

# The Keadby Next Generation Power Station Project

Document Ref: 6.3

Planning Inspectorate Ref: EN0110001

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

## Environmental Statement (ES)

## Volume II – Appendix 1A Scoping Report

The Planning Act 2008

The Infrastructure Planning (Environmental Impact Assessment)  
Regulations 2017

Applicant: Keadby Next Generation Limited

Date: August 2025

Issue: V0

## Document History

<b>Document Ref</b>	6.3.1 / Appendix 1A
<b>Issue</b>	V0
<b>Document Owner</b>	Arup

Project Note: In correspondence and documentation at EIA scoping stage, the Applicant used the name 'SSE Hydrogen Developments Limited' and the project name 'Keadby Hydrogen Power Station' for the Proposed Development. A new project company named 'Keadby Next Generation Limited' was subsequently set up in November 2024, ahead of consultation, and the Applicant and project names were aligned to this thereafter.

# The Keadby Hydrogen Power Station Project

## Environmental Impact Assessment Scoping Report

**Date: 30 April 2024**

**Applicant: SSE Hydrogen Developments Limited**

The Planning Act 2008

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

# Document Version Control

Version	Date	Author	Approver	Changes
0	30/04/24			Report Submitted to PINS

# Glossary

Abbrevia- tion	Description
AADT	Annual Average Daily Traffic
ADMS	Atmospheric Dispersion Modelling System
AEP	Annual Exceedance Probability
AGI	Above Ground Installation
AOD	Above Ordnance Datum
ANNWLM B	Isle of Axholme and North Nottinghamshire Water Level Management Board
APFP	Applications: Prescribed Forms and Procedure (Regulations, 2009)
APIS	Air Pollution Information System
AQAP	Air Quality Action Plan
AQMA	Air Quality Management Area
AQS	Air Quality Standard Objectives
ASR	Annual Status Report
BAT	Best Available Techniques
BGS	British Geological Survey
BS	British Standard

CCC	Committee on Climate Change
CCP	Carbon Capture Plant
CCGT	Combined Cycle Gas Turbine
CCR	Carbon Capture Readiness
CCS	Carbon Capture and Storage
CCUS	Carbon Capture, Utilisation and Storage
CDM	Construction Design and Management Regulations 2015
CEMP	Construction Environmental Management Plan
CHP	Combined Heat and Power
Cifa	Chartered Institute for Archaeologists
CNP	Critical National Priority
COMAH	Control of Major Accident Hazards
COPA	Control of Pollution Act 1974
CO <sub>2</sub>	Carbon Dioxide
CRT	Canal and River Trust
CRTN	Calculation of Road Traffic Noise
DCO	Development Consent Order
Defra	Department of Environment, Food and Rural Affairs

DEMP	Decommissioning Environmental Management Plan
DESNZ	Department for Energy Security and Net Zero
DMRB	Design Manual for Roads and Bridges
DTM	Digital Terrain Model
EIA	Environmental Impact Assessment
ELV	Emission Limit Value
EPUK	Environmental Protection UK
ERA	Environmental Risk Assessment
ES	Environmental Statement
FRA	Flood Risk Assessment
GHG	Greenhouse Gases
Ha	Hectare
HCA	Homes and Communities Agency
HE	Historic England
HER	Historic Environment Record
HGV	Heavy Goods Vehicle
HRSG	Heat Recovery Steam Generator
HRA	Habitats Regulations Assessment

HSE	Health and Safety Executive
IAQM	Institute of Air Quality Management
ICCI	In-Combination Climate Change Impact
IEMA	Institute of Environmental Management and Assessment
IED	Industrial Emissions Directive
ISO	International Organisation for Standardisation
INNS	Invasive Non-Native Species
kV	Kilovolt
LAQM	Local Air Quality Management
LCA	Landscape Character Area
LWS	Local Wildlife Site
OMH	Open Mosaic Habitats
MAGIC	Multi-agency geographical information for the countryside
MCP	Medium Combustion Plant
MMO	Marine Management Organisation
MPA	Minerals Planning Authority
MPS	Marine Policy Statement
MW	Megawatt



NCA	National Character Area
NERC	Natural Environment and Rural Communities
NIA	Nature Improvement Area
NHBC	National House Building Council
NNR	National Nature Reserve
NPPF	National Planning Policy Framework
NPS	National Policy Statement
NSIP	Nationally Significant Infrastructure Project
NSR	Noise Sensitive Receptor
NTS	Non-Technical Summary
PAH	Polyaromatic Hydrocarbons
PEA	Preliminary Ecological Appraisal
PEI	Preliminary Environmental Information
PFA	Pulverised Fuel Ash
PINS	Planning Inspectorate
PRoW	Public Right of Way
PWS	Private Water Supply
SAC	Special Area of Conservation

SCR	Selective Catalytic Reduction
SFRA	Strategic Flood Risk Assessment
SoCC	Statement of Community Consultation
SPA	Special Protection Area
SPZ	Source Protection Zone
SRN	Strategic Road Network
SSSI	Site of Special Scientific Interest
TA	Transport Assessment
TCPA	Town and Country Planning Application
RBMP	River Basin Management Plan
WFD	Water Framework Directive
WHO	World Health Organisation
WPA	Waste Planning Authority
ZTV	Zone of Theoretical Visibility

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# 1. Introduction

## 1.1. Background

Ove Arup & Partners Ltd. (Arup) has been appointed by SSE Hydrogen Developments Limited (an SSE company) ('the Applicant') to prepare an Environmental Impact Assessment (EIA) Scoping Report to inform the scope and content of an EIA for a Hydrogen-fired Combined Cycle Gas Turbine (CCGT) Generating Station ('Keadby Hydrogen Power Station' referred to in this report as 'the Proposed Development') on land at, and in the vicinity of, the existing Keadby Power Station, Trentside, Keadby, Scunthorpe DN17 3EF ('Proposed Development Site', or 'Site') (see Appendix A1.1).

The Proposed Development is an alternative to the consented Keadby 3 Carbon Capture and Storage (CCS) enabled Power Station and would be located within the same site. By obtaining consents for both low carbon CCGT technology options (CCS enabled and hydrogen-fired) on the Site, SSE can continue to support the UK's security of supply in accordance with Government policy and be ready to develop a low carbon CCGT as soon as a commercial decision can be made based on market certainty around the availability of either a carbon dioxide (CO<sub>2</sub>) pipeline or a hydrogen supply.

The Proposed Development is expected to comprise one high efficiency CCGT unit and associated infrastructure. The Proposed Development will be designed to run on 100% hydrogen, with the ambition that this would be the fuel from the start of operation. However it is currently anticipated that the hydrogen supply chain required for this may not be available at the start of operation, in which case the Proposed Development would also need to be able to operate using 100% natural gas until such time as a commercially viable hydrogen supply chain option becomes available to the Site.

The indicative Site under consideration for the Proposed Development is shown in Appendix A1.2.

The Proposed Development is subject to ongoing technical studies, but the CCGT generating station is expected to comprise a single CCGT unit achieving an electrical output capacity of up to 910 megawatts (MW) onto the national transmission network.

The CCGT generating station, and associated infrastructure together forming the Proposed Development, is to be located on land within the existing Keadby Power Station site that is under the control of the Applicant. The proposed electricity transmission, cooling water and natural gas and hydrogen supply infrastructure are predominantly located on land under the control of the Applicant, although they may cross other third-party land or land over which some third parties have existing rights.

Figures identifying the locations of each element of the Proposed Development are provided in Appendix A1.2. The Site is shown in Appendix A1.1.

This EIA Scoping Report considers the environmental context of the Proposed Development Site and the potential environmental impacts of the Proposed Development. Where impacts are considered to have the potential to cause significant environmental effects, these are identified and the proposed approach to be used to characterise the impacts and understand the significance of their effects is outlined. This report also outlines issues perceived to be non-significant, which it is proposed do not require formal assessment as part of the EIA and can therefore be scoped out of the EIA.

The EIA is an iterative process that feeds into the engineering design process to mitigate significant environmental effects where they are predicted to occur. The final design iteration, along with the findings of the EIA will be reported in an Environmental Statement (ES), in accordance with The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 ('EIA Regulations') and will be submitted with the Development Consent Order (DCO) Application for the Keadby Hydrogen Power Station ('the DCO Application') in accordance with Regulation 5 (2)(a) of the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (as amended) ('APFP Regulations').

## 1.2. Strategic Context

The Committee on Climate Change (CCC) has stated a need to invest in and deploy carbon capture and negative emissions technology at scale in order to reach UK's target of net zero by 2050 (The Committee on Climate Change, 2019). The 2019 CCC Net Zero report identified that at least one of the UK's Carbon Capture Utilisation and Storage (CCUS) emerging regional clusters should involve substantial production of low-carbon hydrogen (including blue hydrogen produced from natural gas with carbon capture) by 2030 to stay 'on track' for net zero. Aligned with this objective, SSE Thermal has formed a partnership with Equinor (a future hydrogen supplier) to develop the Proposed Development.

The route for the hydrogen supply pipeline to the Keadby Hydrogen Power Station has not yet been confirmed. The supply pipeline is not included in the Proposed Development Site and will be progressed by a third party under a separate consent and development. In line with Government policy, it is recognised that developments such as the Proposed Development are needed to stimulate investment in the development of hydrogen production and supply infrastructure.

## 1.3. The Applicant

The Applicant, SSE Hydrogen Generation Limited, part of the FTSE-listed SSE plc, is one of the UK's largest and broadest-based energy companies, and the country's leading generator of renewable energy. Over the last 20 years, SSE plc has invested

over £20bn to deliver industry-leading offshore wind, onshore wind, CCGT, energy from-waste, biomass, energy networks and gas storage projects.

SSE owns and operates the adjacent Keadby 1 and Keadby 2 Power Stations. SSE has also obtained a DCO for Keadby 3 CCS enabled Power Station.

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

## 1.4. Consenting Regime

The Proposed Development falls within the definition of a ‘nationally significant infrastructure project’ (NSIP) under Section 14(1)(a) and 15(2) of the Planning Act 2008 (hereafter referred to as ‘the 2008 Act’) as a ‘generating station exceeding 50 MW’.

As a NSIP project, the Applicant is required to seek a Development Consent Order (DCO) to construct and operate the generating station, under Section 31 of the 2008 Act. Section 37 of the 2008 Act also governs the form, content and accompanying documents that are required as part of a DCO application. The requirements are implemented through the APFP Regulations which state that an application must be accompanied by an ES, where a development is considered to be ‘EIA development’ under the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (EIA Regulations).

The DCO Application will be submitted to the Planning Inspectorate who will examine the application and make recommendations to the Secretary of State for Energy Security and Net Zero pursuant to the 2008 Act, who will subsequently determine whether or not a DCO should be granted for the Proposed Development.

It is the Applicant’s intention to take up the Planning Inspectorate’s Tier 3 enhanced pre-application service, with the aim of qualifying for the fast-track consenting timeframe as facilitated by The Infrastructure Planning (Miscellaneous Provisions) Regulations 2024 and The Infrastructure Planning (Examination Procedure) (Amendment) Rules 2024.

Regulation 3(1) of the EIA Regulations defines the meaning of ‘EIA development’ (with reference to Schedules 1 and 2 to the EIA Regulations). The Proposed Development is a ‘Schedule 1’ development under the EIA Regulations as it constitutes *“Thermal power stations and other combustion installations with a heat output of 300 megawatts or more”*. EIA is compulsory for Schedule 1 developments given the type and/or the scale of the development is likely to have the potential for significant effects on the environment. As such, an EIA is required for the Proposed Development and an ES must be prepared in accordance with these Regulations to accompany the application. A formal EIA screening opinion is therefore not being sought from the Secretary of State.



As the Applicant proposes to provide an ES with the application for a DCO, this report constitutes the Applicant's notification under Regulation 8 (1b) of the EIA Regulations.

Having determined that an ES will be included as part of the application for development consent, pursuant to Regulation 10(1) of the EIA Regulations, the Applicant is applying to the Secretary of State for their opinion as to the scope and level of detail of the information to be provided in the ES.

Appendix A1.2 illustrates the indicative Application boundary for the Proposed Development ('the Proposed Development Site'), which comprises the proposed generating station and associated infrastructure including on-site hydrogen and natural gas supply infrastructure, water supply and electricity connections, as well as indicative laydown areas for construction and areas for biodiversity mitigation and enhancement. As explained in Section 1.2, this does not include the hydrogen supply pipeline route.

A description of the existing land-use within and in proximity to the Site and an overview of the Proposed Development is presented in Sections 2 and 3 of this report.

## 1.5. Objectives of Scoping

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

This Scoping Report has been prepared in accordance with the relevant legislative provisions and associated Advice Notes (published by Planning Inspectorate).

Table 1 presents a list of information that should be included in a request for a scoping opinion, as prescribed by Regulation 10(3) of the EIA Regulations. Table 2 presents the information highlighted in paragraph 4.2 (and associated Insert 2) of Advice Note 7 'Environmental Impact Assessment: Preliminary Environmental Information and Environmental Statements' (Planning Inspectorate, 2017) regarding the content of a Scoping Report, including signposting to the location in this report where the information is presented.

**Table 1: Information required for a request for a Scoping Opinion**

Description of Information Required (Regulation 10(3))	Section in Scoping Report where presented
A plan sufficient to identify the land	Appendix A1.1 and A1.2

A description of the proposed development, including its location and technical capacity	Section 2 and Section 3
An explanation of the likely significant effects of the development on the environment	Section 6
Such other information or representations as the person making the request may wish to provide or make	

**Table 2: Information provided in the Scoping Report (Based on Advice Note 7)**

Description of Information Required	Section in Scoping Report where the Information is Presented
<p>The Proposed Development</p> <ul style="list-style-type: none"> <li>an explanation of the approach to addressing uncertainty where it remains in relation to elements of the Proposed Development e.g. design parameters;</li> <li>referenced plans presented at an appropriate scale to convey clearly the information and all known features associated with the Proposed Development.</li> </ul>	<p>Section 3 (The Proposed Development)</p> <p>Appendix A1.1 (Site Location Plan) and A1.2 (Indicative Site Layout)</p>
<p>EIA Approach and Topic Areas</p> <ul style="list-style-type: none"> <li>an outline of the reasonable alternatives considered and the reasons for selecting the preferred option;</li> <li>a summary table depicting each of the aspects and matters that are requested to be scoped out allowing for quick identification of issues;</li> <li>a detailed description of the aspects and matters proposed to be scoped out of further assessment with justification provided;</li> <li>results of desktop and baseline studies where available and where relevant to</li> </ul>	<p>Section 4 (Project Alternatives)</p> <p>Section 7 (Matters to be Scoped Out)</p> <p>Section 7 (Matters to be Scoped Out)</p>

Description of Information Required	Section in Scoping Report where the Information is Presented
<p>the decision to scope in or out aspects or matters;</p> <ul style="list-style-type: none"> <li>aspects and matters to be scoped in, the report should include details of the methods to be used to assess impacts and to determine significance of effect e.g. criteria for determining sensitivity and magnitude;</li> <li>any avoidance or mitigation measures proposed, how they may be secured and the anticipated residual effects.</li> </ul>	<p>Section 2 (Description of the Existing Environment)</p> <p>Section 6 (Potentially Significant Environmental Issues), Baseline Conditions and Scope of the Assessment sections for each environmental topic, and Section 8 (EIA Process)</p> <p>Section 6 (Scope of the Assessment for each environmental topic)</p>
<p>Information sources</p> <ul style="list-style-type: none"> <li>references to any guidance and best practice to be relied upon;</li> <li>evidence of agreements reached with consultation bodies (for example the statutory nature conservation bodies or local authorities);</li> <li>an outline of the structure of the proposed ES.</li> </ul>	<p>Section 6 (Potentially Significant Environmental Issues), Scope of the Assessment sections for each environmental topic)</p> <p>N/A</p> <p>Section 8 (EIA Process)</p>

Source: Advice Note Seven: Environmental Impact Assessment: Preliminary Environmental Information and Environmental Statements, December 2017

## 1.6. Structure of Remainder of this Report

The remainder of this report is structured as follows:

- Section 2 – Description of the Existing Environment: provides a description of the site and the surrounding area, together with any potentially significant environmental sensitivities/receptors within the vicinity of the Proposed Development Site;
- Section 3 – The Proposed Development: outlines the key elements (including those likely to have a significant environmental effect) of the Proposed Development, the infrastructure to be developed and the function of the operational plant;
- Section 4 – Project Alternatives: details the alternatives that have been considered during development of the Proposed Development design;

- Section 5 – Planning Policy and Need: identifies the key documents relating to national and local planning policy in the area, together with a summary of some of the principal planning policies or provisions as relevant to the need for Proposed Development;
- Section 6 – Potentially Significant Environmental Issues: provides a discussion of how the Proposed Development may interact with the different aspects of the receiving environment, together with a description of the proposed assessment methodologies, guidance and best practice to be adopted for the EIA of the Proposed Development (or, as appropriate, its design);
- Section 7 – Matters to be Scoped Out: provides a summary of the issues proposed to be scoped out of the EIA and reasoning why, including a summary in Table 16;
- Section 8 - Environmental Impact Assessment Process: provides an overview of the approach to be taken in the EIA and outline structure for the proposed ES;
- Section 9 – Summary;
- Section 10 – References;
- Appendix 1 – Figures, referenced within this report:
  - A1.1 Site Location Plan;
  - A1.2 Indicative Site Layout;
  - A1.3 Statutory and Non-Statutory Designated Ecological Sites;
  - A1.4 Designated Heritage Assets within 3km and 5km of the Proposed Development Site;
  - A1.5 Surface and Groundwater Bodies and their Attributes;
  - A1.6 Other Environmental Constraints within 5km of the Proposed Development Site;
  - A1.7 UK Habitat Map
  - A1.8 Other Developments to be Considered in Cumulative Impact Assessment.

## 2. Description of the Existing Environment

### 2.1. Proposed Development Site

The Proposed Development will be located within the wider Keadby Site, approximately 5km to the west of the town of Scunthorpe, adjacent to the village of Keadby. The Main Site, together with the on-site connection corridors for the electrical grid connection, natural gas and hydrogen connections, water abstraction and discharge, will be located within the administrative boundary of North Lincolnshire Council (a unitary authority). Appendix A1.1 illustrates the current extent of land considered for the Proposed Development.

For the purposes of this report, the main uses of each part of the Proposed Development Site have been summarised and simplified for ease of reference and illustrated on Appendix A1.2. Some parts of the Site may have more than one use (e.g. construction laydown, followed by development of ancillary facilities) and in these cases it is the permanent, long term anticipated use of the area that is reflected in the simplified layout shown. The layout will be progressed further during the preparation of the DCO application and presented in the ES. The parts of the Site are summarised below:

- **Main Site:** This approximately rectangular area would encompass the proposed generating station comprising the CCGT and including turbines, boiler, exhaust gas treatment, stack(s) and ancillary plant as well as cooling infrastructure, electricity export infrastructure and the ancillary equipment needed for the Proposed Development; as well as CCR land (see explanation in Section 3.1 regarding the need for this);
- **Ancillary Facilities for Main Site:** This approximately square area to the south of the Main Site with another small area to the east may be required in addition to the Main Site for construction facilities or ancillary plant and buildings;
- **Water Connections Corridors:** This area comprises three corridors following the routes of the existing River Trent intake (south) and outfall (north) pipework currently associated with the cooling operations for the Keadby 1 and 2 Power Stations, as well as land associated with a proposed cooling water intake from the Stainforth and Keadby Canal;
- **Electrical Connection Corridors:** To connect the Proposed Development to the adjacent National Grid 400 kilovolt (kV) substation or provide a new 132 kV connection;
- **Construction Access Routes:** Including the haul route proposed for Keadby 3 Power Station which falls outside the Keadby 3 DCO Site boundary and is being consented under a separate planning application to North Lincolnshire Council;

- Waterborne Transport Off-loading Area: The area that would be available should waterborne transport of components via the River Trent be considered as an option by contractors to deliver abnormal indivisible loads (AIL);
- Indicative Construction Laydown Areas;
- Land associated with Keadby 2 Power Station and Keadby 1 Power Station is also included for the purposes of facilitating connections to the Proposed Development for gas, electricity, water and other necessary infrastructure.
- Areas will also be identified for biodiversity mitigation and enhancement.

It is noted that there may be some small elements of demolition required within the Site to facilitate construction of the Proposed Development.

The Proposed Development Site encompasses an area of approximately 77.7 hectares (ha) and is indicative at this stage. The land required for the Proposed Development will be subject to appraisal and refinement as the preparation of the Application progresses. The extent of the Site shown on Appendix A1.2 is anticipated to be the maximum area required for the Proposed Development. The final layout that will be incorporated within the proposed DCO order limits will be determined through ongoing studies of potential constraints and discussions with relevant stakeholders.

## 2.2. History of the Proposed Development Site and Surrounding Areas

The Proposed Development Site forms part of the landholding of Keadby Power Station. The Keadby Power Station Site has a long history of power generation, commencing with a former coal fired power station which was operational between 1952 and 1984, and was demolished by the early 1990's. The current power station, referred to as Keadby 1 Power Station, is a 755MW CCGT power station and has been operating since 1996. Keadby 1 Power Station includes two gas turbines, with associated boilers and exhaust stack, a steam turbine ancillary plant and equipment and general office buildings.

Following the grant of a variation to the existing Section 36 consent in 2016, construction of an 910MW CCGT power station (Keadby 2) commenced in April 2019 on land adjacent to Keadby 1. The construction of Keadby 2 was completed in 2022 and it began commercial operation in March 2023; it is currently the most efficient CCGT in Europe. For the purposes of connections, the Proposed Development Site boundary includes some land associated with both Keadby 1 and Keadby 2 Power Stations, but the Proposed Development will have no impact on the operation of these existing Power Stations.

In December 2022 a DCO was granted to construct and operate a CCS enabled CCGT power station named Keadby 3 Carbon Capture Power Station, comprising a CCGT unit with a capacity of up to 910 megawatts electrical output (gross), carbon capture and

compression plant, electrical, gas, and cooling water connections, and associated development.

A number of historic landfills are located within the immediate vicinity of the Site and more details are provided in paragraph 6.6.1.4. This is illustrated in Appendix A1.6. The area proposed for construction laydown and biodiversity management is currently unused and vegetated, with mounds or spoil heaps which may contain Pulverised Fuel Ash (PFA) associated with historic coal-fired power use. Over time, some semi-natural habitat has become established on this disturbed ground.

### 2.3. Local Topography and Surrounding Land Use

Land within and surrounding the Proposed Development Site is generally low lying, at elevations below 10m Above Ordnance Datum (mAOD) and with very shallow gradients (with the exception of the former ash tip (up to 18 m AOD) to the south-west of the Main Site). Beyond the current Keadby Power Station site, land use is almost entirely arable farming, however, the immediate site surroundings have been developed in recent years with power infrastructure, including the Keadby Windfarm to the north, which became operational in 2014. Additional wind turbines and electricity transmission and distribution infrastructure is present over the wider area.

### 2.4. Environmental Receptors

A number of environmental receptors have been identified within and in the vicinity of the Proposed Development Site. Each of these are detailed below under each environmental discipline. All distances are approximate and given as the shortest distance between the receptor and the closest point of the Proposed Development Site boundary (or defined part of the Site where specified) (see Appendix A1.3 - A1.7).

#### 2.4.1. Residential

The nearest settlement is the village of Keadby, which is located immediately adjacent to the Water Connections Corridors area and approximately 1000m from the Main Site at its closest point.

Other settlements nearby include: Crowle (4km) and Ealand (3.2km) to the west of the Main Site; Althorpe (2.3km) to the south-east of the Main Site and Gunness (1.8km) to the east of the Main Site, on the eastern bank of the River Trent. Closer to the Main Site are a small number of individual dwellings. There are further settlements and individual residential receptors located in the surrounding rural areas.

Those closest properties to the Proposed Development include a property on Chapel Lane (buildings located within <10m of the existing buried Water Connections Corridors) and on the B1392, (residential properties also located within 10m of the existing buried Water Connections Corridors). An isolated property is present at Vazon Bridge,

approximately 50m to the south of the Water Connections Corridors, adjacent to the Stainforth and Keadby Canal.

Other isolated properties include:

- Pilfrey Farm - 200m east of the construction access from the A18;
- A property located approximately 500m south-east of the Indicative Construction Laydown Area to the south of the Stainforth and Keadby Canal; and
- An isolated property located approximately 720m north-east of the Proposed Development Site.

Appendix A1.6 illustrates the location of surrounding residential receptors and communities.

#### 2.4.2. Traffic and Transport

Access to the Proposed Development Site during the construction phase for heavy goods vehicles (HGV) construction traffic is anticipated to be via the existing access road from the A18, avoiding heavy commercial traffic from routing through Keadby village. The location of this access is included within the Proposed Development Site boundary (see Appendix A1.2).

Keadby Power Station Site is accessed from the B1392, a single-carriageway road that serves the village of Keadby. The B1392 joins the A18 trunk road approximately 1.2km south of the Waterborne Transport Off-loading Area at a junction to the west of the village of Althorpe.

Chapel Lane runs north-south through the Site and is an adopted highway maintained by North Lincolnshire Council to a location north of its crossing of the North Soak Drain and Stainforth and Keadby Canal.

Other roads within the Proposed Development Site include Ealand Road/ Bonnyhale Road which runs east-west along the southern edge of Main Site.

Trent Road, North Road and West Road are all roads facilitating the movement of traffic within the current Keadby 1 and Keadby 2 Power Stations sites.

Ealand/ Bonnyhale Road and Trent Road, North Road and West Road are all private roads under the control of the Applicant.

The nearest Public Rights of Way (PRoW) to the Proposed Development Site are identified on the Definitive Map of North Lincolnshire as:

- Footpath 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 Connections Corridors;
- Footpath KEAD 9 which runs parallel to Warping Drain east-west from the northern terminus of Footpath KEAD 10. Footpath LUDD9 joins Footpath KEAD 10.



A number of other PRow are located within the wider surrounding areas. A permissive 'traffic-free cycle route' south of the Stainforth and Keadby Canal is also noted.

A plan illustrating all PRow will be provided in the PEI Report that will be published for statutory consultation.

The Stainforth and Keadby Canal is immediately to the south of the Main Site. The existing wharf on the River Trent is included within the Proposed Development Site boundary to enable deliveries of plant and equipment, if required.

To the south of the Main Site, the Scunthorpe to Doncaster passenger rail line is present; there are no existing connections or sidings into the Keadby Power Station Site. There is a passenger service run by Northern Rail every two hours in each direction that operates from Althorpe rail station, located approximately 1.5km southeast of the Main Site.

Vehicles using the construction access road from the A18 pass over both the Stainforth and Keadby Canal and the Scunthorpe to Doncaster passenger rail line via North Pilfrey Bridge. This bridge has been used for the delivery of wind turbine components for Keadby Windfarm and was used during the construction period for Keadby 2. Structural limits of the bridge will be considered further in the ES for the delivery of any abnormal indivisible loads (AIL).

### 2.4.3. Ecology

The Main Site comprises an area of hardstanding that was formerly used as laydown and storage for the construction of Keadby 2 Power Station, and 'Keadby Common' which is a species-poor grassland of sown origin. Part of the latter area was used as soil storage during the construction of Keadby 2 and now contains disturbed soils being recolonised by ruderal vegetation. Keadby Common is bounded by a network of field drains.

An additional area of habitat associated with the Main Site is the former Keadby Ash Tip, which contains a matrix of scrub, grassland and open mosaic habitats. The latter is a priority habitat and Keadby Ash Tip supports a very good example of this habitat. However, the contributing elements coinciding with the Main Site are of relatively lower quality and comprise compacted stony substrates of former railway sidings.

The wider area covered by the Proposed Development Site includes extensive areas of hardstanding and other built infrastructure (including the Keadby 1 and 2 Power Stations), intensively managed arable fields with boundaries defined by a network of field drains and ditches, and areas of grassland, scrub, hedgerows and plantation woodland. The proposed water supply would be the Stainforth and Keadby Canal which has secondary woodland on its northern bank.

The statutory ecological designations closest to the Proposed Development Site (restricted to those within 10km) are illustrated on Appendix A1.3 as follows (distances measured to the closest part of the Proposed Development Site):

- Humber Estuary Special Area of Conservation (SAC) which encompasses the River Trent at the location of the wharf. The SAC is designated for its estuarine and coastal habitats. It is also important for its populations of grey seal (*Halichoerus grypus*), river lamprey (*Lampetra fluviatilis*) and sea lamprey (*Petromyzon marinus*);
- Humber Estuary Ramsar Site which encompasses the River Trent at the location of the wharf. The Ramsar Site is designated as a representative example of a near-natural estuary and for dependent species including internationally important bird populations and assemblages, grey seal, migratory populations of river lamprey and sea lamprey, and natterjack toad (*Bufo calamita*);
- Thorne Moor SAC which is located 5.5km to the north-west of the Proposed Development Site and is designated for its degraded raised bog habitats still capable of natural regeneration;
- Thorne and Hatfield Moors SPA which is located 5.5km to the north-west of the Proposed Development Site and is designated for its breeding population of nightjar (*Caprimulgus europaeus*);
- Hatfield Moor SAC which is located 8.2km to the south-west of the Proposed Development Site and is designated for its degraded raised bog habitats still capable of natural regeneration;
- Humber Estuary Special Protection Area (SPA) which is located 9.1km downstream, north-east of the Proposed Development Site. It is connected to the Proposed Development via the River Trent. The SPA is designated for its wintering assemblage of water birds, and for its populations of 10 species of wintering bird, five species of passage bird and four species of breeding bird;
- Humber Estuary Site of Special Scientific Interest (SSSI) which encompasses the River Trent at the location of the wharf. The SSSI is designated for its nationally to internationally important estuary, sand dune and standing water habitats. It also supports nationally and internationally important populations of breeding, wintering and passage birds, grey seal, and river and sea lamprey;
- Crowle Borrow Pits SSSI which is located 1.2km west of the Proposed Development Site. The SSSI is designated for its wet woodland, fen and open water habitats that support uncommon plant species;
- Hatfield Chase Ditches SSSI which is located 1.4km south-west of the Proposed Development Site. The SSSI is designated for its network of drainage ditches supporting nationally important assemblages of wetland plants and invertebrate;
- Eastoft Meadow SSSI which is located 3.7km north-west of the Proposed Development Site and is designated for its herb-rich hay meadow habitat;

- Belshaw SSSI which is located 5.2km south-west of the Proposed Development Site and is designated for its population of greater yellow-rattle (*Rhinanthus angustifolius*), a legally protected and nationally rare species;
- Thorne, Crowle and Goole Moors SSSI which is located 5.5km north-west of the Proposed Development Site and is designated for its lowland raised mire habitats, invertebrate assemblage and its breeding and wintering bird populations, including nightjar;
- Humberhead Peatlands National Nature Reserve (NNR) which is located 5.5km north-west of the Proposed Development Site. It is designated as the largest raised bog in lowland Britain;
- Epworth Turbary SSSI which is located 7.5km south-west of the Proposed Development Site. It is designated for its wetland habitat;
- Risby Warren SSSI which is located 7.6km north-east of the Proposed Development Site. The SSSI is designated for its 'coversand' heathland habitat;
- Messingham Sand Quarry SSSI which is located 8.9km south-east of the Proposed Development Site. The SSSI is designated for its mosaic of habitats supporting notable invertebrate and breeding bird assemblage;
- Messingham Heath SSSI which is located 8.9km south-east of the Proposed Development Site. The SSSI is designated for its coversand heathland habitat;
- Tuetoes Hills SSSI which is located 9.1km south-east of the Proposed Development Site. The SSSI is designated for its mosaic of dry acid grassland vegetation;
- Haxey Turbary SSSI which is located 9.5km south-west of the Proposed Development Site. The SSSI is designated for its relict bog with open wet heathland; and
- Rush Furlong SSSI which is located 9.7km south-east of the Proposed Development Site. The SSSI is designated for its hay meadow vegetation.

A further seven statutory designations are located between 10 and 15km of the Proposed Development Site. These more distant Sites would be identified and assessed later if it is determined that they fall within the scope of the Air Quality Impact Assessment.

The non-statutory ecological designations closest to the Proposed Development Site (those within 2km) are illustrated on Appendix A1.3 as follows (distances measured to the closest part of the Proposed Development Site):

- Stainforth and Keadby Canal Corridor Local Wildlife Site (LWS) which is the proposed location for the cooling water intake. The LWS is designated for its aquatic flora and associated bankside neutral grassland;
- Keadby Warping Drain LWS which is crossed by the buried pipeline (Water Discharge Corridor) for the existing line of discharge from Keadby 1 Power Station. It is designated for its aquatic flora;

- Keadby Boundary Drain LWS which is located adjacent and to the west of the Proposed Development Site. The LWS is designated for its aquatic flora and associated bank vegetation;
- Hatfield Waste Drain LWS which is crossed by the construction access route for the Proposed Development off the A18. The LWS is designated for its rich aquatic flora and adjacent grassland vegetation;
- River Torne LWS which is located 20m south of the Proposed Development Site. The LWS is designated for its aquatic habitats and adjacent grassland and wetland vegetation;
- South Soak Drain, Keadby LWS which is located 30m south-east of the Proposed Development Site. The LWS is designated for its aquatic vegetation;
- Keadby Wetland LWS which is located 30m south-east of the Proposed Development Site. The LWS is designated for its mosaic of wetland and scrub habitats;
- Keadby Wet Grassland LWS which is located 50m south-east of the Proposed Development Site. The LWS is designated for its grassland, marsh and swamp habitats;
- Three Rivers LWS which is located 100m south of the Proposed Development Site. The LWS is designated for its aquatic vegetation and adjacent scrub and grassland habitats; and
- South Engine Drain LWS which is located 100m south of the Proposed Development Site. The LWS is designated for its aquatic vegetation and adjacent grassland habitat.

In addition to nature conservation designations, the Proposed Development is located with an area of strategic importance for delivery of improved ecological networks within the Humberhead Levels Nature Improvement Area (NIA).

#### 2.4.4. Hydrology/ Flood Risk

Appendix A1.5 illustrates that the Proposed Development Site and surrounding areas lie within the extensive floodplain of the River Trent. The Main Site lies approximately 1 km west of the River Trent whilst the Water Connections Corridors and haul road (within the Construction Access Routes area), lie immediately west of the tidal River Trent which flows in a northerly direction towards the Humber Estuary.

The study area has a complex surface water hydrology and a long history of land drainage. The Proposed Development Site and land north of the Sheffield and South Yorkshire Navigation – Stainforth and Keadby Canal is within the Isle of Axholme and North Nottinghamshire Water Level Management Board (ANNWLMB) area.

The Proposed Development Site sits on an area of superficial deposits designated as Secondary A aquifer.

#### 2.4.5. Geology and Hydrogeology

The local geology is characterised by approximately 12m to 17m of alluvium comprising of clay, silt, sand and gravel with occasional peat layers recorded at various depths between 0.45m and 1.6m thickness. These superficial deposits overlie the Mercia Mudstone Formation which shows evidence of near surface weathering, the extent of which decreases with increasing depth.

The Environment Agency classifies the underlying natural superficial geology (Warp/alluvium) as a Secondary A aquifer and the Mercia Mudstone as a Secondary B aquifer. The Proposed Development Site does not contain or lie in close proximity to any relevant groundwater Source Protection Zones (SPZ).

#### 2.4.6. Cultural Heritage

Appendix A1.4 illustrates that there are no World Heritage Sites, scheduled monuments, grade I or II\* listed buildings, conservation areas, registered parks and gardens, registered battlefields or protected wreck sites located within the Proposed Development Site. A number of non-designated heritage assets are recorded in the North Lincolnshire Historic Environment Record (HER) located within the Proposed Development Site, including a purported Romano-British settlement site (HER 17311), post-medieval land improvement drains (HER 24691) and peat horizons containing evidence of past environments (MLS22432). Evaluation surveys undertaken in support of the Keadby 3 DCO confirmed that there was no evidence for the purported Romano-British settlement site (HER 17311) and also confirmed the presence of further post-medieval land improvement drains and confirmed that the peat horizons extended across the Proposed Development Site.

Outside the Proposed Development Site boundary, the closest assets are the scheduled monument and grade II listed building at Keadby Lock on the Stainforth and Keadby Canal (NHLE 1005204; 1342734), located approximately 160m south of the Proposed Development Site.

The surrounding landscape contains notable concentrations of listed buildings in Althorpe, Crowle (also a conservation area) and Eastoft. There are isolated and smaller groupings of listed buildings in the surrounding landscape. One further scheduled monument lies within 5km of the Main Site area at Flixborough Saxon Nunnery and Site of All Saints Medieval Church and Burial Ground (NHLE 1009382). The non-designated Isle of Axholme area of Special Historic Landscape Interest (saved policy LC14 of the North Lincolnshire Local Plan) lies 2km south of the Proposed Development Site.

#### 2.4.7. Landscape

At a national scale, the Proposed Development Site lies within the Humberland Levels National Character Area (NCA) which is a flat, low-lying and large scale agricultural landscape (Natural England, 2014). There is widespread evidence of drainage history, The Keadby Hydrogen Power Station Project

in particular from the 17th century, in the evidence of ditches, dykes and canalised rivers. The flat landscape enables extensive, unbroken views where vertical structures including power stations and wind turbines, are very prominent.

At a local scale, the Proposed Development Site lies within the Trent Levels Landscape Character Area (LCA) within the North Lincolnshire Landscape Character Assessment and Guidelines (Estell Warren Landscape Architects, 1999). This LCA is characterised as a flat, open floodplain landscape with long distance views with little diversity in character.

Sensitive visual receptors are likely to be residential receptors located within nearby settlements including Keadby, Althorpe and Gunness. Recreational receptors using the local PRow network including the long distance routes Peatlands Way and Trent Valley Way, and recreational users of the River Trent and local waterways.

## 3. The Proposed Development

### 3.1. Overview

The Proposed Development comprises the construction, operation and maintenance of a CCGT generating station with a capacity of up to 910MW electrical output to be located on land in the vicinity of the existing Keadby Power Stations (Keadby 1 and Keadby 2) near Scunthorpe in North Lincolnshire (the Proposed Development Site).

The Proposed Development is an alternative to the consented Keadby 3 CCS Power Station and would be located on the same Site. By obtaining consents for both low carbon CCGT technology options (i.e. CCS-enabled in the form of Keadby 3 and hydrogen-fired in the form of the Proposed Development) on the Site, SSE can continue to support the UK's security of supply in accordance with Government policy, and be ready to develop a low carbon CCGT as soon as a commercial decision can be made based on market certainty around the availability of either a CO<sub>2</sub> pipeline or a hydrogen supply.

The Proposed Development is expected to comprise one high efficiency CCGT unit and associated infrastructure. The Proposed Development will be designed to run on 100% hydrogen, with the ambition that this would be the fuel from the start of operation. However, it is currently anticipated that the hydrogen supply chain required for this may not be available at the start of operation, in which case the Proposed Development would also need to be able to operate using 100% natural gas until such time as a commercially viable hydrogen supply chain option becomes available to the Site.

In accordance with the Carbon Capture Readiness (Electricity Generating Stations) Regulations 2013, even though the Proposed Development's decarbonisation pathway is hydrogen, land will need to be set aside within the Site for Carbon Capture Readiness (CCR). This requirement is expected to be replaced by the Hydrogen Readiness Requirements when the Decarbonisation Readiness Guidance is adopted, but this is currently anticipated to be after the submission of the Keadby Hydrogen DCO application. Therefore, in the intermediate period, the Site will include land set aside to meet the CCR obligation.

A conceptual Site layout for the Proposed Development Site is provided as Appendix A1.2. The layout will be developed following further engineering evaluation, consultation with stakeholders and on conclusion of further technical and environmental studies. The preferred Site layout is expected to be settled prior to statutory consultation on the application for DCO for the Proposed Development.

The following sections describe the various elements of the Proposed Development in more detail.

### 3.2. Combined Cycle Gas Turbine Unit

In a CCGT power station, a gas fuel (hydrogen or natural gas) is combusted to drive a gas turbine, which is connected to a generator producing electricity. As an amount of usable heat remains in the gas turbine exhaust gas, this is passed into a Heat Recovery Steam Generator (HRSG, a type of boiler) to make steam to generate additional electricity via a steam turbine.

The waste gases from the HRSG are released into the atmosphere via an exhaust stack, following appropriate treatment.

