

Viking CCS pipeline

Preliminary Environmental Information Report Volume I

Non-Technical Summary

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1 Introduction

1.1 Overview

- 1.1.1 Viking CCS will take carbon dioxide that has been captured from Immingham industries and transfer it to deep offshore storage sites.
- 1.1.2 At Theddlethorpe the carbon dioxide will transfer into the existing offshore pipeline to be transported 140 kilometres off the coast of Lincolnshire. Finally, the carbon dioxide will be injected into depleted gas reservoirs 9,000 feet below the seabed.
- 1.1.3 This process is called **'carbon capture and storage'** and is one of several important ways for the UK to achieve its target of achieving net zero carbon emissions by 2050.
- 1.1.4 The Viking CCS Pipeline is an approximately 55.6-kilometre pipeline that will transport captured carbon dioxide from Immingham to the former Theddlethorpe Gas Terminal. The Viking CCS Pipeline is an essential part of Viking CCS, which will put the Humber and Lincolnshire region at the forefront of carbon capture and storage technology in the UK.



- 1.1.5 The Viking CCS Pipeline is classified as a Nationally Significant Infrastructure Project and is hereafter referred to as 'the Project'.

Harbour Energy – Who we are

- 1.1.6 Harbour Energy is the largest London-listed independent oil and gas company. We have a leading position in the UK as well as interests in Indonesia, Vietnam, Mexico and Norway.
- 1.1.7 Our priority is to run safe and reliable operations, while protecting our people, assets and the environment. Across our operations, we are committed to achieving Net Zero greenhouse gas emissions by 2035.
- 1.1.8 We have a long history of operating in the Humber and Lincolnshire area, providing safe and environmentally sound operations. In particular, we have more than 40 years of operational experience relating to the Viking field area in the North Sea. We also operated the Theddlethorpe Gas Terminal site over the same time period.

1.1.9 We are working with industry and government to develop carbon capture, transportation and storage in the UK, as the developer of Viking CCS. Chrysaor Production (U.K.) Limited is the company that will apply for development consent to construct the Viking CCS Pipeline (hereafter referred to 'the Applicant'). The Applicant is owned and controlled by Harbour Energy.

Why do we need this Project?

1.1.10 Meeting the UK's target of achieving net zero carbon emissions by 2050 will require reduced emissions of carbon dioxide from existing industries within the Humber and Lincolnshire region. This transition to a low-carbon economy must be done in a way that retains and promotes jobs and prosperity in the Humber region.

1.1.11 Carbon capture, transport and storage offers a way to maintain these vital energy-intensive industries for decades. The technology allows us to keep jobs in the region and provides the infrastructure needed to promote the development of new industries and investment in the Lincolnshire and Humber regions.

1.1.12 By 2030, Viking CCS plans to capture, transport and store 10 million tonnes of carbon dioxide a year. This would be equivalent to removing almost 20 per cent of the emissions from the UK's cars each year.

1.1.13 This investment will enable to removal of carbon dioxide emissions from existing industry in the Humber region, safeguarding existing jobs and enabling a longer-term sustainable energy transition.

1.2 What is a Preliminary Environmental Information Report?

1.2.1 As part of this Statutory Consultation, a Preliminary Environmental Information Report (PEIR) has been prepared. This report presents an overview of the preliminary environmental information available about the Project, based on the design information available at this stage of the Project. The PEIR is intended to provide members of the public, statutory consultees and other stakeholders with preliminary information on the Project's likely significant environmental effects.

1.2.2 The PEIR is made up of four volumes. Volume II reports the preliminary results of the environmental assessment, Volume III contains a set of figures and Volume IV contains technical appendices. The structure of the PEIR is presented in **Table 1**.

1.2.3 This document is the **PEIR Volume I - Non-Technical Summary** and summarises the preliminary environmental information presented in the main report using non-technical language.

Table 1: Structure of the Preliminary Environmental Information Report

Structure of the Preliminary Environmental Information Report	
Volume I: Preliminary Environmental Information Report Non-Technical Summary - This Document	
<p>The Preliminary Environmental Information Report Non-Technical Summary is presented in this separate document and provides a concise description of the Project, the considered alternatives, baseline, assessment methodology, potential environmental effects and mitigation measures. The Preliminary Environmental Information Report Non-Technical Summary is designed to provide information on the Project in an accessible format which can be understood by a wide audience and to assist interested parties with their familiarisation of the Project, including via a digital platform.</p>	
Volume II: Main Preliminary Environmental Information Report	
<p>This volume forms the main body of the Preliminary Environmental Information Report, detailing the preliminary results of the environmental assessment at the time of writing and based on the baseline information available and sourced to date, the emerging likely significant effects arising from the Project, and the proposed mitigation measures. The Preliminary Environmental Information Report is to be divided into a number of background and technical chapters, each being supported with figures and tabular information. The table of contents is as presented below:</p>	
Chapter 1	Introduction
Chapter 2	Design Evolution and Alternatives
Chapter 3	The Viking CCS Pipeline
Chapter 4	Consultation
Chapter 5	PEIR Assessment Methodology
Chapter 6	Ecology and Biodiversity
Chapter 7	Landscape and Visual
Chapter 8	Historic Environment
Chapter 9	Geology and Hydrogeology
Chapter 10	Agriculture and Soils
Chapter 11	Water Environment
Chapter 12	Traffic and Transport
Chapter 13	Noise and Vibration
Chapter 14	Air Quality
Chapter 15	Climate Change
Chapter 16	Socio-economics
Chapter 17	Health and Wellbeing
Chapter 18	Materials and Waste
Chapter 19	Cumulative Effects
Chapter 20	Major Accidents and Disasters

Structure of the Preliminary Environmental Information Report	
Chapter 21	Summary of Likely Significant Effects
Volume III: Supporting Figures	
A complete set of figures is provided for reference which support the preliminary assessments in Preliminary Environmental Information Report Volume II.	
Volume IV: Technical Appendices	
A complete set of appendices is provided for reference. The appendices include background data, technical reports, tables, figures and surveys which support the preliminary assessments reported in the Preliminary Environmental Information Report Volume II.	

1.3 The Consenting Process

Requirement for a DCO

- 1.3.1 As the Project consists of a pipeline that is over 16.093 km (10 miles) in length, it is classified as a Nationally Significant Infrastructure Project under section 14(1)(g) of the Planning Act 2008 (as amended) and therefore requires a Development Consent Order.
- 1.3.2 An application for a Development Consent Order will be submitted to Secretary of State for Business, Energy & Industrial Strategy via the Planning Inspectorate. The Development Consent Order application will be accompanied by an Environmental Statement prepared in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.
- 1.3.3 The Nationally Significant Infrastructure Project not only includes the pipeline for the transportation of carbon dioxide, it also includes apparatus and works associated with this, which includes the Immingham Facility, Block Valve Stations and the Theddlethorpe Facility.

Environmental Impact Assessment Scoping

- 1.3.4 Scoping forms a key stage of the Environmental Impact Assessment process and on 29 March 2022, an Environmental Impact Assessment Scoping Report was submitted to the Planning Inspectorate outlining the intended scope of each environmental topic. The Environmental Impact Assessment Scoping Report was based on the early design for the Project that was available at the time of writing.
- 1.3.5 A Scoping Opinion was received from the Planning Inspectorate on 5 May 2022 which examined the proposed scope of the Environmental Impact Assessment. The Planning Inspectorate engaged with a range of prescribed consultees (including statutory and non-statutory bodies, agencies and groups) seeking their views on the content of the proposed Environmental Impact Assessment.
- 1.3.6 The feedback within the Scoping Opinion has been taken account of as part of this PEIR and will be reported within the Environmental Statement or in other documentation comprising the Development Consent Order application. More information on the scoping process can be found in *PEIR Volume II Chapter 5: PEIR Assessment Methodology*.

Preliminary Environmental Information Report

- 1.3.7 Public and stakeholder feedback is an essential part of the Environmental Impact Assessment process. The PEIR presents the emerging results of the Environmental Impact Assessment process and has been compiled in accordance with statutory pre-application consultation obligations under the Planning Act 2008. It has been prepared to assist

consultees in understanding the potential impacts of the Project and the mitigation measures currently proposed. It forms part of the consultation material provided for the Statutory Consultation.

- 1.3.8 The feedback received from this Statutory Consultation will inform the Project's design and environmental assessment before the application for development consent is submitted to the Planning Inspectorate in summer 2023.
- 1.3.9 The information presented within this PEIR is **preliminary**. It reflects the current design of the Project and the status of the individual environmental assessments being progressed as part of the Environmental Impact Assessment and is subject to change following this Statutory Consultation.

The Development Consent Order Application

- 1.3.10 The Environmental Statement will form one of a number of documents comprising the Development Consent Order application.
- 1.3.11 The Development Consent Order application will be examined by the Planning Inspectorate who will make a recommendation as to whether the Project should be granted development consent. It is then for the Secretary of State for Business, Energy & Industrial Strategy to make the final decision on whether to grant or refuse the development consent order.

2 Consideration of Alternatives

- 2.1.1 A number of different routes for the new pipeline and associated infrastructure have been considered for the Project. The main aim of considering alternatives is to avoid and/or reduce significant environmental effects as a result of the Project.
- 2.1.2 The design of the Project is currently preliminary and will continue to evolve until the Development Consent Order application submission in summer 2023. The alternatives for the Project 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 methods; and
 - Alternative construction compound locations.
- 2.1.3 The assessment of alternatives has followed the following six-step process:
- **Step 1:** Onshore vs Offshore pipeline solution;
 - **Step 2:** Initial identification of potential pipeline corridors;
 - **Step 3:** Refinement of corridor options and presentation of a preferred pipeline corridor at Non-Statutory Consultation;
 - **Step 4:** Additional design work and consideration of Non-Statutory Consultation feedback;
 - **Step 5:** New preferred pipeline route and associated infrastructure; and
 - **Step 6:** Presentation of new preferred pipeline route for Statutory Consultation.

- 2.1.4 The Non-Statutory Consultation in spring 2022 presented a preferred pipeline corridor to local members of the 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 Project and preferred pipeline route.
- 2.1.5 As a result of this feedback and further design work the following changes have been 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 corridor further to the east of Grimoldby; and
 - Moving the pipeline corridor further away from Theddlethorpe Academy.
- 2.1.6 For more information on the assessment of alternatives process, refer to *PEIR Volume II Chapter 2: Design Evolution*.
- 2.1.7 As part of the review of alternatives process, a comparison against the ‘Do Nothing’ scenario has been made to highlight the benefits the Project will provide. **Table 1** Table provides a summary of the alternatives considered.

Table 1: Alternatives Considered

Alternative	Description	Findings
Do Nothing	The ‘Do Nothing’ scenario means the Project 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.
Alternative Pipeline Route Corridors and Route Options	Initial thought was given to an offshore pipeline in Step 1 of the alternatives process. Environmental, construction and design related constraints were considered too great for an offshore pipeline to be considered further. Step 2 of the alternatives process identified twelve different corridor options split into five sections. The pipeline was split into sections to increase flexibility and provide	The different sections of the pipeline were reviewed from an Environment, Technical and Cost and a Lands perspective. A preferred pipeline corridor was selected from this review of corridor options. The corridor has been further developed as a result of Non-Statutory Consultation.

Alternative	Description	Findings
	<p>further opportunities for the development of the corridor. This process was considered better than developing full corridor options which would make the development of the corridor more difficult in response to feedback and further design work.</p>	
<p>Alternative Offtake Facilities</p>	<p>Immingham Facility</p>	<p>The Immingham Facility is the most appropriate location because it is within an existing industrial area close to carbon dioxide emitters</p>
<p>Alternative Reception Facilities</p>	<p>Theddlethorpe Facility</p>	<p>Two options for the Theddlethorpe Facility are currently being considered. Option 1 remains the preferred option, at the former Theddlethorpe Gas Terminal.</p>
<p>Alternative Block Valve Station sites</p>	<p>Three block valves will be needed along the pipeline.</p>	<p>The need for the Block Valve Stations was determined through an initial engineering assessment. This was to enhance the safety of the Project and ensure sections of the pipeline could be isolated if required.</p>
<p>Construction Compound Alternatives</p>	<p>Three construction compounds are required for the Project's construction due to the length of the pipeline. One close to the northern, central and southern sections of the pipeline.</p>	<p>Twelve locations in total were evaluated against environmental factors, local communities and previous site uses. From this evaluation, two sites were identified for the northern and central construction compounds, and one site for the southern compound.</p>

3 The Project

3.1 The Location

3.1.1 The Project is located in North East Lincolnshire and Lincolnshire, in the Yorkshire and Humber region and East Midlands region of England, respectively. The Project comprises the development of the Immingham Facility from which carbon dioxide, captured by emitters in Immingham, would be transported via a new buried pipeline approximately 55.6 kilometres long, to the Theddlethorpe Facility. This is the Project for which a development consent order will be sought.



- 3.1.2 Although not part of this Viking CCS Pipeline project, the carbon dioxide would be transported for 120 km within the existing LOGGS Pipeline, then a 20km section of newly constructed subsea pipeline, to the proposed Viking offshore injection facilities for permanent storage.
- 3.1.3 Repurposing the existing offshore gas transmission pipeline infrastructure supports the wider project's objective to minimise environmental impact of delivering the Viking CCS Project.

3.2 Key Components of the Viking CCS Pipeline

3.2.1 The key elements of the Project, which are discussed in more detail in *PEIR Volume II Chapter 3: The Viking CCS Pipeline* are:

- Immingham Facility;
- A 55.6 kilometre 24 inch pipeline (below ground, including Cathodic Protection);
- Three Block Valve Stations; and
- Theddlethorpe Facility.

3.2.2 The Development Consent Order application covers the above key elements of the Project, as well as the existing LOGGS pipeline up to the point of Mean Low Water Springs.

3.2.3 The new pipeline will be buried below ground along its entire length 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 would be buried deeper, and the pipe would be installed at these crossing points by trenchless or open cut methods.

3.2.4 The extent of the Project is illustrated through the **Draft Order Limits** which mark out the temporary and permanent land take required for the construction and operation of the Project. Powers over this land are sought through the Development Consent Order application. The Draft Order Limits are shown on **Figure 1**.

