

Viking CCS Pipeline

Environmental Statement Volume I – Non-Technical Summary

Document Reference: EN070008/APP/6.1

Applicant: Chrysaor Production (U.K.) Limited,
a Harbour Energy Company
PINS Reference: EN070008
Planning Act 2008 (as amended)
The Infrastructure Planning (Applications: Prescribed Forms
and Procedure) Regulations 2009 - Regulation 5(2)(a)
Date: October 2023

PINS Reference	Document Reference	Document Revision	Date
EN070008	EN070008/APP/6.1	Revision 1	October 2023

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1 Introduction

Overview


- 1.1.1 This Environmental Statement (ES) Non-Technical Summary has been prepared for the Viking CCS Pipeline (hereafter referred to as the “Proposed Development”) and provides a summary of the Environmental Impact Assessment (EIA) of the Proposed Development. 
- 1.1.2 The Proposed Development is a Nationally Significant Infrastructure Project under the Planning Act 2008, which means that permission is required from the Secretary of State to build and operate the Proposed Development. The permission is called a Development Consent Order. The Development Consent Order application will be examined by the Planning Inspectorate which will make a recommendation to the Secretary of State for Department of Energy Security and Net Zero, who will then determine the application.
- 1.1.3 The Proposed Development is being applied for by Chrysaor Production (U.K.) Limited, a Harbour Energy Company (hereafter “the Applicant”). The Applicant is committed to helping solve the dual challenge the world energy markets face, namely increasing energy supply to meet growing demand and doing so with lower greenhouse-gas emissions.
- 1.1.4 The Proposed Development forms part of the overall Viking CCS Project. The overall Viking CCS Project is a carbon capture and storage scheme that will take carbon dioxide captured by emitters in Immingham (Lincolnshire) to be transported via an underground pipeline of approximately 55.5 kilometres in length to Theddlethorpe (Lincolnshire) via the Viking CCS Pipeline, for onward transportation to a permanent storage site within depleted gas reservoirs beneath the Southern North Sea. The transportation of carbon dioxide between Theddlethorpe and the offshore storage site will be via an existing offshore pipeline (known as the Lincolnshire Offshore Gas Gathering System (LOGGS) pipeline) and a newly installed spur pipeline.

Figure 1: Overall Viking CCS Project (including the Viking CCS Pipeline)



1.1.5 The DCO application and this Environmental Statement (ES) (which forms Volume 6 of the Development Consent Order application), **relate to the onshore pipeline transportation system only**. The offshore pipeline system does not form part of the DCO application and is subject to a separate consent. **Figure 1** illustrates the overall Viking Carbon Capture Storage Project, including the Viking CCS Pipeline. More detailed information on the components included within the Proposed Development are included in Section 4 below.

1.1.6 This ES has been prepared to accompany the DCO application and presents the findings of Environmental Impact Assessment. It includes a description of the Proposed Development and the reasonable alternatives considered in the development of the design, information about the local environment and the likely significant effects of the Proposed Development on the environment and local communities, and the measures proposed to mitigate these effects. This document provides a summary of the ES in non-technical language.

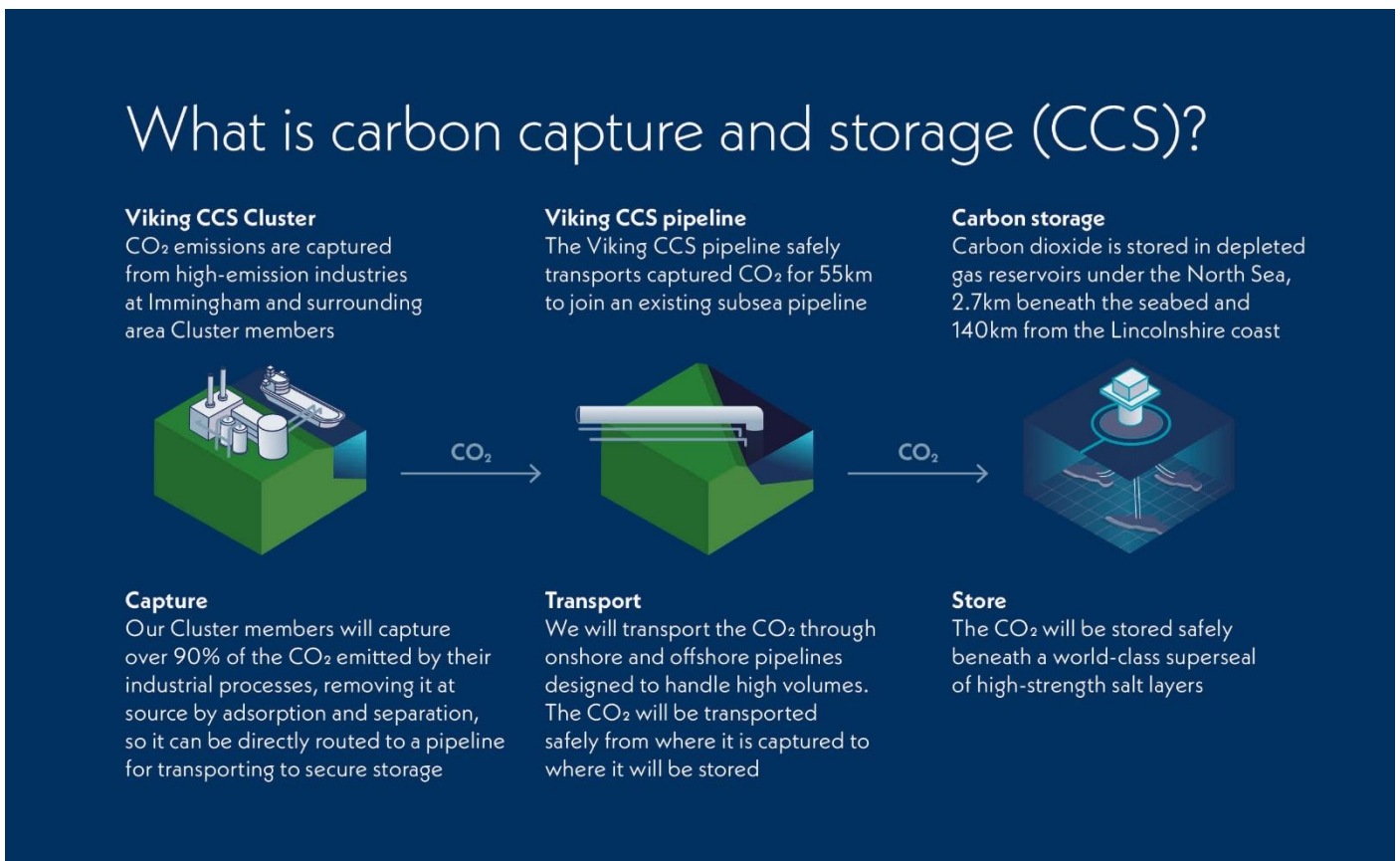
What is carbon capture, transport and storage?

1.1.7 Carbon capture and storage (CCS) is a technique that reduces CO₂ emissions to the atmosphere. CCS usually involves a three-step process:


- Capturing the CO₂ emissions from industrial processes, such as steel and cement production, or from the burning of fossil fuels in power generation and oil refining;
- Transporting the captured CO₂ emissions from where they were produced, for example via a pipeline or a vessel; and
- Storing the CO₂ deep underground in geological formations.

1.1.8 **Figure 2** outlines the three-step process described above specifically relating to the overall Viking CCS Project.

Figure 2: Carbon Capture and Storage explained



2 Need for the Proposed Development

- 2.1.1 The UK government has committed to a legally binding target of achieving Net Zero by 2050. To meet this target, the UK needs to transition towards cleaner sources of energy, while decarbonising existing infrastructure. That is where carbon capture technology is set to play a crucial role. 
- 2.1.2 Carbon capture and storage is recognised by the Intergovernmental Panel on Climate Change and the UK Government as a vital step on the road to achieving Net Zero carbon emissions.
- 2.1.3 The Proposed Development is located in the Humber area, the UK's most industrial and carbon dioxide emissions-intensive region and is uniquely placed to help the UK decarbonise and grow by providing a gateway for investment and the development of a regional low-carbon hub.
- 2.1.4 The south bank of the Humber estuary is a long-established industrial area and while this provides significant regional employment, this industry also makes the Humber region the largest emitter of carbon dioxide in the UK, emitting approximately 20 million tonnes per annum (mtpa) of carbon dioxide.
- 2.1.5 With the Humber area releasing around 20 million tonnes of carbon dioxide per year, the Proposed Development can fulfil more than 50 per cent of the CCS requirement for the area, whilst also offering a route to deliver one third of the UK's target of 30 million tonnes of carbon dioxide capture by 2030, enabling the large-scale decarbonisation of industrial and energy emissions.
- 2.1.6 The Proposed Development is viewed as being vital in helping to meet the UK government's net zero targets, energy security and industrial rejuvenation, and there is a clear need for the development.
- 2.1.7 In its Ten Point Plan, the UK Government committed to establish 4 industrial clusters for Carbon Capture Utilisation and Storage, with 2 clusters to be established by the mid-2020s and 4 to be established by 2030.
- 2.1.8 Two clusters have been progressed through the previously awarded Track 1 process (HyNet and East Coast Cluster). On July 31, 2023, the Viking CCS Project was awarded Track 2 status as part of the UK Government's cluster sequencing process. The announcement marked an important milestone for the Project.
- 2.1.9 The Viking CCS Project will develop the infrastructure necessary to transport carbon dioxide to secure offshore storage sites. The Proposed Development is potentially transformational on the UK's journey to net zero and target a reduction of 10 million tonnes of UK carbon dioxide emissions per year by 2030, and up to 15 million tonnes per year by 2035. This would meet up to one third of the UK's Carbon Capture Storage target.
- 2.1.10 The Proposed Development will provide safe, cost-effective, high-quality, high-volume carbon dioxide storage to meet the high demand that exists in the Humber region. The Proposed Development can make a fast and substantial difference in helping the UK to reach its net zero targets by 2050, achieve energy security and grow the economy of Humberside and Lincolnshire.
- 2.1.11 It is anticipated that the Proposed Development will enable decarbonisation of industry in the Humber region and assist in the continuation of industry and manufacturing in this region while also working towards Net Zero.

2.1.12 While protecting existing employment in this area, the Proposed Development will also assist in generating up to £7 billion worth of investment across the Carbon Capture Storage full value chain investment, with up to 10,000 direct and indirect new employment roles created from this investment.

National Policy Statements

2.1.13 National Policy Statements are produced by the UK Government. They provide reasoning for the policy set out in the statement and explain how the policy takes account of government policy relating to the mitigation of, and adaptation to, climate change. They consist of the government's objectives for the development of nationally significant infrastructure in a particular sector.

2.1.14 In the case of the Proposed Development, the relevant National Policy Statements are:

- National Policy Statement for Overarching Energy, also known as “EN-1”; and
- National Policy Statement for Oil and Gas Supply and Storage, also known as “EN-4”.

2.1.15 The current National Policy Statements were published in 2011; however, they are undergoing a review and update. The latest draft version of EN-1 was published in March 2023. In comparison to the 2011 version, the revised draft EN-1 places more emphasis on the need for new Carbon Capture Storage infrastructure to meet the net zero ambition. At paragraph 3.5.2 it states that:

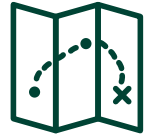
‘the Committee on Climate Change states CCS is a necessity not an option. As well as its role in reducing emissions associated with generating electricity from natural gas, CCS infrastructure will also be needed to capture and store carbon dioxide from hydrogen production from natural gas, industrial processes, the use of BECCS [biomass energy with carbon capture and storage] and from the air’.

2.1.16 The revised draft EN-1 then goes on to state that:

‘The alternatives to new CCS infrastructure for delivering net zero by 2050 are limited, with alternative methods for decarbonising industry including the improvement of energy efficiency, electrification of heat and fuel switching to hydrogen or biomass as fuel or feedstock. Noting that these alternatives are limited as many emissions are process emissions’.

3 Evolution of Proposed Development and Consideration of Alternatives

The “Do Nothing” Scenario



- 3.1.1 The Do Nothing scenario would mean that the Proposed Development is not taken forward. This would mean that the benefits that the Proposed Development would provide, by reducing carbon dioxide emissions from industrial sources in the Humber and Lincolnshire area, would not be realised.
- 3.1.2 The Do-Nothing scenario would be contrary to the UK’s goal to achieve net zero carbon emissions by 2050. The Do-Nothing scenario would also be contradictory to Harbour Energy’s drive to explore opportunities for carbon capture and storage.

Approach to the Consideration of Alternatives

- 3.1.3 A number of different routes for the new pipeline and associated infrastructure have been considered for the Proposed Development. The main aim of considering alternatives is to avoid and/or reduce significant environmental effects as a result of the Proposed Development.
- 3.1.4 The alternatives for the Proposed Development that have been considered include:
- Alternative pipeline routes;
 - Alternative locations of the Immingham Facility;
 - Alternative locations of the Block Valve Stations;
 - Alternative locations of the Theddlethorpe Facility;
 - Alternative construction compound locations; and
 - Alternative construction methods.
- 3.1.5 The assessment of alternatives has followed an eight-step process:
- **Step 1:** Initial review of onshore vs offshore pipeline solution;
 - **Step 2:** Identification and assessment of potential pipeline corridors;
 - **Step 3:** Identification of preferred pipeline corridor and presentation at non-statutory consultation;
 - **Step 4:** Consideration of feedback and further pipeline corridor refinement;
 - **Step 5:** Identification of a preferred pipeline route (including degree of flexibility) and associated infrastructure; and
 - **Step 6:** Development of initial draft Order limits/DCO Site Boundary and presentation at statutory consultation;
 - **Step 7:** Consideration of feedback received during statutory consultation; and
 - **Step 8:** Development of DCO Site Boundary/Order limits for the DCO Submission.
- 3.1.6 The non-statutory consultation held in Spring 2022 presented a preferred pipeline corridor to members of the local public, landowners and other stakeholders for the first time. Each piece of feedback that was received was considered by the Project team and, where possible, has been reflected within the design of the Proposed Development and preferred pipeline route.

3.1.7 As a result of this feedback and further design work, the following changes were made to the preferred corridor:

- Moving the pipeline corridor further away from Stallingborough, Healing, and the Stallingborough Grange Hotel;
- Moving the pipeline corridor further away from Grainsby and North Thoresby;
- Moving the pipeline corridor further away from Covenham St Mary, Covenham St Bartholomew, Yarborough, North End and Alvingham;
- Moving the pipeline corridor further to the east of Grimoldby; and
- Moving the pipeline corridor further away from Theddlethorpe Academy.

3.1.8 For more information on the assessment of alternatives process, refer to *ES Volume II Chapter 2: Design Evolution and Alternatives (Application Document 6.2.2)*.

Figure 3: Schematic of Corridor Options and Indicative Preferred Corridor (Step 2)



3.1.9 **Table 1** provides a summary of the alternatives considered and the assessment findings that have guided the Proposed Development.

Table 1: Alternatives Considered

Alternative	Description	Findings
Do Nothing	The 'Do Nothing' scenario means the Proposed Development would not go ahead. This would likely mean carbon emissions from industrial sources in the region would continue to be released into the atmosphere.	This scenario would not help the UK in its goal to achieve net zero carbon emissions by 2050 and thus was not considered a viable alternative.

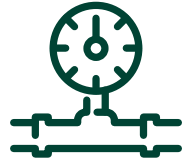
Alternative	Description	Findings
Onshore vs Offshore pipeline solution	An assessment was made of different potential offshore pipeline routes leaving from Immingham were investigated.	The Humber Estuary is an environmentally sensitive area – it is internationally important for wildlife, is a busy waterway for shipping and contains existing key infrastructure which would need to be avoided or crossed. The challenges associated with an offshore pipeline, from an environmental consents, construction and design perspective were considered to be too great to take this option forward.
Alternative Pipeline Route Corridors and Route Options	<p>An eight-step process was followed for the development of the pipeline corridor route, as outlined in paragraph 3.1.5 above.</p> <p>Environmental, social, technical, cost and land considerations were all reviewed and analysed in order to ensure that the pipeline routing selection was robust and informed by the findings of the alternative assessment work undertaken.</p> <p>As part of the alternatives process, twelve different corridor options split into five sections were initially identified. The pipeline was split into sections to increase flexibility and provide further opportunities for the development of the corridor. Finally, feedback at both the non-statutory and statutory stages was considered and helped feedback in directly to the final corridor and indicative route alignment.</p>	A preferred pipeline corridor was selected from the initial alternative assessment work undertaken. This corridor was then further refined as a result of non-statutory consultation, resulting in the identification of the selected pipeline corridor and development of a preferred pipeline route, following statutory consultation.
Alternative Location for the Immingham Facility	The location of the Immingham Facility was driven by the location of future carbon capture plants and the location of available land.	The Immingham Facility is the most appropriate location because it is within an existing industrial area close to carbon dioxide emitters.
Alternative Location for the Theddlethorpe Facility	The location of the Theddlethorpe Facility was driven by the location of the existing LOGGS Pipeline.	Two options for the Theddlethorpe Facility are currently being considered. Option 1 at the former

Alternative	Description	Findings
		Theddlethorpe Gas Terminal, and Option 2 further to the west on existing agricultural land.
Alternative Block Valve Station sites	The need for the Block Valve Stations was determined through an initial engineering assessment. This was to enhance the safety of the Proposed Development and ensure sections of the pipeline could be isolated if required. This work identified a need for three block valve and helped identify their approximate locations.	Following on from the engineering work, additional work was undertaken to identify the most suitable locations for the three block valves. This work resulted in the selection of Block Valve Station sites at 13 km, 24 km and 39 km along the pipeline route.
Construction Compound Alternatives	Twelve potential locations for locating construction compounds were evaluated against environmental factors, local communities and previous site uses. From this evaluation, two potential sites were identified for the northern and central construction compounds, and one site for the southern compound. Additional work was then undertaken to select the most appropriate location for the northern and central compounds.	Three construction compounds are required to construct the Proposed Development, due to the length of the pipeline. These consist of the northern compound, central compound and southern compound.

4 Description of the Proposed Development

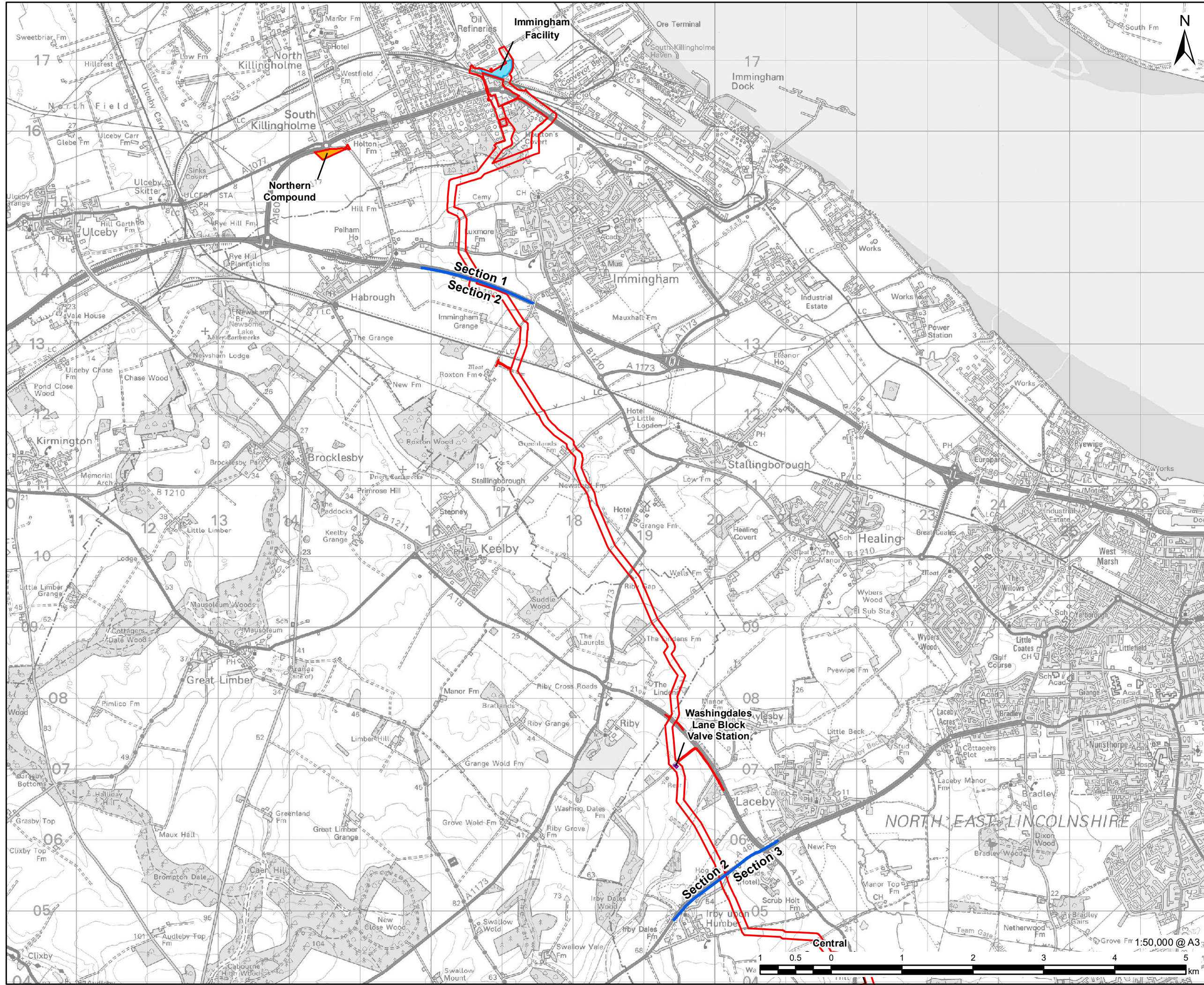
4.1 The Location

- 4.1.1 The Proposed Development is located in North East Lincolnshire and Lincolnshire, in the Yorkshire and Humber region and East Midlands region of England, respectively. The Proposed Development comprises of the Immingham Facility, from which carbon dioxide captured by emitters would be transported via a new buried 24 inch pipeline, of approximately 55.5 kilometre in length, to the Theddlethorpe Facility. This is the scheme for which a Development Consent Order has been applied.
- 4.1.2 The carbon dioxide will be transported from Theddlethorpe Facility for approximately 120 km via the existing LOGGS Pipeline, to a new 20 km section of subsea pipeline connected to offshore injection facilities, then to permanent storage in depleted gas fields. The marine elements of the project (all works and operations seaward of Mean Low Water Springs (MLWS)) are excluded from this DCO application and are subject to a separate consenting process.
- 4.1.3 Repurposing of the existing offshore gas transmission pipeline infrastructure supports the project's objective to minimise the environmental impact of delivering the Viking CCS Project.



4.2 Key Components of the Viking CCS Pipeline

- 4.2.1 The key elements of the Proposed Development, which are discussed in more detail in ES Volume II *Chapter 3: Description of the Proposed Development (Application Document 6.2.3)*, comprise:
- Immingham Facility;
 - A 55.5 kilometre, buried 24 inch diameter pipeline;
 - Three Block Valve Stations;
 - Theddlethorpe Facility; and
 - Dune Isolation Valve.
- 4.2.2 The Development Consent Order application covers the above key elements of the Proposed Development, as well as the existing LOGGS pipeline down to MLWS.
- 4.2.3 The new pipeline will be buried below ground at a minimum depth of 1.2 metres from the top of the pipe to the ground surface. At road, rail and watercourse crossings the pipeline will be buried deeper, and the pipe will typically be installed at these crossing points using trenchless or open cut methods.
- 4.2.4 The extent of the Proposed Development is illustrated through the DCO Site Boundary which marks out the temporary and permanent land take required for the construction and operation of the Proposed Development. The term DCO Site Boundary is interchangeable with the term “Order limits” which is used in other parts of the DCO application. Powers over this land are sought through the Development Consent Order application. The DCO Site Boundary is shown on **Figure 4**.



