KEADBY
NEXT GENERATION
POWER STATION
Hydrogen-enabled flexible power

A collaboration between SSE Thermal and Equinor

The Keadby Next Generation Power Station Project

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Planning Inspectorate Ref: EN0110001

The Keadby Next Generation Power Station Development Consent Order [year]

Environmental Statement (ES)

Non-Technical Summary

The Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure Regulations 2009 – Regulation 5(2)(a) The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017

Applicant: Keadby Next Generation Limited

Date: August 2025

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Glossary

Abbreviation/ Frequently used term	Definition/Notes
AEP	Annual Exceedance Probability - in relation to flooding, the 100-year flood (a flood likely to occur once every 100 years) can be expressed as the 1% AEP flood, which has a 1% chance of being exceeded in any year.
AGL	Above Ground Level - a height above ground level is a height measured with respect to the underlying ground surface.
AIL	Abnormal Indivisible Load - a load that cannot be broken down into smaller loads for transport without undue expense or risk of damage. It may also be a load that exceeds certain parameters for weight, length and width.
ALARP	As Low As Reasonably Practicable - a term often used in the regulation and management of safety-critical and safety-involved systems. The ALARP principle is that the residual risk shall be reduced as far as reasonably practicable.
AOD	Above Ordnance Datum - a spot height (an exact point on a map) with an elevation recorded beside it that represents its height above a given datum.
AONB	Area of Outstanding Natural Beauty - land protected by the Countryside and Rights of Way Act 2000.

Abbreviation/ Frequently used term	Definition/Notes
BAT	Best Available Techniques - the available techniques which are the best for preventing or minimising emissions and impacts on the environment. BAT is required for operations involving the installation of a facility that carries out industrial processes. Techniques can include both the technology used and the way an installation is designed, built, maintained, operated and decommissioned.
BNG	Biodiversity Net Gain - a way of creating and improving natural habitats. BNG makes sure development has a measurably positive impact ('net gain') on biodiversity, compared to what was there before development.
CCGT	Combined Cycle Gas Turbine - a highly efficient form of electricity generation technology. An assembly of heat engines work in tandem using the same source of heat to convert it into mechanical energy which drives electrical generators and consequently generates electricity.
CCRA	Climate Change Risk Assessment - the resilience of a proposed development to future climate change impacts, including damage to the Proposed Development as a result of climate change
CCS	Carbon Capture and Storage - is a way of reducing carbon dioxide (CO2) emissions. It is a three-step process, involving: capturing CO2; transporting it; and then permanently storing it deep underground.
CEMP	Construction Environmental Management Plan - a plan to outline how a construction project will avoid, minimise or mitigate effects on the environment and surrounding area.
COMAH	Control of Major Accident Hazards - Regulations to ensure that businesses take all necessary measures to prevent major accidents involving dangerous substances.

Abbreviation/ Frequently used term	Definition/Notes
CTMP	Construction Traffic Management Plan - a plan outlining measures to organise and control vehicular movement on a construction site so that vehicles and pedestrians using site routes can move around safely.
CWTP	Construction Workers' Travel Plan - a plan managing and promoting how construction workers travel to a particular area or organisation. It aims at promoting greener, cleaner travel choices and reducing reliance on the private car.
DCO	Development Consent Order - made by the relevant Secretary of State pursuant to The Planning Act 2008 to authorise a Nationally Significant Infrastructure Project. A DCO can incorporate or remove the need for a range of consents which would otherwise be required for a development. A DCO can also include rights of compulsory acquisition.
DEMP	Decommissioning Environmental Management Plan - a plan to outline how a decommissioning project will avoid, minimise or mitigate effects on the environment and surrounding area.
EA	Environment Agency - a non-departmental public body sponsored by the United Kingdom government's Department for Environment, Food and Rural Affairs (DEFRA), with responsibilities relating to the protection and enhancement of the environment in England.
EIA	Environmental Impact Assessment - a term used for the assessment of environmental consequences (positive or negative) of a plan, policy, program or project prior to the decision to move forward with the proposed action.
ELV	Emission Limit Value - emission limit values based on the Best Available Techniques (BAT).

Abbreviation/ Frequently used term	Definition/Notes
EMF	Electromagnetic Field - a combination of invisible electric and magnetic fields of force.
ES	Environmental Statement - a report in which the process and results of an Environment Impact Assessment are documented.
GHG	Greenhouse Gases - atmospheric gases such as carbon dioxide, methane, chlorofluorocarbons, nitrous oxide, ozone, and water vapour that absorb and emit infrared radiation emitted by the Earth's surface, the atmosphere and clouds.
Ha	Hectare – a metric unit of measurement, equal to 2.471 acres or 10,000 square metres.
HGV	Heavy Goods Vehicle - vehicles with a gross weight in excess of 3.5 tonnes.
HRSG	Heat Recovery Steam Generator - an energy recovery heat exchanger that recovers heat from a hot gas stream. It produces steam that can be used in a process (cogeneration) or used to drive a steam turbine (combined cycle).
HRA	Habitats Regulations Assessment - the assessment of the impacts of implementing a plan or policy on a Natura 2000 site required under the Habitats Directive.
HSE	Health and Safety Executive - the body responsible for the encouragement, regulation and enforcement of workplace health, safety and welfare.
ICCI	In-Combination Climate Change Impact - the in-combination effects of a changing climate.
IEMA	Institute of Environmental Management and Assessment
LBMEP	Landscaping and Biodiversity Management and Enhancement Plan

Abbreviation/ Frequently used term	Definition/Notes
LCA	Landscape Character Area - areas of homogenous landscape or townscape character. Typical components defining character include landform, land cover, settlement pattern, form and enclosure.
LWS	Local Wildlife Site - defined areas, identified and selected for their nature conservation value, based on important, distinctive and threatened habitats and species with a national, region.
MA&D	Major Accidents and Disasters - the potentially significant effects of a development.
mAOD	Metres above Ordnance Datum
NCA	National Character Area - a natural subdivision of England based on a combination of landscape, biodiversity, geodiversity and economic activity.
NGET	National Grid Electricity Transmission - the owner of the high-voltage electricity transmission network in England and Wales.
NLC	North Lincolnshire Council
NO	Nitric Oxide
NO_x	Oxides of Nitrogen
NRMM	Non-Road Mobile Machinery - machinery typically used off the road, such as construction machinery.
NSIP	Nationally Significant Infrastructure Project - defined by the Planning Act 2008 and cover projects relating to energy (including generating stations, electric lines and pipelines); transport (including trunk roads and motorways, airports, harbour facilities, railways and rail freight interchanges); water (dams and reservoirs, and the transfer of water resources); wastewater treatment plants and hazardous waste facilities.

Abbreviation/ Frequently used term	Definition/Notes
	These projects are only defined as nationally significant if they satisfy a statutory threshold in terms of their scale or effect.
NSR	Noise Sensitive Receptor - locations or areas where dwelling units or other fixed, developed sites of frequent human use occur which may be sensitive to noise impacts.
NTS	Non-Technical Summary - a summary of the Environmental Statement written in non-technical language for ease of understanding.
OMH	Open Mosaic Habitats - found mainly in urban and formerly industrial areas and have high biodiversity value.
OS	Ordnance Survey - the national mapping agency for Great Britain.
OWSI	Outline Written Scheme of Investigation – outline document which describes archaeological evaluation and mitigation works to be carried out.
PEI	Preliminary Environmental Information - an initial statement of the main environmental information available for a study area.
PINS	Planning Inspectorate - executive agency of the Department for Communities and Local Government of the United Kingdom Government. It is responsible for determining final outcomes of town planning.
PRoW	Public Right of Way - a highway where the public has the right to walk. It can be a footpath (used for walking), a bridleway (used for walking, riding a horse and cycling), or a byway that is open to all traffic (including motor vehicles).
SAC	Special Area of Conservation - high quality conservation sites that are protected under the European Union Habitats

Abbreviation/ Frequently used term	Definition/Notes
	Directive, due to their contribution to conserving those habitat types that are considered to be most in need of conservation.
SPA	Special Protection Area - strictly protected sites classified in accordance with article 4 of the EC birds directive. Special Protection Areas are Natura sites which are internationally important sites for the protection of threatened habitats and species.
SSSI	Site of Special Scientific Interest - nationally designated Sites of Special Scientific Interest, an area designated for protection under the Wildlife and Countryside Act 1981 (as amended), due to its value as a wildlife and/or geological site.
SWMP	Site Waste Management Plan - a plan setting out how resources will be managed, and waste controlled at all stages during a construction project.
UK	United Kingdom
WSI	Written Scheme of Investigation – documents which set out the approach to undertaking archaeological monitoring of ground investigation works.
ZTV	Zone of Theoretical Visibility - a computer-generated tool to identify the likely (or theoretical) extent of visibility of a development.

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1. Non-Technical Summary

1.1. Introduction

1.1.1. This document presents a Non-Technical Summary (NTS) of the Environmental Statement (ES) that has been prepared to accompany the Development Consent Order (DCO) Application by Keadby Next Generation Ltd ('the Applicant') for a new high efficiency gas fired power station ('Keadby Next Generation Power Station') at Keadby Power Station, near Scunthorpe, Lincolnshire. In this NTS, and throughout the ES, this is referred to as the 'Proposed Development'.

1.1.2. A DCO is required for the Proposed Development as it falls within the definition and thresholds of a 'Nationally Significant Infrastructure Project' (an 'NSIP'). The Applicant has therefore submitted an application to the Secretary of State for the Department for Energy and Net Zero under Section 37 of the Planning Act 2008 (the 2008 Act), seeking a DCO for the Proposed Development. If granted by the Secretary of State, the DCO will provide the necessary authorisations and consents for the construction, operation, maintenance and eventual decommissioning of the Proposed Development.

1.1.3. The Proposed Development will be a high-efficiency Combined Cycle Gas Turbine (CCGT) power station similar to Keadby 1 and Keadby 2 Power Stations but will be designed to run on 100% hydrogen, natural gas, or a blend of natural gas and hydrogen. The Proposed Development is an alternative to the Keadby 3 Carbon Capture and Storage (CCS) Power Station (herein referred to as 'Keadby CCS Power Station'), which has already been consented under the 2008 Act. Obtaining a DCO for the Proposed Development will enable the Applicant to follow whichever decarbonisation pathway (CCS or hydrogen) becomes technically and commercially viable at the Site first.

1.1.4. Projects such as the Proposed Development are needed to stimulate investment in hydrogen production and supply infrastructure by others in parallel. It is currently anticipated that the required hydrogen supply may not be available at the start of operation of the Proposed Development, but when it is available hydrogen will be supplied via a pipeline to the Site. The supply pipeline is not included in the Proposed Development and will be progressed by a (yet to be determined) hydrogen supplier under a separate consent.

1.1.5. All the land included within the DCO application boundary (see **Plate NTS1**) is referred to as 'the Site' for the purposes of the ES and this NTS.

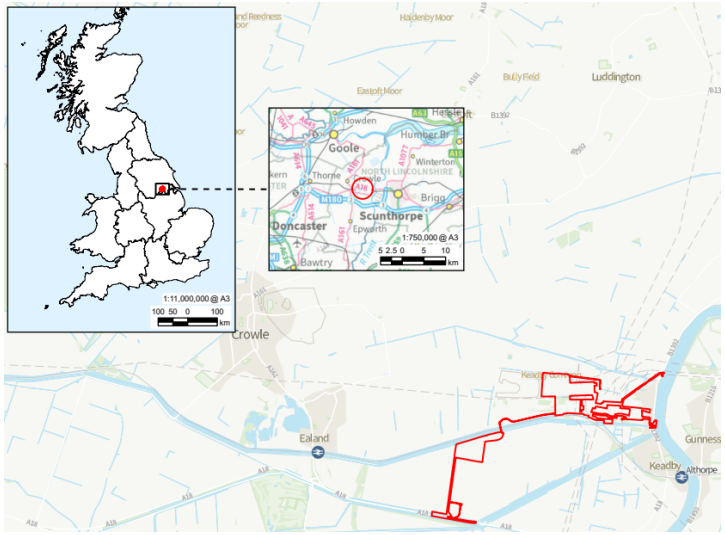


Plate NTS1: Site Location Plan

1.1.6. This document provides a summary of the ES which has been prepared to accompany the DCO in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended) ('the EIA Regulations'). The purpose of this NTS is to describe the Proposed Development and provide an overview of the key findings of the ES.

1.2. The Applicant

1.2.1. The Applicant is a subsidiary of the FTSE-listed SSE plc, one of the UK's largest and broadest-based energy companies, and the country's leading developer of renewable energy. The Proposed Development is being developed in partnership with Equinor, one of the country's leading energy providers. Equinor is developing multiple low-carbon hydrogen and carbon capture projects in the Humber. Over the last 20 years, the SSE group has invested over £20 billion to deliver industry-leading offshore wind, onshore wind, CCGT, energy from-waste, biomass, battery-storage, energy networks and gas storage projects. Related SSE companies own and operate the adjacent Keadby 1 and Keadby 2 Power Stations and have the benefit of the DCO for Keadby CCS Power Station.

1.2.2. SSE Renewables Limited operates Keadby Windfarm, which lies to the north and south of the Site and generates renewable electricity from 34 turbines, with a total installed generation capacity of 68MW.

1.2.3. SSE plc has set out a clear commitment to investment in low carbon power infrastructure, working with government and other stakeholders to create a Net Zero power system by 2040. This

includes investment in flexible sources of electricity generation and storage for times of low renewable output which will complement other renewable generating sources, either using low-carbon fuels and/ or capturing and storing carbon emissions.

1.2.4. The design of the Proposed Development demonstrates the commitment, and the Proposed Development will be built with a clear route to decarbonisation, consistent with SSE's Net Zero Acceleration Programme Plus and net zero transition plan which committed to the development and progression of new low-carbon flexible power including hydrogen-fuelled generation.

1.3. Assessment Methodology

Environmental Impact Assessment Methodology

1.3.1. An Environmental Impact Assessment (EIA) process is intended to ensure that consenting decisions are made with knowledge of the likely significant effects of a future development. The EIA presented in the ES (Volumes I – III (**Application Document Ref. 6.2 – 6.4**) and summarised in this NTS) follows a standard EIA methodology, described here.

1.3.2. EIA is undertaken to help to anticipate changes (or 'impacts') that may occur to the environment as a result of the Proposed Development and assesses key stages in the construction and operation (including maintenance and use) and where possible and relevant, decommissioning stages. The changes are compared to the environmental conditions that would have occurred without the Proposed Development ('the baseline conditions').

1.3.3. The EIA process identifies potentially sensitive 'receptors' that may be affected by these changes (e.g. people living near the Proposed Development, local flora and fauna) and assesses the extent to which these receptors may be affected by the predicted changes and whether or not the receptors are likely to experience a 'significant effect'. Where significant effects are identified during the EIA process, this is likely to influence the Secretary of State's decision of whether to approve the DCO.

1.3.4. Where possible, the EIA uses standard methodologies, based on legislation, defined standards and accepted industry criteria. This is set out in detail in each technical chapter of the ES (**Volume I**, **Application Document Ref. 6.2**). Effects on receptors can be adverse (negative), neutral (neither negative, nor positive) or beneficial (positive). They can also be temporary (e.g. noise

during construction) or permanent (e.g. the views of the finished buildings).

1.3.5. For the purpose of the ES, adverse and beneficial effects are described as 'significant' or 'not significant'. Where the EIA predicts a significant adverse effect, mitigation measures are identified where possible to avoid or minimise the effect, or to reduce the likelihood of the effect occurring. The use of such mitigation is proposed to be secured through Requirements (similar to planning conditions) that are included within the **Draft DCO** (**Application Document Ref. 3.1)** or under other legislation and consenting regimes. Details of the EIA Methodology is provided within **ES Volume I Chapter 2**: Assessment Methodology (**Application Document Ref. 6.2**).

1.3.6. In general, the classification of an effect is based on the magnitude (scale) of the impact and sensitivity or value/ importance of the receptor, using the matrix shown in **Table 1**. Moderate and major effects are considered to be 'significant' for the purposes of the EIA Regulations in accordance with standard EIA practice.

Table 1: Classification of effects

Magnitude of Impact	Sensitivity/Importance of Receptor			
	High	Medium	Low	Very Low
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Very Low	Minor	Negligible	Negligible	Negligible

EIA Scoping

1.3.7. EIA Scoping is a process that is designed to identify relevant topics that should be included in the EIA and reported in the ES. An EIA Scoping Report and request for an EIA Scoping Opinion, under Regulation 10 of the EIA Regulations, was submitted to the Planning Inspectorate (PINS) and relevant consultees on 30 April 2024 to allow them to comment on the extent of and approach to the environmental assessments to be undertaken.

1.3.8. A Scoping Opinion was received from PINS on 10 June 2024 and is presented within **ES Volume II Appendix 1B**: Scoping Opinion (**Application Document Ref. 6.3**). The scope of the ES is based on the Scoping Opinion and therefore includes assessments of the following environmental topics:

- **Chapter 8**: Air Quality;
- **Chapter 9**: Noise and Vibration;
- **Chapter 10**: Traffic and Transport;
- **Chapter 11**: Biodiversity and Nature Conservation;
- **Chapter 12**: Water Environment and Flood Risk;
- **Chapter 13**: Geology, Hydrogeology and Land Contamination;
- **Chapter 14**: Landscape and Visual Amenity;
- **Chapter 15**: Cultural Heritage;
- **Chapter 16**: Socio-economics;
- **Chapter 17**: Population and Human Health;
- **Chapter 18**: Climate Change;
- **Chapter 19**: Major Accidents or Disasters;
- **Chapter 20**: Waste and Materials; and
- **Chapter 21**: Cumulative and Combined Effects.

