.
Visual amenity		Overall enjoyment of a particular area, surroundings, or views in terms of people's activities - living, recreating, travelling through, visiting, or working.
Visual envelope		An area from which a project can be visible
Visual receptor		Individuals and/ or defined groups of people who potentially could be affected by a project.
Visual sensitivity		Visual experience, be it sensitivity to light or visual clutter.
Vulnerability (climate)		The degree to which a system/ asset is exposed and resilient to adverse effects of climate change.
W		
Wales Health Impact Assessment Support Unit	WHIASU	The Wales Health Impact Assessment Support Unit is based in the World Health Organization Collaborating Centre on 'Investment for Health and Well-being', Policy and International Health Directorate, Public Health Wales. It provides an all Wales Service and provides guidance, training, resources and information in relation to the practice of Health Impact Assessments.
Walkers, cyclists and horse riders	WCH	A collective term used to describe pedestrians, cyclists and equestrians.
Waste		Any substance or object which the holder disposes or intends/ is required to dispose.
Wastewater		Water that has been used in the home, in a business or as part of an industrial process.
Waste and Resources Action Programme	WRAP	The Waste Resources Action Programme is a British registered charity working with businesses, individuals and communities to achieve a circular economy.
Waste Framework Directive	Waste FD	The Waste Framework Directive sets the basic concepts and definitions related to waste management, including definitions of waste, recycling and recovery

Term	Acronym	Meaning
Waste Hierarchy Assessment	WHA	If required, this assessment will involve an evaluation of the dredge and disposal methods likely to be involved and will follow the waste hierarchy of Prevention à Preparing for re-use à Recycling à Other Recovery à Disposal.
Water Framework Directive	WFD	A European Union Directive which commits member states to achieve good status of all waterbodies (both surface and groundwater), and also requires that no such waterbodies experience deterioration in status. Good status is a function of good ecological and good chemical status, defined by a number of elements.
Water Framework Directive Assessment		Assessment to identify how the project has the potential to affect each of the water body's quality/ quantity elements and whether it could lead to non-compliance with the Water Framework Directive.
Waste Planning Authority	WPA	Waste Planning Authorities are required to ensure that sufficient land is available to accommodate facilities for the treatment of all waste arising in the area.
Wetland Bird Survey	WeBS	The Wetland Bird Survey monitors non-breeding waterbirds in the UK.
Wildlife and Countryside Act 1981	WACA/ WCA	This legislation protects various animals, plants, habitats in the UK.
Wildlife Trust		The Wildlife Trusts represent the Royal Society of Wildlife Trusts and include 46 local Wildlife Trusts in the United Kingdom, the Isle of Man and Alderney. Wildlife Trusts are individual charitable Trusts.
World Business Council for Sustainable Development	WBCSD	The World Business Council for Sustainable Development is a CEO-led organisation of over 200 international companies.
World Health Organisation	WHO	An agency of the United Nations whose role is to direct and coordinate international health within the United Nations system and to lead partners in global health responses.
World Heritage Site		World Heritage is the designation for places on Earth that are of outstanding universal value to humanity and as such, have been inscribed on the World

Term	Acronym	Meaning
		Heritage List to be protected for future generations to appreciate and enjoy.
World Resources Institute	WRI	The World Resources Institute is a global research non-profit organization established in 1982 and focusing on seven areas: food, forests, water, energy, cities, climate and ocean.
Worst case scenario		An assumption adopted within an Environmental Impact Assessment which identifies a scenario or parameter that would likely result in the maximum environmental effect (termed the worst case). This is typically applied where uncertainty exists over the detail of a particular project component or approach to project delivery, for which a basis of assessment is needed.
Written Scheme of Investigation	WSI	Documents which set out the approach to undertaking archaeological monitoring of ground investigation works.
Z		
Zone of Influence	ZoI	The geographic area (or timescale) over which existing environmental conditions are likely to be influenced by change.
Zone of Theoretical Visibility	ZTV	Map produced (usually digitally) to specific criteria to illustrate the area(s) from which a project can theoretically be visual.

Appendix C Preliminary Ecological Appraisal

AECOM

Land off Kings Road, Immingham

Preliminary Ecological Appraisal

Air Products

AECOM Project Number: 60673509

August 2022

Delivering a better world

Quality information

Prepared by	Checked by	Verified by	Approved by
			
Nicole Mallett BSc (Hons), PgDip, QCIEEM	Steve Carter Associate Director BSc (Hons) MSc CEcol CEnv MCIEEM	Clare Mcilwraith Associate Ecologist BSc (Hons) MCIEEM	Jo Atkinson Associate Ecologist BSc (Hons) MCIEEM

Revision History

Revision	Revision date	Details	Authorized	Name	Position
01	19/08/2022	FINAL	JA	Jo Atkinson	Associate Ecologist

Distribution List

# Hard Copies	PDF Required	Association / Company Name
00	01	Air Products

Prepared for:

Air Products

Prepared by:

AECOM Infrastructure & Environment UK Limited
5th Floor, 2 City Walk
Leeds LS11 9AR
United Kingdom

T: +44 (0)113 391 6800
aecom.com

Table of Contents

Figures

Tables

Executive Summary

Site Details	Land off Kings Road, Immingham (central grid reference TA 198 146) Total Site equating to approximately 21 hectares (ha)
Scheme Details	Construction of an ammonia storage and production facility
Ecological Features that may be affected by the Scheme	Designated Sites: • Humber Estuary Special Protection Area (SPA)/ Special Area of Conservation (SAC)/ Ramsar/ Site of Special Scientific Interest (SSSI) • Laporte Road Brownfield Site Local Wildlife Site (LWS) Habitats: • Abandoned arable cultivated farmland currently comprising overgrown tall poor semi-improved grassland and scattered scrub, species-poor unmanaged hedgerows and ditches overgrown with common reed. The hedgerows and ditches provide important habitat for wintering birds. • Some development enabling work has been undertaken in the northern section of the Site in 2014/2015 to create a new road access off Kings Road, and to install drainage. Protected Species: • Breeding birds – mosaic of suitable habitats within the Site boundary (grassland and scrub) suitable to support nesting birds. • Otter and water vole – ditches on the Site hold some suitability to support these species however the foraging resource is considered to be sub-optimal because they are heavily overgrown with common reed (*Phragmites australis*).
Recommendations for further survey and assessment	• Habitats Regulations Assessment (HRA) – habitats within the Site are unsuitable to support SPA/ Ramsar waterbirds because of the vegetation is tall and no visual connectivity with Humber Estuary. The land is therefore not considered to be functionally linked to the Humber Estuary SPA/ Ramsar. However, there may be potential for indirect effects on qualifying habitats within the Humber Estuary SAC/ Ramsar via changes in air quality arising from the Scheme. • Breeding birds – five surveys between March and June to identify and map breeding species, and to inform avoidance/ mitigation/ enhancement • Otter and water vole – surveys of ditches within the Site boundary in April/ May or September
Recommendations for Mitigation	• Retention of ditches, reedbed habitat and hedgerows where possible. • Enhancement of retained habitat by the introduction of floristically diverse and tussocky. • Creation of species-rich grassland on ditch banks (where retained) • Likely to require mitigation for breeding birds during construction phase (including the requirement to remove vegetation/undertake initial site clearance works outside the breeding bird season March to September inclusive).
Opportunities for Biodiversity Enhancements	There are likely to be limited opportunities for biodiversity enhancements within the Site boundary given the industrial nature of the Scheme and the various safety requirements that will be embedded within the design of the infrastructure/ buildings. Opportunities to meet the planning policy and legislative requirements in respect of biodiversity enhancement (see Appendix B) should be explored as the Scheme design progresses.

1. Introduction

Background

1.1 This Preliminary Ecological Appraisal report (PEAR) has been prepared by AECOM on behalf of Air Products (the client), to assess the ecological constraints in connection with the proposed Immingham Green Energy Terminal (IGET) (hereafter referred to as the Scheme). The Scheme is located adjacent to Kings Road, Immingham, as shown by the red line boundary on Figure 1 in Appendix A. All land situated within this red line boundary is hereafter referred to as the Site.

1.2 The assessment of ecological constraints has been undertaken with reference to current good practice[1] and forms part of the technical information commissioned by Air Products in connection with the Scheme. The PEAR addresses relevant wildlife legislation and planning policy as summarised in Appendix B and is consistent with the requirements of *British Standard 42020:2013 Biodiversity. Code of Practice for Planning and Development.*

1.3 This PEAR is intended for advice in respect of Scheme design and construction, site layout and / or site investigation. Further ecological surveys and / or ecological impact assessment (EcIA) (including detailed mitigation measures) may be required to support a planning application or to contribute to an Environmental Impact Assessment (EIA) once the Scheme proposals have been finalised and any required surveys have been completed.

1.4 At the time of preparing this PEA report, the Scheme was still being developed, therefore and was subsequently extended to include a new jetty, various landside works off Laporte Road and Queens Road respectively and a connecting pipeline. As set out in the Scoping Report which has been prepared for the Scheme, this PEA report pertains only to the land off Kings Road, which is referred to as the 'West Site' in the wider IGET Scheme description.

The Site

1.5 The Site is located on the periphery of Immingham Docks and is centred on Ordnance Survey National Grid Reference TA 200146. The Site comprises approximately 21ha of former arable cultivated land bounded (as determined by Google Earth aerial map regression) by industrial land to the north and east, a landfill to the south and the A1173 (Kings Road) to the west.

1.6 The Site is identified in the North East Lincolnshire Local Plan[2] for employment development as Site ELR001 "Imm-Port Enterprise Zone". Some development enabling works were completed on the Site (drainage and road infrastructure) in 2014/ 2015 relating to a planning consent for industrial/ port-related development (Planning Reference: DM/1027/13/OUT), although no further development of the Site has since been progressed.

Purpose of the Preliminary Ecological Appraisal

1.7 The approach and methodology followed to inform this PEAR is provided in Appendix C. This PEAR presents ecological information obtained during the following:

[1] CIEEM (2017). *Guidelines for Preliminary Ecological Appraisal, 2nd edition.* Chartered Institute of Ecology and Environmental Management, Winchester.
[2] North East Lincolnshire Council (adopted 2018) North East Lincolnshire Local Plan 2013 to 2032. Available online at: https://www.nelincs.gov.uk/assets/uploads/2018/05/20180518-AdoptedLocalPlan2018-WEB.pdf

- desk-study undertaken during March 2022 to obtain records of designated sites, notable habitats[3] and protected and notable species[4] within 2km of the Site (the area covered by the desk study is hereafter referred to as the Study Area);
- wintering bird survey of the Site undertaken on four dates (17th and 21st February and 17th and 21st March 2022) to determine if waterbirds of international and national importance associated with the Humber Estuary designations could utilise the Site for high tide roosting (i.e. whether it is functionally linked land); and an,
- extended Phase 1 habitat survey of the Site conducted on the 21st March 2022 to determine the presence/potential presence of Important Ecological Features (IEF)[5].

1.8 The purpose of the PEAR is to provide a high-level ecological appraisal of the Site, specifically to:

- establish ecological baseline conditions and determine the presence of IEFs (or those that could be present), as far as is possible;
- identify potential ecological constraints to the Scheme and make initial recommendations to avoid impacts on IEFs, where possible;
- identify requirements for mitigation, where possible, including mitigation measures that will be required and those that may be required (depending on results of further surveys or final Scheme design);
- establish any requirements for more detailed surveys; and,
- identify any opportunities offered by the Scheme to deliver biodiversity enhancements.

1.9 The methodology followed for undertaking the desk study and field surveys is detailed in Appendix C, including any limitations to the assessment.

[3]Notable habitats are taken as principal habitats for the conservation of biodiversity listed under Section 41 of the *Natural Environment and Rural Communities Act 2006*; habitats listed under the Lincolnshire Biodiversity Action Plan (BAP); hedgerows identified as being 'important' under the wildlife criteria of the *Hedgerow Regulations 1997*, ancient woodlands and veteran trees.
[4]Notable species are taken as principal species for the conservation of biodiversity listed under Section 41 of the *Natural Environment and Rural Communities Act 2006*; any species listed in an IUCN Red Data Book; and any other species listed under the Lincolnshire BAP.
[5] Important Ecological Features are habitats, species, ecosystems and their functions and processes that are of conservation importance and could potentially be affected by the Scheme.

2. Ecological Baseline, Constraints and Recommendations

2.1 The following sections detail the results of the desk and field-based studies undertaken to inform this PEAR. Where necessary, recommendations for mitigation measures to protect known IEFs, or further surveys to determine the presence or likely absence of IEFs, are provided.

2.2 With regard to background ecology data, 'recent' records are considered to be those no older than 10 years from the date of the desk study. Records outside of this period are historical and have only been reported where more recent records for a feature do not exist. Exceptions to this are detailed in the appropriate sections below.

2.3 In addition to desk-study data requested from the Lincolnshire Environmental Records Centre (LERC), documents pertaining to a planning application on the Site from 2013 were examined for relevant ecological records (Planning Reference: DM/1027/13/OUT). An Environmental Statement was prepared for the application by ECUS in December 2013 and reported the results of a Phase 1 Habitat survey and protected species surveys for breeding and wintering birds, badger, otter and water vole[6].

Designated Sites

Desk Study

2.4 Table 1summarises the designated sites situated within the Study Area. These are shown in Lincolnshire Desk Study Record Report (Appendix E).

Table 1. Designated Sites within the Study Area

Designated Site	Reason for Designation	Location of Designated Site[7]
Statutory		
Humber Estuary Special Protection Area (SPA)	**Article 4.1 qualification - bird species regularly occurring in numbers of 1% or more of the Great Britain populations** Wintering: – Avocet *Recurvirostra avosetta* – Bittern *Botaurus stellaris* – Hen harrier *Circus cyaneus* – Golden plover *Pluvialis apricaria* – Bar-tailed godwit *Limosa lapponica* Passage: – Ruff *Philomachus pugnax* Breeding: – Bittern *Botaurus stellaris* – Marsh harrier *Circus aeruginosus* – Avocet *Recurvirostra avosetta* – Little tern *Sternula albifrons* **Article 4.2 qualification - bird species regularly occurring in numbers of 1% or more of the biogeographical populations of migratory species** Wintering: – Shelduck *Tadorna tadorna* – Knot *Calidris canutus*	1.1 km north-east

[6] ECUS (2013) *Kings Road Industrial Development, Immingham. Environmental Impact Assessment: Environmental Statement Volume One*. ECUS, Sheffield.
[7]Where designated sites are situated outside of the Site boundary, the distance and direction is given at the closest point of the designated site from the Site

Designated Site	Reason for Designation	Location of Designated Site[7]
	– Dunlin *Calidris alpina* – Black-tailed godwit *Limosa limosa* – Redshank *Tringa totanus* Passage: – Knot – Dunlin – Black-tailed godwit – Redshank **Article 4.2 qualification – used regularly by over 20,000 waterbirds in any season** Area regularly supports 153,934 individual waterbirds[8] (five-year peak mean 1996/97 – 2000/01) in the non-breeding season.	
Humber Estuary Ramsar	**Criterion 1:** Site is a representative example of a near-natural estuary with the following component habitats: dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish/ saline lagoons. **Criterion 3:** Breeding colony of grey seals (*Halichoerus grypus*) (at Donna Nook) Breeding natterjack toad *Bufo calamita* (at Saltfleetby-Theddlethorpe) **Criterion 5:** Supports a waterfowl assemblage of international importance. **Criterion 6:** Supports the following species/ populations occurring at levels of international importance: Wintering: – Shelduck – Golden plover – Red knot – Dunlin – Black-tailed godwit – Bar-tailed godwit – Common redshank **Criterion 8:** Migratory river *Lampetra fluviatilis* and sea lamprey *Petromyzon marinus*	1.1 km north-east
Humber Estuary Special Area of Conservation (SAC)	**Habitats that are a primary reason for selection of this site:** – Estuaries – Mudflats and sandflats not covered by seawater at low tide **Habitats and species present as a qualifying feature, but not a primary reason for selection of this site:** – Sandbanks which are slightly covered by sea water all the time – Coastal lagoons – Salicornia and other annuals colonizing mud and sand – Atlantic salt meadows *Glauco-Puccinellietalia maritimae* – Embryonic shifting dunes – Shifting dunes along the shoreline with *Ammophila arenaria* – Fixed coastal dunes with herbaceous vegetation – Dunes with *Hippopha rhamnoides*	1.1km north-east

[8] Waterbirds as defined by the Ramsar Convention

Designated Site	Reason for Designation	Location of Designated Site[7]
	– Sea lamprey – River lamprey – Grey seal	
Humber Estuary Site of Special Scientific Interest (SSSI)	A component of the Humber Estuary SAC/ SPA/ Ramsar. Designated for its nationally important estuary habitats, including intertidal mudflats, sandflats and coastal saltmarsh that support: – nationally important numbers of wintering and passage wildfowl and waders – nationally important assemblage of breeding birds associated with open lowland waters and their margins – breeding grey seal – sea lamprey – river lamprey – vascular plant assemblage – invertebrate assemblage	1.1 km north-east
Laporte Road Brownfield Site Local Wildlife Site (LWS)	Former industrial site (approximately 3 ha) now species-rich brownfield habitat. – Designated for its open mosaic habitats on previously developed land that qualify under criterion BM1 (Brownfield Mosaic) of the Lincolnshire Local Wildlife Site Selection Criteria. – Diverse assemblage of breeding birds and butterflies. – Water vole population on north-western boundary ditch (North Beck Drain).	1.1 km east

Constraints and Recommendations

2.5 The habitat within the Site is dominated by tall-swarded grassland (see Section 2.13) having been taken out of agricultural cultivation approximately 10 years ago. Consequently, the habitats within the Site boundary are not suitable for high tide roosting/ loafing/ feeding waterbirds from the nearby Humber Estuary SPA/ Ramsar. This is because there is insufficient scanning distance for waterbirds to observe approaching ground-based predators, and they therefore typically avoid taller swarded grassland.

2.6 Nevertheless, to support the assessment, wintering bird surveys were undertaken in February and March 2022 to determine whether the habitats were used by SPA/ Ramsar waterbirds (and thus merited a detailed suite of wintering bird surveys). No waterbirds were recorded within the Site boundary. Although the survey period clearly did not span a full winter season, when considered alongside the unsuitability of the habitat for high tide roosting, loafing and feeding waterbirds, it is concluded that the land within the Site is not functionally linked to the Humber Estuary SPA/ Ramsar. This is consistent with the findings of previous wintering bird surveys undertaken within the Site in winter 2011/ 12 for a planning application for development (DM/1027/13/OUT), which also concluded that the land was not functionally linked to the Humber Estuary SPA/ Ramsar (even when the land was under a more regular cultivation regime and thus would be potentially more suitable for waterbirds).

2.7 There is no suitable habitat within the Site for breeding SPA/ Ramsar species bittern, marsh harrier or avocet. Marsh harrier has been previously recorded overflying the Site in 2013 (for planning application DM/1027/13/OUT) but there are no extensive areas of reedbed/ marsh habitat that would be suitable nesting habitat; the reedbed habitat within the Site is restricted to narrow bands within/ on the margins of the ditches.

2.8 Potential air quality pathways by which the Scheme could impact the designated terrestrial habitats of the Humber Estuary SAC/ Ramsar/ SSSI may warrant further investigation. A HRA may be required to determine whether there are any likely significant effects on the Humber Estuary SPA/ Ramsar site features of importance.

2.9 Given the distance of the Laporte Road Brownfield Site LWS from the Scheme, and the lack of habitat connectivity between the two, it is concluded that there will be no direct impacts on the LWS. Potential indirect effects upon the LWS from potential emissions to air may need to be considered.

Habitats

Desk Study

2.10 Table 2 summarises the records of notable habitats and protected or notable flora[9] (including veteran trees[10]) within the Study Area.

Table 2. Notable Habitats and Protected and Notable Flora within Study Area

Habitat/ Flora Feature	Reason for Conservation Interest	Location of Habitat/ Flora[11]
Deciduous woodland	Priority Habitat Inventory (Natural Environment and Communities [NERC] Act S41)	160 m south-west (small area off woodland on west side of A1173) 515 m north-east ('Long Strip' woodland, off Laporte Road)
Intertidal mudflats	Priority Habitat Inventory (Natural Environment and Communities [NERC] Act S41)	1.2 km north-east (coastal habitats within Humber Estuary SAC/ SPA/ Ramsar/ SSSI)

Field Survey

2.11 Summary descriptions of the habitats within the Site are provided below and shown on Figure 1, with specific features highlighted by Target Notes (TNs). TN descriptions and photographs are provided in Appendix D.

2.12 The Site comprises three distinct fields separated by ditches/ hedgerows and was formally cultivated until its abandonment from agricultural production approximately 10 years ago. Some initial enabling activities have been undertaken in the northern portion of the Site (off King's Road) to create a new access road and interconnecting roads/ pavements/ drainage infrastructure (in around 2014/ 15); this is Phase 1 of the consented outline development (Planning Reference: DM/1027/13/OUT) of Site E1/3 in the NELC Local Plan.

Poor Semi-improved Grassland

2.13 Cultivated land which has been set-aside (taken out of agricultural productivity) for at least 10 years is the predominant habitat within the Site, which has reverted to rank grassland with tall ruderals. The vegetation comprises a mixture of common tall grass and ruderal plant species that mainly includes false oat-grass (*Arrhenatherum elatius*), tall fescue (*Schedonorus arundinaceus*), tufted hair-grass (*Deschampsia cespitosa*), meadow foxtail (*Alopecurus pratensis*), great willowherb (*Epilobium hirsutum*), common fleabane (*Pulicaria dysenterica*), bristly oxtongue (*Helminthotheca echioides*), broad-leaved dock (*Rumex obtusifolius*), curled dock (*Rumex crispus*), wild teasel (*Dipsacus fullonum*) and spear thistle (*Cirsium vulgare*).

2.14 Around areas with impeded drainage and/or bare ground the following plant species were prevalent: hard rush (*Juncus inflexus*), brown sedge (*Carex disticha*), creeping bent (*Agrostis stolonifera*), smooth meadow-grass (*Poa pratensis*), colt's-foot (*Tussilago farfara*), dandelion (*Taraxacum officinalis* agg.), smooth tare (*Ervum tetrasperma*), common vetch (*Viccia sativa*) and cut-leaved crane's-bill (*Geranium dissectum*).

Scattered Scrub

2.15 Goat willow (*Salix caprea*) scrub and smaller patches of bramble (*Rubus fruticosus* agg.) have colonised the western and eastern parts of the Site; it is assumed from a review of aerial photography that these fields have been left undisturbed for longer than the central field, which is still mainly grassland habitat.

Swamp

2.16 Areas dominated by common reed and so is consistent with swamp habitat occurs in most of the ditches and within land the Site.

[9] For this assessment 'flora' includes: vascular and non-vascular plants, fungi and lichens.
[10] For this assessment the definition of a veteran tree is taken from Annex 2 of the National Planning Policy Framework (glossary): "A tree which, because of its great age, size or condition is of exceptional value for wildlife, in the landscape, or culturally."
[11] Where features are situated outside of the Site boundary, the distance and direction is given at the closest point of the designated site from the Site

Ditches

2.17 There are a number of man-made ditches alongside the road infrastructure in the northern part of the Site that link up to the wider ditch network (as shown in Appendix D photograph TN3). Based on a review of historical aerial photography, these ditches appear to have been created as part of the Site enabling works around five years ago. These have now become overgrown with dense stands of common reed. There are also two ditches present which form boundaries between the three fields (running north to south), which are also overgrown with dense stands of common reed. The ditches are approximately 1.5m wide, with fluctuating water depth (between 10cm and 60cm) and very slow flow.

2.18 There is a ditch present along the southern boundary of the Site (between the fields and the adjacent landfill), which is approximately 1.5 m wide. This ditch supports no aquatic or emergent vegetation predominately due to shading from overhanging hedgerow present on the south side of the ditch.

Hedgerows

2.19 Species-poor hedgerows occur alongside the southern boundary and central ditches that form the field boundaries. Hawthorn (*Crateagus monogyna*) is the dominant species, with blackthorn (*Prunus spinosa*) occasional and dog rose (*Rosa canina* agg.) rare. The unmanaged hedgerows (approximately 3m tall and 3m wide) are insufficiently species-rich and lack supporting features that would result in them being potentially classified as 'Important' hedgerows, as defined by The Hedgerows Regulations 1997 criteria.

Constraints and Recommendations

2.20 The deciduous woodland and intertidal mudflat Priority Habitats are sufficiently distant from the Site that they will not be directly affected. However, potential pathways by which they could be affected by changes in air quality may require further investigation within an ecological impact assessment.

2.21 No habitats of principal importance were recorded at the Site. The Scheme will result in the removal of scrub, hedgerows and ditches that support common reed, although it is assumed that the existing drainage ditches associated with the road infrastructure in the north of the Site will be retained as part of the Site drainage strategy.

Badger

Desk Study

2.22 There are no recent records of badger within the Study Area. Badger surveys of the Site in 2011 and 2013 for planning application DM/1027/13/OUT did not record any evidence of badger within the Study Area.

Field Survey

2.23 It is possible that badgers may occasionally visit the Site, as the grassland and scrub provide suitable foraging habitat, however no evidence of their presence was recorded within the Site.

Constraints and Recommendations

2.24 The Site is surrounded by roads and badgers are vulnerable to road traffic injury or fatality, therefore reducing the likelihood of badger being present. In summary, badger is not considered to be a constraint to the Scheme.

Bats

Desk Study

2.25 There are no recent records of bats within the Study Area. No bat activity surveys were undertaken for the 2013 planning application on this Site (Ref: DM/1027/13/OUT) because the habitats were concluded to be sub-optimal for foraging bats mainly as a result of the lack of connectivity between the habitats on Site, and suitable bat foraging/ commuting habitat in the wider local area.

Field Survey

2.26 It is possible that bats may forage/commute over the Site; however, any such usage by foraging bats would reasonably be by low numbers of common bat species, given the low quality of the habitats present. The grassland is not particularly diverse to provide opportunities for a high invertebrate faunal assemblage to attract feeding bats, and the Site is relatively open and exposed. There is limited habitat connectivity via the surrounding hedgerow network to any other habitats of high quality for foraging/ commuting bats, and this further reduces the likelihood that the habitats would be well used by bats.

2.27 The shrubs and trees within the Site boundary are not sufficiently mature to support features that may be suitable for roosting bats. There are no buildings or other structures within the Site boundary, and therefore roosting bats are not considered to be a constraint to the Scheme.

Constraints and Recommendations

2.28 It is recommended that Scheme is designed, where possible, to avoid light spillage on to any sections of retained hedgerows and ditches surrounding the Site to avoid displacement over habitat that could be used for foraging by bats.

2.29 Further bat activity surveys are not considered warranted to inform the planning application, due to the overall appraisal of the Site likely value for bats. It is unlikely that the Site is used on anything other than an occasional and transient basis by small numbers of common species of bats. This is on the basis that the habitats are generally of low quality for foraging and commuting bats and are poorly connected to bat foraging/ commuting habitat in the wider local area. Therefore, potential effects of the Scheme would not be considered to be greater than at Site level.

Otter

Desk Study

2.30 There is one recent record of otter within the Study Area (specific location is withheld from LERC data). Otter surveys of the Site in 2011 and 2013 (excluding the newer ditches around the new road infrastructure, which had not been created at that time) for planning application DM/1027/13/OUT did not record any evidence of this species within the Site.