LEGEND

	DCO Site Boundary
	Route Section Break
	Temporary Construction Compound
	Block Valve Station
	Immingham Facility

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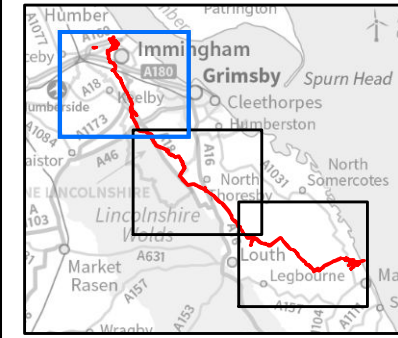


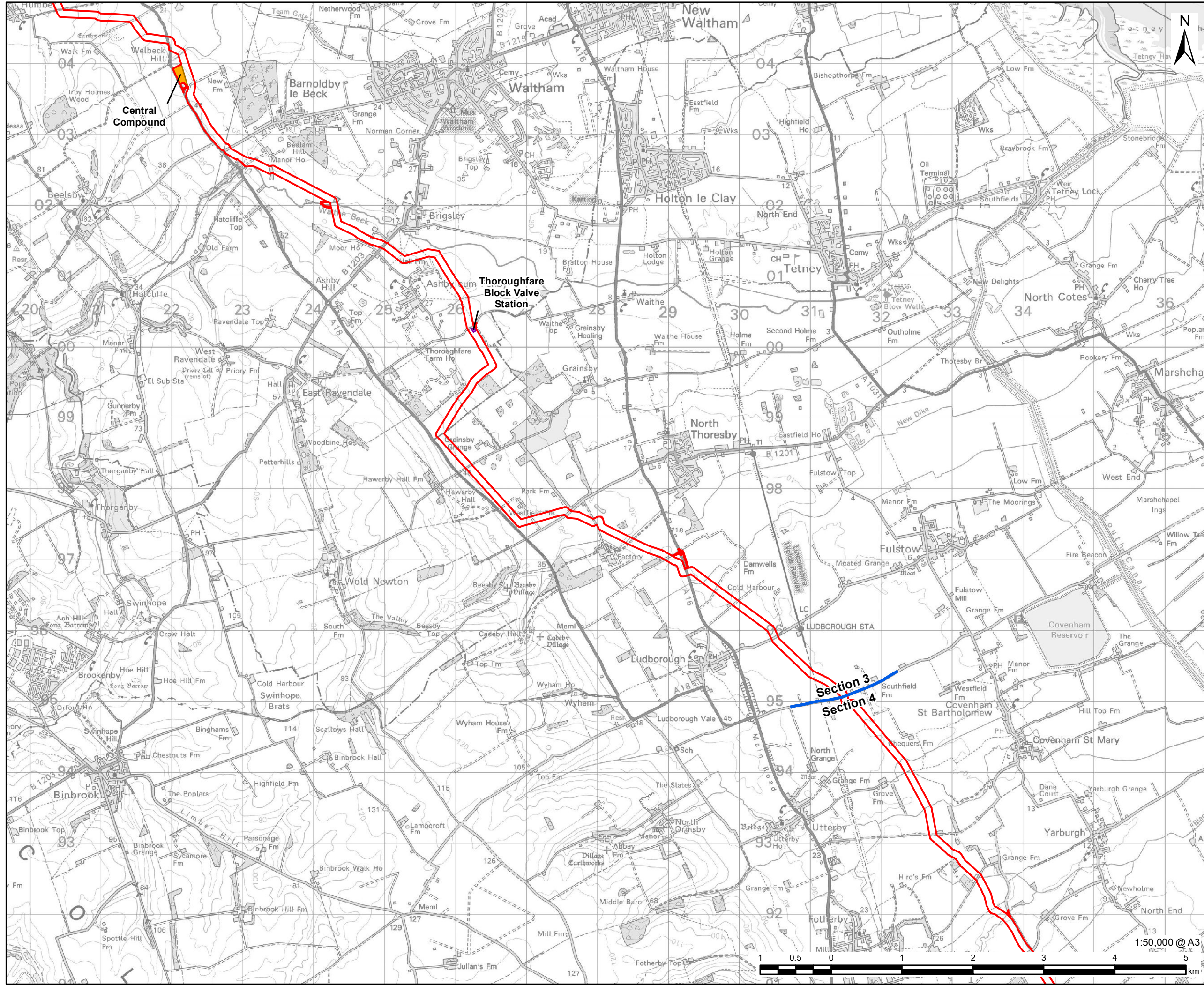
FIGURE TITLE

Figure 4 (1 of 3)

DCO Site Boundary and Location of Key Components of the Proposed Development

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LEGEND

- ▬ DCO Site Boundary
- ▬ Route Section Break
- Temporary Construction Compound
- Block Valve Station

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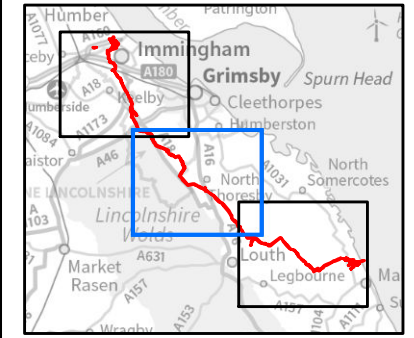
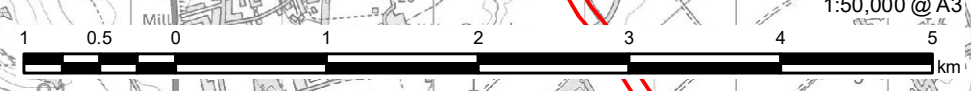
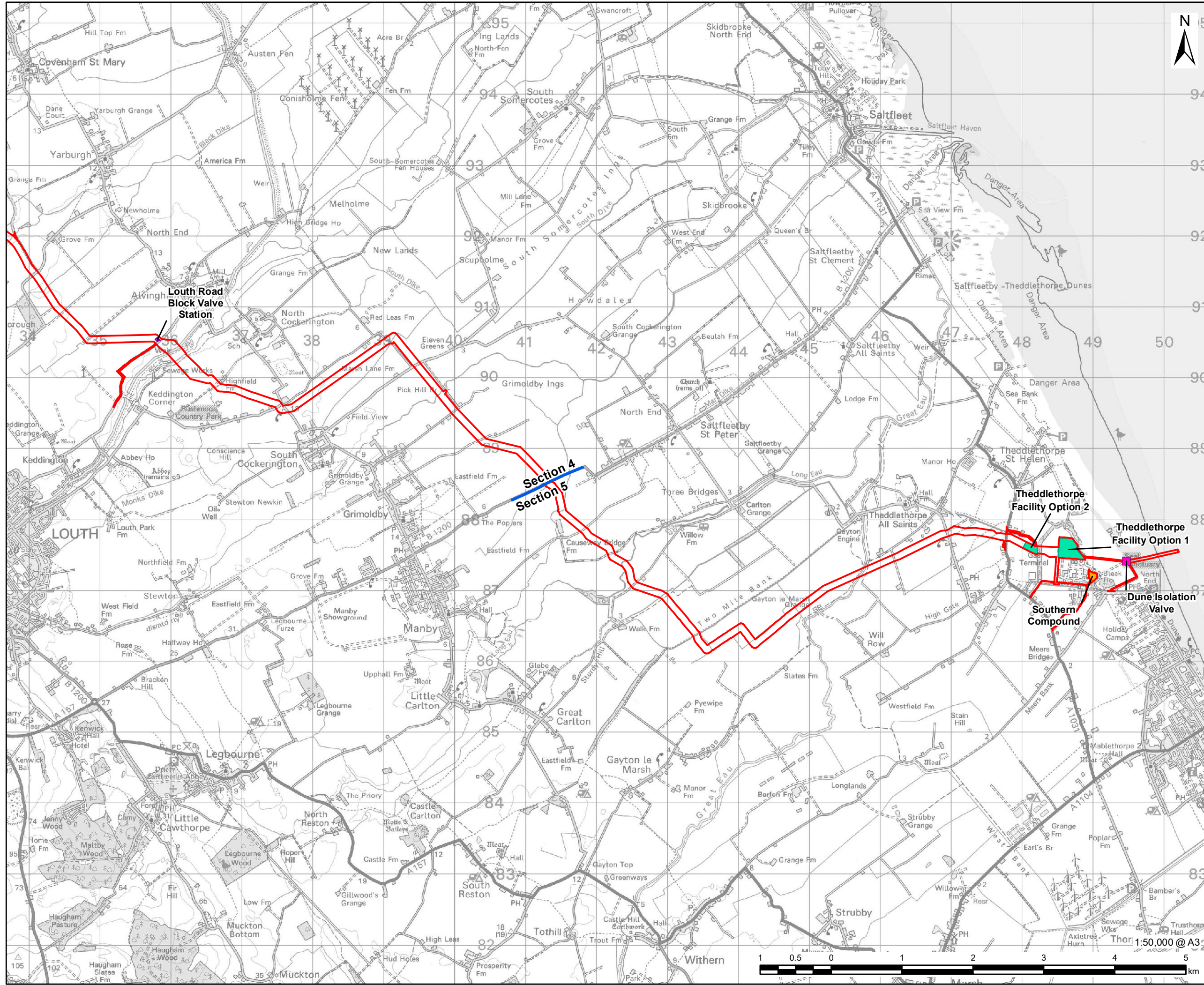


FIGURE TITLE
Figure 4 (2 of 3)
DCO Site Boundary and Location of Key Components of the Proposed Development

ISSUE PURPOSE
 NON TECHNICAL SUMMARY
 PROJECT NUMBER / REFERENCE
 60668955 / VCCS_231023_NTS_4

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LEGEND

- DCO Site Boundary
- Route Section Break
- Dune Isolation Valve
- Temporary Construction Compound
- Block Valve Station
- Theddlethorpe Facility

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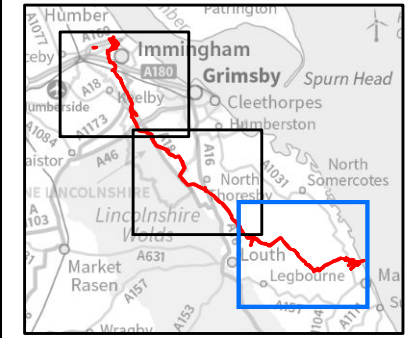
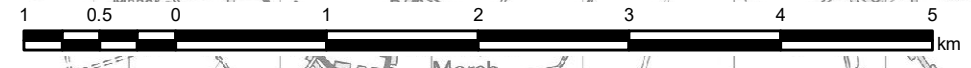


FIGURE TITLE
Figure 4 (3 of 3)
DCO Site Boundary and Location of Key Components of the Proposed Development



Immingham Facility

4.2.5 The first element of the Proposed Development is the Immingham Facility, which is to be located on an area of disused land to the south of the VPI Immingham site. This facility would require a relatively small area of land, consisting of around 10,000 square metres (approximately 1.0 hectares). The existing land comprises a gravelled area with a sparse vegetation covering, as shown in **Figure 5**, to the west of Rosper Road.

Figure 5: Proposed Location of the Immingham Facility



4.2.6 The facilities to capture, meter, and compress carbon dioxide for onward transport would be installed and operated by the emitters, such as at the Humber Refinery operated by Phillips 66 or the VPI Immingham combined heat and power plant operated by Vitol.

4.2.7 The Immingham Facility would include the following equipment:

- Inlet manifold - where the incoming pipelines from each emitter are combined;
- Permanent pigging facilities to allow the pipeline to be cleaned and inspected during commissioning and operation;
- Common pig handling area for the pigging facilities, which may include a projectile blast wall;
- High-integrity Pressure Protection System (this system has a series of Emergency Shutdown Valves and isolation valves which would automatically close if they detect high pressure in the pipeline);
- Emergency Shutdown Valve (ESDV) for each pipeline and isolation valves;

“Pig”

These can either be simple pieces of equipment for cleaning the pipeline, or more complex pieces of equipment that can be used for internal inspection of the pipeline (an ‘intelligent pig’).

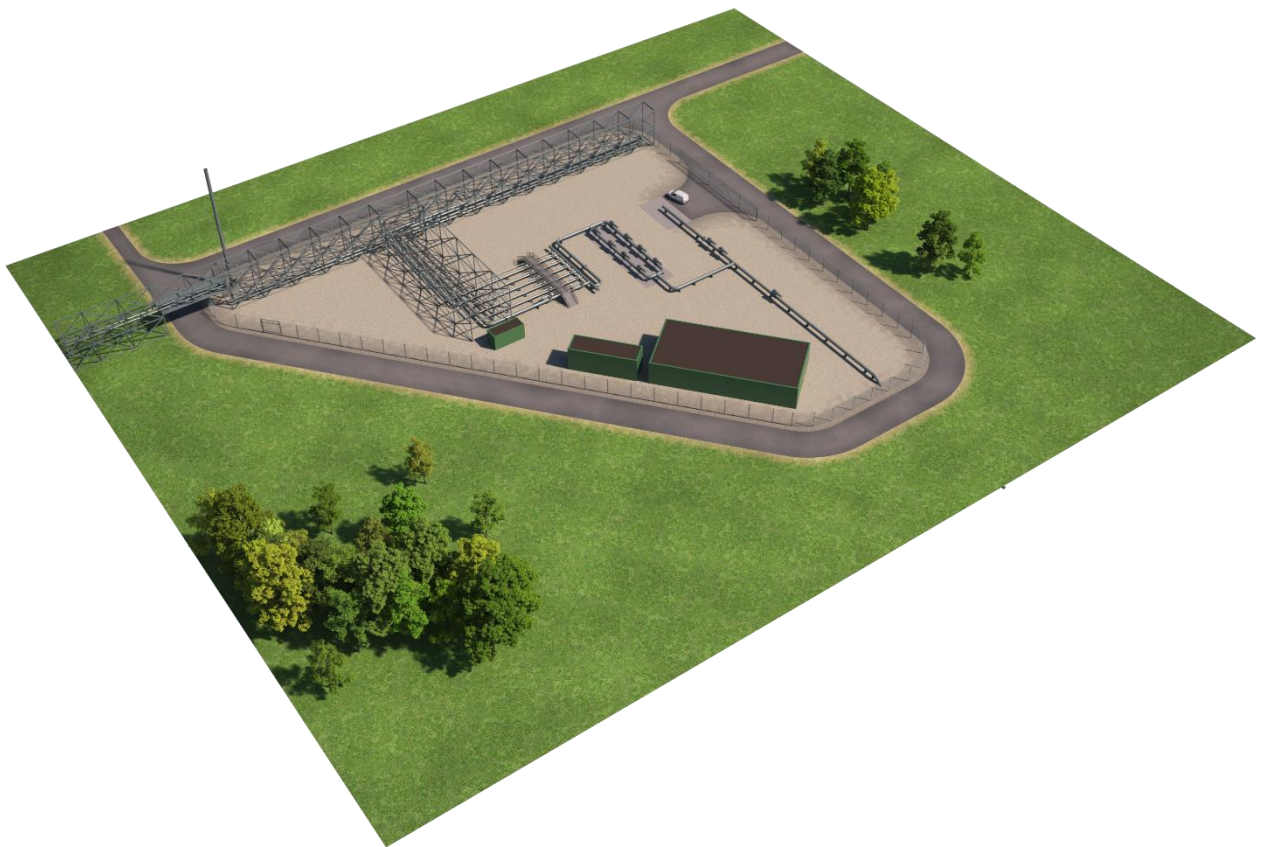
- Venting system, including vent pipework, valves and a vent stack. The permanent vent stack would be a maximum of 24" diameter and up to 25 metres high;
- Various instruments installed on the pipework, including temperature, pressure and flow measurement;
- Local equipment room (LER) - a steel structure consisting of a battery room and an instrument equipment room;
- Central Control Room, which is expected to be co-located within the existing control room of VPI Immingham. However, if required it could alternatively be housed within the LER;
- Analyser house, which would consist of a steel structure containing analysing equipment; and
- Supporting utilities, including provision of electricity and water.

4.2.8 The Immingham Facility would be surrounded by a 3.2 metres high single security fence.

4.2.9 The Immingham Facility would be lit outside of daylight hours, similar to the existing VPI Immingham and P66 sites which are in the immediate vicinity.

4.2.10 A visualisation of the Immingham Facility is presented in **Figure 6**.

Figure 6: Visualisation of Immingham Facility



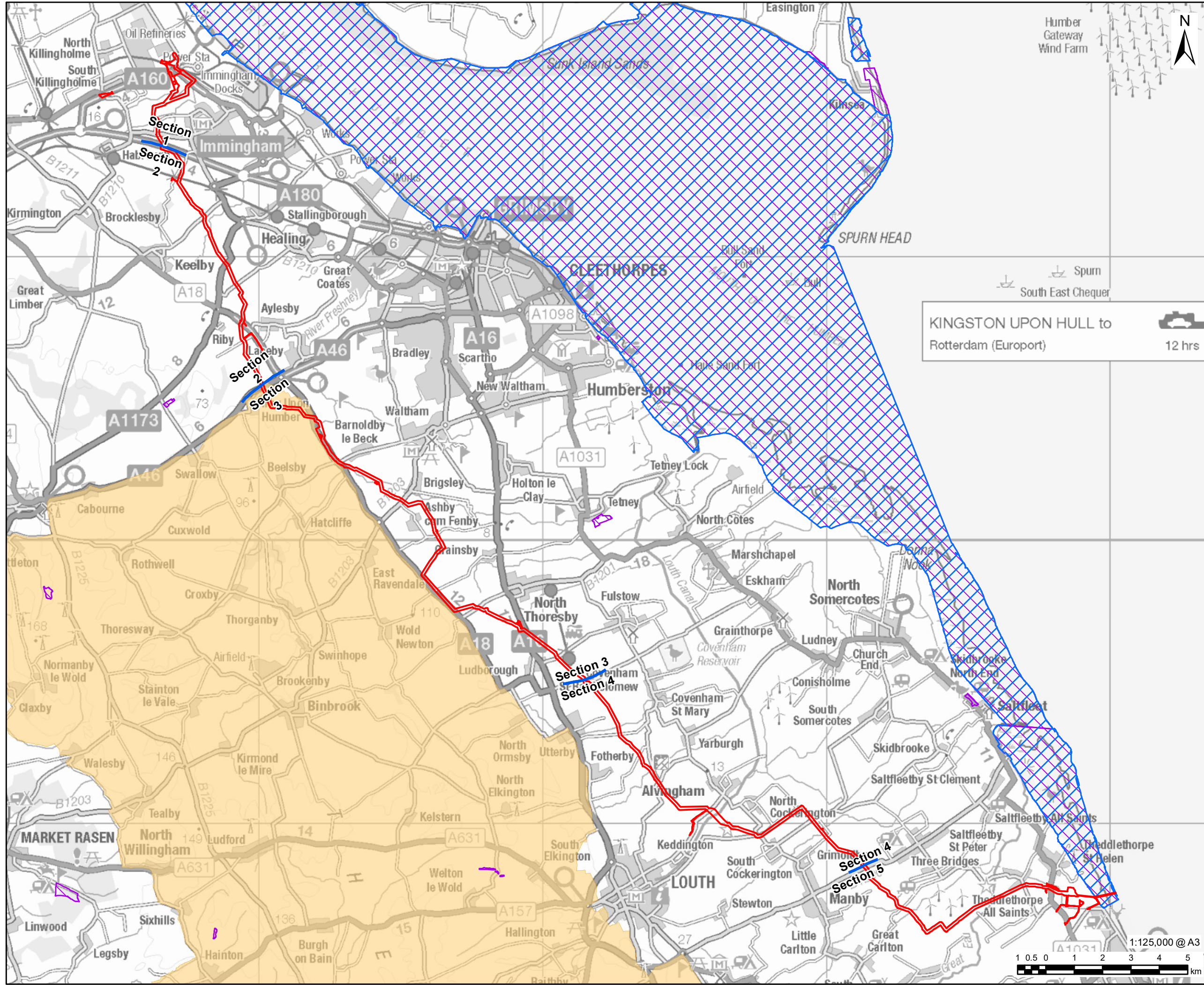
The Pipeline

- 4.2.11 The pipeline would have an initial design life of a minimum of 25 years, however with appropriate maintenance, it is expected to operate for up to 40 years.
- 4.2.12 The onshore pipeline would be designed according to best design practice standards and PD8010 Code of Practice for Pipelines – Part 1 Steel Pipelines on Land, and would be constructed, operated and maintained in accordance with the Pipeline Safety Regulations 1996. However, the entire pipeline would be constructed using thick-walled steel pipe.
- 4.2.13 The pipeline would have an external diameter of 24 inches and be buried to a minimum depth of 1.2 metres to the top of the pipe. Burial depths would typically be greater at railway, roads and watercourse crossing points. Overall, there are expected to be 267 crossings, including railways, roads and watercourses, which would be installed by a variety of either trenchless or open-cut techniques.
- 4.2.14 The DCO Site Boundary is split into five sections for ease of reporting in the ES. The DCO Site Boundary is shown in **Figure 7**.
- 4.2.15 In order to protect the pipeline from rusting over time, a combination of external coatings and cathodic protection would be required. The cathodic protection would be installed below ground as a series of anodes in groundbeds, which would be approximately 30 metres in length. These would be installed at the same time as the pipeline. These groundbeds would be located at the Immingham and Theddlethorpe Facilities.

Table 2: Key features of Preferred Pipeline Corridor within the DCO Site Boundary

Section	Description
Section 1 - Rosper Road, Immingham to A180	<p><i>Option 1:</i> The pipeline route leave the tie-in at the Immingham Facility, crossing Humber Road twice and then a railway line. The route then runs parallel to Manby Road before crossing it south of the Immingham Calor Cylinder Distribution site, heading in a south westerly direction north of Immingham towards the former Immingham Golf Club (closed in 2018), which would be crossed in a more westerly direction using a trenchless technique. The pipeline route then continues to travel westwards before changing direction southwards, crossing Mill Lane and then Harborough Road between the Old School House and Luxmore Farm. Finally, the route continues southwards to cross the A180.</p> <p><i>Option 2:</i> Alternatively, the pipeline could be routed through the Humber Refinery site, then exit the Humber Refinery site between Houlton’s Covert and Children’s Avenue via a trenchless technique heading in a south westerly direction. The pipeline route then continues south until it reaches the alignment of the route as detailed in <i>Option 1</i> above.</p>
Section 2 – A180 to A46	<p>After the A180 crossing, the pipeline route travels east, southeast, then south, crossing Roxton Road and a railway line. The route continues in a south-easterly direction, passing to the west of Little London and Stallingborough and east of Keelby, crossing Keelby Road and North Beck Drain then crossing the A1173. From here, the route continues in a south easterly direction, before turning south/south west to cross the A18 to the west of Aylesby and Laceby. From here, it continues south to the A46.</p>

Section	Description
Section 3 – A46 to Pear Tree Lane	The route crosses the A46, at which point it enters into the Lincolnshire Wolds Area of Outstanding Natural Beauty (AONB) to the east of Irby upon Humber for a distance of approximately 2.34 km. The route exits the AONB by crossing the A18 for a second time. From here, it continues in a south-easterly direction, paralleling the AONB boundary to the west of Barnoldby le Beck, crossing Beelsby Road. The route then turns in an easterly direction and crosses Waithe Beck, continuing southeast where it crosses the B1203. From here, it travels around Ashby cum Fenby turning southwest towards the AONB boundary at Grainsby Grange. It then turns southeast, paralleling the AONB boundary for approximately 1.7 km, crossing Grainsby Lane then travelling in a south-easterly direction, crossing the A16, Station Road and Pear Tree Lane.
Section 4 – A 46 Pear Tree Lane to Manby Middlegate (B1200)	The pipeline route continues south between Utterby to the west and Covenham St Mary to the east. From here, it continues south east crossing the Louth Canal and River Lud to the south east of Alvingham. The pipeline route continues in an easterly direction to the north of South Cockerington and Grimoldby, crossing the Grayfleet Drain towards Manby Middlegate (B1200).
Section 5 – Manby Middlegate (B1200) to Theddlethorpe Facility, then down to Mean Low Water Spring	The pipeline route crosses Manby Middlegate (B1200) to the east of Manby then travels in a south easterly direction crossing the River Long Eau, Two Mile Bank Drain and the River Great Eau to the south of Theddlethorpe All Saints. From here, the route continues in an easterly direction, crossing Mill Road and Mablethorpe Road (A1031) before connecting to the existing LOGGS pipeline at the Theddlethorpe Facility (Option 1 or Option 2). On exiting the Theddlethorpe Facility the existing LOGGS pipeline travels east down to MLWS. An existing isolation valve is located on the existing LOGGS pipeline, west of the sand dunes.