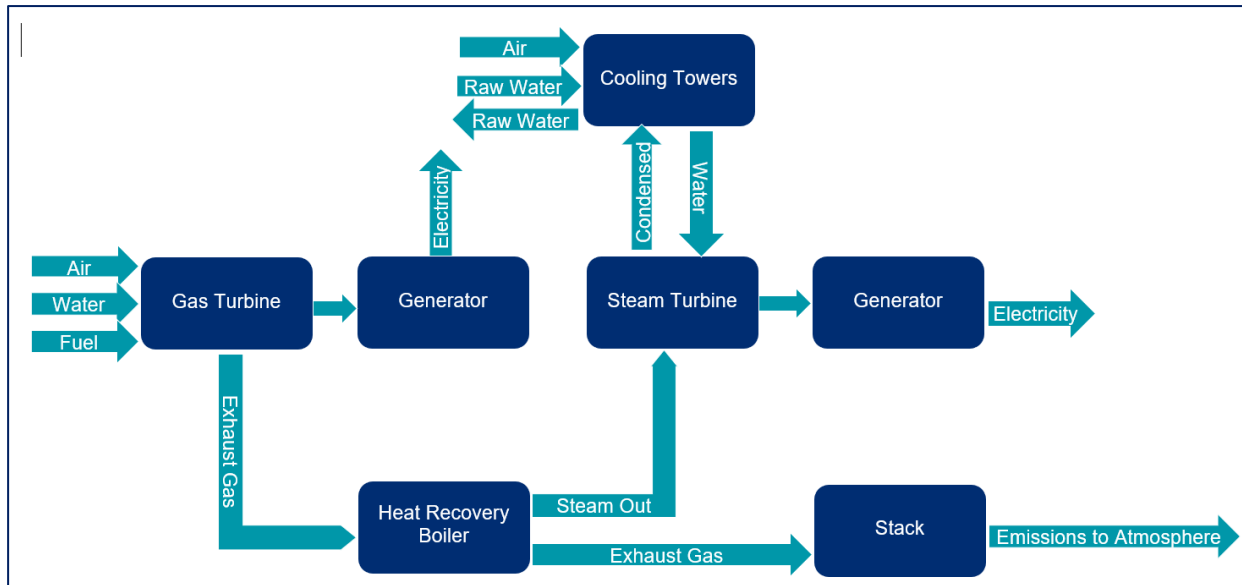
The exhaust steam from the steam turbine is condensed (cooled) back into water which is returned to the HRSG to continue the process. This cooling would be achieved through the use of hybrid wet/ dry cooling towers using make up water, expected to be abstracted from the Stainforth and Keadby Canal immediately to the south of the Main Site. A back-up option would be to abstract from the River Trent (located approximately 1,350m to the east of the Main Site at its closest point). The confirmation as to which source is used for the cooling water make-up is being determined through engineering and environmental studies. Spent cooling water will be purged from the cooling towers and directed through the existing underground water pipeline used by Keadby 1 and Keadby 2 Power Stations, with the water discharged through the existing release point on the River Trent.

The Proposed Development is anticipated to consist of one CCGT unit with a total output of up to 910 Megawatts electrical output (MW(e)). The electrical efficiency of a modern CCGT power station is greater than 62%, which is considerably higher than that for a conventional coal, biomass or oil-fired generating plant, or the existing UK fleet of gas fired power stations.

A schematic of the power generation process associated with the Proposed Development is provided below in Image 1.



**Image 1: Power Generation Process (for a multi-shaft generation module)**



### 3.3. Other Infrastructure

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

- the provision of new gas pipework across the Main Site to convey gas fuel (hydrogen and natural gas) to the CCGT unit. Natural gas would be supplied from the existing gas pipeline associated with Keadby 1 and 2, whereas a new pipeline connection into the Main Site would be necessary to supply hydrogen;
- new Above Ground Installations (AGIs) adjacent to the CCGT to receive natural gas and hydrogen;
- new cooling water infrastructure to provide make-up water for the hybrid cooling towers from the Stainforth and Keadby Canal (or, alternatively, the River Trent<sup>1</sup>),
- Selective Catalytic Reduction (SCR) infrastructure may be required to remove oxides of nitrogen (NOx) from the CCGT exhaust gas stream, consisting of a catalyst chamber, associated pipework and fans and reagent storage vessels;
- electricity transmission infrastructure to connect the CCGT to the National Grid electricity transmission system through the existing substation located adjacent to the Site;
- ancillary infrastructure including:
  - an auxiliary boiler;
  - workshop and stores;

<sup>1</sup> If the back-up cooling water plan on the River Trent is selected, additional infrastructure may be required to be installed at the River Trent to comply with the Eels (England and Wales) Regulations 2009

- electrical, control room and administration building;
- water treatment plant, fire pumps and laboratory;
- cooling water pump house;
- above ground raw and fire water tank;
- above ground demineralised water tank;
- back-up diesel generators, comprising skid-mounted units;
- wastewater treatment plant; and
- additional access roads and car parking.

### 3.4. Access

Access to the Proposed Development Site during the construction phase for HGV construction traffic is anticipated to be via the existing access road from the A18, avoiding heavy commercial traffic from routing through Keadby village. The location of this access is included within the Site boundary on Appendix A1.2.

The use of the wharf within the Site to facilitate the delivery of plant and equipment by barge is also included as an option for the Proposed Development, this was successfully used for the construction of Keadby 2 Power Station and consented as a construction traffic route option as part of the Keadby 3 Power Station DCO.

Access to the Site for the operational traffic would be facilitated via existing access routes.

### 3.5. Preparation of the Site

The Proposed Development would be located within the curtilage of the Keadby Power Station site. The ground conditions vary across the Site depending on their historical use. Given the nature of the former site operations in some parts of the Site, it is known from the results of a ground investigation recently undertaken in relation to Keadby 3 Power Station that some localised subsurface contamination is present.

Any additional soil or groundwater investigation required for the Proposed Development would be undertaken prior to commencing construction. Parts of the Main Site would need to be raised for flood protection so fill material will need to be imported for this purpose.

### 3.6. Construction Programme and Management

Subject to being granted development consent and following a final investment decision, it is the aim that construction will commence in 2026, and it is anticipated to last approximately three and a half years.

The ES will provide further details of the proposed construction activities and their anticipated duration, along with an indicative programme of each phase of the works,

including the construction of the CCGT and any infrastructure to support hydrogen firing.

The ES will be supported by a framework Construction Environmental Management Plan (CEMP), which will describe the specific mitigation measures to be followed to reduce impacts from:

- construction traffic (including parking and access requirements);
- earthworks;
- noise and vibration;
- works on the River Trent or Stainforth and Keadby Canal;
- dust generation; and
- waste generation.

The detailed CEMP will be secured by a requirement attached to any DCO that is granted and will identify the relevant procedures to be adhered to throughout construction.

Contracts with companies involved in the construction works will incorporate environmental control, health and safety regulations and current guidance with the intention that construction activities are sustainable and that all contractors involved with the construction stages are committed to agreed best practice and meet all relevant environmental legislation including: Control of Pollution Act 1974 (COPA), Environment Act 1995 and Hazardous Waste (England and Wales) Regulations 2005.

All construction works will adhere to the Construction (Design and Management) Regulations 2015 (CDM).

### 3.7. Decommissioning

The Proposed Development is expected to operate for at least 25 years. At the end of operation, it is expected that the Proposed Development will have some residual life remaining and an investment decision would then be made based on the market conditions prevailing at that time. If the operating life were to be extended, the Proposed Development would be upgraded in line with the legislative requirements at that time.

At the end of its operating life, the most likely scenario is that the Proposed Development would be shut down and all services would be isolated. The plant would then be decontaminated and prepared for demolition. All above ground structures would then be removed from the Site and it would then be suitably remediated as required to facilitate re-use. Where possible demolition materials will be re-used on Site or recycled.

A Decommissioning Plan (including Decommissioning Environmental Management Plan) would be produced and agreed with the Environment Agency as part of the Environmental Permitting and site surrender process. The Decommissioning

Environmental Management Plan would consider in detail all potential environmental risks on the Site and contain guidance on how risks can be removed or mitigated. This would include details of how surface water drainage should be managed during the decommissioning and demolition.

## 4. Project Alternatives

The EIA Regulations require that an ES should include an outline of the main alternatives that have been studied by the Applicant and an indication of the main reasons for its choices, taking into account the likely significant environmental impacts of each alternative. Under the EIA Regulations there is no requirement to assess alternatives, only a requirement to provide a review of those alternatives that have actually been considered.

The Proposed Development is an alternative to the consented Keadby 3 CCS Power Station and would be located on the same plot on the Keadby Power Station site. Whilst the consented Keadby 3 Power Station is CCS enabled, the Proposed Development is for an alternative low carbon CCGT technology and is hydrogen-fired. The Proposed Development will be one of the world's first power stations of this size designed to be capable of firing 100% on hydrogen fuel and is considered to represent a key project to enable and stimulate hydrogen production and transport infrastructure development in the region to help the UK achieve net zero targets.

An alternative would be to develop a standard natural gas-fired CCGT which is subsequently converted to enable 100% hydrogen-firing; however this would add time, cost and complexity and is not considered to be the most efficient means of achieving SSE's and the UK's net zero ambitions.

Other project alternatives will be considered as the DCO application progresses including:

- the layout of the Proposed Development including the choice and configuration of the CCGT unit;
- the cooling technology and water source to be implemented; and
- the route corridors across the Site for connections for electricity and gas supply.

Where alternatives are examined and assessed during the pre-application process, details of the options and reasons for selection (or otherwise) will be included within the ES for the Proposed Development. Where, at the time of Application, alternatives still exist for any particular element of the Proposed Development, the assessments to be included within the EIA and presented in the ES will consider and assess the 'worst-case' impacts, in accordance with the Rochdale Envelope approach outlined in the Planning Inspectorate (PINS) Advice Note 9: Using the Rochdale Envelope (Planning Inspectorate, 2018).

## 5. Planning Policy and Need

This section sets out the main planning policy documents taken into account in defining the scope of the EIA and which are most relevant to the Proposed Development.

### 5.1. National Planning Statement (NPS) and Marine Policy Statements (MPS)

The policy framework for examining and determining applications for NSIPs is provided by NPS. Section 104 of the 2008 Act requires that applications for NSIPs be determined in accordance with any NPS which has effect in relation to development of the description to which the application relates, and the appropriate marine policy documents (if any), unless this would:

- lead to the UK being in breach of its internal obligations;
- be in breach of any statutory duty that applies to the Secretary of State;
- be unlawful;
- the adverse impacts of the development outweigh its benefits; or
- be contrary to any Regulations that may be made prescribing other conditions.

In January 2024, the Secretary of State for Energy Security and Net Zero ('DESNZ') designated the revised NPS relating to nationally significant energy infrastructure. The NPS that are of relevance to the Proposed Development include:

Overarching National Policy Statement for Energy (EN-1) ('EN-1') (DESNZ, 2024a); and National Policy Statement for Natural Gas Electricity Generating Infrastructure (EN-2) ('EN-2') (DESNZ, 2024b).

The Proposed Development potentially includes land within the marine area (the tidal River Trent). Accordingly, the appropriate marine policy documents are the UK Marine Policy Statement (HM Government, Northern Ireland Executive, Scottish Government, Welsh Assembly Government, 2011) and the East Inshore and East Offshore Marine Plan (Department for Environment, Food and Rural Affairs, 2014).

These documents, from a planning policy perspective, have been the main focus in terms of scoping the EIA.

#### 5.1.1. Overarching NPS for Energy EN-1

Part 3 of EN-1 (DESNZ, 2024a) sets out the need for nationally significant energy infrastructure. Paragraph 3.1.1 states that the *“government sees a need for significant amounts of new large-scale energy infrastructure to meet its energy objectives”* and that the *“government does not consider it appropriate for planning policy to set limits on different technologies but planning policy can be used to support the government’s ambitions in energy policy and other policy areas”* (Paragraph 3.2.3).

Section 3.3 of EN-1 (DESNZ, 2024a) sets out why the Government believes that there is an urgent need for new nationally significant electricity infrastructure, including:

- The need for different types of electricity infrastructure – there are several different types of electricity infrastructure that are needed to deliver our energy objectives. Additional generating plants, electricity storage, interconnectors and electricity networks all have a role, but none of them will enable us to meet these objectives in isolation;
- Alternatives to new electricity infrastructure – the Government has considered alternatives to the need for new large-scale electricity infrastructure and concluded that these would be limited to reducing total demand for electricity through efficiency measures or through greater use of low carbon hydrogen in decarbonising the economy; reducing maximum demand through demand side response; and increasing the contribution of decentralised and smaller-scale electricity infrastructure;
- Delivering affordable decarbonisation – The Net Zero Strategy sets out the Government’s ambition for increasing the deployment of low carbon energy infrastructure consistent with delivering our carbon budgets and the 2050 net zero target. This made clear the commitment that the cost of the transition to net zero should be fair and affordable. Given the changing nature of the energy landscape, we need a diverse mix of electricity infrastructure to come forward, so that we can deliver a secure, reliable, affordable, and net zero consistent system during the transition to 2050 for a wide range of demand, decarbonisation, and technology scenarios; and
- The role of combustion power stations – Low carbon hydrogen could be capable of replicating the role of natural gas in the electricity system, including providing both firm, flexible capacity in the future and a decarbonisation route for unabated combustion power plants. The British Energy Security Strategy sets out the ambition for up to 10GW of low carbon hydrogen production capacity by 2030, subject to affordability and value for money, at least half of which will come from electrolytic hydrogen, working with industry to develop a strong and enduring UK hydrogen economy. The Impact Assessment for the Sixth Carbon Budget shows an illustrative range for low carbon hydrogen of 85- 125TWh in 2035 and 250-460TWh in 2050.

In relation to Hydrogen infrastructure, paragraph 2.3.7 states that low carbon hydrogen will likely play an increasingly significant role in meeting energy demand by 2050, requiring the integration of new low carbon hydrogen into the network.

Paragraphs 3.4.12 states *“There is an urgent need for all types of low carbon hydrogen infrastructure to allow hydrogen to play its role in the transition to net zero”* and paragraph 3.4.13 states *“the government is committed to developing low carbon hydrogen, which will be critical for meeting the UK’s legally binding commitment to*

*achieve net zero by 2050, with the potential to help decarbonise vital UK industry sectors and provide flexible deployment across heat, power and transport.”*

Part 4 of EN-1 sets out a number of ‘assessment principles’ that must be taken into account by applicants and the Secretary of State in preparing and determining applications for nationally significant energy infrastructure. General points include (paragraphs 4.1.3 and 4.1.4) the requirement for the Secretary of State, given the level and urgency of need for the infrastructure covered by the energy NPS, to start with a presumption in favour of granting consent for applications for energy NSIP. This presumption applies unless any more specific and relevant policies set out in the relevant NPS clearly indicate that consent should be refused or any of the considerations referred to in Section 104 of the 2008 Act (noted above) apply.

Paragraph 4.1.5 goes on to state that in considering any proposed development, in particular when weighing its adverse impacts against its benefits, the Secretary of State should take into account:

- Its potential benefits, including its contribution to meeting the need for energy infrastructure, job creation, a reduction of geographical disparities, environmental enhancements, and any long-term or wider benefits; and
- Its potential adverse impacts, including on the environment, and including any long-term and cumulative adverse impacts, as well as any measures to avoid, reduce or compensate for any adverse impacts, following the mitigation hierarchy.

Paragraph 4.1.6 continues by stating that within this context the Secretary of State should take into account environmental, social and economic benefits and adverse impacts, at national, regional and local levels.

Part 4.2 of EN-1 outlines the critical national priority (CNP) for nationally significant low carbon infrastructure as a factor in decision making by the Secretary of State.

Paragraph 4.2.4 states that the Government has concluded that there is a CNP for the provision of nationally significant low carbon infrastructure, with paragraphs 4.2.2 and 4.2.5 highlighting the importance of hydrogen within this.

Other assessment principles include environmental effects/considerations; marine considerations; environmental and biodiversity net gain; criteria for ‘good design’; consideration of CHP; consideration of CCS; climate change adaptation and resilience; network connection, amongst others.

Part 5 of EN-1 (DESNZ, 2024a) lists a number of ‘generic impacts’ that relate to most types of energy infrastructure, which both applicants and the Secretary of State should take into account when preparing and considering applications. These include air quality and emissions; GHG emissions; biodiversity and geological conservation; flood risk; and landscape and visual, amongst others. Paragraphs 5.1.2 and 5.1.3 stress that the list of impacts is not exhaustive, and that applicants should identify the impacts of their projects in the ES in terms of both those covered by the NPS and others that may be



relevant. In relation to each of the generic impacts listed within Part 5 of EN-1, guidance is provided on how the applicant should assess these within their application and also the considerations that the Secretary of State should take into account in decision-making.

### 5.1.2. NPS for Natural Gas Electricity Generating Infrastructure EN-2

NPS EN-2 (DESNZ, 2024b) covers onshore natural gas-fired electricity generating infrastructure. Paragraph 1.6.3 states that while the guidance in EN-2 has been drafted in respect of natural gas-fired electricity generating infrastructure, it may also be relevant to hydrogen gas-fired power stations.

In addition to the assessment principles and generic impacts covered by EN-1 (DESNZ, 2024a), NPS EN-2 sets out ‘assessment and technology specific’ information to be taken into account in the preparation and assessment of applications for natural gas-fired electricity generating infrastructure. These include factors influencing site selection and design; air quality and greenhouse gas emissions, landscape and visual impacts, noise and vibration and water quality and resources.

Factors influencing site selection (Section 2.4 of EN-2) include land use, with natural gas-fired generating stations typically requiring large sites; transport infrastructure; availability of water resources, including for cooling; and availability of grid connection.

Notably, in respect of landscape and visual impacts, EN-2 (paragraph 2.4.27) recognises that gas-fired generating stations are large and that they will have an impact on the surrounding landscape and visual amenity and (paragraph 2.5.3) it is not possible to eliminate the visual and landscape impacts associated with such development.

### 5.1.3. UK MPS

The UK Marine Policy Statement (‘the MPS’) is the framework for preparing Marine Plans and taking decisions affecting the marine environment. It establishes a vision for the marine environment, which is for ‘clean, healthy, safe, productive and biologically diverse oceans and seas’. The MPS underpins the process of marine planning, which establishes a framework of economic, social and environmental considerations in that will deliver these high level objectives and ensure the sustainable development of the UK marine area.

Relevant high level marine objectives relevant to the Proposed Development include:

- Achieving a sustainable marine economy –
  - Infrastructure is in place to support and promote safe, profitable and efficient marine businesses;
- Ensuring a strong, healthy and just society –

- People appreciate the diversity of the marine environment, its seascapes, its natural and cultural heritage and its resources and act responsibly;
- The use of the marine environment is benefiting society as a whole, contributing to resilient and cohesive communities that can adapt to coastal erosion and flood risk, as well as contributing to physical and mental wellbeing;
- The coast, seas, oceans and their resources are safe to use;
- The marine environment plays an important role in mitigating climate change;
- There is equitable access for those who want to use and enjoy the coast, seas and their wide range of resources and assets and recognition that for some island and peripheral communities the sea plays a significant role in their community;
- Living within environmental limits; and
- Biodiversity is protected, conserved and where appropriate recovered and loss has been halted.

Chapter 3 sets out sectoral issues, such as defence and national security, ports and shipping, and marine aggregates. A recognised sector is energy production and infrastructure development (3.3). It is recognised that the UK offshore area is considered to be one of the most promising locations anywhere in the world to permanently store CO<sub>2</sub> (paragraph 3.3.31).

The East Inshore and East Offshore Marine Plans (Department for Environment, Food and Rural Affairs, 2014) establishes the plan led system for the marine area in which the riverine parts of the Proposed Development Site are located.

In section 2 the vision and objectives for the East Marine Plan Areas is stated. The vision (page 23) comprises:

*“By 2034, sustainable, effective and efficient use of the East Inshore and East Offshore Marine Plan Areas has been achieved, leading to economic development while protecting and enhancing the marine and coastal environment, offering local communities new jobs, improved health and well-being. As a result of an integrated approach that respects other sectors and interests, the East marine plan areas are providing a significant contribution, particularly through offshore wind energy projects, to the energy generated in the United Kingdom and to targets on climate change.”*

Section 3 comprises the plan policies. Key policies include:

- Policy EC1: “Proposals that provide economic productivity benefits which are additional to Gross Value Added currently generated by existing activities should be supported.”
- Policy EC2: “Proposals that provide additional employment benefits should be supported, particularly where these benefits have the potential to meet employment needs in localities close to the marine plan areas.”

- Policy SOC3, which requires that proposals that affect the terrestrial or marine character of an area firstly avoid, or then mitigate, or then justify, these effects.
- Policy BIO1, which requires appropriate weight should be attached to biodiversity using an evidence based approach.
- Policy BIO2, which requires that where appropriate, proposals for development should incorporate biodiversity and geological enhancement.
- Policy PS3, which requires that proposals firstly avoid, then failing that mitigate and then justify, interfering with current and future port and harbour expansion opportunities.
- 5.2 Other Matters that may be Important and Relevant
- In making decisions on applications for NSIPs, Section 104 of the 2008 Act states that the Secretary of State must also have regard to any other matters that they consider to be both 'important and relevant' to their decision. A body of recent energy and climate change law, policy and guidance is of potential relevance and is described below. Collectively these provide further support to the urgent need for new energy infrastructure.
- Paragraphs 4.1.10 – 4.1.15 of EN-1 provide some clarification on the other matters that the Secretary of State may consider both important and relevant, such as national planning policy and local plan documents. These are also described below in approximately chronological order.

## 5.2. Other Matters that may be Important and Relevant

### 5.2.1. National Infrastructure Plan

The National Infrastructure Plan (HM Treasury, 2014) (the 'NIP 14') sets out a vision for the UK's infrastructure, reinforcing the Government's commitment to investing in infrastructure and improving its quality and performance.

Paragraph 8.3 states that large-scale investment in gas and low-carbon electricity generation is vital in order to replace ageing energy infrastructure, maintain secure energy supplies and meet legally binding environmental targets. Around £100 billion of investment was estimated to be required in electricity generation and networks by 2020.

Paragraph 8.5 continues:

*“As legacy coal, gas and nuclear power stations come offline, they will increasingly be replaced with a combination of renewable energy, new nuclear power and fossil fuel power stations fitted with Carbon Capture and Storage (CCS) technology. New gas plant is also needed as a vital backup for less flexible renewable generation and to ensure that the system can meet peak electricity demand. Demand for gas to supply heat to homes and businesses will also remain significant for some time to come.”*

### 5.2.2. Clean Growth Strategy

The '*Clean Growth Strategy – Leading the way to a low carbon future*' (Department for Business, Energy & Industrial Strategy, 2017) ('the CGS') sets out the aims of the Government to deliver increased economic growth while reducing carbon emissions.

The Executive Summary (page 9) confirms that for the UK to achieve its fourth and fifth carbon budgets (2023-27 and 2028-2032) it will be necessary to drive a significant acceleration in the pace of decarbonisation.

Page 42 recognises that the flexibility of hydrogen as a low carbon fuel could enable it to play a complementary and enabling role in the decarbonisation of the power sector, in particular addressing the challenges of intermittency and long-term storage.

Subsequently in September 2019, one of the 'Grand Challenges' missions set by the UK Government was confirmed "*to establish the world's first net-zero carbon industrial cluster by 2040 and at least 1 low-carbon cluster by 2030*".

Pages 93 - 101 of Chapter 4 cover '*Delivering Clean, Smart, Flexible Power*'. The overriding objective is to deliver a reduction in emissions from the power sector. Page 96 states that in order to achieve this it will be necessary to continue to bring down the costs of low carbon generation from renewables.

Page 56 of Chapter 3 and page 151 cover the 'hydrogen pathway'. This pathway sees a key role for low carbon hydrogen in decarbonising the grid. Existing gas infrastructure will be adapting to deliver hydrogen for heating, supporting hydrogen production using natural gas and capturing the emissions with CCUS. Because hydrogen is the main energy source for heating and transport, electricity demand and therefore generation is lower than the other pathways at around 340 TWh (around the same level as today).

Page 82 states that there is a range of low carbon heating technologies with the potential to support the scale of change needed, including decarbonising the gas grid by substituting natural gas with low carbon gases, like hydrogen.

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

The Climate Change Act 2008 (2050 Target Amendment) Order 2019 (June 2019) enshrines in law the Government's commitment to achieve 'net zero' in terms of greenhouse gas emissions by 2050. This is in line with the recommendations of the Committee for Climate Change ('CCC').

The executive summary to the CCC report (The Committee on Climate Change, 2019) (page 12) states that the net zero target cannot be met simply by adding mass removal of carbon dioxide on to existing plans for the previous target of an 80% reduction by 2050 compared to 1990 levels. It highlights that CCUS is crucial to the delivery of zero greenhouse gas emissions and that it is of strategic importance to the economy. However, it raises concern that of the 43 large-scale CCUS projects operating worldwide, none are in the UK.

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The report states that the remaining greenhouse gas emissions in the UK must be offset by removing CO<sub>2</sub> and permanently sequestering it through technologies such as CCUS. The report highlights the necessity of CCUS in terms of capturing the carbon dioxide from the production of hydrogen (given that a move to a hydrogen economy is critical to achieving net zero) and from non-renewable electricity production (page 23).

#### 5.2.4. The Future of Hydrogen – Seizing today’s opportunities

*‘The Future of Hydrogen’* (International Energy Agency, June 2019) sets out the current status of hydrogen as an energy source; the ways in which hydrogen can help to achieve a clean, secure and affordable energy future; and how to realise its potential. The study, carried out in collaboration with governments, industry and academia, contains recommendations for immediate opportunities and for scaling up hydrogen.

The report identifies that hydrogen can enable renewables to make an even greater contribution and manage their variable output. The report states that the opportunity should be taken now to scale up technologies and bring down costs to allow hydrogen to become widely used. For hydrogen to make a significant contribution to the clean energy transition, it needs to be adopted in sectors in which it is currently absent, including transport and power generation.

- Seven key recommendations are set out:
  - establish a role for hydrogen in long-term energy strategies (including in the power generation sector);
  - stimulate commercial demand for clean hydrogen;
  - address investment risks of first-movers;
  - support research and development to bring down costs;
  - eliminate unnecessary regulatory barriers and harmonise standards;
  - engage internationally and track progress; and
  - focus on four key opportunities to further increase momentum over the next decade: turn existing industrial ports into hubs for lower carbon hydrogen, use existing gas infrastructure to spur new clean hydrogen supplies, support transport fleets, freight and corridors using fuel cell vehicles, and establish shipping routes for international hydrogen trading.

#### 5.2.5. Net Zero – Opportunities for the Power Sector

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

The National Infrastructure Commission (NIC) provides impartial advice to the government on infrastructure needs and solutions. Its terms of reference are set by government, and while NIC recommendations do not constitute government policy, the

government is required to formally respond to the recommendations, and they may form the evidence base for future policy.

Core to the NIC recommendations (page 7) is that:

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

*“Highly renewable systems are still a low cost option in a net zero world. The analysis once again finds that electricity system costs are broadly flat across a range of different levels of renewable penetrations. If hydrogen is deployed, providing low carbon and flexible generation, it could further reduce the costs of highly renewable systems, by up to 30 per cent in some scenarios modelled here.”*

This is further supported on page 14:

*“Hydrogen, a zero carbon energy carrier, could be used to decarbonise areas of transport, heating, industry and potentially aviation and shipping. The CCC have stated that “By 2050, a new low carbon industry is needed with UK hydrogen production capacity of comparable size to the UK’s current fleet of gas-fired power stations.”*

The NIC has identified that increasing the proportion of renewables on the system does not materially impact the cost of the system and that *“future system costs may even be lower if action is taken to test the feasibility of deploying hydrogen turbines, an emerging technology for the power sector”* (page 5). This is because hydrogen turbines displace many other non-renewable forms of generation and flexibility, reducing the necessary installed capacity of these technologies, and hence system costs.

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

#### 5.2.6. Energy White Paper 2020

The Energy White Paper 2020 (Department for Energy Security and Net Zero and Department for Business, Energy & Industrial Strategy, 2020) builds on the Ten Point Plan and the National Infrastructure Strategy, providing further clarity on the Prime Minister’s measures and puts in place a strategy for the wider energy system that transforms energy, supports a green recovery, and creates a fair deal for consumers.

Page 12 states that the UK is aiming for 5GW of low-carbon hydrogen production capacity by 2030.

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Page 112 recognises that clean hydrogen could potentially provide a way to decarbonise our gas supplies on a much larger scale than reliance on biomethane alone.

#### 5.2.7. Net Zero Strategy 2021

The Net Zero Strategy 2021 (Department for Energy Security and Net Zero and Department for Business, Energy & Industrial Strategy, 2021) sets out clear policies and proposals for keeping the UK on track for its coming carbon budgets, the Government's ambitious Nationally Determined Contribution (NDC), and then sets out the vision for a decarbonised economy in 2050.

Many sectors require low carbon energy, including those where electrification is not a viable option, making the supply of cleaner fuels essential to achieving net zero. Building on commitments in the North Sea Transition Deal, the Government aims to significantly reduce emissions from traditional oil and gas fuel supplies, whilst scaling-up the production of low carbon alternatives such as hydrogen and biofuels.

The Government is actively taking steps to bring forward low carbon technologies capable of replicating the role of unabated gas in the electricity system, including CCUS-enabled generation, hydrogen-fired generation, bio-energy with carbon capture and storage (BECCS), and flexible storage.

Page 109 supports the development of innovative low carbon hydrogen solutions, supported by the UK Hydrogen Strategy, which further sets out the Government's comprehensive approach to growing a UK hydrogen economy. This indicates that use of low carbon hydrogen enabled by 5 GW of production capacity could deliver total emissions savings of 41 MtCO<sub>2</sub> e between 2023 and 2032, the equivalent of the carbon captured by 700 million trees over the same period.

Page 111 states that decarbonising fuel supply and growth of the hydrogen sector will regenerate communities and open up new employment opportunities right around the UK. Based on current estimates, policies and proposals to reduce emissions in fuel supply and growing the hydrogen sector could support up to 10,000 jobs in 2030.

#### 5.2.8. UK Hydrogen Strategy 2021

The UK Hydrogen Strategy (Department for Energy Security and Net Zero, 2021) sets out how the target of 5 GW of low-carbon hydrogen production capacity will be achieved by 2030 and how hydrogen will be positioned to help meet the UK's Sixth Carbon Budget and net zero commitments.

The Executive Summary states that hydrogen is one of a handful of new, low carbon solutions that will be critical for the UK's transition to net zero. As part of a deeply decarbonised, deeply renewable energy system, low carbon hydrogen could be a versatile replacement for high-carbon fuels used today – helping to bring down

emissions in vital UK industrial sectors and providing flexible energy for power, heat and transport.

It further states that there is almost no low carbon production of hydrogen in the UK or globally today.

Page 7 states that low carbon hydrogen will be critical for meeting the UK's legally binding commitment to achieve net zero by 2050, and Carbon Budget Six in the mid-2030s on the way to this. Hydrogen can support the deep decarbonisation of the UK economy, particularly in 'hard to electrify' UK industrial sectors, and can provide greener, flexible energy across power, heat and transport. Moreover, the UK's geography, geology, infrastructure and expertise make it particularly suited to rapidly developing a low carbon hydrogen economy, with the potential to become a global leader on hydrogen and secure economic opportunities across the UK.

Page 8 states that most hydrogen produced and used in the UK and globally is high carbon, coming from fossil fuels with no carbon capture; only a small fraction can be called low carbon, emphasising the need for low carbon hydrogen electricity generating stations.

#### 5.2.9. Net Zero Strategy: Build Back Greener (2021)

The '*Net Zero Strategy: Build Back Greener*' (Department for Energy Security and Net Zero and Department for Business, Energy & Industrial Strategy, 2021) expands on key commitments in the Ten Point Plan, the EWP and sets out the next steps the Government proposes to take to cut emissions, seize green economic opportunities and leverage further private investment in net zero. The strategy sets an indicative delivery pathway for emission reductions to 2037 by sector. It is intended to put the UK on the path for Carbon Budget 6 and ultimately on course for net zero by 2050.

Regarding power, page 19 of the strategy states that the UK will fully decarbonise its power system by 2035 subject to security of supply. It states that the power system will consist of abundant, cheap renewables, cutting edge new nuclear power stations, underpinned by flexibility including storage, gas with CCUS and hydrogen.

#### 5.2.10. Decarbonisation Readiness Consultation 2023

The Decarbonisation Readiness Consultation 2023 (Department for Energy Security and Net Zero, 2023) provides an update to the 2009 Carbon Capture Readiness (CCR) requirements to ensure all new build combustion power plants have a viable route to decarbonisation; make the requirements more flexible and simpler; provide a clear decarbonisation pathway for combustion power plants and keep pace with the evolving nature of decarbonisation technologies, in particular low carbon hydrogen.



The Executive Summary states that the Government sees low carbon hydrogen as a critical component of our broader strategy to deliver energy security, create economic growth and contribute to our net zero target.

It goes on to confirm that hydrogen will enable us to use our domestic energy assets, including gas and renewables, to decarbonise UK industrial sectors, power, heavy transport, and potentially home heating.

It proposes to enable combustion power plants to demonstrate decarbonisation readiness through conversion to hydrogen firing.

Page 20 states that hydrogen to power has the potential to be vital in achieving our decarbonisation targets by providing a large source of firm and flexible low carbon generation that is capable of fast ramping, as we integrate more intermittent renewables.

Section 2.2.1 states that Government analysis shows that having hydrogen available in the power sector could achieve lower emissions at a lower cost than scenarios without hydrogen.

#### 5.2.11. Powering Up Britain (March 2023)

On 30 March 2023 the Government published three documents comprising Powering Up Britain (Department for Energy Security and Net Zero, 2023), the '*Energy Security Plan*' and '*Net Zero Growth Plan*' following the judicial review of the Net Zero Strategy. All three documents provide details of the Government's measures to increase domestic energy production, resilience in the energy supply and achieve net zero.

#### 5.2.12. National Planning Policy Framework and Planning Practice Guidance

The latest version of the National Planning Policy Framework (NPPF) was adopted in December 2023 (Department for Levelling Up, Housing and Communities, 2023). The policies contained within the NPPF are expanded upon and supported by the 'Planning Practice Guidance' (Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities and Local Government, 2024).

The NPPF sets out the Government's planning policies for England and how these are to be applied. It is a material consideration in planning decisions. Paragraph 5 of the NPPF states that the document does not contain specific policies for NSIP and that applications in relation to NSIP are to be determined in accordance with the decision-making framework set out in the 2008 Act and relevant NPS, as well as any other matters that are considered both important and relevant. However, matters that can be considered to be both important and relevant to NSIP may include the NPPF and the policies within it.

Sections of the NPPF that are of particular relevance relevant to the scope of the EIA include:

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- 2 - Achieving sustainable development;
- 6 - Building a strong, competitive economy;
- 11 - Making effective use of land;
- 12 - Achieving well-designed and beautiful places;
- 14 – Meeting the challenge of climate change, flooding and coastal change;
- 15 – Conserving and enhancing the natural environment; and
- 16 - Conserving and enhancing the historic environment.

#### 5.2.13. Local Planning Policy

The Site lies entirely within the administrative area of North Lincolnshire Council. The statutory development plan for the area currently comprises the following documents:

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

It is considered that these documents may be ‘important and relevant’ as defined by EN-1 (DESNZ, 2024a). The following policies are considered relevant to the Proposed Development:

#### 5.2.14. Core Strategy (2011)

- CS2 - Delivering More Sustainable Development;
- CS5 - Delivering Quality Design in North Lincolnshire;
- CS11 - Provision and Distribution of Employment Land;
- CS16 - North Lincolnshire’s Landscape, Greenspace and Waterscape;
- CS17 – Biodiversity;
- CS18 - Sustainable Resource Use and Climate Change;
- CS19 - Flood Risk;
- CS20 - Sustainable Waste Management; and
- CS25 - Promoting Sustainable Transport;

#### 5.2.15. Local Plan (2003)

The following saved policies are considered relevant from the Local Plan:

- IN10 – Wharves;
- RD1 – Development involving High Quality Agricultural Land;
- RD2 - Development in the Open Countryside;

- T1 – Location of Development;
- T2 – Access to Development;
- T5 - Green Travel Plans;
- T6 - Pedestrian Routes and Footpaths;
- T8 - Cyclists and Development;
- T14 - The North Lincolnshire Strategic Road Network (NLSRN);
- T19 - Car Parking Provision and Standards;
- T23 - Water Freight;
- C1 - Special Protection Areas, Special Areas of Conservation and Ramsar Sites;
- LC2 - Sites of Special Scientific Interest and National Nature Reserves;
- LC7 - Landscape Protection;
- LC12 - Protection of Trees, Woodland and Hedgerows;
- HE5 – Development affecting Listed Buildings;
- HE9 – Archaeological Evaluation;
- DS1 – General Requirements;
- DS7 - Contaminated Land;
- DS10 - New Hazardous Installations and Pipelines;
- DS11 - Polluting Activities;
- DS12 - Light Pollution;
- DS13 – Groundwater Protection and Land Drainage;
- DS14 - Foul Sewage and Surface Water Drainage;
- DS15 - Water Resources;
- DS16 - Flood Risk; and
- DS17 - Overhead Power Lines and High-Powered Electrical Installations.
- DS21 - Renewable Energy.

To the south of the Proposed Development Site is the Stainforth and Keadby Canal. The lock at the junction of the canal and the River Trent are grade II listed and are designated by North Lincolnshire Council as a heritage asset in their adopted Local Plan. The lock is located approximately 200m to the south of the 'Water Connections Corridors'.

The River Trent, immediately to the east of the Site is part of the designated SSSI, SAC and Ramsar Site for the Humber Estuary.

The Stainforth and Keadby Canal is designated as a Local Wildlife Site.

#### 5.2.16. Emerging Policy

North Lincolnshire Council is preparing a new Local Plan to 2036. Once agreed (formally adopted), it will replace the current North Lincolnshire Local Plan, the Core Strategy and the Housing and Employment Land Allocations Development Plan Documents (DPD).

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In November 2022, the Council submitted its draft Local Plan to the Secretary of State for an Examination in Public under Regulation 22. This stage is still ongoing. In January 2024, there was an exploratory meeting to discuss a site for the gypsy and traveller community, biodiversity, and minerals and waste.

The following saved policies may be considered relevant from the draft Local Plan:

- SS1 – Presumption in Favour of Sustainable Development;
- SS2 – Spatial Strategy for North Lincolnshire;
- SS3 – Development Principles;
- EC5 – Wharves;
- TC2 – Placemaking and Good Urban Design;
- HE1 – Conserving and Enhancing the Historic Environment;
- RD1 – Supporting Sustainable Development in the Countryside;
- DQE1 – Protection of Landscape, Townscape and Views;
- DQE2 – Landscape Enhancement;
- DQE3 – Biodiversity and Geodiversity;
- DQE5 – Managing Flood Risk;
- DQE6 – Sustainable Drainage Systems;
- DQE7 – Climate Change & Low Carbon Living;
- DQE8 – Renewable Energy Proposals;
- DQE12 – Protection of Trees, Woodland and Hedgerows;
- MIN5 – Energy Minerals (Oil & Gas/ Hydrocarbons);
- T1 – Promoting Sustainable Transport;
- T2 – Promoting Public Transport;
- T3 – New Development and Transport;
- T4 – Parking;
- T5 – Cycle and Motorcycle Parking;
- T6 – Freight;
- DM1 – General Requirements;
- DM3 – Environmental Protection; and
- ID1 – Delivering Infrastructure.

### 5.3. Summary

The energy NPSs and the Marine Policy Statement (HM Government, Northern Ireland Executive, Scottish Government, Welsh Assembly Government, 2011) represent the principal policy documents against which the Proposed Development should be assessed. They set out a number of generic impacts and considerations relevant to the scoping of projects, and assessment principles with which applications for NSIP are expected to comply. They are therefore the main planning policy used to scope the EIA.