Field Survey

2.31 It is possible that otters visit the Site as a place for rest or shelter given that they are likely present in the nearby Humber Estuary, but no sign of their presence or suitable breeding features were identified. The ditches within the Site boundary are shallow and likely to be predominantly dry most of the time (due to being heavily overgrown with common reed) and therefore would not be expected to support sufficient fish to provide prey for foraging otter such that they would be expected to regularly visit the Site.

Constraints and Recommendations

2.32 The Site is surrounded by roads and otters are vulnerable to road traffic injury or fatality, therefore reducing the likelihood of otter being present. Given the overall consideration of the desk study sand field survey results otter is not considered to be a constraint to the Scheme.

Water Vole

Desk Study

2.33 There are two recent records of water vole within the Study Area. The closest / most relevant of these records is associated with a ditch on the north side of Kings Road, which is approximately 55 m from the Site boundary (on the opposite side of the road from the Site).

2.34 Water vole surveys of the ditches on the Site in 2011 and 2013 (excluding the newer ditches around the new road infrastructure, which had not been created at that time) conducted to support planning application DM/1027/13/OUT did not record any evidence of this species within the Site.

Field Survey

2.35 No signs of water vole presence were recorded during the initial inspections of the ditches. The ditches at the Site are subject to great fluctuation in water level. Some ditch sections support dense stands of common reed and the remainder support sparse or no emergent vegetation due to shading from overhanging hedgerow vegetation.

Constraints and Recommendations

2.36 The ditches at the Site are concluded to be sub-optimal to support water vole because of fluctuating (low) water level and sparsity of suitable foraging plants. However, due to the proximity of the nearest recent record of this species to the Site, it is recommended that a detailed water vole survey is undertaken to fully determine presence/ likely absence, and thus to identify whether this species is a constraint to the Scheme. Water vole surveys, in accordance with guidance, should be undertaken between April and September when signs of this species' presence is typically more evident.

Great Crested Newt

Desk Study

2.37 There are no recent records of great crested newt within the Study Area. On a review of present of potential waterbodies which may provide breeding sites for this species, ordnance Survey mapping indicates that there are several waterbodies in a wetland complex to the south of the Site within the adjacent landfill site (approximately 100 m south of the Site boundary). Although the status of these waterbodies cannot be confirmed as were not accessible, it is likely that they would still be present, as they are likely to be required to facilitate the drainage of the landfill site drainage, however, may be subject to continual change and disturbance and are unlikely to be optimal to support this species. Surveys of these wetland areas conducted in 2011 and 2013 for planning application DM/1027/13/OUT did not identify great crested newt.

Field Survey

2.38 There are no ponds present within the Site boundary. The ditches within the Site boundary are subject to seasonal fluctuations in water levels and have been observed during the course of other surveys on the Site to regularly dry out in the spring/ early summer. They are therefore unsuitable for breeding great crested newt because they do not regularly hold sufficient water or aquatic vegetation to enable successful breeding activity (the larvae of this species are entirely aquatic until late summer).

2.39 The wetland complex to the south within the landfill site was evaluated to be sub-optimal for great crested newts in 2013 due to the presence of fish, waterfowl, poor water quality and a lack of egg laying material. As great crested newt was not recorded in 2013, and there are major barriers[12] to great crested newt dispersal onto the landfill site, it is reasonable to conclude that it is unlikely that the species will have colonised this habitat (if it is still present) in the intervening period.

Constraints and Recommendations

2.40 Due to the lack of records in the local area, including from nearest pond(s) to the Site, and the lack of suitable breeding habitat within the Site, it is reasonable to conclude that great crested newt is absent from within the Site and does not pose a constraint to the Scheme. No further surveys for great crested newt are therefore considered necessary.

[12] The following constitute major barriers to dispersal and are unlikely to be traversed by great crested newts: rivers and larger streams; main roads such as A-roads, motorways or any other road with high traffic volume (i.e. high traffic volume during the night when great crested newt are more likely to be dispersing/commuting); and major urban infrastructure including extensive areas of hardstanding and buildings and dense networks of minor roads with little green space.

Reptiles

Desk Study

2.41 There are no records of common lizard (*Zootoca vivipara*), slow worm (*Anguis fragilis*), adder and grass snake (*Natrix helvetica*) within the Study Area. An appraisal of the Site for the 2013 planning application DM/1027/13/OUT concluded that the Site was unsuitable for reptiles, and no reptile surveys were undertaken.

2.42 The Site is outside the geographical range of known populations of smooth snake (*Coronella austriaca*), which are confined to heathlands in the south of England, and sand lizard (*Lacerta agilis*), which are restricted to sandy heathlands in Surrey, Dorset and Hampshire and coastal sand dunes in Merseyside. These species are therefore not considered further.

Field Survey

2.43 The Site is appraised to be sub-optimal for reptiles as it is dominated by tall rank grassland/ scattered scrub and lacks the mosaic of bare ground, variations in topography and areas of refuge favoured by reptiles. Furthermore, the historic land use of the Site and relatively isolated nature of the Site in the wider landscape also reduce its suitability to support reptiles. The ditches within the Site boundary are heavily overgrown and appear to regularly dry out, and therefore they are appraised as being of low suitability to support aquatic prey species (e.g., frogs or fish) for grass snake.

Constraints and Recommendations

2.44 Whilst the habitats have changed since the 2013 Site appraisal due to the further development of rank grassland and scrub since the abandonment of agricultural management, they remain sub-optimal for reptiles. There are also no known populations of reptiles in the wider local area that have habitat connectivity to the Site and that could potentially have colonised the Site in the intervening period. No further surveys for reptiles are considered warranted, as based upon these factors combined it is reasonable to conclude that reptiles are likely absent from the Site and are not considered to be a constraint to the Scheme.

Breeding Birds

Desk Study

2.45 There are recent records for 32 notable[13] bird species within the Study Area. These include 5 species listed on Annex I of the EC Birds Directive, 13 species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended), 15 Species of Principal Importance (SPI), and respectively 16 Red List and 7 Amber List species included in the Birds of Conservation Concern 5 (BoCC5). The records also include 14 species of bird that are priority species in Lincolnshire listed on the Lincolnshire BAP.

2.46 Previous breeding bird surveys of the Site conducted in 2013 to support the planning application DM/1027/113/OUT recorded the following breeding species on the Site:

- Grassland habitat: ground nesting skylark (*Alauda arvensis*) and meadow pipit (*Anthus pratensis*)
- Ditches: reed warbler (*Acrocephalus scirpaceus*), sedge warbler (*Acrocephalus schoenobaenus*) and reed bunting (*Emberiza schoeniclus*).
- Boundary hedgerows: blackcap (*Sylvia atricapilla*), chiffchaff (*Phylloscopus collybita*), willow warbler (*Phylloscopus trochilus*), whitethroat (*Sylvia communis*), lesser whitethroat (*Sylvia curruca*), tree sparrow (*Passer montanus*), yellowhammer (*Emberiza citrinella*), linnet (*Carduelis cannabina*) and song thrush *(Turdus philomelos)*.

[13] Notable bird species are taken as those listed: on Annex I of the EC Birds Directive (2009/147/EC); on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended); as Species of Principal Importance (SPI) for the Conservation of Biodiversity in England listed in Section 41 of the Natural Environment and Rural Communities Act 2006; as Red or Amber in the Birds of Conservation Concern (BoCC) 4 (Eaton MA, Aebischer NJ, Brown AF, Hearn RD, Lock L, Musgrove AJ, Noble DG, Stroud DA and Gregory RD (2015). Birds of Conservation Concern 5: The population status of our birds populations. *British Birds* 114, 723-747); bird species or groups listed under the Lincolnshire BAP.

Field Survey

2.47 The Site supports grassland, scrub, hedgerows and ditches which will provide opportunities for nesting for a range of general species, including some of those that were recorded on the Site over the winter months (see Wintering Birds section), and those that were previously recorded on the Site in the 2013 survey.

Constraints and Recommendations

2.48 Given that the habitats have changed since they were managed, breeding bird surveys were undertaken between March and June 2022 to update the findings of previous now dated surveys of the Site, which at the timing of writing this PEAR will be analysed. This will enable any species-specific mitigation to be identified, as well as to inform the ecological impact assessment and targets for on-site habitat retention/ enhancement.

2.49 As discussed in respect of the Humber Estuary SPA/ Ramsar designated site, it is not considered that there is any suitable nesting habitat within the Site for the qualifying breeding species bittern, marsh harrier or avocet, although marsh harrier may use the habitats for foraging at times.

Wintering Birds

Desk Study

2.50 There are recent records for 32 notable[14] bird species within the Study Area. These include 5 species listed on Annex I of the EC Birds Directive, 13 species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended), 15 Species of Principal Importance (SPI), and respectively 16 Red List and 7 Amber List species included in the Birds of Conservation Concern 5 (BoCC5). The records also include 14 species of bird that are priority species in Lincolnshire listed on the Lincolnshire BAP.

Field Survey

2.51 Wintering bird surveys were undertaken on four occasions during February and March 2022. The purpose of the surveys was to determine whether the land could be potentially functionally linked to the Humber Estuary SPA/ Ramsar, and thus merit further wintering bird surveys to cover a full passage/ wintering season. However, no SPA/ Ramsar waterbirds were recorded within the Site during the surveys. As discussed above in respect of the Humber Estuary SPA/ Ramsar, the habitats within the Site boundary are too overgrown to support high tide roosting waterbirds, and this was supported by the findings of the limited wintering bird surveys undertaken as detailed below.

2.52 During the four winter bird survey visits conducted between 17 February and 21 March 2022, a total of 22 bird species were recorded at the Site. This included 5 SPIs, 5 Red List and 7 Amber List BoCC5 species. These are listed in Table 3.

[14] Notable bird species are taken as those listed: on Annex I of the EC Birds Directive (2009/147/EC); on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended); as Species of Principal Importance (SPI) for the Conservation of Biodiversity in England listed in Section 41 of the Natural Environment and Rural Communities Act 2006; as Red or Amber in the Birds of Conservation Concern (BoCC) 4 (Eaton MA, Aebischer NJ, Brown AF, Hearn RD, Lock L, Musgrove AJ, Noble DG, Stroud DA and Gregory RD (2015). Birds of Conservation Concern 5: The population status of our birds populations. *British Birds* 114, 723-747); bird species or groups listed under the Lincolnshire BAP.

Table 3. Birds Recorded at the Site between February and March 2022

Common Name	Scientific Name	BTO Species Code	Schedule 1 Species	NERC Section 41	Visit 1	Visit 2	Visit 3	Visit 4
					04/02/2022	28/02/2022	17/03/2022	21/03/2022
Blackbird	*Turdus merula*	B.			7	5	3	1
Blue Tit	*Cyanistes caeruleus*	BT					1	
Carrion crow	*Corvus corone*	C.			3	2		
Chaffinch	*Fringilla coelebs*	CH					1	
Dunnock	*Prunella modularis*	D.		✓	1		2	2
Goldfinch	*Carduelis carduelis*	GO			2	2	2	2
Great Tit	*Parus major*	GT			1	1	1	2
Linnet	*Linaria cannabina*	LI		✓			1	2
Long-tailed Tit	*Aegithalos caudatus*	LT			6	1	2	2
Magpie	*Pica pica*	MG			3	4	3	2
Meadow Pipit	*Anthus pratensis*	MP			4	2	2	4
Pheasant	*Phasianus colchicus*	PH			1	1	1	1
Redwing	*Turdus iliacus*	RE	✓		2	10		1
Reed Bunting	*Emberiza schoeniclus*	RB		✓	4	1		4
Robin	*Erithacus rubecula*	R.			2	3	1	1
Skylark	*Alauda arvensis*	S.		✓	1	1	2	1
Snipe	*Gallinago gallinago*	SN			1	5		1
Starling	*Sturnus vulgaris*	SG		✓	7			
Woodpigeon	*Columba palumbus*	WP			7	3	6	28
Woodcock	*Scolopax rusticola*	WK			4			1
Wren	*Troglodytes troglodytes*	WR			4	2	4	4
Yellowhammer	*Emberiza citrinella*	Y.		✓		1		1

2.53 Table 4 summarises the features that were frequently found to provide places of shelter/foraging habitat for small numbers of notable species at the Site (as shown on Figure 2).

Table 4. Habitats Features that support Notable Wintering Birds at the Site

Habitat Feature	Bird Species
Hedgerows	Thrushes and woodcock
Scattered scrub	Reed bunting
Grassland with ephemeral pools	Snipe
Grassland with tussocks	Skylark and meadow pipit

Constraints and Recommendations

2.54 The land within the Site boundary can reasonably be concluded to be not functionally linked to the Humber Estuary SPA/ Ramsar due to habitats present and results of the wintering (and breeding) bird surveys conducted. The presence of tall and overgrown vegetation restricts the required scanning distances that high tide feeding, roosting and loafing waterbirds prefer in terrestrial habitats.

2.55 The Scheme will require the removal of scrub, hedgerow and poor semi-improved grassland habitats. This will result in the displacement of common wintering birds including a low number of notable species that frequent the Site to similar adjacent habitats. The displacement of low number of birds including notable species that frequent the Site to similar adjacent habitats is not considered a constraint to the Scheme.

Terrestrial Invertebrates

Desk Study

2.56 There are 10 recent records of notable[15] terrestrial invertebrates within the Study Area. The closest of these records is associated with white-letter hairstreak which is approximately 360m from the Site boundary.

Field Survey

2.57 Elm (*Ulmus* spp.) the larval foodplant of white-letter hairstreak (*Satyrium w-album*) was not recorded at or adjacent to the Site. None of the habitats at the Site appear to be of particular importance for terrestrial invertebrates of conservation interest given the low floristic diversity of the rank grassland and scrub which would reduce food and larvae resources. However, it is possible that some unobtrusive rare/notable invertebrate species are present.

Constraints and Recommendations

2.58 It is recommended that an updated appraisal of the Site for its suitability to support rare/ notable invertebrates is undertaken in summer by an appropriately experienced specialist surveyor.

Other Species

2.59 The ditches within the Site boundary are not suitable for white-clawed crayfish (*Austropotamobius pallipes*) and therefore this species is not considered further.

2.60 No protected or notable species of plant, or evidence of non-native invasive plant species was recorded during the Phase 1 Habitat Survey.

2.61 Given the overgrown nature of the grassland habitat, it is considered unlikely that brown hare (*Lepus europeaus*) would be present and breeding on the Site.

2.62 The habitats on the Site are potentially suitable for hedgehog (*Erinaceus europaeus*), although given the relatively isolated nature of the Site within the industrial area of the Port of Immingham and the barriers posed by the surrounding road network, any such usage would be likely on a transient and occasional basis only. This species is not considered to represent a constraint to the Scheme, and any potential risk of killing/ injury of hedgehog during clearance works for construction can be adequately mitigated through a precautionary working method statement.

[15] Notable terrestrial invertebrates are taken as principal species for the conservation of biodiversity listed under Section 41 of the Natural Environment and Rural Communities Act 2006; any invertebrate listed under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended); any invertebrate listed under Schedule 2 of the Conservation of Habitats and Species Regulations 2017 (as amended); any invertebrate listed in the IUCN Invertebrate Red Data Book (1991); and any invertebrate listed under a Lincolnshire BAP.

3. Opportunities for Biodiversity Enhancements

General Recommendations

3.1 There are likely to be limited opportunities for biodiversity enhancements within the Site boundary given the industrial nature of the Scheme and the various safety requirements that will be embedded within the design of the infrastructure/ buildings. Opportunities to meet the planning policy and legislative requirements in respect of biodiversity enhancement (see Appendix B) should be explored as the Scheme design progresses.

Biodiversity Net Gain

3.2 It is government policy that planning decisions should minimise impacts on and provide net gain for biodiversity (National Planning Policy Framework 2019). In addition, the Environment Act 2021 includes provisions to make biodiversity net gain (BNG) a mandatory requirement within the planning system in England requiring all relevant developments to achieve a minimum 10% net gain in biodiversity units relative to the Site's baseline biodiversity value, it is anticipated the secondary legislation mandating the need for 10% net gain will be in place by November 2023 for development within the Town & Country Planning Act, and November 2025 for Nationally Significant Infrastructure Projects (NSIPs). Current guidance indicates that NSIPs accepted for examination before the specified commencement date would not be required to deliver mandatory biodiversity net gain (though they could deliver it in response to policy or voluntary commitments).

3.3 A BNG assessment requires the completion of specific BNG metric (currently DEFRA Metric 3.1)[16] which involves an initial assessment of the 'baseline units' of the Site by completion of habitat condition assessments (which are required to be conducted at the optimal period for most habitats between approximately May and August). In turn the information regarding the footprint and type of loss (permanent/ temporary) of habitats as a result of the proposals/development is then used to determine the net loss of units to inform appropriate compensation and enhancement.

3.4 A BNG assessment may be required to support a planning application where habitat losses are predicted, however this should be determined through consultation with the relevant planning authority to account for the evolving local planning policies.

[16] Biodiversity Net Gain Defra Metric 3.1: http://publications.naturalengland.org.uk/publication/6049804846366720

4. Conclusion

4.1 The Site comprises three distinct fields separated by ditches/ hedgerows that were formerly under arable cultivation, and which have developed into rank, species-poor grassland and scrub through natural succession following the abandonment of arable cultivation around ten years ago. Some development enabling work has been undertaken (approximately 5 years ago) in the northern part of the Site to create a new access road off Kings Road, and interconnecting roads/ pavements/ drainage infrastructure; this is Phase 1 of the consented outline development (Planning Reference: DM/1027/13/OUT) of Site E1/3 in the NELC Local Plan.

4.2 The Site is evaluated to be of low ecological value and was found to have limited potential to support protected or notable species. As detailed in Section 2 of this PEAR based upon the findings of the desk study and field surveys combined have determined the status of specific protected species at the Site of which those other than those listed in Table 5 have been scoped out as a constraint to the Scheme.

4.3 Where the status of species or the potential value of the Site for species/species groups cannot be fully determined without additional survey recommendations for these are summarised in Table 5. These recommendations are proposed to seek to collate sufficiently robust ecological baseline information upon which would likely be required to support a future planning application for the Scheme.

Table 5. Summary of Further Survey Recommendations

Feature	Recommendation	Timing
Water vole	Presence/ absence survey of ditches on Site. Methodology involves one initial survey in spring (or autumn) period, where no evidence is recorded or the ditched could not be scoped out as a result of the initial survey, a further survey in autumn (or following spring) period would be required. Where presence is recorded during initial survey the second survey would not be required.	Spring: mid-April-June, Autumn: August- end of September
Breeding birds	Five survey visits to map breeding bird territories in accordance with Common Bird Census methodology (Marchant, 1983[17]).	March – end of June
Terrestrial invertebrate habitat appraisal	Walkover survey to appraise suitability for rare/ notable species and record any species incidentally observed	Appraisal could be conducted between May and September Optimal period would be June/ July

Validity of Data

4.4 Due to the mobility of animals and the potential for colonisation of the Site, combined with the time which may elapse before the Scheme is progressed, it is recommended that in the absence of completion of any of the above surveys within 12 months of this date of this report (by July 2023) that an updated ecological survey would be required to reaffirm the findings and recommendations made in this PEAR.

[17] Marchant, J.H. (1983). *BTO Common Bird Census Instructions*. British Trust for Ornithology, Thetford.

Appendix A Figures

Revision: 0 Drawn: AG Checked: LC Approved: JA Date: 2022-04-14

Filename : \\na.aecomnet.com\lfs\EMEA\Leeds-UKLDS2\Legacy\UKLDS2PFPSW0011WIP\ILE_Projects\Newproje\60673509 - AP Ammonia Terminal\400_Technical\GIS\02_Maps\PEA Report\PEA_01_Habitat_Survey_20220413_AG.mxd

AECOM

PROJECT

Immingham Green Energy Terminal

CLIENT

Associated British Ports

CONSULTANT

AECOM Limited
5th Floor
2 City Walk
Leeds, LS11 9AR
www.aecom.com

LEGEND

- Indicative Survey Area
- Broadleaved Parkland/Scattered Trees
- Intact Hedge - Species-Poor
- Hedge With Trees - Species-Poor
- Fence
- Ditch
- Scrub - Scattered
- Swamp
- Hardstanding
- A — Cultivated/Disturbed Land - Arable

NOTES

ISSUE PURPOSE

FINAL

PROJECT NUMBER

60673509

FIGURE TITLE

Habitat Survey Results

FIGURE NUMBER

Figure 1

Revision: 0 Drawn: AG Checked: LC Approved: JA Date: 2022-04-14

Filename: \\na.aecomnet.com\fs\EMEA\Leeds-UKLDS2\Legacy\UKLDS2PFPSW001\WIP\LE_Projects\Newproje\60673509 - AP Ammonia Terminal\400_Technical\GIS\02_Maps\PEA Report\PEA_02_Winter_Bird_Survey_20220414_AG.mxd

AECOM

PROJECT

Immingham Green Energy Terminal

CLIENT

Associated British Ports

CONSULTANT

AECOM Limited
5th Floor
2 City Walk
Leeds, LS11 9AR
www.aecom.com

LEGEND

Indicative Survey Area

NOTES

ISSUE PURPOSE

FINAL

PROJECT NUMBER

60673509

FIGURE TITLE

Wintering Bird Survey

FIGURE NUMBER

Figure 2

Appendix B Relevant Legislation and Planning Policy

Legislation

4.5 The UK is no longer a member of the European Union (EU). EU legislation as it applied to the UK on 31 December 2020 is now a part of UK domestic legislation. EU legislation which applied directly or indirectly to the UK before 11.00 p.m. on 31 December 2020 has been retained in UK law as a form of domestic legislation known as 'retained EU legislation'.

4.6 The Secretary of State for the Environment, Food and Rural Affairs and Welsh Ministers have made changes to parts of the *Conservation of Habitats and Species Regulations 2017* (referred to as the 2017 Regulations*)* so that they operate effectively. Most of these changes involve transferring functions from the European Commission to the appropriate authorities in England. All other processes or terms in the 2017 Regulations remain unchanged and existing guidance is still relevant.

Designated Sites

Special Protection Areas (SPA) / Special Areas of Conservation (SAC)

4.7 These sites in the UK no longer form part of the EU's Natura 2000 ecological network. The *Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019* (referred to as the 2019 Regulations) have created a national site network on land and at sea, including both the inshore and offshore marine areas in the UK. The national site network includes:

- existing SACs and SPAs
- new SACs and SPAs designated under these Regulations

4.8 Any references to Natura 2000 in the 2017 Regulations and in guidance now refers to the new national site network.

4.9 Formal Appropriate Assessment is required to be undertaken by the competent authority before undertaking, or giving consent, permission or other authorisation for any work which are likely to have a significant effect on such a site.

Wetland of International Importance (Ramsar site)

4.10 Designated under the *Convention on Wetlands of International Importance especially as Waterfowl Habitat 1971* (the Ramsar Convention), in the UK, these sites are treated as having the same level of protection as SPA's and SAC's.

Sites of Special Scientific Interest

4.11 Under the *Wildlife and Countryside Act 1981* (as amended), it is an offence to carry out or permit to be carried out any operations likely to damage the Site of Special Scientific Interest (SSSI). These operations are listed in the SSSI notification.

4.12 Owners, occupiers, public bodies and statutory undertakers must give notice and obtain the appropriate consent under S.28 of the *Wildlife and Countryside Act 1981* (as amended), before undertaking operations likely to damage a SSSI.

Locally Designated Sites

4.13 Local Wildlife Sites are sites with 'substantive nature conservation value'. They are defined areas, identified and selected for their nature conservation value, based on important, distinctive and threatened habitats and species with a region.

4.14 They are usually selected by the relevant Wildlife Trust, along with representatives of the local authority and other local wildlife conservation groups.

4.15 The LWS selection panel, select all sites that meet the assigned criteria, unlike SSSIs, which for some habitats are a representative sample of sites that meet the national standard. Consequently, many sites of

SSSI quality are not designated and instead are selected as LWSs. Consequently, LWSs can be amongst the best sites for biodiversity.

Protected Species

Bats / Otter / Great Crested Newt

4.16 These species, known as European Protected Species, are protected under Regulation 43 of the 2017 Regulations as amended by the 2019 Regulations. This makes it an offence to deliberately capture, injure or kill an animal; deliberately disturb an animal; or damage or destroy a breeding site or resting place used by an animal.

4.17 Deliberate capture or killing is taken to include "accepting the possibility" of such capture or killing. Deliberate disturbance of animals includes in particular any disturbance which is likely a) to impair their ability (i) to survive, to breed or reproduce, or to rear or nurture their young, or (ii) in the case of animals of hibernating or migratory species, to hibernate or migrate; or b) to affect significantly the local distribution or abundance of the species to which they belong.

4.18 Where development works are at risk of causing one or more of the offences listed above, a mitigation licence from Natural England can be obtained to facilitate the works that would otherwise be illegal.

4.19 These species are also protected under Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended). This makes it an offence to intentionally or recklessly obstruct access to any structure or place used for shelter or protection or disturb an animal in such a place.

4.20 Lower levels of disturbance not covered by the *Conservation of Habitats and Species Regulations 2017* remain an offence under the *Wildlife and Countryside Act 1981* although a defence is available where such actions are the incidental result of a lawful activity that could not reasonably be avoided.

Water Vole

4.21 Water voles are protected under the *Wildlife and Countryside Act 1981* (as amended). There are no licensing purposes that explicitly cover development or other construction activities which could have an impact on water voles.

4.22 When development work is proposed in or near an area which is either known to or likely to contain water voles, then the developer will need to implement suitable mitigation to prevent impacts to water voles. The preferred mitigation option is to leave water voles *in situ*, with the development works adopting avoidance measures through redesign of the proposals.

4.23 Where impacts cannot be avoided, operations aimed at displacing water voles from a development site are now no longer covered by the "*incidental result of an otherwise lawful action*" defence in the *Wildlife and Countryside Act 1981* (as amended). Displacement of water voles now needs to be undertaken under a licence.

4.24 In England, small scale (limited to continuous lengths of bank not exceeding 50 m) displacement of water voles can be carried out at certain times of the year (February to April) for the purposes of conservation under a Class Licence by a registered person. For larger scale displacements or displacements outside of this period, displacement can be undertaken under a site-specific conservation licence.

4.25 Where it is considered that the best outcome for water voles is capture and translocation to a different location then this action is considered by Natural England to be outside the scope of the defence as the intentional capture of water voles is unlikely to be considered 'incidental'. In these circumstances there may be genuine grounds for issuing a conservation licence for the purpose of translocating the water vole population to suitable alternative habitat.

Nesting Birds

4.26 All wild birds are protected under the *Wildlife and Countryside Act 1981* (as amended), with some species afforded greater protection under Schedule 1 of the *Wildlife and Countryside Act 1981* (as amended). In addition to the protection from killing or taking that all birds receive, Schedule 1 birds and their young must not be disturbed at the nest.

4.27 There are no licensing purposes that explicitly cover development activities affecting wild birds.

Common Species of Reptile (common lizard, slow worm, grass snake and adder)

4.28 Common species of reptile are protected against intentional killing and injury under Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended). There is no requirement for a licence where development works affect common species of reptiles. Instead, Natural England advise[18] that where reptiles are present, they should be protected from any harm that might arise during the development works through appropriate mitigation.

Badger

4.29 Badgers and their setts are protected under the *Protection of Badgers Act 1992* (as amended). This makes it an offence to wilfully kill, injure or take a badger; or intentionally or recklessly damage, destroy or obstruct access to a badger sett or disturb a badger in its sett.

4.30 It is not illegal to carry out disturbance activities near setts that are not occupied, i.e. those that do not show signs of current use.