Immingham Facility

3.2.5 The first element of the Project will consist of the Immingham Facility which is to be located in a currently disused area of land to the south of the VPI Immingham site. This facility would require a relatively small area of land, consisting of around 11,000 metres squared. The existing land is shown in the photograph below and comprises a grassed area to the west of Rosper Road.



Proposed Location of the Immingham Facility

3.2.6 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 run by Phillips 66 or the VPI Immingham combined heat and power plant.

3.2.7 The Immingham Facility would include the following equipment:

- inlet manifold (where the incoming pipelines from each emitter are combined);
- valve access platform (this allows access to the inlet manifold for maintenance);
- permanent “pig” launcher and receiver to allow the pipeline 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 vales which would automatically close if they detect high pressure in the pipeline);
- Common pig handling area for the pig receiver and launcher;
- Blast wall (The blast wall is provided in case a pig escaped from a pig receiver/launcher in an uncontrolled manner due to residual pressure present when the pig trap door was opened. The blast wall is designed as a 20m long and 5m high structure made of steel or concrete);

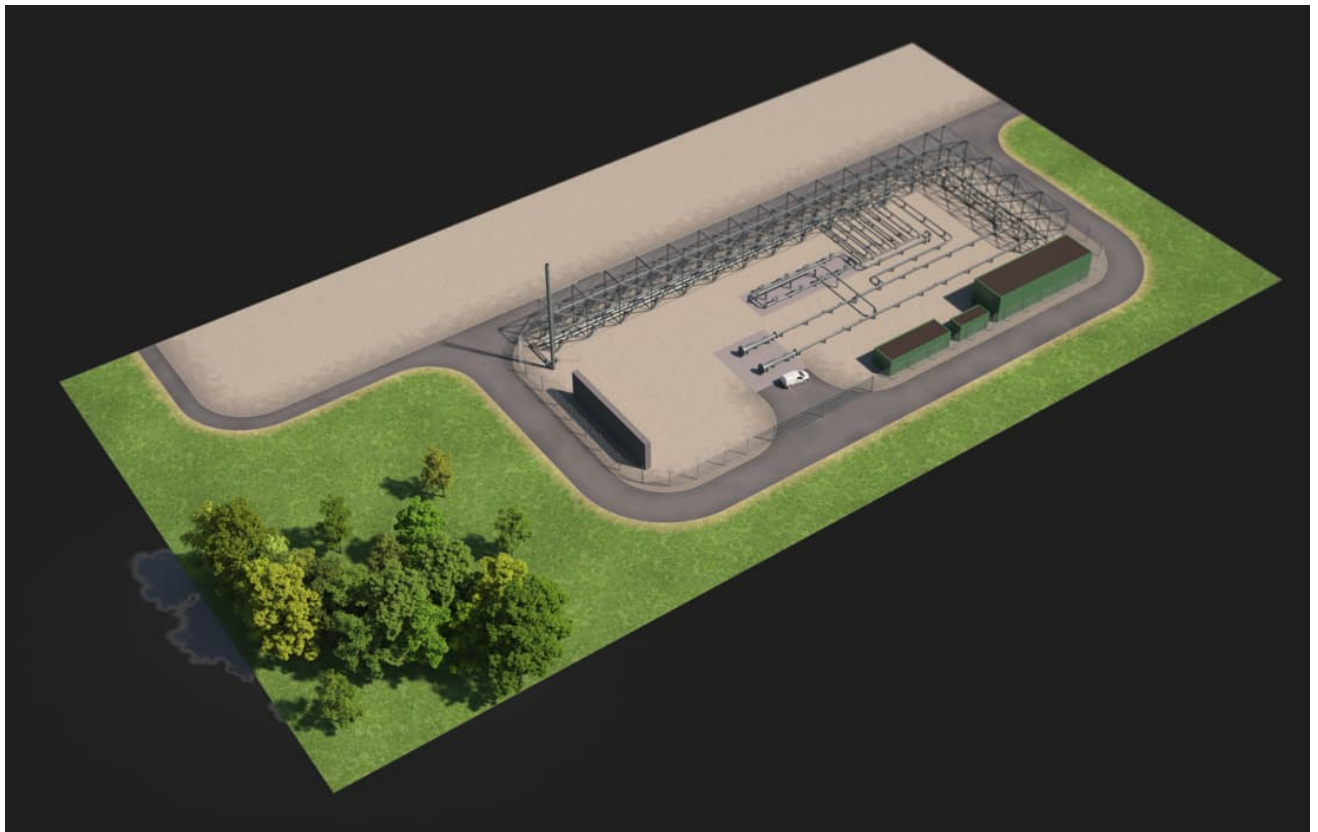
“Pig”
these can either be simple pieces of equipment for cleaning the pipeline, or more complex pieces of equipment that can be used for internal inspection of the pipeline (an ‘intelligent pig’).

- Emergency Shutdown Valve (ESDV) for each pipeline;
- Venting system (a new stand-alone vent stack at 25m will be required to be used to de-pressure facilities);
- Various instruments installed on the pipework, including temperature and pressure measurement and ultrasonic flowmeter;
- Local equipment room (a 12m by 5m steel structure for electrical equipment); and
- Analyser house (a 6m by 2.5m containerised steel structure containing analysing equipment and gas bottles which would be used for calibration and maintenance of the analysers).

3.2.8 The Immingham Facility would be secured by security fencing (1.5m high 3 bar post and rail perimeter fencing and 3.2m high palisade security fencing, with a 5m wide free area between palisade and outer perimeter fencing).

3.2.9 The Immingham Facility would be lit outside of daylight hours, similar to the existing VPI Immingham and P66 site which are immediately vicinity.

3.2.10 A visualisation of the Immingham Facility is presented below.



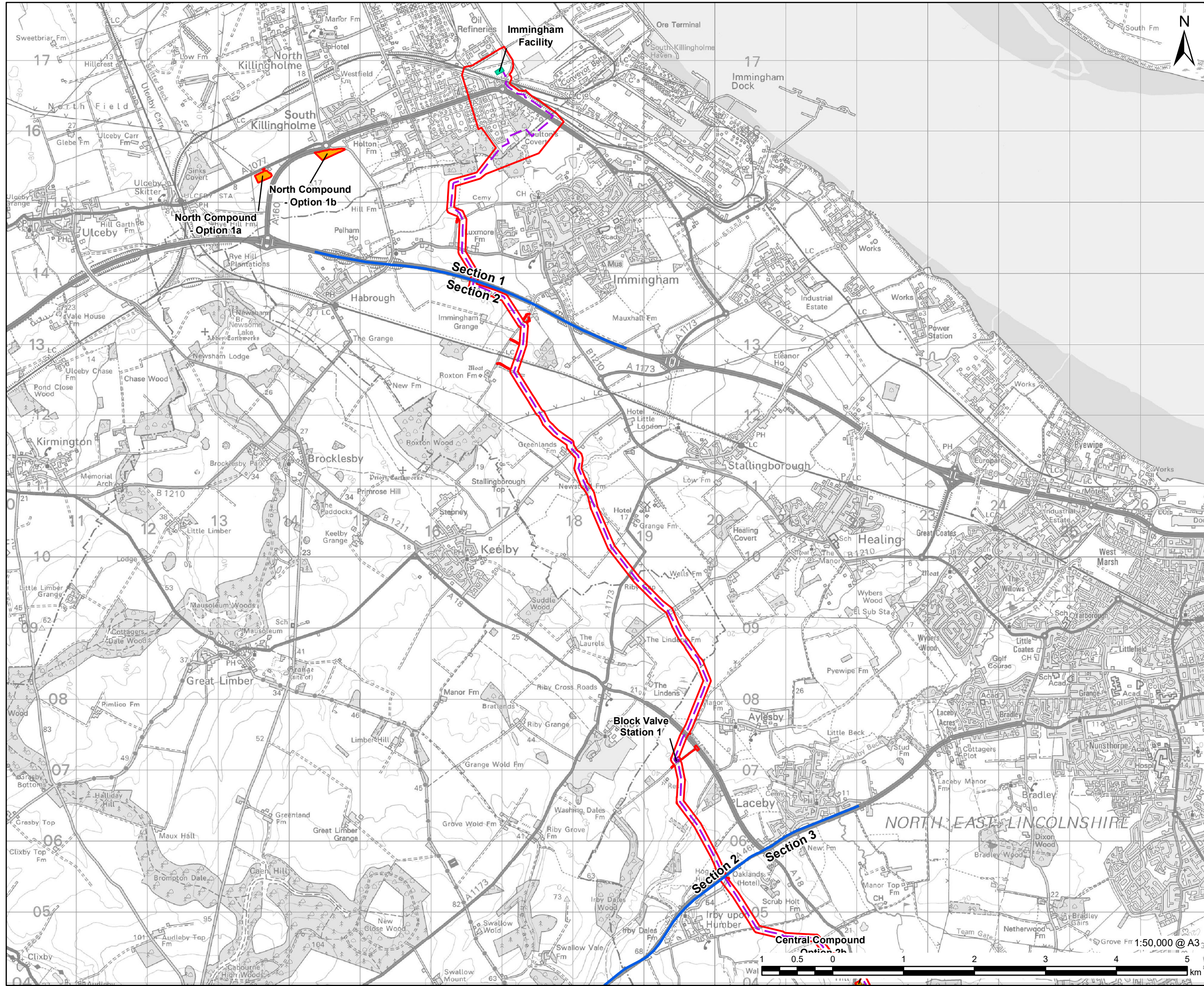
Visualisation of Immingham Facility

The Pipeline

- 3.2.11 The pipeline will have an initial design life of a minimum of 25 years, however with appropriate maintenance, the project is expected to operate for up to 40 years.
- 3.2.12 The onshore pipeline will be designed, with best design practice standards and PD8010 Code of Practice for Pipelines – Part 1 Steel Pipelines on Land and constructed, operated and maintained in accordance with the Pipeline Safety Regulations 1996.
- 3.2.13 The pipeline is expected to have an internal diameter of 24 inches and be buried to a minimum depth of 1.2 metres to the top of the pipe. This will be greater at crossing points of railways, roads and watercourses.
- 3.2.14 The Draft Order Limits have been separated in to five sections (Sections 1-5). A summary of the key features of each section are described in **Table 2** and shown in **Figure 1**. These sections have been referenced throughout the Preliminary Environmental Information Report.

Cathodic Protection

- 3.2.15 In order to protect the pipeline from rusting over time, a combination of external coatings and cathodic protection would be required.
- 3.2.16 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.
- 3.2.17 These groundbeds would be located adjacent to the Block Valve Stations and be 100 metres away from the connection to the pipeline.
- 3.2.18 Some above ground features are required for the cathodic protection including test posts, positioned at regular intervals along the pipeline. These allow monitoring of the pipeline once it is operational and transporting carbon dioxide.



LEGEND

- Draft Order Limits
- Route Section Break
- Preferred Pipeline Route
- Temporary Construction Compound
- Block Valve Station
- Reception Pipeline Facility

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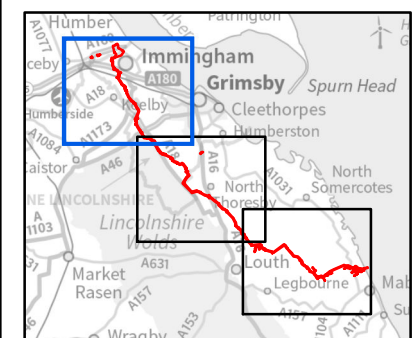


FIGURE TITLE

Figure 1 (1 of 3) Viking CCS Pipeline - Key Components

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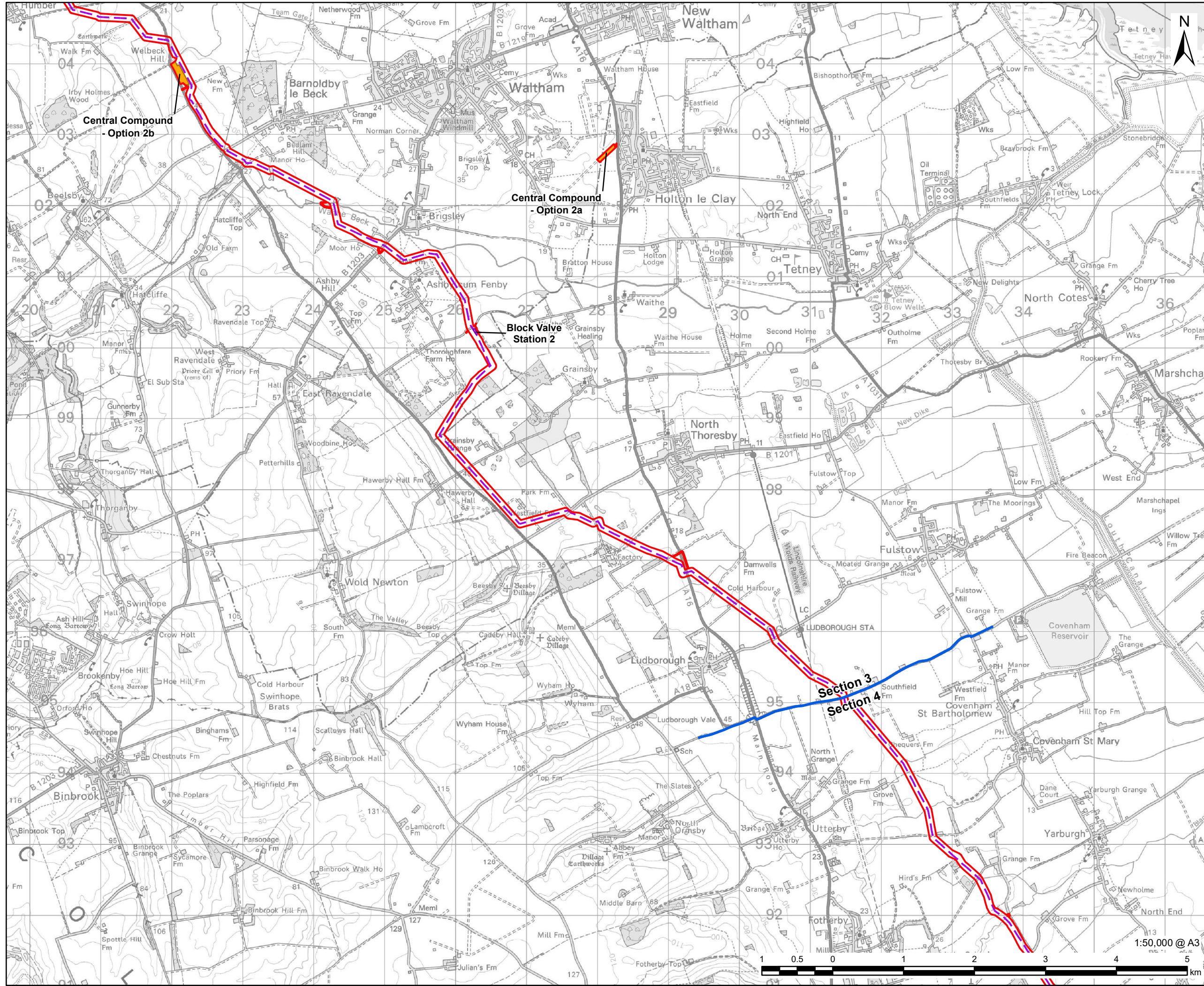
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LEGEND