VikingCCS

AECOM

PROJECT

Viking CCS Pipeline

LEGEND

- DCO Site Boundary
- Route Section Break
- Ramsar
- Site of Special Scientific Interest
- Lincolnshire Wolds Area of Outstanding Natural Beauty

KINGSTON UPON HULL to Rotterdam (Europort) 12 hrs

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FIGURE TITLE

**Figure 7
 DCO Site Boundary and Pipeline Section Splits**

ISSUE PURPOSE

NON TECHNICAL SUMMARY

PROJECT NUMBER / REFERENCE

60668955 / VCCS_231019_NTS_7

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Block Valve Stations

- 4.2.16 Block Valve Stations are used to isolate sections of pipeline for maintenance purposes, or in case of emergency, and allow the pipeline to be monitored from the main control centre.
- 4.2.17 Three Block Valves Stations are required for the Proposed Development, and engineering design work has been undertaken to find the best locations for the Block Valve Stations along the pipeline route. These locations are at approximately 13 kilometres, 24 kilometres and 39 kilometres along the pipeline route, as measured from the Immingham end of the pipeline route.
- 4.2.18 The block valves themselves are installed mostly below ground level, with minimal above ground infrastructure. The block valves would be located within a Block Valve Station, which would include security fencing surrounded by a 10 m wide planting strip. This area would then be surrounded by a 1.5 m high post and rail perimeter fence.
- 4.2.19 The block valve control equipment would be housed in a kiosk of typically 2-3 m in height. There would also be a local vent (up to 4 m high) to ensure that bypass pipework maintenance activities could be performed safely; however, it is not intended that routine pipeline venting would be undertaken at these locations. Each Block Valve Station would also include an access road and car parking area. The Block Valve Stations would be operated remotely with minimal visits for maintenance. A visualisation of a Block Valve Station is shown in **Figure 8**.
- 4.2.20 The three Block Valve Stations are:
- Washingdales Lane Block Valve Station;
 - Thoroughfare Block Valve Station; and
 - Louth Road Block Valve Station.
- 4.2.21 The Block Valve Stations can be remotely monitored from the main control centre, with local control also possible when maintenance personnel are physically on site.

Figure 8: Block Valve Station Visualisation



Theddlethorpe Facility

4.2.22 There are currently two options for locating the Theddlethorpe Facility:

- *Option 1:* new facility on the former Theddlethorpe Gas Terminal site. Demolition of the Theddlethorpe Gas Terminal site was completed in 2021. The site is currently cleared with a mixture of hard standing, stoned areas and pipeline stubs; and
- *Option 2:* new facility to the west of the former Theddlethorpe Gas Terminal site, located on arable land directly west of The Cut. A new access would be created off Mablethorpe Road (A1031).

4.2.23 The Theddlethorpe Facility would comprise the following key components:

- LOGGS pipeline tie-in (where the new onshore pipeline connects to the offshore pipeline);
- Emergency Shutdown Valves for each pipeline and isolation valves;
- Permanent “pig” facilities to allow the pipelines to be cleaned and inspected during commissioning and operation;
- High-integrity Pressure Protection System (this system has a series of Emergency Shutdown Valves and isolation valves which would automatically close if they detect high pressure in the pipeline); High-integrity Pressure Protection System;
- Venting system, comprising a new stand-alone vent stack up to 25 m high which will be required to be used to de-pressure facilities;
- Local equipment room comprising a 12 m by 5 m steel structure for control and electrical equipment; and
- Supporting utilities.

4.2.24 The Theddlethorpe Facility would be surrounded by a 3.2 m high single mesh security fence. A visualisation of the Theddlethorpe Facility is presented in **Figure 9**.

Figure 9: Visualisation of the Theddlethorpe Facility



Existing LOGGS pipeline

- 4.2.25 The existing 36 inch diameter LOGGS pipeline (offshore pipeline) enters the former Theddlethorpe Gas Terminal (TGT) site from the east and terminates at an existing shutdown valve within the site. The LOGGS pipeline was first operated in 1988, transporting natural gas from a variety of gas fields (including the Viking field) in the North Sea to shore.
- 4.2.26 The pipeline ceased operations in 2018, and in line with regulations, it was flushed clean of any hydrocarbons. Several assessments have been undertaken of the pipeline including a fracture assessment, integrity assessment and CO₂ corrosion assessment, which have resulted in high confidence that the pipeline will be suitable for the transportation of the CO₂ as part of the wider Viking CCS Project. Further inspections of the existing LOGGS Pipeline are planned to assess its internal surface.
- 4.2.27 It should be noted that should Option 2 be selected for the Theddlethorpe Facility, the existing LOGGS pipeline would be extended to the west using sections of 36 inch pipeline, tying in the existing LOGGS pipeline to the new Theddlethorpe Facility to the west of the former TGT site.

Dune Isolation Valve

- 4.2.28 There is an existing isolation valve on the onshore section of the LOGGS pipeline, located close to the sand dunes to the east of the former Theddlethorpe Gas Terminal site, which was used as an isolation valve when importing gas from offshore.
- 4.2.29 A replacement valve would be installed in the same location.
- 4.2.30 Access to the Dune Isolation Valve during replacement and maintenance will be via the existing track that runs along the south eastern edge of the field to the east of the existing TGT site.

Figure 10: Dune Isolation Valve



Key components of the Proposed Development split by Local Planning Authority

4.2.31 The Proposed Development is located within four Local Planning Authority (LPA) areas. These are:

- North Lincolnshire Council;
- North East Lincolnshire Council;
- West Lindsey District Council; and
- East Lindsey District Council.

4.2.32 West Lindsey District Council and East Lindsey District Council are within the administrative area of Lincolnshire County Council.

4.2.33 The location of the key components of the Proposed Development in relation to each of these Local Planning Authorities is presented within **Table 3**. In addition, part of the Proposed Development also lies within Lincolnshire Country Council.

Table 3: Key Components of the Proposed Development split by Local Authority

Local Authority	Key Component of the Proposed Development	Temporary or Permanent
North Lincolnshire Council	Northern Construction Compound	Temporary
	Immingham Facility	Permanent
	Pipeline – approximately 1km	Permanent
North East Lincolnshire Council	Central Construction Compound	Temporary
	Washingdales Lane Block Valve Station	Permanent
	Thoroughfare Block Valve Station	Permanent
	Pipeline – approximately 22 km	Permanent
West Lindsey District Council	Pipeline – approximately 2 km	Permanent
East Lindsey District Council	Southern Construction Compound	Temporary
	Louth Road Block Valve Station	Permanent
	Theddlethorpe Facility (Option 1 and 2)	Permanent

Local Authority	Key Component of the Proposed Development	Temporary or Permanent
	LOGGS Pipeline (Existing)	Permanent
	Dune Isolation Valve	Permanent
	Pipeline – approximately 30km	Permanent

4.3 Safety

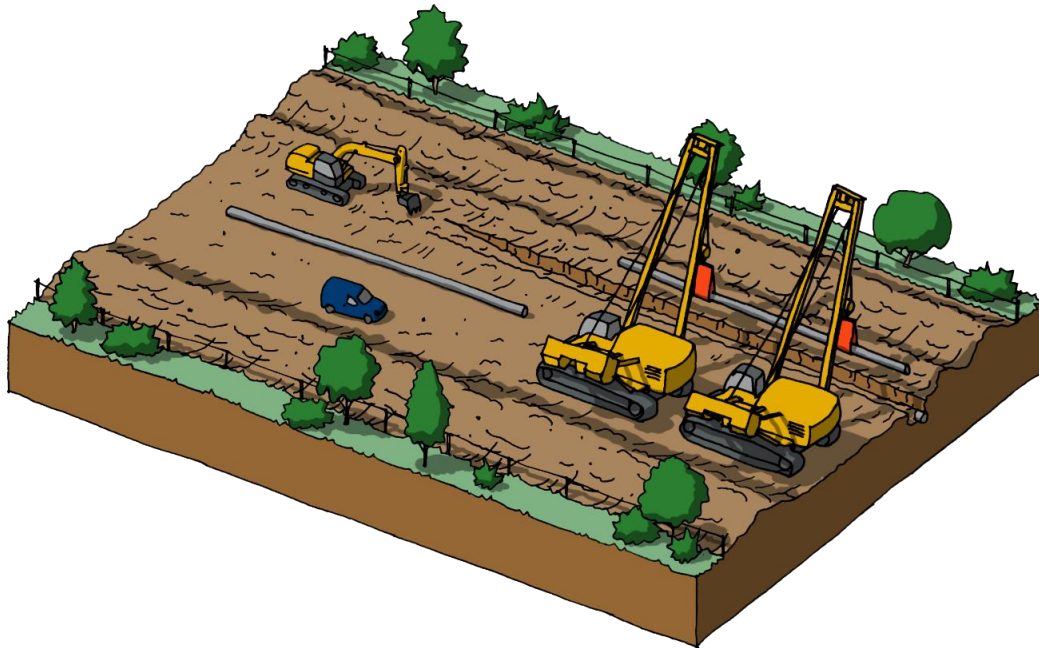
- 4.3.1 Safety is the highest priority for the Proposed Development, and Harbour Energy work responsibly, securely and in accordance with applicable regulations across all their operations. Harbour Energy work to reduce risks and protect their staff, contractors and local communities through the rigorous application of safe engineering practices.
- 4.3.2 Harbour Energy’s Health, Safety, Environment and Security Committee has a wide scope of responsibilities and performance is reviewed on an ongoing basis. Everyone working for or on behalf of Harbour Energy has a personal responsibility to undertake their work in a safe and respectful manner.
- 4.3.3 Harbour Energy has extensive experience of managing major hazard potential facilities in accordance with the Control of Major Accidents and Hazard Regulations, both onshore and offshore, developed throughout the operating history of the heritage companies in the UK. Harbour Energy apply best practices in the design, use and maintenance of their equipment, planning every stage of their operations with the highest levels of control in order to minimise safety risks.
- 4.3.4 Harbour Energy are committed to implementing robust controls to systematically identify, evaluate and manage risks during all phases of the project lifecycle from design through to construction, operation and ultimately decommissioning, in line with their commitments of achieving no harm to people and protecting the environment. Furthermore, Harbour Energy promote robust regulator and public engagement to ensure correct design and planning are demonstrated to all stakeholders throughout the project lifecycle.
- 4.3.5 Harbour Energy will ensure the pipeline is adequately signposted and incorporate mitigation measures to prevent accidental damage by third parties. The burial depth of the pipeline will be sufficient to protect the integrity of the pipeline and avoid any impact on it from regular activities such as farming or road use.
- 4.3.6 Harbour Energy are designing, and would construct and operate the pipeline, in accordance with the Pipeline Safety Regulations 1996 and with best design practice standards.
- 4.3.7 Harbour Energy is taking a robust design approach and has chosen to exceed the current UK design requirements (i.e., PD8010) by selecting a higher design factor for the entire length of the pipeline route, further emphasising their commitment to safety. In opting to specify thick walled pipe in all locations, a significant benefit will be a reduced risk of damage by third-party activities. Additionally, the selection of thick walled pipe for the entire route will eliminate transition sections between standard/heavy wall pipe, which will facilitate a more efficient welding process with the associated improvement in weld quality, productivity, reliability and safety.

4.4 Construction

General overview

- 4.4.1 Subject to the granting of the DCO, it is currently anticipated that site preparation would commence in late 2025, with main construction taking place in 2026 and the Proposed Development becoming operational in 2027.
- 4.4.2 The construction process would be undertaken as a series of parallel work packages along the length of the pipeline, where it is possible to do so. This is to ensure that the construction programme is as efficiently as possible and associated impact duration is as short as possible.
- 4.4.3 A working day of 12 hours (7am to 7pm) Monday to Friday, five days a week, and six hours (7am to 1pm) on Saturday is proposed. This would only be extended to Sunday or Bank Holiday working in special circumstances such as the pull-back phase for a major crossing using Horizontal Directional Drilling or cleaning and testing of the pipeline. There would be no Sunday or Bank Holiday working unless this was agreed in advance with the relevant Local Authority.
- 4.4.4 The sequence of activities for pipeline construction would typically comprise of the following:
- *Pre-construction activities* – pre-construction surveys, creation of temporary construction compounds, access tracks, fencing and receiving of materials;
 - *Removal of topsoil (the upper layer of soil)* - stored in a different area to subsoil (the layer of soil under the topsoil);
 - *Trenching* – excavation of the trench to the required depth using mechanical excavators or using specialised machinery;
 - *Stringing* – (laying out) of pipeline adjacent to the trench, followed by cold bending (if required) and welding of the pipeline;
 - *Lowering* of the pipeline into the trench;
 - A period of *pre-commissioning testing* and *inspections* of the pipeline; this includes *hydrotesting* where the pipeline is filled with water to detect any leaks;
 - *Backfilling* and *reinstatement* of the area as close to its original condition as possible and the removal of temporary fencing and construction compounds; and
 - *As-Built survey* of the area with the Proposed Development now installed.

Figure 11: Illustration of Pipelaying Activities



Pre-construction activities

- 4.4.5 Ahead of construction, any required surveys, such as ecological surveys, detailed utility and drainage surveys would be undertaken.
- 4.4.6 Prior to the commencement of construction activities, a pre-construction survey would be carried out to provide a full record of condition (photographic and descriptive) of the route and surrounding areas. After the works have been completed, this record would be used to verify that the standard of reinstatement meets or exceeds that recorded in the pre-condition survey.
- 4.4.7 The relevant permits and consents for activities such as construction near water, abstraction and discharging of water would be sought from the Environment Agency, Lead Local Flood Authority, Internal Drainage Board or the Canal and River Trust, as necessary.
- 4.4.8 The existing land drainage will be investigated and recorded, and a specialist land drainage contractor will be procured to undertake the land drainage survey and design both pre-construction and post construction land drainage schemes.
- 4.4.9 The Public Rights of Way which intersect the Proposed Development would be temporarily diverted or closed for a period of time agreed with the relevant local authority in order to allow construction works to be carried out safely. The location of the Public Rights of Way can be found on Access and Rights of Way Plans (Application Document 4.20), and more information can be found in the Outline Public Rights of Way Management Plan (Application Document 6.11).
- 4.4.10 The precise pipeline route would be surveyed and pegged (marked) out in consultation with landowners / occupiers. The temporary working width, known as the “spread” would be fenced. The standard working width of the spread would be 30 metres, which would be inside the current DCO Site Boundary which in most places is around 100m wide. The working width would provide sufficient area for a running track (a haul road created within the working width and would be used to access the pipeline), topsoil storage, separate subsoil storage and would enable safe excavation of the trench in which to lay the new pipeline (in open cut sections).

- 4.4.11 The working width could increase to up to 50 metres for major crossings to allow additional space to manoeuvre and for laydown of specialist equipment for trenchless installation, whilst maintaining access along the working width.
- 4.4.12 However, at certain locations, due to environmental considerations, the working width will be reduced to as narrow as 10m wide (e.g., small scale crossings with known riparian mammal communities) to limit and minimise any disturbance.

Construction Activities

Construction Schedule

- 4.4.13 An initial construction schedule has been developed which sets out all of the key activities and associated timelines, as shown in **Figure 12**. From the commencement of the main construction activities to completion of commissioning, the construction programme is expected to last approximately 12 months. Main pipe laying works are predominantly planned during late spring, summer and early autumn months.
- 4.4.14 Construction would be programmed as a series of concurrent work packages along the length of the pipeline where possible to ensure that the construction programme is minimised. A work package may focus on a specific area or location where a group of construction workers would carry out a particular aspect of the main pipeline construction activities, including topsoil stripping, trench excavation, pipe installation and backfilling of trenches.
- 4.4.15 It is currently anticipated that site preparation would commence in late 2025, with main construction taking place in 2026 and the Proposed Development becoming operational in 2027.

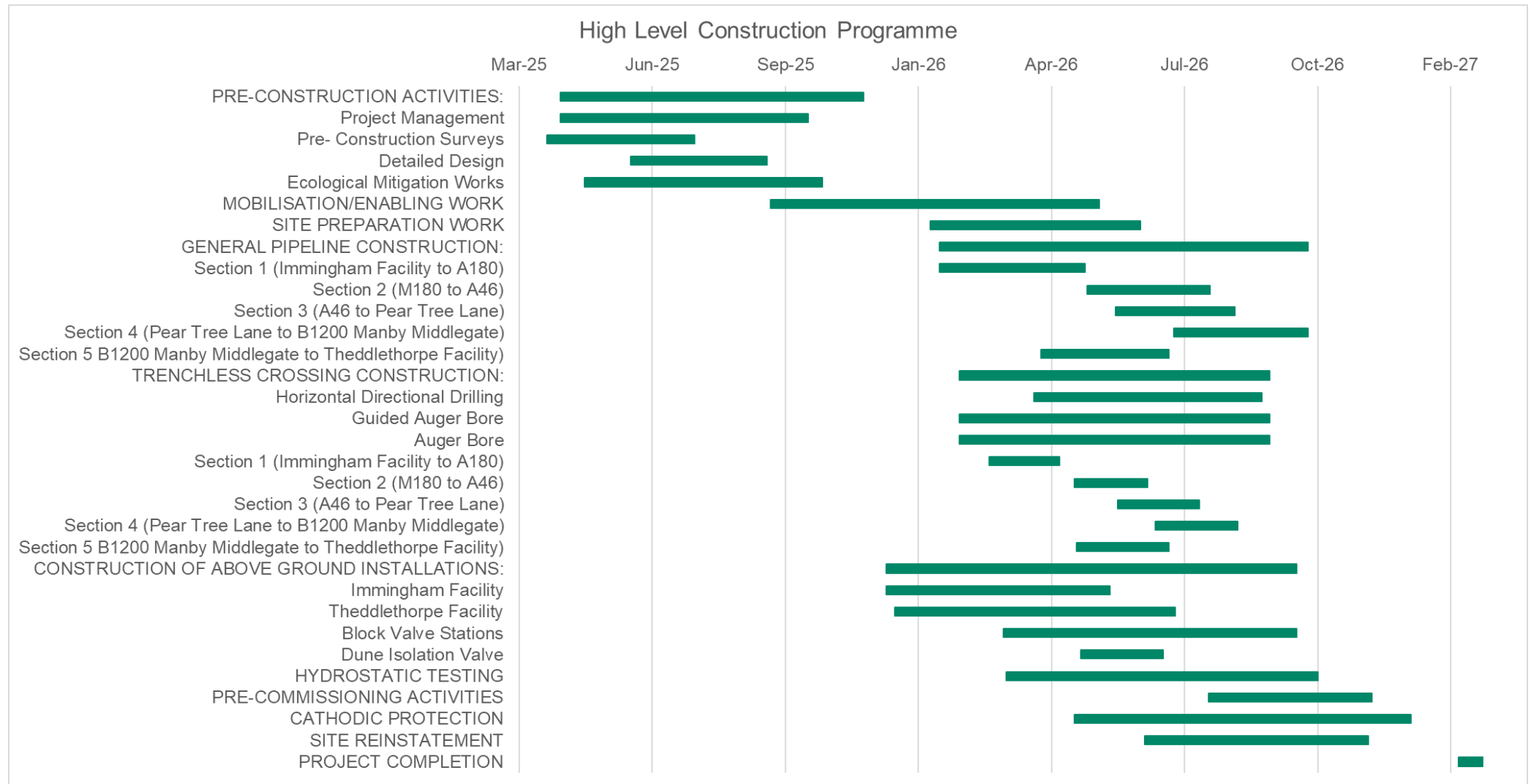
Construction Compounds and Laydown Areas

- 4.4.16 As part of the Proposed Development, areas of land would be temporarily required to be used as:
- *Main Construction Compounds with pipe storage areas*: these would comprise management and construction site offices, welfare facilities, parking, and storage facilities for equipment, materials and machinery. The compounds would serve as a point for accepting deliveries of and storage of pipe and other materials/equipment, from which pipe sections would later be transported directly on to the pipeline spread when required. Further information is provided in paragraph 4.4.17 below;
 - *Temporary construction facilities at the Immingham Facility, the Theddlethorpe Facility and Block Valve Stations*: these would likely include a site office/cabin with electricity and water supply and welfare facilities, and a materials and equipment storage area including crane and earth movers. A concrete batching plant is envisaged for the Theddlethorpe Facility as there are no nearby concrete supplies; and
 - *Temporary Laydown, Welfare and Parking Areas at a number of access points (16 in total)*: Within the working areas made available at road crossings, a number of temporary hardstanding lay-by areas (approximately 100m x 100m at each location) will be constructed and maintained, including all necessary temporary work in culverting to ditches, surface drainage and temporary fencing. These will provide off-road parking areas for construction staff, HGV's and equipment and provide welfare facilities for staff and to allow for deliveries of pipe and other construction materials.
- 4.4.17 The Proposed Development requires three temporary construction compounds, one in the north, centre and south of the DCO Site Boundary and these are described below.
- **Northern Compound** - located to the south of Habrough Roundabout and the A160, approximately 21,500 m² in area. This is greenfield land (arable) and would be used as

a main construction compound and pipe storage area. This is expected to hold approximately 3,000 sections of pipe (12 m lengths). Access would be via Harborough Road;

- **Central Compound** - located near Welbeck Hill to the east of Barton Street (A18), approximately 17,100 m² in area. This would be act as the main pipe / material storage area. It would be able to hold approximately 2,000 pipe sections (12 m lengths). Access is proposed to be off the A18; and
- **Southern Compound** - located at the car park on the former TGT site, approximately 13,000 m² in area. This would be used predominantly as a pipe storage area and is expected to hold up to 1,000 sections of pipe (12 m length).

