

P e l l F r i s c h m a n n

Walcott Farm Biofuel Plant

Environmental Impact Assessment Scoping
Report

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Prepared for

Advanced Fuel Partners

250 Wharfedale Road
Winnersh Triangle
Wokingham
Berkshire
England
RG41 5TP

Prepared by

Pell Frischmann

5th Floor
85 Strand
London
WC2R 0DW



Pell Frischmann

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Acronyms

Abbreviation	Definition
µg/m ³	Microgram per cubic metre
AADT	Annual Average Daily Traffic
AD	Anaerobic Digestion
AFP	Advanced Fuel Partners Limited
ALC	Agricultural Land Classification
AOD	Above Ordnance Datum
APIS	Air Pollution Information Service
AQAL	Air Quality Assessment Level
AQMA	Air Quality Management Area
AQO	Air Quality Objectives
AQS	Air Quality Standard
ASR	Annual Status Report
ATC	Automatic Traffic Count
BAP	Biodiversity Action Plan
BATC	Best Available Technique Conclusions
BGS	British Geological Survey
BNG	Biodiversity Net Gain
BNL	Basic Noise Level
BPM	Best Practicable Means
CEMP	Construction Environment Management Plan
CFPG	Coastal and Floodplain Grazing Marsh
CI	Carbon Intensity
CHP	Combined Heat and Power
CIEEM	Chartered Institute for Ecology and Environmental Management
CIfA	Chartered Institute for Field Archaeologists
CLs	Contaminant Linkages
COMEAP	Committee on the Medical Effects of Air Pollutants
CO ₂	Carbon Dioxide
CRTN	Calculation of Road Traffic Noise
CSM	Conceptual Site Model
CTMP	Construction Traffic Management Plan
dB	Decibels
DEFRA	Department for Environment, Food & Rural Affairs
DMRB	Design Manual for Roads and Bridges

Abbreviation	Definition
DoWCoP	Definition of Waste: Code of Practice
EA	Environment Agency
EAL	Environmental Assessment Levels
EcIA	Ecological Impact Assessment
EIA	Environmental Impact Assessment
EPUK	Environmental Protection UK
EPSL	European Protected Species Licences
ES	Environmental Statement
EU	European Union
FIDOL	Frequency, Intensity, Duration, Offensiveness and Location
FRA	Flood Risk Assessment
GCN	Great Crested Newts
GGSS	Green Gas Support Scheme
GHG	Greenhouse Gases
GLNP	Greater Lincolnshire Nature Partnership
GLVIA	Guidelines for Landscape and Visual Impact Assessment
GWH	Gigawatt-Hour
ha	Hectare
HE	Historic England
HGV	Heavy Goods Vehicle
HMSO	His Majesty's Stationery Office
HS2	High Speed 2
Hz	Hertz
H ₂ S	Hydrogen Sulphide
IAQM	Institute of Air Quality Management
IEA	Institute of Environmental Assessment
IEMA	Institute of Environmental Management and Assessment
IDB	Internal Drainage Board
JNCC	Joint Nature Conservation Committee
km	Kilometres
LAeq	Total Sound Energy measured
LAeqT	Total Sound Energy measured over a specific period of time
LCA	Landscape Character Assessment
LCC	Lincolnshire County Council
LGV	Light Goods Vehicle

Abbreviation	Definition
LOAEL	Lowest Observed Adverse Effect Level
LPA	Local Planning Authority
LCRM	Land Contamination Risk Management
LVIA	Landscape and Visual Impact Assessment
m	Metres
MAGIC	Multi-Agency Geographic Information for the Countryside
MCC	Manual Classified Count
MMP	Materials Management Plan
MSA	Mineral Safeguarding Area
MtCO _{2e}	Million Tonnes Carbon Dioxide Equivalent
MW	Megawatt
NCA	National Character Area
NE	Natural England
NH ₃	Ammonia
NO	Nitric Oxide
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
NOEL	No Observed Effect Level
NOMIS	National Offender Management Information System
NPPF	National Planning Policy Framework
NPPG	National Planning Policy Guidance
NPSE	Noise Policy Statement for England
NTS	National Transmission System
NVZ	Nitrate Vulnerable Zone
OS	Ordnance Survey
PAS	Publicly Available Specification
PEA	Preliminary Ecological Appraisal
PM	Particulate Matter
PM ₁₀	Particulate Matter with an Aerodynamic Diameter of less than or equal to 10 micrometres
PM _{2.5}	Particulate Matter with an Aerodynamic Diameter of less than or equal to 2.5 micrometres
PPG	Planning Practice Guidance
PPV	Peak Particle Velocity
PRA	Preliminary Risk Assessment
PRoW	Public Right of Way
RAF	Royal Air Force

Abbreviation	Definition
SAM	Scheduled Ancient Monument
SOAEL	Significant Observed Adverse Effect Level
SO ₂	Sulphur Dioxide
SSSI	Site of Special Scientific Interest
SWMP	Site Waste Management Plan
S-P-R	source-pathway-receptor
tCO ₂ e	tonnes of carbon dioxide equivalent
tpa	Tonnes per annum
TS	Transport Statement
UAEL	Unacceptable Adverse Effect Level
UKCP18	UK Climate Projections 2018
UKHSA	UK Health Security Agency
UXO	Unexploded Ordnance
VDV	Vibration Dose Value
VOC	Volatile Organic Compounds
WBCSD	World Business Council for Sustainable Development
WFD	Water Framework Directive
WFL	Warrendale Farms Limited
WHO	World Health Organisation
WRI	World Resources Institute
ZOI	Zone of Influence
ZTV	Zone of Theoretical Visibility

1. Introduction

1.1. Purpose of the report

1.1.1. This Environmental Impact Assessment (EIA) Scoping Report has been prepared by Pell Frischmann on behalf of Advanced Fuel Partners (AFP) ('the applicant'), and its partner Warrendale Farms Ltd (WFL), the site owner. The applicant is requesting a formal Scoping Opinion from Lincolnshire County Council (LCC) in respect of Walcott Farm Biofuel Plant, its ancillary infrastructure and equipment, landscaping and access ('the proposed development') on land at Walcott Farm, Digby Road, Lincoln, LN4 3TD ('the site'), as illustrated in Figure 1.1.

1.1.2. This report sets out the proposed methodology and scope of the EIA, the outcome of which will be reported in an Environmental Statement (ES) to be submitted with a forthcoming planning application to LCC. It discusses those environmental topics which are proposed to be assessed in detail in the ES and those which are proposed to be scoped out, based on which features could be materially affected by the construction or operation of the proposed development with the potential to give rise to likely significant environmental effects.

1.1.3. The aim is to reach consensus with LCC and the statutory consultation bodies (including the Environment Agency, Natural England and Historic England) regarding the scope of the EIA and to ensure that the eventual ES covers all relevant features, whilst remaining objective and proportionate. The request for a Scoping Opinion is made pursuant to Part 4 Regulation 15(1) of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (the 'EIA Regulations').

1.2. EIA and scoping

1.2.1. Part 4, Regulation 15(1) of the EIA Regulations (HMSO, 2017) provides for the applicant to ask the Local Planning Authority (LPA), in this case LCC, to state in writing the information that should be provided within the ES, a process known as Scoping. The EIA Regulations specify under Part 4, Regulation 15 (2), that a request for a Scoping Opinion needs to comprise the following:

- A plan sufficient to identify the land (as shown in Figure 1.1);
- A brief description of the nature and purpose of the development and of its possible effects on the environment; and
- Such other information or representations as the person making the request may wish to provide or make.

1.2.2. The report contains sufficient information to allow LCC to consult with relevant stakeholders and consultees on the proposed scope of the EIA so that their comments can be taken into consideration in the EIA and its reporting in the ES. In addition, the report seeks to identify any other sources of environmental information which may be of relevance to the EIA.

2. Proposed development

2.1. Need for the proposed development and objectives

2.1.1. AFP and WFL wish to support the area by building a renewable energy biofuel plant. This plant will supply sustainable, green energy while concurrently helping to remediate agricultural wastes produced on farms in the area. WFL, which has a long track record of owning and working with farms in the north of England, will play a critical role in the biofuel plant due to its extensive poultry operations in the area, knowledge of local farming practices and relationships across the agricultural landscape.

2.1.2. The Walcott Farm Biofuel Plant will provide green gas by using a technological process called anaerobic digestion (AD). There are over 1,100 such plants in the UK today and the technology used in such plants has been used successfully for decades. The AD process involves placing organic feedstocks – in our case, agricultural wastes such as manures – into a tank called a digester. The wastes are then broken down and form two products. One is biogas and the other is digestate. The biogas is captured as it rises in the tank and eventually upgraded into green gas and injected into the gas grid. The digestate is pasteurised to a Publicly Available Specification (PAS) 110 standard and then sold to local farms to use as organic fertiliser – acting as a direct replacement for chemically-derived fertilisers.

2.1.3. The need for a biofuel plant in Lincolnshire is borne out of four key factors:

- Biomethane is one of the few energy sources which is domestically produced and can provide net-negative carbon intensity (CI) energy.
- The reduction of GHG emissions.
- The growth in poultry demand and associated increases in resultant chicken manures coupled with increasing environmental restrictions for farms spreading raw manures, creates the need for a treatment source for such manures.
- The need for domestically sourced CO₂ for the food and beverages industries.

2.1.4. In June 2019, the UK government passed the Climate Change Act. This act legally commits the UK to become a Net Zero economy by 2050. This landmark piece of legislation will have profound implications with its impacts felt down to the local level. To achieve the Net-Zero goal, sources of energy that are net-negative CI will be required. A net-negative CI is achieved when more carbon is taken out of the environment than produced, such as will be the case with the proposed biomethane plant. This is in contrast to wind and solar energy production which have net positive CI impact.

2.1.5. Biofuel plants which are equipped with carbon capture equipment and use waste feedstocks can reduce harmful greenhouse gas (GHG) emissions, like CO₂, significantly. The applicant's biofuel plant will be installed with the most modern equipment enabling the direct capture of 11,000 tonnes of CO₂ annually.

2.1.6. Additionally, by treating manures in a biofuel plant rather than directly spreading on land, there are considerable GHG emission savings. Working with two leading UK consultancies to verify its calculations, the applicant's figures suggest 18,940 tonnes of CO₂e will be abated annually through the operations of the proposed development. This calculation assumes chicken manure will be used as the feedstock, together with the expected feedstock characteristics and haulage distances to and from the Walcott Farm Biofuel Plant.

2.1.7. Government statistics show there has been significant growth in the UK poultry industry between 2012 and 2022. The number of commercial broilers placed on farms – a key measure of the poultry industry - grew by over 27 %; the equivalent of over 250 million birds. In turn, this has created a number of environmental challenges for farms across the UK and in Lincolnshire particularly, given its poultry farming intensity. Left untreated chicken manures can have an adverse impact on soil quality and waterways; especially in NVZs and near rivers. As a result of this significant increase, Lincolnshire will have a considerable need for additional capacity to treat the county's agricultural organic waste over the next decade.

2.1.8. The need for domestically produced food grade quality CO₂ has increased significantly since 2018. In 2018 drinks manufacturers across the UK faced shortages of CO₂. More importantly to Lincolnshire, major meat processors faced critically low supplies in September and October 2021 risking severe disruption to their operations. The knock-on effect could be extremely troubling for livestock producers as animals would need to be kept on feed longer and not sent for processing – thus creating a double economic hit to local farmers. In late 2022, the closure of major fertiliser plants exacerbated these concerns. The Walcott Farm Biofuel Plant will help to address these concerns by providing significant volumes of organic CO₂ for both food and drinks manufacturers.

2.1.9. The applicant believes the Walcott Farm Biofuel Plant will address these four highlighted issues and is committed to making a £30 million investment into Lincolnshire's agricultural economy to further these goals.

2.2. Overview of the anaerobic digestion process

2.2.1. The Walcott Farm Biofuel Plant will process approximately 120,000 tonnes per annum (tpa) of manure to produce a biogas which is rich in methane. Generated biogas will be purified to remove moisture and trace amounts of unwanted gases, and then upgraded to separate carbon dioxide from methane. Clean biomethane will be injected directly to the grid at a connection point close to the site. Anticipated annual energy output to the national gas grid is 100 GWh (approximately 9.6 million m³), which is equivalent to providing heating for about 7,300 households.

2.2.2. The proposed development will also incorporate carbon capture technology to capture CO₂ for supply to other UK industrial sectors, such as the food and beverage industries. With such capture technology used, these carbon savings result in a CI figure well within the carbon intensity compliance level required by the Department for Business, Innovation and Skills in order to achieve the Green Gas Support Scheme (GGSS) accreditation.

2.2.3. The Walcott Farm Biofuel Plant will produce a caked fibre and liquid digestate.

2.2.4. It is estimated that approximately 85,000tpa of solid digestate and 65,000tpa of liquid digestate will be produced. This biofertiliser will be used on farms throughout the area and will replace industrially produced synthetic fertiliser and other environmentally harmful manure spreading.

2.2.5. The proposed development will also incorporate infrastructure to remove ammonia from the digestate and that process will produce ammonium sulphate, which also has good fertilising value. It is estimated approximately 7,500tpa of ammonium will be produced annually.

2.3. Proposed development description

2.3.1. The proposed development will be built on Walcott Farm which is owned and operated by WFL as a chicken farming operation. WFL operate a further four chicken farms within 10 miles of Walcott Farm. The proposed development will therefore be consistent with Policy W5 of the LCC Waste and Minerals Plan, which states:

“Planning permission will be granted for anaerobic digestion, open air composting, and other forms of biological treatment of waste outside.....provided that proposals accord with all relevant Development Management Policies set out in the Plan; where they would be located at a suitable 'stand-off' distance from any sensitive receptors; and where they would be located on either:

- *land which constitutes previously developed and/ or contaminated land, existing or planned industrial/employment land, or redundant agricultural and forestry buildings and their curtilages; or*
- *land associated with an existing agricultural, livestock, food processing or waste management use where it has been demonstrated that there are close links with that use”.*

2.3.2. The main area occupied by the Walcott Farm Biofuel Plant is approximately 6ha, with the wider area within the indicative red line boundary approximately 11ha. The anticipated maximum height of the largest AD units is approximately 16m. The wider area includes access routes and connection to the National Transmission System (NTS) operated by National Gas with an associated compound (the “NTS Compound”).

2.3.3. The site is accessed from Digby Road, via the existing farm access track. Both Digby Road and the farm track will be upgraded to accommodate vehicles associated with the Walcott Farm Biofuel Plant.

2.3.4. The Walcott Farm Biofuel Plant is intended to be fed with manure feedstock (predominantly chicken manure) sourced from Lincolnshire and the surrounding region. The feedstock is unloaded into bunkers within a sealed reception and storage building. The building is kept under negative pressure and fitted with an odour management system to prevent odours from emitting.

2.3.5. Feedstock is continuously fed into a mixing tank, where it is then diluted, preheated and pumped to the anaerobic digestion system. Most of the organic matter is converted biologically by micro-organisms to produce biogas.

2.3.6. The biogas is purified, compressed and transported via pipeline to the point of connection (approximately 300m west) with the NTS. This process is illustrated in a simple flow chart in Figure 2.1.

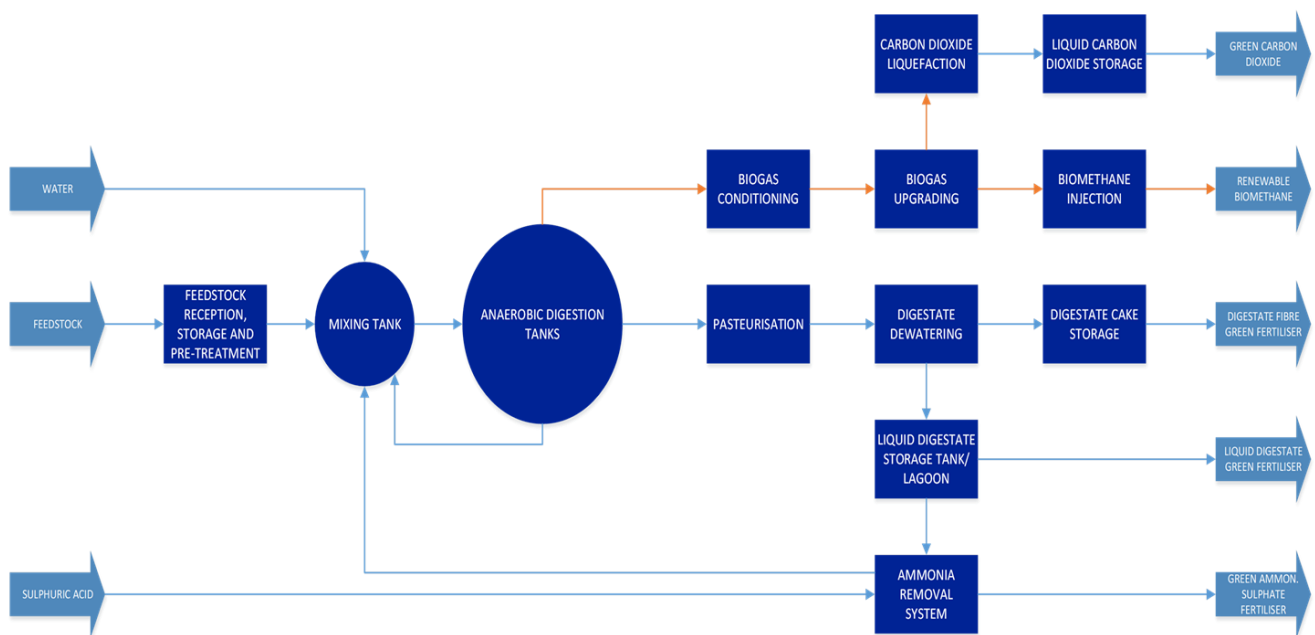


Figure 2.1 AD process flow chart

2.3.7. Digestate is pasteurised and separated using a dewatering system to produce liquid and caked fibrous digestate. Filtrate is re-circulated for the feedstock dilution. The concentration of ammoniacal nitrogen in the recirculated filtrate is reduced, which involves stripping the ammonia and scrubbing the ammonium to produce ammonium sulphate.

2.3.8. The storage lagoons for holding the liquid digestate prior to distribution will be bunded and planted, and incorporated into the wider landscaping and planting strategy for the site to provide suitable visual screening and biodiversity net gain. The lagoons will also be covered to prevent odour emission. The site also includes an office that will house staff facilities and workshop area, and staff parking.

2.3.9. Figure 2.2 illustrates an indicative layout of the Walcott Farm Biofuel Plant, NTS compound and associated access. Figure 2.3 shows indicative elevations of the biofuel plant.

2.3.10. Other elements of the Walcott Farm Biofuel Plant include:

- A natural gas CHP unit for on-site power and heating provision;
- A natural gas/ biogas dual fuel boiler;
- A rainwater harvesting attenuation pond;
- Weighbridges;
- Feedstock buffer storage tanks;
- CO₂ storage tanks;
- Surplus gas flare; and
- Digestate dryer and pelletiser.

2.3.11. The system is set up such that processes can be bypassed to allow cleaning and maintenance. Onsite storage arrangements would allow for suitable contingency of feedstock, and the lagoons would allow for approximately six months storage capacity of the liquid digestate.

2.3.12. In transport and access terms, the operational phase will involve heavy goods vehicles (HGV) deliveries of feedstock and digestate in and out, as well as smaller light goods vehicles (LGV) and daily staff. It is anticipated there will be an average daily movement of approximately 40 vehicles in and out of the site. During the appropriate season for use of the liquid digestate, HGV numbers will peak to provide suitable distribution. Digby Road will be upgraded, including the incorporation of passing places, to improve durability and safety, which the applicant intends to fund.

2.3.13. AFP and WFL are committed to maximising the operational life of the facility through proper ongoing maintenance. If at any point the proposed development loses its economic viability, and the plant can no longer continue in operation, AFP and WFL will restore the site to its previous condition.

Proposed construction works and programme, environmental management and mitigation measures

2.3.14. Construction of the plant is anticipated to start in Q1 2024 and be completed and commissioned within 14 months. This application is for the permanent development and operation of the Walcott Farm Biofuel Plant, with operational activity expected to commence in Q1 2025.

2.3.15. A draft outline Construction Environmental Management Plan (CEMP) will be produced and submitted with the ES. This will identify mitigation measures involving best practice construction methodologies and control measures specified by legislation to minimise negative environmental impacts and maximise positive ones.

2.3.16. A draft Construction Traffic Management Plan (CTMP) will also be produced and submitted with the ES.

2.3.17. Waste generation is anticipated as a result of the construction and operation of the proposed development. Waste produced during all activities on site will be subject to the 'Duty of Care' under the Environmental Protection Act.

2.3.18. The waste hierarchy referred to in Article 4 of the Waste Framework Directive will be applied to the generation and treatment of waste by the activities. Waste materials will be disposed of by the contractor/s to appropriate recycling facilities. During construction, the construction site manager will audit waste carriers and disposal facilities and maintain documentary evidence that these requirements are being met, including a register of waste carriers, disposal sites (including transfer stations) and relevant licensing details for each waste stream.

2.3.19. Where proposed activities are likely to generate excess soil as part of the construction works and where such soils are to be reused on site, the design will be informed by the requirements of the CL:AIRE Definition of Waste: Code of Practice (DoWCoP). This will ensure that the sustainable re-use of soils can be embedded within the development and it will remain compliant with current waste legislation.

2.3.20. It is not expected that the operation of the proposed development will generate potentially hazardous materials. Materials used during construction works such as oil, chemicals, cement, cleaning materials and paint have the potential to cause serious pollution. Therefore, relevant guidance will be followed during the handling, storage and use of such materials.

2.3.21. The 'elimination of waste' such as consideration of the volume of waste generated during construction will be considered with respect to the number of vehicle movements and associated emissions, in the Transport Statement. Management of waste using the waste hierarchy will also be addressed within the sustainability framework. Taking account of the above, it is considered that there would be no significant waste effects and as such, the topic of 'Waste' would be scoped out of the EIA.

2.3.22. As part of this process a Materials Management Plan (MMP) may form an appropriate route to material re-use subject to conformance with the relevant legislation and guidance.

Other supporting documents

2.3.23. Further documents will be submitted with the planning application to provide suitable information and evidence of legal compliance and best practice for the proposed development.

2.3.24. As a result of the forecast trip generation of the proposed use and subsequent likely limited impact on the capacity of the surrounding highway network, a Transport Statement (TS) will be prepared in accordance with both local and national transport policy.

2.3.25. In addition to this, a preliminary design of the proposed site access junction will be submitted as part of the TS. The applicant will also propose other Section 278 works in the form of the provision of new passing places/laybys along Digby Road (and access routes as required), which will be suitably spaced and of an appropriate form and type, to facilitate HGV access to the site.

2.3.26. In order to consider the existing traffic demand along Digby Road, a Manual Classified Count (MCC) will be undertaken at the Pinfold Lane / High Street Junction on an appropriate weekday covering a two-hour period in both the AM (07:00-09:00) and PM (16:00-18:00). An Automatic Traffic Count (ATC) will also be undertaken directly outside the site access for a full 7-day period.

2.3.27. The documents expected to be submitted with the planning application include:

- Agricultural Land Classification Assessment;
- Land Contamination Preliminary Risk Assessment;
- Site Waste Management Plan;
- Socio-Economic Assessment
- Sustainability Framework Statement;
- Carbon Assessment Technical Note;
- Design and Access Statement;
- Planning Statement;
- Topographic Survey;
- Construction Traffic Management Plan;
- Construction Environmental Management Plan;
- Transport Statement; and
- Materials Management Plan.

2.4. Location and context

2.4.1. The site is located on agricultural land off Digby Road (Figure 1.1) 1km to the west of Walcott and 3.5km to the east of Digby. It is currently used for intensive poultry farming. The site lies within an area of

predominantly open countryside with scattered farms and both historic and modern farm buildings. The site is accessed via an existing track on Digby Road, which currently serves the poultry farm.

2.4.2. Walcott is a small village in Lincolnshire surrounded by countryside of agricultural use, with sheep farming and the growing of potatoes being prominent. Digby is a small village and civil parish located in the vale of Digby Beck watercourse and located approximately 19km south of the city of Lincoln.

2.4.3. The site lies within the grounds of Walcott Farm and Walcott Common which house large poultry units, four to the south of the site (including a recently constructed unit), which are accessed from Digby Road and three to the north, accessed from the B1189, near the village of Thorpe Tilney. The site is located on land rated as Grade 2 and Grade 3 by the post 1988 Agricultural Land Classification (ALC) map. However, it is not used for arable farming now and is considered to be too small to be suitable for arable farming in the future.

2.4.4. The site is relatively flat and low lying at approximately 5m AOD. There are limited landscape features within the site and consequently it is largely open in character, with the majority of the site currently laid to rough grass. It is bound on its south-west side by a large, straight drainage ditch. The south-eastern site boundary is relatively open, aside from patches of existing site boundary willow and birch scrub. The north-eastern site boundary features a large, linear reservoir for most of its length, which is bordered by a bunded strip of mixed deciduous trees and shrubs on all sides. The north-western site boundary is open, aside from some patches of willow and birch scrub.

2.4.5. The site lies within a wider area of farmland which is accessible by a number of footpaths and bridleways. No public rights of way (PRoW) cross the site. The nearest PRoW (WBil/4/1) runs along the north-eastern site boundary. PRoW WBil/8/1 (Sleaford and South Kesteven Division) is located 100m south to the west of Catley Cottages and PRoW WBil/3/1 located 500m to the east.

2.4.6. Table 2-1 identifies the nearest residential properties to the development:

Table 2-1 Nearest residential properties

Name	Distance to red-line boundary	Distance to permanent works	Relative orientation
Catley Cottages (including an unnamed property, Priory Cottage and Catley Farm House).	137m	639m	South
Walcott Farm	300m	509m	East
Rowston Grange Farm	428m	709m	West
Crown Farm	643m	807m	East

2.4.7. There are no World Heritage Sites, Registered Battlefields, Registered Parks and Gardens, Conservation Areas contained on site or within a 2km study area. The nearest Listed Building is 1.1km to the north-east of the site, the Thorpe Tilney Hall Grade II Listed Building. There are two scheduled monuments to the south of the site: Catley Priory (143m south) and Neolithic long barrow 770m ESE of Rowston Grange (215m south).

