One Earth Solar Farm

Scoping Report

November 2023

One Earth Solar Farm Ltd

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1. Introduction

1.1. Logika Group Ltd has been commissioned to prepare the Environmental Impact Assessment (EIA) Scoping Report to accompany a request for a Scoping Opinion from the Planning Inspectorate (prepared on behalf of the Secretary of State) for the One Earth Solar Farm by One Earth Solar Farm Ltd (the 'Applicant').

1.2. The One Earth Solar Farm comprises the construction and installation of solar photovoltaic panels, Battery Energy Storage Systems (BESS) and associated grid connection infrastructure which would allow for the generation of an anticipated 740 megawatts (MW) of electricity (the 'Proposed Development') across approximately 1,500 hectares (ha) in Lincolnshire and Nottinghamshire (the 'Site').

The Applicant

1.3. One Earth Solar Farm is being promoted by One Earth Solar Farm Ltd. This is a joint venture between Padero Solaer Ltd (trading as PS Renewables) and Ørsted Onshore UK Ltd.

1.4. Established in 2012, PS Renewables is one of the UK's largest privately held companies that specialises in the development and asset management of renewable energy projects including solar and BESS. PS Renewables existing solar farm portfolio totals over 300MW of electricity producing potential.

1.5. In the UK, Ørsted is a leading offshore wind developer; currently operating 12 offshore wind farms, alongside onshore wind farms in Scotland, and owns and operates sites for energy storage. Ørsted is committed to ensuring that its presence contributes to sustainable growth and development, helping to support the UK in meeting its legally binding net zero targets and benefitting the communities in which it operates.

Consenting Regime and Requirement for Environmental Impact Assessment

Purpose of EIA

1.6. The term EIA describes a procedure that must be followed by certain types of project before it can be given 'consent'. Underpinned by the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017[1], as amended (hereafter referred to as the 'EIA Regulations'), EIA is a formal process required for certain types of development that brings together information to identify the likely significant environmental effects of a project and measures for avoiding, preventing, reducing or, if possible, offsetting likely significant effects. It provides decision-makers with the environmental information needed to make sustainable decisions when determining applications for certain developments and provides information on the likely significant effects of certain developments to the public to understand as part of participating in the planning process.

[1] His Majesty's Office (HMSO) (2017) Infrastructure Planning (Environmental Impact Assessment) Regulations 2017

The Need for EIA

1.7. The aim of EIA is to protect the environment by ensuring that a determining body such as the Secretary of State, when deciding whether to grant consent for a project which is likely to have significant effects on the environment, does so in the full knowledge of these likely significant effects, and thus takes them into account in the decision-making process. The EIA Regulations set out a procedure for identifying those projects which should be subject to an EIA, and for assessing, consulting, and coming to a decision on those projects which are likely to have significant environmental effects.

1.8. The EIA Regulations set out the types of development which must be subject to an EIA (referred to as Schedule 1 development) and other developments, which may be subject to an EIA depending on certain development parameters and / or their potential to give rise to significant environmental effects (referred to as Schedule 2 development).

1.9. The Proposed Development does not fall under any of the types of development set out in Schedule 1 of the EIA Regulations. However, the Proposed Development is of a type and scale described in Schedule 2 (a) of the EIA Regulations, and potentially (b) of that Schedule, as follows:

"Energy industry

a) industrial installations for the production of electricity, steam and hot water (projects not included in Schedule 1 to these Regulations);

b) industrial installations for carrying gas, steam and hot water; transmission of electrical energy by overhead cables (projects not included in Schedule 1 to these Regulations);"

Requirement for a DCO

1.10. As the Proposed Development is an onshore generating station exceeding 50MW of electricity it is automatically classified as a Nationally Significant Infrastructure Project (NSIP), and therefore requires a Development Consent Order (DCO) under Sections 14(1)(a) and 15(2) of the Planning Act 2008[2]. In this instance the Applicant has concluded that the Proposed Development does require an EIA as its development could lead to likely significant environmental effects. The Applicant has therefore chosen to proceed with production of the documentation to inform an EIA and so this Scoping Report represents under Regulation 8 (1)(b) a notification that the Applicant will prepare and submit an Environmental Statement (ES) in support of the DCO without prior request for a Screening Opinion.

Purpose and Structure of the Scoping Report

1.11. The process of identifying the issues to consider within the ES and establishing the scope of the assessment, is known as 'scoping'. Although scoping is not a mandatory requirement under the EIA Regulations, it is recognised as a useful preliminary procedure which helps to identify the main effects that a proposed development is likely to have on the environment.

[2] His Majesty's Office (HMSO) (2008) Planning Act 2008 (as amended)- https://www.legislation.gov.uk/ukpga/2008/29/contents

1.12. The purpose of this Scoping Report is to request an opinion from the Secretary of State to the scope, and level of detail, of the information to be provided in the ES under Regulation 10(1) of the EIA Regulations. This will help ensure that the EIA is focused on the key impacts likely to give rise to significant environmental effects and is also used to obtain agreement on the approach and methodologies for assessments which will be reported in the ES, which will accompany the application for the DCO. This Scoping Report also provides the justification and rationale for scoping out environmental aspects or receptors where it is considered that significant environmental effects are unlikely to arise as a result of the Proposed Development.

1.13. In line with the requirements of Regulation 10(3) of the EIA Regulations, this request contains the following information to assist PINS, on behalf of the Secretary of State, in adopting a Scoping Opinion:

- A plan sufficient to identify the land where development could occur (see Figure 2-1 and Appendix A);
- A description of the Proposed Development, including its location and technical capacity (see Chapter 3);
- An explanation of the likely significant effects of the Proposed Development on the environment (see Chapters 6 to 18); and
- Such other information or representation as the person making the request may wish to provide or make (see Chapters 6 to 18).