NPS EN-1 (DESNZ, 2024a) also sets out the government's need case for new energy infrastructure. A range of evidence from the National Infrastructure Plan (HM Treasury, 2014), the Clean Growth Strategy, 'Net Zero – Opportunities for the Power Sector' (National Infrastructure Commission), the Climate Change Act 2008 (2050 Target Amendment) Order, The Future of Hydrogen - Seizing today's opportunities (International Energy Agency, June 2019), Net Zero – Opportunities for the Power Sector (National Infrastructure Commission, 2020), Energy White Paper 2020 (Department for Energy Security and Net Zero and Department for Business, Energy & Industrial Strategy, 2020), Net Zero Strategy 2021 (Department for Energy Security and Net Zero and Department for Business, Energy & Industrial Strategy, 2021), UK Hydrogen Strategy 2021 (Department for Energy Security and Net Zero, 2021), Net Zero Strategy: Build Back Greener (Department for Energy Security and Net Zero and Department for Business, Energy & Industrial Strategy, 2021), Decarbonisation Readiness Consultation 2023 (Department for Energy Security and Net Zero, 2023), Powering Up Britain (Department for Energy Security and Net Zero, 2023), National Planning Policy Framework (Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities and Local Government, 2024) and Planning Practice Guidance (Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities and Local Government, 2024), as outlined above, demonstrate the continued relevance and urgency of the need case set out in NPS EN-1. NPS EN-2 (DESNZ, 2024b) does not prescribe locations for this type of energy NSIP but establishes criteria by which developers should identify suitable sites. This evidence also demonstrates clear support for hydrogen turbine based power generation, to realise a range of aims that are consistent with the NPS.

For these reasons, the Applicant considers that there is a clear and compelling national need for the Proposed Development.

A range of national and local policy and guidance is also likely to be important and relevant to the determination of the application and has been considered as part of scoping the EIA.

## 6. Potentially Significant Environmental Issues

The following sections present a discussion of the potential environmental impacts associated with the Proposed Development that it is proposed will be considered as part of the EIA. The methodology and assessment criteria that will be used to assess the potential significance of the identified impacts are also outlined, alongside potential mitigation measures for implementation following assessment.

The scope of work described in this section will build on the work previously undertaken to inform the Keadby 3 Power Station EIA, and where appropriate will use existing baseline data and survey results.

### 6.1. Air Quality

#### 6.1.1. Baseline Conditions

##### 6.1.1.1. RELEVANT LEGISLATION, POLICY AND GUIDANCE

The Environment Act 2021 amended the Environment Act 1995, transposing the requirement for local authorities to review air quality within their district or borough, in order to determine where pollutant levels identified in the National Air Quality Standards (AQS) may be exceeded.

If pollutant levels in an area are likely to exceed statutory AQS objectives, then local authorities must declare an Air Quality Management Area (AQMA) and draft an Air Quality Action Plan (AQAP) to achieve the statutory objectives. The Department of Environment, Food and Rural Affairs (Defra) has issued technical guidance to local authorities to assist in undertaking this task.

The following guidance and information have been used to inform this air quality EIA scoping assessment:

- Environment Act 2021;
- Environment Agency Industrial Installations Guidelines 2023;
- Defra Air Quality Management Areas;
- Defra Local Air Quality Management (LAQM) Technical Guidance (TG.22) guidance document;
- Institute of Air Quality Management (IAQM) construction dust guidance;
- Environmental Protection UK (EPUK) / IAQM guidance Land use Planning guidance;
- Department for Transport (DfT) count points; and
- North Lincolnshire Council, 2023 Air Quality Annual Status Report (ASR).

Industrial air pollution sources are regulated through a system of operating permits or authorisations, requiring stringent emission limits to be met. This ensures that any releases to the environment are minimised or rendered harmless. Regulated (or

prescribed) industrial processes are classified as Part A (1), A (2), Part B or Medium Combustion Plant (MCP) processes and are regulated through the Industrial Emissions Directive. The larger more polluting processes are regulated by the Environment Agency, and the smaller less polluting ones by the local authorities. Local authorities focus on regulation for emissions to air, whereas the Environment Agency regulates emissions to air, water and land.

Baseline ambient air quality refers to the concentrations of relevant substances that are already present in the atmosphere which are present from various sources such as industrial processes, commercial and domestic activities, agriculture, traffic and natural sources.

The Air Quality Standards Regulations 2010 (amended in 2016) defines the policy framework for 12 air pollutants known to have harmful effects on human health or the natural environment. The Secretary of State for the Environment has the duty of ensuring compliance with the AQS objectives (pollutant concentrations not to be exceeded by a certain date).

Some pollutants have AQS objectives expressed as annual average concentrations due to the chronic way in which they affect health or the natural environment, i.e. effects occur after a prolonged period of exposure to elevated concentrations. Other pollutants have AQS objectives expressed as 24-hour, 1-hour or 15-minute average concentrations due to the acute way in which they affect health or the natural environment, i.e. after a relatively short period of exposure. Some pollutants have AQS objectives expressed in terms of both long and short-term concentrations.

#### 6.1.1.2. EXISTING CONDITIONS

##### Local air quality management

North Lincolnshire Council has declared an Air Quality Management Area (AQMA) within their administrative area. The AQMA is situated on the eastern side of Scunthorpe, approximately 7km from the Proposed Development Site (refer to Appendix A1.6). The AQMA was declared due to the exceedance of the AQS objective for 24 hour mean concentrations of PM10. It is of note that this location is in close proximity to the Scunthorpe steelworks. The presence of the AQMA indicates that there are areas within the local authority's administrative area where concentrations of PM10 could be above the relevant AQS objective.

##### Local monitoring

North Lincolnshire Council monitors a number of pollutants within their administrative area, with a focus on those areas near to existing industrial sites in Scunthorpe, Killingholme and Immingham. Published reports (NLC, 2023) indicate that annual mean concentrations of all pollutants remain well below their respective limit values, with the exception of Polyaromatic Hydrocarbons (PAH). Short term concentrations of particulate

matter less than 10 microns (PM10) have exceeded the AQS objective at one location for the 24 hour mean concentrations. Short term concentrations of all other pollutants are reported to be below their respective national limit values.

### Background concentrations

Baseline, or existing, background air quality at the Site will be determined using data from nearby representative automatic monitoring stations, supplemented with published local authority air quality monitoring, Defra air quality monitoring and background air quality maps, and where appropriate, data published by the UK Air Pollution Information System (APIS) for ecological sites. Any data gathered for the purposes of the Keadby 3 CCS DCO will also be reviewed.

Any additional monitoring considered necessary at roadside locations to provide information for the purpose of roads traffic model verification or at nearby sensitive ecological receptors (oxides of nitrogen and ammonia) will be agreed with stakeholders including Natural England, North Lincolnshire Council, and the Environment Agency.

### Future baseline

Concentrations of NO<sub>x</sub>, NO<sub>2</sub>, PM10 and PM2.5 are likely to decrease in future years as a result of vehicle turnover and fleet renewal, improvements in technology and the introduction of more stringent regulations and policies.

No changes relevant to the air quality baseline are anticipated within the Site. It is likely that over time with greater regulation, the emissions to air will decrease through more stringent emission limits, however for the purposes of this study, it is assumed that there will be no material changes.

## 6.1.2. Scope of the Assessment

The assessment will consider potential impacts of the Proposed Development on identified human health and ecologically sensitive receptors as a result of:

- Emission of pollutants to air from vehicles associated with construction and operation;
- Construction dust and mobile plant exhaust emissions generated during construction; and
- Emission from the operational phase of the Proposed Development i.e. release of pollutants to air from the CCGT stack during operation.

### 6.1.2.1. CONSTRUCTION

The Proposed Development would introduce additional vehicle movements in the study area that require screening to determine the potential for impacts on local air quality. The Institute of Air Quality Management (IAQM) guidance (IAQM, 2017) sets out indicative criteria to trigger the initiation of an assessment of air quality of a proposed



development, including changes in traffic flows measured using Annual Average Daily Traffic (AADT) flows. The criteria vary, dependent on whether or not the Site is located within or may have an impact upon an AQMA. The Design Manual for Roads and Bridges (DMRB) criteria (Highways England, 2019), indicates that ‘the impact of construction activities on vehicle movements shall be assessed where construction activities are programmed to last for more than 2 years’. These criteria, together with other relevant criteria, would be considered and agreed with North Lincolnshire Council, for the purposes of the assessment.

Should modelling be required, the assessment would utilise local traffic data attained during the proposed traffic and transport assessment (see the Traffic and Transport - Section 6.3 below), including worst-case peak traffic numbers, fleet composition, and average vehicle speeds, to calculate emission fluxes for the above listed pollutants from each road source. The worst-case traffic scenarios would be modelled using designated heavy goods vehicle (HGV) routes, both with and without the Proposed Development and with specific reference to the AQMA.

The construction of the Proposed Development may impact on air quality in the local area due to potential fugitive emissions of dust from demolition and construction works, and emissions from plant equipment. However, with the implementation of best practice control measures any impacts on dust soiling, human health and biodiversity will be negligible and are therefore scoped out.

For the purposes of assessing impacts related to decommissioning, details such as the demolition methodology and changes in traffic flows are not known at this time. However, it is expected that similar mitigation measures to those proposed for construction will be required and set out in the ES.

Potential impacts on air quality, as a result of decommissioning the Proposed Development, will not be separately assessed as part of the air quality assessment. This is on the basis that with appropriate controls implemented through the Decommissioning Environmental Management Plan (DEMP) the effects of decommissioning are likely to be similar to, or no worse than the effects from construction.

#### 6.1.2.2. OPERATION

The Proposed Development is unlikely to result in a significant increase in operational traffic to the Site, in relation to the IAQM and DMRB screening criteria, and operational traffic has therefore been scoped out of the assessment. Operational vehicle movements will similarly be screened against the EPUK/IAQM criteria for outside an AQMA to ensure that the potential for significant effects is considered.

The Proposed Development, when operational, will emit oxides of nitrogen (NO<sub>x</sub>) to air, for which AQS objectives have been set as part of the National Air Quality Strategy.

Whilst operating on natural gas only, emissions of Carbon Monoxide (CO) will also result.

If SCR is required, additional emissions of ammonia will occur.

Emissions of sulphur dioxide (SO<sub>2</sub>) and particulates from natural gas fired power stations are considered to be negligible in terms of their potential to impact air quality, and therefore no assessment of these pollutant species is proposed.

The CCGT will be designed to comply with the requirements of the Industrial Emissions Directive (IED) (European Commission, 2010), the Large Combustion Plant Best Available Techniques (BAT) Reference document (2017) and BAT Conclusions (2021), and in line with draft Guidance on Emergency Technologies guidance on Oxides of Nitrogen Emission Limit Values (ELVs) for Combustion of Hydrogen being drafted by the Environment Agency.

Released pollutants will be assessed for potential human health and habitats effects, recognising the nitrogen deposition potential of ammonia.

An atmospheric impact assessment will be undertaken for the main point source emissions, utilising air dispersion modelling to assess the impact to air quality potentially brought about through the generation and dispersion of emissions from the Proposed Development. The study will be desk-based and will assess the predicted concentrations of emitted pollutants that are potentially hazardous to human health and designated habitats sites, at identified receptors (such as residential homes, schools, designated nature sites) within the study area, as well as the potential effect on the nearby AQMA.

Potential impacts on ecological receptors will be assessed, including statutory designated habitat sites within 15km of the Proposed Development emission stacks, and non-statutory habitat sites within 2km of the Proposed Development emission stacks, in line with Environment Agency guidance. A 2km study area will be used to predict impacts at human health receptors.

The modelling will be based on Emission Limit Values (ELV) set by the IED, the BAT Achievable Emission Levels or from the Environment Agency's draft Guidance on Emergency Technologies guidance on Oxides of Nitrogen Emission Limit Values (ELVs) for Combustion of Hydrogen as appropriate based on the plant design. The modelling and assessment will be undertaken with regard to published government and non-governmental guidance, as appropriate.

The atmospheric dispersion modelling study of operational emissions will be undertaken using the Atmospheric Dispersion Modelling System (ADMS) model, currently version 6. ADMS is widely used by industry and the regulatory authorities.

The dispersion modelling study will be used to determine the most appropriate height for the CCGT stack based on the resultant maximum short term and long term ground level concentrations predicted.

Given that the environmental assessment proposes assessment against criteria that have been established for the protection of human health (e.g. air quality standards), no specific human health impact assessment is proposed for the EIA. Refer to Section 6.11 'Population and Human Health' which describes the signposting appendix that will be provided to summarise the results of the assessment of environmental aspects, including air quality, relating to population and human health.

## 6.2. Noise and Vibration

### 6.2.1. Baseline Conditions

The Proposed Development will be located within and in the vicinity of existing industrial facilities, including Keadby 1 Power Station, Keadby 2 Power Station, the 400kV National Grid substation and the operational Keadby Windfarm. There are residential receptors and potentially sensitive ecological sites which have the potential to be impacted by noise and vibration emissions from the construction and operation of the Proposed Development and its proposed utility connection corridors.

A baseline noise survey was undertaken as part of ongoing work related to Keadby 3 DCO, consisting of a series of continuous unattended noise measurements at residential receptors within the vicinity of Keadby Power Station, during May 2023. Nine noise sensitive receptors (NSR) were discussed and agreed with North Lincolnshire Council representing the receptors that could be worst affected by noise from the Keadby 3 development site. The NSR agreed were as follows, as shown on Image 2:

- NSR1 - Vazon Bridge;
- NSR2 - Hawthorne House;
- NSR3 - Keadby Village;
- NSR4 - Mariners Arms Flats;
- NSR5 - Trent Side;
- NSR6 - Queens Crescent;
- NSR8 - North Pilfrey Farm;
- NSR9 - Ealand Poultry Farm; and
- NSR11 - South Pilfrey Farm.

Note that an NSR 7 North Moor Farm and NSR 10 were included in the DCO application for Keadby 3 Power Station but were later found to be no longer in residential use.

**Image 2: Representative NSR selected for Keadby 3 Project**



Ambient and background sound levels from this survey are included in Table 3.

**Table 3: Summary of representative sound levels at NSR for the Keadby 3 Project**

Receptor	Time period	Ambient sound level ( $L_{Aeq,T}$ dB)	Background sound level ( $L_{AF90,T}$ dB)
NSR1 - Vazon Bridge	Daytime (07:00 to 23:00)	59	41
	Night-time (23:00 to 07:00)	54	40
NSR2 - Hawthorne House	Daytime (07:00 to 23:00)	52	38
	Night-time (23:00 to 07:00)	45	36
NSR3 - Keadby Village	Daytime (07:00 to 23:00)	51	36
	Night-time (23:00 to 07:00)	42	36
	Daytime (07:00 to 23:00)	51	36

Receptor	Time period	Ambient sound level ( $L_{Aeq,T}$ dB)	Background sound level ( $L_{AF90,T}$ dB)
NSR4 - Mariners Arms Flats	Night-time (23:00 to 07:00)	47	30
NSR5 - Trent Side*	Daytime (07:00 to 23:00)	50	36
	Night-time (23:00 to 07:00)	45	30
NSR6 - Queens Crescent	Daytime (07:00 to 23:00)	50	36
	Night-time (23:00 to 07:00)	45	30
NSR8 - North Pilfrey Farm	Daytime (07:00 to 23:00)	43	32
	Night-time (23:00 to 07:00)	42	31
NSR9 - Ealand Poultry Farm	Daytime (07:00 to 23:00)	50	32
	Night-time (23:00 to 07:00)	47	27
NSR 11 – South Pilfrey Farm	Daytime (07:00 to 23:00)	59	42
	Night-time (23:00 to 07:00)	54	28

*\*Data collected at NSR 6 has been considered representative at NSR5*

The above NSRs will be considered in the assessment of noise and vibration for the Proposed Development and the baseline sound levels measured in May 2023 will be used in the assessment. It is proposed that consultation with key stakeholders including North Lincolnshire Council will be undertaken in order to confirm this approach.

### 6.2.2. Scope of the Assessment

The following potential impacts are likely to be associated with the Proposed Development:

- Construction and decommissioning noise and vibration impacts including construction of the Proposed Development;
- Construction traffic on public roads; and
- Operational noise impacts from the Proposed Development.

Taking into consideration the low volumes of operational transport movements and based upon experience of similar projects, it is considered unlikely that trip generation during the operational phase would generate significant road traffic noise and vibration effects and it is proposed that operational traffic noise and vibration effects are screened out, provided that such operational traffic levels are below the screening criteria set within published guidance including 'Calculation of Road Traffic Noise' (Department for Transport, 1988).

Based on the distance between the Proposed Development Site boundary and the nearest receptors, significant vibration impacts associated with operational activities are considered unlikely, although they will still be considered as part of the EIA and their exclusion from detailed analysis, if appropriate, justified with explanation taking into account Site information and published guidance.

The scope of the noise and vibration assessment will be:

- Liaison with local planning authorities and other stakeholders to agree scope and methodology of noise assessment; and
- Assessment of the impact of predicted noise levels at the nearest NSR from the construction, operation and decommissioning of the Proposed Development, including:
  - Construction (and decommissioning) noise and vibration (including construction and decommissioning traffic on public roads) and
  - Operational noise.

Potential impacts from noise and vibration, as a result of decommissioning the Proposed Development, will not be separately assessed as part of the noise assessment. This is on the basis that the effects of decommissioning are likely to be similar to or no worse than the effects from construction.

The noise and vibration assessment will be carried out in accordance with the following guidance:

- 'Noise Policy Statement for England' (Department for Food Agriculture and Rural Affairs (Defra), 2010)
- Planning Practice Guidance for 'Noise' (Ministry of Housing, Communities and Local Government (MHCLG), 2019c)
- National Policy Statement for Energy (EN-1) (Department for Energy Security and Net Zero (DESNZ), 2023a)
- National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) (Department for Energy Security and Net Zero (DESNZ), 2023a)
- National Policy Statement for Electricity Networks Infrastructure (EN-5) (Department for Energy Security and Net Zero (DESNZ), 2023a)

Additionally, reference will be made, but not be limited, to the following:

- British Standard (BS) 5228-1 2009+A1:2014 'Code of practice for noise and vibration control on construction and open Sites. Part 1: Noise' (BSI, 2014a)
- BS 5228-2 2009+A1:2014 'Code of practice for noise and vibration control on construction and open Sites. Part 2: Vibration' (BSI, 2014b)
- International Organisation for Standardisation (ISO) 9613-2: 1996 'Attenuation of sound during propagation outdoors. Part 2: General method of calculation' (ISO, 1996)
- International Organisation for Standardisation (ISO) 9613-2: 2024 'Attenuation of sound during propagation outdoors. Part 2: Engineering method for the prediction of sound pressure levels outdoors' (ISO, 2024)
- BS 4142: 2014+A1:2019 'Methods for rating and assessing industrial and commercial sound' (BSI, 2014c)
- BS 7385: 1993 'Evaluation and measurement for vibration in buildings' (BSI, 1993)
- BS 6472: 2008 'Guide to evaluation of human exposure to vibration in buildings' (BSI, 2008);
- Control of Pollution Act 1974 (as amended)
- 'Calculation of Road Traffic Noise' (Department for Transport, 1988, "CRTN")
- Highways Agency (2020) DMRB Volume 11 Section 3 Part 7 LA 111 (Revision 2) Noise and Vibration

Baseline sound monitoring completed in May 2023 for the Keadby 3 Power Station project will be used. The monitoring procedures conformed to BS 7445: 2003 'Description and Measurement of Environmental Noise' (BSI, 2003), and monitoring was undertaken in close proximity to NSRs at both weekend and weekday times, over a minimum five-day unmanned monitoring period.

Noise levels associated with enabling and construction works will be calculated (at chosen sensitive receptors) using the data and procedures given in BS 5228. The need for prediction of vibration levels will be further considered depending upon the types of activities required but specifically the effects of piling – if required – will be considered. Additionally, noise increases at sensitive receptors due to any construction traffic on public roads will be calculated according to the methods given in CRTN. The assessment of construction works will include the electrical, water and gas connections.

The operational noise impact of the Proposed Development will be predicted using computer noise modelling software, based on information on plant layout, and the operating conditions and the levels of noise generated by plant items and vehicles. The modelling software enables a detailed implementation of the proposed equipment and buildings, existing surrounding buildings and ground features. The software implements the methodology in ISO 9613-2 for the calculation of noise levels from industrial sources.

The significance of the noise impact of the Proposed Development during operation will be assessed using the method given in BS 4142 and potentially World Health Organisation (WHO) guidance (WHO, 1999, 2009 and 2018). BS 4142 provides a

method for rating the acceptability of increases in existing noise levels at noise-sensitive receptors affected by noise from industrial sources at proposed developments, and the WHO guidance provides information regarding assessment of sleep disturbance. Further details of the approach will be discussed and agreed as required with the local authority.

Additionally, the potential for tonal, impulsive and irregular characteristics of the noise emissions from the Proposed Development will be considered and assessed against the prevailing noise climate at the NSR.

The construction of the Proposed Development may have an impact on traffic flows on local roads around the Site. The change in road traffic noise levels, at a selection of relevant receptors, will be predicted using the standard methodology outlined in the CRTN. The predictions will be based on baseline and with-development traffic data provided as part of the proposed traffic and transport assessment (see Traffic and Transport).

The significance of changes in road traffic noise levels will be assessed based on a range of relevant guidance including the DMRB.

Criteria for determining the significance of noise and vibration impacts on relevant noise sensitive ecological receptors, including breeding birds, will be discussed and co-ordinated with the project ecology consultants.

### 6.3. Traffic and Transport

This chapter will outline the proposed approach to assessing the likely significant effects of traffic associated with construction, operation and decommissioning of the Proposed Development.

#### 6.3.1. Baseline Conditions

There are several potential road traffic access routes to the Proposed Development Site from the Strategic Road Network (SRN).

Access to the Proposed Development Site during the construction phase for HGV construction traffic would likely be via the existing access road from the A18, avoiding heavy commercial traffic routing through Keadby village. The location of this access is shown on Appendix A1.2.

Alternatively, from the M18 vehicles would route via Junction 5 (J5) and eastbound to the M180 and exit at J1 to the A18 until its junction with the B1392. Vehicles would then travel northbound along the B1392 for approximately 1km. A further alternative route to the Proposed Development Site is via the M180, where vehicles would leave the motorway at J2 towards and travel northbound along the A161 to its junction with the A18. Vehicles would then utilise the final section of the M18 route via the A18 and B1392. The fourth route to the Proposed Development Site is via the A18 Doncaster Road from either the A1077 to the south or the M181 to the south. Traffic would utilise



the Fordingham Grange roundabout and take the westbound A18 exit. Vehicles would then be required to cross the River Trent via the Keadby Bridge and then perform a right turning manoeuvre at the Junction with the B1392 which would lead directly to the Site access.

The study area will comprise these main highway links and the public transport, cycle and walking provision within the immediate vicinity of these links. The main characteristics of each highway link are summarised below.

#### 6.3.1.1. A18

Within the study area, the A18 is a single carriageway link following an east-west alignment between J1 of the M180 and the Fordingham Grange Roundabout to the west of Scunthorpe. The majority of the road is subject to a National Speed Limit of 60mph and passes through rural areas to the west of Scunthorpe.

To the west of the River Trent, the A18 passes to the west of Althorp village where the speed limit reduces to 40mph. Immediately to the south of Keadby, a 30mph speed limit is enforced and the link becomes more suburban in nature, with footways provided alongside the northern boundary up to and crossing the Keadby Bridge. The route then passes the industrial development to the south of Gunness, following a north-south/south north alignment for a distance of 0.5km, where the road bends sharply at the junction with the B1216, becoming Doncaster Road. To the east of the B1216 junction, the A18 speed limit increases to 40mph for a distance of 0.5km along the frontage of the residential units along the southern boundary, which also facilitates a marked cycle lane on both sides of the road. To the east of these properties, the cycle lanes are discontinued, and the speed limit increases to 60mph on approach to the Fordingham Grange Roundabout.

#### 6.3.1.2. A161

Within the study area, the A161 is a single-carriageway link following a north-south alignment between J2 of the M180 and the A18 to the north. This section of the A161 is subject to a National Speed Limit of 60mph and is rural in nature with no footways provided on either side of the carriageway.

#### 6.3.1.3. B1392

Within the study area, the B1392 is single-carriageway road that serves the village of Keadby, and the existing Keadby 1 Power station. The B1392 is suburban in nature and within the study area it is subject to a 30mph speed limit with footways provided on both sides of the carriageway. Due to the absence of Traffic Regulation Orders (TROs), on-street parking takes place intermittently along the route on both sides of the highway, particularly outside of residential properties without access to a private driveway.

#### 6.3.1.4. CYCLING

With the exception of the 0.5km section of marked cycle lane on the A18, there are no National Cycle Routes (NCRs) that have an interface with the highway links that form the study area.

#### 6.3.1.5. WALKING

As previously identified, footways are present along sections of the A18, intermittently depending on the location, and along the length of the B1392. The presence of footways determines the overall sensitivity value of the highway link.

Five PRoW cross or are directly accessed from the three highway links described in the preceding sub-sections. These are listed in Table 4 below:

**Table 4: PRoW within the Study Area**

Public Rights of Way with Highway Interface
Footpath KEAD120
Footpath GUN180
Footpath BELT25
Footpath BELT141
Footpath BELT21

The PRoW within the immediate vicinity of the Proposed Development Site are described in further detail below:

- Footpath 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 Connections Corridors; and
- Footpath KEAD 9: A footpath which runs parallel to Warping Drain east-west from the northern terminus of Footpath KEAD 10. Footpath LUDD9 joins Footpath KEAD 10.

#### 6.3.1.6. BUSES

There is public transport provision along the A18 and B1392 with a number of bus services currently operating including the 360/1, 90, 35, 399, 646/7 services. These services provide generally frequent buses throughout the day Monday-Friday to The Keadby Hydrogen Power Station Project

locations such as Goole, Amcotts, Crowle and Keadby. However, the majority of services are only available from stops on the A18 close to Althorpe rail station.

#### 6.3.1.7. RAIL

To the south of the Main Site, the Scunthorpe to Doncaster passenger rail line is present; there are no existing connections or sidings into the Keadby Power Station Site. There is a passenger service run by Northern Rail every two hours in each direction that operates from Althorpe rail station, located approximately 1.5 km southeast of the Main Site. A summary of services operating from Althorpe station is provided below:

- Services run between 6:00 – 23:00 between Monday and Friday;
- Services run between 8:00 – 23:00 on Saturday;
- No services on Sunday;
- Services provided by Northern Rail; and
- Services every two hours to Scunthorpe and Doncaster.

#### 6.3.1.8. WATER

The Stainforth and Keadby Canal is immediately to the south of the Main Site. At the intersection with the River Trent, a wharf is present within the Site (known as railway wharf) which was used in 2020 during construction of Keadby 2 Power Station to facilitate the deliveries of plant and equipment. Consideration to using the canal will be given for the delivery of plant during construction, where reasonably practicable, and an indicative waterborne transport off-loading area is included in the indicative Order Limits (Appendix A1.2). Owing to the potential linkage with the UK Marine Area (i.e. as an area temporarily separated from the natural course of the tide), any potential works within the canal will be considered against the relevant marine regulations as appropriate.

As the Proposed Development may require works at the water intake that would lie within the UK Marine Area, a Marine Licence may be required. If a Marine Licence is required this is anticipated to be 'Deemed' within the DCO as per the Keadby 3 DCO (to be agreed with the Marine Management Organisation (MMO)), and potential effects on the marine environment will be appropriately considered, including potential risks to other mariners.

#### 6.3.2. Scope of the Assessment

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

- Generation of traffic during construction (and decommissioning) affecting the local and strategic road network;
- Generation of traffic during operation affecting the local and strategic road network; and

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- Generation of traffic during decommissioning affecting the local and strategic road network.

The volume of construction vehicles associated with the delivery of plant and the labour force has not yet been determined. However, the highest volume of HGV and traffic movements will be associated with the construction phase of the Proposed Development.

It is anticipated that the operational phase will result in a limited number of operational roles and deliveries. There is also the potential for increased operational transport movements associated with planned outages. However, based upon experience of similar projects, it is considered unlikely that trip generation during the operational phase would generate significant traffic and transport effects. It is proposed that the transport assessment scope specifically excludes operational traffic assessment (refer to Section 7 – Matters to be Scoped Out) based on the assumption that operational traffic movements will be below screening thresholds specified in published guidance. This approach would be agreed with the relevant Highways Authority via a Transport Scoping Report.

It is difficult to predict the effects of decommissioning the Proposed Development at this stage given its design life of circa 25 years. At the end of its operating life, the most likely scenario is that the Proposed Development would be shut down and all above ground structures would be removed from Site. At this stage, a standalone DEMF would be produced to consider in detail the potential environmental risks on the Site and contain guidance on how risks can be removed or mitigated. This would include details of the anticipated traffic and transport effects and how they could be mitigated. It is envisaged that decommissioning traffic movements will be comparable to, or less than those associated with construction of the Proposed Development.

Potential impacts on Traffic and Transport, as a result of decommissioning the Proposed Development, will not be separately assessed as part of the Traffic and Transport assessment. This is on the basis that the effects of decommissioning are likely to be similar to or no worse than the effects from construction.

To fully address the impacts of the construction phase on the transport network, the main document supporting the ES Chapter would be the Transport Assessment (TA). The scope of the TA will be developed (following determination of the number of construction movements) in liaison with all relevant local and strategic highway authorities.

The scope of the TA will cover the following key areas:

- A review of national, regional and local transport policy including the National Planning Policy Framework and Local Planning Policy Documents;
- A description of baseline and future baseline conditions, including link and junction flows (described further above), a review of highway safety issues including

examination of personal injury accident data and consideration of accessibility by all main transport modes;

- Calculation of construction traffic flows over the period of construction;
- Distribution and assignment of construction traffic flows to the road network, including the identification of routes for abnormal loads such as the delivery of generators and transformers;
- Local network impact analysis – the size of the study area is to be confirmed with the local authorities and National Highways, and key junctions may be identified by these stakeholders that require detailed capacity analysis;
- Consideration of the local PRow for leisure and commuting uses, and whether their use would be affected by the Proposed Development;
- Cumulative impact assessment – including consideration of the traffic likely to be generated by other committed and proposed Developments in the study area; and
- The formulation of mitigation measures, such as a Construction Worker Travel Plan to promote sustainable journeys during the construction phase of the development and where possible reduce single occupant car journeys, and a Construction Traffic Management Plan to seek to control the routing and impact that HGVs will have on the local road network during construction.

A summary of any residual and cumulative impacts will be provided should the proposed mitigation not fully address the impact of the Proposed Development on the transport network.

#### 6.3.2.1. SCOPE OF THE ES CHAPTER

The traffic and transport chapter will summarise salient points from the TA and relate the magnitude and significance of potential impacts to criteria contained in the Institute of Environmental Management and Assessment (IEMA) Guidelines – Environmental Assessment of Traffic and Movement (2023) (hereafter referred to as the ‘IEMA Guidelines’).

The IEMA Guidelines state that a link on the highway network should be included within the study if one of the following criteria is met:

- Rule 1 – Include highway links where traffic flows will increase by more than 30% (or the number of HGVs will increase by more than 30%); or
- Rule 2 – Include highway links of high sensitivity where traffic flows have increased by 10% or more.

The IEMA Guidelines recommend that several environmental effects may be considered important when considering traffic from an individual development. The chapter will provide preliminary assessment of the following effects:

- Severance of communities;
- Road vehicle driver and passenger delay;

- Non-motorised user delay;
- Non-motorised amenity;
- Fear and intimidation on and by road users;
- Road user and pedestrian safety; and
- Hazardous/large loads.

The impacts of worker traffic and HGV traffic increases associated with the Proposed Development are fundamental to determining the effects in the above categories.

The significance of effect is determined through consideration of two elements: the magnitude of the impact and the sensitivity of the receptor.

The overall effect will be determined by measuring the magnitude of the impact following the introduction of embedded mitigation measures (where applicable) against criteria including the predicted increase in traffic, the type and sensitivity of the receptor, and the type of impact. Effects are defined as beneficial or adverse, with effects further defined using the following classifications:

- Minor – slight, very short, or highly localised impact of no significant consequence;
- Moderate – limited impact (by extent, duration or magnitude) which may be considered significant; and
- Major – considerable impact (by extent, duration or magnitude) of more than local significance, or in breach of recognised acceptability, legislation, policy or standards.

Automatic Traffic Counts (ATCs) will be undertaken at a number of locations in the vicinity of the Proposed Development to determine the baseline traffic conditions of the surrounding highway network. Average Annual Daily Traffic (AADT) flows will be derived from the ATC data to enable baseline traffic flows to be established at the required design years. The extent of the traffic data and scope for any traffic surveys that may be required will be agreed with the local highway authority and National Highways.

## 6.4. Biodiversity and Nature Conservation

### 6.4.1. Baseline Conditions

Information on nature conservation designations in the vicinity of the Proposed Development has been provided in Section 2.4.3 and is not duplicated here (refer also to Appendix A1.3).

The prevailing semi-natural habitats (excluding hard landscaping) present within the Proposed Development Site comprise arable farmland, and various species-poor ('modified') grassland types encompassing agricultural pastures, amenity grassland and road verges. Other habitats occur more locally and include plantation woodland, hedgerows, scrub, ruderal vegetation on previously disturbed ground, ditches and the Stainforth and Keadby Canal. The River Trent, which is the location of the existing wharf The Keadby Hydrogen Power Station Project

and the cooling water outfall structure, is tidal at this location, with narrow bands of reedbed at and above the mean high-water line, and mudflat below this. A map of the habitats within the Site is shown in Appendix A1.7.

The Proposed Development Site overlaps slightly with the former Keadby Ash Tip. This land supports three habitats of principal importance for nature conservation in England under Section 41 of the Natural Environment and Rural Communities Act (NERC) 2006. These are floristically diverse open mosaic habitats (OMH) on previously developed land, comparably floristically diverse lowland dry acid grassland, and lowland mixed deciduous woodland. Only the OMH coincides within the Proposed Development Site and whilst the Keadby Ash Tip as a whole supports a very good example of this habitat, the contributing elements in closest proximity to the Proposed Development are peripherally located and of markedly lower quality.

Several veteran trees exist within and on the boundary of the Proposed Development Site in the vicinity of Trent Road.

Previous surveys commissioned by the Applicant on land within and adjacent to the Main Site have recorded the following protected and notable species: water vole (*Arvicola amphibius*), badger (*Meles meles*), foraging common pipistrelle bat (*Pipistrellus pipistrellus*), other foraging bat species (but only at very low activity levels), breeding birds (albeit coinciding largely with trees, scrub and the former Keadby Ash Tip), grass snake (*Natrix natrix*) (transitory records only), and notable assemblages of plants and terrestrial invertebrates associated with OMH and acid grassland of the former Keadby Ash Tip. Previous surveys have not found great crested newt (*Triturus cristatus*) and all ponds within 500 m of the Proposed Development Site are unsuitable for this species as they dry up during typical summer weather conditions. No bat roosts were found following surveys of relevant trees and structures in 2023.

The River Trent is known to support a diverse fish assemblage, including notable species that migrate past the Proposed Development Site between the Humber Estuary and headwaters in the Trent Catchment. These latter species are European eel (*Anguilla anguilla*), river lamprey and sea lamprey. The last two migratory species are reasons for designation of the Humber Estuary SAC and Ramsar Site. The Stainforth and Keadby Canal is likely to support a diverse assemblage of freshwater fish.

The only plant Invasive Non-Native Species (INNS) (also known as 'controlled weeds') currently known to exist, or have previously existed, on land within and adjacent to the Proposed Development Site are wall cotoneaster (*Cotoneaster horizontalis*), New Zealand pigmyweed (*Crassula helmsii*) and Nuttall's waterweed (*Elodea nuttallii*). The only animal INNS known to occur is zebra mussel (*Dreissena polymorpha*), which is present in the Stainforth and Keadby Canal.

#### 6.4.2. Scope of the Assessment

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

- Permanent loss of habitats within the Proposed Development Site during construction;
- Temporary impacts (direct or indirect) on habitats within or adjacent to the Proposed Development Site during construction and decommissioning;
- Disturbance and displacement of protected species during construction and decommissioning;
- Impingement, entrainment and water quality (including thermal) impacts on aquatic species because of cooling water abstraction and discharge; and
- Air quality and lighting impacts on ecological receptors in the vicinity of, and/or downwind of, the Proposed Development Site during operation.

Potential impacts on relevant ecological features will be assessed in accordance with good practice including Guidelines for Ecological Impact Assessment in the UK and Ireland (Chartered Institute of Ecology and Environmental Management, 2019). This will also include assessment of conflicts and compliance with relevant legislation and policy. Any requirements for impact avoidance and mitigation to remove or reduce potential for significant ecological effects will be identified. Proposals for ecological enhancement will also be made.

As outlined in the Air Quality and Noise and Vibration sections of this report (Section 6.1 and 6.2), the Proposed Development will result in emissions to air, and (particularly during construction) noise and potentially vibration. Potential air quality impacts on relevant statutory and non-statutory nature conservation designations will be described in the Air Quality impact assessment, with additional consideration and assessment in the Biodiversity and Nature Conservation chapter, as appropriate. Similarly, consideration of impacts on relevant species sensitive to noise and vibration disturbance will be made, using data presented in the Noise and Vibration Chapter, with the results presented in the Ecology chapter.

A summary of the existing ecological data and the ecological surveys (with timescales) proposed to be undertaken to facilitate an assessment of the likely effects of the Proposed Development on designated sites, habitats and protected/ notable species is provided in Table 5 below. Ecological features that are proposed to be scoped out are covered in Section 7.

Potential impacts on biodiversity and nature conservation, as a result of decommissioning the Proposed Development, will not be separately assessed as part of the assessment. This is on the basis that the effects of decommissioning are likely to be similar to or no worse than the effects from construction.



**Table 5: Proposed ecological desk-based assessments and surveys to inform the ecological impact assessment for the Proposed Development**

<b>Study/ Survey</b>	<b>Scope</b>	<b>Prior history</b>	<b>Proposed approach</b>
Desk study	<p>Online data search and purchase of records from the Lincolnshire Environmental Records Centre (LERC).</p> <p>1km radius for protected species records and notable habitats, 2km for local nature conservation designations, and 15km for national and international nature conservation designations (SSSIs). This scope meets the data needs for the air quality impact assessment.</p>	-	Complete to inform the PEA report, and subsequent impact assessment.
Preliminary Ecological Appraisal (PEA)/ habitat survey	<p>All habitats within the Proposed Development Site, and immediate surrounds to place Site into context (to a maximum distance of 50 m out).</p> <p>This will update the baseline previously submitted with the Keadby 3 Power Station DCO application, and also the Keadby 3 haul road planning application.</p>	<p>Completed April 2020 for Proposed Development Site.</p> <p>Focussed update May 2023 for Keadby 3 haul road planning application.</p>	<p>Update completed March 2024 to reverify the baseline.</p> <p>Botanical data to be topped up later as need for purposes of Biodiversity Net Gain (BNG) assessment.</p>
Aquatic invertebrate (including INNS)	All watercourses and field drains within the Proposed Development Site where impacts cannot be avoided,	Completed May 2020 for Proposed Development Site.	Data considered sufficient to inform impact assessment given limited impact on

Study/ Survey	Scope	Prior history	Proposed approach
	<p>or appropriate stand-offs achieved.</p>		<p>water bodies and prior conclusion of up-to-county value for the assemblage.</p>
Badger	<p>All habitats within the Proposed Development Site, and immediate surrounds to place Site into context (to a maximum distance of 50m out, where accessible).</p>	<p>Completed April 2020 for Proposed Development Site.  Data reverified in March and May 2023, all relevant setts reinspected.</p>	<p>Update completed in March 2024 through PEA.</p>
Bats	<p>Walked transects in spring, summer and autumn to record and map bat activity in association with Keadby Common and Ash Tip. Coinciding periods of remote static detector deployment (five nights minimum per period).</p> <p>Preliminary roost appraisal and follow-up emergence surveys.</p>	<p>Activity survey completed 2020 at the Main Site. No wider potential impacts on bat activity predicted.  Relative suitability of foraging habitat reverified in May 2023. No change in habitat suitability.</p> <p>All trees and relevant structures requiring removal were appropriately surveyed for roosts between March and September 2023. This also</p>	<p>No further activity surveys considered necessary to inform impact assessment. Bat activity not likely to have changed given comparable habitat conditions. Prior conclusion was local nature conservation value and there is no reasonable likelihood of this having changed.</p> <p>No roosts found in 2023, further update not</p>

Study/ Survey	Scope	Prior history	Proposed approach
		<p>provided evidence of bat activity at survey locations.</p>	<p>considered proportionate prior to application (unless additional trees of relevance are identified) given the available recent survey data. An update survey would be required pre-commencement and can be secured through a Requirement.</p>
<p>Birds - breeding</p>	<p>Targeted survey for breeding birds at locations of substantive permanent habitat loss i.e. the Main Site or where there is potential for meaningful disturbance of birds utilising adjacent areas. Searches for breeding activity by specifically protected bird species. Five breeding bird surveys between April and July.</p>	<p>Previous surveys by AECOM in 2017, and for the Keadby 2 Power Station Environmental Statement in 2015, collected breeding bird data for high quality habitats within and adjacent to the Proposed Development Site. This data is now too old to be relied on in isolation.</p>	<p>Bird survey of Main Site and adjacent habitats in period April to July 2024.</p>
<p>Birds - wintering</p>	<p>Data search.</p>	<p>Habitat suitability appraised through prior (and March 2024) PEA</p>	<p>Extend data search to include purchase of British Trust for</p>

Study/ Survey	Scope	Prior history	Proposed approach
and passage		<p>surveys to understand likely impacts and data needs.</p> <p>Bird data obtained from LERC.</p>	<p>Ornithology (BTO) “Bird Data Report”.</p> <p>The setting of the Proposed Development Site indicates that wintering birds are not likely to be a constraint. Therefore, purchase of a BTO Bird Data Report in combination with a review of habitat suitability for the identified bird species is considered a proportionate approach to meet the data needs for impact assessment and HRA.</p>
Controlled weed species	All habitats within the Proposed Development Site, and immediate surrounds to place Site into context (to a maximum distance of 50m out, where accessible).	<p>Completed May to September 2020 for Proposed Development Site.</p> <p>Focussed update in May 2023 for Keadby 3 haul road planning application</p>	Update completed March 2024 to reverify the baseline.