- Draft Order Limits
- Route Section Break
- Preferred Pipeline Route
- Temporary Construction Compound
- Block Valve Station

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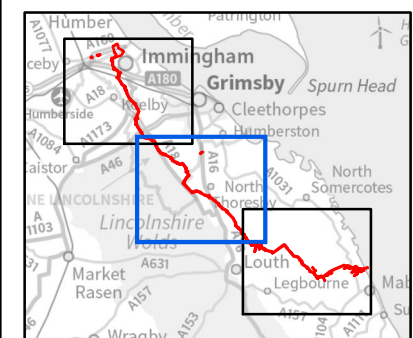
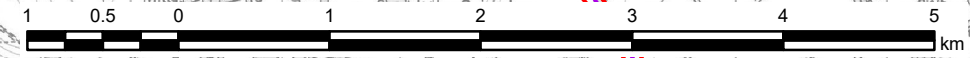


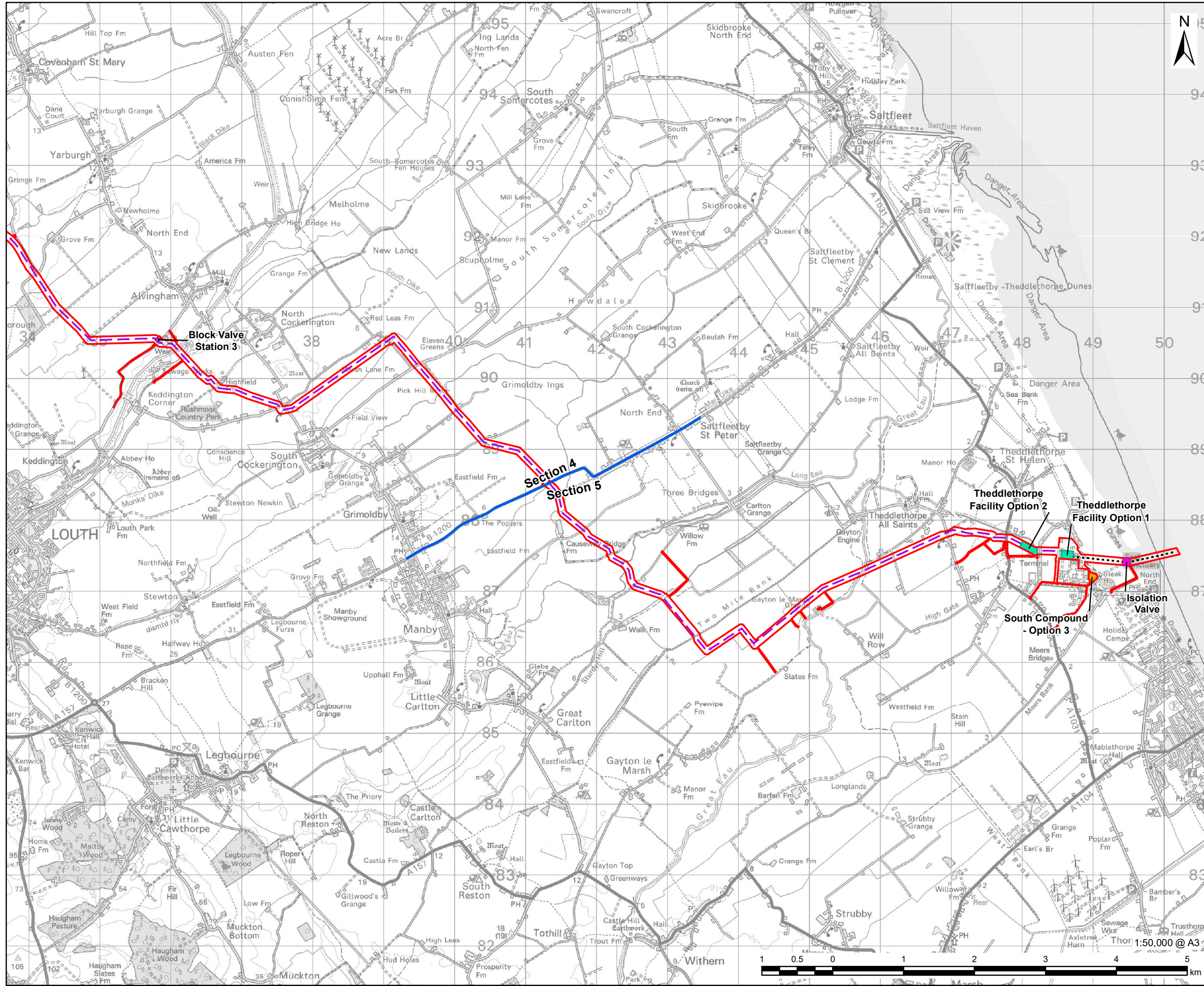
FIGURE TITLE
 Figure 1 (2 of 3) Viking CCS Pipeline - Key Components

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VikingCCS

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PROJECT
Viking CCS Pipeline

LEGEND

- Draft Order Limits
- Route Section Break
- Isolation Valve
- Preferred Pipeline Route
- Existing Loggs Pipeline
- Temporary Construction Compound
- Block Valve Station
- Reception Pipeline Facility

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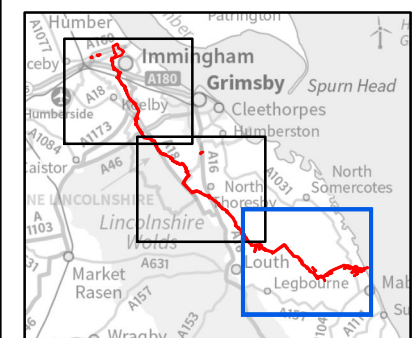


FIGURE TITLE
Figure 1 (3 of 3) Viking CCS Pipeline - Key Components

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Table 2: Key features of Preferred Pipeline Corridor within the Draft Order Limits

Section	Description
Section 1 - Rosper Road, Immingham to A180	The pipeline leaves the tie-in at the Immingham Facility, crossing the railway line, and runs parallel to Manby Road before heading in a south westerly direction north of Immingham and Immingham Golf Club (which closed in 2018). The pipeline then travels in a south easterly direction, passing east of the Immingham, crossing the B1210, then the A180.
Section 2 – A180 to A46	After the A180 crossing, the pipeline travels east, southeast, then south, crossing Roxton Road and the railway line. The corridor 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 (ordinary watercourse) then crossing the A1173. From here, the pipeline continues in a south easterly direction, then turns south/southwest to cross the A18 to the west of Aylesby and Laceby. From here, it continues south to the A46.
Section 3 – A46 to Pear Tree Lane	The pipeline 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 travelling through for approximately 2.34 km and exiting 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 Waltham Road. The pipeline then turns in an easterly direction and crosses Waithe Beck (a main river), continuing south east where it crosses the B1203. From here, it travels around Ashby cum Fenby turning south west towards the AONB boundary at Grainsby Grange. It then turns south east paralleling the AONB boundary for approximately 1.69 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 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 Ludd to the south of Alvingham (both of which are main rivers). The pipeline continues in an easterly direction to the north of South Cockerington and Grimoldby, crossing the Grayfleet Drain (main river) towards Manby Middlegate (B1200).
Section 5 – Manby Middlegate (B1200) to Theddlethorpe Facility, then down to Mean Low Water Spring	The pipeline crosses Manby Middlegate (B1200) to the east of Manby then travels in a southeast direction crossing the River Long Eau (a main river), Two Mile Bank Drain (ordinary watercourse) and the River Great Eau (a main river) to the south of Theddlethorpe All Saints. From here, the pipeline continues in an easterly direction, crossing Mill Road and the A1031 before making a connection to the Theddlethorpe Facility (either Option 1 or 2), where it would connect to the existing LOGGS pipeline, down to MLWS

Block Valve Stations

- 3.2.19 Block Valve Stations will allow the pipeline to be monitored from the main control centre and can be used to isolate sections of pipeline for maintenance purposes or in case of emergency.
- 3.2.20 Three Block Valves Stations are required for the Project, and engineering design work has been undertaken to find the best locations for the block valves along the pipeline route. This work identified block valve locations at approximately 13 kilometres, 24 kilometres and 39 kilometres along the pipeline route.
- 3.2.21 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 and surrounded by security fencing, landscape planting, then a rail fence. The block valve equipment would be housed in a kiosk, which is typically 2-3m in height. The station would also include an access road and a car parking area. The Block Valve Stations would be operated remotely with minimal visits for maintenance. A visualisation of the block valve is shown below.



Block Valve Station Visualisation

3.2.22 Three Block Valves Stations are required for the Project. These are:

- *Block Valve Station No1* - located off Washingdales Lane, accessed from the A18, on arable land;
- *Block Valve Station No2* - is located on arable land and is approximately 800m southeast of the village of Ashby cum Fenby; and
- *Block Valve Station No3* - is located on arable land to the south of Alvingham and is accessed off Alvingham Road.

Theddlethorpe Facility

3.2.23 There are currently two options for the Theddlethorpe Facility:

- *Option 1*: new facility on the former TGT site. The former TGT site was demolished in 2020. 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 TGT site, located on arable land directly west of The Cut (an ordinary watercourse). This reception facility would be accessed from the south of the Draft Order Limits off the A1031 Mablethorpe Road.

3.2.24 Isolation of the Theddlethorpe Facility from the onshore pipeline is provided by an above-ground Emergency Shutdown Valve (ESDV). Isolation of Theddlethorpe from the offshore pipeline is provided by an ESDV which will replace the existing LOGGS ESDV.

3.2.25 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;
- Permanent pig launcher to allow the onshore carbon dioxide pipeline to be cleaned and inspected during commissioning and operation and be suitable for intelligent pigging
- Blast wall (the blast wall is provided in case a pig escaped from a pig receiver/launcher in an uncontrolled manner due to residual pressure present when the pig trap door was opened. Each blast wall is designed as a 20m long and 5m high structure made of steel or concrete);
- 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);
- Venting system (a new stand-alone vent stack up to 25m high will be required to be used to de-pressure facilities);
- Local equipment room (a 12m by 5m steel structure for electrical equipment); and
- Central Control Room.

3.2.26 A visualisation of the Theddlethorpe Facility is presented below.



Visualisation of the Theddlethorpe Facility

Isolation Valve and LOGGS pipeline

- 3.2.27 The existing LOGGS 36 inch pipeline (offshore pipeline) enters the former Theddlethorpe Gas Terminal 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.
- 3.2.28 The pipeline stopped operating in 2018 and several assessments have been undertaken to determine whether the pipeline is likely to be suitable for the transportation of the carbon dioxide as part of the wider Viking CCS Project. Further inspections of the existing LOGGS Pipeline are planned to assess the internal surfaces of the pipeline.
- 3.2.29 In addition, 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 for Theddlethorpe when importing gas from offshore.
- 3.2.30 A new valve will be installed in the same location, in order to reduce the risk of LOGGS pipeline impacting the Theddlethorpe Facility and neighbouring populations.



3.3 Safety

- 3.3.1 Safety is of the highest priority for the Project, and Harbour Energy operate responsibly, securely and in accordance with applicable regulations across all their activities. Harbour Energy work to reduce risks and protect their staff, contractors and the communities within which their activities have the potential to cause impact through the rigorous application of safe engineering practices.
- 3.3.2 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.
- 3.3.3 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.
- 3.3.4 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.

- 3.3.5 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.
- 3.3.6 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.

3.4 Construction

General overview

- 3.4.1 A detailed construction schedule is yet to be developed for the Project and work is ongoing to determine when the most appropriate start date will be. Key construction is anticipated to occur in 2026, with site preparation works (including setting up construction compounds) commencing towards the end of 2025. Where a different construction year has been used within the technical assessments, this is clearly stated. This will be further clarified within the ES, along with the provision of a detailed schedule.
- 3.4.2 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 quick as possible and associated impact duration is as short as possible.
- 3.4.3 A working day of 12 hours (7am to 7pm) Monday to Friday, five days a week, and six hours (7am to 1:30pm) on Saturday is expected. Only in special circumstances and in the case of testing and commissioning would this change. These special circumstances could include continual 24 hour working, where Horizontal Directional Drilling is required. There would be no Sunday working unless this was agreed in advance with the relevant Local Authority.
- 3.4.4 The sequence of activities for pipeline construction will 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 (layer of soil under the topsoil);
 - Trenching – dug with mechanical excavators running alongside the pipeline trench or using specialised machinery;
 - *Stringing* - (Laying out) of pipeline adjacent to the trench, followed by bending, lineup and welding of the pipeline;
 - *Lowering in* 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;
 - *Padding, 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 Project.

Pre-construction activities

- 3.4.5 Ahead of construction, any required surveys, such as ecological surveys, detailed utility and drainage surveys would be undertaken.
- 3.4.6 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. This would provide sufficient area for a running track (a haul road created within the working width and would be used to access the entire length of 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). The working width would increase to up to 50 metres for major crossings to allow additional space to manoeuvre and laydown of specialist equipment, whilst maintaining access along the working width.
- 3.4.7 The relevant permits and consents would be sought from the Environment Agency, Lead Local Flood Authority, Internal Drainage Board or the Canal and River Trust, as necessary. Such permits and consents may be required for certain construction activities, such as working near water and abstracting or discharging water.
- 3.4.8 The existing land drainage will be carefully inspected and recorded and where necessary a pre-construction drainage scheme will be developed. During construction, all the drains found would be recorded and an appropriate method of putting the drains back in place would be developed and carried out after the pipeline was installed.
- 3.4.9 The Public Rights of Way which intersect the Project would only be temporarily diverted or closed for a period agreed with the relevant local authority, to allow for construction works to be carried out safely. Where a Public Right of Way requires to be temporarily diverted or closed, an alternative or new route will be identified.