1.14. In addition, this Scoping Request has been prepared in accordance with the PINS Advice Note Seven, which recommends that a request for a Scoping Opinion should also include:

- The Proposed Development
  - An explanation of the approach to addressing uncertainty where such remains in relation to elements of the Proposed Development e.g. design parameters (see Chapter 3).
  - Referenced plans presented at an appropriate scale to convey clearly the information and all known features associated with the Proposed Development (see Appendix A).
- EIA Approach and Topic Areas
  - An outline of the reasonable alternatives considered and the reasons for selecting the preferred option (see Chapter 2 and Chapter 3).
  - A summary table depicting each of the aspects and matters that are requested to be scoped out allowing for quick identification of issues (see Chapters 6 to 18).
  - A detailed description of the aspects and matters proposed to be scoped out of further assessment with justification provided (see Chapters 6 to 18).
  - Results of desktop and baseline studies where available and where relevant to the decision to scope in or out aspects or matters (see Chapters 6 to 17).

- Aspects and matters to be scoped in, the report should include details of the methods to be used to assess impacts and to determine significance of effects e.g. criteria for determining sensitivity and magnitude (see Chapters 5 to 17).
- Any avoidance or mitigation measures proposed, how they may be secured and the anticipated residual effects (see Chapters 6 to 17).

> Information Sources and Guidance

- references to any guidance and best practice to be relied upon (see Chapters 6 to 18);
- evidence of agreements reached with consultation bodies (for example the statutory nature conservation bodies or local authorities) (see Chapters 6 to 17); and
- an outline of the structure of the proposed ES (see Chapter 5).

Project Team

1.15. Regulation 14(4) of the EIA Regulations require that in order to ensure the completeness and quality of the ES, '*(a) the applicant must ensure that the environmental statement is prepared by competent experts; and (b) the environmental statement must be accompanied by a statement from the applicant outlining the relevant expertise or qualifications of such experts.*'

1.16. In accordance with this requirement Table 1-1 sets out the technical specialists and their relevant expertise who have contributed to the preparation of this Scoping Report and will undertake the EIA that will be reported in the ES. Table 1-1 shows the EIA team is competent to undertake the EIA.

Table 1-1: EIA Consultant Team

Name	Company	Aspect Covered	Qualifications	Description of Competence
Toby Gibbs	Logika Consultants Ltd	EIA	CEnv, CMIEEM	A Chartered Environmentalist and a specialist in EIA having worked on many infrastructure projects, and with experience in the UK, Europe, Africa and the Middle East. Projects include being engaged to provide environmental support to the development of Heathrow Airport's expansion proposals, a major NSIP development. He was also the Director responsible for the EIA that formed part of the DCO documentation for reopening Manston Airport in Kent and had a leadership role in the EIA for Hinkley Point C new Nuclear Power Station DCO application.

Guido Pellizzaro	Logika Consultants Ltd	EIA	BSc (Hons) MIAQM AMIEnvSc PIEMA	Environmental consultant with more than 15 years' experience overseeing the production of EIA reports and ES' for a range of developments, including solar, throughout the UK. Expert in the management of ES' including liaising with clients, external organisations and project team members. Working as part of the team in providing technical advice on a wide range of environmental issues.
Alan Kirby	Logika Consultants Ltd	Ecology and Biodiversity	BSC(HONS), MSC, PHD	Alan is an ecologist with 19 years of consulting experience. Alan has led the biodiversity inputs on a number of large infrastructure projects including input into the ES's as part of the DCO applications for Rampion 2 Offshore Wind Farm (ongoing), the Heathrow Expansion Project, Navitus Bay Offshore Windfarm (NBOWF) and the North London (Electricity Line) Reinforcement Project. He has also provided input to DCO Examination hearing sessions (e.g. Hinkley Point C NNB, NBOWF and Triton Knoll Electrical System), Public Inquiries and Examinations in Public including the provision of written representations, the negotiation of Statements of Common Ground and the giving of oral evidence as an expert witness.
Craig Thwaites	Logika Consultants Ltd	Hydrology and Hydrogeology	MEng	Craig has worked on a variety of complex solar projects across the UK including Tregonning Solar Farm and Inkersall Road Solar Farm. Within all these projects Craig uses his experience to impact design and inform the design team on the requirements and benefits that are provided by implementing sustainable flood and drainage solutions.

Simon McMillan	ADAS	Land and Soils	BASIS, BSSS	Simon is a senior soils consultant for ADAS (an RSK company). He has expertise in the management and delivery of soils consultancy and agricultural and environmental research. In recent years he has delivered soil surveys and provided reports for hundreds of projects, including large scale solar, rail, housing and cross-country pipeline projects. These typically comprise agricultural land classification (ALC), soil resources plans and soils aftercare management plans. Simon was a lead surveyor Welsh Government project that undertook the largest scale soil survey for over 30 years, covering around 3,000 ha of Wales to help develop the Welsh Government's predictive ALC tool.
Claire Cogar	Iceni	Buried Heritage	MCIfA	Claire is the director of archaeology at Iceni. She has extensive experience of development-led archaeology. She has managed works on the Thames Tideway and HS2 Infrastructure schemes and has carved out a niche in undertaking the archaeological and heritage components of large-scale public sector health projects.
Georgia Foy	Iceni	Cultural Heritage	BA (hons)	Georgia specialises in large scale development schemes affecting the historic environment and townscape character, where a careful but pragmatic approach is needed to balance the need for development with the heritage and townscape sensitivities of a place. Her particular expertise is in detailed policy appraisals, design and feasibility advice and inputting into Environmental Impact Assessments