1.3.9. Following the completion of the EIA Scoping Report and publication of a Scoping Opinion, the environmental information for a DCO is reported in two stages:

- a Preliminary Environmental Information (PEI) Report is prepared to inform statutory (formal) consultation with the public and other stakeholders about the Proposed Development, based on the preliminary environmental information available at the time of consultation; and
- an ES, is then prepared to accompany the DCO application including the EIA of the Proposed Development, taking account of any design evolution that has taken place, as well as feedback received during consultation.

1.3.10. A PEI Report was prepared to meet the requirements of Regulation 12(2) of the EIA Regulations. In order to enable consultees to understand the likely environmental effects of the Proposed Development, the PEI Report presented preliminary findings of the environmental assessments undertaken up to that point in time. This allowed consultees the opportunity to provide informed comments on the Proposed Development,

the assessment process and preliminary findings, prior to the finalisation of the ES.

1.3.11. An ES has subsequently been prepared. Regulation 14(2) of the EIA Regulations describes the requirements of an ES, which includes a description of the Proposed Development, its likely environmental effects, measures to avoid, prevent, reduce and offset likely significant adverse effects, a description of alternatives and reasons for the options chosen, and a NTS of the information. This document is the NTS of the ES submitted with the DCO Application.

Consultation

1.3.12. Consultation is important in the preparation of DCO applications and in the EIA process. The 2008 Act requires applicants for development consent to carry out pre-application consultation on their proposals. This includes consultation on the PEI Report, as described above.

1.3.13. Consultation with key stakeholders has been ongoing throughout the EIA process and comments raised have been addressed in the ES where applicable.

1.3.14. All the consultation responses received have been considered in the preparation of the Application and supporting documentation, as set out in the **Consultation Report** (**Application Document Ref. 5.1**) that also accompanies the DCO Application.

Environmental Statement

1.3.15. The format of the ES is outlined in **Table 2**.

Table 2: ES Contents

ES Volume	Content
Volume I – Main Chapters	Chapters 1 - 2 present an introduction to the project and EIA assessment methodology. Chapters 3 - 6 present a description of the Site and surrounding areas; components of the Proposed Development, their construction and decommissioning, programme, design evolution and alternatives. Chapter 7 presents a summary of relevant legislation and planning policy. Chapters 8 – 20 present the findings of the environmental assessments,

ES Volume	Content
	likely significant effects identified, and mitigation, monitoring and enhancement measures proposed. Chapter 21 provides an initial assessment of the potential for cumulative and combined effects to occur as a result of the Proposed Development with other proposed developments. Chapter 22 provides a summary of the likely significant residual environmental effects identified.
Volume II – Appendices	Presents additional information to support the environmental assessments in Volume I.
Volume III – Figures	Presents figures that accompany Volumes I and II.
4 – Non-Technical Summary	A stand-alone summary of the ES Volumes listed above in non-technical language.

1.4. Description of the Existing Environment

The Site and Surroundings

1.4.1. The Site is located within and near to the existing Keadby Power Station site near Scunthorpe, Lincolnshire, as shown on **Plate NTS1** and is centred on national grid reference 481961, 412101. The Site falls within the administrative area of North Lincolnshire Council (NLC).

1.4.2. The Keadby Power Station site includes the operational Keadby 1 Power Station and Keadby 2 Power Station.

1.4.3. Beyond the current Keadby Power Station site, land use is almost entirely low lying farmland and scattered villages, however, the immediate site surroundings have been developed in recent years with power related infrastructure, including the operational Keadby Windfarm to the north and south of the Site and the pylons associated with the existing National Grid 400kV Substation located within the Site.

Parts of the Site

1.4.4. The Site covers an area of approximately 77.1 hectares (ha). Multiple land uses together make up

the Site as shown in **Plate NTS2** and for the purposes of the ES, the following names (described in the following paragraphs) are used to describe parts of the Site:

- Main Site;
- Ancillary Facilities;
- Water Connections;
- Electrical Connections;
- Waterborne Transport Offloading Area;
- Construction Laydown Areas;
- Access Routes (Emergency, Permanent, and Construction);
- A18 Gatehouse Utility Connections;
- Potential Biodiversity Mitigation and Enhancement Area.

1.4.5. The areas of the Site are shown in **Plate NTS2** below.

1.4.6. The Main Site is where the CCGT and most of the associated infrastructure is proposed to be located. This is situated to the west of the Keadby Power Station site on an area called Keadby Common, historically associated with a former coal-fired power station that was demolished in the 1990's. The Main Site is currently covered by grassland with field drains on each boundary and covers an area of around 13.8ha.

1.4.7. Overhead electricity transmission lines associated with the existing National Grid 400kV Substation cross the Main Site and beneath these is an area of unmanaged grassland and scrub. The existing National Grid 400kV Substation is located immediately east of the Main Site and is included within the Site to provide an Electrical Connection for the export of low carbon electricity from the Proposed Development into the National Grid electricity transmission system.

1.4.8. Areas of land located immediately to the south of the Main Site and to the west of the Keadby 2 Power Station have been included within the Site boundary to provide additional space for Ancillary Facilities associated with the Main Site, such as the natural gas supply connection, car parking, gatehouses and administration and control buildings. The Ancillary Facilities area is around 10.4ha.

1.4.9. To the south of the Main Site is a large area of hardstanding, formerly used as laydown areas during the construction of Keadby 2 Power Station. This will be re-used as a Construction Laydown Area for the Proposed Development.

1.4.10. It is anticipated that around 26.7ha of land will be required for Construction Laydown Areas and so a number of areas are included within the Site, shown on **Plate NTS9.** This includes areas within and adjacent to the Main Site but also includes areas of farmland and grassland to the south of the Stainforth and Keadby Canal, west of North Pilfrey Bridge.

1.4.11. The Site includes an emergency vehicle access road which would only be used as a secondary point of access and egress for emergency vehicles and/ or pedestrians in the event of an emergency. A new bridge crossing of a drain (Glew Drain) on the northern boundary of the Main Site will be constructed and connect into this existing farm access track. This would not be used during construction or normal operation of the Proposed Development.

1.4.12. The Site includes land within both Keadby 1 and Keadby 2 Power Station sites required for electricity, water and other necessary connections to the Proposed Development as well as to provide temporary access during construction for abnormal load deliveries.

1.4.13. Cooling water for the CCGT will be abstracted from the nearby Stainforth and Keadby Canal. Treated effluent will be directed to the River Trent and discharged through the existing Keadby 1 and Keadby 2 Power Station outfall and so the easement for the water discharge route is also included in the Site.

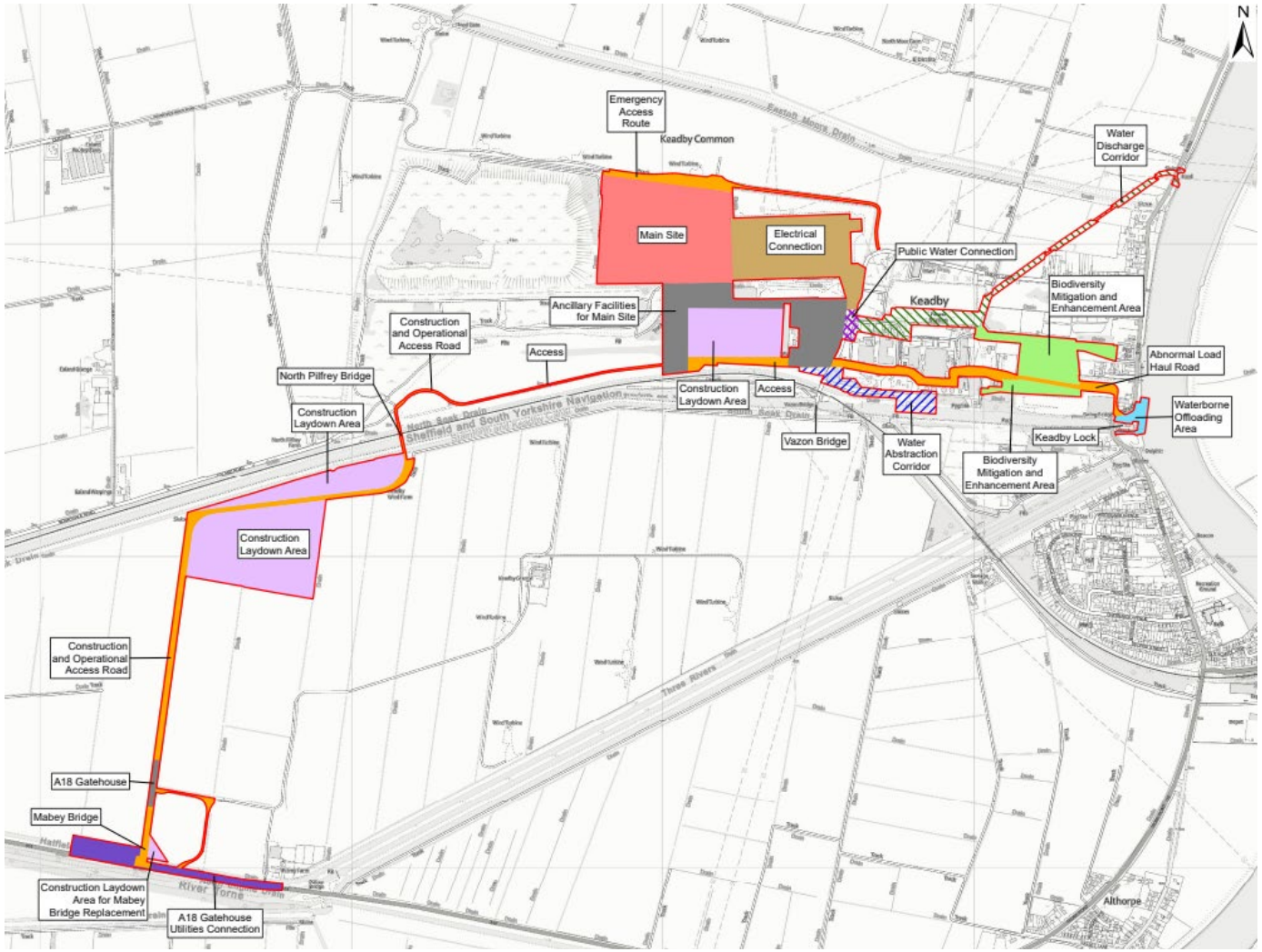


Plate NTS2: Areas of the Site Referred to in the ES

1.4.14. As shown on **Plate NTS2**, a Waterborne Transport Offloading Area at Railway Wharf, directly adjacent to the River Trent and to the north of Keadby Lock is included in the Site boundary. This would be used during construction to offload abnormal load deliveries arriving by barge on the River Trent, as was undertaken during the construction of Keadby 2 Power Station (see **Plate NTS3**). A small (around 5m wide) section of the River Trent is included in the Site to allow for temporary mooring of barges and oversail by cranes unloading moored vessels and an existing mooring point to the south of the Stainforth and Keadby Canal entrance is also included in the Site to ensure longer vessels can safely moor at the Wharf.

Plate NTS3: Waterborne Transport Offloading Area

1.4.15. The Site also includes a temporary haul road, used during the construction of Keadby 2 Power Station for abnormal load deliveries from the Waterborne Transport Offloading Area. This route would be maintained as a temporary haul route, used, and then restored following completion of construction of the Proposed Development.

1.4.16. The main access to the Site during construction and operation would be via the existing access road from the A18. A small permanent gatehouse/ security building and parking provision will be put in place. The existing bridge at the southern end of the access road near the A18 ('Mabey Bridge') will also be replaced in order to provide permanent

access to the Site over its 25 year lifetime. A small temporary construction laydown area will be used near to the junction during these works.

1.4.17. Additional land has also been included in the Site to provide landscaping and biodiversity enhancement areas.

Potential Sensitive Receptors

1.4.18. A number of environmental receptors have been identified within and outside the boundary of the Site and are described in more detail in **ES Volume I Chapter 3**: The Site and Surrounding Area (**Application Document Ref. 6.2**). Distances are provided as the shortest distance between the receptor and the closest point of the boundary of the Site and/ or the Main Site.

1.4.19. Key receptors for each topic area have been identified as part of the assessment process and details are included in the relevant technical chapters (**ES Volume I Chapters 8 - 20** (**Application Document Ref. 6.2**)) and the supporting figures for Chapters 8-20 (**ES Volume III** (**Application Document Ref. 6.4**)). A brief summary is also provided below.

Residential Receptors

1.4.20. The nearest settlement is the village of Keadby which is located immediately adjacent to the Water Discharge Corridor and approximately 1km east from the Main Site at its closest point. Other settlements nearby include Gunness (1.8km) to the east on the eastern bank of the River Trent; Althorpe (2.2km) to the south-east; Ealand (3.0km) to the west; and Crowle (4.0km) to the west.

1.4.21. The closest residential and other sensitive human receptors to the Site include:

- properties along Trent Road including Blacksmiths Cottage (former Trentvale Preparatory School), No. 7 and 8 Mariners Arms Flats and No. 19 Trent Side. The closest of this group of properties is located immediately adjacent to (within 5m of) the Potential Biodiversity Mitigation and Enhancement Area and a single residential property (No 5 Trent Side), approximately 40m east of the Construction Access Haul Route;
- a pair of semi-detached residential properties ‘Holly House’ and ‘Hawthorn House’ located 0m (Hawthorn House) and 35m west (Holly House) of the Water Discharge Corridor on Chapel Lane,

- properties along Chapel Lane, located 50m east of the Water Discharge Corridor;
- an individual property at Vazon Bridge approximately 50 south of the Site boundary, adjacent to the Stainforth and Keadby Canal;
- Scunthorpe Sea Cadets – Boat Station located approximately 55m south of the Site boundary, adjacent to the Stainforth and Keadby Canal;
- Pilfrey Farm, immediately to the north of the A18 Gatehouse Utility Connection Works;
- Keadby Grange, approximately 510m east of the Construction Laydown Areas within the agricultural fields, to the south of Stainforth and Keadby Canal;
- farms along Bonnyhale Road including Ealand Warpings approximately 190m north-west of the Construction and Operational Access Route and North Pilfrey Farm located 225m west of North Pilfrey Bridge;
- North Moor Farm located approximately 500m north of the proposed Emergency Access Route;
- Boskeydyke Farm located approximately 1.1km north of the Water Discharge Corridor;
- Amcotts Grange located approximately 1.4km north of the Water Discharge Corridor; and
- Ealand Poultry Farm, located on Bonnyhale Moor Road, approximately 1.6km west of the Main Site.

1.4.22. A nearby property shown on OS base mapping 'Red House' was demolished in 2019 and is therefore not included as a receptor for the purposes of the EIA.

Ecological Receptors

1.4.23. There are no statutory designated sites within the Main Site, although the River Trent, which is part of the Humber Special Area of Conservation (SAC), Ramsar site and Site of Special Scientific Interest (SSSI), is partially within the Site. Thorne Moor SAC, Hatfield Moor SAC, and Thorne and Hatfield Moors SPA are located within the 15km study area for the EIA.

1.4.24. The nationally designated Crowle Borrow Pits SSSI is located 1.2km to the west of the Site. There are several statutory nature conservation designations located beyond this within the 15km study area; further information is presented in Table 3.1 of **ES Volume I Chapter 3**: The Site and Surrounding Area **(Application Document 6.2).**

1.4.25. There are no non-statutory designated ecological sites within the Main Site although Keadby Boundary Drain Local Wildlife Site (LWS) is directly adjacent. Within the wider Site, the Water Abstraction point is crossed by the Stainforth and Keadby Canal Corridor LWS. The Hatfield Waste Drain LWS is crossed by Mabey Bridge. Additional non-statutory ecological designations within 2km of the Site are shown in Table 3.1 of **ES Volume I Chapter 3 (Application Document 6.2).**

1.4.26. Due to the proximity of internationally designated nature conservation sites, an assessment under the Conservation of Habitats and Species Regulations (2017) is also required. A report to inform a Habitat Regulations Assessment (HRA) is provided to accompany the DCO Application (**Document Ref. 5.2)** which addresses the potential for likely significant effects on the relevant European sites.

Local Transport Receptors including Public Rights of Way

1.4.27. Access to the Site during the construction and operation of the Proposed Development would be via the existing tarmacadam access road from the A18, an adopted highway. The existing access to the wider Keadby Power Station site from the B1392, a single carriageway road that serves the village of Keadby, is not proposed to be used for the Proposed Development during construction or operation.

1.4.28. Chapel Lane, an adopted highway, provides local access from Keadby village through the land associated with Keadby 1 Power Station and Keadby 2 Power Station towards Vazon Bridge. Sections of Chapel Lane are included in the Site where crossings are required, for example, the potential electrical connection to National Grid 400kv substation and the Water Discharge Corridor. With the exception of these small sections, which during construction, may be subject to temporary traffic management, Chapel Lane will not be used by general construction traffic or staff during construction of the Proposed Development (except in the event of an emergency).

1.4.29. Other roads within the Site include Ealand Road/ Bonnyhale Road which runs east-west through the Site. Trent Road, North Road and West Road are all private roads facilitating the movement of traffic within the current Keadby 1 and Keadby 2 Power Station sites within the Site boundary.

