North Lincolnshire Green Energy Park

EIA Scoping Report

October 2020

Project No.: 0483091

The business of sustainability

ERM

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Acronyms and Abbreviations

Name	Description
ABP	Associated British Ports
APFP	Applications: Prescribed Forms and Procedures
APIS	Air Pollution Information System
AQIA	Air Quality Impact Assessment
AQMA	Air Quality Management Area
BEIS	Business, Energy and Industrial Strategy
BTO	British Trust for Ornithology
CEA	Cumulative Effects Assessment
ClfA	Chartered Institute for Archaeologists
cSAC	Candidate Special Areas of Conservation
DCLG	Department for Communities and Local Government
DCO	Development Consent Order
DEFRA	Department for the Environment, Fisheries and Rural
DEM	Digital Elevation Model

dML	Deemed Marine Licence
DMRB	Design Manual for Roads and Bridges
dwt	Dead Weight Tonnage
EA	Environment Agency
EcIA	Ecological Impact Assessment
EIA	Environmental Impact Assessment
ERF	Energy Recovery Facilities
ERM	Environmental Resources Management
ES	Environmental Statement
EU	European Union
GLNP	Greater Lincolnshire Environmental Records Centre
GLVIA	Guidelines for Landscape and Visual Impact Assessment
HE	Highways England
HRA	Habits Regulations Assessment
HSE	Health and Safety Executive
IAQM	Institute of Air Quality Management
IED	Industrial Emissions Directive
IEMA	Institute of Environmental Management and Assessment
LAQM	Local Air Quality Management
LBC	Listed Building Consent
LCA	Landscape Character Area
LDF	Local Development Framework
LERC	Lincolnshire Environmental Records
LiDAR	Light Detection and Ranging
LSE	Likely Significant Effects
LVIA	Landscape and Visual Impact Assessment
LWS	Local Wildlife Site
MAGIC	Multi-Agency Geographic Information for the Countryside
MMO	Marine Management Organisation
MSWI	Municipal Solid Waste Incineration
MW	Mega Watts
NG	Net Gain
NHLE	National Heritage List for England
NLC	North Lincolnshire Council
NLGEP	North Lincolnshire Green Energy Park
NNL	No Net Loss
NPG	Northern Power Grid
NPPF	National Planning Policy Framework
NPS	National Policy Statement
NR	Network Rail
NSIP	Nationally Significant Infrastructure Project

NTS	Non-Technical Summary
PEIR	Preliminary Environmental Information Report
PINS	Planning Inspectorate
PRoW	Public Right of Way
pSPA	potential Special Protection Areas
RDF	Refuse Derived Fuel
S21	Solar 21
SAC	Special Areas of Conservation
SCI	Sites of Community Importance
SMC	Scheduled Monument Consent
SoCC	Statement of Community Consultation
SoS	Secretary of State
SPA	Special Protection Areas
SPD	Supplementary Planning Document
SPV	Special Purpose Vehicle
SSSI	Sites of Specific Scientific Interest
SuDS	Sustainable Urban Drainage Strategy
TCPA	Town and Country Planning Act
TOMPS	Toxic Organic Micro Pollutants
TPA	Tonnes Per Annum
WeBS	Wetland Bird Survey
WFD	Waste Framework Directive
WHO	World Health Organisation
WID	Waste Incineration Directive
ZoI	Zone of Influence
ZTV	Zone of Theoretical Visibility

1. INTRODUCTION

1.1 Overview

1.1.1.1 This Scoping Report has been prepared on behalf of North Lincolnshire Green Energy Park Ltd (the Applicant), which is a Special Purpose Vehicle (SPV) set up by Solar 21 (S21).

1.1.1.2 The Applicant is promoting a new Energy Recovery Facility (ERF) and Associated Development (the Project) which constitutes a thermal combustion combined heat and power plant with a potential power output capacity of upto 100 MWe from a total thermal capacity of 316 MWth together with Associated Developments (described in detail below).

1.1.1.3 This Scoping Report is submitted to the Planning Inspectorate (PINS) as a formal notification to the Secretary of State under Regulation 8(1) (b) of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 ('the IP EIA Regulations 2017') that the Applicant proposes to provide an Environmental Statement (ES) in respect of the development described within this document.

1.1.1.4 This Scoping Report is also submitted to PINS as a request for a Scoping Opinion under Regulation 10(1) of the IP EIA Regulations 2017.

1.2 Requirement for EIA

1.2.1.1 Section 14(1) of the Planning Act 2008 as amended defines "nationally significant infrastructure projects" including *(a) the construction or extension of a generating station*. Section 15(2) of the Planning Act 2008 specifies that the definition of a generating station stated in Section 14(1)(a) only applies where the capacity of a generating station exceeds 50 MW.

1.2.1.2 As the potential 100 MWe electrical output of the Project exceeds this threshold, the Project is classed as a Nationally Significant Infrastructure Project (NSIP). Therefore, a Development Consent Order (DCO) is required under the Planning Act 2008.

1.2.1.3 The IP EIA Regulations 2017 require an ES to be submitted with the DCO for all projects within Schedule 1 of the Regulations. This includes *(2)(1) Thermal power stations and other combustion installations with a heat output of 300 megawatts or more.* The 316 MWth heat output capacity of the Project exceeds this threshold so the Project is classed as an EIA development and an ES must therefore be submitted to the Secretary of State as part of the DCO application.

1.3 The Applicant and EIA Team

1.3.1 The Applicant

1.3.1.1 The Applicant is an SPV set up by S21. S21 is a renewable energy investment company headquartered in Dublin, Ireland with locations in the United Kingdom (UK) and Italy. Established in 2010, S21 specialises in the acquisition and management of solar photovoltaic (PV) installations and in the development of renewable power assets including biomass, biogas and energy

recovery projects in the UK and Europe. S21 has been delivering steady returns to investors since 2011 from its PV assets. To date, S21 has acquired or developed in excess of €240 million in renewable energy assets. Its current pipeline of projects will bring this to €2 billion over the next five years, which includes this Project as part of a series of new energy recovery plants in the UK.

1.3.2 The EIA Team

1.3.2.1 The scoping and delivery of the EIA for the Project is being led by Environmental Resources Management (ERM) Ltd with support from other specialist organisations. ERM is a member of the Institute of Environmental Management and Assessment's (IEMA's) EIA Quality Mark, a scheme that allows organisations to make a commitment to excellence in EIA activities and have this commitment independently reviewed.

1.3.2.2 In line with the IP EIA Regulations 2017, the ES will be prepared by competent experts and will outline the relevant expertise or qualifications of such experts. The sections of this Scoping Report and the environmental topics that will be addressed in the ES will be compiled by EIA practitioners and technical experts from the organisations shown in Table 1-1.

Table 1-1: EIA Team

EIA Topic or Scoping Report Sections	Provider/Author
Introduction	ERM
The Project description	ERM
Policy and legislative context	ERM and Northern Planners
Wider planning concerns	Northern Planners
Consultation, communications and PR	Newgate Communications
Legal counsel	Womble Bond Dickinson
Air quality	ERM
Climate	ERM
Noise and vibration	ERM
Ground conditions and hydrogeology	ERM
Ground investigations	Ian Farmer Associates / ERM
Hydrology and flood risk	ERM
Flood risk modelling	Buro Happold
Landscape and visual amenity	ERM
Ecology and nature conservation	Bowland Ecology Ltd
Ecological survey	Bowland Ecology Ltd
Archaeology and cultural heritage	ERM
Traffic and transport	Buro Happold
Traffic survey	Buro Happold
Socio-economic characteristics	ERM
Waste	ERM
Major accidents and disasters	ERM

Cumulative Effects Assessment	ERM

1.3.3 The Contents of this Scoping Report

1.3.3.1 As this Scoping Report is both the Regulation 8 notification that the Applicant proposes to provide an ES and the Regulation 10 request for a Scoping Opinion, it is important for this document to fulfil the requirements of both regulations.

1.3.3.2 The IP EIA Regulations 2017 require that the following information is included in this Scoping Report:

- a description of the location and any sensitive areas likely to be affected (*Section 3.2.1*);
- a description of the aspects of the environment likely to be significantly affected (*Sections 6 -15*);
- information on the likely significant effects resulting from residues and emissions and the use of natural resources (*Sections 6 -15*); and
- details of any features of the Project and any measures envisaged to avoid or prevent what might otherwise have been a significant adverse effect on the environment (*Sections 6 -15*).

1.3.3.3 The IP EIA Regulations 2017 require that the following information is included in this Scoping Report:

- a plan sufficient to identify the land (Figure 3.1: Project Site Location);
- a description of the Project, including its location and technical capacity (*Section 3.2.4*);
- an explanation of the likely significant effects of the development on the environment (*Sections 6 -15*); and
- such other information or representations as the person making the request may wish to provide or make.

1.3.3.4 The IP EIA Regulations 2017, state that the Secretary of State:

- (a) Must consult the consultation bodies before making a scoping direction in response to a scoping direction request; and
- (b) Within 42 days beginning with the date of receipt of that request, or such longer period as may be reasonably required, must make a scoping opinion and send a copy to the person who made the scoping opinion request.

2. POLICY AND LEGISLATIVE CONTEXT

2.1 Introduction

2.1.1.1 This section sets out the policy and legislative context within which the Project is being proposed and developed. The Project will be progressed taking account of policies at the national, regional and local level set out in this section.

2.2 Article 50 of the Treaty on European Union

2.2.1.1 Based on the outcome of a referendum held in the UK on 23rd June 2016, the United Kingdom triggered Article 50 of the Treaty on European Union on 29th March 2017. This action commenced a two-year period of negotiations of the terms under which the UK will exit the EU. The UK was scheduled to leave the EU on 29th March 2019; however, this was delayed and following a general election, Parliament ratified the withdrawal agreement, and the UK left the EU on 31 January 2020. This began a transition period that is set to end on 31 December 2020. The UK remains subject to EU law and remains part of the EU customs union and single market during the transition period.

2.2.1.2 Much of the UK's environmental legislation and the EIA Regulations that underpin the DCO process itself, are derived from EU Directives. The European Union (Withdrawal) Act 2018 has been legislated to ensure that UK laws continue to apply after exiting the EU. Where EU Directives have been transposed into UK law, the European Union (Withdrawal) Act 2018 guarantees that those laws remain unchanged until amended or rescinded by Parliament.

2.2.1.3 At the time of scoping therefore, it is assumed that all existing EU Directives of relevance to the DCO and EIA process that are transposed into UK law will continue to be relevant to the Project and its DCO application both before and after the date that the UK leaves the EU. The Applicant and EIA Team will monitor this situation as this DCO application progresses in order that the Project is developed in line with the most recent state of affairs.

2.3 Development Consent Legislation

2.3.1 The Planning Act 2008

2.3.1.1 The DCO process is established through the Planning Act 2008 as amended (the '2008 Act') for infrastructure projects of national significance. As described in Section 1.2, the Project is classed as a NSIP as its generating capacity exceeds the 50 MW threshold stipulated in Section 15(2) of the 2008 Act. Under Section 31 of the 2008 Act, any developer wishing to construct a project classified as an NSIP must apply for Development Consent.

2.3.1.2 The Planning Act 2008 (as amended) provides the legal framework for the application, examination and determination of a NSIP proposal. It creates a consenting system specifically for NSIPs that includes a number of steps and processes that are not necessary for smaller developments under the Town and Country Planning Act (TCPA) consenting system. By providing an umbrella consent for NSIPs, it also excludes the need for the following:

- Planning permission under the Town and Country Planning Act 1990;
- Consent under section 36 or 37 of the Electricity Act 1989;
- Listed building and conservation area consent under the Planning (Listed Buildings and Conservation Areas) Act 1990; and
- Scheduled Monument consent under the Ancient Monuments and Archaeological Areas Act 1979.

2.3.1.3 The Marine and Coastal Access Act (MCAA) 2009 introduced a spatial planning system for environmental management in the UK marine area. Section 42(3b) defines the UK marine area as including 'the waters of every estuary, river or channel, so far as the tide flows at mean high water spring tide'. Given that the River Trent is tidal where it passes the Project site, the requirements of the MCAA 2009 are relevant to the Project.

2.3.1.4 Part 4 of the MCAA 2009 creates a requirement for a Marine Licence to be obtained for works in the UK marine area. Licensable activities include the deposition of any substance or object into the UK marine area (Section 66(1)) and the construction, alteration or improvement of any works in the UK marine area (Section 66(7)).

2.3.1.5 Section 149A of the Planning Act 2008 enables a DCO applicant to apply for a 'deemed Marine Licence' (dML) as part of the DCO process where it would normally be necessary to apply for a Marine Licence through Part 4 of the MCAA 2009.

2.3.1.6 The Marine Management Organisation (MMO) is the responsible authority for licensing under the MCAA and is therefore a key stakeholder when a project includes works in marine waters and consequently requires a dML with its DCO. The MMO is the monitoring and enforcement body in relation to conditions and restrictions set out in deemed Marine Licences.

2.3.1.7 The Localism Act 2011 appoints PINS as the executive agency that is responsible for the NSIP planning process. It is the duty of PINS to examine the application submissions and make a recommendation to the Secretary of State (SoS) for the Department of Business, Energy and Industrial Strategy (BEIS) to ultimately grant or refuse a Development Consent.

2.3.1.8 The DCO will provide statutory consent for the development of the Project. This will include the Energy Recovery plant and related power generation infrastructure, ancillary infrastructure such as feedstock storage facilities and concrete block production facilities, and the Project's transport infrastructure.

2.3.1.9 The process for obtaining a DCO has six key phases as follows: pre-application, acceptance, pre-examination, examination, decision and post decision. This Scoping Report and request for a scoping opinion forms an early part of the pre-application phase.

2.3.2 Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

2.3.2.1 The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 sets out the activities and submissions that are required for a DCO application to be successful. This includes:

2.3.2.2 The methods, timing and contents of published notices concerning the Project;

2.3.2.3 The requirement for an ES to be submitted with the DCO application;

- The draft proposed order;
- Flood risk assessment;
- Reporting in relation to the Habitats Regulations;
- Information concerning any required compulsory purchase of land;
- Plans and drawings of the land and proposed works including its position in relation to nature conservation sites, historic sites, and Crown land; and
- A number of other requirements.

2.4 National Planning Policy

2.4.1 National Policy Statements

2.4.1.1 Overarching National Planning Policy Statement for Energy (EN-1) (DECC, 2011a): EN-1 sets out the need for NSIPs, the policy and regulatory framework within which they may be developed, and the key principles and points for consideration by PINS when examining and determining NSIP proposals.

2.4.1.2 National Policy Statement for Renewable Energy Infrastructure (EN-3) (DECC, 2011b):EN-3 describes the position of renewable energy projects within the Government's vision of a low-carbon economy, including the increasing role of biomass and waste combustion in meeting the UK's energy needs.

2.4.2 National Planning Policy Framework

2.4.2.1 The National Planning Policy Framework (NPPF), as amended in 2019, sets out the government's planning policies for England and how these are expected to be applied. It sets out economic, social and environmental objectives for achieving sustainable development in England. The NPPF sets the context for more detailed planning policies and development plans.

2.4.3 Waste Policy

National Planning Policy for Waste

2.4.3.2 The National Planning Policy for Waste (DCLG, 2014) sets out detailed waste planning policies for England. It gives consideration to the need for and appropriate siting of all types of waste management facilities including the siting of low carbon energy recovery facilities. It sets out the principles upon which proposals for waste management facilities should be determined and highlights the importance of good design in achieving favourable planning outcomes.

Waste Management Plan for England

2.4.3.3 The Waste Management Plan for England (DEFRA, 2013) provides an overview of waste management in England and is designed to meet mandatory requirements of the Waste Framework Directive and the Waste (England and

Wales) Regulations 2011 the UK. It describes the position of energy recovery from waste within a waste management hierarchy, stating that the government supports efficient energy recovery from residual waste but that the aim is "to get the most energy out of waste, not to get the most waste into energy recovery".

Energy from Waste Guidance

2.4.3.4 In 2014, DEFRA produced "Energy from waste – A guide to the debate" (DEFRA, 2014). It sets out the environmental case for Energy from Waste or Energy Recovery facilities versus other waste destinations such as landfill and gives an insightful overview of the key issues relating to energy recovery and the planning and development of energy recovery facilities.

2.5 European Union Directives

2.5.1.1 A number of EU Directives influence the activities and reporting undertaken during the EIA. Those of particular relevance are described in the following sections.

2.5.2 Waste Framework Directive

2.5.2.1 Directive 2008/98/EC on waste (the WFD) establishes the basic concepts, principles and definitions relating to waste management. This includes at its core, the waste management hierarchy of waste reduction, reuse, recycling, recovery, and disposal in ways that do not endanger human health or the environment.

2.5.3 Waste Incineration Directive

2.5.3.1 The Waste Incineration Directive (2000/76/EEC) (the WI Directive) specifies controls for new incineration plants according to the size of the facility. It repealed former directives on the incineration of hazardous waste (Directive 94/67/EC) and household waste (Directives 89/369/EEC and 89/429/EEC) and replaced them with a single text. The WI Directive aims to prevent and/or reduce environmental damage caused by the incineration and co-incineration of waste. It focuses on the management of emissions into the air, soil, surface water and groundwater, as well as on the subsequent reduction of risk to human health. The WI Directive sets emission limit values and monitoring requirements for emissions to air (particulates, nitrogen oxides, sulphur dioxide, hydrogen chloride, hydrogen fluoride, heavy metals and dioxins and furans), which will be of relevance to Project design and the air quality assessment in the EIA. It also sets controls on releases to water resulting from the treatment of the waste gases.

2.5.4 Industrial Emissions Directive

2.5.4.1 Directive 2010/75/EU on industrial emissions (the IED) regulates pollutant emissions from industrial installations in the EU. It aims to protect human and environmental health by reducing emissions across Europe through the application of Best Available Techniques (BAT). The IED is implemented in the UK through the Environmental Permitting (England and Wales) (Amendment) Regulations 2013. The emission limits set out in the IED are

relevant to the Project emissions and will be referred to in the EIA. Following consent to construct the Project, the EfW would be operated under an Environmental Permit, which would be issued following a successful application to the Environment Agency. The timing for the application of the environmental permit is intended to be 'twin tracked' with the DCO application, meaning that it will be submitted at the same time as the DCO application.

2.5.5 Water Framework Directive and WFD Compliance Assessment

2.5.5.1 Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy (the Water Framework Directive, or WFD) creates a river basin approach to water management. It aims for all ground and surface water bodies in the EU (including the tidal River Trent) to achieve good ecological and chemical status. Further information on the contents and approach to the WFD Assessment screening is provided in Appendix A.

2.6 Habitats Directive and HRA

2.6.1.1 Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive) ensures the conservation of a wide range of rare, threatened or endemic animal and plant species and habitats. The Habitats Directive is written into UK law through The Conservation of Habitats and Species Regulations 2017 (the Habitats Regulations) and the Conservation of Offshore Marine Habitats and Species Regulations 2017 (Offshore Habitat Regulations).

2.6.1.2 A Habitats Regulations Assessment (HRA) must be undertaken by the 'competent authority', which in the case of the Project is the SoS for the Department for Business, Energy and Industrial Strategy. Under Regulation 5(2)(g) of the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009, a report is required to be submitted alongside the ES. The HRA process has four iterative stages with Stage 1 being the screening for Likely Significant Effects (LSE). The outcome of this assessment is presented in a report, which is referred to as a No Significant Effects Report (NSER). If the assessment concludes that the Project is likely to have a significant effect on any European site, either alone or in combination with other projects, HRA Stage 2 is required. Unless this Stage 2 assessment concludes that the Project will not adversely affect the integrity of any European site, alone or in combination with other projects and plans, the Project will need to move to HRA Stages 3 and 4 (Assessment of Alternatives and Consideration of Imperative Reasons of Overriding Public Interest, respectively). The purpose of the HRA is to identify European Conservation Sites that may be affected by the Project, together with sufficient information that will enable the competent authority to make an appropriate assessment of the implications for the site. As such, the HRA does not form part of the ES, although the baseline and assessment of effects presented in the ES is used to support the HRA.

2.7 Local Planning Policy Context

2.7.1.1 The Project lies entirely within the administrative district of North Lincolnshire Council (North Lincolnshire), which is a unitary authority.

2.7.1.2 The local (statutory) adopted development plan for the area is currently made up of the following documents:

- The 'saved' policies of the Local Plan (adopted May, 2003);
- The Local Development Framework (LDF) Core Strategy (adopted June, 2011);
- The Local Development Framework (LDF) Housing and Employment Land Allocations Development Plan Document (adopted March, 2016); and
- The Local Development Framework (LDF) Lincolnshire Lakes Area Action Plan (adopted May, 2016).

2.7.1.3 Adopted local guidance relevant to the DCO proposals is set out in:

- The LDF Planning for Renewable Energy Development Supplementary Planning Document (SPD) (adopted November, 2011);
- Sustainable Urban Drainage Strategy (SUDS) and Flood Risk Guidance April 2017.

2.7.1.4 North Lincolnshire Council is currently preparing a new Local Plan, and have recently completed public consultation on their Preferred Options. Preparation of a Draft Local Plan has been delayed but we expect this to be published in 2020/2021. Once formally adopted it will replace the current saved North Lincolnshire Local Plan, the Core Strategy and the Housing and Employment Land Allocations Development Plan Documents.

2.7.1.5 Other Relevant Policies

2.7.1.6 The following policy documents will also be taken into consideration during the development of the Project:

- Planning for Renewable Energy Development Supplementary Planning Document (2011) - Policy 10 Cumulative Effects;
- Planning for Renewable Energy Development Supplementary Planning Document (2011) - Policy 12 Telecommunications;
- Planning for Renewable Energy Development Supplementary Planning Document (2011) - Policy 14 Local Grid Connections & Ancillary Equipment;
- Local Plan (2003) Policy IN10 – Wharfs; and
- Local Plan (2003) Policy DS21 - Renewable Energy.

2.8 Additional Consents, Licences and Permits

2.8.1.1 The Project will require additional consents, licences and permits to enable it to be constructed and/or operated, and for which the SoS is not the authorising body under the Planning Act, 2008.

2.8.1.2 The following is not necessarily a comprehensive list but at this stage gives an indication of other consents, licences and permits that the Applicant intends to obtain to allow the construction, operation and maintenance of the Project,

noting some are contingent upon particular circumstances, such as the presence of protected species:

- an Environmental Permit from the Environment Agency under The Environmental Permitting (England and Wales) Regulations 2016 (as amended);
- a deemed Marine Licence from the MMO under the Marine and Coastal Access Act 2009 for construction works in the River Trent;
- a licence from the MMO under the Marine and Coastal Access Act 2009 for the disposal of spoil dredged from the bed of the River Trent;
- approvals from Highways England and North Lincolnshire Council relating to requirements for access and road improvements to be contained in the development consent order;
- licences from Natural England, if required, to affect European Protected Species regarding regulation 53 of the Conservation of Habitats and Species Regulations 2010;
- licences from Natural England, if required, to affect badgers regarding section 10 of the Protection of Badgers Act 1992;
- licences from Natural England, if required, to affect protected species under section 16 of the Wildlife and Countryside Act 1981;
- consents from Natural England to work in SSSIs under regulation 28E of the Wildlife and Countryside Act 1981;
- consent(s) from the Environment Agency for structures in, under or over a main river pursuant to section 109 of the Water Resources Act 1991;
- consent(s) from the internal drainage board to alter ordinary watercourses regarding section 23 of the Land Drainage Act 1991;
- consent(s) from the relevant sewerage undertaker to discharge wastewater to a sewer pursuant to section 118 of the Water Industry Act 1991;
- consent(s) from the North Lincolnshire Council pursuant to section 61 of the Control of Pollution Act 1974; and
- approvals to operate from the Health and Safety Executive under various Health and Safety regulations.

3. THE PROJECT

3.1 Statement of Need

3.1.1.1 The National Policy Statement for Renewable Energy Infrastructure (EN-3) sets out a national need for the generation of energy from the combustion of waste, and highlights the increasing importance that the recovery of energy from the combustion of waste, where in accordance with the waste hierarchy, will play in meeting the UK's energy needs.

3.1.1.2 The DEFRA Waste Framework Directive[1] (WFD) (DEFRA, 2011) sets out the waste hierarchy and enshrines it in law. It requires that the recovery of energy from waste should be prioritised ahead of any alternatives that would result in disposal.

3.1.1.3 Refuse Derived Fuel (RDF) is a final product derived from municipal black bag waste that cannot be or is economically unviable to recycle. Recycling recovery volumes continue to increase as sorting technologies improve, but 26 million tonnes of waste remain unrecycled each year and is converted to RDF. Nine million tonnes of RDF per year currently goes into landfill after the existing 50+ Energy Recovery plants that are operational or in construction in England, have extracted their feedstock, as the current Energy Recovery plants do not have the capacity to use it. Three million tonnes of RDF has historically been exported annually, much of which passes through docks on the Humber River, but the volume of exports has declined in the past year due to import tariffs imposed by European and global destinations and due to COVID-19 demand turndown. This will increase the pressure on volumes destined for landfill.

3.1.1.4 As landfill sites across the country are closing, councils and waste authorities are looking to other alternatives that offer a more sustainable solution. Landfilling is the option of last resort when disposing of waste because it generates significant greenhouse gases and the value of the resource is effectively lost forever. Recovering energy from domestic waste is a better environmental solution than landfill, provided the plant is efficient in turning that waste into useable energy. The target to remove biogenic waste from landfill by 2023 and the segregated collection of food waste will result in RDF becoming predominantly non-recyclable plastic.

3.1.1.5 North Lincolnshire Council has expressed an interest in establishing an ERF in the area to reduce the cost of waste management and deliver the benefits within North Lincolnshire. The regional need for this facility is to intercept the 2 million tonnes of RDF currently being exported through the Humber ports and the 3 million tonnes of household waste currently being landfilled in the East Midlands region. In addition, the closure of landfill sites and the tariffs being placed on exported waste will require an estimated additional 50 energy recovery sites across the UK over the next 10 years.

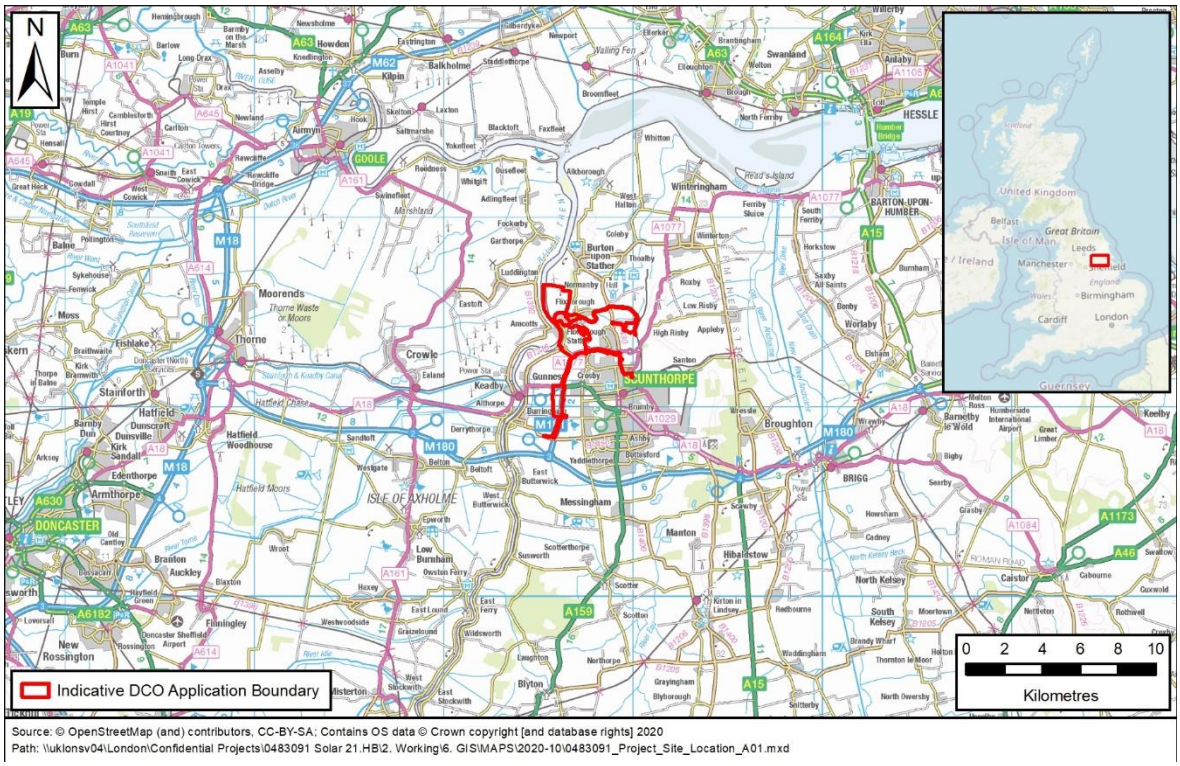
[11] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69353/pb13569-wfd-guidance-091001.pdf

3.2 Project Description

3.2.1 Site and Surrounding Area

3.2.1.1 The Project site is located at and around Flixborough Port, adjacent to Flixborough Industrial Estate, Stather Road/First Avenue, Flixborough DN15 8SF. The Project site location is shown in Figure 3.1: Project Site Location.

Figure 3.1: Project Site Location



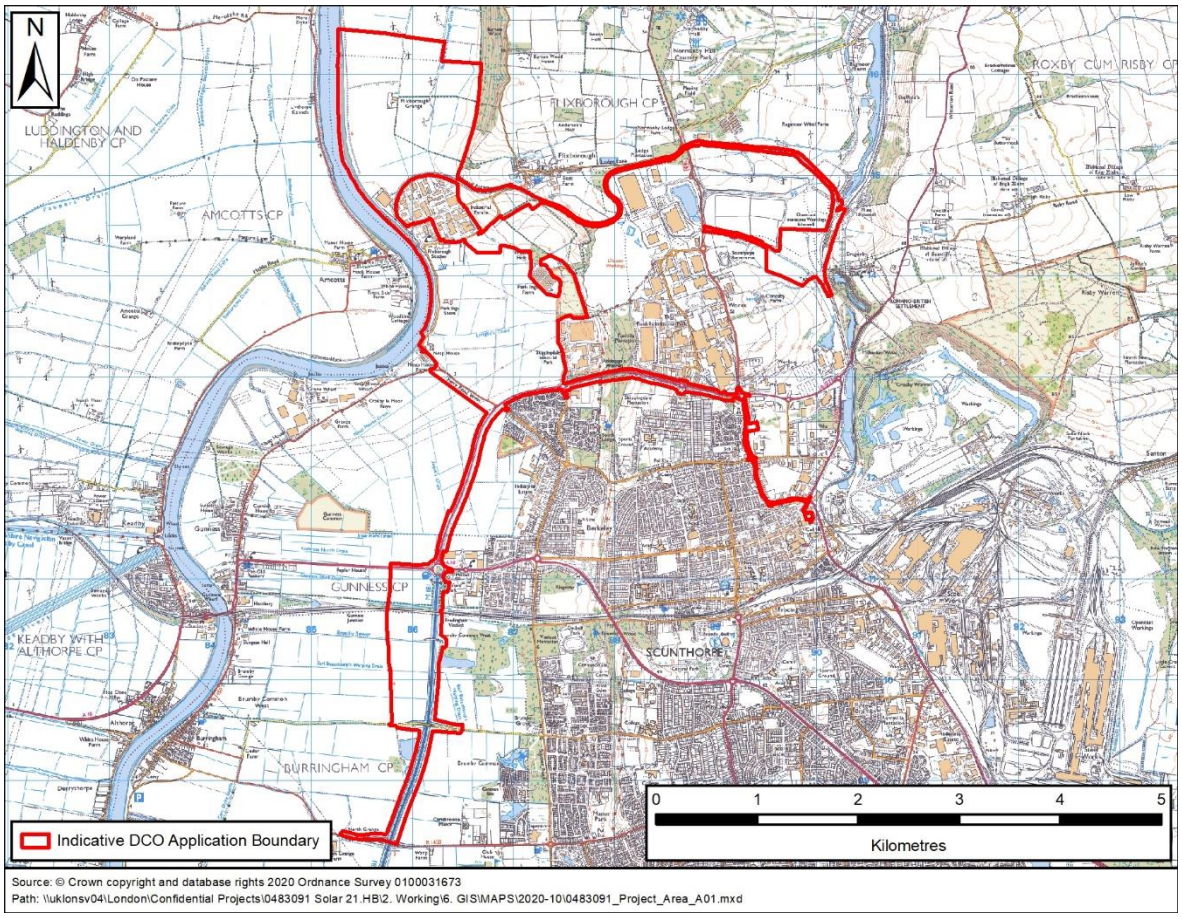
3.2.2 General Setting

3.2.2.1 The Project site includes land within and adjacent to Flixborough Port (RMS Trent Ports) on the River Trent in North Lincolnshire. The Flixborough Port and Flixborough Industrial Estate together form an active industrial complex that has supported a range of businesses and industrial activities since the early 1900s. Existing infrastructure at the Project site includes roads, a rail spur, a 155m long wharf, weigh bridge, cranes, warehousing and stock sheds, workshops and portable offices. Large industrial facilities within the wider Flixborough Industrial Estate and on adjacent land include a cement works, wind turbines, grain processing facilities, and a small power station that has a feedstock of chicken litter and bone meal. The current industrial operations at the Flixborough Port and the Flixborough Industrial Estate provide a brownfield setting that is appropriate for further development. The Project site has national and international transport connectivity by road, rail, and river to sea via the River Trent and River Humber. Land adjacent to the Flixborough Industrial Estate that is included for development by the Project is currently a mix of both brownfield land and areas used for arable agriculture.

3.2.3 The Project Site

3.2.3.1 The main part of the Project site is located on brownfield and agricultural land to the south of Flixborough Wharf and south of the Flixborough Industrial Estate in North Lincolnshire. The site is on the east bank of the tidal River Trent, immediately west of the village of Flixborough and within 2km northwest of Scunthorpe. The Project site as shown in Figure 3.2: Indicative Project Site Boundary covers an area of 598.5 ha. The finished above ground development will occupy 120 ha and the red line boundary will be refined as design proceeds.

Figure 3.2: Indicative Project Site Boundary



3.2.3.2 The main elements of the Project comprise the following key components, defined as the NSIP and Associated Development.

NSIP

- an up to 100 MWe Energy Recovery Facility (ERF) designed to convert up to 760,000 tonnes of refuse derived fuel (RDF) and non-hazardous household and commercial waste annually into energy in the form of power, heat, and steam;
- a water treatment facility; and
- feedstock storage for up to13,000 tonnes of RDF and non-hazardous household and commercial waste.

Associated Development

- carbon dioxide capture facility;
- offices, business centre and visitor centre for the ERF;
- expansion of the existing riverside wharf to provide a total length of approximately 420m, capable of bulk handling;
- renewable energy storage – including hydrogen, battery storage and steam storage;
- a new railhead and reinstatement of an existing 6km railway line that links Flixborough Port to Dragonby Sidings;
- an access road and upgraded road system to improve the flow of traffic between Flixborough Port and Ferry Road West;
- polymer production facility;
- concrete block manufacturing facility producing up to 262,000 tonnes annually using reprocessed residues;
- A treatment facility for approximately 95,000 tonnes of Incinerator Bottom Ash (IBA) and 17,000 tonnes of Flue Gas Treatment residues (FGTr);
- a hydrogen production facility;
- back up heat and power generation to be fuelled by hydrogen;
- Natural gas, hydrogen, and bio methane Above Ground Installation (AGI) infrastructure (to connect to National Grid gas);
- electric vehicle (EV) and hydrogen (H_2) refuelling station for cars, buses and HGVs; and
- a heat, cooling, hydrogen gas, carbon dioxide and renewable power off take / export.

3.2.4 Description

3.2.4.1 The land take or Project footprint required is shown by the indicative Project site boundary, shown in Figure 3.2: Indicative Project Site Boundary, which has been defined for the purposes of the EIA scoping phase and may be refined as the Project develops.

3.2.4.2 The Project includes upgrading the 6km long private railway line that connects the Project site to the Dragonby Sidings and provides the site with multi-modal access and egress with road, sea, and rail connectivity.

3.2.4.3 The Project will include works within the River Trent, which will be agreed with RMS Ports, Associated British Ports (ABP) as the Port Authority, and will require a deemed marine licence (as part of the DCO) from the Marine Management Organisation (MMO).

3.2.4.4 To the south of Flixborough Port, the indicative Project site boundary includes an area for a new access road which will facilitate improved road connectivity between the Wharf and B1216 (Ferry West Road) and an area of agricultural land which will be repurposed for the construction of an electric vehicle changing and hydrogen fuelling station to the north of the B1216.

3.2.4.5 The Project will also include access to land adjacent to the A1077, to facilitate the construction of gas, heat, and cooling offtakes from the Project.

3.2.5 The Technology and Feedstock

3.2.5.1 The choice of technology for the combustion of the feedstock is currently not decided and Solar 21 are actively seeking options that will optimise the rate of energy recovery whilst maintaining the highest health, safety and environmental standards.

3.2.5.2 At its most simple, the technology works by combusting RDF and non-hazardous household and commercial waste to generate heat, which in turn is used to generate steam from water that is used to turn a steam turbine to generate electricity. Residual heat can then be used to provide heat and steam to the Project's heat off-take and steam storage elements, and warm water and generated electricity can then be utilised to produce hydrogen.

3.2.5.3 By-products of the combustion process include ash and gaseous emissions. The residues which include, particulates, dioxins, and other contaminants are treated to produce an inert aggregate-like product, which will then be used in the production of concrete products at a purpose built facility within the Project site.

3.2.5.4 The gaseous emissions will be cleaned, and a portion of the carbon dioxide will be removed, and particulates neutralised through the residue treatment process. Waste heat will be recovered and used in the steam cycle. Any excess steam will be stored and utilised when the demand is high.

3.2.5.5 At present, the Project design is still evolving and it is essential that any feedback from the consultation processes is incorporated into the final design, which will also consider any technology improvements that are available before consent has been granted.

3.2.5.6 The feedstock for the ERF will be RDF and non-hazardous household and commercial waste, with an anticipated feedstock tonnage capacity of upto 760,000 TPA. RDF is a solid product derived from the municipal, industrial and/or commercial waste streams. Solid waste would be sorted to remove recyclable material and non-combustibles such as metals and glass. The remaining material typically includes biodegradable material and plastics, which are shredded, dried and compacted into relatively homogenous bales which are shrink-wrapped. These comprise a transportable and combustible feedstock with a high calorific value. In the future more waste processors will remove any biodegradable material and segregated food waste collections will also remove this at source. This will create RDF with an increased calorific value.

3.2.5.7 The feedstock will be procured through long-term supply contracts with Local Authorities, Tier One Contractors and waste aggregators within a 100-mile radius of the Project site including in the cities of Manchester, Leeds, Derby, Nottingham, Hull and York. The expected throughput of RDF and non-hazardous household and commercial waste through the Energy Recovery Facility each year will be up to 760,000 tonnes, with the opportunity to reprocess additional plastic for plastic derived fuel or to reform polymers for recycling.

3.2.5.8 Details of each of these components is presented below.

3.2.6 Energy Recovery Facility Infrastructure

3.2.6.1 The ERF will be located on a mixture of both greenfield / arable and brownfield land within and to the south of the current Flixborough Wharf site. The facility will be contained within steel-walled housing that is expected to be no more than 55m high. For the purpose of defining a worst-case scenario for the EIA, the ERF will have an emissions stack with a maximum height of 100m above ground level. The worst-case scenario for the stack height has been determined using the outcome of atmospheric dispersion modelling, with the objective of defining a stack height that is sufficiently high to avoid potentially significant adverse effects on human and ecological receptors from stack emissions.

3.2.7 Renewable Energy Storage

3.2.7.1 The Project will operate 24 hours a day, all year round (except for maintenance shutdowns). In addition to exporting electricity to the grid, the Project will be capable of storing energy in the form of hydrogen, steam, and through the use of battery technology which will provide flexibility to boost electricity output when demand is high.

3.2.7.2 Hydrogen will be produced by electrolysis, using water and power from the ERF, when the value of exported electricity is minimal or negative. The Project will install an electrolyser to produce hydrogen, which could be used to produce electricity when demand is high, de-carbonise the gas grid, and / or provide zero carbon fuel for HGV's, buses, and cars at the onsite hydrogen vehicle fuelling station.

3.2.7.3 Steam storage is essential to balance supply and demand on district heat networks. It also helps to manage the production of steam when there is no demand for electricity and excess steam is produced. The Project will have capacity to store steam, which can be used to generate electricity through steam turbine generators or boost the district heat network.

3.2.7.4 Thermo Storage technology will also be incorporated into the Project to increase the efficiency of the plant. Energy may be stored through the use of volcanic rock or hot water. The exact details of the storage medium will be defined as the design of the Project progresses.

3.2.7.5 Battery storage can provide resilience to the National Grid, balance the supply of generation and fluctuating demand and allow the facility to store electricity when the local and network demand are low for release when demand is high.

3.2.8 Carbon Dioxide (CO_2) capture and utilisation

3.2.8.1 The Project proposes to design and implement CO_2 capture post combustion, and not just demonstrate readiness. The implementation of carbon capture from the first day of operation will reduce the operational carbon footprint of the Project, and is in line with the UK's aspirations to become carbon neutral by 2050.

3.2.8.2 The carbon capture infrastructure will be located adjacent to the ERF to the south of the Flixborough Port site.

3.2.9 Water Treatment Facility

3.2.9.1 Water will play an essential role in the operation of the Project, not only for the generation of steam to drive the steam turbine, but also for the production of hydrogen through electrolysis and steam for the CHP steam and heat network offtake. For this reason, the DCO will include an application for an abstraction licence to supply water for the Project from a dedicated groundwater abstraction borehole during operation(to be installed as part of the Project), and may require a temporary abstraction from the River Trent during construction.

3.2.9.2 Abstracted water will need to be treated before it can be used for any operational processes, and as such the Project includes the construction and operation of an onsite reverse osmosis treatment plant.

3.2.10 Hydrogen Production Facility

3.2.10.1 To facilitate the production of hydrogen, a Hydrogen Production Facility will be constructed adjacent to the main ERF plant. The plant will utilise an electrolyser that will use electricity generated by the ERF and residual warm water to split water into hydrogen and oxygen. Hydrogen will then be stored onsite, fed into the national gas grid (when possible, via the AGI), used to fuel hydrogen vehicles, or used to generate electricity when demand is high.

3.2.11 Hydrogen and Natural Gas AGI

3.2.11.1 The Project includes the construction of a new gas above ground installation (AGI) which will facilitate the supply of natural gas to the Project for auxiliary firing and to facilitate the export of hydrogen to the gas grid a point in the future when the concept has been validated.

3.2.12 Hydrogen Fuel Cells

3.2.12.1 The Project will include the construction and operation of hydrogen fuel cells that will be used to generate electricity or heat from hydrogen. The fuel cells will be housed in an acoustically enclosed building within close proximity to the Electric Vehicle and Hydrogen Re-fuelling station with approximate dimensions 12.2m by 2.5m by 2.6m high.

3.2.13 Electric Vehicle and Hydrogen Re-fuelling station

3.2.13.1 The Project will include the construction of an electric vehicle charging and hydrogen refuelling station located on agricultural land on the north side of the B1216 Ferry Road West, which will utilise power and hydrogen produced by the Project, to serve the emerging and growing need in the area.

3.2.14 Power, Heat, and Gas Distribution

3.2.14.1 The Project will incorporate an integrated infrastructure off–take to deliver power, heat, cooling and gas (CHP) to local planned industrial, commercial and housing developments to the east and south of the Project Site. The southern off-take will be approximately 7km long and will require booster stations to maintain the heat supply all year round. Connection points will be included throughout the length of the off-take to facilitate new supplies

being added in the future without major disruption. Where the power, heat and gas offtakes run in parallel with the new access road, this will be designed to carry all the utilities to provide ease of access and minimal disruption for maintenance.

3.2.14.2 The eastern offtake feeding developments within Scunthorpe Town Centre will branch off eastward along the A1077 and terminate at Church Square in the centre of Scunthorpe. The offtake will be designed to allow future developments to 'tap-in' to the supplies as they come online.

3.2.15 Feedstock Transport and Storage

3.2.15.1 The feedstock for the ERF (RDF and and non-hazardous household and commercial waste) will be transported to the facility via road, rail, river or combinations thereof (see Section 14). It will be stored in a designated on-site enclosed feedstock storage facility to facilitate the continuous supply to the ERF, operated under negative pressure to minimise odour, dust, and noise. A reserve feedstock requirement for five days of operation will be held on-site at all times, which equates to approximately 13,000 tonnes. The stored feedstock will be baled and wrapped and stored in purpose-built containers that allow for safe transport to the Project site via ship, train or road.

3.2.16 Ash Handling Facility

3.2.16.1 The ash produced from the energy recovery process will be treated on-site in a facility that will adjoin the ERF. The ash derived from the combustion of RDF and non-hazardous household and commercial waste feedstock is classed in two categories: bottom ash and fly ash. The bottom ash will be reprocessed using crushing and trommels, with metals separated. The flue gas treatment residue (or FGTr) will be processed using carbonation, in which cement and CO2 are mixed with the FGTr and form an aggregate.

3.2.17 Polymer Production Facility

3.2.17.1 Plastics are typically made from the polymers contained in natural gas and oil. These plastics are traditionally split into 7 categories – polyethylene terephthalate or PET typically mineral water bottles, high density polyethylene or HDPE typically detergent bottles, polyvinylchloride or PVC typically toys, pipes and gutters, low density polyethylene or LDPE typically disposable supermarket bags, polypropylene or PP typically heat resistant food containers, polystyrene or PS typically fast food containers and then a category for others. Source-segregated waste plastic is more readily recycled than mixed plastic waste and the target is to establish a commercially viable process to extract the original polymer types from a mixed waste stream to produce clean polymers free of contaminants that can be used to manufacture new plastic products without the use of fossil fuels.

3.2.17.2 Segregated sources of plastic waste that are manufactured using thermoplastic polymers, can easily be heated and re-formed, using the waste heat from the ERF. Technologies have now been developed that will clean and segregate mixed plastic waste and will allow specific polymers to be separated out as the temperature is reduced.

3.2.17.3 Up to 25,000 tonnes per year may be recovered as polymers but there will still be a large proportion of non-recyclable plastics that will be combusted to recover the heat energy. Up to 18,000 tonnes of clean and re-usable polymers could be produced per annum which would displace the use of fossil fuels. Currently 4% of the total world production of oil and gas is used directly in the manufacture of plastics.

3.2.18 Concrete Block Manufacturing

3.2.18.1 Once treated, the ash residues will contribute to the manufacture of up to 262,000 tonnes per year of concrete blocks. The ash can either be shipped off site in vacuum tankers for inclusion into specialist concrete products or used to produce concrete blocks in the adjoining facility. In this way, the ash will be diverted from landfill.

3.2.19 Offices, business centre and visitor centre

3.2.19.1 The business centre and visitor centre will support the administration and security of the whole site. The building will support meeting rooms and flexible office space. The visitor centre will support a wide range of opportunities to educate young and mature students in the technologies and processes that are involved in energy recovery, re-use of resources and the decarbonisation of gas, electricity and heat. The need to inform our decision-makers, politicians and the wider community about the impact of lifestyle choices and its impact on the environment is seen as part of the Solar21 corporate responsibility.

3.2.20 New Access Road

3.2.20.1 The Project will include the construction of a new access road to provide a better road transport link from the Flixborough Industrial Estate out towards the A1077 and the M181. The construction of the road will also incorporate the power, heat, cooling and gas infrastructure for the proposed district heat off-take. The exact route alignment and entry points have yet to be agreed and the road entry and exit points designed.

3.2.21 Rail Spur and New Railhead Development

3.2.21.1 The Project will include the development of a new railhead at Flixborough Port and the re-opening of the 6km railway track linking the Flixborough Port to the sidings at Dragonby, to facilitate the delivery of feedstock and the export of concrete blocks manufactured at the site.

3.2.22 Wharf Extension

3.2.22.1 The Project will extend the length of the wharf at Flixborough Port from the current length of 155m to approximately 420m. It is proposed that the current wharf is doubled in size in order to accommodate additional ships for the delivery of feedstock whilst not interfering with the current port operations.

3.2.22.2 The wharf will be developed to provide automated handling of feedstock, concrete products, and other cargo.

3.2.23 Summary of Project Elements

Project Element		Approximate Footprint	Approximate Height (above ground level)
ERF Plant (inc. Feedstock Storage Facility Water Treatment Facility and CO2 capture, and Steam Storage)	Main Building	300x205m	55m
	Stack	10x10m	100m
Offices and Admin Facilities		35x135m	35m
Renewable Energy Storage	Battery	115x58m	4m
Hydrogen Facility	Electrolysers, compressors, buffer tanks and refuelling station	70x45m	6m
	Fuel cells	12x5m	3m
Heat Offtake	Width and depth below ground	5m working width	2m below ground
Gas AGI		60x60m	
Polymer Production Facility		300x150m	24m
Residue Reprocessing and Concrete Block Manufacturing		210x180m	20m
New Access Road		25x1,300m	N/A
Railhead		850x50m	N/A
Wharf Extension	Length	Up to 420m	N/A

3.3 Landscaping and biodiversity

3.3.1.1 The Impact Assessment for the government's proposed emerging policy on Biodiversity Net Gain (BNG) identifies 10% as the lowest level of biodiversity gain that Defra could confidently expect to mitigate a development's role in biodiversity loss. The 10% provides a small margin of gain to account for uncertainties and variation in project delivery and success. If all projects demonstrate 10% BNG through design, then cumulatively they should at least achieve no net loss in biodiversity.

3.3.1.2 As a Nationally Significant Infrastructure Project (NSIP) the Project does not fall directly within the remit of the national policy requirement within The Environment Bill to deliver 10% BNG.

3.3.1.3 Although BNG is not mandatory for NSIPs, it is The Applicant's desire to develop a project that is closely aligned with this initiative.

3.3.1.4 As such, the Project will strive to incorporate the methodology for calculating BNG described within the Defra metric 2.0, and will include an integrated landscaping and biodiversity strategy which will seek to mitigate any potential effects on landscape and visual impacts whilst also incorporating a biodiversity net gain.

3.4 Stakeholder Engagement

3.4.1.1 The Planning Act 2008 and secondary legislation, including the EIA Regulations, set out the statutory requirements for consulting with prescribed consultees and the local community (in Sections 42 and 47 of the Planning Act 2008 respectively).

3.4.1.2 In accordance with its statutory duties, The Applicant's will undertake statutory consultation including the publication of a Preliminary Environmental Information Report (PEIR) during the pre-application phase (expected in Q1 2021).

3.4.1.3 The involvement of both statutory and non-statutory stakeholders can result in benefits for all parties, through eliciting environmental information which may not otherwise have come to light, increasing trust and transparency as well as providing an opportunity to address potential concerns. In accordance with Section 49 of the Planning Act 2008, The Applicant will have regard to any consultation responses and feedback received in the further design development of the Project, and assessment of the likely significant environmental effects.