Sam Griffiths	Iceni	Landscape and Visual	CMLI	Sam is an Associate Landscape Architect at Iceni working on complex projects as part of multidisciplinary teams, including preparation of landscape planning and design deliverables for Nationally Significant Infrastructure. Sam was part of the landscape team for the DCO consented Longfield Solar Farm.
Gordon Buchan	Pell Frischmann	Transport and Access	BEng (Hons), MSc, CMILT, FCIHT	Gordon Buchan is a highly experienced Transport Planner, having worked on wide range of projects across the UK, Ireland and Scandinavia. Gordon specialises in private sector development and renewable energy projects. He has supported several EDF projects in the UK and have acted as Expert Witness on a number of Public Inquiries and NSIP hearings. He has given presentations at the ICE Infrastructure Show at the NEC and at the All Energy conference in Aberdeen on two occasions. Gordon was a finalist in the 2018 NCE 100 Alternative Energy Award category.
Chris Whall	Air Quality Consultants Ltd	Air Quality	CEnv, MiEnvSci, MIAQM	Chris is a Chartered Environmentalist with over 20 years' experience in environmental consulting. He has a background in air quality, climate change and emissions quantification, impact assessment and management. Chris has particular expertise in the management and delivery of complex air quality and carbon assessments for major infrastructure projects, most notably in the power and transport sectors including Development Consent Order applications and highly contentious public consultation exercises.

Laurence Caird	Air Quality Consultants Ltd	Climate Change	Csci, MIEA, IAQM	Laurence is a Chartered Scientist with 15 years' experience in the field of environmental consultancy with extensive experience in air quality and climate change assessments. He helped shape the methodology for the assessment of greenhouse gas emissions within EIA to satisfy the requirements of the EIA Regulations 2017. He has produced carbon footprints and greenhouse gas assessments for a number of projects including major infrastructure projects including transportation, as well as EIA residential, commercial and mixed-use developments and industrial facilities
Jon Sims	Noise Consultants Ltd	Noise and Vibration	BEng (hons), BSc (hons), MIO	Jon has over 15 years experience in acoustic consultants, this includes many large infrastructure projects including onshore and offshore wind farms, energy transmission systems, rail, road and large industrial projects. Jon provided consultancy advice on noise to HS2 Ltd for several years, particularly in relation to the construction and operation of Phase 1 of HS2, the DCO application for Triton Knoll Offshore Wind Farm Onshore Electrical system, including giving evidence on noise at the planning hearing and environmental permitting for several power stations.
Jon Wright	Iceni	Health	Full Member RTPI, AIEMA	Jon has significant solar experience in the completion on heath assessments; he held a role within the in-house planning team of Lightsource BP, a global leader in the development and management of solar projects and smart energy solutions. He was responsible for large-scale solar farm planning applications throughout the UK and Republic of Ireland.

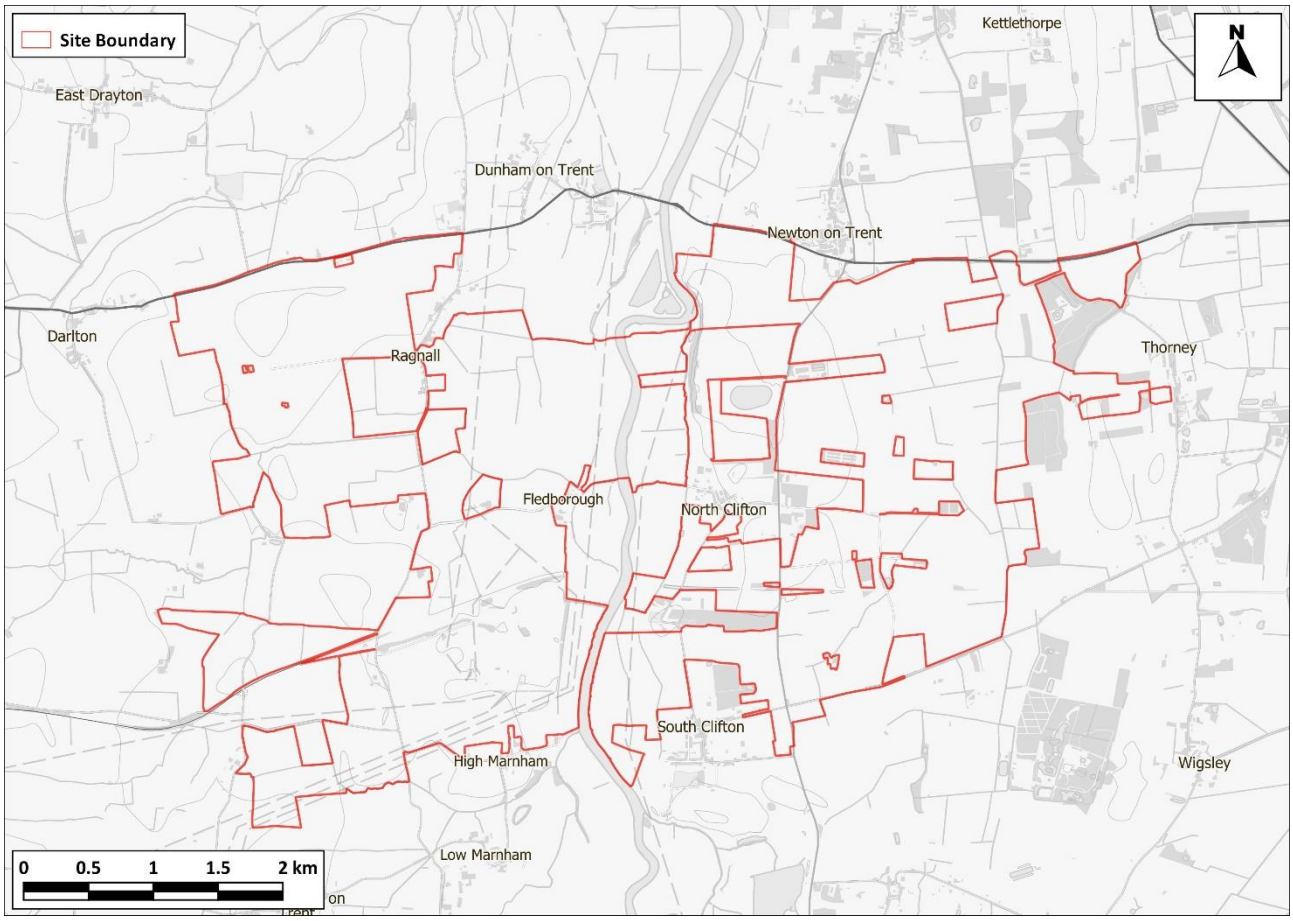
David Tyrer	Logika Consultants Ltd	Socio-Economics	Msc BA (Hons)	David is an environmental policy and economics expert with nearly 20 years professional experience. He specialises in socio-economic impact assessment, cost benefit analysis, impact assessment and valuation, in the context of government policy as well as development plans and projects. He has led studies for the then Department for Communities and Local Government on the UK costs and benefits of the EU proposals for a revised EIA Directive and a further analysis of the adopted proposals (now the 2017 EIA Regs). He has long experience of preparing and reviewing socio-economic assessment as part of the EIA and DCO processes (including airports, nuclear power stations, wind farms, urban extensions, and various mixed-use developments in the UK and overseas).