2.4.8. There are no internationally or nationally designated sites within the site or within a 2km study area. The site is not within any Site of Special Scientific Interest (SSSI) Impact Risk Zones. There are no non-statutory designated sites within 2km of the site.

2.4.9. According to the EA Statutory Main Rivers Map, there are two main rivers running along the site boundaries; Queen's Dyke along the western site boundary and New Cut along the eastern boundary. Both watercourses flow north to south into Dorrington Dike, circa 3.3km south of the site.

2.4.10. The southern part of the site is located within Flood Zone 2 and 3, meaning that it is at medium and high risk of flooding. Surface water flooding on the site ranges from very low to high flood risk. The south-east

of the site is at the highest risk of surface water flooding. None of the plant operations will be situated on land in Flood Zone 3.

2.4.11. Figure 2.4 presents the environmental constraints within 500m of the site. Figure 2.5 presents the environmental constraints within 2km of the site.

3. Proposed EIA methodology

3.1. Approach to EIA

3.1.1. The EIA will be undertaken in line with the requirements of the EIA Regulations (HMSO, 2017). The findings of the EIA will be presented in an ES, produced in accordance with Schedule 4 of the EIA Regulations. The general approach of the EIA will be undertaken in accordance with the Institute of Environmental Management and Assessment (IEMA) guidelines for EIA. Where relevant, specific methods for the assessments of environmental topics will be undertaken in accordance with the relevant guidelines, as mentioned in the relevant topic sections of this report.

3.1.2. An initial review of relevant legislation and policy has been completed for this scoping stage (see Appendix 3.1). This will be reviewed and updated as part of the EIA process and included in the ES. A Development Plan Policy report will also be submitted with the planning application.

3.2. EIA Screening

3.2.1. An EIA Screening Opinion Request was submitted to LCC for the proposed development on 21 September 2022.

3.2.2. A Screening Opinion was provided by LCC on 4 November 2022, whereby LCC adopted the screening opinion that the development constituted an EIA development based on key constraints as summarised below (see full details in Appendix 3.2). The proposed development was considered in line with Schedule 2 3(a) and 3(b) and 11(b) of the EIA Regulations which relates to installations for the production of electricity, steam and hot water, the carrying of gas, steam and hot water, and installations for the disposal of waste.

3.2.3. Although the thermal energy output of the plant is below the National Planning Policy Guidance (NPPG) indicative threshold of 50MW, the tonnages of wastes to be handled by the proposed development is exceeded. This does not automatically trigger the need for EIA, however key factors to consider include visual impacts, transport impacts, and potential impacts arising from site operations and activities such as noise and odour. With the consideration of the size, scale and nature of the operations, the Waste Planning Authority (in LCC) is of the opinion that the proposed development is likely to give rise to impacts that would be of more than local importance, which could lead to significant environmental effects. As such, the proposed development is considered to constitute an EIA development and an Environmental Statement will be submitted with the planning application.

3.2.4. In pre-application advice, LCC identified that the principle and location of the proposed development accords with local and national policy. The following key constraints, risks and opportunities were identified by LCC:

- Proximity of Catley Priory Scheduled Monument and Bronze Age barrow cemetery- potential to impact the setting of a designated asset and very high archaeological potential;
- No designated sites are directly affected. Any proposal would need to demonstrate and deliver biodiversity net gain in line with national requirements;
- The site lies in Flood Zones 1 and 2, with small proportions in Flood Zone 3 (although none of the Walcott Farm Biofuel Plant would be constructed in Flood Zone 3);
- The site is classified as Grade 2 Agricultural Land so justification for the loss of soil and why alternative sites may not be reasonable is required;
- The site is not within or close to a 'sensitive area' as defined in the EIA regulations, however the proposed development may give rise to landscape and visual effects;
- The proposed development could lead to adverse noise and vibration locally; and,
- Improvement and upgrade works to the site access, along with additional passing places will be required for the development to be considered acceptable.

3.2.5. Key information from the Screening Opinion from LCC has been reviewed and used to inform the basis of this Scoping Report. The recommendations from the Screening Opinion will be included in the ES and planning application.

3.3. Approach to assessment scenarios

3.3.1. This Scoping Report has been written to determine the scope of the EIA, to ensure that potential impacts of the proposed development that could give rise to likely significant effects are assessed, and suitably mitigated, against the baseline.

3.3.2. Where impacts are judged to have the potential to cause a significant effect without suitable mitigation, they are scoped into the EIA. Those that are considered not likely to lead to a significant effect, are scoped out. A precautionary approach has been used to scope in topics where there is insufficient information or design progression to determine likelihood or level of effect.

Spatial scope

3.3.3. The physical extent of the site is shown in Figure 2.1.

3.3.4. The zones of influence surrounding environmental features or aspects are dependent on their characteristics, sensitivity and value. The nature and extent of impact from the proposed development or activities can extend beyond the immediate site boundary. As such, the study area varies between topics and are identified within the relevant chapters of this Scoping Report.

Temporal scope

3.3.5. The EIA will consider the construction and the operation of the proposed development. The proposed development construction works are anticipated to start in Q1 2024 and are anticipated to proceed for 14 months. The proposed development is designed to be a continual permanent operation. If the proposed development were to become unviable or not required, the site would be decommissioned and returned to existing condition, or a suitable comparable use. As this is not planned or known when it could occur, decommissioning and restoration is not included within this assessment.

3.3.6. The site is located within an existing operational farm, with no other anticipated changes to land use in the surrounding area. Given this fact, and the proposed construction commencement in Q1 2024, the assessment will be made against the current existing baseline, with no need to consider a future baseline for the construction or operational assessment phases.

3.3.7. Any changes expected due to environmental trends will be described qualitatively, or in certain cases incorporated into model calculations as quantitative scenarios to allow meaningful future year assessment. The ES will include consideration of nearby proposed developments not yet built, or operational, but in the planning system so cumulative effects are identified as required by the EIA Regulations.

Assessment scenarios

3.3.8. The proposed assessment scenarios in the ES are as follows:

- Existing baseline – 2023;
- Construction phase Q1 2024 – Q1 2025;
- Operational phase year of opening – Q1 2025; and
- Operational phase future year – 2040 (YO +15 years).

3.4. Proposed consultation

3.4.1. Consultation will be undertaken with both statutory and non-statutory bodies, including those with an environmental remit, as well as public consultation.

3.4.2. Consultation with relevant stakeholders has commenced through initial data requests for baseline information and via the local authority for the EIA Screening Request. Consultation will continue throughout the EIA process to inform the design, agree assessment parameters, discuss key issues, assessment findings, and proposed mitigation options, with monitoring and maintenance strategies.

3.5. Method of assessment

3.5.1. The EIA process will consider potential impacts of both construction and operation of the proposed development to affect the baseline conditions and their likelihood to result in a significant environmental effect. The baseline conditions are defined as the existing state of the environment and how it may develop in the future in the absence of the proposals. This is a requirement of the EIA Regulations which in Schedule 4, Paragraph 3 require a description of the aspects of the environment likely to be significantly affected by the development (HMSO, 2017).

3.5.2. Predictions are necessary when forecasting future impacts. The EIA Regulations in Schedule 4, Paragraph 6 require a description by the applicant of the forecasting methods used to assess the effects on the environment (HMSO, 2017). Assessments will be undertaken in accordance with relevant legislation and best practice guidelines published by the associated professional bodies. Where there is no topic specific guidance available, a common framework of assessment criteria and terminology has been used.

Receptor sensitivity

3.5.3. The sensitivity of a receptor, or environmental feature, refers to its importance (environmental value / attributes). This may include a feature's level of statutory designation, for example if a site has a European designation (for example, Special Area of Conservation) it will generally be regarded as more important/ sensitive than another site with a national or local designation (for example Local Wildlife Site).

3.5.4. Each individual chapter within this ES considers the attributes of specific receptors in more detail. The criteria for assessing value of a feature can be seen in Table 3-1.

Table 3-1 Criteria for assessment value (sensitivity)

Value (sensitivity) of receptor / resource	Typical description
Very High	Very high importance and rarity, international scale and very limited potential for substitution or replacement.
High	High importance and rarity, national scale, and limited potential for substitution or replacement.
Medium	Medium or high importance and rarity, regional scale, limited potential for substitution or replacement.
Low	Low or medium importance and rarity, local scale.
Very Low	Very low importance and rarity, local scale.
Negligible	No noticeable importance and rarity, local scale.

Magnitude of impacts

3.5.5. Magnitude is determined by predicting the scale of any potential change in the baseline conditions. This can be both negative (adverse) and positive (beneficial). Depending on the environmental topic, impacts may be direct or indirect, and temporary or permanent. The magnitude is dependent upon the frequency, extent and timescale of an impact. Frequency refers to the number of times an activity takes place throughout the life

of the development (construction and operation). The criteria for assessing magnitude of impact can be seen in Table 3-2.

Table 3-2 Criteria for assessing magnitude of impact

Magnitude of impact (change)		Typical description
Very high	Adverse	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements.
	Beneficial	Large scale or major improvement of resource quality; extensive restoration; major improvement of attribute quality.
High	Adverse	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements.
	Beneficial	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality.
Medium	Adverse	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristic, feature or element.
	Beneficial	Some benefit to, or addition of, one (maybe more) key characteristic, feature or element; some beneficial impact on attribute or a reduced risk of negative impact occurring.
Low	Adverse	Small scale loss or detrimental alteration to one or more characteristic, feature or element.
	Beneficial	Small scale benefit to or positive addition of, one or more characteristic, feature or element.
Very Low	Adverse	Very small scale loss or detrimental alteration to one or more characteristic, feature or element.
	Beneficial	Very small scale benefit to or positive addition of, one or more characteristic, feature or element.
No change		No loss or alteration of characteristics, features or elements; no observable impact in either direction.

Classification of effects

3.5.6. To determine the classification of effects the assessor considers the predicted magnitude of impact (change) with the assigned sensitivity (value) of the receptor. Table 3-3 shows how the interaction of magnitude and sensitivity can be combined to determine the classification of an environmental effect on a scale (note this does not define whether an impact is significant or not, see below). Where established methodology or guidance for a specific topic and discipline further defines or deviates from this, a description of how the specific method has been transposed is explained in relevant chapter. This allows for a consistent and comparable approach to be applied to the EIA.

3.5.7. The EIA Regulations in Schedule 4, Paragraph 5 require a description of the likely significant effects of the development. Therefore, environmental effects are described as:

- Adverse or beneficial;
- Direct or indirect;
- Temporary or permanent;
- Short, medium or long term;
- Reversible or irreversible; and
- Cumulative and in-combination.

3.5.8. The duration of the effect will be assessed as either temporary or permanent where:

- Short term (approximately 1 year for example, site preparation and construction phase);
- Medium term (5-10 years); and
- Long term (10 years +).

3.5.9. However, the general criteria for defining the duration of impacts may vary between technical chapters.

Defining significance

3.5.10. Each individual chapter within the ES will consider the nature of effects and their classification providing definitions in more detail as required.

3.5.11. Using the matrix-based approach presented in Table 3-3, effect classification is placed on a scale of negligible to major. Unless otherwise stated within the specialist topic chapters, effects assessed as moderate or major are deemed to be significant in EIA terms, meaning that they are material to the decision-making process. Effects assessed as negligible or minor are not deemed to be significant or material to the decision-making process.

Table 3-3 Classification of effect matrix

		Magnitude of impact (degree of change)					
		No change	Very low	Low	Medium	High	Very high
Value / Sensitivity	Negligible	Negligible	Negligible	Negligible	Negligible or minor	Negligible or minor	Minor
	Very low	Negligible	Negligible	Negligible	Negligible or minor	Minor	Minor
	Low	Negligible	Negligible	Negligible or minor	Minor	Minor	Minor or moderate
	Medium	Negligible	Negligible	Negligible or minor	Minor or moderate	Moderate	Moderate
	High	Negligible	Negligible or minor	Minor	Moderate	Moderate or major	Major
	Very high	Negligible	Minor	Minor	Moderate or major	Major	Major

Table 3-4 Effects definitions

Value	Typical description
Major	These represent key factors in the decision-making process. These effects are generally associated with sites or features of international or national importance. However, a serious change in a site or feature of district importance may also enter this category. Major effects may relate to resources or features which are unique and which, if lost, cannot be replaced or relocated.
Moderate	These effects may be important at a local level, but are not likely to be key decision-making factors. The cumulative effects of such issues may become a decision-making issue if leading to an increase in the overall adverse effect on a particular resource or receptor.
Minor	These effects may be raised as local issues. They are unlikely to be critical in the decision-making process, but are important in enhancing the subsequent design of the project.
Negligible	No effects, or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

3.5.12. Proposals for mitigation will follow the mitigation hierarchy of avoid, reduce, remedy and compensate. Embedded mitigation will include standard control measures to achieve compliance, as well as other measures included in the CEMP.

3.5.13. Design considerations and features that have been adapted and specified to prevent or reduce impacts, such as orientation or location of structure, are included in the 'prior to mitigation' assessment scenario. These design development considerations will be reported in the Considerations of Alternatives chapter of the ES, in response to Schedule 4, paragraph 2 of the EIA Regulations.

3.5.14. Where additional and / or further mitigation is proposed, for both construction and operational controls or specification, this will be included in the 'with mitigation' scenario of the assessment to identify residual effects.

3.6. Approach to cumulative effects

3.6.1. The potential cumulative effects of the proposed development in association with other developments will be included where relevant as required by Schedule 4, Paragraph 5e of the EIA Regulations (HMSO, 2017).

3.6.2. Two types of effects will be assessed, as described below:

- Cumulative effects with other proposed development; and,
- In-combination effects within the works.

3.6.3. A Cumulative Effects chapter reported in the ES will consider these two types of effect as referenced and summarised from the perspective of the relevant technical assessments.

Cumulative effects (Inter- project relationship effects)

3.6.4. The construction or operation of the proposed development together with other developments within the study area, which individually might not be significant, but when considered together could create a significant cumulative effect.

3.6.5. There is no widely accepted methodology or best practice for assessing cumulative effects although various guidance documents exist. The Zone of Influence (ZOI) of the proposed development within which any potential effects of the proposed development may combine with the effects arising from other developments will be determined on the basis of the maximum study areas of the technical assessments considered within the EIA.

3.6.6. A list of developments within the ZOI to be included in the cumulative effects assessment will be identified and filtered on the basis of project specific criteria to shortlist other developments for the assessment of cumulative effects together with the proposed development.

3.6.7. An initial assessment of cumulative sites has been completed, a description of these and potential cumulative effects can be seen in Table 3-5 and the location of the sites illustrated in Figure 3.1.

Table 3-5 Other developments

Application	Description	Proximity	Status	Potential cumulative effects
RAF Metheringham Application: 22/1635/CCC North Kesteven District Council November 2022	Proposed construction of an anaerobic digestion plant and associated infrastructure (request for Screening and Scoping Opinion through The Town and Country Planning (Environmental Impact Assessment) Regulations 2017) Located in land off the B1189/B1191, part of former RAF Metheringham base, near Martin Moor. Process approximately 182,500 tonnes of organic waste equating to an	4km north	Scoping Opinion provided 16 December 2022 District Council agreed with the findings from the application however states Landscape and Visual Impact should be scoped in.	Potential construction phase impacts, including traffic and transport and air quality. Operational cumulative effects may include: ➤ Landscape and Visual effects; ➤ Air Quality effects; and ➤ Traffic and Transport: Cumulative effects from increased traffic movements.

Application	Description	Proximity	Status	Potential cumulative effects
	average of 70 HGV movements per day. Size: 8.1ha			
EDF Solar Farm, Springwell North Kesteven District Council National Significant Infrastructure Proposal	Due to size, the development will need to apply for a Development Consent Order (DCO), decided by the government. It will be handled as a National Significant Infrastructure Proposal by the Planning Inspectorate. EDF Renewables and Luminous Energy plan to develop a solar power project called Springwell Solar Farm having a potential output of up to 800 MW. Size: 1,706ha	5.5km west	Scoping Report submitted to the Secretary of State on the 22 March 2023. The application is expected to be submitted to the Planning Inspectorate in Q2 2024.	Potential construction phase impacts, including traffic and transport and air quality. Operational cumulative effects may include landscape and visual effects.

In-combination effects (Intra-project relationship effects)

3.6.8. Effect interactions are the combined or synergistic effects caused by the combination of effects of the proposed development on a particular receptor whose collective effect is more than the aggregate of the individual impacts. An example of an effect interaction would be where a receptor is affected by dust, noise and traffic disruption during the construction of the proposed development, with the result being a greater level of nuisance than that caused by each individual effect alone.

3.6.9. Only residual effects classified as being of minor, moderate, or major will be considered in relation to the potential for the in-combination (or inter-relationship) effects of individual impacts. Negligible residual effects will not be considered.

3.6.10. Where there is more than one impact on a particular receptor, the potential for impact interactions will be assessed as follows:

- a) Identification of receptors or resources considered in more than one technical chapter, and therefore having the potential to be affected by more than one impact or factor; and,
- b) For receptors or resources identified, the residual effect from each relevant technical chapter will be considered to establish if there will be an in-combination effect between each individual effect.

Construction Environmental Management Plan

3.6.11. The potential effects of the construction phase will be controlled through a Code of Construction Practice. An Outline Construction Environmental Management Plan (CEMP) will be prepared prior to the commencement of construction and will be submitted alongside the planning application. This will contain all the design and additional mitigation measures for construction as identified and reported within the ES.

3.7. Identified topics

3.7.1. The following list of topics, for consideration in this Scoping Report, has been compiled with reference to the matters identified in Part 5, Paragraph 18 of the EIA Regulations:

- Air Quality;
- Noise and Vibration;
- Archaeology and Heritage;
- Landscape and Visual Impact;
- Ecology (Biodiversity);
- Flood Risk and Drainage;
- Climate Change;
- Ground Conditions and Contamination;
- Population and Human Health; and
- Major Accidents and Natural Disasters.

4. Air Quality

4.1. Introduction

4.1.1. The chapter outlines the Air Quality Scoping assessment and provides a summary of the potential effects, how this will be addressed in the EIA and presented in the relevant ES Chapter.

4.2. Baseline environment

4.2.1. Relevant information from the following sources has been reviewed to determine the baseline conditions and potential air quality constraints for the proposed development:

- North Kesteven District Council 2022 Air Quality Annual Status Report (ASR)¹;
- Defra's UK-AIR: Air Information Source website²; and
- Air Pollution Information Service website³.

Key air pollutants

4.2.2. The air pollutants of concern for the construction phase in the context of this assessment are nitrogen oxides (NO_x), particularly nitrogen dioxide (NO₂), and fine particulate matter known as PM₁₀ and PM_{2.5}, as these pollutants are those most likely to be present at concentrations close to or above relevant air quality criteria. In addition, dust generated by construction activities is also a consideration. Operational activities may also result in emissions of NO_x and PM₁₀ and PM_{2.5} as well as sulphur dioxide (SO₂), volatile organic compounds (VOCs), ammonia (NH₃), hydrogen sulphide (H₂S) and odour.

Nitrogen oxides

4.2.3. Nitric oxide (NO) and NO₂ are collectively termed NO_x. NO_x is emitted from combustion sources, including vehicles and stationary combustion plant (for example, boilers) in the form of NO, which oxidises rapidly in the presence of ozone to form NO₂. This has the potential to cause adverse health effects as high concentrations of NO₂ can affect the respiratory system.

4.2.4. Emissions of NO_x also contribute to nitrogen deposition, which can have an adverse effect on sensitive habitats, as can gaseous NO_x.

Particulate matter

4.2.5. Particulate matter is the term used to describe all suspended solid matter, and emission sources can be both natural and man-made in origin. Particulate matter with aerodynamic diameters of less than 10µm (PM₁₀) and 2.5µm (PM_{2.5}) is the subject of health concerns because of its ability to penetrate and remain deep within the lungs.

4.2.6. The health effects of particles are difficult to assess, and evidence is mainly based on epidemiological studies. Evidence suggests that there may be associations between increased PM₁₀ concentrations and increased mortality and morbidity rates, changes in symptoms or lung function, episodes of hospitalisation or doctors' consultations. Recent reviews by the World Health Organisation (WHO) and Committee on the Medical Effects of Air Pollutants (COMEAP) have suggested that exposure to a finer fraction of particles (PM_{2.5}) gives a stronger association with the observed health effects.

¹ [NK Air Quality Annual Status Report 2022.pdf](#)

² [AQMAS interactive map \(defra.gov.uk\)](#)

³ <https://www.apis.ac.uk/>

Dust

4.2.7. Dust is defined within the Institute of Air Quality Management (IAQM)'s Guidance on the assessment of dust from demolition and construction⁴ as solid particles that are suspended in air, or have settled out onto a surface after having been suspended in air. Dust and particulate matter (PM) are often used interchangeably. Dust can contribute to both amenity effects and effects on sensitive ecological receptors, through dust deposition and soiling of surfaces, whilst inhalation of the finer fractions of dust specifically, PM₁₀ and PM_{2.5} can have adverse effects on human health.

Sulphur dioxide

4.2.8. At high concentrations SO₂ is a potent bronchoconstrictor and asthmatic individuals are more susceptible. Exposure to high levels of SO₂ over a long period can also result in structural changes in the lungs and may enhance sensitisation to allergens.

4.2.9. SO₂ can also contribute to the acidification of ecosystems.

Volatile organic compounds

4.2.10. VOCs represent a wide group of organic (specifically, carbon containing) compounds that are volatile (specifically, evaporate or volatilise easily in normal atmospheric conditions). Many VOCs are odorous, even in very low concentrations. Certain VOCs, for example, benzene, are known carcinogens.

Ammonia

4.2.11. NH₃ emissions originate from both natural and man-made sources. It is naturally present at low concentrations in ambient air as a result of the microbial breakdown of organic matter. High concentrations of NH₃ can irritate the skin, mouth, throat and eyes, whilst very high concentrations may cause burns and swelling in the airways, contributing to lung damage.

4.2.12. Ammonia has a distinctive strong, pungent odour and can also contribute to direct and indirect effects on habitats (for example, eutrophication, and bleaching and leaf discoloration).

Hydrogen sulphide

4.2.13. H₂S is a colourless gas with a distinctive odour of rotten eggs above certain concentrations. It is produced naturally and through man-made sources. High concentrations of H₂S can lead to eye irritation or damage, whilst very high concentrations can affect the central nervous and respiratory system.

Local air quality management

4.2.14. The proposed development is located in North Kesteven District Council, where baseline air quality levels have demonstrated compliance with the Air Quality Standards (AQS) and Air Quality Objectives (AQO). With no exceedances of the NO₂ AQO being recorded in the last five years, no Air Quality Management Areas (AQMA) have been declared within North Kesteven and an Air Quality Action Plan has not needed to be published. The closest AQMA is Nottingham AQMA located 58.1km from the proposed development.

4.2.15. As required under Section 82 of the Environment Act 1995, North Kesteven has conducted an ongoing exercise to review and assess air quality within its area of jurisdiction. North Kesteven District Council's 2022 Air Quality Annual Status Report (ASR) states that the main source of pollution is from road traffic emissions from the expansive road network, in particular from the A15, A17 and the A46.

⁴ <https://iaqm.co.uk/text/guidance/construction-dust-2014.pdf>

4.2.16. During 2021, the maximum NO₂ annual mean concentration recorded at a single diffusion tube site in North Kesteven was 24.9µg/m³ (62% of the AQO) which was a decrease from the maximum NO₂ concentration in the 2020 (28.5µg/m³).

Background concentrations

4.2.17. Estimates of background pollutant concentrations of certain pollutants, including NO_x, NO₂, PM₁₀, PM_{2.5} and SO₂, for one kilometre grid squares throughout the UK are available on the Defra UK-Air website⁵ for each year up to 2030. Similarly, the Air Pollution Information Service (APIS) provides mapped estimates of background concentrations of NH₃.

4.2.18. Estimated background concentrations of NO_x, NO₂, PM₁₀, PM_{2.5}, SO₂ and NH₃ for the grid square covering the proposed development are provided in Table 4-1 for a 2022 base year (2001 for SO₂ and 2020 for NH₃ being the latest years available), which indicate that annual mean background concentrations are well below relevant AQS, AQO and Environmental Assessment Levels (EAL) for the protection of human health.

Table 4-1 Background concentrations at works location (µg/m³)

	NO _x	NO ₂	PM ₁₀	PM _{2.5}	SO ₂	NH ₃
Grid Reference 511305, 356281	8.8	6.8	15.3	8.3	2.7	2.9
Standard / Objective / Environmental Assessment Level	30 (ecological receptor)	40 (human receptor)	40 (human receptor)	25 (human receptor – current AQS) 12 (interim target by 2028) 10 (long-term target by 2040)	10 – 20 (ecological receptor)	180 (human receptor) 1 – 3 (ecological receptor)

4.3. Further assessment and consultation

4.3.1. The following assessments will support the planning and permit applications to be submitted to LCC and the EA, respectively. The assessments and plans will include:

- Air quality dispersion modelling and assessment;
- Construction dust assessment; and
- Odour assessment and odour management plan.

4.4. Receptors to be considered as part of the EIA

4.4.1. The nearest residential receptors are listed in Table 2-1.

4.4.2. There are no Natura 2000 sites within 10km, or SSSIs and local wildlife sites within 2km to the site. These are relevant assessment distances for emissions to air and associated effects on ecological receptors as advised by Environment Agency guidance⁶.

4.4.3. The following receptors should be considered at the construction and operational stages of the proposed development:

- Residential receptors along Digby Road to the south of the site and Walcott Farm; and

⁵ <https://uk-air.defra.gov.uk/data/laqm-background-home> (accessed on 19/01/2023)

⁶ <https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit>

- Users of the PRow to the east of the site.

4.4.4. Additional receptors may be included if identified by further technical study. For example, dependent on the final traffic volumes and routings, receptors within Walcott village may be considered.

4.5. Likely environmental effects

Construction effects

4.5.1. During construction, local air quality could potentially be affected by the following:

- Dust emissions arising from earthworks, construction activities and vehicle track-out;
- Emissions from construction plant and equipment on site; and
- Emissions from construction vehicles (cars, vans and lorries) travelling to and from the construction site.