1.4.30. The Site intersects a number of other waterborne and rail transport routes (Stainforth and Keadby Canal, River Trent and Scunthorpe to Doncaster passenger rail line).

1.4.31. No public rights of way (PRoW) are located within the Site. The nearest PRoW are:

- KEAD 10: a bridleway which runs north-south from Chapel Lane to a point north of Warping Drain. The southernmost point of this footpath is approximately 40m from the Water Discharge Corridor;
- Footpath CROW11 located along Bonnyhale Road, approximately 250m north-west of the access road for the Site; and
- Footpath KEAD 9 which runs parallel to Warping Drain east-west from the northern terminus of Footpath KEAD 10 approximately 500m north of the Main Site. Footpath LUDD9 joins Footpath KEAD 10.

1.4.32. A permissive 'traffic-free cycle route' south of the Stainforth and Keadby Canal is also present together with a number of other PRoW located within the wider surrounding areas.

1.4.33. The existing view of the Power Station from PRoW KEAD 10 is shown in **Plate NTS4**.

Plate NTS4 View towards the Site from the closest PRoW KEAD9 KEAD10

Surface Water, Groundwater and Flood Risk

1.4.34. The Site and surrounding areas lie within the extensive floodplain of the River Trent which flows in a northerly direction towards the Humber Estuary. Land within the area is generally low lying and relatively flat at elevations below 10m Above Ordnance Datum (mAOD). The area known as the 'Isle of Axholme' has a complex pattern and history of surface water drainage.

1.4.35. The River Trent is a large (approximately 150m wide) tidal river. The Environment Agency's 'Flood Map for Planning' classifies the entire Site and surrounding areas generally as Flood Zone 3 which is land assessed as having a 1 in 100 or greater annual probability of river flooding (>1% Annual Exceedance Probability or AEP), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5% AEP) in any year. However, land north of the Stainforth and Keadby Canal, which includes the majority of the Site, benefits from flood defences (embankments) along the River Trent.

1.4.36. The Stainforth and Keadby Canal bisects the Site beneath North Pilfrey Bridge and joins the River Trent to the east of the Site at Keadby Lock (**Plate NTS5**).

Plate NTS5: View east along Keadby Lock [1005204; 1342734] at its exit to the River Trent, adjacent to the Waterborne Transport Offloading Area.

1.4.37. A number of Main Rivers and ordinary watercourses are crossed by the Site or are located within the study area and have been considered in the ES.

Cultural Heritage

1.4.38. There are no statutory designated sites of the highest value e.g. World Heritage Sites, Scheduled Monuments, Grade I or II* listed buildings,

conservation areas, registered parks and gardens, registered battlefields or protected wreck sites within the Site. Outside of the Site boundary, the closest assets are the Scheduled Monument (and Grade II listed building) at Keadby Lock on the Stainforth and Keadby Canal, located adjacent to the Waterborne Transport Offloading Area.

1.4.39. One further scheduled monument lies approximately 4.4km north-east of the Site at Flixborough Saxon Nunnery and Site of All Saints Medieval Church and Burial Ground.

1.4.40. The closest listed building to the Site is the Grade II listed Keadby Lock, as noted above. Other listed buildings in the study area are concentrated in settlements at Keadby, Althorpe, Gunness, Ealand and Crowle, as well as features associated with land improvement such as late-18th to early-19th century drainage syphons and sluices

1.4.41. The nearest conservation area is located in Crowle approximately 3.2km west of the Site and provides the context and setting for 14 listed buildings including the Grade I listed Church of St Oswald.

1.4.42. The non-designated Isle of Axholme area of Special Historic Landscape Interest is centred on Epworth with its northern boundary 2km south of the Main Site. A number of non-designated standing buildings and below-ground non-designated heritage assets are recorded within the vicinity of the Site. Other non-designated assets have been determined as a result of fieldwork to investigate archaeological potential presented in **ES Volume I Chapter 15:** Cultural Heritage **(Application Document Ref. 6.2**).

Landscape and Visual Receptors

1.4.43. The Site lies within the Humberhead Levels National Character Area (NCA) which is a flat, low-lying and large-scale agricultural landscape within and within the Trent Levels Landscape Character Area (LCA) which is characterised as a flat, open floodplain landscape with long distance views with little diversity in character. The Site and its immediate surroundings are heavily influenced by industrial structures of the existing Keadby Power Station Site as well as Keadby Wind Farm, overhead electricity pylons and transmission lines converging near the existing Keadby 1 and Keadby 2 Power Stations. There are no natural features of noteworthy landscape value within the Site.

1.4.44. The surrounding area is largely arable, with local villages including Keadby village directly east of the Site. The extent of views available to receptors range from close proximity to long distance views.

A number of receptors are located at the edge of villages, along roads and along PRoW where the landform is low lying. The rising landform in the east and localised areas of slightly raised ground around the Isle of Axholme in the south-west allows for elevated long-distance views towards the Site.

Agricultural Land Classification

1.4.45. The majority of the Site (including the Main Site) is located within land classified as Grade 2 (very good) agricultural land. Land within the Construction Laydown Areas within the agricultural fields south of the Stainforth and Keadby Canal is classified as Grade 1 (excellent quality).

1.5. The Proposed Development

Components of the Proposed Development

1.5.1. The Proposed Development includes the construction, operation, maintenance and eventual decommissioning of a high-efficiency CCGT generating station fuelled by hydrogen or natural gas (or a blend of both) with a capacity of up to 910MW electrical output.

1.5.2. The Proposed Development is described in detail in **ES Volume I Chapter 4**: Proposed Development **(Application Document Ref. 6.2).** The numbered Work Areas within which each component of the Proposed Development are to be built, are defined by the coloured and hatched areas on the **Works Plans** (**Application Document Ref. 2.3**).

1.5.3. In summary the Proposed Development comprises:

- a new-build CCGT electricity generating station fuelled by hydrogen and/or natural gas with a power output of up to 910MW (**Work No. 1**) including:
  - a CCGT plant;
  - cooling infrastructure;
  - natural gas and hydrogen blending equipment (for the Applicant's infrastructure);
  - supporting facilities including administration and control buildings, workshops, storage buildings, effluent treatment facilities, fire water storage tank(s), demineralised water treatment plant including storage tank(s), and permanent laydown areas for operation and maintenance activities;
- a hydrogen supply pipeline, including a gas compound for the hydrogen supplier's apparatus

and a hydrogen gas compound for the Applicant's apparatus (**Work No. 2**);

- a natural gas supply pipeline including a compound for the natural gas supplier's apparatus and a natural gas compound for the Applicant's apparatus (**Work No. 3**);
- electrical connection works for the export and import of electricity to and from the generating station and the existing 400kV National Grid Electricity Transmission (NGET) substation located adjacent to the Keadby Power Station site, including works within the substation (which would be undertaken by NGET) (**Work No. 4**);
- water supply connection works to provide cooling and make-up water to the generating station, including intake structures and an underground and/or overground water supply pipeline running between the generating station and the Stainforth and Keadby Canal (**Work No. 5**);
- connections to and use of an existing outfall and associated pipework for the discharge of used cooling water, surface water and treated effluent to the River Trent (**Work No. 6**);
- public water connection pipeline from a new connection on Chapel Lane to provide potable water to the generating station (**Work No. 7**);
- new permanent access to the generating station (**Work No. 8**), comprising:
  - maintenance and improvement of an existing private access road from the A18, including replacement of a private bridge (Mabey Bridge) (**Work No. 8A**);
  - installation of layby and gatehouse with barriers, enclosures, drainage and lighting north of the A18 junction (**Work No. 8B**) and associated utilities connections (**Work No. 8C**); and
  - emergency access route comprising the maintenance and improvement of an existing private track running between the generating station and Chapel Lane and including new private bridge crossing (**Work No. 8D**);
- temporary construction and laydown areas (**Work No. 9A**);
- maintenance and improvement of the existing paved haulage routes running between the A18 and construction laydown areas (**Work No. 9B**); and the track between skew bridge adjacent to

the A18 and a temporary construction laydown area associated with Mabey Bridge replacement (**Work No. 9C**);

- retention, maintenance and improvement and subsequent removal of existing temporary haulage route from the Waterborne Offloading Facility (**Work No. 9D**) and the inspection and repair if necessary, of the existing wharf, and temporary placement of mobile cranes including the temporary oversailing of crane arms (**Work No. 9E**);
- landscaping and biodiversity enhancement measures (**Work No. 10**); and
- an allocation of land to meet the requirements of the Carbon Capture Readiness (Electricity Generating Stations) Regulations 2013 (**Work No. 11**).

1.5.4. Various associated and ancillary development that may be required in connection with the above works are also detailed in Schedule 1 'Authorised Development' of the **Draft DCO (Application Document Ref. 3.1).** This along with **ES Volume I Chapter 4:** The Proposed Development (**Application Document Ref. 6.2**) provides further description of the Proposed Development.

1.5.5. The Proposed Development will be able to operate in 'baseload' mode (running all the time) and/ or 'dispatchable' mode (able to run when required to match the anticipated intermittency of renewable power in the future power market').

1.5.6. A schematic illustration of the Proposed Development is shown in **Plate NTS6.**

1.5.7. The high efficiency CCGT will combust (burn) hydrogen and/or natural gas that has been conditioned to the required temperature and pressure. The gas turbine selected will be provided with burner technology to minimise the formation of nitrogen oxides (NO_x).

1.5.8. Following combustion, the hot gases will enter the gas turbine where they will expand across the blades of the turbine causing it to rotate and drive an electrical generator. The gas turbine exhaust gases will be passed through the Heat Recovery Steam Generator (HRSG) to recover useful heat in order to produce steam (at various pressures) to generate further power via a separate steam turbine.

1.5.9. Flue gases may be treated with Selective Catalytic Reduction (SCR), a technology used to further remove NO_x to the required Emission Limit Values

(ELV) as prescribed by an Environmental Permit that may be required for the operation of the Proposed Development.

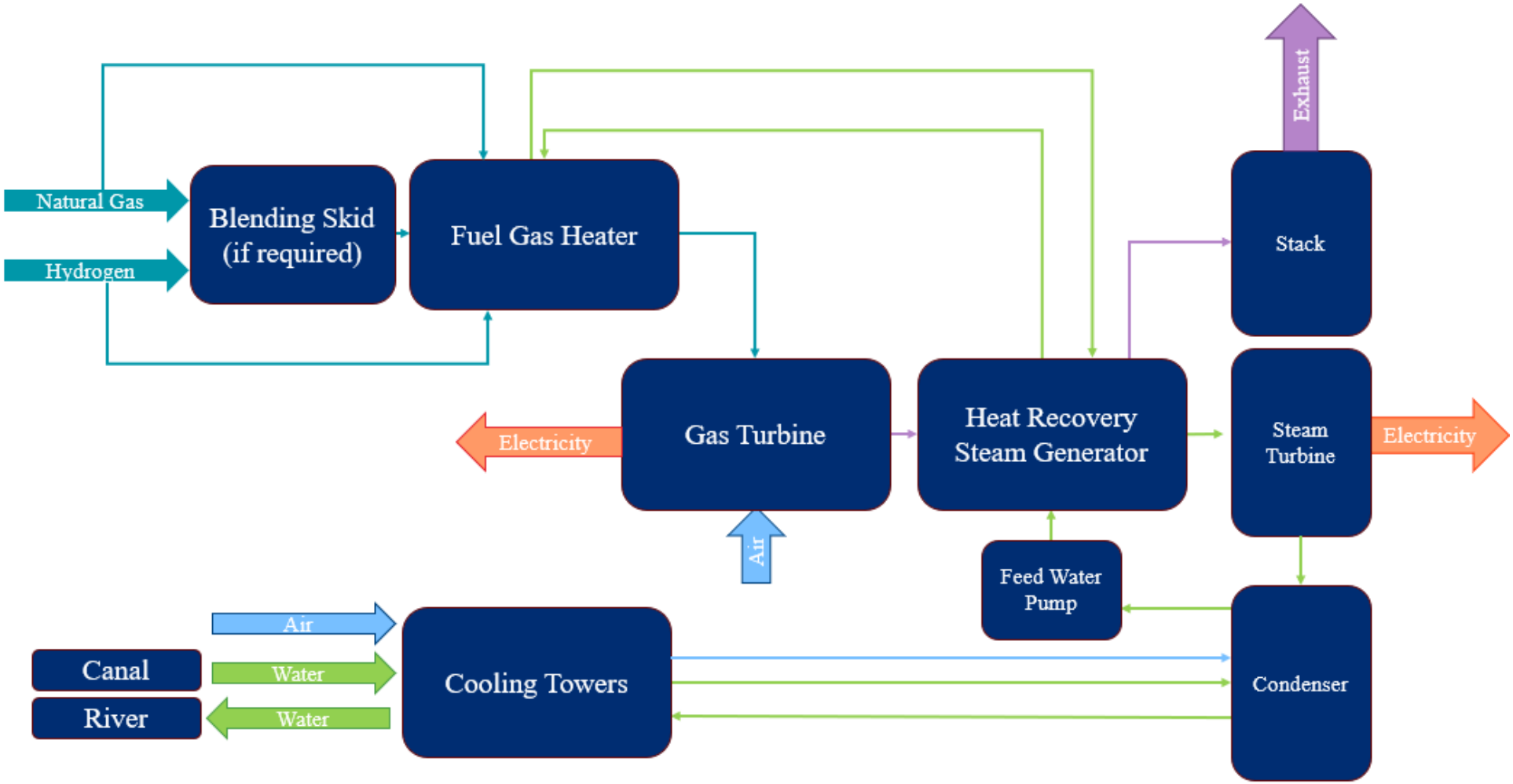


Plate NTS6: Schematic of the Proposed Development

Design Parameters

1.5.10. The detailed design of the Proposed Development is not yet completed so maximum design parameters have been identified to enable a robust EIA to be undertaken. A conservative approach has been adopted whereby the parameters that give rise to the worst-case potential environmental impacts and effects are assessed. This is known as the 'Rochdale Envelope' approach and is further explained in Advice Note Nine: Using the Rochdale Envelope (Planning Inspectorate, 2018a).

1.5.11. The final design will be within the Rochdale Envelope parameters assessed within the ES (**Application Document Ref. 6.2-6.4)** and presented in the **Draft DCO** (**Application Document Ref. 3.1**).

1.5.12. **Plate NTS7** shows an indicative layout of the Main Site and Ancillary Facilities.