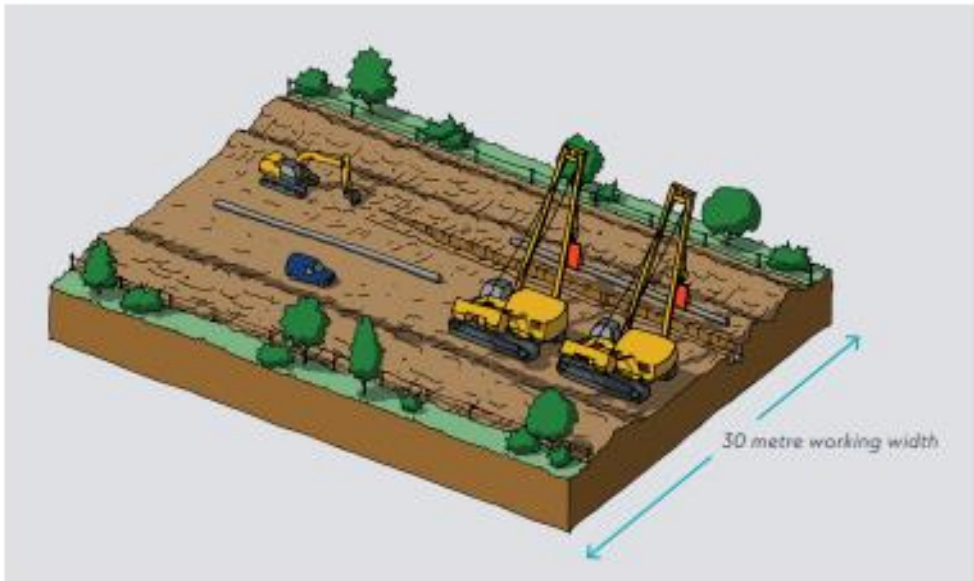
Figure 12: Indicative Construction Schedule



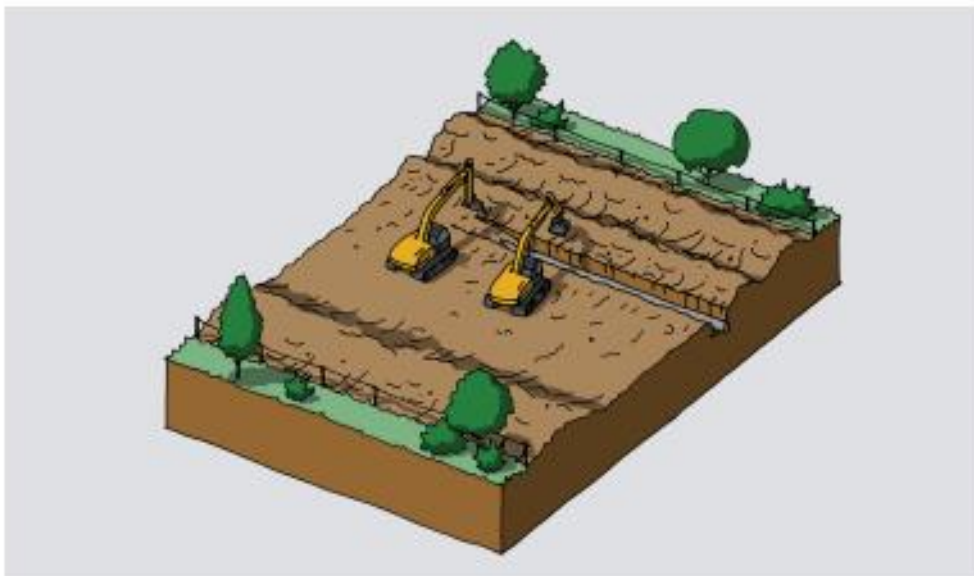
Pipeline Construction Techniques

- 4.4.18 Approximately 55.5 kilometres of steel pipe would be required. The pipe would be manufactured in 12 m lengths and would be delivered to site by road. Temporary storage of pipe would be required at the Construction Compounds before being distributed along the pipeline route.
- 4.4.19 The pipeline would mainly be constructed using an open cut technique which is explained below:
- Firstly, a 30 metre working width is marked out and fenced which is the total area within which construction work would take place;
 - Access routes to the working area would be created from the existing road network;
 - The topsoil would then be carefully stripped back and stored next to where it was removed, on the edge of working width;
 - The pipeline sections would be delivered to the site from the temporary construction compounds and placed on supports and welded together (a process called “stringing”);
 - The pipeline trench would be dug, storing this material separately from the topsoil, on the opposite side of the trench;
 - The pipeline ‘strings’ would then be lowered in to the trench using special vehicles called ‘side booms’;
 - The pipeline strings would be welded together in the trench;
 - The trench would then be filled with the excavated materials first, then the topsoil would be reinstated; and
 - Any drainage would be restored as required and the land would then be returned to its previous use.
- 4.4.20 The minimum depth of cover of the pipeline from the top of the pipeline to the ground surface would be 1.2 metres. The depth of trench would depend on a variety of local circumstances, for instance ground conditions or the size/diameter and depth of services but the maximum depth for open-cut installation will be typically up to 4m.
- 4.4.21 The standard working width of the pipeline spread would be 30 m. This would provide sufficient area for an access track, topsoil storage, separate subsoil storage and safe excavation of the trench (in open cut sections).
- 4.4.22 The working width may differ from the standard 30 m width in certain areas as a result of existing constraints or crossing points. Typical examples would include:
- Areas of hedgerows or trees (or where trees are to be retained which require the width to be reduced), the working width would be reduced to 10 metres where possible;
 - Sensitive water crossings – working widths would be reduced to 10 metres where possible; and
 - Crossing of railways, roads and watercourses – trenchless crossing techniques may require a working width of more than 30 m.

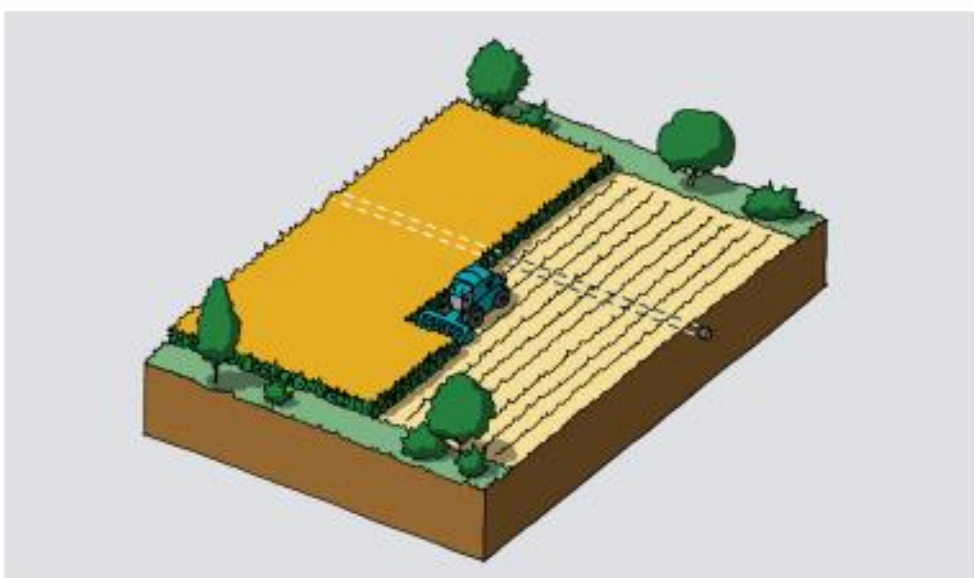
Figure 13: Open-cut Construction Technique



Cross section diagram of the laying of the pipeline



Cross section diagram of the 'backfill' of the pipeline



Cross section diagram of the pipeline beneath farmland following return to its previous use

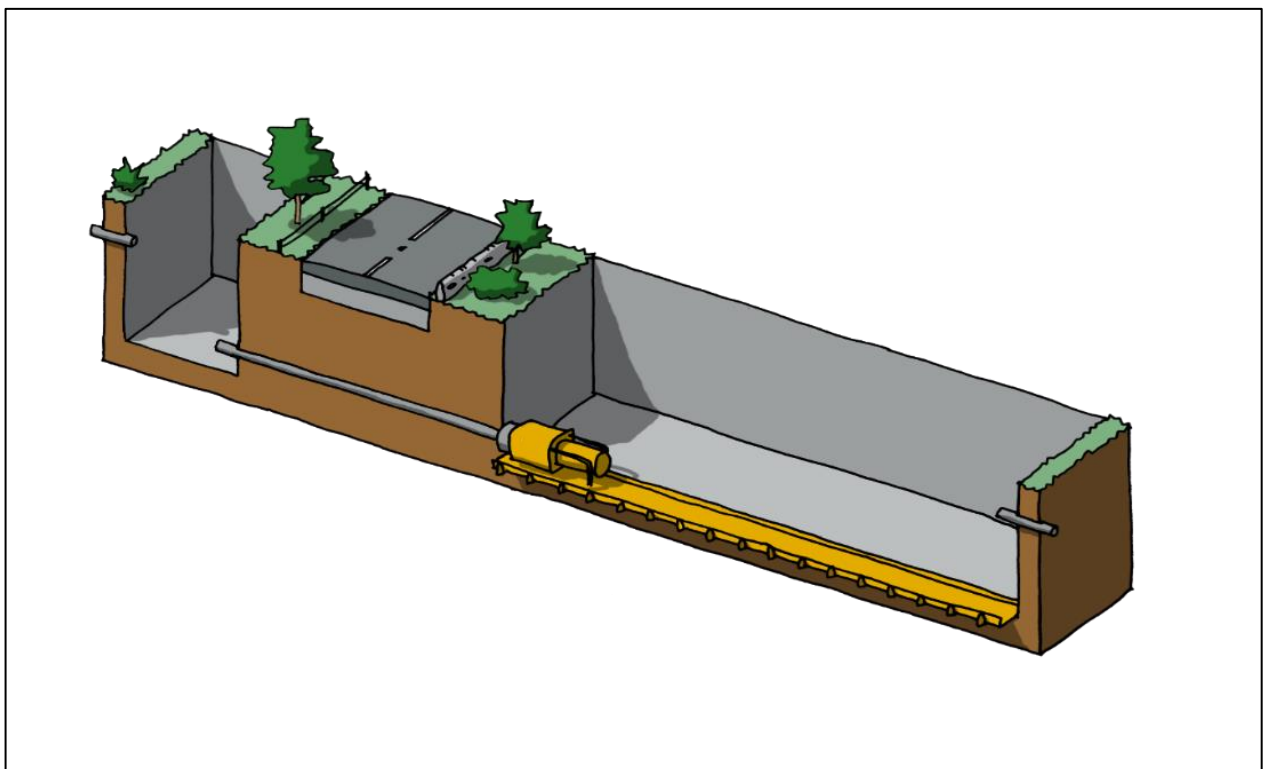
Pipeline Crossing Techniques

4.4.23 The pipeline would need to cross railways, roads, other utilities, and watercourses. In some instances, a crossing would be made using open-cut techniques; however, where open-cut is impracticable, trenchless crossing techniques would be used. The working width at these locations would be typically wider than the standard 30 m working width.

4.4.24 The crossing techniques that would be used include:

- *Open-cut crossing (Figure 13)*: the default crossing technique which involves digging a trench directly across the asset or infrastructure to be crossed, following which a short section of the pipe would be installed and the trench backfilled with the graded excavated material. The surface is then reinstated with appropriate material. This crossing technique is usually to a depth of up to 4m, but in limited cases due to localised conditions or constraints, an allowance would be made to increase the depth of the trench to up to 6.5m at open-cut crossing locations. There are expected to be 136 open cut crossings (excluding those under overhead lines).
- *Auger boring (Figure 14)*: is a technique where a pipe is pushed into the ground whilst the soil at the front face is cut away by an auger which also moves the excavated material back along the pipe. The technique involves digging two pits either side of the crossing section, the sidewalls of which would be battered or supported to prevent collapse. Once the pipeline is installed, the pipeline ends are welded, and the excavated pits backfilled. In total, there are currently expected to be approximately 48 auger bore crossings along the route.

Figure 14: Auger Boring Crossing Technique

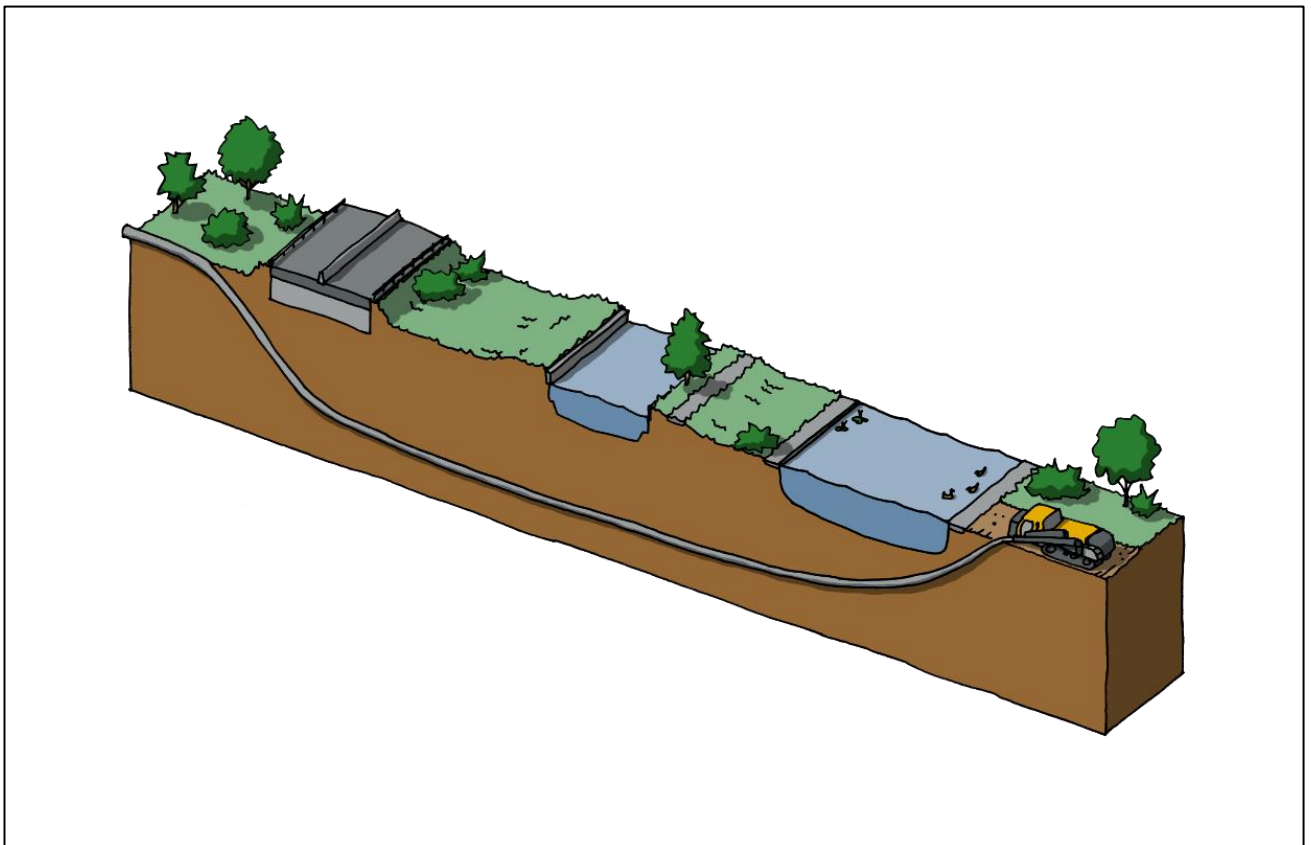


- *Guided auger boring*: involves the installation of a pipeline between two prepared shafts. The auger boring rig is set up in the launch shaft and a pilot pipe is pushed through the ground towards the target shaft. The direction of the head is monitored by a couple-charged device camera throughout and can be adjusted as necessary. The precision-guided bore made by the pilot pipe is then enlarged using steel cased auger sections and the pipe jacked through. In total, there are currently expected to be approximately 6

guided auger bore crossings along the pipeline; However, these may be replaced by HDD crossings, subject to ground conditions and further design.

- *Horizontal directional drilling (Figure 15)*: involves the use of large drill rig which would drill into the ground at an angle. The drill size is small at first, and a 'pilot' hole is drilled under the asset to be crossed. The drill size is gradually increased to the desired width required to install the pipe. A pipe stringing area is set up at the drill exit point and the welded pipe string is then pulled through the drill bore from the drill exit point to the entry point. Bentonite, which is a non-toxic, biodegradable natural clay, is used as a drilling lubricant. The footprint required for the HDD works is greater than that required for an auger bore. Four HDD crossings are anticipated and included in the crossing schedule.

Figure 15: Horizontal Directional Drilling Crossing Technique



- *Micro-tunnelling*: It is not currently anticipated that this trenchless technique will be required. However, if it is adopted during construction, it will require a similar working footprint and impact as to the guided auger bore requirements.

Immingham Facility, Theddlethorpe Facility and Block Valve Stations Installation

4.4.25 The sequencing of construction activities for Immingham Facility, Theddlethorpe Facility and Block Valve Stations installation would typically comprise of the following:

- Pre-construction activities – site access, erection of temporary compounds and fencing;
- Construction of drainage measures, where required, and earthworks to establish foundation levels;
- Formation of plant foundation bases, chambers and above ground structures;
- Construction of pipework, equipment and associated infrastructure;
- Installation of instrumentation and electrical connections, followed by testing and quality control; and

- Replacement of temporary fencing with permanent security fencing, gravel would be spread over the site and the outer strip planted up (as required).

Construction Lighting

- 4.4.26 Construction lighting during the construction of the Immingham Facility, Theddlethorpe Facility and Block Valve Stations would generally not be needed as construction would be undertaken during the lighter months (April to September).
- 4.4.27 The primary objectives of lighting during the construction phase would be:
- To provide illumination for construction activities;
 - To provide a safe working environment in the absence of natural light;
 - Allow workers and site traffic to safely undertake various construction-related tasks; and
 - To provide security lighting.
- 4.4.28 Due to the dynamic nature of a construction site, different levels of illumination would be needed for different tasks or stages in the construction process.
- 4.4.29 To reduce the potential impacts from construction phase lighting, a range of mitigation measures will be implemented including the adoption of the lowest safe lighting levels for the task being undertaken, limiting the hours of lighting where practicable, using the lowest possible mounting for lighting and directing lights from the boundaries inwards.

4.5 Operation and Maintenance

- 4.5.1 The pipeline and the associated manned central control room at the Immingham Facility would be operated 24 hours a day, seven days a week. The Block Valve Stations and the Theddlethorpe Facility would be unmanned except for periodic visits for maintenance and inspection.
- 4.5.2 The pipeline and associated facilities are designed for minimal maintenance with only periodic checks needed. The equipment would be designed in a way so that it can be repaired or quickly replaced to reduce downtime to a minimum. The Proposed Development has a design life of an initial 25 years and with appropriate maintenance could be operational for approximately 40 years.
- 4.5.3 Pipeline inspections would be carried out at regular intervals with an aerial surveillance and walkover of the pipeline route completed once a year. The performance of the cathodic protection system would also be monitored.
- 4.5.4 The Block Valve Stations would require a weekly inspection by one operative, and it is expected that, during operation, the Theddlethorpe Facility will be visited 2 to 3 times per week for the initial six months, and once per week thereafter.

4.6 Decommissioning

- 4.6.1 At the end of the Proposed Development's operations, the pipeline and associated infrastructure would be decommissioned.
- 4.6.2 A programme for the decommissioning phase would be developed in line with all applicable legislation and best practice in place at the time. It would include details on engagement with relevant stakeholders and consultees as appropriate, to understand any possible re-use options for the pipeline and associated equipment.
- 4.6.3 The assessment presented in the ES is based on the current Decommissioning Strategy and has assumed that the pipeline would remain in the ground and that all above ground facilities (Block Valve Stations, Immingham and Theddlethorpe Facilities) would be removed.
- 4.6.4 A detailed Decommissioning Strategy would be developed prior to the commencement of any decommissioning activities; however, the following basic principles would be followed:
- All equipment would be isolated from sources of Carbon Dioxide and residual Carbon Dioxide removed from equipment and pipelines cleaned and capped at either end;
 - All above ground facilities (Block Valve Stations, Immingham and Theddlethorpe Facilities) would be removed, including any connections to local services such as electrical power;
 - The pipeline will be left in-situ along its entire length. Special consideration will however be given to key locations such as road and railway crossings. At such locations agreed methodologies between relevant stakeholders will be employed to ensure the pipeline is left in a suitable condition; this may involve cutting out or filling sections of pipeline with grout; and
 - Any open ends of the pipeline would be capped, and the remaining pipeline marked on all required maps and plans.

5 Consultation

5.1 Overview



- 5.1.1 As part of the DCO process it is a statutory requirement to consult with stakeholders and the local community about the development and obtain feedback in order to further improve the design of the Proposed Development.
- 5.1.2 The Applicant commenced engagement in 2021 by holding a number of initial meetings with key stakeholders and Local Planning Authorities between December 2021 and April 2022. Following this early engagement, a series of formal consultations were carried out for the Proposed Development, these included the following:
- Non-statutory consultation – April to June 2022;
 - Further non-statutory consultation – September to October 2022;
 - Statutory consultation – November 2022 to January 2023; and
 - Targeted design revisions consultation – April to May 2023.
- 5.1.3 In addition to these main consultation periods above, continued stakeholder engagement has taken place with key stakeholders, Local Planning Authorities and the Planning Inspectorate throughout the pre-application period. The purpose of this engagement was to provide updates and take on board feedback from stakeholders in order to inform the emerging design of the Proposed Development and the Environmental Impact Assessment.
- 5.1.4 It is acknowledged how valuable the consultation and engagement process is to the success of any project, which is why extensive periods were allowed for both the non-statutory consultation and the statutory consultation, beyond the prescribed minimum time required in the Regulations.
- 5.1.5 Consultation feedback received has directly fed into the design process and has helped influence the pipeline route and the design of the Proposed Development.

5.2 Non-statutory consultation

- 5.2.1 Two separate phases of non-statutory consultation were undertaken. The first phase was held for six weeks, from Tuesday 26 April to Thursday 7 June 2022 and the second phase was held from Thursday 8 September to Thursday 6 October 2022.
- 5.2.2 The first phase of consultation introduced the Proposed Development and sought feedback from local stakeholders on the initial pipeline corridor. The second phase focused on those areas where the pipeline corridor had been amended as the design of the Proposed Development progressed.
- 5.2.3 A number of community drop-in events took place over both phases of consultation. *ES Volume II Chapter 4: Consultation (Application Document 6.2.4)* contains more details on the time and location of these events. Online and written responses were also accepted. All feedback and responses received were reviewed and considered as part of the design process of the Proposed Development and fed into the production of the ES.

5.3 Statutory consultation

- 5.3.1 Statutory consultation for the Proposed Development was undertaken over a nine-week period from 22 November 2022 to 24 January 2023, in line with the requirements of the Planning Act 2008 and the Environmental Impact Assessment Regulations. Statutory consultation was used to gain valuable feedback from stakeholders with regard to the

emerging design and construction methods, and provided stakeholders with preliminary environmental information, which included the potential environmental effects of the Proposed Development.

5.3.2 Methods of engagement that were undertaken as part of this process included:

- In-person events;
- A Virtual Consultation Room (as shown in **Figure 16**);
- An Online webinar;
- Publication of a consultation brochure, FAQ document, response form, maps, the non-statutory consultation Report, and the Preliminary Environmental Information Report (PEIR);
- Notices in local newspapers and posters in community locations; and
- Engagement with local authorities and elected members.

Figure 16: Screenshot of the Virtual Consultation Room



5.3.3 In total, there were 223 responses to statutory consultation.

5.3.4 Of the respondents who answered the relevant question, 86% of responses were either in support or neutral towards plans for the Proposed Development.

5.3.5 At this stage, the Proposed Development was presenting refined draft Order limits within which the pipeline could be routed. This was reflected in the feedback received at the statutory consultation, with many comments focussed on localised impacts from the draft Order limits and associated infrastructure.

5.3.6 Support was shown for the updates to the pipeline corridor, particularly moving it away from communities such as South Cockerington and Grimoldby.

5.3.7 A number of comments focussed on environmental impacts, notably reinstating agricultural land, impacts on chalk streams and biodiversity net gain opportunities. There was also an increased focus (compared to earlier stages of consultation) relating to construction

management, such as carbon footprint, concerns about construction traffic and the need to reduce impact on agriculture and drainage.

- 5.3.8 Other themes included the above ground infrastructure, including industries at the Immingham facility, and the safety and design of the vent stack at Theddlethorpe. Safety based comments revolved around detection of leaks and contingency plans.
- 5.3.9 Community opportunities were also raised, including questions around funding for local groups, parish councils and charities, as well as raising awareness with local schools and organisations.
- 5.3.10 Specific locations mentioned included: Welbeck Spring, Hoxton medieval village, Sandhill area of conservation, Saltfleetby and Theddlethorpe Nature Reserve.

5.4 Targeted Design Revisions Consultation

- 5.4.1 An additional consultation was held between 14 April to 14 May 2023 on revisions to the Proposed Development's design made since the close of the statutory consultation, taking into account the feedback received and further technical work conducted.
- 5.4.2 This consultation was targeted at those who were likely to be affected by the revisions.
- 5.4.3 Details of feedback received to the Targeted Design Revisions Consultation and the Applicant's response is provided within the *Consultation Report (Application Document 5.1)*.