4.5.2. Guidance provided by Environmental Protection UK (EPUK) and IAQM⁷ provides indicative screening criteria for requiring an air quality assessment. In terms of changes in vehicle numbers, or changes to junctions outside of an AQMA (as would be the case for this location), the following criteria are specified as requiring detailed assessment:

- Change in LGV flows of more than 500 AADT;
- Change in HGV flows of more than 100 AADT; or
- Introduce a new junction or remove an existing junction near to relevant receptors.

4.5.3. Based on indicative data in Section 2, it is unlikely any of the above criteria would be met and a detailed assessment of vehicle emissions is not proposed. However, this position would be reviewed once final development traffic numbers are confirmed.

4.5.4. There are a number of residential properties and agricultural properties along Digby Road located within 350m of the proposed development, which may be affected by construction dust emissions. With appropriate mitigation measures in place for the duration of the construction project, it is considered unlikely that significant adverse effects will occur at these locations due to site-generated dust emissions. However, a risk-based assessment of construction dust emissions will be performed using IAQM guidance⁸.

4.5.5. Exceedances of relevant air quality criteria at sensitive receptors due to construction plant and equipment emissions are unlikely given the distance from the proposed development location to the nearest sensitive receptors and prevailing background pollutant concentrations.

Operational effects

4.5.6. During the operational phase, local air quality could be affected by the following:

- Emissions from vehicles (for example, waste deliveries, employees) travelling to and from the site;
- Point source emissions of combustion products (NO_x, SO₂ and VOCs) from the on-site combustion plant and flare supporting the anaerobic digestion process; and
- Residual NH₃, H₂S and odour emissions from the odour control units that treat extracted air from buildings and storage tanks/lagoons.

⁷ <https://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf>

⁸ <https://iaqm.co.uk/text/guidance/construction-dust-2014.pdf>

4.5.7. Consistent with Section 4.5.3, it is not anticipated that the volume of operational traffic will exceed the indicative screening criteria provided in IAQM guidance and, consequently, detailed assessment of vehicle emissions is not proposed.

4.6. Proposed assessment methodology

Air quality policy and legislation

4.6.1. The following regulations apply in England:

- The Air Quality Standards Regulations 2010⁹ which contain limit values (transposed into domestic legislation as air quality standards) and target values;
- The Air Quality (England) Regulations 2000¹⁰ and Air Quality (England) (Amendment) Regulations 2002¹¹ which set out national air quality objectives; and
- The Environment Act 2021 which established a legally binding duty on Government to bring forward new targets for PM_{2.5}. These targets, which include an interim target to be met by 2028, and a long-term target to be met by 2040, were established by the 2023 Environmental Improvement Plan.

4.6.2. In addition to the above, the Environment Agency provides non-statutory guideline values, known as EALs, for air pollutants other than those covered by the above legislation. These EALs apply to certain pollutants emitted from an anaerobic digestion facility, for example, NH₃ and H₂S.

4.6.3. The AQS, AQOs and EALs established within these regulations and guidance will inform the assessment of effects.

4.6.4. A summary of all relevant national and local policy and guidance will be provided. Any local policies or guidance (for example, Supplementary Planning Guidance (SPG)) relating to air quality will also be considered. Relevant air quality standards and assessment criteria will also be set out.

Construction dust

4.6.5. The assessment methodology will follow that set out in the IAQM's Guidance on the Assessment of Dust from Demolition and Construction. It will identify the potential for dust to be generated and the sensitivity of the surrounding area and will combine these to determine the risk of dust impacts without appropriate mitigation. This information will then be used to determine the appropriate level of mitigation required to ensure that there are no significant effects.

Odour

4.6.6. The facility will be designed to meet the Best Available Technique Conclusions (BATC) for odour management from waste treatment installations as defined by the Commission Implementing Decision (EU) 2018/1147, and the Environment Agency's "Biological waste treatment: appropriate measures for permitted facilities"¹² guidance. These define a number of best practice requirements for the management of odour at anaerobic digestion facilities including, but not limited to:

- Storage of liquid ammonia rich wastes in a contained or enclosed building maintained under negative pressure by extracting building air to an odour abatement plant;
- Buildings accessed through fast acting doors that default to the closed position; and

⁹ [The Air Quality Standards Regulations 2010 \(legislation.gov.uk\)](https://www.legislation.gov.uk/uksi/2010/1181/contents/made)

¹⁰ [The Air Quality \(England\) Regulations 2000 \(legislation.gov.uk\)](https://www.legislation.gov.uk/uksi/2000/1181/contents/made)

¹¹ [The Air Quality \(England\) \(Amendment\) Regulations 2002 \(legislation.gov.uk\)](https://www.legislation.gov.uk/uksi/2002/1181/contents/made)

¹² <https://www.gov.uk/guidance/biological-waste-treatment-appropriate-measures-for-permitted-facilities>

- All bulk storage tanks and lagoons to be covered and extracted through suitable abatement or to the biogas recovery plant.

4.6.7. An odour risk assessment will be undertaken using the methodology set out in the IAQM's Guidance on the assessment of odour for planning¹³. The risk assessment follows a Source-Pathway-Receptor approach and is designed to identify the potential odour impacts associated with an odour source based on the "FIDOL" factors for describing odour releases (Frequency, Intensity, Duration, Offensiveness and Location).

4.6.8. The odour risk assessment will examine the odour generating potential of the proposed development and will estimate the risk of odour impacts at nearby sensitive receptor locations based on the magnitude of odours released, the effectiveness of the pathway between the source and the receptors (which accounts for the embedded odour control mitigation measures), and the perceived sensitivity of the receptors themselves.

4.6.9. The output of the above assessment will feed into the preparation of an Odour Management Plan.

Other emissions to air during the operational phase

4.6.10. Point source emissions to air of NO_x, SO₂ and VOCs from the combustion plant and flare, and residual NH₃ and H₂S emissions from the odour control units will be subject to detailed assessment using a suitable dispersion model. For the purposes of this assessment, the latest release code of the ADMS dispersion model is proposed.

4.6.11. The model will be used to predict process contributions of the above pollutants at specific receptor locations and across a modelled Cartesian grid to allow the generation of pollutant concentration isopleths. Five years of the most recent hourly sequential meteorological data from the RAF Coningsby meteorological station will be used in the model. This station is located approximately 10km to the east of the development site in an area where land use is similar to that at the development site and where the difference in elevation between the development site and meteorological station is less than two metres. Hence, meteorological parameters recorded at Coningsby are highly likely to be representative of those at the development site.

4.6.12. The assessment will use the most up-to-date published guidance and sources of information available at the time the assessment is carried out. Specific activities will involve:

- Defining baseline conditions, including identifying relevant monitoring data and existing sources of pollutants in the area. This will include examination of maps and aerial photographs, a review of nearby industrial operations using the Government's Pollutant Release and Transfer Register, a review of the North Kesteven District Council's air quality Review and Assessment Reports, and collation of published data, as well as any unpublished data made available by North Kesteven District Council. A project specific baseline monitoring survey is not considered necessary;
- Identifying sensitive locations where people might be affected by changes in air quality, taking into account the different averaging periods set out in the Government's air quality objectives. This will be based on examination of maps and aerial photography; and
- Predicting the change in ambient concentrations from baseline conditions in the first full year of operation quantitatively using the ADMS dispersion model.

4.6.13. The classification of effects during the operational phase will be based on the guidance produced by the EPUK and IAQM. The change in concentration of air pollutants at individual receptors will be quantified and evaluated in the context of an Air Quality Assessment Level (AQAL), which may be an AQS, AQO, EAL or target value, using the impact descriptors defined within the EPUK/IAQM guidance. The assessment of resultant effects will be made using professional judgement considering the factors described in Section 7 of the EPUK/IAQM guidance.

¹³ <https://www.iaqm.co.uk/text/guidance/odour-guidance-2014.pdf>

4.7. Scoping assessment summary

4.7.1. It is considered that there is the potential for likely significant effects during the construction and operational phase of the development and, therefore, an air quality assessment is scoped in and an assessment will be undertaken and presented within the relevant ES chapter.

4.7.2. Table 4-2 presents the proposed scope of assessment for air quality for the construction and operational stages.

Table 4-2 Air Quality assessment scoping

Effect	Phase	
	Construction	Operation
AQ emissions	Scoped out	Scoped in
Dust	Scoped in	Scoped out
Traffic emissions	Scoped out ^A	Scoped out ^A
Odour	Scoped out	Scoped in

^A Pending clarification of final development traffic flows

5. Noise and Vibration

5.1. Introduction

5.1.1. This chapter outlines the noise and vibration scoping assessment and provides a summary of how the potential effects will be addressed in the EIA.

5.2. Baseline conditions

5.2.1. The existing ambient noise levels around the site are typical of agricultural activity and traffic along Digby Road to the south of the site.

5.2.2. The nearest residential receptors are listed in Table 2-1.

5.3. Further assessment and consultation

5.3.1. The Noise and Vibration ES Chapter will address the likely noise and vibration effects associated with the construction and operational phases of the proposed development, and to identify appropriate mitigation measures, as necessary.

5.3.2. Consultation with the Environmental Health Officer will be undertaken to confirm the approach to baseline collection and assessment.

5.3.3. A baseline noise survey will be undertaken that will include unattended measurements of the existing ambient noise levels at a minimum of two locations where baseline noise levels are representative of the residential receptors, together with additional sample measurements as required. The baseline noise survey will be undertaken in accordance with BS 7445:2003 "Description and measurement of environmental noise".

5.3.4. Unattended measurements will be undertaken for a period of 4-7 days, inclusive of typical weekday and weekend periods. Monitoring locations will include:

- A location at the southernmost site boundary, representative of Catley Cottages, Walcott Farm and Crown Farm; and
- A location at the eastern site boundary, representative of Rowston Grange Farm.

5.3.5. The measurement positions will be agreed with a representative of LCC's and North Kesteven District Council's Environmental Health Department.

5.4. Receptors to be considered as part of the EIA

5.4.1. Key nearest and most exposed receptors that may be affected by noise and vibration from the proposed development are residential properties, as identified in Table 2-1.

5.4.2. Additional receptors may be included if identified by further technical study. For example, dependent on the final traffic volumes and routings, receptors within Walcott Village may be considered. This may include additional receptors such as:

- Community educational and healthcare facilities;
- Places of worship; and
- Offices and other commercial facilities.

5.5. Likely environmental effects

5.5.1. The potential noise and vibration impacts relating to the construction and operational phases are summarised below.

Study area

5.5.2. The spatial extents of the construction noise and vibration and operational noise assessments are informed by pertinent standards and guidance, including the Design Manual for Roads and Bridges: Sustainability & Environment Appraisal LA 111 Noise and vibration, 2020 (LA 111), and BS 5228-1:2009+A1: 2014 Code of practice for noise and vibration control on construction and open sites: Part 1 – Noise (BS 5228, 2014).

5.5.3. The spatial extents of the construction noise and vibration study areas are:

- 300m: noise effects from construction activities, such as material movements, earthworks, ground improvement and piling, crushing and breaking;
- 100m: ground-borne vibration effects from high energy construction activities, including piling works; and
- 1 dB change: noise effects from construction vehicle movements to and from the construction site likely to result in a change of 1 dB, LAeq,T or greater.

5.5.4. The spatial extents of the operational study area are:

- Spatial extent: up to 600m around new or altered road links;
- The area within 50m of existing road links with the potential to experience a short-term Basic Noise Level (BNL) change of more than 1 dB(A) as a result of the proposed development, and where the noise level is forecast to exceed the relevant Lowest Observed Adverse Effect Level (LOAEL) in the future assessment year scenarios; or
- Spatial extent: up to 1,000m from the site boundary.

Baseline conditions

5.5.5. A review of the Round 3 Defra strategic noise mapping has indicated that road traffic noise from the A15 is negligible at the site. The East Midlands Main Line railway is located towards the western extent of the study area and has not been included in the Round 3 Defra mapping¹⁴, however train movements along it have the potential to influence baseline levels at receptors close to it.

5.5.6. Baseline conditions at the site and existing nearby noise-sensitive receptors are likely to be dominated by road traffic from the local road network including Digby Road and the B1189 through Walcott.

5.5.7. Existing farm activities also have the potential to influence baseline levels at these receptors, and may include but not be limited to, nearby ventilation units associated with existing poultry houses located close to the site.

Construction

5.5.8. The potentially significant effects at the identified receptors resulting from noise and vibration during the construction phase are set out below:

- Impacts from construction activities, such as material movements, earthworks, road surface breaking and compaction rolling;
- Ground borne impacts from high energy construction activities, such as vibratory rollers and piling; and
- Impacts from construction vehicle movements on the local road network.

¹⁴ <https://www.gov.uk/government/publications/strategic-noise-mapping-2019>

Operation

5.5.9. The potentially significant effects at the nearest identified receptors resulting from noise and vibration during the operational phase are set out below:

- Impact of operational road traffic noise; and
- Impact of operational noise from the proposed development.

5.6. Proposed assessment methodology

Construction phase

5.6.1. The definition of appropriate assessment criteria and noise metrics for the purpose of identifying likely significant effects will take into account pertinent national policies, standards and guidance.

5.6.2. Construction noise predictions will be carried out in accordance with guidance contained in BS 5228-1:2009+A1:2014, which will also be used to inform assessment and significance criteria. Calculations will be informed by indicative plant lists, working methods and proposed phasing plans.

5.6.3. The consideration of construction ground borne vibration effects, such as those associated with high-impact activities, shall be considered using criteria advocated in BS 5228-2:2009+A1:2014, and other vibration related standards and guidance (for example, BS 6472-1:2008 Guide to Evaluation of Human Exposure to Vibration in Buildings: Vibration Sources Other than Blasting, 2008 and BS 7385-2:1993 Evaluation and measurement for vibration in buildings: Part 2 Guide to damage levels from ground-borne vibration, 1993).

5.6.4. The calculation of changes in road traffic flows on the local road network during the construction noise phase will use the procedures described in the Department of Transport's 'Calculation of Road Traffic Noise' (CRTN, 1988) and presented in terms of Basic Noise Level (BNL). The results will be assessed by reference to significance criteria advised in Highways England 'LA 111 Noise and vibration' (LA111, 2020).

Operational phase

5.6.5. The assessment will be undertaken in line with national policies, namely the Noise Policy Statement for England (NPSE, 2010), taking into account relevant policies, standards and guidance including:

- NPPF, 2012,
- PPG(N), 2014,
- IEMA Guidelines for Environmental Noise Impact, 2014,
- WHO Guidelines for Community Noise, 1999,
- WHO Night Noise Guidelines, 2009, and
- WHO Environmental Noise Guidelines for the European Region, 2018.

5.6.6. Criteria will be developed to determine effects based on absolute levels of and changes in noise exposure with respect to relevant policy thresholds and guidance.

5.6.7. The calculation of changes in road traffic noise from the local road network during the operational phase will use the procedures described in the Department of Transport's CRTN (1988) and presented in terms of BNL. The results will be assessed by reference to significance criteria advised in Highways England 'LA 111 Noise and vibration' (LA111, 2020). Operational noise at the identified residential receptors will be assessed against criteria developed using methodologies advocated in BS 4142: 2014+A1:2019 Methods for rating and assessing industrial and commercial sound (BS 4142, 2019).

Classification of effects

5.6.8. The identification of likely significant effects requires consideration of the following:

- Significant adverse impacts on health and quality of life, as identified through Government noise policy as set out by the NPSE;
- Likely significant environmental effects (adverse and beneficial);
- In-combination noise effects (intra-project effects); and
- Cumulative noise effects (inter-project effects).

5.6.9. The NPSE (2010) effect levels that relate to the likelihood of significant adverse effects on health and quality of life are as follows:

- NOEL - 'No Observed Effect Level': The level below which no effect can be detected;
- LOAEL - 'Lowest Observed Adverse Effect Level': The level above which adverse effects on health and quality of life can be detected; and
- SOAEL - 'Significant Observed Adverse Effect Level': The level above which significant adverse effects on health and quality of life occur.

5.6.10. PPG(N) provides further detail about how the effects of noise can be described in terms of perception and outcomes, adding a fourth term:

- UAEL – 'Unacceptable Adverse Effect Level': The level above which adverse effects are unacceptable.

5.6.11. Likely significant effects in the context of the EIA Regulations are identified separately to government noise policy defined significant effects on health and quality of life, but do require that a development should include measures, in order to "mitigate and minimise" adverse effects, where it is sustainable to do so.

5.6.12. For the purposes of the assessment, where noise exposure at a residential receptor is assessed as being below the LOAEL threshold, it is considered that a significant effect will not occur. Where the noise exposure at a residential receptor newly exceeds the SOAEL threshold, a likely significant adverse effect in terms of the EIA Regulations is deemed to occur, in addition to a significant observed adverse effect on health and quality of life in terms of government noise policy.

5.6.13. Determining whether a significant adverse effect occurs where noise exposure lies between the LOAEL and SOAEL thresholds requires consideration of additional quantitative and qualitative factors, namely:

- Noise level – the level of exposure between the LOAEL and SOAEL values;
- Change in noise level – the magnitude of noise level change;
- Receptor sensitivity; and
- Receptor type (community population) – the size of population exposed.

5.6.14. Additional factors to be considered include:

- Type and magnitude of impact;
- The existing ambient acoustic environment;
- Additional metrics;
- How effective the measures employed to mitigate effect are, including best practicable means (BPM);
- The duration of the effect; and
- The scale of population exposed.

Assessment criteria

Construction noise

Residential receptors

5.6.15. The determination of effect thresholds for the construction noise assessment is based upon the methodologies presented within Annex E of BS 5228-1:2009+A1:2014 'ABC Method', as summarised in Table 5-1.

Table 5-1: Construction noise (fixed and mobile plant) – 'ABC Method' noise thresholds

Noise Source	Receptor	Period	Threshold value, in decibels (dB LAeq,T)		
			Category A	Category B	Category C
Construction Noise	Residential	Daytime	65 dB LAeq,12h	70 dB LAeq,12h	75 dB LAeq,12h
	Residential	Evening	55 dB LAeq,4h	60 dB LAeq,4h	65 dB LAeq,4h
	Residential	Night	45 dB LAeq,8hr	50 dB LAeq,8hr	55 dB LAeq,8hr
Clarifications and notes: Daytime: Weekdays (0700-1900hrs) and Saturdays (0700-1300hrs) Evening: Weekdays (1900-2300hrs), Saturdays (1300-2300hrs), Sundays and Bank Holidays (0700-2300hrs) Night-time: Weekdays, Weekends and Bank Holidays (2300-0700hrs)					
*Rounded to the nearest 5 dB					

5.6.16. The Category A noise thresholds are assumed to align with the Lowest Observed Adverse Effect Level (LOAEL) as they are the lowest threshold in the 'ABC Method' criteria.

5.6.17. The Category C noise thresholds are assumed to align with a Significant Observed Adverse Effect Level (SOAEL) and is an approach consistent with major infrastructure projects, namely: Thames Tideway Tunnel; Crossrail; and High Speed 2 (HS2) Phase 1 and 2a.

5.6.18. The daytime Category C (SOAEL) threshold of 75 dB LAeq,12hr is taken from the Committee on the Problem of Noise: Noise report (Wilson, 1963) and was set to avoid interference with normal speech indoors.

5.6.19. The evening Category C (SOAEL) is set at 10 dB lower than the day-time criteria, based upon advice presented within the Department of the Environment Advisory Leaflet 72 – Noise Control on Building Sites (AL 72, 1976).

5.6.20. The night-time Category C (SOAEL) of 55 dB LAeq,8hr is consistent with advice presented within the WHO Night Noise Guidelines for Europe (WHO NNG, 2009).

5.6.21. The UAEL thresholds are based upon the BS 5228-1:2009+A1:2014 requirements for temporary rehousing, associated with construction activities of 10 or more days of working in any 15-consecutive days, or for 40 or more days in any six consecutive months, and set at 10 dB above the SOAEL.

5.6.22. Where proposed development related noise exposures are shown to be lower than the LOAEL values, a significant effect will not be deemed to occur at residential receptors.

5.6.23. Development related noise exposures which fall between LOAEL and SOAEL have the potential to constitute a significant effect, subject to additional considerations, namely:

- The level of noise exposure;

- The change in the noise exposure as a result of the proposed development; and
- The population experiencing such change and exposure to noise as a result of the proposed development.

Noise exposure classifications

5.6.24. Table 5-2 provides noise level categories between the LOAEL and UAEL thresholds. Greater weight in terms of significance evaluation has been given to higher noise levels, even when occurring between the same thresholds, specifically LOAEL and SOAEL.

Table 5-2: Construction noise level categories

Noise Level	Construction Noise		
	Daytime	Evening	Night-time
Very Low	<65 dB L _{Aeq, 12h}	<55 dB L _{Aeq, 4h}	<45 dB L _{Aeq, 8h}
LOAEL			
Low	66-68 dB L _{Aeq, 12h}	56-58 dB L _{Aeq, 4h}	46-48 dB L _{Aeq, 8h}
Medium	69-71 dB L _{Aeq, 12h}	59-61 dB L _{Aeq, 4h}	49-51 dB L _{Aeq, 8h}
High	72-74 dB L _{Aeq, 12h}	62-64 dB L _{Aeq, 4h}	52-54 dB L _{Aeq, 8h}
SOAEL			
Very high	>75 dB L _{Aeq, 12h}	>65 dB L _{Aeq, 4h}	>55 dB L _{Aeq, 8h}
UAEL			
Unacceptable	>85 dB L _{Aeq, 12h}	>75 dB L _{Aeq, 4h}	>65 dB L _{Aeq, 8h}

Magnitude of change in noise exposure

5.6.25. The magnitude of change in noise exposure is not considered as part of the construction noise assessment given there are no permanent activities associated with construction phase.

Construction vibration

5.6.26. Construction activities, such as vibratory compaction, have the potential to cause vibration induced adverse effects at residential receptors.

5.6.27. The effect of human exposure to vibration from sources other than blasting is covered in BS 6472:2008. The standard provides guidance for predicting human response to vibration in buildings over the frequency range of 0.5 Hz to 80 Hz. It presents frequency-weighting curves for humans exposed to whole-body vibration, advice on measurement methods and methods for assessing continuous, intermittent and impulsive vibrations.

5.6.28. BS 6472:2008 uses the vibration dose value (VDV ms^{-1.75}) to determine the effect of vibration on human receptors within the buildings, as “[p]resent knowledge shows that this type of vibration is best

evaluated with the vibration dose value (VDV)." As noted in BS 5228-2:2009+A1:2014, for construction it is considered more appropriate to consider effects of vibration levels in terms of Peak Particle Velocity (PPV mms-1).

5.6.29. The use of the PPV metric is also consistent with the guidance within BS 7385:1993, which presents assessment criteria to be applied for the likelihood of cosmetic damage to buildings.

5.6.30. Table 5-3 provides presents a summary of the assessment criteria given in terms of human response and cosmetic building, derived based on guidance within BS 5228-2:2009+A1:2014 and BS 7385:1993.

Table 5-3: Vibration limits for human response and building (cosmetic) damage

Vibration Limit (PPV mms-1)	Effect	Magnitude of Impact
< 0.14	Vibration unlikely to be perceptible	None
0.14	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration	Negligible
0.30	Vibration might be just perceptible in residential environments	Minor
1.00	It is likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given the residents	Moderate
7.50	Guide value for cosmetic damage of residential buildings where dynamic loading may lead to resonance	Significant
10.00	Vibration is likely to be intolerable for any more than a very brief exposure to these levels in most building environments	Very Significant

5.6.31. A significant effect from construction vibration is deemed to occur at a residential receptor where there is an exceedance of a magnitude of impact of 1.00 mms-1 PPV during the daytime, or 0.30 mms-1 PPV during the night-time periods.

Construction road traffic noise

5.6.32. The assessment criteria used in the construction traffic assessment is consistent with the operational road traffic noise assessment, as summarised in Table 5-4.

Table 5-4: Thresholds of potential effect criteria (outdoor, free-field noise levels unless otherwise stated)

Noise Source	Period	LOAEL	SOAEL	UAEL
Construction Road Traffic	Daytime	55 dB LA10,18h (façade)	68 dB LA10,18h (façade)	71 dB LAeq,12h
	Night-time	40 dB Lnight, outside	55 dB Lnight, outside	66 dB LAeq,4h

Noise exposure classifications

5.6.33. Table 5-5 provides noise level categories between the LOAEL and UAEL thresholds. Greater weight in terms of significance evaluation has been given to higher noise levels, even when occurring between the same thresholds, specifically, LOAEL and SOAEL.

Table 5-5: Construction road traffic noise level categories

Noise Level	Construction Road Traffic	
	Daytime	Night-time
Very Low	<55 dB L _{A10,18h} (façade)	<40 dB L _{night, outside}
LOAEL		
Low	55-59 dB L _{A10,18h} (façade)	40-45 dB L _{night, outside}
Medium	60-63 dB L _{A10,18h} (façade)	46-49 dB L _{night, outside}
High	64-67 dB L _{A10,18h} (façade)	50-54 dB L _{night, outside}
SOAEL		
Very high	>=68 dB L _{A10,18h} (façade)	>=55 dB L _{night, outside}
UAEL		
Unacceptable	>=71 dB L _{Aeq,16h}	>=66 dB L _{Aeq,8h}

Magnitude of change in noise exposure

5.6.34. A beneficial change is deemed to occur where there is a reduction in noise level, and an adverse change is deemed to occur where there is an increase.

5.6.35. Potential impacts associated with road traffic during the construction phase will be short-term. With regards to construction road traffic noise, potential adverse impact thresholds in Government policy and EIA terms have been established by reference to LA 111 and the IEMA guidelines, as summarised in Table 5-6.

Table 5-6 Change in road traffic noise level categories

Noise Change Category	Change in Road Traffic Noise
Negligible	<1 dB
Low	1 – 2.9 dB
Medium	3 – 4.9 dB
High	5 – 9.9 dB
Very High	>10 dB

Non-residential receptors

5.6.36. Table 5-7 summarises the noise impact criteria for non-residential receptors, should they be included in the assessment. For all noise related impact criteria for non-residential receptors, there is an additional consideration where the noise exposure increases the existing ambient by 3 dB or more.