3.4.1.4 In addition to the statutory requirements, The Applicant has completed an 8 week period of non-statutory engagement in order to identify any issues earlier in the development process. This engagement has taken the form of mail shots of project information and literature to the local community, local newspaper advertisements, online presentations / webinars where members of the public are encouraged to ask questions of the project team and their advisors, and one-to-one telephone 'drop-in' sessions, where individuals have been able to discuss the proposals for the Project with a North Lincolnshire Green Energy Park Ltd representative.

3.5 Project Programme

3.5.1.1 Assuming that the DCO Application is submitted in Q3 2021, the earliest approval would be Q4 2022. Construction would therefore begin no sooner than Q1 2023 and will take three years to complete. Operation is expected to begin in 2025/26 and to operate for 25-40 years. A technology refresh would be anticipated by 2050/51, subject to future changes in technology.

3.6 Construction Phase Activities

3.6.1.1 The ES will define how construction materials and components of the ERF will be brought to the Project site (i.e. by road, rail, river and combinations thereof).

3.6.1.2 Construction laydown will be located within the indicative Project site boundary set out within this Scoping Report.

3.6.1.3 Construction techniques for piling, basement and foundation laying will be defined in the ES.

3.6.1.4 The ES will also define any particularly noisy activities (e.g. concrete breaking or the demolition of existing buildings) that will occur during construction and their timing. Any noise abatement methods that will be employed will also be defined.

3.6.1.5 Piling in the River Trent during the construction of the wharf extension is likely to be driven piles.

3.6.1.6 A small brick derelict pump house on the bank of the River Trent will be demolished.

3.6.1.7 The concept engineering design of any flood risk defence infrastructure will be defined in the ES.

3.7 Operation of the Project

3.7.1.1 For the purposes of defining the Scope of the EIA, is has been assumed that the Project will be able to operate 24 hours/day, 7 days/week, 365 days/year. However, this will be subject to planned outages. The facility will most likely operate in the region of 8,000 hours/year. This assumption may change as further details of the Project develop, and the operational regimes of each element of the Project are further defined.

3.8 Decommissioning of the Project

3.8.1.1 After the Project's operational lifespan, the Project is likely to be decommissioned. While it is difficult at this early stage to accurately define how the Project site will be redeveloped, decommissioning is likely to involve the dismantling and recycling of the ERF components with associated movements of HGVs, traffic and waste. These activities will be managed through appropriate environmental management plans and industry best practices and are not expected to result in any abnormal environmental conditions.

3.9 Access

3.9.1.1 The site will be accessed by road, rail, and river. The inward transportation of feedstock, as well as the outward transportation of concrete blocks will be split between road, rail and river freight. For the purposes of the EIA, and in accordance with the Rochdale Envelop approach, a realistic worst case of the proportionate split between these modes of transport will be defined and assessed. These transport connections are detailed below.

3.9.2 Road Access

3.9.2.1 Road access to the operational Flixborough Port is currently via B roads that link to the A1077 and A18 and on to the strategic motorway network via the M181 located approximately 5km to the south. The Project includes an improvement the B1216 where it connects to the A1077 in order to by-pass the dwelling at Neap House Farm to the south of the Project site. The B1216 is currently used by traffic accessing the Flixborough Industrial Estate and Flixborough Port. The road improvement will facilitate the flow of traffic approaching the Project site from the south.

3.9.3 Rail Access

3.9.3.1 A 6km long single-track rail line connects the Flixborough Port with the steel works at Scunthorpe. This line was in use until 2012 when it carried 1m tonnes of steel and iron ore to service British Steel (Tata) before being bought by the

current owners, RMS Ports. In places the line has been encroached on by vegetation but the rails are still in place and connect directly to the mainline railway through to Immingham and Hull.

3.9.3.2 During site preparation works, the line will be cleared of vegetation and following engineering safety checks, the line will be brought back into operation to facilitate the transportation of feedstock and the automated handling of feedstock, ash, and concrete products. A new railhead will be constructed within the Project site boundary.

3.9.4 River Access

3.9.4.1 Flixborough Wharf is on the tidal River Trent and is an operational port capable of handling 600,000 tonnes per annum of dry bulk, general cargo and steel. The Project will require river access adjacent to the ERF and railhead capable of handling two 5,500 dwt coasters up to 95m length and with 5.5m draft, as well as barge traffic. To achieve this, the Project will extend the existing wharf to the north from 155m to 420m length.

3.9.4.2 The ES will define the numbers and frequencies of daily/weekly vessel movements to and from Flixborough Wharf, as well as any potential effect on the operation of the port during construction and operation, if any.

3.10 Electrical Grid Connection

3.10.1.1 An electrical grid connection has been secured with Northern Power Grid (NPG) at the 132kv Scunthorpe North Substation. A “Statement of Works” has been provided by National Grid stating that the connection will require no strengthening of the 132kv connection back to the National Grid at Keadby. As no works are required to establish the electrical grid connection for the ERF, the electrical grid connection is not included in the DCO application or further discussed in this Scoping Report. The power output of the EFW (upto 100 MWe) will primarily be used for on site consumers, within the North Lincolnshire Green Energy Park itself, to power the ash treatment facility, concrete block manufacturing and production of hydrogen, and the balance will be exported to the national grid.

3.11 Emissions and Waste Streams

3.11.1.1 The ES will present data on the types and quantities of waste streams produced during construction, process wastes during operation, and other waste streams where there is potential for them to have an impact on the environment.

3.12 Water Requirements and Management

3.12.1.1 The supply of water for construction of all elements of the Project will ultimately be the responsibility of the principal construction contractor. However, at this early stage in the evolution of the design it has been assumed that water required during construction will be sourced from either the public water supply, a private groundwater abstraction borehole to be installed as part of the project, or abstraction from the River Trent. Should they be required, an application for a borehole and or river abstraction licence will be applied for

and provision will be made to include treatment by reverse osmosis to remove any potential contaminants.

3.12.1.2 The discharge of any effluents during construction, including site drainage, will also be the responsibility of the principal construction contractor who will be required to reach agreement with the Environment Agency, Internal Drainage Board (IDB) and the local sewerage undertakers with regards to detailed methods of disposal.

3.12.1.3 For the purposes of scoping, it is assumed that the Project will utilise air-cooling condensers, substantially reducing operational water intake. During operation, the process water required on a day-to-day basis for the Project would be for make-up to the boiler feed water. This is expected to be approximately 13m^3 per hour, and it is anticipated that this water will be sourced from the public water supply. Should this position change during the design of the Project, opportunities for ground water abstraction will be considered and discussed with the Environment Agency, with an assessment of the impacts on ground water and water resources included in the PEIR and ES.

3.12.1.4 Small quantities of water (blowdown) will be discharged to avoid the build-up of impurities in the steam/water cycle. The blowdown is virtually pure water containing very small quantities of chemicals that are used to prevent corrosion and scaling in the system. This blowdown will become incorporated into the bottom ash and will be discharged, to the local sewerage network, via the ash treatment facility, subject to agreement with the local sewerage undertaker, or removed from site by tanker and disposed of at an appropriately licensed treatment facility.

3.12.1.5 At this stage, discharge of both construction and process water to the River Trent has been discounted and liquid effluents will be released to sewer following agreement with the local water authority. Should this position change during the design of the Project, opportunities for discharge consent will be discussed with the Environment Agency, with an assessment of the impacts on the River Trent, aquatic ecology and water resources included in the PEIR and ES.

3.12.1.6 The ES will define the quantities and flow rates of process water in and effluents out.

3.12.1.7 Water will also be required during the operational phase as a key element in the production of hydrogen. Although the details of the electrolyser have not been finalised, and the operational water balance of this element of the Project is still under consideration, the assessment is based on a standard assumption of 20m^3 water per 100 MW electricity input. As such, it is likely that the hydrogen production element of the Project will have an operational water demand of approximately 2m^3 per hour.

3.12.1.8 The discharge of surface water will be detailed in a surface water drainage strategy which will be developed in consultation with the Environment Agency, Lead Local Flood Authority, and Internal Drainage Board as necessary.

3.13 Design Evolution, Flexibility and Applying the 'Rochdale Envelope'

3.13.1.1 Large-scale projects commonly go through substantial design evolution during the planning stage, as such the Project design must be flexible and respond to changes in economic and technological developments. PINS recognises this need for design evolution and flexibility, particularly as the outcomes of pre-application and EIA stage consultations can influence Project design for the better. Despite an Applicant's need for a responsive design, Regulation 14 (2) (a) of the IP EIA Regulations 2017 requires that the ES describes the Project '*comprising information on the site, design, size and other relevant features of the development*'. This is to allow the likely significant environmental effects of the development to be assessed with a view to enabling the decision-maker, statutory consultees and the public to make well-informed responses.

3.13.1.2 An EIA therefore typically strives to define a proposed development with sufficient detail to allow the accurate prediction of likely significant environmental effects, whilst defining 'envelopes' of design flexibility or specification ranges within which the Applicant can realistically deliver the Project within a context of change. The definition of design envelopes includes the description of reasonable 'worst case scenarios' with respect to the likely significant effects on the environment caused by a given design component or specification. The worst-case design specification is identified in relation to environmental receptors and may vary between different receptors. For example, the worst-case stack height for landscape and visual amenity would be the maximum feasible height as it would be visible from the farthest distance and by the greatest number of receptors. By contrast, the worst-case stack height for air quality would be the minimum feasible height as atmospheric emissions would be released closer to the ground and be therefore more likely to affect local air quality.

3.13.1.3 Through this approach, an EIA robustly assesses the likely significant effects of the Project on the environment by taking account of reasonable design flexibility and variations. Such an approach is good practice, as reflected in case law that led to the definition of the 'Rochdale Envelope' principle: *R. v Rochdale MBC ex parte Milne (No. 1) and R. v Rochdale MBC ex parte Tew* [1999] and *R. v Rochdale MBC ex parte Milne* (No. 2) [2000]. Suitably applied in EIA it can help to avoid the need for protracted re-submission procedures at a later stage, whilst giving a comprehensive assessment of the likely environmental effects.

3.13.1.4 PINS Advice Note 7 (sections 9 – 12) highlights an important relationship between the level of uncertainty and the corresponding amount of detail that may be required to satisfy regulators and consultees:

3.13.1.5 "Where uncertainty remains, the applicant should provide as much detail as possible or assume the worst case (e.g. maximum dimensions of a building or feature)".

3.13.1.6 This DCO EIA has been scoped at a time when the Project is still evolving so a level of uncertainty is inherent. The Scoping Report makes every effort to be transparent about this and to be clear about the worst-case scenario for each impact such that the approach taken in every case is

precautionary whilst proportionate. This has included the development of a suite of Project description assumptions and worst case scenarios, which the Scoping Report sets out, in order to provide as much detail as possible on the nature of any potential impacts and/or the responses of receptors and to be very clear where any uncertainty lies. It goes on to specify what the EIA team intends to do in the later Preliminary Environmental Information Report (PEIR) and EIA phases to achieve a reasonable level of confidence/certainty in predicting likely significant effects.

3.14 Site Selection and Consideration of Alternatives

3.14.1.1 Regulation 14(2)(d) of the IP EIA Regulations 2017 requires 'a description of the reasonable alternatives studied by the applicant, which are relevant to the Project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment'.

3.14.1.2 The main alternatives considered by the Applicant are:

- alternative sites;
- alternative Energy Recovery technologies;
- alternative feed-stock products;
- feed-stock transport options;
- the strengthening of the 132kV cable connection to Scunthorpe North substation;
- an electrical connection beneath the River Trent to Keadby II; and
- stack height ranges.

3.14.1.3 The site was chosen based on the following criteria:

- It is within an existing industrial / brownfield location;
- Proximity to available feedstock;
- Multi-modal transport access;
- Proximity of grid connection of required capacity; and
- Local heat and power export opportunities.

3.14.1.4 Alternative sites were considered but they did not match the requirement of transport by rail and sea or have a proximity to a planned new-build development that could support local heat distribution.

3.14.1.5 The ES will present further detail on all alternatives considered by the Applicant.

4. EIA PROCESS

4.1 EIA Regulations and Guidance

4.1.1.1 Directive 2011/92/EU, as amended by Directive 2014/92/EU (the "EIA Directive") on assessment of the effects of certain public and private projects on the environment, requires an EIA to be undertaken for a range of projects. The Project is listed in Annex I (*2)(a) Thermal power stations and other combustion installations with a heat output of 300 megawatts or more.*

4.1.1.2 As described in *Section 2.3,* the requirements of the EIA Directive for developments defined as a NSIP by the Planning Act 2008 are written into UK law through the IP EIA Regulations 2017. These Regulations set out the statutory process and minimum requirements for the provision of adequate environmental information to enable the EIA process. The Scoping Report is provided in accordance with Regulation 10 of the IP EIA Regulations 2017.

4.1.1.3 Regulation 14 and Schedule 4 specify the information that must be included in an ES. The ES will report the findings of the EIA and its supporting activities including survey findings, modelling outputs, and additional studies.

4.2 Consultation

4.2.1.1 The requirement to consult with prescribed consultees is an important consideration within the Development Consent Order (DCO) application process, as described under Section 42 of the Planning Act 2008. In addition, Section 47 of the Planning Act 2008 requires promoters to consult with the local community. The consultation undertaken pursuant to Section 42 and Section 47 of the Planning Act will be presented in a Consultation Report which will be submitted with the DCO application.

4.2.1.2 The approach to consultation has been informed by the relevant legislation and guidance. In particular, the Planning Act 2008: Guidance on the pre-application process (March 2015), which recommends "*early involvement of local communities, local authorities and statutory consultees*". It also endorses an "*iterative, phased consultation consisting of two (or more) stages, especially for large projects with long development periods*". The requirements of North Lincolnshire Council's Statement of Community Involvement (2013) have also been taken into account.

4.2.1.3 The aims of this consultation are to:

- Deliver a robust consultation programme that meets statutory requirements, takes account of relevant guidance and delivers and iterative design process;
- Allow stakeholders, communities and 3rd party interests affected by any aspect of the Project to be engaged with at an early opportunity and given opportunities to feedback and raise concerns where appropriate;
- Utilise a range of consultation methods to promote participation including with hard to reach groups; and
- Promote awareness and understanding of the Energy Recovery process.

4.2.1.4 The Applicant is proposing a two-stage consultation:

- A non-statutory round of public consultation to introduce the Project concept, proposals and build a level of understanding of the need for the Project. This was carried out between 26 May and 14 July 2020; and
- A statutory round of public consultation will be carried out in accordance with the requirements of the Planning Act 2008. This will enable the local community to feedback on the PEIR and comment on any specifics of the Project. The consultation will take place for a minimum period of 6 weeks.

4.3 Purpose and Methodology of the EIA

4.3.1.1 The purpose of the EIA process is to produce the ES and associated documents to inform the decision-making process of the SoS and PINS when they come to make a recommendation in favour of or against granting consent, and to inform stakeholders regarding the likely significant effects of the Project throughout its lifetime.

4.3.1.2 It is also a tool for enabling an iterative project design process that allows potential environmental impacts to be designed out of the Project.

4.3.1.3 This Scoping Report functions as the terms of reference for the EIA, which will be presented in the PEIR and ES. Sections 6 to 16 outline the overall assessment methodology that will be adopted in the EIA and that has been considered in developing the scope of the technical topic assessments.

4.4 Preliminary Environmental Information Report (PEIR)

4.4.1.1 Under Regulation 12 (1)b of the IP EIA Regulations 2017, the Applicant is required to set out how it intends to publicise and consult on preliminary environmental information relating to the Project. Regulation 12 (2) then defines preliminary environmental information as being the information which has been compiled by the applicant, and is reasonably required for the consultation bodies to develop an informed view of the likely significant effects of the development (and of any associated development).

4.4.1.2 In the case of the Project, as set out in Section 4.2 above, the PEIR will be published as part of the statutory consultation process which will be undertaken in accordance with the Planning Act 2008.

4.5 Environmental Statement

4.5.1.1 The ES will identify the likely significant effects of the Project for each relevant EIA topic by comparing baseline environmental conditions with the future conditions that would prevail during the construction, and operation of the Project. The effects of decommissioning are considered likely to be similar to those encountered during the construction of the Project and therefore are not assessed separately. The effects of any decommissioning activities will be assessed in detail closer to the time of decommissioning, through the production of a decommissioning plan, which will be approved by the local planning authority prior to commencement.

4.5.1.2 The likely significance of any changes identified is established through comparisons of emissions with legal or industry standards (where appropriate)

and consideration of the environment's capacity to absorb or adapt to the effects identified. In the absence of specific quantified standards, changes to the physical environment (i.e. air, water, or soils) are not considered significant in their own right. A change brought about by the Project can only be significant in relation to the environmental receptors that experience the change. Environmental receptors can be people and communities, built resources (e.g. listed buildings) and natural resources (e.g. sites of ecological importance, protected species).

4.5.1.3 The technical topics often tailor this approach with the application of topic-specific criteria and other methods that are specific to the given field of study. The methodologies proposed for each topic are set out in Sections 6-16.

5. PROPOSED SCOPE OF EIA

5.1 Introduction

5.1.1.1 This Section describes the environmental topics that should be addressed by an EIA, in line with the requirements of the EIA Regulations. Schedule 4 specifies that the ES must include a description of the aspects of the environment which are likely to be significantly affected by the Project.

5.1.1.2 This requirement and the broad categories set out in Schedule 4, along with others which are considered likely to lead to significant environmental effects, have been interpreted and applied in the context of the Project. Table 5-1 sets out those topics that it is proposed to scope into or out of the EIA.

Table 5-1: EIA Scope

EIA Regulation Topic	Scoped In / Scoped Out?	Discussion and rational within this Scoping Report
Population	In	Considered in Sections 14 (Traffic and Transport) and 15 (Socio-economic Characteristics)
Human health[2]	In	Considered in Sections 6 (Air Quality), 8 (Noise and Vibration), and 10 (Hydrology, Flood Risk and Water Resources).
Biodiversity (for example fauna and flora)	In	Considered in Section 11 (Ecology)
Land (for example land take)	In	Considered in Section 9 (Ground Conditions and Hydrogeology)
Soil (for example organic matter, erosion, compaction, sealing)	In	Considered in Section 9 (Ground Conditions and Hydrogeology)
Water (for example hydromorphological changes, quantity and quality	In	Considered in Section 10 (Hydrology, Flood Risk and Water Resources, and 9 (Ground Conditions and Hydrogeology).
Air	In	Considered in Section 6 (Air Quality)
Climate (for example greenhouse gas emissions, impacts relevant to adaptation)	In	Considered in Section 7 (Climate) Green House Gas assessment
Material assets	In	Considered in Section 13 (Archology and Cultural Heritage), and 9 (Ground Conditions and Hydrogeology).
Cultural heritage, including architectural and archaeological aspects	In	Considered in Section 13 (Archology and Cultural Heritage).
Landscape	In	Considered in Section 12 (Landscape and Visual Impact).
Emission of pollutants, noise, vibration, light, heat and radiation, the creation of nuisances, and the disposal and recovery of waste	In	Considered in Section 6 (Air Quality), 8 (Noise and Vibration), 12 (Landscape and Visual Impact).

5.2 Topics Not Included in the EIA Scope

5.2.1.1 As set out in NPS EN1, the ES should be focused, documenting only the assessment of likely significant environmental effects. Therefore, those effects

[2] To reduce the potential for repetition, a standalone Human Health section of the EIA is not proposed.

which are not likely to result in significant affects should not be included, and should be scoped out of the EIA. Table 5-2 sets out those topics that have been determined not to be significant and therefore are not included in the EIA, together with the rationale for doing so.

Table 5-2: Topics to be scoped out

EIA Topic to be scoped out	Rational for "scoping out"
Risks of Major Accidents and/or Disasters	The ES will not include a stand-alone chapter for the risks of major accidents or disasters for the reasons set out below. Key environmental risks will be described within the Project Description section of the ES, which will also provide sufficient information upon which the assessment of such issues can take place. Topic chapters within the ES will consider foreseeable risks during the construction period, from accidents such as fuel spillages and identify how the risk of such events will be minimised (Section 9 - 10). In addition to any requirements set out in the DCO, the Project would be operated under an Environmental Permit issued by the Environment Agency. Provision of an Environmental Permit will be contingent upon the provision of emergency response plans and contingency measures designed to mitigate the effects of any accidents of disasters. In addition, it is considered that the Health and Safety effects arising from accidents and disasters would be dealt with through relevant industry controls. Impacts to human health from the operation of construction and operation of the Project will be considered as part of the EIA, as outlined in Table 5-1 above. For these reasons, it is considered that sufficient controls would be in place to ensure any effects to the environment resulting from accidents or disasters would be reduced to a level that is not significant. It is therefore considered that this can be scoped out of the ES.
Climate Change Risk Assessment	Climate Change Risk assessment, which would usually consider the impacts of a changing climate on the Project and surrounding areas (such as potential for wild fires, landslides etc.) will not be undertaken as the potential for these sorts of Climate Change associated risks are considered negligible for this part of the country (given land use and topography). However, as stated in Table 5-1, impacts on the Climate will be considered in a greenhouse gas assessment and the effects of climate change on flooding will be included in the site-specific flood risk assessment.

Aviation	It is not a requirement under the EIA Regulations to undertake an assessment of likely impacts to aviation resulting from a proposed development.
Daylight and Sunlight	Daylight and sunlight assessments typically consider the effects of a proposed development on levels of light at neighbouring properties and outdoor amenity areas. The closest residential receptors are located approximately 400 m to the west, Trent Side, on the opposite side of the River Trent from the Project. Given the intervening distance from Project, it is not considered that there would be any loss of daylight or sunlight at the closest residential receptors, and this element of the assessment is therefore proposed out of the EIA.
Environmental Wind	An environmental wind assessment typically assesses the effect of a proposed development on pedestrian comfort and safety because of any changes to the local microclimate created by the proposed development. As there are no public rights of way within or in sufficiently close proximity to the Project site, it is considered unlikely that there would be any pedestrian receptors that could be affected. For this reason, it is not considered that the Project would result in significant effects to the environment in terms of environmental wind. It is therefore proposed to scope environmental wind out of the EIA.
Waste	The ES will not include a stand-alone chapter for waste for the reasons set out below. The EIA Regulations require that ES describe the likely significant effects of the development on the environment resulting from 'the disposal and recovery of waste'. As with all major infrastructure projects, wastes will inevitably be generated during the construction of the Project. However, the degree of waste generated on modern construction sites is largely recognised as minimal, and what waste that is generated will be managed in accordance with Construction Environmental Management Plan (CEMP) and in accordance with legislative requirements aimed at environmental protection. It is The Applicant's aim to develop a project that is as sustainable and energy efficient as possible, which takes waste and turns it into a usable commodity. It is for this reason that the ERF is coupled with a concrete block manufacturing facility, which will take the waste generated by the ERF (in the form of ash) and turn it into a valuable product. For this reason, the operational waste from the Project is also considered to be negligible and likely be limited to office-based consumables. For this reason, the impact of waste generated by the Project is not considered within the ES. The secondary impacts of waste will be considered in other chapters where appropriate (i.e. traffic). It should also be noted that the waste used as fuel in not considered as a waste derived from the Project. Information on the Applicant's approach to waste management during construction will be provided in an outline CEMP included

	as an Annex to the ES and for operation will be described in the 'Project Description' chapter.

5.3 Approach to Mitigation and Environmental Management

5.3.1.1 Schedule 4 (paragraph 7) of the IP EIA Regulations 2017 requires that where significant effects are identified, the ES should provide:

> "a description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements (for example the preparation of a post-project analysis). That description should explain the extent, to which significant adverse effects on the environment are avoided, prevented, reduced or offset, and should cover both the construction and operational phases".

5.3.1.2 The achievement of high environmental standards is integral to the Project. Measures to avoid, prevent, reduce, or otherwise mitigate environmental impacts are integrated into the design of the Project as well as being planned into its implementation. For each significant negative effect of the Project that is identified during the EIA, the specialists undertaking the assessments will identify mitigation measures consistent with statutory requirements and good practice in their respective field. These measures will be committed to through a number of means, for example: integration into design; by imposition of requirements; or through a Code of Construction Practice or equivalent. Residual effects, once mitigation measures have been incorporated into the Project, will be classified as not significant or still significant (albeit reduced), as appropriate. Where effects are still significant, the mitigation options considered and the reasons for selecting particular measures will be reported in the ES.

5.3.1.3 In addition to the specific mitigation measures identified for each of the environmental topics, the Project will conform to general environmental management practices. Under the Construction (Design and Management) Regulations 2015, the Project's Construction Environmental Management Plan (CEMP) will include general environmental and health and safety considerations. It is no longer a formal requirement for developers to produce a Site Waste Management Plan.

5.3.1.4 The Project will be operated in accordance with the terms of an Environmental Permit approved by the EA. The application for this permit will be submitted at the same time as the DCO applications and, once granted, will set limits for noise and emissions to air, within which the Project must not exceed, and will also detail the requirements of monitoring of flue gasses. It is anticipated that this monitoring will use an automated system of instruments that allow monitoring to be undertaken 24 hours a day, 365 days a year.

5.3.1.5 Nevertheless, it is recognised that construction, operation, and decommissioning stages all have the potential to create waste. The Applicant will adopt good construction and management practices to ensure waste is minimised as far as possible and that the storage, transport and eventual

disposal of waste will have no significant environmental effects. Management and collection of the waste streams will be carried out under the requirements of the UK waste regulatory regime and within the framework provided by the Applicant's environmental management system, adopting accepted good industry practice.

5.4 Approach to the Assessment of Cumulative Effects

5.4.1.1 Both the EIA Directive and the IP EIA Regulations 2017 require the ES to consider the potential for the Project to have cumulative effects on receptors. NPS EN-1 also refers to the consideration of cumulative effects in paragraph 4.2.5, stating that:

> "The ES should provide information on how the effects of the applicant's proposal would combine and interact with the effects of other development (including projects for which consent has been sought or granted, as well as those already in existence)."

5.4.1.2 PINS Advice Note 17 (Cumulative effects assessment relevant to nationally significant infrastructure projects) goes on to emphasise the importance of considering cumulative effects in the context of the EU EIA Directive, the IP EIA Regulations 2017 and NPS EN-1.

5.4.1.3 The Cumulative Effects Assessment (CEA) proposed for the Project will be undertaken in line with the four-staged approach set out in PINS advice note 17 as follows:

- Stage 1: Establish the Project's zone of influence (ZOI) and identify a list of other developments within it.
- Stage 2: Identify a shortlist of other developments for CEA based on their potential to have similar effects to those of the Project on the same receptors,
- Stage 3: Information gathering,
- Stage 4: Cumulative Effect Assessment (CEA).

5.4.1.4 As recommended by PINS advice note 17, the outcome of Stage 1 is documented in this report (Section) in order that the SoS may respond to the CEA scope in the Scoping Opinion for the Project.

5.4.1.5 The following Sections identify the environmental topics scoped into the EIA, the likely effects identified and the methodology proposed to undertake the topic assessments. In some instances, the scope of the assessment is based on environmental information already collected (including desk study data, site walkovers and previously conducted survey work) which is being used to inform the emerging design of the Project.

6. AIR QUALITY

6.1 Introduction

6.1.1.1 This section sets out the approach and scope of the Air Quality Impact Assessment (AQIA) which will consider the wider environmental setting for the Project in terms of sensitive human and ecological receptors to changes in air quality.

6.1.1.2 The AQIA will consider the likely impacts on air quality in the construction and operational phases and identify likely significant effects. Where necessary, the AQIA will identify mitigation measures and design parameters. The AQIA will utilise a variety of approaches reflecting the sources of interest and the potential for significant effects to arise.

6.1.1.3 The AQIA will consider the following key elements:

- Construction Phase
  - construction dust; and
  - construction traffic.
- Operational Phase
  - emissions from the stack;
  - operational traffic (road, rail and shipping);
  - dust from ash handling; and
  - odour.

6.2 Topic-Specific Legislation and Guidance

6.2.1.1 The scope of the AQIA will be based on the following key legislation, policy and associated guidance:

- National Policy Statements EN-1 and EN-3.
- Air Quality Standards Regulations (England) 2016.
- Environment Agency (accessed September 2020) Air emissions risk assessment for your environmental permit (DEFRA, 2016a).
- Industrial Emissions Directive (IED) (2010) Directive 2010/75/EU.
- Institute of Air Quality Management (IAQM, 2017) Guidance on land-use planning and development control.
- Institute of Air Quality Management (IAQM, 2014) Assessment of dust from demolition and construction 2014.
- AQTAG06 Final Approved (Environment Agency, 2014a).
- Releases from waste incinerators: Guidance on assessing group 3 metal stack emissions from incinerators (Environment Agency, 2014b).
- TG(16) Local Air Quality Management (LAQM) Technical Guidance (DEFRA, 2018).
- Air Pollution Information System (APIS) (accessed September 2020).

6.3 Baseline Data Sources

6.3.1.1 Baseline air quality data and local meteorological data for the EIA will be derived from publicly available sources including local and national monitoring and mapping. No bespoke air quality baseline monitoring will be undertaken. There is an Air Quality Management Area (AQMA) for Particulate Matter (PM10) for central and eastern Scunthorpe and covering an area to the east of Scunthorpe that includes the site of a steelworks. This AQMA does not coincide with the Project site footprint but the ES will consider the AQMA within the context of the outputs of air dispersion modelling and Project-related road traffic.

6.3.1.2 The baseline for sensitive ecological receptors will be derived from information contained on the APIS website. The baseline data will be derived for each designated site of interest. Baseline data will be gathered for oxides of nitrogen, sulphur dioxide, ammonia, nutrient nitrogen deposition and acid deposition.

6.3.1.3 Baseline data for sensitive human receptors will be derived from a range of sources, including:

- National monitoring networks including:
- Automatic Urban and Rural Network;
- Automatic Hydrocarbon Network;
- Diffusion tube network;
- Heavy Metals network;
- Toxic Organic Micro Pollutants (TOMPS); and
- Acid gases and aerosols network.
- Local Authority monitoring; and
- Defra background mapping.

6.3.1.4 Some of the pollutants of interest for the Project may not be monitored locally. Where this is the case, data will be derived from other national sites, and professional judgement used to determine the most representative baseline data.

6.4 Likely Significant Effects

6.4.1.1 The AQIA will consider the likely significant effects from the following activities:

- construction dust emissions;
- construction and operational vehicle exhaust emissions;
- waste gases from the combustion process;
- rail transportation activities;
- emissions from shipping using the wharf;
- odour from a feedstock product containing a proportion of putrescible material;
- ash handing on site prior to reuse in the concrete manufacture facility; and

- other lesser sources as required.

6.4.1.2 Where any aspects of the plant design are not fully defined the Rochdale Envelope principle will be applied to establish suitable parameters for the assessment. In particular, within the AQIA, an assessment will be undertaken to define an appropriate stack height, including stack height sensitivity analysis. In addition, the assumption is made that the plant will operate with emissions within the limits set out in the Industrial Emissions Directive (IED).

6.5 Spatial Scope

6.5.1.1 The spatial scope of the AQIA will be as follows for the following activities:

- Demolition activities – 350m from activity;
- Land clearing – 350m from activity;
- Construction of the Project – 350m from activity;
- Track-out from the site – 500m from access points on public roads;
- Construction traffic - 200m of any road with increases in traffic above the IAQM screening thresholds;
- Emissions from the main stack on sensitive ecological receptors:
  - 15km for Special Areas of Conservation (SACs), Special Protection Areas (SPAs), and Sites of Special Scientific Interest (SSSIs), and
  - 2km for non-statutory sites and local designated sites.
- Emissions from the main stack on sensitive human receptors AQMA within a radius of 10km from the site;
- Emissions from operational road traffic within 200m of any road with increases in traffic above the IAQM screening thresholds;
- Emissions from operational rail traffic within 200m of the rail spur from the mainline to the site;
- Impacts from operational shipping traffic emissions will be determined on the basis of more detailed assessment in the AQIA, but will likely be no greater than 1km from the wharf;
- Emissions from dust during ash handling including during concrete block production within 350m of the Project; and
- Odour emissions within 1km of the site, anticipating that this is the maximum extent for any odour to migrate.

6.6 Temporal Scope

6.6.1.1 The temporal scope for the construction phase will be temporary, limited to the duration of the construction activities.

6.6.1.2 The temporal scope for the operational phase will be long-term, non-permanent, limited to the operational life of the Project.

6.6.1.3 The project will be designed and operated in a manner to allow its ready decommissioning by dismantlement and removal of equipment and

infrastructure and with recycling of materials maximised. The precise details of the decommissioning process some 25-40 years hence are not presently foreseeable. However, the impacts and effects of decommissioning are unlikely to be materially different or greater than those from construction and associated impacts are likely to be manageable to a similar extent as during construction.

6.7 Technical Scope and Approach to the EIA

6.7.1.1 The following section details the issues related to air quality that will be scoped into the EIA, together with the proposed assessment approaches.

6.7.1.2 Impacts from construction dust will be assessed using a qualitative approach based upon the IAQM guidance. This assessment will identify the risk of significant dust nuisance issues, and identify mitigation accordingly, as the underlying assumption is that all dust impacts can be mitigated to being not significant or minor significance at worst.

6.7.1.3 Impacts from construction traffic will be assessed with reference to TG(16) and IAQM. An initial screening phase will identify the likely impacts based upon the IAQM screening thresholds for traffic. If required a more detailed semi-quantitative approach based upon the Defra LAQM methods will be undertaken. Detailed modelling is not anticipated.

6.7.1.4 Impacts from operational phase emissions from the main stack will be assessed utilising detailed dispersion modelling. The modelling will be undertaken in line with EA guidelines, including the use of five years of hourly sequential meteorological data, appropriate representation of land use and terrain, building effects (if required) and emissions parameters. The modelling will consider a base-case stack height of 100m, with additional stack heights assessed in order to determine the appropriate stack height. This will take into account impacts on both human and ecological receptors, and the need to manage impacts on these. The assessment will consider the existing baseline air quality, but will not make forward projections of the possible future air quality except when considering cumulative effects (see below in relation to transport related effects on air quality).

6.7.1.5 Impacts from operational road traffic beyond the site itself will be assessed with reference to TG(16) and IAQM. An initial screening phase will identify the likely impacts based upon the IAQM screening thresholds for traffic. If required a more detailed semi-quantitative approach based upon the Defra LAQM methods will be undertaken. Detailed modelling is not anticipated.

6.7.1.6 Impacts from operational road traffic emissions within the site will be included in the detailed dispersion modelling being undertaken for the main stack. This is scoped in as there are sensitive habitats adjacent to the Project site that may be affected by the emissions from operational road traffic cumulatively with other emission sources on site.

6.7.1.7 Impacts from train emissions due to rail movements within the site will be included in the detailed dispersion modelling being undertaken for the main stack. This is scoped in as there are sensitive habitats adjacent to the Project site that may be affected by the emissions from trains cumulatively with other emission sources on site.

6.7.1.8 Impacts from shipping emissions at the wharf side and within 1km will be included in the detailed dispersion modelling being undertaken for the main stack. This is scoped in as there are sensitive habitats adjacent to the Project site that may be affected by the emissions from the ships cumulatively with other emission sources on site.

6.7.1.9 There are well-established measures in operating an Energy Recovery plant with respect to dust emissions from ash handling, and the assessment will consider the arrangements for ash handling including its transfer and use within the concrete block manufacture facility. The assessment will identify any additional mitigation required to reduce potentially significant residual impacts.

6.7.1.10 There are well-established measures in operating an Energy Recovery plant with respect to odour emissions, including from the transfer of feedstock to the plant. The assessment will consider the arrangements for waste handling and identify any additional mitigation required to reduce potentially significant residual odour impacts.

6.7.1.11 Consideration will be given to effects on habitats from emissions from the main stack cumulatively with emissions from other planned but not yet operational facilities.

6.7.1.12 The following issues are proposed to be scoped out of the EIA:

6.7.1.13 Operational phase rail traffic beyond the site itself are scoped out. This is based on guidance set out in TG(16), TG(16) which states that emissions from locomotives need to be assessed in the following cases:

- Stationary locomotives: Where there will be locomotives stationary for more than 15 minutes at least 3 times a day, and there is relevant exposure within 15m of the rail line; or
- Moving locomotives: on a small number of high capacity diesel rail lines (for example Paddington to Swansea, Swindon to Taunton etc.).

6.7.1.14 Neither of these conditions is met in this case, and therefore locomotive emissions are screened out beyond the site.

6.7.1.15 Shipping beyond the wharf (1km): based upon guidance set out in TG(16), impacts of shipping movements are scoped out. TG(16) states that emissions from ships need to be assessed in the following cases:

- Ports where there are more than 5,000 large ship movements/annum and relevant exposure within 250m of the port; or
- Ports where there are more than 15,000 large ship movements/annum and relevant exposure within 1km of the port.

6.7.1.16 Neither of these conditions is met in this case, and therefore ship emissions are screened out beyond the site.

6.7.1.17 Back-up generators and cold start engines: the plant will be equipped with engines to provide back-up power in the event of mains power failure and to start the plant. Power failures are anticipated to be very rare and if they do occur, to be for short durations. On this basis, it is expected that the engines will be used to provide back-up power on a very infrequent basis, likely to be less than once per year and far less than the 500 hours of operation that would

require their consideration in the Environmental Permit. The plant is also designed to run continually. Whilst there will be routine shut-downs, there are anticipated to be only a small number every year, and the emissions from the subsequent start-ups are considered to be negligible. On this basis, the emissions to atmosphere from back-up generators and cold start engines will not be assessed in the AQIA.

6.7.1.18 Cumulative effects on human receptors: As part of the scoping exercise, ERM undertook a preliminary Air Quality Impact Assessment, including a review of the baseline air quality for the pollutants of interest for human health. Publically available data sets were reviewed to identify the baseline. This review found that the baseline air quality at human receptors in the vicinity of the Project is considered likely to be well below air quality standards and in general air quality in the UK has been on an improving trajectory in the last few decades with this trend set to continue. There are other potential schemes that may have a small influence on air quality at the same receptors as the proposed Project. However, it is highly unlikely that their points of maximum impact will coincide, and due to the requirements of planning and permitting for any one facility, it is anticipated that the cumulative effects of these schemes will be negligible. On this basis, cumulative effects for human receptors will not be assessed.

6.7.1.19 The methodologies that will be adopted in the EIA are set out in the following section, with reference to the pertinent infographics:

- Construction dust (Figure 6.1);
- Construction traffic and operational traffic (Figure 6.2); and
- Emissions from the main stack, road traffic within the site, rail traffic within the site and shipping vessels at the wharf (Figure 6.3).

6.7.1.20 Dust from ash handling: these impacts will be assessed on a semi-quantitative basis noting that a well-run plant should have no issues with dust.

6.7.1.21 Odour impacts will be assessed on a semi-quantitative basis, noting that a well-run plant should have no issues with odour.

6.7.1.22 Cumulative effects on habitats: consideration will be made of the emissions from the main stack cumulatively with emissions from other planned but not yet operational facilities. This will be undertaken on a semi-quantitative basis, and will consider information from other granted planning applications or Permits. The cumulative effects assessment will also consider the wider air quality context including changes in the overall air quality in the region and the UK as a whole, and the status of habitat sites. This part of the AQIA will also provide input to the assessment of in combination effects for the Habitats Regulations Assessment.

6.8 Statutory Consultees

6.8.1.1 The following key organisations will be consulted throughout the design and assessment of the Project with regards to Air Quality;

- Environment Agency
- Natural England

- North Lincolnshire Council - Environmental Health Department.

Figure 6.1: Assessing Air Quality Impacts from Dust (Construction Activities)

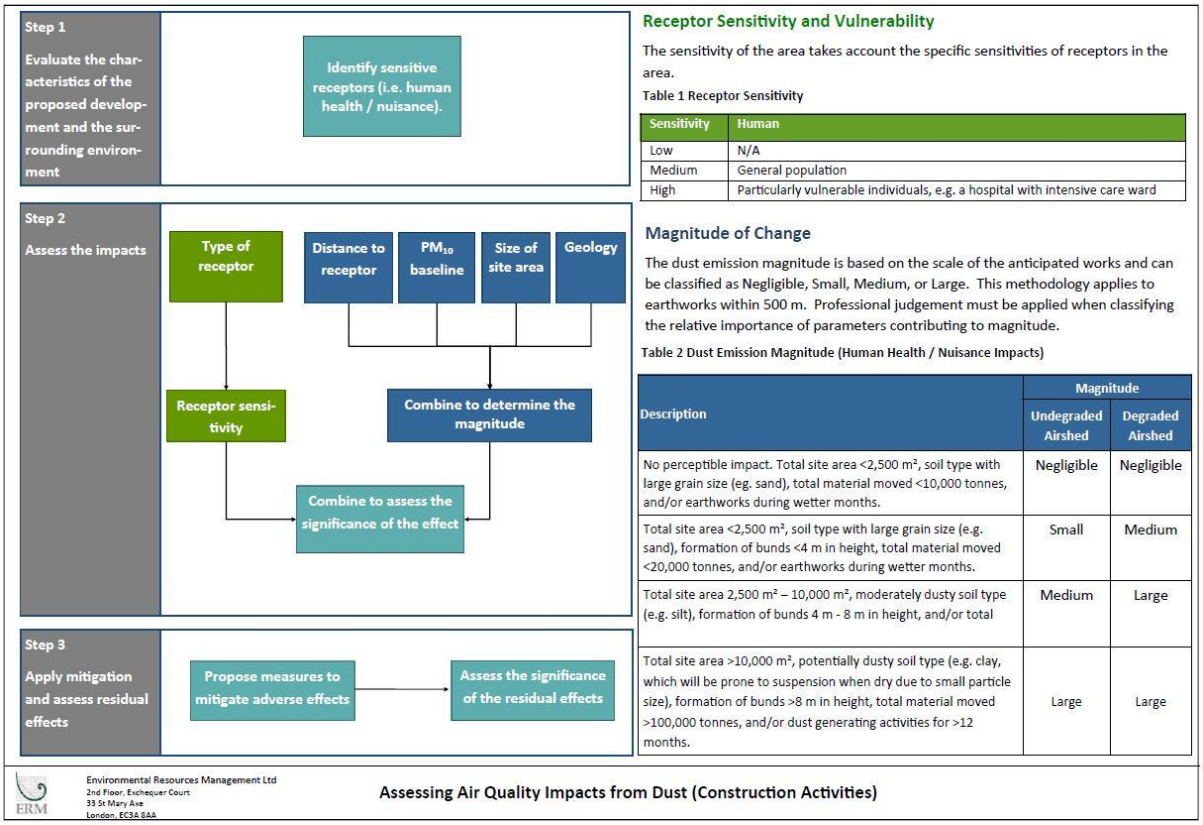


Figure 6.2: Assessing Air Quality Impacts from Road Traffic, UK Projects

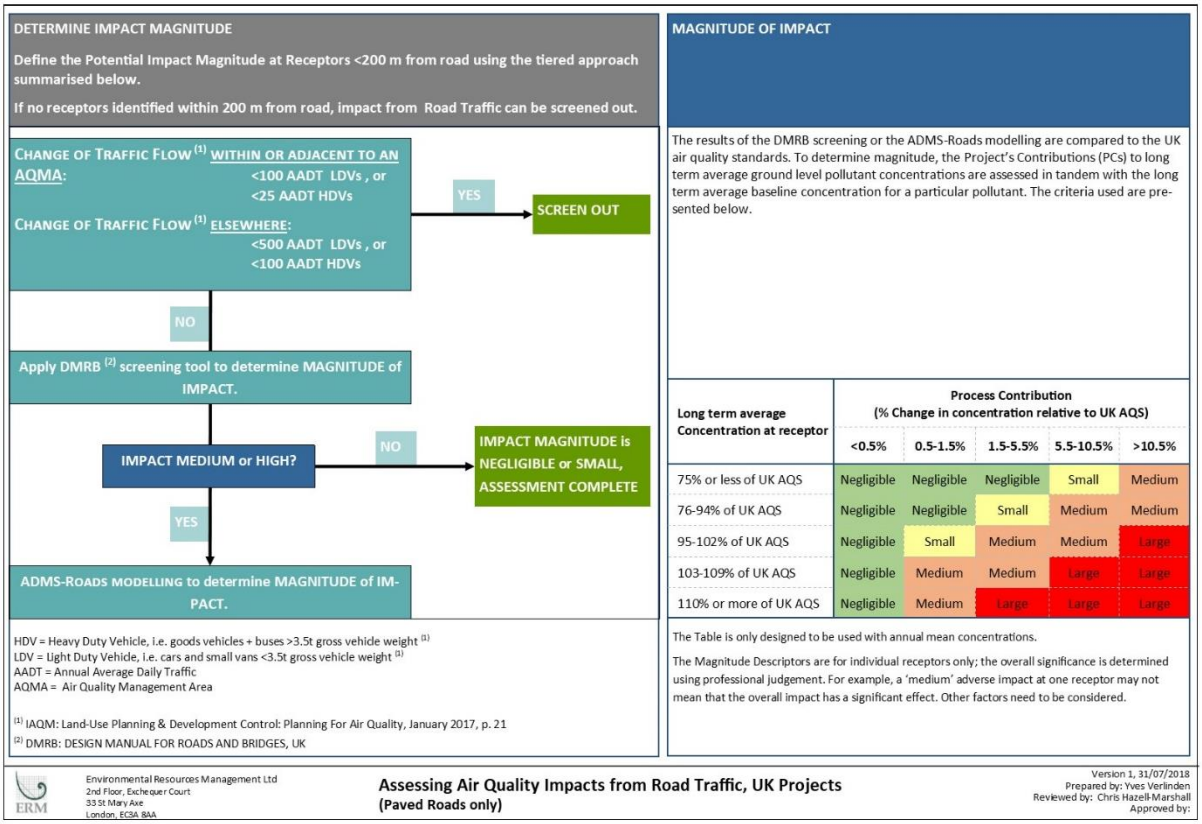
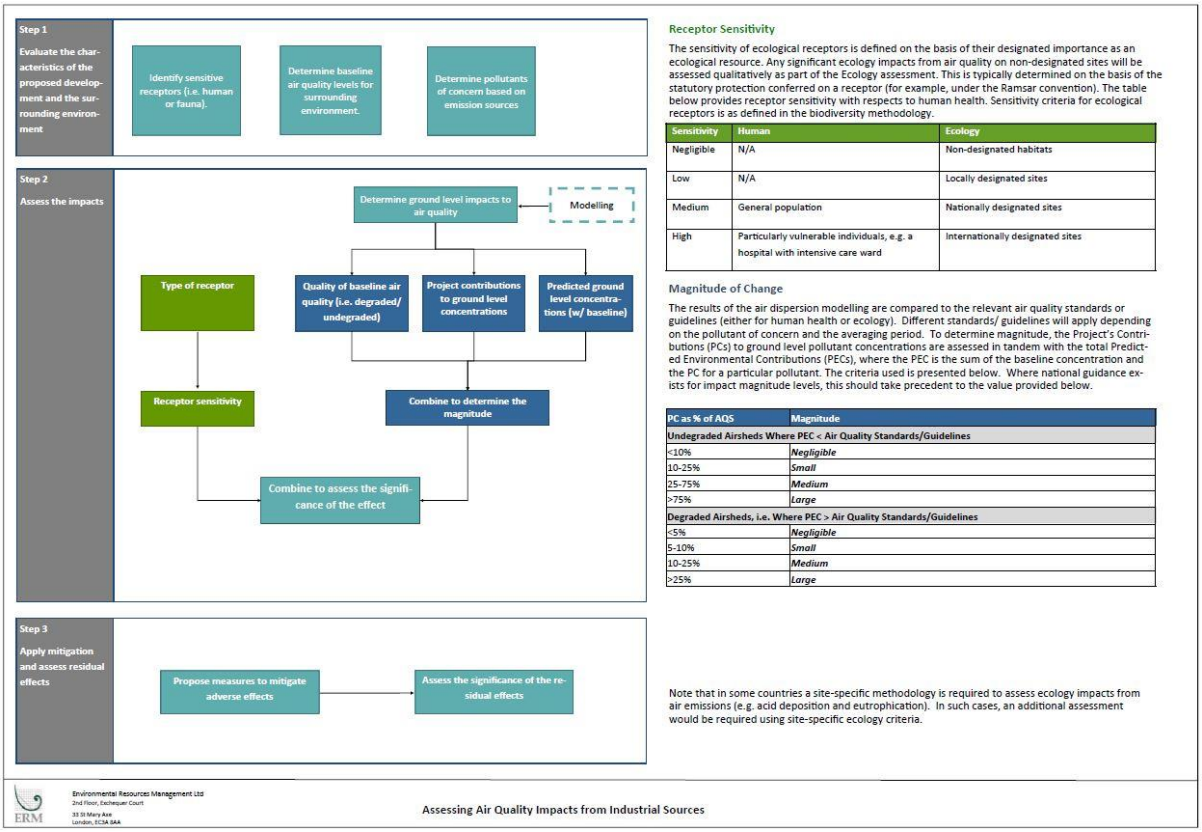


Figure 6.3: Assessing Air Quality Impacts from Industrial Sources



7. CLIMATE

7.1 Introduction

7.1.1.1 This section sets out the approach and scope of the Greenhouse Gas Assessment (GHGA). A GHGA determines the extent to which a project affects the climate by quantifying the emissions of greenhouse gases (GHG) and comparing this to the baseline (GHG emissions before Project development).

7.1.1.2 An assessment of how climate change could exacerbate impacts identified by other technical topics will also be undertaken.

7.2 Topic-Specific Legislation and Guidance

7.2.1.1 The scope of the GHGA is based upon the following key legislation, policy and associated guidance:

- National Policy Statements for energy infrastructure (2011); Overarching National Policy Statement for Energy (EN-1) and National Policy Statement for Renewable Energy Infrastructure (EN-3);
- The Infrastructure Planning (Environmental Impact Assessment) Regulations (IP EIA Regulations) 2017;
- The Climate Change Act 2008 leading to the Adaptation Reporting Power (ARP) and the national Climate Change Risk Assessments (2012 and 2017);
- The National Adaptation Programme and the Third Strategy for Climate Adaptation Reporting (2018);
- NPPF Planning Practice Guidance (PPG) on climate change; and
- Environment Agency guidance on climate change allowances to be used in flood risk assessments as set out in the National Planning Policy Framework (NPPF).

7.3 Baseline Data Sources (GHGA)

7.3.1.1 There are no direct baseline GHG emissions data from the Project site to review as GHG emissions prior to the Project are considered to be zero. However, by creating new waste management capacity the Project will influence waste management streams in the UK and the balance of UK energy production.

7.3.1.2 The UK landfills hundreds of thousands of tonnes of waste annually. Although the commercial contracts for the Project and therefore the exact source of waste are not yet confirmed at scoping, it is reasonable to assume that the Project will contribute to the national capacity of Energy Recovery Facilities and reduce the need for landfill.