4.31 Where required, licences for development activities involving disturbance or sett interference or closure are issued by Natural England. Licences for activities involving watercourse maintenance, drainage works or flood defences are issued under a separate process.

4.32 When assessing the requirement for a licence in respect of development, Natural England[19] state that badgers are relatively tolerant of moderate levels of noise and activity around their setts, and that a low or moderate level of apparent disturbing activity at or near to badger setts does not necessarily disturb the badgers occupying those setts.

4.33 Licences are normally not granted from December to June inclusive (the badger breeding season) because dependent cubs may be present within setts.

Species and Habitats of Principal Importance for the Conservation of Biodiversity

4.34 Section 40 of the Natural Environment & Rural Communities Act (NERC) 2006 sets out the duty for public authorities to conserve biodiversity in England.

4.35 Habitats and species of principal importance for the conservation of biodiversity are identified by the Secretary of State for England, in consultation with Natural England, are referred to in Section 41 of the NERC Act for England. The list, known as the 'England Biodiversity List', of habitats and species can be found on the Natural England web site.

4.36 The 'England Biodiversity List' is used as a guide for decision makers such as public bodies, including local and regional authorities, in implementing their duty under Section 40 of the NERC Act 2006 to have regard to the conservation of biodiversity in England when carrying out their normal functions.

Hedgerows

4.37 Under The Hedgerows Regulations 1997, it is against the law to remove or destroy certain hedgerows without permission from the local planning authority. In general, permission will be required before removing hedges that are at least 20 metres in length, over 30 years old and contain certain species of plant. The local planning authority will assess the importance of the hedgerow using criteria set out in the regulations.

Planning Policy

National Planning Policy Framework, 2019

4.38 The National Planning Policy Framework (NPPF) sets out the Governments planning policies for England and how these are expected to be applied by Local Authorities within their Local Development Frameworks (LDF). Chapter 15 of the NPPF '*Conserving and enhancing the natural environment*' sets out the requirements to consider biodiversity in planning decisions.

[18] Reptiles: guidelines for developers, English Nature 2004
[19] Interpretation of 'Disturbance' in relation to badgers occupying a sett, Natural England (2009)

Local Planning Policy

4.39 The local planning policies are detailed in the North East Lincolnshire Local Plan document, adopted in 2018. Policies relevant to the Scheme are outlined in the table below.

Policy Document	Policy Number	Policy Detail
North East Lincolnshire Local Plan 2018	Policy 9 - Habitat Mitigation - South Humber Bank	1. Within the Mitigation Zone identified on the Policies Map (covering an area of agricultural land on the South Humber Bank between Pyewipe and Immingham), proposals which adversely affect the Humber Estuary SPA/Ramsar site due to the loss of functionally linked land will normally be required to provide their own mitigation in order to comply with the requirements of the Habitats Regulations. 2. The Strategic Mitigation sites, circa 120ha, identified on the Policies Map, represent those sites which have been identified to deliver appropriate mitigation which will address the adverse impacts of development within the Mitigation Zone at a strategic level. The identified Mitigation Sites will be safeguarded against development, and appropriate habitat will be delivered and managed on these sites in accordance with the North East Lincolnshire South Humber Gateway Ecological Mitigation Delivery Plan. 3. Development proposals on greenfield land[20] within the Mitigation Zone will be required to make contributions towards the provision and management of the mitigation sites identified on the Policies Map. Where landowners have contributed to the implementation strategy through the donation of land, the required contribution will be reduced by an equivalent value. 4. The Council will secure such contributions, based on a proportional approach relating to the site area. The formula for the calculation or the relevant contribution is as follows: **Contribution (£) = SA x (£MC/ha)** • The Mitigation Contribution (£MC/ha) will be £11,580/ha. This contribution is not index linked. • The Contribution shall be paid when development commences on site, or through agreement with the Council where a phase approach to delivery is accepted by the Council. 5. All other planning requirement will also be expected to be met. 6. On an exceptional basis independent alternative mitigation proposals will be considered on sites within the identified Mitigation Zone. Proposals should be supported by evidence that demonstrates that the alternative mitigation contributes to the overall mitigation strategy and ensures that the development avoids adverse effects on the integrity of the SPA/Ramsar site, alone or in combination. It will be a requirement of any planning consent that mitigation is implemented prior to the commencement of development.
	Policy 41 - Biodiversity and Geodiversity	1. The Council will have regard to biodiversity and geodiversity when considering development proposals, seeking specifically to: A. establish and secure appropriate management of, long-term mitigation areas within the Estuary Employment Zone, managed specifically to protect the integrity of the internationally important biodiversity sites (see Policy 9'Habitat Mitigation - South Humber Bank'); B. designate Local Wildlife Sites (LWSs) and Local Geological Sites (LGSs) in recognition of particular wildlife and geological value; C. protect manage and enhance international, national and local sites of biological and geological conservation importance, having regard to the hierarchy of designated sites, and the need for appropriate buffer zones; D. minimise the loss of biodiversity features, or where loss is unavoidable and justified ensure appropriate mitigation and compensation measures are provided; E. create opportunities to retain, protect, restore and enhance features of biodiversity value, including priority habitats and species; and, F. take opportunities to retain, protect and restore the connectivity between components of the Borough's ecological network. 2. Any development which would, either individually or cumulatively, result in significant harm to biodiversity which cannot be avoided, adequately mitigated or as a last resort compensated for, will be refused.

Local Biodiversity Action Plans

4.40 The Lincolnshire Biodiversity Plan (Collop, 2011)[21] was drafted by the Lincolnshire Biodiversity Partnership in 2011, and outlines biodiversity conservation objectives within the region and identifies priorities for action for priority habitats, species, locally important wildlife, and sites.

[20] Exceptionally brownfield sites may be required to contribute if evidence identifies that SPA/Ramsar birds have been using the site in significant numbers.
[21] Collop, C. (ed.), (2011). Lincolnshire Biodiversity Action Plan. 2011-2020 (3rd edition). Lincolnshire Biodiversity Partnership, October 2011. Available online at: http://www.southkesteven.gov.uk/CHttpHandler.ashx?id=7371&p=0

Appendix C Methodology

Desk Study

Background Records Search

4.41 The preliminary ecological assessment includes a desk study to obtain background records relevant to a Site and the Scheme. The data obtained provides contextual information for the scope of field surveys, to aid the evaluation of field survey results, and to provide supplementary information where complete field survey coverage is not possible.

4.42 The Study Area is dependent upon the nature, timing and scale of the Scheme, as well as the location of the Site and the surrounding landscape. These variables all contribute to what is referred to as the Zone of Influence (ZoI) of the Scheme, which is the area over which ecological features may be affected by biophysical changes because of the works and associated activities.

4.43 In March 2022 the Lincolnshire Environmental Records Centre (LERC) was contacted to obtain the following ecological data:

- Records of non-statutory designated sites (LWS's) within 2 km of the Site boundary;
- Records of legally protected and notable species (fauna and flora) within 2 km of the Site boundary, including Species of Principal Importance for the Conservation of Biodiversity listed under Section 41 of the Natural Environment & Rural Communities Act 2006 in the England Biodiversity List[22].

4.44 The Multi-Agency Geographic Information for the Countryside (MAGIC) website (www.magic.gov.uk) was reviewed for the following information:

- Designated sites of nature conservation importance (statutory sites only) within 2 km of the Site; and,
- Notable habitats within 2 km of the Site, these being areas of ancient woodland and 'Habitats of Principal Importance for the Conservation of Biodiversity' included in the England Biodiversity List.

Great Crested Newt Pond Search

4.45 Ordnance Survey maps and the *Where's the Path* website (https://wtp2.appspot.com/wheresthepath.htm) have been used to identify the presence of water bodies within 250 m of the Site boundary, in order to help establish if the land within and immediately surrounding the Site could be used by great crested newts. This species can use suitable terrestrial habitat up to 500 m from a breeding pond[23], though there is a notable decrease in great crested newt abundance beyond 250 m from a breeding pond[24].

Field Survey

Extended Phase 1 Habitat Survey

4.46 The preliminary ecological assessment includes a walkover survey of the Site, broadly following the Phase 1 habitat survey methodology as set out in Joint Nature Conservation Committee guidance (JNCC, 2010)[25]. This survey method records information on habitat types and is 'extended' to record any evidence of and potential for protected or notable species to be present. Plant names recorded during the survey follow Stace (2019)[26].

4.47 During the walkover survey, the following protected or notable species are considered:

[22] Section 40 of the Natural Environment & Rural Communities Act 2006 requires that very public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity. The Secretary of State has drawn up, in accordance with Section 41 of the Act and in consultation with Natural England, a list of habitats and species of principal importance for the conservation of biodiversity in England that is known as the *England Biodiversity List*

[23] Great Crested Newt Mitigation Guidelines (English Nature, 2001).

[24] Natural England. An assessment of the efficiency of capture techniques and the value of different habitats for the great crested newt (ENRR576) http://publications.naturalengland.org.uk/publication/134002.

[25] Joint Nature Conservation Committee (2010) *Handbook for Phase 1 habitat survey - a technique for environmental audit*.

[26] Stace, C E (2019) *New Flora of the British Isles, 4th Edition*. Cambridge University Press.

- **Badger:** the survey involves searching for signs of badger activity including setts, tracks, snuffle holes and latrines, following the methodology detailed in Scottish Badgers (2018)[27] and Harris et al (1989)[28];
- **Bats**: the survey involves searching for potential roosting sites for bats within trees and structures (such as buildings, bridges or underground features such as mines) and categorising the potential of those trees or structures to support roosting bats (negligible to high, or confirmed roost), in accordance with Bat Conservation Trust (BCT) guidance (2016)[29];
- **Otter**: the survey involves assessing the potential of watercourses and water bodies, and adjacent terrestrial habitat within the Survey Area to support otter, following RSPB (1994)[30] and Chanin, P. (2003)[31] guidance;
- **Water vole**: the survey involves assessing the potential of watercourses and water bodies within the Survey Area to support water vole, following The Mammal Society (2016)[32] guidance;
- **Birds**: the survey involves assessing the potential of habitats within the Survey Area to support breeding, wintering or migrating birds, either individually notable species or assemblages of both common and rarer species;
- **Great crested newt**: the survey involves assessing the potential of habitats within the Survey Area to support great crested newt, following English Nature (2001)[33] and Froglife (2001)[34] guidance;
- **Reptiles:** the survey involves assessing the potential of habitats within the Survey Area to support reptiles (typically adder, grass snake, common lizard and slow worm only, though in some locations and habitat types (most notably heathland) may also include smooth snake and sand lizard), following Froglife (1999)[35] and JNCC (2003)[36] guidance;
- **Notable species of invertebrate**: the survey involves assessing the potential of habitats within the Survey Area to support notable species of invertebrates, both terrestrial and aquatic (including white-clawed crayfish);
- **Protected or Notable species of plants**: the survey involves recording protected or notable plant species;
- **Other notable species**: the survey involves assessing the potential of habitat within the Survey Area to support other Notable Species, such as hedgehog, brown hare, polecat or common toad;
- **Non-native invasive plant species**: the survey involves recording evidence of the presence of invasive plants listed on Schedule 9 of the *Wildlife and Countryside Act 1981* (as amended) and subject to strict legal control.

Wintering Bird Survey

4.48 Surveys of wintering birds using the Site were undertaken to assess whether land is functionally linked to the Humber Estuary SPA/Ramsar site (and thus afforded additional protection in the planning process). The survey was based on methods following Bibby *et al* (2000)[37] and Gilbert *et al*, (1998)[38], with all areas within 50m of the Site. The surveys were undertaken twice per month for a period of 2 hours either side of high tide, with surveys alternating between early in the morning, commencing just after sunrise and late afternoon, finishing before dusk in February and March 2022. This approach helped to establish the

[27] Scottish Badgers (2018). *Surveying for Badgers: Good Practice Guidelines*. Version 1.
[28] Harris, S. Cresswell, P. and Jefferies, D. (1989). *Surveying Badgers*.
[29] Collins, J.(ed) (2016). *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd edition). The Bat Conversation Trust. London.
[30] Ward, D. Holmes, N. Jose, P. (1994). *The New Rivers and Wildlife Handbook*. Royal Society for the Protection of Birds. Bedfordshire.
[31] Chanin, P (2003b). *Monitoring the Otter Lutra lutra*. Conserving Natura 2000 Rivers Monitoring Series No 10. English Nature, Peterborough.
[32] Dean, M. Strachan, R. Gow, D. Andrews, R. (2016). *The Water Vole Mitigation Handbook (The Mammal Society Guidance Series).* Eds Fiona Mathews and Paul Chanin. The Mammal Society. London.
[33] English Nature (2001). *The Great Crested Newt Mitigation Guidelines*.
[34] Froglife (2001). *The Great Crested Newt Conservation Handbook*.
[35] Froglife (1999). *Reptile Survey: An introduction to planning, conducting and interpreting surveys for snake and lizard conservation*. Froglife Advice Sheet 10. Froglife, Halesworth.
[36] Joint Nature Conservation Committee (2003). *Herpetofauna Workers Manual*.
[37] Bibby *et al* (2000). *Bird Census Techniques*. Academic Press, London.
[38] Gilbert *et al* (1998). *Bird Monitoring Methods: A Manual of Techniques for Key UK Species*. The Royal Society for the Protection of Birds, Sandy.

overall use of the Site by different species groups, particularly any species which may arrive at or after dusk to roost overnight.

4.49 On each survey visit the route was walked at a slow pace with start and finish times noted. All birds seen and heard will be recorded directly onto a base map of the Site. Registrations of birds were recorded using standard British Trust for Ornithology (BTO) two letter species codes. All bird species were recorded and mapped across the Site. Each survey visit was undertaken to coincide with high tide at the adjacent Immingham Docks during appropriate weather conditions (dry with a wind speed <F5) for recording birds survey. The times and dates of the surveys and the weather conditions are set out in the table below.

Visit Number	Date	High Tide Time	Sunrise/Sunset	Survey Times	Weather Conditions
1	04/02/2022	08:14	07:40	07:14 – 09:14	F3SW, 4°C, dry, good visibility, cloud cover 7/8.
2	28/02/2022	16:14	17:40	12;35 – 16:35	F3S, 10°C, dry (then rain from 15:00), cloud cover 8/8.
3	17/03/2022	17:33	18:08	12:30 – 14:30	F4SW, 13°C, dry, good visibility, cloud cover 2/8.
4	21/03/2022	07:53	06:01	06:50 – 08:50	F1SE, 4 to 11°C, dry, good visibility, cloud cover 2/8.

Limitations and Assumptions

4.50 This PEA report pertains only to the land off Kings Road, which is referred to as the 'West Site' in the wider IGET Scheme as detailed in the Scoping report for the Scheme.

4.51 The aim of a desk study is to help characterise the baseline context of a Scheme and provide valuable background information that would not be captured by a single site survey alone. Information obtained through desk study is dependent upon people and organisations having made and submitted records for the area of interest. As such, a lack of records for a particular habitat or species does not necessarily mean that it does not occur in the study area. Likewise, the presence of records for particular habitats and species does not automatically mean that these still occur within the area of interest or are relevant in the context of the Scheme.

4.52 Where habitat boundaries coincide with physical boundaries recorded on OS maps the resolution is as determined by the scale of mapping. Elsewhere, habitat mapping is as estimated in the field and/or recorded by hand-held Global Positioning System (GPS). Where areas of habitat are given these are approximate and should be verified by measurement on site where required for design or construction. While indicative locations of trees are recorded this does not replace requirements for detailed specialist arboricultural survey to British Standard 5837:2012 Trees in Relation to Design, Demolition and Construction.

Appendix D Target Notes and Photographs

Target Note	Description	Photograph(s)
TN1	Grassland which has established on the formerly cultivated fields that has established .	
TN2	Example of scattered scrub which has established throughout the Site within the grassland.	
TN3	Ditch supporting common reed.	

Appendix E LincoInshire Desk Study Record Report

LERC Search Summary Report

Grid Reference: TA 20056 14641
Buffer: 2km

Date of publication: 17/03/2022
Expires: 17/03/2023

Achieving more for nature

GLNP
GREATER LINCOLNSHIRE NATURE PARTNERSHIP

Report Details

Produced for	Nicole Mallett, AECOM
Search area	

Terms and conditions

1. The data and reports provided by LERC are only to be used for the specific purpose they were produced.
2. The data and any copyright remains the property of GLNP, its licensors and/or the data providers (as applicable), and the data products and services remain the copyright of GLNP.
3. Permission to use the data and reports provided by LERC expires 12 months following supply.

For full terms and conditions see https://search.glnp.org.uk/terms-and-conditions

This report summarises a search of statutory sites, non-statutory sites, other sites, habitats and species within the specified area; where no information is returned for a section, it is excluded from this summary report.

About the Lincolnshire Environmental Records Centre

The Lincolnshire Environmental Records Centre (LERC) collates wildlife and geological information for Greater Lincolnshire from various sources and makes it available for various uses. This data is crucial to aid conservation management of sites, to help organisations prioritise action, and to understand the distribution of species and trends over time. For more information on LERC or to request a data search, visit the website at https://glnp.org.uk/partnership/lerc/

an ALERC accredited LERC
Association of Local Environmental Records Centres

Lincolnshire Environmental Records Centre is an ALERC accredited LRC, meeting the standard level criteria.
For more information on acceditation, see the ALERC website at http://www.alerc.org.uk/alerc-accreditation.html

Statutory Sites

Statutory sites are those afforded legal protection aimed at preventing activities that may damage features of interest. Further information on these sites is available from Natural England (SSSIs, NNRs, LNRs, SPAs, SACs, Ramsars) and The National Association for Areas of Outstanding Natural Beauty (AONBs).

Code	Designation	Status	Name
1	SSSI	Notified	Humber Estuary
2	SPA	Classified	Humber Estuary
3	SAC	Designated	Humber Estuary
4	Ramsar	Listed	Humber Estuary

Statutory Sites within the search area

Space restrictions on the map may result in some sites not being labelled.

- Site of Special Scientific Interest
- Special Protection Area
- Special Area of Conservation
- Ramsar Site
- Search area
- LERC boundary

Non-statutory sites

The GLNP works directly with local authorities to coordinate the Local Sites system in Greater Lincolnshire. Sites are selected by the Nature Partnership, based on recommendations made by its expert working groups known as the LWS Panel and LGS Panel. The Register of Local Sites is then submitted for inclusion within local authority planning policy.

These sites are recognition of wildlife or geological value and are a testament to the land management that is already being undertaken on them. Identifying these sites helps local authorities meet their obligations under legislation and government guidance, including reporting on the number of sites in positive management for Single Data List Indicator 160-00.

Code	Designation	Status	Name
1	LWS	Selected	Laporte Road Brownfield Site

Non-statutory sites within the search area

Space restrictions on the map may result in some sites not being labelled. Please refer to the site citations for details.

Local Wildlife Site

LERC boundary

Search area

Habitats

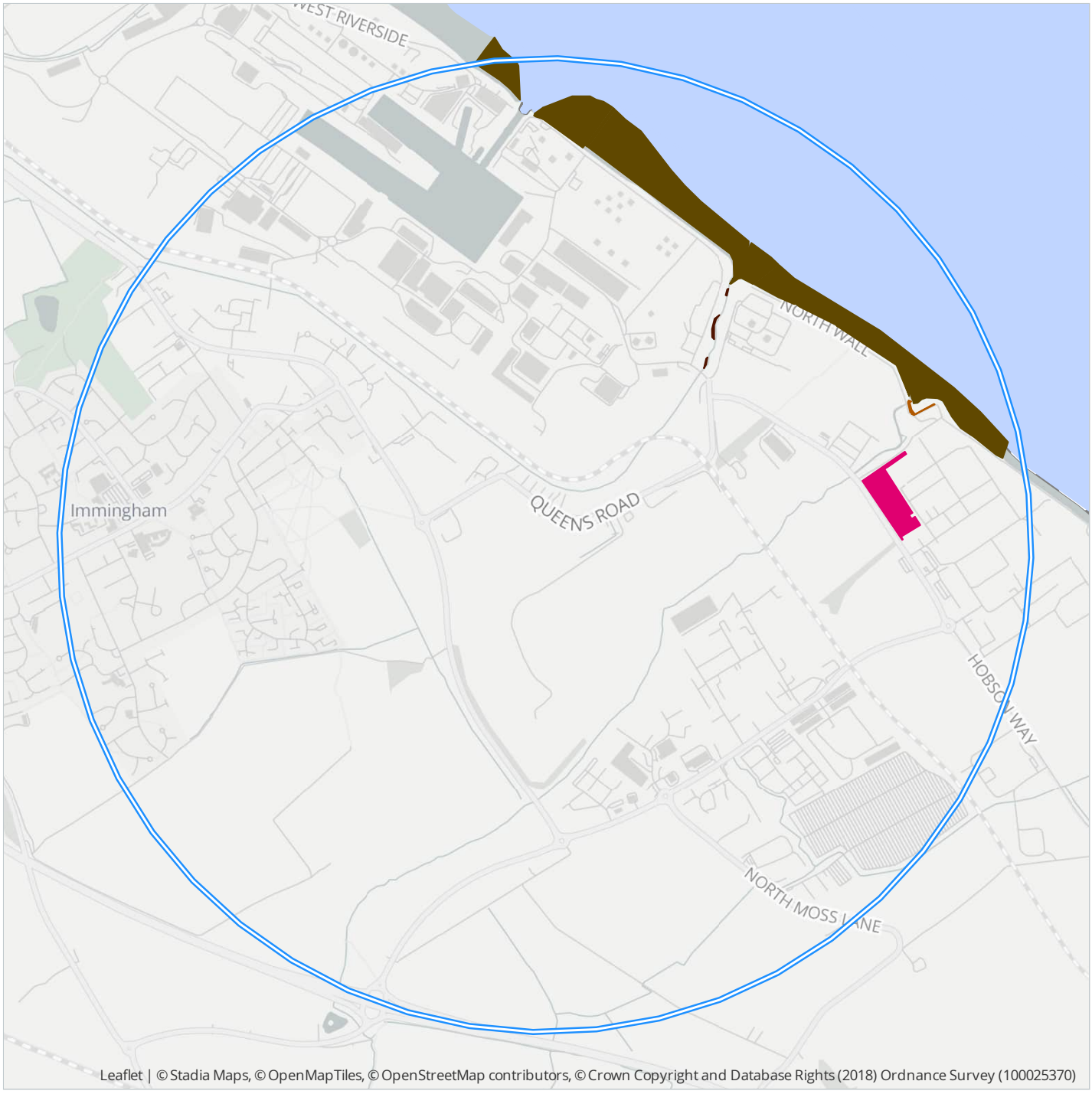
Priority habitats are those identified as being the most threatened and requiring conservation action in the UK. The most-recent list of UK priority species and habitats was published in August 2007 following a 2-year review of the process and priorities, representing the most comprehensive analysis of such information ever undertaken in the UK.

The data presented is the most up-to-date of the data collated by the GLNP and mostly comes from surveys of Local Sites; further historic data and non-Priority habitat data may also be available. Absence of information doesn't mean that the Priority habitat isn't present merely that no information is held.

A number of different datasets have been consulted to produce this report - a summary of attribution statements is available at https://glnp.org.uk/images/uploads/services/lincolnshire-environmental-records-centre/habitat%20attribution.pdf.

Type	Habitat	Survey Date	Area (ha)
Priority Habitat	Coastal saltmarsh	2001	0.07
Priority Habitat	Intertidal mudflats	2003 - 2009	28.63
Priority Habitat	Open mosaic habitats on previously developed land	2015	2.93
Priority Habitat	Reedbeds	2015	0.1
Priority Habitat	Rivers	2010 - 2011	10440.42

Habitats within the search area



Space restrictions on the map may result in some sites not being labelled.