Table 5-7: Non-residential receptor external noise impact criterion

Non-residential Receptor Group	Daytime 0700-2300hrs Impact Criterion dB LAeq,16h	Non-residential Receptor Group dB LAeq,8h	Reference
Place of Worship	50*	Not Applicable	BS 8233:2014
Educational	50*	45*	BB93:2015
Healthcare	55*	50*	HTM08-01:2013
*and a change of >3 dB			

Operational road traffic noise

Residential receptors

5.6.37. The assessment criteria will be primarily based on the LOELs and SOAELs as set out within LA 111.

5.6.38. UK policy does not define daytime or night-time UAEL values for road traffic noise. The assessment assumes UAEL values based on advice set out within BS 8233: 2014 Guidance on sound insulation and noise reduction for buildings (BS 8233, 2014) and ProPG: Planning & Noise – Professional Practice Guidance on Planning & Noise, (ProPG, 2017).

5.6.39. It has been assumed that the target internal noise levels, as set out in BS 8233 (2014) would be deemed unacceptable once they exceed by 10 dB or more. It has also been assumed that 26 dB is a reasonably conservative assumption for the outdoor to indoor level difference. This represents the level difference expected for a property with a masonry construction and single glazed (closed) windows.

5.6.40. The derivation of the UAEL values from the BS 8233 (2014) daytime and night-time target internal noise levels is presented in Table 5-8.

Table 5-8: Operational road traffic noise – Internal noise level thresholds

Noise Source	Period	BS 8233 (2014) Target Internal Noise Level	Unacceptable Internal Noise Level	Unacceptable External Noise Level (UAEL)
Operational Road Traffic	Daytime	35 dB LAeq,16h	45 dB LAeq,16h	71 dB LAeq,16h
	Night-time	30 dB LAeq,8h	40 dB LAeq,8h	66 dB LAeq,8h

5.6.41. A summary of the assessment criteria used to assess road traffic noise is given in Table 5-9. Whilst LA 111 specifies night-time criteria as L_{night} and the derived UAEL is in terms of LAeq,8hr, for the road traffic assessment, these are considered to be equivalent as they have both been determined in relation to annual average road traffic flows.

Table 5-9: Road traffic noise thresholds of potential effect criteria (outdoor, free-field noise levels unless otherwise stated)

Noise Source	Period	BS 8233 (2014) Noise Level	Unacceptable Noise Level	Unacceptable Noise Level (UAEL)
Operational Road Traffic	Daytime	55 dB LA10,18h (façade)	68 dB LA10,18h (façade)	71 dB LAeq,16h
	Night-time	40 dB L _{night, outside}	55 dB L _{night, outside}	66 dB LAeq,8h

5.6.42. Where development related noise exposures are shown to be lower than the LOAEL values in Table 5-9, a significant effect in terms of the EIA Regulations will not be deemed to occur at residential receptors.

5.6.43. Development related noise exposures which fall between LOAEL and SOAEL have the potential to constitute a significant effect, subject to additional considerations, namely:

- The level of noise exposure;
- The change in the noise exposure as a result of the proposed development; and
- The population experiencing such change and exposure to noise as a result of the proposed development.

Noise exposure classifications

5.6.44. Table 5-10 provides noise level categories between the LOAEL and UAEL thresholds. Greater weight in terms of significance evaluation is given to higher noise levels, even when occurring between the same thresholds, for example, LOAEL and SOAEL.

Table 5-10: Operational road traffic noise level categories

Noise Level	Road Traffic Noise	
	Daytime	Night-time
Very Low	<55 dB LA10,18h (façade)	<40 dB Lnight, outside
LOAEL		
Low	55-59 dB LA10,18h (façade)	40-45 dB Lnight, outside
Medium	60-63 dB LA10,18h (façade)	46-49 dB Lnight, outside
High	64-67 dB LA10,18h (façade)	50-54 dB Lnight, outside
SOAEL		
Very high	>=68 dB LA10,18h (façade)	>=55 dB Lnight, outside
UAEL		
Unacceptable	>=71 dB LAeq,16h	>=66 dB LAeq,8h

Magnitude of change in noise exposure

5.6.45. A beneficial change is deemed to occur where there is a reduction in noise level, and an adverse change was where there is an increase.

With regards to operational road traffic noise, potential adverse impact thresholds in government policy and EIA terms have been established by reference to LA 111 and the IEMA guidelines, as summarised in Table 5-11.

Table 5-11 Change in road traffic noise level categories

Noise Change Category	Change in Road Traffic Noise
Negligible	<1 dB
Low	1 – 2.9 dB
Medium	3 – 4.9 dB
High	5 – 9.9 dB
Very High	>10 dB

Non-residential receptors

5.6.46. Table 5-12 summarises the noise impact criteria for the any non-residential receptors that may be included in the assessment. For all noise related impact criteria for non-residential receptors, there is an additional consideration where the noise exposure increases the existing ambient by 3 dB or more.

Table 5-12: Non-residential receptor external noise impact criterion

Non-residential Receptor Group	Daytime 0700-2300hrs Impact Criterion dB L _{Aeq,16h}	Non-residential Receptor Group dB L _{Aeq,8h}	Reference
Place of Worship	50*	Not Applicable	BS 8233:2014
Educational	50*	Not Applicable	BB93:2015
Healthcare	55*	50*	HTM08-01:2013
*and a change of >3 dB			

Operational noise

Residential receptors

5.6.47. British Standard 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound' (BS 4142, 2019) is the standard applicable to the assessment of sound of an industrial nature, such as that from the operation of the proposed development. The BS 4142 (2019) methodology assesses the likely effects of sound on people and premises used for residential purposes and provides an indication of the likely magnitude of impact. The BS 4142 (2019) magnitude of impacts, including where there is an indication of 'significant adverse impact' has been aligned with the effect levels in NPSE (2010), namely the SOAEL, which is the effect level above which significant adverse effects on health and quality of life occur.

5.6.48. For residential receptors during the daytime and night-time periods, the SOAEL threshold is set at 10 dB greater than the background sound level, when determined in accordance with the BS 4142 (2019) assessment procedure. When this threshold is exceeded it indicates that a significant adverse effect in EIA terms is likely to occur, subject to factors relating to context.

5.6.49. The LOAEL threshold is exceeded where the rating level is equal to or exceeds the background sound level. Table 5-13 summarises the threshold levels relating to operational sound.

Table 5-13: Operational noise – BS 4142 (2019) LOAEL and SOAEL criteria

Period	LOAEL	SOAEL
Daytime* (0700-2300hrs)	Equal to background sound level, $L_{A90,T}$ (with consideration of context).	Background sound level, $L_{A90,T} + 10$ dB (with consideration of context).
Night-time (2300-0700hrs)	Equal to background sound level, $L_{A90,T}$ (with consideration of context).	Background sound level, $L_{A90,T} + 10$ dB (with consideration of context).

*where necessary, consideration of the evening period (1900-2300) will be included

5.6.50. In instances where the predicted rating levels are between the LOAEL and the SOAEL, thresholds can require some additional quantitative and qualitative considerations. Consideration must be given to the context within which the effect occurs in addition to employing professional judgement. These considerations can include:

- The magnitude of the effect;
- The change in magnitude of the effect;
- The type of effect, including its intermittency;
- The existing ambient environment;
- How effective the measures employed to mitigate the effect are, including BPM; and
- The duration of the effect.

5.7. Scoping assessment summary

5.7.1. It is considered that any noise and vibration relating to the construction phase and operational phase has the potential to cause adverse effects at nearby receptors.

5.7.2. The potential impacts on sensitive receptors from noise and vibration are:

- Construction noise effects from construction activities, such as material movements, earthworks, road surface breaking and compaction rolling;
- Construction vibration effects due to high energy construction activities, such as vibratory rollers and piling;
- Construction road traffic noise;
- Operational road traffic noise; and
- Operational noise from the proposed development.

5.7.3. Table 5-14 presents the proposed scope of assessment for noise and vibration for the construction and operational stages.

Table 5-14 Noise and vibration assessment scoping

Effect	Phase	
	Construction	Operation
Noise effects from activities	Scoped in	Scoped in
Vibration effects from activities	Scoped in	Scoped out
Road traffic noise	Scoped in	Scoped in

6. Archaeology and Heritage

6.1. Introduction

6.1.1. This chapter outlines the archaeology and heritage scoping assessment and provides a summary of how the potential effects will be addressed in the EIA.

6.2. Baseline conditions

6.2.1. This initial historic environment baseline has been formed from a review of open-source information available on the National List¹⁵ and the on-line Lincolnshire Historic Environment Records¹⁶ database of Historic England¹⁷ data.

6.2.2. The site has been subjected to prolonged intensive arable farming, considerably reducing the chances of archaeological remains surviving.

6.2.3. There are no World Heritage Sites, Registered Battlefields, Registered Parks and Gardens, Conservation Areas contained on site. The nearest Listed Building is 1.1km to the north-east of the site, the Thorpe Tilney Hall Grade II Listed Building. The proposed development is not located within a Conservation Area. Current information indicates that the closest Conservation Area is circa 4km to the south-east at Billingham.

6.2.4. There are two scheduled ancient monuments to the south of the site. Catley Priory (143m south) and the Neolithic Long Barrow 770m ESE of Rowston Grange 215m to the south. The Historic England survey of Catley Priory (see below) indicates that doubt has been cast on this interpretation of the Neolithic Long Barrow.

6.2.5. LCC has identified the site as having high archaeological potential and has identified the potential of the proposed works to affect the setting of the Scheduled Ancient Monument (SAM) of Catley Priory to the immediate south of the site.

6.2.6. A survey report was completed for Catley Priory in 2005.¹⁸ There are no extant standing structures at Catley, the archaeological remains survive as earthworks dating from the medieval period, however bronze-age remains were found in the surrounding fields.

6.2.7. Additional data from the on-line Lincolnshire Historic Environment Records database indicates that assets recorded on or within the vicinity of the site include:

- Monument record MLI88587 - Possible Bronze Age Cropmark Round Barrow, Walcott;
- Find Spot record MLI80368 – Late Neolithic cutting flake found during fieldwalking;
- Find Spot record MLI80369 – Mesolithic blade fragment found during fieldwalking;
- Find Spot record MLI88222 - Polished flint axe, Walcott Commons;
- Find Spot record MLI82866 – Early Bronze Age flanged flat axe, Walcott Commons;
- Monument record MLI88957 – Medieval earthwork ridge and furrow, Walcott;
- Monument record MLI60313 - Walcott Commons barrow cemetery; and
- Monument record MLI60312 – Barrow cemetery near Catley Priory.

6.3. Further assessment and consultation

6.3.1. Consultation with key statutory consultees, including Historic England and the County Historic Environment Officer will be undertaken as part this process. LCC has identified the site as having high

¹⁵ The National Heritage List for England (NHLE) - <https://historicengland.org.uk/listing/the-list/>

¹⁶ The Lincolnshire Historic Environment Record - <https://www.lincolnshire.gov.uk/historic-environment/historic-environment-record>

¹⁷ [Historic England - Championing England's heritage | Historic England](https://historicengland.org.uk/research/results/reports/6431/CatleyPrioryLincolnshire_aGilbertineHouseintheWithamValleySurveyReport)

¹⁸ https://historicengland.org.uk/research/results/reports/6431/CatleyPrioryLincolnshire_aGilbertineHouseintheWithamValleySurveyReport

archaeological potential as well as the potential to affect the “setting” of the Scheduled Monument of Catley Priory to the immediate south of the site.

6.3.2. A Heritage Impact Assessment incorporating desk based data and the results of a geophysical survey will inform the heritage ES chapter, which will include consideration of the identified archaeological potential within the site and surrounding area along with the setting of designated heritage assets. Following review of the desk based data and geophysical survey the information will be provided to the LPA’s heritage advisers to ascertain the need (or otherwise) for additional information to be provided in support of the planning application.

6.3.3. Due to the distance and associated lack of influence of the proposed development to listed buildings and conservations areas within the surrounding area, these will not be considered for further assessment in the ES.

6.4. Receptors to be considered as part of the EIA

6.4.1. The baseline section above identified the receptors which could potentially be affected as a result of the proposed development and will thus be assessed within the ES. Additional receptors may be included if identified by further technical study. As part of this Scoping Opinion the applicant would also request that LCC provide any additional receptors they consider should be included.

6.5. Likely environmental effects

Construction effects

6.5.1. In respect of construction phase effects, there may be potential for as yet unknown archaeological remains to be uncovered. The effect is uncertain until further research has been carried out as to the extent of any potential impacts and the effect on any archaeological remains present.

6.5.2. The proposed development will result in a change to the landscape during the construction phase as the construction of the new above ground Walcott Farm Biofuel Plant and access to the NTS Compound will introduce new elements to the landscape. Temporary impacts on the landscape during the construction phase will be assessed within the Landscape and Visual Impacts chapter (see Chapter 7).

6.5.3. There will be no physical impacts on any built heritage assets. Any construction impacts on the setting of designated built heritage assets in the vicinity of the works are likely to be temporary, small-scale changes. These temporary impacts will not result in significant environmental effects and are therefore scoped out of this assessment.

Operational effects

6.5.4. At the operational stage the key impacts to archaeology and heritage will be to the landscape from the new permanent structure. This has the potential to change the character of the landscape.

6.5.5. It is not anticipated there would be any further intrusive works or loading to the site beyond that identified in the construction phase. Therefore, there are no expected impacts to archaeology and any unknown below-ground heritage features at the operational phase.

6.5.6. It is not expected that there will be long-term impacts on the setting of designated heritage assets during the operational phase. From initial observations, views to the SAM to south appear obscured by trees, hedgerows and Catley Cottages. Landscape mitigation (see Chapter 7) is proposed to provide visual screening that would further obscure views to and from the SAM to the south. However, a zone of visual influence (as informed by the ZTV identified in the LVIA) would assess more ably the potential impacts on the settings of heritage assets and the historic landscape.

6.6. Proposed assessment methodology

Proposed scope

6.6.1. The proposed scope of the historic environment assessment will be to provide an understanding of the below and above ground assets that may be affected by the proposed development.

6.6.2. The study area for the assessment of buried archaeological assets will be agreed with the LPA's Historic Environment Officer in order to determine the likelihood of buried archaeology existing within the footprint of the proposed development and to understand the archaeological potential from the background information. It is anticipated that this search area may be up to 1km. A systematic search will be undertaken of all readily available and relevant documentary sources for the study area, following the Chartered Institute for Archaeologists' (CIfA) Standard and Guidance for archaeological desk-based assessment¹⁹. Other guidance to be used will include the NPPF (Chapter 16), relevant local plan policies and Historic England guidance, particularly GPA2: Managing Significance in Decision-Taking in the Historic Environment²⁰ and GPA3: The Setting of Heritage Assets²¹.

6.6.3. The proposed scope will include:

- A review of evidence held at the Lincolnshire Historic Environment Record (HER) and Historic Landscape Characterisation also held by the HER;
- An examination of national and local planning policies in relation to heritage assets;
- A map regression exercise looking at the cartographic evidence for the site;
- An examination of available topographical evidence;
- An inspection of geological sources (maps/borehole logs/trial-pit data) available for the site;
- A review of the results of archaeological field work undertaken within the vicinity of the site;
- A site walkover of the site and surrounding area to understand the conditions of the site and its relationship with surrounding heritage;
- An assessment of existing impact on the site;
- An assessment of relevant published and unpublished sources;
- Review of relevant archaeological Research Agendas and Frameworks in relation to archaeological assets;
- A geophysical survey of the site; and
- A review of the ZTV.

6.6.4. The study area for the assessments on the setting of designated heritage assets will be approximately 1km from the proposed development location and the assessment will be informed by the ZVI as established in the landscape and visual assessment (see Chapter 7).

6.6.5. The assessment of impacts to the setting of heritage assets will follow the "5-step" process set out in GPA3.

Establishing the baseline

6.6.6. To establish the baseline a site visit will be required following the review of historic maps. This will be supported by a Desk Based Heritage Assessment. A geophysical magnetometer survey using a modular cart-based magnetometer system, will also be undertaken at the site to detect the potential for physical properties of buried archaeological remains in the surrounding soil underlying the site.

¹⁹ Chartered Institute for Archaeologists, 2020, Standard & Guidance for historic environment desk-based assessment

²⁰ Historic England, 2015, Historic Environment Good Practice Advice in Planning 2. Managing Significance in Decision-Taking in the Historic Environment

²¹ Historic England, 2017, Historic Environment Good Practice Advice in Planning 3. The Setting of Heritage Assets December

Assessment criteria

Heritage potential

6.6.7. The classification of effect is determined by identifying the importance of an asset, assessing the magnitude of change the proposal would have on the asset's significance (where significance is defined as the attributes that give the asset its importance) and then combining these two elements to classify the effect.

6.6.8. In relation to the terminology identified in Chapter 3, the asset's importance or significance defines its value. The following text and tables provide further detail on the process of assessing effects.

Each heritage asset in the baseline is assigned a value as shown in Table 6-1. The magnitude of potential impacts of the proposed development will then be assessed. The magnitude of impact will be rated on a four-point scale and can be either beneficial or adverse as shown in Table 6-2.

Table 6-1 Value of heritage asset

Value	Description	Example
Very High	Internationally important or significant heritage assets	World Heritage Sites, or buildings recognised as being of international importance.
High	Nationally important heritage assets generally recognised through designation as being of exceptional interest and value.	Grade I and II* Listed Buildings, Grade I and II* Registered Parks and Gardens, Scheduled Monuments, Protected Wreck Sites, Registered Historic Battlefields, Conservation Areas with notable concentrations of heritage assets, archaeological assets that can contribute significantly to acknowledged national research objectives and undesignated assets of national or international importance.
Medium	Nationally or regionally important heritage assets recognised as being of special interest, generally designated.	Grade II Listed Buildings, Grade II Registered Parks and Gardens, Conservation Areas and undesignated assets of regional or national importance, including archaeological remains (for example, LPA Archaeological Priority Areas), which relate to regional research objectives or can provide important information relating to particular historic events or trends that are of importance to the region.
Low	Assets that are of interest at a local level primarily for the contribution to the local historic environment.	Undesignated heritage assets such as locally listed buildings, undesignated archaeological sites, undesignated historic parks and gardens etc. Can also include degraded designated assets that no longer warrant designation.
Very Low	Elements of the historic environment which are of insufficient significance to merit consideration in planning decisions and hence be classed as heritage assets.	Undesignated features with very limited or no historic interest. Can also include highly degraded designated assets that no longer warrant designation.
Negligible	The importance of an asset has not been ascertained.	

Table 6-2 Criteria for assessment of magnitude of impact

Magnitude of Impact	Factors in assessment of the magnitude of impact
Very High	<ul style="list-style-type: none"> ➤ Change to all key archaeological material, such that the resource is totally altered. ➤ Change to the key historic building elements, such that the resource is totally altered ➤ Change of use of access, resulting in total change to historic landscape / townscape character unit. ➤ Comprehensive changes to setting.
High	<ul style="list-style-type: none"> ➤ Change to most of all key archaeological material, such that the resource is totally altered. ➤ Change to the key historic building elements, such that the resource is totally altered ➤ Change of use of access, resulting in total change to historic landscape / townscape character unit. ➤ Comprehensive changes to setting.
Medium	<ul style="list-style-type: none"> ➤ Changes to many key archaeological materials, such that the resource is clearly modified. ➤ Changes to many key historic building elements, such that the resource is clearly modified. ➤ Changes to the setting of a heritage asset, such that it is considerably modified. ➤ Changes to many key historic landscape/ townscape elements, parcels or components, visual change to many key aspects of the historic landscape/ townscape; noticeable differences in noise or sound quality; considerable changes to use or access; resulting in moderate changes to historic landscape/ townscape character.
Low	<ul style="list-style-type: none"> ➤ Changes to key archaeological materials, such that the asset is slightly altered. ➤ Change to key historic building elements, such that the asset is slightly different. ➤ Change to setting of a heritage asset, such that it is noticeably changed. ➤ Changes to a few key historic landscape/ townscape elements, parcels or components; slight visual changes to few key aspects of historic landscape/ townscape; limited changes to noise levels or sound quality; slight changes to use or access; resulting in limited changes to historic landscape/ townscape character.
Very Low	<ul style="list-style-type: none"> ➤ Very minor changes to archaeological materials. ➤ Slight changes to historic buildings elements or setting that hardly affect it. ➤ Very minor changes to key historic landscape/ townscape elements, parcels or components; virtually unchanged visual effects; very slight changes in noise levels or sound quality; very slight changes to use or access; resulting in a very small change to historic landscape/ townscape character.
No change	<ul style="list-style-type: none"> ➤ No loss or alteration of archaeological material, historic buildings or setting. ➤ No changes to key historic landscape/ townscape elements, parcels or components; virtually unchanged visual effects; very slight changes in noise levels or sound quality; no changes to use or access. ➤ No overall change to the historic landscape / townscape character.

6.6.9. The classification of the effect will then be determined by considering the value of the heritage asset and the magnitude of impact as shown in Table 3-2. An effect is considered significant if it is moderate or major. Minor and negligible effects are not considered significant.

Archaeological potential

6.6.10. The likelihood that significant undiscovered heritage assets may be present within the study area is referred to as archaeological potential. Overall levels of potential can be assigned to different landscape zones, recognising that the archaeological potential of any zone will relate to particular historical periods and types of evidence. The following factors are considered in assessing archaeological potential:

- The distribution and character of known archaeological remains in the vicinity, and based on consultation with the County Historic Environment Officer;
- The history of archaeological fieldwork and research in the surrounding area, which may give an indication of the reliability and completeness of existing records;
- Environmental factors such as geology, topography, and soil quality, which would have influenced land use in the past and can therefore be used to predict the distribution of archaeological remains;
- Land use factors affecting the survival of archaeological remains, such as ploughing or commercial forestry planting; and

- Factors affecting the visibility of archaeological remains, which may relate to both environment and land use, such as soils and geology (which may be more or less conducive to formation of cropmarks), arable cultivation (which has potential to show cropmarks and create surface artefact scatters), vegetation, which can conceal upstanding features, and superficial deposits such as peat and alluvium which can mask archaeological features.

6.6.11. The overall archaeological potential assigned to different landscape zones can be seen in Table 6-3.

Table 6-3 Archaeological potential criteria for assessment value

Potential	Definition
Very High	Undiscovered heritage assets are present, and these are likely to include assets of high importance.
High	Undiscovered heritage assets are almost certainly present, and these are likely to include assets of high or medium importance.
Medium	Undiscovered heritage assets are likely to be present, and it is possible, though unlikely, that these may include assets of high or medium importance.
Low	The study area may contain undiscovered heritage assets, but these are unlikely to be numerous and are highly unlikely to include assets of high or medium importance.
Very low	The study area is highly unlikely to contain undiscovered heritage assets of any level of importance.
Negligible	There is no possibility of undiscovered heritage assets existing within the study area.

6.6.12. The archaeological potential of an area informs the potential for finding unknown cultural heritage assets. As these assets are unknown their significance (or importance, thereby defining its value) cannot be assessed meaningfully nor can the magnitude of impact be predicted. Rather this provides an informed assessment of the possibility of finding archaeological remains within the area.

6.7. Scoping assessment summary

6.7.1. Table 6-4 presents the topics which are scoped into the archaeology and heritage chapter of the ES at the construction and operational phase.

Table 6-4 Archaeology and Heritage scoping summary

Effect	Phase	
	Construction	Operation
Built heritage assets	Scoped out	Scoped out
Archaeology	Scoped in	Scoped out
Historic landscape	Scoped in	Scoped in

7. Landscape and Visual Impact

7.1. Introduction

7.1.1. This chapter sets out the proposed scope of the Landscape and Visual Impact Assessment (LVIA) including a summary of the likely potentially significant effects.

7.1.2. The purpose of LVIA is to identify potential effects of the development on:

- The elements that make up the landscape;
- The specific aesthetic or perceptual qualities of the landscape;
- The character of the landscape; and
- People who will be affected by changes in views or visual amenity.

7.1.3. The LVIA process will also influence the development as the design evolves and enable the applicant to consider potential mitigation and landscape enhancement.

7.2. Baseline conditions

Introduction

7.2.1. Walcott Farm is located on agricultural land off Digby Road 1km to the west of Walcott and 3.5km to the east of Digby. It is currently used for intensive poultry farming. The site lies within an area of predominantly open countryside with scattered farms and both historic and modern farm buildings.

Landscape character

7.2.2. Located in the East Midlands, the site lies in the eastern side of the Southern Lincolnshire Edge National Character Area (NCA), published by Natural England (2014). Compared to the open, primarily arable higher ground of the north, this area is typically characterised by wetter heavier clay soils, where pasture is more prevalent, with hedgerows predominant on the site boundary providing a more intimate and enclosed feel to the landscape, with more woodland and trees.

7.2.3. At a more local level, the site lies within the Central Plateau Landscape Character Type, as published within the Landscape Character Assessment (LCA) by North Kesteven District Council (2007). This is one of four broad landscape character types within North Kesteven, each elongated from north to south. Within the Central Plateau, the site lies within the Central Clays and Gravels Sub-Area 11. The site is close to the boundary with the Fens Landscape Character Type and the Fenland Sub-Area 13, which lies to the south and east but takes its main characteristics from the Central Clays and Gravels Sub-Area 11.

7.2.4. Key characteristics of the Central Clays and Gravels Sub-Area 11, relevant to the site, include the following aspects:

- A gently undulating lowland clay vale, underlain with boulder clay and gravel deposits. The gradient slopes gently down from west to east (approximately 20m down to 5m);
- Fields are generally smaller and more varied in shape than on the adjacent limestone plateau with some grazing land as well as arable;
- Surface water drains into small streams running from west to east and drainage ditches run by the sides of the fields;
- Well-kept hedgerows along roadsides and sometimes between fields;
- Dark brown coloured soil; and
- Small copses of broad-leaved woodland throughout the sub-area and larger areas of woodland on the eastern edge.

Landscape planning policy

7.2.5. Key landscape related planning policies, Policy DM6 - Impact on Landscape and Townscape (Lincolnshire Minerals & Waste Local Plan 2016) and Policy LP17: Landscape, Townscape and Views (Adopted Central Lincolnshire Local Plan 2017) are referred to in Appendix 3.1. It should be noted that the site does not lie within any landscape designated areas.