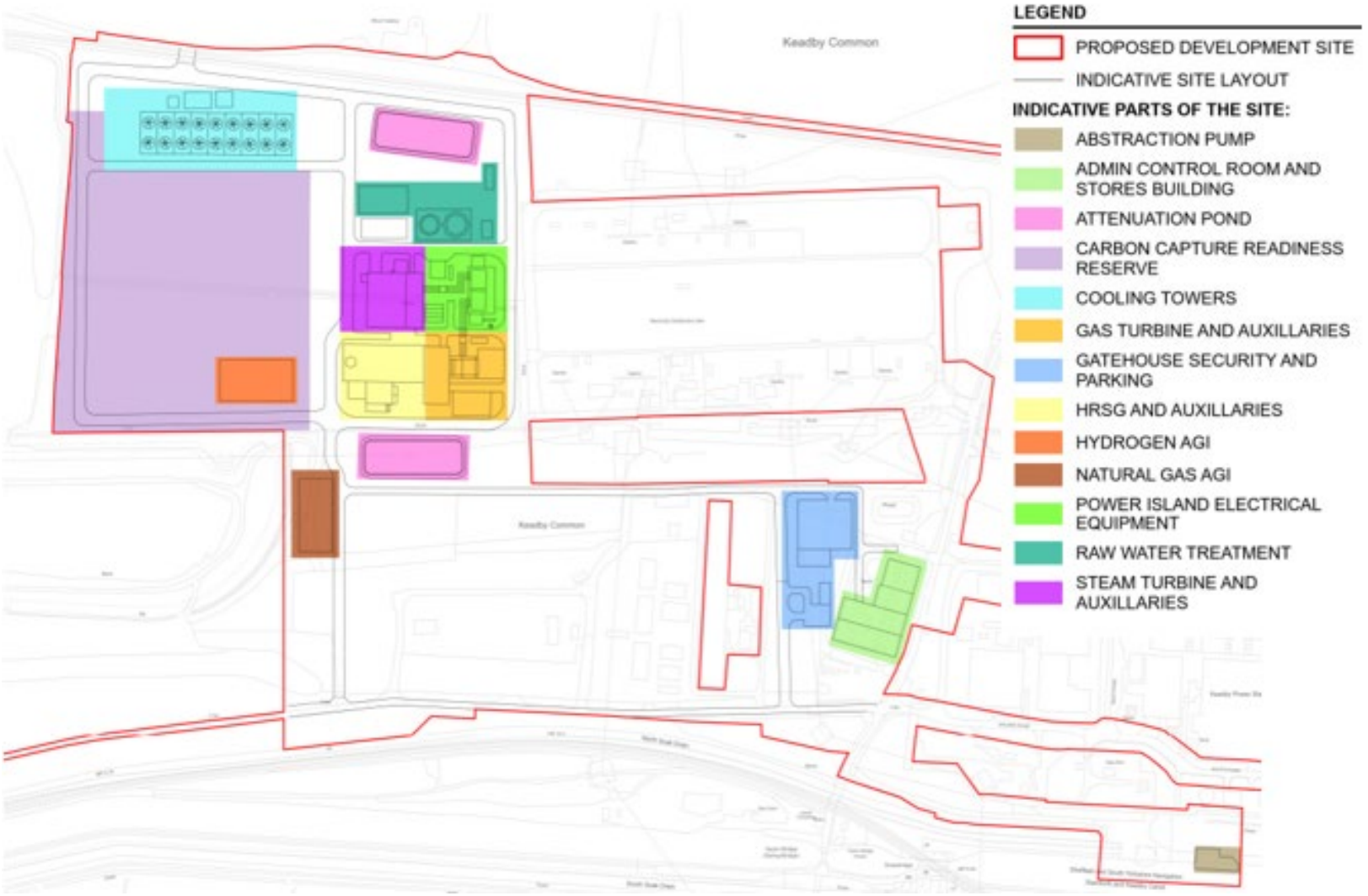


Plate NTS7: Indicative layout of the Main Site and Ancillary Facilities

Proposed Development Construction

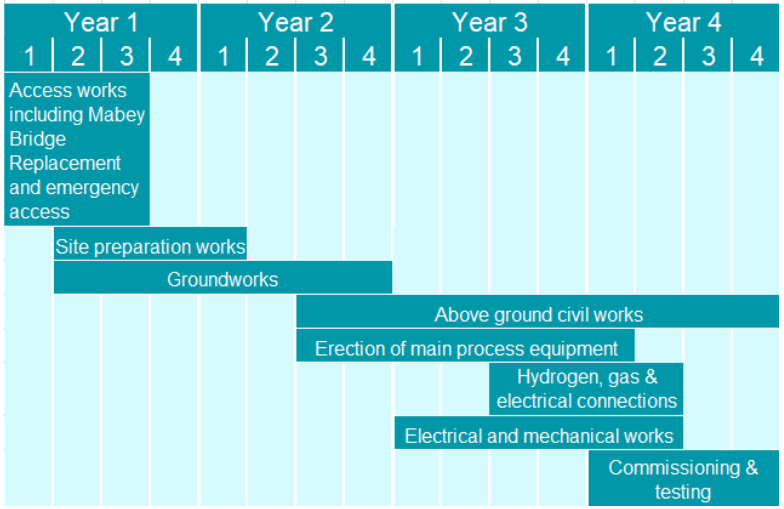
1.5.13. Construction of the Proposed Development could (subject to the necessary consents being granted and an investment decision being made) potentially start in 2027 when it is anticipated the consent would have been granted. Construction activities are expected to be completed within approximately three years, followed by commissioning, however detailed phasing will be the responsibility of the appointed contractor(s).

1.5.14. Each environmental assessment topic within the ES identifies and assesses the reasonable 'worst-case' construction scenario for that topic, where relevant. The DCO Application seeks consent for commencement of development up to seven years from the date of granting of consent. For this reason, a scenario where construction commences later in the programme, up to 2034 has also been assumed as a reasonable worst-case for some technical assessments such as traffic and transport in the ES.

1.5.15. The Applicant would appoint contractor(s) to undertake the construction phase of the Proposed Development. The Applicant would retain overall responsibility for the project and would ensure that the works would be undertaken in accordance with legal requirements.

1.5.16. An indicative construction programme is outlined in **Table 3** below.

Table 3: Indicative Construction Programme for the Proposed Development



1.5.17. Core construction working hours would be 07:00 to 19:00 Monday to Friday (except bank holidays) and 08:00 to 13:00 on Saturdays. However, it is likely that some construction activities may need to be undertaken outside of these core working hours. Such work would be subject to agreement with North Lincolnshire Council to ensure that noise and other related construction impacts are controlled.

1.5.18. A detailed Construction Environmental Management Plan (CEMP) will be prepared prior to

construction. The submission, approval and implementation of this is secured by a Requirement of the **Draft DCO** (**Application Document Ref. 3.1**). **An Outline CEMP** (**Application Document Ref. 7.4**) accompanies the DCO Application and sets out the key measures to be employed during construction to control and minimise the impacts on the environment.

1.5.19. Early works over an approximate 9-month period will include construction of the emergency access crossing and the replacement of Mabey Bridge. Piling works using continuous flight auger methods are likely to take place for the new bridge and the existing deck will be removed before the main new structure is constructed and installed.

1.5.20. After this, during the approximate three and a half year main works construction phase, earthworks will be required to produce a level platform, raise land for flood mitigation, excavate foundations, import engineering fill material and/ or remove surplus material or remediate contaminated soils. Off-site waste arisings would be minimised as far as possible, although some excess material is likely to be generated and need to be transported off-site and some additional fill material will need to be imported to improve the ground conditions and raise land levels for flood mitigation. The main Site access from the A18 would be used by all Heavy Goods Vehicles (HGV). Any excess spoil generated during construction will be managed through the Site Waste Management Plan (SWMP) that would form part of the final CEMP. An outline SWMP is provided in the **Outline CEMP (Application Document Ref. 7.4).**

1.5.21. Construction laydown areas and a contractor's compound will be required. In order to assess a worst case in the ES, it has been assumed that up to around 26.7ha of construction laydown will be required for materials and plant storage and laydown areas which would also be used for fabrication and erection of plant and equipment, concrete batching facilities, vehicle and cycle parking etc. **Plate NTS8** shows the indicative construction laydown areas.

1.5.22. The contractor will prepare and land raise parts of the Main Site and Ancillary Facilities areas where required for flood mitigation, followed by piling and excavation for main foundations of large structures. Plant and equipment will be pre-fabricated where practicable, however, certain larger items of plant may need to be fabricated and erected on-site due to their anticipated size or weight.

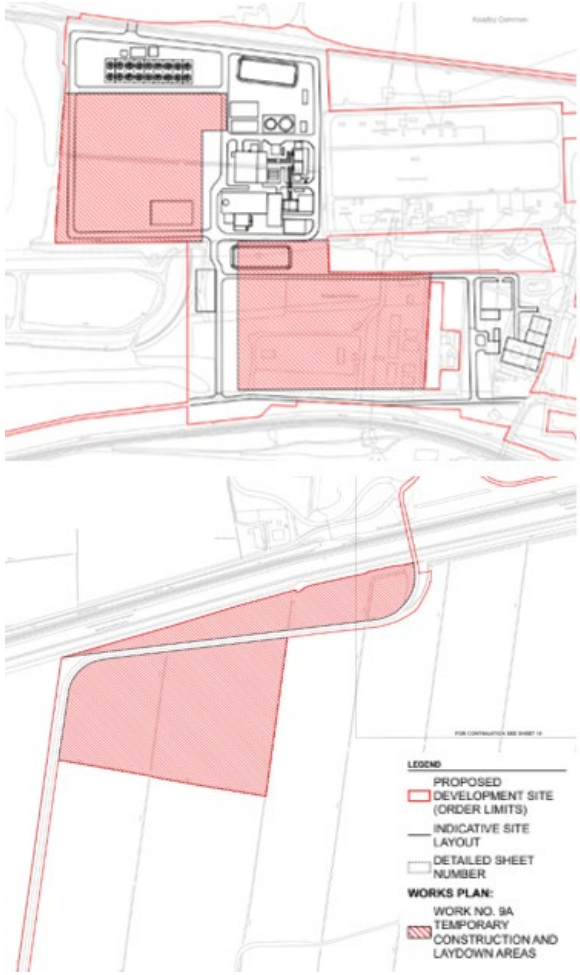


Plate NTS8: Construction Laydown Areas

1.5.23. A new natural gas connection, if required, would link into Keadby Power Station's existing natural gas supply infrastructure. Construction will be undertaken by a National Gas approved contractor.

1.5.24. A new hydrogen connection will also be provided to the Site by a hydrogen supplier. Construction will be undertaken by the hydrogen supplier or their approved contractor.

1.5.25. A new cooling water intake would be constructed near to the intake for Keadby 2 Power Station within the Stainforth and Keadby Canal (**Plate NTS9**). In order to undertake works safely, a temporary cofferdam, which may be installed using sheet piling techniques, would extend into the Canal. A water pipeline would be constructed from the intake into the Main Site. This method is likely to include open cut methods for parts of the route. The majority of this pipeline is expected to be below ground.

1.5.26. The electrical connection to the National Grid 400kV substation within the Site is anticipated to be via underground cables. There are two potential routes into the substation – from the east or from the west – the final route will be selected at the detailed design stage in conjunction with National Grid. Underground construction will require the use

of an 'open-cut' method, with a trench excavated, and the cables laid below ground.

1.5.27. Construction temporary site lighting is proposed to enable safe working on the construction site in the hours of darkness. Glare will be minimised outside of the construction site in accordance with principles that are set out in the **Outline Lighting Strategy** (**Application Document Ref. 5.11**) and are secured by a Requirement of the **Draft DCO** (**Application Document Ref. 3.1**).

Plate NTS9: Typical cofferdam that would be required on the canal, adjacent to the intake for Keadby 2 Power Station

1.5.28. Access to the Site during construction for workers and for all HGV would be via the existing access road from the A18 via Mabey Bridge and North Pilfrey Bridge. It is estimated that there will be up to around 1,050 personnel contracted to work on the Proposed Development at the peak of construction. In order to manage travel to the Site, a Construction Workers' Travel Plan (CWTP) is proposed to be secured by a Requirement of the **Draft DCO** (**Application Document Ref. 3.1**). An Outline CWTP has been produced and accompanies the DCO application (**Application Document Ref. 7.6**).

1.5.29. HGV movements, including deliveries and abnormal loads arriving at/ departing from the Site, would be controlled by a Construction Traffic Management Plan (CTMP) including HGV and abnormal load routing strategy. **An Outline CTMP** (**Application Document Ref. 7.5**) has been produced and accompanies the DCO Application. This would require, for example, all HGV to arrive and depart from the west via the A18, A161 and M180 Junction 2.

1.5.30. Three potential routes are available and have been assessed for abnormal loads. It is proposed that the largest abnormal loads will be received at the Port of Immingham and transported by boat to the

Waterborne Transport Off-Loading Area (**Plate NTS3**). It is estimated that around 35-40 abnormal loads may be required at the Waterborne Transport Offloading Area. Consistent with the abnormal load deliveries during the construction of Keadby 2 Power Station, mobile crane(s) would be used to offload the deliveries. Temporary traffic management ('stop/go signs') would be required to allow the abnormal loads to cross a short section of the B1392 before entering the Site via the temporary haul road to the east of PD Ports Services freight yard. This route is shown on **Plate NTS10.**

Plate NTS10: AIL route via Waterborne Transport Offloading Area for Proposed Development.

1.5.31. Smaller abnormal loads are expected to be transported by road from Immingham Dock via the M180 to Junction 2 and then from the A161 to the A18, entering the Site via the existing access road on the A18, over Mabey Bridge and North Pilfrey Bridge. This route is shown on **Plate NTS11.**

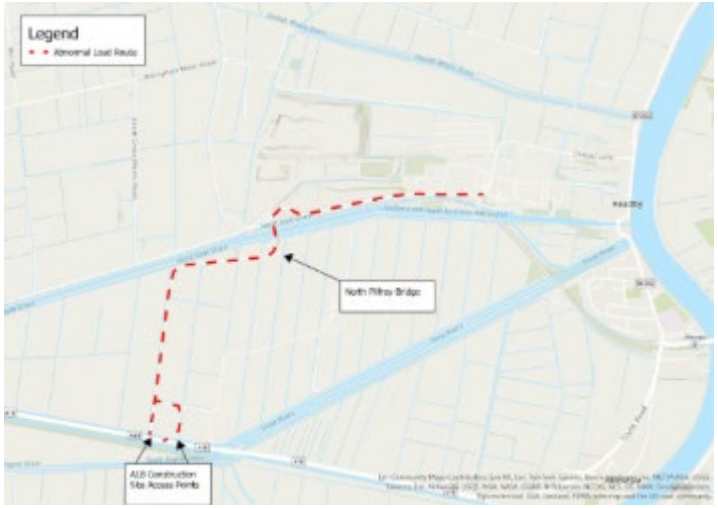


Plate NTS11: Proposed access route for abnormal loads.

1.5.32. An alternative access route for certain AIL that cannot pass over North Pilfrey Bridge was used during construction of Keadby 2 Power Station, via Bonnyhale Road to the west of the Site. This route would only be used for the Proposed Development if North Pilfrey Bridge and Railway Wharf are

unavailable or if delays to the construction programme would otherwise result. During the Keadby 2 construction consent was provided for up to 10 AIL to use this route. This route is shown on **Plate NTS12.**

Plate NTS12: Alternative proposed access route for certain abnormal loads (avoiding North Pilfrey Bridge)

Proposed Development Operation

1.5.33. The facility will be capable of operating up to 24 hours per day, 7 days per week, with programmed offline periods for maintenance.

1.5.34. Operation of the Proposed Development is anticipated to create around 50 operational roles. Temporary and contractor employees associated with maintenance activities would also be employed, as required.

1.5.35. The operation of the Proposed Development would be regulated by the Environment Agency through an Environmental Permit, which will implement the requirements of the Industrial Emissions Directive (IED). This permit would be used to control normal emissions to the environment from the plant and would also consider potential abnormal operation scenarios and prevention or minimisation of accidents, through the use of management procedures and process monitoring.

1.5.36. Routine maintenance will be planned and scheduled via the maintenance management system to ensure the Proposed Development including utility connections operates safely. Scheduled maintenance outages will occur approximately once every two to five years

depending on the nature of the plant operations in that period.

1.5.37. Permanent access to the Proposed Development during operation would be via the existing road access from the A18 which passes via the existing North Pilfrey Bridge over the Stainforth and Keadby Canal and the Scunthorpe to Doncaster passenger rail line.

Proposed Development Decommissioning

1.5.38. It is envisaged that the Proposed Development will be designed to operate for at least 25 years. At this stage, it is expected that the Proposed Development will have some residual life remaining, and an investment decision would then be made based on an assessment of the technical feasibility and the market conditions prevailing at that time. The ES has assumed that the Proposed Development could operate for longer than 25+ years, and in relevant chapters has considered and assessed the potential for operational impacts/ effects to continue beyond this timeframe.

1.5.39. If the operating life were to be extended, the Proposed Development would be upgraded in line with the legislative requirements at that time.

1.5.40. At the end of its operating life, the most likely scenario is that the Proposed Development would be decommissioned.

1.5.41. A Decommissioning Plan (including Decommissioning Environmental Management Plan (DEMP)) will be produced within the period specified in the relevant legislation in force at the time of cessation of operations and agreed with the Environment Agency as part of the Environmental Permit and site surrender process. It is proposed that this would be secured by Requirement on the **Draft DCO** (**Application Document Ref. 3.1**).

1.6. Consideration of Alternatives

Introduction

1.6.1. The EIA Regulations state that an ES should include a description of reasonable and relevant alternatives studied by an applicant and the main reasons for selecting the chosen development, taking into account the environmental effects. **ES Volume I Chapter 6**: Consideration of Alternatives (**Application Document Ref. 6.2**) provides this information in respect of the Proposed Development.

1.6.2. The detailed design of the Proposed Development has not yet been completed but has continued to evolve up to the point of submission of the DCO Application in response to consultation feedback (explained in the **Consultation Report** (**Application Document Ref. 5.10**)) and with reference to surveys and technical studies which are now complete.

Alternatives Considered

1.6.3. In summary, alternatives have been considered during the evolution of the Proposed Development including:

- alternative technologies and fuels;
- alternative sites;
- alternative design options and design evolution;
- alternative layouts and temporary construction laydown areas within the Site; and
- alternative layouts and design options within the Site.

1.6.4. The environmental effects of these alternatives have been compared to inform the Proposed Development layout and design.

1.6.5. The Proposed Development includes an appropriate degree of flexibility in the dimensions of buildings and structures to allow for the selection of the preferred technology and contractors. In order to ensure a robust assessment, a maximum built 'envelope' (also referred to as the 'Rochdale envelope') has been defined to accommodate this necessary flexibility and to enable the EIA to consider the 'worst-case'. For example, the landscape and visual impact assessment has assessed the largest massing of buildings and tallest structures that are anticipated to be required.

1.6.6. The Site was identified as being the most suitable for the following key reasons:

- the Site is suitably located to connect to the developing hydrogen supply network, which includes National Grid's Project Union (a national hydrogen transmission network for the UK, connecting hydrogen production and storage to hydrogen consumers) and Northern Gas Networks' proposed local hydrogen transmission network (East Coast Hydrogen project);
- the Site has excellent links to existing infrastructure including electrical grid and gas (specifically the National Grid electricity and natural gas transmission networks); water (given

proximity to both the Stainforth and Keadby Canal and River Trent) and transport (A18 and M180 as well as waterborne options);
- the Main Site is a brownfield site, which is considered more appropriate to redevelop for large scale power generation than an alternative greenfield site, and has no existing major structures requiring demolition, treatment and removal;
- the location of the Main Site minimises interference with the Landscape and Creative Conservation Plan for Keadby 2 Power Station and specifically, the Habitat Management Areas secured via Conditions 31-34 inclusive of the Section 36 consent for Keadby 2 Power Station;
- the Main Site provides sufficient space to accommodate the required scale of a single high efficiency combined cycle gas turbine (CCGT) unit, without encroaching on the exclusion areas for the Keadby Wind Farm turbines to the north, the former Keadby Ash Tip to the west and the existing overhead lines to the south and east;
- the Site is located largely within the boundary of the existing Keadby Power Station site (and associated land within the ownership or control of the Applicant); and
- the Main Site is located in close proximity to the existing Keadby 1 and Keadby 2 Power Stations, providing opportunities for synergies and efficiencies for the Proposed Development, such as shared use of the existing cooling water discharge infrastructure and existing access routes.