7.4 Likely Significant Effects

7.4.1.1 Landfills that have gas capture and power generation still emit a significant quantity of methane, which is a potent GHG. This emission can be significantly reduced by diverting waste away from landfill. Therefore, the GHGA will calculate GHG emissions for a baseline scenario in which waste would

otherwise be sent to landfill and compare this to the GHG emissions for the Project.

7.4.1.2 Additionally, the new ERF will produce beneficial products of electricity exported to the National grid and heat, which can/is intended to be used by local businesses and dwellings.

7.4.1.3 This electricity and heat would be produced by other means under the baseline situation, which include combustion of fossil fuels (e.g. natural gas) with associated GHG emissions. Therefore, the likely impact on GHG emissions as a result of the change in mode of energy production will also be assessed.

7.5 Spatial Scope

7.5.1.1 The spatial scope of the GHGA will focus on the EfW facility, and the Project site. When considering the impacts of climate change on other technical topics, the spatial scopes outlined in those Sections will be followed.

7.5.1.2 The GHGA will also consider the wider GHG emissions from the management of waste and the impact on production of electricity and heat in the UK.

7.6 Temporal Scope

7.6.1.1 The temporal scope of the GHGA will be based on the life cycle of the Project; as such construction is expected to occur in the 2020s and the Project has an operational lifetime of 25-40 years. Therefore, the influence of Project-related GHG on climate projections for the 2050s will be considered based on operational effects only.

7.7 Technical Scope and Approach to the EIA

7.7.1.1 The GHGA will include assessment of direct emissions as a result of the Project and emissions associated with purchased electricity/ steam/ heat/ cooling. This does not include the heat and power distribution connection, which is scoped out of the assessment because there are expected to be minimal operational emissions associated with this, except for maintenance activities which are not expected to occur annually.

7.7.1.2 The following activities have also been scoped out of the GHGA:

- Shipping: because the fuel used by vessels and therefore the associated GHG are not under the operational control of the Project;
- Use of the rail spur: due to the minor emissions expected as a result of these activities in comparison to other modes of transport; and
- All activities associated with the construction phase because construction represents a relatively small proportion of total emissions during the lifecycle of an ERF, which are largely associated with the operational phase.

7.8 Statutory Consultees

7.8.1.1 The following key organisations will be consulted throughout the design and assessment of the Project with regards to Climate;

- Environment Agency; and

- North Lincolnshire Council - Environmental Health Department.

8. NOISE AND VIBRATION

8.1 Introduction

8.1.1.1 This section sets out the approach and scope of the noise and vibration assessment that will be undertaken as part of the EIA for the Project. It considers all Project elements, their locations, and the wider environmental setting whilst setting out the noise and vibration impacts which could affect off-site receptors during construction and operation and how this will be considered in the noise and vibration assessment.

8.2 Topic-Specific Legislation and Guidance

8.2.1.1 The National Policy Statement NPS EN-1 states that the IPC should ensure that new development is appropriate for its location taking into account the likely effects of pollution on health, living conditions and the natural environment. In doing so the Project should demonstrate good design through selection of the quietest cost-effective plant available; containment of noise within buildings wherever possible; optimisation of plant layout to minimise noise emissions; and, where possible, the use of landscaping, bunds or noise barriers to reduce noise transmission.

8.2.1.2 The scope of the noise and vibration assessment is based on the following key legislation, policy and associated guidance:

- National Policy Statements EN-1 and EN-3;
- National Planning Policy Framework (2019);
- BS 5228: Code of Practice for noise and vibration control on construction and open sites;
- BS 4142: Methods for rating and assessing industrial and commercial sound;
- Design Manual for Roads and Bridges (DMRB): Volume 11 Environmental Assessment and other sections as required;
- The Noise Insulation (Railway and Other Guided Systems) Regulations 1996;
- Criteria for the assessment of noise effects on aquatic fauna as published literature (Popper et al, 2014; Mickle et al., 2018); and
- Planning for Renewable Energy Development Supplementary Planning Document (2011) - Policy 8 Noise.

8.3 Baseline Data Sources

8.3.1.1 To carry out the noise assessment for the EIA, it will be necessary to collect baseline noise data. Noise monitoring will be undertaken over a seven-day period using continuous noise logging equipment so that a representative baseline noise level can be derived. This will provide information about the existing noise environment and will help to inform how it might change during the construction, operation, and decommissioning phases.

8.3.1.2 Noise monitoring is expected to be undertaken at three locations representing the nearest properties in Amcotts, Neap House, and Flixborough. These locations will be agreed with the Local Authority.

8.3.1.3 The nearest noise sensitive receptors are:

- properties in the village of Amcotts located approximately 400m to the west of the ERF site, and 230m to the south west of the Project site boundary on the opposite (west) bank of the River Trent;
- Neap House Farm located approximately 1km south of the ERF site, and less than 30m from the southern boundary of the Project site and close to the proposed access road alignment;
- properties in the village of Flixborough located just over 1km east of the ERF site, and 50m north of the boundary of the Project site, and

8.3.1.4 Baseline information concerning the numbers of vessels using the river, road traffic, and the previous use of the railway will also be considered to ensure that the context of the increased traffic is considered.

8.4 Likely Significant Effects

8.4.1.1 Noise effects are likely to occur due to activities undertaken during the construction, operation, and decommissioning phases, with the likely sources of noise and vibration listed below.

8.4.2 Construction

8.4.2.1 Construction activities are likely to result in increases in noise levels at the residential properties in Amcotts and in the vicinity of the A1077. The noise will be generated by general construction plant comprising:

- excavators;
- piling;
- dozers;
- delivery lorries;
- mobile cranes;
- cement/lime delivery trucks; and
- dumpers.

8.4.2.2 Underwater noise during piling may also have effects on aquatic species in the section of the River Trent, including river and sea lamprey, which are part of the designation of the SAC and SSSI.

8.4.3 Operation

8.4.3.1 Operation of the Project will result in noise emissions, which will need to be developed and described in the ES, and appropriate mitigation will need to be specified if necessary. The site is approximately 280 m east of, and across the River Trent from, the nearest residential settlement at Amcotts. The site is approximately 1.2 km west of the residential settlement of Flixborough. Flixborough Stather is adjacent to the site, but this is an industrial site, and is not deemed to be noise sensitive. Isolated dwellings are located further from the site; they are expected to have similar noise sensitivity as the closest communities, but will be less affected by site noise due to the large distance between them and the site.

8.4.3.2 Operation of the disused rail spur may result in noise and some vibration close to the track as a result of the passage of trains accessing and departing from the site. This has the potential to cause a noticeable change in the noise environment close to the railway in Flixborough as the railway has been closed for seven years. There are not expected to be any major construction works associated with re-opening of the existing railway.

8.4.3.3 The operation of the existing RMS ports on the River Trent will be a source of operational noise which could affect receptors at Amcotts as a result of the noise from vessels moving to/from the site and unloading. While the quay is currently used by vessels importing steel, vessel numbers accessing the site are expected to increase during the operational phase of the Project.

8.4.4 Decommissioning

8.4.4.1 Decommissioning activities are likely to result in noise and vibration impacts; however, as the decommissioning is not reasonably foreseeable at this time the likely methods and practices used to decommission the site are not known. However, it is reasonable to assume that such activities will not result in noise and vibration impacts that would be materially different from those during construction.

8.5 Spatial Scope

8.5.1.1 With regards to construction noise, in order to develop a spatial scope, the construction equipment mentioned above is assumed to have a total sound power level of 125 dB (A). This is typical of a major construction site involving noisy activity such as driven piling. A scoping calculation based on this sound power level has shown that the construction noise level would be expected to fall below the lowest noise assessment criterion in BS 5228 (for Category A) i.e. a threshold of 65 dB(A) daytime at 600 m from the construction site boundary. Therefore, receptors at Amcotts, Neap House, and to the south of A1077 will be assessed.

8.5.1.2 Construction vibration is generally imperceptible beyond approximately 100 m, even based on worst-case vibration sources such as driven piling. Therefore, the potential effects of construction vibration are expected to be limited to the residential properties at Neap House and to the south of the A1077.

8.5.1.3 The receptors that are likely to be affected by noise from operation of the main ERF and operation of the quay are likely to include Amcotts and Flixborough, and these are expected to form the spatial scope of the operational noise assessment. Other receptors that are further from the site may be affected by noise; however, assuming that the noise at the two closest communities will be mitigated sufficiently to avoid significant noise effects, receptors further from the site would also not be likely to be significantly affected.

8.5.1.4 Noise impacts may occur as a result of vessels accessing the site via the Trent, travelling past Burton upon Stather and Amcotts. Trains will also pass Flixborough village. At this stage of the scoping, it is not known how frequent or noisy the vessels and trains will be, and therefore further consideration of these noise sources will be given in the ES. The effects of road traffic may also need to be considered on road links where there is a likely significant

change in traffic noise on road links used by the Project. As presented in Section 14, Rochdale envelope approach to transport will be taken, where the realistic worst case of each transport option (Road, Rail, and River) is assessed. The spatial scope of the assessment of road traffic will be agreed with the appropriate stakeholders once the change in traffic numbers is further understood.

8.5.1.5 Underwater noise can propagate long distances, but the effects may vary considerably based on the acoustical properties of the river water column and the river bed. Consideration of underwater noise may be required to support the ecological assessment of the effects on river fauna if any noise sensitive species are identified as being likely to be present during piling activities in the river.

8.6 Temporal Scope

8.6.1.1 Construction activities will be temporary and, therefore, likely to cause temporary noise impacts.

8.6.1.2 Operational noise of the Project is likely to have long-term effect and will be considered over the lifetime of the Project.

8.6.1.3 The project will be designed and operated in a manner to allow its ready decommissioning by dismantlement and removal of equipment and infrastructure and with recycling of materials maximised. The precise details of the decommissioning process some 25-40 years hence are not presently foreseeable. However, the impacts and effects of decommissioning are unlikely to be materially different or greater than those from construction and associated impacts are likely to be manageable to a similar extent as during construction.

8.7 Technical Scope and Approach to the EIA

8.7.1.1 The following issues will be scoped in to the EIA:

- Effects on noise sensitive receptors from construction activities and associated vehicles, plant and other equipment;
- The likely effects of underwater noise will be defined in the noise section of the ES, with associated effects on noise sensitive receptors in the River Trent from the construction of the extended quay reported upon in the ecology section;
- Effects on noise sensitive receptors from noise generated during the operation of the ERF, including operational road traffic movements; and
- Effects of increased noise from vehicle movements, including, road, vessel and rail movements on noise sensitive receptors.

8.7.1.2 Vibration from railways is only a significant issue for receptors close to a railway. Based on experience of other projects the vibration is expected to decay to below appropriate thresholds beyond a precautionary scoping distance of approximately 30 m of the line. There are some industrial facilities in close proximity to the railway but there are no residential properties within 30m of the railway. Therefore, noise and vibration impacts from the operation

of the railway spur are proposed to be scoped out of the assessment because there are no noise / vibration sensitive receptors located within 30 m of the line.

8.8 Statutory Consultees

8.8.1.1 The following key organisations will be consulted throughout the design and assessment of the Project with regards to Noise and Vibration;

- Environment Agency;
- Natural England; and
- North Lincolnshire Council.

9. GROUND CONDITIONS AND HYDROGEOLOGY

9.1 Introduction

9.1.1.1 This section sets out the approach and scope of the ground conditions and hydrogeology assessment that will be undertaken as part of the ES. It presents a summary of the baseline ground conditions and hydrogeology of the Project site and identifies the likely significant effects which could result from the development of the Project on sensitive receptors.

9.2 Topic-Specific Legislation and Guidance

9.2.1.1 The scope of the ground conditions and hydrogeology assessment is based on the following key legislation, policy and associated guidance:

- National Policy Statements EN-1 and EN-3;
- Part 2A of the Environmental Protection Act 1990;
- Model Procedures for the Management of Land Contamination (CLR 11);
- The Building Regulations 1991;
- The Environmental Protection Act 1990, Part I;
- Environmental Permitting (England and Wales) Regulations 2016 (the Environmental Permitting Regulations);
- the Planning for Renewable Energy Development Supplementary Planning Document (SPD) (adopted November, 2011); and
- Planning for Renewable Energy Development Supplementary Planning Document (2011) - Policy 5 Soil and Hydrology.

9.3 Baseline Data Sources

9.3.1.1 To understand the current baseline conditions within and around the project site, the following data sources have been reviewed:

- British Geological Survey (BGS) superficial and bedrock geological maps;
- Environment Agency aquifer classification data;
- Historic Ordinance Survey mapping; and
- Ground investigation report of the RMS Ports Site (Ian Farmer Associates, 2018).

9.3.1.2 From these it is understood that the area of the Project site located around the existing RMS Ports site is not within an area that is likely to have been affected by coal mining activity and as such contamination from coal mining is not anticipated.

9.3.1.3 The BGS data indicate that the superficial deposits within the port area are made up of alluvial deposits comprising clay, silt, sand and gravel. These superficial deposits are underlain by bedrock of the Mercia Mudstone Group.

9.3.1.4 The superficial deposits are classed as a Secondary A Aquifer, which are defined as permeable formations with the potential to support localised abstractions whilst the bedrock is classified as a Secondary B Aquifer.

Secondary B Aquifers are lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering.

9.3.1.5 The Environment Agency has classified the groundwater as having an overall poor quality and the site is not situated within a Groundwater Source Protection Zone[3].

9.3.1.6 Groundwater was encountered between 6.30 m and 6.80 m bgl during the 2018 Ian Farmer Associates ground investigation. Groundwater rest levels were recorded between 1.65 m and 2.08 m bgl.

9.3.1.7 More detailed geological data have been provided through a review of the Ian Farmer Associates, (2018) report which concludes that the port area is directly underlain by made ground comprising predominantly sandy gravel with slag, brick, concrete, flint, coal, sandstone and mudstone. This report also reveals that parts of the port site may have the potential for ground contamination, due to the findings of heavy metals, PAHs and elevated levels of ground gas (methane and carbon dioxide).

9.3.1.8 Following the scoping stage, currently available baseline information will be supplemented with the review of a detailed Envirocheck report of the entire Project area (not just the port site) including a review of historic mapping to gain an understanding of former land use, and potential sources of contamination. If, during the review of this information, it becomes apparent that further ground investigations are warranted, the scope of these will be discussed and agreed with North Lincolnshire Council and the Environment Agency prior to commencement.

9.4 Likely Significant Effects

9.4.1.1 Given the historic industrial land use of at least part of the Project site, the construction phase of the Project has the potential to result in the following impacts:

- opening up potential pathways for the release of contamination from ground to surrounding sensitive receptors (including controlled waters);
- exposure of construction workers to potential contamination;
- introducing higher sensitivity receptors (end users);
- chemical attack and decay of buried concrete structures;
- permeation of water supply pipes by potential contaminants and damage to structures by explosion due to ground gases; and
- introduction of new potential contaminants to the environment.

9.4.1.2 The Project itself will be designed and operated in a way that it will not itself act as a source of contamination to soil and groundwater. The measures to achieve this will be described in the Project Description of the ES as the design of the Project is refined.

[3] https://magic.defra.gov.uk/

9.5 Spatial Scope

9.5.1.1 The spatial extent of the area considered in this assessment includes land within the existing industrial estate, greenfield land, brownfield mixed-use land, the disused rail spur, an area operated by RMS Ports including use of an existing wharf. Areas outside of these are associated with the existing industrial estate and will not be included within this assessment.

9.6 Temporal Scope

9.6.1.1 The temporal scope for the ground conditions and hydrogeology assessment will be limited to the construction phase as this is the time during which potential contamination pathways may be opened. The Project will be designed and operated in a manner to allow its ready decommissioning by dismantlement and removal of equipment and infrastructure and with recycling of materials maximised. The precise details of the decommissioning process some 25-40 years hence are not presently foreseeable. However, the impacts and effects of decommissioning are unlikely to be materially different or greater than those from construction and associated impacts are likely to be manageable to a similar extent as during construction.

9.7 Technical Scope and Approach to the EIA

9.7.1.1 Given the potential pathways identified in *Section 9.4,* the following technical scope of the assessment of ground conditions and hydrogeology is proposed.

9.7.1.2 The ES will set out the approach to site investigation and monitoring prior to construction works to confirm the land condition and the composition of any soil contamination that may exist. The process will follow that presented in CLR 11 Model Procedures for Land Contamination.

9.7.1.3 In the event that contamination is detected, the ES will recommend mitigation measures (see *Section 9.7* for more detail) to be incorporated as part of the construction programme.

9.7.1.4 Any required remediation/validation works to be conducted for the development footprint will produce a final soil and groundwater condition that does not unduly constrain any eventual permitted land use.

9.7.1.5 On the basis of the above, it is considered that permanent effects in relation to contamination will not be significant during the operational phase of the Project, as the contamination legacy of the site will have been addressed during construction. This status will be dependent on any proposed remediation works being suitably validated.

9.7.1.6 As all issues relating to ground conditions and contamination are confined within the Project footprint, with no significant requirement for off-site disposal of soils during development, there is considered to be no potential for cumulative effects to occur. If hazardous materials are encountered during construction, contingency measures will be put in place to allow for safe disposal of such materials at appropriately licenced disposal facilities.

9.7.1.7 The assessment methodology is made up of five principal tasks, namely:

- review of salient information sources and relevant policy and legislation;

- definition of the baseline ground conditions that exist for the Project site;
- assessment of the scale and significance of temporary, permanent, or cumulative effects relevant through construction and after-use;
- definition of measures, where practicable and appropriate, to avoid, mitigate or compensate for any predicted significant effects, or maximise the potential for positive benefits occurring as a result of the Project; and
- identification of the scale and nature of residual effects and further work required to understand and mitigate these risks.

9.7.1.8 A desk-based study of the Project footprint, including a review of available historic maps will be completed and reported upon in the PEIR and ES.

9.7.1.9 From this, a detailed site investigation and quantitative risk assessment will be completed, with an outline conceptual site model produced for the site. The information obtained from the desk based study and site investigation will allow a remediation and validation programme to be designed with the objective of achieving ground conditions suitable for commercial/industrial land use. This will include, if required, a remedial options appraisal report and a detailed strategy for remediation. If required, the investigation and remediation process for the Project footprint will be completed in line with CLR11, Model Procedures for the Management of Land Contamination prior to the construction phase of the Project.

9.7.1.10 There may be a requirement to complete remediation and validation works for the site particularly during the removal of the existing foundations but also as part of the construction process and to discharge any associated DCO requirements via submission of relevant reports to the Local Planning Authority.

9.7.1.11 Once this has been achieved, any specific detailed design proposals for development will address the existing ground conditions in light of specific layout details. Supplementary ground investigations will be carried out to provide detail on specific issues. This will apply to the entire Project footprint.

9.7.1.12 A Code of Construction Practice (CoCP) will be developed for the Project, secured through a requirement of the DCO. The CoCP will be adhered to by the Contractor and will include clauses in relation to ground conditions as follows:

- Full compliance with Construction Design and Management (CDM) Regulations, and other Health and Safety legislation will apply throughout any works on site (including any pre-development works);
- If contamination that has not been previously identified is encountered on site, measures will be put in place to provide suitable mitigation. This may include additional site investigation, regulatory dialogue and remediation measures;
- The water environment will be protected through the management of earthworks and materials arising, particularly in areas of potential contamination; and
- In the unlikely event of contaminated material being encountered, the Safety Officer (or equivalent) will ensure that a Workers' Safety Information Sheet is prominently displayed in rest/mess rooms and wash rooms covering hygiene, work practices, clothing requirements etc.

9.7.1.13 A construction Waste Management Plan (WMP) will be developed, as a requirement of the DCO, in accordance with the *Non-statutory guidance for site waste management plans* (DEFRA April 2008) and in consultation with the Environment Agency and the Local Planning Authority. The plan will identify:

- responsibilities for waste management;
- the waste category and quantities of materials generated;
- measures to minimise waste generation;
- opportunities for recycling and/or re-use;
- proposed treatment and disposal routes; and
- licensing requirements.

9.7.1.14 The WMP will include an audit programme to be undertaken to demonstrate compliance with statutory requirements.

9.7.1.15 Spoil arising from the works that is classed as 'acceptable fill' will be used in construction works wherever practicable (dependent upon compliance with existing waste management legislation). To achieve this the *CL:AIRE Definition of Waste: Development Industry Code of Practice* (DoW CoP) will be employed, allowing the reuse of excavated materials.

9.7.1.16 The disposal of waste, including any surplus spoil, is expected to be managed so far as is reasonably practicable to maximise the environmental and development benefits from the use of surplus material and reduce any adverse environmental effects of disposal. To achieve this the DoW CoP will be employed, allowing the movement and reuse of excavated materials between sites.

9.7.1.17 Provision will be made for a suitable environmental specialist to identify any 'hazardous waste' as defined in the *Hazardous Waste (England and Wales) Regulations 2005* so that it can be suitably managed and disposed of during works.

9.7.1.18 Appropriate precautions will be taken if materials containing asbestos are encountered. The contractor will observe the exposure limits and measurement methods for asbestos, set out in Health and Safety Executive (HSE) guidance document, *Asbestos: The analysts' guide for sampling, analysis and clearance procedures* (HSG 248) and will comply with HSE guidance document *Asbestos: The licensed contractors' guide* (HSG 247), in so far as these are applicable to the construction works.

9.7.1.19 The construction site will be made safe at night and measures will be implemented to prevent trapping or injury to wildlife, such as sealing off or providing means of escape from holes or trenches in excess of one metre in depth.

9.7.1.20 With these measures in place, all identified temporary adverse impacts in relation to ground conditions will be mitigated.

9.8 Statutory Consultees

9.8.1.1 The following key organisations will be consulted throughout the design and assessment of the Project with regards to Ground Conditions and Hydrogeology;

- Environment Agency; and
- North Lincolnshire Council.

10. HYDROLOGY, FLOOD RISK AND WATER RESOURCES

10.1 Introduction

10.1.1.1 The hydrology and flood risk section of the ES will describe the likely significant effects resulting from the construction and operation of the Project on surface water resources. It will also address the Project's compliance with Water Framework Directive (WFD) water body status objectives.

10.1.1.2 Flood risk and the likely impacts associated with flooding will be assessed in detail through a stand-alone Flood Risk Assessment (FRA), which will be submitted as a separate dedicated document as part of the DCO application.

10.1.1.3 Likely impacts on groundwater resources will be assessed within the ES section on Ground Conditions and Hydrogeology (see *Section 9* of this Scoping Report).

10.2 Topic-Specific Legislation and Guidance

10.2.1.1 This scope of the hydrology and flood risk assessment section of the EIA has been developed in line with the following key legislation, policy and associated guidance.

- NPS EN1 and EN3;
- EU Directive 2000/60/EC (the Water Framework Directive (WFD);
- The EU Priority Substances Directive;
- UK Environmental Standards and Conditions (Phase 1) 2008 Technical Advisory Group on the Water Framework Directive (WFD UKTAG);
- The Environmental Permitting (England and Wales) Regulations 2010;
- National Planning Policy Framework (NPPF); and
- The Core Strategy of the North Lincolnshire Local Development Framework (LDF) (Core Strategy Policy 19 and Core Strategy Policy 20).

10.3 Baseline Data Sources

10.3.1.1 The ES will present detailed information on the surface water bodies in the vicinity of the Project following the review and analysis of the following data sources:

- Environment Agency Flood Zones (Fluvial and Pluvial);
- Environment Agency Risk of Flooding from Surface Water map;
- Environment Agency Areas Benefiting From Defences;
- Environment Agency Historic Flood Outlines;
- Environment Agency Detailed River Network;
- Environment Agency Catchment Data Explorer (WFD classification data) data;
- public water abstractions and discharges (Envirocheck);
- private water abstractions and discharges (Local Authority); and

- Hydraulic modelling and hydrological analysis undertaken as part of this project to inform the design and flood risk assessment for the Project.

10.3.1.2 At scoping, it is not anticipated that any baseline surveys will be required to undertake the water resources and flood risk assessment elements of the ES. A site walk over survey will be undertaken once all third party data have been received in order to verify this data. If this site walk over survey reveals inconsistencies with existing third party data, then further data collection surveys will be undertaken.

10.4 Likely Significant Effects

10.4.1.1 Likely significant effects on the water environment may occur from the key elements of the Project in terms of water use and water quality.

10.4.1.2 The following likely significant effects relevant to hydrology and flood risk may result from the construction of the Project:

- remobilisation of contamination during construction;
- surface water contamination from general construction activities; and
- increase in flood risk as a result of construction within the floodplain of the River Trent.

10.4.1.3 Construction of the quay extension may result in the following likely significant effects on the water environment:

- remobilisation of contamination during construction;
- surface water contamination from general construction activities;
- change in channel hydromorphology resulting in a localised change in flow regime within the River Trent;
- increase in fluvial flood risk; and
- deterioration in WFD status of the Humber Upper water body.

10.4.1.4 The construction of the quay extension will be undertaken using recognised industry best practice methods to reduce the risk of a breach of the existing flood defences, or reduction in the standard of defences. As such, the risk of the construction of the Project resulting in a beach is not considered necessary. However, the flood risk assessment will consider the residual flood risk affects that the construction of the Project will have on receptors in the surrounding area in the event of a breach in the defences.

10.4.1.5 The construction of the quay extension could result in likely significant effects on the water environment through the loss of riparian habitat, which is relevant to WFD compliance and is described in further detail in *Section 11.4*.

10.4.1.6 The upgrade to the existing road system will include the crossing of a number of small IDB maintained drains, which could result in the following likely significant effects:

- remobilisation of contamination during construction;
- surface water contamination from general construction activities; and

- increase in flood risk as a result of construction over Internal Drainage Board (IDB) maintained drains.

10.4.1.7 The operation of the Project requires a water supply to provide boiler makeup, dust suppression within the feedstock store, and hydrogen production. The source of this water is still to be confirmed, but could be from the public supply, a dedicated groundwater borehole to be installed as part of the Project, or abstraction from the River Trent.

10.4.1.8 All process effluents will be suitably treated and discharged to the local foul sewer.

10.4.1.9 The operation of the extended quay may result in likely significant effects on the River Trent via accidental spillage of fuel stock and other chemicals from vessels.

10.4.1.10 The operation of the upgraded road system for the Project may result in the following likely significant effects:

- increase in pollution to local waterbodies resulting from accidental spillages resulting from road traffic accidents, and
- increase in pollution to local watercourses through routine runoff as a result of increased traffic movements.

10.4.1.11 The reoperation of the disused rail spur and the operation of trains on the line is not anticipated to have any likely significant effects on local surface water resources or flood risk during the construction / re-opening phase. Although the spur does cross a number of watercourses, including agricultural drains, the re-opening of the line is not anticipated to require any significant construction / engineering works, and will simply require vegetation clearance which is considered unlikely to have any significant effect on the water environment.

10.4.1.12 Once re-opened and operational, this element of the Project will involve freight trains running along the existing track. The operation of trains on this length of track may result in the pollution of watercourses in the event of an accident / spillage from the delivery rolling stock.

10.5 Spatial Scope

10.5.1.1 It is proposed that the spatial scope of the water resources, flood risk and WFD compliance assessments should not be defined by a generic radius from the Project. Instead, it is proposed that a proportionate approach should be taken, which considers those surface water receptors that are within hydraulic connection of the Project. As such, all surface water receptors within the Order Limits of the Project, and all those downstream of any proposed works are considered within the spatial scope of the hydrology and flood risk assessment. The farthest downstream receptor to be considered within the assessment will be the confluence of the River Trent with the Humber Estuary.

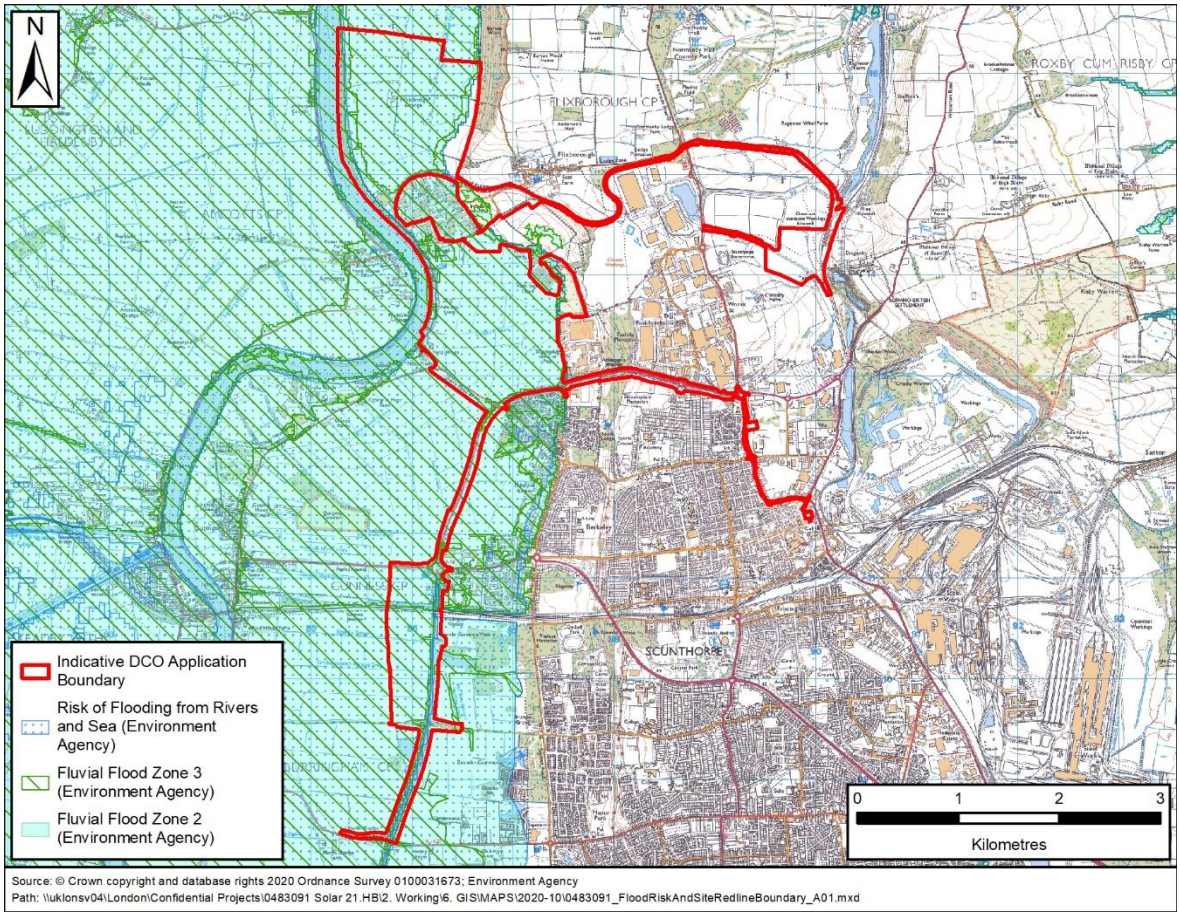
10.5.1.2 Based on an initial, high level review of Environment Agency and Ordinance Survey Data, the main water bodies are considered to be;

- The River Trent, with the Project located on its eastern bank and including works on its banks and within its channel for the construction of the quay extension;

- Burton and Flixborough Drain, which runs adjacent to the northern extent of the Project site, and approximately 250 m northeast of the ERF;
- Winterton Beck, located approximately 4.3 km east of the ERF and is within the Project site boundary where it is crossed by the railway line; and
- numerous agricultural field drains / ditches located within the functional floodplain of the River Trent.

10.5.1.3 Figure 10.1 shows the spatial scope of the assessment including the surface water bodies that have hydraulic connectivity with the Project.

Figure 10.1: Water Resources and Flood Risk Zones around the Project Site



10.6 Temporal scope

10.6.1.1 The temporal scope of the water resources, flood risk and WFD compliance assessments will consider all impacts associated with construction, and operational phases of the Project. The project will be designed and operated in a manner to allow its ready decommissioning by dismantlement and removal of equipment and infrastructure and with recycling of materials maximised. The precise details of the decommissioning process some 25-40 years hence are not presently foreseeable. However, the impacts and effects of decommissioning are unlikely to be materially different or greater than those from construction and associated impacts are likely to be manageable to a similar extent as during construction.

10.7 Technical Scope and Approach to the EIA

10.7.1.1 To assess the flood risk resulting from surface water runoff from the increased area of hard standing (compared to baseline) and the displacement of flood water within the River Trent floodplain, a stand-alone Flood Risk Assessment (FRA) will be submitted to accompany the DCO application. The scope of the flood risk assessment will be agreed with the Environment Agency and North Lincolnshire Council, as the Lead Local Flood Authority, but is likely to include:

- assessment of the likely increase in surface water runoff, consideration of possible attenuation options and production of a SuDS feasibility matrix, which will be then be incorporated into the surface water drainage strategy for the site;
- modelling of the River Trent to establish the impact of the Project, if any, on the mechanism of flooding, extent and depth of floodwater across the development site and the extent and depth of flooding of surrounding land and property in the event of a breach of, or overtopping of the existing flood defences; and
- the development of mitigation options if required.

10.7.1.2 The risk of mobilising contaminated materials during a flood event will be addressed by the FRA, which will include details of all likely flood scenarios up to and including the 1 in 200 year event plus climate change scenario. It will incorporate mitigation into the design of the Project such that contamination of the environment with feedstock is prevented. As the protection of fuel stocks from flooding will become an embedded mitigation of the Project design, reporting of the impacts from this likely significant effect is not considered necessary and as such it is proposed that it is scoped out of the detailed assessment. The ES will clearly set out the embedded mitigation and any measures required to enable their successful delivery.

10.7.1.3 As described in Section 10.4, the construction of the Project including its feedstock storage area may result in pollution of local surface water resources through the remobilisation of contamination during construction and spillages from general construction activities. All of these likely significant effects can be actively managed and mitigated through the adherence to a strict CoCP.

10.7.1.4 The quay extension may affect the hydromorphology of the River Trent, affecting the flow regime, riparian habitat, and aquatic ecology. Any change to hydromorphology and / or aquatic ecology may have a detrimental effect on a waterbody's WFD status. A WFD compliance screening assessment has been undertaken as part of the scoping report (Appendix A) and found that there are risks to hydromorphology, biology (habitats and fish), water quality and protected areas. As such, a full WFD compliance assessment will be undertaken and reported alongside the ES. A summary of the findings of the WFD compliance assessment will be included in the ES.

10.7.1.5 The WFD compliance assessment will include:

- identification of all waterbodies;
- field investigation to confirm current WFD status and agree present status with the Environment Agency;

- assessment of the Project to determine whether or not it results in deterioration of current ecological status and/or inability to achieve target status;
- review of effects against reasons for not achieving good status;
- proposed mitigation if required; and
- a proposed monitoring regime encompassing pre, during and post-construction works.

10.7.1.6 All of the above will also be undertaken through close, and continuous consultation with the Environment Agency.

10.7.1.7 The quay extension could affect flood risk in the River Trent by altering the channel morphology and changing the flow regime. This risk will be addressed within the standalone FRA through hydraulic modelling, and options to mitigate the increase will be developed and incorporated into the final ES. The exact scope of the modelling work to be undertaken will be agreed with the Environment Agency prior to commencement.

10.7.1.8 Once constructed, the operation of the extended quay could cause pollution to the River Trent through accidental fuel spillages from delivery vessels. However, the RMS Trent Port at Flixborough is already an existing operational port which handles coasters of various sizes and stocks a variety of mainly bulk and steel based imports and exports. As such, there is clear evidence that the port already operates successfully, with no evidence of causing pollution to the River Trent. The operation of the extended quay will continue in the same manner post construction, following the same procedures and will be subject to the same licences to operate. As such, the risk of increased pollution of the River Trent as a result of the operation of the extended quay is considered to be minimal, and it is proposed to scope this out of the detailed assessment. The ES will describe the management plans that will be in place for the portside operations that will minimise the risk of impacts to the River Trent.

10.7.1.9 Construction of the access road could affect water quality and flood risk within the watercourses and IDB maintained drains over which it will pass. It is anticipated that the majority of construction related-impacts will be mitigated though the implementation of measures detailed in the CoCP. However, a qualitative assessment of the likely impact will also be carried out at new watercourse crossings, or where significant new construction work is required at existing crossings. As the road does not pass over, or have any physical connection with the River Trent, impacts on the River Trent are anticipated to be negligible.

10.7.1.10 The operation of the new road, along with any increase in traffic along this route as a result of the operation of the Project, could reduce water quality in local watercourses through increased pollution due to spillages and an increase in routine runoff as a result of an increase in traffic.

10.7.1.11 In order to assess this impact, the Highways England's Water Risk Assessment Tool (HEWRAT) will be used to carry out an initial screening of the risk from these sources. If the tool reveals that the risk of pollution is likely to significant, mitigation options will be considered and incorporated into the design.

10.7.1.12 As stated in *Section 3.2.21* the re-operation of the disused rail spur is anticipated to require engineering safety checks and minimal maintenance works to allow the reopening of the line. These activities are not anticipated to introduce pollution pathways to any surface water receptors. All works will be undertaken in accordance with the CoCP.

10.7.1.13 Once re-opened, the operation of the spur will simply involve the running of trains on the line. The operation of trains to, from and on Network Rail's infrastructure (known as the Regulated Asset Base) and associated private railways fall under the provisions of the Railways Act and related regulations and guidance, including The Railways and Other Guided Transport Systems (Safety) Regulations 2006 (ROGS) and The Health and Safety at Work Act 1974. The safety management system is the basis for making sure a transport system runs safely and in line with ROGS. Train operators and infrastructure managers must keep written records of arrangements for managing safety risks. Those applying for a safety certificate must provide evidence that their safety management system makes sure the railway can be operated safely.

10.7.1.14 Under ROGS, operators must not run vehicles or manage infrastructure unless they have the appropriate safety certificate (for train operators) or safety authorisation (for infrastructure managers, including station operators). Operators must have a certificate or authorisation for all mainline operations and many non-mainline operations. The regulations which amended ROGS introduced the concept of an 'entity in charge of maintenance' (ECM). An ECM is a person or organisation that is responsible for the safe maintenance of a vehicle. You can only place a vehicle in service or operate it on the network if:

- the vehicle has an ECM assigned to it;
- that person or organisation is registered as the ECM in the National Vehicle Register; and
- for freight wagons, the ECM has an ECM certificate.

10.7.1.15 Train operators wishing to obtain or retain an Operating Licence are required to meet stringent conditions by the Office of Rail & Road as the designated Regulator, including on environmental matters. In this regard the ORR Licensing Guidance states that all operators are required to produce an environmental policy within six months of their licence or SNRP coming into effect. This must include details of supporting objectives and management arrangements, both when they are first developed and when any material changes are made. ORR will review these policies to check that they conform with guidance and comply with requirements for policies to be established.

10.7.1.16 In addition, Railway Group Standard GORT3056 Working Manual for Rail Staff Freight Train Operations sets out further guidance for train crew on the safe preparation, inspection and operation of freight trains.

10.7.1.17 All rolling stock will be operated as above, and will be appropriately maintained to avoid spillage of fuel stock or leakage of fuel / oils. It is therefore considered appropriate to scope out the assessment of any likely significant effects that could arise as a result of the re-opening and operation of the currently disused rail spur.

10.8 Statutory Consultees

10.8.1.1 The following key organisations will be consulted throughout the design and assessment of the Project with regards to Hydrology, Water Resources and Flood Risk;

- Environment Agency;
- North Lincolnshire Council – As Lead Local Flood Authority;
- Marine Management Organisation (MMO); and
- North East Lindsey Internal Drainage Board.

11. ECOLOGY AND NATURE CONSERVATION

11.1 Introduction

11.1.1.1 This section considers effects from the Project on the ecology and nature conservation interests in the vicinity of the Project site. The likely significant effects of the Project on the ecology and nature conservation interests are considered and identified, and the scope of further work required to inform the ecological impact assessment (EcIA) is described.

11.2 Topic-Specific Legislation and Guidance

11.2.1.1 The scope of the EcIA is based on the following key legislation, policy and associated guidance:

- NPS EN-1 and EN-3;
- The Conservation of Habitats and Species Regulations (2017) (known as the Habitats Regulations) that implement the Habitats Directive in the UK;
- the Wildlife and Countryside Act (W&CA) 1981 (as amended);
- the Birds Directive (2009/147/EC);
- the Natural Environment and Rural Communities (NERC) Act 2006;
- the Hedgerow Regulations 1997;
- the Protection of Badgers Act, 1992;
- National Planning Policy Framework (NPPF);
- guidance from Defra / Natural England on protected sites and species; and
- ecological impact assessment guidance by CIEEM.

11.3 Baseline Data Sources

11.3.1.1 This section has been informed by the following data:

- information from the Lincolnshire Environmental Records Centre (LERC) (in partnership with the Greater Lincolnshire Nature Partnership (GLNP)) for a radius of 10 km (statutory sites), 5 km (non-statutory sites) and 5 km for flora and fauna species of note (all distances were taken from a grid reference of SE 85715 14683 located at the centre of the Project site;
- an Extended Phase 1 Habitat Survey (JNCC, 2010; CIEEM 2017) (Bowland Ecology, 2018, 2019, 2020 – see Appendix B) undertaken in 30th July 2018, June 2019, November 2019, July 2020 and October 2020;
- migratory and wintering bird survey (Bowland Ecology, 2018 - see Appendix C);
- an ecological walkover of the wider area, the findings of which are summarised in Appendix D: Ecological Constraints Plan; and
- a preliminary review of habitats from aerial imagery captured from high definition drone imagery in 2020 covering the Project and 5 km up and downstream of the Project along the River Trent.

11.3.1.2 The statutory designated sites identified within 15 km of the Project site are listed (in order of increasing distance from the Project site) in Table 11-1 and shown in Figure 11.1.

11.3.1.3 The non-statutory designated sites identified within 2 km of the Project site are listed in Table 11-2 and shown in Figure 11.1

Table 11-1: Statutory Designated Sites within 15 km of the Project

Designation Type	Designation Name	Distance from Project Site	Description
SAC	The Humber Estuary	Adjacent	Large estuary complex designated for its estuary and coastal habitats including intertidal mudflats, sand flats, saltmarsh, reed beds and dunes, as well as populations of sea lamprey, river lamprey and grey seal.
Ramsar Site	The Humber Estuary	Adjacent	Large estuary complex which supports internationally important populations of breeding, wintering and passage birds, estuary habitats and plant species.
SSSI	The Humber Estuary	Adjacent	Large estuary complex designated for its important estuary and coastal habitats and supports colonies of breeding grey seals, river lamprey and sea lamprey in addition to supporting nationally important assemblages of breeding birds.
SSSI	Conesby (Yorkshire East) Quarry	Adjacent	Geological designation for exposure of Frodingham Ironstone. Supports rich bivalve population.
Local Nature Reserve (LNR)	Conesby Quarry	Adjacent	Restored area of Conesby Quarry which is managed as acid grassland and also includes Normanby Road lake “Blue Lagoon” and the surrounding grassland. The area supports several priority species including skylark, lapwing and grayling butterfly.
LNR	Phoenix Parkway / Phoenix	Part of the project site / adjacent	21.5 ha of structurally diverse, species-rich sandy dry habitats including semi-natural woodland, scattered and dense scrub, with unimproved and semi-improved acid grassland in the northern end of the site.
LNR	Atkinson’s Warren	Part of the project site / adjacent	32.8 ha of sloping rough grassland and woodland with some scrub. Tree species include birch and oak with additional plantings of Scots pine and sycamore.
LNR	Sawcliffe	0.58 km south-east	Land-filled former sand quarry comprising recently planted woodland and neutral grassland. A track running north-west to south-east consists of diverse flora typical of sandy soils.
SSSI	Risby Warren	1.15 km east	Designated for its extensive heathland, grassland and dune formations with associated important plant communities.
LNR	Brumby Wood	1.4 km east	Woodland divided into three blocks by two roads. Supports a substantial amount of semi-natural woodland with neutral grassland and small areas of scrub. There are several veteran trees.
LNR	Frodingham	1.57 km south-west	Rectangular area comprising semi-natural woodland, scrub, grassland (unimproved and damp grassland), marsh and fen.
LNR	Silica Lodge	1.59 km south-east km	A mixture of scrub, acid grassland (unimproved and semi-improved) with a lake and coarse grassland. The lake is used for fishing and is associated with a rich fauna of birds and invertebrates.
LNR	Ashbyville	3.51 km south-east	A popular reserve for visitors, comprising two water bodies used for fishing and water sports. Wetland, acid grassland and two copses are also present.
SPA	The Humber Estuary	4.82 km north	Large estuary complex which supports internationally important populations of breeding, wintering and passage birds.

SSSI	Messingham Heath	5.17 km south	Designated for its covers and heathland habitat.
SSSI	Broughton Far Wood	5.86 km south-east	Designated for its rich limestone flora and woodland.
SSSI	Broughton Alder Wood	6.23 km south-east	Designated for its alder woodland and associated woodland ground flora.
SSSI	Eastoft Meadow	6.61 km west	Designated for its small herb-rich hay meadow.
SSSI	Crowle Borrow Pits	6.63 km west	Designated for habitats including alder carr, fen and water which support several locally uncommon plant species.
SSSI	Tuetoes Hills	6.85 km south	Tuetoes Hills support an importance mosaic of dry acid grassland vegetation such as acid dune grassland dominated by sand sedge. This type of vegetation is now rare in Lincolnshire and very restricted in its distribution nationally.
SSSI	Messingham Sand Quarry	5.17 km south-east	Designated for its mosaic of habitats which included open water, wetland and woodland as well as re-establishment of natural heathland vegetation. It is important for its insect fauna and supports a diverse breeding bird community.
SSSI	Hatfield Chase Ditches	6.97 km west	A large area of former marsh and wetland which has been drained and split into a complex network of ditches. The ditches retain elements of the former marshland.
SSSI	Castlethorpe Tufas	8.63 km south-east	Geological designation for its important Quaternary interest of fossil pollen and shells which were preserved in a deposit of tufa.
SSSI	Manton and Twigmoor	8.74 km south-east	Designated for its important heathland, grassland and wetland on covers and deposits.
SSSI	Belshaw	8.78 km south-west	A short length of land along a disused railway line which is important because it supports a colony of greater yellow-rattle. This nationally rare species is now known to occur in only six localities in Great Britain.
SSSI	Scotton and Laughton Forest Ponds	9.06 km south	Designated for distinctive marginal wetland vegetation, a type of base-poor fen/mire which formed on permanently wet acid soils. There are also peaty heathland pools associated with open acid grassland and woodland.
SPA	Thorne and Hatfield Moors	9.12 km west	Designated for its extensive lowland raised mire system and the largest remaining lowland peatland in England. The diverse mosaic of habitats supports nationally rare breeding birds including Nightjar.
SAC and SSSI	Thorne, Crowle and Goole Moors	9.12 km west	Largest extent of lowland raised mire in England which supports nationally rare invertebrate species and breeding and wintering birds.
SSSI	Scotton Beck Fields	9.5 km south	Designated for its extensive area of acidic unimproved grassland.
LNR	Owston Ferry Castle	9.65 km south-west	A meadow habitat which attracts many birds and butterflies. A section of the site is a Scheduled Ancient Monument dating back to the 11 Century.
SSSI	Manton Stone Quarry	9.69 km south-east	Geologically designated for its particular importance in the interpretation of the local, internal stratigraphy of the Lower Lincolnshire Limestone Formation.
SSSI	Scotton Common	9.8 km south	Scotton Common is one of the few extant areas of lowland heathland left in north-west Lincolnshire, it contains a range of habitats supporting a succession of communities rich in species.
LNR	Axholme Line-Haxey	10.41 km south-west	A 2 km stretch of former railway line consisting of grassland, woodland and scrub.
SSSI	Epworth Turbary	10.51 km south-west	Geologically designated as an area of relic peat vegetation, the plant communities present are birch woodland, heathland and fen.

SSSI	Rush Furlong	10.69 km south-west	Designated for its unfenced strip of hay meadow on base-rich Keuper Marl soils.
SSSI	South Ferriby Chalk Pit	10.8 km north-east	Geologically designated for its considerable importance in providing good sections of Upper Jurassic and Lower Cretaceous rocks.
SSSI	Cliff Farm Pit	11.05 km south-east	Geologically designated as the best and most extensive exposure of the economically important Kirton Shale Member of Lincolnshire Limestone formation in its type area. The Kiton Shale is well known for its coral fauna.
LNR	Mayfield and Broom Park	12.99 km north-west	No citation available, an orchid population is present at Broom Park site.
LNR	Owlet Plantation	13 km south	Managed by the Woodland Trust, Owlet Plantation LNR is a 50 ha area of birch, oak and pine, interspersed among more open heath with scattered mature oak trees. Remnant heath vegetation occurs on more open areas and is home to a wealth of butterflies like the brimstone, small copper and purple hairstreak
SSSI	Wrawby Moor	13.04 km east	Designated for its rich chalk stream fauna.
LNR	Far Ings	13.27 km north-east	Situated on the south bank of the Humber Estuary, Far Ings LNR comprises pits and reedbeds. The reserve is rich in wildlife and is one of the UK's strongholds for bittern (a Schedule 1 listed bird).
SSSI	Melton Bottom Chalk Pit	13.49 km north-east	Geological designation for displays of extensive exposure of Chalk, overlying the Lias with marked unconformity.
SAC and SSSI	Hatfield Moors	12.25 km south-west	Hatfield Moors are the second largest remaining raised bog in lowland England, it is an important area for breeding birds and insect populations.