6 EIA Assessment Methodology

Environmental Impact Assessment

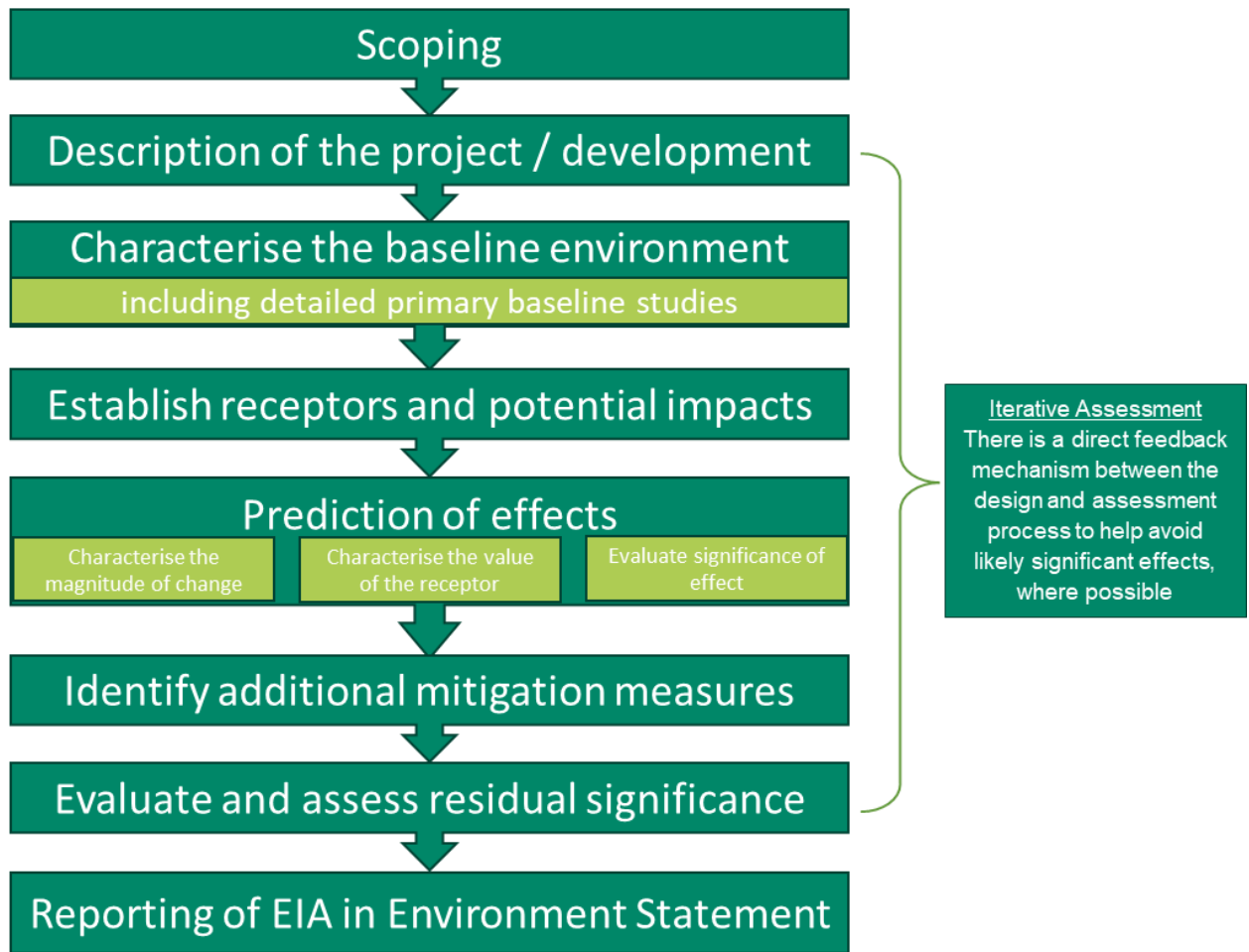


- 6.1.1 Environmental Impact Assessment is the process of identifying, evaluating and mitigating the likely significant environmental effects of a project. It promotes the early identification and evaluation of likely significant environmental effects in order to develop appropriate mitigation (measures to avoid, reduce or offset significant adverse effects) as part of the Proposed Development design process.
- 6.1.2 The full Environmental Impact Assessment is reported within the Environmental Statement (ES), of which this document constitutes the Non-Technical Summary (ES Volume I). The ES is being submitted alongside the application for the Development Consent Order and has been prepared in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. The ES provides the decision maker, in this case the Secretary of State to the Department for Energy Security and Net Zero, with information about:
- The baseline environment (the environment as it is today);
 - The likely significant effects resulting from the Proposed Development in all phases of development (construction, operation and decommissioning);
 - Committed mitigation being delivered as part of the Proposed Development (to avoid, reduce or offset potential significant adverse effects); and
 - Any residual significant effects that cannot be mitigated.
- 6.1.3 This allows the decision maker to make a fully informed decision when considering whether or not to grant consent for the Proposed Development.

Environmental Assessment Methodology

- 6.1.4 The Applicant has gathered information about the existing environment in a study area around the Proposed Development. The size of the study area depends on the topic that is being assessed and is reported in each technical ES chapter along with a rationale for its selection.
- 6.1.5 Topics that have been scoped in or out of assessment were agreed with the Planning Inspectorate, with input from statutory consultees, during the Scoping phase of the EIA Process.
- 6.1.6 The method for assessing the significance of effects is reported in full in *ES Volume II Chapter 5: EIA Methodology (Application Document 6.2.5)*. More specific methods for each technical topic, based on relevant standards or guidelines, are presented in *ES Volume II Chapters 6-20 (Application Document 6.2)*. Any deviation from the methodology presented in *Chapter 5* is explained in each respective chapter.
- 6.1.7 The assessment methodology for the ES follows a systematic approach in order to identify the significant effects of the Proposed Development on human health, the natural and physical environments and material assets. The staged approach for the ES assessment methodology is illustrated in **Figure 17**.

Figure 17: Staged Approach for ES Assessment Methodology



6.1.8 The parameters of the assessment have been developed so as to assess the reasonable worst case including, for example, assuming that the pipeline route could be located anywhere within the DCO Site Boundary. As such, the final design of the development would be within the set design parameters and the effects would not be worse than those reported in this ES.

Mitigation

6.1.9 A standard hierarchical approach to identifying mitigation requirements has been used:

- *Avoid or Prevent:* In the first instance, mitigation should seek to avoid or prevent the adverse effect at source, for example by routing the pipeline away from a sensitive receptor. Mitigation by design has played an important role in avoiding impacts as the design of the Proposed Development has evolved;
- *Minimise or Reduce:* If the effect is unavoidable, mitigation measures should be implemented which seek to reduce the significance of the effect, for example the use of a noise bund to reduce noise levels at nearby noise sensitive receptors; and
- *Offset:* If the effect can be neither avoided nor reduced, mitigation should seek to offset the effect through the implementation of compensatory mitigation, for example offsite habitat creation to replace habitat losses.

6.1.10 The mitigation measures described in the ES fall into two categories, as follows:

- *Embedded Design Mitigation:* This is where the design of the Proposed Development has developed through an iterative process which involves seeking to avoid or reduce

potential environmental effects through appropriate routeing, siting and design specifications. This is also referred to as 'mitigation by design'; and

- *Additional Mitigation and Enhancement Measures:* This refers to additional measures which have been identified as being necessary following an initial assessment, to help ensure any potential effects are reduced further wherever possible.

- 6.1.11 A Draft Construction Environmental Management Plan (CEMP) has been prepared (*ES Volume IV Appendix 3.1, Application Document 6.4.3.1*) which contains a mitigation register setting out all of the mitigation measures proposed as part of the ES, and which includes detailed descriptions of the actions required to be implemented by the main contractor(s) and the Applicant during the construction phase of the Proposed Development. In addition, an Operational Phase Mitigation document has been prepared and presented within *ES Volume IV Appendix 3.6, (Application Document 6.4.3.6)* which outlines the required operational phase mitigation.
- 6.1.12 The Draft CEMP will subsequently be further developed once the construction Contractor(s) is appointed. The draft DCO includes a requirement that ensures that those measures included in the Draft CEMP are legally secured and have to be actioned pre / during / post construction.
- 6.1.13 In addition, an Operational Phase Mitigation document has been prepared and presented within *ES Volume IV (Appendix 3.6, Application Document 6.4.3.6)* which outlines the required operational phase mitigation.

7 Ecology and Biodiversity



7.1.1 This assessment looks at the effects of the Proposed Development on animal and plant species in the area. Survey work and desk-based research has helped to inform this assessment by establishing the baseline (or existing) environment, in particular any protected or valuable habitats, including designated sites and protected species that fall within the DCO Site Boundary and the surrounding area.

Baseline Environment

7.1.2 A 10 km Study Area around the DCO Site Boundary has been used to identify European and statutory designated sites, and a 2 km Study Area has been used for the identification of local non-statutory conservation sites and for gathering third party records of habitats and protected and notable species.

7.1.3 There are four European designated sites within the DCO Site Boundary:

- Humber Estuary Special Protection Area and Humber Estuary Ramsar;
- Saltfleetby-Theddlethorpe Dunes & Gibraltar Point Special Area of Conservation; and
- Greater Wash Special Protection Area with marine components.

7.1.4 The Humber Estuary Special Area of Conservation is within 1.3 km of the DCO Site Boundary.

7.1.5 There are 15 nationally designated sites (Sites of Special Scientific Interest / National Nature Reserves) within 10 km of the DCO Site Boundary, two of which are within the DCO Site Boundary:

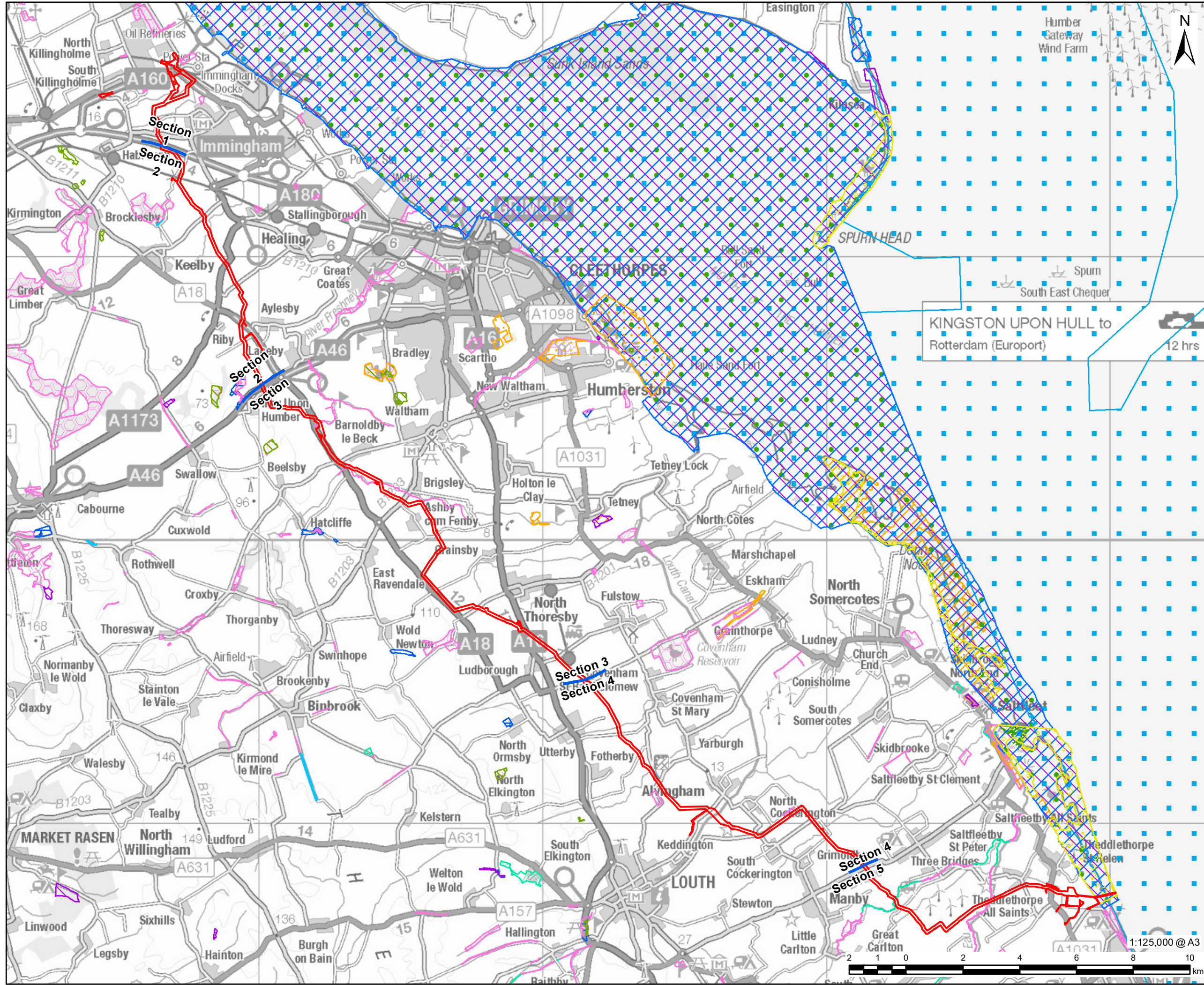
- Saltfleetby – Theddlethorpe Dunes Site of Special Scientific Interest; and
- Saltfleetby - Theddlethorpe Dunes National Nature Reserve.

7.1.6 In addition, there are 33 non-statutory sites, designated for their local nature conservation value, within 2 km of the DCO Site Boundary, five of which are within the DCO site boundary:

- River Freshney Headwaters Local Wildlife Site;
- Waithe Beck East Local Wildlife Site;
- Great Eau Site of Nature Conservation Importance (SNCI);
- Long Eau, East SNCI; and
- Great Eau Local Wildlife Site.

7.1.7 A preliminary ecological appraisal, which included a Phase 1 habitat survey of all land within the DCO Site Boundary, was undertaken between March 2022 and May 2023. In addition to this, further technical surveys were undertaken for a variety of species to help further inform the baseline information presented within the ES.

7.1.8 Habitats of Principal Importance or those listed within Local Biodiversity Action Plans (LBAP) for relevant local authorities were identified through desk study, and the site was appraised for its suitability to support protected and notable species.



- LEGEND**
- ▬ DCO Site Boundary
 - ▬ Route Section Break
 - Statutory Designated Sites
 - Local Nature Reserve (LNR)
 - National Nature Reserve (NNR)
 - Ramsar
 - Special Protection Area (SPA)
 - Special Area of Conservation (SAC)
 - Site of Special Scientific Interest (SSSI)
 - Non-Statutory Designated Sites
 - Ancient Woodland
 - Local Geological Site
 - Local Wildlife Site
 - Local Wildlife Trust
 - Road Nature Reserve
 - Site of Nature Conservation Interest

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FIGURE TITLE

Figure 18
European Statutory Designated Sites and Nationally Designated and Non-

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Overview of Assessment

7.1.9 Statutory and non-statutory designated sites of international, national and county importance were taken forward to impact assessment. These were:

- Five internationally designated sites including:
 - the Humber Estuary Special Protection Area;
 - the Humber Estuary Ramsar;
 - Saltfleetby-Theddlethorpe Dunes and Gibraltar Point Special Area of Conservation;
 - Greater Wash Special Protection Area with marine components; and
 - Humber Estuary Special Area of Conservation;
- 15 nationally designated sites; including Sites of Special Scientific Interest, National Nature Reserves and Local Nature Reserves; and
- 33 non-statutory designates sites; these designations include Local Wildlife Sites, Sites of Nature Conservation Interest, Local Wildlife Trust sites or Roadside Nature Reserve sites.

7.1.10 Only features of county and local importance and above were taken forward to impact assessment. These included the following habitats:

- Open mosaic habitat on previously developed land – local importance;
- Semi-natural broadleaved woodland – local importance;
- Broad-leaved plantation woodland – local importance;
- Woodpasture and parkland – county importance;
- Hedgerows – local importance;
- Scattered trees – local importance;
- Veteran Trees – national importance;
- Semi-improved grassland – local importance;
- Running water – local and county importance;
- Open water (ponds) – local importance; and
- Dune grassland, Dune Scrub and Open Dune – international importance.

7.1.11 The following protected species or species groups were identified to be of local importance and above and were therefore taken forward to impact assessment:

- *Terrestrial invertebrates* (county importance);
- *Great crested newt* (county importance);
- *Common toad* (local importance);
- *Reptiles* (local importance);
- *Fish* (county importance);
- *Birds* (national importance);
- *Roosting bats* (local importance);

Veteran Trees

A veteran tree can be any age, but it is a tree which shows ancient characteristics such as:

- A low, fat and squat shape – because the crown has reduced in size through age;
- A wide trunk compared with others of the same species; and
- Hollowing of the trunk (though this is not always visible).

- *Foraging and commuting bats* (local importance);
- *Otter* (county importance);
- *Water vole* (national importance);
- *Brown hare* (local importance);
- *Hedgehog* (local importance);
- *Badger* (local importance);
- *Aquatic macroinvertebrates and macrophytes* (local importance); and
- *Invasive non-native species* (negligible, but a legal offence to plant or otherwise allow to spread in the wild).

7.1.12 During construction, operation and/or decommissioning of the Proposed Development, potential impacts on the ecological receptors identified above could include habitat loss or damage, noise and vibration disturbance, visual disturbance, emissions and artificial lighting.

Mitigation

7.1.13 The route of the pipeline corridor has been defined so as to avoid or reduce effects on features of ecological importance, including statutory and non-statutory designated sites and Habitats of Principal Importance. Habitats such as woodland and ponds have been avoided where possible to reduce ecological effects. Construction techniques have also been embedded into the design of the project to help reduce the impacts. For example, the use of Horizontal Directional Drilling to avoid effects on woodland habitat at Immingham. All veteran trees will be retained and protected.

District Level Licensing

District level licensing aims to increase the number of great crested newts by providing new or better habitats in targeted areas to benefit their wider population.

7.1.14 A number of additional mitigation and enhancement measures have been identified to reduce potential impacts. These include developing various method statements and plans for use during the construction phase to ensure that specific activities, including watercourse crossing, are undertaken in a sensitive manner; seasonal timing of specific activities to reduce potential impacts; establishment of exclusion and buffer zones to protect habitats and species; and compensation for habitat loss. A Landscape and Ecological Management Plan (LEMP) will be prepared to make sure that habitats created/ enhanced for biodiversity are maintained during the operational phase of the Proposed Development. An outline LEMP has been included as *Application Document 6.8*.

7.1.15 A suitably qualified ecologist will be available for the duration of the construction period to monitor compliance with good practice mitigation measures and undertake necessary surveys to ensure up-to-date information is available.

Residual Effects and Conclusions

7.1.16 During the construction phase, the assessment has determined that there would be **no Significant effects** to statutory and non-statutory designated sites, features of county and local importance, or protected species during the construction phase.

7.1.17 During the operational and decommissioning phases, the assessment has determined all potential effects would be **Not Significant**.

7.1.18 Biodiversity Net Gain, or “BNG”, is not mandatory for the Proposed Development. However, the Applicant recognises the value of delivering BNG and has made a voluntary commitment

to deliver up to a 10% net gain in biodiversity relating to the permanent habitat loss at the above ground facilities (the Immingham Facility, Block Valve Stations and Theddlethorpe Facility, including permanent accesses).

- 7.1.19 A Biodiversity Net Gain Metric Calculation has been carried out for the Proposed Development which is reported in the *Biodiversity Net Gain Assessment (Application Document 6.7.1)*. The assessment has been completed taking guidance from Natural England's Biodiversity Metric 4.0, where appropriate to habitat lost as a result of the permanent facilities. It was informed by data collected during the Phase 1 habitat surveys. The initial assessment details the methodologies and outputs of the baseline and post-development assessment for the Proposed Development.
- 7.1.20 A Draft Biodiversity Net Gain Strategy is provided (*Application Document 6.7.2*) which details the opportunities being considered for delivering Biodiversity Net Gain.

8 Landscape and Visual



8.1.1 The landscape assessment considers how the Proposed Development could affect the landscape through physical change and what impact this has on the existing character and setting. The visual assessment considers how the views of the landscape would be altered by the Proposed Development and the impact this could have on people.

Baseline Environment

8.1.2 A Study Area of 1 km from the DCO Site Boundary has been used for the landscape and visual assessment, which is extended to 2 km in proximity to the Immingham and Theddlethorpe Facilities.

8.1.3 Site visits were undertaken in March and June 2023 to assess the existing character of the landscape and to photograph representative viewpoints. A thorough review of desk-based sources including mapping, aerial photography, planning and policy documents, landscape character assessments and other sources of information was also undertaken to identify the existing landscape character.

Landscape Baseline

8.1.4 The Study Area falls within:

- Three National Character Areas;
- Six Regional Character Areas; and
- Five Local Landscape Character Areas.

8.1.5 The Lincolnshire Wolds Area of Outstanding Natural Beauty (AONB) and an area identified as an Area of Great Landscape Value also fall within the Study Area.

Visual Baseline

8.1.6 In order to identify locations with the potential to have views of the Proposed Development and understand to what extent it is likely to be visible, a number of 'Zones of Theoretical Visibility' have been produced.

8.1.7 Key receptors that have the potential to be affected by the Proposed Development include settlements, Public Rights of Way, National Cycle Network routes and other transport routes such as a major 'A' roads and 'B' roads.

8.1.8 Thirty representative viewpoints have been selected to represent these key visually sensitive receptors from which the potential effects on views can be assessed.

Overview of Assessment

8.1.9 During construction of the Proposed Development, several elements and activities have the potential to temporarily impact landscape character and visual amenity within the Study Area. These impacts relate to the removal of existing landscape features such as hedgerows and arable land, and the visibility of new temporary features such as construction machinery, including effects on perceptual qualities of landscape and visual amenity.

8.1.10 The potential for temporary impacts on landscape and visual receptors may arise from a number of construction activities including:

- Construction of the temporary access routes and three main compounds;
- Site clearance and earthworks associated with the construction of the pipeline and above ground installations;

- Stockpiling and temporary storage of materials, including soil storage mounds adjacent to the pipeline route; and
- Localised lighting during short daylight hours.

8.1.11 During the operational phase, the potential impacts include:

- Presence and operation of a number of permanent structures including vents at the Immingham and Theddlethorpe Facilities; and
- Gaps in hedgerows and other boundary vegetation as a result of vegetation removal during construction, including the presence of new reinstatement planting around above ground installations.

8.1.12 During the decommissioning phase, potential impacts may arise during the removal of above ground installations.

Mitigation

8.1.13 The Proposed Development has been sensitively sited and routed to limit its proximity to settlements and houses and avoid more sensitive landscape features such as woodland. Other design principles, such as the simple design of the Block Valve Stations and locating the Immingham Facility within an existing industrial area in Immingham, will help to improve landscape fit and minimise visual impacts. Landscape planting of up to 10 m in depth is also proposed around each of the Block Valve Stations and Option 2 for the Theddlethorpe Facility.

8.1.14 Other construction controls and management measures to mitigate landscape and visual impacts have also been considered in the design such as setting maximum working widths to minimise land take, minimising vegetation clearance, implementing landscape maintenance and reinstating hedgerows across the route.

8.1.15 A number of additional mitigation measures have been identified to mitigate against the effects on landscape and visual amenity. The additional mitigation measures to be adopted during the construction phase include seeking opportunities to reduce impacts of nearby sensitive visual receptors through the sensitive design of construction compounds (such as use of earthworks / fencing to screen internal activities) and additional planting in selected areas to assist with screening views from sensitive receptors.

Residual Effects and Conclusions

8.1.16 The assessment has determined that landscape receptors will experience **no Significant** effects during any stage of the Proposed Development.

8.1.17 The assessment of visual impacts has determined that the viewpoints listed below are likely to experience **Significant** short-term adverse effects during the construction phase as a result of the high sensitivity of the receptor and proximity to the construction operations associated with the pipeline route and limited intervening vegetation:

- Viewpoint 6 (Public Right of Way NELC 16, Walk Lane, Irby Upon Humber);
- Viewpoints 7 and 8 (Public Rights of Way NELC 17 and NELC 122, Welbeck Hill, Irby Upon Humber (Lincolnshire Wolds AONB)); and
- Users of the heritage railway at Viewpoint 17 (Station Road, Ludborough).

8.1.18 Effects are assessed to reduce to **Not Significant** during operation and decommissioning for all visual receptors. The full assessment can be found in *ES Volume II Chapter 7: Landscape and Visual (Application Document 6.2.7)*.

9 Historic Environment



9.1.1 The historic environment assessment considers the potential effects of the Proposed Development on cultural heritage – namely archaeological remains, historic buildings and the historic landscape character.

Baseline Environment

9.1.2 The known heritage assets within the Study Area were identified through comprehensive desk-based research and a suite of surveys including walkover surveys and aerial photographic assessment and LiDAR analysis. Geophysical surveys are currently being completed. Based on comments from statutory consultees a programme of trial trenching and geoarchaeological investigation has also been developed and is expected to commence in winter 2023.