1.6.7. The design and definition of the Proposed Development has continued to evolve since the publication of the PEI Report for statutory consultation, partly in response to consultation responses, and also due to ongoing refinement of the design and Site boundary with reference to ongoing discussions with technology providers and manufacturers. The main design refinements are summarised in **Table 4**.

Table 4: Summary of design refinements since publication of the PEI Report

Topic	Information in PEI Report	Information in ES and Draft DCO	Reason for change
Rochdale Envelope parameters	HRSG Building: 28m length, 69m width, 56m height above ground level (AGL), 59.0m height above ordnance datum (AOD). Stack: Up to 8.5m diameter. Cooling towers: 123m length, 38m width and 25m AOD height	HRSG Building: 33m length, 74m width, 58m height AGL, 61.0m AOD. Stack: Up to 9m external diameter (8.4m internal diameter). Cooling towers: 170m length, 38m width, 28m AOD height.	Refined during design development and in consultation with technology manufacturers. Cooling towers dimension has evolved to enable the towers to be orientated in either a paired line or a single line – as the dimensions for the latter are greater they have been adopted as the worst-case.
Electrical connection route	Electrical connection route from the Main Site directly into the existing 400kV substation from the west.	An alternative connection route has been designed to enable connection from the Main Site to the 400kV substation from the east via an underground cable along Chapel Lane. Both options are to be retained until a connection agreement is confirmed.	Input from engagement with National Grid necessitating flexibility to be retained as to where the power station will connect into the substation
Construction staff numbers	Peak construction: 1,300	Peak Construction: 1,050	The initial figures were based on Keadby CCS. Based on a review of the construction workforce used on

Topic	Information in PEI Report	Information in ES and Draft DCO	Reason for change
			Keadby 2 Power Station (considered to be more similar in scale to the Proposed Development) and refinement of the calculations for the volume of material required in the land raising, the figures have been reduced.
Site boundary	Site boundary presented in PEI Report covered an area of 70.9 hectares (ha).	Site boundary has been adjusted to reflect design evolution and covers an area of 77.1ha. The Site boundary refinements are: 1. Inclusion of additional land around the junction of the access road with the A18. 2. A marginal increase in the width of the Site boundary around Mabey Bridge. 3. An increase to area allowed for the natural gas connection to the National Grid Gas natural gas supply network.	The reason for each Site boundary change is: 1. To allow for utility connections to the proposed A18 gatehouse. 2. To accommodate the proposed replacement bridge which is marginally wider than the existing. 3. To facilitate the most direct natural gas connection route within the Site. 4. To allow for an alternative electrical connection route into the eastern side of the 400kV Substation

Topic	Information in PEI Report	Information in ES and Draft DCO	Reason for change
		4. Inclusion of land to the south-east of the 400kV Substation. 5. Inclusion of wider area in the Stainforth and Keadby Canal. 6. Inclusion of land to the south of Railway Wharf. 7. Minor refinements to remove small areas of third party land.	5. To ensure there is a sufficient temporary working area in the Canal to install the cofferdam 6. To enable land access to an existing anchor point for vessels using the Waterborne Transport Offloading Area (Railway Wharf). 7. Areas are no longer considered to be required.
Cumulative impacts	The longlist and shortlist of committed developments was presented in the PEI Report with a high level cumulative assessment	The committed developments have been updated and a more detailed assessment of cumulative impacts is presented within the ES.	Refined to reflect the latest known status of other proposed developments within the zone of influence and to provide a robust cumulative impact assessment.

1.7. Summary of Environmental Effects

1.7.1. This section provides a summary of the likely environmental effects predicted to occur as a result of the construction, operation, maintenance and decommissioning of the Proposed Development.

These likely significant environmental effects are fully described in **ES Volume I** (**Application Document Ref. 6.2)** and its accompanying technical appendices (**ES Volume II** (**Application Document Ref. 6.3**)).

1.7.2. A summary of likely significant residual effects (effects that are likely to occur even after the implementation of mitigation measures) is outlined in **ES Volume I Chapter 22**: Summary of Likely Significant Residual Effects (**Application Document Ref. 6.2**).

Air Quality

1.7.3. **ES Volume I Chapter 8:** Air Quality (**Application Document Ref. 6.2**) considers potential impacts and effects from the Proposed Development on both human health and ecological receptors.

1.7.4. The air quality assessment uses screening tools and computer models to predict the dispersion of air emissions from the Proposed Development including emissions associated with the construction of the Proposed Development and emissions from the proposed stacks (chimneys) of the operational development. These predict concentrations of pollutants in ambient air which are compared to national air quality standards where available, or other appropriate levels as agreed with regulators.

1.7.5. Emissions assessed include:

- construction dust;
- exhaust emissions from construction site plant or Non-Road Mobile Machinery (NRMM);
- exhaust emissions from construction road vehicles;
- process emissions from the operational plant; and
- the proposed development as a whole.

Likely Impacts and Effects

1.7.6. Through the use of standard construction management measures, which reduce dust and emissions from site clearance and site preparation activities, emissions to air from construction activities are assessed to have no significant adverse effects on human or ecological receptors. Such measures would include standard best practice construction measures such as appropriate storage of materials, suppression of dust from soil movement and material storage, cleaning of vehicles and locating construction plant away from sensitive receptors; through control of emissions in the Final CEMP, effects of construction dust are assessed as not significant.

1.7.7. Based on expected vehicle movements, construction traffic air impacts are considered to be negligible at all human and ecological receptors

and the effect is therefore assessed as not significant.

1.7.8. The impact of abnormal loads (waterborne transport) is considered to be negligible (not significant) on both the Humber Estuary ecological receptor and human health receptors due to the limited number of vehicles and river vessels requiring access and the limited duration of activities and the intermittent hours.

1.7.9. The environmental effects on air quality from construction of the Proposed Development have therefore been identified as not significant. No additional mitigation other than the use of a CEMP has been identified as necessary for the construction phase of the Proposed Development.

1.7.10. During operation, impacts could arise due to process emissions from the operational Proposed Development (stack emissions, including ammonia based emissions which are assessed in respect of human health and ecological receptors). Emissions from operational road traffic are considered negligible based on predicted traffic volumes and the effect is therefore assessed as not significant.

1.7.11. An assessment of operational effects of the Proposed Development has been undertaken using atmospheric dispersion modelling and taking into account a number of conservative assumptions.

1.7.12. Predicted ground level concentrations of relevant air pollutants (principally oxides of nitrogen and ammonia) due to air emissions from the operation of the Proposed Development have been assessed. Effects as a result of the Proposed Development at the identified human receptors are assessed as not significant.

1.7.13. The deposition of nutrient nitrogen on sensitive ecological receptors from the air emissions of oxides of nitrogen and ammonia has also been calculated. Effects from Proposed Development emissions are assessed to be not significant.

1.7.14. Emissions from the Proposed Development during operation will be carefully controlled and regulated by the Environment Agency through the Environmental Permit and in accordance with the use of Best Available Techniques (BAT). The Permit must be granted prior to operation of the Proposed Development. The Applicant is working with the Environment Agency and other parties to determine BAT for hydrogen-fired CCGTs given the first of a kind nature of the Proposed Development. An application for an Environmental Permit has been prepared by the Applicant and will be

submitted to the Environment Agency for determination alongside the DCO application.

Noise and Vibration

1.7.15. A noise and vibration assessment has been undertaken and is presented in **ES Volume I Chapter 9**: Noise and Vibration **(Application Document Ref. 6.2).**

1.7.16. Key noise sensitive receptor (NSR) locations have been selected which are considered to be representative of the nearest and potentially most sensitive existing receptors in all directions around the Proposed Development. It is reasonably considered that if noise and vibration levels are suitably controlled at the NSR identified, then noise and vibration levels will be suitably controlled at other sensitive receptors in the surrounding area.

1.7.17. Noise levels during construction and operation of the Proposed Development have been predicted following relevant standards and best practice guidance and using construction information from other power station projects. The predicted results have been compared against measured baseline noise levels at the identified receptors to identify potential adverse impacts. National standards have been applied to determine whether there is the potential for significant effects without further mitigation measures being applied.

1.7.18. The assessment has also considered the potential for vibration effects from construction, operation and decommissioning of the Proposed Development. Vibration is likely to occur for a short period of the construction works as piling is likely to be required for some of the main structures on the Main Site, for installation of a cofferdam within the Stainforth and Keadby Canal and for the replacement Mabey Bridge.

Likely Impacts and Effects

1.7.19. Noise is likely to be generated throughout the construction phase through works such as initial site preparation, main civil works, plant installation, electrical connection works, as well as from construction traffic on the local road network.

1.7.20. Construction noise effects at all residential NSR during construction of the Main Site within core working hours are predicted to be not significant due largely to the distances between the works and the NSR.

1.7.21. Working outside core hours is not expected to be required. However, it may be necessary for some

minor construction activities (such as continuous concrete pours) to take place continuously over day, evening and night periods during peak construction times, although the exact nature of such works is unknown at this stage. If construction works take place continuously over night-time periods, and assuming (as a worst case for assessment) the same intensity of working as for the daytime, there would be the potential for significant adverse noise effects at all NSR. Construction activities taking place outside core working hours will therefore be planned, managed and controlled appropriately to minimise impacts as practicable as possible and relevant limits will be agreed with North Lincolnshire Council in advance.

1.7.22. The control of construction noise is secured by a Requirement in the **Draft DCO (Application Document Ref. 3.1)**. The preferred approach for controlling construction noise and vibration is to reduce levels at source, where reasonably practicable. During construction mitigation measures to minimise noise impacts for NSR would be specified in the final CEMP in accordance with best practicable means (BMP) the final CEMP will be secured through a Requirement of the **Draft DCO** (**Application Document Ref. 3.1)**. On the basis that mitigation is employed such that the relevant noise limits are met and the mitigation measures to be set out in the CEMP are followed, residual (after mitigation) effects are assessed as not significant. The final CEMP will be in accordance with the **Outline CEMP (Application Document Ref. 7.4)** which accompanies the ES. Further detailed assessment would be undertaken once a contractor is appointed and working methods are established.

1.7.23. No significant vibration effects have been identified for human or built receptors as a result of construction works on the Main Site or those at the proposed Canal Water Abstraction to install and remove the temporary cofferdam. Control and mitigation of vibration effects have been included in the **Outline CEMP (Application Document Ref. 7.4)** and will require consideration in the final CEMP.

1.7.24. It is anticipated that there will be either no change or a very low change in road traffic noise due to traffic flows along the construction traffic routes of the Proposed Development. Therefore, effects at local residential NSR are predicted to be not significant.

1.7.25. The final design of the Proposed Development has not yet been determined therefore noise modelling has been undertaken based upon the indicative layout of operational equipment. Modelling

software has been used to assess the likely effects of operational noise at NSR using conservative assumptions and sound source data from similar developments and discussions with potential contractor(s) to provide a worst-case assessment. Without additional mitigation, significant effects may occur at some properties, particularly at night when background sound levels are lower.

1.7.26. Application of practical mitigation to reduce relevant noise at source within the Main Site will therefore be undertaken during detailed design, and an operational noise control scheme (including agreed noise limits) will be prepared. This is proposed to be secured by a Requirement of the **Draft DCO (Application Document Ref. 3.1)**. Mitigating through detailed design to meet environmental noise limits, which will be agreed with North Lincolnshire Council, will ensure that any adverse impacts do not result in significant effects. These measures would also demonstrate use of BAT for the control of noise for the Environmental Permit.

Traffic and Transport

1.7.27. An assessment has been undertaken which considers the potential effects of the construction, operation (including maintenance) and decommissioning of the Proposed Development on traffic and transport; this is presented within **ES Volume I Chapter 10**: Traffic and Transportation (**Application Document Ref. 6.2**).

1.7.28. The assessment considers the predicted number of vehicle movements generated during the construction and operation of the Proposed Development, and the sensitivity (including pedestrian and cyclist safety) and capacity of the local road network. Public rights of way (PRoW), including footpaths and cycle route networks, that cross roads within the study area have also been considered and have helped define the sensitivity of the road links.

Likely Impacts and Effects

1.7.29. As baseline traffic flows on the road network are projected to increase year on year, to undertake a worst-case assessment, a future year for baseline traffic flows of 2036 has been modelled. This is the anticipated 'peak construction' year for traffic if the DCO consent was not implemented until seven years after being granted (2027).

1.7.30. The additional traffic due to Proposed Development construction activities would result in temporary increases of traffic flows, including HGV, on the roads leading to the Site. The effects of construction traffic on pedestrian amenity, severance, fear and intimidation, highway safety,

driver delay and hazardous loads have been assessed using relevant guidance. Effects at all road sections and junctions within the study area are anticipated to be not significant.

1.7.31. A number of traffic management measures would be implemented during the Proposed Development construction phase to minimise traffic impacts upon the local road network. This would include both a CTMP and CWTP that the appointed contractors would need to adhere to – outline versions of these documents are included with the DCO Application (**Application Document Ref. 7.5** and **7.6** respectively).

1.7.32. The assessment of operational road traffic has been scoped out as it is anticipated to be less significant than construction traffic. During planned maintenance outages which may occur infrequently (once every 2-5 years) and be short-lived (approximately 3 months), approximately 200 additional staff could be on-site on any one day. As these periods are short-lived it is considered that the effects during maintenance periods would be negligible as the vehicle numbers generated would be considerably lower than those that would be experienced during construction. Overall, traffic effects during operation would be not significant.

Biodiversity and Nature Conservation

1.7.33. An assessment has been undertaken of the potential effects of the construction, operation (including maintenance) and decommissioning of the Proposed Development on biodiversity and nature conservation in **ES Volume I Chapter 11:** Biodiversity and Nature Conservation (**Application Document Ref. 6.2**).

1.7.34. The baseline information has been determined through a combination of desk studies and field surveys, detailed within **ES Volume II Appendices** 11C to 11H (**Application Document Ref. 6.3**).

1.7.35. There are six international and 23 national statutory nature conservation and biodiversity designations within the overall 15km study area including the Humber Estuary Special Area of Conservation (SAC), Ramsar site and SSSI designations within the River Trent, which is partly within the Site. As is required, an assessment of the likely significant effects of the Proposed Development on these sites is being undertaken to inform the appropriate assessment screening to be undertaken under the Habitats Regulations. A further 11 local non-statutory nature conservation designations (local wildlife sites or LWS) occur within a 2km study area.

1.7.36. The scope of works for necessary habitat and protected species surveys was confirmed through a Phase 1 Habitat survey and Preliminary Ecological Appraisal (PEA) provided as **ES Volume II Appendix 11C** (**Application Document Ref. 6.3**). An assessment of impacts and effects on all relevant habitats and species has been undertaken.

Likely Impacts and Effects

Designated Sites

1.7.37. Construction of the Proposed Development has the potential to affect the designated biodiversity features of interest of the Humber Estuary SAC, Ramsar site and SSSI through:

- potential air quality impacts on habitats for which the Humber Estuary is designated; and
- noise and visual disturbance for breeding, passage and wintering birds for which the Humber Estuary SSSI and Ramsar site is designated.

1.7.38. Due to the absence of construction works in the River Trent, distance of the habitats of greatest importance for birds from the activities of highest disturbance (i.e. periodic piling) and embedded mitigation measures including dust management, construction durations and methods to be included in the final CEMP, which will be secured by the **Outline CEMP** (**Application Document Ref. 7.4**); the assessment concludes that construction activities are not likely to adversely impact the conservation status of relevant bird species associated with the Humber Estuary.

1.7.39. Overall, the potential construction effect on the Humber Estuary SSSI, SAC and Ramsar site is assessed as not significant.

1.7.40. The new water intake structure would be constructed within the Stainforth and Keady Canal Corridor LWS, designated for its aquatic and wetland plant interest, in a similar way to the works recently completed for Keadby 2 Power Station. The potential construction effect on the LWS is assessed as not significant.

1.7.41. There are no likely significant direct or indirect construction impacts and effects on any other statutory nature conservation designations.

1.7.42. Potential impacts during the operational phase that could result in effects on ecological features have been assessed including:

- air quality impacts - air pollution from stack emissions, potentially leading to adverse effects

on sensitive habitats, including nature conservation designations, through increased ammonia, nitrogen and acid deposition; and

- disturbance impacts - external operational lighting and noise has potential to affect bats where it coincides with their foraging and commuting habitats.

1.7.43. Based on the findings of the air quality impact assessment, effects from all atmospheric pollutants (including NO_X, ammonia, nutrient nitrogen deposition and acid deposition) are anticipated to be not significant when taking into consideration the existing pollutant levels and wider context of status of the condition of all relevant designated sites.

Habitats

1.7.44. The highest value habitats within the wider Keadby Power Station have been largely avoided. These include nationally important open mosaic habitat (OMH) and acid grassland immediately to the west and south-west of the Main Site although very small scale losses of these, and other habitats such as scattered scrub would occur as a result of site clearance. The effect of these minor habitat losses is assessed as not significant.