- Coastal saltmarsh
- Intertidal mudflats
- Open mosaic habitats on previously developed land
- Reedbeds
- Rivers
- Search area
- LERC boundary

Species

Lincolnshire Environmental Records Centre holds records on the following species within or overlapping the search area. Data shown is as held by LERC; past records of presence of a species does not guarantee continued occurrence and absence of records does not imply absence of a species, merely that no records are held. Confidential data, zero abundance records, data at poorly defined geographic resolutions and data pending validation and/or verification are also excluded from this report. A number of different datasets have been consulted to produce this report - a summary of attribution statements is available at https://glnp.org.uk/images/uploads/services/lincolnshire-environmental-records-centre/species%20attribution.pdf

Amphibian (4 taxa)

Common Frog, *Rana temporaria*	3	1977 - 2004	Protected
Common Toad, *Bufo bufo*	4	2004 - 2012	Protected, Priority
Great Crested Newt, *Triturus cristatus*	1	1976 - 1976	Protected, Priority, Local Priority
Smooth Newt, *Lissotriton vulgaris*	2	2004 - 2004	Protected, Local Priority

Bird (62 taxa)

Avocet, *Recurvirostra avosetta*	2	2003 - 2019	Protected
Barn Owl, *Tyto alba*	7	1999 - 2017	Protected, Local Priority
Black-tailed Godwit, *Limosa limosa*	55	1995 - 2020	Protected
Brambling, *Fringilla montifringilla*	4	2010 - 2011	Protected
Bullfinch, *Pyrrhula pyrrhula*	48	1979 - 2020	Local Priority
Canada Goose, *Branta canadensis*	17	2007 - 2020	Non-native
Cattle Egret, *Bubulcus ibis*	1	2016 - 2016	Non-native
Cetti's Warbler, *Cettia cetti*	1	2020 - 2020	Protected
Collared Dove, *Streptopelia decaocto*	122	2004 - 2020	Non-native
Corn Bunting, *Emberiza calandra*	1	1977 - 1977	Local Priority
Cuckoo, *Cuculus canorus*	13	1975 - 2020	Priority
Curlew, *Numenius arquata*	196	1989 - 2020	Priority, Local Priority
Fieldfare, *Turdus pilaris*	40	1978 - 2019	Protected
Gadwall, *Mareca strepera*	100	2019 - 2020	Non-native
Goldeneye, *Bucephala clangula*	1	1998 - 1998	Protected
Grasshopper Warbler, *Locustella naevia*	4	2004 - 2010	Priority
Green Sandpiper, *Tringa ochropus*	49	2004 - 2020	Protected
Greenshank, *Tringa nebularia*	18	2001 - 2020	Protected
Grey Partridge, *Perdix perdix*	4	2005 - 2020	Priority, Local Priority, Non-native
Greylag Goose, *Anser anser*	91	2010 - 2020	Protected
Hen Harrier, *Circus cyaneus*	1	2009 - 2009	Protected
Hobby, *Falco subbuteo*	5	2001 - 2010	Protected
House Sparrow, *Passer domesticus*	140	1977 - 2017	Priority, Local Priority

Bird (62 taxa)			
Kingfisher, *Alcedo atthis*	5	1999 - 2020	Protected
Lapwing, *Vanellus vanellus*	153	1979 - 2020	Priority, Local Priority
Linnet, *Linaria cannabina*	110	1977 - 2020	Local Priority
Little Gull, *Hydrocoloeus minutus*	2	2013 - 2020	Protected
Little Ringed Plover, *Charadrius dubius*	6	2002 - 2020	Protected
Marsh Harrier, *Circus aeruginosus*	1	2012 - 2012	Protected
Merlin, *Falco columbarius*	1	1998 - 1998	Protected
Mute Swan, *Cygnus olor*	51	2007 - 2020	Non-native
Osprey, *Pandion haliaetus*	2	2016 - 2020	Protected
Peregrine, *Falco peregrinus*	32	2002 - 2020	Protected
Pheasant, *Phasianus colchicus*	61	2005 - 2020	Non-native
Pink-footed Goose, *Anser brachyrhynchus*	12	1999 - 2019	Non-native
Pochard, *Aythya ferina*	5	2007 - 2020	Non-native
Purple Sandpiper, *Calidris maritima*	1	2016 - 2016	Protected
Red Kite, *Milvus milvus*	2	2009 - 2015	Protected
Red-legged Partridge, *Alectoris rufa*	2	2011 - 2017	Non-native
Redshank, *Tringa totanus*	195	1978 - 2020	Local Priority
Redwing, *Turdus iliacus*	40	1974 - 2017	Protected
Reed Bunting, *Emberiza schoeniclus*	99	1975 - 2020	Priority, Local Priority
Ring Ouzel, *Turdus torquatus*	3	2011 - 2017	Priority
Rock Dove, *Columba livia*	6	2007 - 2020	Non-native
Rose-coloured Starling, *Pastor roseus*	1	2015 - 2015	Non-native
Ruff, *Calidris pugnax*	1	1995 - 1995	Protected
Scaup, *Aythya marila*	1	2007 - 2007	Protected, Priority
Skylark, *Alauda arvensis*	126	1979 - 2020	Local Priority
Snipe, *Gallinago gallinago*	33	1998 - 2020	Local Priority
Snow Bunting, *Plectrophenax nivalis*	3	1989 - 2009	Protected
Song Thrush, *Turdus philomelos*	38	2004 - 2017	Local Priority
Spoonbill, *Platalea leucorodia*	2	2020 - 2020	Protected
Spotted Flycatcher, *Muscicapa striata*	1	2011 - 2011	Priority
Starling, *Sturnus vulgaris*	233	1978 - 2020	Local Priority
Swift, *Apus apus*	31	2005 - 2020	Local Priority
Tree Sparrow, *Passer montanus*	36	1977 - 2017	Priority, Local Priority
Turtle Dove, *Streptopelia turtur*	8	2003 - 2011	Priority, Local Priority
Whimbrel, *Numenius phaeopus*	1	2020 - 2020	Protected
Wigeon, *Mareca penelope*	11	2004 - 2020	Non-native

Bird (62 taxa)			
Wood Sandpiper, *Tringa glareola*	2	2002 - 2020	Protected
Yellow Wagtail, *Motacilla flava*	31	2004 - 2020	Local Priority
Yellowhammer, *Emberiza citrinella*	108	1977 - 2020	Priority, Local Priority

Bony Fish (Actinopterygii) (2 taxa)			
Common Carp, *Cyprinus carpio*	19	1988 - 1995	Non-native
Crucian Carp, *Carassius carassius*	11	1988 - 1995	Non-native

Conifer (6 taxa)			
Austrian Pine, *Pinus nigra*	3	2009 - 2019	Non-native
European Larch, *Larix decidua*	1	2015 - 2015	Non-native
Lawson's Cypress, *Chamaecyparis lawsoniana*	1	1997 - 1997	Non-native
Leyland Cypress, *Cupressus macrocarpa x Xanthocyparis nootkatensis = X Cuprocyparis leylandi*	4	2010 - 2019	Non-native
Monkey-puzzle, *Araucaria araucana*	1	2009 - 2009	Non-native
Norway Spruce, *Picea abies*	2	2010 - 2015	Non-native

Flowering Plant (139 taxa)			
Alsike Clover, *Trifolium hybridum*	2	2009 - 2019	Non-native
American Willowherb, *Epilobium ciliatum*	5	2009 - 2019	Non-native
Apple, *Malus pumila*	12	2008 - 2019	Non-native
Balm-of-Gilead, *Populus balsamifera x deltoides = P. x jackii*	1	2019 - 2019	Non-native
Barren Brome, *Bromus sterilis*	20	1993 - 2019	Non-native
Beaked Hawk's-beard, *Crepis vesicaria*	15	1993 - 2015	Non-native
Black Horehound, *Ballota nigra*	2	2015 - 2019	Non-native
Black-bindweed, *Fallopia convolvulus*	7	1993 - 2019	Non-native
Black-grass, *Alopecurus myosuroides*	9	1993 - 2019	Non-native
Bluebell, *Hyacinthoides non-scripta x hispanica = H. x massartiana*	1	2019 - 2019	Non-native
Bread Wheat, *Triticum aestivum*	4	2009 - 2019	Non-native
Bristly Oxtongue, *Picris echioides*	54	1988 - 2019	Non-native
Broad Bean, *Vicia faba*	1	2014 - 2014	Non-native
Broad-leaved Cockspurthorn, *Crataegus persimilis*	1	2019 - 2019	Non-native
Bugloss, *Anchusa arvensis*	1	2014 - 2014	Non-native
Butterfly-bush, *Buddleja davidii*	16	1997 - 2019	Non-native
Buttonweed, *Cotula coronopifolia*	1	2015 - 2015	Non-native
Canadian Fleabane, *Conyza canadensis*	11	2008 - 2019	Non-native
Canary-grass, *Phalaris canariensis*	1	2009 - 2009	Non-native
Charlock, *Sinapis arvensis*	15	1993 - 2019	Non-native

Flowering Plant (139 taxa)			
Cherry Laurel, *Prunus laurocerasus*	1	2015 - 2015	Non-native
Cherry Plum, *Prunus cerasifera*	4	2009 - 2009	Non-native
Common Field-speedwell, *Veronica persica*	18	1993 - 2019	Non-native
Common Fumitory, *Fumaria officinalis*	4	1993 - 2019	Non-native
Common Mallow, *Malva sylvestris*	11	1993 - 2019	Non-native
Common Poppy, *Papaver rhoeas*	11	1993 - 2019	Non-native
Common Vetch, *Vicia sativa subsp. segetalis*	3	1997 - 2015	Non-native
Cornflower, *Centaurea cyanus*	1	2014 - 2014	Priority, Non-native
Cornus sanguinea subsp. australis, *Cornus sanguinea subsp. australis*	2	2015 - 2019	Non-native
Cotton Thistle, *Onopordum acanthium*	2	1996 - 1996	Non-native
Crown Vetch, *Securigera varia*	2	2010 - 2015	Non-native
Cut-leaved Crane's-bill, *Geranium dissectum*	33	1993 - 2019	Non-native
Cut-leaved Dead-nettle, *Lamium hybridum*	3	1997 - 2014	Non-native
Dotted Loosestrife, *Lysimachia punctata*	1	2015 - 2015	Non-native
Dwarf Mallow, *Malva neglecta*	1	2009 - 2009	Non-native
Dwarf Spurge, *Euphorbia exigua*	1	1993 - 1993	Non-native
Eastern Rocket, *Sisymbrium orientale*	2	2007 - 2007	Non-native
Equal-leaved Knotgrass, *Polygonum arenastrum*	2	2009 - 2019	Non-native
Feverfew, *Tanacetum parthenium*	2	2009 - 2019	Non-native
Field Forget-me-not, *Myosotis arvensis*	22	1993 - 2019	Non-native
Field Pansy, *Viola arvensis*	3	1997 - 2007	Non-native
Field Penny-cress, *Thlaspi arvense*	2	1997 - 2009	Non-native
Flowering Currant, *Ribes sanguineum*	1	2019 - 2019	Non-native
Foxtail Barley, *Hordeum jubatum*	2	2015 - 2019	Non-native
Franchet's Cotoneaster, *Cotoneaster franchetii*	1	2015 - 2015	Non-native
Fumaria officinalis subsp. officinalis, *Fumaria officinalis subsp. officinalis*	2	2007 - 2007	Non-native
Garden Asparagus, *Asparagus officinalis*	1	2009 - 2009	Non-native
Garden Candytuft, *Iberis umbellata*	1	2014 - 2014	Non-native
Garden Lobelia, *Lobelia erinus*	1	2015 - 2015	Non-native
Garden Privet, *Ligustrum ovalifolium*	2	2009 - 2019	Non-native
Giant-rhubarb, *Gunnera tinctoria*	1	2015 - 2015	Non-native
Gooseberry, *Ribes uva-crispa*	1	1997 - 1997	Non-native
Greater Burdock, *Arctium lappa*	2	2014 - 2015	Non-native
Greater Periwinkle, *Vinca major*	2	2009 - 2019	Non-native
Green Alkanet, *Pentaglottis sempervirens*	1	2019 - 2019	Non-native
Green Field-speedwell, *Veronica agrestis*	2	1997 - 1997	Non-native
Grey Alder, *Alnus incana*	3	1997 - 2019	Non-native

Flowering Plant (139 taxa)			
Guernsey Fleabane, *Conyza sumatrensis*	1	2009 - 2009	Non-native
Hare's-tail, *Lagurus ovatus*	1	2013 - 2013	Non-native
Hedge Mustard, *Sisymbrium officinale*	25	1993 - 2019	Non-native
Hedgerow Crane's-bill, *Geranium pyrenaicum*	1	2019 - 2019	Non-native
Hemlock, *Conium maculatum*	55	1993 - 2019	Non-native
Henbit Dead-nettle, *Lamium amplexicaule*	1	2011 - 2011	Non-native
Hoary Cress, *Lepidium draba*	6	1993 - 2019	Non-native
Horse-chestnut, *Aesculus hippocastanum*	2	2014 - 2015	Non-native
Horse-radish, *Armoracia rusticana*	6	1997 - 2019	Non-native
Hybrid Black-poplar, *Populus nigra x deltoides = P. x canadensis*	11	1997 - 2019	Non-native
Hybrid Coralberry, *Symphoricarpos microphyllus x orbiculatus = S. x chenaultii*	1	2019 - 2019	Non-native
Hybrid Crack-willow, *Salix euxina x alba = S. x fragilis*	1	2008 - 2008	Non-native
Italian Rye-grass, *Lolium multiflorum*	7	1993 - 2019	Non-native
Ivy-Leaved Speedwell, *Veronica hederifolia subsp. hederifolia*	1	2014 - 2014	Non-native
Japanese Honeysuckle, *Lonicera japonica*	1	2019 - 2019	Non-native
Japanese Knotweed, *Fallopia japonica*	1	2009 - 2009	Non-native
Japanese Rose, *Rosa rugosa*	4	2010 - 2019	Non-native
Lamiastrum galeobdolon subsp. argentatum, *Lamiastrum galeobdolon subsp. argentatum*	1	2019 - 2019	Non-native
Large Bindweed, *Calystegia silvatica*	9	2008 - 2019	Non-native
Least Duckweed, *Lemna minuta*	1	2013 - 2013	Non-native
Lepidium draba subsp. draba, *Lepidium draba subsp. draba*	3	2010 - 2019	Non-native
Lesser Swine-cress, *Lepidium didymum*	3	2014 - 2015	Non-native
Lilac, *Syringa vulgaris*	3	1999 - 2019	Non-native
London Plane, *Platanus occidentalis x orientalis = P. x hispanica*	2	2015 - 2015	Non-native
Long Smooth-headed Poppy, *Papaver dubium*	3	1997 - 2019	Non-native
Lucerne, *Medicago sativa subsp. sativa*	1	2015 - 2015	Non-native
Moth Mullein, *Verbascum blattaria*	1	2019 - 2019	Non-native
Mugwort, *Artemisia vulgaris*	41	1993 - 2019	Non-native
Narrow-leaved Pepperwort, *Lepidium ruderale*	4	1993 - 2019	Non-native
Narrow-leaved Ragwort, *Senecio inaequidens*	13	2010 - 2019	Non-native
Norway Maple, *Acer platanoides*	2	2009 - 2015	Non-native
Nuttall's Waterweed, *Elodea nuttallii*	7	1997 - 2015	Non-native
Oil-seed Rape, *Brassica napus subsp. oleifera*	10	1997 - 2019	Non-native
Opium Poppy, *Papaver somniferum*	5	1997 - 2015	Non-native
Osier, *Salix viminalis*	9	1997 - 2019	Non-native
Oxford Ragwort, *Senecio squalidus*	33	1993 - 2019	Non-native

Flowering Plant (139 taxa)			
Petty Spurge, *Euphorbia peplus*	5	2008 - 2019	Non-native
Pineappleweed, *Matricaria discoidea*	11	1993 - 2019	Non-native
Prickly Lettuce, *Lactuca serriola*	14	1997 - 2019	Non-native
Purple Toadflax, *Linaria purpurea*	7	1997 - 2019	Non-native
Rat's-tail Fescue, *Vulpia myuros*	17	1993 - 2019	Non-native
Red Dead-nettle, *Lamium purpureum*	8	1997 - 2019	Non-native
Red Horse-chestnut, *Aesculus carnea*	1	2019 - 2019	Non-native
Red Valerian, *Centranthus ruber*	1	2014 - 2014	Non-native
Reflexed Stonecrop, *Sedum rupestre*	2	1988 - 2009	Non-native
Ribbed Melilot, *Melilotus officinalis*	3	1993 - 2013	Non-native
Russian Comfrey, *Symphytum officinale x asperum = S. x uplandicum*	2	2015 - 2019	Non-native
Russian-vine, *Fallopia baldschuanica*	2	2014 - 2014	Non-native
Salsify, *Tragopogon porrifolius*	1	2011 - 2011	Non-native
Scented Mayweed, *Matricaria chamomilla*	10	1993 - 2015	Non-native
Scentless Mayweed, *Tripleurospermum inodorum*	39	1993 - 2019	Non-native
Shaggy Soldier, *Galinsoga quadriradiata*	1	2009 - 2009	Non-native
Shepherd's-purse, *Capsella bursa-pastoris*	19	1993 - 2019	Non-native
Six-rowed Barley, *Hordeum vulgare*	2	2010 - 2014	Non-native
Slender Speedwell, *Veronica filiformis*	1	2015 - 2015	Non-native
Small Nettle, *Urtica urens*	2	1997 - 1997	Non-native
Small Toadflax, *Chaenorhinum minus*	1	1997 - 1997	Non-native
Snow-in-summer, *Cerastium tomentosum*	1	1997 - 1997	Non-native
Snowdrop, *Galanthus nivalis*	5	1999 - 2020	Non-native
Soapwort, *Saponaria officinalis*	1	2009 - 2009	Non-native
Spreading Cotoneaster, *Cotoneaster divaricatus*	1	2019 - 2019	Non-native
Stag's-horn Sumach, *Rhus typhina*	1	2009 - 2009	Non-native
Sticky Groundsel, *Senecio viscosus*	11	1993 - 2013	Non-native
Sun Spurge, *Euphorbia helioscopia*	3	1997 - 2014	Non-native
Swedish Whitebeam, *Sorbus intermedia*	6	1997 - 2019	Non-native
Swine-cress, *Lepidium coronopus*	1	1997 - 1997	Non-native
Sycamore, *Acer pseudoplatanus*	20	1993 - 2019	Non-native
Tall Melilot, *Melilotus altissimus*	12	1994 - 2019	Non-native
Tall Rocket, *Sisymbrium altissimum*	1	1997 - 1997	Non-native
Wall Barley, *Hordeum murinum*	11	1993 - 2019	Non-native
Wall Cotoneaster, *Cotoneaster horizontalis*	1	2019 - 2019	Non-native
Weeping Willow, *Salix alba x babylonica = S. x sepulcralis*	2	2015 - 2019	Non-native
Weld, *Reseda luteola*	24	1993 - 2019	Non-native

Flowering Plant (139 taxa)			
White Campion, *Silene latifolia*	14	1993 - 2019	Non-native
White Dead-nettle, *Lamium album*	25	1993 - 2019	Non-native
White Dogwood, *Cornus alba*	1	2009 - 2009	Non-native
White Melilot, *Melilotus albus*	1	2019 - 2019	Non-native
White Poplar, *Populus alba*	2	2019 - 2019	Non-native
White Stonecrop, *Sedum album*	4	1988 - 2019	Non-native
White Willow, *Salix alba*	4	2009 - 2015	Non-native
Wild Plum, *Prunus domestica*	4	2009 - 2019	Non-native
Wild-oat, *Avena fatua*	8	1993 - 2019	Non-native

Insect - Butterfly (4 taxa)			
Small Heath, *Coenonympha pamphilus*	16	1998 - 2016	Priority
Wall, *Lasiommata megera*	16	1999 - 2014	Priority
White Admiral, *Limenitis camilla*	2	2014 - 2014	Priority
White-letter Hairstreak, *Satyrium w-album*	34	2003 - 2020	Protected, Priority

Insect - Moth (1 taxa)			
Cinnabar, *Tyria jacobaeae*	1	2015 - 2015	Priority

Insect - True Bug (Hemiptera) (1 taxa)			
Western Conifer Seed Bug, *Leptoglossus occidentalis*	1	2010 - 2010	Non-native

Marine Mammal (1 taxa)			
Common Porpoise, *Phocoena phocoena*	2	2010 - 2010	Protected, Priority

Mollusc (2 taxa)			
Bladder snails, *Physa*	2	2006 - 2006	Non-native
Jenkins' Spire Snail, *Potamopyrgus antipodarum*	9	2006 - 2017	Non-native

Terrestrial Mammal (10 taxa)			
Brown Hare, *Lepus europaeus*	7	1976 - 2018	Priority
Brown Rat, *Rattus norvegicus*	2	1977 - 2002	Non-native
Eastern Grey Squirrel, *Sciurus carolinensis*	4	1977 - 2018	Non-native
Eurasian Badger, *Meles meles*	1	2016 - 2016	Protected
Eurasian Otter, *Lutra lutra*	1	2020 - 2020	Protected, Priority
European Rabbit, *Oryctolagus cuniculus*	9	1977 - 2015	Non-native
European Water Vole, *Arvicola amphibius*	8	2007 - 2018	Protected, Priority, Local Priority

Terrestrial Mammal (10 taxa)			
Harvest Mouse, *Micromys minutus*	1	2009 - 2009	Priority
House Mouse, *Mus musculus*	1	1977 - 1977	Non-native
West European Hedgehog, *Erinaceus europaeus*	8	1976 - 2018	Priority

Terrestrial Mammal (bat) (5 taxa)			
Bat, *Chiroptera*	11	2001 - 2014	Protected, Priority, Local Priority
Brown Long-eared Bat, *Plecotus auritus*	1	2008 - 2008	Protected, Priority, Local Priority
Common Pipistrelle, *Pipistrellus pipistrellus sensu stricto*	4	2003 - 2011	Protected, Local Priority
Noctule Bat, *Nyctalus noctula*	2	2003 - 2011	Protected, Priority, Local Priority
Pipistrelle Bat species, *Pipistrellus*	5	1992 - 2009	Protected, Priority, Local Priority

Greater Lincolnshire Nature Partnership
Banovallum House
Manor House Street
Horncastle
Lincolnshire
LN9 5HF

Tel: 01507 528398
Email: info@glnp.org.uk
Web: www.glnp.org.uk

Achieving more for nature

GLNP
GREATER LINCOLNSHIRE
NATURE PARTNERSHIP

aecom.com

Appendix D Cultural Heritage Desk Based Assessment

Immingham Green Energy Terminal

Heritage Desk-Based Assessment

13 July 2022

Delivering a better world

Quality information

Prepared by	Checked by	Verified by	Approved by
			
Andrew Copp Principal Heritage Consultant	Helen Maclean Technical Director, Archaeology	Amy Jones Technical Director	Neil Macnab Technical Director
			
Katy Murray Graduate Built Heritage Consultant			

Revision History

Revision	Revision date	Details	Authorized	Name	Position
0.1	13.07.2022	First draft for client review	NM	Neil Macanb	Technical Director (Archaeology & Heritage)

Distribution List

# Hard Copies	PDF Required	Association / Company Name
-	1	Air Products

Prepared for: Air Products

Prepared by:

Andrew Copp
Principal Heritage Consultant
E: andrew.copp@aecom.com

Katy Murray
Graduate Built Heritage Consultant
E: katy.murray@aecom.com

AECOM Limited
16 Toft Green
York YO1 6JT
United Kingdom

T: +44 (1904) 652709
aecom.com

Table of Contents

Figures

Plates

1. Introduction

1.1 AECOM were commissioned by Air Products to produce a historic environment desk-based assessment (DBA) for the construction of a new ammonia import terminal (see Appendix B Figure 1). The purpose of this historic environment desk-based assessment is to understand the potential impacts of the proposed development on the significance, including setting, of the heritage assets affected. The requirement for this assessment and its scope is guided by policy contained within the National Policy Statement (NPS) for Energy EN-1specifically paragraph 5.8.8, which seeks an assessment proportionate to the assets importance and sufficient to understand the potential impacts of the proposed development and to appraise the nature and extent of any impact upon the setting and significance of those heritage assets affected.

1.2 This DBA identifies all known designated and non-designated heritage assets within the proposed development and the study area in order to establish the archaeological and historical background. It assesses the potential for previously unrecorded buried archaeological remains to exist within the land required to construct and operate the proposed development and provides an assessment of the significance of the heritage assets with the potential to be affected by the proposed development. It concludes with identification of impacts on potentially affected assets and any anticipated constraints

1.3 All work has been carried out in line with the Chartered Institute for Archaeologists (CIfA) Standard and guidance for historic environment desk-based assessment (CIfA, 2020) and the Code of Conduct (CIfA, 2021).

Proposed Development Description

1.4 This DBA covers the landside terrestrial parts of the proposed development. The proposed new facility at the Port will comprise:

(a) on the landside (terrestrial components):

(i) refrigerated ammonia storage;

(ii) hydrogen production units, known as dissociators. They use the ammonia as feed to produce hydrogen;

(iii) hydrogen liquefiers to liquefy the hydrogen for temporary storage and road transport;

(iv) loading bays to fill the road tankers with hydrogen.

1.5 The construction of the jetty and topside jetty infrastructure will facilitate the import of ammonia into Immingham. The ammonia will then be stored and processed to create green hydrogen for onward transport to other parts of the UK. The jetty, topside and pipeline to the storage facility is the NSIP and the site areas for the transfer, storage and processing of the ammonia will be included in the DCO as associated development.

1.6 The landside infrastructure works will consist of the following:

(a) Pipework and pipelines required to link the jetty and the unit operations described below.

(b) Ammonia storage: The refrigerated liquid ammonia is stored in a large tank at nearly atmospheric pressure at -33°C thus providing the safest means of storage.

(c) H2 production: The liquid ammonia (NH3) is then transformed back into hydrogen and nitrogen (nitrogen makes up 78% of the composition of ambient air) using a process unit called a dissociator. The core of the process is a catalytic bed through which the ammonia will undertake dissociation into nitrogen (N2) and hydrogen (H2). This reaction is endothermic, i.e. it requires heat to take place, so the catalytic bed sits within a furnace.

(d) H2 liquefaction and storage: The hydrogen in a gaseous form is then turned into liquid through a hydrogen liquefier so it is easier to safely store and transport. The liquid hydrogen is stored in horizontal storage vessels.

(e) H2 export: road tanker loading bays for both liquid and gaseous hydrogen for distribution to the points of use throughout the UK.

1.7 A number of off-shore elements will be required but these are outside the scope of this report and are therefore not considered.

Site Location

1.8 The proposed development (see Appendix B Figure 1) for the terrestrial elements comprises three separate areas known as Main Site, the Pipeline Corridor and the Storage Tank Area which together cover approximately 49.14ha (including temporary construction areas) of mixed-use land alongside Kings Road and Queens Road (A1173 road) at Immingham. Without the temporary construction areas the area totals 34.56ha. The proposed development site is generally flat and is situated below the 2m contour.

1.9 The wider landscape is characterised by mixed industrial and commercial development with industrial estates to the south of the site and business park estates to the north-east. The docks comprise several operational areas, with bulk commodities such as liquid fuels, solid fuels, and ores, as well as freight, being handled from in-river jetties.

Main Site

1.10 The site is formed by three former agricultural fields used as farmland which are bounded by linear hedgerows and minor drainage ditches. The northern boundary of the site is defined by Kings Road (A1173) and an electrical sub-station in the north-western corner and is demarcated by a wire fence. Queens Road (also A1173) runs along the eastern boundary with residential and commercial properties adjacent to the site. A short tarmac access road has been constructed from Kings Road into the site. It is centred on National Grid Reference (NGR) TA 19890 14605.

1.11 A series of overhead power cables run across the middle and southern boundary of the site with a mains water and gas pipe also along the southern boundary.

Pipeline Corridor

1.12 The corridor crosses an area that has mostly already been impacted by industrial development alongside Queens Road, including parts that are currently unused. At the eastern end the corridor continues through a narrow belt of woodland between Laporte Road and the Humber Estuary. It is centred on NGR TA 20646 15035.

Storage Tank Area

1.13 The site is a former works site / storage area within Immingham Port which is currently covered in hardstanding. It is centred on NGR TA 20874 15355.

Aims and Objectives

1.14 The aims of the desk-based assessment is to identify heritage assets which may be affected by the proposed development.

1.15 The objectives of the desk-based assessment are to:

- Identify designated and non-designated heritage assets with the potential to be affected by the proposed development;
- describe the significance and any contribution made by the setting of the heritage assets affected;
- identify the impact of the proposals on the significance of the identified heritage assets; and,
- identify opportunities for enhancing the historic environment.

Report Structure

1.16 This report is structured into the following sections, with illustrations and appendices at the end:

- The legislative and planning policy framework is provided in Section 2 (Legislation, Planning Policy and Guidance) which also includes an overview of Historic England policy and guidance;
- The methodology for the identification of the study areas, the baseline and the assessment of the heritage potential and significance is set out in Section 3 (Methodology);
- The heritage baseline, including designated and non-designated heritage assets and a description of the historical and archaeological background, as well as previous archaeological investigations undertaken within the proposed development, is set out in Section 4 (Heritage Baseline);
- Section 5 determines the potential for unrecorded archaeological remains to exist within the proposed development and provides an assessment of the significance of heritage assets that may be impacted by the proposed development (Assessment of Baseline); and
- Section 6 summarises the results of the assessment (Conclusions).

2. Legislation, Planning Policy and Guidance

Introduction

2.1 This section of the report describes the key policy and guidance that are relevant to the assessment of cultural heritage assets.

2.2 Legislation identifies the requirement for the Secretary of State to have regard to the desirability of preserving listed buildings, Scheduled Monuments, and the character of conservation areas.

2.3 Legislation, planning policy and guidance of most relevance to cultural heritage and pertinent to the proposed development are set out below.

Legislative Background

The Ancient Monuments and Archaeological Areas Act 1979 (as amended)

2.4 The Ancient Monuments and Archaeological Areas Act imposes a requirement for Scheduled Monument Consent for any works of demolition, repair, and alteration that might affect a Scheduled Monument.

The Planning (Listed Buildings and Conservation Areas) Act 1990

2.5 The Planning (Listed Buildings and Conservation Areas) Act 1990 (the Act) sets out the principal statutory provisions that must be considered in the determination of any application affecting listed buildings and conservation areas.

2.6 Section 66 of the Act states that in considering whether to grant planning permission for development which affects a listed building or its setting, the local planning authority or, as the case may be, the Secretary of State, shall have special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses. By virtue of Section 1(5) of the Act a listed building includes any object or structure within its curtilage.

2.7 Section 72 of the Act establishes a general duty on a local planning authority or the Secretary of State with respect to any buildings or other land in a Conservation Area to pay special attention to the desirability of preserving or enhancing the character or appearance of a Conservation Area.

Planning Policy Context

National Policy Statement (NPS) for Energy EN-1

2.8 The NPS EN-1 (DECC, 2011) sets out the government's overarching policy statement for energy. With regard to the Historic Environment, Section 5.8 of the NPS provides a series of requirements and recommendations for the appropriate level of assessment of energy proposals that have the potential to impact upon the historic environment, and decision-making policies. These are consistent with the polices outlined in the NPPF.