Construction Activities

Construction Compounds and Laydown Areas

- 3.4.10 As part of the Project, areas of land would be temporarily required to be used as:
- *Main Construction Compounds with pipe storage areas:* these would comprise of a management and construction site office, welfare facilities, parking, and storage facilities for equipment, materials and machinery and 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;
 - *Temporary facilities at both the Immingham Facility and Theddlethorpe Facility:* this would likely include a site office/cabin with electricity and water supply and welfare facilities, a materials and equipment storage area including crane, earth movers. A concrete batching plant is envisaged for the Theddlethorpe Facility as there are no nearby facilities; and

- *Temporary facilities adjacent to the Block Valve Stations:* these would include a security cabin, welfare facilities and storage container.

3.4.11 The Project requires three temporary construction compounds, one in the north, centre and south of the Draft Order Limits. There are different options for the location of the temporary construction compounds in the north and centre of the Draft Order Limits and these are described below. There is only one option for the southern compound:

North Compound

- *Option 1a:* located to the south of A1077, approximately 23,300m². This land has been used previously as a construction compound. This would be used as both a main construction compound and pipe storage area. This is the preferred option;
- *Option 1b:* located to the south of Habrough Roundabout, approximately 21,500m². This is greenfield land (arable) and would be used as a main construction compound and pipe storage area;

Central Compound

- *Option 2a:* located at the former Grimsby Airfield off A16 Louth Road, near Holton Le Clay, approximately 17,100m². This would be used as a pipe / material storage area only and it is estimated it would be able to hold 3,000 pipes. This land has been previously used as a construction compound;
- *Option 2b:* located at Welbeck Hill to the east of Barton Street, approximately 20,900m². This would be used as a pipe / material storage area only and it is estimated it would be able to hold 3,000 pipes.

Southern Compound

- *Option 3:* located at the car park on the former Theddlethorpe Gas Terminal site, approximately 13,000m². This would be used as pipe storage area.

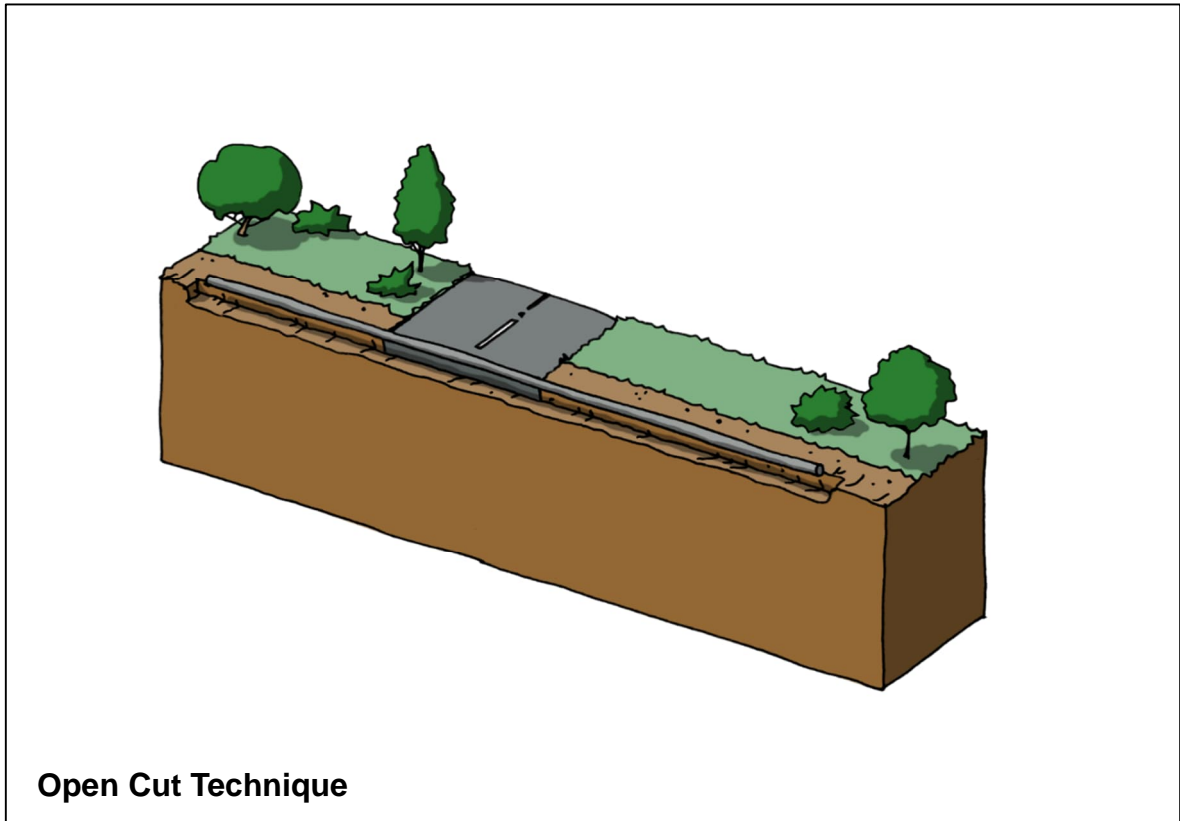
Pipeline Construction Techniques

3.4.12 Approximately 55.6 kilometres of steel pipe will be required. The pipe will be manufactured in specific pre-determined lengths and wall thicknesses and delivered to site by road. Temporary storage of pipe would be required at the Construction Compounds before it is distributed along the pipeline route.

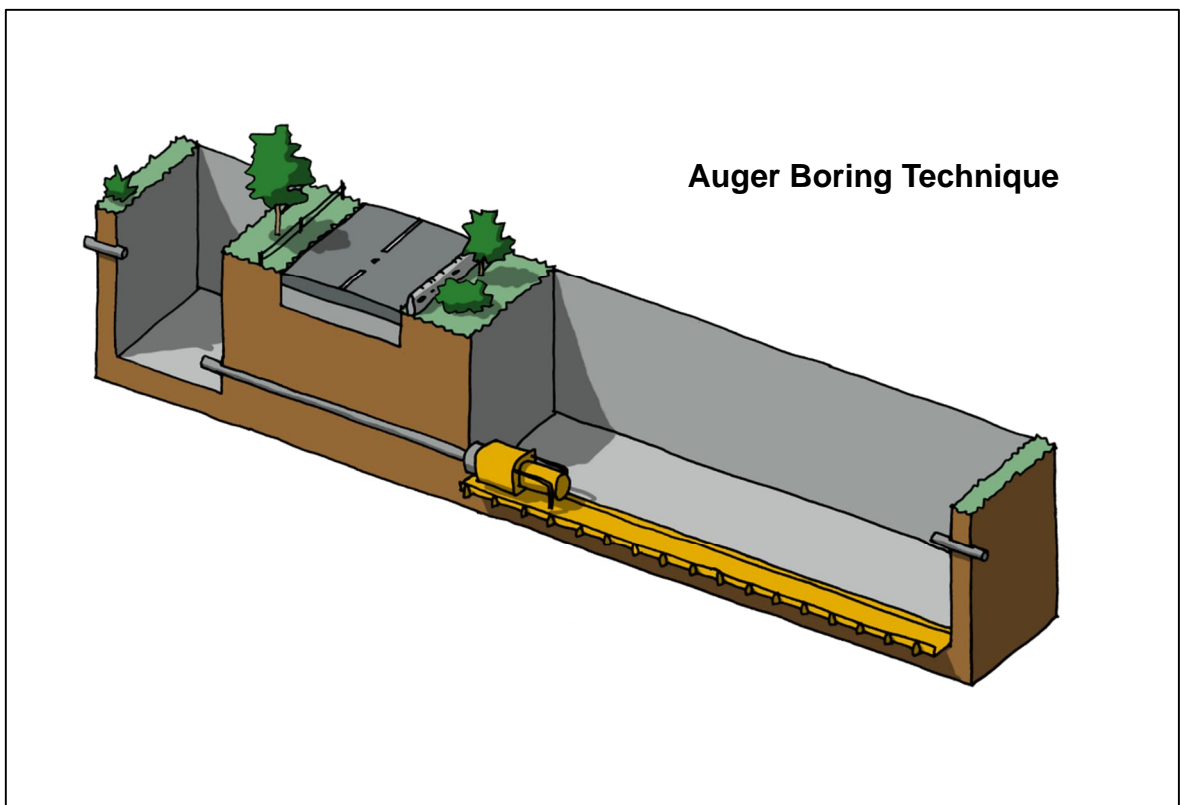
3.4.13 The pipeline would mainly be constructed using an open cut technique. The trench for the pipe would be dug either with a mechanical excavator or specialised trenching machine down to a depth of 1.8 metres. The depth from the top of the pipeline to the ground surface will be a minimum of 1.2 metres.

3.4.14 At crossings such as roads, railways and certain watercourses, different construction techniques will be required and typically a wider working width. The crossing techniques include:

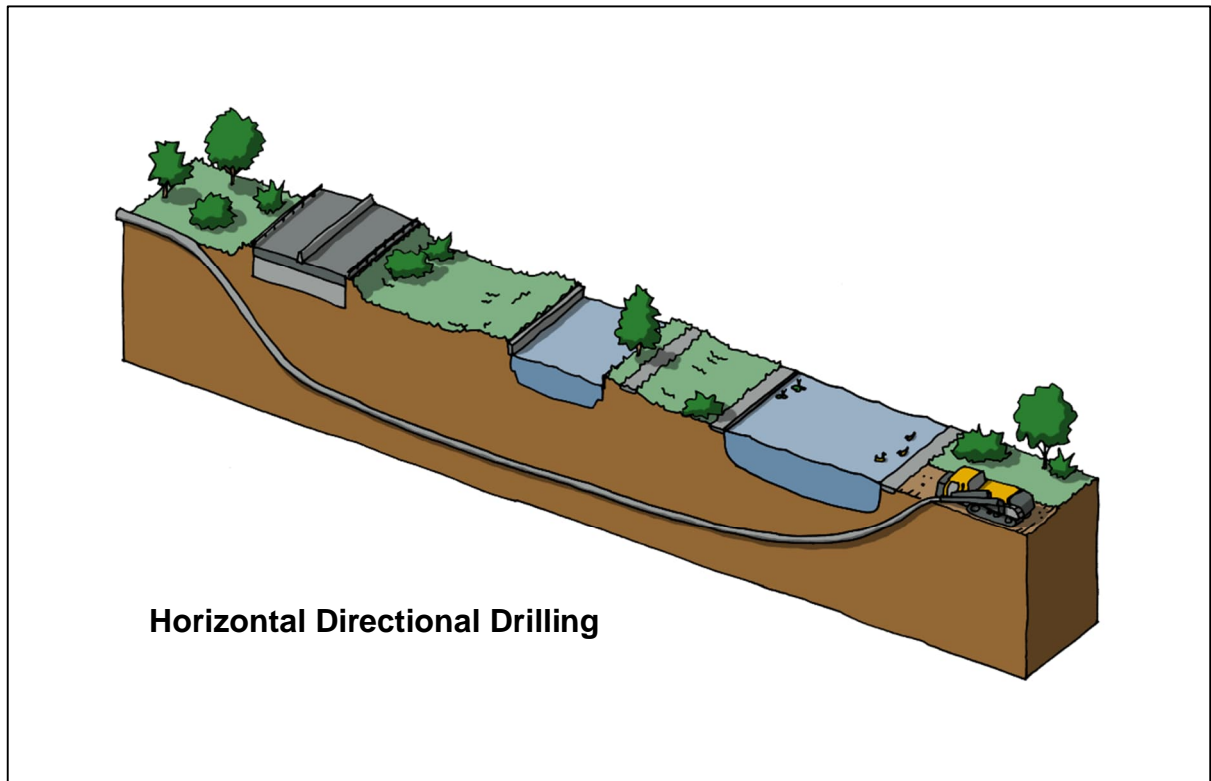
- *Open-cut crossing:* digging a trench directly across the asset or infrastructure to be crossed, following which a short section of the pipe is installed and the trench backfilled with the graded excavated material. The surface is then reinstated with appropriate material.



- *Auger boring*: involves digging two pits either side of the crossing section. The side of the pit would either be stabilised, if space allows, or sheets and frames installed to support the pit from collapse. A wider area of land is required to install the pit.



- *Horizontal Directional Drilling*: involves the use of large plant which would drill in to the ground at an angle where the drill size is firstly small and drills a 'pilot' hole under the asset or infrastructure to be crossed. The drill size is gradually increased to the desired width required to install the pipe. The pipe is eventually connected to the end of the drill to install it. Bentonite, a non-toxic, biodegradable natural clay is used as a drilling lubricant. A wider area of land is required to accommodate the size of the required drill and associated equipment



3.4.15 Design work is currently ongoing to identify the appropriate method for each crossing and details will be reported within the Environment Statement.

Immingham Facility, Theddlethorpe Facility and Block Valve Stations Installation

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

- Pre-construction activities – Clearance, excavation and grading, erection of temporary fencing;
- Formation of secure concrete bases – For the above ground infrastructure including control kiosk, block valve and vent stacks as applicable;
- Infrastructure is placed on respective bases;
- Construction of associated infrastructure would follow;
- Connection to utility services; and
- Perimeter is reinstated, temporary fencing would be replaced with secure, permanent fencing, gravel would be spread over the site and the outer strip planted up (as required).

Construction Lighting

- 3.4.17 Lighting on the pipeline spread is not currently thought to be required as work is planned during summer months, however there may be localised lighting for the Immingham and Theddlethorpe Facilities and hydrotesting at the latter stages of the construction works.
- 3.4.18 There may be some lighting at the construction compounds, however once the stored pipe has been delivered on to the pipeline spread it will be scaled back. The lighting would be static lighting points fixed to temporary structures such as the masts, cabins, workshops, gantry cranes and silos. These would be used to light up regularly used work areas, the car park and access areas. Baffles (a trim on the lighting to reduce glare) would be installed on all lighting columns and light is to be angled to face works.
- 3.4.19 Where lighting is required during construction, this would be positioned away from mature trees, hedgerows and watercourses.