Study/ Survey	Scope	Prior history	Proposed approach
Fish	<p>eDNA survey of the Stainforth and Keadby Canal in the vicinity of the proposed water intake. eDNA survey has been demonstrated to be less intrusive and more effective than traditional fish survey techniques.</p> <p>No survey of the River Trent is proposed given the size of the river and the tidal influence. The key fish species of relevance are already known (as assessed for the Keadby 3 Power Station DCO).</p>	<p>Data gathered through desk study only.</p>	<p>Complete Spring/Summer 2024 pending agreement for survey with Canal and Rivers Trust.</p>
Flora - aquatic	<p>All watercourses and field drains within the Proposed Development Site where impacts cannot be avoided, or appropriate stand-offs achieved.</p>	<p>Completed July 2020 for Proposed Development Site.</p>	<p>Data considered sufficient to inform impact assessment given limited impact on water bodies and prior conclusion of up-to-county value for the assemblage.</p>
Flora - terrestrial	<p>All habitats within the Proposed Development Site where impacts cannot be avoided, or appropriate stand-offs achieved.</p>	<p>Completed April 2020 for Proposed Development Site.</p> <p>Focussed update May 2023 for Keadby 3 haul road planning application.</p>	<p>No update proposed given that no change has been detected in the baseline habitats as confirmed during the 2024 PEA.</p>

Study/ Survey	Scope	Prior history	Proposed approach
			<p>The habitat associations of the notable flora found previously are well understood (acid grassland and OMH) and the relevant flora do not coincide with the Proposed Development Site.</p>
Otter	<p>Relevant watercourses and field drains within the Proposed Development Site, and immediate surrounds to place Site into context. Watercourses will be surveyed where impacts cannot be avoided, or appropriate stand-offs achieved.</p>	<p>Completed May and September 2020 for Proposed Development Site. No suitable refuge habitat found.</p> <p>Updated in May and July 2023 for Main Site and Mabey Bridge (access off A18). No suitable refuge habitat found.</p>	<p>Targeted update in summer 2024, if appropriate, with reference to the final design.</p>
Water vole	<p>Relevant watercourses and field drains within the Proposed Development Site, and immediate surrounds to place Site into context. Watercourses will be surveyed where impacts cannot be avoided, or appropriate stand-offs achieved.</p>	<p>Completed May and September 2020 for Proposed Development Site.</p> <p>Updated in May and July 2023 for Main Site and Mabey Bridge (access off A18).</p>	<p>Update the available time series of data in summer 2024 to provide current data on status at end of breeding season i.e. peak population size.</p>

#### 6.4.2.1. HABITATS REGULATION ASSESSMENT

Given the proximity of the Humber Estuary SPA/SAC/Ramsar Site, Thorne Moor SAC, Hatfield Moor SAC and Thorne and Hatfield Moors SPA to the Proposed Development Site, a signposting report to inform a Habitats Regulations Assessment (HRA) will be undertaken. It is anticipated that an Appropriate Assessment under the Conservation of Habitats and Species Regulations 2017 (as amended) (the Habitats Regulations) will be required given the proposed water intake could affect qualifying fish species. The assessment will align with current good practice as set out in The Planning Inspectorate (PINS) Advice Note 10: Habitats Regulations Assessment (Planning Inspectorate, 2012).

The scope of the signposting report to inform the HRA will be determined through consultation with Natural England and other relevant stakeholders. It is recognised that HRA is a multi-stage process and, therefore, the Applicant will continue to consult with Natural England as the HRA progresses. However, it is anticipated that all relevant information to inform the HRA will be provided by the Applicant in the EIA and will be signposted accordingly to assist the competent authority in its completion.

#### 6.4.2.2. BIODIVERSITY NET GAIN (BNG) ASSESSMENT

A BNG assessment will be provided that complies with the requirements specified for Nationally Significant Infrastructure Projects (NSIPs) if these have been published at the time of application (no guidance has been published as of April 2024). In the absence of specific guidance then the proposed approach is to provide a BNG assessment which aligns with the BNG regime for Town and Country Planning Act (TCPA) planning applications.

The BNG regime for planning applications requires that applicants submit a baseline BNG assessment with their planning application. A full BNG assessment, which would also consider the measures needed to achieve 10% BNG, is not proposed to accompany the DCO application given that this is only mandatory for planning applications after determination as a pre-commencement requirement.

The baseline BNG assessment will be made utilising the iteration of the Statutory Biodiversity Metric (Department for Environment, Food & Rural Affairs, 2023) that is current at the time of assessment.

## 6.5. Water Environment and Flood Risk

### 6.5.1. Baseline Conditions

The Proposed Development Site and a 1km study area surrounding this lies within the extensive floodplain of the River Trent. Land is generally low lying at elevations below 10 m Above Ordnance Datum (AOD) and with very shallow gradients (with the exception the former ash tip (up to 18 m AOD) to the south-west of the Main Site).

Beyond the current Keadby Power Station Site, land use is almost entirely arable farming. The study area has a complex surface water hydrology and a long history of land drainage. The Proposed Development Site and land north of the Sheffield and South Yorkshire Navigation – Stainforth and Keadby Canal is within the Isle of Axholme and North Nottinghamshire Water Level Management Board (ANNWLMB) area.

#### 6.5.1.1. GROUNDWATER AND HYDROGEOLOGY

According to the British Geological Survey (BGS), the entire study area is underlain by bedrock of the Mercia Mudstone Group (BGS, 2024). Above this, superficial deposits consist mainly of Warp (sand and silt) with Alluvium (clay, sand, silt, and gravel) along the course and immediate margins of the River Trent.

According to the Multi-Agency Geographical Information for the Countryside (MAGIC) online maps, the bedrock beneath the Proposed Development Site is classed as a Secondary B aquifer (MAGIC, 2020). Secondary B aquifers are *'predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of former non-aquifers.'* The superficial deposits across the Proposed Development Site are classed as a Secondary A aquifer. Secondary A aquifers are *'permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.'*

According to the Environment Agency's online Catchment Data Explorer website, groundwater beneath the Proposed Development Site sits across two groundwater bodies. The majority of the Site is underlain by the 'Idle Torne – Secondary Mudrocks' (ID GB40402G992200) groundwater body (Environment Agency, 2024). This water body has a surface water area of 320.9 km<sup>2</sup> and is currently at Good overall status. The eastern portion of the Site is underlain by the Lower Trent Erewash – Secondary Combined groundwater body (ID GB40402G990300) (Environment Agency, 2024). This groundwater body has a surface area of approximately 1924 km<sup>2</sup> and is currently at Good Overall Status.

#### 6.5.1.2. SURFACE WATER BODIES

The Proposed Development Site lies immediately west of the tidal River Trent, which flows in a northerly direction. According to the Environment Agency's online Catchment Data Explorer, the River Trent estuary forms part of the Humber Upper transitional and coastal water body (ID GB530402609203) under the Humber RBMP (Environment Agency, 2024). It is heavily modified and is currently rated as Moderate Ecological Potential due to angiosperms. The chemical status does not require assessment under the 2022 Cycle 3 data.



Historical (2017) sediment sampling data obtained from the Marine Management Organisation (MMO) indicates that generally, contaminant concentration levels are not of concern around the intake and outfall heads within the River Trent (Cefas; MMO, 2018). Organotins were found to be below the levels of detection whilst trace metal results suggest detectable levels of cadmium, chromium, nickel, lead and zinc levels. All trace metal results are below relevant indicative thresholds for safe disposal to sea and more generally are representative of sedimentology at this location. Polyaromatic hydrocarbons (PAH) are the only substance group identified as of 'potential concern' however, it is noted that concentrations have decreased since 2014 in sediment samples (1094 mg/kg in 2014 to 721-712 mg/kg in 2017). Further interpretation of sediment sampling data will be presented in the PEI Report.

Approximately 300 m to the north of the Proposed Development Site, beyond Keadby Common, is Warping Drain (otherwise known as Eastoft Moor Drain). Warping Drain is an Ordinary Watercourse that flows east and into the tidal River Trent via sluice gates. The drain is artificial in its character, being overwide, straight, and with flood embankments either side. Flows will also be influenced by tidal locking<sup>2</sup>. The northern part of the Proposed Development Site lies within the catchment area of Warping Drain. According to the Environment Agency's online Catchment Data Explorer it is designated under the Water Framework Directive (WFD) as water body GB104028064300 'Paupers Drain Catchment (tributary of Trent)'. This water body consists of two separate watercourses, Warping Drain and Paupers Drain, which lie further north and would be unaffected by the Proposed Development. The water body is approximately 13km long and drains an area of around 32 km<sup>2</sup>. It is an artificial water body that is currently at Moderate Ecological Potential due to the fish biological quality element and dissolved oxygen, with ammonia and phosphates also not being good (both poor status) (i.e. Cycle 3, 2022 classification). The chemical status does not require assessment under the 2022 Cycle 3 data.

To the west of the Proposed Development Site is the Keadby Boundary Drain, which runs south to north and appears to flow into Warping Drain. Keadby Boundary Drain is an Ordinary Watercourse but is not designated as a water body in its own right under the WFD, but forms part of the catchment of water body GB104028064300 (Paupers Drain Catchment (tributary of Trent)).

South of the Main Site there are a number of watercourses running east to west in parallel with each other. These include the North Soak Drain and the South Soak Drain, which flow either side of the Sheffield and South Yorkshire Navigation – Stainforth and Keadby Canal. The North and South Soak Drains flow into the Three Rivers a short

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<sup>2</sup> Tidal locking occurs when a tidal flap gate between a tributary and a tidal watercourse is shut during high tide, so water cannot flow from the tributary into the main watercourse.

distance to the south, and this then connects with the River Trent via sluice gates. These three watercourses, plus the River Trent, are all Main Rivers where flood risk management is the responsibility of the Environment Agency.

The North and South Soak Drains are designated under the WFD together as artificial waterbody GB104028064350 (North Soak Drain Catchment (tributary of Torne/Three Rivers)) of the Humber RBMP). This water body is approximately 26km long and drains an area of around 56km<sup>2</sup>. It is currently at Moderate Ecological Potential due to not all mitigation measures being implemented, dissolved oxygen being at bad status (2022 classification), and ammonia being at poor status. The chemical status does not require assessment under the 2022 Cycle 3 data.

According to the Environment Agency's online Catchment Data Explorer the Three Rivers watercourse is also a WFD water body. Three Rivers is artificial waterbody GB104028064340 (Torne/Three Rivers from Mother Drain to Trent) of the Humber RBMP, and it is currently at Moderate Potential (2022 classification), with the dissolved oxygen being at poor status. The chemical status does not require assessment under the 2022 Cycle 3 data.

The Sheffield and South Yorkshire Navigation (New Junction and Stainforth and Keadby Water Body) Canal is linked to the River Trent via Keadby Locks. It is managed by the Canal & River Trust (CRT). The canal is also designated as an artificial water body under the Humber RBMP (ID GB70410281) and is classified as at Good Ecological Potential (Cycle 3, 2022 classification). The Scunthorpe Sea Cadets Boat Station is also located on the canal and it is possible they use a number of waterways in this area for recreational activities.

### 6.5.1.3. DESIGNATIONS

According to the MAGIC online maps, there are no Drinking Water Protected Areas, Drinking Water Safeguard Zones, or Source Protection Zones in the study area. However, the entire study area is within a Nitrate Vulnerable Zone. There are also a number of different designated ecological sites within the study area.

Downstream (and north of) Althorpe Station, the River Trent is included within the Humber Estuary Ramsar, Special Area of Conservation (SAC) and Site of Special Scientific Interest (SSSI) (refer to Section 6.4– Biodiversity and Nature Conservation for further details of the reasons for designation).

Approximately 1.3km to the south-west of the Proposed Development Site access route, south of the canal, lies the Crowle Borrow Pits SSSI. The Hatfield Chase Ditches SSSI Site is located approximately 1.5 km west of the Construction Access Route part of the Proposed Development. There does not appear to be any direct flow pathways between these SSSIs and the Proposed Development and so they will not be considered any further by the water environment impact assessment.

#### 6.5.1.4. FLOOD RISK

The entire Proposed Development Site and surrounding environs (other than a small, slightly elevated area between Keadby Common in the east, Keadby Boundary Drain in the west, and the canal to the south, and around Crowle) is within the Environment Agency's indicative Flood Zone 3. Flood Zone 3 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 canal benefits from flood defences (embankments) along the River Trent.

A Strategic Flood Risk Assessment (SFRA) is available for this area - The North Lincolnshire and North East Lincolnshire Strategic Flood Risk Assessment (North Lincolnshire Council, 2011). Detailed information available (flood compartment 34T) indicates that whilst the Proposed Development Site is located within Flood Zone 3, tidal defences (embankments) between 6 and 6.3m AOD at the Keadby 1 / Keadby 2 location are in position to provide a 1 in 200 level of protection.

According to online surface water flood maps (GOV.UK, 2020) the Proposed Development Site is generally not at risk from surface water flooding, with only isolated areas at low and medium risk, and one small area of high risk along East Road within the existing Keadby Power Station Site.

The Proposed Development Site is not considered at risk from reservoir flooding (<https://flood-warning-information.service.gov.uk/long-term-flood-risk/map>). The Sheffield and South Yorkshire Navigation – Stainforth and Keadby Canal is close to the Site, but given the flat, shallow gradients, the risk of flooding is also likely to be low.

Historical data indicates that the Site is not at risk from reservoir flooding and groundwater flooding based on the geological setting of the wider area encompassed by Keadby 1 and Keadby 2 Power Stations (Mott MacDonald, 1991). Based on historical assessment as part of the Keadby 2 Power Station ES (SSE, 2016), groundwater flooding is currently understood to be effectively managed via a well-developed drainage system serving Keadby 1 and Keadby 2 Power Stations.

Analysis undertaken at the Keadby 2 Power Station Site in 2015 and a DCO application for Keadby 3 (2022) indicates potential flood risks arising from a breach of the tidal Trent defences within the vicinity of the Proposed Development. Breach Analysis undertaken in support of Keadby 2 and 3 Power Stations and recent breach modelling undertaken by the Environment Agency will be reviewed to identify requirements; this will be discussed with the Environment Agency.

Further desk-based assessment, including requesting relevant data from the Environment Agency and a review of local SFRA and Humber Extreme Water Levels data (HEWL) will be undertaken as part of the Flood Risk Assessment (FRA) and impact assessment. Further desk-based assessment will also be undertaken of the

water quality and water resource baseline, including data requests to the Environment Agency and local Environmental Authority, as well as site walkover surveys as required.

## 6.5.2. Scope of Assessment

### 6.5.2.1. POTENTIAL IMPACTS

The Proposed Development has the potential to have direct and indirect impacts on water quality and resources, flood risk, and the physical form and hydromorphology of water features. Other potential sensitive uses of local water resources and waterways (e.g. navigation or recreation) could also be adversely impacted (subject to confirmation of use). Furthermore, any impacts on water quality and resources can also have secondary adverse impacts on ecological species and habitats. Such impacts may be direct (i.e. where there are well defined hydrological pathways between the Proposed Development and the receptor site) or they may be indirect. In addition, it is also important to ensure that existing flood risks are taken into account and that the Proposed Development is designed in an appropriate way taking these risks into account so that it remains safe for its entire lifetime.

During construction, potential impacts include contamination from suspended solids or other chemical contaminants that may be present in site runoff, infiltrate to ground, or be spilt directly into waterbodies when there are works within or adjacent to them. Any existing ground contamination, if present, could also be mobilised, although the Proposed Development Site will be appropriately investigated (see Section 3) and if remedial works are necessary, these would be undertaken prior to construction works taking place.

Other impacts during construction may involve physical damage to waterbodies or temporary changes to their flows and water levels (e.g. from an increase in runoff, changes to flow pathways, and construction of new pipelines or intake/discharge infrastructure). Potential impacts on the water environment and flood risk, as a result of decommissioning the Proposed Development, will not be separately assessed as part of this assessment. This is on the basis that the effects of decommissioning are likely to be similar to or no worse than the effects from construction. However, where there may be beneficial effects (e.g. cessation of water abstraction for cooling or discharges of process water etc.) this will be assessed qualitatively and reported.

During operation and maintenance of the Proposed Development, adverse impacts may include the effects of diffuse pollutants in surface water runoff (that may contain metals, hydrocarbons, and inert solids etc.); the risk of pollution from chemical spillages or fire on the Proposed Development Site (which may necessitate the use of fire-fighting chemicals or large volumes of water that may become contaminated); changes in flood risk and hydromorphology of water features; and the effects of water abstraction from, and discharges to, local watercourses (e.g. cooling or process water).

### 6.5.2.2. SCOPE OF THE ASSESSMENT

Through appropriate design and mitigation measures, flood risk to the Proposed Development and off-site, surface and foul drainage, abstractions and discharges from and to watercourses, response to spillages and emergencies, and potential impacts on the hydromorphology of water features, can usually be effectively managed. This includes other regulatory regimes that require permits or consents to be obtained from the Environment Agency, Lead Local Flood Authority (i.e. North Lincolnshire Council) or the ANNWLMB for works close to and affecting watercourses.

The scope of the water environment and flood risk impact assessment will therefore be to consider all potential impacts to surface and groundwater features, which are in hydraulic connectivity with the Proposed Development Site during construction and during the entire life span of the Proposed Development. However, any impacts to ponds will be assessed under 'Biodiversity and Nature Conservation and any impact as a consequence of contaminated land, will be assessed under 'Geology, Hydrogeology and Land Contamination'.

Information from previous assessments at the Proposed Development Site, supported by an updated desk-based study, will be used to confirm potential receptors and to establish the baseline. This will include available water quality monitoring data from Environment Agency. No additional water quality sampling and analysis is proposed as existing, freely available data should be sufficient. However, this will be kept under constant review as more details of the Proposed Development become available. Data on historical pollution incidents, local abstraction and discharge consents will also be obtained from the Environment Agency and reviewed. Although local ground conditions suggest there is a low potential for private water supplies (PWS), a request will also be made to the Local Environmental Health Officer for information of any unlicensed potable abstractions. The Humber RBMP and online Catchment Data Explorer website (Environment Agency, 2009) will also be used to establish WFD water body status, pressures and objectives, and to review measures that may have been determined to be required for local water bodies to meet good Ecological Status/ Potential under the Water Environment (WFD) (England and Wales) Regulations 2017. Consultation will be undertaken with the Environment Agency, ANNWLMB, CRT and Yorkshire Water in order to obtain relevant available flood risk and water resource quality data and related information. At this stage it is assumed that there will be no changes to existing outfall structures in the River Trent or any in river works.

The potential impacts of the Proposed Development on the water environment will be assessed for the construction, operation and maintenance and decommissioning phases of the Proposed Development. The impact assessment will be undertaken in consideration of EN-2 [paragraphs 2.3.1 to 2.3.4 (climate change adaptation and resilience), paragraphs 2.4.8 to 2.4.17 (water resources), paragraphs 2.4.30 to 2.4.31 (water quality and resources) and paragraphs 2.5.12 to 2.5.13 (water quality and

resources)]. Consideration of EN-4 [paragraphs 2.9.25 to 2.9.36 (water quality), paragraphs 2.10.4 to 2.10.6 and 2.22.9 to 2.22.10 (water quality and resources), paragraphs 2.11.4 to 2.11.7 and 2.21.34 to 2.21.41 (water quality and resources) will also be made. The impact assessment will demonstrate that appropriate measures will be put into place to mitigate adverse effects following a precautionary principle and the mitigation hierarchy (i.e. avoid, minimise, reduce and compensate (if absolutely necessary)) any adverse impacts on waterbodies (including their uses) and flood risk, and the significance of any residual effects will be presented in the ES.

In most cases, a qualitative assessment of potential impacts on surface water, groundwater, hydromorphology and flood risk using a source-pathway-receptor approach and standard significance of effects criteria will be undertaken. The assessment of flood risk, operation surface water discharges, and abstractions and discharges may also be supported by quantitative analysis, where appropriate. The scope of any specific assessments will be agreed with the relevant consultees during future direct consultation.

In relation to changes in drainage regime, the magnitude of this impact will depend on the proposed extent of hardstanding and the implication on run-off rates within the Site. This will be determined through preparation of a Drainage Strategy as part of the FRA. The significance of this impact will be assessed as part of the ES. The proposals will be designed to ensure that sufficient attenuation is provided for storage of surface water run-off to minimise the potential risk of flooding.

The Proposed Development is likely to seek to utilise make-up water from the Stainforth and Keadby Canal (or alternatively, the River Trent) with an associated discharge into the River Trent. The abstraction of water for this purpose will be considered within the ES; the current scope of the assessment will be to:

- Identify and review publicly available information on existing water abstraction strategy for the Humber catchment;
- Identify and review current abstraction licences (river & groundwater);
- Assess potential available abstraction headroom; and
- Review available plant requirements and assess potential for water supply via abstraction (including limitations).

The discharge of treated effluent will be assessed, including in terms of any potential thermal uplift and chemical alteration (i.e. as a result of biofouling prevention). The assessments of the potential impacts from the direct discharge of effluents and/ or cooling water will be undertaken in accordance with the Environment Agency 'Surface water pollution risk assessment for your environmental permit' (April 2018). A range of qualitative assessment and quantitative modelling options are available to support the ES where required. Initially, qualitative assessment based on expected flows and chemical loads will be undertaken. No chemical modelling is proposed at this stage, but this will be kept under review as further scheme information becomes available. In

addition, depending on the volumes of water abstracted for the Proposed Development, there may be a risk of entrapment to species; this is discussed in further detail within Terrestrial Ecology (Section 7.2).

Finally, the potential effects arising from the Proposed Development in terms of water quality, resources and flood risk surrounding abstraction of water will be presented in further detail within the Water Environment and Flood Risk chapter of the ES. This will also be used to inform engagement with the Environment Agency and other stakeholders, as required, regarding any amendment to an existing abstraction licence or application for a new licence for the Proposed Development.

#### 6.5.2.3. FLOOD RISK ASSESSMENT

A FRA is required in accordance with the NPPF (Ministry of Housing, Communities and Local Government, 2019a) and NPS EN-1 (DECC, 2011a) due to the size (over 1 ha) and location of the Proposed Development (partly in Flood Zones 2, 3 and 3b). The FRA will consider risks to the Proposed Development from flooding as well as identify how, if at all, the risk of flooding will change as a result of the Proposed Development (including taking climate change into account). Where appropriate, recommendations to manage flood risks will be made, considering the vulnerability of the proposed development to flooding, so that the development remains safe throughout its lifetime. This will inform the design of the Proposed Development (including finished ground and floor levels) as well as the EIA.

#### 6.5.2.4. WATER FRAMEWORK DIRECTIVE ASSESSMENT

A WFD assessment will be undertaken in accordance with Planning Inspectorate Advice Note 18 The Water Framework Directive (Version 1, PINS, June 2017), with works affecting transitional and coastal water bodies assessed using the 'Clearing the Waters for All guidance Advice Note 18 WFD (Environment Agency, last updated 2023). At this stage, only a 'preliminary' WFD Assessment is proposed. This will cover the screening and scoping stages of assessment to consider:

- Whether the Proposed Development has the potential to cause deterioration in ecological status/potential of the water bodies;
- Whether the Proposed Development has the potential to prevent the water bodies from meeting their objective of good ecological status/potential (i.e. prevention of the implementation of Environment Agency identified mitigation measures); and
- Whether the Proposed Development has the potential to prevent or compromise WFD objectives being met in other waterbodies.

The preliminary WFD Assessment will be based on a combination of desk study and a hydromorphological walkover survey. It will also be informed by existing data available for the existing Keadby Power Station (K1); this includes sedimentology and water

quality data related to dredging and disposal activities for the K1 cooling water system MLA/2014/00183/2 (MMO, 2014) and more recently MLA/2017/00312 (MMO, 2018).

Components of the Proposed Development that have the potential to impact WFD status/potential or prevent improvement will be identified, with reference to guidance on exemptions, and these will be carried forward to further assessment. The need for further, more detailed assessment will be determined in consultation with the Environment Agency once the preliminary screening and scoping assessments have been completed.

## 6.6. Geology, Hydrogeology and Land Contamination

### 6.6.1. Baseline Conditions

For the purposes of determining the local baseline conditions with respect to geology and land contamination, a study area that extends 250m from the boundary of the Proposed Development Site will be adopted. This will be extended for hydrogeology to 1km from the Proposed Development Site. This is appropriate to assess the local geological and hydrogeological setting, and the influence that potential contaminated land might have on the Proposed Development Site or local receptors. However, the baseline conditions in terms of soil chemical quality, where available, will be based on information directly within the Proposed Development Site only.

#### 6.6.1.1. GEOLOGY

The British Geological Survey (BGS) Map Sheet 88 (Doncaster, 1:50,000 scale) and Map Sheet 79 (Goole) indicates that the Site geology comprises superficial Warp (artificially induced alluvium) over the majority of the Site. Where Warp deposits are absent, alluvium is mapped to be present in the far-eastern part of the Main Site. The alluvium is associated with the River Trent. Granular alluvium comprising sands, silts and clays is anticipated beneath cohesive alluvium. The published superficial geology is indicated to overlie the Mercia Mudstone Group. Made ground is also expected across the Proposed Development Site given the historical phases of development that have taken place.

Accounting for a review of selected historical BGS borehole records from the Main Site, the geology is characterised by approximately 12m to 17m of alluvium comprising of clay, silt, sand, and gravel with occasional peat layers recorded at various depths between 0.45m and 1.6m thickness. These superficial deposits overlie the Mercia Mudstone Formation which shows evidence of near surface weathering, the extent of which decreases with increasing depth.

Information obtained from the Soilsmap Viewer of the Land Information System (LandIS) website (LandIS, 2024) describes the soils at the Site as “*Loamy and clayey soils of coastal flats with naturally high groundwater*” (Soilscape 21).



There are no SSSI designated specifically for their geological importance within the study area. Further consultation will be required with North Lincolnshire Council to establish if there are any designated Local Geological Sites present within the study area.

#### 6.6.1.2. MINERAL RESOURCES

North Lincolnshire Council is the local authority responsible for minerals planning in Keadby. The adopted 2003 Local North Lincolnshire Plan has been replaced by the North Lincolnshire Local Development Framework. The latter includes The Core Strategy, which was adopted in June 2011 and sets out the long term vision/blueprint for North Lincolnshire up to 2026. The documents do not refer to any minerals safeguarding or consultation areas in the study area. The 2003 Local North Lincolnshire Plan and the North Lincolnshire Local Development Framework plans are due to be replaced by the North Lincolnshire Local Plan which will run to 2036. This is currently at Stage 6 (2022) – Submission and Examination.

According to the 'Volume II - Appendix 13A: Phase 1 Desk Based Assessment' (dated May 2021) completed for Keadby 3 (hereafter referred to as the 'May 2021 desk-based assessment'), based on available data and local authority consultation carried out there are no records of aggregate/ mineral quarrying or mining, non-coal mining or coal mining within 500m of the study area of the Proposed Development Site. As such, the risk from quarrying and mining can be considered negligible.

#### 6.6.1.3. HYDROGEOLOGY

Groundwater monitoring within the historical boreholes as detailed in the records indicate generally shallow groundwater levels within the superficial geology of between 0.9m and 3.0m below ground level (bgl). Occasionally, deeper groundwater strikes were recorded between 5.4m and 6.9m bgl. There is insufficient information to conclude at this stage whether these levels are representative of true groundwater levels across the wider area.

The Environment Agency classifies the underlying natural superficial geology (Warp/alluvium) as a Secondary A aquifer and the Mercia Mudstone as a Secondary B aquifer. The extent to which groundwater is used as a local resource is currently not known at this stage.

There are no groundwater source protection zones (SPZ) within the study area according to the MAGIC website (MAGIC, 2024).

#### 6.6.1.4. LAND CONTAMINATION

The majority of the Proposed Development Site forms part of Keadby Power Station Site. This was built on the site of a former coal fired power station which was operational between 1952 and 1984. The Keadby 1 Power Station was commissioned

in 1996 and comprises two gas turbines, with associated boilers and exhaust stacks, a steam turbine, ancillary plant and equipment and general office buildings.

The Main Site's history as a coal-fired power station highlights a potential for land contamination to be present which may have resulted from the spillage, leakage and accumulation of hydrocarbons, process by-products and wastes into soil and/ or groundwater. Large quantities of coal/ hydrocarbons would have been stored and processed at the Site during the operational period. Asbestos may have been used at the Site during the original construction and some residual impact from this, and the demolition/ reconfiguration of buildings and infrastructure historically at the Site, may be present in near surface soils.

According to the May 2021 desk-based assessment, there are eight licensed and historical waste management facilities either within the Proposed Development Site boundary (On-Site) or within 250 m of the Proposed Development boundary (Off-Site). Available information on the landfill sites is as follows, and whilst there are similarities in names, they are all distinct features. This information is corroborated by Groundsure's Enviro Data Viewer.

#### On-Site:

##### BGS recorded landfill site and historical landfill site

Keadby Power Station landfill located in the northern area of the Proposed Development Site and extends beyond the Proposed Development Site boundary to the west. Operated by the Central Electricity Generating Board with the first waste input recorded in 1958. Identified as having received inert and industrial waste. Status: not provided.

##### Historical landfill site

Keadby Central Electricity Generating Board slightly overlaps into the boundary of the Proposed Development Site, and licensed between 1977 and 1990, but with the first recorded input to have been in 1958 and last input in 1990. This landfill is indicated to have received inert, commercial, industrial and household waste. Also, known to have received Ash (from Keadby Power Station after lagoon settlement), construction, colliery tailings, refractories (from Keadby Power Station) and asbestos. Status: not provided.

##### Licensed waste management facility and historical landfill site

Keadby Power Station landfill slightly overlaps into the boundary of the Proposed Development Site and licensed in 1992. First recorded input in 1992 and last recorded input in 1993. This landfill is indicated to have received inert, commercial and household waste. Construction, demolition wastes of an inert nature only, comprising brick and concrete rubble arising from the demolition of Keadby Power Station. Operated by Keadby Power Ltd. Maximum input: Medium (equal to or greater than 25,000 and less than 75,000 tonnes per year). Status: inactive.

### Registered landfill Site and historical landfill site

Transtore Industries/ Former Keadby Power Station landfill slightly overlaps into the boundary of the Proposed Development Site. Operated by the Central Electricity Generating Board, licensed from 1987 but received date of waste was from 1981. No indicated surrender dates. This landfill is indicated to have received inert, industrial, commercial, household and special waste. Maximum input: Very Small (less than 10,000 tonnes per year). Status: licence cancelled.

#### Off-Site:

##### Historical landfill site

Keadby Power Landfill located in the central part of the Keadby 1 Power Station, approximately 15m from the Proposed Development Site, and licensed between 1992 and 2000. Reported to have received inert and industrial waste. Status: not provided.

##### Licensed waste management facility and historical landfill site

John Brown Engineering landfill located approximately 15m west of the Proposed Development Site at its closest point. Licensed between 1994 and 2000, but with the first input in 1994 and the last input recorded in 1995. This landfill is indicated to have received inert, industrial and liquid sludge waste. Operated by J Brown Engineering Ltd. Maximum input: Large (equal to or greater than 75,000 tonnes per year). Status: inactive.

##### Historical landfill site

Pulverised Fuel Ash (PFA) Settlement Lagoon, Keadby Power Station, located to the east of the Keadby Power Station landfill and approximately 45m west of the Proposed Development Site at its closest point. Operated by the Central Electricity Generating Board with no recorded licence details. Status: not provided.

##### Historical landfill site

Keadby Power Station landfill located to the west of the PFA settlement lagoon and approximately 80m west of the Proposed Development Site at its closest point. Operated by John Brown Engineering. No licence or waste details indicated. Status: not provided.

The location of the licensed and historical waste management facilities are shown on Appendix A1.6.

There are sensitive receptors located in proximity to the Site. This primarily includes the Humber Estuary (River Trent) which is a Ramsar designated area, a SSSI and a SAC. Groundwater is both a receptor and a pathway for contamination which may provide a link between any contamination at the Proposed Development Site and other controlled waters receptors, including the River Trent. There are residential receptors in proximity

to the Proposed Development Site and employees that work in the surrounding area, including in agricultural operations.

#### 6.6.2. Scope of the Assessment

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

- Disturbance of contaminated soils and groundwater and creation of new pathways to sensitive receptors (including construction workers and controlled waters) during construction; and
- Pollution of soils and controlled waters within or near the Main Site and connection corridors during operation, for example due to the accidental spillage of polluting materials (if materials are not appropriately stored at the Proposed Development in accordance with BAT under the Environmental Permit and/or an appropriate drainage system is not implemented and maintained).

A desk-based assessment was completed in May 2021 to identify potential contaminative uses at the Proposed Development Site. This desk-based assessment identifies the potential for land contamination and potential pathways to sensitive receptors and considers the potential for mobilisation of contaminants associated with current and historical land use in and around the Proposed Development Site.

It is recognised that the May 2021 desk-based assessment is now nearly three years old and considered a slightly different site area. Therefore, an addendum Technical Note will be prepared to highlight any key differences and updates that need to be accounted for in the Keadby Hydrogen geology, hydrogeology and land contamination assessment. This will include for a review of updated site sensitivity data as well as relevant site investigations undertaken since completion of the May 2021 desk-based assessment.

The results of the desk-based assessment, addendum Technical Note and the associated conceptual site model will be used to assess data gaps and uncertainties and, if required develop an initial scope for site investigation, which may also be required to assess possible foundation solutions. This phased approach to assessment is consistent with the Environment Agency's online guidance for the risk management of land contamination and BS10175:2011+A2:2017. It is anticipated that the requirements for any initial intrusive investigation will be discussed and agreed in advance with the Environment Agency and North Lincolnshire Council.

An assessment of potential impacts on existing ground conditions will be undertaken as part of the EIA, including the potential for the Proposed Development to result in land contamination, as defined in the Part 2A of the Environment Act 1995. Consideration will also be given to potential impacts associated with the construction and operation of the Proposed Development and how these will be prevented or minimised.

The approach to assessing the potential impacts of the Proposed Development from, and to land contamination, will be undertaken by comparing the risk levels at baseline via the preliminary conceptual site model (developed as part of the May 2021 desk-based assessment and addendum Technical Note) and the risk levels for the construction, operation and decommissioning stages respectively, to determine the change in risk at each stage. Potential risks are determined and assessed based on the likelihood (or probability) and consequence using the principles given in the National House Building Council (NHBC) and Environment Agency report R&D66 titled 'Guidance for the Safe Development of Housing on Land Affected by Contamination'. This provides guidance on development and application of the consequence and probability matrix to risk assessment and broad definitions of consequence and, whilst it is acknowledged that the Proposed Development is not residential in nature, this guidance is widely used for a range of development and so is considered applicable here.

The significance of the effects of land contamination are assessed by comparing the difference in risk of each contaminant linkage at baseline to those at construction, operation and decommissioning stages. Where there is shown to be a decrease in contamination risk the Proposed Development is assessed as having a beneficial effect on the environment in the long term.

If geological designations or mineral designations are present, the assessment of significance considers the sensitivity or importance of the asset/ resource and the magnitude of potential impact that might occur.

Based on the assessment of the baseline and the identification of any potential impacts, the ES will make recommendations for mitigation measures. These may include the recommendation for an initial intrusive investigation (to address residual data gaps or better delineate identified potential contamination hotspots or plumes), quantitative risk assessment, remediation and validation. It will also make recommendations for possible mitigation measures to be employed by contractors, should any previously unidentified contamination be encountered during the construction phase.

Potential impacts as a result of decommissioning the Proposed Development, will not be separately assessed as part of the geology, hydrogeology and land contamination assessment. This is on the basis that the effects of decommissioning are likely to be similar to or no worse than the effects from construction.

## 6.7. Landscape and Visual Amenity

### 6.7.1. Baseline Conditions

The Proposed Development Site lies within the Humberland Levels National Character Area (NCA) which is a flat, low-lying and large-scale agricultural landscape (Natural England, 2014). There is widespread evidence of drainage history, in particular from the The Keadby Hydrogen Power Station Project

17th century, in the evidence of ditches, dykes and canalised rivers. The flat landscape enables extensive, unbroken views where vertical structures including power stations and wind turbines, are very prominent.

The Proposed Development Site lies within the Trent Levels Landscape Character Area (LCA) within the North Lincolnshire Landscape Character Assessment and Guidelines (Estell Warren Landscape Architects, 1999). This LCA is characterised as a flat, open floodplain landscape with long distance views with little diversity in character.

Sensitive visual receptors are likely to be residential receptors located within nearby settlements including Keadby, Althorpe and Gunness. Recreational receptors using the local PRow network including the long distance routes Peatlands Way and Trent Valley Way, and recreational users of the River Trent and local waterways.

### 6.7.2. Scope of the Assessment

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

- Temporary changes to landscape character and views from sensitive receptors in the vicinity of the Proposed Development Site during construction and decommissioning; and
- Permanent changes to landscape character and views from sensitive receptors in the vicinity of the Main Site and Ancillary Facilities during operation.

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

- Guidelines for Landscape and Visual Impact Assessment, Third Edition. (IEMA; Landscape Institute 2013);
- Visual Representation of Development Proposals. Technical Guidance Note 06/19 (Landscape Institute, 2019);
- Assessing Landscape Value Outside National Designations. Technical Guidance Note 02/21 (Landscape Institute, 2021); and
- Infrastructure. Technical Guidance Note 04/2020 (Landscape Institute, 2020).

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

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

The assessment of impacts on built heritage, including impacts on the setting of listed buildings and structures, will be addressed by the cultural heritage assessment – see Section 6.8.

A detailed study of the existing landscape components, character and views of the Proposed Development Site and an identified study area will be carried out in consideration of the following:

- Site context;
- Topography;
- Vegetation including green infrastructure;
- Roads, public rights of way and access;
- Settlement and land-use;
- Landscape character; and
- Representative views.

This will be supported by figures, annotated viewpoint photographs, wireframes and photomontages as appropriate. The planning context with respect to landscape character and visual amenity will also be reviewed, taking into account relevant national, regional and local planning policies. The baseline study will form the basis of the assessment of the predicted impacts of the Proposed Development.

From the initial Site visit and planning policy context review and based on a stack height of approximately 90m (to be confirmed following air emissions modelling), a 10km radius study area is proposed for the landscape and visual impact assessment of the Proposed Development. It is not considered that any significant landscape or visual impacts would occur beyond 10km.

Up to ten representative views will be identified within the zone of theoretical visibility (ZTV) for the main building envelope and the potential stacks, as well as around the AGI for the natural gas and hydrogen connections. The ZTV will be generated using a bare ground Digital Terrain Model (DTM) and be reviewed in the field against the following criteria in order to determine the selection of representative views which form the basis of the visual assessment:

- Receptor function/ activity;
- Distance from the Site;
- Topography and elevation;
- Degree and period of exposure;
- Designation of the viewing place; and
- Distribution of receptors.