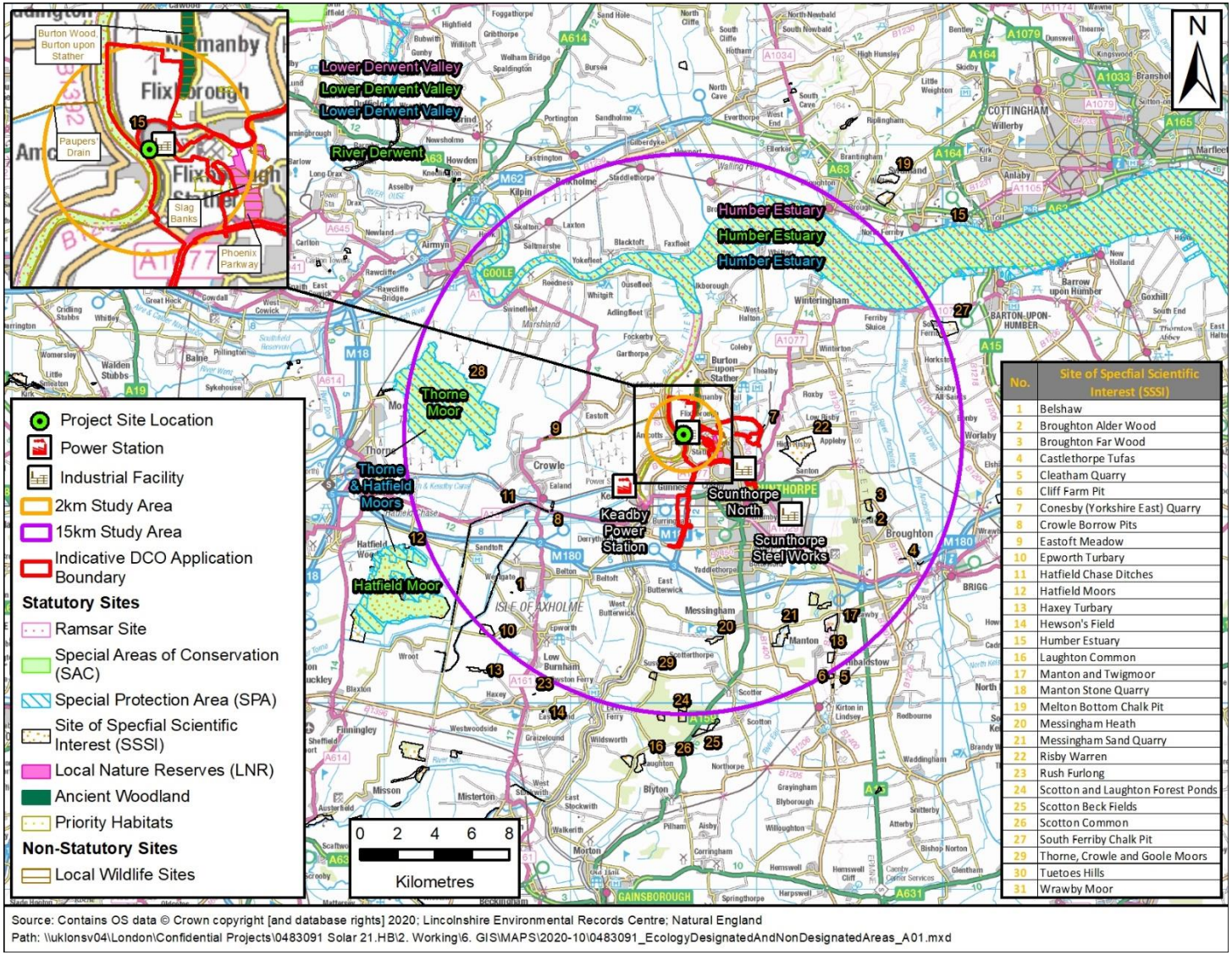
Table 11-2: Non-Statutory Designated Sites within 2 km of the Project

Designation Type	Designation Name	Distance from Project Site	Description
LWS (Local Wildlife Site)	Phoenix Parkway	Part of the project site / adjacent	21.5 ha of structurally diverse, species-rich sandy dry habitats including semi-natural woodland, scattered and dense scrub, with unimproved and semi-improved acid grassland in the northern end of the site.
LWS and Local Geological Site (LGS)	Conesby Quarry	Part of the project site / adjacent	A large (60.1 ha) ironstone quarry, with the western and central parts in filled and a deep depression in the est. The main habitat types include scrub, semi-improved neutral grassland, ruderal and unimproved acid grassland. There is also wetland vegetation in the east.
LWS	Yorkshire East Gullet	Part of the project site / adjacent	Unmanaged former ironstone quarry complex which centres around an elongated lake. The lake is bordered by a steep slope which supports scrub and woodland vegetation with some smaller areas of grassland bracken. Conesby (Yorkshire East) Quarry SSSI is contained within this LWS in the south-east.
LWS	Atkinson's Warren	Part of the project site / adjacent	32.8 ha of sloping rough grassland and woodland with some scrub. Tree species include birch and oak with additional plantings of Scots pine and sycamore.
LWS	Burton Wood, Burton upon Stather	Adjacent	Several springs and small streams, the entire site is listed on the ancient woodland inventory as re-planted ancient woodland.
LWS	Slag Banks	1.7 km south-east	Wetland and grassland on the north-eastern and south-eastern margins of an infilled ironstone quarry, and a botanically-rich sandy area in the south-west within Phoenix Parkway LNR.

LGS	Conesby Rock Store	Adjacent	A 0.7 ha area of low-lying ironstone ore stockpiled by North Lincolnshire Council as an educational resource.
LWS	Dragonby Gullet	Adjacent	Former ironstone quarry which is dissected by a disused railway. The south-west area of the site comprises a fishing lake which is fringed with unmanaged trees, scrub, grassland, and hay meadows. The north-east area of the site comprises another fishing lake with surrounding coarse grassland and scrub. Botanically diverse and likely to support a range of invertebrates and birds.
LWS	Brumby Common West	Adjacent	A diverse group of habitats including a lake, conifer plantation, semi-natural woodland, acid grassland, bracken, scrub and arable weeds.
LGS / Site of Nature Conservation Interest (SNCI)	Dragonby Mine	0.11 east	Dragonby mine entrance which is vegetation with grassland.
LWS	Land adjacent to Johnson's Transport	0.15 km east	Moderately-sized area of grassland habitat with some areas of woodland and wetland habitat close to housing, with a bordering ditch to the west.
LWS	Normanby Park Community Woodland	0.17 km north	An area of extensive planting of trees and shrubs with botanically interesting areas of grassland as well as bracken and a pond. Supports a good variety of invertebrates, birds and amphibians.
LWS	Paupers' Drain	0.2 km west	A 7 km stretch of a canalised watercourse with an outfall into the Humber Estuary SSSI on the western banks of the River Trent.
LGS	Dragonby dragon	0.3 km east	A ridge of hard travertine over 20 m long, 5 m wide and < 2 m tall.
LWS	Bessemer Brownfield Sites	0.31 km east	Former industrial site which comprises areas of grassland and scrub. Species are typical of open sandy swards and also include neutral grassland species.
LWS	Gunness Common	0.37 km east	Flat area of acidic peaty pasture on a damp floodplain and bordered by a strip of unmanaged trees and scrub.
LWS	Westcliff Lagoon	0.43 km east	Complex lake system surrounded by oak and birch woodland with a small amount of heathland grassland and standing/fallen deadwood.
LWS	Normanby Park	0.48 km north	A variety of habitats including planation woodland, grassland (both managed and unmanaged), stream, pond, marsh and wet woodland. A section of the park is managed for deer. These habitats support a range of birds, brown hare and amphibians.
LGS	Sawcliffe	0.58 km south-east	Land-filled former sand quarry comprising recently planted woodland and neutral grassland. A track running north-west to south-east consists of diverse flora typical of sandy soils.
LWS	Sawcliffe Medieval Village	0.65 m east	Semi-improved neutral grassland field which is hummocky and also contains three botanically rich ponds and bordering hedgerows.
SNCI	Winterton Road Pits	0.7 km south	Drains and banks at the edge of former ironstone workings with varied flora including bracken and damper areas of willow and birch scrub.
LGS	Normanby Park Golf Course	0.81 km north	Roughly 49 ha site comprising area of improved grassland with unmanaged areas including acid grassland, bracken, stream and marshy grassland. The unmanaged areas are botanically interesting.

LWS	Mannaberg Way Drainage Area	0.85 km east	Flood alleviation basin on the west side of the A1029 with wetland vegetation at the lowest levels which supports a mixture of plants, invertebrates and birds.
LWS	Kingsway Golf Course	0.88 km east	Semi-natural woodland, wet woodland and acid grassland surrounded by housing, the A18 and a railway line. The site supports a good variety of birds and invertebrates.
LGS	Crosby Warren Quarry	1.08 km east	Quarry restoration adjacent to a fishing lake. SSSI designated due to the well-preserved ammonite fauna.
LWS	Brumby Wood	1.4 km east	Woodland divided into three blocks by two roads. Supports a substantial amount of semi-natural woodland with neutral grassland and areas of scrub. There are several veteran trees.
LWS	Burton upon Stather Brick Pit	1.43 km north	Water-filled former brick pit at the eastern shore of the River Trent. The pit margins support reedbed, additional vegetation includes scrub, grassland and planted shrubs.
SNCI	The Buttonhook and Brackenholmes	1.44 km east	Mature oak woodland with some open areas of ruderal vegetation.
LWS	Ashby Decoy Golf Course	1.47 km east	The golf course comprises acid grassland with woodland, scrub, neutral grassland and standing water.
LWS	Ridge Walk	1.48 km east	A long strip of mature hawthorn scrub on a limestone escarpment.
LWS	Bagmoor Gullet, Bagmoor Quarry	1.5 km north	Botanically diverse strip of a former ironstone quarry complex. The central spine is an elongated lake bordered by scrub and grassland.
SNCI	Roxby Gullet	1.54 km north-east	Disused ironstone workings with a lake in the base.
LWS	Frodingham Railway Cutting	1.57 km south-east	Rectangular area comprising semi-natural woodland, scrub, grassland (unimproved and damp grassland), marsh and fen.
LWS	Silica Park	1.59 south-east	A mixture of scrub, acid grassland (unimproved and semi-improved) with a lake and coarse grassland. The lake is used for fishing and is associated with a rich fauna of birds and invertebrates.
LWS	Butterwick Hale and Common	1.95 km south	A large pasture with a wide ditch on the northern boundary. An important area for birds and botanical interest. The site also contains two unfenced ponds and scattered trees.

Figure 11.1: Statutory Sites within 15km and Non-Statutory Sites within 2km of the Project Site



No.	Site of Specfial Scientific Interest (SSSI)
1	Belshaw
2	Broughton Alder Wood
3	Broughton Far Wood
4	Castlethorpe Tufas
5	Cleatham Quarry
6	Cliff Farm Pit
7	Conesby (Yorkshire East) Quarry
8	Crowle Borrow Pits
9	Eastoft Meadow
10	Epworth Turbary
11	Hatfield Chase Ditches
12	Hatfield Moors
13	Haxey Turbary
14	Hewson's Field
15	Humber Estuary
16	Laughton Common
17	Manton and Twigmoor
18	Manton Stone Quarry
19	Melton Bottom Chalk Pit
20	Messingham Heath
21	Messingham Sand Quarry
22	Risby Warren
23	Rush Furlong
24	Scotton and Laughton Forest Ponds
25	Scotton Beck Fields
26	Scotton Common
27	South Ferriby Chalk Pit
29	Thorne, Crowle and Goole Moors
30	Tuetoes Hills
31	Wrawby Moor

Source: Contains OS data © Crown copyright [and database rights] 2020; Lincolnshire Environmental Records Centre; Natural England
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11.3.1.4 The following sections provide an overview of the habitats and species associated with the Project site. This project area is described sequentially beginning with habitats and species of the port (Flixborough Wharf) followed by: areas to the west; areas to the north; areas to the south and west; areas to adjacent to the A1077, M181 and Normanby Road, areas along the disused railway line; and areas associated with the new road. Further detail is provided in the Phase 1 habitat reports (Appendix B).

11.3.1.5 The RMS Ports site occupies land within the Flixborough industrial estate. The River Trent corridor, which lies in the Humber Estuary SAC, Ramsar site and SSSI borders the western edge of the site of the NSIP. The nearest point of the Humber Estuary SPA lies approximately 4.82 km to the north; Burton Wood Ancient Woodland and LWS is situated adjacent to the site on the north-east.

11.3.1.6 The port site consists of hard standing comprising roads, car parks, footpaths and storage areas interspersed with 14 buildings including porta cabins, large metal corrugated buildings and brick buildings. Small areas of trees, scattered scrub and introduced scrub are present and an area of standing water is located in the south-eastern corner. In the north-eastern corner, at the end of the inactive rail line, there is a small area of poor semi-improved grassland, with some tree cover, scattered scrub, ruderal and marginal vegetation. A small area of spoil/rubble is located in the northern part of the site, with small areas of disturbed land to the east and scrub to the west.

11.3.1.7 The Extended Phase 1 Habitat Survey and ecological site walkover found evidence of the following:

- eight water bodies within 250 m of the port site to the north, south and south-east;
- habitats potentially suitable for protected species such as great crested newts, , and breeding birds;
- Protected species field signs including water vole burrows and water vole latrines. EDNA sampling also confirmed the presence of great crested newts in ponds within 250 m of the site boundary; and
- estuarine habitats including reed beds, ditches, a section of stream and coastal saltmarsh (qualifying interest of the Humber SAC) along the banks of the River Trent corridor directly adjacent to the Project which are potentially suitable for protected species such as sea and river lamprey, otter, wintering, breeding and migrating birds.

11.3.1.8 North of Flixborough Wharf, the habitats consist of arable fields with marginal vegetation, ditches, hedgerows and a set-aside grassland. A short section of stream is present along the northern site boundary. To the north of the site boundary, the ecological walkover survey identified trees with the potential to support roosting bats. Flixborough Grange which is also located north of the site boundary is considered likely to support roosting bars and barn owl (a Schedule 1 listed species). The ecological site walkover north of Flixborough Wharf found evidence of habitats potentially suitable for protected species such as otter, water vole, and breeding birds. The otter and water vole survey of the ditches conducted in May 2019 and September 2020 confirmed

the presence of water vole in the ditches. The presence of otters here was identified.

11.3.1.9 One small water body which is dominated by common reed (*Phragmites australis*) swamp is located immediately north of the site boundary, in Flixborough Grange. EDNA sampling of the water body for GCN was attempted in June 2020, however the water level was too low for the sample to be conducted.

11.3.1.10 Immediately to the west of the port area, aerial imagery and a site walkover indicates that the River Trent is dominated by marginal riverine habitat and areas of saltmarsh and hard standing and buildings associated with the operational port. The central eastern area of the NSIP site within the Flixborough Wharf consists of hardstanding of roads and laydown areas holding storage containers.

11.3.1.11 The ecological site walkover near to the banks of the River Trent found estuarine habitats including marginal vegetation and reed beds, ditches and coastal saltmarsh (qualifying interest features of the Humber SAC) along the banks of the River Trent corridor, which are potentially suitable for protected species such as sea and river lamprey, otter, wintering, breeding and migrating birds.

11.3.1.12 The Extended Phase 1 Habitat Survey and ecological site walkover identified a small derelict brick pump house on the bank of the River Trent that has bat roost potential.

11.3.1.13 In the south and west of Flixborough Wharf is brownfield mixed-use land that abuts the River Trent corridor on the westernmost edge. An extensive area of arable land with associated ditches, marginal vegetation, hedgerows and set-aside grassland are present to the south of Flixborough Wharf. Two large barns are located at Park Ings Store. The Humber Estuary SPA is approximately 4.82 km north and the Humber Estuary SAC, Ramsar site and SSSI adjoin the site along the River Trent corridor. Slag Banks LWS and Phoenix Parkway LWS are situated adjacent to this area of the Project Site.

11.3.1.14 The ecological walkover survey of land to the south and west of the port site found evidence of habitats potentially suitable for protected species such as breeding birds, bats, water voles, otters, amphibians, and reptiles. The otter and water vole survey in ditches to the south Flixborough Wharf conducted in September 2020 confirmed the presence of water vole. One otter was recorded laying up the marginal vegetation of a ditch, however no other evidence indicating regular use by this species was found.

11.3.1.15 The two water bodies noted above are ponds used for surface water drainage. The one closest to the River Trent has steep banks and is lined with a geotextile material. The other (directly east of the former) is an accessible feature and the amphibian survey conducted in 2019 confirmed the presence of great-crested newt (*Triturus cristatus*) (GCN) in this pond.

11.3.1.16 An ecological walkover survey of land to the south-east of Flixborough Wharf, identified an area of a mosaic of semi-natural habitats, including dense scrub, semi-improved acid grassland, swamp and bracken. The preliminary ecological appraisal (Bowland Ecology, 2020) highlighted this an area of

potentially valuable relic 'heathland' habitat. The area is connected to Local Nature Reserves (LNR) which are similar in character; Phoenix LNR, Phoenix Parkway LNR and Atkinson's Warren LNR.

11.3.1.17 Five water bodies were recorded in the area of mosaic, semi-natural habitats to the south-east of Flixborough Wharf. EDNA survey conducted in June 2020 confirmed the presence of GCN in one of the ponds. A pond located in an area of dense scrub was also subject to eDNA testing for GCN and returned a negative result. The remaining three water bodies did not contain enough water at the time of survey to conduct an eDNA sample survey.

11.3.1.18 Land adjacent to the A1077 road and M181 was surveyed in July 2020, this included a buffer of 100 m to the west and east of the road. The majority of the land use adjacent to the road is arable farmland, with the Gallagher Retail Park located to the east of the road. Habitats recorded within the road easement area included diches, marginal vegetation, plantation woodland, semi-natural woodland, dense scrub, scattered scrub and scattered trees. Brumby Common LWS and Ashby Golf Course LWS are located within 500 m of the road.

11.3.1.19 Land adjacent to the A1077 road (Phoenix Parkway) and Normanby Road was surveyed in October 2020, including a 30 m from the road. The land use in the most eastern section of the survey area is dominated by residential and retail development. Foxhills industrial estate is located to the north of the A1077 and the road intersects Atkinson's Warren LNR, LWS. Habitats recorded within the road easement area include semi-natural woodland, plantation woodland, dense scrub, scattered scrub, scattered trees, neutral semi-improved grassland, amenity grassland, hard standing and buildings. The Schedule 9 listed invasive species; Japanese knotweed was also recorded within the survey area.

11.3.1.20 Evidence of the following was found during the ecological site walkover associated with the A1077:

- Five water bodies within 250 m of the road;
- habitats potentially suitable for protected species including water voles, great crested newts, bats, reptiles, and breeding birds; and
- Plantation woodland, semi-natural woodland, dense scrub, scattered trees and scattered scrub.

11.3.1.21 Five water bodies within 250 m of the road are scheduled for GCN eDNA sampling and GCN amphibian presence/absence surveys in 2021. The ditches are scheduled for water vole and otter surveys. In addition, trees assessed as having potential to support roosting bats are scheduled for inspection by a suitably experienced ecologist.

11.3.1.22 Leading away to the east of the NSIP, the disused railway spur of approximately 6 km that runs to a National Rail connection east of Scunthorpe. Burton Wood Ancient Woodland and LWS is approximately 500 m north of the railway spur.

11.3.1.23 From aerial imagery and film footage of the track from 2018, the habitats along the railway spur appear to consist of railway track overgrown in places by small plants and shrub saplings and areas of dense vegetation, scrub and

scattered trees along either side of the track. Some vegetation has encroached the track and there are also some areas of bare ground, marginal vegetation and grassland. The surrounding land includes arable fields with hedgerows and ditches, rough grassland and areas of hard standing and buildings. The route lies adjacent to waterbodies that appear to be manmade lakes in the southern part.

11.3.1.24 The ecological site walkover found evidence of the following:

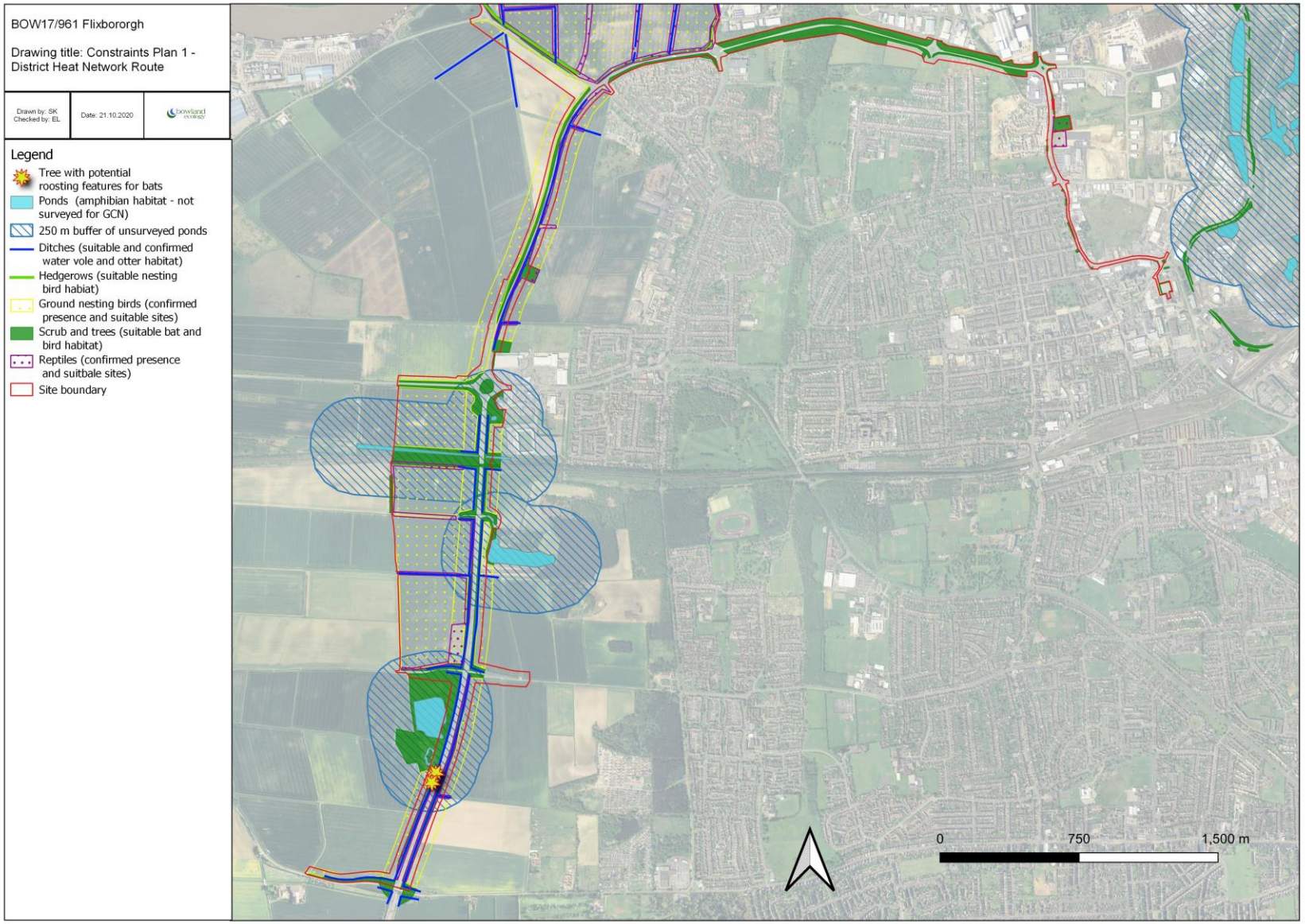
- water bodies within 250 m of the railway spur;
- habitats potentially suitable for protected species such as great crested newts, , bats, otters, water voles, reptiles and breeding birds; and
- protected species field signs along the railway spur including bat boxes, and latrines.

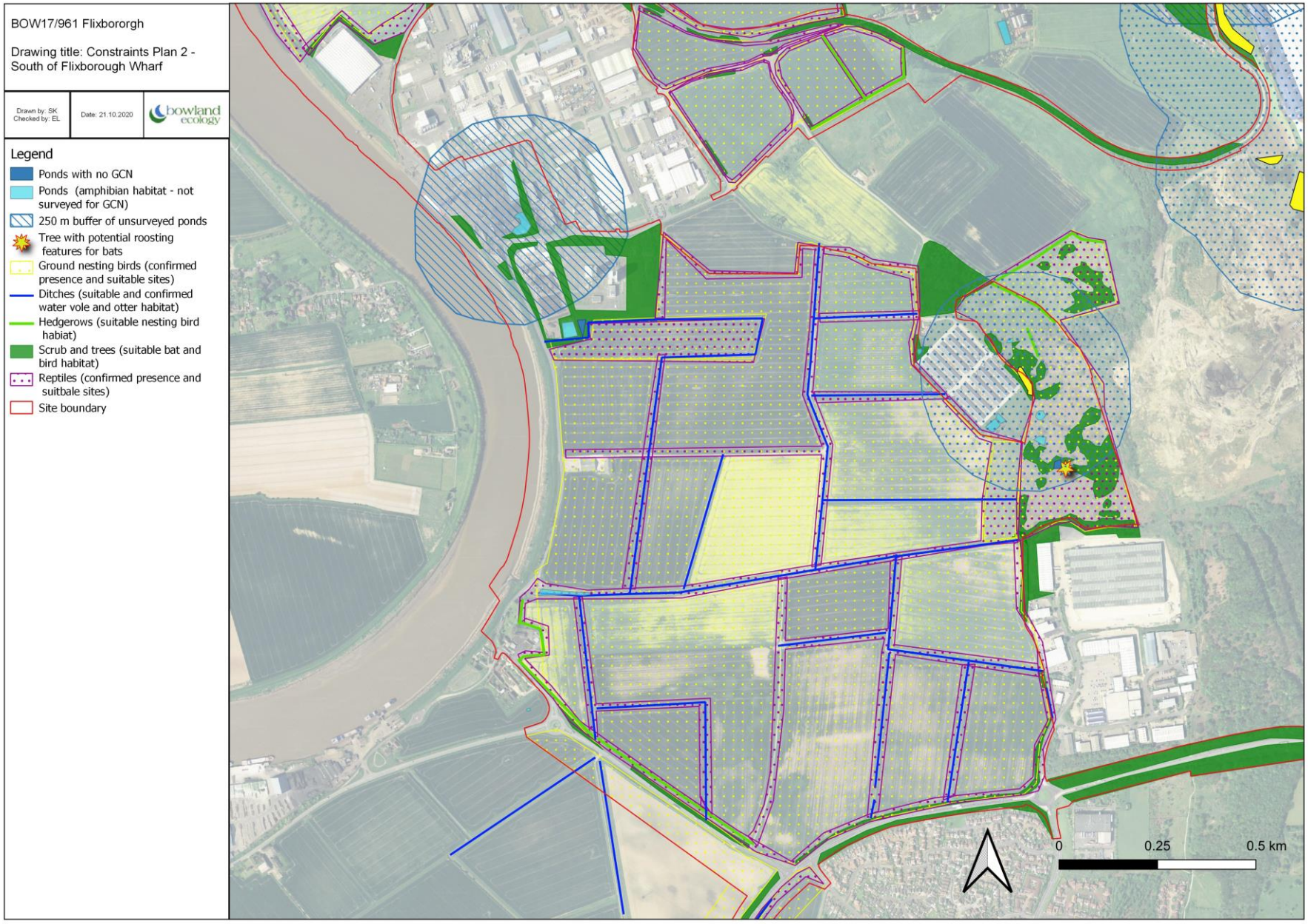
11.3.1.25 Subsequently, 15 ponds and two ditches were subject to Habitat Suitability Index (HSI) assessment. Of these, 11 ponds and two ditches were subject to GCN amphibian presence/absence surveys (all within 250 m of the railway spur). One pond was subject to eDNA survey (due to lack of access for physical survey). The ponds and ditches surrounding Normanby industrial estate were confirmed to hold populations of GCN.

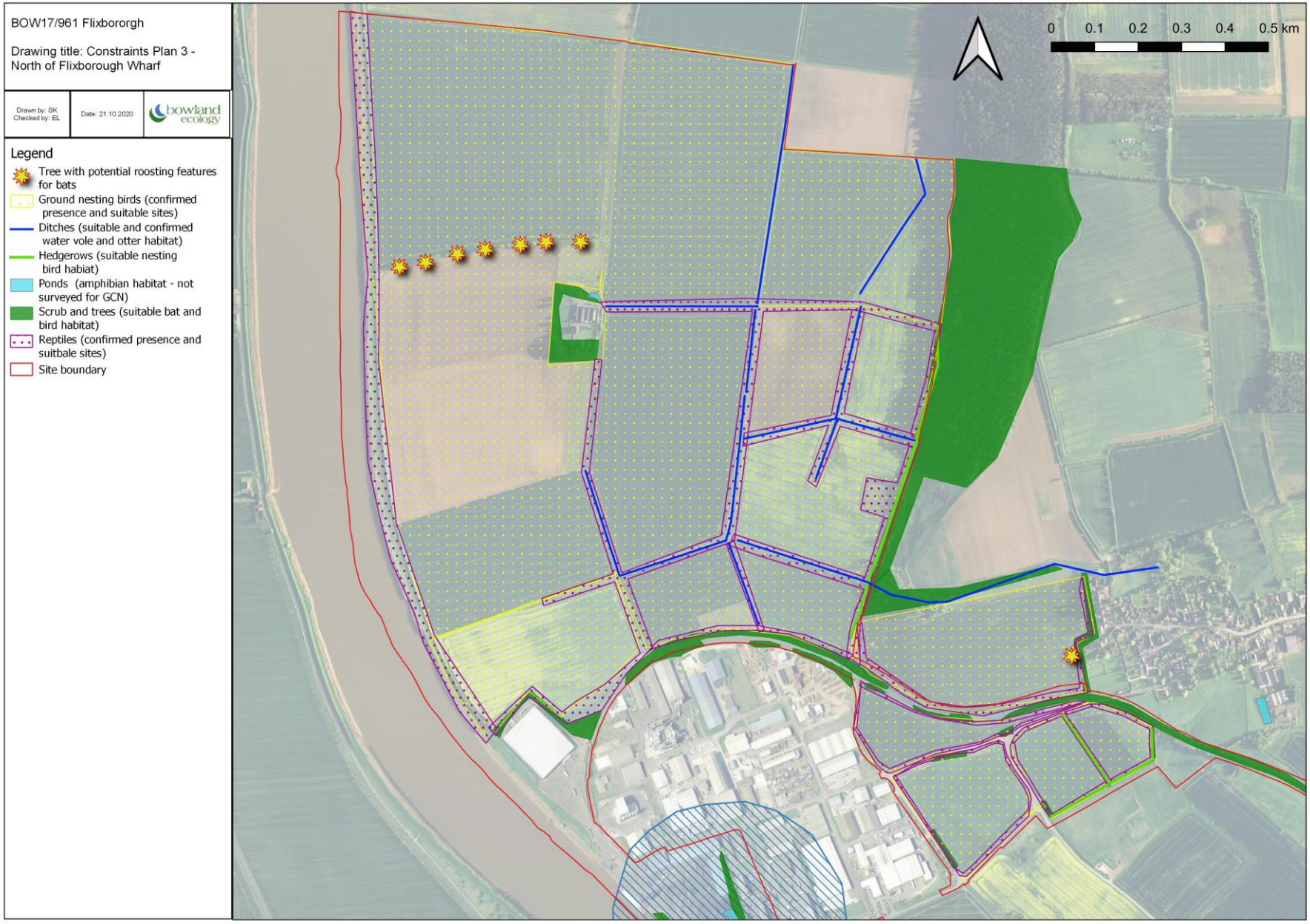
11.3.1.26 The route of the proposed new road, although still undefined, would pass through mainly agricultural land, crossing some small areas of scrub, trees and woodland. The road improvements are adjacent to the Humber Estuary SAC, Ramsar site and SSSI. The surrounding land includes arable fields with hedgerows and ditches, rough grassland and areas of hard standing and buildings. The ecological site walkover found evidence of habitats potentially suitable for protected species such as great crested newts, water voles, reptiles and breeding birds.

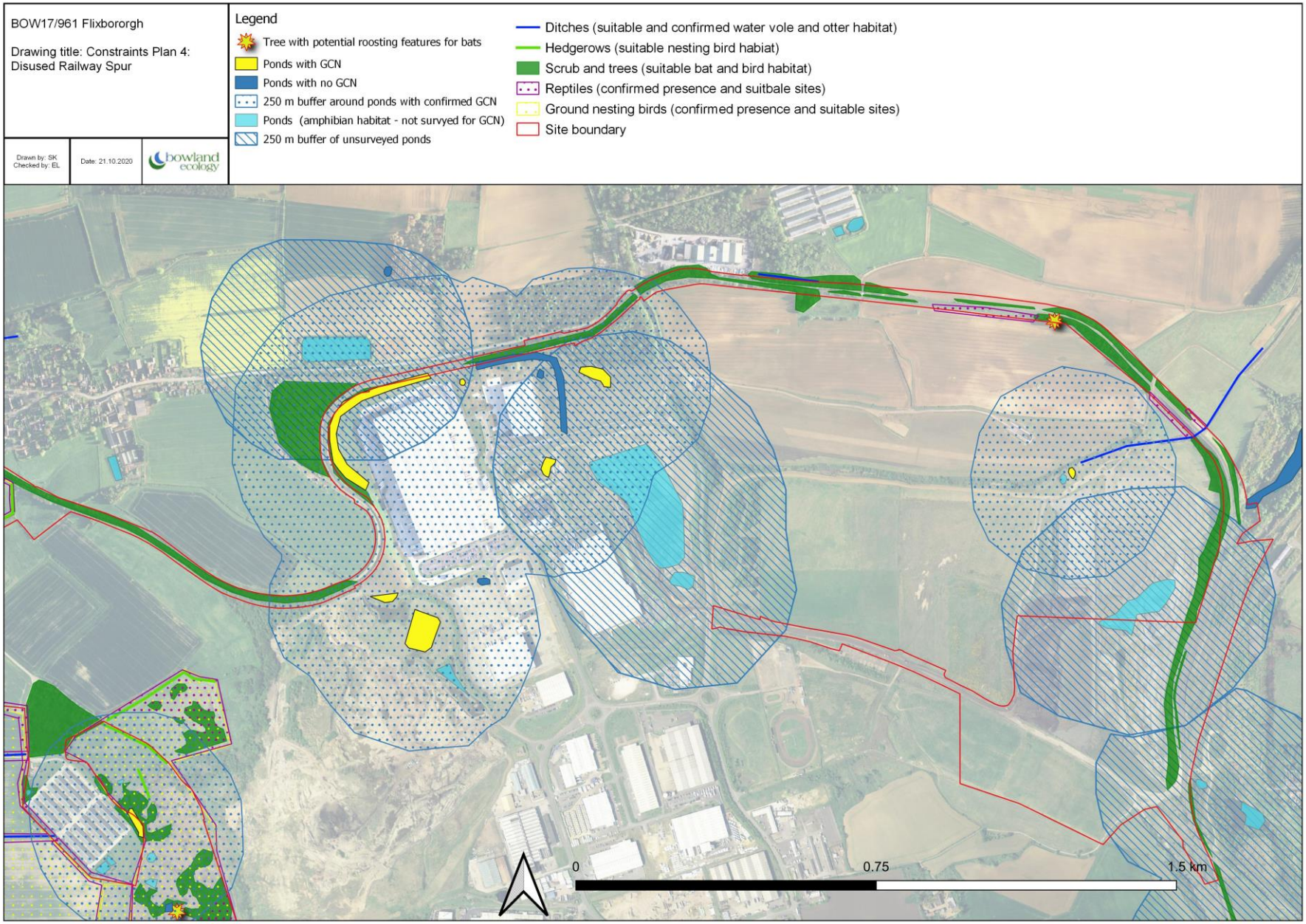
11.3.1.27 Figure 11.1 presents the location of the key habitats identified in the vicinity of the Project Site.

Figure 11.2: Habitat Distribution around the Project Site




BOW17/961 Flixborough
Drawing title: Constraints Plan 2 - South of Flixborough Wharf
Drawn by: SK
Checked by: EL
Date: 21.10.2020
bowland ecology
Legend
Ponds with no GCN
Ponds (amphibian habitat - not surveyed for GCN)
250 m buffer of unsurveyed ponds
Tree with potential roosting features for bats
Ground nesting birds (confirmed presence and suitable sites)
Ditches (suitable and confirmed water vole and otter habitat)
Hedgerows (suitable nesting bird habiat)
Scrub and trees (suitable bat and bird habitat)
Reptiles (confirmed presence and suitbale sites)
Site boundary
0
0.25
0.5 km


BOW17/961 Flixborough
Drawing title: Constraints Plan 3 - North of Flixborough Wharf
Drawn by: SK
Checked by: EL
Date: 21.10.2020
bowland ecology
Legend
Tree with potential roosting features for bats
Ground nesting birds (confirmed presence and suitable sites)
Ditches (suitable and confirmed water vole and otter habitat)
Hedgerows (suitable nesting bird habiat)
Ponds (amphibian habitat - not surveyed for GCN)
Scrub and trees (suitable bat and bird habitat)
Reptiles (confirmed presence and suitbale sites)
Site boundary
0 0.1 0.2 0.3 0.4 0.5 km


BOW17/961 Flixborough
Drawing title: Constraints Plan 4: Disused Railway Spur
Drawn by: SK
Checked by: EL
Date: 21.10.2020
bowland ecology
Legend
Tree with potential roosting features for bats
Ponds with GCN
Ponds with no GCN
250 m buffer around ponds with confirmed GCN
Ponds (amphibian habitat - not survyed for GCN)
250 m buffer of unsurveyed ponds
Ditches (suitable and confirmed water vole and otter habitat)
Hedgerows (suitable nesting bird habiat)
Scrub and trees (suitable bat and bird habitat)
Reptiles (confirmed presence and suitbale sites)
Ground nesting birds (confirmed presence and suitable sites)
Site boundary
0
0.75
1.5 km

11.4 Likely Significant Effects

11.4.1.1 The potential impacts arising from the Project that could result in effects on ecological and nature conservation interests are:

- disturbance and loss of habitat to temporary and permanent features of the project through removal of vegetation during site preparation works;
- mobilisation of contaminants and/or sediment during construction works on land;
- possible spills of fuel affecting water quality;
- movement of construction vehicles and plant;
- noise and light emissions during construction;
- emission of airborne pollutants from the stack;
- noise and light emissions during operation of the Project; and
- movement of vehicles and vessels used during operation of the Project.

11.5 Spatial Scope

11.5.1.1 The spatial scope of the assessment is proposed to consider the potential impacts identified above on all habitats and flora and fauna of nature conservation interest within the boundaries of the Project site, as well as statutory designated sites identified within 15 km of the Project site and non-statutory designated sites identified within 2 km of the Project site.

11.5.1.2 Given the information available to date, the areas of greatest ecological interest are likely to be the River Trent corridor within the Humber Estuary SAC, Ramsar and SSSI. Some parts of the Project may directly impinge on the river corridor, whilst others lie adjacent and may cause effects due to disturbance or mobilisation of contaminants within the designated area.

11.5.1.3 Away from the river corridor, the railway spur has been disused for a period of approximately seven years and is vegetated with trees and scrub in places either side of the railway lines. As such, it is likely to be of some ecological interest. Effects on ecological interests along this spur will be influenced by the extent of the site preparation and re-opening works required, especially habitat clearance as well as, to a lesser degree, the commencement of operational movements along the track.

11.5.1.4 Whilst located in an area of both brownfield and agricultural land dominated by intensively managed arable crops, the development of the ERF and associated facilities and the road improvement to the south of the wharf will result in some permanent loss of habitat. Baseline surveys will be undertaken to allow the assessment to consider any potential effects on farmland bird species and ecological interests associated with any drainage ditches and hedgerows.

11.5.1.5 Ecological interests in and around other parts of the Project site are likely to reflect the locations of specific habitats (e.g. waterbodies, ditches, hedgerows, scrub, buildings with access for roosting bats).

11.5.1.6 As the Project will generate emissions to air that will be released via the stack, the effects of these emissions on sensitive habitats (including those that are qualifying interests of European, national and local designated sites such as dunes, grasslands, bogs) in the surrounding area will be assessed. As well as airborne emissions, the effects of deposited pollutants will also be assessed. The spatial scope of this part of assessment will be informed by the findings of the air dispersion modelling.

11.6 Temporal Scope

11.6.1.1 The ES will consider the likely significant effects of the Project listed in *Section 11.4* on designated sites, habitats, flora and fauna of nature conservation interest on the site and in the surrounding area during the construction and operational phases. The project will be designed and operated in a manner to allow its ready decommissioning by dismantlement and removal of equipment and infrastructure and with recycling of materials maximised. The precise details of the decommissioning process some 25-40 years hence are not presently foreseeable. However, the impacts and effects of decommissioning are unlikely to be materially different or greater than those from construction and associated impacts are likely to be manageable to a similar extent as during construction.

11.7 Technical Scope and Approach to the EIA

11.7.1.1 The EcIA will consider the potential impacts identified in *Section 11.4* in terms of their potential to cause the following effects on habitats, flora and fauna of nature conservation interest, and both statutory and non-statutory designated sites:

- permanent or temporary habitat loss;
- degradation of water-dependent habitat as a result of changes to surface, or ground water regimes;
- habitat fragmentation and/or deterioration and the creation of barriers to movement of species;
- direct faunal mortality e.g. as a result of increased vehicle activity, or vegetation clearance;
- degradation of habitats and damage to plants due to airborne and deposited pollution sources particularly at sensitive habitat types, including protected areas, in particular from stack emissions and road haulage transport;
- disturbance and/or displacement of a species due to loss of habitat, increased noise, vibration, light and human presence during site activities;
- degradation of habitats and damage to plants as a result of pollution incidents such as spills; and
- the introduction or spread of invasive alien species during construction and operational (rail) works.

11.7.1.2 Many of the above potential effects are manageable through the application of standard working practices and the assessment of impacts in the ES will be accordingly proportionate.

11.7.1.3 The ES will be informed by desk study sources of data and information on species and habitats and via consultation with relevant statutory and non-statutory organisations.

11.7.1.4 Desk study information to inform the assessment will be gathered from the LERC, Multi-Agency Geographic Information for the Countryside (MAGIC), NBN gateway and local bird reports about habitats and species on and around the Project site.

11.7.1.5 Information on birds using the River Trent corridor will be gathered, including intertidal habitats in the Humber Estuary Ramsar site, from the British Trust for Ornithology (BTO) (e.g. Wetland Bird Survey (WeBS), Waterways Breeding Bird Survey).

11.7.1.6 Information on aquatic ecology (e.g. otters, water voles, fish, and invertebrates) will be gathered from the Environment Agency (EA).

11.7.1.7 Information on the distribution of the qualifying interests of the Humber Estuary SAC and SSSI in the River Trent including sea and river lamprey will be sought through consultation with Natural England (NE). Once the available data have been reviewed, the approach to the assessment of these species will be discussed and agreed with the EA and NE.

11.7.1.8 Views and information from stakeholders will be collated from the responses to the Scoping Report including from the statutory nature conservation agencies, North Lincolnshire Council Environment Team, Lincolnshire Wildlife Trust, RSPB, and local nature conservation groups (e.g. the Lincolnshire Bird Club, the Lincolnshire Bat Group, the Lincolnshire Badger Group), with additional consultations undertaken as appropriate.

11.7.1.9 It may be necessary to gather additional information about the habitat and species interests on designated sites in the wider area if they are likely to be significantly affected by airborne / deposited air emissions. If necessary, additional baseline information will be sought initially from the relevant organisations with responsibilities for the sites.

11.7.1.10 Additional Extended Phase 1 Habitat Surveys will be undertaken in areas not yet surveyed to the south of the port. The approach and buffer zones will be the same as those undertaken to date. The findings of these surveys will be used to inform the need for detailed surveys for flora and / or fauna species.

11.7.1.11 The findings of the Extended Phase 1 Habitat Surveys undertaken to date and the interim constraints map suggest that detailed surveys will be required for:

- breeding birds, particularly along the wooded rail corridor, the mosaic of semi-natural habitats located to the south-east of Flixborough Wharf and arable fields;
- passage and wintering birds along the River Trent and in arable fields to the north and south;
- bats including for their use of habitats for foraging and commuting;
- great crested newts including HSI for waterbodies within 250m, and surveys to determine presence / absence and if necessary population size class (although it is noted these water bodies appear to be large and unsuitable for great crested

newt populations) (the justification for restricting this to 250m is that the majority of ponds within the area are located along the railway line where impacts to habitat are expected to be minimal, so it is therefore unlikely that ponds with populations of GCN greater than 250 m from the site would be negatively impacted by the works);

- Water vole and otter surveys in the ditches throughout the arable farmland
- reptiles in the woodland and grassland area in the north-east corner and along the wooded rail corridor; and
- Invertebrate survey along the wooded rail corridor.

11.7.1.12 It is not possible to undertake a detailed otter survey along the River Trent corridor that runs along the western boundary of the Project site due to density of the reed and the unsafe nature of the banks. In developing suitable construction practices and mitigation measures, potential otter presence will be assumed.

11.7.1.13 The report of the wintering bird survey undertaken in 2018/19 is provided in Appendix C. No notable birds associated with the SPA were recorded during the wintering bird surveys, which is likely due to the unsuitable habitats surrounding the site for the majority of species in the SPA citation. Additional wintering bird surveys conducted in 2019/2020 recorded the presence of one male foraging marsh harrier (*Circus aeruginosus*) in the arable fields north of Flixborough Wharf, close to the River Trent. Marsh harrier are an Annex 1 qualifying feature of the SPA during the breeding season. It is considered likely that this was a migratory/over-wintering individual as there is no suitable roosting or nesting habitat for this species within the site.

11.7.1.14 The scope and approach to detailed surveys will be discussed with the statutory nature conservation agencies and the North Lincolnshire Council Environment Team.

11.7.1.15 Once the baseline ecology information has been collated, the likely effects of the Project on designated sites, habitats and species of nature conservation interest will be assessed.

11.7.1.16 The significance of effects will be determined taking into account the *Guidelines for Ecological Impact Assessment in UK and Ireland – Terrestrial, Freshwater, Coastal and Marine* (CIEEM, 2018). Where the Project design includes measures to avoid, minimise or reduce negative impacts these will be acknowledged. Any additional mitigation measures will be described, and the significance of residual effects that remain reported.

11.7.1.17 The EcIA will seek to achieve a biodiversity Net Gain, outlining compensatory measures for any significant residual effects that remain and identifying suitable opportunities to enhance the nature conservation interests where possible. The approach to achieving Net Gain and the compensatory measures that are appropriate in this case will be discussed and agreed with North Lincolnshire Council and Natural England by the end of the PEIR phase.

11.8 Approach to Habitats Regulations Assessment

11.8.1.1 The Project will have direct effects on the Humber Estuary SAC and Ramsar sites, both of European importance for nature conservation. It may also have secondary effects on these and other European sites for example due to disturbance / displacement of qualifying interest species and the effects of emissions to air on habitats. Therefore, it will be necessary to determine whether likely significant effects on one or more European sites will occur, either due to the effects of the Project alone, or in combination with other plans or projects as required by the Habitats Regulations.

11.8.1.2 Information will be gathered to inform a Habitats Regulations screening assessment by the Competent Authority (in this case the Secretary of State). This will determine whether the Project will result in any likely significant effects at European sites within a 15 km radius (to allow for the effects of emissions to air), taking into consideration the presence and location of features within the sites that are sensitive to the effects. The findings of the screening stage assessment will in turn inform the need for an Appropriate Assessment. If likely significant effects are identified, or there remains uncertainty about whether they will occur, further work will be undertaken to inform an Appropriate Assessment by the Competent Authority.

11.9 Statutory Consultees

11.9.1.1 The following key organisations will be consulted throughout the design and assessment of the Project with regards to Ecology and Habitats;

- Natural England;
- Lincolnshire Wildlife Trust;
- RSPB;
- Marine Management Organisation; and
- North Lincolnshire Council.

12. LANDSCAPE AND VISUAL AMENITY

12.1 Introduction

12.1.1.1 This section sets out the approach and scope of the landscape and visual amenity assessment that will be undertaken as part of the EIA for the Project. It identifies the potential for significant effects in relation to the landscape and visual amenity during the construction and operation of the Project and sets out the proposed technical, temporal and spatial scope of the assessment.

12.2 Topic-Specific Legislation and Guidance

12.2.1.1 The scope of the landscape and visual amenity assessment has been prepared based on the following legislation and guidance:

- NPS EN-1 and EN3;
- Guidelines for Landscape and Visual Impact Assessment (GLVIA 2013[4]);
- 'Photography and Photomontage in Landscape and Visual Impact Assessment (Landscape Institute Advice Note 01/11, 2011);
- Conservation Principles: Policies and Guidance for the Sustainable Management of the Historic Environment (Historic England, 2017a[5]);
- The Setting of Heritage Assets (Historic England, 2017b[6]);
- National Planning Policy Framework (NPPF)
- North Lincolnshire Core Strategy (2011);
- Planning for Renewable Energy Development Supplementary Planning Document (2011); and
- Local Plan (2003).

12.3 Baseline Data Sources

12.3.1.1 The following sources of information on landscape and visual amenity have been consulted to determine the scope of the landscape and visual amenity assessment:

- North Lincolnshire Council (NLC) website for information on planning policy, conservation areas and listed buildings (accessed in January/February 2019, available online: https://www.northlincs.gov.uk/planning-and-environment/);
- the National Heritage List for England (NHLE), maintained by Historic England, for information on designated built heritage assets. (accessed in January/February 20192019, available online: https://historicengland.org.uk/listing/the-list/);

[4]Landscape Institute and Institute of Environmental Management & Assessment (2013) Guidelines for Landscape and Visual Impact Assessment (Third Edition)
[5] Historic England, 2017a (Consultation Draft). Conservation Principles for the Sustainable Management of the Historic Environment. Historic England
[6] Historic England, 2017b. The Setting of Heritage Assets. Historic Environment Good Practice Advice in Planning Note 3 (Second Edition). Historic England.

- National Character Areas (previously Joint Character Areas), held by Natural England [(7)]; and,
- North Lincolnshire Landscape Character Assessment and Guidelines [(8)].

12.3.1.2 At a national level, the Project is located within the Humberhead Levels National Landscape Character Area (*NCA No. 39*) (Figure 12.1: National Landscape Character Areas). It is on the edge of the NCA and close to Northern Lincolnshire Edge with Coversands (NCA no 45).

12.3.1.3 At the county level the North Lincolnshire Landscape Character Assessment and the East Riding of Yorkshire Landscape Character Assessment divides the landscape into broad local landscape character areas (LCAs). The LCAs located within 10km of the Project site and their further subdivision to local landscape types have been illustrated in Figure 12.2: Local Landscape Character Areas .

12.3.1.4 A number of landscape and built heritage features have been considered for assessment within the 7.5km study area *(*Figure 12.3: Landscape and Built Heritage Features*).* These include;

- Conservation areas;
- Scheduled monuments; and
- Listed buildings.