Landscape context

7.2.6. The topography of the wider area is gently undulating in nature, rising to approximately 15m AOD at the edge of the plateau, east of the site, in the vicinity of Billingham, Walcott, Thorpe Tilney and Timberland before reducing to the lower level of the Fens in the east and south which lie at approximately 2m AOD. West of the site the topography rises gently to approximately 20m AOD.

7.2.7. The landscape of the central clay and gravels area is generally open in character but feature a number of broad-leaved woodland copses and tree belts and some conspicuous roadside and field hedgerows.

7.2.8. The site lies within the grounds of Walcott Farm and Walcott Common which house large poultry units, four to the south of the site (including a recently constructed unit), which are accessed from Digby Road and three to the north, accessed from the B1189, near the village of Thorpe Tilney. Within Walcott Farm, blocks of tree and shrub planting are maturing around the established units. There is also prominent woodland at the site of a previous unit adjacent to Digby Road. Close to the western site boundary of the site are a line of prominent trees adjacent to the poultry unit and further west, at a distance of approximately 150m, lies a linear band of semi mature mixed woodland tree and shrub planting.

7.2.9. The nearest residential properties lie on Digby Road, at the bend in Digby Road near Walcott Farm. Here there are three two storey properties which make up Catley Cottages; one large unnamed property, Priory Cottage and Catley Farm House. Other properties further east and west respectively along Digby Road are Crown Farm and Rowston Grange. The nearest village of Walcott lies approximately 1km to the east of the site, see Table 2-1.

7.2.10. The site lies within a wider area of farmland which is accessible by a number of footpaths and bridleways. No public rights of way (PRoW) cross the site. The nearest PRoW (WBil/4/1) runs along the north-eastern site boundary.

The site landscape

7.2.11. The site is relatively flat and low lying at approximately 5m AOD. There are limited landscape features within the site and consequently it is largely open in character, with the majority of the site currently laid to rough grass. It is bound on its south-west side by a large, straight drainage ditch. The south-eastern boundary is relatively open, aside from patches of existing site boundary willow and birch scrub. The north-eastern boundary features a large, linear reservoir for most of its length, which is bordered by a bunded strip of mixed deciduous trees and shrubs on all sides. The north-western site boundary is open, aside from some patches of willow and birch scrub.

Preliminary visual appraisal

7.2.12. A preliminary 'bare earth' and 'woodland' Zone of Theoretical Visibility (ZTV) has been prepared and used to guide the preliminary site work. A single point study based on the proposed highest point of the development has been modelled. The LVIA will provide a detailed evaluation of views.

7.2.13. The 'bare earth' ZTV shows the 'worst case scenario' without any buildings, woodland cover or hedgerows, showing from where the site cannot be seen. It shows the effect of topography alone and in this

case the relative lower height of the fen area to the site, restricting visibility beyond the plateau edge east of Walcott (see Figure 7.1 ZTV bare earth).

7.2.14. The 'woodland' ZTV shows the effect of the inclusion of woodland, modelled at 15m height. This is sourced from the National Forest Inventory (NFI) which covers all forest and woodland areas over 0.5 hectare with a minimum of 20% canopy cover, or the potential to achieve it, and a minimum 20m width. The ZTV shows the effect of the large woodland blocks and belts within the study area and how this curtails some of the views (see Figure 7.2 ZTV including NFI woodland).

7.2.15. The site visits also confirmed the presence of other smaller woodland areas and hedgerows, notably the woodland copse south of the site adjacent to Digby Road. Overall, it is concluded that whilst the site lies in open farmland, visibility from public viewpoints is relatively restricted by existing woodland copses, tree belts and intervening hedgerows. This is illustrated in the viewpoints shown in Appendix 7.1.

7.2.16. There would be some views from properties on Digby Road but views of the site directly from the south are limited by the recently constructed poultry unit. Views of the site from properties within the village of Walcott to the east are largely screened by intervening woodland and hedgerows.

7.2.17. There are views of the site from the nearby footpath north of the site. There are also views, at greater distance, from the footpath on higher ground, east of the site that runs north and south of Walcott. Views from the countryside to the west are limited by existing woodland and hedgerows.

7.2.18. The site is partially visible from vehicles travelling on Digby Road on the approach from either direction towards the site entrance, although the large, existing poultry units and intervening vegetation screen most of the views into the site. Fleeting, partial views of the site are likely from passengers travelling on the Great Northern and Great Eastern Joint Railway line as it passes Digby, approximately 2.5 km west of the site.

7.3. Further assessment and consultation

7.3.1. A desk study, site visit (7 and 8 February 2023) and preliminary assessment has been carried out to inform the scoping input.

7.3.2. LCC will be consulted regarding the scope of the LVIA and preferred viewpoint locations. A study area and representative viewpoints have been suggested for agreement with LCC (see below).

7.4. Receptors to be considered as part of the EIA

7.4.1. The receptors to be considered within the assessment include:

- Landscape Receptors
 - The physical landscape fabric of the site; and
 - The character of the surrounding landscape.
- Visual Receptors
 - Local residents, particularly properties on Digby Road;
 - Users of land with public access and PRoW to the east of the site; and
 - Passengers travelling on the Great Northern and Great Eastern Joint Railway.

7.5. Likely environmental effects

Construction

7.5.1. Likely effects at the construction phase are:

- Temporary loss of landscape features, such as farmland to allow for construction, and associated features such as temporary access routes and construction compounds;

- Visibility of construction equipment, lighting and active construction worksites from surrounding receptors;
- The influence of the presence of construction plant and activities on the surrounding landscape character; or
- The influence of the presence of construction plant and activities upon views.

Operational

7.5.2. Likely effects of the development at the operational phase are:

- Direct physical effects upon the landscape of the site from the presence of the development;
- The influence of the proposed development upon the character of the surrounding landscape; or
- The influence of the development upon views including PRoW to the east of the site and residential properties to the south of the site.

7.6. Proposed assessment methodology

Legislation and guidance

7.6.1. The LVIA will be undertaken with reference to the following legislation and guidance documents:

- Guidelines for Landscape and Visual Impact Assessment (the GLVIA) Landscape Institute and Institute for Environmental Management and Assessment 2013 (3rd edition)²²;
- Visual Representation of Development Proposals Technical Guidance Note TGN 06/19 Landscape Institute 2019; and
- Visual Representation of Windfarms, Version 2.2 (February 2017) by Scottish Natural Heritage (where relevant for ZTV methodology).

7.6.2. A desk-based study and site familiarisation survey has enabled the production of ZTV mapping to inform the likely visibility of the site to facilitate pre-application discussions and input to evolving design.

7.6.3. A study area of an approximate 3km radius from the site is suggested following the preliminary ZTV and site assessment work, as shown on Figure 7.1. This is informed by the visibility given existing landform and landcover, described above, and illustrated in the viewpoints in Appendix 7.1. The study area includes the villages of Walcott and Timberland to the east and the transition of the clay lowlands with the Fens in this area. It also includes the villages of Digby, Rowston and Kirkby Green west of the site. The study area includes the PRoWs within the vicinity including those bordering the site in the east and further west.

7.6.4. Representative viewpoints within the study area have also been suggested to show a range of viewpoints from properties, footpaths and public areas for agreement with LCC. The selection of viewpoints is based on the following criteria:

- The requirement to provide an even spread of representative viewpoints within the study area and around all sides of the site;
- The requirement to provide viewpoints from locations which represent a range of near, middle- and long-distance views;
- Whilst private views are relevant, public viewpoints specifically, from roads and public rights of way and other area of open public access, will be selected since they are the most significant in terms of the number of receptors affected; and
- Views from sensitive receptors.

²² Landscape Institute, Institute for Environmental Management and Assessment, (2013), Guidelines for Landscape and Visual Impact Assessment, Third Edition.

7.6.5. Representative viewpoint photograph (and their locations) are shown in Appendix 7.1, and include panoramic photographs to show the suggested representative views.

7.6.6. The requirement and type of photomontage from key viewpoints will also be agreed with LCC as necessary. The LVIA will identify 'likely significant' environmental effects which are determined by:

- Identifying potential landscape and visual receptors to an environmental effect;
- Considering the value and susceptibility, or sensitivity, of those receptors to the type of change proposed;
- Determining the magnitude of change that would be experienced by those or at those receptors; and,
- Applying professional judgement to advise the significance that should be attributed to that effect.

7.6.7. The LVIA will also include supporting figures to indicate site location and context, policy designations, landscape character areas, topography, viewpoint locations and annotated panoramic viewpoint photographs.

7.6.8. The methodology for considering the value and susceptibility of receptors; the magnitude of change that would be experienced by those receptors and the classification of the effect is set out below.

Landscape assessment methodology

7.6.9. Landscape assessment considers the potential effects of development on:

- The elements that make up the landscape;
- The specific aesthetic or perceptual qualities of the landscape; and,
- The character of the landscape.

Sensitivity of receptor likely to be affected

7.6.10. The sensitivity of a landscape receptor is determined by combining judgements about the susceptibility of a landscape receptor to a specific change and about the value attached to that landscape receptor.

7.6.11. Susceptibility to change means the ability of the landscape receptor to accommodate the proposed development without undue consequences for the maintenance of the baseline situation and/or the achievement of the landscape planning policies and strategies (whether it be the overall character or quality/condition of a particular area, or individual element and/or feature).

7.6.12. Judgements about the susceptibility of a landscape receptor to change are recorded as being high, medium or low, based on the criteria set out in Table 7-1.

Table 7-1 Landscape susceptibility to change

Classification	Typical criteria
High	Receptors with an inability to accommodate the proposed development without undue consequences for the maintenance of the baseline situation and / or the achievement of the landscape planning policies and strategies.
Medium	Receptors with some ability to accommodate the proposed development without undue consequences for the maintenance of the baseline situation and / or the achievement of the landscape planning policies and strategies.
Low	Receptors with an ability to accommodate the proposed development without undue consequences for the maintenance of the baseline situation and / or the achievement of the landscape planning policies and strategies.

7.6.13. Judgements about the value of a landscape receptor are recorded as being high, medium, or low based on information gathered in the landscape baseline (such as landscape quality (condition), scenic quality, rarity, representativeness, conservation interests, recreation value, perceptual aspects and associations).

provides some examples which help to distinguish between the different value thresholds. Table 7-2 provides some examples which help to distinguish between the different thresholds.

Table 7-2 Landscape value

Classification	Typical Criteria	Typical Scale	Typical examples
Very high	High Importance (or Quality) and Rarity. No or limited potential for substitution.	International, National, Local	World Heritage Site, National Park, AONB.
High	High Importance (or Quality) and Rarity. Limited potential for substitution.	National, Local	Areas of Great Landscape Value, Conservation Area.
Medium	Medium Importance (or Quality) and Rarity. Limited potential for substitution	Regional, local	Local designations such as ALLV or undesignated but value perhaps expressed through non-official publications or demonstrable use.
Low	Low Importance (or Quality) and Rarity.	Local	Areas identified as having some redeeming feature or features and possibly identified for improvement or areas identified for recovery.
Very low	Low or no Importance (or Quality) and Rarity.	Local	Areas identified for recovery.

7.6.14. Landscape sensitivity is dependent on the proposed development and the ability of the existing landscape to accommodate the perceived changes. Landscapes vary in their capacity to accommodate different forms of development. In general terms, a landscape of very high sensitivity will have low ability to accommodate change of the type proposed and a landscape of low sensitivity will have some ability or likelihood to accommodate change of the type proposed.

Evaluating the magnitude of change

7.6.15. The magnitude of change to a landscape receptor is judged in terms of its:

- Size or scale - Extent to which the removal or addition of landscape features alters the existing landscape character;
- Geographical extent - area over which the effect is evident;
- Duration of the effect - (whether the effect is short 0-5yrs/ medium 5-10yrs / long term 10-25yrs); and
- Reversibility – (specifically whether the impact is temporary or permanent).

7.6.16. Judgements about the magnitude of change on landscape receptors identify whether the impact will be negative (adverse) or positive (beneficial) and are recorded as being high, medium, low, very low or no change, based on the criteria set out in Table 7-3.

Table 7-3 Magnitude of landscape change

Magnitude of Change	Typical Criteria Descriptors
High adverse	Total loss or large-scale damage to existing character or distinctive features and elements, and/ or the addition of new but uncharacteristic conspicuous features and elements.
Medium adverse	Partial loss or noticeable damage to existing character or distinctive features and elements, and/or the addition of new but uncharacteristic noticeable features and elements.
Low adverse	Slight loss or damage to existing character or features and elements, and/or the addition of new but uncharacteristic features and elements.
Very low adverse	Barely noticeable loss or damage to existing character or features and elements, and/or the addition of new but uncharacteristic features and elements.
No change	No noticeable loss, damage or alteration to character or features or elements.
Very low beneficial	Barely noticeable improvement of character by the restoration of existing features and elements, and/or the removal of uncharacteristic features and elements, or by the addition of new characteristic elements.
Low beneficial	Slight improvement of character by the restoration of existing features and elements, and/ or the removal of uncharacteristic features and elements, or by the addition of new characteristic elements.
Medium beneficial	Partial or noticeable improvement of character by the restoration of existing features and elements, and/ or the removal of uncharacteristic and noticeable features and elements, or by the addition of new characteristic feature.
High beneficial	Large scale improvement of character by the restoration of features and elements, and/ or the removal of uncharacteristic and conspicuous features and elements, or by the addition of new distinctive features.

Evaluating the significance of effect

7.6.17. The significance of a landscape effect is assessed through professional judgement, combining the sensitivity of the receptor with the magnitude of impact. Judgements will typically follow the rationale and criteria set out in Table 7-4.

Table 7-4 Significance of landscape effect

		Magnitude of Landscape Change				
		No Change	Very Low	Low	Medium	High
Sensitivity of Receptor	Low	No Effect	Negligible/ Minor	Negligible/ Minor	Minor	Minor/ Moderate
	Medium	No Effect	Negligible/ Minor	Minor	Moderate	Moderate/ Major
	High	No Effect	Minor	Minor/ Moderate	Moderate/ Major	Major

7.6.18. Table 7-5 below summarises the rationale for judgments for each significance criteria that could be applied to the proposals.

Table 7-5 Significance of landscape effect typical criteria descriptors

Significance	Typical Criteria Descriptors
Major adverse	The development would be at considerable variance with the character (including quality and value) of the landscape and substantially degrade or diminish the integrity of a range of characteristic features and elements and their setting and are likely to damage a sense of place. Such effects would be incapable of full mitigation and would degrade the integrity of a high-quality landscape.
Moderate adverse	The development would conflict with the character (including quality and value) of the landscape and have an adverse impact on characteristic features or elements and their setting and are likely to diminish a sense of place. Proposals are likely to be out of scale with the existing topography, grain, scale and pattern of the landscape.
Minor adverse	The development would not quite fit the character (including quality and value) of the landscape and is at variance with characteristic features and elements and their setting

Significance	Typical Criteria Descriptors
	and are likely to detract from a sense of place. Effects may temporarily damage or does not logically complement the existing topography, grain, scale and pattern of the landscape to constitute an unsympathetic outcome.
Negligible adverse/ beneficial	The proposals will affect minor landscape features which have no or limited value.
No effect	The development would maintain the character (including quality and value) of the landscape. The proposals would blend in with characteristic features and elements, enabling a sense of place to be retained.
Minor beneficial	The development would complement the character (including quality and value) of the landscape and maintain or enhance characteristic features and elements and their setting enabling some sense of place to be restored. The proposals would enable moderate and/ or short-term restoration of degraded landscape character, features and their setting.
Moderate beneficial	The development would improve the character (including quality and value) of the landscape and enable the restoration of characteristic features and elements partially lost or diminished as a result of changes from inappropriate management or development and thus enabling a sense of place to be restored. Such effects may be capable of further mitigation so as to maximize the benefits of the proposal.
Major beneficial	The development would substantially enhance the character (including quality and value) of the landscape and enable the restoration of characteristic features and elements lost as a result of changes from inappropriate management or development thus enabling a sense of place to be enhanced. The proposals would fundamentally improve on previous condition through the introduction of integrated features and landscape design which would result in a more harmonious and distinctive landscape character. Such effects may be capable of further mitigation to maximize the benefits of the proposal.

Visual assessment methodology

7.6.19. Visual assessment considers the potential effect of development on visual amenity, as experienced by people within the study area. They relate to changes that arise in the composition of available views as a result of changes to the landscape, to people's responses to the changes, and to the overall effects with respect to visual amenity.

7.6.20. Effects on visual amenity are assessed through the consideration of potential effects on receptors. Visual receptors include people in their homes, at work, undertaking recreational activities or when travelling through and area for example, using roads, railways, footpaths etc., where they would be likely to experience a change in the existing view as a result of the construction and operation of the proposed development.

Sensitivity of visual receptors

7.6.21. The sensitivity of a visual receptor is considered by combining judgements about the value attached to a particular view and the susceptibility of the visual receptor to changes in that view.

7.6.22. As identified within GLVIA 3, susceptibility is mainly a function of:

- The occupation or activity of people experiencing the view at particular locations; and
- The extent to which their attention or interest may be focussed on views and the visual amenity they experience at particular locations.

Judgements about the susceptibility of a visual receptor will be recorded as being high, medium or low, typically reflecting the criteria set out in Table 7-6. Judgements may vary, however, depending on the nature of the receptor who will be affected and the extent to which their attention is likely to be focused on views or visual amenity.

Table 7-6 Visual susceptibility to change

Value	Typical criteria
High	Residents at home, although this will depend on the rooms occupied during waking hours. People, whether residents or visitors, who are engaged in outdoor recreation, including users of public rights of way. Visitors to heritage assets, or to other attractions, where views of the surroundings are an important contributor to the experience. Communities where views contribute to the landscape setting enjoyed by residents in the area. Where travel involves recognised scenic routes awareness of views is likely to be particularly high.
Medium	Communities where views partly contribute to the landscape setting experienced by residents in the area. Travellers on road, rail and other transport routes where awareness of views is limited.
Low	Communities where views do not contribute to the landscape setting experienced by residents in the area. People engaged in outdoor sport and recreation which does not involve or depend upon appreciation of views of the landscape. People at their place of work whose attention may be focused on their work or activity, not on their surroundings, and where the setting is not important to the quality of their working.

7.6.23. Judgements about the value attached to views experienced by a visual receptor are recorded as being high, medium or low, based on the criteria set out in Table 7-7.

Table 7-7 Visual importance/ value

Value	Typical criteria
High	Unique or identified view (for example, shown as such on an Ordnance Survey map, guidebook or tourist map) or one noted in literature or art. A view where a landscape and/or heritage asset makes an important contribution to the view (for example, open views of landscapes in sensitive or unspoilt areas which contribute to the visual amenity experienced by people).
Medium	A view where a landscape and/or heritage asset makes some contribution to the view (for example, partial/ interrupted views of landscapes in sensitive or unspoilt areas which contribute to the visual amenity experienced by people or open views over moderately sensitive/ unspoilt landscapes).
Low	Undistinguished or unremarkable view (The view may contain detracting features which spoil the overall quality of the view and detract from the visual amenity experienced by people).

Magnitude of visual change

7.6.24. The magnitude of visual change experienced by visual receptors as a result of the development proposals are described by reference to the:

- Scale of change in the view in respect of the loss or addition of features and changes in the visual composition, including the proportion of view occupied by the proposed development;
- Geographical extent – This is likely to reflect the orientation/ angle of view in relation to the main activity of the receptor; The distance of the viewpoint from the main development and the extent of the area over which the changes would be visible;
- Duration of the effect - (Short 0-5yrs/ medium 5-10yrs/ long term 10-25yrs, temporary, permanent, intermittent/ continuous and whether the views will be full, partial or glimpses); and
- Reversibility - The ability of the proposed development to be reversed.

7.6.25. Judgements about the magnitude of a visual change experienced by visual receptors as a result of the development proposals are recorded as being high, medium or low, very low or no change. The criteria that is used to guide the assessment of the magnitude of change is outlined in Table 7-8.

Table 7-8 Magnitude of visual change

Magnitude of Change	Typical Criteria Descriptors
High adverse	The proposals would form a significant and immediately apparent deterioration to the scene that is likely to damage its overall character.
Medium adverse	The proposals would form a visible and recognisable new element that would deteriorate the overall scene to some extent and would be readily noticed by the observer.
Low adverse	The proposals would be perceptible but would not alter overall balance of features and elements that comprise the existing view or markedly deteriorate the overall quality of the scene.
Very low adverse	Only a very small part of the proposals would be discernible, and / or the proposals would be at such a distance that it would form a barely noticeable feature or element of the view and consequently would result in very little deterioration to the scene
No change	No part of the project, or work or activity associated with it, would be discernible.
Very low beneficial	Only a very small part of the proposals would be discernible, and / or the proposals would be at such a distance that it would form a barely noticeable feature or element of the view and consequently would result in very little improvement to the scene.
Low beneficial	The proposals would be perceptible but would not alter overall balance of features and elements that comprise the existing view or markedly improve the overall quality of the scene.
Medium beneficial	The proposals would form a visible and recognisable new element that would improve the overall scene to some extent and would be readily noticed by the observer.
High beneficial	The proposals would form a significant and immediately apparent improvement to the scene that is likely to enhance its overall character.

Significance of visual effects

7.6.26. The significance of a visual effect is assessed through professional judgement, combining the sensitivity of the receptor with the magnitude of impact. Judgements will typically follow the rationale and criteria set out in Table 7-9.

Table 7-9 Significance of visual effects

		Magnitude of Visual Change				
		No Change	Very Low	Low	Medium	High
Sensitivity of Receptor	Low	No Effect	Negligible/ Minor	Negligible/ Minor	Minor	Minor / Moderate
	Medium	No Effect	Negligible/ Minor	Minor	Moderate	Moderate/ Major
	High	No Effect	Minor	Minor / Moderate	Moderate/ Major	Major

7.6.27. Table 7-10 below summarises the rationale for judgments for each significance criterion that could be applied to the proposals.

Table 7-10 Significance of visual effect typical criterion descriptors

Significance	Typical Criterion Descriptors
Major adverse	The proposals would cause major deterioration to a view experienced by a highly sensitive receptor and would constitute a major discordant element in the view.
Moderate adverse	The proposals would cause obvious deterioration to a view experienced by a moderately sensitive receptor or perceptible damage to a view experienced by a more sensitive receptor.
Minor adverse	The proposals would cause limited deterioration to a view experienced by a moderately sensitive receptor or cause greater deterioration to a view experienced by a low sensitivity receptor.

Significance	Typical Criterion Descriptors
Negligible adverse/ beneficial	Only a very small part of the proposal would be discernible and/ or would be at such a distance that it will be scarcely appreciated.
No effect	No perceptible change to the view.
Minor beneficial	The proposals would cause limited improvement to a view experienced by a receptor of medium sensitivity or would cause greater improvement to a view experienced by a receptor of low sensitivity.
Moderate beneficial	The proposals would cause obvious improvement to a view experienced by a moderately sensitive receptor or perceptible improvement to a view experienced by a more sensitive receptor.
Major beneficial	The proposals would lead to a major improvement to a view experienced by a highly sensitive receptor.

7.7. Scoping assessment summary

7.7.1. Due to the nature of the works, it is considered that the proposed development has the potential to result in landscape and visual effects. Therefore, a LVIA will be undertaken and will be scoped into the EIA.

8. Ecology (Biodiversity)

8.1. Introduction

8.1.1. This chapter outlines the ecology (biodiversity) scoping assessment and provides a summary of how the potential effects will be addressed in the EIA.

8.2. Baseline conditions

8.2.1. The Multi-Agency Geographic Information for the Countryside (MAGIC) website²³ has been reviewed for information on nationally and internationally designated sites of nature conservation importance (statutory sites only) within 2km of the site.

8.2.2. Greater Lincolnshire Nature Partnership (GLNP) provided data on locally designated sites of nature conservation importance (non-statutory) and protected species records within 2km of the site.

8.2.3. Ordnance Survey maps and the MAGIC website were used to identify the presence of water bodies and notable habitats such as hedgerows and woodland within 250m of the proposed development location, in order to establish if the land within the worksite could be used as habitat for priority species such as Great Crested Newts (GCN).

8.2.4. An ecological walkover survey was undertaken on 14 February 2023 to establish the habitat types that are present within the site boundary, and within a suitable ecological zone of influence, where identified. The survey also aimed to record and locate invasive plant species if present at the time of survey. The methodology used for this survey implements those detailed by the Institute of Environmental Assessment (IEA) (1995) and the Joint Nature Conservation Committee (JNCC) (2010).

Statutory designated sites

8.2.5. A desktop study of the ecology on site identified that there are no internationally or nationally designated sites within the site boundary or within 2km of the site boundary. The nearest Site of Special Scientific Interest (SSSI) is Metheringham Heath Quarry SSSI located 7.9km to the north and is designated due to geological interests. Tattershall Old Gravel Pits SSSI is located 8.6km to the east.

8.2.6. The site is not within any SSSI Impact Risk Zones and therefore no consultation with Natural England is considered necessary at this stage in relation to SSSIs.

Non-statutory designated sites

8.2.7. There are no non-statutory designated sites within 2km of the site boundary.

Habitats

8.2.8. Based on the desk study, 17 UK Biodiversity Action Plan (BAP) Priority Habitats (most threatened and requiring conservation action) have been identified within a 2km search buffer of the site boundary.

8.2.9. Two of these priority habitats are located on the northern and southern boundaries of the site (Coastal and Floodplain Grazing Marsh (CFPG)). However, GLNP has advised that these habitats may have been mapped due to their proximity to the Environment Agency Flood Zone 3, rather than actual survey data confirming the presence of the priority habitat, and therefore this would require further consultation from Natural England.

²³ <http://magic.defra.gov.uk/>

8.2.10. The remaining 15 priority habitats within the 2km search buffer included five additional CFPG habitats located to the south of the site and ten areas of Deciduous Woodland located south-west and north-west of the site, with the nearest one being approximately 840m south-west of the site boundary.