9.1.3 The Study Area for designated heritage assets is set up to 2 km from the DCO Site Boundary. Assets between 2 km and 5 km were initially considered but as no potential impacts were identified beyond 2 km, these were not considered further. For non-designated heritage assets, the Study Area is set to 500 m from the DCO Site Boundary. A study area of 1 km has been used to identify any historic landscape features likely to be impacted by the Proposed Development.

9.1.4 There are a total of 166 designated heritage assets within the 2 km wide Study Area comprising:

- 15 scheduled monuments;
- Three conservation areas; and
- Listed buildings that are:
 - Grade I (17 no.);
 - Grade II* (22 no.); and
 - Grade II (115 no.).

9.1.5 The pipeline route passes through two of Lincolnshire’s historic landscape character areas:

- Area 3 Northern Marshes; and
- Area 8 Grazing Marshes.

Overview of Assessment

9.1.6 During construction of the Proposed Development, temporary impacts to the setting of heritage assets are likely to include:

- The presence and movement of construction plant, equipment and traffic, including change arising from noise and dust; and
- The presence of construction compounds as a result of noise or light intrusion.

Listed Buildings and Scheduled Monuments

A building is listed when it is of special architectural or historic interest considered to be of national importance and therefore worth protecting.

The different grades mean:

- **Grade I buildings** are of exceptional interest, only 2.5% of listed buildings are Grade I
- **Grade II* buildings** are particularly important buildings of more than special interest; 5.8% of listed buildings are Grade II*
- **Grade II buildings** are of special interest; 91.7% of all listed buildings are in this class and it is the most likely grade of listing for a home owner

A scheduled monument is a heritage asset of national importance protected under legislation.

9.1.7 Permanent construction impacts that would last beyond the construction phase may include:

- Physical impacts on known and previously unknown buried archaeological assets arising from construction activities, including earthworks;
- Physical impacts on landscapes of historical, cultural or archaeological significance as a consequence of construction, such as the loss of important elements of the landscape as a result of site clearance; and
- The disturbance, compaction or removal of previously unrecorded subsurface archaeological deposits through construction activities.

9.1.8 Operational impacts that could result in changes to the settings of heritage assets are considered in relation to limited noise and visual intrusion associated with the above ground installations, including traffic movement associated with general operational activities.

9.1.9 Impacts during the decommissioning phase are likely to be similar to those temporary impacts experienced during construction.

Mitigation

9.1.10 The design of the Proposed Development involved careful routeing of the proposed pipeline corridor to avoid direct physical impacts on designated heritage assets and, where possible, non-designated assets. Other embedded mitigation measures include:

- Limiting land take within the DCO Site Boundary to only that required to construct, operate and maintain the Proposed Development, to minimise disturbance to buried archaeology, for example, the size of the Central Compound has been reduced, moving it further away from Welbeck Spring;
- Limiting soil stripping for temporary facilities in areas where archaeology is recorded to avoid disturbance, and instead using geotextile and stone over topsoil; and
- Planting (once established) to visually screen above-ground elements of the Proposed Development, such as the Block Valve Stations, to reduce adverse effects on the setting of heritage assets.

9.1.11 Additional mitigation measures have been identified to help mitigate potential impacts to heritage assets, including measures which are considered to be standard requirements of statutory stakeholders and which will form the basis of the archaeological mitigation strategy. The archaeological mitigation strategy will include the scope, guiding principles and methods for the planning and implementation of essential archaeological mitigation.

9.1.12 Other additional mitigation measures identified include the protection of built heritage assets and archaeological sites during construction and the control of light spillage, noise and dust within construction areas to minimise impacts on the setting of heritage assets.

Residual Effects and Conclusions

9.1.13 Where the pipeline can be routed within the DCO Site Boundary to avoid or preserve archaeological remains, the residual effects would be considered **Not Significant**.

9.1.14 Where impacts on archaeological remains cannot be avoided, additional mitigation is unable to reduce the magnitude of these impacts as the excavation, recording, and publication of the archaeological features will not compensate for the loss of remains, which are considered a finite resource.

9.1.15 The following archaeological receptors are therefore assessed as having **moderate adverse (Significant)** effects due to direct physical permanent impact of buried archaeological remains during the construction phase of the pipeline:

- Historic Settlement at Roxton (Section 2);

- A former field system or enclosures south-east of Greenlands Farm (Section 2); and
- The area of surviving parkland at Barnoldby le Beck Park (Section 3).

9.1.16 Moderate significant effects have also been identified due to the change to the setting of designated and non-designated built heritage assets. The following heritage assets are assessed to have temporary **moderate adverse (Significant)** effects during the construction phase of the pipeline:

- Grade II* Church of Edmund in Riby (Section 2);
- Grade II Listed Manor House, Barnoldby le Beck (Section 3); and
- Grade II listed 19th century Ashleigh Farm (Section 5).

9.1.17 In the event that unidentified archaeological remains are encountered within the DCO Site Boundary and are removed by the construction of the Proposed Development, a range of residual effects would result. Depending on the value of the remains, these residual effects could be significant.

9.1.18 During construction of the Theddlethorpe Facility (Option 2), the following heritage assets are assessed to have temporary **moderate adverse (Significant)** effect due to the change to the setting of designated and non-designated built heritage assets:

- Grade II listed Ashleigh Farm; and
- Dicote House.

9.1.19 During construction of the Proposed Development in all sections, there would be direct physical permanent impact on any as of yet unidentified archaeological remains within the DCO Site Boundary, which is assessed as **negligible adverse (Not Significant) to major adverse (Significant)**.

9.1.20 During the operational phase, the Theddlethorpe Facility Option 2 would result in **moderate adverse (Significant)** effects to the setting of the following heritage asset:

- Grade II listed Ashleigh Farm.

9.1.21 The residual effects due to the decommissioning of the Proposed Development would be **Not Significant**.

9.1.22 Effects on historic landscape character zones due to construction, operation or decommissioning of the Proposed Development would be **Not Significant**.

9.1.23 The full assessment can be found in *ES Volume II Chapter 8: Historic Environment (Application Document 6.2.8)*.

10 Geology and Hydrogeology



10.1.1 The geology and hydrogeology assessment considers the existing ground conditions, including geology and the presence of known or suspected potentially contaminated materials associated with past land use activities, as well as the impact to water below ground (“groundwater”).

Baseline Environment

- 10.1.2 The Study Area for the geology and hydrogeology assessment is 250 m either side of the DCO Site Boundary. Interaction beyond this Study Area from a geology and hydrogeology perspective would generally not occur. Where relevant for specific subtopics, the Study Area extends to 500 m either side of the DCO Site Boundary for groundwater source protection zones (SPZs), and up to 2 km for groundwater abstractions.
- 10.1.3 Baseline conditions for the Proposed Development were established primarily through a desk-based study of a number of sources including maps and aerial imagery.
- 10.1.4 Geology and hydrogeology site surveys were also undertaken. The surveys focussed on the Immingham Facility and Theddlethorpe Facility with a number of visits to other areas of potential interest along the pipeline route.
- 10.1.5 Made Ground deposits (where the ground has been previously worked or backfilled) are only present within Section 1 of the DCO Site Boundary and are shown to be of stiff to firm, silty clay with evidence of anthropogenic (human caused) materials.
- 10.1.6 Superficial geology in the Study Area is made up predominantly of Glacial Till (sections 1 to 4) and Tidal Flat Deposits (section 5), with more localised areas of Glaciofluvial Deposits, Alluvium and Lacustrine Deposits.
- 10.1.7 Bedrock geology in the Study Area is made up predominantly of the Welton Chalk Formation and the Burnham Chalk Formation.
- 10.1.8 In relation to hydrogeology, the superficial deposits are classified as Unproductive Strata or Secondary Aquifers. The chalk is classified as a Principal Aquifer. Groundwater vulnerability is generally classified as medium to high.
- 10.1.9 The route intersects several groundwater source protection zones (SPZ) including an SPZ 1 and several SPZ 2s in sections 1 to 3.
- 10.1.10 Sites of potentially contaminative current and/or historical land uses have been identified within the Study Area including railways and nearby industrial development associated with Immingham Docks and the former Theddlethorpe Gas Terminal. However, the majority of land within the DCO Site Boundary is used for agriculture which is likely to have low potential for contamination.

Overview of Assessment

- 10.1.11 Potential receptors in the context of the geology and hydrogeology assessment are considered to be geology (superficial and bedrock geology), hydrogeology (aquifers, SPZs and groundwater abstractions), human health (construction workers and site users) and development infrastructure (above ground infrastructures and pipelines).
- 10.1.12 During the construction phase, potential impacts to geology and hydrogeology as a result of the Proposed Development include chemical spillage (of fuel/oil), potential for dewatering to locally affect groundwater levels, degradation of soil quality during handling and movement of soil or tracking of heavy plant, the disturbance of contaminated soil and the potential for the creation of contaminant migration pathways.

- 10.1.13 During the operational phase, potential impacts as a result of the Proposed Development include new foundations and structures creating new preferential pathways for contaminants and aggressive ground contaminants posing a risk to the pipeline.
- 10.1.14 The scale and nature of activities undertaken during decommissioning phase would be similar to those during the construction phase. The potential effects from decommissioning are therefore be regarded as, at worst, the same as construction.

Mitigation

- 10.1.15 The Proposed Development has been designed to avoid important geological features or resources, and sources of contamination, through careful routing and site selection.
- 10.1.16 Additional mitigation measures to mitigate effects relating to ground contamination, groundwater (dewatering), private water supplies and human health (construction site workers) have been identified. These include the completion of intrusive ground investigation of selected areas within the DCO Site Boundary and detailed hydrogeological assessment, development of an environmental emergency response plan strategy and measures related to material import and the storage / handling of chemicals.
- 10.1.17 If the ground investigation indicates a significant potential for contamination exists, further mitigation measures may be required such as ground gas risk assessment, piling risk assessment and generic quantitative risk assessment of potential risks to identified human health and groundwater receptors.

Residual Effects and Conclusions

- 10.1.18 Through the implementation of good practice and application of the identified additional mitigation measures, the residual effects during the construction phase of the Proposed Development have all been assessed as **Not Significant**. The assessment of residual effects during the decommissioning phase is assumed to be the same as the construction phase and therefore **Not Significant**.
- 10.1.19 Effects during the operational phase of the Proposed Development have all been assessed as **Not Significant** following implementation of additional mitigation.
- 10.1.20 The full assessment can be found in *ES Volume II Chapter 9: Geology and Hydrogeology (Application Document 6.2.9)*.

11 Agriculture and Soils



11.1.1 The agriculture and soils assessment considers the effects of the Proposed Development on agricultural soil, in particular, the 'best and most versatile land'.

Baseline Environment

11.1.2 The Study Area for the agriculture and soils assessment is the DCO Site Boundary of the Proposed Development.

11.1.3 A number of data sources were used in the desk-study for this assessment including provisional Agricultural Land Classification maps, likelihood of Best and Most Versatile Agricultural Land maps (strategic scale), surveys and aerial photography.

Best and Most Versatile Land
This land is considered the most flexible, productive and efficient and is most capable of delivering crops for food and non-food uses. They are classed as Grade 1, 2 and 3a of the Agriculture Land Classification

11.1.4 Eleven soil associations have been identified within the Study Area, of which three are classed at low sensitivity (0.48% of Study Area), seven are classed as medium sensitivity (94.86% of Study Area) and one is considered high sensitivity (4.5% of Study Area).

11.1.5 The Study Area contains approximately 567 hectares of agricultural land. This equates to approximately 0.1% of the available agricultural land within Lincolnshire, 0.7% of the available agricultural land within North Lincolnshire and 3.18% of the available agricultural land within North East Lincolnshire.

11.1.6 Of the agricultural land within the Study Area approximately 548 hectares have been classified as BMV, comprising 76.55 hectares of Grade 2 and 471.17 hectares of Subgrade 3a. For context this equates to 0.13% of the total BMV land in Lincolnshire, 0.90% of the total BMV land in North Lincolnshire, or 5.94% of the total BMV land in North East Lincolnshire.

Overview of Assessment

11.1.7 For soils and agricultural land, the potential impacts can be categorised as loss of agricultural land (including Best and Most Versatile Land) and loss of soil functions/volumes and soil-related features.

11.1.8 During the construction phase, potential impacts can be categorised as follows:

- Loss of agricultural land due to the direct impacts of the Proposed Development. This includes permanent loss through construction of permanent infrastructure and permanent land use change (e.g., for landscaping), or temporary loss during construction activities; and
- Disturbance of and impacts to soil resources, including from stripping, stockpiling and reinstatement of topsoil / subsoil, ground excavation and trenchless drilling, vehicle movements, haul road construction and construction of permanent infrastructure.

11.1.9 Operational phase activities with potential to impact upon agriculture and soils, i.e., maintenance and emergency repairs, will be limited and will be of a significantly smaller scale than experienced at construction; therefore, operational effects have been scoped out.

11.1.10 The scale and nature of activities undertaken during decommissioning would be similar to those undertaken during construction and would be temporary only. Therefore, the impacts of decommissioning are considered to be no greater than those anticipated at construction and have not been assessed separately.

Mitigation

- 11.1.11 The Proposed Development has been designed so that the permanent loss of agricultural land is avoided as far as possible. The Immingham Facility and Theddlethorpe Facility (Option 1) will be located within non-agricultural land, and the remaining above ground installations have avoided likely Best and Most Versatile Land to the extent possible.
- 11.1.12 Block Valve Stations have been located adjacent to the highway network to reduce the need for additional disturbance/loss of land to accesses and the pipeline has been routed to avoid areas identified as Grade 2 Agricultural Land as far as is reasonably practicable.
- 11.1.13 The sensitive positioning of the pipeline route and access tracks towards the edges of fields, at field boundaries, or through less productive areas of individual fields (where possible) will reduce impacts on productive land during the construction period.
- 11.1.14 Additional mitigation measures identified to mitigate against the effects on agricultural and soils include the preparation of a Soil Management Plan which would detail best practice for soil handling, maintaining access to agricultural lands and water supplies for fields, land drainage reinstatement / replacement and full reinstatement of agricultural land following completion of construction operations.

Residual Effects and Conclusions

- 11.1.15 During the construction phase, the permanent loss of Best and Most Versatile Land is expected to be less than 3 hectares and would be attributed to the development of Theddlethorpe Facility (Option 2) and the creation of its new access road, as well as the three Block Valve Stations. It is calculated that the permanent loss of agricultural land would be approximately 0.2 hectares of Grade 2 agricultural land and 2.0 hectares of Subgrade 3a agricultural land. The permanent loss of any Grade 2 agricultural land is considered to be **Significant**.
- 11.1.16 There would be no permanent loss of Best and Most Versatile Land if Theddlethorpe Option 1 is taken forward, nor would there be any permanent loss of Best and Most Versatile Land along the pipeline route.
- 11.1.17 It is noted that the permanent loss of Grade 2 land equates to 0.0001% of Grade 2 land in Lincolnshire, 0.0005 % of Grade 2 land in North Lincolnshire, and 0.0055 % of Grade 2 land in North East Lincolnshire.
- 11.1.18 During the construction phase (and decommissioning phase), there would be temporary and reversible loss of agricultural land including Grade 2 agricultural land, Subgrade 3a agricultural land and Subgrade 3b agricultural land. Industry standard good practice measures such as those set out in the Outline Soil Management Plan (*ES Volume II Appendix 10-1 (Application Document 6.4.10.1)*) will ensure that the land is restored to its former condition (or better). Therefore, this effect is considered to be **Not Significant**.
- 11.1.19 Construction (and decommissioning) activities would also temporarily disturb soils, but the mitigation measures presented in the Outline Soil Management Plan would ensure that the soils resource is protected and maintained.
- 11.1.20 The full assessment can be found in *ES Volume II Chapter 10: Agriculture and Soils (Application Document 6.2.10)*.

12 Water Environment



12.1.1 The water environment assessment considers the effects of the Proposed Development on surface water quality, water resources, hydromorphology, flood risk and drainage.

Baseline Environment

12.1.2 The general Study Area for the Water Environment assessment is 500 m from the DCO Site Boundary to identify all water features that may be affected by the Proposed Development and is extended to 2km for designated sites. Where relevant, the Study Area is also extended to cover potential impacts to waterbody quality and quantity at downstream receptors.

12.1.3 Data sources used to establish the baseline included Ordnance Survey Maps, Land Use Mapping, British Geological Survey and Soils mapping, Environment Agency mapping and abstraction data, and Local Authority flood risk assessments. Site walkovers of the Study Area were also carried out which focused on surface water features in the study area.

12.1.4 The Proposed Development potentially affects 15 Water Framework Directive surface waterbodies and crosses six watercourses which are classed by the Environment Agency as Main Rivers (with a further six located within the Study Area which are connected to a watercourse potentially impacted by the Proposed Development). There are likely to be over 100 Ordinary Watercourses crossed by, or within 500m of the DCO Site Boundary, in addition to a large number of standing water features. Natural England records also indicate three Chalk Streams within the Study Area.

12.1.5 The Proposed Development crosses Flood Zones 2 and 3, in particular within Section 5 due to its proximity to the coast, and associated risk of coastal flooding.

Overview of Assessment

12.1.6 The main potential impacts to the water environment relating to construction of the Proposed Development include:

- Mobilisation of fine sediment affecting water quality through runoff or scour;
- Impacts to hydromorphology of watercourses;

Hydromorphology

The physical characteristics of the shape, boundaries and content of a water body.

Main Rivers

Statutory watercourse, typically larger streams or rivers but can also include smaller watercourses of strategic drainage importance.

Ordinary Watercourse

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.

Water Framework Directive

The overarching aim of the Water Framework Directive is to protect and enhance watercourses.

Flood Zones

Zones based on annual probability of river and sea flooding:

Flood Zone 1 – low probability of flooding (annual <0.1% chance of flooding from rivers or sea).

Flood Zone 2 - medium probability of flooding (annual 1%-0.1% chance of flooding from rivers and 0.5%-0.1% chance of flooding from the sea).

Flood Zone 3 - high probability of flooding (annual $\geq 1\%$ chance of flooding from rivers or $\geq 0.5\%$ chance of flooding from the sea).

- Release of oils and / or other chemicals affecting water quality;
- Temporary flow obstructions from open cut and culverting at crossings, and associated effects of dewatering affecting flow regime; and
- Severance or disturbance to underground field/land drainage infrastructure.

12.1.7 The main potential impact relating to operation is increased surface water runoff (which can mobilise sediments and pollutants into water features) through increased impermeable or compacted areas resulting from the above ground installations. The scale and nature of activities undertaken during decommissioning would be similar to those undertaken during construction and would be temporary only. Therefore, the impacts of decommissioning are considered to be no greater than those anticipated at construction.

Mitigation

12.1.8 Mitigation measures which have been incorporated into the Proposed Development design include the development of a Drainage Strategy and Water Management Plan, use of trenchless crossings to avoid impacts to the more important and sensitive water environment receptors, including all Main Rivers, and construction of drainage measures (temporary or permanent) where required. The considerate placement and design of construction features has also sought to avoid areas at risk of flooding, key flood protection features, protected areas or more important and sensitive watercourses.

12.1.9 Mitigation measures that are proposed to provide additional mitigation for predicted effects on the water environment include preparation of a Flood Warning and Evacuation Plan, completion of a pre-construction hydromorphological survey of proposed open-cut watercourse crossings to inform a Channel Reinstatement Scheme, following good practice for materials storage and protection of critical electrical equipment from potential breach tidal flooding.

Residual Effects and Conclusions

12.1.10 With the incorporation of embedded mitigation and additional mitigation including the development of management plans and adherence to best practice, effects on the water environment due to the construction of the Proposed Development are expected to be **Not Significant**. The assessment of residual effects during the decommissioning phase is assumed to be the same as the construction phase and therefore **Not Significant**.

12.1.11 Residual effects during the routine operation of the Proposed Development are considered **Not Significant** as the principal watercourses crossed by the Proposed Development would be non-intrusive and drilled / bored beneath the bed at a sufficient depth to avoid exposure.

12.1.12 A Water Framework Directive (WFD) Assessment has been undertaken for the Proposed Development. The WFD Assessment assesses whether the Proposed Development meets the requirements of the WFD. The WFD Assessment concludes that, with the proposed mitigation in place, it is not expected that there would be any deterioration in the status of the water bodies and would not prevent the water bodies achieving Good Ecological Status and Good Ecological Potential. The full WFD Assessment can be found in *ES Volume IV Appendix 11.3 (Application Document 6.4.11.3)*.

12.1.13 A Flood Risk Assessment was prepared for the Proposed Development as it is partly located within Flood Zones 2 and 3. This assesses the Proposed Development against the risk of flooding, whether that be from groundwater, river (fluvial), surface water (pluvial), estuary/coastal (tidal), or from sewer sources. The Flood Risk Assessment has concluded that it will be possible to manage flood risk to and from the Proposed Development. It demonstrates that the Proposed Development conforms to the National Planning Policy Framework (which sets out the government's planning policies). The full Flood Risk Assessment can be found in *ES Volume IV Appendix 11.5 (Application Document 6.4.11.5)*.

13 Traffic and Transport

13.1.1 The traffic and transport assessment considers how the Proposed Development could cause changes in traffic numbers and vehicle types on the local and the strategic road network. It also assesses how the construction of the Proposed Development could impact road users including pedestrians.



13.1.2 During the operational phase, it is anticipated that the amount of operational traffic will be negligible, being associated only with periodic inspections and maintenance at the Immingham and Theddlethorpe Facilities and the Block Valve Stations. On this basis, operational traffic has been scoped out of the assessment as agreed with the Planning Inspectorate.

Baseline Environment

13.1.3 The Study Area for the traffic and transport assessment includes the anticipated routes that would be used by construction vehicles associated with the Proposed Development, within and surrounding the DCO Site Boundary, as well as a number of smaller routes to be included for assessment purposes.

13.1.4 Data sources to establish the baseline include Automatic Traffic Count survey data, Personal Injury Collision analysis data from the relevant highway authority as well as traffic flow data from the Department for Transport. The Automatic Traffic Count surveys were undertaken so as to understand the existing levels of traffic using the local road network. Public Right of Way and National Cycle Networks were identified through online mapping data.

Overview of Assessment

13.1.5 Due to the nature of the Proposed Development the construction traffic will be comprised of the following elements, each of which is assessed separately:

- Construction vehicles and workers travelling to each of the access points onto the pipeline; and
- Pipeline deliveries from the port of Immingham to the construction compounds.

13.1.6 The proposed numbers of vehicle movements required for the construction of the Proposed Development were compared to existing baseline traffic levels to assess level of increase and what impacts this may have. In accordance with guidance, highway links were only included in the study where one of the following 'rules of thumb' was met:

- Rule 1 - Traffic flows increase by more than 30% (or HGV flows increase by more than 30%); or
- Rule 2 - Traffic flows in sensitive areas increase by more than 10%.

13.1.7 To assess the effects of construction of the Proposed Development, percentage increases in vehicle movement were considered alongside impacts from construction traffic and on the severance of routes (separation of people from places and other people), pedestrian amenity, fear and intimidation of pedestrians, driver delays and highway safety.

Mitigation

13.1.8 Mitigation has been developed as part of the ongoing development of the Proposed Development design to reduce potential significant effects.

13.1.9 Embedded mitigation measures included within the design include the following:

- The routes proposed for construction traffic have been carefully considered to reduce both the number of routes affected and also to remove more sensitive routes where possible; and
- All access points that require the creation of a junction bellmouth will be designed based on the relevant standard and in consultation with the Local Highways Authority (this reduces any potential safety impact associated with construction activity).

13.1.10 A number of additional mitigation measures have been identified to avoid or reduce likely significant effects resulting from the Proposed Development. These measures include:

- The production of a Detailed Construction Traffic Management Plan to establish construction vehicle routing and safe access and egress to construction compounds in consultation with the Highways Authorities. This will be based on the Draft Construction Traffic Management Plan (*Application Document 6.4.12.7*) and include such items as:
 - The necessary agreements and timing restrictions for construction traffic for example Monday – Saturday working, prohibition during school drop-off and pick-up times on certain links (this will be managed by appropriate measures in the Construction Traffic Management Plan (CTMP) which will likely prohibit movements during busy network periods such as the AM and PM peak), and prohibition during loading times at commercial premises;
 - Escort arrangements for abnormal loads;
 - Route signage;
 - Details of the advanced notification to the general public, warning of any construction transport movements, specifically AILs;
 - Details of proposed information and road signage, warning road users of forthcoming AIL transport and construction traffic movements;
 - Arrangements for regular road maintenance and cleaning, e.g., road sweeping in the vicinity of the site access points, as necessary, drain clearing, wheel cleaning / dirt control arrangements;
 - Arrangements for winter road maintenance e.g., de-icing and snow clearing;
 - Construction Contractor speed limits; and
 - Community and emergency services liaison details.
- The production of a Construction Logistics Plan to manage sustainable delivery of goods and materials; and
- Implementation of a Travel Plan that supports and encourages sustainable travel by workers (public transport, cycling, walking and car-sharing).