1.7.45. As part of the construction of the proposed Water Abstraction Point in the Stainforth and Keadby Canal, two likely veteran/ ancient trees may need to be removed. These trees are considered irreplaceable habitats so cannot be fully compensated for. A bespoke compensation strategy will be produced in agreement with North Lincolnshire Council, to be secured by Requirement on the **Draft DCO (Application Document Ref. 3.1).** The outline approach to this strategy is provided in the **Outline Landscape and Biodiversity Management and Enhancement Plan (LBMEP) Report (Application Document Ref. 5.10).**

1.7.46. Construction of the Main Site could also result in the loss of two minor field drains and part of a third which are of local biodiversity and nature conservation value. The localised and relatively small-scale permanent construction impacts on other drains would not affect the wider nature conservation status of drain habitats and effects on watercourses is therefore assessed as not significant.

Species

1.7.47. Water vole have been identified as present and active on the Site and construction within the Main Site will necessitate the permanent loss of two field

drains associated with their habitat. However, the loss of these drains will not result in the loss of water vole from the Site. In addition, enhancement of the existing sub-optimal, habitats and preparation of a Water Vole Impact Avoidance strategy to be implemented during construction will sufficiently mitigate the displacement of water vole. Low levels of activity have been recorded for wider terrestrial species including bats, birds, badger and grass snake however mitigation measures have been included within the **Outline CEMP (Application Document Ref. 7.4)** to avoid adverse impacts on these species. With the implementation of embedded mitigation measures, no significant effects are predicted on terrestrial species or their conservation status as a consequence of construction activities.

1.7.48. Appropriate pre-construction surveys will be undertaken prior to works commencing to confirm that no protected species are present in working areas.

1.7.49. An Outline Lighting Strategy **(Application Document Ref. 5.11)** will secure the sensitive design of permanent external artificial lighting. The effect on bats from external lighting required for operation of the Proposed Development is therefore assessed as not significant.

1.7.50. Works required for cooling water abstraction within the Stainforth and Keadby Canal will be agreed with regulators and undertaken to provide compliance with the Eels Regulations. No impact pathways would be likely to result in an adverse operational effect on the conservation status of fish populations in either the River Trent or the Stainforth and Keadby Canal. The effect is therefore assessed as not significant.

1.7.51. During the decommissioning phase, activities will be limited to the areas of the built footprint of the Proposed Development and there would be no requirement to remove or disturb habitats. Any vegetation which has established which could be impacted would be assessed and managed appropriately in accordance with a DEMP to be secured by Requirement on the **Draft DCO (Application Document Ref. 3.1)**.

1.7.52. There are no likely significant effects associated with decommissioning activities on designated sites, habitats or species.

1.7.53. Proposals to enhance the biodiversity, landscape and green infrastructure value of the Site and to achieve an overall net gain for biodiversity for Proposed Development are described within an

Outline LBMEP Report (**Application Document Ref. 5.10**) which accompanies the DCO application.

1.7.54. The biodiversity enhancement proposals will be designed to be delivered within the existing land ownership of the Applicant and focus on enhancing the value of existing habitats within the vicinity of the Proposed Development which may include:

- creation of flower-rich native grassland;
- new species-rich native hedgerow plantings (**Plate NTS13)**;
- enhancement of field drains for water voles and other aquatic biodiversity; and
- installation of nest boxes for barn owl and other birds, habitat creation for willow tit, and installation of roosting boxes for bats.

1.7.55. The proposals shown in **Plate NTS14** and **Plate NTS15** would provide no net loss and overall demonstrate a net gain for habitats as a result of the Proposed Development.

1.7.56. Agreement on the details of the final biodiversity enhancement measures to be implemented is secured by a Requirement in the **Draft DCO** (**Application Document Ref. 3.1**).

Plate NTS13: Existing hedgerow habitats would be improved.

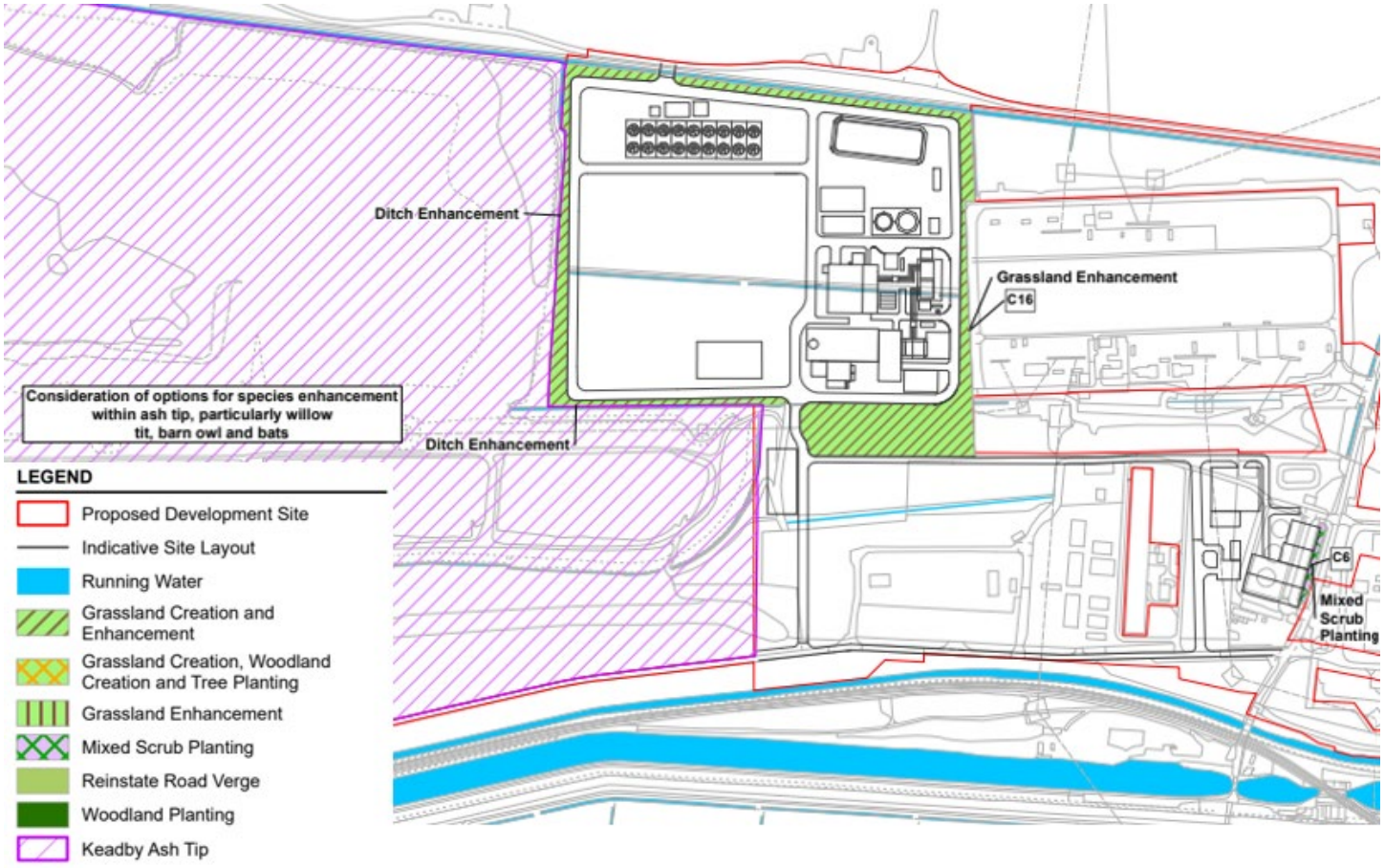


Plate NTS14: Indicative Biodiversity Management and Enhancement Plan for central part of Site

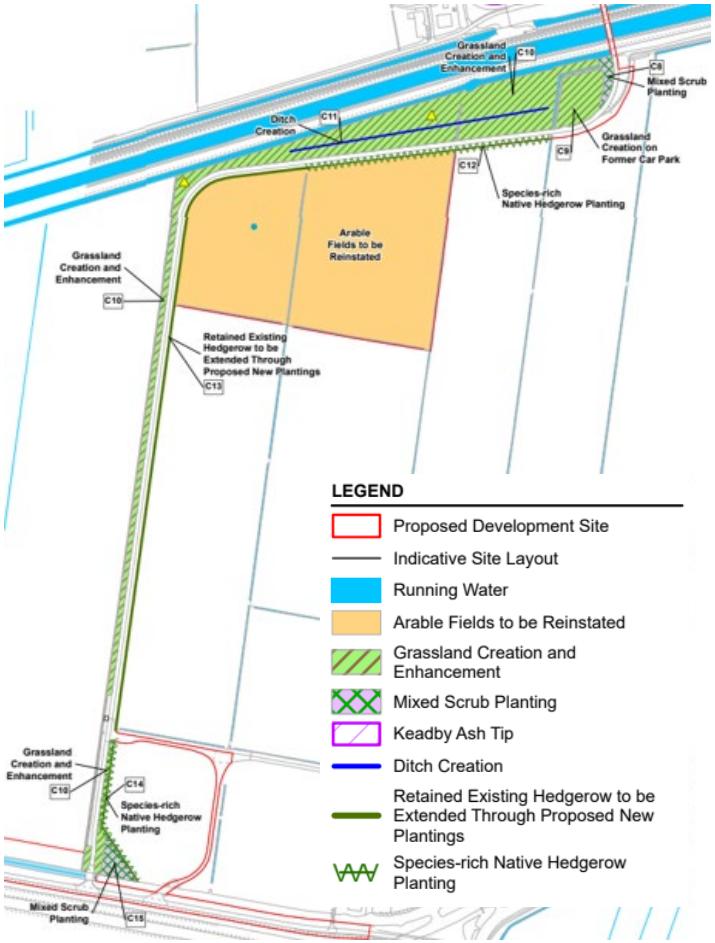


Plate NTS15: Indicative Biodiversity Management and Enhancement Plan for southern extent of Site

Water Environment and Flood Risk

1.7.57. An assessment has been undertaken which considers the potential effects of the Proposed Development on the water environment and flood risk, presented in **ES Volume I Chapter 12**: Water Environment and Flood Risk **(Application Document Ref. 6.2).**

1.7.58. Key water bodies that may receive runoff or discharges either during construction or operation or be affected by temporary construction works have been identified, and the potential contamination risk to these water bodies has been assessed. The study area for surface water has been defined based on the potential for impacts to occur i.e. the surrounding 1km and includes those watercourses crossed by or close to the Site as well as numerous ordinary watercourses in the study area.

1.7.59. The Site lies within the extensive floodplain of the River Trent within the Isle of Axholme and is largely classified as Flood Zone 3 (high risk). However the majority of the Site is at a 'low' risk of flooding due to the existing flood defences in place along the River Trent, although these defences do not protect the areas of the Site that are to the south of Stainforth and Keadby Canal.

Likely Impacts and Effects

1.7.60. Potential flood risk impacts to the Proposed Development, including the current and future (with climate change) risk of flooding from all sources (tidal, fluvial, surface water, groundwater, artificial sources and drainage infrastructure) has been assessed including consideration of a potential worst case future (with climate change) scenario if the tidal River Trent flood defences were to be breached. Hydraulic modelling for this potential 'defence breach' scenario has been undertaken to predict the effects. The assessment is presented in **ES Volume II Appendix 12A**: Flood Risk Assessment **(Application Document Ref. 6.3).**

1.7.61. The 'defence breach' modelling has been used to determine the required level to raise land for the key Proposed Development infrastructure to ensure if would not be impacted by flooding in the event of a breach of the River Trent defence. The modelling also demonstrates that there would be no significant effects on properties outside the Site due to the proposed land raising.

1.7.62. A range of mitigation measures are proposed to mitigate residual flood risks so that the occupiers of the Site are safe and critical operational infrastructure associated with the CCGT can continue to operate. This includes a Flood Emergency Response Plan and allocation of places of safe refuge for staff in case of flooding, as well as the implementation of the outline drainage strategy and flood resilience measures which are also set out in the Flood Risk Assessment (**ES Volume II Appendix 12A** (**Application Document Ref. 6.3**)).

1.7.63. With these measures, the effects on surface water drainage and flood risk as a result of the Proposed Development are anticipated to be not significant.

1.7.64. Potential impacts on the Water Framework Directive status of waterbodies have been considered and are detailed in **ES Volume II Appendix 12B**: Water Framework Directive Assessment (**Application Document Ref. 6.3**).

1.7.65. The assessment has considered potential effects for the construction and operational phases in relation to the following:

- temporary impacts on surface water quality; and
- temporary impacts on morphology (shape and structure) of watercourses.

1.7.66. Construction activities such as earthworks, excavations, site preparation, levelling and grading

operations can result in the disturbance of soils, and changes to groundwater and surface water runoff and flows which result in impacts upon groundwater and surface water resources. There is a risk that leaks and spillages of hazardous substances could pollute nearby surface watercourses if their use is not carefully controlled and spillages enter existing waterbodies. Through the use of a CEMP and embedded mitigation, including water quality monitoring, no significant adverse effects are predicted for the water environment during construction. The effect on all waterbodies is considered not significant.

1.7.67. An assessment has been made of the localised and temporary impacts on the morphology of the Stainforth and Keadby Canal habitats that would occur during construction, as a result of a temporary cofferdam that would need to be installed for construction of the proposed cooling water intake works. The effects are assessed as not significant. Where physical works to other watercourses are required, such as the need for new bridge or service crossings, localised, temporary adverse impacts may occur but the effects of these are assessed as not significant.

1.7.68. Two minor field drains and part of a third would be permanently lost on the Main Site, with another culverted to facilitate a new crossing for the emergency access route. Waterbodies directly to the west and north-west of the Main Site, including Keadby Boundary Drain LWS, would not be affected by the loss. Through the implementation of habitat creation opportunities which focus on enhancement of field drains and use of sustainable drainage systems, effects are assessed as not significant.

1.7.69. Cooling water from the Proposed Development will discharge to the River Trent under an Environmental Permit, regulated by the Environment Agency and will be subject to monitoring and limit values on chemical and thermal releases. The effects of thermal discharges have been considered in the design of the Proposed Development and assessed as having a negligible (not significant) impact on the temperature status of the River Trent that would not provide a barrier to migratory routes for fish.

1.7.70. No changes are likely to impact on Water Framework Directive classifications for the River Trent or any of the other waterbodies within the study area.

1.7.71. Connections into existing infrastructure within the Site will be made for foul water and it is anticipated

this would be treated at the local treatment works on Chapel Lane. If the existing connection is not suitable, a package treatment plant will be used to treat foul water before discharging it into the Water Discharge Corridor. The impact of foul water discharge is therefore considered to be not significant.

1.7.72. Navigational risks have been considered, such as those associated with construction activity in Stainforth and Keadby Canal and the use of Railway Wharf on the River Trent for delivery of abnormal indivisible loads (AIL). Mitigation measures to manage these risks are outlined in **ES Volume II Appendix 12C:** Navigational Risk Assessment (**Application Document Ref. 6.3**) and the **Outline CEMP (Application Document Ref. 7.4).** With the application of mitigation, it is considered that all risks can be reduced to a level As Low as Reasonably Practicable (ALARP) and can be suitably managed by risk controls to reduce them to an acceptable level (not significant).

Geology, Hydrology and Land Contamination

1.7.73. An assessment has been undertaken which considers the potential effects of the construction, operation (including maintenance) and decommissioning of the Proposed Development on geology, groundwater and land contamination and is presented in **ES Volume I Chapter 13**: Geology, Hydrogeology and Land Contamination **(Application Document Ref. 6.2).** A desk based assessment of historical ground conditions information and information from historical site investigations has been used to identify the potential effects associated with ground conditions using a source-pathway-receptor risk based approach. This is presented in **ES Volume II Appendix 13A**: Phase 1 Desk-based Assessment (**Application Document Ref. 6.3**).

1.7.74. Bedrock (Mercia Mudstone Group) is anticipated to be present at an approximate depth of 14m below ground level. A naturally high groundwater table is present across the study area and it is anticipated that groundwater is likely to be present near surface (1m to 3m below ground level) within the superficial deposits. Groundwater vulnerability to pollution is classified as medium-high. There are no local potable water abstractions, although abstractions for agricultural and industrial uses are present in the study area.

Likely Impacts and Effects

1.7.75. The construction phase may introduce new sources of contamination due to accidental leaks and spillages and could disturb and mobilise existing contamination within soils. Historical and current

areas of potential contamination have been identified and areas of higher risk defined within **ES Volume II Appendix 13A**: Phase 1 Desk-based Assessment (**Application Document Ref. 6.3**) will be subject to further assessment before construction to inform the development of the detailed design and to validate assumptions made in the initial risk assessment.

1.7.76. Potential impacts during the construction phase include:

- mobilising existing contamination in soil and groundwater as a result of ground disturbance and potential dewatering;
- increasing the potential for contaminants in unsaturated soils to leach to groundwater in open excavations;
- increasing the potential for contaminated surface run-off to migrate to surface water and groundwater receptors as a result of leaching from uncovered stockpiles;
- introducing new sources of contamination, such as fuels and oils used in construction plant;
- creating preferential pathways for the migration of soil contamination and gases, for example, along new below ground service routes, service ducts and as a result of potential dewatering; and
- introducing new human health receptors such as site staff during and post construction.