3.5 Operation and Maintenance

- 3.5.1 The pipeline and the associated manned control room would be operated continuously 24 hours a day, seven days a week.
- 3.5.2 The Block Valve Stations and the Theddlethorpe Facility would be unmanned except for periodic visits for maintenance and inspection. The frequency of such visits is yet to be determined but would be in line with equipment supplier recommendations and risk assessments.
- 3.5.3 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 Project has a design life of approximately 25 years and with appropriate maintenance should be operational for approximately 40 years.
- 3.5.4 Pipeline inspections would be carried out at regular intervals using aerial surveillance and a walkover of the pipeline route would be conducted every year. The performance of the cathodic protection system would also be monitored.
- 3.5.5 The Block Valve Stations would require a weekly visit by one operative, with routine maintenance carried out by discipline engineers on a pre-planned basis. The frequency of maintenance for each item is yet to be defined but would be based on equipment supplier recommendation and risk assessment.

3.6 Decommissioning

- 3.6.1 When appropriate, the pipeline and associated infrastructure would be decommissioned.
- 3.6.2 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.
- 3.6.3 The preliminary assessment presented in the PEIR has assumed that the pipeline would remain in the ground and the Immingham Facility, Block Valve Stations and Theddlethorpe Facility would be dismantled. The pipeline would have the carbon dioxide flow stopped, and the pipe appropriately cleaned and capped at either end.

4 Consultation

4.1 Non-Statutory Consultation

- 4.1.1 The Applicant commenced initial engagement activities for the Project in 2021, recognising that effective consultation is critical to the overall success of the Project. Two separate phases of non-statutory consultation have been undertaken as a result. The first phase was held for six weeks, from Tuesday 26 April to Thursday 7 June 2022. The second phase was held from Thursday 8 September to Thursday 6 October 2022.
- 4.1.2 The first phase of consultation introduced the Project 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 Project progressed.
- 4.1.3 A number of community drop-in events took place over both phases of consultation. *PEIR Volume II - Chapter 4: Consultation* contains more details on the time and location of these events. Online and written responses were also accepted. All feedback and responses received have been reviewed and considered as part of the ongoing design process of the Project and will feed into the production of the ES.

4.2 Statutory Consultation

- 4.2.1 Statutory consultation for the Project is being undertaken over a nine-week period commencing on 22 November 2022 and ending on 24 January 2023, in line with the requirements of the Planning Act 2008 and the Environmental Impact Assessment Regulations. The Applicant actively encourages the local community to have their say and provide feedback on the latest plans for the Project.
- 4.2.2 Methods of engagement that are being undertaken as part of this process include:
- In-person events (see **Table 3**);
 - A Virtual Consultation Room (<http://www.consultation.vikingccs.co.uk>);
 - Online webinar;
 - Notices in local newspapers;
 - Engagement with local authorities; and
 - Publication of the following documents online and made available in the local area; a consultation brochure, Frequently Asked Questions Document, response form, maps, the Non-Statutory Consultation Report, this PEIR (including all 4 volumes) and the Statement of Community Consultation.

Table 3: In-Person Consultation Events

Date	Location	Time
Tuesday 22 nd November	Theddlethorpe Village Hall, Silver Street, Theddlethorpe, Mablethorpe, LN12 1PA	3pm – 7pm
Wednesday 23 rd November	Louth Town Hall, Eastgate, Louth, LN11 9NH	3pm – 7pm

Date	Location	Time
Friday 25 th November	Immingham Civic Centre Hub, Pelham Road, Immingham, DN40 1QF	3pm – 7pm
Saturday 26 th November	Healing Village Hall, Poplar Road Park, Poplar Road, Healing, DN41 7SR	2pm – 5pm
Monday 28 th November	Trusthorpe Village Hall, Sutton Road, Trusthorpe, Mablethorpe, LN12 2GN	3pm – 6.30pm
Wednesday 30 th November	North Thoresby Village Hall, The Square, North Thoresby, Grimsby, DN26 5QL	3pm – 6.30pm
Thursday 1 st December	Grimoldby and Manby Village Hall, 6 Tinkle Street, Grimoldby, LN11 8SW	3pm – 7pm

5 PEIR Assessment Methodology

Environmental Impact Assessment

- 5.1.1 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 Project design development process.
- 5.1.2 The full Environmental Impact Assessment will be reported in an Environmental Statement (ES) and submitted alongside the application for the Development Consent Order. The ES provides the decision maker, in this case the Secretary of State for Business, Energy & Industrial Strategy, with as much information as possible about:
- The baseline environment (the environment as it is today);
 - The likely significant effects resulting from the Project in all phases of development (construction, operation and decommissioning);
 - Appropriate mitigation being delivered as part of the Project (to avoid, reduce or offset potential significant adverse effects); and
 - Any residual effects that cannot be mitigated.

5.1.3 This allows the decision maker to make an informed a choice as possible when it comes to granting consent for the Project.

Preliminary Assessment Methodology

5.1.4 The Project is currently in the preliminary phase of the EIA process. During this phase the Applicant has gathered more information about the existing environment in a Study Area around the Project.

5.1.5 The size of the Study Area depends on the topic that is being assessed and is reported in each technical chapter along with a rationale for its selection.

5.1.6 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.

5.1.7 The method for preliminarily assessing the significance of effects is reported in full in *PEIR Volume II Chapter 5: Assessment Methodology*. In *PEIR Volume II Chapters 6-20*, the method has been made more specific based on relevant standards or guidelines. Any deviation from Chapter 5 is explained in the respective chapter.

5.1.8 The method used in this PEIR differs from the more detailed assessment methodology which will be followed for the development of the EIA and the preparation of the ES. This assessment methodology was agreed via the Scoping process and a copy of it is included in *PEIR Volume IV – Appendix 5.1*.

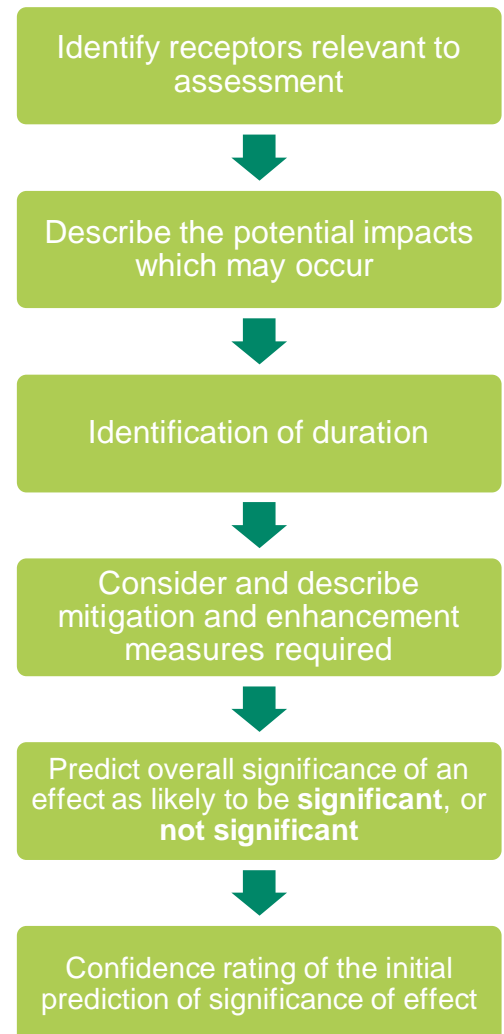
5.1.9 For the PEIR assessment methodology approach, firstly, receptors are identified, and then the potential impacts associated with different Project activities on these receptors are identified. The duration of the impact, (i.e., whether this is short, medium or long term) is also considered. Mitigation measures, both embedded and additional are identified. The potential significance of effects is then assessed after this mitigation is in place. The environmental effects resulting from the Project are described as either **Significant** or **Not Significant** and stated clearly in each technical chapter.

5.1.10 Finally, the confidence in the prediction of the significance of effects resulting from the Project is given a rating (high, moderate or low) as well as a justification provided.

Mitigation

Embedded Mitigation

5.1.11 Embedded mitigations are mitigation measures which have been identified and adopted as part of the evolution of the project’s design. The design will be further developed to reflect the findings of ongoing environmental studies, comments raised during this statutory consultation and ongoing engagement with stakeholders. As the design develops, the embedded mitigation measures will also be refined as part of an iterative process.



Additional Mitigation

Preliminary Draft Construction Environmental Management Plan

- 5.1.12 The Draft Construction Environmental Management Plan (CEMP) aims to set out the initial mitigation measures identified to help avoid or reduce adverse environmental effects during the Project’s construction whilst also setting out applicable environmental legislation which needs to be complied by the Contractor who builds the Project.
- 5.1.13 It is called a Draft Construction Environmental Management Plan when it is submitted with the Development Consent Order application, as it would need to be finalised by the appointed Contractor prior to the start of construction, based on a detailed project design and construction programme. The Final (or construction issue) CEMP would cover all construction activities, clearly set out roles and responsibilities and provide contact details for key personnel. A requirement would be included within the Development Consent Order, which would state that the Final CEMP would need to be submitted to and approved by the relevant local authorities.
- 5.1.14 The iteration included in *PEIR Volume IV Appendix 3.1* is called the Preliminary Draft Construction Environmental Management Plan and has been produced to support the Preliminary Environment Information Report and the preliminary assessment within. **Table 4** further explains the iterations of the Construction Environmental Management Plan.

Table 4: Construction Environmental Management Plan Iterations Summary

CEMP Iteration	Stage of the Project
Preliminary Draft Construction Environmental Management Plan	Statutory Consultation (to support the Preliminary Environment Information Report and the preliminary assessment within)
Draft Construction Environmental Management Plan	Submission of the Development Consent Order application (to support the Environmental Statement and the assessment within)
Final Construction Environmental Management Plan	Developed by the Contractor, once appointed.

- 5.1.15 The Preliminary Draft Construction Environmental Management Plan contains a Preliminary Mitigation Register, which outlines all of the currently identified environmental commitments, mitigation measures, and measures to ensure compliance with legislation and requirements of Statutory Environmental Bodies and monitoring programmes are identified.
- 5.1.16 This will be reviewed at the next stage and updated as appropriate based on feedback received from this Statutory Consultation and as the Project design progresses.

6 Summary of Preliminary Environmental Effects

6.1 Ecology and Biodiversity

6.1.1 This assessment looks at the effects of the Project on wildlife and plants in the area. Ongoing survey work and desk-based research helps 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 Draft Order Limits and the surrounding area.

Baseline Environment

6.1.2 There are four European designated sites within the Draft Order Limits:

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

6.1.3 The Humber Estuary Special Area of Conservation is within 10km of the Draft Order Limits. There are a further 15 nationally designated sites (Sites of Special Scientific Interest / National Nature Reserves) within 10km of the Draft Order Limits.

6.1.4 In addition, there are 33 non-statutory sites, designated for their nature conservation value, within 2km of the Draft Order Limits. These designations include:

- Local Wildlife Sites;
- Sites of Nature Conservation Interest;
- Local Wildlife Trusts; and
- Roadside Nature Reserves.

6.1.5 Habitats have, at this point, been identified through a combination of desk-based surveys and field surveys. Field surveys will continue during and after the Statutory Consultation to ensure desk-based information is verified and further information is collected. Habitats identified within the Draft Order Limits include woodland, scrub, trees, grassland, standing and running water, dry ditches, sand dunes, arable land, species rich and species poor hedgerows, buildings and bare ground or hardstanding.

6.1.6 Protected and notable species surveys are also ongoing, but to date in conjunction with desk-based records, have identified the following species within the Draft Order Limits:


- Invertebrates; including (but not limited to) moths, beetles and butterflies;
- Amphibians including great crested newt, smooth newt, palmate newt, common frog, common toad, natterjack toad;
- Reptiles including common lizard, grass snake, slow worm;
- Fish including brown / sea trout, common carp, crucian carp, European eel, grayling, rainbow trout, spined loach
- Birds including (but not limited to) avocet, black stork, black tern, black necked grebe, cattle egret, common scoter, cuckoo, curley, gadwall, garganey, goldeneye, green sandpiper, greenshank, greyleg goose, hawfinch, hobby, hoopoe, and little gull;

- Bats including (but not limited to) common Pipistrelle, brown long eared bat and Natterer's Bat;
- Otter;
- Water vole;
- Brown hare;
- Hedgehog; and
- Badger;

Mitigation

- 6.1.7 The Draft Order Limits have been developed over time to avoid and minimise effects on ecology and biodiversity receptors. Where the Draft Order Limits cross major watercourses, trenchless construction techniques will be used to avoid disturbance within the channel and harm to bankside habitats. Design work is ongoing to identify where other habitats may be avoided through alternative construction methods to seek to reduce the potential for significant effects.
- 6.1.8 Mitigation measures to reduce any potential effects on ecology and biodiversity have been outlined in the Preliminary Draft Construction Environmental Management plan and include management plan and site practices which will need to be adhered to by the contractor when the Project is under construction.

Preliminary Assessment

- 6.1.9 During the construction phase, there is a potential for a direct loss of woodland habitat within the Draft Order Limits and damage to retained trees due to encroachment of machinery, compaction of soil or a pollution event. As a result of the loss of this habitat, the effects would likely be **Significant**. There is a low confidence rating for this prediction as options for installing the pipeline crossing woodland habitat are being reviewed. Further survey work will be undertaken in 2022 and 2023 after which a comprehensive review of potentially significant effects will be provided within the ES.
- 
- 6.1.10 All potential effects due to the operational phase of the Project are expected to be **Not Significant**, with a confidence rating ranging from high to low depending on the receptor that was assessed. The Applicant is committed to making a positive contribution to biodiversity net gain and these additional details will be included within the ES. This has the potential to lead to a **significant beneficial effect**. We would welcome any views people have on how best to achieve this as part of the Statutory Consultation.
- 6.1.11 All potential effects due to the decommissioning of the Project are expected to be **Not Significant**, with a confidence rating ranging from high to low depending on the receptor that was assessed.
- 6.1.12 The design work will focus on avoiding valuable habitats identified by ongoing survey work to seek opportunities to minimise significant effects by investigation alternative construction methods. In addition, opportunities for biodiversity enhancement measures will also be sought.
- 6.1.13 The full preliminary assessment can be found in *PEIR Volume II Chapter 6: Ecology and Biodiversity*.

6.2 Landscape and Visual

6.2.1 The landscape and visual assessment considers how the Project could affect the landscape through physical change and what impact this has on the existing character and setting. The visual assessment considers how the Project would alter the views that are available to people and their perception of change in these views.