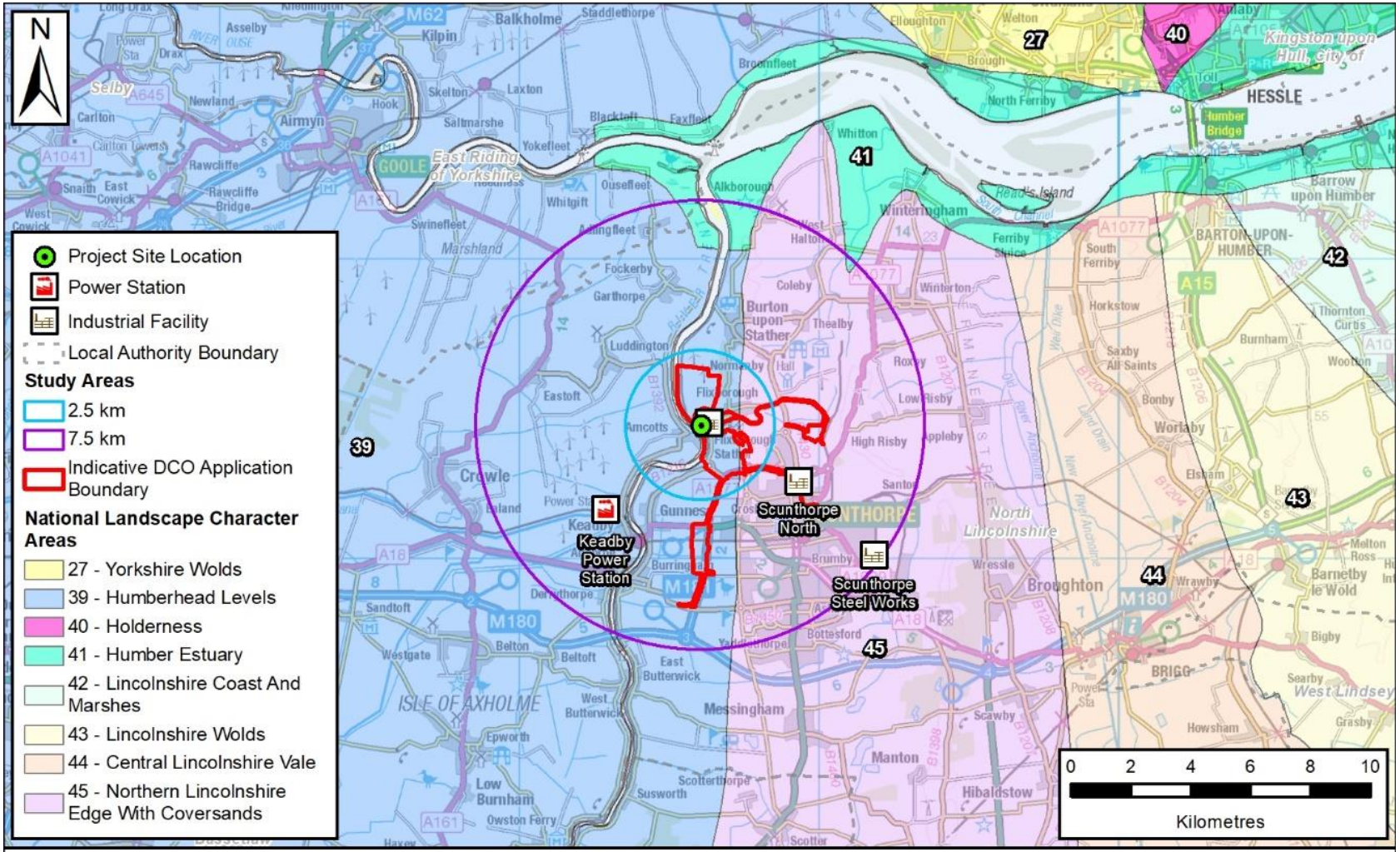
12.3.1.5 There are no conservation areas within 2.5km, but three conservation areas are within 7.5km. With regards to listed buildings, there are no Grade I listings within 2.5km, but three are within 7.5km. There are also several Grade II listed buildings within 2.5 km radius, the nearest being the Old Rectory at Amcotts and 4 Grade II listed buildings in Flixborough.

12.3.1.6 In addition Public Rights of Way (PRoW) and important recreational walks/cycle routes will also be mapped and considered in the assessment where applicable.

(7) Natural England (2012) National Character Area Profile 39: Humberhead Levels

(8) North Lincolnshire Council, September 1999

Figure 12.1: National Landscape Character Areas



Source: © Crown copyright and database rights 2020 Ordnance Survey 0100031673; Natural England
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Figure 12.2: Local Landscape Character Areas

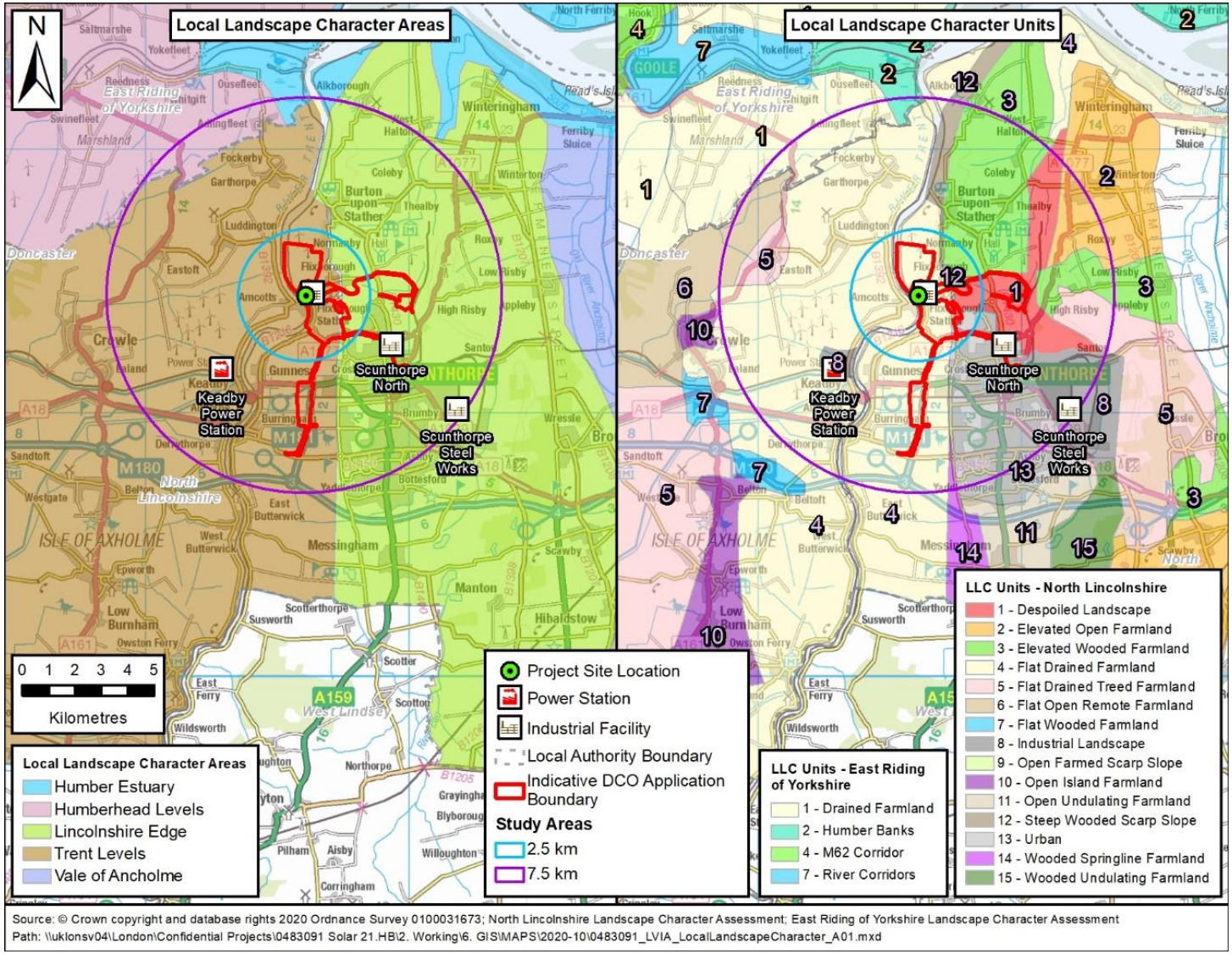
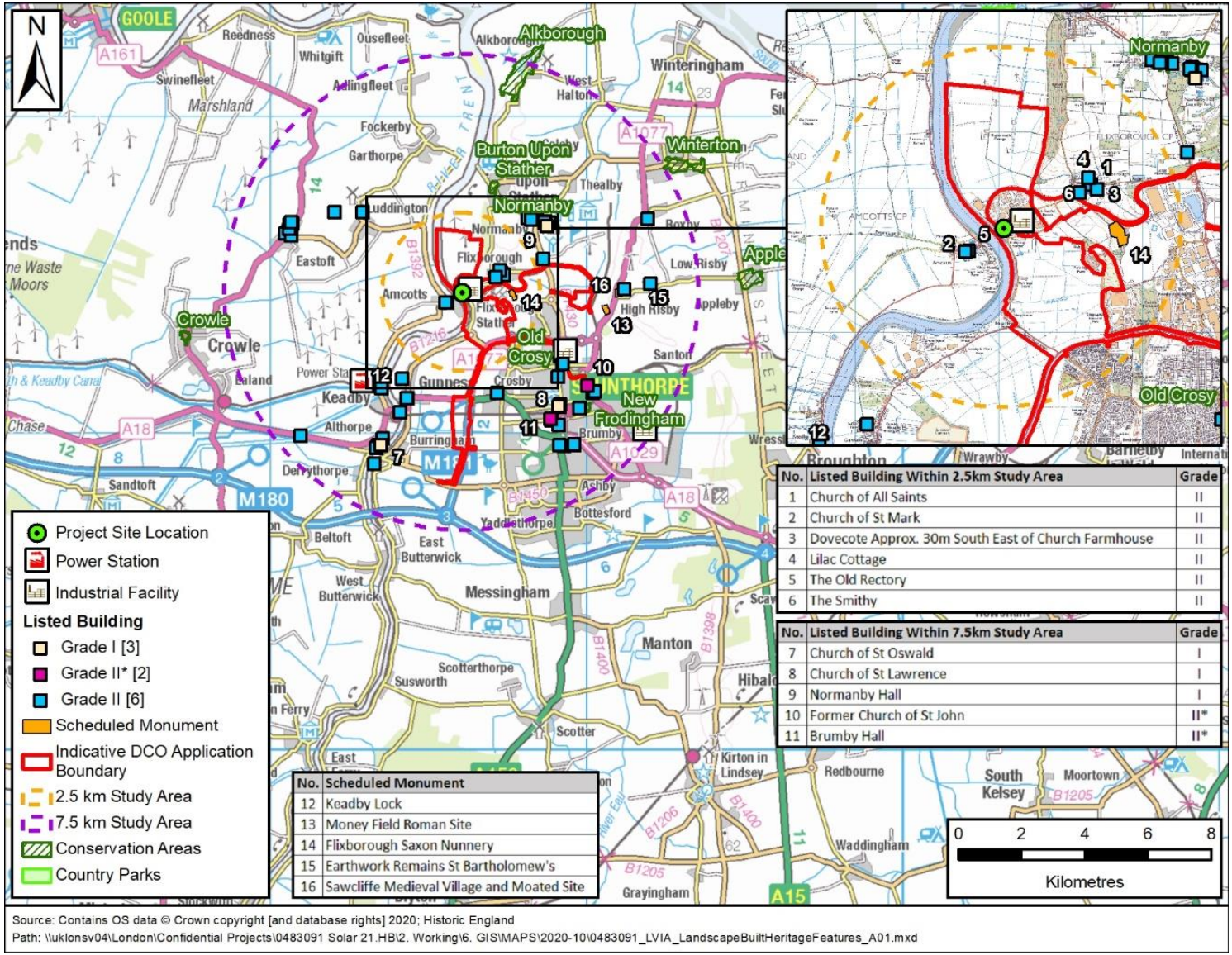


Figure 12.3: Landscape and Built Heritage Features



12.4 Likely Significant Effects

12.4.1.1 The Project may give rise to potentially significant effects on landscape resources and visual amenity within the proposed study area. Where practicable, likely adverse effects will be identified at an early stage so that suitable mitigation can be considered and integrated in the design development of the Project.

12.4.1.2 During construction, effects on landscape character and visual amenity are expected due to the presence of large scale plant and machinery, additional lighting and moving features in the landscape. Once constructed, the Project will have permanent effects on the landscape and visual receptors due to its scale and size. However, it is not expected that significant effects will arise due to changes in the pattern and structure of the landscape or as a result of the loss of vegetation since most of the major works are within or adjacent to an industrial/brownfield mixed use area.

12.5 Spatial Scope

12.5.1.1 Defining the spatial scope for the EIA involves defining the Zones of Theoretical Visibility (ZTV) and representative viewpoint locations. The ZTV prepared for the scoping stage has assumed the worst case scenario for landscape within a 10km radius based on a 100m high stack. The ZTV for the Project, produced using ArcGIS software and a Digital Elevation Model (DEM), is illustrated in Figure 12.4.

12.5.1.2 Due to the relatively flat topography in the region and because the ZTV does not take into account the screening provided by intervening landscape elements, the ZTV indicates a widespread theoretical visibility across an extensive area. It is important to note that the ZTV results are not intended to show the actual visibility of an object, they are intended to indicate where the object may be visible from. Actual visibility can only accurately be determined by site survey and photomontages since there are a multitude of local variables that may affect lines of sight.

12.5.1.3 The scale of the development will be considered within the context of the surrounding landscape, in particular its location within an existing industrial setting adjacent to the River Trent, surrounded by relatively flat topography and its proximity to other industrial areas such as Keadby Power Station, Scunthorpe North and Steelworks. Given the location and surrounding areas, the study area of 7.5km radius from the centre of the Project site is considered to be sufficient. While it is recognised that there may be some long range views of the Project available beyond 7.5 km, it is considered these will not produce any significant effects on the visual amenity from these distances.

12.5.1.4 The study area has been selected based on the professional judgement that this will capture all likely significant landscape and visual effects as the likelihood of visibility reduces from afar due to topography, scale, distance and likelihood of visual obstruction caused by intervening buildings, vegetation and other engineered structures.

12.5.1.5 This represents a reasonable worst case scenario and highlights areas from where the maximum stack height will theoretically be visible and also those areas where it is unlikely to be visible from.

12.5.1.6 Given that the landscape is relatively flat in the west, the ZTV highlights large areas from where the stack may be visible. Following an analysis of the ZTV and taking into account settlement patterns, and the locations of known key receptors, 12 viewpoints have been selected to represent the main areas from which the Project may be visible and the different type of viewing opportunities offered.

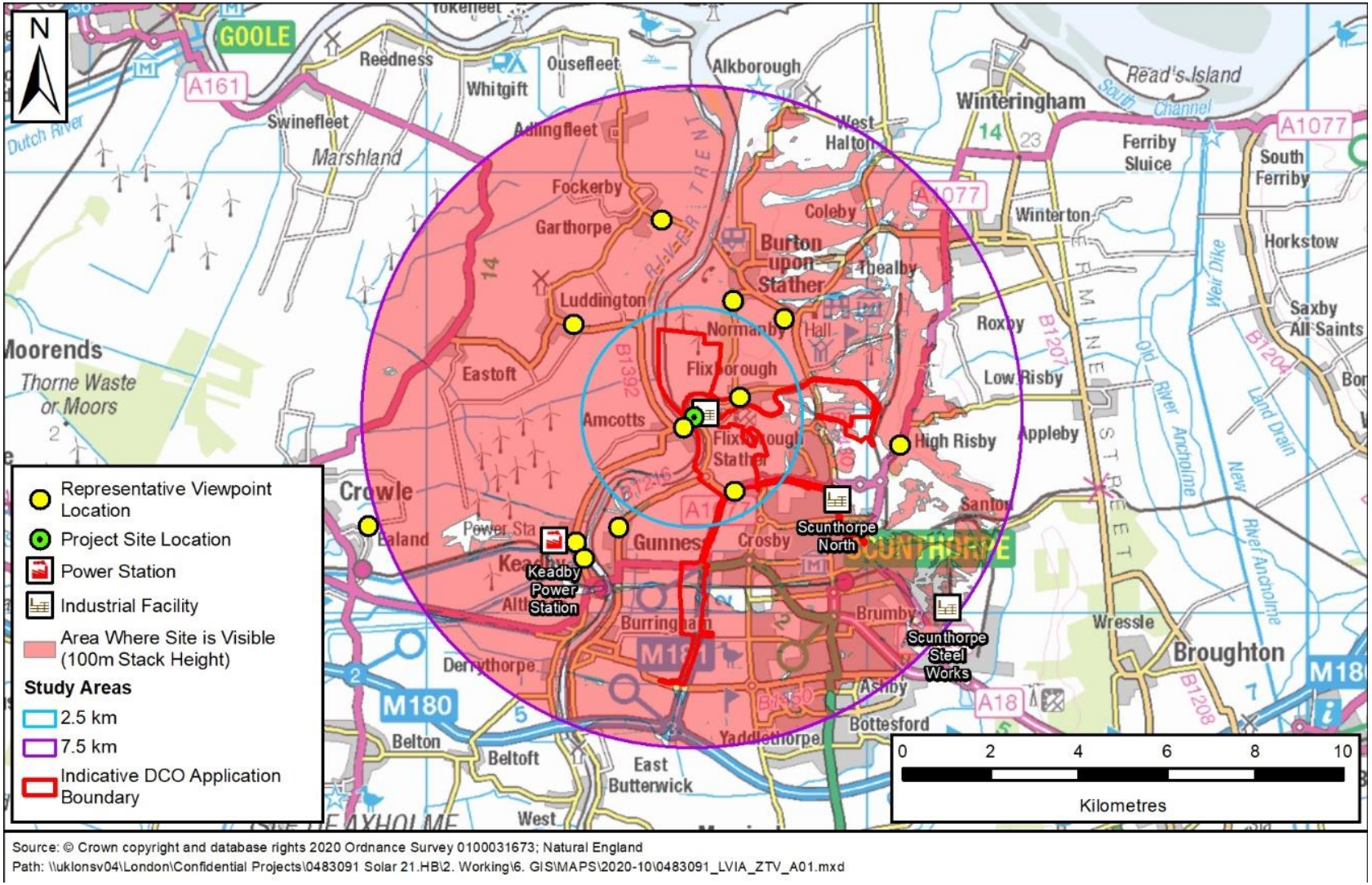
12.5.1.7 Viewpoints have been selected across the study area to represent groups of receptors with potential views of the Project. Residential and recreational receptors, which have a high sensitivity to change, and transport receptors (road users), which have a medium sensitivity to change, have been identified.

12.5.1.8 The representative viewpoint locations selected are (edges of villages, exact locations to be determined and agreed following consultation and during site visit):

- view from Amcotts;
- view from Flixborough;
- view from Normanby;
- view from Keadby Village;
- view from Gunness;
- view from Althorpe;
- view from Luddington;
- view from Garthorpe;
- view from Burton upon Stather;
- view from Ealand;
- view from Dragonby (From A1077); and
- view from northwest edge of Scunthorpe.

12.5.1.9 The indicative locations of these viewpoints are presented on Figure 12.4.

Figure 12.4: Zone of Theoretical Visibility and Indicative View Point Locations



Source: © Crown copyright and database rights 2020 Ordnance Survey 0100031673; Natural England
Path: \\uklonsv04\London\Confidential Projects\0483091 Solar 21.HB\2. Working\6. GIS\MAPS\2020-10\0483091_LVIA_ZTV_A01.mxd

12.6 Temporal Scope

12.6.1.1 The temporal scope of the assessment generally refers to the time periods over which effects may be experienced. In general, the following terms will be used:

- short-term when the impact or effect is temporary and lasts for up to 12- 16 months;
- medium-term when the impact or effect lasts for up to 5 years; and
- long-term when the effect remains for a substantial time, perhaps permanently, or until the project is decommissioned.

12.6.1.2 The temporal scope of the LVIA includes the construction and operational phases of the Project. The project will be designed and operated in a manner to allow its ready decommissioning by dismantlement and removal of equipment and infrastructure and with recycling of materials maximised. The precise details of the decommissioning process some 25-40 years hence are not presently foreseeable. However, the impacts and effects of decommissioning are unlikely to be materially different or greater than those from construction and associated impacts are likely to be manageable to a similar extent as during construction.

12.7 Technical Scope and Approach to the EIA

12.7.1.1 The following sensitive receptors have been identified and will be considered in the ES:

- national and local landscape character areas and types and landscape features within the study area (see Section 12.5 for the spatial scope of the assessment);
- residential users with views of the Project site, users of recreational trails, PRoW and road network within the study area; and
- recreational visitors to the landscape and heritage resources and other attractions where views of the areas are either designated and /or important.

12.7.1.2 Construction of the Project will cause a number of temporary effects on landscape and visual receptors arising from the removal of existing vegetation, topsoil stripping, the presence of site compounds and the presence of construction/demolition plant, including tall cranes.

12.7.1.3 During operations, the Project will have permanent effects on the landscape and visual receptors due to its scale and size. The effects and the mitigation measures to reduce them will be covered in the ES.

12.7.1.4 The potential temporary and / or permanent effects to be included within the ES include:

- alterations to the existing landscape structure and pattern through the addition or loss of landscape elements, structures and vegetation;
- a change in landscape character as a result of the presence of new structures and features in the landscape;
- alterations to the composition of existing views from receptors; and

- the presence of activities and structures within the Project site and increased illumination in the immediate landscape setting, altering the sense of place.

12.7.1.5 During operation, the scale of visual effects may alter over time as a result of maturing vegetation in and around the Project as well as around receptors.

12.7.1.6 The ES will be supported by figures illustrating the baseline landscape character and resources, including representative viewpoint locations together with photomontages or photo wirelines of the Project and its activities. Based on an initial site visit undertaken during the scoping phase, approximately 12 representative viewpoint locations (listed above) and approximately 6-8 photomontages/photo wirelines are proposed for the assessment. The viewpoint positioning is based on ZTV analysis and knowledge of the site and its' setting, but the exact numbers and locations of the viewpoints will be confirmed after a further site visit. For the purpose of scoping a worst case scenario for the ES, the maximum stack height considered for the Project is assumed to be 100m high.

12.7.1.7 The location of viewpoints will be agreed with stakeholders and local authorities as part of the consultation process for the PEIR.

12.7.1.8 The assessment will be prepared with reference to the Guidelines for Landscape and Visual Impact Assessment 3rd edition (2013), produced jointly by the Landscape Institute and the Institute of Environmental Management and Assessment.

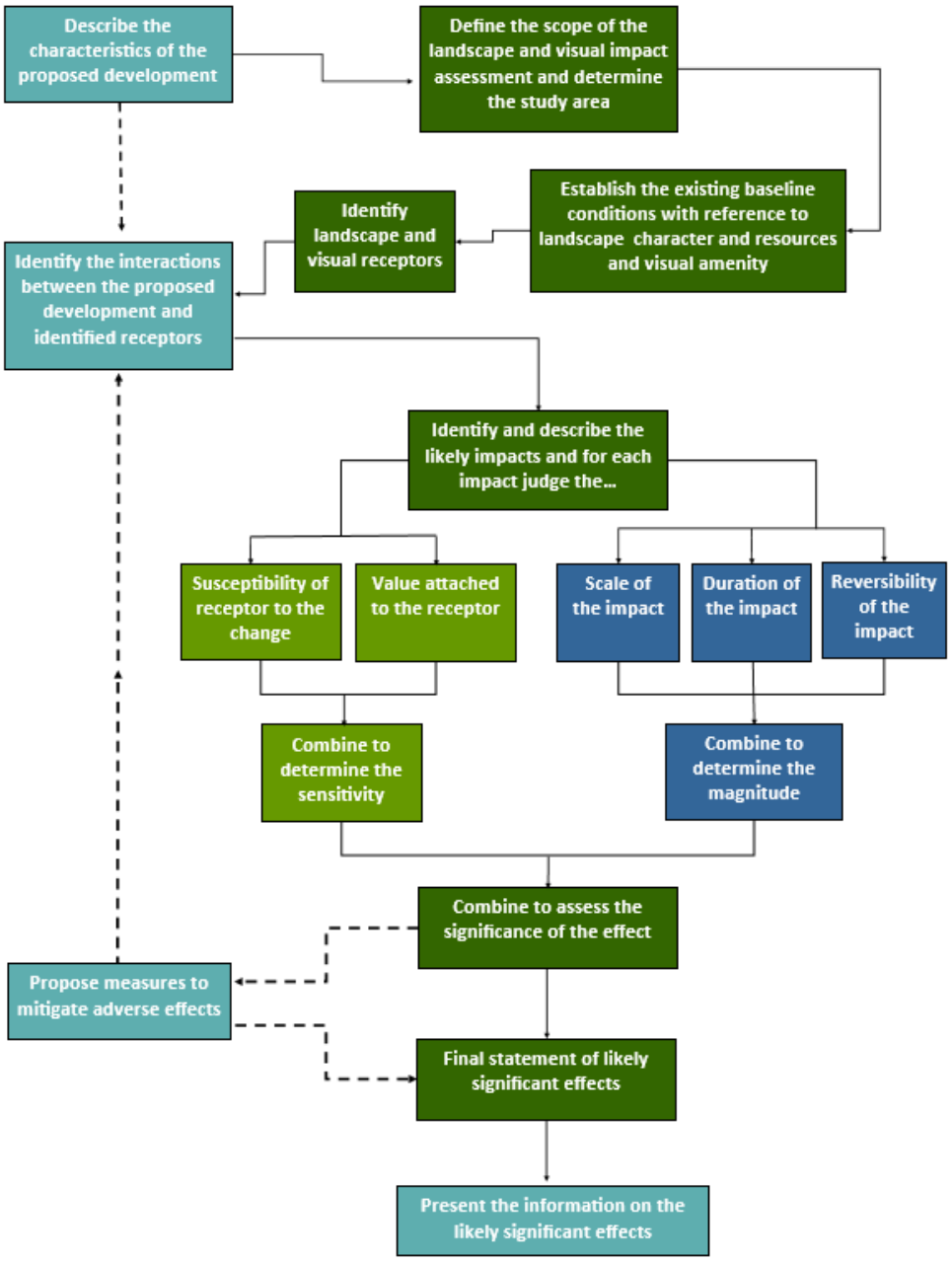
12.7.1.9 Landscape character and resources are considered to be of importance in their own right and are valued for their intrinsic qualities regardless of whether they are seen by people. Effects on visual amenity as perceived by people, are therefore clearly distinguished from, although closely linked to, effects on landscape character and resources. Landscape and visual impact assessments are therefore separate, albeit linked processes.

12.7.1.10 For the purpose of this assessment a clear distinction has been drawn between impacts on landscape character and visual impacts, as described below:

- landscape impacts relate to the effects of the Project on the physical and other characteristics like fabric, character and quality of the existing landscape, whereas;
- visual impacts relate to the effects on views from visual receptors (e.g. residents, workers, tourists, etc.) at specific viewpoint locations.

12.7.1.11 The overall methodology is illustrated in Figure 12.5 below and applies to both construction and operational effects.

Figure 12.5: LVIA Methodology



12.7.1.12 Some key definitions used to guide the assessment process are outlined below.

- Landscape value is the relative value or importance attached to a landscape (often as a basis for designation or recognition), which expresses national or local consensus, because of its quality, special features including perceptual aspects such as scenic beauty, tranquillity or wildness, cultural associations or other conservation issues.
- Landscape character is the distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape, and how this is perceived by people.

- Landscape quality (or condition) is based upon judgements about the physical state of the landscape and its intactness from visual, functional, and ecological perspectives. It also reflects the state of repair of individual features and elements that make up the character in any one place.
- Landscape sensitivity is defined in relation to the specific type of change envisaged and depends on landscape character and how vulnerable this is to change. Landscapes that are highly sensitive are at risk of having their key characteristics fundamentally altered, leading to a different landscape character. Sensitivity is assessed by considering the physical characteristics and the perceptual characteristics of landscapes in light of particular forms of development.
- Visual sensitivity relates to the type of visual receptor, their activity and the permanence of the receptor in the study area.

12.7.1.13 The assessment of landscape and visual impacts has been based on three stages:

- Classification of the sensitivity of the landscape or visual receptors to the type of development proposed.
- Prediction of the magnitude of change in the landscape or the view resulting from the Project resulting from the development, taking into account embedded mitigation.
- Evaluation of the significance of residual landscape and visual effects depending on the sensitivity of the landscape or viewer to change and the magnitude of change.

12.7.1.14 The assessment will consider effects that are: temporary (i.e. those occurring during construction); permanent (i.e. the permanent loss of vegetation or alteration to landscape elements and introduction of new structures); and operational (i.e. structures and lighting associated with the operational phase).

12.7.1.15 The prediction and evaluation process has been illustrated in Figure 12.5.

12.7.1.16 Significance is determined by considering the sensitivity of the landscape or visual receptor and the magnitude of change expected as a result of the development. Professional judgement and experience are applied on a case by case basis in order to identify broad levels of significance for each receptor. Each case is assessed on its own merits given the need to consider factors unique to each circumstance.

12.7.1.17 The effects will be described in terms of their duration and reversibility and whether or not they are adverse or beneficial. Any subjectivity associated with the judgements made will be described. Consideration will be given to the way in which effects alter with time.

12.7.1.18 Potential cumulative effects will also be considered for landscape and visual amenity in the ES. The schemes to be considered will be agreed through consultation and based on the profile of those other developments at the time but those of relevance to landscape and visual amenity will mainly comprise proposed wind farm developments nearby.

12.8 Statutory Consultees

12.8.1.1 The following key organisations will be consulted throughout the design and assessment of the Project with regards to Landscape and Visual Assessment;

- North Lincolnshire Council.

13. ARCHAEOLOGY AND CULTURAL HERITAGE

13.1 Introduction

13.1.1.1 This section of the Scoping Report presents legislation and planning policy, standards and guidance and identifies the likely significant effects in relation to Archaeology and Cultural Heritage assets resulting from the construction and operation of the Project.

13.1.1.2 The ES will present an assessment of the likely significant effects on Archaeology and Cultural Heritage as a result of the Project under three sub-topics: buried archaeology; built heritage; and the historic landscape.

13.2 Topic-Specific Legislation and Guidance

13.2.1.1 The scope of the archaeology and cultural heritage assessment has been developed with reference to the following key legislation, policy and associated guidance:

- NPs EN-1 and EN-3;
- Ancient Monuments and Archaeological Areas Act 1979 (amended by the National Heritage Act 1983 and 2003;
- Planning (Listed Buildings and Conservation Areas) Act 1990 (amended by the Enterprise and Regulatory Reform Act 2013);
- National Planning Policy Framework Section 16 (MHCLG, 2019);
- North Lincolnshire Core Strategy (2011)
- Planning for Renewable Energy Development Supplementary Planning Document (2011) - Policy 4 Heritage Assets;
- North Lincolnshire Local Plan (2003);;
- Chartered Institute for Archaeologists (CIfA 2014a): Code of Conduct;
- Historic England, 2017a: Conservation Principles: Policies and Guidance for the Sustainable Management of the Historic Environment;
- Design Manual for Roads and Bridges (DMRB) HA 208/07 (Highways Agency et al., 2007);
- Historic England, 2017b: The Setting of Heritage Assets; and
- Standard and guidance for historic environment desk-based assessment (CIfA 2014b).

13.3 Baseline Data Sources

13.3.1.1 The following sources of information have been utilised in defining the baseline of the archaeology and cultural heritage assessment:

- the National Heritage List for England (NHLE), maintained by Historic England, for information on designated built heritage assets. (accessed 01 February 2019, available online: https://historicengland.org.uk/listing/the-list/);
- North Lincolnshire Council (NLC) website for information on planning policy, conservation areas and listed buildings (accessed on 31 January 2019, available online: https://www.northlincs.gov.uk/planning-and-environment/);
- NLHER for information on designated and non-designated heritage assets, including relevant reporting and ArcGIS files (information received 31 January 2019); and
- The East Midlands Updated Research Agenda and Strategy for the Historic Environment (Knight et al. 2012) (accessed 01 February 2019, available online: https://archaeologydataservice.ac.uk/researchframeworks/eastmidlands/wiki/Main).

13.3.1.2 The study areas, defined in Section 13.5 and shown on Figure 13.1, have been subject to an extensive non-invasive and invasive archaeological fieldwork. Fieldwork has been conducted by academic institutions, Local Authorities, English Heritage and commercial archaeological field units. Methods of archaeological investigation represented within the 2500m study area include geophysical survey, LiDAR survey, surface artefact collection, watching briefs and various forms of archaeological excavation, including trial trenching and open area excavation. Within the footprint of the development trial trenching and other ground investigation (GI) work designed to model the Trent Valley alluvial deposits has taken place. The application of these various techniques means that a detailed description of the character of the historic environment exists in the literature, and will be utilised assessing the potential impacts of the Project.

13.4 Likely Significant Effects

13.4.1.1 Likely significant effects have been identified as potentially occurring as a result of the construction and operation phases of the Project.

13.4.1.2 Likely construction impacts include:

- temporary impacts comprising a change to the setting of designated and non-designated built heritage and archaeological assets (as a result of construction activities only);
- permanent impacts comprising the total or partial removal of non-designated archaeological assets; and
- permanent impacts comprising the total or partial removal of key elements of historic landscape types.

13.4.1.3 Likely operational impacts include:

- Permanent impacts on the setting of designated and non-designated built heritage and archaeological assets, resulting from the presence of new industrial elements.

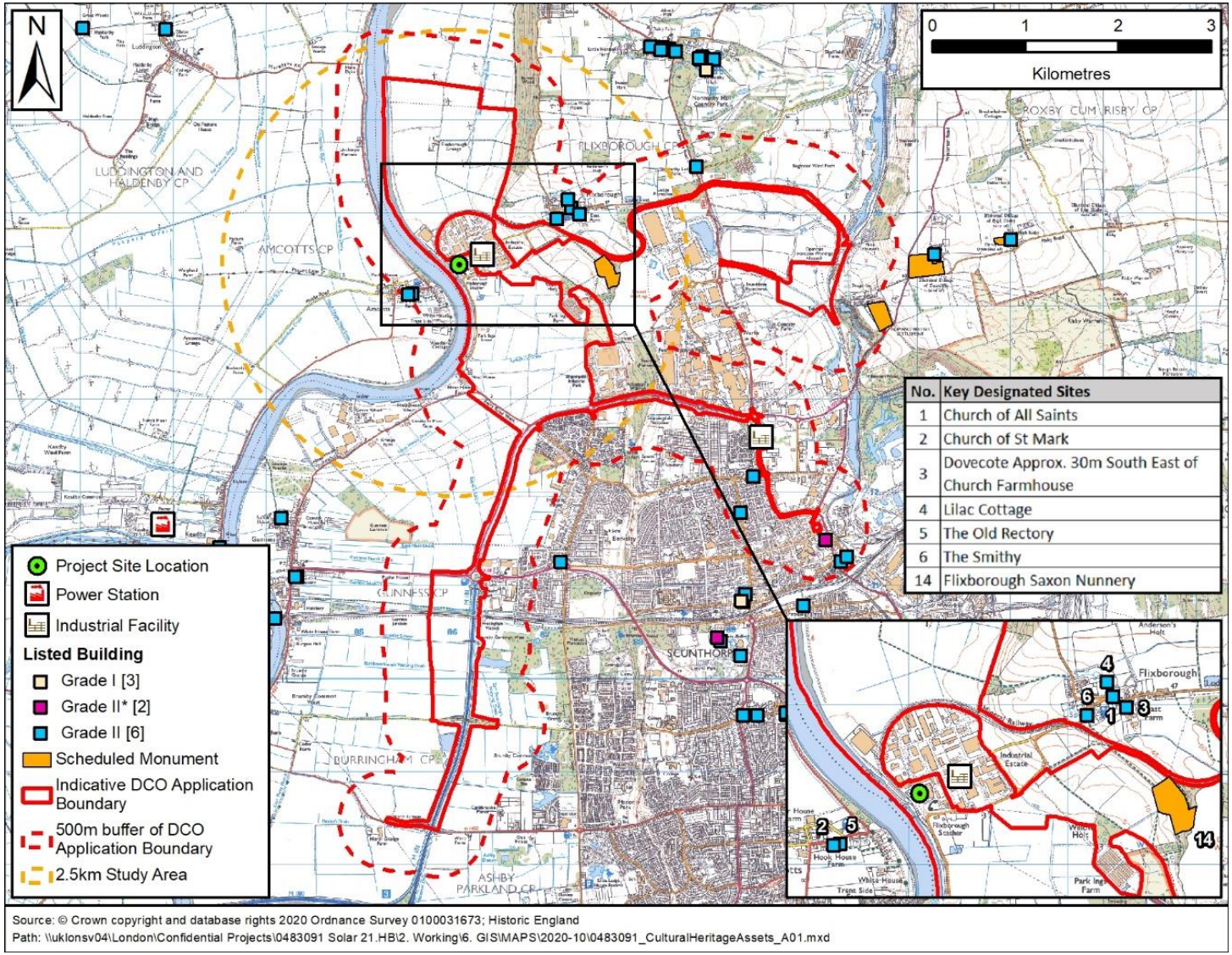
13.5 Spatial Scope

13.5.1.1 Based on professional judgement and guidance provided by the sources presented in Section 13.2, the study area for the consideration of construction effects on archaeological remains, built heritage and the historic landscape is defined as an area extending 500 m in all directions from the footprint of the Project. This accounts for potential effects on the setting of heritage assets that may occur outside the Project boundary.

13.5.1.2 The study area for the consideration of operational effects is defined as an area extending 2.5 km in all directions from the location of the stack element of the Project. This study area has been developed with reference to the Zone of Theoretical Visibility (ZTV) presented in Section 12*: Landscape and Visual Amenity*.

13.5.1.3 Within this study, the likely significant effects of the Project on archaeological and cultural heritage assets comprise a change in the setting of designated built heritage assets to the southwest and northeast, non-designated built heritage assets to the north and designated buried archaeological assets to the east. Unless mitigated, the potential exists for significant effects as a result of total or partial removal of non-designated archaeology within the footprint of the Project or as a result of enabling works.

Figure 13.1: Cultural Heritage Designated Assets



13.6 Temporal Scope

13.6.1.1 The temporal scope for the construction phase will be temporary; limited to the duration of construction activities but with potentially permanent consequences for designated archaeological remains.

13.6.1.2 The temporal scope for the operational phase will be long-term and permanent, albeit limited to the 25-40 year operational lifespan of the Project. The project will be designed and operated in a manner to allow its ready decommissioning by dismantlement and removal of equipment and infrastructure and with recycling of materials maximised. The precise details of the decommissioning process some 25-40 years hence are not presently foreseeable. However, the impacts and effects of decommissioning are unlikely to be materially different or greater than those from construction and associated impacts are likely to be manageable to a similar extent as during construction.

13.7 Technical Scope and Approach to the EIA

13.7.1.1 The sub-topics of buried archaeology, built heritage and historic landscape for the Archaeology and Cultural Heritage topic have been considered with regard to potential effects upon them resulting from the construction and operation of the Project.

13.7.1.2 No intrusive fieldwork has been undertaken in support of scoping. Desk-based work is considered sufficient for the purposes of defining the scope to be assessed.

13.7.1.3 Scoping has been undertaken without detailed information concerning construction activities, including the specific locations of compound and/or set down areas. Details of which will be included in the PEIR and ES.

13.7.1.4 An overall methodology for EIA is presented in Section 4. A topic specific assessment methodology will be applied for Archaeology and Cultural Heritage for the ES and is presented below. The method is supported by guidance presented in *Section 13.2* and professional judgement.

13.7.1.5 The National Planning Policy Framework (NPPF) (MHCLG 2019, Section 16[9]) defines the significance of a heritage asset as:

13.7.1.6 ‘The value of a heritage asset to this and future generations because of its heritage interest. The interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset’s physical presence, but also from its setting. For World Heritage Sites, the cultural value described within each site’s Statement of Outstanding Universal Value forms part of its significance.’ (NPPF Annex 2: Glossary)

13.7.1.7 For the purposes of assessment and to avoid confusion with ‘significance of effect’ the term ‘value’ will be used to describe the historic, archaeological, architectural or artistic merit (Historic England 2017b) of a heritage asset.

[9] Ministry of Housing, Communities and Local Government, 2018. National Planning Policy Framework. MHCLG

13.7.1.8 Assessment of setting and the contribution this may make to the value of heritage assets will be undertaken in accordance with the guidance provided in *The Setting of Heritage Assets* (Historic England 2017b).

13.7.1.9 For scoped in sub-topics the assessment of the value of identified heritage assets will be undertaken on a five-point scale of very high, high, medium, low and negligible and based on professional judgment.

13.7.1.10 Magnitude of impact is the degree of change that would be experienced by a heritage asset if the Project was completed. Magnitude of impact is assessed without reference to the value of each heritage asset, and may include direct (physical) impacts upon the asset or changes to its setting or amenity value (indirect impacts). Five levels of impact are defined; no change, negligible, minor, moderate, and major.

13.7.1.11 Assessment of potential changes to the setting of heritage assets will be based on professional judgement informed by DMRB and supported by *The Setting of Heritage Assets* (Historic England 2017b).

13.8 Key Statutory Consultees

13.8.1.1 The following key organisations will be consulted throughout the design and assessment of the Project with regards to Archaeology and Cultural Heritage;

- North Lincolnshire Council
- Historic England.

14. TRAFFIC AND TRANSPORT

14.1 Introduction

14.1.1.1 A Transport Assessment (TA) will be prepared by Buro Happold, which will include a multi-modal impact assessment of the proposed development on all transport infrastructure in the vicinity of the Project.

14.1.1.2 The TA would be submitted as a stand-alone document to accompany any forthcoming DCO Application.

14.1.1.3 North Lincolnshire Council (NLC) is the local planning authority, and also the highway authority responsible for the local road network surrounding the Site.

14.1.1.4 Highways England (HE) is the highway authority responsible for the wider strategic road network, which includes the M180 and M181 located approximately 3.5 kilometres south of the Site.

14.1.1.5 Network Rail (NR) is the railway authority responsible for the rail network and existing Dragonby sidings.

14.1.1.6 ABP Humber is the maritime authority responsible for navigation and maritime safety for the existing port facility at Flixborough, whilst the Marine Management Organisation (MMO) is responsible for planning, licensing and regulating marine activities in the seas around England.

14.1.1.7 The Traffic and Transport ES chapter will be prepared by Buro Happold on the basis of a transport strategy for the Project that will seek to utilise road, rail and marine connections to minimise environmental impacts whilst accounting for any practical constraints as well as commercial factors. The balance between these three modes of transport is currently being assessed and will be discussed with both HE and NLC prior to commencement of modelling.

14.1.1.8 The Traffic and Transport ES chapter will be prepared by Buro Happold on the basis of the TA; this chapter will provide sufficient information to enable the reader to understand the likely significant effects in environmental terms of the proposed ERF in relation to traffic and transport. The methodology to be applied in the TA is subject to separate but parallel scoping discussions with NLC and HE.

14.1.1.9 The TA will describe and take into consideration the proposed changes to the highway network in discussion with NLC and HE. These changes will include the construction of a new access road between Stather Road and the B1216 Ferry Road West. The intention being that this new access road would serve the proposed ERF and the wider NLGEP site, as well as the existing Flixborough Industrial Estate and Port area. It seeks to provide improved road connectivity and removes the need for heavy goods vehicles (HGVs) to use the existing section of Stather Road that runs parallel with the River Trent via Neap House, which is very narrow and generally unsuitable for two-way HGV movements.

14.1.1.10 The exact route alignment of this new access road is subject to further discussion with NLC.

14.1.1.11 The ES chapter will identify proposed changes to the disused rail line and nearby junctions to allow the re-commissioning of the Flixborough rail connection for the benefit of the ERF.

14.1.1.12 The ES chapter will also identify changes to the existing wharf facilities, highlighting any extension to the wharf facilities required to allow vessels to service the ERF.

14.1.1.13 The Traffic and Transport ES chapter will consider the effect of the proposed ERF during construction as well as once it is operational and will review this assessment with respect to mitigation measures proposed. It will consider the existing baseline conditions and the future design year, which will form the future baseline scenario, will be agreed with the local planning and highway authority. Cumulative schemes and assessment time periods will also be agreed at this point and factored into the assessment accordingly.

14.2 Topic Specific Legislation and Guidance

14.2.1.1 The proposed scope and approach to the assessment draws upon the guidance set out in 'Guidelines for the Environmental Assessment of Road Traffic,1993' published by the Institute of Environmental Management and Assessment (IEMA), which will be referred to as the 'IEMA Guidelines' throughout the remainder of this chapter.

14.2.1.2 The ES Traffic and Transport chapter will also outline the relevant transport policies for the proposed development at the national, regional and local level.

14.2.1.3 Comments arising on the Transport Assessment from the EIA scoping process will also be addressed by the ES Traffic and Transport chapter.

14.3 Baseline Data

14.3.1.1 The existing baseline year is 2021, which represents the submission date of the DCO application.

14.3.1.2 Existing baseline conditions would be established with reference to the following sources:

- Published/web-based traffic data;
- Rail data provided by Network Rail;
- Shipping data provided by ABP Humber Ports;
- Traffic counts at junctions and road links throughout the study area (see Section 14.5) commissioned in October 2020;
- NLC Road traffic Accident Statistics for the latest available five-year period; and
- Local, regional and national planning policy documents.

14.3.1.3 The relevant baseline conditions within the study area will be described in detail in the TA and will be summarised in the ES Traffic and Transport chapter.

14.3.1.4 Details relating to committed developments in the area will be obtained from NLC and these will be included in the future baseline traffic flow calculations.

14.4 Likely Significant Effects

14.4.1.1 The IEMA Guidelines (Section 2: Analysis) identifies groups, locations and areas which may be sensitive to changes in traffic conditions and environmental effects that may be considered to be potentially important when considering traffic from an individual development.

14.4.1.2 It includes a checklist of likely effects covering noise, vibration, visual impact, severance, driver delay, pedestrian delay, pedestrian amenity, fear and intimidation, highway safety, hazardous loads, air pollution, dust and dirt, ecological impact and heritage and conservation areas. Many of these effects will be assessed elsewhere within the ES.

14.4.1.3 In terms of hazardous and Abnormal Indivisible Loads (AIL), it is anticipated that every effort will be made to minimise effects upon the local road network by using other transport modes (such as rail or river) for the transportation of hazardous and over-sized cargo, so effect on the road network of such activities are likely to be scoped out.

14.4.1.4 The key areas that will be assessed in the Traffic and Transport chapter are set out below:

- Potential effects on the existing rail network associated with increased rail traffic to and from the ERF.
- Potential effects on the existing port operations associated with increased shipping associated with the ERF.
- Potential effects on the community associated with severance caused by an increase in traffic levels during construction and occupation of the Project.
- Potential effects on drivers associated with driver delay caused by additional traffic generated by the Project.
- Potential effects on pedestrians associated with delays caused by changes in traffic volume or speed of traffic.
- Potential effects on pedestrian amenity caused by the increase in traffic flow, traffic composition and pavement width/separation from traffic.
- Potential effects on pedestrians associated with fear and intimidation caused by increase in volume of traffic and its Heavy Goods Vehicle (HGV) composition.
- Potential effects of highway safety caused by the increase in traffic flow as a result of the approved development.

14.4.1.5 These effects will be considered in the context of the receptors which they are likely to affect (receptors are described later in this chapter).

14.4.1.6 In terms of public transport, the IEMA Guidelines do not identify a specific need to assess the impact of public transport changes. Where improvements involve material changes to public transport services and/or if they form part of a mitigation measure to reduce traffic generation (such as a

Travel Plan) it may be necessary to consider this but the impact on public transport would be considered separately as part of the TA.

14.4.1.7 The effects of construction traffic resulting from the construction of the proposed development, including workforce traffic, will be assessed in consideration of the predicted change in traffic flows. Cumulative effects of construction will also be considered where appropriate in terms of other construction sites that are active at the same time as this development. The potential effects of construction traffic will be assessed by comparing the likely trip generation of construction traffic against future baseline traffic conditions (assessment years to be determined).

14.4.1.8 The potential effects of operational traffic will be assessed by comparing the likely trip generation for the proposed development against future baseline traffic conditions when the development is expected to be completed (2026) and any other horizon years that may be agreed with the highway authority as part of the TA scoping discussions.

14.5 Spatial Scope: Geographical Area

14.5.1.1 The Site is located adjacent to Flixborough Industrial Estate and Flixborough Port, approximately 800 m west of the village of Flixborough in North Lincolnshire.

14.5.1.2 In accordance with the IEMA Guidelines, the study area will be defined by identifying any road link where it is felt that potentially significant environmental effects may occur as a result of the proposed development.

14.5.1.3 The scope of the assessment (study area) will be determined based on the IEMA Road Traffic Guidelines (Section 3: Traffic Impact Analysis), which indicate that roads should be included where traffic flows (and/or HGVs) are predicted to increase by more than 30%, unless the road in question is located within a specifically sensitive area, in which case the road should be included if traffic flows increase by 10% or more.

14.5.1.4 Impacts on the rail network will be discussed with Network Rail in accordance with their processes and procedures.

14.5.1.5 A desktop exercise (together with a site visit) will be undertaken to identify the road links to be included in the study area.

14.6 Temporal Scope: Assessment Years

14.6.1.1 The assessment will consider the environmental impacts of the proposed development at key stages in its construction and operational use.

14.6.1.2 The assessment scenarios used to consider the effects of the proposed ERF will be agreed with the highway authority during this TA scoping process. At this stage, it is envisaged that the following assessment scenarios will be considered:

- Baseline Year (2021) – the year during which the assessment is made;
- Future baseline year (s) without the development –referred to as ‘Do Nothing’ scenario;

- Future baseline year (s) with the development - referred to as the 'Do Something' scenario.

14.6.1.3 The potential effects of the proposed development on the transport network in these scenarios will be considered against the IEMA Guidelines.

14.7 Technical Scope and Approach to the EIA

14.7.1.1 In assessing the environmental effects of traffic and transport, two factors are considered. Firstly, the sensitivity of receptors within the study area and secondly the anticipated magnitude of change/impact. These two factors are then combined to give an effect significance that depends on the sensitivity of the receptor and the anticipated magnitude of change.

14.7.1.2 In terms of sensitive receptors, IEMA identifies groups, locations and areas which may be sensitive to changes in traffic conditions and which should be considered for assessment. These potentially affected parties include:

- People at home and in workplaces;
- Sensitive groups including children, the elderly and disabled;
- Sensitive locations, e.g. hospitals, churches, schools, historical buildings;
- People walking and cycling;
- Open spaces, recreational sites, shopping areas; and
- Sites of ecological/nature conservation value.

14.7.1.3 Against this background and the fact that the greatest impacts from the proposed development are likely to arise from operational activity, transport receptors are considered to fall into the following categories:

- Pedestrians and cyclists travelling within and through the area surrounding the site, with particular reference to sensitive pedestrian groups such as children, the elderly and those with mobility impairments;
- Private vehicle users travelling or parking on the local highway network;
- Emergency services requiring access within or passing through the area surrounding the site;
- Delivery and service vehicle operators using loading on street in the vicinity of the site; and,
- Public transport (bus and rail) users (passengers) travelling to, from and through the area surrounding the site.

14.7.1.4 The sensitivity of the receptor is judged on the sensitivity of people who use the road, principally pedestrians, and their vulnerability e.g. consideration of age and mobility. It also considers the nature of the road – local residential or strategic trunk road for example. Pedestrian and cycle facilities will also be considered and public transport. The sensitivity receptors will then be evaluated using a scale of 'High' – 'Moderate' – 'Low'.

14.7.1.5 To assist with identifying the magnitude of change as a result of the proposed development with regard to traffic and transportation, reference will be made to the IEMA Road Traffic Guidelines (Section 4: Assessment), which

identifies considerations and thresholds in respect to changes in the volume and composition of traffic. Where there are no set criteria, professional judgement will be used in line with best practice and industry standards.

14.7.1.6 A scale of magnitude will be provided and the magnitude of likely impacts / change from the baseline conditions will be assessed against a scale: 'Negligible' - 'Small' – 'Medium' – 'Large' magnitude.