8.2.11. The habitats in the surrounding area are dominated by agricultural land.

8.2.12. The habitats recorded within the site include:

- Tussocky grassland with bands of tall ruderal vegetation;
- Wet and dry ditches providing connectivity to the off-site river to the east of the site; and
- Three mature trees within the north-eastern extents of the site along with strips of young tree planting (considered to be approximately 10 – 15 years of age).

8.2.13. With the presence of potential priority CFPG habitat to the both the north and south of the site, and the site appearing to be an extension of this same habitat, further botanical surveys will be required from early May onwards to determine if the site meets the criteria for CFPG priority habitat. Based on the initial site observations, feedback from GLNP and review of the JNCC description of CFPG, the site did not seem swampy or have water filled hollows and ponds. In addition, the species identified were consistent with fairly generic grassland which has developed into tussocks attributed to the site not having been managed recently.

Protected species

8.2.14. Records of protected and notable species which have been identified within a 2km boundary of the site were provided by GLNP. Records of Granted European Protected Species Licences (EPSLs) have been provided by MAGIC. These are summarised in Table 8-1. Historic records have been included where they provide context of the suitability of the site for the protected species.

Table 8-1 Ecological desk study records

Species	Desk Study	Walkover Survey	Further Surveys Required to Determine Presence/Absence prior to Planning Application
Bats	31 records for bats. The most recent and also closest record returned was for an unknown bat species in 2018 approximately 365m east of the site boundary.	No roosting potential was identified within the site, with trees identified as negligible. No buildings were present within the site and those present adjacent to the site were corrugated metal framed agricultural sheds. Based on the proposals no transect surveys will be required as there are no key flight lines such as hedgerows for foraging – best practice will be followed within the design to keep lighting to a minimum.	No
Eurasian otter (<i>Lutra lutra</i>)	Ten records for Eurasian otter the nearest observation recorded in 2009, approximately 750m east of site boundary.	No suitable habitat was identified within the site for otters, however the adjacent river to the east is suitable. No significant effects likely as there is no suitable habitat within the site boundary. The CEMP will provide mitigation to manage run-off.	No
Water vole (<i>Arvicola amphibius</i>)	22 water vole records with the closest being approximately 450m east of the site boundary, recorded in April 2018.	Suitable habitat within the ditch is present. The water quality was noted to appear likely polluted. Although the ditches are connected to the wider landscape with data records present, there are unlikely to be significant effects resulting from the proposed development. The CEMP will include the requirement for pre-commencement checks to determine any change.	No

Species	Desk Study	Walkover Survey	Further Surveys Required to Determine Presence/Absence prior to Planning Application
West European hedgehog (<i>Erinaceus europaeus</i>)	26 records of West European hedgehog with the closest record being 1.5km to the east of the site in 2013. (The most recent record is 1.7km north of the site, recorded in September 2021).	Suitable habitat present but impacts would not be to a scale that would cause significant effects on population.	No
Brown hare (<i>Lepus europaeus</i>)	68 records of brown hare were returned by GLNP, with the closest record being approximately 580m north of the site, recorded in 2015.	Suitable Habitat present but impacts would not be to a scale that would cause significant effects on population.	No
Great crested newts (<i>Triturus cristatus</i>) (GCN)	GLNP did not return any recent records for GCN within 2km of the site boundary. The only record returned was historical and dated 1977 with an unspecified location.	Habitat suitability index (HSI) assessment identified the ditch to be of below average (0.54) suitability for GCN and the adjacent reservoir/pond of good (0.74) suitability for GCN. Suitable habitat for GCN was present within the site and therefore presence cannot be ruled out.	Yes - eDNA survey was completed on 18 April 2023 and also an initial bottle trapping/ torch survey. If positive, or undetermined, further bottle trapping/ torch survey will be completed within the suitable survey season. If negative, no further surveys will be completed.
Other Amphibians	GLNP returned records for three amphibian species: five records of common frog (<i>Rana temporaria</i>) with five records and five records of common toad (<i>Bufo bufo</i>) with five records both from 2009, and located 900m south-west of the site boundary and smooth newt (<i>Lissotriton vulgaris</i>) with one record from 1976 with an unspecified location.	Suitable habitat was present, but impacts would not be to a scale that would cause significant effects on population.	No
Reptiles	GLNP documented four occurrences of grass snakes (<i>Natrix helvetica</i>), with the most recent record dating from 2009, 1km south-west of the site boundary. The remaining three records did not have their location specified.	Suitable habitat for reptiles, most notably grass snake is present within the site in the form of tussocky grassland, wet ditches and the adjacent reservoir.	Yes – presence / absence surveys between April and May 2023 over seven survey visits using artificial refugia in suitable weather conditions.
Birds	GNLP identified a total of 864 records of 46 bird species within a 2km buffer of the site, with the records ranging from March 2013 to September 2022. The GNLP identified the following notable	Limited habitat is available for nesting birds. While the habitats on site are considered suitable for protected or notable ground nesting species, such as skylarks which have been observed on site, the impacts would not be to a scale that would cause significant effects on population.	No

Species	Desk Study	Walkover Survey	Further Surveys Required to Determine Presence/Absence prior to Planning Application
	species with protected status: barn owl (<i>Tyto alba</i>), Bittern (<i>Botaurus stellaris</i>), Hobby (<i>Falco subbuteo</i>), Hen Harrier (<i>Circus cyaneus</i>), Indet. Harrier (<i>Circus sp.</i>), Greylag goose (<i>Anser anser</i>), Kingfisher (<i>Alcedo atthis</i>), Marsh Harrier (<i>Circus aeruginosus</i>), Montagu's Harrier (<i>Circus pygargus</i>), Peregrine (<i>Falco peregrinus</i>), Quail (<i>Coturnix coturnix</i>), and Red Kite (<i>Milvus milvus</i>).		
Other species	GNLP did not return records for other protected or notable species within 2km of the site boundary.	Mammal runs were identified within the site, [redacted]	No
Invasive species	There were no records of scheduled invasive and non-native species.	No scheduled invasive species were identified however the survey was completed outside of the main flowering season. Pre-commencement surveys to determine any changes should be included within the CEMP.	No

8.3. Further assessment and consultation

8.3.1. An extended Phase 1 habitat survey was undertaken on 14 February 2023 to identify the potential for any sensitive habitats and species on site. This involved the identification of the sensitive ecological receptors and an assessment of their nature conservation value to ensure that suitable mitigation is included in the development. It also identified the further protected species surveys that are required (as summarised in Table 8-1).

8.3.2. Consultation with key statutory consultees, including LCC ecology officer, the local Wildlife Trust, the EA and potential other interest and volunteer groups will be undertaken as part of this process to gain knowledge and understanding of the local ecological and nature conservation status.

8.3.3. A Biodiversity Net Gain (BNG) Assessment for the site will be undertaken. The BNG assessment will use the latest DEFRA Biodiversity Metric Calculation Tool (3.1 at the time of ecological walkover survey conducted 14 February 2023). Calculations on the habitats present within the site will be collected during the PEA and entered into the metric calculator and used to create the baseline. This will be submitted separately to the ES Chapter but will help to inform the mitigation and enhancement required.

8.4. Receptors to be considered as part of the EIA

8.4.1. Ecology receptors include habitats and species within the site boundaries and immediate proximity.

8.4.2. Further surveys required prior to the planning application will include botanical surveys to inform the priority habitat assessment, GCN and reptiles.

8.4.3. Pre-commencement surveys for other species including nesting birds, water voles, [redacted] and invasive species will be outlined within the CEMP.

8.5. Likely environmental effects

Construction

8.5.1. Potential construction impacts associated with the proposed development include:

- Direct habitat loss;
- Physical disturbance and noise;
- Contamination impacts (such as dust and runoff); and
- Impacts to species (including loss of life).

Operation

8.5.2. Potential impacts for the operational phase of the development are likely to include:

- Permanent loss of habitat; and
- Increased disturbance to adjacent habitats and species.

8.5.3. Beneficial impacts include habitat enhancement and biodiversity net gain.

8.6. Proposed assessment methodology

8.6.1. An Ecological Impact Assessment (EclA) will inform the ES Chapter and will combine the PEA report with the findings of any additional protected species surveys. The EclA will follow the criteria of the CIEEM guidelines and will also be subject to the assessor's own professional judgement.

Zone of Influence

- Main ZOI: Up to 500m from the site. This ZOI will be used to assess habitat suitability for protected species; and
- Broad ZOI: Up to 2km, apart from 30km if the statutory designation is for bats. This ZOI is used for a desk study of international and national statutory nature conservation designations, non-statutory nature conservation designations and records of protected and/or notable species.

Assessment criteria

8.6.2. The assessment will take into account both on-site impacts and ecological features that may occur adjacent to, and at a greater distance away from, the site. Effects on nature conservation features will be characterised based on predicted changes as a result of the proposed activities, characterised on account of:

- The magnitude of the impact;
- The spatial extent over which the impact would occur;
- The temporal duration of the impact;
- Whether the impact is reversible and over what timeframe; and
- The timing and frequency of the impact.

8.6.3. The assessment will identify significant effects based on the integrity and the conservation status of the ecological feature. Effects are unlikely to be significant where features of local value or sensitivity are subject to small scale or short-term impacts.

8.6.4. In addition to determining the effect to ecological features, the assessment will also identify any legal requirements for mitigation measures.

8.6.5. The criteria to classify the effect are shown in Table 8-2. Residual effects will be assessed against these criteria and then a final assessment made to confirm whether they are significant in EIA terms, as described in Chapter 3.

Table 8-2 Criteria for classification of effects

Significance	Effect
Major Adverse /Beneficial	Permanent or long-term and/ or large-scale magnitude of impact on integrity and/ or conservation status on feature of county or greater value.
Moderate Adverse /Beneficial	Temporary and/ or small-scale magnitude of impact on integrity and/ or conservation status on feature of national or international value. Short or medium term and/ or moderate scale magnitude of impact on integrity and/ or conservation status on feature of county or greater value. Permanent or long-term and/ or large-scale magnitude of impact on integrity and/ or conservation status on feature of local (parish/ district) value.
Minor Adverse /Beneficial	Temporary and/ or small-scale magnitude of impact on integrity and/ or conservation status on feature of local (parish/ district) or county value. Impact to conservation status on feature of site value.
Negligible	No effect on integrity and/ or conservation status.

Assumption and limitations

8.6.6. The ecological baseline surveys will detail the conditions and species identified at the time of survey. Most species are highly mobile and therefore the dynamic nature of the natural environment will result in changes to the surrounding environment as seasons change.

8.6.7. Any additional species-specific assumptions or limitations will be outlined following the further protected species surveys where required.

8.6.8. With the presence of priority CFPG habitat to the both the north and south of the site, and the site appearing to be an extension of this same habitat, further botanical surveys will be required during the late spring/ early summer to determine if the site meets the criteria for CFPG priority habitat.

8.7. Scoping assessment summary

8.7.1. Given the information presented above, impacts to designated sites are scoped out of this ES. Impacts to species and from habitat loss are scoped into the ES. Details of topics scoped in or out of the ecology ES chapter can be seen in Table 8-3. The ES chapter will also be supported by an EcIA, and a BNG report that will be submitted as technical appendices.

Table 8-3 Ecology (Biodiversity) scoping assessment summary

Effect	Phase	
	Construction	Operation
Designated Sites	Scoped out	Scoped out
Priority Habitat	Scoped in	Scoped in
Other habitats (if not priority)	Scoped out	Scoped out
Bats	Scoped out	Scoped out
Eurasian otter	Scoped out	Scoped out
Water vole	Scoped out	Scoped out
West European hedgehog	Scoped out	Scoped out
Brown hare	Scoped out	Scoped out
Great crested newts	Scoped in	Scoped out
Other amphibians	Scoped out	Scoped out
Reptiles	Scoped in	Scoped in
Birds	Scoped out	Scoped out

Effect	Phase	
	Construction	Operation
Other species	Scoped out	Scoped out
Invasive species	Scoped out	Scoped out

9. Flood Risk and Drainage

9.1. Introduction

9.1.1. This chapter outlines the flood risk and drainage scoping assessment and provides a summary of how the potential effects will be addressed in the EIA.

9.2. Baseline conditions

9.2.1. Information was obtained from the EA Flood Risk for Planning²⁴, Historic Flood Map²⁵, Catchment Data Explorer²⁶, Defra's Magic Maps²⁷ and National Archives for public sector information licensed under the Open Government Licence v3.0²⁸.

9.2.2. According to the EA Statutory Main Rivers Map, there are two main rivers running along the site boundaries, Queen's Dyke along the western site boundary and New Cut along the eastern. Both watercourses flow north to south into Dorrington Dike, circa 3.3km south of the site. In addition, there are numerous field drains within the study area. The EA's Catchment Data Explorer indicates that the site falls with the Witham Lower Operational Catchment.

9.2.3. New Cut is classified as a Water Framework Directive (WFD) channel and forms part of the Dorrington Dike Water Body. Dorrington Dike is designated as heavily modified and is classified as having poor ecological status. The WFD summary data is listed in Table 9-1.

Table 9-1 WFD surface water body summary

WFD Criteria		Dorrington Dike
Water body ID	GB105030056175	
Water body type	River	
Water body designation	Heavily modified	
2019 Classifications (target date to achieve Good)	Overall potential	Poor
	Ecological potential	Poor
	Chemical potential	Fail
Elements less than 'good' (target date to achieve Good)	Macrophytes and Phytobenthos Combined: Poor (Good by 2021) Mercury and Its Compounds: Fail (Good by 2063) Polybrominated diphenyl ethers (PBDE): Fail (Good by 2063)	
Reasons for not achieving 'good'	Pollution from rural areas (Agriculture and rural land management) Pollution from wastewater (Water Industry)	

9.2.4. There is one standing water body within the study area, located 5m to the northeast of the site. This is understood to be used for general agriculture, spray irrigation and storage.

Hydrology

9.2.5. Baseline conditions have been informed using publicly available information. The geological mapping indicates that the site is underlain by the following sequence of superficial deposits and bedrock strata (the descriptions for each stratum are taken from the BGS):

²⁴ [Flood risk assessments if you're applying for planning permission - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/guidance/flood-risk-assessments-if-youre-applying-for-planning-permission)

²⁵ [Historic Flood Map - data.gov.uk](https://data.gov.uk/dataset/historic-flood-map)

²⁶ [England | Catchment Data Explorer](https://catchmentdataexplorer.gov.uk/)

²⁷ <https://magic.defra.gov.uk/MagicMap.aspx>

²⁸ [Office of Public Sector Information | The National Archives](https://www.nationalarchives.gov.uk/)

- Tidal Flat Deposits (superficial): “Normally a consolidated soft silty clay, with layers of peat, sand and a basal gravel. A stronger, desiccated surface zone is sometimes present”.
- Till, Mid Pleistocene (superficial): “Till is unsorted and unstratified drift, generally over consolidated, deposited directly by and underneath a glacier without subsequent reworking by water from the glacier. It consists of a heterogenous mixture of clay, sand, gravel, and boulders varying widely in size and shape”.
- Oxford Clay Formation (bedrock): “Silicate-mudstone, grey, generally smooth to slightly silty, with sporadic beds of argillaceous limestone nodules”.

9.2.6. Both the superficial deposits are classified by the EA as “Secondary Undifferentiated” and “Unproductive Strata”. The bedrock deposits are classified by the EA as “Unproductive Strata”.

9.2.7. There are no Source Protection Zones (SPZ), groundwater abstraction or groundwater discharge consents in close proximity to the site.

Flood risk – surface water

9.2.8. The southern part of the site is located within Flood Zone 2 and 3, meaning that it is at medium and high risk of flooding. Flood Zone 3 is defined as land classified as having a 1 in 100 or greater annual probability of flooding from fluvial sources. Flood Zone 2 is defined as land classified as having between a 1 in 100 (1%) and 1 in 1000 (0.1%) annual probability of flooding from fluvial sources.

Flood risk – surface water (pluvial)

9.2.9. Surface water flooding on the site ranges from very low to high flood risk. The south-east of the site is at the highest risk of surface water flooding. Historic aerial photos of the site indicate a potential overland flow route crossing through the site. The site topography also highlights a potential low route across the site.

Flood risk – artificial sources

9.2.10. There are two types of reservoir flooding extents which are considered by the EA: when river levels are normal and when there is also flooding from rivers. The EA long term risk mapping suggests that the study area along Queen’s Dyke is at risk of flooding from reservoirs when there is also flooding from rivers, however, this appears to remain in channel.

Historic flood risk

9.2.11. A review of the EA’s Recorded Flood Outlines and Historic Flood Map services does not show any historic flood events at the site. However, as mentioned in section 9.2.9 historic aerial photography shows evidence of previous water flow across the site.

9.2.12. Within the study area the bedrock geology comprises Kellaways formation – Sandstone, Siltstone and Mudstone. The underlying bedrock aquifer is designated as unproductive and classed as low importance.

9.2.13. The superficial deposits within the site are Tidal Flat Deposits, Clay and Silt. The superficial drift aquifer is designated as unproductive and classed as low importance.

9.3. Further assessment and consultation

9.3.1. The following assessments and consultation will be undertaken to support the design and planning of the proposed development:

- A Flood Risk Assessment (FRA); and
- An outline Drainage Strategy in line with the NPPF.

9.3.2. Impacts in relation to flood risk and drainage will be assessed against the methodology as described in Chapter 3.

9.3.3. Consultation with key statutory consultees, including the North Lincolnshire Council, as the Lead Local Flood Authority, Witham First District Internal Drainage Board (IDB) and the EA, will be undertaken as part of the process to gain knowledge and understanding of the local hydrological conditions.

9.4. Receptors to be considered as part of the EIA

9.4.1. At the construction and operational phase, the following receptors will be considered:

- Surface water quality and quantity;
- Groundwater quality; and
- WFD bodies.

9.5. Likely environmental effects

9.5.1. The proposed development has the potential to affect various elements of the water environment. Potential impacts have been considered for both the construction and operational phases and are listed within the following subsections.

Construction

9.5.2. The following potential impacts have been identified during the construction phase.

- Construction works within Flood Zone 3 have the potential to reduce existing floodplain storage or existing in-channel capacity and therefore increase the risk of flooding in the area or elsewhere. It is noted none of the plant operations will be situated on land in Flood Zone 3;
- Construction works, including compounds, vehicle tracking, excavations and storage could increase pollutant and sediment laden run off locally that would drain into and enter nearby watercourses. This could adversely affect surface water quality leading to impacts to ecological status elements and hydromorphology (when considering WFD status). Depending on water dependencies, this could also lead to impacts to sites of biological importance during construction;
- Construction traffic and activities also have the potential to increase the risk of pollution incidents, such as spillage incidents;
- Construction activities increase the risk of the introduction or spread of Invasive Non-Native Species (INNS) via machinery or operatives. The spread of INNS to other parts of the study area or off-site, in addition to their spread into site from elsewhere, could result in an adverse effect to ecological status elements of water quality of all watercourses;
- Excavations or other below ground works have the potential to create pathways which polluted or sediment laden run off could enter into groundwater and lead to deterioration of water quality; and
- Excavations or other below ground works have the potential to disrupt or alter groundwater flow paths temporarily that may lead to loss of base flow to nearby watercourses, or loss to the aquifer, leading to adverse quantitative water balance impacts.

9.5.3. It is not considered likely that the watercourses within the site boundary are used for public water supply, particularly due to the size and nature of the watercourses. It is not thought likely, therefore, that the proposed development would cause loss or change to surface water supplies.

Operation

9.5.4. During operation a number of potential impacts have been identified:

- Increased release in operational pollutants from the proposed development into surrounding watercourses;
- Loss or change to surface water supplies due to degradation of water quality, changes in drainage patterns or disruption to supply infrastructure;
- Excavations or below ground works that occur during the construction phase have potential to permanently alter groundwater flow paths (during the operational phase) that may lead to loss of base flow to nearby watercourses, or loss to the aquifer leading to adverse quantitative water balance effects;
New groundwater abstractions have potential to alter groundwater flow paths permanently that may lead to loss of base flow to nearby watercourses, or loss to the aquifer leading to adverse quantitative water balance effects;
- The indicative site boundary includes areas within Flood Zones 2 and 3. Therefore, if unmitigated, the proposed development would cause a reduction in floodplain storage and could increase the risk of fluvial flooding in the area. Development in the floodplain can also interrupt or change fluvial and surface water flow paths;
- New impermeable areas can also increase the risk of flooding from surface water as there is less permeable area to store water. This could increase the potential for the ponding of water. Culverts and works to drainage ditches are proposed as part of the works, and any unmitigated blockages of these culverts could reduce capacity and increase the risk of surface water flooding; and
- The flood risk within the site could also be exacerbated by climate change impacts.

9.6. Proposed assessment methodology

Legislation and policy

9.6.1. The following legislation and policy will be considered throughout:

- National Planning Policy Framework, 2021;
- Planning Practice Guidance, 2014; and
- Water Framework Directive 2000/60/EC

Assessment

9.6.2. The assessment of the water environment will involve following the key tasks:

- Consultation with relevant statutory and non-statutory bodies to establish the principal water environment issues associated with the study area;
- Detailed desk studies and field surveys to ascertain the current baseline conditions at the site. This will include the physical extent of the proposed development and a buffer of 1km;
- Assessment of the potential impacts related to the construction and operation of the proposed development; and
- Identification of measures to avoid, minimise or mitigation predicted impacts upon the water environment.

9.6.3. The assessment will focus on defining the characteristics and potential impacts upon surface water and groundwater receptors including the wider hydrological catchment, as categorised by the EA and WFD.

9.6.4. An ES chapter will be informed by the flood risk assessment and outline drainage strategy.

Loss or change to surface water receptors

9.6.5. An evaluation of the potential for pollution of surface waters as a result of spillage and of the release of sediments into watercourses or water bodies will involve a review of areas where construction would be

required within or in close proximity (for example, within 50m) to surface watercourses and water bodies. Mobilisation of potentially contaminated sediments during construction will also be considered in terms of local receptors including surface or groundwater supplies (both licensed and unlicensed).

9.6.6. The potential for pollution of groundwaters / aquifers is greatest where piling through contaminated land or sediments is proposed. Groundwater vulnerability will be assessed, with suitable mitigations put in place where there is any potential for pollution identified.

9.6.7. The impact assessment will include an evaluation of the potential for pollution of surface water as a result of run-off from the proposed development during high order events which could exceed the capacity of the proposed attenuation pond.

Loss or changes to groundwater aquifers and supported water supplies

9.6.8. An assessment of the potential impacts of the proposed development on groundwater quality and quantity will be undertaken with respect to identified abstractions including licensed, unlicensed and private water supplies and other groundwater dependent receptors (such as Groundwater Dependent Terrestrial Ecosystems).

Indirect loss or changes to surface water receptors

9.6.9. Surface water bodies such as streams, lakes and wetlands can receive or recharge groundwater, with movement likely between receptors. Changes to groundwater as a result of dewatering may indirectly impact surface water bodies and result in changes to surface water flow. These impacts shall be assessed qualitatively.

Flood Risk

9.6.10. A FRA will be carried out in accordance with the NPPF and associated PPG. The objectives of the FRA are to:

- Assess the risk to the proposed development from all potential sources of flooding;
- Create a hydraulic model to further define and mitigate the overland flow routes,
- Establish the existing and future flood risk to the proposed development;
- Consider flood risk to the site during construction;
- Assess the potential impacts of the proposed development on flood risk elsewhere; and
- Determine appropriate mitigation measures to manage flooding issues post development in a sustainable way.

9.6.11. Regarding climate change allowances, the Environment Agency Flood risk assessment: climate change allowances guidance will be referred to which uses peak river flow, peak rainfall intensity and sea level data from different sites around England to classify suitable allowances for the site.

Assessment criteria

9.6.12. The importance or sensitivity of waterbodies will be evaluated considering their quality, rarity, scale and substitutability. The magnitude of impacts will be evaluated taking into account the extent of loss and effects on integrity of the relevant waterbody attributes.

Assessing the importance or sensitivity

9.6.13. The following standard terms will be applied to this ES when determining the importance or sensitivity of water environment attributes, including surface water attributes, groundwater attributes and assets vulnerable to flood risk:

- High: The receptor/ resource has little ability to absorb change without fundamentally altering its present character or is of international or national importance;
- Medium: The receptor/ resource has moderate capacity to absorb change without significantly altering its present character, or is of high importance; and,
- Low: The receptor/ resource is tolerant of change without detriment to its character, is of low or local importance.

Table 9-2 Criteria for assessment value (sensitivity)

Importance	Criteria
Very High	Attribute has a high quality and rarity on regional or national scale.
High	Attribute has a high quality and rarity on local scale.
Medium	Attribute has a medium quality and rarity on local scale.
Low	Attribute has a low quality and rarity on local scale.
Very Low	Attribute has a very low quality and rarity on local scale.
Negligible	Attribute has a no quality and rarity on local scale or cannot be assessed.

9.6.14. The criteria for assessing the magnitude of an impact are shown in Table 9-3.

Table 9-3 Criteria for assessing magnitude of impact

Magnitude	Criteria
Very High adverse	Results in loss of attribute and / or quality and integrity of the attribute, severe damage to key characteristics.
High Adverse	Results in loss of attribute and / or quality and integrity of the attribute.
Medium Adverse	Results in effect on integrity of attribute, or loss of part of attribute.
Minor Adverse	Results in some measurable change in attribute's quality or vulnerability.
No change	Results in no change to the receptor.
Low Beneficial	Results in some beneficial effect on attribute or a reduced risk of negative effect occurring.
Medium Beneficial	Results in moderate improvement of attribute quality.
High Beneficial	Results in major improvement of attribute quality. Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality.
Very High Beneficial	Results in major improvement of attribute quality.

9.7. Scoping assessment summary

9.7.1. Given the information presented above, there is the potential for impacts to the water environment at the construction and operational phase of the proposed development, therefore surface water quality and quantity, groundwater quality and quantity, and flooding is scoped into the ES.

Table 9-4 Flood risk and drainage scoping summary

Effect	Phase	
	Construction	Operation
Surface water quality and quantity	Scoped in	Scoped in
Groundwater quality and quantity	Scoped in	Scoped in
Flooding	Scoped in	Scoped in

10. Climate Change

10.1. Introduction

10.1.1. This chapter sets out the approach and scope of the Greenhouse Gas (GHG) Assessment. A GHG assessment determines the extent to which a project affects the climate by quantifying the emissions of GHG and comparing this to the baseline (GHG emissions before project development).