2. Description of the Site and Surrounding Area

Site Location and Boundary

2.1. The Site is located at OS grid reference SK816718 (approximate centre of the Site). The Site boundary is shown in Figure 2-1 and consists of approximately 1,500 hectares (ha) of land, comprising of approximately 170 agricultural fields located to the east and west of the River Trent. Hedgerows, trees and woodland form the boundaries to many of the fields within the Site. At its maximum, the Site extends approximately 4.5km in a north-south direction and approximately 8km in an east-west direction.

Figure 2-1 Site Boundary



2.2. The Site falls across two county boundaries and three local authorities. Approximately 1,250ha of the Site falls within Nottinghamshire County Council and the remaining 250ha of the Site falls within Lincolnshire County Council. The Site also extends across three administrative boundaries these being Newark and Sherwood District Council, West Lindsey District Council and Bassetlaw District Council.

2.3. The River Trent dissects the Site in a north-south alignment. The nearest villages include:

- North Clifton and South Clifton located on the eastern boundaries of the Site;

- Newton on Trent located within 50m of the nearest boundary of the Site to the north;
- Dunham located within 500m to the north of the nearest boundary of the Site;
- Fledborough located on the western boundaries of the Site; and
- Ragnall located on the western boundaries of the Site.

2.4. In addition, there are a number of isolated properties and hamlets, which are dispersed throughout the landscape. To the southwest of the Site is the existing national grid substation at High Marnham, which will provide the connection for the project to the National Grid Electricity Transmission network. The Applicant has secured a connection agreement with National Grid which would allow export and import up to 740MW of electricity to the High Marnham substation (more details are provided in Chapter 3 of this Report).