Residual Effects and Conclusions

13.1.11 The assessment of residual effects related to traffic and transport has been split into each section (1-5) of the pipeline route and is summarised below:

- *Section 1*: all routes have been assessed as either Minor or Negligible which is **Not Significant**;
- *Section 2*: all routes have been assessed as either Minor or Negligible which is **Not Significant**;

- *Section 3:* A1031 Humberston Road and A1031 Thoresby Road have been assessed as having moderate effects from construction traffic which is **Significant**. All other routes in Section 3 have been assessed as Minor or Negligible which is **Not Significant**;
- *Section 4:* A1031 Main Road and A1031 Warren Road have been assessed as having moderate effects from construction traffic which is **Significant**. All other routes in Section 4 have been assessed as Minor or Negligible which is **Not Significant**; and
- *Section 5:* All other routes in Section 5 have been assessed as Negligible which is **Not Significant**.

13.1.12 It is anticipated that measures which will be incorporated into the Detailed Construction Traffic Management Plan, Construction Logistics Plan and the Travel Plan would reduce the number of construction worker trips, however, these measures cannot be confirmed at this stage and so have not been included within the assessment.

13.1.13 The decommissioning phase has not been assessed separately; however, any impact is likely to be no greater than the construction phase.

13.1.14 The full assessment can be found in *ES Volume II Chapter 12: Traffic and Transport (Application document 6.2.12)*.

14 Noise and Vibration



14.1.1 The noise and vibration assessment considers how the noise and vibration produced by the construction and operation of the Proposed Development would create impacts on receptors including residential receptors (houses), hospitals, schools and care homes.

Baseline Environment

14.1.2 The Study Area for construction and operational noise effects will include receptors within 500m of the Immingham Facility, Block Valve Stations and Theddlethorpe Facility and within 300m of the DCO Site Boundary. These distances have been selected based on previous experience that operational noise sources are likely to be negligible at distances greater than 500m and that construction noise predictions are generally reliable up to 300m.

14.1.3 There are no identified Noise Important Areas and Noise Action Plan Priority Areas within the Study Area described above.

14.1.4 Background sound level monitoring locations were determined based on the location of the anticipated operational and constructional noise along the preferred pipeline route with respect to noise sensitive receptors. Sound level monitoring was carried out between January and March 2023 to establish the existing noise climate in the area and provide a baseline against which the likely noise associated with the Proposed Development could be measured.

14.1.5 In order to assess the noise and vibration effects due to the Proposed Development, a selection of sensitive receptors were identified. The sensitive receptors considered are the nearest receptors to the Proposed Development (i.e., the receptors that will experience the highest levels of noise and vibration). A total of 58 receptors were selected of which 56 were residential and two non-residential (Swallow Park Caravan Site and Hall Farm Hotel and Restaurant).

Overview of Assessment

14.1.6 The noise and vibration assessment considers the following:

- Construction noise;
- Construction vibration;
- Construction traffic noise; and
- Operational noise from the Immingham Facility, Theddlethorpe Facility and the Block Valve Stations.

14.1.7 During the construction phase, noise and vibration impacts may result from construction activity such as the operation of machinery and plant. There may also be noise impacts from construction traffic.

14.1.8 During the operational phase, noise associated with the Proposed Development would be limited primarily to operation of electrical and mechanical equipment at the Immingham Facility, Theddlethorpe Facility and Block Valve Stations (no sensitive receptors are located in the vicinity of the Immingham Facility). Operational traffic noise is expected to be minimal and therefore scoped out.

14.1.9 During the decommissioning phase, noise effects of the Proposed Development will be similar or less than noise effects during the construction phase; therefore, the construction noise assessment presented is considered equivalent to, or an overestimate of, the decommissioning phase.

Mitigation

- 14.1.10 Embedded mitigation has been included as part of the Proposed Development design and includes pipeline routing to avoid sensitive receptors and minimise the effects of construction and decommissioning noise and vibration as far as reasonably practicable. Embedded mitigation measures relevant to the operational phase include use of quieter plant, consideration of noise impacts as part of design of layouts and screening of noise sources.
- 14.1.11 Additional mitigation measures pertinent to noise and vibration including a set of generic best practice working methods which would be employed by the Construction Contractor during the construction phase, such as selection of the quietest plant and equipment, careful placement of noisy plant and implementation of on-site speed limits. Localised noise screening will be used where required and a good communication strategy will be put in place to ensure that local residents have prior warning when particularly noisy or vibration-causing activities are due to be carried out.

Residual Effects and Conclusions

- 14.1.12 During the construction phase, after the implementation of additional mitigation measures the residual effects from construction noise or vibration have been assessed as **Not Significant**.
- 14.1.13 Effects in relation to construction traffic have also been assessed as **Not Significant**.
- 14.1.14 During the operational phase, effects from the Proposed Development are expected to be **Not Significant**.
- 14.1.15 As noise effects during the decommissioning phase of the Proposed Development will be similar or less than noise effects during the construction phase, the noise assessment presented for the construction phase is considered representative (or an overestimate) of the decommissioning phase and therefore **Not Significant**.
- 14.1.16 The full assessment can be found in *ES Volume II Chapter 13: Noise and Vibration (Application Document 6.2.13)*.

15 Air Quality



15.1.1 The air quality assessment assesses how the construction of the Proposed Development may cause changes to the local air quality. This includes airborne pollutants such as dust, nitrogen dioxide and particulate matters, including PM₁₀.

Baseline Environment

15.1.2 An area of 10 km from the DCO Site Boundary has been considered with respect to published baseline information on air quality. Data sources used include Local Authority Annual Status Reports, background concentrations and Air Quality Management Area boundaries provided by DEFRA's UK Air Information Resource as well as designated ecological sites provided by DEFRA's MAGIC maps.

PM₁₀
Particulate Matter or PM₁₀ are very small particles (10 micrometres (0.01 mm) or smaller) found in dust and smoke and are a common air pollutant.

15.1.3 The following Study Areas have been used where an assessment of dust emissions produced by construction activities is required:

- A human receptor (sensitive for harm to human health and amenity) within:
 - 350 m of the limits of construction activity within the site considered; or
 - 50 m from the construction route on the public highway, up to 500 m from the site entrance(s).
- An ecological receptor within:
 - 50 m of the limits of construction activity within the DCO Site Boundary; or
 - 50 m of the construction route on the public highway, up to 500 m from the site entrance(s).

15.1.4 The Study Area is therefore 350 m from the DCO Site Boundary.

15.1.5 One Air Quality Management Area (AQMA) is located within 10 km of the DCO Site Boundary, Grimsby AQMA declared for exceedances of nitrogen dioxide due to traffic. Construction traffic is not anticipated to route through this AQMA which covers a small stretch of road within an urban centre.

Air Quality Management Area
Areas that are likely to exceed the national air quality objective for a specific pollutant. They are determined by Local Authorities.

15.1.6 Based on review of baseline data, background concentrations in the Study Area are low, due to the predominantly rural nature of the area when compared to larger urban centres.

Overview of Assessment

15.1.7 During the construction phase, air quality impacts to human health and amenity (dust soiling) sensitive receptors and nature conservation receptors may result from:

- Construction dust emissions;
- Construction plant emissions; and
- Construction traffic emissions.

15.1.8 In agreement with the Planning Inspectorate's Scoping Opinion, operational and decommissioning phase impacts are considered likely to be minor and have therefore been scoped out of the assessment.

Mitigation

- 15.1.9 Embedded mitigation measures have been identified and adopted as part of the evolution of the project design, and to reflect the findings of ongoing environmental studies and comments from stakeholders. As the design has developed, the pipeline route was planning to avoid areas with high population density and higher value nature conservation sites, which helps to avoid impacts that may otherwise have occurred.
- 15.1.10 Additional mitigation measures identified to reduce the effects associated with construction activity impacts include a range of measures to reduce and minimise air quality emissions such as the production of a Dust Management Plan which will include specific measures to control dust and other emissions, damping down of haul routes, avoiding the use of diesel or petrol powered generators (in favour of alternative fuel, battery or mains powered alternatives where possible), using sustainable power sources where practicable and implementing speed limits on surfaced roads and in work areas.

Residual Effects and Conclusions

- 15.1.11 In relation to air quality, effects from construction dust and plant are expected to be **Not Significant** due to the application of industry standard practice and effective mitigation.
- 15.1.12 It is expected that effects on local air quality would be **Not Significant** as a result of construction traffic movements associated with the Proposed Development.
- 15.1.13 Air quality effects during the operational and decommissioning phase of the Proposed Development have been scoped out from further assessment.
- 15.1.14 The full assessment can be found in *ES Volume II Chapter 14: Air Quality (Application Document 6.2.14)*.

16 Climate Change



16.1.1 The climate change assessment has two separate considerations which are:

- *Lifecycle Greenhouse Gas (GHG) Impact Assessment*: predicts the greenhouse gas emissions to be produced during the construction, operation and decommissioning of the Proposed Development and examines the affect this could have on the UK Carbon Budget;
- *Climate Change Resilience Assessment*: assesses vulnerability of the Proposed Development to climate change such as extreme weather events and sea level rise.

Baseline Environment

16.1.2 The Study Area for the lifecycle GHG impact assessment covers all direct greenhouse gas emissions arising from activities undertaken within the DCO Site Boundary and indirect emissions from activities outside the DCO Site Boundary. The Study Area for the Climate Change Resilience Assessment is the DCO Site Boundary.

Greenhouse gases
Carbon dioxide
Methane
Nitrous Oxide
Hydrofluorocarbons
Perfluorocarbons
Sulphur hexafluoride
Nitrogen trifluoride

16.1.3 The current baseline for the lifecycle GHG impact assessment is based on a 'Do Nothing' scenario where the Proposed Development is not constructed or operated. The baseline typically consists of the GHG emissions from the existing carbon stock within the soil and vegetation with the DCO Site Boundary. As current land use within the DCO Site Boundary will have minor levels of associated GHG emissions which are not considered material in the context of the Proposed Development, a net GHG emissions baseline of zero has been assumed.

16.1.4 The baseline for the Climate Change Resilience Assessment is based on historic climate data from the Met Office recorded by the closest meteorological station to the Proposed Development. The Met Office historic 10-year averages for the 'England and North East England' region identify gradual warming (although not uniformly so) between 1969 and 2018, with increased rainfall also.

Overview of Assessment

Lifecycle GHG impact assessment

16.1.5 The lifecycle GHG impact assessment involves the calculation of GHG emissions (as tonnes of carbon dioxide equivalent (tCO₂e)) associated with the construction, operation and decommissioning of the Proposed Development, then comparison against the baseline.

16.1.6 The total construction related GHG emissions from the Proposed Development are calculated to be around 84,279 tCO₂e, predominantly associated with the embodied carbon of construction materials. Other project activities contributing to emissions during the construction phase include:

- Plant emissions and enabling works;
- Transportation of materials;
- Construction worker commuting; and
- Construction waste.

Embodied Carbon
The carbon emitted during the manufacturing of a material or product.

16.1.7 The lifetime operational GHG emissions from the Proposed Development within the DCO Site Boundary are calculated to be approximately 2,514 tCO₂e with 100% of operational emissions associated with electricity usage onsite. The GHG emissions associated with

carbon dioxide transportation, capture and storage as part of the wider Viking CCS Project are also considered, with more than 10 million tonnes of CO₂ per year transported for subsequent storage, commencing in 2027.

16.1.8 The total GHG emissions for the decommissioning phase are calculated to be approximately 91 tCO₂e, predominantly due to transport of waste material.

Climate Change Resilience assessment

16.1.9 During the construction phase, receptors such as the construction work force, construction plant, vehicles, materials and the construction programme may be vulnerable to a range of climate risks. These could include:

- Inaccessible construction sites or health and safety risks to the workforce due to severe weather events (flooding, snow and ice, storms);
- Unsuitable conditions (due to very hot weather or very wet weather, for example) for certain construction activities; and
- Damage to construction materials, plant and equipment, including damage to temporary buildings/facilities as a result of stormy weather.

16.1.10 During the operational phase, potential impacts include damage to equipment and infrastructure due to severe weather events or high temperatures, flooding and restricted site access due to increased winter rainfall and potential flooding of the Theddlethorpe Facility due to sea level rise.

Mitigation

16.1.11 For the purposes of the climate change assessment, an initial worst-case assessment has been undertaken within which no mitigation measures are considered embedded into the design.

16.1.12 Additional mitigation measures identified to reduce the GHG impact of the Proposed Development include the adoption of an Energy Reduction Plan, the development of a Sustainable Procurement Plan and development of a Materials Management Plan, amongst other measures.

Residual Effects and Conclusions

16.1.13 The GHG assessment for the Proposed Development has considered the Proposed Development to have a minor adverse residual effect and is therefore considered **Not Significant**.

16.1.14 The Proposed Development forms part of a wider Viking CCS Project to abate carbon emissions from large industrial emitters at the Immingham Industrial Site. This broader project will result in significant reductions in carbon emissions and is expected to give a **Significant Beneficial** effect.

16.1.15 The Climate Change Resilience Assessment has been qualitative and provides commentary on how the Proposed Development will be resilient to climate change within the context of current and predicted future climate conditions. Effects are expected to be **Not Significant**.

16.1.16 The full assessment can be found in *ES Volume II Chapter 15: Climate Change (Application Document 6.2.15)*.



17 Socio-Economics



17.1.1 The socio-economics assessment considers the impact of the construction, operation and decommissioning of the Proposed Development on local communities and the economy.

Baseline Environment

17.1.2 The current baseline has been established through gathering data on populations, businesses, employment and training, economic growth, land uses, communities, private assets, recreational routes and Public Rights of Way within the DCO Site Boundary and the wider local authority areas of North Lincolnshire, North East Lincolnshire, East Lindsey, and West Lindsey which the Proposed Development lies within.

17.1.3 The Proposed Development is located in the Yorkshire and the Humber region, which has an estimated population of 5,480,774, and the East Midlands region, which has an estimated population of 4,880,054.

Overview of Assessment

17.1.4 The Proposed Development has the potential to result in a wide range of effects during the construction and decommissioning stages. The socio-economic assessment identifies potential effects during the construction and decommissioning phases for the following:

- Employment (including training and apprenticeship opportunities) and local economy (Gross Value Added);
- Users of recreational routes and Public Rights of Way (PRoW);
- Community severance; and
- Private assets (including residential properties, development land, local businesses, community facilities, open space and visitor attractions relevant for tourism).

17.1.5 As agreed in the scoping opinion, socio-economic effects are unlikely to result in any significant effects during the operation phase and have therefore been scoped out of the assessment.

17.1.6 During the decommissioning phase, socio-economic effects on development land have been scoped out as it is not possible to anticipate which development allocations will have either been built out, or retained, at the time of decommissioning, and therefore a robust assessment is not possible.

Mitigation

17.1.7 The Proposed Development has been designed to avoid sensitive receptors such as PRoW, residential properties, business premises, visitor attractions, community facilities, open spaces and development land allocations as far as possible.

17.1.8 Embedded mitigation measures are incorporated into the Proposed Development as set out in the respective assessment chapters. Of particular relevance to socio-economics are those related to noise and vibration, air quality, traffic and transport, and landscape and visual as these embedded mitigation measures reduce the potential for amenity effects on residential receptors from a socio-economics perspective.

17.1.9 Additional mitigation measures identified which will contribute to reducing socio-economic effects include development of the following:

- A Draft Public Rights of Way Management Plan which sets out measures to reduce any significant effects to PRoW as well as ensure the safety of users of PRoW during construction works. The Plan sets out the nature, length and duration of potential

temporary closures and/or diversions so that access to any Public Right of Way impacted by the construction works is minimised as far as possible;

- A Construction Traffic Management Plan which aims to reduce any significant effect of increased traffic flow during construction such as potential community severance effects on users of community facilities and other social infrastructure nearby to the Proposed Development; and
- The Contractor will develop a Skills, Employment and Supply Chain Plan in liaison with the four Local Authorities: North Lincolnshire Council, North East Lincolnshire Council, East Lindsey District Council and West Lindsey District Council. This Plan will identify measures so that the potential economic benefits of the Proposed Development for local people and businesses might be maximised. This will include seeking to develop links with education and employment establishments in the locality if appropriate (for example, schools, colleges, employment agencies, and business groups). This will increase the potential for the Proposed Development to have a beneficial effect on the provision of training and apprenticeships and the local workforce.

Residual Effects and Conclusions

- 17.1.10 During the construction phase, the Proposed Development is expected to create temporary employment opportunities, both directly at work sites and indirectly in the supply chain and gross value would be added to businesses in the Proposed Development area. There would also be the creation of training opportunities and apprenticeships, including opportunities to upskill local residents during construction resulting in a **minor beneficial effect** on employment. Additionally, the construction phase is expected to contribute approximately £13.9 million to the local economy, another **minor beneficial effect**. These *minor beneficial* effects are considered **Not Significant**.
- 17.1.11 During the construction phase it is also anticipated there will be some minor severance / disruption of access to users of community facilities/residents of nearby settlements due to impacts from construction activities on the road network and/or PRow. This means there would be a **minor adverse effect**. There is also potential for impacts on viability of 'other existing developments and/or approved developments' (due to temporary or permanent land take, or severance or disruption to access) which could result in **minor adverse effects**. These *minor adverse* effects are considered **Not Significant**.
- 17.1.12 During the construction phase, the effects on all other identified receptors are also expected to be **Not Significant**.
- 17.1.13 Socio-economic effects during the operation phase have been scoped out of the assessment.
- 17.1.14 During the decommissioning phase of the Proposed Development, the effects are expected to be **Not Significant**.
- 17.1.15 The full assessment can be found in *ES Volume II Chapter 16: Socio-economics (Application Document 6.2.16)*.

18 Health and Wellbeing



18.1.1 The health and wellbeing assessment considers how the Proposed Development may impact on human health during construction, operation and decommissioning.

Baseline Environment

18.1.2 The Study Area used for the health and wellbeing assessment includes the DCO Site Boundary along with surrounding areas based on administrative boundaries to align with how the Government publishes official data.

18.1.3 Information has been gathered from multiple sources including Census (2021) data, Annual Population Survey and from Public Health England.

18.1.4 The baseline reports population, an age breakdown, ethnicity breakdown, education, skills and training, employment and economic activity, deprivation, life expectancy, health, wellbeing and mortality, availability of healthcare facilities, Public Rights of Way and private assets.

Overview of Assessment

18.1.5 The assessment considers human health determinants of relevance to the Proposed Development and has therefore assessed the following:

- Access to healthcare services and other social infrastructure;
- Air quality, noise, and neighbourhood amenity;
- Accessibility and active travel;
- Access to work and training; and
- Social cohesion and neighbourhoods.

18.1.6 Assessment of impacts on radiation has been scoped out of the assessment.

18.1.7 The assessment has identified that the Proposed Development has potential to create a number of impacts, and those which have assessed as having a potentially significant effect have been listed below:

- Reduced air quality, providing risk to residents; and
- Potential disturbance to local ecological, heritage and human receptors through noise.

Mitigation

18.1.8 The Proposed Development has been designed taking into account sensitive receptors, including human receptors, such as by positioning infrastructure to avoid receptors such as PRow, residential properties and communities as far as possible.

18.1.9 A Draft Construction Traffic Management Plan has been prepared to help identify the local road network use of construction traffic and is designed to help to reduce the impacts of increased traffic flow on local roads during the construction of the Proposed Development. This can be found in *ES Volume IV Appendix 12.5 (Application Document 6.4.12.5)*.

18.1.10 The Draft Construction Environmental Management Plan also contains a number of additional mitigation measures which would be implemented in the construction phase which are of relevance to the health and wellbeing assessment and refer out to mitigation measures proposed by the landscape and visual, traffic and transport, noise and vibration, air quality and socioeconomics assessment, all of which are relevant to mitigation effects on health and wellbeing.

Residual Effects and Conclusions

- 18.1.11 During the construction and decommissioning phase, (i) access to healthcare services and other social infrastructure, (ii) air quality, noise and neighbourhood amenity, (iii) accessibility and active travel, (iv) access to work and training and (v) social cohesion and neighbourhood effects are expected to be **Not Significant**.
- 18.1.12 During the operational phase, (i) Air Quality, noise and neighbourhood amenity, (ii) Accessibility and active travel, (iii) social cohesion and neighbourhood effects are expected to be **Not Significant**.
- 18.1.13 During the decommissioning phase, the effects are expected to be the same or less than that experienced in the construction phase.
- 18.1.14 The full assessment can be found in *ES Volume II Chapter 17: Health and Wellbeing (Application Document 6.2.17)*.

19 Materials and Waste



19.1.1 This chapter presents the assessment of the likely significant effects of the Proposed Development on materials and waste. The assessment includes consideration of impacts to landfill capacity, national and regional availability of key construction materials and safeguarded waste sites.

Baseline Environment

19.1.2 The Study Area for the assessment of construction and operational waste generation from the Proposed Development as well as impacts on safeguarded mineral and waste sites are the DCO Site Boundary.

19.1.3 The expansive Study Area for non-hazardous waste management comprises the East Midlands and Yorkshire and the Humber. For hazardous waste management the Study Area is England. For the availability of key construction materials this is assessed on a national scale (United Kingdom or Great Britain, depending on where information is available).

19.1.4 The baseline from a material assets and waste perspective covers the availability of key construction materials, potential recycled content, landfill capacity and sites, and the presence of safeguarding areas and sites within the Study Area. The DCO Site Boundary passes through a Mineral Safeguarding Area (MSA) for sand and gravel. Additionally, there are two safeguarded waste sites and 12 local permitted and surrendered waste sites in close proximity to the DCO Site Boundary as well as nine local waste site permit applications.

Overview of Assessment

19.1.5 The materials and waste assessment considers:

- The types and quantities of materials which would be required to construct and operate the Proposed Development and the availability of these materials and their potential recycled content;
- The types and quantities of waste produced to construct and operate the Proposed Development, and the planned recovery of this waste;
- The cut and fill balance of the earthworks associated with constructing the Proposed Development; and
- The impact on safeguarded waste sites and associated access.

19.1.6 The final details of the materials and waste associated with the Proposed Development is not yet fully established. Therefore, the assessment is based upon worst case early estimations, likely types of materials that will be used and wastes that are likely to be generated during the construction of the Proposed Development in order to adequately predict the likelihood of significant environmental effects.

19.1.7 During the construction phase, the potential impacts on materials and waste as a result of the Proposed Development are expected to be:

- Changes in landfill capacity;
- Changes in demand for materials; and
- Impacts on safeguarded waste sites and associated access.

19.1.8 As agreed in the scoping opinion, the following have been scoped out of the assessment:

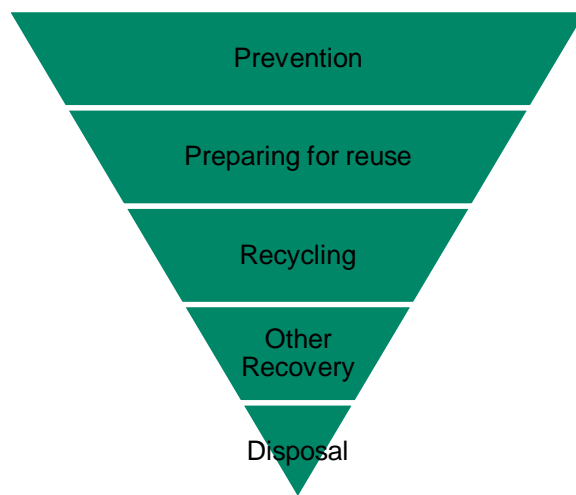
- Waste from extraction, processing and manufacture of construction components and products;

- Other environmental impacts associated with the management of waste from the Proposed Development;
- Impacts on safeguarded mineral sites;
- Direct impacts on Mineral Safeguarding Areas; and
- Effects associated with operation and decommissioning of the Proposed Development.