Up to four accurate Visual Representations of the Proposed Development for agreed representative views (visual receptors) will be produced in line with the guidance within

the Landscape Institute Technical Guidance Note 02/17 Visual representation of development proposals (Landscape Institute, 2019).

The location of representative views and photomontages will be agreed in consultation with North Lincolnshire Council and other consultees, as appropriate.

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

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

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

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

Where the assessment indicates the need for mitigation as a result of significant effects on landscape character or visual amenity, these will be outlined within the ES. A detailed landscaping and biodiversity management strategy will be prepared to accompany the Application.

Potential impacts on landscape and visual amenity, as a result of decommissioning the Proposed Development, will not be separately assessed as part of this landscape and visual assessment. This is on the basis that the effects of decommissioning are likely to be similar to or no worse than the effects from construction.



## 6.8. Cultural Heritage

### 6.8.1. Baseline Conditions

The Cultural Heritage baseline conditions of the Proposed Development Site were identified and assessed in relation to the consented Keadby 3 Power Station development. This included the production of a Cultural Heritage Desk-Based Assessment (DBA) supported by archaeological evaluation surveys undertaken within the Proposed Development Site including geophysical survey, trial trenching, and geoarchaeological assessment.

There are no World Heritage Sites, scheduled monuments, Grade I or II\* listed buildings, conservation areas, registered parks and gardens, registered battlefields or protected wreck sites located within the Proposed Development Site.

There are a number of non-designated heritage assets recorded on the North Lincolnshire Historic Environment Record (HER) located within the Proposed Development Site. These include a purported Romano-British settlement site located south of Trent Road (HER 17311), post-medieval land improvement drains (HER 24691) and peat horizons that contain evidence of past environments (MLS22432). The evaluation surveys undertaken in support of the Keadby 3 DCO confirmed that there was no evidence for the survival of the purported Romano-British settlement site (HER 17311) and they also confirmed that the peat horizons extended across the Proposed Development Site at varying depths and degrees of survival/ preservation. No additional archaeological remains were identified within the Proposed Development Site. The EIA for the Keadby 3 DCO identified the requirement for mitigation in relation to the impact to these peat horizons and the DCO includes a condition relating to the required archaeological mitigation within the Proposed Development Site.

Outside the Proposed Development Site boundary, the closest assets are the scheduled monument and grade II listed building at Keadby Lock on the Stainforth and Keadby Canal (NHLE 1005204; 1342734), located approximately 160m south of the Proposed Development Site. Scheduled Monument Consent has been granted for works to the lock gates in relation to the proposed water abstraction from the Stainforth and Keadby Canal for Keadby 3 Power Station. This consent would also need to be enacted for the Proposed Development.

The surrounding landscape contains notable concentrations of listed buildings in Althorpe (including Grade I listed Church of St Oswald NHLE 1083258), Crowle (also a conservation area and including Grade I listed Church of St Oswald NHLE 1346672) and Eastoft. There are isolated and smaller groupings of listed buildings in the surrounding landscape. One further scheduled monument lies within 5km of the Main Site area at Flixborough Saxon Nunnery and Site of All Saints Medieval Church and Burial Ground (NHLE 1009382).

There are no World Heritage Sites, conservation areas, registered parks and gardens, registered battlefields or protected wreck sites located in the surrounding area. The non-designated Isle of Axholme area of Special Historic Landscape Interest (saved policy LC14 of the North Lincolnshire Local Plan 2003) lies 2km south of the Proposed Development Site.

Appendix A1.4 shows the locations of designated and non-designated heritage assets located within the Proposed Development Site, and within 3km and 5km of the Proposed Development Site.

### 6.8.2. Scope of the Assessment

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

- Physical impacts and/ or impacts caused by change to the setting of designated and non-designated heritage assets, including archaeological sites and historic landscape character areas, within the Proposed Development Site during construction; and
- Impacts caused by change to the setting of designated and non-designated heritage assets, including listed buildings, conservation areas and historic landscape character areas, in the vicinity of the Proposed Development Site during construction and operation.

The cultural heritage assessment will consider these impacts as part of the EIA.

The cultural heritage baseline conditions for the Proposed Development Site are unlikely to be significantly different to those identified in the preparation of the Keadby 3 Power Station DCO, however, the Cultural Heritage Desk-Based Assessment is required to be updated with a new formal search of the North Lincolnshire HER and to include the results of intrusive investigations undertaken to date in relation to Keadby 3. The effects of the Proposed Development on designated and non-designated heritage assets located within and in the vicinity of the Proposed Development Site will also need to be assessed anew in relation to the proposed design parameters for the Proposed Development.

An updated cultural heritage desk-based assessment will determine, as far as is reasonably possible from existing records, the nature of the archaeological resource within a study area of 1km from the Proposed Development Site boundary for non-designated heritage assets. Formal HER searches of the North Lincolnshire HER will be carried out. A larger study area of 3km will be used to identify designated heritage assets and the results will be used to identify any impacts that the Proposed Development may have on the receptors due to change to their settings. An extended study area of 5km will be used to identify those assets of the highest significance (e.g. World Heritage Sites, scheduled monuments, grade I and II\* listed buildings,

conservation areas containing highly significant buildings) that have the potential to be impacted by the Proposed Development as a result of change to their settings.

A Zone of Theoretical Visibility (ZTV) (to be undertaken as part of the landscape and visual impact assessment as discussed in Section 6.7. Landscape and Visual Amenity) will also be used as a tool of assessment to identify areas of visibility for the setting assessment. However, as the setting of a heritage asset is not a solely visual concept, other aspects such as aural intrusion, experience, and historical associations will also be taken into account. The assessment will follow current professional good practice and guidance including that produced by the Chartered Institute for Archaeologists (CIfA), Historic England (HE) and IEMA:

- CIfA Standard and Guidance for historic environment desk-based assessment (CIfA, 2020);
- CIfA Code of Conduct (CIfA, 2022);
- HE Good Practice Advice in Planning Note 2: Managing Significance in Decision-Taking in the Historic Environment (HE, 2015);
- HE Good Practice Advice in Planning Note 3: The Setting of Heritage Assets (HE, 2017);
- HE Advice Note 12: Statements of Heritage Significance; Analysing Significance in Heritage Assets (HE, 2019); and
- IEMA, IHBC and CIfA: Principles of Cultural Heritage Impact Assessment (2021).

Each of the study area boundaries defined above can be altered if deemed necessary through consultation and professional judgment to assess the effects of the Proposed Development in a proportionate manner. For instance, in the case of the 1km study area for non-designated assets, it is known that the Proposed Development Site lies within 2km of the Isle of Axholme area of Special Historic Landscape Interest (saved policy LC14 of the North Lincolnshire Local Plan). Whilst this asset is non-designated, its significance may warrant an extension to the 1km study area to assess any potential impacts arising from change to its setting as a result of the Proposed Development Site.

An inventory of all heritage assets will be cross-referenced to figures and the report narrative. This baseline collation of data will be supported by Site visits to identify the potential for any unknown archaeological assets, the potential for survival of archaeology and to establish the setting of identified heritage assets.

It is expected that sufficient heritage information is presently available, through the work carried out in relation to the Keadby 3 Power Station DCO, to provide a baseline assessment for the EIA, enhanced with a new search of national and local databases to establish any new information and/or changes to the baseline. Further archaeological evaluation such as geophysical survey and/or trial trenching is not anticipated, but this will be discussed and agreed with North Lincolnshire Council archaeological advisors.

The purpose of the EIA will be to assess the potential impacts of the Proposed Development upon the significance of the heritage resource and to understand the level of harm to that resource. The aim will then be to propose appropriate mitigation to resolve the harm caused, where possible.

Once all of the potential heritage receptors have been identified, they will be assigned a 'value'. This is not solely a reflection of their designated or non-designated status but is determined through a number of factors including their values which can be expressed as artistic, archaeological, architectural or historic. The impact from the Proposed Development upon the significance of the heritage assets will then be quantified and expressed within the EIA. This will produce an initial significance of effect of the Proposed Development upon the heritage resource, taking into account any design or embedded mitigation.

Following the impact assessment process, any potential mitigation strategies required will be considered and recommendations made. The significance of residual effects remaining after mitigation will be assessed.

Potential impacts on cultural heritage, as a result of decommissioning the Proposed Development, will not be separately assessed as part of this assessment. This is on the basis that the effects of decommissioning are likely to be similar to or no worse than the effects from construction, and, in the case of effects derived from change to the setting of heritage assets, will largely be reversed upon decommissioning.

## 6.9. Socio-Economics

### 6.9.1. Baseline Conditions

The Proposed Development Site is located adjacent to the existing Keadby 1 and Keadby 2 Power Stations in the North Lincolnshire Council area. The North Lincolnshire Local Plan (November 2022), of which submission and examination was held in October 2023, includes a focus on low carbon energy. Alongside other relevant strategies in the plan, low carbon policies include Climate Change and Low Carbon Living (DQE7), Renewable Energy Proposals (DQE8) and Green Infrastructure Network (DQE11). The document states *that "suitable provision for the use of renewable and low carbon energy will be made"* and seeks to *"promote the use of renewable and low carbon energy"* indicating the alignment of the Proposed Development with the revised Local Plan.

North Lincolnshire Council launched its revised Economic Growth Plan for 2023 - 2028, setting out its focus on highly skilled jobs and workforce, decarbonisation, and growth. It outlines the Humber Region, which Keadby Carbon Capture and Keadby Hydrogen Power Stations are located within, as the UK's Energy Estuary Priority 2 of the Plan aims to deliver a place where businesses and residents make positive changes to create a cleaner, greener, healthier and more sustainable future for North Lincolnshire, The Keadby Hydrogen Power Station Project

with a focus on the move to a net zero economy, something that the Proposed Development could be a central part of.

### 6.9.2. Scope of the Assessment

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

- Creation of direct and indirect employment during construction, operation and decommissioning alongside possible training and skill development opportunities;
- Potential impacts on community infrastructure and businesses in proximity to the Proposed Development;
- Potential impacts on leisure and tourism receptors in proximity to the Proposed Development;
- Potential impact on land use (such as effects on other planned or proposed developments);
- Potential disruption on the local and strategic road networks; and
- Potential disruption to PRow.

Potential traffic, noise, air quality/ dust and visual impacts on local residents and other sensitive receptors will be assessed as part of the Traffic and Transport, Noise and Vibration, Air Quality, and Landscape and Visual Amenity assessments described in other parts of this Report.

The methodology for assessing socio-economic impacts will follow standard EIA guidance and will involve:

- Review of relevant baseline conditions at the Proposed Development Site and locality;
- Assessment of local (North Lincolnshire), regional (East of England) and national (England) socio-economic policy context to consider alignment and contribution of the Proposed Development to these activities;
- Estimate of employment generated during the construction, operational and decommissioning phases;
- Assessment of land use and local amenities that may be affected by the Proposed Development; and
- Consideration will also be given to whether there are any cumulative impacts that are not assessed in other ES chapters (Traffic and Transport, Noise and Vibration, Air Quality, and Landscape and Visual Amenity) that might affect local amenities and land use.

For socio-economics, there is no accepted definition of what constitutes a likely significant (or not significant) socio-economic effect. It is recognised that 'significance' reflects the relationship between the scale of impact (magnitude) and the sensitivity (or value) of the affected resource or receptor. As such, the significance criteria for socio-economic effects are assessed using the expert judgement of authors with professional

experience in socio-economics, and relies on the assessment of the sensitivity of receptors and magnitude of impacts

The assessment will be carried out using a number of recognised data sources including, but not limited to the following:

- 2021 Census (Office for National Statistics (ONS));
- ONS Labour Force and Neighbourhood Statistic;
- Business Register and Employment Survey;
- Annual Population Survey;
- Google Maps; and
- Travel to Work Data.

Wherever possible the impacts of the socio-economic assessment will be appraised against relevant national standards such as those provided by HM Treasury and Homes and Communities Agency (HCA). Where no standards exist, professional experience and judgement will be applied and justified.

A summary will be provided of key residual impacts of the Proposed Development and how the Proposed Development fits into local and regional socio-economic objectives, as well as its overall impact on the contribution to the local economy and community.

Potential impacts on socio-economics, as a result of decommissioning the Proposed Development, will not be separately assessed as part of the socio-economic assessment. This is on the basis that the effects of decommissioning are likely to be similar to or no worse than the effects from construction.

## 6.10. Climate Change

### 6.10.1. Baseline Conditions

The baseline for the lifecycle greenhouse gas (GHG) assessment will consider existing carbon emissions at the Site of the Proposed Development along with future GHG emissions at the Site if the Proposed Development does not proceed. As well as any emissions associated with the operation of the current Site, emissions will be put into the context of wider GHG emissions associated with energy generation for the UK electricity grid. The GHG baseline will also consider GHG's being locked in or sequestered through existing soils and habitats.

The existing baseline for the climate change resilience assessment and In-Combination Climate Change (ICCI) assessment is based on historic observational data available from the Met Office at the nearest weather station to the location of the Proposed Development.

The future baseline for the climate change resilience and ICCI assessments is based on United Kingdom Climate Change Projection 2018 (UKCP18) data for the 25km<sup>2</sup> grid

square within which the Proposed Development is located. UKCP18 probabilistic projections for pre-defined 30-year periods for the following average climate variables have been obtained and are presented in Table 6.

**Table 6: Climate change baseline and projection data**

Climate Variable	Base-line (1981 - 2010)	Climate change projection RCP8.5 (2020-2049)	Climate change projection RCP8.5 (2050-2079)	Climate change projection RCP8.5 (2070-2099)	Projected Trend	Climate projection source
<b>Temperature</b>						
Mean annual maximum daily temperature (°C)	14.07	+1.1 (+0.1 to +2.2)	+2.5 (+0.4 to +4.7)	+3.7 (+0.9 to +6.7)	↑	UKCP18 RCP8.5
		+15.17 (+14.17 to +16.27)	+16.57 (+14.47 to +18.77)	+17.77 (+14.97 to +20.77)		
Mean summer maximum daily temperature (°C)	21.01	+1.4 (-0.6 to +3.3)	+3.2 (-0.2 to +6.7)	+4.9 (0.2 to +9.9)	↑	UKCP18 RCP8.5
		+22.41 (+20.4 to +24.31)	+24.21 (+20.6 to +27.71)	+25.91 (+21.21 to +30.91)		
Mean winter minimum	1.11	+0.9 (-0.5 to +2.6)	+2.1 (-0.5 to +5.4)	+3.1 (-0.4 to +7.5)	↑	UKCP18 RCP8.5

Climate Variable	Base-line (1981 - 2010)	Climate change projection RCP8.5 (2020-2049)	Climate change projection RCP8.5 (2050-2079)	Climate change projection RCP8.5 (2070-2099)	Projected Trend	Climate projection source
daily temperature (°C)		+2.01 (+0.6 to +3.7)	+3.2 (+0.6 to +6.5)	+4.2 (+0.7 to +8.6)		
Number of days of air frost per annum	48.77		<p><i>“Reports have shown that the number of frost air and ground frost days have decreased since the 1960s. These long-term trends, combined with detailed studies, point to a long-term warming trend of the UK’s climate and a reduction in cold events.”<sup>3</sup></i></p>		↓	Met Office
Highest temperature for baseline period (°C)	21.91	-	-	-	-	
Lowest temperature for baseline	0.98	-	-	-	-	

<sup>3</sup> <https://www.metoffice.gov.uk/research/climate/understanding-climate/uk-and-global-extreme-events-cold>



Climate Variable	Base-line (1981 - 2010)	Climate change projection RCP8.5 (2020-2049)	Climate change projection RCP8.5 (2050-2079)	Climate change projection RCP8.5 (2070-2099)	Projected Trend	Climate projection source
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period  
(°C)

Rainfall						
Mean annual rainfall (mm)	574.45	+0.2%	-2.1%	-2.2%	↓ ↑	UKCP18 RCP8.5
		(-12.0% to +12.3%)	(-18.8% to +14.2%)	(-22.5% to +19.1%)		
		575.6 (505.5 to 645.1)	562.4 (466.5 to 656.0)	561.8 (445.2 to 684.2)		
Mean summer rainfall (mm)	54.96	-4.0%	-20.0%	-29.8%	↓	UKCP18 RCP8.5
		(-34.9% to +29.9%)	(-57.6% to +19.7%)	(-68.6% to +16.1%)		
		52.8 (35.8 to 71.4)	44.0 (23.3 to 65.8)	38.6 (17.3 to 63.8)		
Mean winter rainfall (mm)	41.8	+3.6%	+10.0%	+16.0%	↑	UKCP18 RCP8.5
		(-9.6% to +19.8%)	(-11.5% to +39.5%)	(-12.5% to +56.4%)		
		43.3	46.0	48.0		

Climate Variable	Base-line (1981 - 2010)	Climate change projection RCP8.5 (2020-2049)	Climate change projection RCP8.5 (2050-2079)	Climate change projection RCP8.5 (2070-2099)	Projected Trend	Climate projection source
		(37.8 to 50.1)	(37.0 to 58.3)	(36.6 to 65.4)		
Wettest month on average (mm)	June (62.98 mm)	-	-	-	-	
Driest month on average (mm)	February (32.22 mm)	-	-	-	-	
<b>Other</b>						
Heatwaves	<i>“Under a high emissions scenario, it is estimated that by the end of the 21st century, all areas of the UK are projected to be warmer with hotter and drier summers likely to become more common”.</i> <sup>4</sup>				↑	Met Office
Drought/ Wildfires	<i>“The Met Office has projected a trend towards drier summers on average, with generally stronger drying in southern parts of the UK. It also suggested that the drying trend is stronger under a high greenhouse gas emission scenario compared to a low one. However, it is the</i>				↑	Met Office

<sup>4</sup> <https://www.metoffice.gov.uk/research/climate/understanding-climate/uk-and-global-extreme-events-heatwaves>

Climate Variable	Base-line (1981 - 2010)	Climate change projection RCP8.5 (2020-2049)	Climate change projection RCP8.5 (2050-2079)	Climate change projection RCP8.5 (2070-2099)	Projected Trend	Climate projection source
	<i>distribution of rainfall through the seasons that will determine UK drought risk.”<sup>5</sup></i>					
Storms	<i>“The UKCP18 model suggest a small contribution from storm surges, however it is unclear if the frequency and severity of future storm surges is going to change. Although, rising sea levels due to climate change are expected to worsen the impacts of storm surges.”<sup>6</sup></i>				↑↓	UKCP18

### 6.10.2. Scope of the Assessment

The Proposed Development supports the UK Government’s drive to decarbonise the electricity grid and continue to ensure security of electricity supply.

To align with the requirements of the EIA Regulations and the National Policy Statement for Energy (EN1) and associated published guidance, three separate aspects have been considered in scoping the climate assessment:

- Lifecycle greenhouse gas (GHG) impact assessment: The effect on the climate of GHG emissions arising from the Proposed Development, in the context of the UK Government carbon budgets;
- In-combination climate change impact (ICCI) assessment: The combined impact of the Proposed Development and potential climate change on receptors in the receiving environment; and
- Climate change resilience assessment: The resilience of the Proposed Development to climate change impacts, including how the design has been adapted to take into account anticipated impacts of climate change.

<sup>5</sup> <https://www.metoffice.gov.uk/research/climate/understanding-climate/uk-and-global-extreme-events-drought>

<sup>6</sup> <https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18-fact-sheet-sea-level-rise-and-storm-surge.pdf>

The relevance and applicability of each aspect has been considered in the context of the Proposed Development; Table 7 presents scoping outcomes and rationale.

**Table 7: Scoping outcomes of climate assessment**

Aspect	Scoping outcome	Rationale
Lifecycle GHG impact assessment	Scoped in	Due to its nature and purpose, the Proposed Development is considered likely to result in notable GHG emissions impacts, both in terms of GHG emissions arising through construction and operation but also the potential GHG emissions avoided due to the future use of a low carbon fuel source.
In-combination climate change assessment (ICCI)	Scoped in	The impacts of the Proposed Development on receptors in the surrounding environment may be exacerbated by the impacts of the climate change and will therefore need to be assessed.
Climate change resilience review	Scoped in	The impacts of climate change are likely to have an impact on the construction and operation of the Proposed Development.

An assessment of lifecycle GHG emissions will be undertaken. The approach to the GHG assessment will align with best practice set out in BSIs Publicly Available Statement (PAS) 2080:2023 which requires GHG emissions to be assessed and reported by lifecycle stage. The assessment of significance of the Proposed Development on the climate will be undertaken in line with IEMA Guidance for assessing the impact of GHGs in EIA. In line with IEMA guidance the significance of impact will be determined not only by considering the magnitude of emissions from the Proposed Development but how the Proposed Development will help transition the UK to net zero.

Table 8 presents the GHG lifecycle stages to be considered and the emissions sources scoped into the GHG assessment

**Table 8: GHG lifecycle scoping outcomes**

Lifecycle Stage	Activity	Scoped in/ out	Rationale for Scoping Conclusion
Pre-construction stage	Enabling works; Land clearance and land raising; Disposal of any waste generated during the enabling works.	In	GHG emissions are expected to arise from: - fuel use for works equipment and vehicles - fuel use for worker commuting - loss of carbon sink - disposal of waste - fuel consumption of transportation of waste
Production stage	Raw material extraction and manufacturing of products required to build the Proposed Development.	In	Embodied GHG emissions
Construction process stage	On-Site construction activity; Transport of construction materials (where these are not included in embodied GHG emissions); Transport of construction workers; Disposal of any waste generated during the	In	GHG emissions from energy (electricity, fuel, etc.) consumption for plant and vehicles, generators on Site; Fuel consumption from transport of materials to Site (where these are not included in embodied GHG emissions); GHG emissions from fuel use for worker commuting; GHG emissions from disposal of waste; GHG emissions from fuel consumption of transportation of waste.

Lifecycle Stage	Activity	Scoped in/ out	Rationale for Scoping Conclusion
	construction processes.		
Operation Stage	Operation of Proposed Development; Maintenance.	In	GHG emissions from operation of the Proposed Development; Potential GHG emissions avoided due to low carbon approach and the beneficial impact of the Proposed Development on the carbon intensity of power generation in the UK as well as supporting the decarbonization path to net zero; Fuel use for maintenance activities.
Decommissioning	Removal and or renewal of the full Proposed Development	Out	The decommissioning or renewal of the Proposed Development is not reasonably foreseeable and would be subject to a separate permission

An ICCI assessment will be undertaken to identify how the resilience of receptors in the surrounding environment will be impacted by future climate conditions and the Proposed Development. The likelihood and consequence of climate hazards impacting the receptors will be assessed to understand if there are any significant impacts. The assessment will be undertaken in line with guidance published by IEMA for assessing climate risk in EIA. The climate variables relevant to the Proposed Development are detailed in Table 9 .

**Table 9: Climate variables for the ICCI review of the Proposed Development**

<b>Climate Variable</b>	<b>Scoped In/ Out</b>	<b>Rationale for Scoping Conclusions</b>	<b>Planning Document which will Consider the Issue/Risk</b>
Extreme weather events.	In	The impacts of extreme weather events will be considered as part of the climate change allowances to be made within the Flood Risk Assessment	Flood Risk Assessment
Temperature change	In	No significant impacts on receptors in the surrounding environment from increased temperatures are anticipated as a result of the combined impact of climate change and the Proposed Development.  However, any residual combined temperature impacts will be considered by the Landscape and Biodiversity Management Strategy.	Landscape and Biodiversity Management Strategy
Sea level rise	In	The Proposed Development Site is located adjacent to	A Flood Risk Assessment will consider a range of scenarios and will be informed by future Climate

Climate Variable	Scoped In/ Out	Rationale for Scoping Conclusions	Planning Document which will Consider the Issue/Risk
		the River Trent which is tidal at this location.	Change Predictions regarding sea level rise. Tidal surge and the potential for embankment breach will be considered.
Precipitation change (increased frequency and magnitude of precipitation events) and rainfall and low precipitation and drought conditions	In	<p>Climate change may lead to an increase in substantial precipitation events that could lead to flash flooding. Projected increases in rainfall will be considered as part of the Landscape and Biodiversity Management Strategy and Flood Risk Assessment.</p> <p>Climate change may lead to periods of decreased precipitation resulting in water scarcity. The suitability of vegetation used for landscaping for future climate conditions will be considered in the Landscape and Biodiversity Management Strategy</p>	<p>Landscape and Biodiversity Management Strategy</p> <p>Flood Risk Assessment</p> <p>Landscape and Biodiversity Management Strategy</p>
Wind	Out	The impacts of wind on receptors in the	N/A



Climate Variable	Scoped In/ Out	Rationale for Scoping Conclusions	Planning Document which will Consider the Issue/Risk
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surrounding environment are likely to be no worse relative to baseline conditions.

The climate change resilience assessment will consider resilience in terms of both gradual climate change, and the risks associated with the predicted increase in frequency of extreme weather events, as set out in Table 10. The likelihood and consequence of climate hazards impacting the Proposed Development will be assessed to identify any significant risks. It will consider the resilience and adaptation measures for such risks within the proposed design for infrastructure and assets comprising the Proposed Development; the design of which will be assumed to comply with current planning, design and engineering practice and codes. The assessment will be undertaken in line with guidance published by IEMA for assessing climate risk in EIA.

**Table 10: Climate variables for the climate change resilience review of the Proposed Development**

Climate Variable	Scoped In/ Out	Rationale for Scoping Conclusions
Extreme weather events.	In	The Proposed Development may be vulnerable to extreme weather events such as storm damage to structures and assets.
Temperature change	In	Increased temperatures may increase cooling requirements of the Proposed Development and could impact on structural integrity of buildings and materials.
Sea level rise	In	The Proposed Development Site is located adjacent to the River Trent which is tidal at this location.

<p>Precipitation change (increased frequency and magnitude of precipitation events) and rainfall and low precipitation and drought conditions</p>	<p>In</p>	<p>The Proposed Development may be vulnerable to changes in precipitation, for example, pressure on water supply during periods of reduced rainfall, and damage to structures and drainage systems during periods of heavy precipitation.</p>
<p>Wind</p>	<p>Out</p>	<p>The impacts of wind on receptors in the surrounding environment are likely to be no worse relative to baseline conditions.</p>

Based on the table above a climate change resilience assessment is scoped into the Climate Change assessment. Outputs from the lifecycle GHG impact assessment and the climate change resilience assessment will be presented in a standalone Climate Change Impact Report.

Potential impacts on climate change, as a result of decommissioning the Proposed Development, will not be separately assessed as part of the climate change assessment. This is on the basis that the effects of decommissioning are likely to be similar to or no worse than the effects from construction.

## 6.11. Population and Human Health

### 6.11.1. Baseline Conditions

Public health profile data produced by Public Health England (Office for Health Improvement & Disparities), published under the Public Health Outcomes Framework has been reviewed for the purposes of this EIA Scoping Report. A human health profile will be developed for the socio-economics assessment which focuses on key indicators identified by Public Health England at ward level including a comparison with district and national averages. This profile will be consolidated by engaging with the Integrated Care Board and the relevant local authority to ensure that it is a consolidated baseline. The Proposed Development Site is located within the Axholme North ward in North Lincolnshire. Indicators deemed relevant to likely health impacts of the Proposed Development for the local area have been identified, with data relating to the Axholme North ward and the comparative geographies set out in Table 11 .

An initial review of the human health baseline has been undertaken using a number of recognised data sources including:

- Census 2021 (ONS, 2021);

- Claimant Count 2024 (ONS, 2024); and
- Public Health England - Office for Health Improvement and Disparities (2024).

The list above is intended to provide an outline of sources and it should be noted that additional datasets may be used in the preparation of the assessment.

**Table 11: Human health baseline indicators**

Indicator	Axholme North Ward	North Lincolnshire	Yorkshire and the Humber	England
Population (2021)	8,249	169,680	5,480,774	56,490,048
Population aged under 16 (%) (2021)	17.4	17.8	18.5	18.5
Population aged 65 and over (%) (2021)	22.5	22.0	19.0	18.3
Unemployment rate (%) (2021)	2.1	2.6	2.7	2.9
Claimant Count (% claiming unemployment-related benefits aged 16-64) (2024)	3.0	3.7	4.2	3.9
General Health – good or very good (%) (2021)	78.6	78.8	80.5	82.2
General Health – bad or very bad (%) (2021)	6.3	6.0	5.8	5.2

Indicator	Axholme North Ward	North Lincoln- shire	Yorkshire and the Humber	England
Disability – day- to-day activities limited a lot or a little (%) (2021)	19.9	19.7	18.6	17.3
Life expectancy at birth (male) (years) (2020- 2022)	80.1*	78.4	77.9	78.9
Life expectancy at birth (female) (years) (2020- 2022)	84.9*	82.9	81.9	82.8
Overweight or obese adults (%) (2021/2022) <sup>7</sup>	-	73.5	66.5	63.8
Obese children (reception year) (%) (2021/2022)	21.2	21.8	22.5	21.3
Smoking prevalence in adults (%) (2022) <sup>8</sup>	-	15.4	13.1	12.7

<sup>7</sup> Please note that this data for some wards is unavailable from Public Health England.

<sup>8</sup> Please note that this data for some wards is unavailable from Public Health England.

Indicator	Axholme North Ward	North Lincolnshire	Yorkshire and the Humber	England
Physically inactive adults (%) (2021/2022) <sup>9</sup>	-	30.1	23.6	22.3
Under 75 mortality rate from causes considered preventable (per 100,000) (2022) <sup>10</sup>	-	169.1	178.4	153.7

*Source: ONS (2021), Census 2021; ONS (2024), Claimant Count – February 2024; Public Health England – Office for Health Improvement and Disparities (2024), Local Health Profiles. \*The only available life expectancy data for Axholme North Ward is for the 2016 – 2020 period.*

#### 6.11.2. Scope of the Assessment

In November 2022, the Institute of Environmental Management and Assessment (IEMA) published two new pieces of guidance on assessing human health as part of EIA. Previous to this, there was no consolidated methodology or practice for the assessment of effects on human health. Therefore, previously no specific human health impact assessment was required as environmental aspects that were relevant or partially relevant to population and human health would assess the impacts on human health within each respective chapters.

The human health assessment will be based on this new IEMA guidance and it will consider the potential impacts for each phase of the development. Wherever possible, the impacts identified in the assessment will be appraised against relevant national standards. Where relevant standards do not exist, professional experience and expert judgement will be applied and justified.

This chapter will identify the communities that will be subject to impacts associated with the Proposed Development and will identify the potential effects on the health and

<sup>9</sup> Please note that this data for some wards is unavailable from Public Health England.

<sup>10</sup> Please note that this data for some wards is unavailable from Public Health England.

wellbeing of those communities in Axholme North and the wider area where relevant, as a consequence of the Proposed Development.

This chapter will consider the Proposed Development in the context of established national and local policy standards and best practice benchmarks. This will include human health policy alignment with the Proposed Development.

If a change in a wider determinant of health is likely, it should be scoped into the human health assessment. The assessment must present the 'likely significant' human health effects of the project. At the scoping stage, there are uncertainties and there is limited insight into significance, so scoping identifies whether health effects are 'potentially significant' or not. Therefore, the anticipated potential impacts during construction, operation, and decommissioning which could be potentially significant include the following determinants:

- Access to healthcare and other social infrastructure services;
- Access to open space, public rights of way, recreational facilities and opportunities for physical activity and active travel;
- Transport modes, access, and connections;
- Education and training;
- Employment and income;
- Air quality;
- Noise and vibration;
- Landscape and visual amenity;
- Water quality or availability;
- Community identity and social participation;
- Climate change mitigation and adaptation;
- Built environment; and
- Wider societal infrastructure and resources.

The following determinants have been scoped out of this assessment:

- Diet and nutrition;
- Risk taking behaviour;
- Housing;
- Relocation;
- Community safety; and
- Radiation.

Other relevant EIA technical topics will also inform the population and human health assessment. These are as follows:

- Air Quality;
- Noise and Vibration;
- Traffic and Transport;

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- Water Environment and Flood Risk;
- Landscape and Visual Amenity;
- Socio-Economics; and
- Climate Change.

Potential impacts on human health, as a result of decommissioning the Proposed Development are likely to be similar to or no worse than the effects from construction. If any decommissioning effects vary to construction, we would identify this and assess the effect.

## 6.12. Materials and Waste

### 6.12.1. Baseline Conditions

The study areas for the assessment of impacts related to materials and waste are defined in line with the Institute of Environmental Management and Assessment (IEMA) Guide to: Materials and Waste in Environment Assessment, Guidance for a Proportionate Approach (referred from herein as the 'IEMA Guidance') (IEMA, 2020).

The Proposed Development Site lies within North Lincolnshire and the Yorkshire and the Humber region.

Baseline data within the Proposed Development Site has been reviewed to date for:

- Impacts on any safeguarded mineral (e.g. quarries) and waste sites;
- Presence of historic and permitted landfills; and
- Presence of permitted waste sites and waste site applications.

Additional baseline information will be gathered and presented in the Materials and Waste chapter for:

- Non-hazardous and inert landfill void capacity (Yorkshire and the Humber);
- Hazardous waste landfill void capacity (England);
- Waste management facility capacity (liquid waste only) (England); and
- Availability of key construction materials (UK/GB and Yorkshire and the Humber).

An initial review of baseline conditions within the Proposed Development Site has been undertaken and consists of:

- Four historic landfill sites (of a total of seven in the vicinity) and no permitted landfill sites as shown in the Environment Agency's Historic Landfill Sites (EA, 2024a) and Permitted Waste Sites - Authorised Landfill Site Boundaries data sets (EA, 2024b);
- No permitted waste Sites and waste site applications as outlined in the Environment Agencies Environmental Permitting Regulations – Waste Sites (EA, 2024c); and
- No safeguarded mineral (e.g. quarries) or waste sites listed in the North Lincolnshire Core Strategy Adopted 2011 (North Lincolnshire Council, 2011a) or Proposals Map (North Lincolnshire Council, 2016).

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### 6.12.2. Scope of the Assessment

The assessment will follow the methodology set the IEMA Guidance (IEMA, 2020).

For the purpose of this scoping report, 'materials and waste' comprises:

- The consumption of materials (key construction materials only e.g. concrete, aggregate, asphalt and steel); and
- The generation and management of waste.

Materials are defined in the IEMA Guidance materials as:

"physical resources that are used across the lifecycle of a development. Examples include key construction materials such as concrete, aggregate, asphalt and steel."

Other material assets considered include built assets such as landfill void capacity and safeguarded mineral and waste sites.

Waste is defined as per the Waste Framework Directive (European Union, 2008) as:

"any substance or object which the holder discards or intends or is required to discard".

The IEMA Guidance offers two methods for the assessment of waste. Method W1 – void capacity has been selected as this is a more detailed methodology and is appropriate for larger and more complex projects.

The assessment of materials and waste will consider the following:

- Waste producers have a legal duty of care to manage their waste in accordance with regulations and to ensure that any waste leaving the Site where it is generated is transferred to a suitably licensed facility for further treatment or disposal;
- Facilities transferring, treating or disposing of waste must be either licensed or apply for an exemption from a license, and impacts arising from the operation of waste management facilities are considered as part of the planning and permitting process for these facilities themselves;
- As part of their planning function, Waste Planning Authorities (WPAs) are required to ensure that sufficient land is available to accommodate facilities for the treatment of all waste arising in the area, either within the WPA area, or through export to suitable facilities in other areas; and
- Minerals Planning Authorities (MPAs) are similarly required to ensure an adequate supply of minerals, sufficient to meet the needs of national and regional supply policies, and local development needs.

The following matters will be scoped out of the assessment of materials and waste:

- Waste arising from extraction, processing and manufacture of construction components and products. This is based on the assumption that these products and



materials are being developed in a manufacturing environment with their own waste management plans, facilities, and supply chain, which are potentially in different regions of the UK or the world and therefore outside of the geographical scope of this study. Such matters cannot be accurately predicted and assessed in the ES as they relate to procurement decisions that cannot be assured;

- Other environmental impacts associated with the management of waste from the Proposed Development e.g., on water resources, air quality, noise or traffic resulting from the generation, handling, on-Site temporary storage or off-Site transport of materials and waste are addressed separately in other relevant chapters;
- Effects associated with decommissioning as the Proposed Development has a long design life and such it is not considered possible to reliably forecast decommissioning requirements and infrastructure far in the future. A Decommissioning Environmental Management Plan would consider in detail all potential environmental risks on the Proposed Development Site and contain guidance on how risks can be removed or mitigated;
- Changes to safeguarded mineral and waste sites, as there are no such sites within the Proposed Development Site; and
- Changes in availability of maintenance materials during the operation of the Proposed Development. Forecast materials effects are (using professional judgement) considered negligible in relation to the scale and nature of the Proposed Development.

Due to the limitation on information available at this stage, and the uncertainty about the nature of mitigation(s) and the method by which mitigation(s) would be secured, material use and waste generation during the construction and waste generation during operation of the Proposed Development is scoped into the assessment.

Table 12 provides an outline scope of assessment.

**Table 12: Outline Scope of Materials and Waste Assessment**

Proposed Development phase	Effects	Scope in/ out
Construction, operation and decommissioning	Waste arising from extraction, processing and manufacture of construction components and products.	Scope out
	Other environmental impacts associated with the management of waste from the Proposed Development.	Scope out

Proposed Development phase	Effects	Scope in/ out
	Changes to safeguarded mineral Site	Scope out
	Changes to safeguarded waste Site	Scope out
Construction	Changes in availability of construction materials	Scope in
	Changes in available landfill void capacity	Scope in
Operation	Changes in availability of maintenance materials	Scope out
	Changes in available landfill void capacity	Scope in
	Changes in available waste management facility capacity (liquid waste only)	Scope in
Decommissioning	Changes in availability of decommissioning materials	Scope out
	Changes in available landfill capacity	Scope out

The sensitive receptors for this assessment of impacts are:

- Landfill void capacity in the expansive study areas of the Yorkshire and the Humber (non-hazardous landfill void capacity) and England (hazardous landfill void capacity) – as defined in the IEMA guidance *“landfill is a finite resource, and hence – through the ongoing disposal of waste – there is a continued need to expand existing and develop new facilities, This requires the depletion of natural and other resources which, in turn, adversely impacts the environment.”*; and
- Materials (construction only), national consumption of key construction materials – as outlined in the IEMA guidance *“materials are, in their own right, sensitive*

*receptors. Consuming materials impacts upon their immediate and (in the case of primary material) long-term availability; this results in the depletion of natural resources and adversely impacts the environment.”.*

The IEMA guidance “does not consider waste processing and recovery facilities as sensitive receptors, rather: they are part of a system that has the potential to reduce the magnitude of adverse impacts associated with waste generation and disposal. Waste processing and recovery facilities are, hence, different to landfills, in that the latter are finite resources.”

The assessment criteria for determining sensitivity, magnitude and significance as set out by the IEMA Guidance will be used in the assessment.

The sensitivity of receptors and magnitude of impacts on materials and waste will be assessed through the following:

#### Materials (construction only)

- Establishing the baseline for national and regional consumption of key construction materials by weight;
- Assessing the sensitivity of materials as related to the availability and types of materials to be consumed by the Proposed Development in construction;
- Establishing the quantities of key construction materials required for the construction of the Proposed Development; and
- Comparing the total quantities of key construction materials with the most recent national and regional consumption (utilising a percentage approach).

#### Waste

- Establishing the baseline landfill void capacity in the non-hazardous (including inert) and hazardous waste study areas;
- Assessing the sensitivity of landfill void capacity;
- Establishing the quantities of construction, demolition, excavation and operational waste to be generated during the construction and operation of the Proposed Development; and
- Comparing the total waste arising from the construction and operation of the Proposed Development against the landfill void capacity (utilising a percentage approach). Where operational wastes are identified that are not suitable for landfill disposal (e.g. liquids) these wastes will be considered in the context of national waste management facility capacity rather than landfill void capacity.

### **6.13. Major Accidents or Disasters Vulnerability**

This section of the Scoping Report sets out the proposed scope and methodology of the assessment of Major Accidents and Disasters (MA&D) in respect of the Proposed Development.

This section should be read in conjunction with:

- Section 2: Description of the Existing Environment;
- Section 3: The Proposed Development;
- Section 6.3: Traffic and Transport;
- Section 6.5: Water Environment and Flood Risk; and
- Section 6.10: Climate Change.

A summary of the key terms used in this MA&D assessment is provided in Table 13 and will be developed further within the ES.