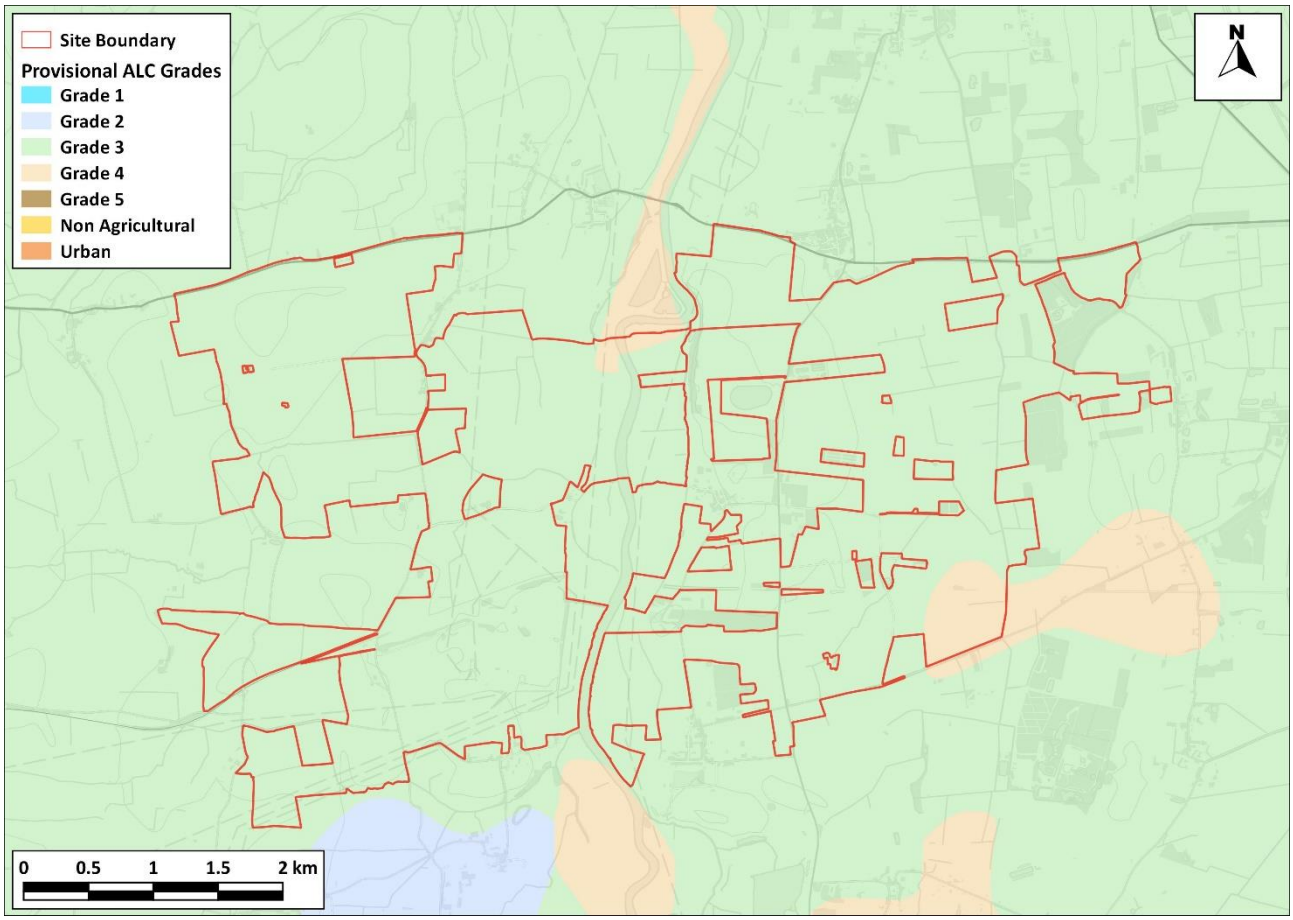
Environmental Characteristics

2.5. The below paragraphs present details relating to the main environmental characteristics of the Site and surrounding area. A detailed summary of the environmental baseline is contained within each of the individual environmental aspect chapters (see Chapters 6 to 17).

Land use

2.6. The Site is predominantly arable agricultural land and includes a network of hedgerows, drains and ditches, and blocks of woodland. The Agricultural Land Classification (ALC) mapping published by Natural England indicates that much of the Site consists of Grade 3 (good to moderate agricultural land) with an area of Grade 4 (poor) land to the southeast. A plan showing the ALC grades across the Site is provided in Figure 2-2.

Figure 2-2: Agricultural Land Classifications across the Site



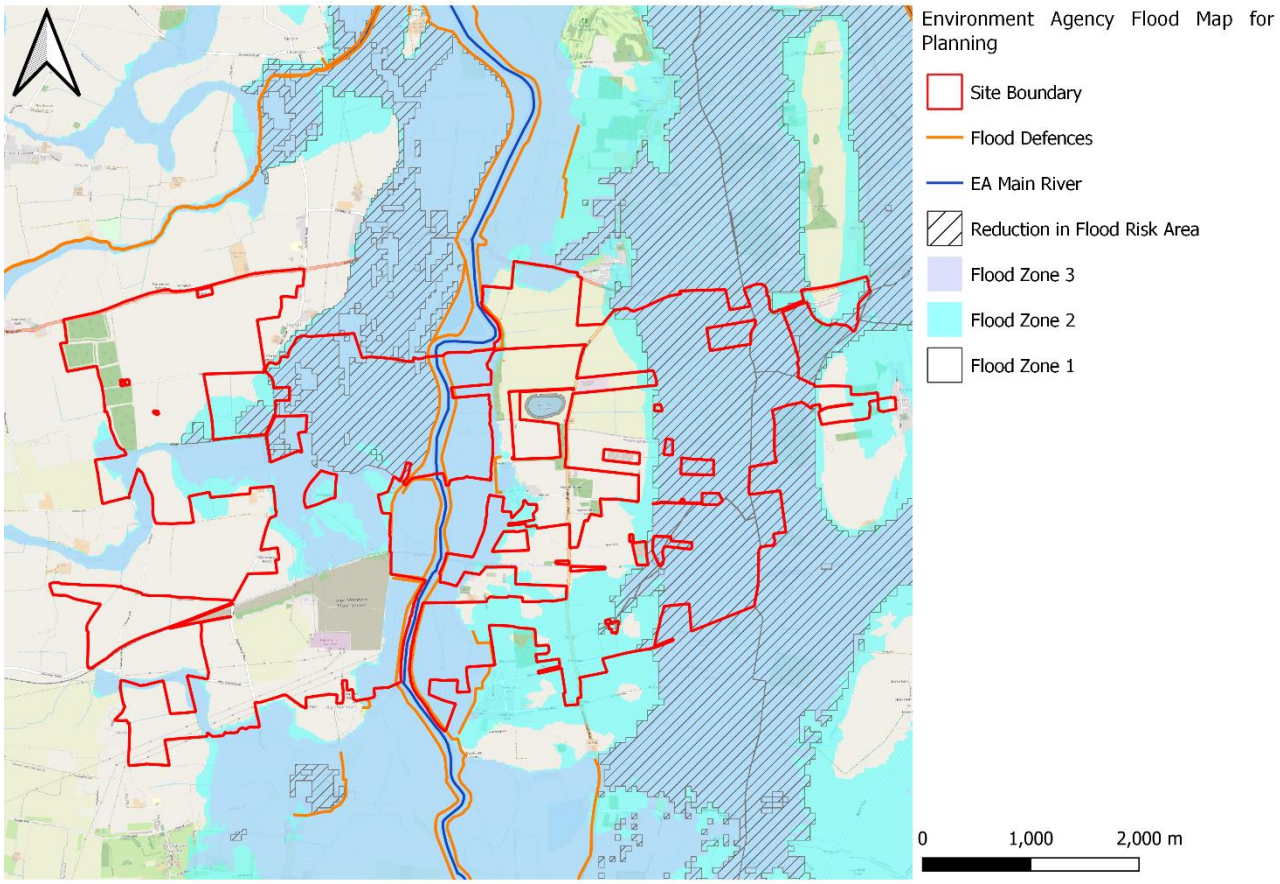
2.7. As discussed in Chapter 8, detailed fieldwork to study the soil across the Site commenced in October 2023 and is anticipated to be completed in Q1 2024. Preliminary information from the survey will be reported in the Preliminary Environmental Information Report (PEIR) to give consultees an opportunity to understand what likely significant effects may occur. The final results will be reported in the ES.