Mitigation

19.1.9 Embedded mitigation in relation to material assets and waste firstly follows a hierarchy which prioritises waste prevention, followed by preparing for re-use, recycling and recovery, and lastly disposal to landfill. Other measures include design for materials optimisation, design for off-site construction to encourage a process of assembly and designing for the future to allow for materials to be more easily adapted over an asset's lifetime.

19.1.10 The additional mitigation measures which would be implemented in the construction phase include the production of a Site Waste Management Plan which would incorporate measures to ensure that waste produced or held on the Proposed Development's construction site is disposed of safely, efficiently and lawfully. Waste would be sorted and segregated into different waste streams (where feasible).



Residual Effects and Conclusions

19.1.11 The impacts on materials and waste receptors as a result of the Proposed Development have been assessed and their effects are deemed to be **Not Significant**.

19.1.12 The full assessment can be found in *ES Volume II Chapter 18: Materials and Waste (Application Document 6.2.18)*.

20 Major Accidents and Disasters



20.1.1 The major accidents and disasters assessment considers the potentially significant effects of a major accident and/or disaster event has on human health, wildlife and the environment. A major accident and/or disaster is defined as:

- **Major Accident:** is an event (for instance, a major road traffic accident) that threatens immediate or delayed serious effects to human health, welfare and/or the environment and may require the use of resources beyond those of the client or its appointed representatives (i.e., contractors) to manage; and
- **Disaster:** is an external hazard that can be man-made (such as an act of terrorism) or natural (such as an earthquake) with the potential to cause an event or situation that meets the definition of a major accident.

Baseline

20.1.2 The baseline relevant to major accidents and disasters comprises:

- Features external to the Proposed Development that contribute a potential source of hazard to the Proposed Development itself;
- Sensitive environmental receptors at risk of a significant effect, as described in each of the technical chapters of the ES; and
- Identified major accident and disaster risks which currently exist within the local area.

20.1.3 The Study Area for major accidents and disasters has been developed based on professional judgement as there is no regulatory guidance or standardised methodology.

Overview of Assessment

20.1.4 Following receipt of the Scoping Opinion, the following items were confirmed by the Planning Inspectorate to be scoped into the major accidents and disasters assessment:

- **Natural Hazards:**
 - *Geophysical:* landslides, sinkholes;
 - *Hydrology:* tidal flooding, fluvial flooding;
 - *Climatological and Meteorological:* wave surges; and
 - *Biological:* animal diseases.
- **Technological or Manmade Hazards:**
 - *Major Accident Hazard Chemical sites:* Major Accident Hazard Chemical sites, Major Accident Hazard Pipelines, fires;
 - *Pollution accidents:* air; and
 - *Malicious Attacks:* cyber, flood defence failure.

Mitigation

20.1.5 The Proposed Development will be designed, constructed, operated and maintained in line with the relevant legislation and with current best practice standards.

20.1.6 Safety has been key to the design of the Proposed Development. The Proposed Development's engineering team has undertaken a number of initial technical studies which have helped to influence the pipeline corridor routeing and the location of Immingham and Theddlethorpe Facilities and the Block Valve Stations (which can act as emergency shutdown valves). Future detailed engineering work will also be undertaken relating to

process safety and safeguarding, isolation, venting, emergency shutdown and if required, depressurisation.

- 20.1.7 As part of the ongoing optimisation of the Proposed Development, the Applicant has taken the decision to construct the entire pipeline using heavy wall pipe. This goes above and beyond typical design requirements set out in relevant guidance and also brings additional security and safety benefits to the Proposed Development, by helping to reduce the probability of any major incidents from happening. This approach ensures a safer design is developed with potential risks mitigated and appropriately managed.
- 20.1.8 During the construction phase, risks will be mitigated through the use of appropriately trained and qualified contractors and work will be controlled with risk assessments, work method statements and operating procedures in order to reduce the likelihood of an incident. Once operational, appropriate control measures and monitoring procedures will be in place to minimise the risk of incidents occurring and to minimise the effects of any such incidents on the operational workforce as well as the nearby population.
- 20.1.9 In addition, project specific operating documentation will be developed to help reduce risks and ensure adequate planning and preparation is in place in the event of a major incident occurring. Key documents/systems of note include:
- Risk management system and adherence to all applicable HSE guidelines;
 - Adherence to the Construction Environmental Management Plan;
 - Undertaking additional studies to produce an inherently safer design and to ensure residual risks are managed;
 - Preparation of incident response plans; and
 - Developing detailed emergency plans.
- 20.1.10 The Applicant's Emergency Response and Crisis Management Standard will be the overarching document from which bespoke response plans will be developed. This follows a three-level response structure. Each level will have a specific focus and establishing a hierarchy of response that is structured to provide successive tiers of incident support depending upon the nature and scale of the incident.
- 20.1.11 The bespoke response plan may include information such as details of the emergency response organisation; emergency roles and responsibilities, emergency equipment; muster and evacuation plans for site personnel; medical response plans, and arrangements for communication and co-ordination of emergency response. Coordination with external emergency response agencies will be key to the preparation of the response plans. Such external agencies include the local emergency services, local authorities, Environment Agency and the Health and Safety Executive.

Residual Effects and Conclusions

- 20.1.12 During the construction and operational phase, the assessment identified risks and whether these are able to be managed to be As Low as Reasonably Practicable (often referred to as ALARP) or whether further mitigation would be required. All effects identified for these phases of the Proposed Development are expected to be As Low as Reasonably Practicable and therefore tolerable and **Not Significant**. Decommissioning of the Proposed Development is not specifically included as the hazards are anticipated to be encompassed by those assessed for the construction and operation phase, and no additional decommissioning hazards have been identified.
- 20.1.13 The full assessment can be found in *ES Volume II Chapter 20: Major Accidents and Disasters*.

21 Cumulative Effects



21.1.1 The cumulative effects assessment considers both cumulative and in-combination effects of as a result of the Proposed Development. These are described as intra-project and inter-project effects and are defined below:

- **Intra-Project Effects** – these are where an individual environmental receptor or resource will likely be affected by more than one type of impact as a result of the construction / operation of the Project. For example, a residential receptor may experience air quality effects as well as noise and vibration effects, visual effects, health and wellbeing effects and socioeconomic effects.
- **Inter-Project Effects** – these are effects caused by the Project in-combination with other developments which are within close proximity and whose development phases may overlap.

Intra-Project Effects

21.1.2 This assessment of intra-project effects involves the identification of those receptors that have the potential to be affected by more than one of the identified residual effects as identified in the individual technical chapters within *ES Volume II (Application Document 6.2)*. These receptors include residential properties, ecological or biological receptors and the physical environment.

21.1.3 In assessing potential intra-project effects, receptors experiencing individual effects of minor or greater magnitude have been considered. Examples of the types of impacts that could be experienced by human receptors and that may interact are the combined impacts relating to different activities relating to noise, air quality and visual effects, during both construction and operation. Other examples include the impacts on local ecology as a result of physical disturbance and noise impacts, or the visual impact and impact caused to the cultural heritage setting as a result of a new part of the Proposed Development.

21.1.4 Mitigation of any intra-project effects identified is best achieved through management and control measures employed to prevent or reduce the individual effects in the first instance, thereby reducing the likelihood of the effects interacting and combining.

21.1.5 Following the incorporation of the embedded and additional mitigation, no significant intra-project cumulative effects are expected to occur.

Inter-Project Effects

General Overview

21.1.6 The assessment of Inter-project effects follows a four-stage approach in accordance with the guidance detailed within Planning Inspectorate's Advice Note Seventeen: cumulative effects assessment. The stages to the Cumulative Effects Assessment are as follows:

- **Stage 1:** Establish Project Zone of Influence and identify long list of 'other existing development and/or approved development'.
- **Stage 2:** Identify the shortlist of 'other existing development and/or approved development' for inclusion within the cumulative effects assessment.
- **Stage 3:** Information gathering.
- **Stage 4:** Assessment of shortlisted 'other existing development and/or approved development'.

21.1.7 Part of Stage 1 of the cumulative effects assessment is to assign certainty to 'other existing development and/or approved development' and give a tier rating of 1, 2 or 3 based on the amount of currently available information for the development in the public domain:

- *Tier 1*: a planning application that is under construction, has planning approval and has submitted a planning application;
- *Tier 2*: a project that is visible on the Planning Inspectorate's Programme of Projects where a scoping report has been submitted; and
- *Tier 3*: a project that is visible on the Planning Inspectorate's Programme of Projects where a scoping report has not been submitted or it is identified in a relevant Development Plan, or other plans and programmes which set a framework for future development.

Summary of Stages 1 and 2

21.1.8 The Zone of Influence for use in Stage 1 of the Cumulative Effects Assessment was determined by examining all the environmental topic study areas. From this the following areas of search were adopted for Stage 1:

- Nationally Significant Infrastructure Projects:** 15 km. This is based upon professional judgement from similar projects on the likely area for which other large scale infrastructure projects may result in significant cumulative effects; and
- Town and Country Planning Applications:** 4 km. Includes those which have been submitted to and are present on the relevant local authorities planning portals. The 4 km is based upon the largest environmental assessment topic Zone of Influence (2 km) and doubling it, under the assumption other projects have a similar Zone of Influence to the Proposed Development This is based upon a review of the environmental topic Zol's and the likely maximum distances for any impacts to occur.

21.1.9 The update of the Long List used data sources including the National Infrastructure Planning website and planning portals for North East Lincolnshire Council, North Lincolnshire Council, West Lindsey District Council, East Lindsey District Council and Lincolnshire County Council. A detailed copy of this Long List of potential cumulative schemes is provided in *ES Volume IV Appendix 20.1: Cumulative Assessment Supporting Information (Application Document 6.4.20.1)*.

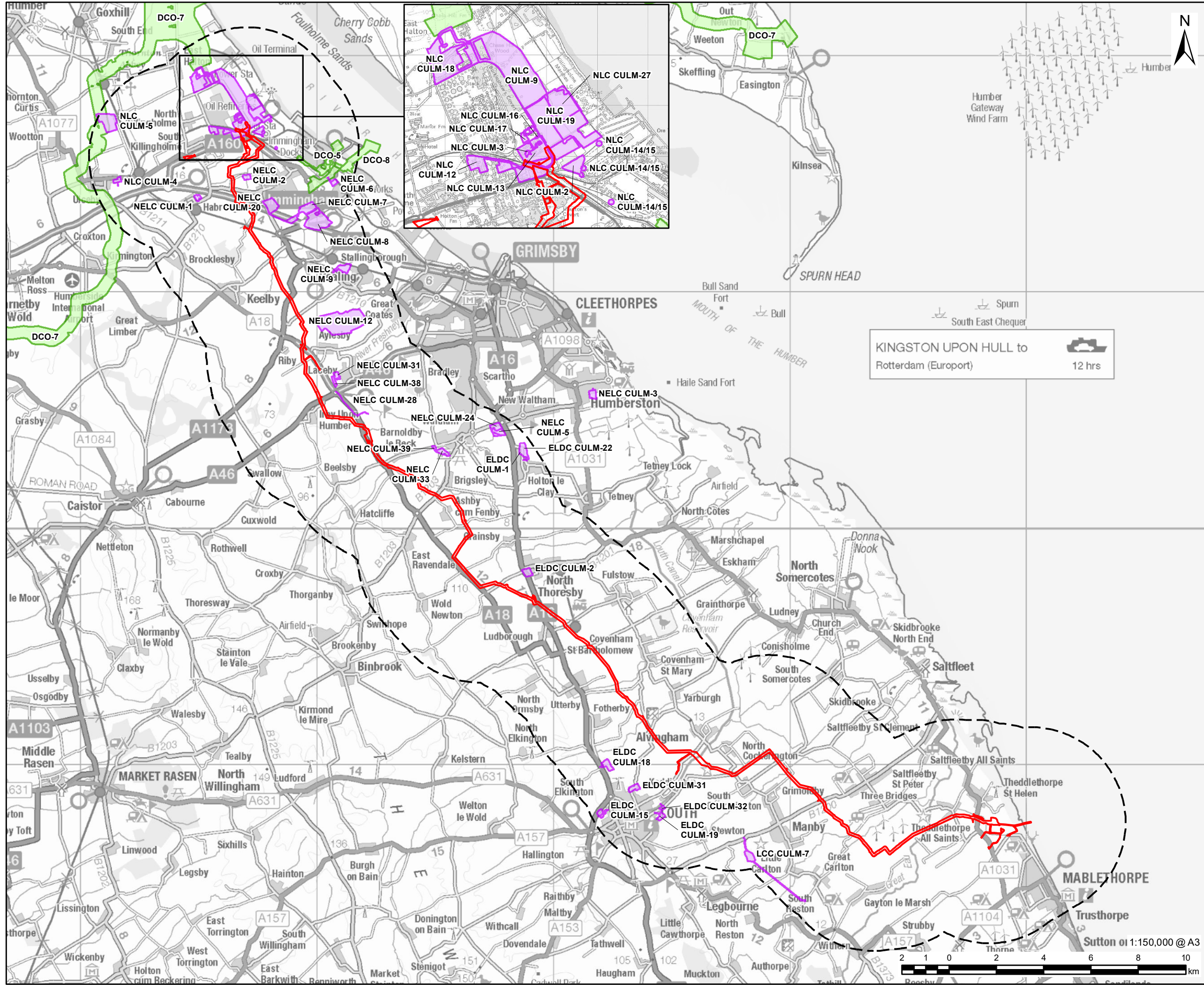
21.1.10 During the completion of the Environmental Statement, the Long List of other developments continued to be updated with additional developments or information that emerged (up until a cut-off date of May 2023). The Long List of schemes identified within each LPA was shared with them via email to enable them to review the list and provide any comments. This ensured that the final Long List of schemes presented within this Environmental Statement was as accurate as possible.

21.1.11 Each development within the Long List was reviewed to determine its status at the time of undertaking the assessment (May 2023). It was then assigned a final status and tier informed by the guidance and levels presented within the Planning Inspectorate's Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects.

21.1.12 Based on a review of the initial long list of developments, it was considered that potential exists for some of these to generate cumulative impacts with the Proposed Development based on their location, scale and/or their likely construction and operational timescales. This is discussed further in the next section.

Summary of Stages 3 and 4

- 21.1.13 This stage involved searching for and reviewing available information relating to the shortlisted developments to establish the details of their likely environmental effects. For each shortlisted scheme, this information has included, where available, planning applications, reported environmental effects within Environmental Statements or Environmental Reports, details on design, location, construction programme (including demolition), and operational activities.
- 21.1.14 The information gathering exercise also focussed on factors including: the Zone of Influences of the environmental topics assessed; the planned timescales for the other schemes; and details of their potential or likely significant effects.
- 21.1.15 A reference and link to the key sources of information used relating to the shortlisted cumulative schemes is contained within *ES Volume IV Appendix 20.1 Cumulative Assessment Supporting Information (Application Document Ref 6.4.20.1)*.
- 21.1.16 The Inter-Project Effects Assessment (stage 4) for the Construction Phase (and where relevant, Operational phase) assessed the potential for inter-project effects for the following topics including: Ecology and Biodiversity; Landscape and Visual; Historic Environment; Geology and Hydrogeology; Water Environment; Traffic and Transport; Noise and Vibration; Climate Change; Socio-economic; and Health and Wellbeing.
- 21.1.17 Due to the fact that decommissioning would not occur until a minimum of 25 years' time, it is not possible to include in the assessment.
- 21.1.18 The potential for cumulative effects to arise, from one or several of the shortlisted developments in combination with the Proposed Development has been assessed. Each topic reviewed the shortlist of other cumulative schemes to establish the potential for any cumulative effects to occur. Where necessary, a narrative was provided to support the findings of each cumulative assessment undertaken for each technical topic and the details were provided within *ES Volume II Chapter 20: Cumulative Effects Assessment (Application Document 6.2.20)*.
- 21.1.19 Through consideration of the available information for each of the identified shortlisted developments, and due consideration of the effects associated with the Proposed Development, it has been concluded there is the potential for cumulative effects to occur related to:
- Temporary (non-significant) adverse cumulative effects associated with noise generated at the Proposed Development and at least one other development;
 - Temporary (non-significant) adverse cumulative effects upon local ecological receptors, particularly to birds using the Rosper Road pools near Immingham;
 - Temporary (non-significant) adverse cumulative effect related to traffic movements on the local road network; and
 - Beneficial effects related to employment opportunities that will arise during both construction and operation of the Proposed Development along with the other identified developments.
- 21.1.20 Due to the incorporation of both embedded and additional mitigation measures within the Proposed Development and associated with the other identified developments, it is not anticipated that any significant cumulative effects would occur, during either the construction or operational phases.



VikingCCS

AECOM

PROJECT
Viking CCS Pipeline

LEGEND

- DCO Site Boundary
- 4km Study Area
- Town and Country Planning Application
- DCO Application

KINGSTON UPON HULL to Rotterdam (Europort) 12 hrs

NOTES:
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FIGURE TITLE
Figure 19
Location of Short List of Other Developments

ISSUE PURPOSE
 NON TECHNICAL SUMMARY

PROJECT NUMBER / REFERENCE
 60668955 / VCCS_231019_NTS_19

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22 Summary of Residual Effects



22.1.1 This section provides an overview of the identified significant adverse effects. These are effects which have been classed as being of an either Major or Moderate significance which remain after the consideration and adaptation of both embedded and additional mitigation measures.

22.1.2 These have been split between the three key phases of the Proposed Development, namely the construction phase, operational phase, and Decommissioning. Where no Significant effects have been identified, this is also stated.

Construction Phase

- **Ecology and Biodiversity** - No significant adverse effects have been identified;
- **Landscape and Visual** - The visual amenity assessment has determined that recreational users at VP6 (PRoW NELC 16 Walk Lane, Irby Upon Humber) VP7 (PRoW NELC 17 Welbeck Hill, Irby Upon Humber (Lincolnshire Wolds AONB)), VP8 (PRoW NELC 122 Welbeck Hill, Irby Upon Humber (Lincolnshire Wolds AONB)) and users of the heritage railway at VP17 (Station Road, Ludborough) are likely to experience significant short-term adverse effects during the construction phase of the Proposed Development as a result of the high sensitivity of the receptor and proximity to the construction operations associated with the pipeline route and limited intervening vegetation;
- **Historic Environment** - The historic environment assessment has determined that there would be Significant effects on buried archaeological remains of Iron Age and Roman settlement due to the construction the Proposed Development at specific points along the pipeline (Sections 2 and 3). Moderate significant effects have also been identified due to the change to the setting of designated and non-designated built heritage assets (Section 2, 3 and 5). The Theddlethorpe Facility Option 2 would also result in significant effects during the construction phase to the setting of a single built heritage assets. During construction of the Proposed Development in all sections, there would be direct physical permanent impact on any as of yet unidentified archaeological remains within the DCO Site Boundary, which are assessed as negligible through to significant;
- **Geology and Hydrogeology** - No significant effects have been identified;
- **Agriculture and Soils** - There would be a permanent, irreversible loss of 0.2 ha of Grade 2 agricultural land resulting in a Moderate adverse effect (Significant);
- **Water Environment** - No significant effects have been identified;
- **Traffic and Transport** - There is the potential for significant effects from construction traffic, severance, fear and intimidation and highways safety on several sections of the A1031 within Sections 3 and 4;
- **Noise and Vibration** - No significant effects have been identified;
- **Air Quality** - No significant effects have been identified;
- **Climate Change** - No significant effects have been identified;
- **Socio-economics** - No significant effects have been identified;
- **Health and Wellbeing** - No significant effects have been identified;

- **Materials and Waste** - No significant effects have been identified; and
- **Major Accidents and Disasters** - No significant effects have been identified.

Operational Phase


- **Ecology and Biodiversity** - No significant effects have been identified. It should however be noted that The Applicant is committed to making a positive contribution through biodiversity net gain, as outlined in the Draft BNG Strategy (*Application Document 6.7.2*);
- **Landscape and Visual** - No significant effects have been identified;
- **Historic Environment** - Theddlethorpe Facility (Option 2); Changes to the setting of Grade II listed Ashleigh Farm which impact integrity and diminish the contribution of setting, has resulted in a moderate adverse effect (Significant);
- **Geology and Hydrogeology** - No significant effects have been identified;
- **Agriculture and Soils** - Operation phase effects were scoped out of the assessment, as there was no potential for significant effects;
- **Water Environment** - No significant effects have been identified;
- **Traffic and Transport** - Operation phase effects were scoped out of the assessment as there was no potential for significant effects;
- **Noise and Vibration** - No significant effects have been identified associated with operational noise associated with the Immingham or Theddlethorpe Facilities. Operational phase road traffic noise and vibration effects were scoped out of the assessment, consequently no significant effects have been identified;
- **Air Quality** - Operation phase effects were scoped out of the assessment as there was no potential for significant effects;
- **Climate Change** - Transportation (and storage) of significant volumes of CO₂ during the lifetime of the Proposed Development, which would otherwise be emitted to the atmosphere. Reducing CO₂ emissions and contributing to the UK's Net Zero targets, leading to a Significant (Beneficial) effect;
- **Socio-economics** - No significant effects have been identified;
- **Health and Wellbeing** - No significant effects have been identified;
- **Materials and Waste** - Operation phase effects were scoped out of the assessment, as there was no potential for significant effects; and
- **Major Accidents and Disasters** - No significant effects have been identified.

Decommissioning Phase

- **Ecology and Biodiversity** - No significant effects have been identified;
- **Landscape and Visual** - No significant effects have been identified;
- **Historic Environment** - No significant effects have been identified;
- **Geology and Hydrogeology** - No significant effects have been identified;
- **Agriculture and Soils** - No significant effects have been identified;
- **Water Environment** - No significant effects have been identified;

- **Traffic and Transport** - Decommissioning phase effects were scoped out of the assessment as there was no potential for significant effects;
- **Noise and Vibration** - No significant effects have been identified;
- **Air Quality** - No significant effects have been identified;
- **Climate Change** - No significant effects have been identified;
- **Socio-economics** - No significant effects have been identified;
- **Health and Wellbeing** - No significant effects have been identified;
- **Materials and Waste** – Decommissioning phase effects were scoped out of the assessment as there was no potential for significant effects; and
- **Major Accidents and Disasters** - No significant effects have been identified.

23 What happens next?

- 23.1.1 The Applicant has now completed the pre-application stage of the DCO process and has submitted this ES as part of the DCO Application to the Planning Inspectorate. The Planning Inspectorate, on behalf of the Secretary of State will manage the planning process and will appoint one or more inspectors, known as the Examining Authority, to examine the DCO application. The six-stage process is described in more detail here and illustrated in the image below. 
- 23.1.2 The next stage of the process is 'acceptance' which commences once the application has been submitted. There follows a period of 28 days at the end of which the Planning Inspectorate will decide whether or not the application meets the standards required to be accepted for examination.
- 23.1.3 The next stage of the process is known as the 'pre-examination period', which lasts a minimum of three months. A notice will be published saying where the DCO Application documents can be viewed. Members of the public can register with the Planning Inspectorate as interested parties, which will entitle them to make written representations and participate in the examination process. Information on how to register can be found on the Planning Inspectorate's website:
- <https://infrastructure.planninginspectorate.gov.uk/application-process/participating-in-the-process/>
- 23.1.4 The next stage is the 'examination period'. A preliminary meeting will be held, and all interested parties will be invited to attend. At this meeting, the Examining Authority will decide on the key issues which will be taken into account during the examination period. Registered interested parties can again send written representations to the Examining Authority during this period and can request to speak at public hearings. The examination period lasts six months.
- 23.1.5 After the examination period, the Examining Authority has three months to consider the findings from the examination period. The Examining Authority will then provide the Secretary of State with a report including a recommendation on whether the application should be granted.
- 23.1.6 The Secretary of State then has a further three months to decide whether or not to grant the DCO. Once the decision has been made and published, there is a six week High Court challenge period.
- 23.1.7 Granting the DCO would give the Applicant the necessary legal powers to construct and operate the Proposed Development.