1.7.77. Best practice measures would be adopted to minimise pollution risks including the adoption of working methods to manage contamination risk to soils, groundwater, surface water, implementation of appropriate pollution incident control plans and procedures and the safe storage of fuel, oils and equipment. Requirements of the **Draft DCO** (**Application Document Ref. 3.1**) provide a scheme to deal with any contamination of land, including groundwater, likely to cause significant harm.

1.7.78. Impacts will be managed by appropriate construction mitigation measures (which are outlined in the **Outline CEMP** (**Application Document Ref. 7.4)**) and as such adverse effects are not anticipated and have been assessed as not significant.

1.7.79. Potential impacts to soil quality, groundwater and watercourses could potentially occur during operation as a result of accidental spills from the handling or leakage of fuels, lubricants, stored

chemicals and process liquids. However, with appropriate management, housekeeping and preventative maintenance practices (such as appropriate storage of potentially contaminating chemicals), as required by the Environmental Permit that will be needed for the operational Site, potential impacts to soil and groundwater will be minimised. As such, effects have been assessed as not significant.

Landscape and Visual Amenity

1.7.80. An assessment has been undertaken which considers the potential effects of the construction, operation (including maintenance) and decommissioning of the Proposed Development on landscape character and visual amenity and is presented in **ES Volume I Chapter 14**: Landscape and Visual Amenity **(Application Document Ref. 6.2).**

1.7.81. Baseline data has been gathered through desk study, review of aerial photography, consultation and site visits, including obtaining summer and winter photography from key viewpoints.

1.7.82. Visibility within the study area is generally widespread. Tree and shrub cover within the study area is generally sparse and the topography is low lying and flat. Due to the limited intervening vegetation, there are frequent, open views in the north-west and east towards the Site. Visibility from the south and south-west is more restricted due to existing buildings and topography.

1.7.83. The study area for landscape and visual effects includes areas where it is considered that there is potential for significant direct or indirect effects on landscape character or sensitive views due to the construction or operation of the Proposed Development. The area in which the Proposed Development is likely to be visible has been defined using a computer model which shows the 'Zone of Theoretical Visibility' (ZTV) considering the largest possible dimensions for the Proposed Development and worst-case stack height up to 85m above existing ground level which would be 88m AOD considering the raised ground level proposed for flood mitigation. The ZTV and 10km radius study area used to identify locations which have potential views of the Proposed Development and those where visibility would be unlikely is shown on **Plate NTS16** and **Plate NTS17.** Representative viewpoints and sensitive receptors were identified through these methods and agreed with regulatory bodies.

1.7.84. The study area includes a number of areas designated locally for their landscape character and/ or perceived qualities/ tranquillity, whilst being heavily influenced by industrial developments, residential areas and transport corridors and includes a proposed extension to the Lincolnshire Wolds Area of Outstanding Natural Beauty (AONB). The Site and immediate surrounding area is heavily influenced by power related industrial structures. Wind turbines are prominent features in the landscape alongside large pylons and transmission lines converging near Keadby 1 Power Station and Keadby 2 Power Station.

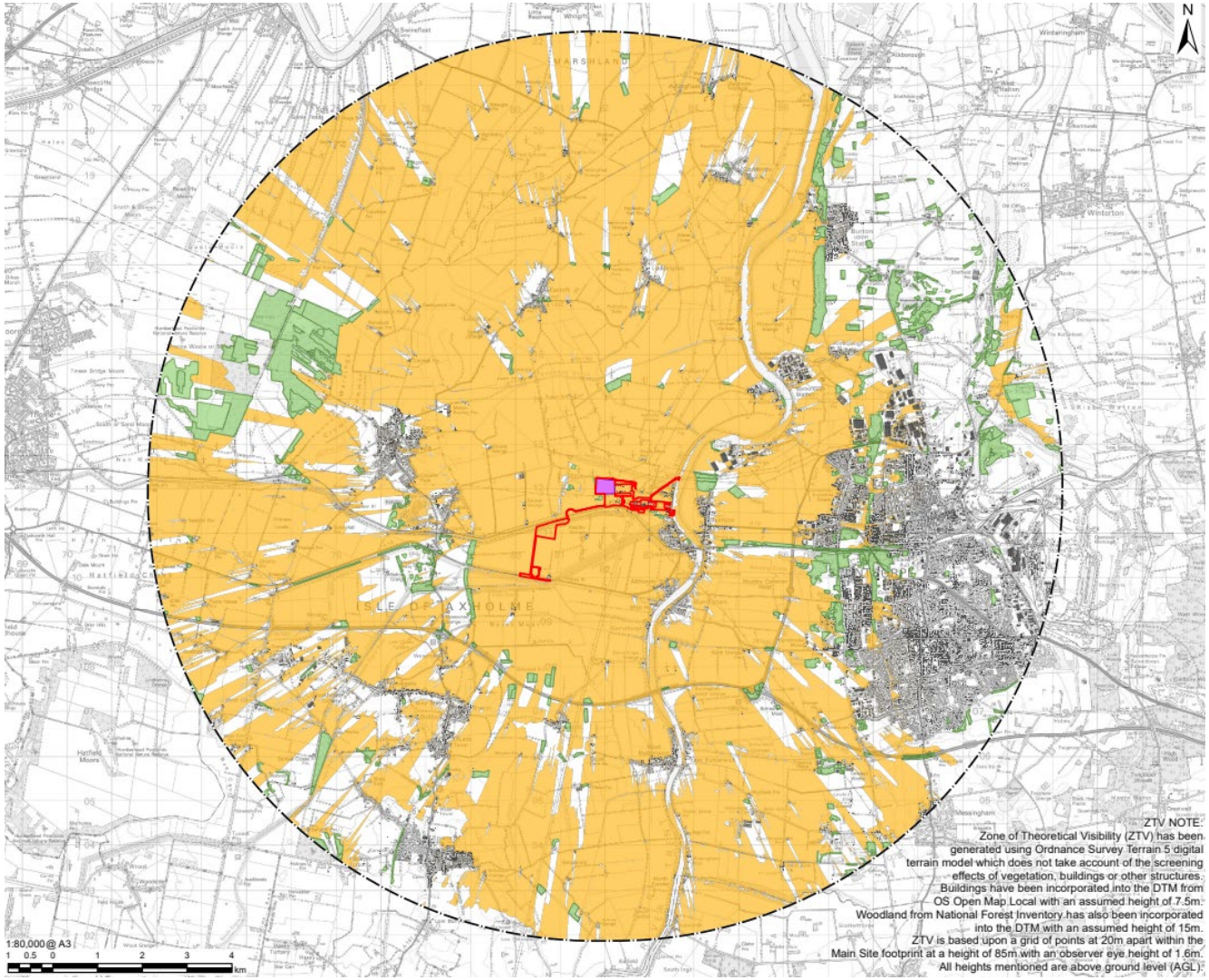


Plate NTS16: Zone of Theoretical Visibility

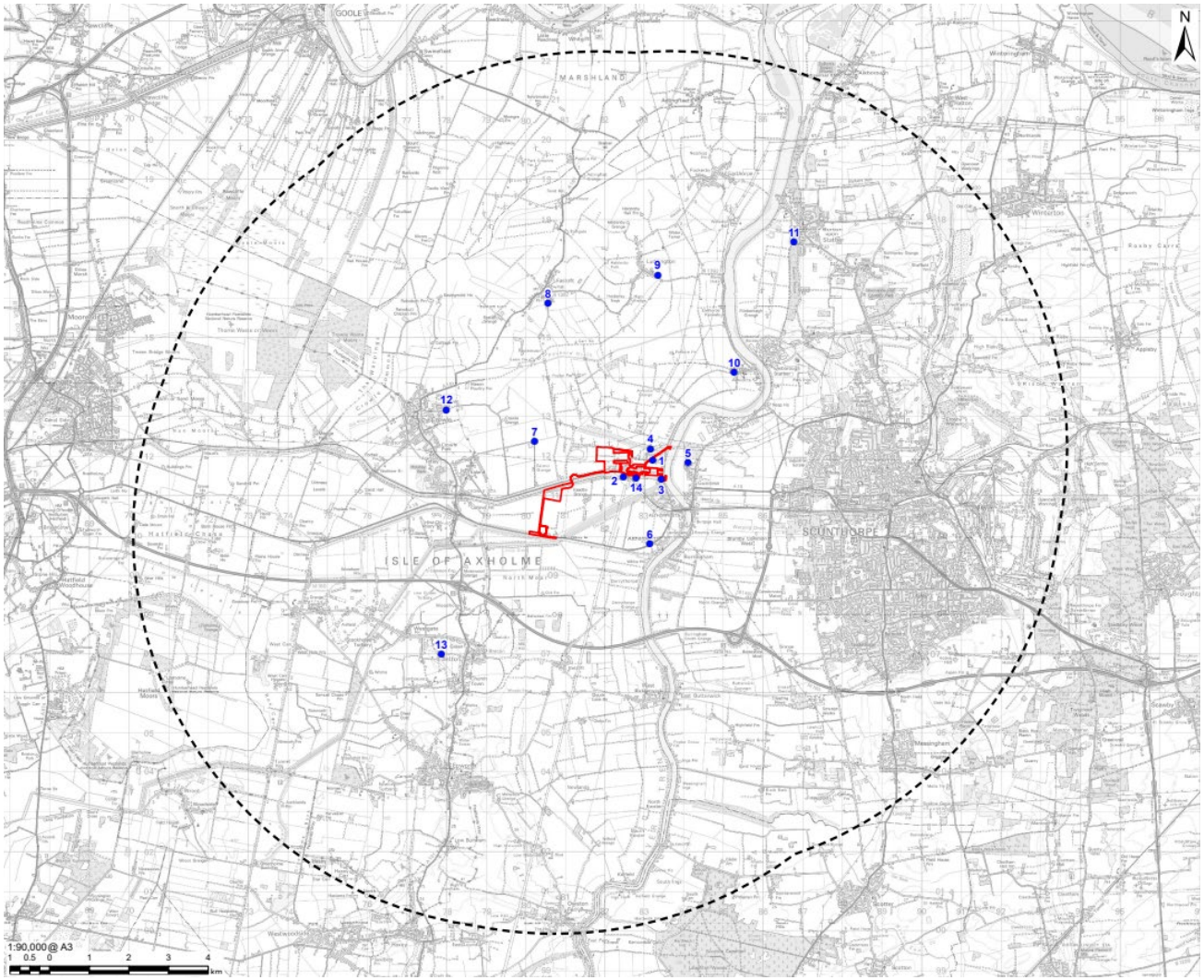


Plate NTS17: Potential Viewpoints Assessed

Likely Impacts and Effects

1.7.85. The potential landscape impacts of the Proposed Development primarily relate to the visibility of proposed structures (temporary and permanent), including how this affects the overall landscape character of the area. The Proposed Development is assessed as likely to result in a low or very low impact on landscape character during construction, opening and operation because the additional built form is similar to that already within the Keadby Power Station. Effects on landscape character are assessed as not significant.

1.7.86. Changes in views may give rise to adverse or beneficial visual effects, through obstruction in views, alteration of the parts of the view and the opening up of new views by removal of screening. To help to interpret the visual effects of the Proposed Development, 'photomontage' images have been prepared which show existing baseline views and the indicative scale and visibility of the Proposed Development from selected viewpoints. These are illustrated in **Plate NTS18 – Plate NTS21** below.

1.7.87. A total of 14 viewpoints have been assessed; the majority would experience visual amenity effects that are classified as adverse, but not significant during construction and operation of the Proposed Development. At three of the closest receptors, referred to in the ES as Viewpoint 1 (Chapel Lane West, Keadby), Viewpoint 2a and 2b (Gate Keepers Residence, Vazon Bridge, Keadby) and Viewpoint 4 (PRoW KEAD9 and KEAD10), effects would be classified as significant due to the introduction of built structures against the skyline, making them more prominent and extending the amount of the view which includes large scale development.

1.7.88. Opportunities for mitigation of visual amenity effects are limited due to the size and scale of the Proposed Development and construction plant. An integrated design approach for the Main Site to minimise potential effects has the potential to reduce visual impacts of the Proposed Development.

1.7.89. An **Outline LBMEP Report** (**Application Document Ref. 5.10)** accompanies the DCO application which presents proposals for planting, although such planting would not reduce the significance of visual effects at these locations.

Plate NTS18: Viewpoint 2a – Gate Keepers Residence (Vazon Bridge), Keadby – Baseline Summer View

Plate NTS19: Viewpoint 2a – Gate Keepers Residence (Vazon Bridge), Keadby – Baseline Winter View

Plate NTS20: Viewpoint 2a – Gate Keepers Residence (Vazon Bridge), Keadby – Summer view with Proposed Development

Plate NTS21: Viewpoint 2a – Gate Keepers Residence (Vazon Bridge), Keadby – Winter view with Proposed Development

Cultural Heritage

1.7.90. This assessment addresses the potential effects of the Proposed Development on cultural heritage assets. It identifies the location, type and significance of cultural heritage assets and their setting, and reports on the predicted impacts of the Proposed Development on these resources. The assessment considers the likely significance of effects upon cultural heritage assets by reference to their significance and the magnitude of any impacts and is presented in **ES Volume I Chapter 15**: Cultural Heritage (**Application Document Ref. 6.2**). A detailed desk based assessment is presented in **ES Volume II Appendix 15A**: Cultural Heritage Desk Based Assessment **(Application Document Ref. 6.3).** A summary of cultural heritage assets is included in Section 1.4 of this NTS.

Likely Impacts and Effects

1.7.91. Construction effects consider the setting impacts on above ground scheduled monuments and built heritage, as the buildings and structures of the Proposed Development are installed and constructed. They also consider potential effects on below-ground archaeology.

1.7.92. Construction of the Proposed Development has the potential to affect heritage assets in the following ways:

- partial or total removal of below ground archaeological remains;
- compaction of below ground archaeological remains by construction traffic, land raising and structures;
- changes to local waterbodies that could dry out any peat deposits and therefore affect preservation of potential heritage assets;
- vibration effects that could cause physical damage; and
- other adverse effects on the setting of heritage assets e.g. due to visual intrusion, noise etc.

1.7.93. Impacts on built heritage for a range of receptors have been assessed. Impacts to the setting of Keadby Lock (scheduled monument and Grade II listed) and other designated assets such as listed buildings and conservation areas are assessed as not significant.

1.7.94. Impacts to below ground archaeological remains are likely to derive from the following construction works:

- piles, pile caps, ground beams and floor slabs;

- any required ground remediation;
- levelling of surfaces for temporary construction laydown areas;
- land raising;
- installation of any below ground structures; and
- burial of pipes and cables.

1.7.95. A geophysical survey previously undertaken within the Site identified organic (peaty) deposits and earlier buried land surfaces, as well as potential palaeoenvironmental remains within the Main Site and proposed construction laydown area south of the Stainforth and Keadby Canal. Construction of the Proposed Development in the Main Site would result in permanent ground disturbance due to ground levelling, land raising, piling and installation of below ground structures and pipework. This could result in assets being removed or truncated, resulting in an effect that would be classified as significant.

1.7.96. Mitigation would either comprise preservation in situ (where reasonably practicable to avoid assets through detailed design) or if this is not reasonably practicable, excavation would provide mitigation in the form of preservation by record. Mitigation in the form of geoarchaeological analysis and reporting within specified areas of the Proposed Development has been agreed and is set out in the **Outline Written Scheme of Investigation** (OWSI) which accompanies the DCO Application (**Application Document Ref. 7.7).** No further stages of archaeological evaluation are required. The programme of geoarchaeological analysis and reporting will not minimise the physical impacts to individual heritage assets but would preserve them by record and as such would reduce the residual effects so that they are not significant.

Socio-economics

1.7.97. An assessment has been undertaken of the potential socio-economic impacts of the Proposed Development which considers the potential effects of construction and operation of the Proposed Development

1.7.98. Economic benefits can arise directly (through employment of local people) and indirectly (e.g. during the construction phase, when contractors may be using local accommodation and other amenities). Adverse effects can also occur for example in relation to the wider implications of any demand on local services or worker accommodation. The assessment has taken into account the demographics of the area surrounding the Proposed Development when considering the impacts which are likely to occur. The assessment

is presented in **ES Volume I Chapter 16**: Socio-economics **(Application Document Ref. 6.2).**

Likely Impacts and Effects

1.7.99. Based on experience of similar projects, the Proposed Development is anticipated to create an average of approximately 478 temporary construction jobs, with a peak of circa 1,050 during the construction period. The net construction employment created by the construction phase of the Proposed Development is predicted to have a major beneficial (significant) short-term effect in the local area through the creation of jobs directly and indirectly, and across a wide range of sectors and skills and benefits for the local economy. Although these jobs are temporary, they would provide a positive economic impact over the circa four year construction programme. The direct expenditure involved in the construction phase would lead to increased output generated in the local economy (Scunthorpe Travel to Work Area (TTWA)).

1.7.100. Minor disruption on the local community, businesses and amenity is expected during construction but effects of this are not significant.

1.7.101. During the Proposed Development operational phase, employment would be generated in operative, management and maintenance roles. Operation of the Proposed Development is anticipated to create up to around 50 full-time operational roles. Temporary and contractor employees associated with maintenance activities would also be employed as required. These operational effects are assessed as beneficial, although not significant.

1.7.102. There are not anticipated to be any impacts on businesses from the operation of the Proposed Development. The businesses in the area are currently located within close proximity to the existing Keadby Power Station and it is not anticipated they would experience any change from their current interaction with the wider Keadby site. The impact on local businesses would be not significant.