Baseline Environment

6.2.2 A Study Area of 1km from the pipeline corridor and 3km from the Immingham Facility and Theddlethorpe Facility was used for the landscape assessment.

6.2.3 A thorough review of desk-based sources including mapping, aerial photography, planning and policy documents, landscape character assessments and other sources of information has identified the existing landscape character. The Study Area falls within:

- Three National Character Areas;
- Nine Regional Character Areas;
- Seven Local Character Areas; and
- Five Character Zones.

6.2.4 The Lincolnshire Wolds Area of Outstanding Natural Beauty also falls within the Study Area.

6.2.5 A number of specific viewpoints have also been selected to represent key visually sensitive receptors including views from local residential receptors, Public Rights of Way and designated landscape including the Lincolnshire Wolds Area of Outstanding Natural Beauty.

Mitigation

6.2.6 The Preliminary Mitigation Register within the Preliminary Draft Construction Environmental Management Plan includes a series of landscape and visual mitigation such as undertaking a topographic and photographic survey prior to the start of construction to record current condition and to inform the reinstatement, the type of temporary fencing around construction compounds and sensitive design of construction compounds.

Assessment

6.2.7 During the construction phase, the introduction of construction activity including vehicle movement, signage, fencing, excavations, earth movements, removal of vegetation and agricultural land may have potential effects on tranquillity. Landscape elements could be lost as a result of the removal of trees and vegetation and the landscape pattern of the area could change due to the removal of field boundary hedgerows. Visual receptors could experience a change in character as a result of the introduction of construction activities and the removal of landscape features.

6.2.8 Impact as a result of construction operations will be short term, however, long term impacts may arise where hedgerows or trees have to be removed during construction. As a result of the landscape assessment, it has been determined effects on the local landscape character, residential and recreational receptors could be **Significant**, with a confidence rating of moderate.

6.2.9 During the operational phase, permanent infrastructure associated with the Project is being introduced into an existing industrial landscape. There will also be a change to landscape pattern and a loss of landscape elements as a result of the removal of field boundary hedgerows, trees and vegetation. It has been determined effects on the local landscape character could be **Significant** with a confidence rating of moderate.

- 6.2.10 Visual effects on Public Rights of Way, local road users and places of business are anticipated to be **Significant**, however, once mitigation planting matures the effects are expected to reduce to **Not Significant**.
- 6.2.11 During the decommissioning phase, effects as a result of the Project are expected to be similar or less than the effects described during the construction phase. The assessment presented for the construction phase in relation to the landscape and visual assessment is therefore considered to be representative.
- 6.2.12 The full preliminary assessment can be found in *PEIR Volume II Chapter 7: Landscape and Visual*.

6.3 Historic Environment

- 6.3.1 The historic environment refers to a range of specific places or objects that has a significant historic value. They may be listed (built before 1700) or scheduled (nationally important archaeological sites) or they may be unknown (not previously recorded) underground archaeology.
- 6.3.2 The preliminary assessment identifies the known heritage assets within the Study Area through desk-based research. Surveys, including geophysical survey will be completed to better understand the potential for below ground, unrecorded archaeology.

Baseline Environment

- 6.3.3 The Study Area for this topic is set within a 1km wide buffer, 500m either side of the pipeline for non-designated assets and 2km wide buffer, 1km either side of the pipeline for designated assets. A thorough review of desk-based sources including the National Heritage List for England, North Lincolnshire Council’s and Lincolnshire County Council’s Historic Environment Record, Heritage Gateway and the Archaeology Data Service to define preliminary baseline conditions for heritage assets has been undertaken.
- 6.3.4 There are a total of 184 designated assets within the 2km wider Study Area comprising:
 - 18 Scheduled Monuments;
 - Listed Buildings that are:
 - Grade I (19 no.);
 - Grade II* (23 no.); and
 - Grade II (123 no.);
 - a Historic Park and Garden that is Grade I registered; and
 - four Conservation Areas.

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

Mitigation

- 6.3.5 The Project's design has avoided physical impacts to designated heritage assets and was a key consideration during the routeing and siting work that was undertaken to inform the Draft Order Limits.
- 6.3.6 Archaeological surveys are currently being planned in consultation with Local Planning Authority Archaeology Officers and Historic England, which will confirm the presence and significance of archaeological remains within the Draft Order Limits.
- 6.3.7 An archaeological geophysical survey is also currently being planned in consultation with Local Planning Authority Archaeology Officers and Historic England and is expected to commence in November 2022. These will inform any potential future programme of archaeological investigations in areas where potential areas of archaeological interest are found. From this, a robust programme of archaeological mitigation known as a Written Scheme of Investigation can start to be produced. Archaeological investigations would take place prior to construction. The Preliminary Draft Construction Environmental Management Plan also contains a series of standard and best practice measures.

Assessment

- 6.3.8 During the construction phase, there is the potential for physical impacts to archaeological remains and impacts to the setting of heritage assets within the Study Area.
- 6.3.9 During the construction phase, there is the potential for **Significant** effects on known and previously unknown earthwork and buried archaeological remains identified within the Study Area. Confidence in this prediction is low to moderate.
- 6.3.10 During the operational phase, the Immingham Facility would tie into the existing industrial sites in the area. The introduction of the pipeline, Block Valve Stations, Immingham Facility and Theddlethorpe Facility is unlikely to introduce noticeable change into the setting of heritage assets. As a result, operational effects from a historic environment perspective are considered to be **Not Significant** at this preliminary stage.
- 6.3.11 The decommissioning phase of the Project is unlikely to result in additional temporary or permanent impacts to heritage assets as the pipeline infrastructure would be left in situ once operation ceases. The other associated infrastructure will be removed, with effects likely similar to that in the construction phase.
- 6.3.12 The full preliminary assessment can be found in *PEIR Volume II Chapter 8: Historic Environment*.

6.4 Geology and Hydrogeology

- 6.4.1 The geology and hydrogeology preliminary assessment considers the existing ground conditions, including geology and the presence of known or suspected potentially contaminated materials associated with past land use activities and operational or closed landfills, as well as the impact to water below ground ("groundwater").

Baseline Environment

- 6.4.2 The Study Area for the geology and hydrogeology assessment is 250m either side of the Draft Order Limits. Interaction beyond this Study Area from a geology and hydrogeology perspective would generally not occur.
- 6.4.3 Baseline conditions for the Project were established through a desk-based study of the following sources:

- Google Maps and Aerial Imagery;
- Groundsure Report;
- MAGIC.gov.uk (DEFRA);
- British Geology Survey (BGS) Online Viewer (Geo-Index);
- Zetica UXO Risk Maps;
- The Coal Authority; and
- UKradon (UK Health Security Agency).

6.4.4 Made Ground deposits (where the ground has been previously worked or backfilled) are only present within Section 1 of the Draft Order Limits and are shown to be of stiff to firm, yellow / grey silty clay with evidence of anthropogenic (human caused) materials.

6.4.5 Superficial geology in the Study Area is made up of:

- Tidal Flat Deposits: Soft to very soft dark grey silty organic clay;
- Glacial Till: Firm to stiff slightly fissured grey brown slightly gravelly clay;
- Glaciofluvial Deposits: Medium dense orange brown slightly silty fine to medium sand;
- Alluvium: Soft to firm sandy gravelly clay with localised silt; and
- Lacustrine Deposits: Soft to firm laminated slightly sandy silty clay.

6.4.6 Bedrock geology in the Study Area is made up of:

- Welton Chalk Formation: Hard white thickly bedded chalk with common flint nodules; and
- Burnham Chalk Formation: White thinly bedded chalk with common discontinuous flint bands and sporadic marl seams.

Mitigation

6.4.7 The Project has been designed to avoid important geological features or resources, and sources of contamination, through careful routing and site selection. A Preliminary Draft Construction Environmental Management Plan has been prepared as part of the Preliminary Environmental Information Report and incorporates measures relevant to geology and hydrology and more specifically ground contamination, groundwater and private water supplies.

Assessment

6.4.8 During the construction phase, potential impacts as a result of the Project includes but is not limited to, chemical spillage, potential dewatering, changes in subsoil structure, subsoil compaction and the disturbance of contaminated soil. Effects as a result of the Project's construction have all been assessed as **Not Significant**, with confidence in these predictions being moderate to high.

6.4.9 During the operational phase, potential impacts as a result of the Project include potential dewatering (though not anticipated), new foundations and structures creating new preferential pathways for contaminants and aggressive ground contaminants posing a risk to the pipeline. Effects as a result of the Project's operation have all been assessed as **Not Significant**, with confidence in these predictions being moderate.

- 6.4.10 During the decommissioning phase, the effects will be similar to that experienced during construction.
- 6.4.11 The full preliminary assessment can be found in *PEIR Volume II Chapter 9: Geology and Hydrogeology*.

6.5 Agriculture and Soils

- 6.5.1 The agricultural and soils preliminary assessment considers the effects of the Project on agricultural soil, in particular, the 'best and most versatile land'. These are those classified as Grade 1, 2, and 3a of the Agricultural Land Classification.

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

Baseline Environment

- 6.5.2 The Study Area for the agriculture and soils assessment is the Draft Order Limits of the Project, minus areas considered to be marine or intertidal which do not have the potential to contain soils or agricultural land.
- 6.5.3 A number of data sources were used in the desk-study for this assessment including the LandIS Soils Guide, as well as maps, surveys and aerial photography.
- 6.5.4 A review of provisional Agricultural Land Classification in the Study Area shows the following approximate split between the Grades shown in **Table 5**.

Table 5: Agricultural Land Classification Grading in Lincolnshire

ALC Grade	Area (ha)	Percentage (%) of total land area	Percentage (%) available agricultural land*
North East Lincolnshire			
Grade 1	0.0	0	0
Grade 2	3,612.9	18.8	24.4
Grade 3	11,223.2	58.4	75.6
Grade 4	0.0	0.0	0.0
Grade 5	0.0	0.0	0.0
Non-agricultural	192.7	1.0	-
Urban	4,203.1	21.9	-
Total	19,232.0	100.0	100.0
Total BMV**	9,224.5	48.0	62.2
Total agricultural land*	14,836.1		
North Lincolnshire			
Grade 1	8,249.4	9.7	10.6
Grade 2	37,178.6	43.8	47.6
Grade 3	31,232.1	36.8	40.0

ALC Grade	Area (ha)	Percentage (%) of total land area	Percentage (%) available agricultural land*
Grade 4	1,382.1	1.6	1.8
Grade 5	10.8	0.0	0.0
Non-Agricultural	3,612.0	4.3	-
Urban	3,245.0	3.8	-
Total	84,910.2	100.0	100.0
Total BMV**	61,044.1	71.9	78.2
Total agricultural land*	78,053.2		
Lincolnshire			
Grade 1	75,757.2	12.8	13.4
Grade 2	186,750.2	31.6	33.0
Grade 3	296,246.4	50.1	52.3
Grade 4	7,448.3	1.3	1.3
Grade 5	0.0	0.0	0.0
Non-Agricultural	17,132.6	2.9	-
Urban	8,486.8	1.4	-
Total	591,821.5	100.0	100
Total BMV**	410,630.6	69.4	72.5
Total agricultural land*	566,202.1		
* Excludes land mapped as non-agricultural or urban			
**The land mapped as Grade 3 has been split 50/50 between Subgrades 3a (BMV) and 3b (non-BMV).			

Mitigation

- 6.5.5 The Project has been designed so that the permanent loss of agricultural land is avoided as much as possible. A Preliminary Draft Construction Environmental Management Plan has been prepared as part of the Preliminary Environmental Information Report and includes measures to mitigate the effects of the Project in relation to agricultural land and soils. Measures such as topsoil stripping outside of the winter period and the production of a soils management plan, amongst other measures, are included to minimise the effect of the Project.

Assessment

- 6.5.6 During the construction phase, effects are all expected to be **Not Significant**, with a high confidence in these predictions. The permanent loss of Best and Most Versatile land is expected to be below 20 hectares. There would be a permanent loss of approximately 1.1 hectares of agricultural land. Construction activities would temporarily disturb soils but the

mitigation measures presented in the Draft CEMP would ensure that the soils resources is protected and maintained.

- 6.5.7 During the operational phase, activities with the 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 during the construction phase. Therefore, with the agreement with the Planning Inspectorate, operational effects have been scoped out.
- 6.5.8 During the decommissioning phase, the scale and nature of activities undertaken would be similar to those described previously for construction, and they would be temporary during the period of decommissioning activities on site. Following the removal of the structures and the reinstatement of the land there would be no further potential effects on agricultural land and soil resources. Therefore, effects from the Project during decommissioning are expected to be **Not Significant**.
- 6.5.9 The full preliminary assessment can be found in *PEIR Volume II Chapter 10: Agriculture and Soils*.

6.6 Water Environment

- 6.6.1 The preliminary water environment assessment considers the effects of the Project on the quality of the surface water environment and potential changes to flood risk.

Baseline Environment

- 6.6.2 The Study Area for the Water Environment assessment is 1km either side of the Draft Order Limits so that all waterbodies that may be affected by the Project can be identified.
- 6.6.3 Data sources used to establish the baseline includes various online mapping services such as Ordnance Survey Maps, Land use Mapping, British Geological survey mapping, Environment Agency, and local authority mapping.
- 6.6.4 The Project will cross a variety of waterbodies which are classed as Main Rivers, Water Framework Directive Watercourses, drains and the Louth Canal. The Project also crosses Flood Zones 2 and 3, in particular in Section 5.

Mitigation

- 6.6.5 The following key mitigation measures have been incorporated into the Project design which are relevant to the water environment:
 - Pipeline crossing techniques and locations: a variety of trenchless crossing techniques would be used where open-cut is not appropriate;
 - Soil reinstatement: along the pipeline route the ground would be reinstated with stored top and subsoil within the same year;

Main Rivers

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 I, 2 and 3a of the Agriculture Land Classification

Water Framework Directive

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

Flood Zones

Flood zones are a guidance tool, formed by the Environment Agency, to demonstrate the probability of river and sea flooding in areas across England

Areas in flood zone 2 can also be described as: Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding;

or

Land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding.

Areas within flood zone 3 have been shown to be at a **1% or greater probability of flooding from rivers or 0.5% or greater probability of flooding from the sea**. Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding.