**Table 13: Summary of the key terms used in the MA&D assessment**

Term	Definition
Vulnerability	Vulnerability describes the susceptibility of an individual, a community, assets or systems to the impacts of hazards, either in terms of the likelihood of that experience or the extent to which an impact might result in an effect (and how reversible that effect might be). Within MA&D assessment, the term 'vulnerability' is used to describe the ability of the Proposed Development to plan, control, resist and recover from a MA&D event in a timely manner.
Hazard	A hazard is defined as an event that may cause harm. Hazards for the purposes of the MA&D assessment are defined as non-malicious events including natural disasters, industrial accidents and industrial action.
Threat	Threats for the purposes of the MA&D assessment are defined as malicious attacks.
Serious damage	Serious damage includes the potential loss of life or permanent injury and/or permanent or long-lasting damage to an environmental receptor that cannot be restored through minor clean-up and restoration efforts and which requires the use of resources beyond those of the Proposed Development or its contractors to manage.
Major accident	A major accident, in the context of a MA&D assessment, means an uncontrolled event caused by a man-made activity or asset that may result in immediate or delayed serious damage to human health, welfare and/or the environment and requires the use of resources beyond those of the Proposed Development or its contractors to manage. It should be noted that malicious intent is not accidental, however the outcome of

Term	Definition
	such an incident, e.g. aeroplane crash, may be the same and, therefore, the same mitigation measures may apply to both deliberate and accidental events.
Disaster	A disaster, in the context of MA&D assessment, is a naturally occurring phenomenon such as an extreme weather event (e.g. storm, flood, extreme temperatures) or ground-related hazard event (e.g. subsidence, landslide, earthquake) with the potential to cause an event or situation that leads to immediate or delayed serious damage to human health, welfare and/or the environment and requires the use of resources beyond those of the Applicant or its contractors to manage.

Guidance that is relevant to the assessment of MA&D are as follows:

- Chapter 4 of the Cabinet Office’s 2006 Emergency Preparedness guidance on part 1 of the CCA (hereafter referred to as the ‘CCA risk assessment framework’;
- Chemicals and Downstream Oil Industries Forum (CDOIF) 2016 Guidelines, Environmental Risk Tolerability for COMAH Establishments;
- European Commission’s 2017 Guidance on EIA;
- Planning Inspectorate’s 2017 Annex G to Advice Note eleven: Working with public bodies in the infrastructure planning process;
- European Commission’s 2017 Overview of Natural and Man-made Disaster Risks the European Union May Face;
- HSEs 2001 Reducing Risks Protecting People decision-making process;
- IEMAs 2020 MA&D in EIA: A Primer;
- HSEs Major Hazard Regulatory Model: Safety Management in Major Hazard Sectors;
- Defra’s 2011 The Green Leaves III Guidelines for Environmental Risk Assessment; and
- The Department for the Environment, transport and regions 1999 Guidance on the Interpretation of Major Accidents to the Environment for the purposes of COMAH Regulations.

Additional guidance may be applicable during the EIA, and this will be referred to as appropriate in the MA&D chapter.

### 6.13.1. Baseline Conditions

The study area for assessment of MA&D is not defined within regulatory guidance or standardised methodology. Therefore, for the purpose of this Scoping Report, potential MA&D have been identified through the use of professional judgement and previous assessments of similar, comparable projects.

A number of external factors will be taken into consideration for the MA&D assessment. An outline of these factors is set out below, with further detail to be provided within the ES.

Man- made:

- The North Lincolnshire Council local authority area has a population of 169,700 people as of 2021 (Office for National Statistics 2021);
- There are two airfields within 20km of the Proposed Development Site. These are Sandtoft Airfield approximately 7.4km southwest and Doncaster/Sheffield Airport approximately 20km southwest;
- There are also three ports within 2km of the Proposed Development Site: Keadby Port (handles steel, forest products, dry bulks and pallets); Guinness Wharf (UK's market leader for handling long steel products) and Althorpe Wharf (handles a range of products including subsea decommissioning);
- A railway line and canal lie within 500m of the Proposed Development Site;
- A wind farm is located north of the Proposed Development Site; and
- The Proposed Development Site is situated in an industrial area which contains a number of sites which are regulated in accordance with (Control of Major Accident Hazards) COMAH Regulations, as detailed on the Health and Safety Executive (HSE) public information search (these sites include:
  - Grove Wharf which is a lower tier COMAH Site for the manufacture/production and or disposal of chemicals. and
  - Flixborough which is an upper tier COMAH Site for the manufacture/production and/or disposal of chemicals.

Potentially sensitive environmental receptors include:

- There are 20 statutory ecological designations within 10km of the Proposed Development Site. Further details of each designation are set out in Section 2.4.3 of this Scoping Report;
- A further 10 non-statutory ecological designations have been identified within 2km of the Proposed Development Site. Details of which are provided in Section 2.4.3 of this Scoping Report;
- The Proposed Development Site and surrounding area lies within the extensive floodplain of the River Trent. The Main Site lies approximately 1km west of the River Trent whilst the Water Connections Corridors and haul road (within the Construction

Access Area) lie immediately west of the tidal River Trent which flows in a northerly direction towards the Humber Estuary; and

- The Proposed Development Site is at a low risk of Unexploded Ordnance.

Natural hazards relevant to the Proposed Development Site (including meteorological hazards, geological hazards and other types of hazards):

- Flooding;
- Ground instability;
- Storms;
- Drought;
- Earthquakes;
- Heatwave;
- Cold and snow;
- Wildfire;
- Lightning and electrical storms;
- Events of reduced visibility (e.g. due to volcanic ash, dust sand or fog); and
- Extreme humidity (high and low).

#### 6.13.2. Scope of Assessment

The proposed generic project-wide approach to the assessment methodology is set out in Chapter 8: EIA Process. The methodology adopted for the MA&D assessment differs from the generic EIA methodology in that the MA&D assessment focuses on risk (i.e. the combination of the consequence (impact magnitude) arising from a potential event and its likelihood of occurrence), rather than the magnitude of impact only.

This section provides a summary of the MA&D assessment methodology. The scope of assessment considers the impacts and resultant effects during the construction and operation of the Proposed Development.

##### 6.13.2.1. OVERVIEW

The MA&D assessment will consider the potential for risks to occur due to the:

- Vulnerability of the Proposed Development to a natural disaster;
- Potential for the Proposed Development to create a new or alter an existing source of a major accident;
- Potential for the Proposed Development to create a new pathway between a source of a MA&D and receptor; and
- Potential for the Proposed Development to impact on the vulnerability of a receptor to a MA&D risk event.

In accordance with guidance provided by IEMA, the MA&D assessment will focus on the high consequence, low probability events and therefore will not consider the risk events which will be suitably assessed, regulated and controlled by other legislative

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frameworks. For example, the potential for construction-related accidents, causing harm to construction workers, are not within the scope of the EIA, unless these could also cause harm to an environmental receptor including members of the public beyond the boundaries of the construction Site. Existing legislation around safe working practices and Construction Design and Management (CDM) would ensure that such risks are mitigated appropriately without the need for further assessment.

In addition, with regards to 'disasters', there are a number of potential impacts which will be assessed within other topic-specific sections of the ES. For example, extreme weather events may result in disasters such as flooding and pollution. The potential for flooding disasters will be covered by the Flood Risk Assessment as part of the Water Environment impact assessment. Pollution to groundwater resources and contaminated land will be considered within the Geology, Hydrogeology and Land Contamination assessment. Accidental spillage of contaminants such as hydrocarbons and their subsequent release into the drainage system will also be considered in the Water Environment and Flood Risk section. Events that could occur as a result of a flood (i.e. are triggered by a flood) will be considered within the MA&D assessment.

It is assumed that existing safety precautions at neighbouring industrial sites, along with the implementation of a CEMP at the Proposed Development Site, will mitigate the risk of domino effects occurring. If further specific mitigation is required as a result of the introduction of the Proposed Development, this will be identified through the COMAH licence application and will be reported in the ES, if available at the time of assessment, as either embedded or additional mitigation.

Given the broadly similar nature of decommissioning activities when compared to construction activities, the main consequences of the Proposed Development during the decommissioning phase are considered to be equivalent to that highlighted for the construction phase therefore risks would remain as assessed for the construction phase. It is therefore proposed to scope out an assessment of decommissioning activities.

#### 6.13.2.2. STUDY AREA

Each identified MA&D hazard and threat (a 'risk event') will be assigned an individual study area taking consideration of hazard or threat source, any identified impact pathways, potential receptors and the reasonably foreseeable worst-case environmental consequence if the event occurred. The study area is determined on the basis of a worst-case impact area of a similar incident that has previously occurred if information on this is available, or on the basis of professional judgement if not available.

##### Establishment of baseline and definition of surveys

The baseline for identifying source-pathway-receptor linkages for MA&D risk events has been established through the identification of:



- Potential natural hazards that may impact the Proposed Development Site, including meteorological hazards, geological hazards and other types of hazards;
- Existing major accident hazard sources that may impact the Proposed Development Site;
- Risk events identified within the UK National Risk Register; and
- Sensitive environmental receptors within the study area at risk of MA&D hazards associated with the Proposed Development.

It is noted that North Lincolnshire Council is part of the Humber Local Resilience Forum and has therefore prepared a Community Risk Register that details risks relevant to the areas surrounding the Proposed Development Site. It not been possible to access the Community Risk Register during the preparation of this EIA Scoping Report, however this will be considered during the preparation of the ES.

The baseline that will be presented within the MA&D assessment will build upon that set out above, using baseline information presented within other technical assessments of the of the ES where relevant. The information will be used to establish existing risk events at the Proposed Development Site that may impact the Proposed Development and to identify the relevant receptors.

Other information relevant to the baseline assessment that will inform the identification of potential MA&D source-receptor-pathway linkages within the defined study areas include:

- Sites with existing COMAH and/ or a Hazardous Substance Consents;
- Sites permitted by the Environment Agency for landfill or mining;
- Utilities; and
- Other key infrastructure, such as railway lines and main roads.

#### Future baseline

The future baseline will assume the likely future conditions in the study area in the absence of the Proposed Development. It will assume that the land remains undeveloped and (where relevant) part of the wider Keadby Power Station Site.

The future baseline for the MA&D assessment will consider natural population growth and how predicted climate change might affect existing conditions at the Proposed Development Site.

#### 6.13.2.3. ASSESSMENT METHODOLOGY

The assessment methodology follows the below staged process.

- Stage 1: Identification of risk events
  - All MA&D risk events will be collated into an Environmental Risk Assessment.

- Stage 2: Screening of risk events
  - Each risk event will be reviewed to determine whether a source-pathway-receptor linkage exists to any of the identified environmental receptors.
  - For each risk event with a linkage pathway, the reasonably foreseeable worst-case environmental consequence (i.e. the likely significant effect) will be identified.
  - The reasonably foreseeable worst-case consequence of risk events will be identified and categorised based on the ‘severity of harm’ and ‘duration’ as set out in the Environmental Risk Assessment. The criteria for the assessment of both ‘severity of harm’ and ‘duration’ are based on CDOIF and HSE Guidelines.
- Stage 3: Identification of mitigation
  - Primary and tertiary mitigation measures that are either embedded within design, required for compliance with legislation, other regulatory regimes, or represent standard practice, and reduce the risk of risk event will be identified.
  - Following the consideration of primary and tertiary mitigation, the likelihood of the risk event occurring will be determined on the basis of the probability criteria.
- Stage 4: Identification of residual risks and their significance
  - Following the consideration of all mitigation proposed, a residual risk category will be assigned and the significance of the residual risks determined.

In summary, the approach will consider the reasonably foreseeable worst-case environmental consequences of the identified risk events (i.e. the likely significant effect), the probability of these consequences occurring, embedded and specific mitigation to be implemented and the acceptability of the subsequent risk to the environment. The assessment process is iterative with the aim to identify sufficient controls to mitigate all MA&D risks to a level such that no significant M&AD effects are predicted.

The proposed assessment criteria drawn upon the approach set out within the Chemical and Downstream Oil Industries Forum (CDOIF) Guidelines on Environment Risk Tolerability for COMAH Establishments, which is a common approach adopted in MA&D assessments in recent comparable applications. However, for clarity, throughout the assessment criteria adopted within the ES reference will be made to the criteria provided within the CCA risk assessment framework to allow for consistency with future emergency planning at a local level.

#### 6.13.2.4. ASSESSMENT CRITERIA

##### Severity of harm

The criteria that will be used in the MA&D has been developed from CDOIF Guidelines and HSE guidelines. Reference is also made to the criteria provided within the CCA risk assessment framework.

## Duration

The criteria for the assessment of the duration of harm is also based on CDOIF and HSE. The CCA risk assessment framework only provides guidance on the duration of harm under social (population) receptors.

## Level of consequences (Impact Magnitude)

The level of consequence matrix for the MA&D assessment will be defined using CDOIF Guideline. Level of consequence will consider the severity of harm and the duration of the harm to separate risk events into five categories ('Not a MA&D' and categories A to D). 'Not a MA&D' represents the lowest level of consequence and category 'D' the highest.

The ES will provide a comparison of the level of consequence between the criteria set out within the CCA risk assessment framework and the CDOIF Guidelines.

For the purposes of this assessment, those hazards or threats which are considered to be a level 1 event under the CCA risk assessment framework are not considered to constitute a MA&D and will be screened out of further assessment. Risk events considered to be a level 2 event, whilst not considered an emergency under the CCA risk assessment framework, are considered to constitute a MA&D as they could result in serious damage as defined for the purposes of this assessment.

## Probability of a risk event occurring

The probability of a risk event occurring has been assessed in accordance with the definitions which are based on CDOIF Guidelines and the CCA risk assessment framework.

## Classification of risk

Following CDOIF guidelines, the tolerability of a risk is identified by considering the consequence of a risk event and the probability of the risk event occurring. This is similar to the CCA risk assessment framework that classifies risks using 'impact' and 'likelihood'. The matrix below (Table 14) identifies how risks are classified in the MA&D assessment.

**Table 14: Classification of risk**

Consequence	Probability					
	Extremely improbable	Extremely remote	Remote	Rare	Unlikely	Likely
D	Tolerable	Tif-ALARP	Intolerable	Intolerable	Intolerable	Intolerable
C	Tolerable	Tolerable	Tif-ALARP	Intolerable	Intolerable	Intolerable
B	Tolerable	Tolerable	Tolerable	Tif-ALARP	Intolerable	Intolerable
A	Tolerable	Tolerable	Tolerable	Tolerable	Tif-ALARP	Intolerable
Not a MA&D	Not within the scope of MA&D assessment					

Following the classification of a risk, a clear statement is made as to whether the risk is 'significant' or 'not significant'. As a general rule, intolerable risks are considered to be significant and tolerable or 'Tolerable if As Low As Reasonably Practicable' (TifALARP) risks are considered to be not significant. However professional judgement is also applied where appropriate.

#### 6.13.2.5. SIGNIFICANCE OF EFFECTS

A significant adverse effect for the Proposed Development is an event that has the potential to cause permanent injury or loss of human life and/ or permanent or long-lasting damage to an environmental receptor which cannot be restored without clean-up or restoration efforts. The determination of significance takes into account a number of other factors and will be determined based on professional judgement.

Furthermore, reference will be made to the tolerability criteria of MA&D risk events established within existing guidance documents to conclude whether an effect is considered to be significant.

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#### 6.13.2.6. ASSUMPTIONS AND LIMITATIONS

The following limitations are relevant to the MA&D assessment:

No modelling or detailed calculations will be undertaken but a qualitative assessment approach has been adopted;

- Where information is not available (such as historical evidence on the likelihood and the environmental consequence of an event), professional judgement will be used to reach a conclusion;
- Each risk event will be considered on an individual basis. Where a risk event has the potential to result in chain reaction, this will be clearly identified within the Environmental Risk Assessment to identify where an assessment of the additional risk event that could occur can be found; and
- No surveys beyond those undertaken to inform other EIA topics will be completed to establish the baseline for the MA&D assessment.

### 6.14. Cumulative and Combined Effects

In accordance with the EIA Regulations, consideration will also be given to the potential for cumulative impacts to arise. Cumulative impacts are those that accrue over time and space from a number of development activities. The impact of the Proposed Development will be considered in conjunction with the potential impacts from other projects or activities which are both reasonably foreseeable in terms of delivery (e.g. have planning consent) and are located within a relevant geographical scope where environmental impacts could act together to create a more significant overall effect.

A number of other proposed developments have been identified in the vicinity of the Proposed Development that could potentially result in cumulative impacts during its construction and operation. For the purposes of scoping, major developments which have either been submitted or determined and approved under the Town and Country Planning Act (TCPA) 1990 have been identified within 2km of the Proposed Development Site and are shown on Appendix A1.8. Projects listed on the PINS National Infrastructure Planning website (Planning Inspectorate, 2024) within 10km of the Proposed Development Site have also been identified. Relevant projects identified are shown in Table 15.

Keadby 3 Carbon Capture Power Station DCO has been excluded from Table 15 because the Proposed Development is an alternative to Keadby 3 Power Station, so there is no potential for cumulative effects to occur.

**Table 15: Other developments to be included in Cumulative Impact Assessment**

ID	Application reference	Local Planning authority	Applicant for 'other development' and brief description	Approximate Distance from Site	Status
1	EN010 116	Planning Inspectorate DCO	North Lincolnshire Green Energy Park Limited. Energy Recovery Facility (ERF) converting up to 650,000 tonnes per annum of Refuse Derived Fuel (RDF) to generate a maximum of 95 Mega Watts of electrical output (MWe) and/or 380 Mega Watts of thermal output (MWt) to provide power, heat and steam on the Site of the operating Flixborough Wharf on the River Trent.	4km	Decision expected May 2024
2	EN010 148	Planning Inspectorate DCO	Tween Bridge Solar Farm The project will comprise the construction, operation, management and decommissioning of a ground mounted solar photovoltaic (PV)	9km	Pre-application

ID	Application reference	Local Planning authority	Applicant for 'other development' and brief description	Approximate Distance from Site	Status
			electricity generating facility exceeding 50 megawatt (MW) output capacity, together with associated works including substation, energy storage and green infrastructure.		
3	EN020 034	Planning Inspectorate DCO	National Grid Electricity Transmission A proposal to reinforce the 400kV high voltage power network between North Humber and High Marnham.	5km	Pre-application
4	PA/202 3/1915	North Lincolnshire Council	Planning permission for the construction, operation (including maintenance) and reinstatement of land following use, of a temporary haul road, formed from a combination of existing roadways/hardstanding and new	500m	Not yet determined

ID	Application reference	Local Planning authority	Applicant for 'other development' and brief description	Approximate Distance from Site	Status
			sections of road, and dismantling of warehouse canopy*		
5	PA/2022/77	North Lincolnshire Council	Planning permission to erect 28 dwellings with associated access	1.6km	Not yet determined

\* The haul road planning application for Keadby 3 Power Station site could be implemented for the Proposed Development under the PA/2023/1915 application but has been included in Proposed Development Site boundary so could alternatively be implemented through the Keadby Hydrogen DCO. If the haul road is implemented under the PA/2023/1915 application the timelines of these works may not align and thus cumulative effects may not arise.

Consultation with North Lincolnshire Council will be undertaken in respect of identifying any additional proposals or planning applications submitted under the TCPA 1990 that may also have the potential to produce significant cumulative environmental effects. NSIP and projects submitted under other consenting regimes will also be considered in line with PINS Advice Note 17: Cumulative Effects Assessment (Planning Inspectorate, 2019).

Combined effects will also be assessed. The combination of predicted environmental impacts resulting from a single development on any one receptor that may collectively cause a greater effect (such as the combined effects of noise and air quality/ dust impacts during construction on local residents), are referred to as combined effects.

## 6.15. Combined Heat and Power (CHP) Assessment

Although not formally part of the EIA, it is a requirement of the NPS that applicants for all new power stations explore and develop feasible CHP opportunities. This is in order to maximise the use of waste heat and in turn the thermal efficiency of the proposed combustion plant.

A CHP investigation will be undertaken as part of the DCO application, building on the CHP assessment previously undertaken for Keadby 3 Power Station, which will involve identifying and contacting potential CHP users in the local area in accordance with the Environment Agency CHP Ready Guidance (Environment Agency, 2013). This will

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initially be based on examining a map around the Site based on a predetermined economic radius for heat transportation. Should any potential uses be identified, a 'heat map' of the local area would be produced incorporating community, commercial and industrial heat uses and opportunities. Within this 'heat map' area the identified users would then be classified into user sectors. Community opportunities would mainly consider industrial, residential and housing opportunities, though would also include any hotels, leisure centres, large corporate buildings, hospitals, universities, prisons, defence installations and accommodation complexes. Industrial opportunities would be readily identified by the industrial sector of those industries inside the 'heat map' radius.

The CHP feasibility review will consider the heat availability from the Proposed Development together with future CCS implications and the heat demand opportunities in the locality to justify the approach that will be taken for maximising CHP opportunities for the plant.

## 6.16. Carbon Capture Readiness (CCR) Assessment

CCR needs to be demonstrable for all new combustion generating stations with a generating capacity at or over 300 MW in accordance with the Carbon Capture Readiness (Electricity Generating Stations) Regulations 2013. Until the new Decarbonisation Readiness Guidance is formally adopted (currently at consultation stage) and this legislation is updated accordingly, the requirement to demonstrate CCR applies to hydrogen fired power stations, even though hydrogen fired power stations do not produce CO<sub>2</sub>.

The Applicant will therefore provide a standalone CCR Report to satisfy the current legislation, however it is envisaged that this document would primarily be a signposting document for the purpose of demonstrating that the requirements have been met through the compilation of the Application, including the allocation of a suitably sized area of CCR land within the Proposed Development Site. In future when the new Decarbonisation Readiness Guidance is adopted the Applicant will be in a position to demonstrate Hydrogen Readiness.

## 7. Matters to be Scoped Out

This section provides a summary of topics that are proposed to be scoped out of the EIA. A summary table is provided at the end of the section.

### 7.1. Dust from Demolition and Construction

As discussed in Section 6.1.2.1, the construction of the Proposed Development may impact on air quality in the local area due to potential fugitive emissions of dust from demolition and construction works, and emissions from plant equipment. However, with the implementation of best practice control measures any impacts on dust soiling, human health and biodiversity will be negligible and are therefore scoped out.

### 7.2. Operational Road Traffic (including related air quality and noise and vibration effects)

At this stage the volume of traffic associated with the operational phase of the Proposed Development has not been quantified. However, it is reasonably anticipated that the effects of operational traffic would be considerably lower than those generated during the construction phase. Depending on the forecast volumes of operational traffic, a detailed environmental assessment of this phase would potentially be scoped out following agreement on the TA scope with the relevant highway authorities.

Using the operational forecast traffic flows from the TA scoping report, relevant screening criteria for air quality and noise and vibration will be applied in order to determine the potential for significant effects from the Proposed Development. Depending on the forecast volumes of operational traffic, a detailed assessment of this phase would potentially be scoped out with North Lincolnshire Council for air quality and noise and vibration.

### 7.3. Biodiversity and Nature Conservation (surveys not required)

As described in Section 6.4, the following species have been scoped out of the ecological impact assessment as potential constraints, and therefore no survey work is proposed:

- Great crested newt – prior work and data review has demonstrated that there is no reasonable likelihood of great crested newt occurring in the zone of influence of the Proposed Development. In 2010, AECOM surveyed all ponds within 500m of the Proposed Development Site; no great crested newts were found, and all ponds were found to have dried up by July that year. In 2012 and 2015, ecologists from Jacobs undertook monitoring surveys for Keadby Wind Farm that involved surveys of ponds within 500m of the Proposed Development Site; again, the species was not found. Work completed by AECOM in 2017 and 2020 did not involve surveys for great

crested newt but again confirmed that all of the ponds within 500m of the Proposed Development Site dry up by July and consequently are unsuitable to support a breeding population of great crested newt. There are also no desk study records for great crested newt in the local area. The combined prior evidence therefore demonstrates that there is no breeding habitat within the zone of influence of the Proposed Development

- Reptiles – the PEA has demonstrated that the Proposed Development Site does not contain habitats that would be likely to support a Site faithful reptile population, although transitory activity could occur due to habitat linkages with more optimal habitats outside the Proposed Development Site. Survey data is not needed to inform impact assessment given that reptiles are only likely to occur on a transitory basis
- Wintering and passage birds – the PEA has demonstrated habitats that are not likely to be of importance for notable wintering and passage bird species or assemblages. As stated in Section 6.4.2, data proportionate to that needed for impact assessment and HRA will be obtained from third party data providers (BTO Bird Data Report).
- Terrestrial invertebrate survey – the PEA has demonstrated that the habitats present within the Proposed Development Site, with the exception of those within the former Keadby Ash Tip, are not likely to support notable invertebrate assemblages. The value of acid grassland and OMH within the former Keadby Ash Tip for terrestrial invertebrates is well understood through work commissioned by AECOM in 2017. Update surveys are not likely to relevantly increase this understanding. Given the Proposed Development would not affect the acid grassland and would only coincide with a small peripheral area of OMH it is not consider necessary or proportionate to undertake further survey work for terrestrial invertebrates.

## 7.4. Population and Human Health Determinants

All relevant population and human health determinants are scoped into the assessment as set out in Section 6.11.2, but the following determinants have been scoped out of the population and human health assessment because the Proposed Development is not anticipated to have any effects on these determinants:

- Diet and nutrition;
- Risk taking behaviour;
- Housing;
- Relocation;
- Community safety; and
- Radiation.

## 7.5. Materials and Waste Matters

As set out in Section 6.12.2 the following matters are proposed to be scoped out of the materials and waste assessment:

- Waste arising from extraction, processing and manufacture of construction components and products. This is based on the assumption that these products and materials are being developed in a manufacturing environment with their own waste management plans, facilities, and supply chain, which are potentially in different regions of the UK or the world and therefore outside of the geographical scope of this study. Such matters cannot be accurately predicted and assessed in the ES as they relate to procurement decisions that cannot be assured;
- Other environmental impacts associated with the management of waste from the Proposed Development e.g., on water resources, air quality, noise or traffic resulting from the generation, handling, on-Site temporary storage or off-Site transport of materials and waste are addressed separately in other relevant chapters;
- Effects associated with decommissioning as the Proposed Development has a long design life and such it is not considered possible to reliably forecast decommissioning requirements and infrastructure far in the future. A Decommissioning Environmental Management Plan would consider in detail all potential environmental risks on the Proposed Development Site and contain guidance on how risks can be removed or mitigated;
- Changes to safeguarded mineral and waste sites, as there are no such sites within the Proposed Development Site; and
- Changes in availability of maintenance materials during the operation of the Proposed Development. Forecast materials effects are (using professional judgement) considered negligible in relation to the scale and nature of the Proposed Development.

## 7.6. Decommissioning Phase Assessment

Potential impacts as a result of decommissioning the Proposed Development, will not be separately assessed as part of the ES. This is on the basis that the effects of decommissioning are likely to be similar to or no worse than the effects from construction for each topic area. Decommissioning is therefore scoped out for all topics as reflected in Table 16.

## 7.7. Electronic Interference

The proposed maximum building heights and expected temporary construction cranes will be no higher than those associated with the construction of Keadby 2 Power Station. Therefore, an assessment of the Proposed Development's effect on electronic interference is not considered to be required.

Further to this, analogue signals have ceased to be transmitted and have been replaced by digital signals. As such, the Proposed Development's potential to interfere with television, radio (both analogue and digital) and mobile phone reception is considered negligible.

## 7.8. Aviation

It is proposed to scope out impacts on aviation based on the height of the stacks and buildings associated with the Proposed Development as these are anticipated to be comparable to the heights of structures and stacks within the Keadby 2 and Keadby 1 Power Stations (85m and 60m respectively). On this basis, the Applicant considers that a stand-alone chapter is not required.

The Civil Aviation Authority (CAA) will however be consulted on the Proposed Development to review any requirements for aviation lighting on the stack(s) and enable the Proposed Development to be charted in future. Should taller stacks or cranes be required than currently expected the need for an aviation assessment will be reviewed accordingly.

## 7.9. Summary of issues proposed to be scoped out of ES

The following issues are proposed to be scoped out of the ES that accompanies the Application:

**Table 16: Matters proposed to be scoped out of the ES**

Aspect	Construction Assessment	Operational Assessment	Decommissioning Assessment
Dust from demolition and construction	Scoped out	N/A	Scoped out
Road traffic assessment (transport assessment)	Scoped in	Scoped out	Scoped out
Road traffic assessment (noise and vibration assessment)	Scoped in	Scoped out	Scoped out
Road traffic emissions assessment (air quality assessment)	Scoped in	Scoped out	Scoped out

Aspect	Construction Assessment	Operational Assessment	Decommissioning Assessment
<p>Additional surveys to inform the EIA for the following species:</p> <ul style="list-style-type: none"> <li>• Great crested newts;</li> <li>• Reptiles;</li> <li>• Wintering and passage birds; and</li> <li>• Terrestrial invertebrates.</li> </ul>	<b>Scoped out</b>	<b>Scoped out</b>	<b>Scoped out</b>
<p>Proposed Development impacts on the following population and human health determinants:</p> <ul style="list-style-type: none"> <li>• Diet and nutrition;</li> <li>• Risk taking behaviour;</li> <li>• Housing;</li> <li>• Relocation;</li> <li>• Community safety; and</li> <li>• Radiation</li> </ul>	<b>Scoped out</b>	<b>Scoped out</b>	<b>Scoped out</b>
<p>Waste and materials impacts relating to:</p> <ul style="list-style-type: none"> <li>• Waste from extraction, processing and manufacture of construction components and products;</li> <li>• Other environmental impacts associated with the management of waste from the Proposed Development;</li> <li>• Decommissioning;</li> <li>• Changes to safeguarded mineral and waste sites; and</li> </ul>	<b>Scoped out</b>	<b>Scoped out</b>	<b>Scoped out</b>

Aspect	Construc- tion Assess- ment	Opera- tional Assess- ment	Decomm- issioning Assess- ment
<ul style="list-style-type: none"> <li>Changes in availability of maintenance materials during operation of the Proposed Development.</li> </ul>			
Assessment of decommissioning effects (all topics)	N/A	N/A	Scoped out
Electronic interference	Scoped out	Scoped out	Scoped out
Aviation	Scoped out	Scoped out	Scoped out

## 8. EIA Process

### 8.1. EIA Methodology and Reporting

The ES will set out the process followed during the EIA including the methods used for the collection of data and for the identification and assessment of impacts. Any assumptions made will be clearly identified.

The EIA process is designed to be capable of, and sensitive to, changes that occur as a result of changes to the design, including any mitigation measures that are incorporated during the EIA. This will be particularly important for the Proposed Development as the design and layout is still being refined, and minor changes are likely to be made following submission of this EIA Scoping Report.

The EIA is based on a number of related activities, as follows:

- establishing existing baseline conditions;
- consultation with statutory and non-statutory consultees throughout the DCO application process;
- consideration of relevant local, regional and national planning policies, guidelines and legislation relevant to EIA;
- consideration of technical standards for the development of significance criteria;
- review of secondary information, previous environmental studies and publicly available information and databases;
- physical surveys and monitoring;
- desk-top studies;
- computer modelling;
- reference to current legislation and guidance; and
- specialist opinion.

Impacts will be considered on the basis of their magnitude, duration and reversibility.

Cumulative and combined effects will also be considered where appropriate.

Significance will be evaluated on the basis of the scale of the impact and the importance or sensitivity of the receptors, in accordance with standard assessment methodologies (major, moderate, minor and negligible). For the purpose of the EIA, moderate and major effects will be deemed 'significant'.

Where likely significant environmental effects are identified in the assessment process, measures to mitigate these effects will be put forward in the form of recommendations to be undertaken as part of the project development.

### 8.2. Structure of the ES

The ES will address the direct effects of the Proposed Development in addition to the likely indirect, cumulative, short, medium and long term, permanent, temporary,



beneficial and adverse effects. The mitigation measures envisaged in order to prevent, reduce or where possible offset significant adverse effects will also be described. The concluding chapters will provide a summary of the cumulative and combined effects and likely significant residual environmental effects.

The ES will comprise the following set of documents:

- Non-Technical Summary (NTS): this document will provide a summary of the key issues and findings of the EIA in non-technical language;
- Volume I Environmental Statement: this will contain the full text of the EIA;
- Volume II Technical Appendices: these will provide supplementary details of the environmental studies conducted during the EIA including relevant data tables, figures and photographs; and
- Volume III Figures.

### 8.2.1. Structure of Technical Chapters

The technical chapters will be structured based on the following sub-headings:

#### Introduction

The Introduction will describe the format of the assessment presented within the chapter.

#### Legislation and planning policy context

The Legislation and Planning Policy Context section of the technical chapters will provide an overview of the relevant legislation, planning policy and technical guidance relevant to the assessment.

#### Assessment methodology and significance criteria

The methods used in undertaking the technical study will be outlined in this section with references to published standards (e.g. British Standards, Building Research Establishment), guidelines (e.g. DMRB and Institute of Environmental Management & Assessment guidelines) and relevant significance criteria.

The significance of effects before and after mitigation will be evaluated with reference to definitive standards, accepted criteria and legislation where available. Where it is not possible to quantify impacts, qualitative assessments will be carried out, based on available knowledge and professional judgment. Where uncertainty exists, this will be noted in the relevant technical assessment chapter.

Specific criteria for each technical assessment will be developed, giving due regard to the following:

- extent and magnitude of the impact;
- impact duration (whether short, medium or long term);
- impact nature (whether direct or indirect, reversible or irreversible);

- whether the impact occurs in isolation, is cumulative or interactive;
- performance against environmental quality standards where relevant;
- sensitivity of the receptor; and
- compatibility with environmental policies and standards.

For issues where definitive quality standards do not exist, significance will be based on the:

- local, district, regional or national scale or value of the resource affected;
- number of receptors affected;
- sensitivity of these receptors; and
- duration of the impact.

In order to provide a consistent approach to expressing the outcomes of the various studies undertaken as part of the EIA, and thereby enable comparison between effects upon different environmental components, the following terminology will be used throughout the ES to define effects:

- adverse – detrimental or negative effect to an environmental resource or receptor; or
- beneficial – advantageous or positive effect to an environmental resource or receptor;

and

- negligible – imperceptible effect to an environmental resource or receptor; or
- minor – slight, very short or highly localised effect of no significant consequence; or
- moderate – more than a slight, very short or localised effect (by extent, duration or magnitude) which may be considered significant; or
- major – considerable effect (by extent, duration or magnitude) of more than local significance or in breach of recognised acceptability, legislation, policy or standards.

As indicated above, for the purpose of this EIA moderate and major effects will be deemed 'significant', and where possible mitigation measures will be identified to reduce the residual effects to 'not significant'.

Each of the technical chapters will provide the criteria, including sources and justifications, for quantifying the different levels of residual effect. Where possible, this has been based upon quantitative and accepted criteria (for example, the National Air Quality Strategy objectives or noise assessment guidelines), together with the use of value judgement and expert interpretation to establish to the scale of an effect.

### Baseline conditions

In order to assess the potential impacts and effects of the Proposed Development, it is necessary to determine the environmental conditions that currently exist on site and in the surrounding area, for comparison. These are known as the 'existing baseline conditions'. Baseline conditions are determined using the results of site surveys and investigations or desk based data searches, or a combination of these, as appropriate.

Future baseline conditions', which are the likely future conditions in the study area in the absence of the Proposed Development, will also be considered and described. In particular, consideration will be given to the future decarbonisation of the Keadby 2 power station with CCP or hydrogen-firing.

For the purposes of assessment, each chapter will identify a reasonable 'worst case scenario' with regards these future baseline scenarios; for example, the Traffic and Transport assessment will assume the peak of any proposed Keadby 2 CCP or hydrogen retrofit construction traffic will coincide with peak construction traffic for the Proposed Development.

### Development design and impact avoidance

Measures that have been integrated into the Proposed Development in order to avoid or reduce adverse environmental effects will be described. Such measures may include refinement of the design and layout of the Proposed Development to avoid impacts on sensitive receptors, implementation of Construction Environmental Management Plans, and adherence of relevant legislation, guidance and best practice. The assessment of impacts and effects will take account of these measures already being in place.

### Likely impacts and effects

This section will identify the likely impacts resulting from the Proposed Development. The magnitude of impacts is defined with reference to the relevant baseline conditions (existing or future, as appropriate), and effects are determined in accordance with the identified methodology.

### Mitigation and enhancement measures

The Mitigation and Enhancement Measures section will describe the measures that will be implemented by the Applicant to reduce any significant adverse effects identified by the assessment and enhance beneficial effects during construction and operation of the Proposed Development.

### Monitoring

The EIA Regulations make provision for post-consent monitoring of significant adverse effects on the environment in appropriate cases. Where post-consent monitoring is considered necessary to secure the success of mitigation measures, this will be described and included in the Schedule of Commitments (ES Volume II). The Applicant will work with the relevant responsible authorities to develop appropriate monitoring, where required.

### Residual effects and conclusions

Effects of the Proposed Development remaining following the implementation of available mitigation measures are known as 'residual effects'. These will be discussed for each of the potential effects, and their significance level identified.

### 8.3. Scoping and Consultation

The process of consultation is critical to the development of a comprehensive and balanced ES. The views of statutory and non-statutory consultees serve to focus the environmental studies and to identify specific issues that require further investigation. Consultation is an ongoing process, which enables mitigation measures to be incorporated into the project design thereby limiting adverse effects and enhancing environmental benefits.

Following the publication of this EIA Scoping Report, a project website will be launched. The website will be maintained throughout the construction and operational phases of the Proposed Development to provide up-to date information.

As required by Section 47 of the 2008 Act, the Applicant will prepare a Statement of Community Consultation (SoCC). The SoCC will outline the methods and timescales for the statutory consultation with the local community. North Lincolnshire Council will be fully as to what is to be in the statement before it is prepared.

The PEI Report will be provided for statutory consultation, which will take place later in 2024. A range of methods including newsletters and ongoing use of the project website will be considered.

All responses received during consultation will be carefully considered and taken into account in the development of the project and the terms of any proposed application, in accordance with Section 49 of the 2008 Act. Details of any responses received during consultation and the account taken of those responses will be included in a Consultation Report, as required by Section 37 of the 2008 Act. This Consultation Report will be submitted with the DCO Application to PINS and will be available for public review at that point.

The Consultation Report will demonstrate how the Applicant has complied with the consultation requirements of the 2008 Act and will be considered by PINS, both when determining whether to accept the Application, and then in examining the completed Application.

## 9. Summary

This EIA Scoping Report has identified the potential for significant effects to arise from the construction and operation of the Proposed Development. The following specialist assessments are proposed:

- Air Quality;
- Noise and Vibration;
- Traffic and Transportation (including Transport Assessment);
- Biodiversity and Nature Conservation;
- Water Resources and Flood Risk (including Flood Risk Assessment);
- Geology, Hydrogeology and Land Contamination;
- Landscape and Visual Amenity;
- Cultural Heritage;
- Socio-economics;
- Climate Change and Sustainability (including greenhouse gas emissions assessment, climate change resilience and ICCI);
- Population and Human Health;
- Waste and Material Resources;
- Major Accidents and Disaster Vulnerability; and
- Cumulative and Combined Effects.

The detailed assessments for each of these topics will be undertaken in accordance with standard guidance and best practice and reported in the ES. Where significant effects are identified, mitigation measures will be described where possible to reduce the residual effects.

This EIA Scoping Report is now submitted to PINS with a formal request for a Scoping Opinion in accordance with Regulation 10 of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 as amended.