2.9 NPS EN-1 states (paragraph 5.8.8 '*the applicant should provide a description of the significance of the heritage assets affected by the proposed development and the contribution of their setting to that significance. The level of detail should be proportionate to the importance of the heritage assets and no more than is sufficient to understand the potential impact of the proposal on the significance of the heritage asset.*'

2.10 NPS EN-1 states (paragraph 5.8.9) '*Where a development site includes, or the available evidence suggests it has the potential to include, heritage assets with an archaeological interest, the applicant should carry out appropriate desk-based assessment and, where such desk-based research is insufficient to properly assess the interest, a field evaluation.' And (paragraph 5.8.10) 'The applicant should ensure that the extent of the impact of the proposed development on the significance of any heritage assets affected can be adequately understood from the application and supporting documents.*'

2.11 NPS EN-1 states (paragraph 5.8.14) '*There should be a presumption in favour of the conservation of designated heritage assets and the more significant the designated heritage asset, the greater the presumption in favour of its conservation should be. Once lost heritage assets cannot be replaced and their loss has a cultural, environmental, economic and social impact. Significance can be harmed or lost through alteration or destruction of the heritage asset or development within its setting. Loss affecting any designated heritage asset should require clear and convincing justification. Substantial harm to or loss of a grade II listed building park or garden should be exceptional. Substantial harm to or loss of designated assets of the highest significance, including Scheduled Monuments; registered battlefields; grade I and II* listed buildings; grade I and II* registered parks and gardens; and World Heritage Sites, should be wholly exceptional.*'

2.12 NPS EN-1 states (paragraph 5.8.15) '*Any harmful impact on the significance of a designated heritage asset should be weighed against the public benefit of development, recognising that the greater the harm to the significance of the heritage asset the greater the justification will be needed for any loss. Where the application will lead to substantial harm to or total loss of significance of a designated heritage asset the* [decision taker] *should refuse consent unless it can be demonstrated that the substantial harm to or loss of significance is necessary in order to deliver substantial public benefits that outweigh that loss or harm.*'

2.13 NPS EN-1 states (paragraph 5.8.17) '*Where loss of significance of any heritage asset is justified on the merits of the new development, the* [decision taker] *should consider imposing a condition on the consent or requiring the applicant to enter into an obligation that will prevent the loss occurring until it is reasonably certain that the relevant part of the development is to proceed.*'.

2.14 Paragraph 5.8.18 notes that '*When considering applications for development affecting the setting of a designated heritage asset, the* [decision taker] *should treat favourably applications that preserve those elements of the setting that make a positive contribution to, or better reveal the significance of, the asset. When considering applications that do not do this, the* [decision taker] *should weigh any negative effects against the wider benefits of the application. The greater the negative impact on the significance of the designated heritage asset, the greater the benefits that will be needed to justify approval*.'.

2.15 Paragraph 5.8.22 states that '*Where the* [decision taker] *considers there to be a high probability that a development site may include as yet undiscovered heritage assets with archaeological interest, the* [decision taker] *should consider requirements to ensure that appropriate procedures are in place for the identification and treatment of such assets discovered during construction*.'

National Policy Statement for Ports (NPSP)

2.16 Section 5.12 of the NPSP deals with the Historic Environment. It recognises that the construction, operation and decommissioning of port infrastructure has the potential to result in adverse impacts on the Historic Environment (Department for Transport, 2012: paragraph 5.12.1). Therefore, the extent of the impact and the significance of any heritage assets affected need to be adequately understood in order to support a planning application (ibid; paragraph 5.12.9).

2.17 It sets out the expectations for assessment if a development site includes, or has potential to include, heritage assets with an archaeological interest. The expectation is that an appropriate desk-based assessment is required and, where such desk-based research is insufficient to properly assess the interest, a field evaluation. Furthermore, where proposed development will affect the setting of a heritage asset, representative visualisations may be necessary to explain the impact (ibid; paragraph 5.12.7).

National Planning Policy Framework (NPPF)

2.18 In accordance with the NPPF, the NPS policies relating to the applicant's assessment are the primary source of policy guidance regarding this assessment, in particular Section 5.8 of the NPS. In accordance with Section 1 of the NPPF, exerts have been included in this DBA to the extent that it is considered it may be relevant to decision-making.

2.19 The NPPF sets out the Government's planning policies for England and how these should be applied to contribute to the achievement of sustainable development.

2.20 Section 16 of the NPPF deals specifically with the historic environment. Where changes are proposed, the NPPF sets out a clear framework to ensure that heritage assets are conserved, and where appropriate enhanced, in a manner that is consistent with their significance.

2.21 The NPPF sets out the importance of being able to assess the significance of heritage assets that may be affected by a development. Significance is defined in Annex 2 as being the "value of a heritage asset to this and future generations because of its heritage interest. That interest may be archaeological, architectural, artistic or historic". Significance is not only derived from an asset's physical presence, but also from its setting. The setting of a heritage asset is defined in Annex 2 as, "the surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve".

National Planning Practice Guidance (PPG)

2.22 The PPG (Ministry of Housing, Communities and Local Government, 2019 provides further advice and expands on the guidance and policy outlined in the NPPF.

2.23 Significance of heritage assets and its importance in decision taking is explored in Historic Environment Paragraph 009 of the PPG which states that heritage assets may be affected by direct physical change or by change in their setting. Being able to properly assess the nature, extent and importance of the significance of a heritage asset, and the contribution of its setting, is very important to understanding the potential impact and acceptability of development proposals (ID 18a-009-20140306 Last updated 23 July 2019).

2.24 The setting of the heritage asset is also of importance and a thorough assessment of the impact on setting needs to take into account, and be proportionate to, the significance of the heritage asset under consideration and the degree to which the proposed changes enhance or detract from that significance and the ability to appreciate it. The extent and importance of setting is often expressed by reference to visual considerations. Although views of or from an asset will play an important part, the way in which an asset is experienced in its setting is also influenced by other environmental factors such as noise, dust and vibration from other land uses in the vicinity, and by our understanding of the historic relationship between places.

2.25 Historic Environment Paragraph 013 of the PPG recognises that the contribution that setting makes to the significance of the heritage asset does not depend on there being public right or the ability to experience that setting. When assessing any application for development which may affect the setting of a heritage asset, the decision taker may need to consider the implications of cumulative change (ID 18a-013-20140306 Last updated 23 July 2019).

2.26 The PPG discusses how to assess if there is substantial harm. It states that what matters in assessing if a proposal causes substantial harm is the impact of the significance of the heritage asset. Ultimately, whether a proposal causes substantial harm will be a judgement for the decision taker. However, it acknowledges that substantial harm is a high test so may not arise in many cases. A key consideration when assessing whether there is an adverse impact on a listed building is whether the adverse impact seriously affects a key element of its special architectural or historic interest. It is the degree of harm to the asset's significance rather than the scale of the development that is to be assessed (Paragraph: 017 Reference ID: 18a-017-20140306).

East Inshore and East Offshore Marine Plans

2.27 The proposed development is within the East Inshore Marine Plan Area which has been adopted as of April 2014 (Defra, 2014). The East Inshore and East Offshore Marine Plans provide guidance for sustainable development for the coastal area between Flamborough Head to Felixstowe which includes the Port of Immingham. The Marine Plans address the key issues for the area, setting a vision and plan objectives which describe the aim of the marine plans that need to be met in order to deliver the vision. The plans include detailed policies that set out how these will be achieved and how issues will be managed or mitigated.

2.28 Plan policy SOC2 is specific to heritage assets and applies both to the Inshore and Offshore Marine Plan Area (see Figure 1 in the East Inshore and East Offshore Marine Plans). Proposals that may affect heritage assets should demonstrate, in order of preference:

a) That they will not compromise or harm elements which contribute to the significance of the heritage asset;

b) how, if there is compromise or harm to a heritage asset, this will be minimised;

c) how, where compromise or harm to a heritage asset cannot be minimised it will be mitigated against; or,

d) the public benefits for proceeding with the proposal if it is not possible to minimise, mitigate compromise or harm to the heritage asset.

Local Planning Policy

2.29 The proposed development lies wholly within the administrative area of North East Lincolnshire Council.

2.30 The North East Lincolnshire Local Plan 2013 to 2032 (North East Lincolnshire District Council, 2018) was adopted in 2018. It recognises the significant role the historic environment plays in providing a sense of community identity and local distinctiveness, and enhance the aesthetic, social and cultural quality of life available to residents (Ibid: p.218).

2.31 Strategic Objectives (SO) provide a framework for the Plan policies to facilitate the form and pattern of development necessary to ensure that the vision is fully realised by 2032. SO6 refers to the built, historic and natural environment: 'Ensure that the development needs of the Borough are met in a way that safeguards and enhances the quality of the built, historic and natural environment...'

2.32 Policy 39: Conserving and enhancing the historic environment sets out a clear approach providing guidance to developers on how to safeguard and respond to the historic environment, recognising designated and non-designated heritage assets. It outlines the Council's strategy for securing and facilitating conservation of the historic environment and the Borough's heritage assets, how it has and will continue to implement that strategy over the plan period.

Other Guidance

Historic England Guidance

2.33 Historic England has published a series of Good Practice Advice (GPA) and Historic England Advice Notes of which those of most relevance to this assessment are GPA2 - Managing Significance in Decision-taking (March 2015), GPA3 - The Setting of Heritage Assets (2nd Edition) (December 2017), and Historic England Advice Note 12, Statements of Heritage Significance (October 2019).

2.34 GPA2 emphasises the importance of having a knowledge and understanding of the significance of heritage assets likely to be affected by the development and that the “first step for all applicants is to understand the significance of any affected heritage asset and, if relevant the contribution of its setting to its significance” (paragraph 4). Early knowledge of this information is also useful to a local planning authority in pre-application engagement with an applicant and ultimately in decision making (paragraph 7).

2.35 GPA3 provides advice on the setting of heritage assets. Setting is as defined in the NPPF and comprises the surroundings in which a heritage asset is experienced. Elements of a setting can make positive or negative contributions to the significance of an asset and affect the ways in which it is experienced. Historic England state that setting does not have a boundary and what comprises an asset’s setting may change as the asset and its surrounding evolve. Setting can be extensive and particularly in urban areas or extensive landscapes can overlap with other assets. The contribution of setting to the significance of an asset is often expressed by reference to views and the GPA in paragraph 11 identifies those views such as those that were designed or those that were intended, that contribute to understanding the significance of assets.

2.36 Historic England Advice Note 12outlines a recommended approach to assessing the significance of heritage assets in line with the requirements of NPPF. It includes a suggested reporting structure for a

'Statement of Heritage Significance', as well as guidance on creating a statement that is proportionate to the asset's significance and the potential degree of impact of a proposed development. The Advice Note also offers an interpretation of the various forms of heritage interest that an asset can possess, based on the terms provided in the NPPF Glossary (Annex 2: Glossary); namely archaeological, architectural, artistic, and historic.

Principles of Cultural Heritage Impact Assessment in the UK (IEMA, 2021)

2.37 Principles of Cultural Heritage Impact Assessment (CHIA) provides guidance on understanding cultural heritage assets and evaluating the consequences of change.

2.38 Understanding cultural heritage assets is split into three stages: Description, Significance and Importance. The description arrives at a factual statement that establishes the nature of the asset. The heritage values of the asset are then analysed (the guidance stresses that these include but are not limited to aesthetic, historic, scientific, social or spiritual values) and a statement of cultural significance given. Finally, the importance of the asset is assessed, and a conclusion drawn as to the level of protection that the asset merits in planning policy and cultural heritage legislation. The guidance notes that unlike cultural significance importance is scaled and can be described as high, medium or low.

2.39 The process of evaluating the consequences of change is split into three stages: Understanding change, assessing impact and weighting the effect. All aspects of a proposal that could change a cultural heritage asset or its setting are first explained. If these changes affect the cultural significance of the asset the resulting impact, which could be positive or negative, and its magnitude is then assessed. The effect is a combination of the magnitude of the impact and the cultural heritage asset's importance and the scale of the effect will determine by how much the issue should influence the design of the proposal and whether the proposal is acceptable and will be permitted.

Lincolnshire County Council

2.40 The baseline assessment also follows guidance in the Lincolnshire County Council Archaeology Handbook (Jennings, 2019).

Chartered Institute for Archaeologists

2.41 The baseline assessment has been undertaken in accordance with guidance published by the Chartered Institute for Archaeologists (CIfA), specifically the *Standard and Guidance for Historic Environment Desk-Based Assessment* (CIfA 2020) and the *Code of Conduct* (CIfA 2021).

3. Methodology

Study area

3.1 The study area to establish the cultural heritage baseline of this report was developed through professional judgement. A study area extending 1.6km from an approximate centre-point for the three areas was considered suitable for the identification of known heritage assets (non-designated) and for assessing the archaeological potential of the area affected by the proposed works. For designated heritage assets a slightly larger 2km study area was used (see **Figure 2**, **Appendix B**).

Baseline sources

3.2 The preparation of the heritage baseline was informed by information collated from sources including:

- North East Lincolnshire Council Historic Environment Record (NELCHER);
- National Heritage List for England;
- Unpublished archaeological reports and archive material held at various online archaeological resources, including Heritage Gateway, Archaeological Data Service, University of York);
- Historic Ordnance Survey maps;
- Portable Antiquities Scheme;
- Historic England Aerial Archaeology Mapping Explorer;
- British Geological Survey (BGS) Geology of Britain Viewer; and
- The Soil Survey of England and Wales soil association mapping (Soil Survey of England and Wales,1984) (1:250,000 scale).

3.3 A site inspection visit of the proposed development area and the surrounding area (using public roads and foot paths) was conducted on the 18 May 2022 in order to:

- Assess the general historic character of the area incorporating the proposed development, the surrounding study area, and the topographic setting;
- Assess the condition of known archaeological and historic building assets and their setting;
- Identify areas of potential within the proposed development that may contain previously unidentified archaeological remains; and
- Identify the location, extent and severity of modern ground disturbance and previous construction impacts within the proposed development.

3.4 For the purpose of the assessment all heritage assets have been given a unique heritage reference number and are referred to according to these numbers (identified in bold within square brackets). Each heritage reference number can be cross-referenced to their corresponding National Heritage List for England (NHLE) reference number and NELCHER reference number at **Appendix A**, which provides a gazetteer of all identified heritage assets. The location of the heritage assets, study area and proposed development area perimeter are shown on **Figures 2** and **3** at **Appendix B**.

Significance of Heritage Assets

3.5 An assessment of the significance of assets and their setting has been undertaken in consideration of guidance and good practice issued by Historic England. Historic England GPA3 (2017) provides the basis of a methodology for the assessment of setting.

3.6 The NPPF defines significance as ‘the value of a heritage asset to this and future generations because of its heritage interest. That interest may be archaeological, architectural, artistic, or historic. Significance derives not only from a heritage asset’s physical presence, but also from its setting’ (Annex 2, MHCLG, 2021). Historic England’s Advice Note 12 (2019) also offers an interpretation of the various forms of heritage interest that an asset can possess, based on the terms provided in the NPPF Glossary.

3.7 Significance is often established by statutory designations such as listed buildings, scheduled monuments and conservation areas.

3.8 The terminology used in this statement relates to the terminology used by NPPF, and Historic England Advice Note 12, referring to significance in terms of heritage interest and not heritage values.

3.9 The significance of heritage assets has been determined based on professional judgement guided by designations, national and local policies, guidance documents and research frameworks.

Archaeological Potential

3.10 Archaeological potential assesses the possibility that unrecorded archaeological remains may exist within the proposed development site in addition to the known archaeological resource identified in the baseline. The potential for unrecorded archaeological remains to exist has been determined by professional judgement guided by an assessment of the existing heritage resource and the impact of previous modern development or disturbance at the proposed development site.

3.11 The potential for an area to contain archaeological remains is rated ‘high’, ‘medium’, ‘low’, ‘negligible’, or ‘unknown’. This rating is based on an understanding of the archaeological resource as a whole and takes into account the geological and topographical setting as well as modern development or ground disturbance. The rating also considers the number and proximity of known and predicted archaeological/historical sites or find spots within the proposed development site and the surrounding study area. ‘High potential’ therefore means that there is a high probability that archaeological remains of a given period (e.g., Roman period) will be located within the proposed development area; a corresponding lower probability equates with ‘moderate potential’ and a still lower probability with ‘low potential and then ‘negligible potential’. Where it is ’unknown’ this means that there is not enough information to make a professional judgement.

Consultation

3.12 At this stage no consultation has been undertaken to date with the Local Planning Authority Planning Archaeologist or Conservation Officer. However, it is intended that consultation will be undertaken as the project progresses regarding the findings of this report.

4. Heritage Baseline

4.1 The sources, including the NELCHER which incorporates the results from the Rapid Coastal Zone Assessment Survey of the Inner Humber Estuary (https://historicengland.org.uk/research/current/discover-and-understand/landscapes/rapid-coastal-zone-assessment-survey-of-the-inner-humber-estuary/) reveal a diverse and important cultural heritage resource along the coastal strip of the Humber Estuary.

Physical Site Conditions

Geology and soils

4.2 The British Geological Survey (BGS) web-based Geology of Britain Viewer (mapapps.bgs.ac.uk/geologyofbritain/home.html) indicates that the local geology within the proposed development site is characterised by superficial deposits of river and estuarine Alluvium (clay, silt and sand) that formed up to 2 million years ago in the Quaternary Period and tidal flat deposits (clay and silt). The underlying bedrock is Sedimentary Chalk Bedrock. The alluvium formed in an environment dominated by rivers with fine silt and clay deposited from overbank floods and some bogs depositing peat.

4.3 The Soil Survey of England and Wales soil association mapping (Soil Survey of England and Wales,1984) (1:250,000 scale) describes the soils as loamy and clayey soils of coastal flats with naturally high groundwater, characteristic of wet brackish coastal flood meadows.

4.4 Historic boreholes from the BGS viewer that were drilled in 1937 / 1938 along the southern side of the Main Site indicate topsoil and clay to a depth of over 5 feet and sealing a peat (4 feet thick) over a sequence of silt, boulder clay and chalk (borehole references TA21SW91, TA21SW278).

Site conditions

4.5 The Humber Estuary is one of the largest river estuaries in Britain and high flood banks contain the estuary as it opens out as it enters the North Sea. On the south bank there are ports and extensive industrial complexes of oil and chemical tanks, towers, chimneys, warehouses and storage areas, with some agricultural land. Long views provide the dominant focus within much of the area. Along the Humber Estuary the landscape is always changing due to the tidal movements, which expose extensive mudflats at low tide, and the effects of the changing weather. Large ships, including ferries, container ships and cargo ships, are constantly moving in and out of the estuary.

4.6 The farmed landscape has been altered by relatively recent industrial and commercial development but originally was more open and expansive with large regular fields and few visible field boundaries. Along the estuary much of the land has been formed from reclaimed salt marshes of the estuary using the drainage of the wet alluvial soils, and from a process known as ‘warping’ (seasonal tidal impoundment of farmland with water rich in silt). This has created a fertile land that is drained by a network of ditches which supports arable farming with areas of saltmarsh and reedbeds along tidal channels that cross the drained marshes. Immingham Docks with its port, warehouses, storage and production areas, chimneys and lighting columns is a major and distinctive feature of this part of the estuary. Mudflats are exposed along the estuary at low water.

4.7 At the Main Site ground conditions appear to have changed since a desk-based assessment was undertaken for the Main Site in 2013 (ENL300) (ECUS, 2013) (see below). A short tarmac access road has been constructed off Queens Road at the north end of the site and it appears that several drainage ditches have been installed (**Plate 2,** Appendix C). In the central area, the uneven ground surface was marked by wheel ruts, possibly from plant tracking across the site, and the overall impression was of extensive surface disturbance. It is possible that the area has been used for soil storage and bunds along the southern and part of the eastern sides of the site. The eastern and western parcels of land within the Main Site show less sign of ground disturbance but here tree saplings and bushes impede surface visibility (**Plate 3**, Appendix C).

Relevant previous archaeological reports

4.8 There have been several archaeological reports written for developments within the 1.6km study area, including desk-based assessments (ENL260, ENL300), archaeological geophysical surveys (ENL269, ENL301, ENL352), archaeological monitoring / watching brief (ENL58, ENL378), archaeological evaluation (ENL423), trial trenching (ENL426, ENL427), archaeological excavation (ENL306, ENL470) and historic building recording (ENL441) (refer to Table A.1, Appendix A). Work directly relevant to the proposed development include the following:

- In 2011 an archaeological geophysical survey on land next to Queen's Road (east of the Main Site) recorded mostly variations reflecting the presence of modern features, including boundary fencing, a gas pipeline and miscellaneous ferrous rich objects (ENL269) (Pre-Construct Geophysics, 2011).
- In 2013 a desk-based assessment for a proposed development at the Main Site concluded a high potential for late post-medieval and modern land management features; a moderate potential for Neolithic to Romano-British environmental and organic remains within waterlogged contexts; a low potential for Iron Age to Romano-British activity; and a low potential for medieval and post-medieval activity, including salt making industry (ENL300) (ECUS, 2013).
- Subsequent archaeological geophysical survey at the Main Site (ENL301) (Bunn, 2013) identified various anomalies which likely relate to buried paleoenvironmental features (former tidal channels, pools and salt marsh). Some of the features identified could relate to possible medieval salt production sites on the edge or close to the former tidal channels. Recent former land boundaries, land drains, services and ground disturbance were also identified.
- In 2018 an archaeological geophysical survey at Mauxhall Farm, Stallingborough (1.4km to the south-west of the proposed development) identified possible archaeological anomalies, including potential enclosures and medieval ridge and furrow (ENL352) (APS, 2019).
- Further survey work at Mauxhall Farm (metal-detection and fieldwalking) combined with archaeological evaluation trial trenching recorded remains of prehistoric to Roman date (ENL423) (APS, 2020a).

Designated Assets

4.9 There are no World Heritage Sites, scheduled monuments, Grade I or II* listed buildings, conservation areas, registered parks and gardens, registered battlefields or protected wreck sites within the 2km study area. The nearest registered park and garden is Brocklesby Park [NHLE1000971] located c. 6.6km to the south-west; and the nearest conservation area is Great Coates Conservation Area that is located c.5km to the south.

4.10 There are no statutorily designated archaeology assets within the 2km study area. The nearest scheduled monument is located c.2.5km to the south-west of the site centre (Stallingborough medieval settlement, post-medieval manor house and formal gardens; [**NHLE1020423]**).

4.11 There is one Grade II listed building located within the 2km study area for designated assets. Immingham War Memorial [**NHLE1455139**] is located c.1.57km to the north-west of the site centre, along Pelham Road, Immingham at the junction with Humberville Road. The memorial was dedicated in 1925 and inscribed with the dates and names of those killed in World War II and the Afghanistan War. The memorial is a white granite obelisk on a square plinth with three-stepped base also in white granite.

4.12 North East Lincolnshire Council maintains local lists of historic assets of special interest (considered to be best examples of their kind in the authority or because of the contribution that they make to the character of the local area). The draft local list for 'Immingham and the Villages' includes two assets:

- Roman Settlement. Stallingborough Interchange, Stallingborough. A high-status Roman settlement and industrial site [**MNL4490**].
- Immingham Police Station [**MNL4726**] located 1.57km north-west of the centre of the site on Humberville Road. The Police Station, cells and houses were built in 1912 and are now used as private offices. The Police Station is set back from Humberville Road behind a half-height red brick wall topped with cast iron railings and full height brick gate piers.

Heritage Baseline

4.13 Archaeological evidence reveals that the estuary has been a key trade and communication route between the North Sea and the Pennines, and also to the Midlands (River Trent), since prehistoric times. Significant palaeoenvironmental and archaeological evidence is preserved within the wetland locations. For instance, Bronze-age boats, suitable for both river and sea use, and fish traps have been discovered in the intertidal areas. There is also evidence of early settlement on higher, drier land, while the lower wetlands provided fishing and fowling as well as summer grazing for the surrounding settlements.

4.14 Recent research on the Humber wetlands has suggested that at the beginning of the Holocene, the onset of warmer conditions led to the establishment of dense vegetation cover over undulating boulder clay. At the same time, kettle-holes and poorly draining hollows would have allowed the formation of a series of organic peaty sediments and raising sea levels would have led to increasing sedimentation through the process of alluviation and the formation of marshlands (Macklin et al., 2000; Taylor et al., 2000; Van de Noort et al., 1993).

4.15 The Humber continued to have great importance throughout the Roman and medieval periods for trade and communication. It is possible that on the north bank some drainage of the marshes began as long ago as the second century AD.

Prehistoric (to AD43) and Roman (AD43 to 410)

4.16 The earliest evidence of prehistoric activity is a pair of ditches, [**MNL4182**] located c.1.1km south-east of the site centre, that may have been dug to flank a trackway. These contained flintwork of Neolithic (4,000 – 2,500BC) or Bronze Age (2500 BC – 700 BC) date. This suggests prehistoric occupation in the area (ArcHeritage, 2012).

4.17 A high status Roman settlement and industrial site has been recorded at Stallingborough Interchange (business park development) [**MNL4490**, **MNL4763**], c.1.4km south-west of the proposed development at Mauxhall Farm. Geophysical survey undertaken in 2016 revealed a complex of pits and ditches making up enclosures with a possible trackway that were tentatively dated to the Roman period. Subsequent field walking and metal detecting yielded a small quantity of Roman greyware pottery and a single Roman coin (WYAS, 2016). Subsequently, two phases of trial trenching revealed a substantial settlement of two main phases (1st-2nd centuries and 3rd centuries) followed by abandonment (Oxford Archaeology, 2017 and 2018; HAP, 2021). Remains consisted of a limestone building, potentially measuring at least 20m long, but possibly up to 40m and a wall on a slightly different alignment. Evidence for malting was found, as well as other industrial activities such as metalworking. The excavations suggest that the majority of the Roman settlement was focused at the Mauxhall Farm site, but it is likely that it is part of more extensive Roman agricultural landscape which is likely to extend beyond the investigated area (finds from the site are supportive of a domestic settlement). The presence of a stone building marks this out as different from other settlements along the edge of the tidal flats and it has been suggested that this site may have functioned as a possible estate centre from which other sites were managed (site identified as a locally listed asset). Undated cropmarks of rectangular ditched enclosures [**MNL4607**], c.1.1km to the south-east of the site centre (under Kiln Lane Trading Estate) could form part of the Roman landscape.

4.18 Although not directly connected to the study area, approximately 3km north of the proposed development, archaeological trenching has revealed a late prehistoric and Roman settlement, located on the edge of the Humber estuary where there was evidence for salt-making and iron smelting occurring near the settlement (Stronach, 2010). The same site also recorded earlier Bronze Age activity located beneath 0.40m of alluvium and in association with a possible relic soil. The excavators concluded that the buried soil layer indicated that there was a period of perhaps a few decades when estuarine alluviation ceased, long enough for the site to be used by people. When sea levels rose, the site was buried beneath more flood-deposited alluvium.

4.19 There are several other enclosures and a series of linear features that could represent field systems in the study area, but these too are undated and could belong to any period between the prehistoric to post-medieval and modern periods [**MNL4601**, **MNL4602**, **MNL4618**, **MNL4619**, **MNL4674**]. A possible enclosure of likely prehistoric or Roman date [**MNL4124**] is shown on aerial photographs from 1946 but lies beneath the A1173 road, north-west of the Main Site.