14.7.1.7 The significance of effect will be determined by evaluating the magnitude of the impact / change from the baseline against the identified sensitivity of the receptor using a standard matrix approach to rating, using a significance scale: 'Negligible' – 'Minor Adverse' – 'Moderate Adverse' – 'Major Adverse' – 'Minor Beneficial' – 'Moderate Beneficial' or 'Major Beneficial.

14.7.1.8 Potential effects will therefore be concluded to be of negligible, minor, moderate or major significance and either beneficial or adverse. Moderate and major effects will be considered as 'significant' in EIA terms.

14.8 Statutory Consultees

14.8.1.1 The following key organisations will be consulted throughout the design and assessment of the Project with regards to Traffic and Transport;

- North Lincolnshire Council – as local Highways Authority;
- Network Rail;
- ABP Humber; and
- Highways England .

15. SOCIO-ECONOMIC CHARACTERISTICS

15.1 Introduction

15.1.1.1 The potential socio-economic effects arising from the construction and operation of the Project on the area administered by North Lincolnshire Council (the 'immediate impact area'), and Yorkshire and the Humber region (the 'broad impact area') will be assessed relative to the baseline conditions and benchmarked against regional and national characteristics where appropriate.

15.2 Topic-Specific Legislation and Guidance

15.2.1.1 The scope of the socio-economic assessment is based upon the following policies at the national and local level.

15.2.1.2 *Overarching National Policy Statement for Energy (EN-1)* (DECC, 2011a) and National Policy Statement for Renewable Energy Infrastructure (EN-3) (DECC, 2011b) and The *National Planning Policy Framework* (2019) constitute the relevant national planning policy context.

15.2.1.3 The local planning policy context is provided by the North Lincolnshire Local Development Framework Core Strategy (2011), saved policies of the North Lincolnshire Local Plan (2003) and the associated Housing and Employment Land Allocations Development Plan Document (2016). North Lincolnshire is currently preparing a new local plan, but it is still at an early stage and no weight can be given to emerging policy.

15.2.1.4 In addition, the North Lincolnshire Strategic Economic Plan (2014) and the Humber Strategic Economic Plan (2014) provide the basis upon which the local authority and local enterprise partnership (LEP) seek to increase the prosperity of the North Lincolnshire and broader area.

15.2.1.5 There are no legislative requirements which dictate the form of socio-economic assessment and the approach adopted will follow UK Government Guidelines and best practice. It will follow guidance set out in:

- HM Treasury's Green Book(10);
- English Partnerships Additionality Guidance(11);
- the Department for Business Innovation and Skills research on Additionality(12); and
- Scottish Government, Input-Output Tables(13).

15.3 Baseline Data Sources

15.3.1.1 The data used to prepare the baseline profile will reflect the range of publicly available information. Baseline data will include information sourced from:

(10) http://www.hm-treasury.gov.uk/d/green_book_complete.pdf

(11) Additionally Guide – *A Standard Approach to Assessing the Additional Impacts of Projects*: English Partnerships (2008)

(12)https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/191512/Research_to_improve_the_assessment_of_additionality.pdf

13 http://www.gov.scot/Topics/Statistics/Browse/Economy/Input-Output

- employment and labour market data from Office of National Statistics,
- data from NOMIS including labour market profiles and Census 2011 data; and
- Public Health England, Public Health Outcomes Framework..:

15.3.1.2 A separate Economic impact assessment by Mott MacDonald has also been commissioned by The Applicant and presents information on direct and wider economic impacts, a labour market analysis and training benefits associated with the overall North Lincolnshire Green Energy Park. This report also provides useful context for the socio-economic assessment.

15.4 Likely Significant Effects

15.4.1.1 The following section sets out those aspects of the Project that will be within the scope of the socio-economic assessment and those which have been scoped out of further consideration.

15.4.1.2 Table 15-1 details those aspects of the Project which will be considered as part of the socio economic assessment.

Table 15-1: Scoping for Socio-Economic Effects

Project phase and activity	Environmental Impact	LSE at scoping stage	Justification	Proposed approach to assessment	Further baseline data requirements
Construction	Employment	Scoped In	Project construction has the potential to affect employment within the defined study areas.	The assessment will include a quantification of construction employment and the consideration of likely significant effects on job creation during construction of the Project.	Desk-based analysis of current labour market capacity and the existence of appropriately skilled residents in local impact areas. Consultation with LEP and local authority in regards labour market capacity.
Construction	Economic activity	Scoped In	Project construction has the potential to affect economic activity within the defined study areas.	The assessment will include consideration of likely significant effects on indirect and induced employment and GVA during construction of the Project.	Desk-based analysis of baseline GVA conditions in sectors related to the construction of the Project. This will draw predominantly on publicly available datasets. Consultation with LEP and local authority in regards economic activity in the area.
Construction	Demographic Effects and impacts on community infrastructure,	Scoped In	Project related construction employment and	The assessment will include consideration of likely significant effects on housing,	Consultation with relevant local authority to ascertain current conditions and capacity in the supply of housing,

Project phase and activity	Environmental Impact	LSE at scoping stage	Justification	Proposed approach to assessment	Further baseline data requirements
	housing, education, and other community facilities.		construction activities have the potential to affect community facilities and housing.	education, and other community facilities during construction of the Project.	accommodation and local services.
Construction	Impact on existing land uses	Scoped In	Construction will require land take resulting in changes in land use.	The assessment will include consideration of the impact of land take and changes in land uses which will occur at the construction phase but will be a permanent impact.	Desk-based analysis of current land uses.
Operation	Employment	Scoped In	Project operation has the potential to affect employment within the defined study areas.	The assessment will include consideration of likely significant effects on employment opportunities during operation of the Project.	Desk-based analysis of current labour market capacity and the existence of appropriately skilled residents in local impact areas.
Operation	Economic activity	Scoped In	Project operation has the potential to effect economic activity within the defined study areas.	The assessment will include consideration of likely significant effects on indirect and induced employment and GVA during operation of the Project.	Desk-based analysis of baseline GVA conditions in sectors related to the operation of the Project. This will draw predominantly on publicly available datasets. Consultation with LEP and local authority in regards economic activity in the area.
Construction and Operation	Tourism	Scoped In	There are several tourism sites with proximity to the Project area. These include The Eddie Wright Raceway, Normanby	The assessment will include consideration of likely significant effects on amenity value and tourism attractions during construction and operation of the Project.	Desk-based analysis of baseline tourism receptors in proximity to the Project and associated Project baselines defined within ES sections on landscape and visual, noise and air quality.

Project phase and activity	Environmental Impact	LSE at scoping stage	Justification	Proposed approach to assessment	Further baseline data requirements
			Hall Country Park, Go Ape, Normanby Hall Golf Course and Normanby Hall Country Park Caravan and Campsite.		

15.4.1.3 Research into the impacts of three operational Energy Recovery facilities (ERF) on property prices in the surrounding areas was undertaken in 2005 as part of a study into the potential impacts of a proposed ERF in East Sussex (Cluttons, 2005). Average house prices in the areas surrounding all three ERFs, had risen significantly since 1998 and continued to rise following the commissioning of the facilities even if the stack was clearly visible from the properties. This report was then updated in 2011. It is clear from both studies that the development of ERFs have no noticeable or lasting detrimental effect on residential property prices.

15.4.1.4 In 2014, Cranfield University, analysed property prices surrounding three ERFs in the UK, all of which have been operational for at least seven years (Philips et al, 2014). Property sales data, within 5km of the sites, were analysed and compared against the local house price index before and after the facilities become operational. In all cases, there was no significant negative effect on property prices at any distance within 5km from the plants.

15.4.1.5 In 2017, Cranfield University published another study using the hedonic pricing method [14] to monetise the impact of waste incinerators sited on brownfield land (Casado et al, 2017). Although this research is based on waste incinerators and not energy recovery facilities, the results show broadly inconsistent impacts across the stage of development (planning, construction or operation) and distance from incinerator. In two out of the three incinerators there were no significant negative impacts detected within 2km of the incinerator. This suggests that careful siting of incinerators reduced the impact on residents. At the other incinerator there was a significant negative impact within 2km of the incinerator, despite this area previously hosting a now defunct incinerator However, once operational, the impact of the incinerators studied ranged from approximately 0.4% of the mean house price to 1.3%. These represent a small proportion of total house sale value.

15.4.1.6 It is therefore considered that there is no evidence to support the notion that the construction and operation of the Project will affect local property prices so it is proposed that this potential effect is scoped out of the ES.

[14] The HPM uses housing 63 market data to estimate the price individuals are willing to pay for a non-marketed quality (Lancaster et al., 1996), such as distance from a waste management site

15.4.1.7 Table 15-2 provides details of those aspects of the Project which will not be considered further as part of the socio economic assessment.

Table 15-2: Scoped Out Issues for Socio-Economic Effects

Project phase and activity	Environmental Impact	LSE at scoping stage	Justification
Operation	Effects on property prices	Not Significant	Research has indicated that this effect does not occur
	Demographic effects and impacts on community infrastructure, housing, education, and other community facilities.	Not Significant	It is not anticipated that the operation of the Project will result in demographic changes and affect community facilities and housing.

15.5 Spatial Scope

15.5.1.1 The Project site is located in and adjacent to Flixborough Industrial Estate with off-site infrastructure improvements. The Project is within the North Lincolnshire local authority area, (the 'immediate impact area'), and Yorkshire and the Humber region (the 'broad impact area'). North Lincolnshire is most likely to be affected by the likely socio-economic effects of the Project.

15.6 Temporal Scope

15.6.1.1 Effects on socio-economic receptors will be considered for the construction and operational phases. The project will be designed and operated in a manner to allow its ready decommissioning by dismantlement and removal of equipment and infrastructure and with recycling of materials maximised. The precise details of the decommissioning process some 25-40 years hence are not presently foreseeable. However, the impacts and effects of decommissioning are unlikely to be materially different or greater than those from construction and associated impacts are likely to be manageable to a similar extent as during construction.

15.7 Technical Scope and Approach to the EIA

15.7.1.1 The socio-economic impact assessment will examine the baseline conditions and potential impacts and effects of the Project, identifying possible mitigation and overall residual effects. The baseline assessment will include both qualitative and quantitative information including a detailed study of the socio-economic conditions in the defined study areas, a review of relevant regeneration and economic development objectives and initiatives and consultation with relevant stakeholders.

15.7.2 Establishing a Socio-Economic Baseline

15.7.2.1 For the stated spatial areas a description of the baseline environment will be developed for the Project including the relevant local policy and economic development objectives. The following aspects of the baseline environment will be included:

- population structure and trends;

- labour supply characteristics;
- employment and unemployment levels;
- structure of business and industry sectors in the local and wider economy;
- deprivation;
- housing and community infrastructure provision; and
- existing land use.

15.7.3 Likely Significant Effects

15.7.3.1 An assessment of the socio-economic impacts and effects of the Project against the baseline will be undertaken. The assessment will include:

- job creation and employment effects;
- wider economic (multiplier) effects;
- population changes;
- local housing and infrastructure effects; and
- effects on land use and development potential.

15.7.4 Assessment of Residual Effects

15.7.4.1 Following agreement on mitigation/enhancement measures the assessment will identify the likely residual socio-economic effects of the Project.

15.8 Statutory Consultees

15.8.1.1 The following key organisations will be consulted throughout the design and assessment of the Project with regards to Socio-Economic Characteristics;

- North Lincolnshire Council
- Greater Lincolnshire LEP (Local Enterprise Partnership).

16. CUMULATIVE EFFECTS ASSESSMENT APPROACH

16.1 Overview

16.1.1.1 Cumulative effects result from the combined impacts of multiple projects / plans. Their consideration is important as the effects of a development in isolation may not be significant but when combined with the effects of other projects they may be.

16.1.1.2 Cumulative effects are understood to be changes to the environment that are caused by an action in combination with other past, present and future actions[15]). These may include:

- effects over a larger area;
- effects over a longer period;
- effects on areas of special environmental sensitivity due to interactions with other actions; and
- other existing and future actions.

16.1.1.3 As such, the Project should not be considered in isolation. In the assessment of potential environmental effects, it is important to include other planned and proposed projects that could begin construction or operation within the same period as the Project. Decommissioning is too far into the future to allow any meaningful consideration of cumulative effects and so is not considered further.

16.1.1.4 The cumulative effects assessment (CEA) will seek to:

- determine the effect of the Project cumulatively with the effects of other planned and proposed projects within defined zones of influence;
- provide an assessment of the likely significance of any effects; and
- suggest mitigation if tenable / deliverable.

16.2 Cumulative Effects Assessment Methodology

16.2.1 Overview

16.2.1.1 There are several methods for assessing cumulative effects including models, matrices and threshold analysis. The method adopted for this EIA includes six distinct stages as follows.

- Stage 1: identifying impacts from the Project that may contribute to cumulative effects on receptors and resources and defining the zones of influence (ZoI) of the Project's impacts in terms of specific geographical and temporal boundaries (corresponding with Stage 1 of PINS advice note 17).
- Stage 2: identification of other planned and proposed projects which may interact with the Project impacts ZoIs (corresponding with Stage 1 of PINS advice note 17).

[15] Hegmann, G. et al. 1999. Cumulative Effects Assessment Practitioner's Guide. Hull, Canada: Canadian Environmental Assessment Agency. Available from http://publications.gc.ca/collections/Collection/En106-44-1999E.pdf

- Stage 3: screening the Project's impacts identified in Stage 1 above to establish their potential for acting cumulatively on the same receptors and resources as the potential impacts from the long-list of other planned and proposed projects identified in Stage 2 above, and from this produce a shortlist of screened developments to be taken forward in the CEA (corresponding with Stage 2 of PINS advice note 17).

16.2.1.2 The above three stages are used to identify the other planned and proposed projects and specific topics scoped into the EIA for cumulative assessment. The following three stages set out how the cumulative effects will be subsequently assessed in the EIA and reported in the PEIR.

- Stage 4: individual EIA topics will define the level of detail to be adopted within the assessment through identification of such matters as potential cause and effect relationships between the Project and screened developments and the relative magnitude of impacts from the Project and other developments that contribute to potential cumulative effects. Cumulative effects will be assessed to different levels of detail depending on the degree of risk involved in the effect and the level of detail available for the other developments (corresponding with Stages 3 and 4 of PINS advice note 17). For example the air quality assessment will model operational emissions from the Project but will consider other air quality impacts on the receptors it affects in terms of available data from the modelling of screened developments or through qualitative assessment where such data are not available.
- Stage 5: potential impact pathways will be identified for cumulative effects to occur and determining the extent to which the Project contributes to such impacts and effects (corresponds with Stage 4 of PINS advice note 17). If a receptor is not affected by the Project, no cumulative effects are anticipated.
- Stage 6: proposed mitigation will be developed for the Project's impacts that contribute to cumulative effects, taking account of measures already identified in the EIA. Where appropriate, additional measures may be identified where practicable to avoid, minimise or reduce the contribution of the Project's impacts to significant cumulative effects. Where appropriate, monitoring may be suggested to deal with uncertainty in conclusions and would be discussed and agreed with consultees and other stakeholders (corresponds with Stage 4 of PINS advice note 17).

16.2.1.3 The assessment of cumulative effects is an iterative process with consultation input on other planned and proposed projects to be screened in and the results of the assessment informing Project design and its environmental mitigation.

16.3 Scoping of Potential Cumulative Effects for the EIA

16.3.1 Stage 1: Identifying Project Impacts with Potential to Contribute to Cumulative Effects

16.3.1.1 To undertake a cumulative effects assessment, it is necessary to identify the main impacts from the Project that have the potential to contribute to cumulative effects with impacts from other planned and proposed projects. The assessment team has identified impacts and effects on environmental /

social receptors via this scoping exercise; this process will be further refined during the subsequent stages of the assessment process.

16.3.1.2 The topics and impacts detailed below have been identified at this early stage as having the potential to contribute to cumulative effects.

Table 16-1: Project Impacts with Potential to Contribute to Cumulative Effects

Topic	Potential Impacts
Air Quality	During operation, the key consideration will be the potential cumulative effect of emissions to atmosphere (from the Project and other large combustion activities, especially thermal power plants) and their combined potential effect on human and ecological receptors. Cumulative impacts of road traffic on air quality are automatically considered through the application of traffic growth factors in the Traffic Assessment. Dust generating activities during construction could act cumulatively on receptors with dust generating activities from screened development in very close proximity.
Surface water	Surface water will be managed within the site and effluent discharges will be required to meet the requirements of the Environment Agency in accordance with The Water Environment (Water Framework Directive) (England and Wales) Regulations. Potential cumulative effects with other discharges are fully considered under the permitting process.
Flood risk	Residual flood risk to the Project and from the Project is a key consideration for the Project. Flood risk mitigation measures required for the project will be assessed as part of the Flood Risk Assessment and any change in flood risk external to the site will be quantified.
Ecology and Nature Conservation	During construction potential cumulative disturbance effects could occur with screened development in close proximity. During operation, the key consideration will be the potential combined effect of emissions to atmosphere (from the Project and other combustion processes) and subsequent pollutant and acid deposition on designated sites.
Socio-economic	The Project will be set against a background of a variety of economic development activity and in a regional context will have potential economic and employment benefits. However, it is not considered necessary for the purposes of the EIA to assess such cumulative positive impacts. Potential negative effects on people and human health are considered in the context of other topics (e.g. noise, air quality and traffic).
Noise	During construction and operation nearby receptors could be affected by noise from the Project and from screened development. Cumulative noise impacts of road traffic are automatically considered through the application of traffic growth factors in the Traffic Assessment.
Traffic	Cumulative traffic effects are assessed as a matter of course in Transport Assessments by including future growth of traffic flows due to general increase in road use by residents and businesses.
Cultural Heritage / archaeology	The Project and screened development could potentially affect the setting of the same scheduled monuments.
Geology/ contamination	All impacts related to geology and contamination will be managed within the site and there is no potential for cumulative effects with screened development
Landscape and visual	During operation screened development is considered in terms of potential for inter-visibility.

	Cumulative effects during construction are not considered as it is a temporary activity where the impacts are 'replaced' by the operational Project.

16.3.2 Stage 1: Defining the Areas of Influence of Project Impacts

16.3.2.1 A key requirement of the assessment process is to appropriately define study areas (for baseline survey, modelling etc.) so that the Project's ZoI can be understood. The ZoI takes into consideration the areas / receptors likely to be affected by:

- the Project activities and facilities that are directly owned, operated, or managed (including by contractors) and that are a component of the Project;
- effects from unplanned but predictable potential effects caused by the Project that may occur later or at a different location; and
- indirect effects (if appropriate).

16.3.2.2 As the adopted ZoIs are defined by individual topics they vary. A summary of adopted ZoIs for the purposes of screening other planned and proposed projects into or out of the cumulative effects assessment is provided below in Table 16-2.

Table 16-2: The Project's Zones of Influence for the Purpose of Screening other Development for Inclusion in the Cumulative Effects Assessment

Topic	Assumed study area
Air Quality	15km for SACs, SPAs and SSSIs 2km for Non-Statutory sites Everything else within 500m or less
Noise and Vibration	Amcotts, Flixborough and other properties within a 2km radius
Ground Conditions and Hydrogeology	Not applicable. As described in Section 9.4, all issues relating to ground conditions and contamination are confined within the Project footprint and there is no potential for cumulative effects to occur.
Hydrology and Flood Risk**	Intrinsically considered as part of the Flood Risk Assessment River Trent downstream of the Project site
Ecology and Nature Conservation	15 km for European sites 10 km for statutory sites and 5km for non-statutory sites 5 km for flora and fauna species of note 500m for habitats
Landscape and Visual Amenity	Minimum 7.5km radius study area from center of Project site 10km for ZTV (may change following site visit)
Archaeology and Cultural Heritage	500m in all directions for direct effects 2.5km in all directions from the location of the stack element for indirect effects
Traffic and Transport	Intrinsically considered as part of the Traffic Assessment
Socio-Economics and Human Health	Potential cumulative effects are considered in the context of other topics Zone of Influence.

16.3.3 Stage 2: Development and Topics Screened for Further Assessment in the EIA

16.3.3.1 The next step in the cumulative effects assessment will be to identify a long list of other planned and proposed projects with the potential to contribute

to cumulative effects with the Project. Together with anticipated input from the Scoping Opinion, this will be achieved by reviewing Local Planning Authority, PINS, Section 36 and Section 37 Electricity Act and Transport and Works Act planning applications from the past five years. The search will be limited to the five years preceding the submission of this Scoping Report since planning permissions typically expire after a period of three to five years (unless an application for extension is permitted), so any permissions from an earlier date are presumed to have elapsed or have been implemented and therefore form part of the baseline.

16.3.3.2 Other planned and proposed projects will be mapped in relation to the Project and then screened as follows.

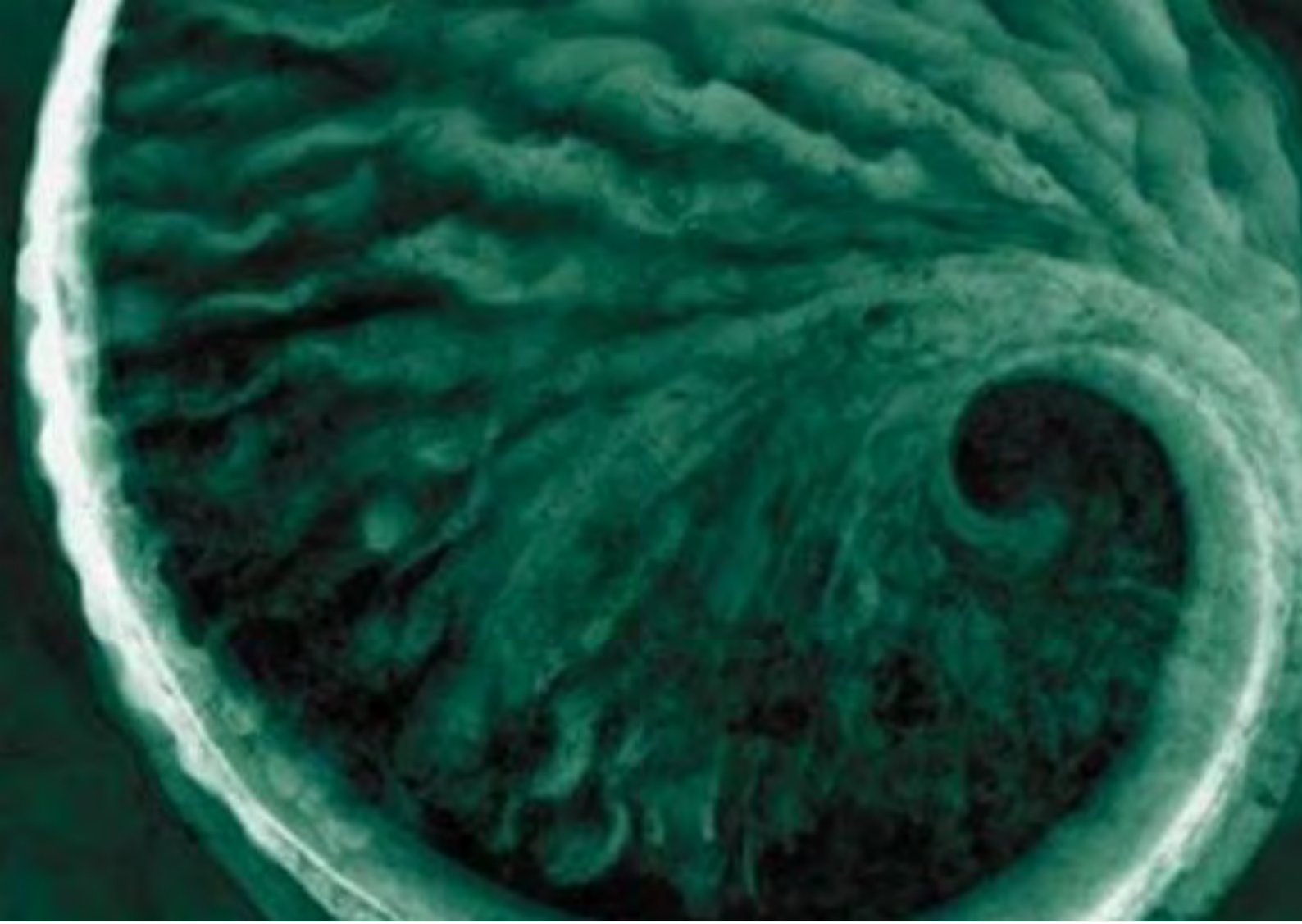
- For each of the other planned and proposed projects, a judgement will be made by the EIA team of its likely main impacts based on the nature of the particular project. No judgement will be made on impact magnitude in accordance with a precautionary approach.
- For each type of impact it has, the other planned or proposed project will be screened into or out of the need for further assessment in the EIA based on the separation distance between the Project and the screened development with respect to the ZoI for that type of impact.

16.3.3.3 The results of the screening exercise will be presented in tabular format as follows.

- Application reference number/code.
- Location and distance from Project site (km).
- Status: e.g. pending, approved, refused but under appeal, under construction.
- Description: an outline of the other planned or proposed project sufficient to indicate its scale and main attributes.
- Potential contribution to cumulative effects: based on its attributes the main potential impacts it is likely to have which could contribute to cumulative effects (e.g. disturbance of fauna, construction noise, construction dust, cultural heritage setting, landscape and visual during operation).
- Screened In: Yes or No.
- Explanation: e.g. overlapping ZoIs, non-overlapping ZoIs, non-concurrent construction phases.

16.3.3.4 Once the above screening process is complete and validated by consultation with North Lincolnshire Council, the further and more detailed assessment of cumulative effects (Stages 4 to 6 as described above) will be undertaken by EIA topic specialists and reported in the respective chapters of the PEIR and ES.

APPENDIX A WATER FRAMEWORK DIRECTIVE (WFD) SCREENING



NORTH LINCOLNSHIRE GREEN ENERGY PARK

Water Framework Directive

Scoping Assessment

22 October 2020

Project No.: 0403257

The business of sustainability

ERM

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1. INTRODUCTION

1.1.1.1 The sea from the mean low water mark up to 1 nautical mile from shore is protected under the Water Framework Directive (WFD), 2000 as implemented by the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. For licenced applications in this zone, the Marine Management Organisation (MMO) must make sure that the marine licence decision is compatible with the WFD and the Humber River Basin District River Basin Management Plan (RBMP)[1].

1.1.1.2 Under the WFD, every water body is attributed an overall WFD classification status based upon a suite of biological, physico-chemical and chemical water quality elements. The aim of the WFD is for all water bodies to be at 'Good' overall status by a certain date. The status of each waterbody is regularly re-assessed and 2015 saw the end of the first management cycle since the legislation was introduced. Any waterbody not already achieving good status will have an extended target date, and will be aiming to improve by 2021 or 2027. In the case of this reach of the River Trent, the relevant water body is the 'Humber Upper' which is classified as a transitional water with a target of 'Good' overall status by 2027. The current WFD status is set out in the RBMP where the overall status classification of the Humber Upper is 'Moderate' (i.e. does not meet 'Good' – the maximum status for a Heavily Modified Water Body)2.

1.1.1.3 New guidance, titled Clearing the Waters for All3, has been produced for activities in estuarine (transitional) and coastal waters. It defines the level of assessment required for a development and states that an assessment can have up to three stages: screening, scoping and impact assessment.

1.1.1.4 The WFD assessment must show if the activity will:

- cause or contribute to deterioration of status; and
- jeopardise the water body achieving 'Good' status.

1.1.1.5 The development of the North Lincolnshire Green Energy Park involves alteration / extension of Flixborough Wharf, currently owned and operated by RMS Trent Ports Ltd. In the context of a WFD compliance assessment, the extension of the wharf is deemed a high-risk construction activity and therefore the second 'scoping' stage of assessment is required. A standard template4, produced by the Environment Agency, has been adapted to record the

1 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/718328/Humber_RBD_Part_1_river_basin_management_plan.pdf

2 https://environment.data.gov.uk/catchment-planning/WaterBody/GB530402609203

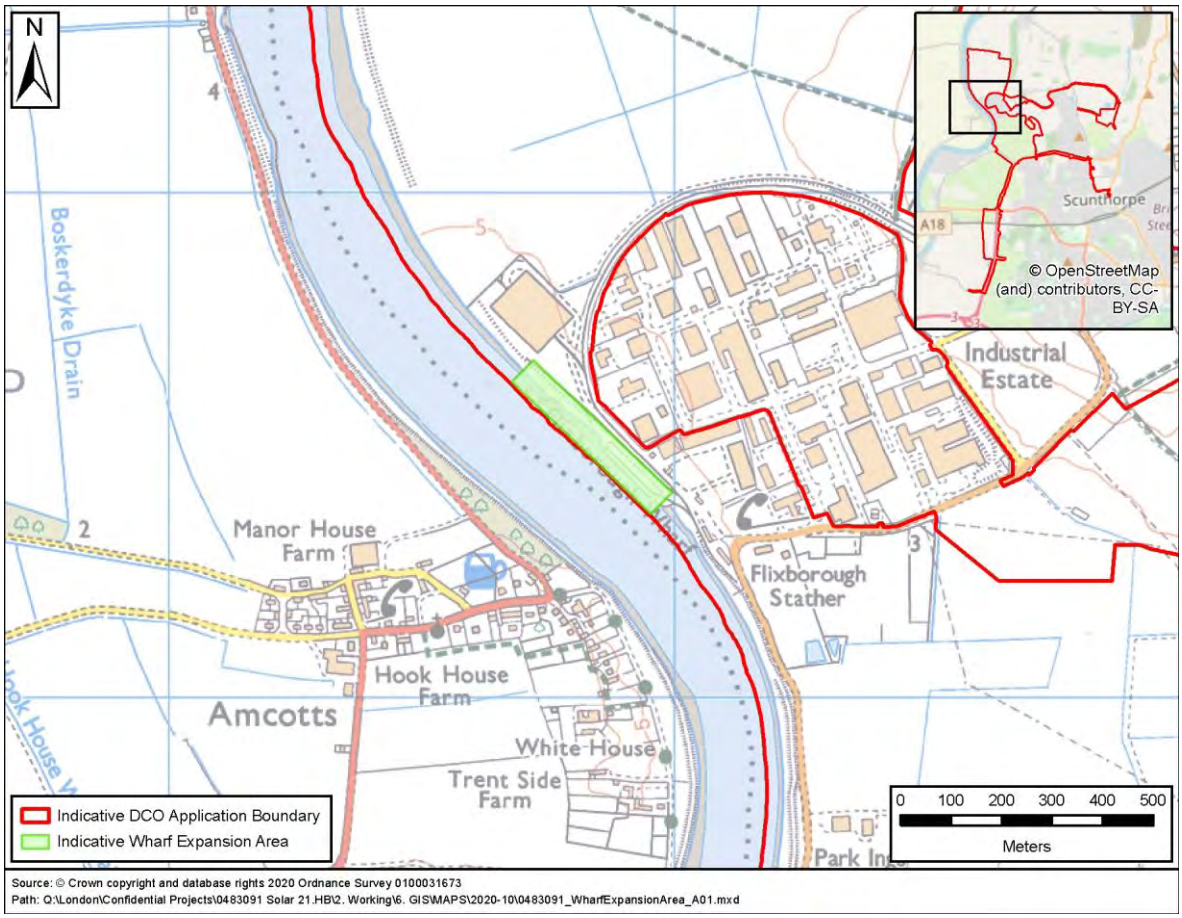
3 Environment Agency, Clearing the Waters for All, June 2017

4 https://www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters#contents

findings of the scoping stage of the WFD assessment. Only one water body would be affected and therefore only one template has been completed.

1.1.1.6 A site location plan is provided in Figure 1.

Figure 1: Site Location Plan



Your activity	Description, notes or more information
Applicant name	Solar 21
Application reference number (where applicable)	
Name of activity	Extension of Flixborough Wharf
Brief description of activity	The proposal is to construct an extension to the existing quay wall on the right (east) bank of the River Trent located at Flixborough Wharf. The quay wall will be extended to a total length of approximately 380m within the inter-tidal zone of the River Trent.
Location of activity (central point XY coordinates or national grid reference)	SE 85891 14471
Footprint of activity (ha)	2.28 ha.
Timings of activity (including start and finish dates)	Exact dates are yet to be established, but it has been assumed that the works would commence in Quarter 4 of 2025 and would be undertaken in a phased manner over approximately 12-18 months.
Extent of activity (for example size, scale frequency, expected volumes of output or discharge)	It is estimated that the existing Flixborough Wharf receives approximately 100 vessels per year, associated with steal and aggregate deliveries to the RMS Ports and their clients. The estimated overall usage of the wharf in future years is expected to increase to 200 vessels per year, of which up to 100 would be associated with the delivery of refuse derived fuel (RDF) to the North Lincolnshire Green Energy Park. It is predicted that during the opening year there would be a ‘worst case’ of 50 additional vessels in this reach of the River Trent associated with the activities of the Proposed Development. It is anticipated that the extended wharf will be used all year round.
Use or release of chemicals (state which ones)	Construction and operation of the quay wall extension will not result in the release of any chemicals. Strict construction and operational controls will be put in place to ensure that the potential for accidental spillage and release of chemicals is maintained as low as practically possible.

Water body[1]	Description, notes or more information
WFD water body name	Humber Upper
Water body ID	GB530402609203
River basin district name	Humber
Water body type (estuarine or coastal)	Transitional Water
Water body total area (ha)	1233.169 ha
Overall water body status (2015)	Moderate
Ecological status	Moderate
Chemical status	Good
Target water body status and deadline	Supports Good
Hydromorphology status of water body	Heavily Modified
Heavily modified water body and for what use	Yes – Modified for navigation, ports, and flood defence.
Higher sensitivity habitats present	Saltmarsh
Lower sensitivity habitats present	Intertidal soft sediments like sand and mud
Phytoplankton status	High
History of harmful algae	No records identified – Confirmation with the Environment Agency required.
WFD protected areas within 2km	Yes

[1] Water body information can be found in the Environment Agency's catchment data explorer and the water body summary table. Magic maps provide additional information on habitats and protected areas. Links to these information sources can be found in the WFD assessment guidance for estuarine and coastal waters.

2. HYDROMORPHOLOGY

Consider if your activity:	Yes	No	Hydromorphology risk issue(s)
Could impact on the hydromorphology (for example morphology or tidal patterns) of a water body at high status	Requires impact assessment	Impact assessment not required	**No** - the activity does not impact a water body at high status; the Humber Upper water body is classified as having Moderate ecological status.
Could significantly impact the hydromorphology of any water body	Requires impact assessment	Impact assessment not required	**No** - the total footprint of the quay extension is anticipated to be approximately 2.28 ha. Compared to the total area of the waterbody (1233.169 ha) this represents just 0.18% of the total area of the waterbody, which is considered negligible. The Trent is over 220m wide at this location. Any localised change to flow velocity or water level associated with the extended quay wall will be confined to the eastern bank of the River Trent, within the Upper Humber where lower sensitivity habitats have been identified. It is therefore anticipated that the extended quay wall will not significantly alter area weighted average sediment erosion and deposition depths/ net deposition within the river channel as a whole.
Is in a water body that is heavily modified for the same use as your activity	Requires impact assessment	Impact assessment not required	**Yes** - this reach of the River Trent within the Humber Upper waterbody is modified for the purposes of navigation, ports, and flood defence. The proposed activity is to extend the existing port quay wall to increase access and activities within the port.

3. BIOLOGY

3.1 Habitats

Higher sensitivity habitats [2]	Lower sensitivity habitats [3]
chalk reef	cobbles, gravel and shingle
clam, cockle and oyster beds	intertidal soft sediments like sand and mud
intertidal seagrass	rocky shore
maerl	subtidal boulder fields
mussel beds, including blue and horse mussel	subtidal rocky reef
polychaete reef	subtidal soft sediments like sand and mud
Saltmarsh	
subtidal kelp beds	
subtidal seagrass	

[2] *Higher sensitivity habitats have a low resistance to, and recovery rate, from human pressures.*

[3] *Lower sensitivity habitats have a medium to high resistance to, and recovery rate from, human pressures.*

Consider if the footprint[4] of your activity is:	Yes	No	Biology habitats risk issue(s)
0.5km^2 or larger	Yes to one or more – requires impact assessment	No to all – impact assessment not required	**No**
1% or more of the water body's area			**No**
Within 500m of any higher sensitivity habitat			**Yes** – overlaps Higher Sensitivity Habitat – Saltmarsh A2.5 and Lower Sensitivity Habitat – Intertidal soft sediments like sand and mud A2.2, A2.3, A2.4
1% or more of any lower sensitivity habitat			**No** Losing 0.1ha Intertidal soft sediments like sand and mud Losing 0.04ha saltmarsh

[4] *Note that a footprint may also be a temperature or sediment plume. For dredging activity, a footprint is 1.5 times the dredge area.*

3.2 Fish

Consider if fish are at risk from your activity, but only if your activity is in an estuary or could affect fish in or entering an estuary.

Consider if your activity:	Yes	No	Biology fish risk issue(s)
Is in an estuary and could affect fish in the estuary, outside the estuary but could delay or prevent fish entering it or could affect fish migrating through the estuary	Continue with questions	Go to next section	**Yes**
Could impact on normal fish behaviour like movement, migration or spawning (for example creating a physical barrier, noise, chemical change or a change in depth or flow)	Requires impact assessment	Impact assessment not required	**Yes** - noise from piling and quay extension works and potential water quality/ turbidity barrier to migrating fish species caused by disturbance of inter-tidal sediments during construction.
Could cause entrainment or impingement of fish	Requires impact assessment	Impact assessment not required	**No**

Record the findings for biology habitats and fish and go to section 3: water quality.

4. WATER QUALITY

Consider if water quality is at risk from your activity.

Use the water body summary table to find information on phytoplankton status and harmful algae.

Consider if your activity:	Yes	No	Water quality risk issue(s)
Could affect water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for longer than a spring neap tidal cycle (about 14 days)	Requires impact assessment	Impact assessment not required	**Yes** - at this stage, without a detailed construction programme or method statement for the quay wall extension, it is not possible to rule out the potential to affect water clarity (turbidity).
Is in a water body with a phytoplankton status of moderate, poor or bad	Requires impact assessment	Impact assessment not required	**No** - WFD phytoplankton status is high for the Upper Estuary
Is in a water body with a history of harmful algae	Requires impact assessment	Impact assessment not required	**No** - no evidence of historic harmful algae have been identified. Confirmation with Environment Agency required.

Consider if water quality is at risk from your activity through the use, release or disturbance of chemicals.

If your activity uses or releases chemicals (for example through sediment disturbance or building works) consider if:	Yes	No	Water quality risk issue(s)
The chemicals are on the Environmental Quality Standards Directive (EQSD) list	Requires impact assessment	Impact assessment not required	**No** - the activities would not release chemicals on the EQSD list. The risk of chemical spillage during demolition and construction (e.g. fuel oils) would be managed by a Construction Environmental Management Plan or Code of Construction Practice. Strict protocols would be in place to minimise risks associated with oil spillages from vessels utilising the extended quay, as are currently in place for vessels currently using this reach of the River Trent.
It disturbs sediment with contaminants above Cefas Action Level 1	Requires impact assessment	Impact assessment not required	**Yes** – although the current chemical status of the water is good, chemical analysis of the sediments, which make up the bank of the River Trent at this location is not available at this stage. Given the industrial activities undertaken at Flixborough, and the

			serious accident, which occurred there in 1974, a precautionary approach should be taken until chemical analysis can be undertaken.

If your activity has a mixing zone (like a discharge pipeline or outfall) consider if:	Yes	No	Water quality risk issue(s)
The chemicals released are on the Environmental Quality Standards Directive (EQSD) list	Requires impact assessment[5]	Impact assessment not required	**No** - the scheme does not incorporate a pipe or outfall which would constitute a mixing zone. No chemicals will be discharged to the River Trent during construction or operating of the proposed development.

[5] *Carry out your impact assessment using the Environment Agency's surface water pollution risk assessment guidance, part of Environmental Permitting Regulations guidance.*

5. WFD PROTECTED AREAS

Consider if WFD protected areas are at risk from your activity. These include:

- special areas of conservation (SAC)
- special protection areas (SPA)
- shellfish waters
- bathing waters
- nutrient sensitive areas
-

Use Magic maps to find information on the location of protected areas in your water body (and adjacent water bodies) within 2km of your activity.

Consider if your activity is:	Yes	No	Protected areas risk issue(s)
Within 2km of any WFD protected area[6]	Requires impact assessment	Impact assessment not required	**Yes** - Humber Estuary SAC, and Ramsar.

[6] *Note that a regulator can extend the 2km boundary if your activity has an especially high environmental risk.*

6. INVASIVE NON-NATIVE SPECIES (INNS)

Consider if there is a risk your activity could introduce or spread INNS.

Risks of introducing or spreading INNS include:

- materials or equipment that have come from, had use in or travelled through other water bodies
- activities that help spread existing INNS, either within the immediate water body or other water bodies

Consider if your activity could:	Yes	No	INNS risk issue(s)
Introduce or spread INNS	Requires impact assessment	Impact assessment not required	**No** - construction practices will be carefully controlled in line with the updated Invasive Non-native Species Strategy for Great Britain (Defra 2015) to minimise as far as reasonably practicable the pathways of introduction (both intentional and non-intentional) for example by not using equipment that has been in contact with other water bodies.

7. SUMMARY

Summarise the results of scoping here.

Receptor	Potential risk to receptor?	Note the risk issue(s) for impact assessment
Hydromorphology	Yes	The Proposed activity in a water body that is heavily modified for the same use.
Biology: habitats	Yes	Sensitive Habitats within 500m and overlapping proposed quay extension.
Biology: fish	Yes	Potential sediment plumes, noise from piling and construction of quay extension (dredging though RMS responsibility)
Water quality	Yes	Potential effect on water clarity, further construction method information required. The risk of disturbing sediment with contaminants above Cefas Action Level 1 cannot be ruled out at this stage.
Protected areas	Yes	SAC and Ramsar (if Ramsar needs separate consideration)
Invasive non-native species	No	-

If you haven't identified any receptors at risk during scoping, you don't need to continue to the impact assessment stage and your WFD assessment is complete.

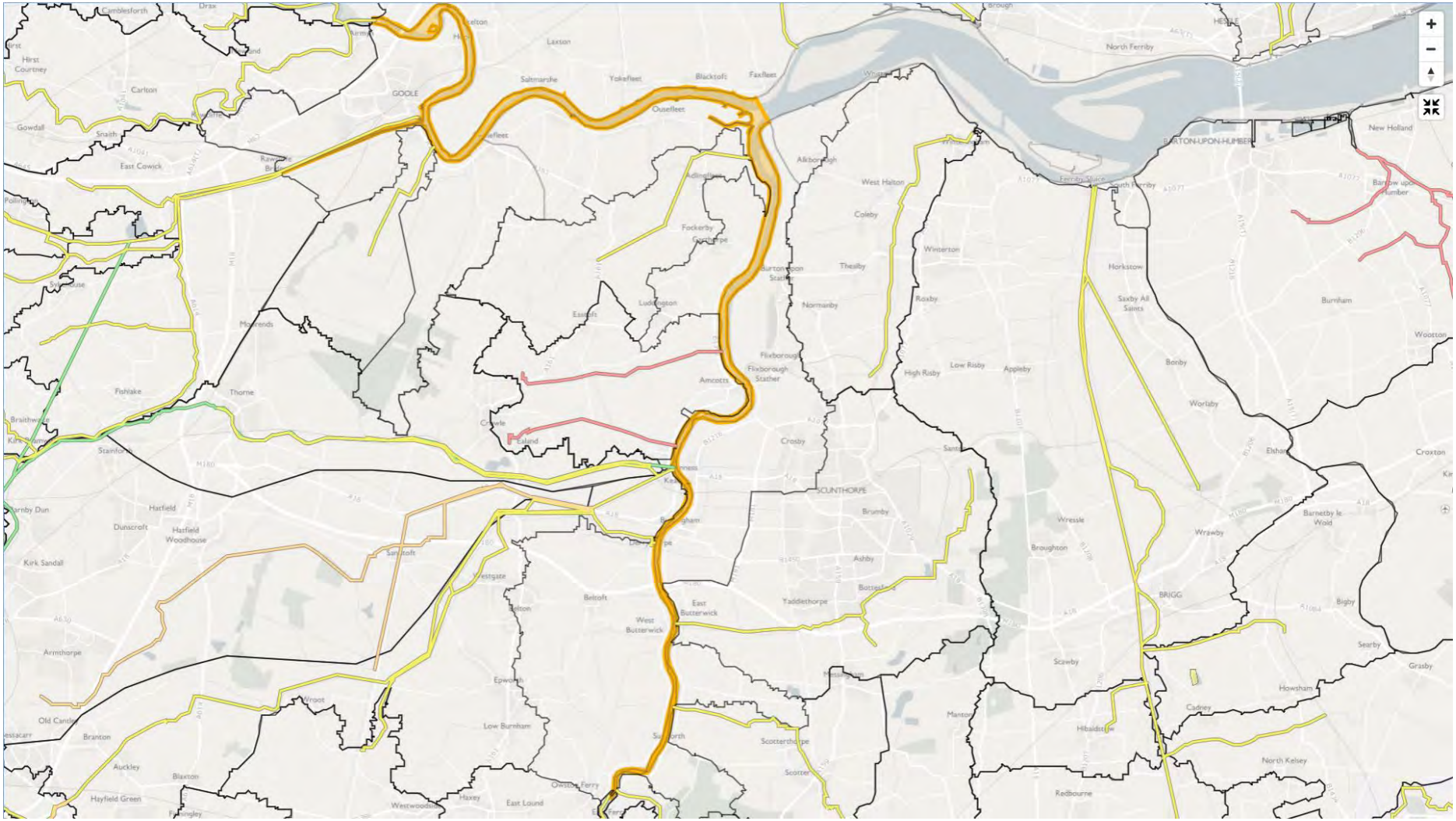
If you've identified one or more receptors at risk during scoping, you should continue to the impact assessment stage.

Include your scoping results in the WFD assessment document you send to your activity's regulator as part of your application for permission to carry out the activity.

APPENDIX A WATER FRAMEWORK DIRECTIVE DATA

Sourced from the Environment Agency Catchment Data Explorer [23/10/2020]

HUMBER UPPER



Overview

Overall classification for 2019
Moderate

Id	GB530402609203
Type	Transitional Water
Hydromorphological designation	Heavily modified
NGR	SE7856623918
Surface area	1233.169 ha
Surface area	12.332 km2
Surveillance Water Body	Yes

Classifications

Cycle 2 classifications

Classification Item	2013	2014	2015	2016	2019
Overall Water Body	Moderate	Moderate	Moderate	Moderate	Moderate
Ecological	Moderate	Moderate	Moderate	Moderate	Moderate
Supporting elements (Surface Water)	Moderate	Moderate	Moderate	Moderate	Moderate
Mitigation Measures Assessment	Moderate or less	Moderate or less	Moderate or less	Moderate or less	Moderate or less
Biological quality elements	Good	Moderate	Moderate	Moderate	Moderate
Angiosperms	-	Moderate	Moderate	Moderate	Moderate
Fish	Good	Good	Good	Good	Good

Classification Item	2013	2014	2015	2016	2019
Macroalgae	High	High	High	High	High
Phytoplankton	High	High	High	High	High
Hydromorphological Supporting Elements	Supports Good	Supports Good	Supports Good	Supports Good	Supports Good
Hydrological Regime	Supports Good	Supports Good	Supports Good	Supports Good	Supports Good
Physico-chemical quality elements	Moderate	Moderate	Moderate	Moderate	Good
Dissolved oxygen	Moderate	Moderate	Moderate	Moderate	Good
Specific pollutants	Moderate	High	High	High	High
Chlorothalonil	-	-	-	-	High
Pendimethalin	-	-	-	-	High
Triclosan	-	-	-	High	High
Chromium (VI)	-	-	-	-	High
2,4-dichlorophenol	-	-	-	High	High
2,4-dichlorophenoxyacetic acid	-	-	-	High	High
Arsenic	-	-	-	-	High
Copper	High	High	High	High	High
Diazinon	-	-	-	High	High
Dimethoate	-	-	-	High	High
Iron	-	-	-	-	High

Classification Item	2013	2014	2015	2016	2019
Linuron	-	-	-	High	High
Mecoprop	-	-	-	High	High
Permethrin	-	-	-	-	High
Phenol	-	-	-	High	High
Toluene	-	-	-	-	High
Zinc	Moderate	High	High	High	High
Chemical	Fail	Fail	Good	Good	Fail
Priority substances	Fail	Fail	Good	Good	Fail
1,2-Dichloroethane	-	-	-	-	Good
Atrazine	-	-	-	Good	Good
Benzene	-	-	-	-	Good
Alachlor	-	-	-	-	Good
Chlorpyrifos	-	-	-	Good	Good
Cypermethrin (Priority hazardous)	-	-	-	-	Fail
Octylphenol	-	-	-	-	Good
Dichlorvos (Priority)	-	-	-	-	Good
Aclonifen	-	-	-	-	Good
Chlorfenvinphos	-	-	-	Good	Good
Cybutryne (Irgarol®)	-	-	-	-	Good

Classification Item	2013	2014	2015	2016	2019
Terbutryn	-	-	-	-	Good
Dichloromethane	-	-	-	-	Good
Diuron	-	-	-	Good	Good
Fluoranthene	Fail	Fail	-	Good	Good
Isoproturon	-	-	-	Good	Good
Lead and Its Compounds	Good	Good	-	-	Good
Napthalene	-	-	-	Good	Good
Nickel and Its Compounds	Good	Good	Good	Good	Good
Pentachlorophenol	-	-	-	Good	Good
Simazine	-	-	-	Good	Good
Trichlorobenzenes	-	-	-	-	Good
Trichloromethane	-	-	-	-	Good
Other Pollutants	Does not require assessment	Does not require assessment	Does not require assessment	Good	
Aldrin, Dieldrin, Endrin & Isodrin	-	-	-	-	Good
Carbon Tetrachloride	-	-	-	-	Good
DDT Total	-	-	-	Good	Good
para - para DDT	-	-	-	Good	Good
Tetrachloroethylene	-	-	-	-	Good

Classification Item	2013	2014	2015	2016	2019
Trichloroethylene	-	-	-	-	Good
Priority hazardous substances	Good	Good	Good	Good	Fail
Anthracene	-	-	-	Good	Good
Polybrominated diphenyl ethers (PBDE)	-	-	-	-	Fail
Perfluorooctane sulphonate (PFOS)	-	-	-	-	Good
Benzo (b) and (k) fluoranthene	-	-	-	Good	-
Benzo(a)pyrene	-	-	-	Good	Good
Cadmium and Its Compounds	Good	Good	Good	Good	Good
Dioxins and dioxin-like compounds	-	-	-	-	Good
Benzo(b)fluoranthene	-	-	-	-	Fail
Benzo(g-h-i)perylene	-	-	-	-	Fail
Benzo(k)fluoranthene	-	-	-	-	Fail
Heptachlor and cis-Heptachlor epoxide	-	-	-	-	Good
Hexabromocyclododecane (HBCDD)	-	-	-	-	Good
Quinoxyfen	-	-	-	-	Good
Di(2-ethylhexyl)phthalate (Priority hazardous)	-	-	-	Good	Good
Endosulfan	-	-	-	-	Good

Classification Item	2013	2014	2015	2016	2019
Hexachlorobenzene	-	-	-	-	Good
Hexachlorobutadiene	-	-	-	-	Good
Hexachlorocyclohexane	-	-	-	-	Good
Mercury and Its Compounds	-	-	-	-	Fail
Nonylphenol	-	-	-	Good	Good
Tributyltin Compounds	-	-	-	-	Fail
Trifluralin (Priority hazardous)	-	-	-	Good	Good

Cycle 1 classifications

Upstream water bodies

Name
Adlingfleet Drain Upper Catchment (trib of Trent)
Bottesford Beck Catchment (trib of Trent)
Don from Mill Dyke to River Ouse
Eau from Manton Sewer to Trent
Laughton Drain Catchment (trib of Trent)
Ouse from R Wharfe to Upper Humber
Paupers Drain Catchment (trib of Trent)
Swinefleet Warping Drain Source to River Ouse
Torne/Three Rivers from Mother Drain to Trent
Trent from Carlton-on-Trent to Laughton Drain

Downstream water bodies

Name
Humber Middle

Investigations into classification status

Classification Element	Cycle	Year	Status	Outcome
No data to show				

Reasons for not achieving good status and reasons for deterioration

Reason Type	SWMI	Activity	Category	More	Classification Element
RNAG	Point source	Sewage discharge (continuous)	Water Industry	Details	Dissolved oxygen
RNAG	Physical modification	Other (not in list, must add details in comments)	Local and Central Government	Details	Mitigation Measures Assessment
RNAG	Physical modification	Other (not in list, must add details in comments)	Local and Central Government	Details	Mitigation Measures Assessment
RNAG	Natural	Natural conditions - other	No sector responsible	Details	Angiosperms
RNAG	Physical modification	Flood protection - structures	Sector under investigation	Details	Angiosperms
RNAG	Flow	Surface water abstraction	Other	Details	Dissolved oxygen
RNAG	Diffuse source	Poor nutrient management	Agriculture and rural land management	Details	Dissolved oxygen

Objectives

Classification Item	Status	Year	Reasons
Overall Water Body	Moderate	2015	Unfavourable balance of costs and benefits Disproportionate burdens Cause of adverse impact unknown
Ecological	Moderate	2015	Unfavourable balance of costs and benefits Disproportionate burdens Cause of adverse impact unknown
Supporting elements (Surface Water)	Good	2027	Disproportionate burdens
Mitigation Measures Assessment	Good	2027	Disproportionate burdens
Biological quality elements	Good	2027	Cause of adverse impact unknown
Angiosperms	Good	2027	Cause of adverse impact unknown
Fish	Good	2015	
Macroalgae	Good	2015	
Phytoplankton	Good	2015	
Hydromorphological Supporting Elements	Supports Good	2015	
Hydrological Regime	Supports Good	2015	
Physico-chemical quality elements	Moderate	2015	Unfavourable balance of costs and benefits
Dissolved oxygen	Moderate	2015	Unfavourable balance of costs and benefits
Specific pollutants	High	2015	
Copper	High	2015	

Zinc	High	2015	
Chemical	Good	2015	
Priority substances	Good	2015	
Nickel and Its Compounds	Good	2015	
Other Pollutants	Does not require assessment	2015	
Priority hazardous substances	Good	2015	
Cadmium and Its Compounds	Good	2015	

Protected areas

PA Name	ID	Directive	Type	More information
Humber Estuary	UK0030170	Habitats and Species Directive	SAC	Natural England
653	NVZ12SW016530	Nitrates Directive		
298	NVZ12SW012980	Nitrates Directive		
Humber Estuary	UK9006111	Conservation of Wild Birds Directive	SPA	Natural England
652	NVZ12SW016520	Nitrates Directive		
352	NVZ12SW013520	Nitrates Directive		
281	NVZ12SW012810	Nitrates Directive		
River Trent	UKENRI130	Urban Waste Water Treatment Directive		

APPENDIX B EXTENDED PHASE 1 HABITAT SURVEY

North Lincolnshire Green Energy Park

Extended Phase 1 Habitat Survey

July 2019

Contents

1. Introduction

1.1 Bowland Ecology Ltd was commissioned by Solar 21 to complete an extended Phase 1 Habitat survey of land at Flixborough, located to the north of Scunthorpe, North Lincolnshire (NGR: SE 85715 14683). The Site is proposed for re-development into an Energy Recovery Facility with associated business park, glasshouses, new road development, installation of a heat network and biodiversity and landscaping areas.