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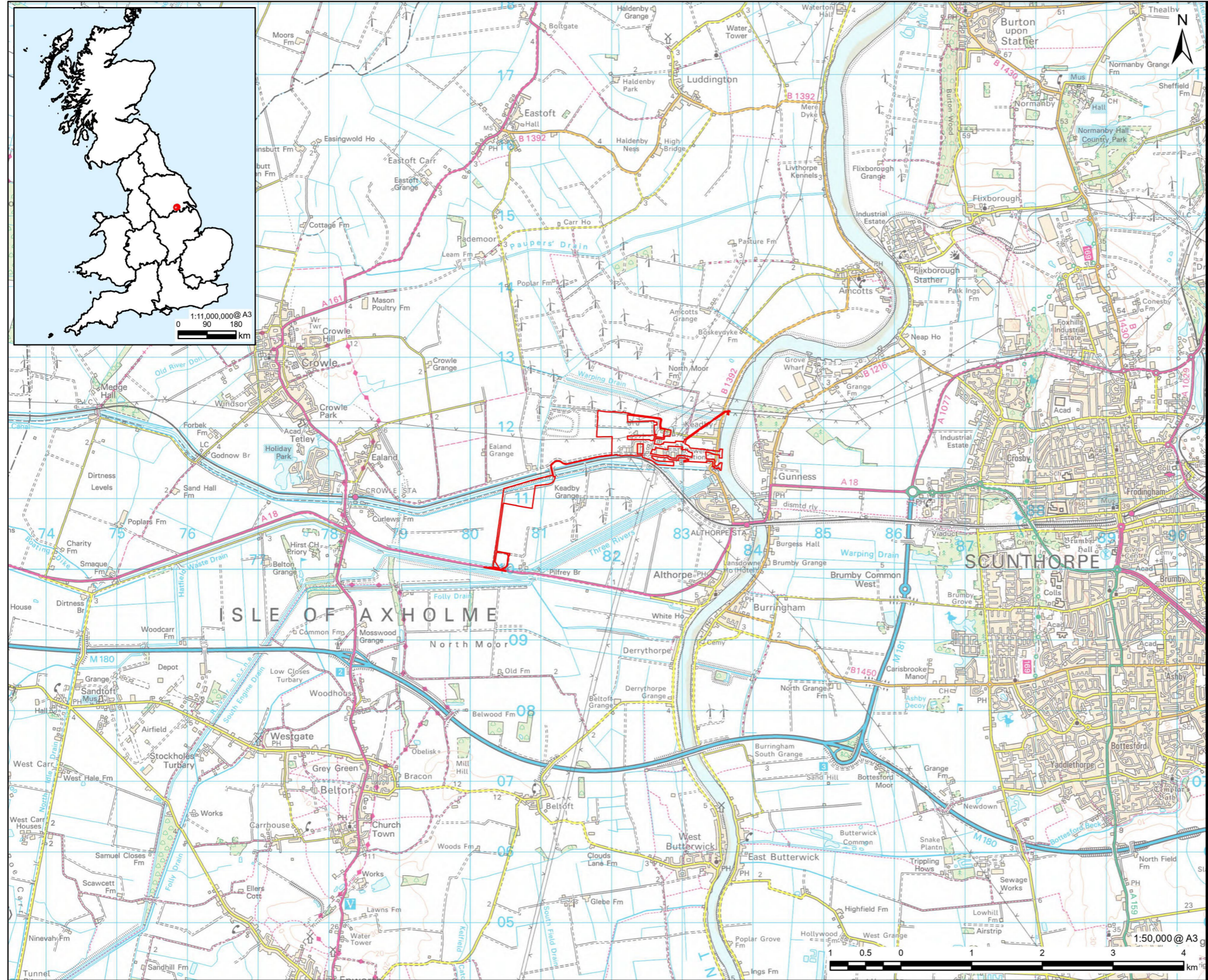
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# Appendix 1 - Figures

# A1.1 Site Location Plan

Revision: 0 Drawn: KH Checked: JW Approved: SW Date: 2024-04-26



**AECOM**  
PROJECT

**KEADBY  
HYDROGEN  
POWER STATION**  
A collaboration between SSE Thermal and Equinor

**CONSULTANT**  
AECOM Limited  
Midpoint,  
Alencon Link  
Basingstoke, RG21 7PP  
www.aecom.com

**LEGEND**  
Proposed Development Site

**NOTES**  
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**ISSUE PURPOSE**  
Final

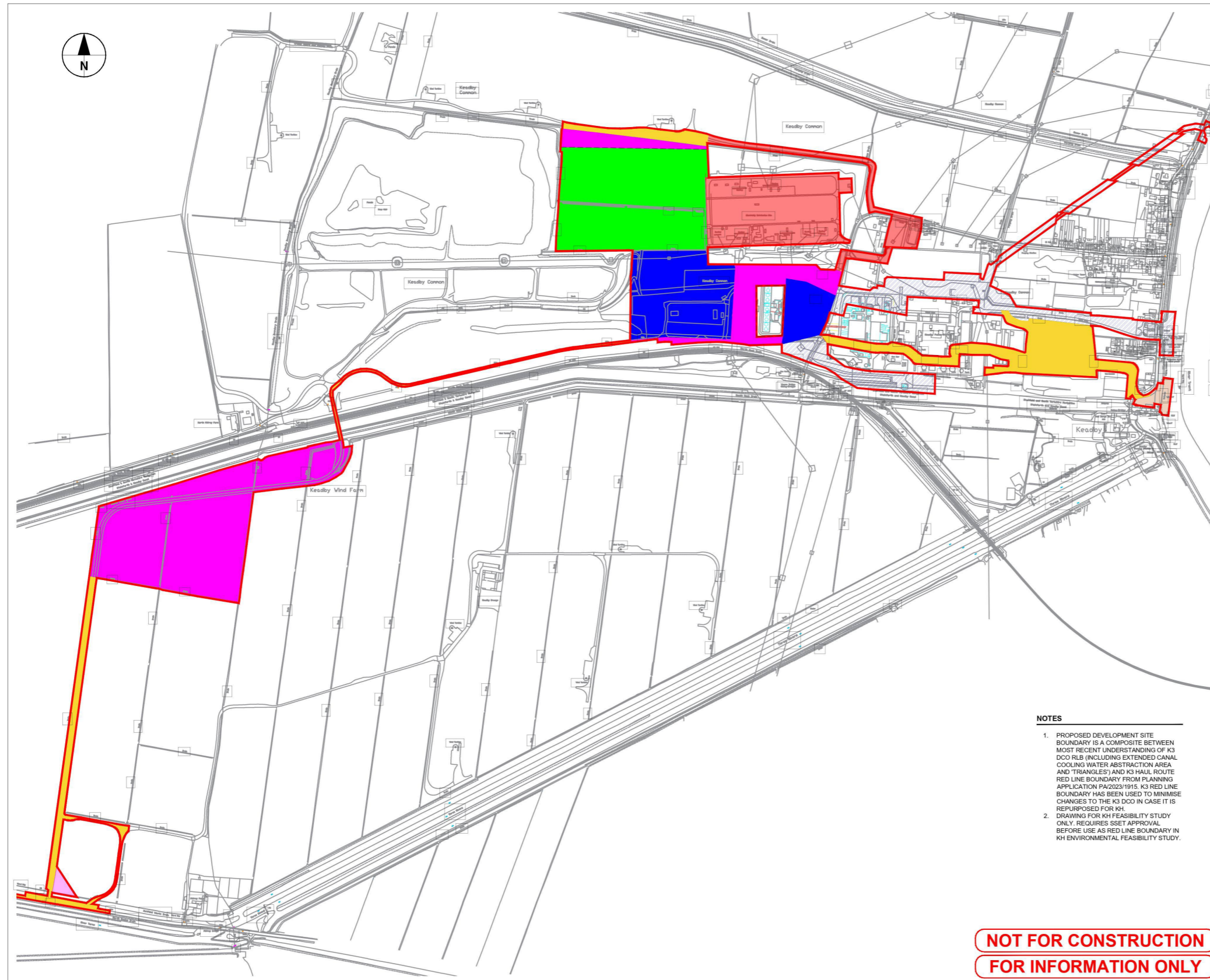
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**FIGURE TITLE**  
Site Location Plan

**FIGURE NUMBER**  
Figure 1.1

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Information: System: 07/21/2024 10:00:00 AM, User: jw, Project: 60721867, Drawing: A1.1\_Site\_Location\_Plan.dwg

# A1.2 Indicative Site Layout



**AECOM**

**PROJECT**  
KEADBY  
HYDROGEN  
POWER STATION  
A collaboration between SSE Thermal and Equinor

**CONSULTANT**  
AECOM  
Portwall Place  
Bristol BS1 6NA  
+44 (0) 117 001 7000 tel 7099 fax  
www.AECOM.com

**LEGEND**

- Ancillary Facilities for Main Site
- Main Site
- Indicative Construction Laydown Areas
- Proposed Development Site
- Construction Access Routes
- Water Connections Corridor
- Waterborne Transport Off-Loading Area
- Electrical Connection Corridor

**NOTES**

- PROPOSED DEVELOPMENT SITE BOUNDARY IS A COMPOSITE BETWEEN MOST RECENT UNDERSTANDING OF K3 DCO RLB (INCLUDING EXTENDED CANAL COOLING WATER ABSTRACTION AREA AND 'TRIANGLES') AND K3 HAUL ROUTE RED LINE BOUNDARY FROM PLANNING APPLICATION PA/2023/1915. K3 RED LINE BOUNDARY HAS BEEN USED TO MINIMISE CHANGES TO THE K3 DCO IN CASE IT IS REPURPOSED FOR KH. DRAWING FOR KH FEASIBILITY STUDY ONLY. REQUIRES SSET APPROVAL BEFORE USE AS RED LINE BOUNDARY IN KH ENVIRONMENTAL FEASIBILITY STUDY.

0 125 250 m  
SCALE 1:5000m @ A3

APPROVED FOR ISSUE		
3	RC	SA GC
2	EB/RC	SA GC
1	RWG	SA GC
I/R	DRAWN BY	CHECKED APPROVED

ISSUE/REVISION		
3	12/04/2024	THIRD ISSUE
2	09/04/2024	SECOND ISSUE
1	27/03/2024	FIRST ISSUE
I/R	DATE	DESCRIPTION

**NOT FOR CONSTRUCTION  
FOR INFORMATION ONLY**

**PROJECT NUMBER**  
60721867

**SHEET TITLE**  
Indicative DCO Site Layout

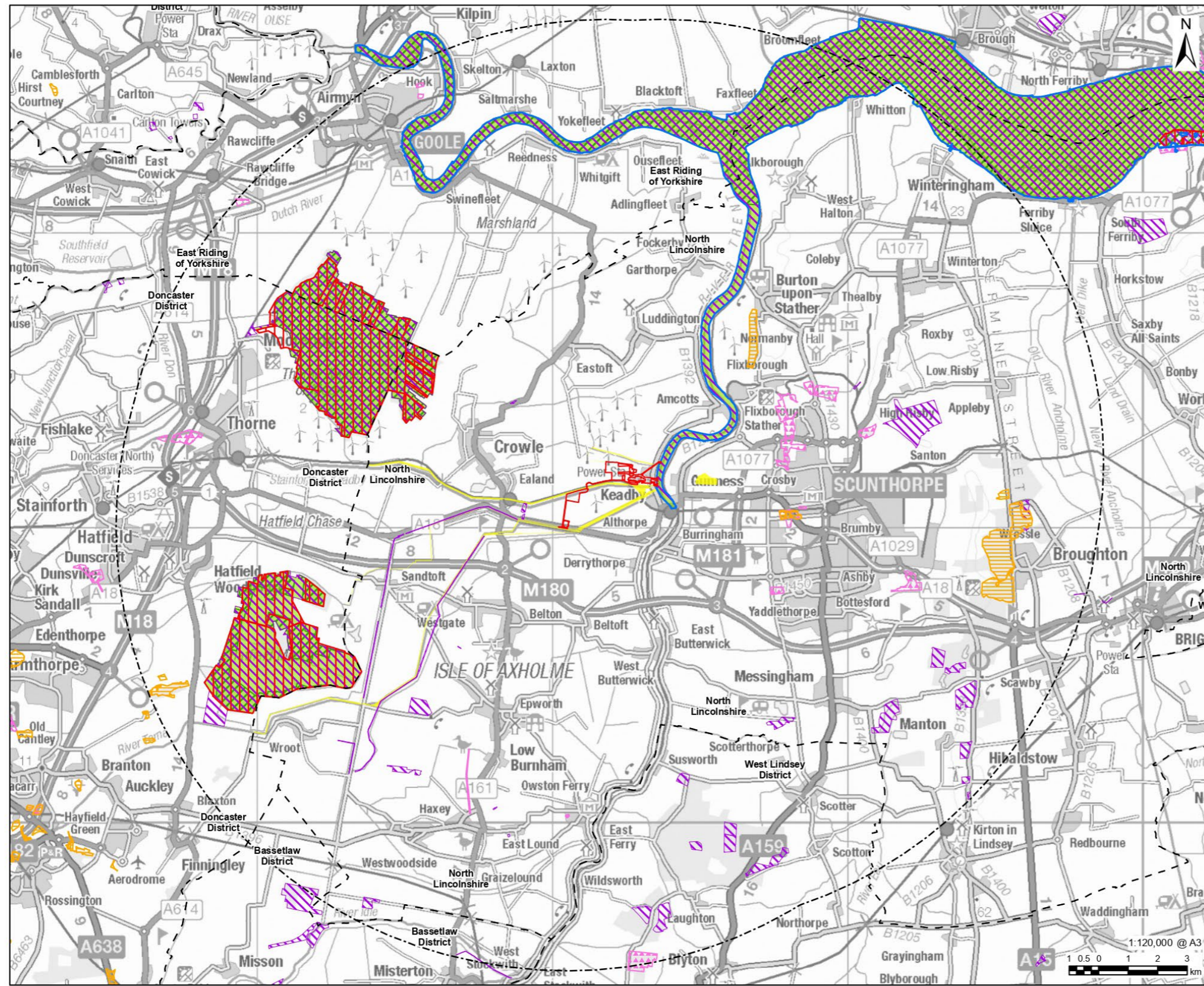
**SHEET NUMBER**  
60721867-KH-DR-106

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# A1.3 Statutory and Non Statutory Designated Ecological Sites

Revision: 0 Drawn: KH Checked: JW Approved: SW Date: 2024-04-26

File Path: \\saecon\comps\BMS\BMS\GIS\Projects\A1.3\A1.3\_Statutory\_and\_Non\_Statutory\_Designated\_Ecological\_Sites\A1.3\_Statutory\_and\_Non\_Statutory\_Designated\_Ecological\_Sites.aprx



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www.aecom.com

**LEGEND**

- Proposed Development Site
- 15km Study Area
- Local Authority
- Ancient Woodland
- Local Nature Reserve (LNR)
- Local Wildlife Site (LWS)
- National Nature Reserve (NNR)
- Ramsar
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)
- Site of Special Scientific Interest (SSSI)

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**ISSUE PURPOSE**  
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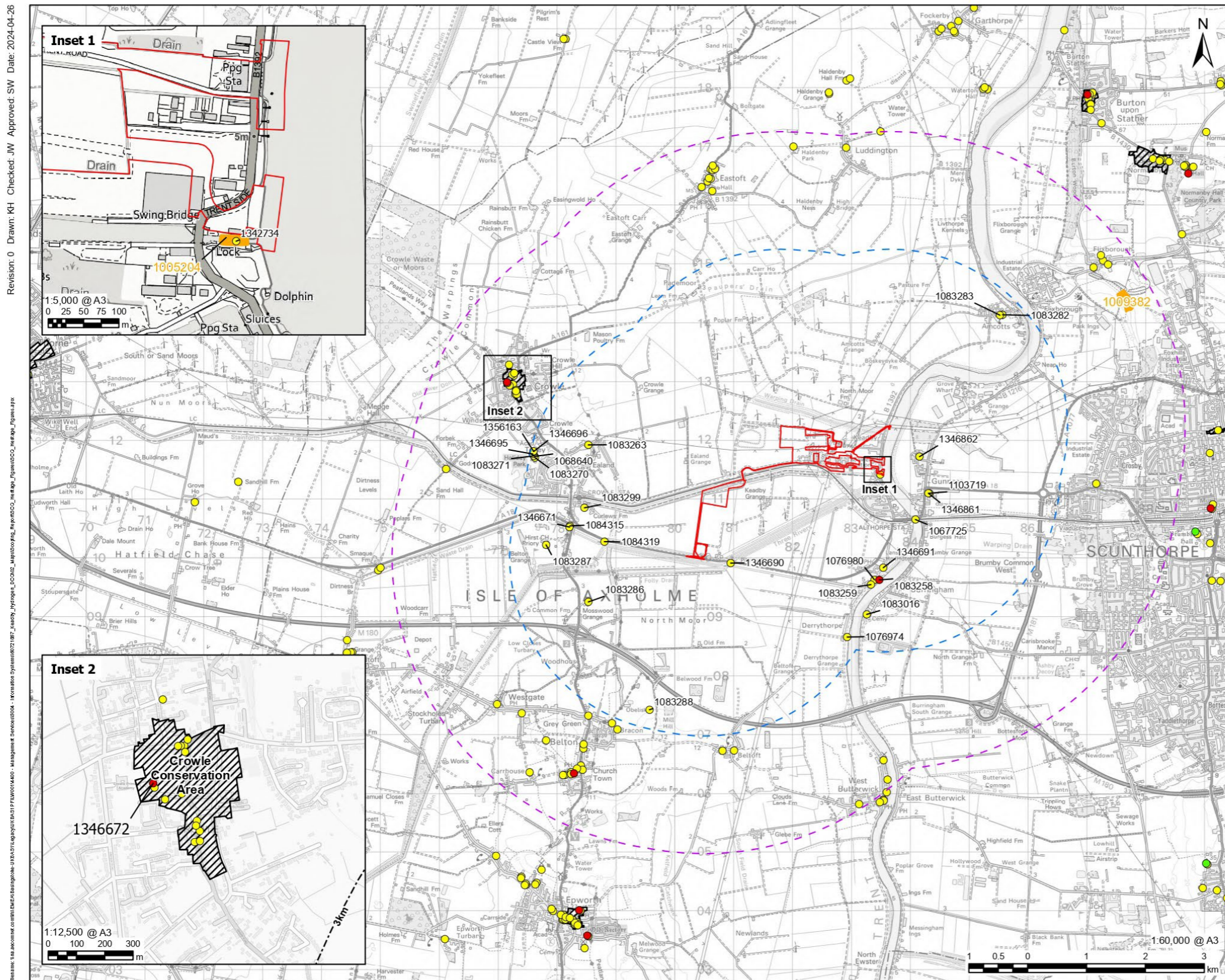
**PROJECT NUMBER**  
60721867

**FIGURE TITLE**  
Statutory and Non-Statutory Designated Ecological Sites

**FIGURE NUMBER**  
Figure 1.3

1:120,000 @ A3  
1 0.5 0 1 2 3  
km

# A1.4 Designated Heritage Assets within 3km and 5km of the Proposed Development Site



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**LEGEND**

- Proposed Development Site
- 3km Study Area
- 5km Study Area
- Conservation Area
- Scheduled Monument
- Listed Building
  - Grade I
  - Grade II\*
  - Grade II

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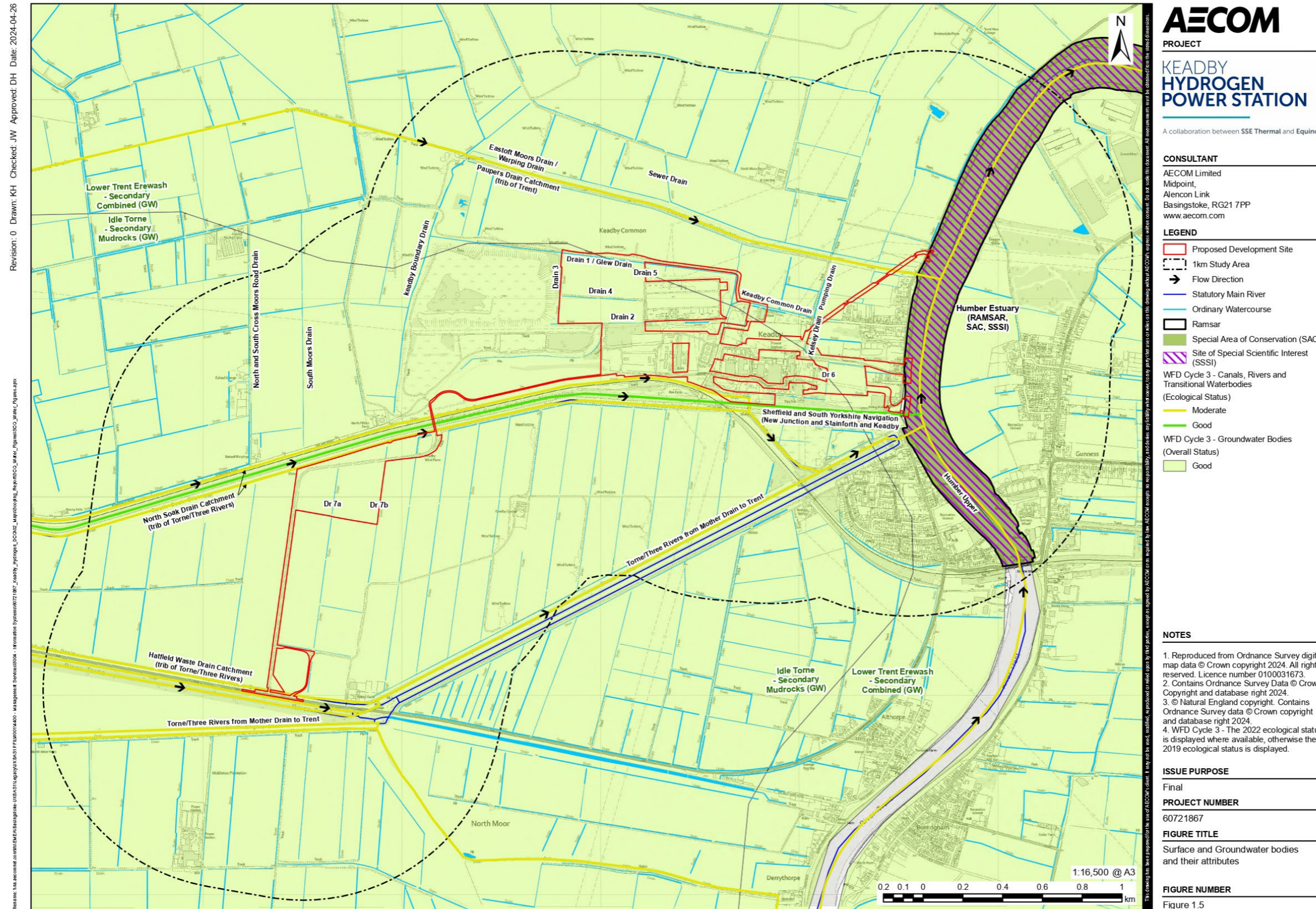
**PROJECT NUMBER**  
60721867

**FIGURE TITLE**  
Designated Heritage Assets within 3km and 5km of the Proposed Development Site

**FIGURE NUMBER**  
Figure 1.4



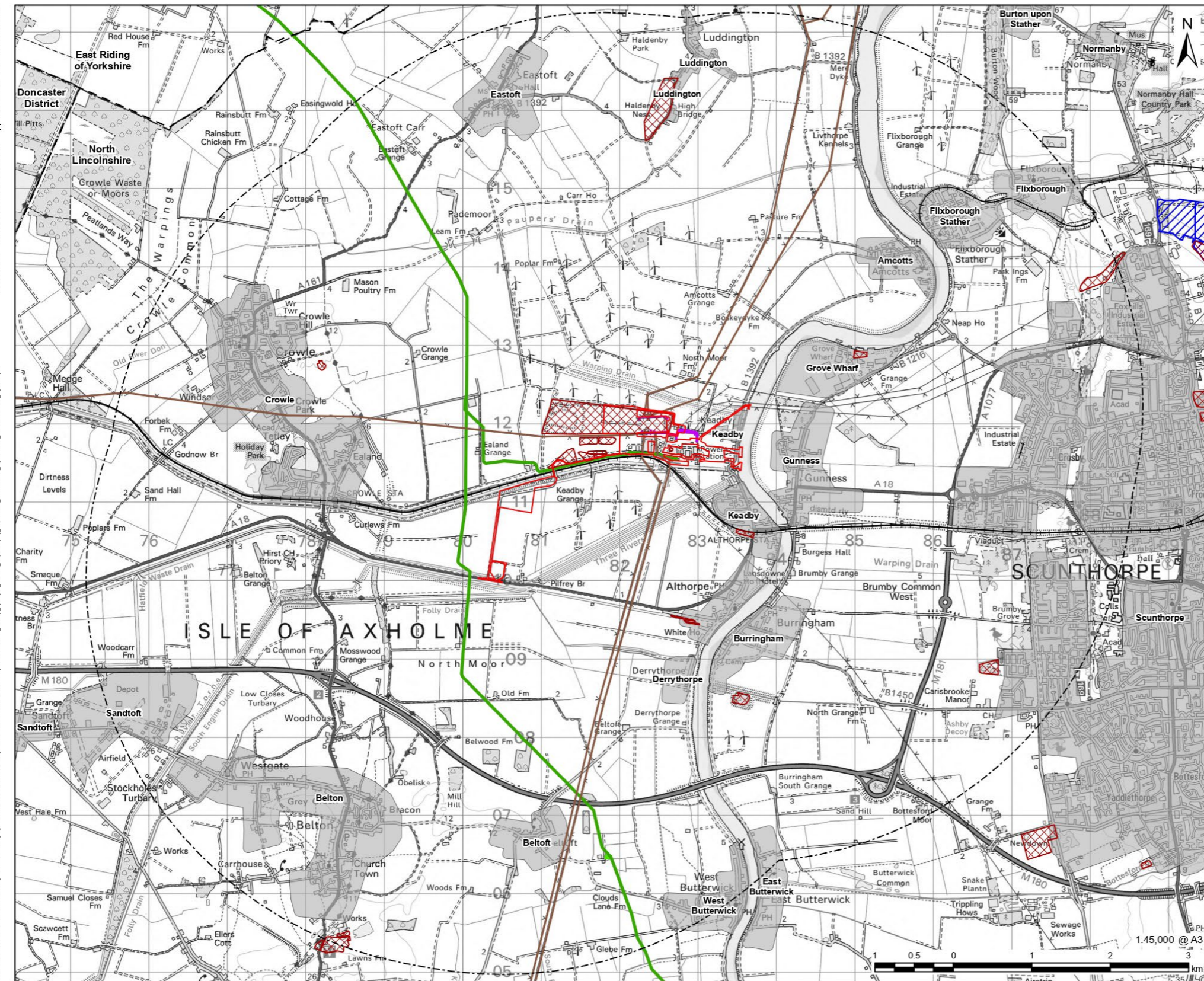
# A1.5 Surface and Groundwater Bodies and their Attributes



# A1.6 Other Environmental Constraints within 5km of the Proposed Development Site

Revision: 0 Drawn: KH Checked: JW Approved: SW Date: 2024-04-26

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**LEGEND**

- Proposed Development Site
- 5km Study Area
- Local Authority
- Settlement / Residential / Commercial Area
- Air Quality Management Area
- Historic Landfill Site
- Permitted Waste Site / Authorised Landfill Site
- Railway Line
- National Grid
- Overhead Line
- Underground Cable
- Gas Pipe
- Gas Site

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Final

**PROJECT NUMBER**  
60721867

**FIGURE TITLE**  
Other Constraints within 5km of the Proposed Development Site

**FIGURE NUMBER**  
Figure 1.6

# A1.7 UK Habitat Map

Revision: 0 Drawn: MAB Checked: AG Approved: CW Date: 2024-04-26

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**LEGEND**

- Proposed Development Site
- Cropland - Cereal crops
- Grassland - Modified grassland
- Heathland and shrub - Mixed scrub
- Sparsely vegetated land - Ruderal/Ephemeral
- Urban - Developed land; sealed surface
- Watercourse footprint - Watercourse footprint

**NOTES**

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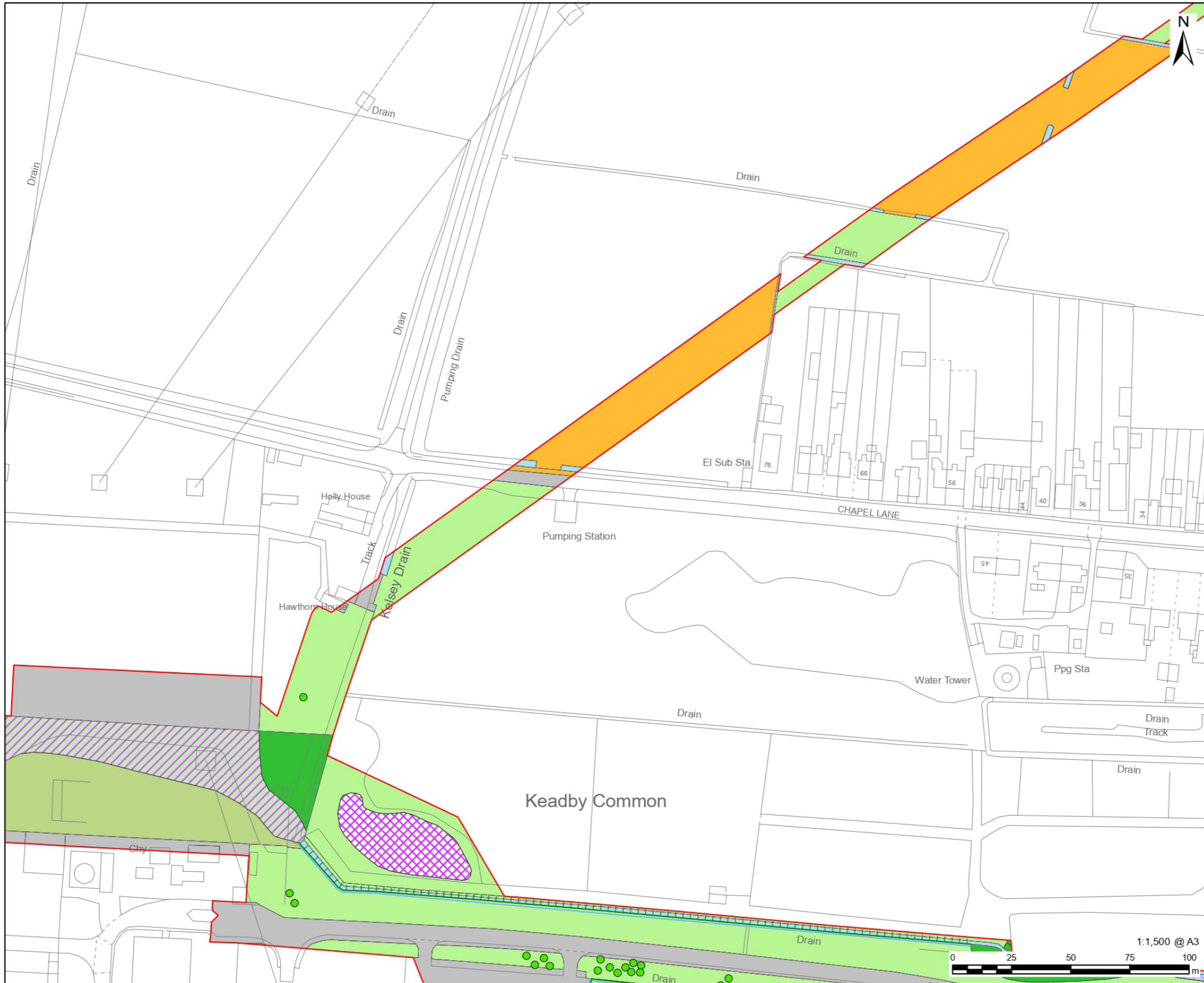
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**FIGURE TITLE**  
UK Habitat map

**FIGURE NUMBER**  
Figure 1.7 (Page 1 of 15)

Revision: 0 Drawn: MAB Checked: AG Approved: CW Date: 2024-04-26

Please see: ssa.aecomed.com/UK/EIAs/energy/keadby-hydrogen-power-station/Environmental-Impact-Assessment/Environmental-Impact-Assessment-Scoping-Report/Environmental-Impact-Assessment-Scoping-Report-Appendix-A/Environmental-Impact-Assessment-Scoping-Report-Appendix-A-UK-Habitat-Map.pdf



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**LEGEND**

- Proposed Development Site
- Urban Tree
- Native hedgerow - associated with bank or ditch
- Native hedgerow with trees - associated with bank or ditch
- Cropland - Cereal crops
- Grassland - Modified grassland
- Grassland - Other neutral grassland
- Heathland and shrub - Bramble scrub
- Heathland and shrub - Hawthorn scrub
- Heathland and shrub - Willow scrub
- Urban - Developed land; sealed surface
- Watercourse footprint - Watercourse footprint
- Woodland and forest - Other woodland; broadleaved

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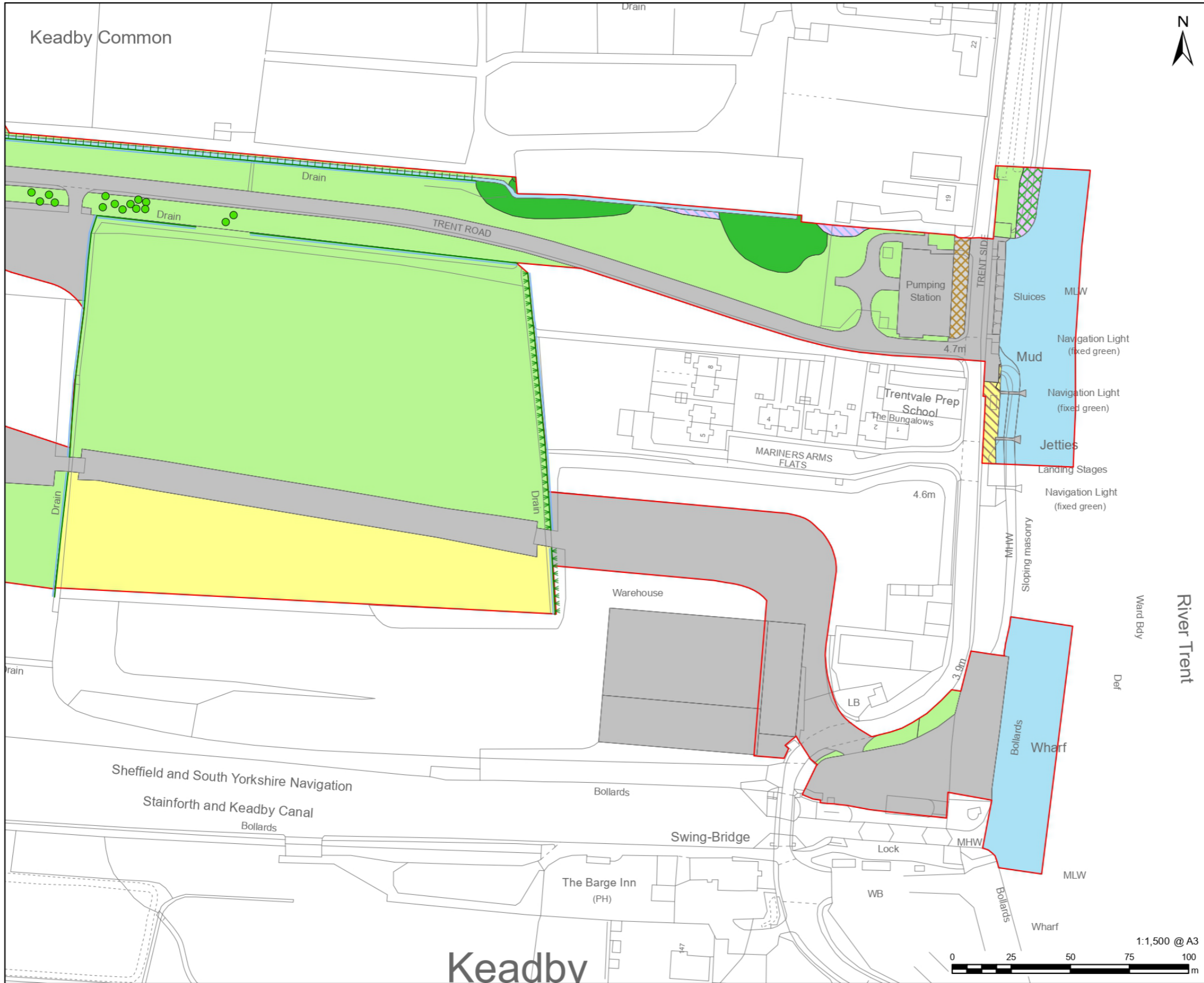
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**FIGURE TITLE**  
UK Habitat map

**FIGURE NUMBER**  
Figure 1.7 (Page 2 of 15)

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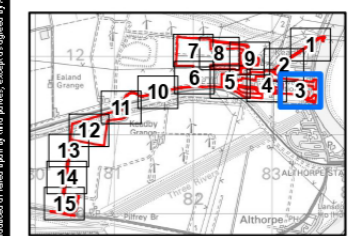
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- LEGEND**
- Proposed Development Site
  - Urban Tree
  - Native hedgerow - associated with bank or ditch
  - Native hedgerow with trees - associated with bank or ditch
  - ▼▼▼ Species-rich native hedgerow with trees - associated with bank or ditch
  - Grassland - Modified grassland
  - Heathland and shrub - Hawthorn scrub
  - Heathland and shrub - Mixed scrub
  - Sparsely vegetated land - Ruderal/Ephemeral
  - Sparsely vegetated land - Tall forbs
  - Urban - Developed land; sealed surface
  - Urban - Introduced shrub
  - Watercourse footprint - Watercourse footprint
  - Woodland and forest - Other woodland, broadleaved



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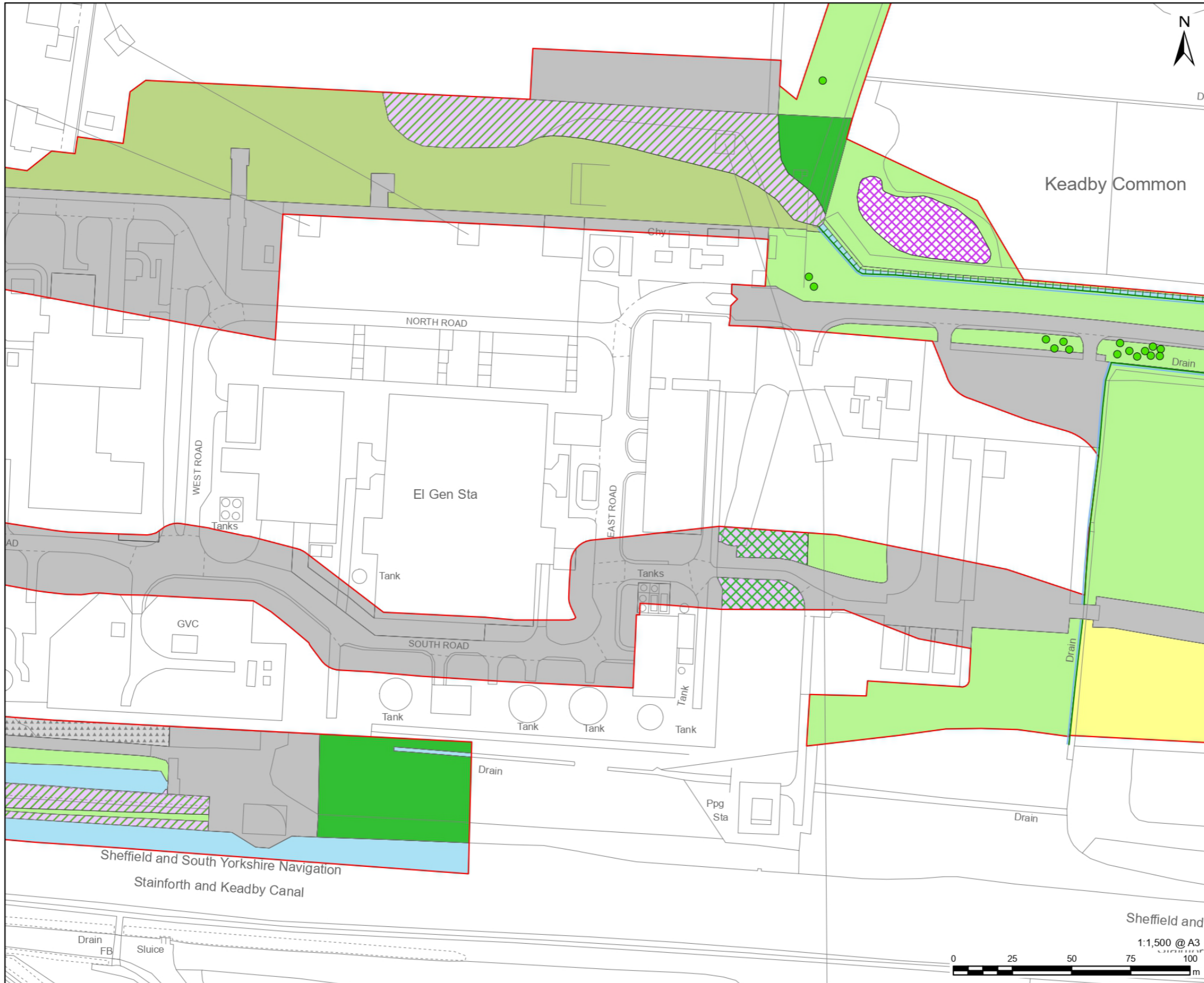
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**FIGURE TITLE**  
UK Habitat map