Early Medieval (410 to 1066)

4.20 There are no assets of early medieval date within the study area.

Medieval (1066 to 1540)

4.21 Immingham is mentioned in Domesday, the Lindsey Survey (c.1115) and the Early Yorkshire Charters (1090-6) and historically within the wapentake and deanery of Yarborough (Ekwall, 1960; Cameron, 1991). The parish also contains the hamlet of Roxton. At the end of the 19th century the parish measured roughly 4100 acres which included a large c.900 acre area of coastal marshland called Habrough Marsh which was previously a detached part of Habrough township. It has boundaries with Brocklesby, Habrough, Keelby, Killingholme, and Stallingborough. Part of the boundary with Stallingborough is formed by North Beck Drain, and the boundary with South Killingholme is also formed by a beck.

4.22 The form of the settlement appears to have been a chain of farmsteads or hamlets laid out along a pair of parallel roads, with a denser core around the parish church. Aerial photographs show some possible burgage plots to the south-west of the church, suggestive of at least some planning to the village. Roxton has no obvious topographic influence upon settlement form. The former earthworks of the hamlet have the appearance of a small, nucleated core around a moated manorial site, possibly with a tight grid like pattern of roads.

4.23 Along Stallingborough Road (Highfield House) archaeological trial trenching has revealed late medieval activity (mainly ditches, pits and postholes likely forming crofts and tofts) and pottery (early medieval to early post-medieval. The areas in which no archaeological evidence has been found correspond to those areas most prone to flooding, and were perhaps farmed rather than inhabited (APS, 2020b).

4.24 The proposed development area is situated within the former parish of Habrough Marsh and was first recorded in 1150. Aerial photography has recorded a large rectilinear enclosure of possible medieval or post-medieval date near the farmstead at Harborough Marsh, located c.900m north of the site centre [**MNL4649**]. Nun's Creek located c.816m north of the site centre at Habrough Marsh [**MNL4269**] is recorded as early as the 13th century which connected to Coatham Nunnery in Brocklesby, although sections have been straightened as part of more recent land drainage.

4.25 Domesday records a saltpan at Habrough, which likely indicates that there were salt production sites along the coastal margins from at least the medieval period onwards, although earlier evidence is recorded. As noted above, salt working of Roman date has also been identified. The presence of a saltpan was recorded in 1186 when William Berner granted land in Habrough to Newhouse Abbey. At Northesse Marsh (a marsh that lay to the north-east of the development area) remains of medieval salt making was recorded during land drainage work (Loughlin et al., 1979). It is likely that Habrough Marsh was outside of the permanent arable land that once surrounded the historic core of Immingham (indicated by the extent of former ridge and furrow cultivation features visible on historic aerial photographs). The marsh was likely subject to periodic seasonal flooding and would have likely been used for summer grazing.

4.26 Salt working was an important local industry along the coastal margins and is likely to have been carried out on a seasonal basis (salt extracted from salt-encrusted sand from the foreshore was treated and dumped in large mounds) (Historic England, 2018). Eventually, as the ground along the foreshore was improved and raised to prevent seasonal flooding, the coastline gradually retreated and new salterns advanced seawards (Owen, 1984).

4.27 There is evidence for medieval settlement activity within the study area. A possible deserted medieval settlement near Mauxhall Farm is visible on aerial photography, including ridge and furrow cultivation features, trackways and possible building platforms [**MNL326**]. Ridge and furrow is also recorded at Stallingborough [**MNL2235**].

Post-Medieval (1540 to 1900) to Modern (1900 to present)

4.28 Local abbeys began to promote drainage schemes in the area from the 12th century. However, from the 17th century, coastal reclamation, drainage and enclosure had a significant impact on the rural landscape on the north side of the estuary. On the south side, flood defences were built to protect the developing towns and industrial areas. Warping (the process by which water was deliberately flooded over the land to enrich the soil with riverine sediments) was introduced by the Dutch in the 18th century. Later, Parliamentary enclosures produced the landscape of regular, geometric fields, mostly enclosed by dykes, with associated large brick-built isolated farmsteads and excavation of brick pits for the extraction of Pleistocene clays (for example at Barton).

4.29 Aerial photography has recorded the remains of post-medieval field boundaries and narrow ridge and furrow cultivation features at Harborough Marsh [**MNL4648**, **MNL4653**, **MNL4658**, **MNL4659**, **MNL4660**]. They also record the presence of either singular or a series of drainage ditches at Kiln Lane Trading

Estate and further to the south and south-east of the trading estate [**MNL1793**, **MNL4603**, **MNL4604**, **MNL4606**, **MNL4620**]. North Beck Drain forms the southern boundary of the gypsum disposal / landfill area, which is also identified on the HER as an historic feature [**MNL1796**]. A series of historic roads and trackways of post-medieval date are recorded on the early Ordnance Survey (OS) maps which may have origins in the medieval period. These include North Moss Lane [**MNL3507**], Kiln Lane [**MNL3508**], Laporte Road [**MNL3509**], Hobson Way [**MNL3510**], Ephams Road [**MNL3512**], Pelham Road [**MNL3522**], Kings Road [**MNL3523**] and Ings Lane [**MNL3524**]. Aerial photographs record trackways north of North Beck Drain at the gypsum disposal / landfill areas [**MNL4621**]; and c.1km to the north of the site centre [**MNL4654**]. Further details on the historic mapping analysis can be found below.

4.30 The HER records several woodland features that are shown on the historic OS maps, including Long Strip [**MNL1797**] that forms the eastern boundary of the Storage Tanks Area site, and Fox Covert [**MNL1799**], located c.950m north of the site centre. Other landscape features are also recorded, including an osier (willow plantation) at Reeds Meer [**MNL2684**], a mere at Stallingborough [**MNL2685**], and a blow well (spring) also at Stallingborough [**MNL4299**].

4.31 Aerial photographs and historic OS maps record historic flood defences across the study area, including at Immingham [**MNL4682**], c.1.5km north-west of the site centre; at Kiln Lane Trading Estate, c.1.3km south-east of the site centre [**MNL2086**, **MNL4608**]; and at Harborough Marsh, c.1km north of the site centre [**MNL4650**]. Historic OS maps also record the presence of several features associated with coastal navigation and transportation, including Stallingborough Ferry [**MNL3131]**, the site of a coastal shipping light [**MNL1789**] and beacons [**MNL4263**, **MNL4426**], and the site of a coastguard station [**MNL1790**]. The maps also show several buildings that reflect the rural and coastal character of the area prior to the development of the docks. The Ship Inn public house [**MNL1792**] is shown at the location of Stallingborough Ferry and farm buildings at Habrough Marsh [**MNL1798**], and Marsh Cottage [**MNL1876**] and Mauxhall Farm [**MNL2452**] are also shown. A kiln of unknown type is shown as a linear building at Stallingborough Haven on a 1734 chart of the Humber Estuary [**MNL3130**].

4.32 From the 16th and 17th centuries defensive structures were constructed to protect the coastline and the Humber Estuary from attack and the threat of invasion. The importance of defence continued into the late 19thcentury with a coastal artillery battery, and a minefield control centre built at Paull Point on the north bank of the Humber. A 20th century World War I acoustic mirror near Kilnsea and two forts were also constructed at the estuary mouth. During World War II anti-aircraft batteries and bombing decoys were built on the north bank to protect Hull Docks.

4.33 On the south side of the estuary deeper channels enabled the expansion of several ports. Immingham Dock was established by the Humber Commercial Railway and Dock Company in association with the Great Central Railway (Humber Commercial Railway and Dock Act of 1904, and subsequent amendments) [**MNL272**]. A temporary settlement, or workers village, was established at Immingham (Humberville) comprising of a series of corrugated tin huts, known as Tin Town, for the dock construction workers [**MNL1077**]. Other buildings of early 20th century date include the locally listed Immingham Police Station on Humberville Road [**MNL4726**], located c.1.5km north-west of the site centre, and the site of a demolished water tower built c.1909 [**MNL289**].

4.34 Construction of the dock began in 1906 and was complete by 1912. The dock exported coal from the coalfields of Derbyshire and Yorkshire via the Humber Commercial Railway (Grace's Guide, 2020). Numerous features that are associated with the historic development and operation of the docks are recorded on the HER, including a coaling stage [**MNL3097**], a former grain store [**MNL4429**], a wool shed [**MNL4438**] and a large polygonal bank and ditched enclosure [**MNL4657**]. In addition there are several records relating to the use and expansion of the transportation infrastructure associated with the dock and port at Immingham, including a light electric railway (Grimsby District Electric Light Railway), which was used for contractors' traffic and later for carrying passengers / dock workers [**MNL2087**], the site of an early 20th century wooden signal box [**MNL2819**], an extensive complex of railway lines and sidings integrated into Immingham dock (London and North Eastern Railway - Immingham Dock Branch) [**MNL3039**], the site of an engine shed [**MNL3040**], a light railway (London and North Eastern Railway - Grimsby District Light Railway) [**MNL3078**], a large possible rail embankment running from Habrough Marsh northwards to the shoreline [**MNL4656**], and the site of a tram shelter at Queens Road [**MNL4715**].

4.35 During World War I Immingham dock was a submarine base for British D-class submarines. This was later used for cruise ships in the 1930s, including vessels of the Orient Steam Navigation Company, White Star Line and Blue Star Line. Following the end of World War I trade declined, as it did elsewhere along the

east coast, including demand for shipping services and new ships. However, World War II revived its prospects, but, together with other ports along the east coast such as Hull, it became the target of bombing raids. It became a naval base and headquarters for the Royal Navy and anti-aircraft batteries were located around the dock during the war (heavy anti-aircraft battery Humber H21 & H22).

4.36 The HER records numerous features relating to World War II activity in and around the docks at Immingham, including gun emplacements [**MNL1501**, **MNL1534**], anti-landing obstacles [**MNL4630**, **MNL4631**, **MNL4632**, **MNL4633**, **MNL4634**, **MNL4640**, **MNL4641**, **MNL4655**, **MNL4679**], barrage balloon sites [**MNL4651**, **MNL4684**, **MNL4675**], and other buildings and installations [**MNL4644**, **MNL4689**]. Aerial photographs taken before 1942 indicate that anti-landing obstacles were located at the gypsum disposal / landfill areas [**MNL4630**] and at the Main Site [**MNL4640**], and a barrage balloon mooring site was also located at the gypsum disposal / landfill areas [**MNL4675**]. Evidence of German bombing raids is also represented by several lines of small circular hollows on aerial photographs [**MNL4623**, **MNL4643**, **MNL4645**]. Aerial photographs also record a linear earthwork of possible modern date underlying the railway lines servicing Immingham Docks (also cuts across post-medieval fields), located c.695m north of the site centre [**MNL4647**]; and a small rectilinear enclosure also of possible modern date [**MNL4652**], located c.945m NNE of the site centre and west of Queens Road.

4.37 A memorial dedicated to the fallen of both World War I and World War II was erected in 1925 at the junction of Humberville Road and Pelham Road, Immingham. Immingham War Memorial is Grade II listed [**NHLE1455139**, **MNL4111**].

4.38 In the second half of the 20th century the docks expanded with the construction of east and west jetties and the addition of several deep-water jetties for bulk cargo. Immingham Oil Terminal jetty was also constructed in 1969 on the banks of the Humber, west of the dock entrance, and the Immingham Bulk Terminal was commissioned in 1970 for the export of coal and the import of steel. In 1985 the Immingham Gas Jetty was opened, handling liquid petroleum gas, and thereafter extensions to these facilities were added, including new terminals and roll-on/roll-off facilities during the 21st century, to improve connections to Europe and to develop port infrastructure and associated facilities and to facilitate the export of bulk goods.

4.39 Several landfill sites of modern date are recorded on the HER to the south of Kings Road and Queens Road, including one [**MNL1063**] that lies beyond the southern boundary to the Main Site. The other landfill sites are recorded at Kiln Lane Landfill Site [**MNL1039**] located c.890m south of the site centre; Immingham Dock South East Landfill Site [**MNL1178** / **MNL1179**], located c.1.5km west of the site centre; and Laporte Road Landfill Site [**MNL1180**], located c.1.14km ENE of the site centre.

4.40 Other non-designated built heritage assets of modern date include the County Hotel [**MNL290**], which is located 1.58km north-west of the site centre on the junction between Pelham Road and Humberville Road. The hotel was built in 1910 by G.H. Mumby in red brick with ashlar clad ground floor and later brick extensions.

4.41 Two rows of non-designated early 20th century terraced housing (**ACM1**) are located on the west side of Queens Road, between 485 and 635m north-west of the site centre. The terraces appear on the 1932 Ordnance Survey map, set back from Queens Road behind short front gardens, with narrow enclosed rear yards and views from the rear first floor windows to the agricultural land comprising the Main Site. The terraces are constructed in brick with render and some whitewash, likely built as accommodation for dockworkers and their families. During the site walkover several of the terraces were observed to be unoccupied and having fallen into a state of disrepair.

Undated assets

4.42 There are several undated cropmark sites recorded on the HER, including an area of enclosures or natural features located c.1.4km ESE of the site centre [**MNL4106**]; a sub-circular feature, possibly a prehistoric ring ditch or another natural feature, located c.594m south-east of the gypsum disposal / landfill areas [**MNL4622**]; and linear features to the south of Kiln Lane Industrial Site, located c.1.2km south-east of the site centre [**MNL4400**].

4.43 Undated peat deposits located c.823m ENE of the site centre [**MNL4439**] were recorded in a historic geological borehole alongside North Beck Drain [**MNL1796**] (borehole reference TA21SW93).

Historic maps

4.44 The 1820 enclosure map for Habrough shows that the proposed development lay within a large area identified as Meadow Marsh that was owned by Lord Yarborough and leased to several tenants. No land divisions are shown, suggesting it may have been a relatively open landscape in the early 19th century. By 1837 the Habrough Parish tithe map shows that the land had been sub-divided into several regular narrow rectangular plots, similar to the layout shown on the 1st edition OS map of 1888 to 1891, which may reflect its incorporation into part of Immingham Parish in the mid-1820s. In the wider area, several small dwellings are depicted to the north which may have been farmsteads, including Marsh Cottage.

4.45 At the time that the 1st edition OS map was produced some of the fields had been sub-divided but generally the character of the field pattern remained basically the same as shown on the earlier tithe map (**Plate 1**, **Appendix C**). The farming landscape contains a scatter of dwellings reflecting the wetland conditions (numerous springs are labelled throughout the area). North Beck Drain is labelled on the OS map. At the Storage Tank Area the fields are shown orientated north-east / south-west which are parallel to a narrow belt of trees labelled 'Long Strip' which forms the southern boundary of the site and which also forms the eastern end of the proposed Pipeline Corridor.

4.46 The settlement at Immingham developed slowly during the 19th century with only c.230 inhabitants in 1911 (Tailby, 1970). Features that are shown and / or labelled on the historic OS maps include Habrough Marsh Farm to the north-east of the site centre, Fox Culvert, Plantation and lake. The maps also show that several trackways were formalised into roads, including Kings Road, Ings Lane and Pelham Road.

4.47 Subsequent OS maps indicate little change within the proposed development area until the construction of Immingham Dock to the east. Construction of the docks began in 1906 to 1912 to accommodate larger vessels unable to enter Grimsby Docks. The OS maps of 1932 show the changes to the wider area. Immingham Dock and new rail infrastructure, including rail sidings, had replaced the agricultural landscape to the north. A new railway station is also shown to the south of the proposed development area. Queens Road and Kings Road are shown for the first time with two rows of terraced dwellings along Queens Road.

4.48 Immingham and the area surrounding the docks grew rapidly (the population in 1911 reached 2681). A suburb known as Humberville was created to house dock workers and also became known as Tin Town due to the extensive use of corrugated iron panels in the construction of dwellings. Several areas surrounding the docks were used for storage and, subsequently, landfill. South and east of the Main Site a Gypsum Disposal Bed is labelled on the 1953 OS map, replacing the farmland. By 1966 an electrical transforming station had also been constructed to the south-west of Main Site, and during the early 1980s the A1173 was constructed, forming the western edge of the site.

Historic Landscape Character

4.49 Several sources were consulted to inform the assessment, including the following:

- NELC Historic Landscape Character Report Heritage and conservation - NELC | NELC (nelincs.gov.uk).
- NELCHER provided information about known heritage assets.
- Historic Ordnance Survey maps.
- Online resources were consulted for modern aerial photographs.
- Information from the heritage walkover to identify elements that contribute to an understanding of the historic landscape.

4.50 The historic landscape character types identified within the study area are shown on **Figure 3, Appendix B**.

4.51 In general, the proposed development area and its immediate surroundings are relatively flat and low-lying and is characterised by industrial development with pockets of open, arable land and occasional woodland. A limestone ridge, which runs north-south borders the western edge of the 1.6km study area.

4.52 The proposed development site lies within Regional Character Area 3, ‘The Northern Marshes’ and subsidiary zone ‘The Immingham Coastal Marsh’ (Lord and MacIntosh, 2011). Along the seaward bank of

the Humber Estuary this area is characterised by the large modern industrial presence of Immingham Dock and its deep-water facilities which make an important contribution to its 'unique character, often creating brooding and dramatic skylines across great distances' (ibid, p.21).

4.53 The coastal marsh zone is dominated by industrial works, particularly installations related to the petrochemical industry and docks at Immingham. The settlement expanded rapidly in the 20th century from its historic core and is the only settlement within the zone. There are a few, scattered isolated farmsteads surviving within the western periphery of the character zone (several have been subsumed into industrial works), and there are correspondingly very few surviving fields as these have been subsumed into industrial works and port use. Where they do survive, the fields are evenly split between modern consolidated fields and surviving planned enclosure, with some examples of ancient enclosure in the vicinity of settlements.

4.54 Before the drainage and enclosure movements of the 18th and 19th centuries, the coastal landscape mainly comprised saltmarsh grazing for the settlements to the west. Certain areas of higher ground, especially in the immediate vicinity of Immingham, were used for arable farming in a traditional field regime. The zone was subject to planned enclosure and drainage in the 18th and 19th centuries when many of the isolated farmsteads would have been established. Following the end of World War II many of the fields were consolidated and enlarged, resulting in the loss of some of the field boundaries.

4.55 The early 20th century saw the development of Immingham Port (opened in 1913) with good rail transport links to the rest of the country. The development of the port facility led to the establishment of other industrial facilities in the surrounding area, some providing supporting infrastructure to the port, others connected to the import of materials or the export of finished products.

4.56 It is still possible to identify historic elements within the landscape. Although the historic core of Immingham is largely gone, the historic Church of St Andrew remains as an indicator of its original location. The planned enclosure of the 18th century survives largely intact in the coastal area to the east of Lindsey Oil Refinery. Modern industries do not immediately appear to retain any vestiges of preceding landscapes, but they are typically aligned according to the planned field systems over which they were built. The internal roads and tracks of the Lindsey Oil Refinery in particular follow the courses of former field drains that can be seen on historic map data.

4.57 The HLC identifies the Main Site as an area of Modern Fields (**Figure 3**, **Appendix B**), although part of the rectilinear field pattern that is recorded on the 1837 tithe map and historic OS maps is still visible. The Storage Tank Area site is identified as part of a larger Chemical Works at Immingham Docks and has not retained any time depth linked to the character of the historic landscape. The Pipeline Corridor comprises a mixture of recently developed warehouses, distribution, industrial works and former abandoned works areas which also has no time depth to its historic character (overlies areas of former private panned enclosure and modern fields) (**Plate 4**, **Appendix C**), apart from a narrow belt of Plantation Woodland known as 'Long Strip'. This plantation is shown on historic OS maps dating to the second half of the 19th century, that survives either side of Laporte Road and which appears to be a surviving element of the historic landscape (Plate 5).

Archaeological Potential

4.58 The archaeological potential of the proposed development was partially assessed in the 2013 desk-based assessment, which covered the Main Site (ECUS 2013). This concluded that there was a high potential for late post-medieval and modern land management features; a moderate potential for Neolithic to Romano-British environmental and organic remains within waterlogged contexts; a low potential for Iron Age to Romano-British activity; and a low potential for medieval and post-medieval activity, including salt making industry. However, based on the results of a geophysical survey (Bunn 2013), it is now considered that within the Main Site there is high potential for late post-medieval and modern land management features; high potential for evidence of former channels and salt marsh - palaeoenvironmental deposits and features and low potential for medieval and post-medieval activity, including salt making industry.

4.59 Given previous land disturbance within the Pipeline Corridor and Storage Tank Areas, the archaeological potential for these parts of the proposed development are considered to be negligible.

5. Assessment of Baseline

5.1 The following assessment draws on the information contained in the baseline and assesses the significance of assets with the potential to be impacted by the proposed development.

5.2 The only recorded site within the Main Site is the site of World War II anti-landing obstacles [**MNL4640**]. These were visible as earthworks on aerial photographs taken in 1940, but these are no longer extant, and were not located during geophysical survey (Bunn 2013). Should any remains survive, they would be of local (low) historic interest for their relationship to the defence of the area in World War II.

5.3 Probable late post-medieval and modern land management features were identified during the previous phase of work. These would have local (low) archaeological and historic interest related to the post-Enclosure land management of the area.

5.4 Palaeoenvironmental features were also identified. These are undated but would have local (low) to regional (moderate) archaeological interest related to past environmental change.

5.5 The geophysical survey undertaken in 2013 (Bunn 2013) identified anomalies that might relate to possible medieval salterns for salt processing. This interpretation remains uncertain, but any such remains would be of archaeological and historic interest related to the development of the salt processing industry and likely to be of local (low) to regional (moderate) interest.

5.6 Previous development within the Storage Tank Area and the Pipeline Corridor indicates that there is unlikely to be impacts on archaeological remains, although for the Pipeline Corridor there is potential for deeply buried remains to survive, particularly in natural features (infilled former tidal channels or within or beneath alluvium).

5.7 At the Main Site the proposed development would be a change to the historic landscape character from modern (19th and 20th century) field pattern within an area of modern industrial development to modern industrial development. There would be no impacts on the historic landscape character at the Storage Tank Area site which has previously been impacted by modern industrial development. The Pipeline Corridor would involve change from modern industrial development with remnant 19th century tree belts to modern industrial development.

5.8 The proposed development will not impact on Immingham War Memorial (NHLE1455139). The asset is located at a sufficient distance from the site within the urban area of Immingham town centre, that the proposed development is not considered to form any aspect of its setting, nor does it contribute to the ability to interpret its significance. There is no potential for visual intrusion from the proposed development, due to the density of urban development surrounding the asset. Therefore, the proposed development will not affect the asset's significance or heritage interest.

5.9 The proposed development will not impact Immingham Police Station (MNL4726) nor the County Hotel (MNL290). Both assets are located within the urban area of Immingham town centre, sufficiently distant from the site and shielded by development. The site is not considered to contribute to the ability to interpret special interest of either asset, therefore the proposed development will not affect their heritage interest.

5.10 The proposed development has potential to impact the two rows of terraces housing on Queens Road (ACM1) through changes to setting. The development of the Main Site will result in the removal of the agricultural landscape visible from the rear of the terraced properties. This agricultural land is considered to form an aspect of the asset's setting by demonstrating the historical context of the landscape prior to the construction of the port. However, they are only of limited historic interest related to the industrial development of the docks, and of limited architectural interest due to their poor state of repair.

6. Conclusion

6.1 This report has been prepared based on currently available design information and further updates may be made as the design evolves and following the outcome of consultation.]

6.2 The desk-based research indicates that there is limited evidence for modern activity that may have removed archaeological within the Main Site (it is assumed that the ground disturbance noted during the walkover is superficial). Archaeological investigation within the 1.6km study area has found evidence for Roman settlement (Mauxhall Farm), which has the potential to extend beyond the core settlement area, and noting that an undated possible oval enclosure to the west of the Main Site (MNL4124) could be related to the Roman settlement.

6.3 This report also indicates that the only recorded archaeological site within the Main Site is the site of a World War II anti-landing obstacle, although these are no longer extant. Undated possible salt processing activity areas (salterns) and natural features have also been previously identified at the Main Site by geophysical survey (Bunn 2013); natural features (former tidal channels and pools) have the potential to contain marine / alluvial deposits of geoarchaeological and palaeoenvironmental interest relating to the development of past landscapes, for example, containing evidence relating to ecofacts (such as pollen), soils and sediment accumulation and material suitable for scientific dating. Other features were related to late post-medieval and modern land management. Previous development within the Storage Tank Area and the Pipeline Corridor indicates that there is unlikely to be impacts on archaeological remains, although for the Pipeline Corridor there remains the potential for deeply buried remains to survive (former tidal channels and alluvium deposits).

6.4 Any requirement for archaeological evaluation to support the application will be discussed and agreed with the Heritage Officer at North East Lincolnshire Council.

6.5 At the Main Site, the proposed development has the potential to impact possible anomalies that might relate to possible medieval salterns for salt processing and natural features related to tidal salt marsh (former tidal channels and pools that may contain palaeoenvironmental sequences and archaeological remains). The Pipeline Corridor may also contain deeply buried palaeoenvironmental sequences.

6.6 It is therefore recommended that an archaeological evaluation is undertaken including geoarchaeological investigation and targeted trial trenching, targeting the geophysical anomalies (possible medieval saltern features and natural features (former tidal channels and pools) and investigating areas previously inaccessible to survey due to vegetation (Areas 1 and 3; Bunn, 2013). It should be noted, however, that the area is low lying and likely to include high ground water levels and deeply buried alluvial sequences and peats and the evaluation should be carefully designed taking these factors into account. Geotechnical investigations should also be subject to monitoring by a Geoarchaeologist to gain an understanding of the geoarchaeological and palaeoenvironmental potential of the Main Site and the Pipeline Corridor and an understanding of the development of the landscape.

6.7 Depending upon the results of the archaeological evaluation, further archaeological mitigation may be required post-DCO consent and prior to construction. Any such work should be conducted with full consideration of the Updated Research Agenda and Strategy for the Historic Environment of the East Midlands (Knight et al., 2012).

7. References

APS, (2019). Mauxhall Farm Stallingborough North East Lincolnshire Geophysical Survey. Client report prepared by Archaeological Project Services.

APS, (2020a). Archaeological Evaluation at Mauxhall Farm, Stallingborough. Client report prepared by Archaeological Project Services.

APS, (2020b). Land at Highfield House, Stallingborough Road, Immingham.

ArcHeritage, (2012). Archaeological Watching Brief Report and Excavation on the Stallingborough Pipeline, North East Lincolnshire: Archaeological Assessment Report.

Bunn, D. (2013). Archaeological geophysical survey. Land at Immingham, North East Lincolnshire. Report prepared for Pre-Construct Archaeological Services Ltd by Pre-Construct Geophysics Ltd.

Cameron K., (1991). The Place-Names of Lincolnshire: Part 2: The Place-Names of Yarborough Wapentake. English Place-Name Society, Volume LXIV/LXV, University of Nottingham, Nottingham.

CIfA, (2020). Standard and guidance for historic environment desk-based assessment. https://www.archaeologists.net/sites/default/files/CIfAS%26GDBA_4.pdf

CIfA, (2021). Code of Conduct. https://www.archaeologists.net/sites/default/files/Code%20of%20conduct%20revOct2021.pdf

DECC (2011) National Policy Statement for Energy (EN-1). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf

Department for Environment, Food and Rural Affairs (DEFRA), (2014). East Inshore and East Offshore Marine Plans. London. (https://www.gov.uk/government/publications/east-inshore-and-east-offshore-marine-plans).