10.1.2. An assessment of how climate change could exacerbate effects identified by other technical topics will also be undertaken under the topic specific assessments.

10.2. Baseline conditions

Greenhouse gas emissions

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

10.2.2. The Walcott Farm Biofuel Plant will process approximately 120,000 tonnes per annum (tpa) of manure to produce a biogas which is rich in methane. It is understood that the proposed development will contribute to the national capacity of energy recovery facilities as its anticipated annual energy output to the national gas grid is 100 GWh (approximately 9.6 million m³), which is equivalent to providing heat to about 7,300 households.

10.2.3. Untreated manures used for direct land spreading, can emit considerable GHG emissions. These emissions are not only reduced by treating manures in an anaerobic digester, but they count as a carbon saving towards the net-zero goal. Therefore, the GHG emissions will be calculated for a baseline scenario in which manure would be left untreated as compared to the GHG emissions for the proposed development.

10.2.4. The study area for the assessment encompasses a wider extent than the site so as to include embodied GHG emissions from products and materials, and GHG emissions associated with the transport of materials and people to site. The study area also includes activities that may be avoided or displaced as a result of the proposed development, namely agricultural activities.

10.2.5. It is anticipated that GHG emissions both regionally and in the UK will decrease over the operational lifetime of the proposed development in line with UK Government targets. Projections of future GHG emissions will be considered in the future baseline scenario.

10.2.6. When considering the effects of climate change on other technical topics, the scopes outlined in those sections will be followed. The GHG Assessment will also consider the wider GHG emissions from the management of waste and the effect on production of electricity and heat in the UK.

Climate Change adaptation

10.2.7. The receptor for climate change resilience is the proposed development itself. The climate resilience review will provide commentary on how climate change has been considered within the design of the proposed development and therefore provide commentary on its overall resilience to climate change.

In-combination climate change impact

10.2.8. The baseline for the in-combination climate impact assessment is based on the current conditions at the site and surrounding environment (existing baseline) and how the identified receptors are affected by future climate parameters (future baseline) as relevant to the geographical location, characteristics, and timeframe of

the proposed development. The baseline will also identify the extent to which receptors are vulnerable to and affected by these parameters.

10.2.9. The study area for the in-combination impact assessment is the surrounding environment potentially affected by the proposed development as defined by the other environmental disciplines (including, for example, air quality, ecology (biodiversity) and noise).

10.3. Further assessment and consultation

10.3.1. Carbon emissions will be associated with the construction and operational phase of the proposed development. At the construction phase, emissions will result from embodied carbon associated with construction materials, energy use on site and emissions from transport. At the operational phase emissions will derive from the energy use on site and emissions from transport to site. Due to this, a Carbon and GHG emissions technical note will be produced which will include the carbon calculations.

10.3.2. Flood Risk will be assessed within the FRA supporting the planning application which will consider the impact on climate change due to flooding events.

10.4. Likely environmental effects

Greenhouse Gas emissions

10.4.1. Likely significant effects on GHG emissions during construction will be the embodied carbon in materials used, specifically structural materials such as steel and concrete, transport of materials/ workers/ waste to and from the site.

10.4.2. Likely significant effects from climate change during construction are higher average temperatures and changes to the local precipitation regime, these will be assessed through consideration of the UK climate projections. It is not anticipated that any significant effects will arise at the construction phase due to the short period.

10.4.3. Emissions from maintenance during operation are likely to be minimal in proportion to the overall GHG footprint and are therefore scoped out of the assessment.

10.4.4. It is anticipated that the operation of the Walcott Farm Biofuel Plant and transport to and from the site will represent the majority of GHG emissions. However, the GHG emissions offset through the production of cleaner energy, capture of carbon dioxide and avoidance of Scope 3 GHG emissions during the operational phase will be accounted for within the GHG emissions calculations, as reported in the carbon and GHG emissions technical note to be submitted as a supporting document in the planning application.

Climate Change adaptation

10.4.5. Due to the short duration of the construction period (approximately 14 months) the construction period will not be susceptible to climatic changes.

10.4.6. The proposed development may be vulnerable to extreme weather events, such as storm damage to structures and assets and droughts and heatwaves affecting the structural integrity of buildings and materials. Likely significant effects associated with climate resilience will be limited to the above ground infrastructure. Therefore, potential likely significant effects would include frequency of flooding events and failure of the electrical systems due to an extreme weather event such as a heat wave, and this will be considered within the flood risk assessment.

10.4.7. Increased air temperatures due to climate change may require increased cooling requirements within the design of the proposed development, this will be considered and incorporated within the design developments.

In-combination climate impact

10.4.8. The site is not located in an urban area or high-density development and therefore will not result in a significant additional contribution to the urban heat island effect. Increased temperatures owing to climate change could increase the sensitivity of human receptors to pollutant/ dust emissions.

10.4.9. Climate change may lead to periods of decreased precipitation resulting in water scarcity, and periods of heavier rainfall leading to flooding. Impacts on groundwater and surface water from changing precipitation in combination with the proposed development will be outlined within the FRA and identified effects mitigated as appropriate. Separate consideration of this issue in Climate Change assessment is therefore not considered to be required.

10.5. Scoping assessment summary

10.5.1. The EIA Regulations require an ES to consider “the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change”. Projected changes to average climatic conditions, as a result of climate change, and an increased frequency and severity of extreme weather events (such as heavy and / or prolonged precipitation, storm events and heatwaves) have the potential to affect the ability of the surrounding natural environment to adapt to climate change. The key parameters of climate change are: changing temperature, changing rainfall quantities and frequency, wind strength and sea level rise.

10.5.2. The proposed development has the potential for GHG emissions during construction and operation (operations and transport to and from the site) however there is potential for most of these emissions to be offset through the production of cleaner energy during the operation of the Walcott Farm Biofuel Plant. Keeping in line with the sustainability objectives of the proposed development, the assessment of GHG emissions will be presented as a standalone GHG Technical Note and will also be covered within the sustainability framework document.

10.5.3. The main in-combination impact of the climate change parameters and the proposed development is considered to be the potential for an increase in surface water run-off and drainage issues. Measures to address this aspect of climate change will be addressed through an appropriate drainage strategy. Other general adaptation measures will also be considered as part of the design, including: selection of climate resilient construction materials, on-site attenuation and landscaping to minimise the impact on the local drainage network and incorporation of sustainable drainage systems (SuDS) into the design.

10.5.4. Climate change and greenhouse gas emissions as a stand-alone topic is therefore proposed to be scoped out of the EIA, although the EIA will comment on the proposed development’s adaption and resilience to climate change scenarios. Future impacts of climate for drainage and flooding will be considered as part of the FRA.

11. Ground Conditions and Contamination

11.1. Introduction

11.1.1. This chapter outlines the ground conditions and contamination scoping assessment and provides a summary of how the potential effects will be addressed in the EIA.

11.2. Baseline conditions

11.2.1. The following 'desk-based' geo-environmental data sources have been reviewed to establish the baseline conditions for the site and its surroundings:

- Historical and current Ordnance Survey Maps;
- Historical and current aerial photographs;
- Defra Magic Map;
- Zetica UXO Website;
- Public Health England UK Radon UK Map Viewer;
- EA data; and
- BGS maps and records.

Geology

11.2.2. The published geology of the area is shown on the geological map for Lincoln (Sheet 114, scale 1:50,000)²⁹. Further geological information has also been obtained from the BGS website

11.2.3. The geological mapping indicates that majority of the site is underlain by Tidal Flat deposits (superficial). The BGS describes Tidal Flat Deposits as "*normally a consolidated soft silty clay, with layers of peat, sand and a basal gravel. A stronger, desiccated surface zone is sometimes present*". A small area in the south of the site where the access road connects with Digby Road is underlain by Till, Mid Pleistocene superficial deposits. The Till deposits are described by BGS as "*unsorted and unstratified drift, generally over consolidated, deposited directly by and underneath a glacier without subsequent reworking by water from the glacier. It consists of a heterogenous mixture of clay, sand, gravel, and boulders varying widely in size and shape*".

11.2.4. The BGS mapping indicates that the entire site is underlain by the Oxford Clay Formation (bedrock), which comprises "*Silicate-mudstone, grey, generally smooth to slightly silty, with sporadic beds of argillaceous limestone nodules*".

11.2.5. There are no BGS mapped records of artificial ground or linear geological features onsite.

Mineral resources

11.2.6. There are no BGS recorded mineral sites within 1km of the site. The site is also not within a mineral safeguarding area as indicated on the Lincolnshire minerals safeguarding areas (MSA) map³⁰.

Mining

11.2.7. A review of the Coal Authority's online interactive map³¹ indicates that the site is not within the Coal Authority coal mining reporting area and not within a 'development high risk area'.

²⁹ British Geological Survey (1973) Geological Survey of Great Britain (England and Wales) Solid and Drift Lincoln Sheet 114

³⁰ Lincolnshire County Council (2016) Lincolnshire Minerals Safeguarding Areas Map

³¹ The Coal Authority Interactive Map <https://mapapps2.bgs.ac.uk/coalauthority/home.html>

Radon

11.2.8. Reference to the UK Health Security Agency (UKHSA) interactive map³² 'UK maps of radon' indicates that the site is not within a radon affected area.

Hydrogeology

11.2.9. The EA aquifer designations for the underlying superficial deposits and bedrock are summarised in Table 11-1.


Table 11-1 Aquifer designations

Stratum	Aquifer designation	Description
Till, Mid Pleistocene (superficial)	Secondary undifferentiated	"Assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type."
Tidal Flat Deposits (superficial)	Unproductive	"These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow."
Oxford Clay Formation (bedrock)	Unproductive	

Hydrology

11.2.10. The nearest surface water features and active licensed surface water abstractions and discharge consents are summarised in Table 11-2.

Table 11-2 Surface water features, abstractions and discharge consents

Nearest surface water features	
<p>There are two surface watercourses along the western and eastern boundaries of the site. Both watercourses flow north to south flow into Dorrington Dike, circa 3.3km south of the site. There are also networks of surface water drains are present along the site boundary and the in the surrounding areas.</p> <p>A reservoir is located adjacent to the north-east site boundary, with a surface water drain locally oriented and flowing from north-west to south-west. The surface water field drains extend in a grid layout into the surrounding fields. A secondary large surface drain is located approximately 85m south-west of the site, locally oriented and flowing from north-west to south-west.</p>	
Hydrology information	Records
Licensed surface water abstractions	<p>There are three potentially active surface water abstractions recorded within 250m.</p> <ul style="list-style-type: none"> ➤ 5m (N): for general agriculture: spray irrigation – storage, water body & permit end date not listed. ➤ 35-39m (N) two records both operated by G. S. Grantham Limited for fill - reservoir transfer and general agriculture: spray irrigation – storage, water body & permit end date not listed for either abstraction.
Surface water discharge consents	<p>There is one potentially active discharge consent to surface waters recorded within 500m. Located 138m south-east for the discharge of sewage (final/treated effluent) into the tributary Of Billingham Skirth, from a private property. The issue date of the permit was 15 July 2003 and the revocation date was not provided.</p>

³² UK Health Security Agency (UKHSA) interactive map 'UK maps of radon' www.ukradon.org

Site history and contaminative land uses

11.2.11. The following historic records provided within the Envirocheck Report³³ have been reviewed to provide an overview of the site's history and to help identify potentially contaminative historic land uses both onsite and in the immediate surrounding area:

- Historic County Series and Ordnance Survey (OS) map editions (1888 -2023); and
- Historic and recent aerial photographs.

11.2.12. The site remained largely unchanged since the earliest mapping (1888) till present day, comprising of agricultural fields with surface water drainage ditches, and an access road running southeast connecting into Digby Road.

11.2.13. The review of the historical mappings, the Envirocheck report and other environmental data sources did not identify made ground, waste/ landfill sites or other contaminative land uses within 500m of the site.

Agricultural land classification

11.2.14. The Natural England agricultural land classification map³⁴ indicates that the site is located on land classed as Grade 2 (very good quality) agricultural land. Natural England guidance³⁵ describes Grade 2 land as “*very good quality agricultural land with minor limitations that affect crop yield, cultivations or harvesting. A wide range of agricultural and horticultural crops can usually be grown*”. Land classed as Grades 1, 2, and 3a are defined by Natural England as ‘best and most versatile’ (BMV) agricultural land, and are considered the most flexible, productive and efficient and is most capable of delivering crops for food and non-food uses.

11.3. Further assessment and consultation

11.3.1. A Preliminary risk assessment (PRA) which includes a desk study and development of a preliminary Conceptual Site Model (CSM) will be produced to inform the assessment. The PRA will be undertaken in line with the EA Land Contamination Risk Management guidance (LCRM)³⁶, which sets out the process that should be followed for managing the risk from land contamination. This includes ensuring that the site will be ‘suitable for its proposed use’ in line with NPPF including within regulatory and site management contexts.

11.3.2. An agricultural land classification assessment will be submitted with the planning application.

11.4. Preliminary risk assessment

11.4.1. The PRA includes the development of an ‘initial’, ‘outline’ or preliminary CSM for the site. A CSM shows the possible relationships between contaminants, pathways and receptors based on the source-pathway-receptor (S-P-R) approach, as shown in Figure 11.1.

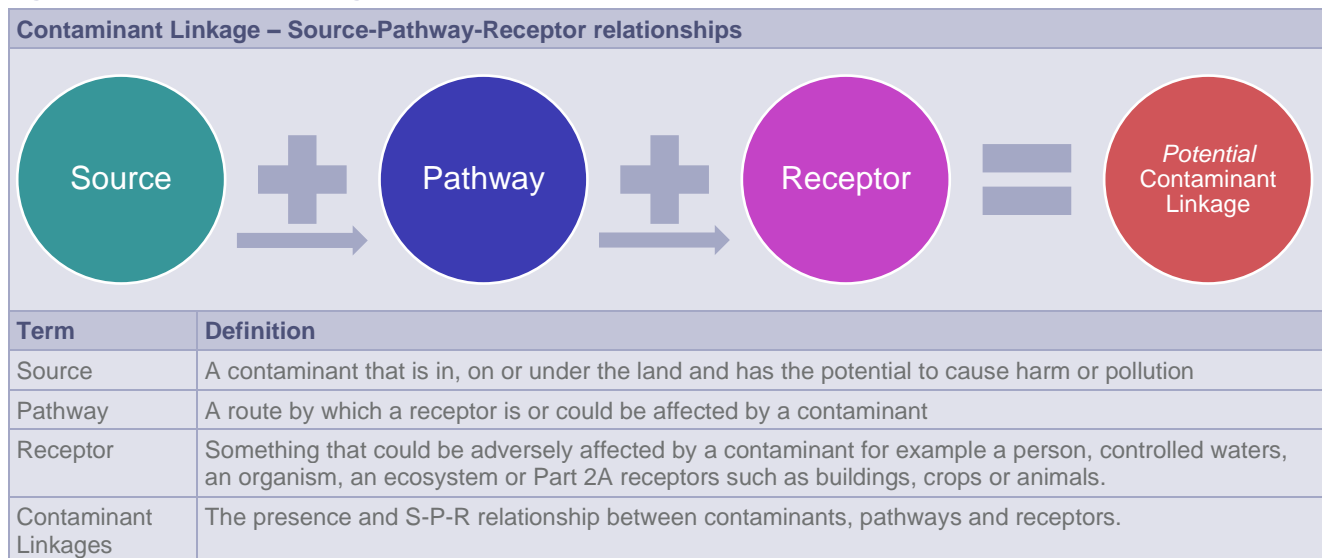
³³ Landmark Information Group (2023) Envirocheck Report Order Number: 306771665_1_1

³⁴ Natural England (2010) Agricultural Land Classification (1:250,000) East Midlands Region <http://publications.naturalengland.org.uk/category/5954148537204736>

³⁵ Natural England (2021) Guide to assessing development proposals on agricultural land <https://www.gov.uk/government/publications/agricultural-land-assess-proposals-for-development/guide-to-assessing-development-proposals-on-agricultural-land>

³⁶ Environment Agency (2021) Land Contamination Risk Management guidance (LCRM) <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm>

Figure 11.1 Contaminant linkages (S-P-R)



11.4.2. All three elements (S-P-R) of a contaminant linkage must be present for a land contamination risk to exist, specifically, even if a contaminant has been identified; but if there is no receptor or no pathway then the S-P-R linkage is incomplete and there is not a risk – “A contaminant linkage must be present for there to be a S-P-R relationship. Without a linkage, there is not a risk – even if a contaminant is present” (LCRM, 2020).

Potential land contamination sources

11.4.3. No significant onsite or offsite sources of potential contamination have been identified from the review of the historical land use at the site. No Made Ground is shown on the geological mappings, and it is not anticipated that significant anthropogenic materials will be encountered onsite during the construction works.

Potential receptors

11.4.4. The potential receptors that have been identified with respect to the site and the proposed development are summarised in Table 11-3.

Table 11-3 Potential receptors

Receptor	Identified?	Details
Human health – end users	Yes	Future users of the proposed development
Human health – during site preparation and construction	Yes	Construction workers
Controlled waters		
Surface water	Yes	Surface water near the site
Groundwater	Yes	Unproductive aquifer
Other		
Ecological systems	No	None identified
Geological receptors	No	None identified

11.5. Likely environmental effects

Construction

11.5.1. No significant sources of contamination have been identified from the review of the available environmental data and historical mappings. Based on this, it is considered that the construction of the proposed development is unlikely to lead to significant effects to the identified potential receptors in relation to land contamination. However, the EA’s LCRM process will be followed to confirm whether unacceptable risk from land contamination is present as discussed in Section 11.4.

Operational

11.5.2. The operation of the proposed development is considered unlikely to lead to significant effects to the identified potential receptors.

11.6. Scoping assessment summary

11.6.1. The scoping assessment concludes that based on the available information reviewed, the risks to the identified will be low and no significant effects relating to ground conditions and contamination are anticipated.

11.6.2. For land contamination effects, the LCRM process, which begins with a PRA will be followed. The effects relating to agricultural land will be addressed in the agricultural land classification assessment report. Therefore, effects to these are scoped out of the ES.

12. Population and Human Health

12.1. Introduction

12.1.1. This chapter outlines the population and human health scoping assessment and discusses the potential effects associated with the proposed development.

12.2. Baseline conditions

12.2.1. The area surrounding the site is predominantly rural in nature, dominated by agricultural land use and associated buildings, with small towns and villages.

Population

12.2.2. Baseline conditions are ordinarily established by examining the existing demographic, economic and social conditions through reference to a number of published data sources such as: 2021 Census data, the Office of National Statistics (ONS) website, ONS Mid-Year Population Estimate series, NOMIS, the latest Annual Population Survey data, the 2019 Indices of Deprivation and other relevant data sources. Socio-economic analyses typically establish any strengths and weaknesses of the local economy and social infrastructure that the proposals may affect during both the construction and operational phases of development. This will be reported in the Socio-economic assessment to be submitted within the planning application.

Land use and agriculture

12.2.3. The area of the site is approximately 11ha, most of which is classified as good quality agricultural land but is currently disused grazing pasture. There are also a network of ditches and access tracks that are present within and adjacent to the site. The Walcott Farm Biofuel Plant operations is expected to occupy approximately 6ha.

Residential properties

12.2.4. The nearest residential receptors are listed in Table 2-1.

12.2.5. Further residential properties are located in Walcott, located approximately 1km to the east, and Digby approximately 3km to the west.

Public Rights of Way

12.2.6. There are multiple Public Rights of Way (PRoW) within proximity of the proposed development:

- PRoW WBil/4/1 (Sleaford and South Kesteven Division) located adjacent to the eastern site boundary;
- PRoW WBil/8/1 (Sleaford and South Kesteven Division located 100m south to the west of Catley Cottages; and
- PRoW WBil/3/1 located 500m to the east.

Employment

12.2.7. Based on the latest 2021 Census data, levels of unemployment amongst economically active people in North Kesteven is 3.01%, which is lower than both the East Midlands rate of 4.18% and 4.86% across England and Wales as a whole. The equivalent 2021 data for Billingham, Martin and North Kyme ward (2021) indicates that the proportion of unemployed amongst the economically active residents at a localised level is higher than the district and regional averages, at 4.52%, although this is still below the national rate.

Local businesses

12.2.8. The site is owned by Warrendale Farms Ltd and currently used for intensive poultry farming. Within the village of Walcott to the east there are various local businesses. To the west, there are various local businesses in Digby.

Community features

12.2.9. To the east, Walcott Primary School is located on the corner of Pinfold Lane and Digby Road, in Walcott. There is also Manor Barn Day Nursery, St Oswald's Church and the village hall in Walcott, as accessed from High Street.

12.2.10. To the west, is the village of Digby, with Digby Church of England Primary School, Digby Village pre-school, St Thomas Martyr's Church, and Digby War Memorial Hall.

12.3. Further assessment and consultation

12.3.1. As part of the proposed development and associated planning application, the applicant has planned a programme of consultation and engagement with statutory stakeholders, landowners, local community groups and businesses, as well as residents and the general public.

12.4. Likely environmental effects

Construction and operational Effects

Land use and agriculture

12.4.1. Advanced Fuel Partners Limited, in collaboration with its partner Warrendale Farms Ltd as the land owner, plan to repurpose the site to treat agricultural organic waste, through the production of bioenergy. An agricultural land classification report will accompany the planning application to describe and justify the trade off between the loss of agricultural land and the proposed development.

Residential properties

12.4.2. There will be no direct land take from land in private residential use. Potential for disruption from the proposed development will be assessed as appropriate in the relevant topics (Air Quality, Noise and Vibration, Transport Statement).

PRoW

12.4.3. The proposed development will not require temporary or permanent stopping up or diversion of any PRoW.

Employment

12.4.4. The construction phase of the proposed development has the potential to have a beneficial impact through the provision of direct, indirect and induced employment opportunities primarily in the form of construction workers and employment related to the procurement orders for materials, components and services.

12.4.5. The operational phase will produce additional jobs through operations, regular maintenance, biological services, management and administration, as well as providing employment for the HGV drivers going to and from the site with the digestate on a daily basis.

Local business and community features

12.4.6. There are no local businesses or community features within the study area which could be affected by any direct land take or are likely to be affected by loss of amenity.

12.5. Scoping assessment summary

12.5.1. A Socio-economic assessment will be produced to support the planning application, that will consider employment, and the overall business case of the proposed development. In relation to other human receptors, these will be assessed as appropriate within the other topics of the ES. Therefore, the consideration of population and human health is scoped out of the EIA.

13. Major Accidents and Natural Disasters

13.1. Introduction

13.1.1. This chapter provides the major accidents and natural disasters scoping assessment and discusses the potential effects associated with the proposed development.

13.2. Baseline conditions

13.2.1. Records do not show any extreme flooding events, accidents or disasters over the site.

13.3. Further assessment and consultation

13.3.1. No further consultation is proposed to be undertaken in relation to major accidents and natural disasters.

13.4. Likely environmental effects

Construction effects

13.4.1. During the construction phase, the potential effects derive from:

- Frequent delivery of fuels and chemicals; and
- Potential for traffic accidents.

13.4.2. Given the scale of the development, with the implementation of good construction practices and a CEMP, potential risks are considered low.

Operational effects

13.4.3. During the operational phase risks include:

- Potential for future flooding.

13.4.4. The planning application is to be supported by a FRA, which details outline and operational capacity of the flood defence.

13.5. Scoping assessment summary

13.5.1. It is considered that whilst there is always a potential risk that a major accident or natural disaster could result in a significant environmental effect, given the nature of the proposed development and the construction and operational control measures that will be in place, it is considered that risk can be mitigated.

13.5.2. It is proposed that major accidents and natural disasters are scoped out of the ES.

14. Assessment Summary Matrix

Effects	Construction	Operation	Comments
Air Quality			
Air Quality Emissions	Scoped out	Scoped in	Assessment of operational effects will be based on guidance produced by EPUK and IAQM. The ADMS dispersion model will predict the change in ambient concentrations from baseline conditions.
Dust	Scoped in	Scoped out	The assessment methodology will follow that set out in the IAQM's Guidance on the Assessment of Dust from Demolition and Construction.
Transport Emissions	Scoped out	Scoped out	Traffic flows will be considered in the transport statement. It is proposed transport emissions are scoped out (pending clarification of final development traffic flows).
Odour	Scoped out	Scoped in	An odour risk assessment will be undertaken using the methodology set out in the IAQM's Guidance on the assessment of odour for planning and will inform an Odour Management Plan.
Noise and Vibration			
Noise	Scoped in	Scoped in	The proposed development has the potential to increase noise levels at the construction and operational stage, therefore noise is scoped into the assessment.
Vibration	Scoped in	Scoped out	Construction methods are still to be defined therefore assuming a worst-case scenario, if piled foundations are required, a construction vibration assessment will be completed. Operational activities do not include percussive equipment.
Archaeology and Heritage			
Built heritage assets	Scoped out	Scoped out	There are no designated built heritage assets in the vicinity of the development.
Archaeology	Scoped in	Scoped out	There is potential for as yet unknown archaeological remains to be uncovered. Further research is needed to establish the extent of potential impacts and the effect on any archaeological remains present.
Historic landscape	Scoped in	Scoped in	Due to the open nature of the environment, it is considered that the construction and operation has the potential to affect the character of the historic landscape.
Landscape and Visual Impact			
Landscape setting and character	Scoped in	Scoped in	Due to the nature and scale of the works the proposed development has the potential to result in landscape and visual effects.
Visual Impact	Scoped in	Scoped in	
Ecology (Biodiversity)			
Designated Sites	Scoped out	Scoped out	There are no designated sites within 1km of the works.
Priority Habitat	Scoped in	Scoped in	17 priority habitats found within the 2km search distance.
Other habitats (if not priority)	Scoped out	Scoped out	No other notable habitats found on site.