Water Resources

2.8. The River Trent runs through the Site on a general south-north alignment flowing from Staffordshire northwards toward the Humber Estuary. The river effectively separates the Site into those parcels to the west and those to the east of the Trent. A network of drains and field ditches that follow field boundaries are also present across the Site.

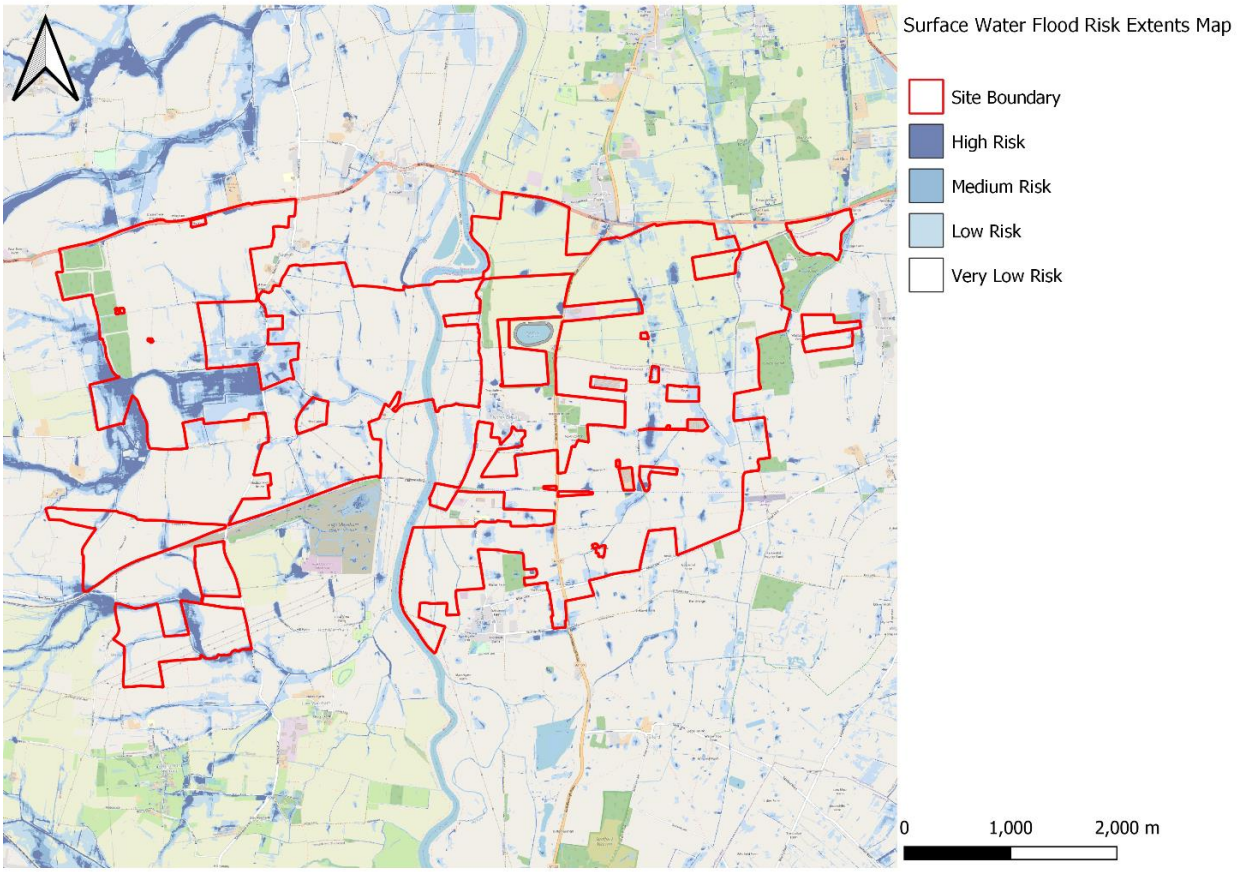
2.9. The River Trent is tidal at this location and, as shown in Figure 2-3, approximately 55% of the Site is within Flood Zones 2 and 3, indicating a medium and high probability of flooding from tidal and fluvial sources. This flooding is considered to originate and be predominantly associated with the River Trent. There are a number of flood defences within the Site, this includes embankments between Fledborough and Dunham-on-Trent and at South Clifton and North Clifton. As such the areas within Flood Zones 2 and 3 would experience a reduction in flood risk due to the presence of the existing flood defences.

Figure 2-3: Environment Agency Flood Map for Planning



2.10. The Site is predominantly considered to be at low risk of surface water flooding. As shown in Figure 2-4, there are however localised areas within the Site which are shown to be at low, medium and high risk, which are largely associated with the Fledborough Beck in the west and unnamed Ordinary Watercourses in the southwest and east of the Site.