1.2 For the purposes of this report the DCO boundary is spilt into five Zones (illustrated in Appendix E). Zone A, currently used by the RMS Ports and occupies land within the Flixborough industrial estate; Zone B a greenfield area, approximately 5 m from the River Trent corridor on its western boundary; Zone C, a brownfield mixed-use site that abuts the River Trent corridor; Zone D, a disused railway spur of approximately 6 km that runs from Zone A, to a National Rail connection east of Scunthorpe, and Zone E, used by RMS Ports, and an active quay that is the port of entry from which goods are distributed.

1.3 Zone A is dominated by hard standing areas and buildings, with occasional areas of scattered scrub and trees and areas of grassland. Zone B comprises arable fields and boundary features including wet ditches and unmanaged arable field margins; Zone E comprising the River Trent is located directly adjacent to the western boundary of Zone A with tall ruderal and marginal vegetation present on the banks of the river. Zone D comprises a disused mineral railway line; a variety of habitats are present along the line including broadleaved woodland, semi-improved grassland, scrub and bare ground. Zone C is predominantly bare ground with scattered scrub, hedgerows, tall ruderal vegetation, two ponds and surface water drainage channels.

1.4 The purpose of the survey was to complete an extended Phase 1 Habitat survey. This report includes a description of survey methods and a summary description of habitats and fauna.

2. Methodology

2.1 The extended Phase 1 Habitat survey and the report followed the Guidelines for Preliminary Ecological Appraisal and the Guidelines for Ecological Report Writing (CIEEM, 2017 a, b), and are in line with the British Standard BS42020:2013 'Biodiversity – Code of practice for planning and development'

Phase 1 Habitat Survey

2.2 The extended Phase 1 Habitat survey followed standard methodology (JNCC, 2010 and CIEEM, 2017). All features of ecological significance were target noted.

2.3 This survey methodology records information on the habitats together with any evidence of and potential for legally protected and notable fauna, in particular:

- Potential roosting sites for bats within buildings and trees (identification of suitable cracks and crevices – survey undertaken externally and from ground only). An assessment of suitability was undertaken according to Collins, 2016 (Appendix B);
- Assessing the suitability of habitats for other notable and protected species such as nesting birds (including any active or disused nests), reptiles, water vole (*Arvicola amphibius*), otter (*Lutra lutra*), white-clawed crayfish (*Austropotamobius pallipes*), badger (*Meles meles*) and invertebrates;
- Checking for the most common invasive plant species subject to strict legal control including: Japanese knotweed (*Fallopia japonica*), giant knotweed (*F. sachalinensis*), hybrid knotweed (*F. x bohemica*), giant hogweed (*Heracleum mantegazzianum*), rhododendron (*R. ponticum, R. ponticum x R. maximum* and *R. luteum*) and Himalayan balsam (*Impatiens glandulifera*);
- Assessing the suitability of the habitat for amphibians and for the protected great crested newt. Ponds on site and within 0.25 km (access permitting) were subject to a Habitat Suitability Index (HSI) (Oldham *et al*. 2000) assessment for great crested newt[1].

2.4 The survey of Zone A was carried out by Claire Wilson MSc, BSc (Hons), MCIEEM on the 30th July 2018. The weather was warm (approximately 16°C) and dry, with 10% cloud cover and a gentle breeze (Beaufort Scale No. 3). The survey of Zones B, C, D and part of E was undertaken on the 20th June 2019 by Claire Wilson. The weather was warm (approximately 22°C) and dry, with no breeze.

2.5 The timing of the surveys was within the optimum period for Phase 1 Habitat survey and the majority of the site was accessible. Therefore, a valid assessment of the habitats present and their potential to support legally protected species was undertaken.

[1] A HSI is a numerical index, between 0 and 1. Values close to 0 indicate unsuitable habitat, 1 represents optimal habitat. The HSI for the great crested newt incorporates ten suitability indices, all of which are factors known to affect this species. The HSI for great crested newts is a measure of habitat suitability - it is not a substitute for newt surveys.

Limitations

2.6 Ecological surveys are limited by factors which affect the presence of plants and animals such as the time of year, migration patterns and behaviour. Therefore, the survey of the study area has not produced a complete list of plants and animals.

2.7 The list of invasive plant species included on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) is extensive and these plants are found in a range of different habitats, including aquatic habitats. The extended Phase 1 Habitat survey checked, in particular, for the presence of Japanese knotweed, giant knotweed, hybrid knotweed, giant hogweed, rhododendron and Himalayan balsam. There may be other invasive plant species present on the Site which were not recorded, but it is considered that this survey is sufficient to identify any significant constraints posed by invasive plants.

3. Results

Habitats

3.1 Target notes summarising key interest features for wildlife recorded during the extended Phase 1 Habitat survey are included in Appendix C. The Phase 1 Habitat Plan of the Site presented in Appendix D, includes the locations of the target notes. Plant species nomenclature follows Stace (2010).

Buildings

3.2 14 buildings are present within Zone A, which are constructed from a variety of materials. The majority of the buildings are used for the storage of materials and comprise large, metal corrugated warehouse type structures, with pitched, corrugated roofs (B1 and B5 – B9). To the north side of Site, on the banks of the River Trent there is a small red brick building (B2). Other brick buildings on Site are located at B3, B4 and B10, B11, B12, B13 and B15. B14 is a series of porta cabins used primarily as office facilities.

3.3 Two buildings are located within Zone C, B15 and B16. B15 is a porta cabin type building with a pitched, metal corrugated roof. Building 16 is a large storage building with breeze block walls from the ground to the mid-point on the building. The remainder is clad with timber to the wall tops. The roof comprises single skinned, corrugated metal sheeting.

Standing water

3.4 There are 16 ponds and two ditches on/within 0.25 km of the boundaries of Zones A - E. An area of standing water is located at the south eastern corner of Zone A, at TN10. The topography of the site in this area is a natural low point and water from hardstanding runs into the area. Construction materials including steel, timbers, and piles of aggregates are scattered throughout the area.

3.5 Two large, very deep, surface water drainage ponds are located to the south of Zone C.

- Pond 1 is large (35 m x 30 m), lined with a geotextile type material with steep banks and no aquatic vegetation. The pond is surrounded by scattered scrub and fencing on the margins.
- Pond 2 is approximately 35 m x 10 m. It receives water from the adjacent yard, and has a large outlet that is likely pumped into Pond 1. The pond has a dense cover of common reed (*Phragmites australis*), is relatively turbid with some open water and steep banks of compacted mud and gravel.

3.6 The remainder of the ponds/ditches (described below) are all located within 0.25 km of Zone D.

- Pond 3 is narrow, approximately 50 m x 10 m and surrounded by dense young alder (*Alnus glutinosa*) and bramble (*Rubus fruticosus agg.*) scrub. The pond is mostly open, but with a small area of reedmace (*Typha latifolia*) swamp at the western side.
- Pond 4 is a moat-like pond with a central island; the water body in total is approximately 250 m x 10 m in extent. The pond supports large areas of reedmace and common reed along the margins. Open areas have abundant submerged aquatic vegetation. The pond is situated in an

area of mixed scrub and unmanaged grassland. Newt exclusion fencing is located approximately 30 m to the south of the pond on the edge of an adjacent development site.

- Pond 5 is a shallow flash near the corner of an access road, on flat ground. It is a maximum of 10 cm in depth. It supports an abundance of common spike rush (*Eleocharis palustris*) and occasional reedmace.
- Pond 6 is a series of very shallow, clear pools on generally flat, but slightly undulating surface of rutted clay and limestone fragments. The pools are generally a maximum of about 10 cm deep and 2-5 m x 1-2 m in size. Patches of reedmace and common reed are present, alongside common spike rush and sprawling bryophytes.
- Pond 7 is a small pool in an area of dense reed swamp, approximately 7 m x 7 m in extent. Reedmace is dominant and the pond is surrounded by young willow (*Salix* sp.) scrub. The water is slightly turbid, but with filamentous algae gradually growing across the surface.
- Pond P8 is a large fishing pond used for private fishing, with numerous jetties present along the margins. The pond is surrounded by mature trees and scrub with no aquatic vegetation present. The banks vary from shallow to steep.
- Pond 9 is approximately 15 m x 15 m in extent, situated on the south-western corner of a small poplar (*Populus* sp.) plantation, and situated within an arable farm; the surrounding fields are managed to grow grass turves. The pond appears quite recently enlarged, with bare earth banks and sandy rocky margins, and low but dense charophyte growth across the central two thirds of the pond, together with occasional reedmace.
- Pond 10 is part of a dense reed bed approximately 40 m x 50 m. It is very shallow, approximately 5-10 cm in depth with a few deeper patches reaching to about 30 cm.
- Pond 11 is similar to Pond 6, with several interconnecting areas of open shallow swamp supporting patches of reedmace, rushes and common spike rush, with no other aquatic vegetation present. The pools are a maximum of 10 cm deep and 5/6 m wide (maximum area 70 m x 20 m).
- Pond 12 is a slurry pit for an industrial chicken farm that is regularly pumped out.
- Pond 13 is a fish pond that is heavily stocked with carp, rudd, tench and perch.
- Pond 14 is a reedbed, approximately 25 m x 10 m in extent and is densely covered with common reed.
- Pond 15 is approximately 25 m x 10 m in extent, and slightly less densely covered with reeds than Pond 14. No aquatic plants other than emergent reeds are present and the banks are covered with dense willow and bramble scrub.
- Pond 16 is a very large water body that stretches to the north (1000 m x 70 m). It is a disused ironstone quarry that has filled with water. Much of it has sheer stone cliffs, the majority is inaccessible because of steep slopes covered with dense gorse (*Ulex* sp.), bramble and hawthorn (*Crataegus monogyna*).
- Ditch 1 is largely dry and filled with dense stands of common reed, and approximately 1 m in width. The northern section of the ditch has water flowing from a manhole cover. A short section (10 m) at the far north-western end has ponded where the gradient is very slight. Water clarity is good, however no aquatic vegetation is present.

- Ditch 2 is approximately 2 m - 4 m wide, supporting dense reedmace and common reed along its margins, alongside grassy herbaceous banks.

Running water

3.7 The River Trent (TN1) is located directly adjacent to the western boundary of Zones A and E. The banks of the river were not closely inspected due to high water levels, however, the banks appear gently sloping and muddy. The river is very wide, spanning approximately 0.16 km, and is very turbid and fast flowing due to its tidal nature.

3.8 Wet ditches are located on the boundaries of the arable fields located to the north of Zone B. The ditches are large agricultural drains (Burthon and Flixborough Drain). The ditches are typically steep sided with a bank gradient of approximately 45° or more. The banks are covered with a dense growth of grasses and tall herbaceous plants such as oilseed rape (*Brassica napus*), common nettle (*Urtica dioica*), cow parsley (*Anthriscus sylvestris*) and scattered common reed. Water depth varies from 0 cm to 30 cm, with deeper water (and mud) in the main drain.

Broadleaved woodland and scattered trees

3.9 A small area of broadleaved woodland is located at the north eastern corner of Zone A, at TN7. The woodland is located on a raised mound and comprises a very dense scrub layer with very little ground flora present. Scrub and canopy species include cherry (*Prunus avium*), damson (*Prunus domestica*), elder (*Sambucus nigra*), rose (*Rosa* sp.), field maple (*Acer campestre*), snowberry (*Symphoricarpos albus*), willow, bramble and ash (*Fraxinus excelsior*).

3.10 A line of semi-mature trees is located at the south eastern corner of Zone A, at TN11. Species present include poplar (*Populus* sp.), oak (*Quercus sp.*), pine (*Pinus sp.*), willow and ash.

3.11 Along sections of the mineral railway line are areas of broadleaved woodland; the majority are not particularly dense and form a linear feature along the length of the line (TNs 13, 17 and 19). The trees are located on the steep embankments of the railway line and the canopy overhangs the line. The trees are semi-mature in nature and largely comprise sycamore (*Acer pseudoplatanus*) and ash with an understory of hawthorn, bramble and rose. The ground beneath the areas of woodland and along the railway line is largely bare due to the presence of a pebble/stone substrate, limiting vegetation growth. Species present includes false oat grass (*Arrhenatherum elatius*), cock's-foot (*Dactylis glomerata*), cleavers (*Galium aparine*), ivy (*Hedera helix*) and red fescue (*Festuca rubra*).

Dense and scattered scrub

3.12 Scrub is a relatively common feature of the Zone A, being more common in the northern section, particularly surrounding B1. The majority of the scrub is scattered, and is dominated by willow, bramble and elder. At TN2, on the north-western boundary of the Zone A is an area of dense scrub dominated by willow and bramble.

3.13 Dense and scattered scrub is a common feature of the railway line within Zone D. The majority of species present include willow, hawthorn, bramble, blackthorn and rose. However, towards the eastern section, close to the quarry gorse is dominant (TN20).

3.14 Some scattered scrub comprising hawthorn, willow and bramble is located within the drainage channel in Zone C.

Hedgerow

3.15 A species poor, unmanaged roadside hedgerow is located on the western boundary of Zone C. Hawthorn dominates the feature alongside occasional bramble and rose.

Tall ruderal and marginal vegetation

3.16 Marginal vegetation dominated by common reed is located along the banks of the River Trent within Zone E. Scattered stands of Himalayan balsam are also present in and amongst the common reed (TN3).

3.17 A dense stand of Himalayan balsam is located at TN4 along the banks of the River Trent, in Zone E.

3.18 Tall ruderal vegetation is located at the northern section of Zone A surrounding B1 and to the south of the arable fields in Zone B. The most frequently occurring species present include common nettle, rosebay willowherb (*Epilobium hirsutum*) and creeping thistle (*Cirsium arvense*). At TN8 on a mound of raised earth is a dense stand of tall ruderal vegetation comprising common nettle, rosebay willowherb, teasel (*Dipsacus fullonum*), broad-leaved dock (*Rumex obtusifolius*), false oat grass, great willowherb (*Epilobium hirsutum*) and creeping thistle.

Species poor semi-improved grassland

3.19 There are several small areas of species poor semi-improved grassland scattered throughout Zone A, specifically at the north eastern tip (TN9), adjacent to the disused railway line on the eastern boundary, along the footpath adjacent to the River Trent and surrounding B10 (TN12), to the south of Zone A. Common grassland species recorded include red fescue, dandelion (*Taraxacum agg*.) and annual meadow grass (*Poa annua*).

3.20 The margins of the arable fields within Zone B are species poor in nature. They are coarse and unmanaged and dominated by grasses including false oat grass, cock's-foot, cow parsley and the remnants of arable crops including oilseed rape.

Semi-improved neutral grassland

3.21 Small areas of semi-improved neutral grassland are located along the banks of the railway line within Zone D, at TNs 14, 15, 16. Some areas have slightly fewer herbs within the sward and are becoming outcompeted by tall ruderal vegetation including cow parsley and common hogweed. However, common species noted include bush vetch (*Vicia sepium*), primrose (*Primula vulgaris*), annual meadow grass (*Poa annua*), false oat grass, cock's-foot, forget-me-not (*Myotis* sp.), shining cranesbill (*Geranium lucidum*), meadow vetchling (*Lathyrus pratensis*), Russian comfrey (*Symphytum x uplandicum*), field horsetail (*Equisetum arvense*), barren brome (*Bromus sterilis*), white campion (*Silene latifolia*) and common knapweed (*Centaurea nigra*).

Semi-improved calcareous grassland

3.22 Two distinct areas of semi-improved calcareous grassland are located along the mineral railway line in Zone D. Both areas are unmanaged and located on

freely draining, base rich, pebble/stone substrate. The first area is located to the north of Normanby industrial estate, at TN18. Along this section of the line the habitat is open with only scattered willow scrub along the margins. As such, the area is open and receives much sunlight. The sward varies in height, from very low ephemeral type vegetation to swards with a height of approximately 50 cm. There is no one common or dominant species throughout, however viper's bugloss (*Echium vulgare*) is locally dominant. Other species noted includes barren brome, false oat grass, soft brome (*Bromus hordeaceus*), Yorkshire fog (*Holcus lanatus*), red fescue, blue fleabane (*Erigeron acris*), sulphur clover (*Trifolium ochroleucon*), common stork's bill (*Erodium cicutarium*), shining cranesbill, smooth cat's ear (*Hypochaeris glabra*), smooth tare (*Vicia tetrasperma*), common vetch (*V. sativa*), perforate St. John's wort (*Hypericum perforatum*), biting stonecrop (*Sedum acre*) and great mullein (*Verbascum thapsus*). A single northern marsh orchid (*Dactylorhiza purpurella*) was also noted within the sward.

3.23 The second, notable area of semi-improved calcareous grassland is located further east along the mineral railway line, close to the quarry at TN21. The second area has all the species noted in paragraph 3.37 above, alongside additional red campion (*Silene dioica*), common centaury (*Centaurium erythraea*), white dead nettle (*Lamium album*), yarrow (*Achillea millefolium*), hairy tare (*Vicia hirsuta*), wood sage (*Teucrium scorodonia*), wild mignonette (*Reseda lutea*) and common vetch. Hare's foot clover (*Trifolium arvense*) is locally common throughout the sward and a single bee orchid (*Ophrys apifera*) and southern marsh orchid (*Dactylorhiza praetermissa*) were also noted.

Arable

3.24 Large arable fields are the dominant habitat within Zone B.

Amenity grassland

3.25 A small area of amenity grassland is located in the north western corner of Zone C. The sward is well maintained and short. Species present include daisy (*Bellis perennis*), selfheal (*Prunella vulgaris*), annual meadow grass, perennial rye grass, cock's-foot and dandelion.

Introduced shrubs

3.26 Butterfly bush (*Buddleia davidii*) is scattered throughout Zone A, primarily at the northern section surrounding B1 and to the south, surrounding B10 and B12.

Other habitats

3.27 Zone A and Zone C is dominated by hardstanding comprising roads, footpaths and storage areas. A large mound of bare earth is located at TN5, directly north of B1 in Zone A, and along the edge of B1 (TN6) in Zone A are areas where still has been laid down. Scattered throughout this area are small sections of ephemeral vegetation and introduced shrubs dominated by butterfly bush.

3.28 Sections of the track along the mineral railway line in Zone D are dominated by bare ground.

3.29 Small areas of ephemeral vegetation on a shallow substrate are located between the storage buildings located to the south of Zone A.

Species

Bats

3.30 Potential foraging habitats within Zones A-E include hedgerows, grassland, dense and scattered scrub, broadleaved woodland and scattered trees. These habitats are connected to other areas of continuous, good quality bat foraging and commuting habitat; specifically mature hedgerows and woodland located along arable field boundaries. Therefore the Site is considered to provide **moderate** value foraging and commuting habitat for bats.

3.31 The aforementioned habitats provide suitable foraging and commuting habitat for bat species which show a preference for utilising 'edge' habitats. Such species include common pipistrelle (*Pipistrellus pipistrellus*) and myotid species (*Myotis* spp.), which are flexible in their foraging habitat. The arable fields and areas of semi-improved grassland may potentially provide favourable foraging habitat for noctule (*Nyctalus noctula*) bats which show a preference for feeding in 'open' habitats. However, the abundance of insects would influence the value of the foraging habitat for noctule bats.

3.32 There are 14 buildings in Zone A and 2 buildings in Zone C. None of the buildings have any Potential Roosting Features (PRFs) suitable for bats, as such the building are considered to have **negligible** potential to support roosting bats (see Appendix C). However, there are a number of trees with PRFs located along the embankments of the railway line (Zone D). Table 2 below provides a description of each tree and its potential to support roosting bats.

Table 2: Trees with bat roost potential

Tree No.	Description	Bat Roost Potential
1	Semi-mature ash with light ivy cladding.	Low
2	Semi-mature ash with moderate ivy cladding. Dense foliage in the canopy limited a full view of the tree.	Low/moderate
3	Semi-mature trees with bat boxes attached.	High

Birds

3.33 The hedgerows, marginal vegetation, scattered trees, dense and scattered scrub, broadleaved woodland and tall ruderal vegetation in Zones A-E provides suitable nesting and foraging habitat for tree and shrub nesting birds. The arable field boundaries potentially provide foraging habitat for raptors and owls and habitat for ground nesting farmland birds including skylark (*Alauda arvensis*). The arable fields may also provide favourable habitat for a variety of ground nesting birds including lapwing (*Vanellus Vanellus*).The marginal vegetation in Zone E provides suitable nesting habitat for riparian species.

Otter & water vole

3.34 The River Trent (TN1) may be used as a foraging and commuting route by otter and the marginal vegetation along the banks of the river has potential to provide suitable lay-up sites. However, due to the tidal nature of the watercourse it is unlikely that otter would use lay-up sites along the river, they are more likely to use smaller tributaries/wet ditches linked to the river. There is

a small area of woodland within Zone A, however it is considered unsuitable for the species as it is located away from the banks of the river, and adjacent to buildings on site where there are frequent vehicles and people movements.

3.35 The wet ditches along the arable field boundaries are connected throughout the landscape to additional ditches/field drains. In addition, the banks of the ditches are covered with a variety of short and long grasses suitable for foraging water vole and the bank profile is steep and deep providing abundant burrowing habitat. Some scattered aquatic vegetation also suitable for foraging water vole is also present within the ditches.

Other mammals

3.36 The hedgerows, broadleaved woodland, dense scrub, tall ruderal vegetation and coarse semi-improved grasslands located in Zones A-E provides potential refuge habitat for European hedgehog (*Erinaceus europaeus*) and other small mammals. It is likely that European hedgehog is common in the area due to the presence of scattered villages and abundant hedgerows providing wildlife corridors, foraging and refuge habitat for the species.

3.37 A hedgehog was noted along the railway line (Zone D), close to the village of Flixborough during the evening bat activity survey on the 20th June 2019.

3.38 The arable crops within Zone B and the wider area provide abundant foraging habitat for brown hare (*Lepus europaeus*).

3.39 Brown hare have been recorded in the area on dusk activity surveys that have been undertaken during spring/summer 2019.

3.40 No evidence of, or habitat for any other protected or notable species was recorded in Zones A-E during the surveys.

Invertebrates

3.41 Tall ruderal vegetation, scrub and introduced shrubs, primarily butterfly bush within Zone A provide abundant food sources for a variety of moths and butterflies that may be present in the area.

3.42 During the survey of Zone A variety of butterflies including cabbage white (*Pieris rapae*), peacock (*Aglais io*), red admiral (*Vanessa atalanta*) and comma (*Polygonia c-album*) were noted at the northern section of Zone, primarily foraging within scattered buddleia scrub and tall ruderal vegetation.

3.43 The semi-improved grasslands along the railway line (Zone D) also provide habitat for a variety invertebrates.

Amphibians & reptiles

3.44 There are two ponds within Zone C and 14 ponds and two ditches within 0.25 km of Zone D. Descriptions of each pond/ditch are located in paragraph 3.5–3.6 above. The ponds/ditches provide potential breeding habitat for great crested newt and other common amphibians including common toad (*Bufo bufo*) a Species of Principal Importance (SPI).

3.45 The HSI calculations for the ponds/ditches are shown in Table 3 below. Ponds 2, 8 and 12 provide 'poor' suitability for GCN. Pond 1 and ditch 1 provide 'below average' suitability for GCN. Ponds 5, 6, 11, 14 and 15 provide 'average' suitability for GCN. Ponds 3, 7, 9 and 13 provide 'good' suitability for GCN, and ponds 4, 10, 16 and ditch 2 provide 'excellent' suitability for GCN.

Table 3: Pond/ditch HSI Scores

No.	SI1 - Location	SI2 - Pond area	SI3 - Pond drying	SI4 - Water quality	SI5 - Shade	SI6 - Fowl	SI7 - Fish	SI8 - Ponds	SI9 – Terr'l habitat	SI10 - Macrophytes	HSI
1	1	0.95	0.9	0.33	1	0.67	0.67	0.4	0.33	0.3	0.59
2	1	1	0.5	0.01	1	1	1	0.4	0.33	0.9	0.48
3	1	1	0.9	0.67	0.2	1	1	1	1	0.6	0.77
4	1	0.9	0.9	1	1	0.67	1	1	1	1	0.94
5	1	0.2	0.1	0.67	1	1	1	1	0.67	0.7	0.60
6	1	0.6	0.1	0.67	1	1	1	0.95	0.67	0.8	0.68
7	1	0.1	1	0.67	1	0.67	1	0.95	1	0.7	0.70
8	1	-	0.9	0.33	0.2	0.67	0.01	0.63	0.67	0.3	0.33
9	1	0.4	1	1	1	0.67	1	0.98	0.67	0.3	0.75
10	1	0.4	0.5	0.67	1	1	1	0.95	1	0.8	0.80
11	1	0.85	0.1	0.67	1	1	1	0.95	1	0.4	0.68
12	1	0.8	0.1	0.01	1	1	1	0.8	0.33	0.3	0.38
13	1	0.9	0.9	0.67	1	0.67	1.01	0.8	0.33	0.8	0.77
14	1	0.2	1	0.33	1	1	1	0.9	1	0.3	0.67
15	1	0.2	1	0.33	1	1	1	0.9	1	0.3	0.67
16	1	0.8	0.9	1	0.4	0.67	1	0.85	1	0.8	0.82
D1	1	0.1	0.9	0.67	0.2	1	1	0.95	1	0.3	0.57
D2	1	1	0.9	0.67	1	0.67	1	1	0.95	0.8	0.89
Pond suitability: <0.5 'poor', 0.5 – 0.59 'below average', 0.6 – 0.69 'average', 0.7 – 0.79 'good', >0.8 'excellent'											

3.46 The large quarry lagoon and large, deeper ponds, specifically P1, P2, P8 and P16 potentially provide more favourable breeding habitat for common toad, as this species shows a preference for breeding in deeper waterbodies, as opposed to small, shallow ponds, preferred by other common amphibians.

3.47 Habitats within Zones A-E including hedgerows, tall ruderal vegetation, dense and scattered scrub, broadleaved woodland, and areas of coarse, unmanaged semi-improved grassland provide suitable refuge habitat for great crested newt and other common amphibians.

3.48 Habitats along the railway line (Zone D), specifically the open areas of semi-improved grassland provide suitable basking habitat for reptiles. The areas of scrub and woodland potentially provide suitable refuge habitat for reptiles.

References

British Standards Institution (2013) *BS 42020:2013 Biodiversity – Code of practice for planning and development*. British Standards Institution, London.

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Oldham R.S., Keeble J., Swan M.J.S. & Jeffcote M. (2000). *Evaluating the suitability of habitat for the Great Crested Newt (Triturus cristatus)*. Herpetological Journal 10 (4), 143-155.

Appendix A – Legal Information

This report provides guidance of potential offences as part of the impact assessment. This report does not provide detailed legal advice and for full details of potential offences against protected species the relevant acts should be consulted in their original forms i.e. The Wildlife and Countryside Act, 1981, as amended, The Countryside and Rights of Way Act 2000, The Natural Environment and Rural Communities Act, 2006 and The Conservation of Habitats and Species Regulations 2017.

Species	Legislation	Offences	Notes on licensing procedures and further advice
Species that are protected by European and national legislation			
Badger	Protection of Badgers Act 1992	Wilfully kill, injure or take a badger; Intentionally or recklessly damage, destroy or obstruct access to a badger sett; Disturb a badger in its sett. It is not illegal to carry out disturbance activities in the vicinity of setts that are not occupied.	Where required, licences for development activities involving sett loss, damage or disturbance are issued by Natural England (NE). Licences for activities involving watercourse maintenance, drainage works or flood defences are issued under a separate process. Licences are normally not granted from December to June inclusive because cubs may be present within setts. https://www.gov.uk/badgers-protection-surveys-and-licences
Bats *European protected species*	Conservation of Habitats and Species Regulations 2017 Reg 41	Deliberately[1] capture, injure or kill a bat; Deliberate disturbance[2] of bats; Damage or destroy a breeding site or resting place used by a bat. The protection of bat roosts is considered to apply regardless of whether bats are present.	An NE licence in respect of development is required in England. https://www.gov.uk/bats-protection-surveys-and-licences *European Protected Species: Mitigation Licensing- How to get a licence* (NE 2010) *Bat Mitigation Guidelines* (English Nature 2004) *Bat Workers Manual* (JNCC 2004) *BS8596:2015 Surveying for bats in trees and woodland* (BSI, 2015)
	Wildlife and Countryside Act 1981 (as amended)[4] S.9	Intentionally or recklessly[3] obstruct access to any structure or place used for shelter or protection or disturb a bat in such a place.	Licence from NE is required for surveys (scientific purposes) that would involve disturbance of bats or entering a known or suspected roost site.

Species	Legislation	Offences	Notes on licensing procedures and further advice
Birds	Wildlife and Countryside Act 1981 (as amended)[4] S.1	Intentionally kill, injure or take any wild bird; Intentionally take, damage or destroy the nest of any wild bird while that nest is in use or being built; Intentionally take or destroy the nest or eggs of any wild bird. **Schedule 1 species** Special penalties are liable for these offences involving birds on Schedule 1 (e.g. most birds of prey, kingfisher, barn owl, black redstart, little ringed plover). Intentionally or recklessly[3] disturb a Schedule 1 species while it is building a nest or is in, on or near a nest containing eggs or young; intentionally or recklessly disturb dependent young of such a species.	No licences are available to disturb any birds in regard to development. Licences are available in certain circumstances to damage or destroy nests, but these only apply to the list of licensable activities in the Act and do not cover development. General licences are available in respect of 'pest species' but only for certain very specific purposes e.g. public health, public safety, air safety. https://www.gov.uk/wild-birds-protection-surveys-and-licences https://www.gov.uk/prevent-wild-birds-damaging-your-land-farm-or-business
Great crested newt *European protected species*	Conservation of Habitats and Species Regulations 2017 Reg 41	Deliberately[1] capture, injure or kill a great crested newt; Deliberate disturbance[2] of a great crested newt; Deliberately take or destroy its eggs; Damage or destroy a breeding site or resting place used by a great crested newt.	Licences issued for development by NE. https://www.gov.uk/great-crested-newts-protection-surveys-and-licences *European Protected Species: Mitigation Licensing - How to get a licence* (NE 2010) *Great Crested Newt Mitigation Guidelines* (English Nature 2001)
	Wildlife and Countryside Act 1981 (as amended)[4] S.9	Intentionally or recklessly[3] obstruct access to any structure or place used for shelter or protection or disturb a great crested newt in such a place.	Licences issued for science (survey), education and conservation by NE.
Otter *European protected species*	Conservation of Habitats and Species Regulations 2017 Reg 41	Deliberately[1] capture, injure or kill an otter; Deliberate disturbance[2] of otters; Damage or destroy a breeding site or resting place used by an otter.	Licences issued for development by NE. https://www.gov.uk/otters-protection-surveys-and-licences *European Protected Species: Mitigation Licensing- How to get a licence* (NE 2010)
	Wildlife and Countryside Act 1981 (as amended)[4] S.9	Intentionally or recklessly[3] obstruct access to any structure or place used for shelter or protection or disturb an otter in such a place.	No licence is required for survey in England. However, a licence would be required if the survey methodology involved disturbance.

Species	Legislation	Offences	Notes on licensing procedures and further advice
Reptiles (species that are not European protected): **Common lizard** **Grass snake** **Slow worm**	Wildlife and Countryside Act 1981 (as amended)[4] S.9(1) (part); S.9(5)	Intentionally kill or injure any common reptile species.	No licence is required in England. However an assessment for the potential of a site to support reptiles should be undertaken prior to any development works which have potential to affect these animals. https://www.gov.uk/reptiles-protection-surveys-and-licences
Water vole	Wildlife and Countryside Act 1981 (as amended)[4] S.9	Intentionally kill, injure or take water voles; Intentionally or recklessly[3] damage, destroy or obstruct access to any structure or place used for shelter or protection; Disturb a water vole in such a place.	No licence is required for survey in England, unless you are likely to commit an action that is otherwise illegal. There are currently no licensing purposes that explicitly cover development activities or activities associated with the improvement or maintenance of waterways. However when a proposed lawful activity has no opportunity to retain water voles within a development site and their translocation would result in a conservation benefit then a licence from NE may be obtained. *The Water Vole Conservation Handbook* (R. Strachan, T. Moorhouse & M. Gelling, Wildlife Conservation Research Unit (WildCRU), 3rd Edition 2011). https://www.gov.uk/water-voles-protection-surveys-and-licences Water voles and development licensing policy -NE Technical Information Note TIN042 2008
Other species			
Rabbits, foxes and other wild mammals **For BAP species and Species of Principal Importance, see below**	Wild Mammals (Protection) Act 1996	Intentionally inflict unnecessary suffering to any wild mammal.	Natural England provides guidance in relation to rabbits (Technical Information note TIN003, Rabbits- management options for preventing damage, July 2007) and foxes (which are also protected under the Wildlife and Countryside Act 1981 from live baits and decoys, see Species Information notes SIN003 (2011), *Urban foxes* and SIN004 (2011) *The red fox in rural areas* as well as other wild mammals. Lawful and humane pest control of these species is permitted.

[1]Deliberate capture or killing is taken to include "accepting the possibility" of such capture or killing

[2]Deliberate disturbance of animals includes in particular any disturbance which is likely a) to impair their ability (i) to survive, to breed or reproduce, or to rear or nurture their young, or (ii) in the case of animals of hibernating or migratory species, to hibernate or migrate; or b) to affect significantly the local distribution or abundance of the species to which they belong.
Lower levels of disturbance not covered by the Conservation of Habitats and Species Regulations 2017 remain an offence under the Wildlife and Countryside Act 1981 although a defence is available where such actions are the incidental result of a lawful activity that could not reasonably be avoided. Thus deliberate disturbance that does not result in either (a) or (b) above would be classed as a lower level of disturbance.

[3]The term 'reckless' is defined by the case of Regina versus Caldwell 1982. The prosecution has to show that a person deliberately took an unacceptable risk, or failed to notice or consider an obvious risk.

[4] The Wildlife and Countryside Act (1981) has been updated by various amendments, including the Countryside and Rights of Way Act 2000 and the Natural Environment and Rural Communities Act 2006. A full list of amendments can be found at http://jncc.defra.gov.uk/page-1377.

Habitats & Species	Legislation	Guidance
Species and Habitats of Principal Importance for the Conservation of Biodiversity	Natural Environment & Rural Communities Act 2006 S.40 (which superseded S.74 of the Countryside & Rights of Way Act 2000).	S.40 of the NERC Act 2006 sets out the duty for public authorities to conserve biodiversity in England. Habitats and species of principal importance for the conservation of biodiversity are identified by the Secretary of State in consultation with NE, are referred to in S.41 of the NERC Act for England. The list of habitats and species was updated in 2008:http://webarchive.nationalarchives.gov.uk/20140605090108/http:/www.naturalengland.org.uk/ourwork/conservation/biodiversity/protectandmanage/habsandspeciesimportance.aspx The habitats and species listed are not necessarily of higher biodiversity value, but they may be in decline. Habitat Action Plans and Species Action Plans are written for them or are in preparation, to guide their conservation. Ecological impact assessments should include an assessment of the likely impacts to these habitats and species.
Biodiversity Action Plan (BAP) Habitats & Species	No specific legislation, unless it is also a species or habitat of principal importance as described above.	The UK Post 2010 Biodiversity Framework published in July 2012 succeeds the UK BAP. Following devolution in 1998, each of the four countries of the UK have developed their own Biodiversity Strategies. In England the current strategy is *Biodiversity 2020: A strategy for England's wildlife and ecosystem services* (2011), which also reflects a change in strategic thinking following the Convention for Biological Diversity's (CBD) Strategic Plan for Biodiversity 2011-2020 and the launch of the new EU Biodiversity Strategy. The UK Post 2010 Biodiversity Framework demonstrates how the work of the four countries and the UK contributes to the Aichi Biodiversity Targets in the CBD's Strategic Plan for Biodiversity 2011-2020. The original UK BAP list of species and habitats, prepared over 10 years ago, was used to compile the lists of species and habitats of principal importance under section 41 of the NERC Act 2006 which now forms the focus of England's Biodiversity Strategy. In addition to the England Biodiversity Strategy, there are also many BAPs at the regional and local level which feed into the delivery at the country level and also identify biodiversity priorities at the more local level.
Hedgerows	The Hedgerow Regulations 1997	Under the regulations, it is against the law to remove or destroy hedgerows that are classified as "important" under the regulations without permission from the local planning authority. The regulations apply if a hedgerow is in or runs alongside agricultural land, common land including town or village greens, land used for forestry or for the breeding or keeping of horses etc, a local nature reserve or Site of Special Scientific Interest. A hedgerow can be classified as 'Important' due to its wildlife

Habitats & Species	Legislation	Guidance
		and landscape value or due to its heritage value. In general, permission will be required before removing hedges that are at least 20 metres in length, over 30 years old and contain certain species/diversity of plant. The local planning authority will assess the importance of the hedgerow using criteria set out in the regulations. See Defra and Natural England websites for further guidance and information.
Himalayan balsam	Wildlife and Countryside Act 1981 (as amended) S.14	It is illegal to plant these species or otherwise cause them to grow or spread in the wild. *Guidance on Section 14 of the Wildlife and Countryside Act, 1981* (Defra, 2010)

Appendix B – Bat Roost Potential and Habitat Suitability Categories

Guidelines for assessing the potential suitability of proposed development sites for bats, based on the presence of habitat features within the landscape (Collins, 2016).

Suitability	Description of Roosting Habitat	Commuting & Foraging Habitats
Negligible	Negligible habitat features on site likely to be used by roosting bats	Negligible habitat features on site likely to be used by commuting or foraging bats.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitats to be used on a regular basis or by a larger number of bats (i.e. unlikely to be suitable maternity or hibernation). A tree of sufficient size and age to contain potential roosting features but with none seen from the ground, or feature seen with only very limited roosting potential.	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or unvegetated stream, but isolated i.e. not very well connected to the surrounding landscape by other habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions, and surrounding habitat but unlikely to support a roost of high conservation status.	Continuous habitat connected to the wider landscape that could be used by bats for commuting, such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging, such as trees, scrub, grassland or water.
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis, and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.	Continuous high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats, such as broadleaved woodland, tree-lined watercourses and grazed parkland. Site is close and connected to known roosts.

Appendix C – Target Notes

Target Note	Description	Photograph
TN1	River Trent, a wide, fast flowing, very turbid watercourse. The section of the river adjacent to the site has bankside vegetation dominated by common reed. Numerous gulls were noted on the water during the survey including black-headed gulls and lesser black-backed gulls. The river provides potential for foraging and commuting otter and a variety of fish species.	
TN2	A mosaic of scrub and tall ruderal vegetation located on a raised earth bund on the south-western side of Building 1. Species present include; willow, common nettle, Yorkshire fog, rosebay willowherb, creeping thistle, common hogweed, great willowherb, Himalayan balsam, bindweed, colt's foot, elder, field maple, bramble and Snowberry. The scrub is denser towards the south. The area provides nesting bird habitat, bat foraging and commuting habitat, small mammal and amphibian refuge habitat and invertebrate foraging habitat.	
TN3	Marginal vegetation on the banks of River Trent. Dominated by common reed with occasional common nettle, bindweed, common hogweed, Himalayan balsam, Yorkshire fog, cock's-foot, common couch, broad-leaved dock, great willowherb and cleavers. Scattered willow and elder scrub is also occasional within the area. The vegetation provides potential refuge habitat for otter and nesting bird habitat.	
TN4	Dense stand of Himalayan balsam on banks of river.	No photograph

TN5	Hardstanding in working site, predominantly tarmac roads, storage areas and walkways. Construction materials are scattered throughout, including steel rails, rubble piles, bricks, timber, concrete and pallets. The majority of the items are raised from the ground; however, some are scattered along grassy verges. Where materials have not been stored above ground suitable refuge habitat for amphibians is present.	
TN6	The boundary of B1 is surrounded by steel girders, timbers and piles of waste. Amongst this is scattered tall ruderal vegetation, dominated by willowherb species, introduced shrubs, primarily butterfly bush and short grasses including red fescue and Yorkshire fog. Where materials have not been stored above ground suitable refuge habitat for amphibians is present. The vegetation provides foraging habitat for invertebrates.	
TN7	Mound of earth adjacent to the disused railway line. Densely vegetated with semi-mature trees and scrub species, including elder, rose, field maple, snowberry, willow, bramble and ash. The area provides nesting bird habitat, bat foraging and commuting habitat, small mammal and amphibian refuge habitat and invertebrate foraging habitat.	
TN8	The section of mound closest to B1 is dominated by tall ruderal vegetation comprising common nettle, rosebay willowherb, teasel, broad-leaved dock, false oat-grass, great willowherb and creeping thistle. The area provides nesting bird habitat, bat foraging and commuting habitat, small mammal and amphibian refuge habitat and invertebrate foraging habitat.	

TN9	An old mineral railway line with stone substrate beneath steel rails and timber railway sleepers. Vegetation with a mixture of grass species, herbs and scrub. Bramble is located along the boundary of site. Other species present includes rosebay willowherb, butterfly bush, false oat grass, dandelion, common ragwort, teasel, willow, weld and Yorkshire fog. A Mound of earth covered with grasses is located directly adjacent to railway line, species present includes cock's-foot, red fescue and ribwort plantain. The habitat provides foraging habitat for invertebrates.	
TN10	Large area of standing water at the south eastern corner of the site. Construction materials are scattered throughout the area. These include steel, timbers, and piles of aggregates.	
TN11	Linear semi-mature trees present on the south western boundary of Site. Species present are poplar, oak, pine, willow and ash trees. The trees provide nesting bird habitat, bat foraging and commuting habitat, small mammal and amphibian refuge habitat and invertebrate foraging habitat.	
TN12	Area of species poor semi-improved grassland with red fescue, false oat grass and cock's-foot.	No photograph

TN13	Line of broadleaved woodland along steep embankments of mineral railway line. Canopy species comprise ash and sycamore, the understory is dominated by hawthorn, bramble and rose. The ground flora beneath the woodland is relatively sparse due to the dense canopy. The substrate comprises stone and rocks with very little earth present. The majority of the railway line along this point is predominantly bare ground with some scattered false oat grass, cock's-foot, bramble and herb Robert. The woodland provides nesting bird habitat, bat foraging and commuting habitat, small mammal and amphibian refuge habitat and invertebrate foraging habitat.	
TN14	Area of semi-improved neutral grassland along the steep sided north and south facing embankments of the railway line. Common knapweed is locally dominant alongside forget-me-not, false oat grass, Yorkshire fog, common vetch, herb Robert and red fescue. Tall ruderal vegetation dominated by common hogweed and cow parsley is encroaching into the edges of the sward. The grassland provides nesting bird habitat, bat foraging and commuting habitat, small mammal and amphibian refuge habitat and invertebrate foraging habitat.	
TN15	Small area of semi-improved neutral grassland along the steep sided north and south facing embankments of the railway line. Common knapweed is locally dominant alongside forget-me-not, false oat-grass, Yorkshire fog, common vetch, herb Robert and red fescue. Tall ruderal vegetation and dominated by common hogweed and cow parsley is encroaching into the edges of the sward, alongside bramble scrub. The area provides nesting bird habitat, bat foraging and commuting habitat, small mammal and amphibian refuge habitat and invertebrate foraging habitat.	

TN16	Small areas of semi-improved neutral grassland along the steep sided north and south facing embankments of the railway line that has a greater diversity of herbs within the sward than other areas. The sward is approximately 0.5 m in height and unmanaged. Species present includes bush vetch, primrose, annual meadow-grass, false oat-grass, cock's-foot, forget-me-not, shining cranesbill, meadow vetchling, Russian comfrey, field horsetail, barren brome, white campion and common knapweed. The area provides nesting bird habitat, bat foraging and commuting habitat, small mammal and amphibian refuge habitat and invertebrate foraging habitat.	
TN17	Broadleaved woodland on steep north and south facing embankments of the railway line. The canopy is relatively dense and dominated by ash and sycamore. The understory comprises predominantly hawthorn and bramble with occasional rose and elder Frequent ash saplings are also present within the understory. Ground flora is relatively sparse, likely due to the dense shading from the canopy and the stoney substrate beneath. False oat-grass and ivy is locally common alongside occasional herb Robert and cock's-foot. The railway line within this section is predominantly bare stone. The area provides nesting bird habitat, bat foraging and commuting habitat, small mammal and amphibian refuge habitat and invertebrate foraging habitat.	
TN18	Area of semi-improved calcareous grassland on shallow stoney substrate. The habitat has opened up slightly with only light cover provided by the adjacent scrub on the margins of the railway line. Viper's bugloss is locally dominant. Other species noted includes barren brome, false oat grass, soft brome Yorkshire fog, red fescue, blue fleabane, sulphur clover, common stork's bill, shining cranesbill, smooth cat's ear, smooth tare, common vetch, perforate St. John's wort, biting stonecrop and great mullein. A single northern marsh orchid was also noted within the sward. The area provides nesting bird habitat, bat foraging and commuting habitat, small mammal	

	and amphibian refuge habitat and invertebrate foraging habitat.	
TN19	Area of dense broadleaved woodland with a dense canopy cover. The railway embankment sat this location are slightly less steep. The canopy is dominated by ash, sycamore and sliver birch with hawthorn and bramble dominating the understory. There is very little ground flora and the majority of the railway line at this location is covered with bramble scrub.	
TN20	Dense scrub on north and south facing, steep sided embankments of the railway line. Willow and gorse is locally common alongside hawthorn, blackthorn and elder.	No photograph
TN21	Large are of semi-improved calcareous grassland along the entire eastern section of the railway line. At this point the line is not densely shaded by woodland, as such it is very open and has a greater diversity of herbs present that the area at TN18. Additional species at this location include red campion, common centaury, white dead nettle, yarrow, hairy tare, wood sage, wild mignonette and common vetch. Hare's foot clover is locally common throughout the sward and a single bee orchid and southern marsh orchid were also noted. The area provides nesting bird habitat, bat foraging and commuting habitat, small mammal and amphibian refuge habitat reptile basking habitat and invertebrate foraging habitat.	No photograph

B1	A large corrugated, metal storage building located at northern tip of the site. The roof is pitched with skylights along all sections making the internal space very light. The building is used for the storage of materials and internally is well lit and relatively noisy due to vehicle movements. No habitat suitable for roosting bats was noted during the survey. As such the building is considered to have negligible potential to support roosting bats. Evidence of roosting pigeons was recorded inside the building as numerous droppings were noted on the floor.	
B2	A single storey red brick building with a pitched corrugated roof located on the banks of the River Trent outside of the Site boundary. Structural cracks are located on the north eastern facing elevation, these are open and exposed and section of the roof are missing. The building provides negligible bat roost potential.	
B3	Single storey red brick building with a pitched roof comprising of timber covered with bitumastic felt which is in very poor condition with sections of felt and timber missing. The windows and doors are open and broken and no entry into the building is permitted due to the unsafe nature of the structure. Timber barge boards are also present on the on gable ends. A view if the internal space from the windows identified as separate loft space, however, ceiling panels were missing due to the very damp nature of the building. There are also numerous gaps in the brickwork. The building is considered to have negligible potential to support roosting bats due to its very damp nature.	
B4	Single storey red brick building with a mono pitch corrugated roof. The building is used to house electrical generators and has negligible potential to support roosting bats.	No photograph

B5-9	Series of five large metal corrugated storage sheds with pitched corrugated roofs. All the buildings have large doors which are open throughout the day. Large skylights are located across the roof. The building has negligible potential to support roosting bats. The surrounding area is also very noisy and heavily lit.	
B10	Single storey red brick building with a flat concrete roof. Well sealed metal framed windows and doors are also present. No features suitable for roosting bats was noted. The building considered has negligible bat roost potential.	
B11	Single storey, red brick building with a flat roof. Some areas have missing bricks and mortars, some gaps in brickwork, however, these are all low to ground. The building has negligible potential to support roosting bats.	
B12	Red brick building with a flat roof used as a mechanics garage. Large doors are open all day. The building has negligible potential to support roosting bats.	