Effects	Construction	Operation	Comments
Bats	Scoped out	Scoped out	No roosting potential, or key flight lines such as hedgerows for foraging identified on site.
Eurasian otter	Scoped out	Scoped out	No suitable habitat was identified within site.
Water vole	Scoped out	Scoped out	Suitable habitat present but impacts would not be to a scale that would cause significant effects on population.
West European hedgehog	Scoped out	Scoped out	Suitable habitat present but impacts would not be to a scale that would cause significant effects on population.
Brown hare	Scoped out	Scoped out	Suitable habitat present but impacts would not be to a scale that would cause significant effects on population.
Great crested newts	Scoped in	Scoped out	Suitable habitat for GCN present on site.
Other amphibians	Scoped out	Scoped out	Suitable habitat present but impacts would not be to a scale that would cause significant effects on population.
Reptiles	Scoped in	Scoped in	Suitable habitat for reptiles found on site.
Birds	Scoped out	Scoped out	Limited habitat present but impacts would not be to a scale that would cause significant effects on population.
Other species	Scoped out	Scoped out	Signs of mammals, [REDACTED], found on site; however, impacts would not be to a scale that would cause significant effects on population.
Invasive species	Scoped out	Scoped out	No INNS found on site.
Flood Risk and Drainage			
Surface water quality and quantity	Scoped in	Scoped in	The ES will include assessment of loss or change to surface water receptors and indirect loss or changes to surface water receptors.
Groundwater quality and quantity	Scoped in	Scoped in	Abstractions have the potential to alter flow paths that may result in loss of base flow to nearby watercourses, or loss to the aquifer leading to adverse quantitative water balance effects.
Flooding	Scoped in	Scoped in	The proposed development is located in Flood Zone 2 and 3. An FRA will be submitted with the ES.
Climate Change			
Climate Change GHG	N/A	N/A	Construction and operational GHG emissions will be considered and reported in the Sustainability Framework document and Carbon and GHG Assessment Technical Note.
Climate Change Resilience	N/A	N/A	Climate change vulnerability will be considered and reported in the Sustainability Framework document and Flood Risk Assessment.
In-combination Climate Impact Assessment	N/A	N/A	Considered and reported in the ES and Sustainability Framework document.
Ground Conditions and Contamination			
Human Health	Scoped out	Scoped out	

Effects	Construction	Operation	Comments
Geology	Scoped out	Scoped out	There are no recorded statutory geological sites or regionally important geological sites on or adjacent to the site. Ground conditions will not present any significant environmental impacts during the operation of the works. A Land Contamination Preliminary Risk Assessment will be produced as part of the Land Contamination Risk Management process for planning.
Groundwater	Scoped out	Scoped out	
Population and Human Health			
Land use and agriculture	N/A	N/A	Effects will be assessed in the sustainability assessment, landscape assessment and Agricultural Land Classification Report that will be submitted as part of the planning application.
Community facilities and amenity	Scoped out	Scoped out	The proposed development does not contain or affect any community facilities or amenity features, therefore this assessment is scoped out of assessment.
Local business (including agriculture)	Scoped out	Scoped out	The overall business case of the proposed development is to re-purpose farming waste products (manures) for the production and delivery of green gas. The proposed development does not directly affect any other local business. As such, assessment to local business is scoped out.
PRoW users	N/A	N/A	The proposed development will not require temporary or permanent stopping up of PRoW. PRoW users will be considered within the both the traffic assessment and landscape and visual impact assessment.
Employment	N/A	N/A	Construction and operational employment opportunities will be included in the Socio-Economic Assessment that will be submitted with the planning application.
Major Accidents and Natural Disasters			
Major accidents and disasters	Scoped out	Scoped out	The proposed development is not located in an area which is anticipated to be at risk of foreseeable major accidents or disasters.

15. Proposed Structure of the ES

15.1. Structure of the ES

15.1.1. The ES will include all the required information defined in The Town and Country Planning (Environmental Impact Assessment Regulations) 2017³⁷.

15.1.2. The subsequent ES will include:

- Volume 1: Environmental Statement;
- Volume 2: Appendix; and
- Non-technical summary.

15.1.3. Although subject to change, the structure of the ES is anticipated to be as follows:

Context

- Introduction;
- Environmental Impact Assessment Legislation;
- Planning policy and context;
- Site and surrounding area;

Project Description

- The proposed development;
- Consideration of alternatives;

Assessment

- Air Quality;
- Noise and Vibration;
- Archaeology and Heritage;
- Landscape and Visual Impact;
- Ecology (Biodiversity);
- Flood Risk and the Water Environment;
- In combination and Cumulative Impacts;

Conclusions

- Summary of residual environmental effects, mitigation and monitoring.

15.1.4. An EIA and associated legislation and relevant guidance and policy review will be summarised in an appendix. The overall method of assessment, and how specific guidance and requirements for technical topics has been transposed in line with the EIA regulations will also be described in an appendix. Technical assessments, modelling outputs and appraisals for each topic will be submitted as evidence in appendices as required.

15.1.5. The following technical assessments will be submitted:

- Construction Environmental Management Plan;
- Environmental Action and Commitment Register;
- Flood Risk Assessment;
- Outline Drainage Strategy;

³⁷ The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (legislation.gov.uk)

- Air Quality Dispersion Model and Assessment;
- Construction Dust Assessment;
- Odour assessment and odour management plan;
- Noise Impact Assessment;
- Heritage Impact Assessment;
- Landscape and Visual Impact Assessment;
- Landscape Design Management Plan;
- Ecological Impact Assessment; and
- Biodiversity Net Gain Assessment.

15.2. Additional documents

15.2.1. The following documents will be submitted to support the planning application:

- Transport Statement;
- Construction Traffic Management Plan;
- Preliminary Highway Design;
- Agricultural Land Classification Assessment;
- Land Contamination Preliminary Risk Assessment;
- Site Waste Management Plan;
- Socio-Economic Assessment;
- Sustainability Framework Tracker;
- Carbon and GHG Assessment Technical Note;
- Preliminary Lighting Assessment;
- Topographic Survey;
- Construction Traffic Management Plan;
- Design and Access Statement; and
- Planning Statement.

15.2.2. Additional permits:


- Noise and Vibration Permit application;
- Bespoke permit application; and
- Air Quality Permit application.

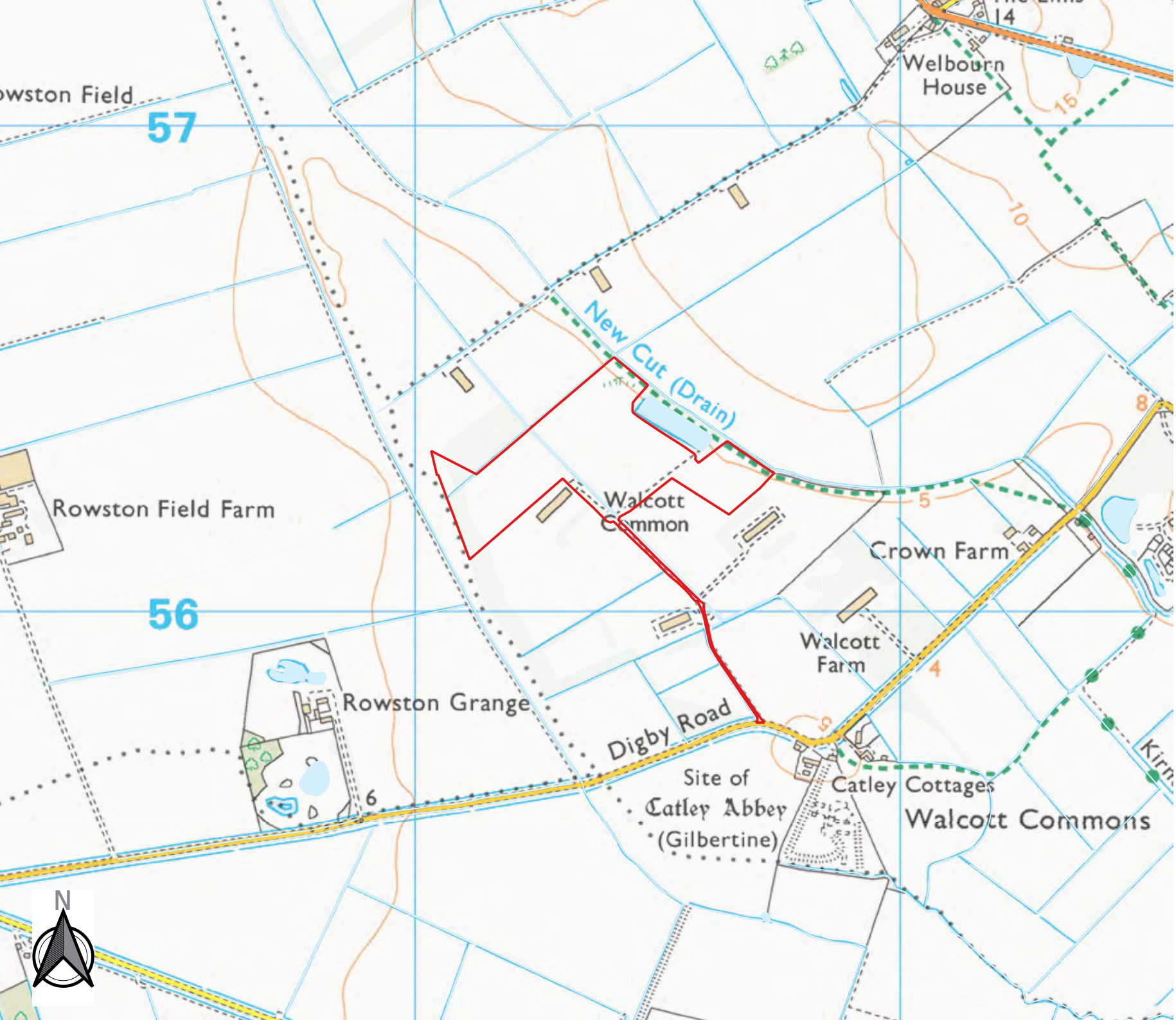
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- Figure 2.2 Indicative layout (in Figures Volume)
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Legend

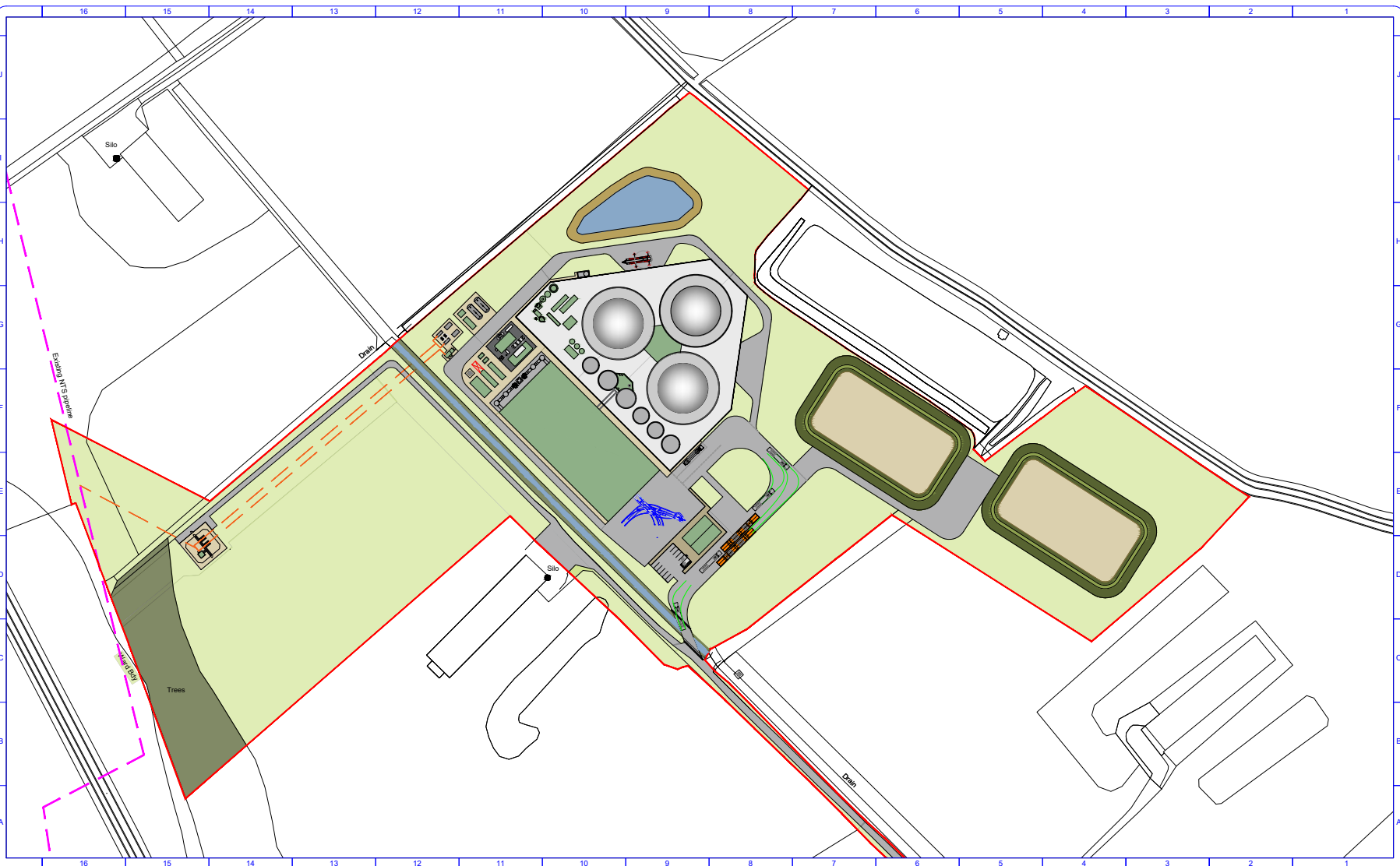
-  Indicative Red Line Boundary



Walcott Farm Biofuel Plant

Figure 1.1 Location Map



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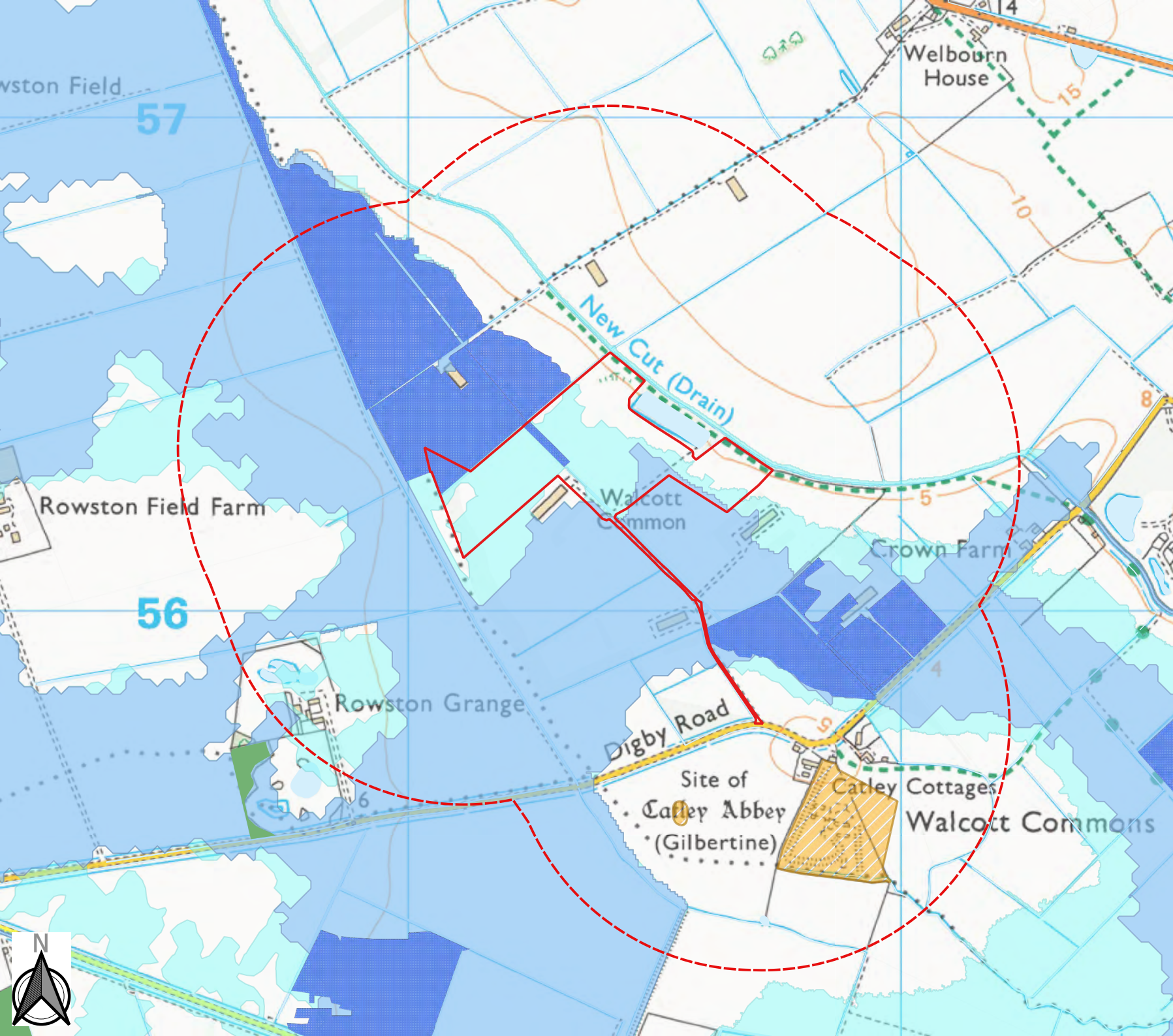


Walcott Farm Biofuel Plant

Figure 2.2 Indicative Layout

Legend

-  Indicative Red Line Boundary
-  500m Buffer
- Priority Habitat**
 -  Coastal and floodplain grazing marsh
 -  Deciduous woodland
- Heritage**
 -  Scheduled Ancient Monument
- Flood Zones**
 -  Flood Zone 2
 -  Flood Zone 3




Walcott Farm Biofuel Plant

Figure 2.4 Environmental Constraints (500m)


1:10000


Legend


 Indicative Red Line
Boundary


 2km Buffer


Priority Habitat

 Coastal and floodplain
grazing marsh

 Deciduous woodland

 No main habitat but
additional habitats
present

 Traditional orchard

 Scheduled Ancient
Monument

 Historic Landfill

Listed Buildings

 Grade I

 Grade II

 Grade II*

Flood Zones

 Flood Zone 2

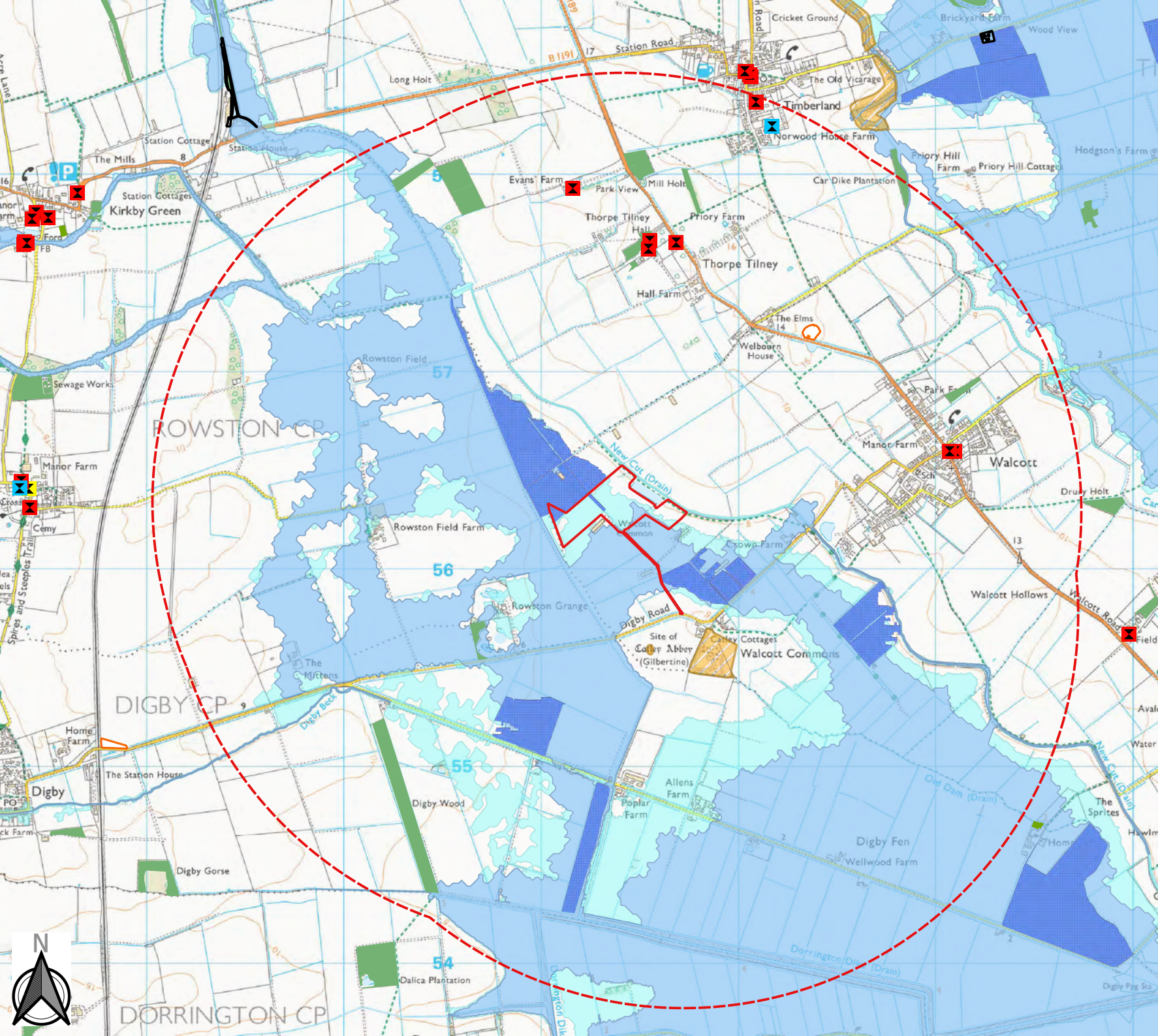
 Flood Zone 3

Walcott Farm Biofuel
Plant



Figure 2.5 Environmental
Constraints (2km)

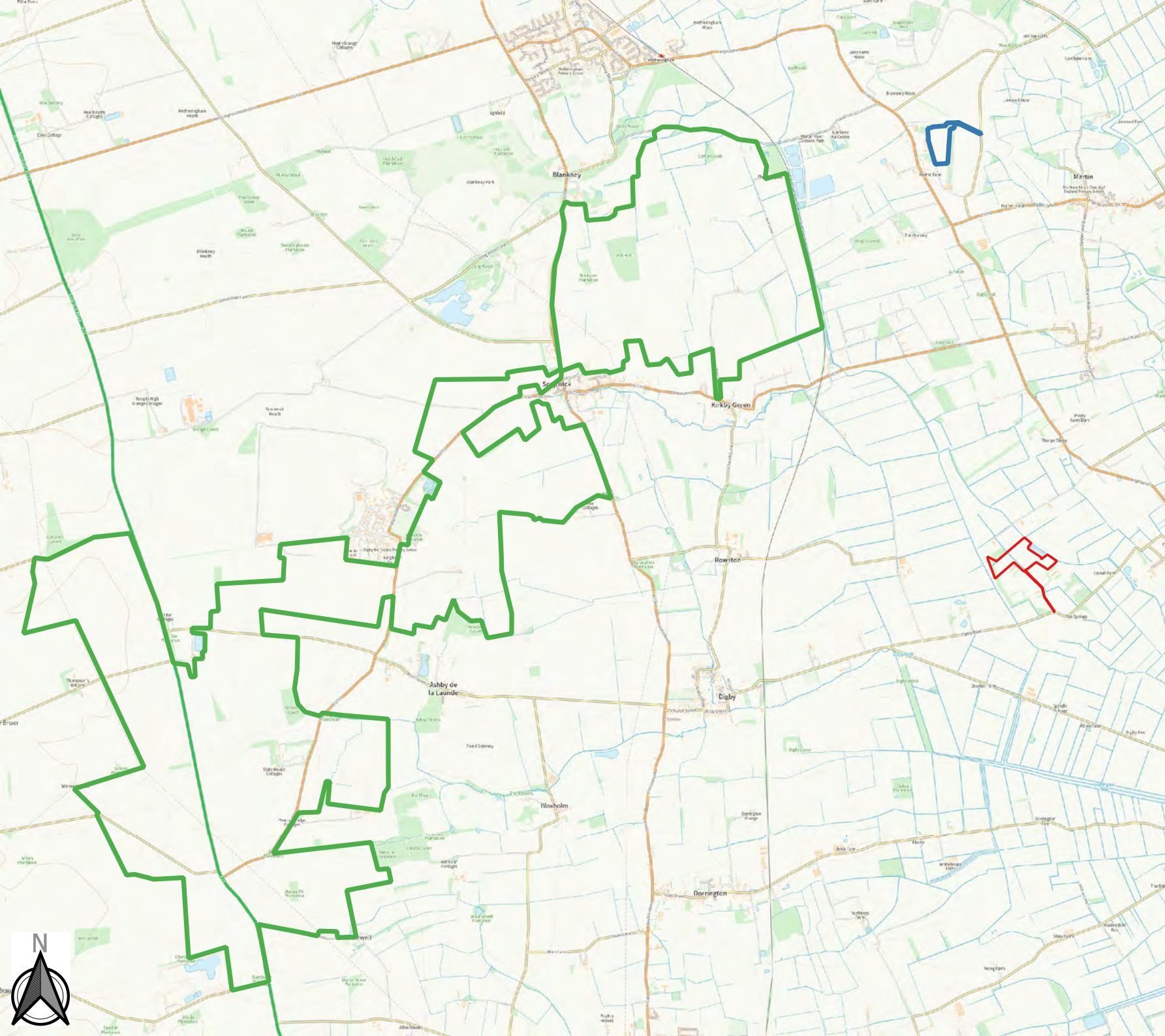
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Legend

-  Indicative Red Line Boundary
-  Springwell Solar Farm*
-  RAF Metheringham



Walcott Farm Biofuel Plant

Figure 3.1 Cumulative Sites Map

1:50000

*Springwell Solar Farm based on Indicative Red Line Boundary SECNewgate - Springwell Solar (3dwtech.co.uk)