Population and Human Health

1.7.103. The assessment presented in **ES Volume I Chapter 17**: Population and Human Health **(Application Document Ref. 6.2)** addresses the potential effects on population and human health during the construction, operation (including maintenance), and decommissioning phases of the Proposed Development.

1.7.104. The study area includes features that could be at risk from potential direct and indirect impacts. Direct human health impacts are considered for the Axholme North Ward which the Site is located within. Consideration is also given to impacts in larger contexts – North Lincolnshire Local Authority, Yorkshire and the Humber, and England.

1.7.105. The health and wellbeing of individuals is determined by a broad range of individual constitutional and behavioural factors, as well as broader environmental, social and economic factors.

Likely impacts and Effects

1.7.106. During the Proposed Development's construction phase, additional workers may place extra demand on health and social care services if they move to the area, or if emergency treatment is required. During operation, 58 net jobs will be created (direct and indirect employment), although it is unlikely all operational staff will relocate to the study area. The anticipated impact upon healthcare services during both construction and operational phases, when assessed alongside the capacity of the general population to adapt to changes in access to health and social care services, results in overall effects that are not significant. While there are vulnerable sub-populations (e.g. the elderly) with higher reliance on health services, effects are similarly considered to be not significant.

1.7.107. Overall changes in job provision within the study area during the construction and operational phases of the Proposed Development, as set out in **ES Volume I Chapter 16**: Socio-economics **(Application Document Ref. 6.2),** would be small in the context of the overall number of jobs locally. Although beneficial, the effects of construction on employment and income, and associated education and training opportunities, are not significant.

1.7.108. Residents surrounding the Proposed Development may be impacted by increased traffic flows and severance effects during construction, restricting access to healthcare and community facilities. Construction activities may intersect, or otherwise impact upon, accessibility. Given the duration of these impacts and the potential for only minor changes in traffic patterns during construction, the overall impact is assessed to be not significant for both the general population and vulnerable sub-populations. Operational road traffic is scoped out owing to the fact there is no anticipated impact.

1.7.109. A number of Public Rights of Way (PRoW) are located within the study area, including several bridleways and footpaths. No PRoWs will be altered

or closed during construction or operation, and therefore the likely effects on human health and wellbeing arising from impacts to open space, leisure, and play is assessed as not significant.

1.7.110. As detailed in **ES Volume I Chapter 8**: Air Quality (**Application Document Ref. 6.2**), the effects of construction dust and vehicle emissions are assessed as not significant after implementation of appropriate mitigation. Additionally, the environmental effects from operation of the Proposed Development have been identified as not significant at all human health receptors. For both the general population and vulnerable sub-populations, the overall effects on human health is therefore assessed to be not significant.

1.7.111. Increases in noise and vibration during construction and operation of the Proposed Development have the impact to lead to adverse health and wellbeing impacts in terms of annoyance and/or disrupt local amenities. As detailed in **ES Volume I Chapter 9**: Noise and Vibration (**Application Document Ref. 6.2**), residual effects of noise and vibration during construction and operation on residential and ecological NSRs after mitigation are assessed to be not significant, as are effects from construction traffic and activities. The overall impact of noise and vibration on the general population is therefore considered to be not significant.

1.7.112. As set out in **ES Volume I Chapter 18:** Climate Change (**Application Document Ref. 6.2**) the greenhouse gas (GHG) emissions have been calculated during the construction and operational phases. The effects on the general population are assessed as not significant. A range of operational scenarios were assessed to consider a range of durations for use of natural gas, hydrogen and a blend of both. Based on the assessment as outlined in the Climate Change Section below, the overall effect of climate change on the general population is assessed as not significant.

1.7.113. **ES Volume I Chapter 12**: Water Environment (**Application Document Ref. 6.2)** contains an assessment of impacts on ground and surface water contamination and quality. Construction effects are not considered significant, and a final CEMP will be implemented. Additionally, a final Drainage Strategy will ensure suitable treatment is provided prior to discharge to any watercourse. The overall effects of construction and operation of the Proposed Development on water quality and availability are therefore not significant.

1.7.114. The Power Station has an established Community Liaison Officer who will serve as a point of contact for the community throughout the construction and operation of the Proposed Development. Additionally, the Power Station hosts a Community Liaison Group and manages a community fund for supporting local initiatives. Community engagement will continue with the Proposed Development, therefore the overall likely effect on community identity and social participation is assessed to be beneficial and significant.

1.7.115. A summary of social infrastructure in the local area is assessed in **Chapter 16**: Socio-economics (**ES Volume I** (**Application Document Ref. 6.2**)). Construction workers may place extra demand on these facilities if they move to the area, although many will likely stay in temporary accommodation during the week. The construction of the Proposed Development will result in small, temporary increases in traffic flows which is unlikely to affect access to services and infrastructure. Meanwhile, the creation of 58 net jobs (direct and indirect employment) during operation is expected to place a low level of additional demand and is unlikely to impact access to services. The overall likely effects arising from impacts on the built environment are considered not significant.

1.7.116. Due to the potential for the electrical connection cables to be located partly within or alongside Chapel Lane to facilitate connection to the existing substation, there is a potential for road users to be exposed to Electro-Magnetic Field (EMF) radiation. During construction there will be no EMFs produced as such the effect on road users is assessed as not significant. Operational effects are to be mitigated by ensuring the cables are buried at a suitable depth (0.8-1.2m) below ground level such that the EMF effects would not exceed threshold limits set by National Grid. The embedded mitigation means the effects on human health from EMF radiation are assessed as not significant.

Climate Change

1.7.117. The assessment presented in **ES Volume I Chapter 18**: Climate Change and Sustainability (**Application Document Ref. 6.2**) addresses the potential effects of the Proposed Development on climate change and considers the potential impact of future climate change on the Proposed Development and the surrounding environment. The assessment addresses three separate aspects:

- lifecycle greenhouse gas (GHG) impacts;
- In-combination Climate Change Impacts (ICCI); and
- Climate Change Risk Assessment (CCRA).

Likely Impacts and Effects

1.7.118. The receptor for the GHG assessment is the global climate. The UK's carbon budgets (restrictions put in place by UK Government on the total amount of greenhouse gases the UK can emit in each future 5-year period) are used as a proxy to contextualise the magnitude of GHG impacts associated with the Proposed Development.

1.7.119. Given that hydrogen may not be commercially available to fuel the Proposed Development from the start of operation, a range of operational scenarios have been assessed to robustly consider a range of possible outcomes for use of hydrogen, natural gas and blended fuel. For all assessment scenarios, the total GHG emissions associated with the Proposed Development exceed 1% of the corresponding UK carbon budget limits at either the 6th, 7th or 8th carbon budget. By the 9th carbon budget, GHG emissions associated with the Proposed Development would be between 2% and 9% of the national carbon budget.

1.7.120. Whilst scenarios in which hydrogen supply does not become available, or only becomes available late in the Proposed Development's operational life have been assessed, these scenarios are considered highly unlikely due to the clear government policy ambitions for hydrogen supply to be available in the future.

1.7.121. Based on the outcome of the assessment if there is insufficient hydrogen supply to enable the Proposed Development to run on 100% hydrogen at any point during its operation, there is a potential for **significant** adverse effects.

1.7.122. For scenarios consistent with government policy on hydrogen supply and therefore considered to represent the more likely operational scenarios, the overall impact of the Proposed Development is considered to be **not significant**.

1.7.123. The ICCI assessment considers the existing and projected future climate conditions for the geographical location and assessment timeframe. It identifies the extent to which identified receptors in the surrounding environment are potentially vulnerable to and affected by these factors.

1.7.124. Factors considered as part of the assessment include:

- extreme weather;
- rainfall change;
- temperature and humidity;
- sea level rise; and

- wind.

1.7.125. No potential ICCI impacts or effects during the construction, operation or decommissioning of the Proposed Development have been identified and effects are therefore assessed as **not significant**.

1.7.126. The Climate Change Risk Assessment (CCRA) considers the potential climate change impacts. It includes all infrastructure and assets associated with the Proposed Development and reviews the potential impacts to and vulnerability of the Proposed Development against both gradual climate change and the risks associated with an increased frequency of extreme weather events.

1.7.127. Climate change risk factors covered by the assessment include:

- extreme weather;
- flood risk;
- sea level rise;
- temperature change; and
- rainfall change.

1.7.128. The CCRA has taken into account existing embedded control measures which have already been included within the scheme including the implementation of a Drainage Strategy (Annex 3 of **ES Volume II (Application Document Ref. 6.3)** and **Outline CEMP** (**Application Document Ref. 7.4)**.

1.7.129. Following completion of the assessment and assuming the implementation of recommended adaptation measures, no risks have been rated as high or extreme and therefore no risks have been categorised as significant. Overall, there are no significant climate resilience risks associated with the Proposed Development.

Major Accidents and Disasters

1.7.130. **ES Volume I Chapter 19:** Major Accidents and Disasters (**Application Document Ref. 6.2**) presents the assessment of major accidents and disasters (MA&D) that have the potential to arise during the construction and operation of the Proposed Development. The assessment considers the vulnerability of the Proposed Development to existing hazards and assesses the potential for the Proposed Development to cause significant environmental effects as a result of a major accident.

1.7.131. Major accidents are incidents such as fires and explosions that could result in serious harm to

people. They also have the potential to cause widespread damage to property and the environment. Disasters can be naturally occurring events, such as earthquakes, landslides and flooding.

Likely Impacts and Effects

1.7.132. A number of hypothetical MA&D scenarios were identified for the Proposed Development which could have significant consequences to people and the environment, but at a very low probability of occurrence.

1.7.133. The engineering design, construction and operation of the Proposed Development will incorporate appropriate standards and mitigation measures necessary to reduce the risks of MA&D to an acceptable level, i.e. as low as is reasonably practicable (ALARP), which is the standard expected by the regulatory authorities (Health and Safety Executive (HSE) and Environment Agency). As well as an Environmental Permit, if appropriate, the operational plant will be regulated under a Control of Major Accident Hazards (COMAH) Licence regulated by the HSE.

1.7.134. It is anticipated that through implementation of appropriate mitigation measures to reduce risks to ALARP, residual effects on sensitive receptors are not considered likely and effects are therefore assessed as not significant.

Waste and Materials

1.7.135. As detailed in **ES Volume I Chapter 20:** Materials and Waste (**Application Document Ref. 6.2)** an assessment has been undertaken to consider the potential impacts and effects as a result of the construction, operation (including maintenance) and decommissioning of the Proposed Development on materials and waste. The assessment follows the methodology set out in the Institute of Environmental Management and Assessment (IEMA) Guide to Materials and Waste in EIA, Guidance for a Proportionate Approach ('IEMA Guidance').

1.7.136. For this report, materials and waste comprise:

- the consumption of materials (key construction materials only); and
- the generation and management of waste during construction, operation and decommissioning.

1.7.137. Several study areas have been identified for the assessment of materials and waste:

- the Proposed Development Study Area for construction and operational waste generation, and for use of construction materials;
- the Expansive Study Area for non-hazardous and inert waste management, comprising the Yorkshire and Humber Region; and
- the Expansive Study Area for hazardous waste management, which is England.

1.7.138. To assess effects upon waste associated with the Proposed Development, the assessment considers potential changes to landfill void capacity assuming a worst case that waste is sent to landfill.

1.7.139. To assess effects upon materials, the total quantities of key construction materials were compared to the most recent national and regional availabilities.

Likely Impacts and Effects

1.7.140. Key materials expected to be used during the construction of the Proposed Development include topsoil and subsoil, steel, aggregates, cabling, asphalt and concrete. Effects of construction materials on national and regional availabilities are considered to be not significant.

1.7.141. Waste will be generated during the construction and operation of the Proposed Development and will be managed in accordance with relevant environmental regulations using licensed waste contractors.

1.7.142. The majority of waste expected to be generated during the construction phase is comprised of non-hazardous inert materials and municipal waste. A large proportion of non-hazardous and inert waste from the Proposed Development is likely to be recovered rather than disposed of to landfill, further reducing the overall quantities of waste for disposal. Based on this assessment, the effects of non-hazardous and inert waste generated during construction are considered to be not significant.

1.7.143. A smaller proportion of total construction waste is anticipated to be hazardous. In practice, some of this waste could be non-hazardous, and/or likely to be sent to a waste management facility rather than disposed of to landfill. Effects from hazardous waste generated during construction are considered to be not significant.

1.7.144. Operational waste from the Proposed Development will comprise waste from site offices and from power station processes, the majority of which will be hazardous. It is expected that some hazardous

operational waste will not be suitable for landfill disposal and will be sent to a hazardous waste management facility, although the annual quantity is likely to be small in the context of national capacity. For both non-hazardous and hazardous operational waste, effects are assessed to be not significant.

1.7.145. Quantified effects associated with decommissioning are scoped out as the Proposed Development has a long design life and it is therefore not considered possible to reliably forecast decommissioning requirements and infrastructure far in the future as agreed in the Scoping Opinion. However, based on a qualitative assessment, decommissioning effects are considered to be not significant.

Cumulative and Combined Effects

1.7.146. The purpose of **ES Volume I Chapter 21**: Cumulative and Combined Effects (**Application Document Ref. 6.2**) is to provide an assessment of the potential for cumulative and combined effects to occur as a result of the Proposed Development being built and operated at the same time as other committed developments.

1.7.147. A number of other proposed developments that are also likely to be constructed and operated in future, and that have the potential to generate cumulative environmental effects together with the Proposed Development have been identified. Following a thorough review of other developments proposed within 15km of the Site (the largest study area considered by the EIA) a longlist of 40 developments were identified for consideration. The majority of these were ruled out from the cumulative assessment based on their small scale nature and limited effects. The following other developments have been scoped into the cumulative effects assessment:

- Humber Carbon Capture Pipeline DCO (EN0710003)
- North Lincolnshire Green Energy Park DCO (EN010116);
- Tween Bridge Solar Farm DCO (EN10148);
- North Humber to High Marnham DCO (EN020034);
- Moors Solar Farm (NLC planning application PA/SCR/2021/8);
- Pilfrey Solar Farm (NLC planning application PA/SCR/2021/7); and
- Scunthorpe Electric Arc Furnace (NLC planning application PA/2024/123).

1.7.148. The potential for cumulative effects with these other developments has been considered for all environmental topics by a review of the available information (including published environmental information where available). The assessment of the remaining shortlisted developments (listed above) has concluded that based on the currently available information, significant cumulative effects are unlikely.

1.7.149. The assessment of combined effects has considered the potential for the effects of minor significance and above, identified within each of the technical assessments reported within **ES Volume I Chapters 8 to 20** (**Application Document Ref. 6.2**) to interact and combine to affect common receptors, and has concluded that there would be no new significant combined effects during either construction or operation of the Proposed Development.

1.8. Summary and Conclusions

1.8.1. The ES presents the findings of the EIA process that has been undertaken for the Proposed Development and includes an assessment of the potential environmental impacts and effects of the Proposed Development during construction, commissioning, operation (including maintenance) and decommissioning phases.

1.8.2. Section 1.7 of this NTS and **ES Volume I Chapters 8-21** (**Application Document Ref. 6.2**) have considered the potential environmental impacts and effects of the Proposed Development, including the identification of potential adverse and beneficial environmental effects that are considered significant both before, and after mitigation and enhancement measures are taken into account. The assessment has been undertaken following Rochdale Envelope principles where worst-case assumptions have been used for any aspects where the final design selection cannot yet be made and flexibility must be retained.

1.8.3. A range of environmental impact avoidance, design and mitigation measures have been identified to mitigate and control environmental effects during construction, operation and decommissioning phases of the Proposed Development. These will be secured through appropriate requirements within the **Draft DCO** (**Application Document Ref. 3.1)** for the Proposed Development. Additional controls will be applied through other legislative requirements including an Environmental Permit and, if required, a COMAH Licence for the operation of the Proposed Development.

1.8.4. **ES Volume I Chapter 22**: Summary of Likely Significant Residual Effects (**Application Document Ref. 6.2**) indicates that likely significant residual effects (after mitigation) of the Proposed Development include:

- significant adverse effect due to the potential for two likely veteran/ ancient trees (irreplaceable habitats) to be removed, for which a compensation strategy is secured by the Draft DCO;
- significant adverse effects on visual amenity (views) during Proposed Development construction, operation and decommissioning on Viewpoint 1 (Chapel Lane West, Keadby), Viewpoint 2a and 2b (Gate Keepers Residence, Vazon Bridge, Keadby) and Viewpoint 4 (PRoW KEAD9 and KEAD10), north of Keadby due to the introduction of built structures against the skyline, making them more prominent and extending the amount of view which includes large scale development. Mitigation opportunities are limited due to the size and scale of the Proposed Development. An integrated design approach that considers massing and placing of taller structures to minimise potential effects has the potential to reduce visual impacts;
- a significant beneficial socio-economic effect related to direct and indirect employment created by the construction phase of the Proposed Development;
- a significant beneficial effect on community identity and social participation relating to community engagement during construction and operation of the Proposed Development;
- potential for significant adverse GHG effects during operation in the unlikely event that there is insufficient hydrogen supply for the Proposed Development to run on 100% hydrogen at any point during its operation. This scenario has been assessed as a 'worst case' scenario. The GHG effect would not be significant if the Proposed Development is able to run on 100% hydrogen within its operational life, which is considered to be likely, given government support for low carbon hydrogen production and hydrogen to power projects.

1.9. References

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