B13	A series of porta cabins with metal frames and flat roofs used as office facilities. Negligible bat roost potential.	
B14	Single storey red brick building with PVC framed windows and a flat bitumen felted roof with concrete slabs on the edges. Well-sealed timber barge boards are present on the northern elevation. Internally the ceiling comprises suspended plaster board. The building has negligible bat roost potential.	
B15	Large porta cabin building used as an office facility. The building is well sealed and provides negligible bat roost potential.	
B16	A large storage building with breeze block walls from the ground to the mid-point on the building. The remainder is clad with timber to the wall tops. The roof comprises single skinned corrugated metal sheeting. The building provides negligible bat roost potential.	

Appendix D – Phase 1 Habitat Plan

Legend

- Site boundary Feb 19
- Target note
- Individual tree
- Introduced shrub
- Scattered scrub

Boundaries

- Species poor hedgerow
- Fence
- Dry ditch

Habitats

- Scrub - dense/continuous
- SI Poor semi-improved grassland
- Tall ruderal vegetation
- Marginal/ inundation vegetation
- Standing water
- Running water
- A Arable
- A Amenity grassland
- Ephemeral vegetation
- Buildings
- Bare ground

0 25 50 75 100

Metres

N

BOW17/961 Flixborough
Figure 5.6.2: Phase 1 Plan 1 of 6

Scale: See Scale Bar
Size A3
Version: 1
Drawn: LB
Checked: CW
Approved:
Date: 04.007.2019

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Legend

- Site boundary Feb 19
- Target note
- Individual tree
- Introduced shrub
- Scattered scrub
- Dry ditch

Habitats

- Broadleaved woodland - semi-natural
- Scrub - dense/continuous
- SI Poor semi-improved grassland
- Tall ruderal vegetation
- Marginal/ inundation vegetation
- Running water
- Spoil/Rubble
- A Arable
- Ephemeral vegetation
- Buildings
- Bare ground

Boundaries

- Fence

0 25 50 75 100

Metres

N

BOW17/961 Flixborough
Figure 5.6.3: Phase 1 Plan 2 of 6

Scale: See Scale Bar
Size A3
Version: 1
Drawn: LB
Checked: CW
Approved:
Date: 04.007.2019

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SOLAR21

Legend

- Site boundary
- Target notes
- Broadleaved trees
- Scattered scrub
- Watercourse
- Broadleaved woodland
- A Arable
- SI Semi improved grassland
- Dense scrub
- Bare ground
- Tall ruderal vegetation

0 50 100

Metres

N

BOW17/961 Flixborough
Figure 5.6.4: Phase 1 Plan (3 of 6)

Scale: See Scale Bar
Size A3
Version: 1
Drawn: LB
Checked: CW
Approved:
Date: 03.07.2019

bowland ecology

SOLAR21

Legend

- Site boundary
- Target notes
- Broadleaved trees
- Scattered scrub
- Watercourse
- SI Semi-improved calcareous grassland
- Broadleaved woodland
- A Arable
- Plantation woodland
- Dense scrub
- Bare ground

0 50 100

Metres

N

BOW17/961 Flixborough
Figure 5.6.5: Phase 1 Plan (4 of 6)

Scale: See Scale Bar
Size A3
Version: 1
Drawn: LB
Checked:CW
Approved:
Date: 03.07.2019

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Legend

- Site boundary
- Target notes
- Watercourse
- SI Semi-improved calcareous grassland
- Broadleaved woodland
- Plantation woodland
- Dense scrub

0 50 100

Metres

N

BOW17/961 Flixborough
Figure 5.6.6: Phase 1 Plan (5 of 6)

Scale: See Scale Bar
Size A3
Version: 1
Drawn: LB
Checked:CW
Approved:
Date: 03.07.2019

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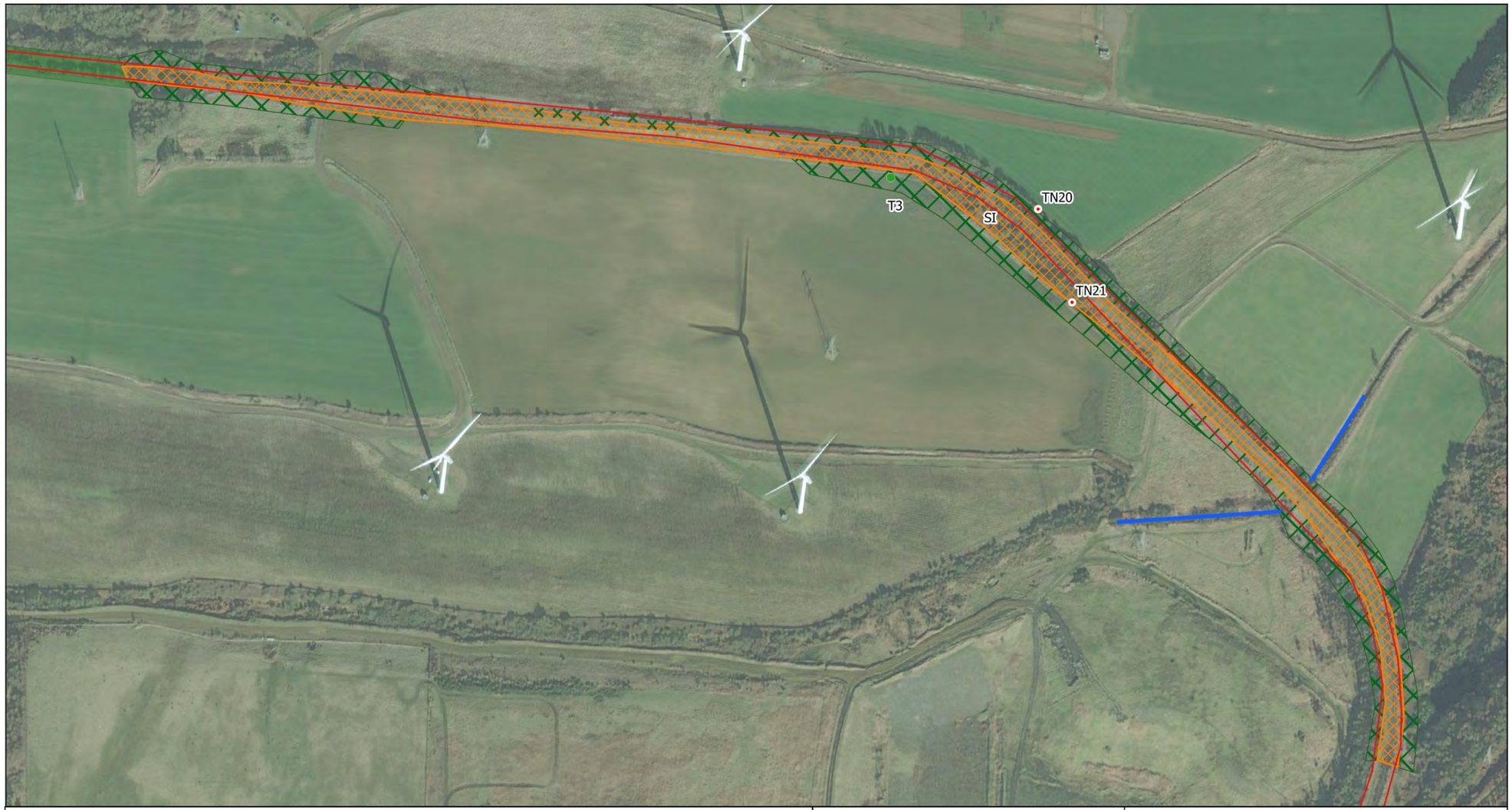
SOLAR|21



Legend

- Site boundary
- Watercourse
- Target notes
- SI Semi-improved calcareous grassland
- Broadleaved trees
- Broadleaved woodland
- Scattered scrub
- Dense scrub

0 50 100 150

Metres

N

BOW17/961 Flixborough
Figure 5.6.7: Phase 1 Plan (6 of 6)

Scale: See Scale Bar
Size A3
Version: 1
Drawn: LB
Checked: CW
Approved:
Date: 03.07.2019

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SOLAR21

Appendix E – Plan showing Zones as defined in the Introduction

BOW17/961 North Lincolnshire Green Energy Park
Drawing title: Plan showing Zones

Drawn by: SK

Date: 25/08/2020

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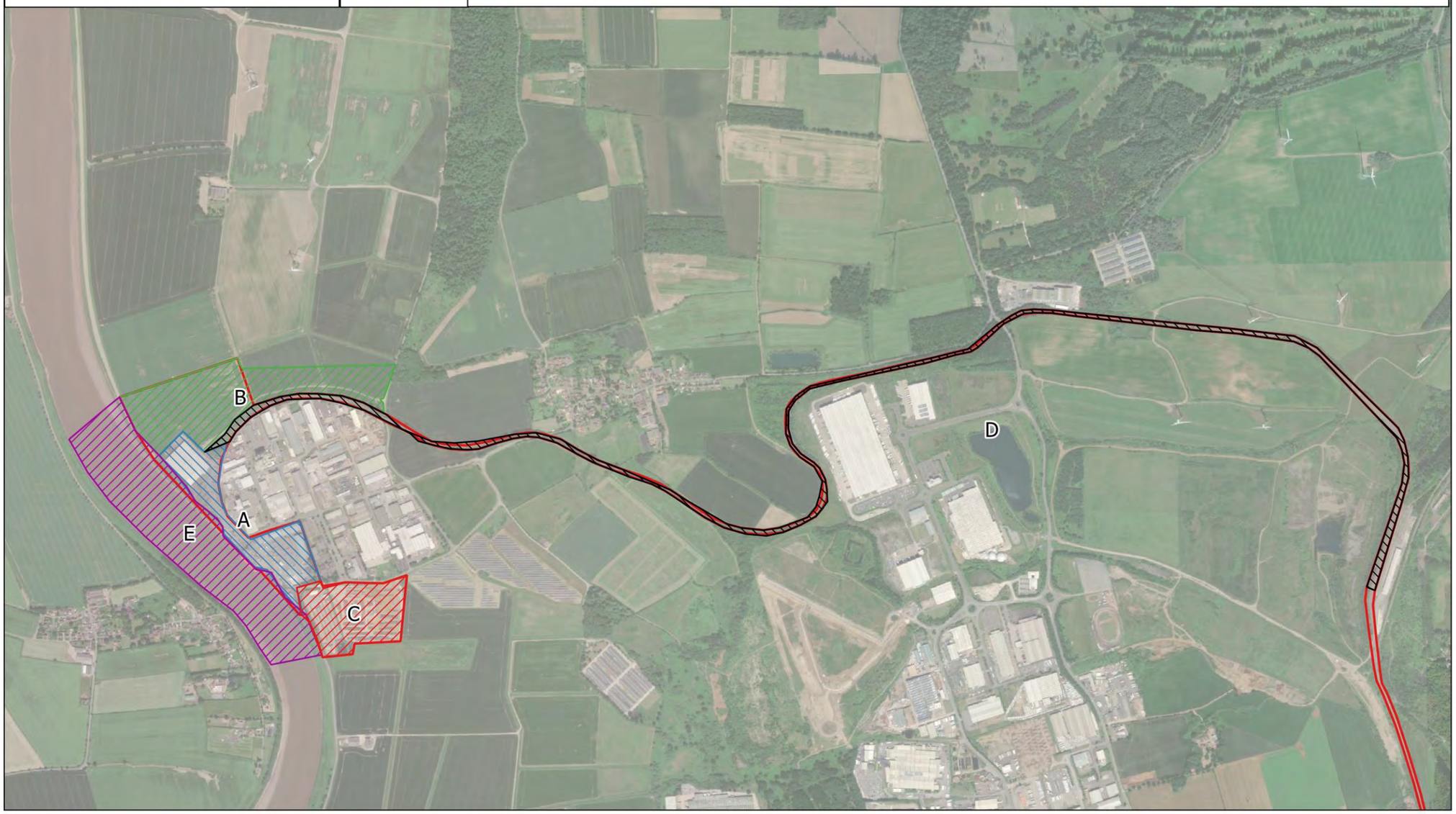
Legend
Site boundary Feb 19
Zones
A
B
C
D
E

0 0.5 1 km



APPENDIX C WINTERING BIRD SURVEY

Technical Appendix C: Ornithological Assessment Methodology and Results

May 2019

Contents

1. Introduction

1.1 Bowland Ecology Ltd was commissioned by Energyline Ltd. to complete a winter ornithological assessment of land at Flixborough (NGR: SE 85715 14683) on behalf of Solar 21. Site proposals currently include construction of an Energy From Waste (EFW) facility, the reinstatement of approximately 6 km of a railway line, which was decommissioned in 2012 and road improvement works to allow access to the EFW facility.

1.2 The main EFW Site is located in North Lincolnshire, approximately one mile from the village Flixborough, adjacent to Flixborough Industrial Estate. Currently the Site is an active port, from which goods are taken in and distributed. The railway line extends eastwards from the EFW site and connects into the active railway line just north of Dragonby.

1.3 The EFW Site is dominated by hard standing areas, with occasional areas of scattered scrub and trees and areas of grassland. Directly north of the Site, within the proposed Development Consent Order (DCO) red line boundary is a network of arable fields and associated field drains. The River Trent is located directly adjacent to the western boundary of the Site. Dense marginal and tall ruderal vegetation dominate the banks of the River Trent. The railway line comprises a variety of habitats along its length, largely dominated by woodland and scrub, with occasional areas of short grassland and bare earth.

1.4 The full extent of the impacts to habitats on Site is not currently known, however it is considered likely that the following habitats will be lost to accommodate the proposed development; arable fields, bare ground, scattered trees and scrub, neutral grassland and buildings.

1.5 The Site lies approximately 6 km south of the Humber Estuary Special Protection Area (SPA). As such, re-development of the Site has the potential to negatively impact qualifying bird species associated with the SPA (see Appendix C). Therefore consideration of the Site, taking into account its proximity to the SPA and its potential to be utilised by associated wintering, passage and breeding birds will be assessed as part of the development plans for the Site.

1.6 The SPA comprises extensive areas of wetland and coastal habitats. The inner estuary supports reedbed habitats, with areas of mature and developing saltmarsh backed by grazing marsh in the middle and outer estuary. On the north Lincolnshire coast, the saltmarsh is backed by low sand dunes with marshy slacks and brackish pools. The estuary supports important numbers of waterbirds (especially geese, ducks and waders) during the migration periods and over winter.

1.7 The SPA qualifies under Article 4.1 of the EU Birds Directive as it supports populations of the following Annex I species; bittern *(Botaurus stellaris*), marsh harrier (*Circus aeruginosus*), avocet (*Recurvirostra avosetta*), little tern (*Sterna albifrons*), avocet (*Recurvirostra avosetta*), hen harrier (*Circus cyaneus*), golden plover (*Pluvialis apricaria*), bar-tailed godwit (*Limosa lapponica*) and ruff (*Botaurus stellaris*).

1.8 The SPA also qualifies under Article 4.2 of the EU Birds Directive in that it supports an internationally important assemblage of waterfowl, supporting over 150,000 waterbirds. The SPA is also used by a variety of Annex I species that are not listed qualifying species as numbers recorded are less than 1% of the Great Britain population. These include non-breeding merlin (*Falco columbarius*), peregrine (*F.*

peregrinus) and short-eared owl (*Asio flammeus*) and breeding common tern (*Sterna hirundo*) and kingfisher (*Alcedo atthis*).

1.9 The aim of the wintering bird surveys was to provide baseline information on the numbers and distribution of wintering birds within the Site and the surrounding area. This report includes a description of assessment methods and describes survey results together with associated plans/figures (Appendix B).

2. Methodology

2.1 The initial wintering bird survey was undertaken on the 30th November 2018 by Louise Redgrave MA (Oxon), MSc, MCIEEM, CEcol, CEnv. The remaining surveys were undertaken on the 18th December 2018, 22nd January, 14th February and 1st March 2019 by Mark Breaks BSc (Hons). A modified wintering bird survey was conducted in line with the specifications detailed by the British Trust for Ornithology (Gilbert *et al.* 1998). This method is a 'scaled down' version of the Wetland Bird Survey (WeBS) combined with Low Tide Counts. Surveys involved the ornithologist walking the EFW Site boundary (twice) recording and mapping all bird species (peak counts) present on Site and in the surrounding areas with particular focus on the River Trent, located to the west of the site and the arable fields to the north. Additional vantage point counts were undertaken from the B1392 and adjacent river bank to the north and east of the village of Amcotts, immediately west of the site. Surveys were completed at various stages of the tidal cycle, and between two to three hours in duration.

2.2 Bird species and their abundance were recorded as well as any additional information on behaviour. Registrations of birds (sight or sound) were marked onto bird survey plans (see Appendix B) using standard BTO species codes. Care was taken during the surveys avoid double counting species/flocks by only recording birds in the forward sightlines.

2.3 Weather conditions and Flixborough Wharf tide times during the surveys is detailed in Table 1 below.

Table 1: Weather conditions and tide times

Date (Time)	Weather	High Tide (HT)Low Tide (LT)
30 Nov 2018 (10:45-13:20)	Dry, sunny (3/8 cloud) and gentle breeze (F3 SW), temperature of approximately 8°C.	HT – 12:40 LT – 07:49
18 Dec 2018 (11:30-14:20)	Light rain showers, cloudy (8/8 cloud) and moderate breeze (F4 SSW), temperature of approximately 9°C.	HT – 15:30 LT – 10:24
22 Jan 2019 (10:45-13:00)	Dry, sunny (3/8 cloud) and calm (F1 W), temperature of approximately 5°C.	HT – 07:50 LT – 15:56
14 Feb 2019 (08:50-11:00)	Dry, sunny (1/8 cloud) and calm (F1/2 S), temperature of approximately 9°C.	HT – 13:26 LT – 08:35
1 Mar 2019 (11:00-13:30)	Dry, cloudy (8/8 cloud) and calm (F1 SW), temperature of approximately 7°C.	HT – 15:13 LT – 10:33

2.4 Ornithological surveys are limited by factors which affect the presence of birds such as the time of year, migration patterns and behaviour. The entire Site was accessible and five surveys were completed within the recommended survey period.

Survey Limitations

2.5 The surveys did not commence until November 2018, and as such will have not recorded any passage birds during September and October. Whilst this has resulted in a small gap in the data collected; information from the Wetland Bird Survey data (WeBS) and the Lincolnshire Bird Report has been reviewed, therefore the absence of data from September and October is not considered to be a significant constraint to the survey.

3. Results

3.1 The majority of the Site where the EFW is to be located is dominated by hardstanding and buildings, which provides very limited nesting and foraging habitat for birds. Furthermore, the volume of traffic, vehicle and machinery movements (cranes associated with the port) and the number of people further reduces the favourability of the Site for foraging and nesting birds.

3.2 Foraging habitats on Site are limited to small areas of scattered scrub, trees and coarse grassland which are located in close proximity to the buildings (within the Site's boundary). Adjacent habitats, outside the Site's boundary including the River Trent and arable fields provide favourable habitat for foraging birds, including lapwing (*Vanellus vanellus*) which was recorded during the surveys.

3.3 Table 2 below lists three species; cormorant (*Cyanistes caeruleus*), lapwing and mallard (*Anas platyrhynchos*) which are cited in the assemblage qualification of the SPA (Article 4.2) and regularly use the SPA in the non-breeding season. Table 2 also highlights S41 species; these species are those that are listed as Species of Principal Importance under The Natural Environment and Rural Communities (NERC) Act 2006.

3.4 Birds of Conservation Concern 4 (BoCC4) (Eaton et al, 2015) assessment for birds in the UK, places birds on Red[1], Amber[2] or Green lists to indicate the level of conservation concern. During the surveys a total of 30 different species of bird was recorded. Of these 30 species, four are Red listed birds, five Amber listed and 21 Green listed. Species recorded, their peak counts and dates recorded is detailed in Appendix A.

3.5 The remainder of the species recorded during the surveys (see Appendix A) are common and widespread throughout Great Britain and North Lincolnshire and representative of the habitats present in the area.

Table 2: SPA (Article 4.2), S41, Red and Amber listed species recorded during the surveys

Common Name	Scientific Name	SPA species[3]	S41	Red Listed	Amber Listed
Cormorant	*Cyanistes caeruleus*	✓			
Lapwing	*Vanellus vanellus*	✓	✓	✓	
Mallard	*Anas platyrhynchos*	✓			✓
Song thrush	*Turdus philomelos*		✓	✓	
Dunnock	*Prunella modularis*		✓		✓
Herring gull	*Larus argentatus*		✓		
Skylark	*Alauda arvensis*		✓	✓	
Yellowhammer	*Emberiza citrinella*		✓	✓	

[1] Red listed birds are those that are; Globally threatened, have shown historical population decline in the UK during 1800–1995, have shown a severe (at least 50%) decline in UK breeding population over last 25 years, or longer-term period, and have had a severe (at least 50%) contraction of their UK breeding range over last 25 years, or the longer-term period.

[2] Details on Amber listed birds can be found at https://www.rspb.org.uk/birds-and-wildlife/wildlife-guides/uk-conservation-status-explained/

[3] Non-qualifying species listed under article 4.2 of the Directive.

3.6 The species listed in Table 2, their peak counts and location during the surveys are described in detail below;

- Approximately 50 lapwing were recorded flying around arable fields north of the village of Amcotts, west of the River Trent during the survey in November. A single lapwing was also recorded in arable fields to north of Site during the survey undertaken in March;
- Individual cormorants were recorded flying along the River Trent during the December, February and March surveys;
- Mallard were recorded on all five surveys with birds observed roosting and feeding along the banks of the River Trent. A peak count of approximately 41 mallards were recorded during the survey completed in November;
- Dunnock were regularly recorded during each survey, a peak count of five individuals was the maximum recorded during each survey;
- Herring gull were recorded on buildings outside of the proposed EFW site during the January to March surveys;
- A single skylark was recorded singing in arable fields to the north of the site during surveys undertaken in February and March;
- A single song thrush was recorded in scrub at the north western corner of the Site in December and again in March; and
- A pair of yellowhammer were observed in scrub on the northern boundary of the Site during the March survey.

3.7 The most commonly occurring species recorded on and adjacent to Site was feral pigeon (*Columba livia domestica*) with a peak count of 470 during the January survey. Additional species with high peak counts include jackdaw (*Corvus monedula*); a peak count of 109 during the January survey, carrion crow (*Corvus corone*) and wood pigeon (*Columba palumbus*) with peak counts of 13 during the February survey.

3.8 All other species recorded on or adjacent to Site (see Appendix A) during the surveys were recorded in low numbers (>10 individuals)

3.9 No Annex I SPA qualifying species were recorded on Site, or in the area during the surveys. In addition, no SPA migratory species (Article 4.2) or non-qualifying species of interest were recorded during the surveys.

4. References

Eaton, M., Aebischer, N., Brown, A., Hearn, R., Lock, L., Musgrove, A., Noble, D., Stroud, D. and Gregory, R. (2015). *Birds of Conservation Concern 4: the population status of birds in the UK, Channel Islands and Isle of Man*, British Birds 108, December 2015, 708–746.

Gilbert, G., Gibbons, D.W. and Evans, J. (1998). *Bird Monitoring Methods: A manual of techniques for key UK species*. RSPB, Bedfordshire.

Appendix A: Bird Recorded During Surveys

BTO code	Species	Scientific name	30 Nov	18 Dec	22 Jan	14 Feb	1 Mar	BoCC4
B.	Blackbird	*Turdus merula*			8	4	10	Green
BH	Black-headed gull	*Chroicocephalus ridibundus*	5			2		Amber
BT	Blue tit	*Cyanistes caeruleus*			2	6	3	Green
BZ	Buzzard	*Buteo buteo*				2		Green
C.	Carrion crow	*Corvus corone*		5	5	13	11	Green
CA	Cormorant	*Phalacrocorax carbo*		1		1	1	Green
CD	Collared dove	*Streptopelia decaocto*			1		1	Green
CH	Chaffinch	*Fringilla coelebs*		1				Green
CM	Common gull	*Larus canus*		12	9			Amber
D.	Dunnock	*Prunella modularis*		2	5	2	5	Amber
FP	Feral pigeon	*Columba livia domestica*	c.150	c.200	c.470	c.400	c.290	Green
GO	Goldfinch	*Carduelis carduelis*			6	1	18	Green
GR	Greenfinch	*Chloris chloris*				1		Green
GT	Great tit	*Parus major*					2	Green
HG	Herring gull	*Larus argentatus*			1	2	2	Green
JD	Jackdaw	*Coloeus monedula*		109				Green
L.	Lapwing	*Vanellus vanellus*	c.50				1	Red
M.	Mistle thrush	*Turdus viscivorus*				1	1	Green
MA	Mallard	*Anas platyrhynchos*	c.41	3	14	8	17	Amber
MG	Magpie	*Pica pica*		2		1	1	Green
PH	Pheasant	*Phasianus colchicus*		1	1		2	Green
PW	Pied wagtail	*Motacilla alba*		2	1	6		Green
R.	Robin	*Erithacus rubecula*		1	3	3	7	Green
RL	Red-legged partridge	*Alectoris rufa*					1	Green
S.	Skylark	*Alauda arvensis*				1	1	Red
SD	Stock dove	*Columba oenas*		1	2	3	2	Amber
ST	Song thrush	*Turdus philomelos*		1			1	Red
WP	Wood pigeon	*Columba palumba*		2	9	13	12	Green
WR	Wren	*Troglodytes troglodytes*		1	1	1	3	Green
Y.	Yellowhammer	*Emberiza citrinella*					2	Red

Appendix B: Winter Bird Survey Plans

BOW17/961 Flixborough

Drawing title: Bird Survey Plan 30.11.18

Drawn by: LB
Checked by: MB

Date: 09.05.2019

bowland ecology

Legend

c.40xMA Bird species and count

Site boundary Feb 19

Bird Species Codes:

BH Black Headed Gull
FP Feral Pigeon
L. Lapwing
MA Mallard

BOW17/961 Flixborough

Drawing title: Bird Survey Plan 18.12.18

Drawn by: LB
Checked by: MB

Date: 20.3.2019

bowland ecology

Legend

- Bird flight lines
- c.40xMA Bird species and count
- Site boundary Feb 19

Bird Species Codes:

C. Carrion Crow
CA Cormorant
CH Chaffinch
CM Common Gull
D. Dunnock
FP Feral Pigeon
JD Jackdaw
MA Mallard
MG Magpie
PH Pheasant
PW Pied Wagtail
R. Robin
SD Stock Dove
ST Song Thrush
WP Woodpigeon
WR Wren

BOW17/961 Flixborough

Drawing title: Bird Survey Plan
22.01.19

Drawn by: LB
Checked by: MB

Date: 19.05.2019

bowland ecology

Legend

c.40xMA Bird species and count

Site boundary Feb 19

Bird Species Codes:

B. Blackbird
BT Blue Tit
BZ Buzzard
C. Carrion Crow
CD Collared Dove
CM Common Gull
D. Dunnock
FP Feral Pigeon
GO Goldfinch
HG Herring Gull
MA Mallard
MG Magpie
PH Pheasant
PW Pied Wagtail
R. Robin
ST Stock Dove
WP Woodpigeon
WR Wren

BOW17/961 Flixborough

Drawing title: Bird Survey Plan
14.02.19

Drawn by: LB
Checked by: MB

Date: 09.5.2019

bowland ecology

Legend

- Site boundary
- Bird flight lines
- c.40xMA Bird species and count

Bird Species Codes:

B. Blackbird
BH Black Headed Gull
BT Blue Tit
BZ Buzzard
C. Carrion Crow
CA Cormorant
D. Dunnock
FP Feral Pigeon
GJ Greylag Goose
GO Goldfinch
GR Greenfinch
HG Herring Gull
M. Mistle Thrush
MA Mallard
MG Magpie
PW Pied Wagtail
R. Robin
S Skylark
SD Stock Dove
WP Woodpigeon
WR Wren

BOW17/961 Flixborough

Drawing title: Bird Survey Plan
01.03.19

Drawn by: LB
Checked by: MB

Date: 09.05.2019

bowland ecology

Legend

→ Bird flight lines

c.40xMA Bird species and count

Site boundary Feb 19

Bird Species Codes:

B. Blackbird
BT Blue Tit
C. Carrion Crow
CA Cormorant
CD Collared Dove
D. Dunnock
FP Feral pigeon
GO Goldfinch
GT Freat Tit
HG Herring Gull
L. Lapwing
M. Mistle Thrush
MA Mallard
MG Magpie
PH Pheasant
R. Robin
RL Red-Legged Partridge
S. Skylark
SD Stock Dove
ST Song Thrush
WP Woodpigeon
WR Wren
Y. Yellowhammer

Appendix C: Species Associated with the Humber Estuary

The Humber Estuary SPA qualifies under Article 4.1 of the Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive. During the breeding season the area regularly supports:	
Common Name	**Key Population Facts**
Bittern *Botaurus stellaris*	10.5% of the population in Great Britain 2000-2002
Avocet *Recurvirostra avosetta*	8.6% of the population in Great Britain 1998-2002
Marsh harrier *Circus aeruginosus*	6.3% of the breeding population in Great Britain
Little Tern *Sterna albifrons*	2.1% of the breeding population in Great Britain
Over winter the area regularly supports:	
Bittern *Botaurus stellaris*	4% of the population in Great Britain 1998/9 to 2002/3
Avocet *Recurvirostra avosetta*	1.7% of the population in Great Britain 1996/7 to 2000/1
Hen harrier *Circus cyaneus*	1.1% of the population in Great Britain 1997/8 to 2001/2
Bar-tailed godwit *Limosa lapponica*	4.4% of the population in Great Britain 1996/7 to 2000/1
Golden plover *Pluvialis apricaria*	12.3% of the population in Great Britain 1996/7 to 2000/1
On passage the area regularly supports:	
Ruff *Philomachus pugnax*	1.4% of the population in Great Britain 1996-2000.
The Humber Estuary SPA also qualifies under Article 4.2 of the Directive by supporting populations of European importance of the following migratory species. Over winter the area regularly supports the following:	
Shelduck *Tringa totanus*	1.5% of the north western Europe (breeding) population
Knot *Calidris canutus*	6.3% of the wintering north eastern Canada/Greenland/Iceland/North western Europe population
Black-tailed Godwit *Limosa limosa*	3.2% of the Icelandic breeding population 1996/7 to 2000/1
Dunlin *Calidris alpina alpina*	1.7% of the northern Siberia, Europe, Western Africa population 1996/7 to 2000/1
Redshank *Tringa totanus*	3.6% of the eastern Atlantic wintering population 1996/7 to 2000/1
On passage the area regularly supports:	
Knot *Calidris canutus*	4.1% of the north eastern Canada/Greenland/Iceland/ north western Europe population 1996-2000
Dunlin *Calidris alpina alpina*	1.5% of the northern Siberia, Europe, Western Africa population 1996-2000
Black-tailed godwit *Limosa limosa islandica*	2.6% of the Icelandic breeding population 1996-2000;
Redshank Tringa tetanus	5.7% of the eastern Atlantic wintering population1996-2000.
In the non-breeding season the area regularly supports 153934 waterfowl including:	
Mallard (*Anas platyrhynchos)*, golden plover (*Pluvialis apricaria)*, bar-tailed godwit (*Limosa lapponica*), shelduck (*Tadorna tadorna*), knot (*Calidris canutus*), dunlin (*Calidris alpina*), redshank (*Tringa tetanus*), cormorant (*Phalacrocorax carbo*), dark-bellied brent goose (*Branta bernicla bernicla*), bittern (*Botaurus stellaris*), teal (*Anas crecca*), curlew (*Numenius arquata*), pochard (*Aythya farina*), goldeneye (*Bucephala clangula*), oystercatcher (*Haematopus ostralegus*), ringed plover (*Charadrius hiaticula*), grey plover (*Pluvialis squatarola*), lapwing (*Vanellus vanellus*), sanderling (*Calidris alba*), black-tailed godwit (*Limosa limosa islandica*), wigeon (*Anas Penelope*) and whimbrel (*Numenius phaeopus*),.	

APPENDIX D ECOLOGICAL CONSTRAINTS PLAN

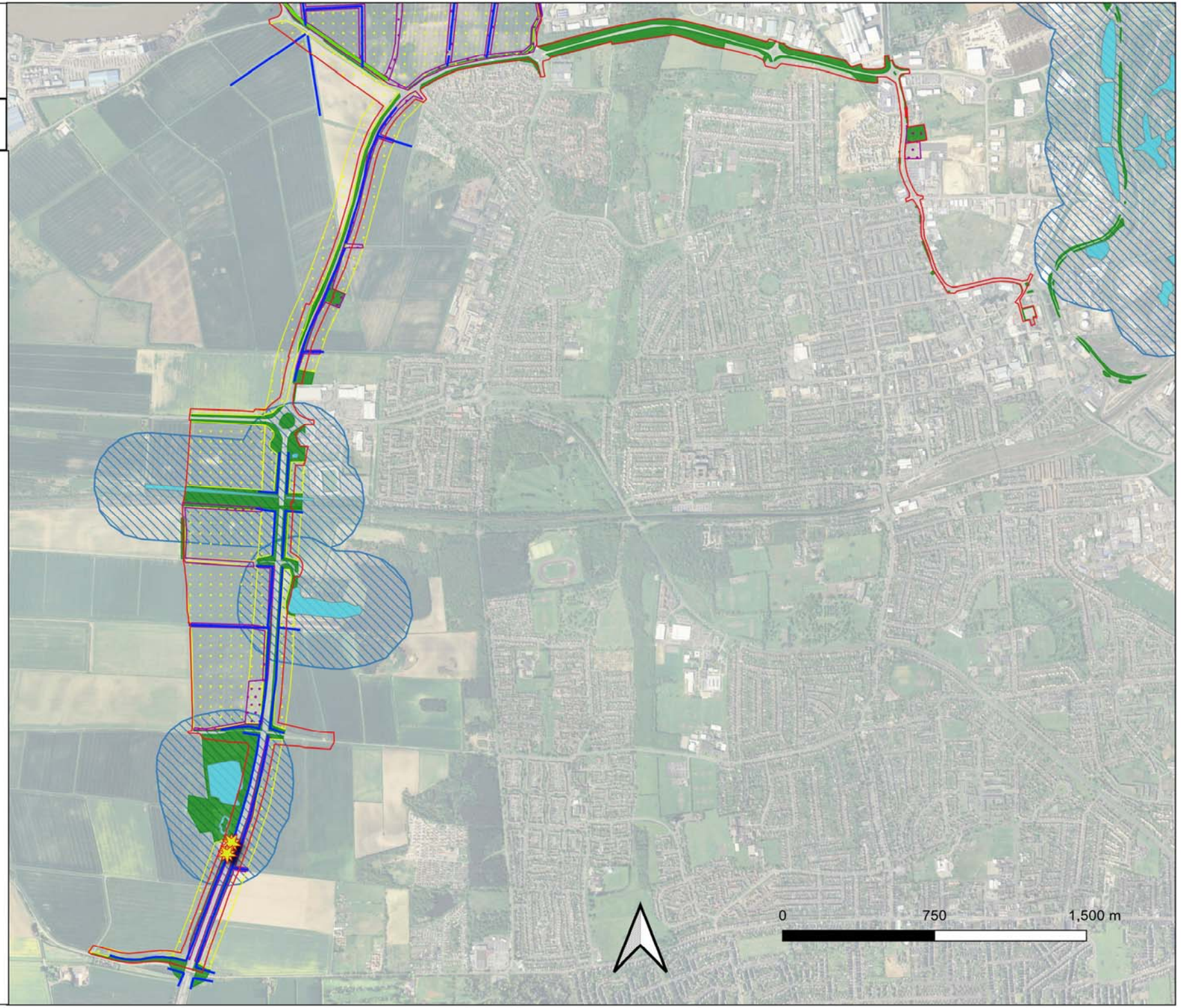
BOW17/961 Flixborough

Drawing title: Constraints Plan 1 - District Heat Network Route

Drawn by: SK Checked by: EL	Date: 21.10.2020	bowland ecology

Legend

- Tree with potential roosting features for bats
- Ponds (amphibian habitat - not surveyed for GCN)
- 250 m buffer of unsurveyed ponds
- Ditches (suitable and confirmed water vole and otter habitat)
- Hedgerows (suitable nesting bird habiat)
- Ground nesting birds (confirmed presence and suitable sites)
- Scrub and trees (suitable bat and bird habitat)
- Reptiles (confirmed presence and suitbale sites)
- Site boundary



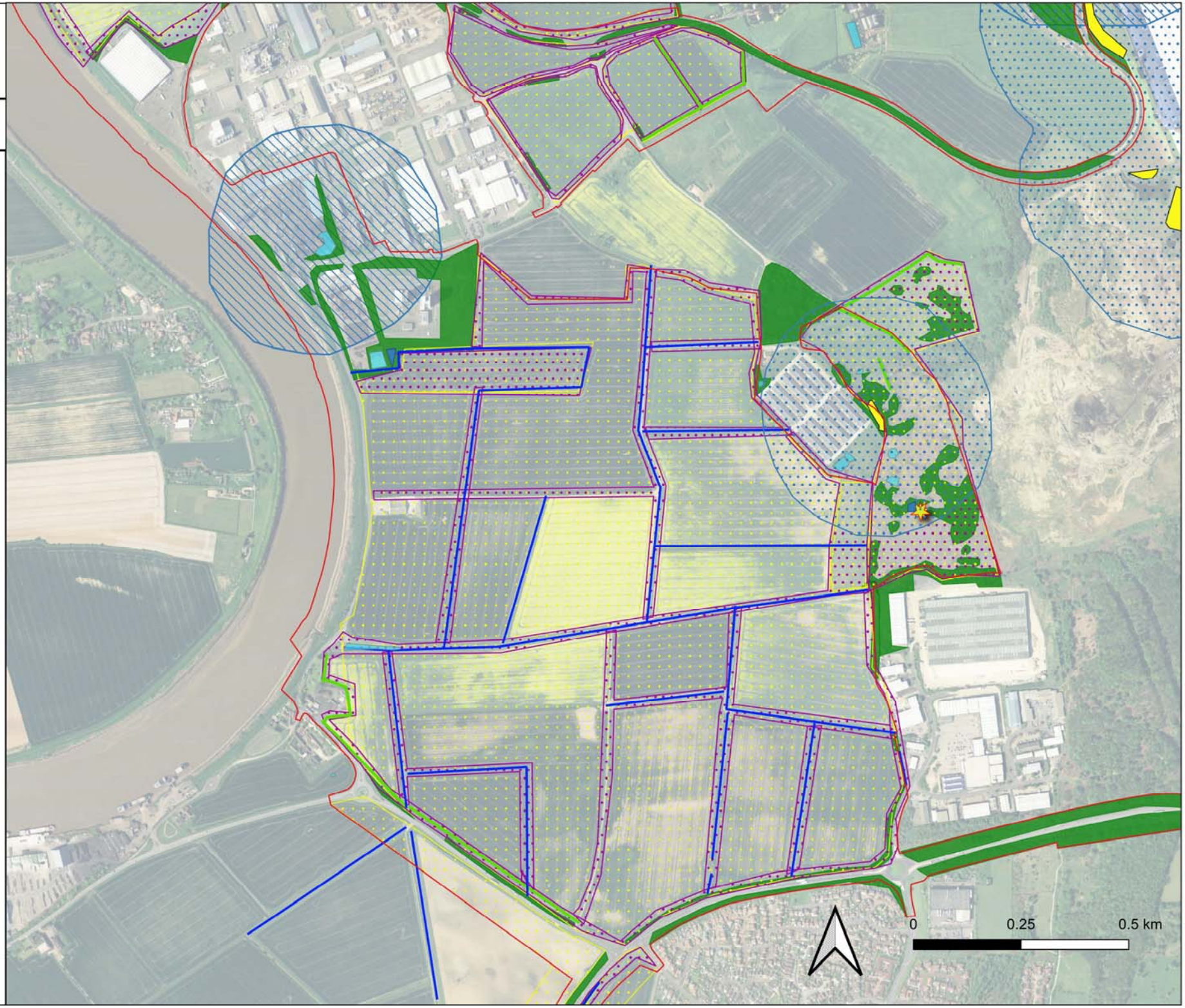
BOW17/961 Flixbororgh

Drawing title: Constraints Plan 2 - South of Flixborough Wharf

Drawn by: SK Checked by: EL	Date: 21.10.2020	bowland ecology

Legend

- Ponds with no GCN
- Ponds (amphibian habitat - not surveyed for GCN)
- 250 m buffer of unsurveyed ponds
- Tree with potential roosting features for bats
- Ground nesting birds (confirmed presence and suitable sites)
- Ditches (suitable and confirmed water vole and otter habitat)
- Hedgerows (suitable nesting bird habiat)
- Scrub and trees (suitable bat and bird habitat)
- Reptiles (confirmed presence and suitbale sites)
- Site boundary



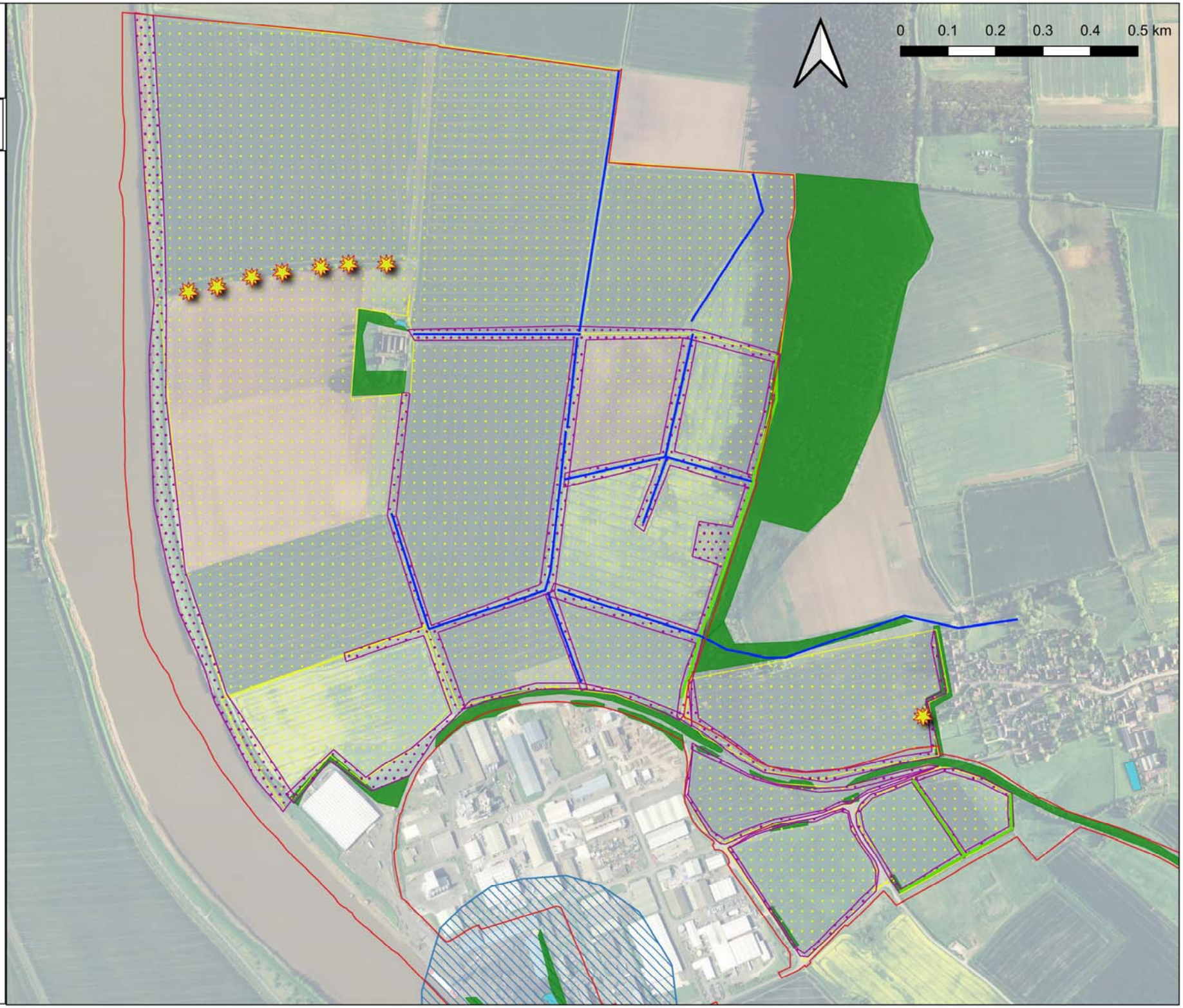
BOW17/961 Flixborough

Drawing title: Constraints Plan 3 - North of Flixborough Wharf

Drawn by: SK Checked by: EL	Date: 21.10.2020	bowland ecology

Legend

- Tree with potential roosting features for bats
- Ground nesting birds (confirmed presence and suitable sites)
- Ditches (suitable and confirmed water vole and otter habitat)
- Hedgerows (suitable nesting bird habiat)
- Ponds (amphibian habitat - not surveyed for GCN)
- Scrub and trees (suitable bat and bird habitat)
- Reptiles (confirmed presence and suitbale sites)
- Site boundary



BOW17/961 Flixborough

Drawing title: Constraints Plan 4: Disused Railway Spur

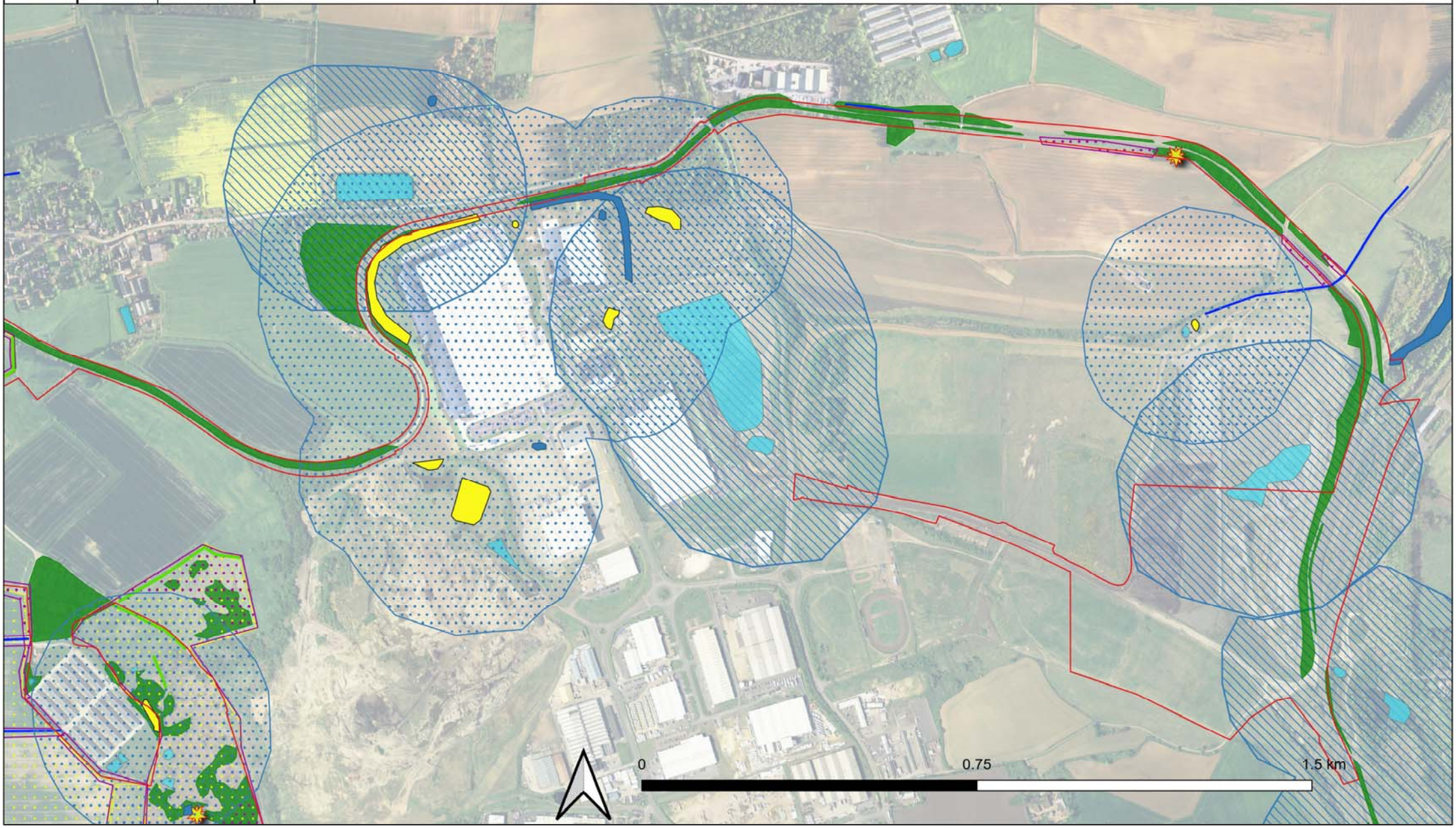
Drawn by: SK
Checked by: EL

Date: 21.10.2020

bowland ecology

Legend

- Tree with potential roosting features for bats
- Ponds with GCN
- Ponds with no GCN
- 250 m buffer around ponds with confirmed GCN
- Ponds (amphibian habitat - not survyed for GCN)
- 250 m buffer of unsurveyed ponds
- Ditches (suitable and confirmed water vole and otter habitat)
- Hedgerows (suitable nesting bird habiat)
- Scrub and trees (suitable bat and bird habitat)
- Reptiles (confirmed presence and suitbale sites)
- Ground nesting birds (confirmed presence and suitable sites)
- Site boundary



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