- Land drainage reinstatement: the location of existing land drainage would be investigated; and
- Sustainable Drainage Systems or “SuDs”: The Block Valve Station’s surface will be so that rainfall can drain to existing open ground, to soakaways or to existing drainage facilities and appropriate.

6.6.6 A Preliminary Draft Construction Environmental Management Plan has been submitted as part of the Preliminary Environmental Information Report. A number of measures contained within the Construction Environmental Management Plan mitigate against the effects on the water environment where relevant.

Assessment

6.6.7 During the construction phase, there is a risk of pollution to surface water from construction activities involving polluting substances such as fuels, cement and other chemicals as well as from excessive fine sediment in runoff from the disturbance of soil during earthworks. There are potential effects to flood risk associated with construction activities.

6.6.8 Effects due to the construction of the Project are generally expected to be **Not Significant**, confidence in these predictions is rated from low to high depending on the aspect of the water environment being assessed.

6.6.9 The effects of constructing the pipeline across Laceby Beck / River Freshney and South Dike and Grayfleet Drain could potentially be **Significant** as the technique to be used is ‘open cut’ as described in section 3.4.14. This could cause a temporary impact on the watercourses’ cross-section shape (morphology). It may be that a different technique is applicable after a site visit and further understanding of these watercourses. If not, additional mitigation may be recommended at full assessment stage and be reported in the Environmental Statement and Draft CEMP.

6.6.10 During the operational phase, the following water environment impacts may occur:

- Impacts on water quality in waterbodies that may receive surface water runoff or be at risk of chemical spillages from above ground facilities for the Project (e.g., Immingham Facility) from diffuse pollutants in runoff, operational discharges and the risk of chemical spillages;
- Hydromorphological impacts to waterbodies including changes to physical form which underpin habitats;
- Impacts on flood risk from increased runoff from new impervious areas at above ground facilities for the Project;
- Potential impacts on hydrology as a result of the Project by changing the way water infiltrates into the ground and supports baseflow to waterbodies; and
- Permanent loss of floodplain within areas classified as Flood Zone 2 and 3.

6.6.11 Effects due to the operation of the Project are expected to be **Not Significant**, confidence in these predictions is rated from low to high depending on the aspect of the water environment being assessed.

6.6.12 During the decommissioning phase, effects would be expected to be similar (albeit perhaps on a smaller scale) to the construction effects already described and could result in a temporary risk of pollution to surface water and potential effects to flood risk.

- 6.6.13 A preliminary Water Framework Directive Assessment and Flood Risk Assessment has been undertaken for the Project. The Water Framework Directive Assessment assesses whether the Project meets the requirements of the Water Framework Directive. A Flood Risk Assessment is required as the Project falls within Flood Zones 2 and 3. This assesses the Project against the risk of flooding, whether that be from groundwater, river (fluvial), surface water (pluvial), estuary/coastal (tidal), or from sewer sources.
- 6.6.14 The full preliminary assessment can be found in *PEIR Volume II Chapter 11: Water Environment*.

6.7 Traffic and Transport

- 6.7.1 The preliminary traffic and transport assessment considers how the Project could cause changes in traffic levels/volumes on the local and the strategic road network. It also assesses if the construction and operation of the Project would have an impact on journey times, highways safety and the severance of routes.

Baseline Environment

- 6.7.2 The Study Area for the traffic and transport assessment includes the anticipated routes that would be used by construction vehicles associated with the Project, as well as a number of smaller routes to be included for assessment purposes.
- 6.7.3 Data sources to establish the baseline include Automatic Traffic Count survey data, personal incident accident data from the relevant highway authority as well as data from the Department for Transport. The Automatic Traffic Count surveys were undertaken so 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 and received from the local authorities as well as Personal Injury Collision analysis data.
- 6.7.4 This data was analysed against the proposed number of vehicle movements required for the construction and operation of the Project, comparing to existing traffic levels, to see what the level of difference is and what impact this may have.

Mitigation

- 6.7.5 Mitigation has been developed as part of the ongoing development of the Project design to reduce likely significant effects resulting from the Project. Embedded mitigation from a traffic perspective is as follows:
- All access points that require the creation of a junction bellmouth will be designed based on the relevant standard from Design Manual for Roads and Bridges CD 123 Geometric Design, thereby negating any potential safety impact associated with construction activity; and
 - It is anticipated that all mitigation required will be set out within the outline designs where required for route improvements between the A road network and compounds and the compound access junctions. Swept path analysis will be presented to support these designs. Temporary diversion or other mitigation measures for footpaths and cycle paths will be proposed where necessary.
- 6.7.6 A Preliminary Draft Construction Environmental Management Plan has been prepared alongside the Preliminary Environmental Information Report, included in this are measures to avoid or reduce likely significant effects resulting from the Project. Measures such as the production of a traffic management plan, construction logistics plan, and a travel plan will, once implemented, reduce traffic and transport effects resulting from the construction phase of the Project.

Assessment

- 6.7.7 During the construction phase, there will be temporary increases in traffic flows on the road network that will be used by construction vehicles to access the construction compound(s). The network of roads affected will be extensive, stretching from the Immingham Dock to an area north of Mablethorpe, plus any wider routes that could potentially be used to deliver construction plant and materials.
- 6.7.8 Other aspects of the construction phase could lead to a significant effect, including:
- Significant severance to communities caused by a large increase in traffic for a longer period;
 - Increased risk of road traffic accidents caused by a large increase in traffic for a longer period;
 - Temporary road closures, diversions and widening;
 - Construction traffic using temporary bell mouths and site entrances for access to construction areas; and
 - Temporary closures or diversions of Public Rights of Way and other public access routes.
- 6.7.9 Not all access routes proposed have been assessed at this stage, just those that would experience peak construction. Updates will be provided for the remaining routes in the Environmental Statement.
- 6.7.10 Properties off Thoroughfare in Section 3 of the pipeline may potentially experience a short term **Significant** effect during the construction phase due to Heavy Goods Vehicle movements on the road network. Similar small country roads could be affected in a similar way. All other effects on receptors within the Study Area are expected to be **Not Significant**.
- 6.7.11 During the operational phase, it is anticipated that the amount of operational traffic will be negligible, being associated 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.
- 6.7.12 The decommissioning strategy identified will determine if further assessment is required. Options will include leaving the pipeline in situ and/or dismantling above ground installations. Further assessment will be undertaken within the ES once more details are available.
- 6.7.13 The full preliminary assessment can be found in *PEIR Volume II Chapter 12: Traffic and Transport*.

6.8 Noise and Vibration

- 6.8.1 The preliminary noise and vibration assessment considers how the noise and vibration produced by the construction and operation of the Project would create impacts on receptors including residential receptors, hospital, schools and care homes.

Baseline Environment

- 6.8.2 The Study Area for construction and operational noise effects will include receptors within 500m of the Theddlethorpe Facility and Block Valve Stations and within 300m of the Draft Order Limits. 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 300m.

- 6.8.3 Based on information presented in the 2017 (Round 3) Department for Environment, Food & Rural Affairs Strategic noise mapping dataset, the dominant sources of sound in the area are considered to be the local road network including the A16 and A18. Additional sound sources include agricultural activities on surrounding road networks along the extent of the Draft Order Limits, the Humberside Airport, and current extremely limited on site works at the Theddlethorpe Gas Terminal. Forty-four groups of, or individual residential and non-residential sensitive receptors have been identified at this preliminary stage.
- 6.8.4 Sixteen baseline noise monitoring locations have been proposed and their exact survey location will be agreed with the local planning authorities. Baseline noise monitoring will be carried out after Statutory Consultation to establish the existing noise climate in the area. This provides a baseline upon which the likely noise associated with the Project can be measured against.

Mitigation

- 6.8.5 Embedded mitigation has been included as part of the Project design and includes plant selection (quiet as possible) and sensitive consideration of the layout of the facilities and construction compounds.
- 6.8.6 A Preliminary Draft Construction Environmental Management Plan has been prepared as part of this Preliminary Environmental Information Report and includes additional and enhancement mitigation measures pertinent to noise including a set of generic best practice working methods which would be employed by the contractor during the construction phase, such as localised noise screening, the duration of key noisy activities and communication with local residents over any particularly noisy construction works.

Assessment

- 6.8.7 During the construction phase, there may be noise and vibration impacts from the construction activity, such as from the operation of machinery and plant. There may also be noise and vibration impacts from construction traffic.
- 6.8.8 During the construction phase, **Significant** effects from construction noise and vibration may be experienced at six groups of sensitive receptors within the Study Area, with a moderate level of confidence. Effects in relation to construction traffic are also expected to be **Not Significant**, with a moderate confidence in prediction.
- 6.8.9 During the operational phase, noise and vibration from the operation of the Project would include the limited noise from the operation of electrical and mechanical equipment at the facilities and Block Valve Stations. Effects from the Project's operation are expected to be **Not Significant**, with a moderate confidence in prediction.
- 6.8.10 During the decommissioning phase, noise effects of the Project will be similar or less than noise effects during the construction phase. The noise assessment presented for the construction phase is therefore considered representative (or an overestimate) of the decommissioning phase.
- 6.8.11 The full preliminary assessment can be found in *PEIR Volume II Chapter 13: Noise and Vibration*.

6.9 Air Quality

- 6.9.1 The preliminary air quality assessment assesses how the construction of the Project may cause changes to the local air quality. This includes airborne pollutants such as dust, Nitrogen dioxide and particulate matters, including PM₁₀.

6.9.2 Operational phase impacts have been scoped out of the assessment. This will be reviewed as further details on the venting system are developed, and if required, an assessment will be included within the Environmental Statement.

Baseline Environment

6.9.3 An area of 10km of the Draft Order Limits has been considered with respect to published baseline information on air quality. Data sources used include Annual Status Reports from North Lincolnshire Council, North East Lincolnshire Council and West Lindsey District Council, background concentrations and Air Quality Management Area boundaries provided by Department for Environment, Food & Rural Affairs Air Information Resource as well as designated ecological sites provided by Natural England’s MAGIC maps.

6.9.4 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:
 - 350m of the limits of construction activity within the site considered; or
 - 50m of site access points; and
 - Vehicles on the public highway, up to 500m from the site entrance(s).
- An ecological receptor within:
 - 50m of the limits of construction activity within the site considered; or
 - 50m of the route(s) used by construction vehicles; and
 - On the public highway, up to 500m from the site entrance(s).

6.9.5 The Study Area is therefore 350m from the Draft Order Limits. For the full EIA, the Study Area may need to be refined as the Project evolves, following the IAQM guidance.

6.9.6 Two Air Quality Management Areas are located within the Study Area, Scunthorpe Air Quality Management Area, declared for exceedances of PM₁₀ from industrial sources, and Grimsby Air Quality Management Area declared for exceedances of Nitrogen dioxide due to traffic. Construction traffic is not anticipated to route through any of the existing Air Quality Management Areas.

PM₁₀

Particulate Matter or PM₁₀ are very small particles found in dust and smoke. They have a diameter of 10 micrometres (0.01 mm) or smaller. PM₁₀ particles are a common air pollutant. Urban background PM₁₀ pollution has reduced in the long-term

6.9.7 Local authorities are required to monitor pollutant concentrations. There are 17 monitoring locations within the 10km Study Area, there were no exceedances in air quality objectives reported with the exception of the Air Quality Management Area at Grimsby.

Air Quality Management Area

Since December 1997 each local authority in the UK has been carrying out a review and assessment of air quality in their area. This involves measuring air pollution and trying to predict how it will change in the next few years. The aim of the review is to make sure that the national air quality objectives (PDF) will be achieved throughout the UK by the relevant deadlines. These objectives have been put in place to protect people’s health and the environment.

Mitigation

6.9.8 Mitigation to reduce the effects associated with construction activities impacts are contained within the Project’s Draft Construction Environmental Management Plan and include such measures as the production of a Dust

Management Plan, which will include specific measures to control dust and other emissions.

Assessment

- 6.9.9 During the construction phase, there are potential effects on air quality due to construction dust, construction plant emissions and construction traffic emissions.
- 6.9.10 In relation to air quality, effects are expected to be **Not Significant** due to the application of industry standard guidance. Dust soiling and ecological receptors are considered to be at medium to low risk of dust impacts, while human health receptors are considered to be a low – negligible risk from dust impacts. It is expected that effects on local air quality would be **Not Significant** as a result of construction traffic movements associated with the Project.
- 6.9.11 Air quality effects during the operational and decommissioning phase of the Project have been scoped out from further assessment. Emissions in this operational phase would be restricted to occasional maintenance activities and would not affect air quality objectives.
- 6.9.12 The full preliminary assessment can be found in *PEIR Volume II Chapter 14: Air Quality*.

6.10 Climate Change

6.10.1 The preliminary climate change assessment has two separate considerations which are:

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

UK Carbon Budget
A carbon budget places a restriction on the total amount of greenhouse gases the UK can emit over a 5-year period.

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

Baseline Environment

6.10.2 The current baseline from a climate change perspective is based on a ‘Do Nothing’ scenario where the Project is not constructed or operated. This baseline is based on historic climate data from the Met Office recorded by the closest meteorological station to the Project.

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

6.10.3 The Study Area for the Greenhouse Gas Emissions assessment covers all direct greenhouse gas emissions arising from activities undertaken within the Draft Order Limits of the Project. The Study Area for the Climate Change Resilience Assessment is the Draft Order Limits.

6.10.4 The current land use within the Draft Order Limits has minor levels of greenhouse gas emissions as the land use is largely agricultural. 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.

Mitigation

6.10.5 Mitigation measures adopted as part of the Project are detailed in a Preliminary Draft Construction Environmental Management Plan. The measures include the adoption of an Energy Reduction Plan, the development of a Sustainable Procurement Plan and Materials Management Plan, amongst other measures.

Assessment

- 6.10.6 For the Greenhouse Gas Emissions Assessment, where data is available greenhouse gases that would be emitted over the life of the Project have been predicted with a large majority of the emissions associated with the embodied carbon of the construction materials being used for the Project.
- 6.10.7 These have been compared against the existing baseline of greenhouse gas emissions. Comparing these figures as a percentage of the relevant UK Carbon Budget for the time period shows the Project impact on climate is expected to be **Not Significant**.
- 6.10.8 The Project 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.
- 6.10.9 The preliminary Climate Change Resilience Assessment has been qualitative and provides commentary on how the Project will be resilient to climate change within the context of current and predicted future climate conditions. Effects are expected to be **not significant**.
- 6.10.10 The full preliminary assessment can be found in *PEIR Volume II Chapter 15: Climate Change*.