**FIGURE NUMBER**  
Figure 1.7 (Page 3 of 15)

Revision: 0 Drawn: MAB Checked: AG Approved: CW Date: 2024-04-26

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**LEGEND**

- [Red outline] Proposed Development Site
- [Green dot] Urban Tree
- [Green line] Native hedgerow - associated with bank or ditch
- [Green line with trees] Native hedgerow with trees - associated with bank or ditch
- [Light Green] Grassland - Modified grassland
- [Light Green] Grassland - Other neutral grassland
- [Hatched Green] Heathland and shrub - Bramble scrub
- [Hatched Green] Heathland and shrub - Mixed scrub
- [Hatched Green] Heathland and shrub - Willow scrub
- [Yellow] Sparsely vegetated land - Tall forbs
- [Grey] Urban - Bare ground
- [Grey] Urban - Developed land; sealed surface
- [Blue outline] Watercourse footprint - Watercourse footprint
- [Dark Green] Woodland and forest - Other woodland; broadleaved

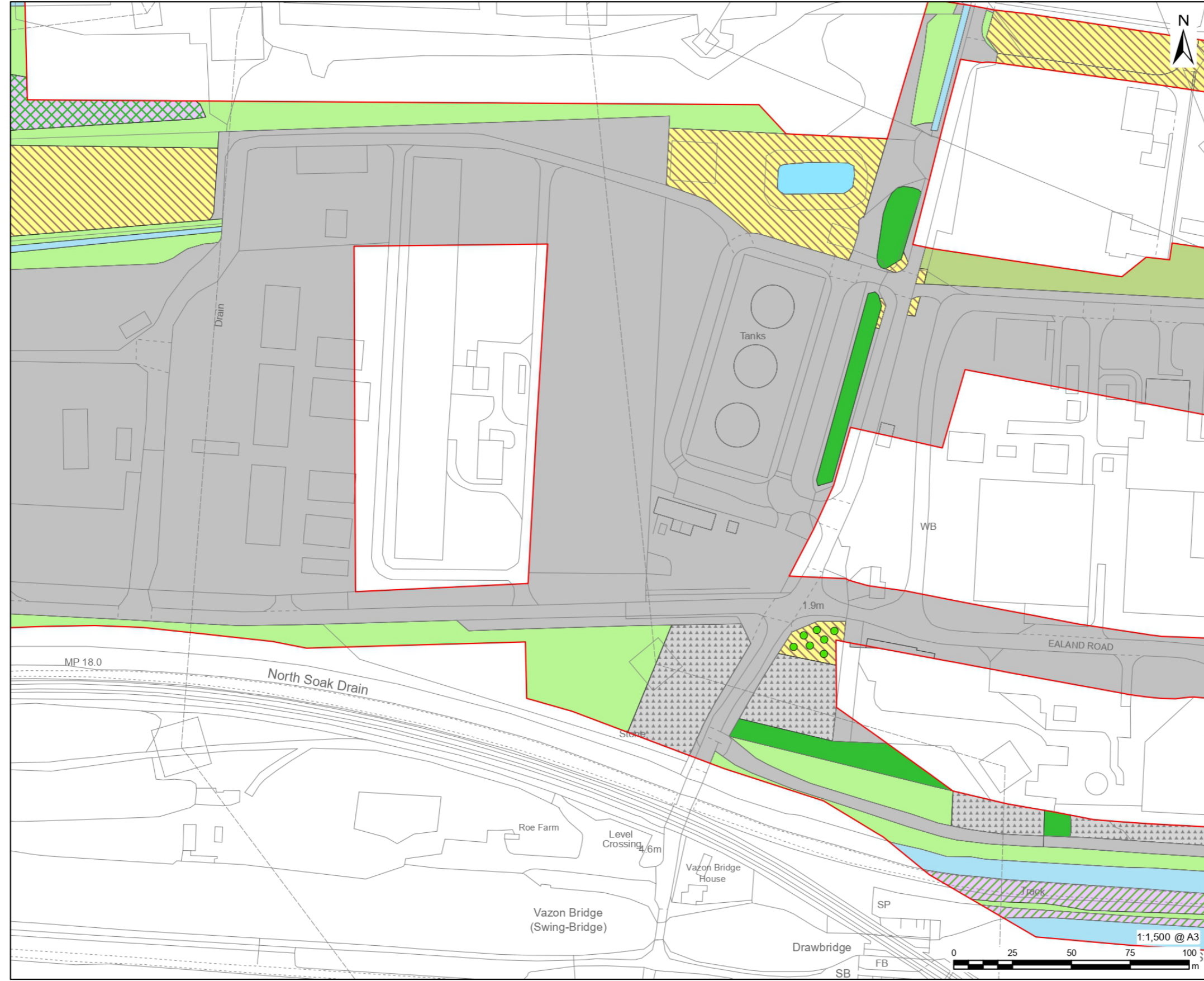
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**FIGURE TITLE**  
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Figure 1.7 (Page 4 of 15)

0 25 50 75 100 m

1:1,500 @ A3

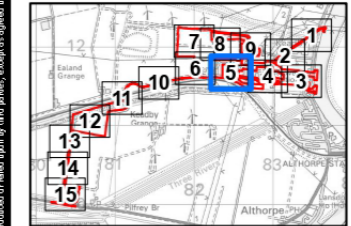


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**LEGEND**

- Proposed Development Site
- Urban Tree
- Grassland - Modified grassland
- Grassland - Other neutral grassland
- Heathland and shrub - Bramble scrub
- Heathland and shrub - Mixed scrub
- Lakes - Ponds (non-priority habitat)
- Sparsely vegetated land - Ruderal/Ephemeral
- Urban - Bare ground
- Urban - Developed land; sealed surface
- Watercourse footprint - Watercourse footprint
- Woodland and forest - Other woodland; broadleaved



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**FIGURE NUMBER**  
Figure 1.7 (Page 5 of 15)





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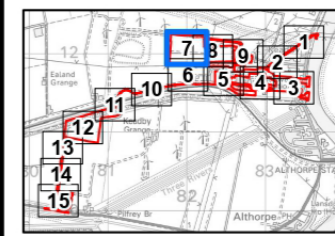
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- LEGEND**
- Proposed Development Site
  - Cropland - Cereal crops
  - Grassland - Modified grassland
  - Heathland and shrub - Hawthorn scrub
  - Heathland and shrub - Willow scrub
  - Open mosaic habitats
  - Urban - Developed land; sealed surface
  - Watercourse footprint - Watercourse footprint



**NOTES**

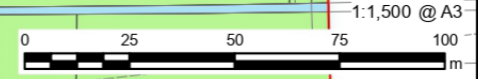
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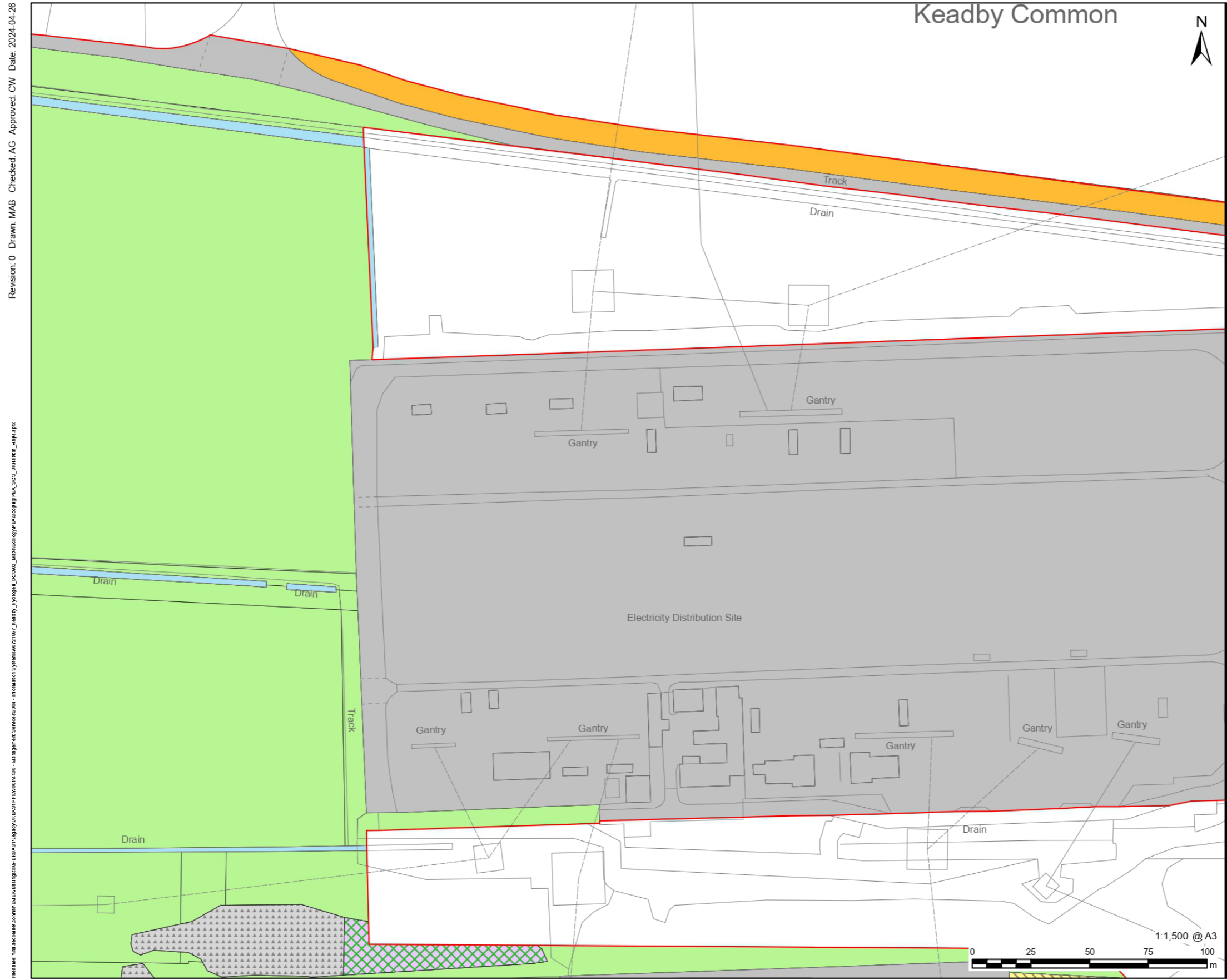
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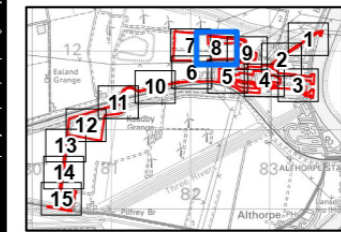
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- LEGEND**
- Proposed Development Site
  - Cropland - Cereal crops
  - Grassland - Modified grassland
  - Heathland and shrub - Mixed scrub
  - Sparsely vegetated land - Ruderal/Ephemeral
  - Urban - Bare ground
  - Urban - Developed land; sealed surface
  - Watercourse footprint - Watercourse footprint



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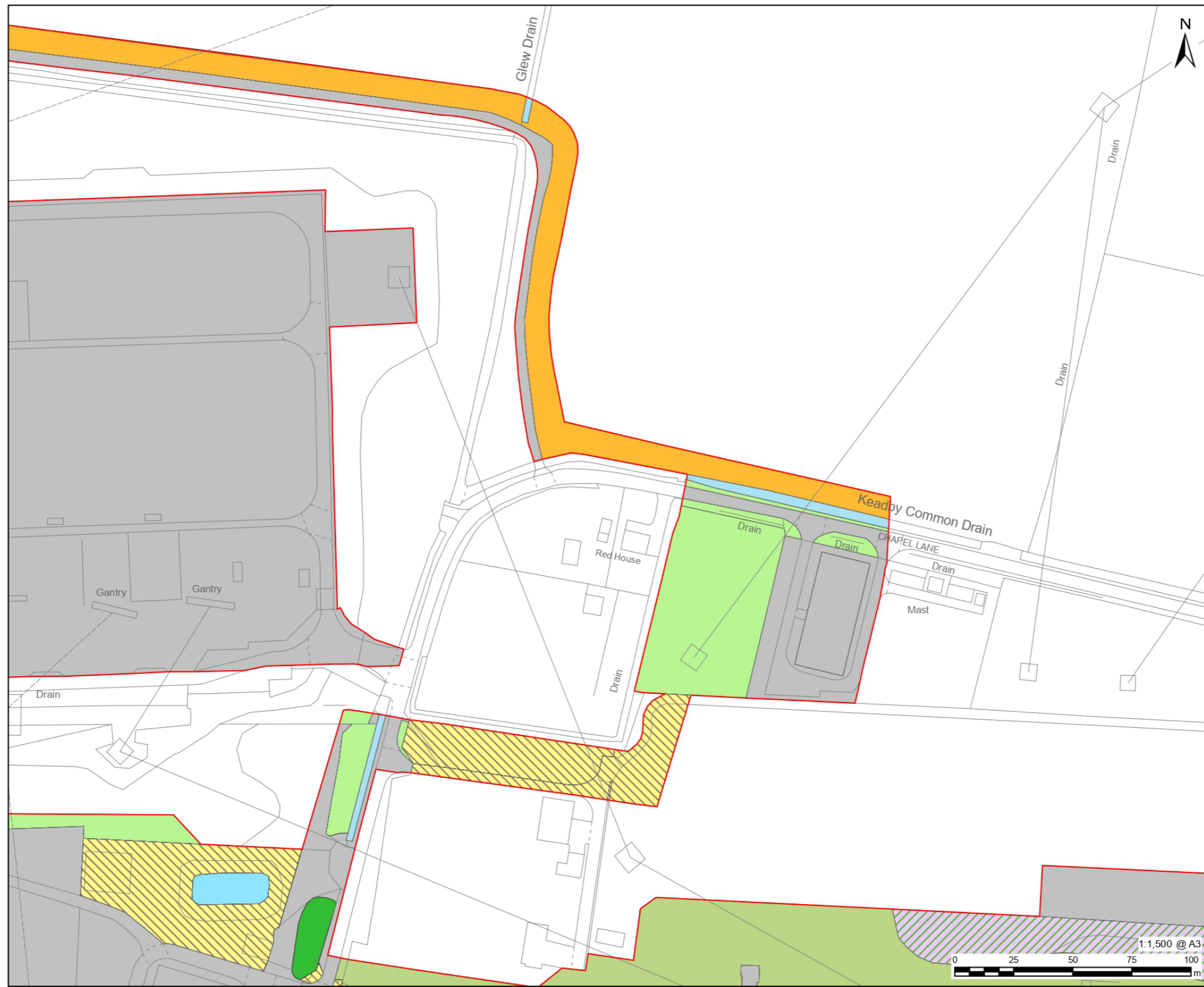
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Figure 1.7 (Page 8 of 15)

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**LEGEND**

- Proposed Development Site
- Cropland - Cereal crops
- Grassland - Modified grassland
- Grassland - Other neutral grassland
- Heathland and shrub - Bramble scrub
- Lakes - Ponds (non-priority habitat)
- Sparsely vegetated land - Ruderal/Ephemeral
- Urban - Developed land; sealed surface
- Watercourse footprint - Watercourse footprint
- Woodland and forest - Other woodland; broadleaved

**NOTES**

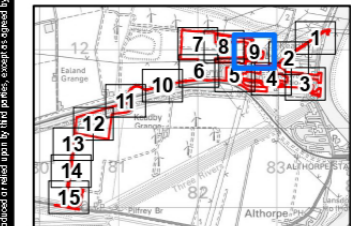
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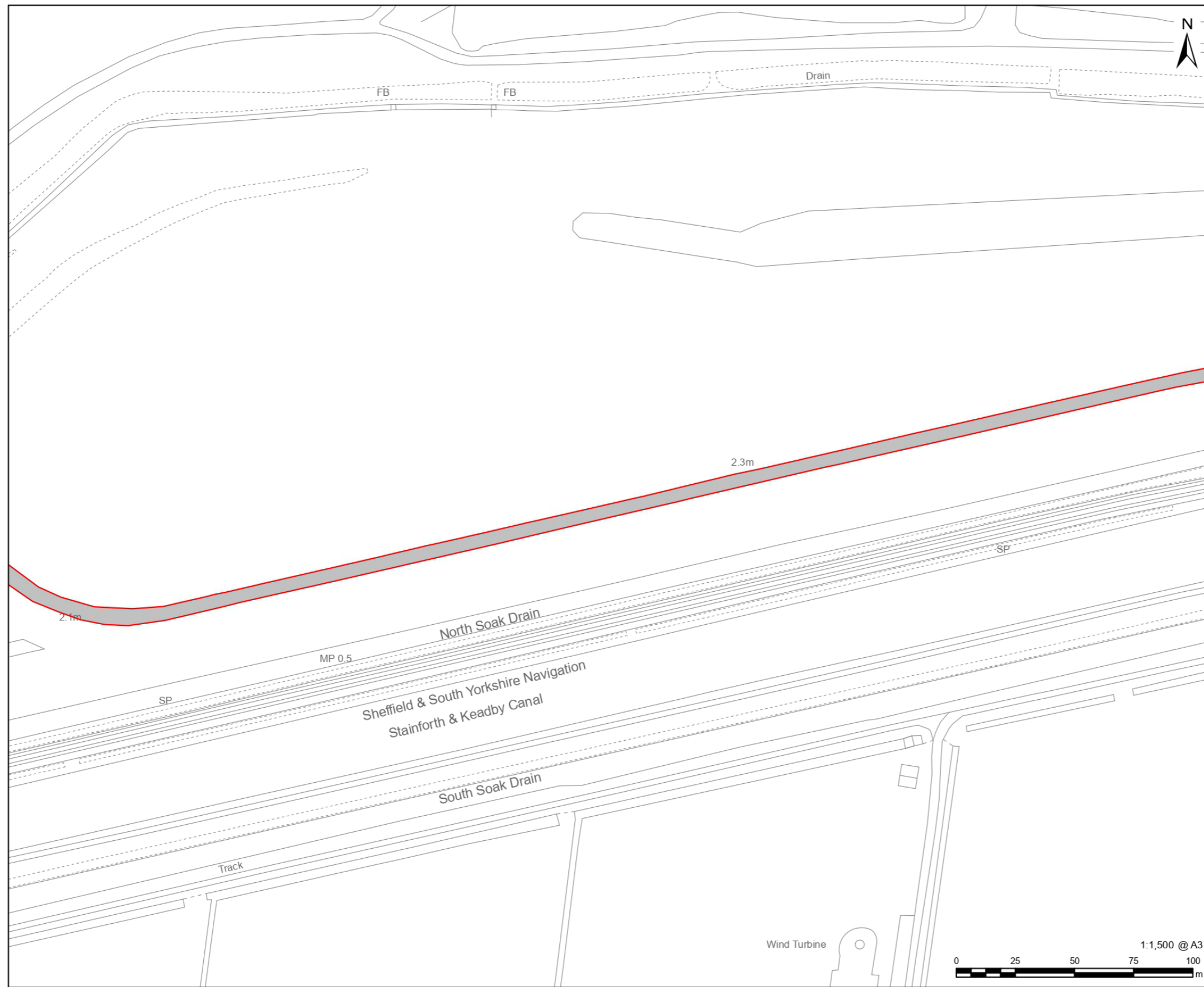
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UK Habitat map

**FIGURE NUMBER**  
Figure 1.7 (Page 9 of 15)



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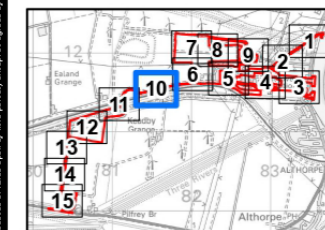
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LEGEND

- Proposed Development Site
- Urban - Developed land; sealed surface



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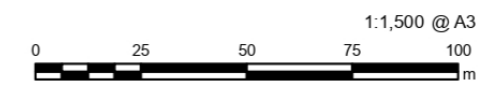
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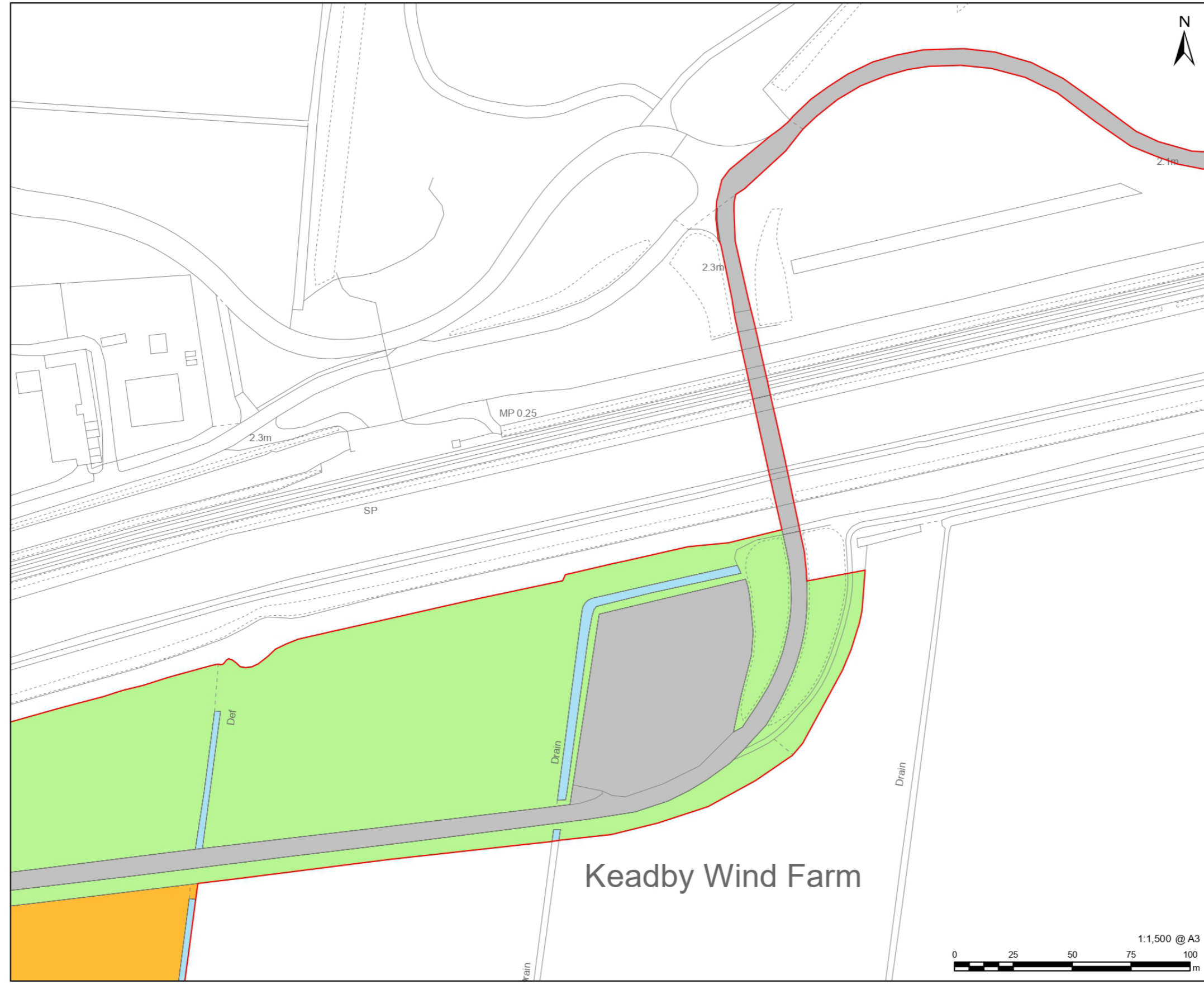
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Figure 1.7 (Page 10 of 15)



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**LEGEND**

- Proposed Development Site
- Cropland - Cereal crops
- Grassland - Modified grassland
- Urban - Developed land; sealed surface
- Watercourse footprint - Watercourse footprint

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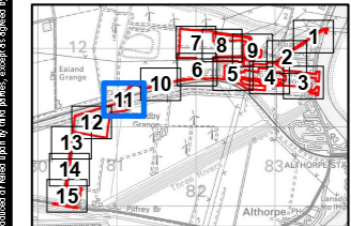
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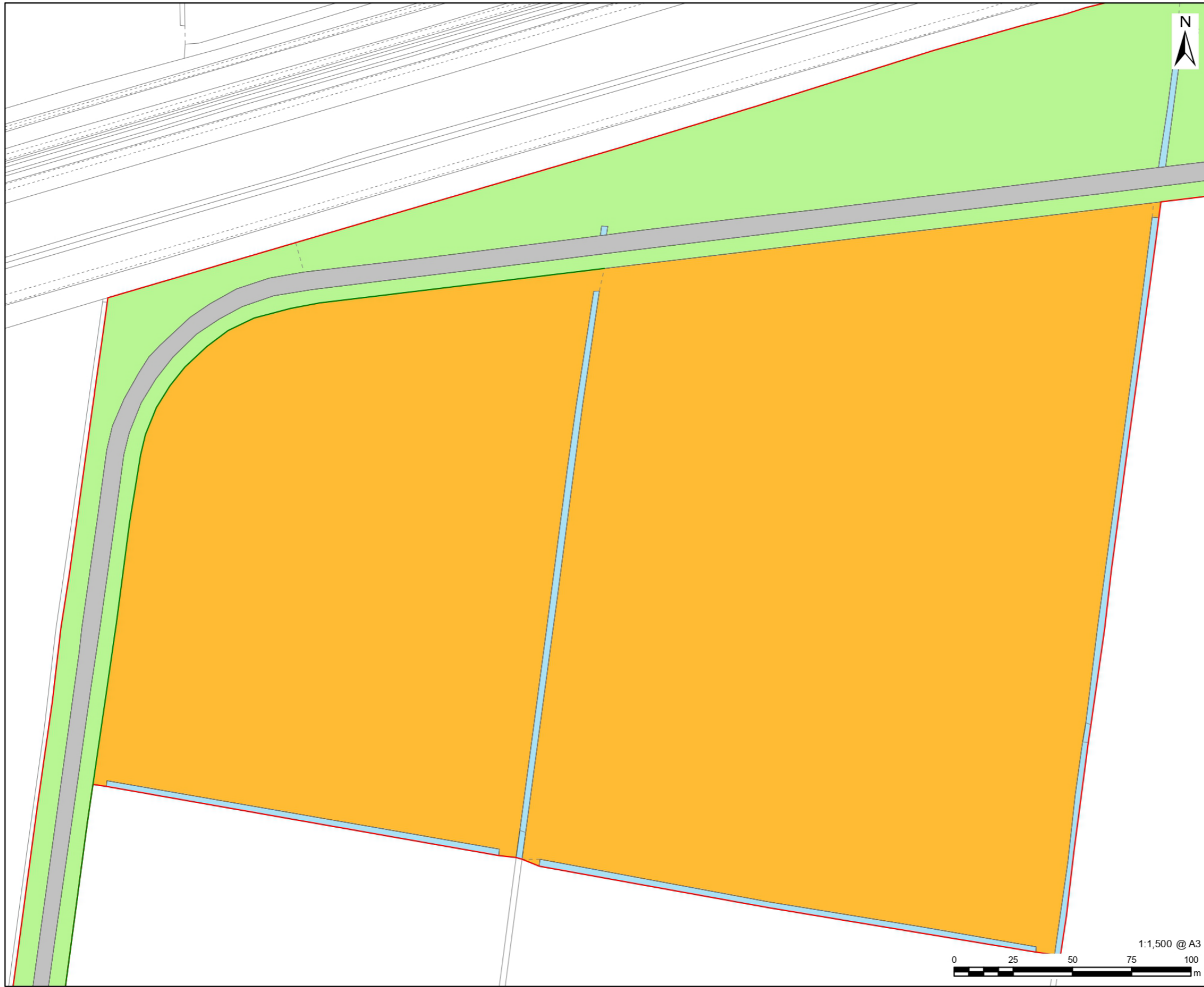
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Figure 1.7 (Page 11 of 15)

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Please see: \\na.aecomed.co.uk\BIS\EMEA\Basingstoke\UK\KAS1\ugby\UK\KAS1\FEM001\400 - Management Services\0504 - Informative Systems\071867\_1867\_1\ugby\_1\ugby\_1\DC\DC2\_Maps\Ecology\FE\Ecology\FEA\_Scoping\Map\Map.aprx



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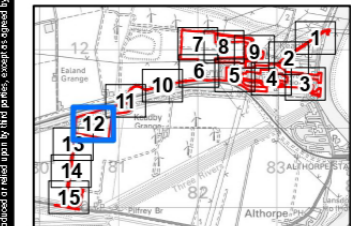
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LEGEND

- Proposed Development Site
- Native hedgerow
- Cropland - Cereal crops
- Grassland - Modified grassland
- Urban - Developed land; sealed surface
- Watercourse footprint - Watercourse footprint



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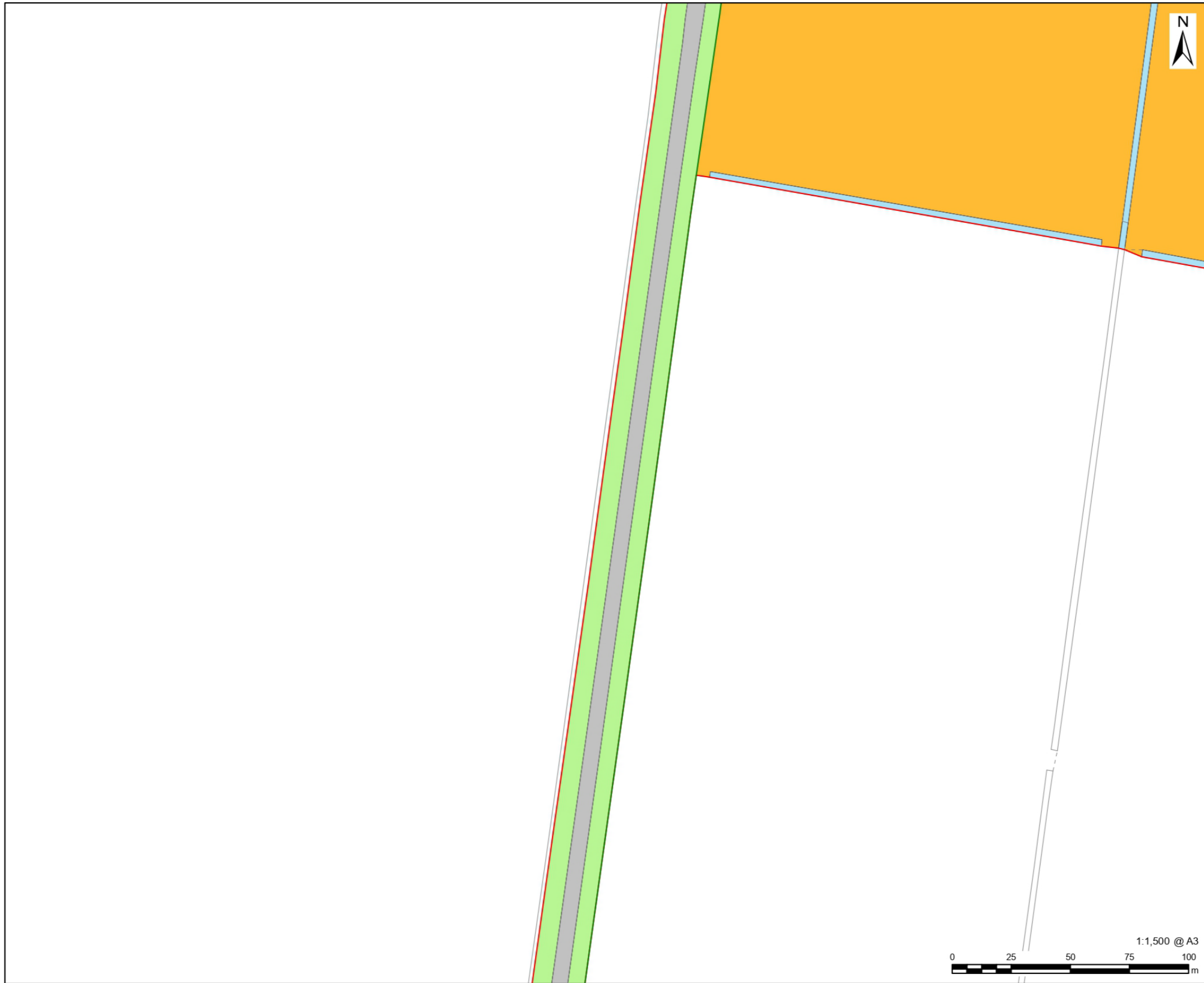
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FIGURE TITLE  
UK Habitat map

FIGURE NUMBER  
Figure 1.7 (Page 12 of 15)

Revision: 0 Drawn: MAB Checked: AG Approved: CW Date: 2024-04-26

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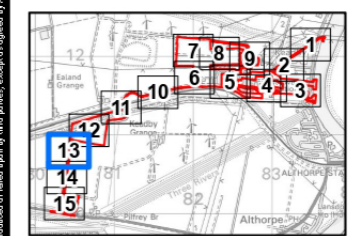


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**LEGEND**

- Proposed Development Site
- Native hedgerow
- Cropland - Cereal crops
- Grassland - Modified grassland
- Urban - Developed land; sealed surface
- Watercourse footprint - Watercourse footprint



**NOTES**

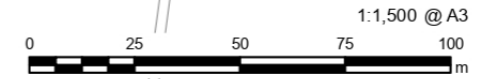
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**ISSUE PURPOSE**  
Draft

**PROJECT NUMBER**  
60721867

**FIGURE TITLE**  
UK Habitat map

**FIGURE NUMBER**  
Figure 1.7 (Page 13 of 15)



Revision: 0 Drawn: MAB Checked: AG Approved: CW Date: 2024-04-26

File name: \\na.aecomanet.co.uk\ENR\EMEA\Baird\globe-178\AS1\Agg\01\KAS1\FW001\440 - Management Services\04 - Information Systems\8721867 - Keadby\_Hydrogen\_DC202\_Maps\000001\FEA\_SCO\_UK\Habitat\_Maps.aprx

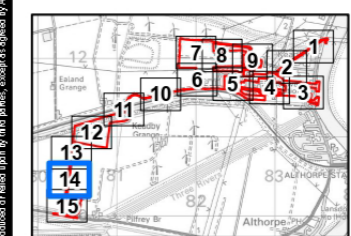


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**CONSULTANT**  
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2 City Walk  
Leeds  
LS11 9AR  
www.aecom.com

**LEGEND**

- Proposed Development Site
- Native hedgerow
- Grassland - Modified grassland
- Urban - Developed land; sealed surface



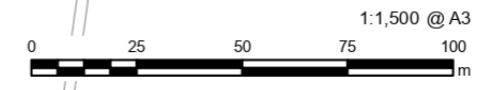
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**PROJECT NUMBER**  
60721867

**FIGURE TITLE**  
UK Habitat map

**FIGURE NUMBER**  
Figure 1.7 (Page 14 of 15)





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PROJECT  
**KEADBY  
HYDROGEN  
POWER STATION**

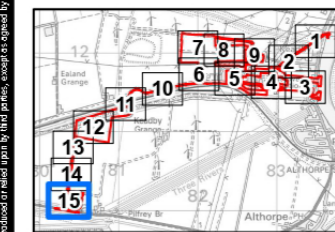
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**LEGEND**

- Proposed Development Site
- Native hedgerow
- Cropland - Cereal crops
- Grassland - Modified grassland
- Urban - Developed land; sealed surface



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**FIGURE TITLE**

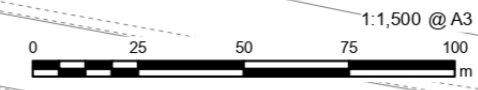
UK Habitat map

**FIGURE NUMBER**

Figure 1.7 (Page 15 of 15)

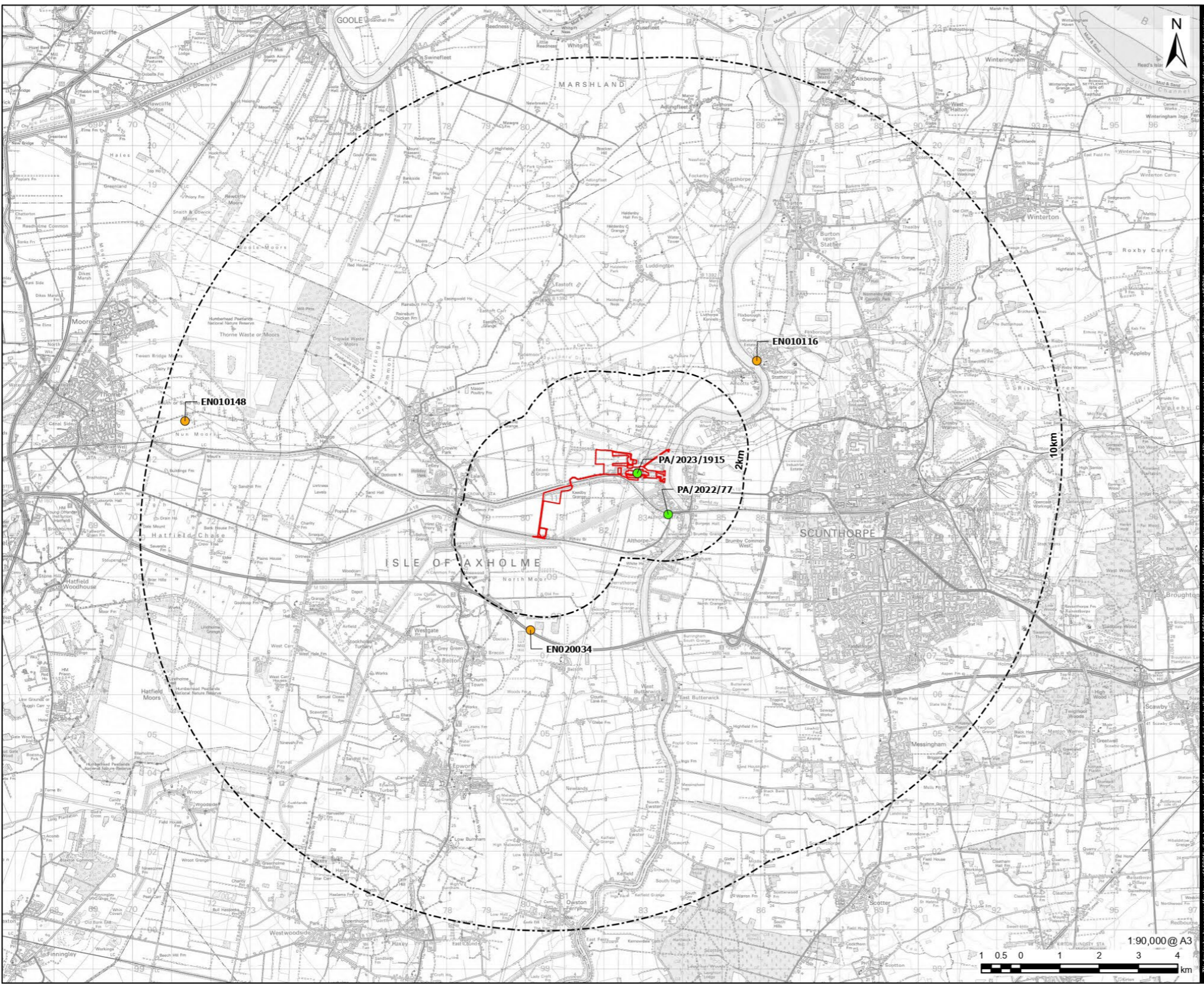
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# A1.8 Other Developments to be Considered in Cumulative Impact Assessment

Revision: 0 Drawn: KH Checked: JW Approved: SW Date: 2024-04-26



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AECOM Limited  
Midpoint,  
Alencon Link  
Basingstoke, RG21 7PP  
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**LEGEND**

- Proposed Development Site
- Study Area
- PINS National Infrastructure Applications
- TCPA Planning Applications

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**ISSUE PURPOSE**  
Final

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**PROJECT NUMBER**  
60721867

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**FIGURE TITLE**  
Other Developments to be Considered in the Cumulative Impact Assessment

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**FIGURE NUMBER**  
Figure 1.8