Department for Transport (DfT), (2012). National Policy Statement for Ports. https://www.gov.uk/government/publications/national-policy-statement-for-ports

ECUS Ltd, (2013). Kings Road, Immingham: Desk Based Assessment.

Ekwall, E., (1960). The Concise Oxford Dictionary of English Placenames. Fourth Edition.

Grace's Guide. (2020). Immingham Dock (Online, accessed 22 March 2022). https://www.gracesguide.co.uk/Immingham_Dock

HAP, (2021). Archaeological strip map and record on Land off Stallingborough Interchange, Kiln Lane, Stallingborough. Humber Archaeology Partnership report.

Historic England, (2015). Historic Environment Good Practice Advice in Planning: 2. Managing Significance in Decision Taking in the Historic Environment. English Heritage, Swindon. https://historicengland.org.uk/images-books/publications/gpa2-managing-significance-in-decision-taking/

Historic England, (2017). Historic Environment Good Practice Advice in Planning Note 3. 2nd edition. The Setting of Heritage Assets. Historic England, Swindon. http://historicengland.org.uk/images-books/publications/gpa3-setting-of-heritage-assets/

Historic England, (2018). Roman and Medieval Sea and River Flood Defences. Introductions to Heritage Assets. Historic England.

Historic England, (2019). Statements of Heritage Significance: Analysing Significance in Heritage Assets. Historic England Advice Note 12. October 2019. Historic England, Swindon. https://historicengland.org.uk/images-books/publications/statements-heritage-significance-advice-note-12/

IEMA, (2021). New guide to good practice in cultural heritage impact assessment (published jointly by the Institute of Environmental Management and Assessment (IEMA), the Institute of Historic Building

Conservation (IHBC) and CIfA.
https://www.archaeologists.net/sites/default/files/j30361_iema_principlesofchia_v8.pdf

Jarvis, R.A., Bendelow, V. C., Bradley, R. I., Carroll, D. M., Furness, R. R., Kilgour, I. N. L., King, S. J., (1984). Soils and Their Use in Northern England. Soil Survey of England and Wales Bulletin 10, Harpenden.

Jennings, L. (ed.), (2019). Lincolnshire County Council Archaeology Handbook. Lincolnshire County Council. https://www.lincolnshire.gov.uk/downloads/file/2204/archaeology-handbook-pdfa

Knight, D., Vyner B. and Allen C. (2012). An Updated Research Agenda and Strategy for the Historic Environment of the East Midlands. https://historicengland.org.uk/images-books/publications/east-midlands-heritage/

Lord, J. and MacIntosh, A. (2011). Historic Character of the County of Lincolnshire: English Heritage Project No.4661 Main – The Historic Landscape Character Zones. Lincolnshire County Council.

Loughlin, N. and Miller, K., (1979). A survey of archaeological sites in Humberside. Humberside Libraries and Amenities.

Macklin, M. G., Taylor, M. P., Hudson-Edwards, K. A. and Howard, A. J., (2000). 'Holocene environmental change in the Yorkshire Ouse Basin and its influence on river dynamics and sediment fluxes to the coastal zone' in Shennan, I and Andrews, J E (eds) Holocene Land-Ocean Interaction and Environmental Change Around the North Sea. Geological Society of London Special Publication 166, 87-96.

MHCLG, (2019). Planning Practice Guidance – Conserving and enhancing the historic environment. Ministry of Housing, Communities and Local Government, London.
https://www.gov.uk/guidance/conserving-and-enhancing-the-historic-environment

MHCLG, (2021). National Planning Policy Framework (NPPF). Ministry of Housing, Communities and Local Government, London.
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf

North East Lincolnshire District Council, (2018). Local Plan 2013 to 2032. http://www.nelincs.co.uk/wp-content/uploads/2018/05/20180518-AdoptedLocalPlan2018-WEB.pdf

North East Lincolnshire Planning Office, (2016). Draft Local List of Historic Assets of Special Interest: Immingham and the Villages.

Owen, A.E.B., (1984). Salt, Sea Banks and Medieval Settlement on the Lindsey Coat, in Fields, N., and White, A. A Prospect of Lincolnshire, pp. 46-49. County Offices, Lincoln.

Oxford Archaeology East, (2017). Evaluation at Stallingborough Interchange (Phase 1).

Oxford Archaeology East, (2018). Evaluation at Stallingborough Interchange (Phase 2).

Pre-Construct Geophysics, (2011). Geophysical Survey: Land off Queen's Road, Immingham, North East Lincolnshire.

Soil Survey, (1983). Soil Map of England and Wales. 1:250,000.

Stronach, S. (2010). Heron Renewable Energy Plant – Trial Trenching. Headland Archaeology Report.

Tailby, A. R., (1970). The story of a village: Immingham. Castle Press, Grimsby.

Taylor, M. P., Macklin, M. G. and Hudson-Edwards, K. A., (2000). 'River sedimentation and fluvial response to Holocene environmental change in the Yorkshire Ouse Basin, northern England'. The Holocene 10, 201-12.

Van de Noort, R. and Davies, P., (1993). Wetland heritage, and archaeological assessment of the Humber wetlands. S. Ellis (ed.). Hull: Humber Wetlands Project, University of Hull.

WYAS, (2016). Geophysics and field walking on land at the Stallingborough Interchange. West Yorkshire Archaeological Service report.

Online resources consulted:

Rapid Coastal Zone Assessment Survey of the Inner Humber Estuary

https://historicengland.org.uk/research/current/discover-and-understand/landscapes/rapid-coastal-zone-assessment-survey-of-the-inner-humber-estuary/)

British Geological Survey

mapapps.bgs.ac.uk/geologyofbritain/home.html

Railway history:

http://www.disused-stations.org.uk

Historic England Aerial Archaeology Mapping
https://historicengland.maps.arcgis.com/apps/webappviewer/index.html?id=d45dabecef5541f18255e12e5cd5f85a

Aerial photographic collections:

http://www.britainfromabove.org.uk/

Heritage Gateway:

https://www.heritagegateway.org.uk/gateway/

NE Lincolnshire Historic Landscape Characterisation

Heritage and conservation - NELC | NELC (nelincs.gov.uk)

Appendix A

A.1 Historic environment events register

NELC HER event no.	Event type	Description
ENL58	C.A.T.C.H. Project, Immingham, NE Lincolnshire. Archaeological Watching Brief.	A single undated (probably modern) drainage ditch was the only feature identified during the entire watching brief (2005). Lindsey Archaeological Services. 2005. C.A.T.C.H. Project, Immingham, NE Lincolnshire. Archaeological Watching Brief.
ENL260	Brocklesby to Stallingborough High Pressure Pipeline: Desk Based Assessment, Fieldwalking, Aerial Photography Survey, Excavation and Watching Brief.	Surveys (1994 to 1996) identified several areas of archaeological interest, including evidence of prehistoric activity (south of the former medieval settlement of Habrough) and a cropmark complex of indeterminate age and nature (south of Eleanor House in Stallingborough). British Gas Engineering Projects. 1996. Brocklesby to Stallingborough High Pressure Pipeline: Desk Based Assessment, Fieldwalking, Aerial Photography Survey, Excavation and Watching Brief.
ENL269	Geophysical Survey: Land off Queen's Road, Immingham, North East Lincolnshire.	The survey (2011) mostly recorded variations reflects modern features, including boundary fencing, a gas pipeline and miscellaneous ferrous rich objects. Pre-Construct Geophysics. 2011. Geophysical Survey: Land off Queen's Road, Immingham, North East Lincolnshire.
ENL300	Kings Road, Immingham: Desk Based Assessment.	Assessment and survey work (2013) concluded a high potential for late post-medieval and modern land management features; a moderate potential for Neolithic to Romano-British environmental and organic remains within waterlogged contexts; a low potential for Iron Age to Romano-British activity; and a low potential for medieval and post-medieval activity, including salt making industry. ECUS Ltd. 2013. Kings Road, Immingham: Desk Based Assessment.
ENL301	Archaeological Geophysical Survey: Land at Immingham, North East Lincolnshire.	Geophysics survey (2013) did not identify any clearly defined indicators of potentially significant archaeological activity but did identify palaeoenvironmental features (tidal channels/creeks and pools) and possible medieval salt production activity; and recent boundaries, land drains, a buried service and miscellaneous ferrous-rich objects, as well as features contained within the ploughsoil or along field boundaries. Pre-Construct Geophysics. 2013. Archaeological Geophysical Survey: Land at Immingham, North East Lincolnshire.
ENL306	Archaeological Excavation on the Stallingborough Pipeline, North East Lincolnshire.	Excavation (2011) identified that the site was heavily truncated, c.7 gullies from probable round houses recorded and large ditches; other possible internal subdivisions were also recorded. Early Romano-British pottery enabled the majority of the gullies to be dated and phased. ArcHeritage. 2012. Archaeological Watching Brief Report and Excavation on the Stallingborough Pipeline, North East Lincolnshire: Archaeological Assessment Report. ArcHeritage. 2014. Archaeological Excavation on the Stallingborough Pipeline, North East Lincolnshire.

NELC HER event no.	Event type	Description
ENL352	Mauxhall Farm Stallingborough Geophysical Survey Report.	Geophysical survey (2018) identified possible archaeological anomalies across the site, including potential enclosures and medieval ridge and furrow (trackways also evident as earthworks). Archaeological Project Services. 2019. Mauxhall Farm Stallingborough North East Lincolnshire Geophysical Survey.
ENL378	Archaeological Watching Brief at Kiln Lane, Stallingborough.	In 2015 18 trenches were monitored (HER does not record whether remains were recorded). AOC Archaeology Group. 2016. Archaeological Watching Brief at Kiln Lane, Stallingborough. GRIMS:2016.005.
ENL423	Archaeological evaluation on land at Mauxhall Farm, Stallingborough.	An evaluation in 2020 (metal detecting, fieldwalking and trial trenching) recorded prehistoric to Roman archaeology during trenching. Archaeological Project Services. 2020. Archaeological Evaluation at Mauxhall Farm, Stallingborough.
ENL425	Geophysics and field walking on land at the Stallingborough Interchange.	Geophysics and fieldwalking surveys (2016) (HER does not record any discoveries). West Yorkshire Archaeological Service. 2016. Geophysics and field walking on land at the Stallingborough Interchange.
ENL426	Evaluation at Stallingborough Interchange (Phase 1).	Trial trenching (2017) (HER does not record whether remains were recorded). Oxford Archaeology East. 2017. Evaluation at Stallingborough Interchange (Phase 1).
ENL427	Evaluation at Stallingborough Interchange (Phase 2).	Trial trenching (2018) (HER does not record whether remains were recorded). Oxford Archaeology East. 2018. Evaluation at Stallingborough Interchange (Phase 2).
ENL441	Tram Shelter, Queens Road, Port of Immingham Historic Building Recording.	Historic building recording (2021) was undertaken of a former tram shelter prior to demolition. Humble Heritage. 2021. Tram Shelter, Queens Road, Port of Immingham, Building Recording.
ENL470	Archaeological strip map and record on Land off Stallingborough Interchange, Kiln Lane, Stallingborough.	Monitoring in 2021 revealed interleaving layers of underlying natural strata and remains of probable medieval furrows. Artefacts recovered dates from the Romano-British period to the medieval period including a fragment of mortaria. Humber Archaeology Partnership. 2021. Archaeological strip map and record on Land off Stallingborough Interchange, Kiln Lane, Stallingborough. GRIMS:2021.022.

A.2 Heritage asset register

Abbreviations: ACM (AECOM, new heritage assets), NHLE (National Heritage List England), NELC (North East Lincolnshire Council); HER (Historic Environment Record); NHLE (National Heritage List England); AP (aerial photographs); OS (Ordnance Survey).

ACM / NHLE /NELC HER number	Description	Type	Period	Designation
MNL1039	**Kiln Lane Landfill Site, Stallingborough.**	Refuse disposal site	Modern	non-designated
MNL1063	**Immingham H.C.C. Landfill Site.**	Refuse disposal site	Modern	non-designated
MNL1077	**Humberville (Tin Town) Immingham.** A temporary settlement built for the construction workers of Immingham dock.	Workers village	Modern	non-designated
MNL1178, MNL1179	**Immingham Dock South East Landfill Site.**	Refuse disposal site	Modern	non-designated
MNL1180	**Laporte Road Landfill Site.**	Refuse disposal site	Modern	non-designated
MNL1521	**Heavy Anti-Aircraft Battery KH21, Long Strip, Immingham.** First referenced in February 1940 and last referred to on 22 June 1942 when it was unarmed and had no radar.	Military installation	Modern	non-designated
MNL1534	**Stallingborough Coastal Battery (World War 2).**	Military installation	Modern	non-designated
MNL1789	**Stallingborough Light.** A coastal shipping light shown on historic maps.	Coast light	Post-medieval	non-designated
MNL1790	**Coastguard Station, Stallingborough.** Site of a coastguard station shown on historic maps.	Coastguard station	Post-medieval	non-designated
MNL1792	**Ship Inn, Stallingborough.** Site of a public house marked on the OS 1887-9 25 inch to 1 mile maps.	Public house	Post-medieval	non-designated
MNL1793	**Middle Drain.** A land drain marked on the OS 1887-9 25 inch to 1 mile maps.	Drain	Post-medieval	non-designated
MNL1796	**North Beck Drain, formerly Stallingborough Beck.** Marked on the OS 1887-9 25 inch to 1 mile maps.	Drain	Post-medieval	non-designated
MNL1797	**Long Strip.** A plantation marked on the OS 1887-9 25 inch to 1 mile maps.	Plantation	Post-medieval	non-designated
MNL1798	**Habrough Marsh.** Site of a probable farm complex marked on the OS 1887-9 25 inch to 1 mile maps.	Farmhouse	Post-medieval	non-designated
MNL1799	**Fox Covert.** Marked on the OS 1887-9 25 inch to 1 mile maps.	Covert	Post-medieval	non-designated

ACM / NHLE /NELC HER number	Description	Type	Period	Designation
MNL1876	**Marsh Cottage.** Marked on the OS 1887-9 25 inch to 1 mile maps (part of a small complex of buildings which may represent a small farm).	Farm?	Post-medieval	non-designated
MNL2085	**Possible Former Sea Defence Bank in Immingham.** A bank, and in some places also a ditch, marked on the OS 1st edition maps.	Sea defences	Post-medieval	non-designated
MNL2086	**Possible Former Sea Defence Bank in Stallingborough.** A possible former sea defence bank, extrapolated from the line of the possible bank in Immingham and an abrupt change in field morphology.	Sea defences	Post-medieval	non-designated
MNL2087	**Grimsby District Electric Light Railway.** A light electric railway marked on OS maps of 1932-3.	Railway	Modern	non-designated
MNL2235	**Ridge and Furrow in Stallingborough.** GIS mapping layer showing ridge and furrow located on APs.	Ridge & furrow, find spot	Medieval, post-medieval	non-designated
MNL2452	**Mauxhall Farm.** An extant C19 farmhouse and farmstead forming a four sided courtyard complex marked on OS.	Farmhouse	Post-medieval	non-designated
MNL2684	**Reeds Meer.** A landscape feature marked and annotated with Osiers and brush on the OS maps of 1887-9.	Water feature	Post-medieval	non-designated
MNL2685	**Possible Moss or Mere in Stallingborough.** A possible moss (peaty marshland) or mere (shallow lake) shown on OS maps of 1887-9.	Water feature	Post-medieval	non-designated
MNL272	**Immingham Dock.** Built 1906-12 by GCR at the cost of £2.6m to take larger vessels which could not enter Grimsby Docks. The 45 acre basin was at the heart of a 1,000 acre estate.	Dock	Modern	non-designated
MNL2819	**Immingham East Signal Box.** An early C20 wooden signal box.	Signal box	Medieval, post-medieval	non-designated
MNL289	**Water Tower, Immingham.** Site of a demolished polygonal and bi-pinnacled water tower of 1909 (one of the most prominent buildings in Immingham).	Water tower	Modern	non-designated
MNL3039	**London and North Eastern Railway - Immingham Dock Branch.** A large complex of railway lines and sidings integrated into Immingham Dock, branching off from the main LNER line.	Railway	Modern	non-designated
MNL3040	**Engine Shed, Immingham Railway Branch.** Site of an engine shed marked on OS maps of 1932-3.	Engine shed	Modern	non-designated

ACM / NHLE /NELC HER number	Description	Type	Period	Designation
MNL3078	**London and North Eastern Railway - Grimsby District Light Railway.** A light railway marked on OS maps of 1932-3.	Railway	Modern	non-designated
MNL3097	**Immingham Coaling Stage.** A C20 concrete coaling tower at Immingham docks, a prominent landmark, now disused.	Coal drop	Modern	non-designated
MNL3130	**Stallingborough Kiln.** A kiln of unknown type recorded at Stallingborough Haven as a linear building on a 1734 chart of the Humber estuary.	Kiln	Post-medieval	non-designated
MNL3131	**Stallingborough Ferry.** A ferry is marked on OS C19 maps and a 'Ferry house' (at the location of the Ship Inn; MNL-1792) is recorded on a chart of c.1875.	Ferry crossing, landing point?	Post-medieval	non-designated
MNL326	**Possible Deserted Settlement, near Mauxhall Farm.** APs suggest ridge & furrow earthworks, trackways and possible building platforms. Trenching recorded ridge & furrow.	Settlement, ridge & furrow	Medieval, post-medieval	non-designated
MNL3507	**North Moss Lane, Stallingborough.** A road marked on OS maps of 1887-9. A major re-alignment has superseded a large section of road which is now annotated as a trackway part of Kiln Lane.	Road	Medieval, post-medieval	non-designated
MNL3508	**Kiln Lane, Stallingborough.** A road marked on OS maps of 1887-9 (north eastern end has been realigned).	Road	Medieval, post-medieval	non-designated
MNL3509	**Laporte Road (was part of Green Lane), Stallingborough.** A road marked on OS maps of 1887-9.	Road	Medieval, post-medieval	non-designated
MNL3510	**Hobson Way (was part of Green Lane), Stallingborough.** A road marked on OS maps of 1887-9.	Road	Medieval, post-medieval	non-designated
MNL3512	**Ephams Lane, Stallingborough.** A road marked on OS maps of 1887-9.	Road	Medieval, post-medieval	non-designated
MNL3522	**Pelham Road, Immingham.** Road marked, but not annotated, on OS maps of 1887-9 (1100m long section has been demolished to make way for Immingham Docks).	Road	Medieval, post-medieval	non-designated
MNL3523	**Kings Road, Immingham.** Road marked, but not annotated, on OS maps of 1887-9 (approx. half of the extent was demolished to make way for Immingham Docks).	Road	Medieval, post-medieval	non-designated
MNL3524	**Ings Lane, Immingham.** Road marked on OS maps of 1887-9 (mostly downgraded to a footpath).	Road	Medieval, post-medieval	non-designated
MNL4106	**Cropmark Site in Stallingborough.** Cropmarks of enclosures or natural features.	Enclosure?, Natural feature?	Undated	non-designated

ACM / NHLE /NELC HER number	Description	Type	Period	Designation
NHLE1455139, MNL4111	**Immingham War Memorial.** Unveiled in 1925 and dedicated to the fallen of World War 1 and 2.	War memorial	Modern	Designated, grade II
MNL4124	**Possible Enclosure, Immingham.** A possible enclosure shown on APs from 1946.	Enclosure?	Prehistoric / Roman	non-designated
MNL4182	**Ditches in Stallingborough.** A pair of ditches recorded in a watching brief, possible dug to flank a trackway which contained flintwork of Neolithic or Bronze Age date.	Ditch	Prehistoric	non-designated
MNL4263	**Beacon in Stallingborough.** A beacon marked on OS maps of 1887-9.	Beacon	Post-medieval	non-designated
MNL4269	**Nun's Creek, Habrough Marsh.** Recorded as early as 1250-60, connected to Coatham Nunnery in Brocklesby. Shown, but not annotated, on OS maps of 1887-9. Sections have been straightened as part of land drainage.	Water feature	Undated	non-designated
MNL4299	**Blow Wells in Stallingborough.** Shown on OS maps of 1856 within a small enclosure. Later maps show a small wood or group of trees at this point.	Spring, wood	Post-medieval	non-designated
MNL4400	**Undated ditches at Stallingborough.**	Ditch	Undated	non-designated
MNL4426	**Site of beacon, Stallingborough Haven.** A beacon is recorded on historic OS maps on the edge of the sea defence bank.	Beacon	Post-medieval, modern	non-designated
MNL4427	**Former sewage works, near Queens Road, Immingham.** Works recorded on the 4th edition OS map (1932-33) and survives as a square earthwork.	Sewage works	Modern	non-designated
MNL4429	**Former Grain Store, Immingham Dock.** Site of demolished grain store at Immingham Docks (recorded on the 4th edition OS map. It was a seven-storey building connected to the quayside by a conveyor.	Grain warehouse	Modern	non-designated
MNL4438	**Site of Wool Shed, Immingham Dock.** Site of demolished wool store at Immingham Dock recorded on 4th edition OS map.	Wool warehouse	Modern	non-designated
MNL4439	**A peat deposit to the south west of Laporte Road, near Long Strip.** Identified by geological borehole survey in 1906, peat c.0.6m thick (TA21SW93 — LONGMARSH IMMINGHAM LINCS).	Buried land surface?	Undated	non-designated
MNL4490	**Roman Settlement. Stallingborough Interchange, Stallingborough.** High status Roman settlement and industrial site. (Locally listed asset - archaeology)	Settlement, industrial activity	Roman	Non-designated

ACM / NHLE /NELC HER number	Description	Type	Period	Designation
MNL4601	**Post-medieval drainage ditches, Stallingborough.** Linear ditched features are visible as earthworks on APs taken in 1946.	Trackway	Prehistoric to post-medieval	non-designated
MNL4602	**Uncertain trackway or drainage ditch, Stallingborough.** A linear ditched feature is visible as earthworks on APs taken in 1946 running for over 1km in an NNE direction to the west of Grassmere.	Trackway, drainage ditch	Prehistoric to post-medieval	non-designated
MNL4603	**Post-medieval drainage ditch, Stallingborough.** Linear ditched features are visible as earthworks on APs taken in 1946 to the south-east of Kiln Lane Trading estate.	Drainage ditch	Medieval, post-medieval	non-designated
MNL4604	**Post-medieval drainage ditch, Stallingborough.** A linear ditched feature is visible as earthworks on APs taken in 1946 running NW-SE across a field to the south of Kiln Lane Trading estate.	Drainage ditch	Medieval, post-medieval	non-designated
MNL4606	**Post-medieval drainage ditches, Stallingborough.** Linear ditched features are visible as earthworks on APs taken in 1946 under what is now Kiln Lane Trading Estate.	Drainage ditch	Medieval, post-medieval	non-designated
MNL4607	**Rectilinear ditched enclosures, Stallingborough.** Linear ditched features are visible as cropmarks on APs taken in the 1940's under what is now Kiln Lane Trading Estate.	Enclosure	Roman to late post-medieval	non-designated
MNL4608	**Historic boundary bank, Stallingborough.** A multiple banked feature is visible as low earthworks and cropmarks on APs taken in 1941. It runs for 440m east-west across fields to the east of Kiln Lane Trading Estate.	Flood defences, boundary bank	Medieval, post-medieval	non-designated
MNL4618	**Undated enclosure, Stallingborough.** A large oval ditched enclosure, 166m across and visible as cropmarks on APs taken in 2005 (NE of Kiln Lane Trading Estate).	Enclosure?, Natural feature	Late prehistoric?	non-designated
MNL4619	**Undated enclosures, Stallingborough.** Rectilinear bank and ditched features are visible as cropmarks on APs taken in 1941 in a field to the north of Kiln Lane. Appear to form parts of up to three enclosures, possibly part of an undated field system.	Enclosure?, Field system	Prehistoric to post-medieval	non-designated
MNL4620	**Historic drainage ditches, Stallingborough.** A series of ditched linear features visible as cropmarks on APs taken in 1962 in a field to the west of the Grimsby and Immingham Electric Railway (area now under a car park and industrial estate).	Drainage ditch?	Medieval, post-medieval	non-designated

ACM / NHLE /NELC HER number	Description	Type	Period	Designation
MNL4621	**Historic trackway, Immingham.** A linear ditched feature is visible as cropmarks on APs taken in 1947, north of North Beck Drain.	Trackway	Medieval, post-medieval	non-designated
MNL4622	**Uncertain ring ditch, Stallingborough.** A subcircular ditched feature (12m across) visible as cropmarks on APs taken in 1947. It is of uncertain date and function, but morphologically similar to prehistoric remains (Bronze Age barrows and later prehistoric round houses, however, a natural origin such as a fungus ring cannot be ruled out.	Ring ditch, Natural feature?	Undated	non-designated
MNL4623	**World War 2 bomb craters, Stallingborough.** A line of three small circular hollows visible as earthworks on APs taken in 1941. They are c.4m across and considered likely to be World War 2 bomb craters.	Bomb crater	Modern	non-designated
MNL4630	**World War 2 Anti-Landing Obstacles, Immingham.** Site of features visible as earthworks on APs taken in 1942 in fields to the north of North Beck Drain. Multiple lines of obstacle run NE-SW across the field which have since been plough-levelled.	Anti-landing obstacle	Modern	non-designated
MNL4631	**World War 2 Anti-Landing Obstacles, Stallingborough.** Site of a line of anti-landing obstacles is visible as earthworks on APs taken in 1942 and 1947 in a field to the south-east of North Beck Drain.	Anti-landing obstacle	Modern	non-designated
MNL4632	**World War 2 Anti-Landing Obstacles, Immingham.** Site of anti-landing obstacles visible as earthworks on APs taken in 1941 in fields to the east of Long Strip.	Anti-landing obstacle	Modern	non-designated
MNL4633	**World War 2 Anti-Landing Obstacles, Stallingborough.** Site of anti-landing obstacles visible as earthworks on APs taken in 1941 in fields under what is now Kiln Lane Trading Estate.	Anti-landing obstacle	Modern	non-designated
MNL4634	**World War 2 Anti-Landing Obstacles, Green Lane, Stallingborough.** Site of anti-landing obstacles visible as earthworks on APs taken in 1941 in fields south-west of Green Lane (now Laporte Road).	Anti-landing obstacle	Modern	non-designated
MNL4640	**World War 2 Anti-Landing Obstacles, Immingham.** Site of anti-landing obstacles are visible as earthworks on APs taken in 1940 in fields east of Immingham (multiple lines of obstacle run NE-SW).	Anti-landing obstacle	Modern	non-designated