6.11 Socio-Economics

- 6.11.1 The preliminary socio-economics assessment considers the impact of the construction, operation and decommissioning of the Project on local communities and the economy.

Baseline Environment

- 6.11.2 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 Draft Order Limits and the wider local authority areas of North Lincolnshire, North East Lincolnshire, East Lindsey, and West Lindsey which the Project lies within.
- 6.11.3 The Project is located in the Yorkshire and the Humber region, which has an estimated population of 5,526,350, and the East Midlands region, which has an estimated population of 4,865,600.

Mitigation

- 6.11.4 Mitigation measures have been development as part of the Project and included within the Preliminary Draft Construction Environmental Management Plan. Such measures include for example the Applicant seeking to develop links with educational establishments in the locality, cycle proficiency courses for children and talks at local secondary schools to provide an insight into engineering as a possible profession.

Assessment

- 6.11.5 The assessment identified potential impacts as a result of the Project on community severance and impacts to development land, private assets and recreational routes and Public Rights of Way.
- 6.11.6 During the construction phase, the Project 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 Project area. There would also be the creation of training opportunities and apprenticeships, including opportunities to upskill local residents during construction. This means there would a temporary **beneficial** effect on employment.
- 6.11.7 There may be temporary disruption to Public Rights of Way during construction work which may result in a temporary **Significant** effect, however the Project would work to ensure the timescales of any temporary closures are minimised. Effects in relation to development land is expected to be **Not Significant**.
- 6.11.8 The construction of the Project has the potential to cause likely significant effects on accessibility (both directly and indirectly) or result in severance for communities and people when accessing community facilities and social infrastructure.
- 6.11.9 During the operational phase, the Project is anticipated to not have any significant socio-economic effects.
- 6.11.10 During the decommissioning phase of the Project, it is expected that the significance of effects would be similar to that of the construction phase.
- 6.11.11 The full preliminary assessment can be found in *PEIR Volume II Chapter 16: Socio-economics*.

6.12 Health and Wellbeing

- 6.12.1 The preliminary health and wellbeing assessment considers how the Project may impact on the health and wellbeing of the general population.

Baseline Environment

- 6.12.2 The Study Area used for the health and wellbeing assessment includes the Draft Order Limits along with surrounding areas based on administrative boundaries to align with how the Government publishes official data.
- 6.12.3 Data has been gathered from multiple sources including census data, Annual Population Survey and from Public Health England for characteristics where Census 2021 data is yet to be released and health profiles.
- 6.12.4 The baseline reports population, an age breakdown, ethnicity breakdown, education, skills and training, deprivation, life expectancy, health, wellbeing and mortality, availability of healthcare facilities, and Public Rights of Way.

Mitigation

- 6.12.5 Mitigation measures have been development as part of the Project 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.

Assessment

- 6.12.6 The preliminary assessment has identified that the Project would create the following impacts:
- Increased temporary employment and training in the Study Area leading to improved mental and physical health outcomes. Increased expenditure for local businesses. This would create a temporarily **positive** effect which is **Significant**;
 - Temporary increase in population including demographic change from construction workforce. potential increase in demand for accommodation and community services including health services. This effect would be **Not Significant**;
 - Potential amenity effects (e.g. noise, dust, construction traffic, air quality and visual intrusion) which could impact on the mental and physical health of people living or working in local communities as well as visitors, including impacts on community cohesion due to severance and/or impacts to the local communities' quality of life. This would create a temporary **negative** effect which is **Significant**; and
 - Potential severance impacts (temporary diversions in a worst case scenario) on walkers, cyclists and horse-riders in accessing recreational routes and amenity areas including open spaces and nature, public rights of way, local community services and social infrastructure. This would create a temporary **negative** effect which is **Significant**.
- 6.12.7 During the operational phase, potential amenity and severance effects are expected to be **not significant**.
- 6.12.8 During the decommissioning phase, the effects are expected to be the same or less than that experienced in the construction phase.
- 6.12.9 The full preliminary assessment can be found in *PEIR Volume II Chapter 17: Health and Wellbeing*.

6.13 Material Assets and Waste

- 6.13.1 The materials and waste assessment considers:
- the types of quantities of materials which would be required to construct and operate the Project and the availability of these materials and their potential recycled content;
 - the types and quantities of waste produced to construct and operate the Project, and the planned recovery of this waste;
 - the cut and fill balance of the earthworks associated with constructing the Project; and
 - the impact on safeguarded waste sites and associated access.
- 6.13.2 The complete details of the materials and waste associated with the Project is not yet fully known. Therefore, the preliminary assessment is based upon early estimations and potential sources of materials and capacity for disposal in order to adequately predict the likelihood of significant environmental effects.

Baseline Environment

- 6.13.3 The Study Area for the assessment of construction and operational waste generation from the Project as well as impacts on safeguard mineral and waste sites are the Draft Order Limits.

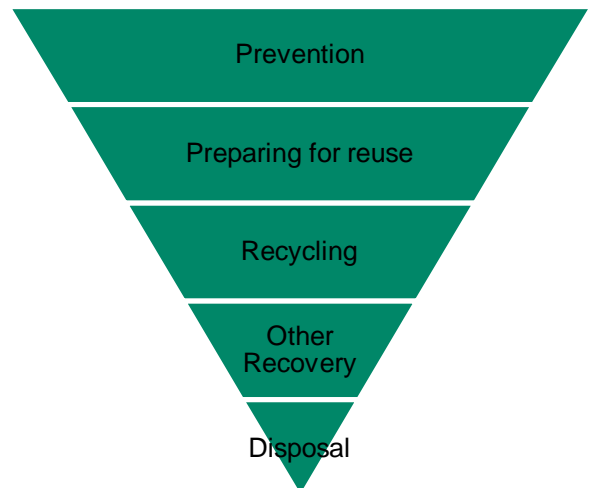
6.13.4 The expansive Study Area for non-hazardous waste management comprises the East Midlands and Yorkshire and the Humber. For hazardous waste management the Study Area is England. For the availability of key construction materials this is assessed on a national scale (United Kingdom or Great Britain).

6.13.5 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 Draft Order Limits passes through a Mineral Safeguarding Area (MSA) for sand and gravel. Additionally, there are two safeguarded waste sites in close proximity to the Draft Order Limits. Additionally, there are 16 local permitted and surrendered waste sites in close proximity to the Draft Order Limits as well as eight local waste site permit applications.

Mitigation

6.13.6 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.

6.13.7 The Preliminary Draft Construction Environmental Management Plan also contains a number of mitigation measures which would be implement in the construction phase and include the prodction of Site Waste management plan to incudes measures to ensure that wast produced or held on the Project’s construction site is disposed of safely, efficiently and lawfully.



Assessment

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

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

6.13.9 These impacts have been assessed and they effects are deemed to be **not significant** on material and waste receptors.

6.13.10 The full preliminary assessment can be found in *PEIR Volume II Chapter 18: Materials and Waste*.

6.14 Cumulative Effects

6.14.1 The cumulative effects assessment considers both cumulative and in-combination effects of as a result of the Project. 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

6.14.2 This assessment of intra-project effects involves the identification of those impact interactions upon separate receptors. Due to the on-going design and assessment of the Project, these interactions have been preliminarily identified and will be fully identified and assessed in the ES.

Inter-Project Effects

6.14.3 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'

6.14.4 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.

6.14.5 The following areas of search have been used for the cumulative effects assessment, though this is subject to review as the assessment progresses:

- Nationally Significant Infrastructure Projects – 15km based on professional judgement from similar projects on the likely area for which the Project may interact with other NSIPs and give rise to cumulative effects; and
- Town and Country Planning Act Projects (those which have been submitted to and are present on the relevant local authorities planning portals) – 4km based upon the largest environmental assessment topic Zol (2km) and doubling it, under the assumption other projects have a similar Zol to the Project.

- 6.14.6 As part of the Preliminary Environmental Information Report, Stage 1 of this assessment has commenced and a Long List of other developments to consider in the full assessment has been produced. This will be subject to further refinement and finalised for the ES. The full longlist is displayed in *PEIR Volume II - Chapter 19: Cumulative Effects*.
- 6.14.7 Stages 2 – 4 will commence in the coming months and the findings will be reported in the ES.
- 6.14.8 The full preliminary assessment can be found in *PEIR Volume II Chapter 19: Cumulative Effects Assessment*.

6.15 Major Accidents and Disasters

- 6.15.1 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.
- 6.15.2 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;
 - **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.
- 6.15.3 Safety has been key to the design of the Project. The Project's engineering team has undertaken a number of initial technical studies which have helped to influence the pipeline routing and the location of Immingham and Theddlethorpe Facilities and the Block Valve Stations (which act as emergency shutdown valves).
- 6.15.4 Future detailed engineering work will also be undertaken relating to process safety and safeguarding, isolation, venting, emergency shutdown and if required, depressurisation.
- 6.15.5 A Preliminary Draft Construction Environmental Management Plan has been prepared to set out how construction activities would be managed and controlled in compliance with accredited health and safety and environmental management systems, relevant legislation and environmental permits, consents and licences.

Preliminary Assessment

- 6.15.6 Following receipt of the Scoping Opinion (*PEIR Volume IV - Appendix 5.2*), the following items were confirmed by the Planning Inspectorate to be scoped in to 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;

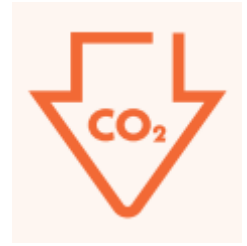
- *Pollution accidents*: Air; and
- *Malicious Attacks*: cyber, flood defence failure.

- 6.15.7 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 or whether further mitigation would be required. All effects identified for these phases of the Project are expected to be As Low as Reasonably Practicable and therefore tolerable and **Not Significant**.
- 6.15.8 Decommissioning of the Project 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.
- 6.15.9 The full preliminary assessment can be found in *PEIR Volume II Chapter 20: Major Accidents and Disasters*.

7 Summary and Next Steps

- 7.1.1 The PEIR predicts that there would be **no** significant effects on:
- geology and hydrogeology,
 - agriculture and soils;
 - air quality; and
 - materials and waste.
- 7.1.2 However, it does predict that there would be the potential for some significant effects on:
- **ecology and biodiversity**: potentially a direct loss of woodland habitat and damage to trees;
 - **landscape and visual**; temporary changes to landscape character as a result of the construction, temporary loss of landscape elements such as hedgerows, trees and vegetation which contribute to the natural beauty of the Lincolnshire Wolds Area of Outstanding Natural Beauty, a temporary change in views from certain residential properties, Public Rights of Ways, local roads, and places of business during construction. During operation the 25m high vent stack at the Theddlethorpe Facility would impact the view for certain local residents. The replanted landscape features will take time to restore;
 - **historic environment**; there may be physical effects on unknown buried archaeology and a change to the surroundings in which a heritage asset is experienced;
 - **water environment**; there may be temporary change on the Laceby Beck / River Freshney and South Dike and Grayfleet Drain cross-section shape (morphology) whilst the pipeline is installed via an open-cut method;
 - **traffic and transport**; particular properties off Thoroughfare (road) may experience short term changes to the number of heavy goods vehicles travelling along the road;

- **noise and vibration:** noise during the construction phase of the pipeline could lead to potential effects at a number of residential properties;
- **climate;** captured carbon dioxide would be transported for onward transmission and storage ensuring that the Project would contribute to the U.K. meeting its Net Zero targets;
- **socioeconomics:** there may be a temporary increase in employment and training opportunities during the construction phase. However, there may be a temporary increase in noise during construction and temporary diversion of Public Rights of Way and recreational routes. There may be a temporary loss of open space; and
- **health and wellbeing:** there may be temporary positive impacts on health and wellbeing during the construction phase, as a result of an increase in employment and training opportunities. However, there may be temporary negative impacts on the health and wellbeing of local residents, workers and visitors in communities close to the construction sites due to an increase in noise from construction as well as a change in air quality, visual intrusion and reduced accessibility for users of Public Rights of Way.



- 7.1.3 The detailed design of the Project will continue to be developed ahead of a DCO submission, and any feedback received from this Statutory Consultation will be considered as part of this process.
- 7.1.4 Environmental and engineering surveys will continue through 2022 and early 2023, with further assessment work undertaken as part of the ongoing EIA process. The preliminary assessment will be developed into a full assessment which will improve the confidence rating. As more survey work is completed there will be a better understanding of the existing environment against which the Project's activities can be assessed. Additionally, as the Project's design matures, more information will be available to aid in the understanding of its potential impacts.
- 7.1.5 The full assessment will be detailed in an Environmental Statement which will be submitted with the Development Consent Order application in Summer 2023.
- 7.1.6 The Planning Inspectorate would then examine our proposals and application and, if appropriate, hold public hearings before making a recommendation to the Secretary of State for Business, Energy and Industrial Strategy as to whether to grant approval.

8 Have your say

- 8.1.1 This Statutory Consultation is set to be held from 22nd November 2022 right through until Tuesday 24th January 2023. This is to ensure that all interested parties have ample opportunity to share ideas, provide feedback on the proposals or offer advice and local knowledge. It will also be a great opportunity to ask any questions you may have.
- 8.1.2 Further information, including electronic copies of all materials produced in support of the Statutory Consultation, is available on the Project website, at:
www.consultation.vikingccs.co.uk
- 8.1.3 You will also be able to view hard copies of the brochure and this NTS of the PEIR at selected locations as highlighted within the Statement of Community Consultation.
- 8.1.4 Your response can be shared, in writing, in one of the following ways:
- Completing the online response form located on the project website at www.consultation.vikingccs.co.uk;
 - Attending an in-person consultation event (as outlined in chapter 4 of this document), where you can meet with core members of the project team. Here you can complete a paper copy of the response form;
 - Requesting the response form by post or picking up a paper copy at one of the document inspection venues – these can be posted (no stamp required) to Freepost VIKING CCS PIPELINE; or
 - Emailing the response form to vikingccspipeline@aecom.com.
- 8.1.5 All responses must be received by 23:59 on Tuesday 24 January 2023. Responses received after this date may not be considered.
- 8.1.6 Additionally, the following phone number and email address can be used to ask any questions without making a formal response:
- Phone: 07917 986 094
 - Email us at: vikingccspipeline@aecom.com