Figure 2-4: Environment Agency Flood Risk from Surface Water Map



Biodiversity

2.11. The Site is not covered by any statutory ecological designations. The closest statutory designations to the Site include:

- Birklands and Bilhaugh Special Area of Conservation (SAC) which is located approximately 12km from the nearest part of the boundary to the west of the Site and is designated for its presence of old acidophilous oak woods and is notable for its rich invertebrate fauna, particularly spiders, and for a diverse fungal assemblage;
- Besthorpe Warren Sites of Special Scientific Interest (SSSI) which is located approximately 5km to the southeast from the nearest part of the Site boundary, and is designated for the mosaic of dry acid grassland and dune grassland;
- Besthorpe Meadows SSSI is located approximately 5km south from the nearest part of the Site boundary, and is designated for the wet grassland and associated wetland habitats; and,
- Spalford Warren SSSI is approximately 4km south from the nearest part of the Site boundary and is designated for the presence of grass heath.

2.12. In addition to the above, whilst not subject to formal designation, the Sherwood Forest prospective potential Special Protected Area (ppSPA) is recognised by planning policy and statutory consultees to support notable populations of nightjar and woodlark. This ppSPA is located approximately 16km also to the west from the centre of the Site.

2.13. The Fledborough Holme Local Wildlife Site is not located in the Site but is located on the boundary of the Site, east of Fledborough and west of the River Trent.

Cultural Heritage

2.14. There are no listed buildings or Registered Parks and Gardens within the Site. The South Clifton Conservation Area is located within 1km to the east from the closest edge of the Site boundary.

2.15. There are a number of designated heritage assets within 1km of the Site boundary comprising:

- 3 Grade I listed buildings;
- 6 Grade II* listed buildings; and
- 61 Grade II listed buildings.

Buried Heritage

2.16. There are no Registered Battlefields or World Heritage Sites within 1km of the Site boundary.

2.17. The Site includes a number of Scheduled Monuments, which are shown in Appendix A, including:

- A Roman Vexillation Fortress, two Roman Marching Camps, and a Royal Observer Corps monitoring post located within land south of the A57 and east of the River Trent. This monument comprises a 1st century Roman vexillation fortress sits on a ridge above the River Trent. The fortress is visible as a series of cropmarks; and
- Whimpton Moor medieval village and moated site which straddles the A57 to the west of the River Trent. This monument includes the earthwork and buried remains of Whimpton Moor medieval village, including a moated site.

2.18. Although these Scheduled Monuments fall within the Site, the Proposed Development does not include any solar panels or associated infrastructure on them (see Appendix A), and these sites would only be used for potential mitigation and enhancement (more detail is shown in Chapter 3).

Transport And Access

2.19. The Site is currently accessible from a number of existing field accesses that are currently capable of facilitating the movement onto the Site of large agricultural machinery.

2.20. In terms of the Strategic Road Network (SRN), the A1 which connects Blyth to the north and to Stamford in the south, is located approximately 8km to the east from the centre of the Site. The A1 forms a junction with the A57, which connects Markham Moor to Lincoln. The A57 is located on the northern boundary, approximately 2.5km from the centre of the Site. The A57 runs eastwards before forming a junction with the A46 to the east of the Site. The A1133 is located within the eastern part of the Site, approximately 1.5km to the east from the centre of the Site, and connects Torksey Lock with Winthorpe, where it then joins the A46.

2.21. The Trent Valley Way extends for 174km from Nottingham in the south, to the Humber Estuary. This long-distance footpath route follows the eastern edge of the River Trent as it runs through the Site. In addition, there are several footpaths and bridleways that cross the Site.

2.22. Located within the Site and approximately 500m south of the centre of the Site, is the Sustrans Cycle Route 647. This path is part of the National Cycle Network (NCN) and is a disused railway line associated with the former Lancashire, Derbyshire and East Coast Railway, which runs east-west and that connected Lincoln to the east with Tuxford to the west. Crossing over the River Trent, the Sustrans Route includes Fledborough Viaduct consisting of masonry arches. This is one of a few river crossing opportunities in the locality.

2.23. The access and recreation resources are shown in Appendix A.

Existing Infrastructure

2.24. The site of the former High Marnham coal fuelled Power Station is located on the southwest boundary of the Site, which was decommissioned in 2003. The final site clearance of the facility was undertaken in 2012 with the demolition of the cooling towers. The remaining infrastructure comprises extensive metalled roadways, including the access road from Fledborough Road to the west, as well as the former pump house on the River Trent.

2.25. On the site of the former High Marnham Power Station remains a National Grid 400 kilovolt (kV) and 275kV substation The Proposed Development will connect into the referred substation or the substation that may be modified from time to time by National Grid in this location. As above, the Applicant has secured a connection agreement with National Grid which would allow export and import up to 740MW of electricity to the High Marnham substation (more details are provided in Chapter 3 of this Report).

2.26. National Grid overhead power lines carried by pylon structures are located to the east of the River Trent travelling north to south, and are also located throughout the land to the west of the River Trent. The numerous pylons and high voltage overhead power lines dominate the localised setting (further detail is provided in Chapter 11).

2.27. Approximately 6.5km to the north of the Site is the site of the decommissioned coal-fired Cottam Power Station. In August 2023 demolition occurred of the main building, bunker bay, turbine hall and the coal conveyer.

2.28. Utilities searches within the Site are ongoing and will help inform the design of the Proposed Development.

3. The Development Proposals

The Proposed Development

3.1. The design of the Proposed Development is currently ongoing, informed by operational needs and a range of technical and environmental aspects, as well as responses from the consultation and engagement undertaken. At the point of the DCO application the design will have reached a state of maturity appropriate to allow the EIA to be undertaken. Information provided on layout and design within the DCO application will be based on the principles of the 'Rochdale Envelope' (See Chapter 5) in accordance with PINS Advice Note 9: Rochdale Envelope. The Rochdale Envelope is an acknowledged way of dealing with an application comprising EIA development where details of a project have not been fully resolved by the time the application is submitted. This means that maximum design parameters will be adopted to provide sufficient flexibility for the later detailed design of the Proposed Development (detailed design would take place post granting of the DCO and would be subject to a requirement in the DCO, for details to be approved by the relevant local planning authority), whilst also allowing for a robust assessment of environmental effects (this assessment being based on maximum 'worst case' parameters) to be made.