ACM / NHLE /NELC HER number	Description	Type	Period	Designation
MNL4641	**World War 2 Anti-Landing Obstacles, Immingham.** Site of anti-landing obstacles are visible as earthworks on APs taken in 1940 in the field to the east of Ings Lane, Immingham (multiple lines of obstacle run NE-SW).	Anti-landing obstacle	Modern	non-designated
MNL4643	**World War 2 bomb crater, Immingham.** The probable site of a World War 2 bomb crater visible as earthworks on APs taken in 1941. The circular hollow is c.8m across and lies in the field to the east of Long Strip.	Bomb crater	Modern	non-designated
MNL4644	**World War 2 military installation, Immingham.** The probable military site is visible as structures and bare earth features on APs taken in the 1940s (including a possible day mark that survived into the 1950s).	Military installation, day mark	Modern	non-designated
MNL4645	**Early C20 hollow, possible crater, Habrough Marsh, Immingham.** A large circular hollow visible as earthworks on APs taken in the 1940s (c.20m across and marked on the OS 4th edition map underlying a line of rail-track). The feature looks like a bomb crater however the overlying trackway would seem incongruous.	Hollow, bomb crater?	Modern	non-designated
MNL4646	**Early C20 building, Habrough Marsh, Immingham.** Site of a small building (6m by 3m) visible on APs taken in the 1940s between the railway lines of Immingham Docks. Possibly a structure associated with the railway such as a signal box.	Building	Modern	non-designated
MNL4647	**Early C20 linear earthwork, Immingham.** A wide ditch visible as earthworks on APs taken in the 1940's underlying the railway lines servicing Immingham Docks. It cuts across the post-medieval fields marked on the OS 1st edition map and is therefore considered to be of early C20 date.	Ditch	Modern	non-designated
MNL4648	**Post-medieval field boundaries and tracks, Habrough Marsh, Immingham.** A series of linear bank and ditched features visible as earthworks on APs taken in the 1940's in the vicinity of the post-medieval farmstead at Habrough Marsh. Not marked on the OS historic mapping but are considered to be field boundaries and trackways associated with the farmstead.	Field boundary, trackway, farmstead	Post-medieval	non-designated

ACM / NHLE /NELC HER number	Description	Type	Period	Designation
MNL4649	**Historic enclosure, Habrough Marsh, Immingham.** A large, elongated rectilinear enclosure visible as earthworks on APs taken in the 1940's in the vicinity of the post-medieval farmstead at Habrough Marsh. Enclosure is not marked on the OS historic mapping and considered to be of medieval or post-medieval date, possibly relating to an earlier phase of the farmstead.	Enclosure	Medieval, post-medieval	non-designated
MNL4650	**Historic flood defences, Habrough Marsh, Immingham.** A long linear bank marked on the OS 1st edition map running roughly SE-NW across Habrough Marsh. It continues north westwards to the open marsh which later became the site of Immingham Docks. It is considered to be a flood defence bank of medieval or post-medieval origin (parts of the bank are visible as earthworks on APs taken in the 1940's).	Flood defences	Medieval, post-medieval	non-designated
MNL4651	**World War 2 barrage balloon mooring site, Immingham.** The possible site of a military installation visible as structures on APs taken in the 1940s. It includes a roadway leading to a circular structure with a second circular earthwork to the north-west.	Military installation, barrage balloon mooring	Modern	non-designated
MNL4652	**Early C20 enclosure, Immingham.** A small rectilinear enclosure visible as earthworks on APs taken in 1941 in a field to the west of Queens Road. It is of uncertain function.	Enclosure	Modern	non-designated
MNL4653	**Post-medieval field boundary, Immingham.** A linear banked feature visible as earthworks on APs taken in the 1940s. Likely to be C19 or C20 date.	Field boundary	Post-medieval, modern	non-designated
MNL4654	**Post-medieval trackway, Immingham.** A linear ditched feature visible as earthworks on APs taken in the 1940s. Likely be C19 or C20 date.	Trackway	Post-medieval, modern	non-designated
MNL4655	**Possible World War 2 Anti-Landing Obstacles, Immingham Docks.** Linear features visible as earthworks on APs taken in the 1940s cutting across open ground east of Immingham Docks (not marked on the OS 1st edition map and are therefore likely early C20 date.	Anti-landing obstacle	Modern	non-designated

ACM / NHLE /NELC HER number	Description	Type	Period	Designation
MNL4656	**Possible railway embankment, Immingham Docks, Immingham.** A large embanked linear feature visible as earthworks on APs taken in the 1940s running from Habrough Marsh northwards for 500m to the shoreline. It has several small branches to the north-east and looks like a disused rail embankment (not marked on the OS 1st edition map and is therefore likely to be of early C20 date.	Railway embankment?	Modern	non-designated
MNL4657	**C20 enclosure, Immingham Docks, Immingham.** A large polygonal bank and ditched feature visible as earthworks on APs taken in the 1940s immediately to the west of the possible rail embankment (MNL4656).	Enclosure?	Modern	non-designated
MNL4658	**Post-medieval field boundaries, Immingham.** Two linear banked features visible as earthworks on APs taken in the 1940s immediately to the east of Immingham Docks (not marked on the OS 1st edition map and likely to be C19 or C20 date.	Field boundary	Post-medieval, modern	non-designated
MNL4659	**Post-medieval field boundaries and ridge and furrow, Immingham.** Two units of narrow post-medieval ridge and furrow visible as earthworks on APs taken in the 1940s south of Immingham Docks and associated with a field boundary and linear terrace.	Field boundary, narrow ridge & furrow	Post-medieval, modern	non-designated
MNL4660	**Post-medieval linear terrace, Immingham.** A linear scarp (possible cultivation terrace) visible as earthworks on APs taken in the 1940s running for 390m from what was Fox Covert in a WSW direction. It forms the southern end of the two units of narrow ridge and furrow (described in MNL4661) and incorporates a sloped trackway onto the higher ground to the north.	Cultivation terrace	Post-medieval	non-designated
MNL4674	**Undated curvilinear ditched enclosure, Immingham.** The feature is visible as cropmarks on APs taken in 1942.	Enclosure	Prehistoric to modern	non-designated
MNL4675	**World War 2 barrage balloon mooring site, Immingham.** Site visible as earthworks and structures on APs taken in 1940. It includes a small circular anchor point 11m across and three associated buildings. Located immediately south-east of Immingham Docks (one of a number of balloon sites built to protect the docks).	Barrage balloon mooring	Modern	non-designated

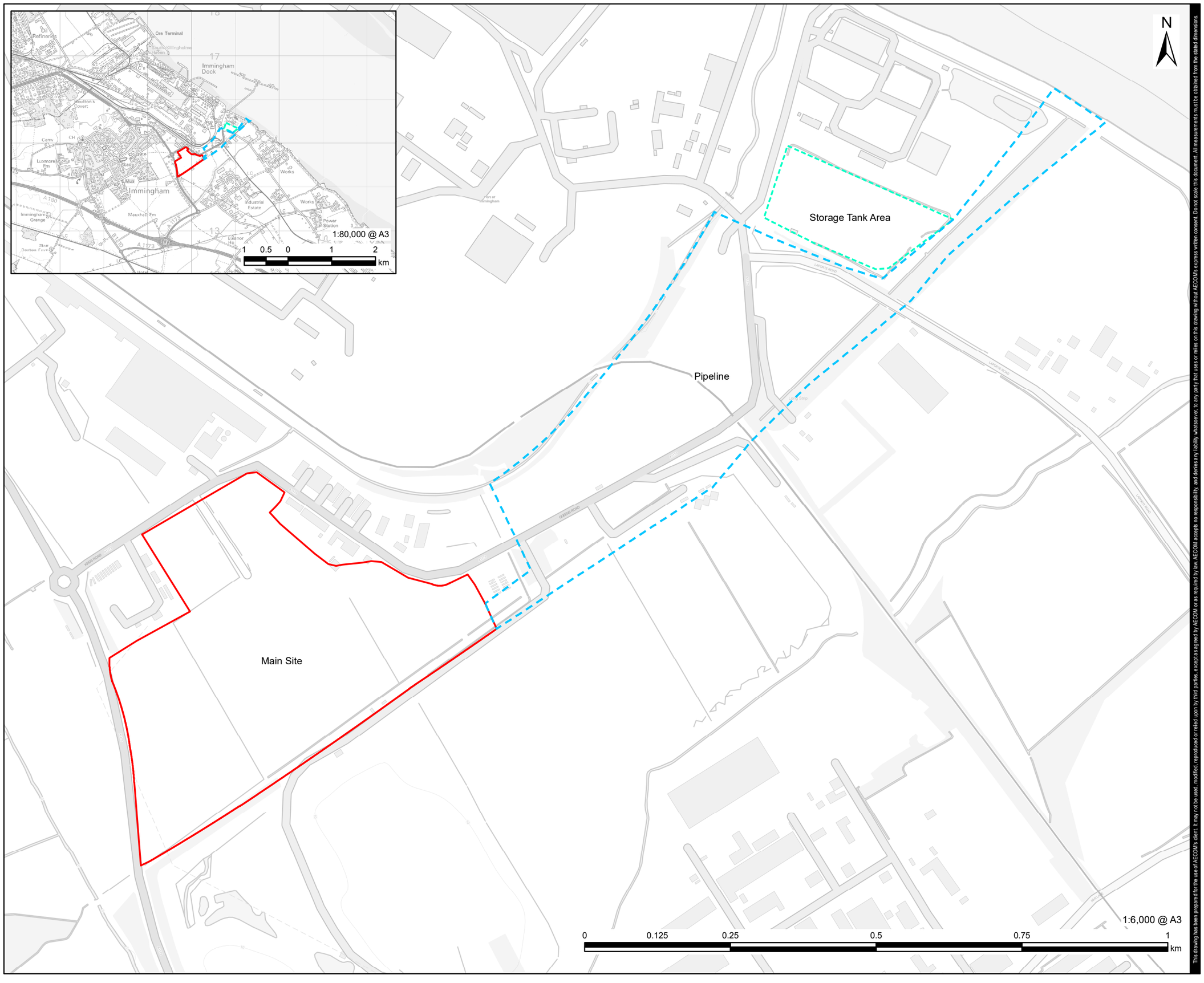
ACM / NHLE /NELC HER number	Description	Type	Period	Designation
MNL4679	**World War 2 Anti-Landing Obstacles, Immingham.** Site of earthworks visible on APs taken in the 1940s in a field north of Immingham.	Anti-landing obstacle	Modern	non-designated
MNL4682	**Historic flood defences, Immingham.** Features marked on the OS 1st edition map north-east of Immingham. A short stretch is marked on the 4th edition map running northwards from allotments before being cut by Immingham Dock. It is visible on APs taken in the 1940's.	Flood defences	Post-medieval, modern	non-designated
MNL4684	**World War 2 barrage balloon mooring site, Immingham.** Features visible as earthworks and structures on APs taken in 1940, including a small circular anchor point 8m across and associated buildings.	Barrage balloon mooring	Modern	non-designated
MNL4689	**World War 2 military buildings, Immingham Docks.** Site of a group of buildings constructed at the eastern end of Immingham Docks during World War 2. Marked on the OS 4th Edition map and possibly of military function (docks becoming a naval base in 1940). They are associated with a series of parallel structures of uncertain function, possibly a firing range.	Military building, firing range	Modern	non-designated
MNL4715	**Tram Shelter, Queens Road, Port of Immingham.** Site of a single storey building with a rectangular footprint that probably dates to the formation of the Grimsby and Immingham Electric Railway (an electric light railway primarily for passenger traffic linking Grimsby with the Port of Immingham). This spur of the railway days to c.1914. Probably rebuilt during World War 2 with engineering brick and considerable use of pre-cast concrete possibly to provide shelter for workers during air raids. The tram service closed in 1961.	Tram shelter	Modern	non-designated
MNL4726	**Immingham Police Station.** Cells and police houses of 1912 built to serve the developing town. Red brick with slate roof and corner quoins, façade is five bays wide with two right bays set back creating an asymmetrical appearance. Plans were drawn up in 1910 by the County Surveyor James Thropp for a complex including a superintendent's house, inspectors house, 12 cells, four constables' houses, courthouse etc (unclear if these plans were executed to the full). An important landmark for the development of Immingham from a village to town.	Police station	Modern	non-designated

ACM / NHLE /NELC HER number	Description	Type	Period	Designation
MNL4763	**Roman pottery sherd found on land off the Stallingborough Interchange, Stallingborough.**	Find spot	Roman	non-designated
MNL290	**The County Hotel** Large hotel built 1910 by G.H. Mumby. Two storeys plus attics in brick with ashlar-clad ground floor. A two storey gabled west wing was later added in brick. The hotel occupies a prominent corner plot and is considered an important landmark, its construction signifying Immingham's transformation from village to port town. Briefly used as a HQ by Lord Mountbatten after HMS Kelly sustained damage.	Hotel	Modern	non-designated
ACM1	**Two terrace rows on Queen Road** Two rows of terraces located on Queens Street. Early 20th century, first appearing on the 1932 25-inch Ordnance Survey map. Terraces are in brick and render with pitched pantile roofs. Set back from Queens Road behind short gardens, with narrow enclosed yards to the rear.	Terraced housing	Modern	non-designated

Appendix B Figures

Revision: 0 Drawn: AG Checked: LC Approved: EA Date: 2022-05-24

Filename: \\na.aecomnet.com\fs\EMEA\Leeds-UKLDS2\Legacy\UKLDS2PFPSW001\WIP\LE_Projects\Newproje\60673509 - AP Ammonia Terminal\400_Technical\GIS\02_Maps\Heritage Study\Figure1_GeneralLocationMap.mxd



AECOM

PROJECT

Immingham Green Energy Terminal

CLIENT

Associated British Ports

CONSULTANT

AECOM Limited
5th Floor
2 City Walk
Leeds, LS11 9AR
www.aecom.com

LEGEND

- Main Site
- Pipeline
- Storage Tank

NOTES

ISSUE PURPOSE

FINAL

PROJECT NUMBER

60673509

FIGURE TITLE

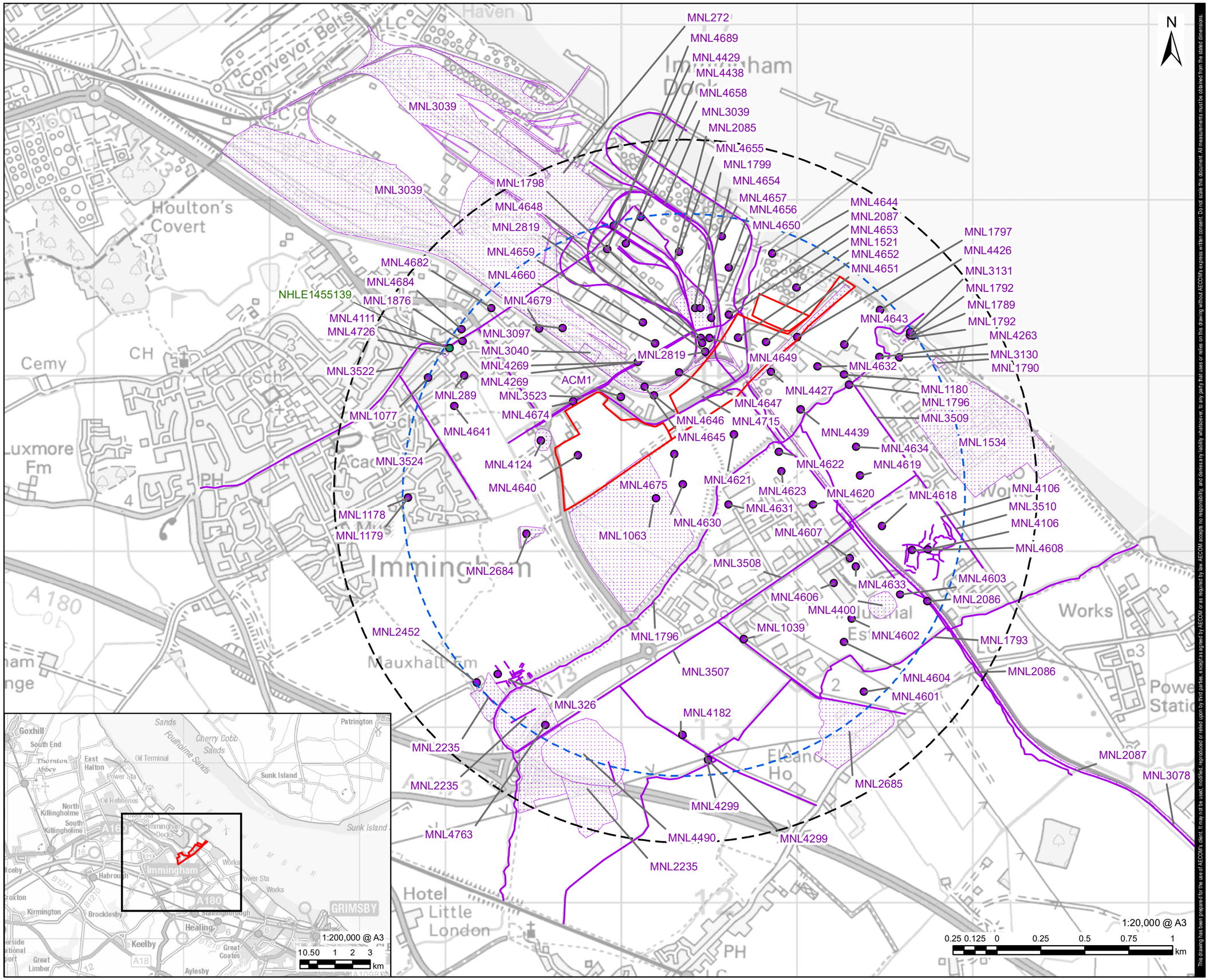
Location of Site

FIGURE NUMBER

Figure 1

Revision: 0 Drawn: JH Checked: LC Approved: AC Date: 2022-05-27

Filename: \\na.aecomnet.com\tls\EMEA\Leeds-UKLDS2\Legacy\UKLDS2PFPSW001\WIP\LE_Projects\Newport\60673509 - AP Ammonia Terminal\400_Technical\GIS\02_Maps\Heritage Study\Figure2_HeritageAssetsWithinStudyArea_220527_JH.mxd



AECOM

PROJECT

Immingham Green Energy Terminal

CLIENT

Associated British Ports

CONSULTANT

AECOM Limited
5th Floor
2 City Walk
Leeds, LS11 9AR
www.aecom.com

LEGEND

- Proposed Development Boundary
- 1.6km Study Area For Non-Designated Assets
- 2km study area for designated assets
- Hsitoric England Designated
- Heritage Assets (point)[1]
- Heritage Assets (polyline)[1]
- Heritage Assets (polygon)[1]

NOTES

[1] Provided by North East Lincolnshire Council Historic Environment Record

ISSUE PURPOSE

FINAL

PROJECT NUMBER

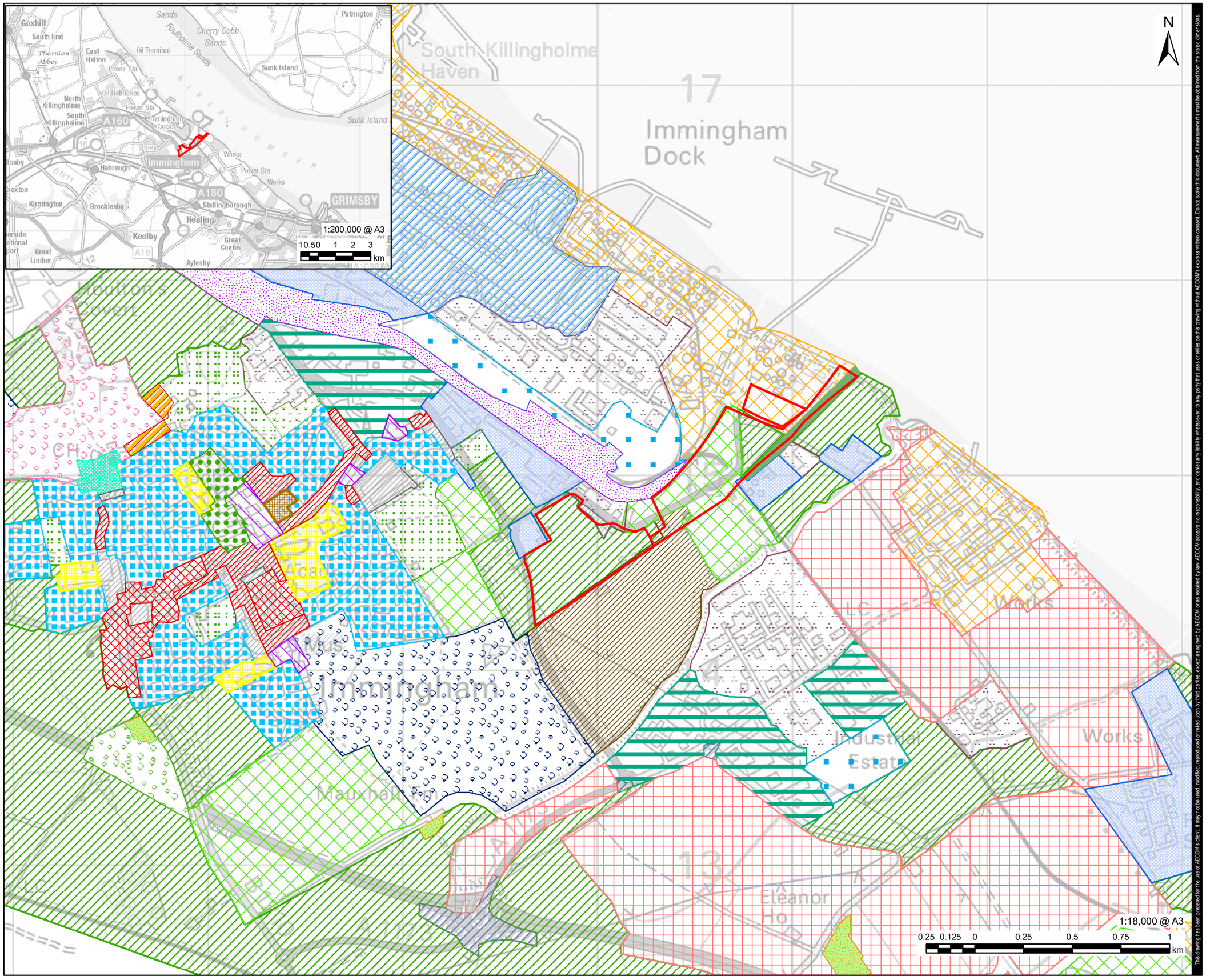
60673509

FIGURE TITLE

Location of heritage assets within study area

FIGURE NUMBER

Figure 2



AECOM

PROJECT

Immingham Green Energy Terminal

CLIENT

Associated British Ports

CONSULTANT

AECOM Limited
5th Floor
2 City Walk
Leeds, LS11 9AR
www.aecom.com

LEGEND

- Proposed Development Boundary

North East Lincolnshire Council (NELC) Historic Landscape Character Types [1]

- Allotments
- Ancient Enclosure
- Car Storage
- Chemical Works
- Docks, Wharves and Havens
- Educational
- Flats and
- Golf Course
- Historic Settlement Core
- Industrial Estate
- Isolated Farmstead
- Junction
- Landfill
- Modern Fields
- Municipal
- Other Factory
- Other Industrial Works
- Other Woodland
- Parliamentary Planned Enclosure
- Planned Residential Development
- Plantation Woodland
- Post 1960s Semi Detached Housing
- Pre 1960s Semi Detached Housing
- Private Planned Enclosure
- Recreation Ground
- Sidings
- Terraced Housing (C20)
- Village Farmstead
- Warehouses & Distribution

NOTES

[1] - Digitised from: NELC Historic Landscape Characterisation Map - Historic Landscape Charater Types for Immingham, Stallingborough, Healing and Habrough.

ISSUE PURPOSE

FINAL

PROJECT NUMBER

60673509

FIGURE TITLE

Historic landscape character types

FIGURE NUMBER

Figure 3

Filename: \\na.aecomnet.com\fs\EMEA\Leeds-UKLDS2\Legacy\UKLDS2PFPSW001\WIP\LE_Projects\Newproje\60673509 - AP Ammonia Terminal\400_Technical\GIS\02_Maps\Heritage Study\Figure3_HistoricLandscapeCharacterTypes_220523_JH.mxd Revision: 0 Drawn: JH Checked: LC Approved: AC Date: 2022-05-23

Appendix C Plates

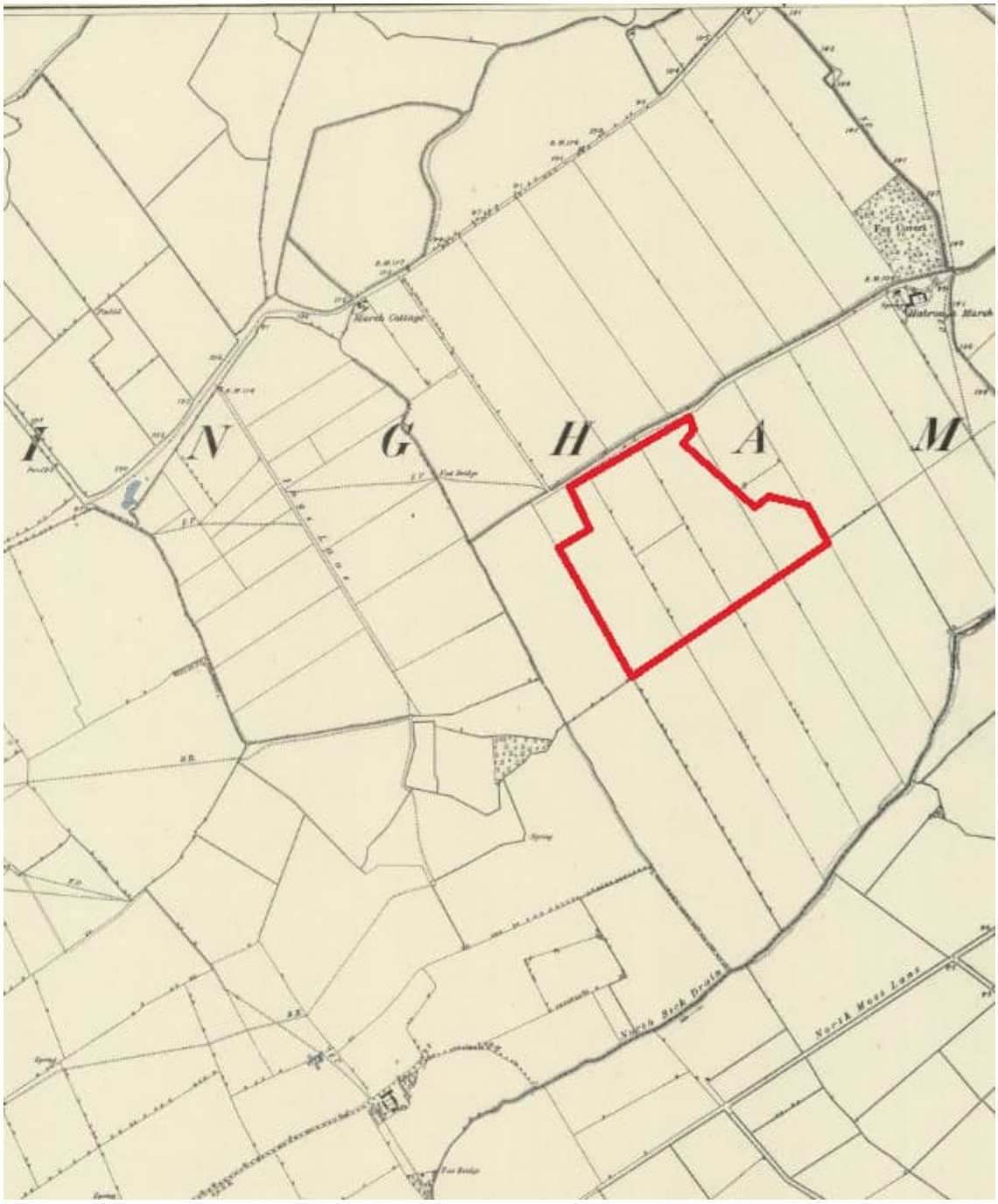


Plate 1: 1887 1st edition Ordnance Survey (Lincolnshire sheet XIII.SE West)

Plate 2: View across Main Site (looking south)

Plate 3: View across Main Site, east side (looking south)

Plate 4: Developed land at corner of Laporte Road and Queens Road

Plate 5: Woodland known as 'Long Strip'

aecom.com