3.2. Appendix A provides a plan sufficient to identify the land where development could occur. Appendix A was published as part of the non-statutory Stage 1 community consultation which took place between 27th September 2023 and 8th November 2023.

3.3. It is noted the Proposed Development will be aligned to the '*Design Principles for National Infrastructure*' as set out by the National Infrastructure Commission[3]. The guidance seeks to embed the following four key considerations into the conception, planning and delivery of nationally significant infrastructure projects:

- Climate - Infrastructure must help set the trajectory for the UK to achieve net zero greenhouse gas emissions by 2050 or sooner and be capable of adapting to climate change.
- People – Projects should be human scale, instinctive to use and seek opportunities to improve the quality of life for people who live and work nearby.
- Places – Schemes should provide a sense of identity for communities, supporting the natural and built environment and enriching ecosystems.
- Value – Value should be added beyond the main purpose of the infrastructure, solving problems well and achieving multiple benefits.

3.4. As the Proposed Development progresses, the guiding principles for the detailed design of the scheme will be developed and will be set out in the Outline Design Principles documents which will be included as part of the DCO application.

3.5. The Proposed Development will comprise the following:

[3] National Infrastructure Commission, Design Group (2020) Climate, People, Places, Value: Design Principles for National Infrastructure

Solar PV Arrays

3.6. Solar PV modules convert sunlight into electricity by utilising individual photovoltaic cells to generate a direct current (DC) electrical output. Typically, a module will be up to 2.6m long and 1.3m wide, the photovoltaic cells are beneath a layer of toughened glass. The module is typically built from anodised aluminium. Figure 3-1 shows a typical group of solar PV modules.

Figure 3-1: Example of a Solar Array

Photography undertaken by Ps Renewables 2023

3.7. The Proposed Development will consist of a ground mounted solar PV system, which will connect to the High Marnham substation. The DC generating capacity of each Solar PV module cannot be confirmed at this early stage as it will depend on advances in technological capabilities that are available at the time of construction.

3.8. As shown in Figure 3-2, the Solar PV modules will be fixed to a mounting structure (discussed below) in groups known as ‘strings’. The number of modules which will make up each string is not yet known. Various factors will help to inform the number and arrangement of modules in each string, and it is likely some flexibility will be required to accommodate future technology developments. The rows of Solar PV modules will be spaced apart to allow for maintenance and for flora to grow underneath. in Appendix A shows the potential areas for solar PV and potential infrastructure, as well as potential areas for mitigation and enhancement.

3.9. At this stage there are two options for the mounting structures, which are:

- Fixed South Facing Arrays: The fixed south facing PV modules would be fixed in a position at an angle between approximately 10 to 25 degrees from the horizontal.

- Single Axis Tracker Arrays: The single-axis tracker Solar PV modules move solar panels aligned with the north and south allowing the panels to track the sun from east to west. The tracker arrays would be oriented at a 50 to 60-degree angle from the horizontal facing east in the morning and would track as they pivot up to 60 degrees from the horizontal to face west in the evening.

3.10. Further detail will inform the DCO application.

Figure 3-2: Example of a Fixed South Facing Array

Photography undertaken by Ps Renewables 2023

Module Height and Specification

3.11. The solar PV modules will vary in height, at this stage it is considered in areas without flood risk and where flood depths are less than 1m, the maximum height of the top of the Solar PV modules would be 3.8m. The maximum heights in areas of flood risk greater than 1m will be determined following further discussions with the Environment Agency (see Chapter 7 for further details on flood risk). The maximum heights will be detailed in the DCO application.

Solar PV Module Mounting Structures

3.12. The solar PV modules will be mounted on metal racks, known as mounting structures. These will likely be supported by steel poles driven, typically driven 1m to 3.5m, depending on ground conditions. In areas where ground penetration is unsuitable, alternative foundations will be required. These may include concrete ballast foundation to which the mounting structures will be affixed. The maximum depth of the mounting structure piles will be detailed in the DCO application

Inverters

3.13. Inverters convert DC electricity from the solar PV modules to alternating current (AC), allowing export onto the grid system. The number of modules that can be connected to each inverter will be determined by the size of the inverters available in the market. Inverter technology is in continuous evolution. Two types of inverters are being considered for use within the Proposed Development:

- Central container inverters – these are bigger than string inverters so a fewer number of them are required..
- String inverters – these inverters are smaller than central inverters but carry less power so a higher number of them would need to be installed on the Site.

3.14. The decision on which is the most appropriate type of inverter will depend on technical and environmental aspects which will inform the detailed design. An example of a central inverter container is provided in Figure 3-3

Figure 3-3: Example of a Central Inverter Container

Photography undertaken by Ps Renewables 2023

Transformers

3.15. Transformers are designed to step up the voltage of the electricity produced by the inverter to enable delivery to the National Grid. Subject to factors that will inform the detailed design, multiple transformer will be required across the Site to meet the power requirements. For central inverters the transformers are likely to be housed in a standard manufactured delivered solution on one base as shown in Figure 3-3. For string inverters, transformers are likely to be installed separately along with a container to house multiple string inverter inputs and protection devices. They are likely to be located across the Site at regular intervals.

3.16. The transformers will connect to an onsite substation (see further details below) to step up the voltage and connect to the substation at High Marnham (see Chapter 2 for further details). The Applicant has secured a connection agreement with National Grid which would allow export and import up to 740MW of electricity to and from the national electricity transmission system to the 275kV grid substation.

Switchgear

3.17. Switchgear includes electrical disconnect switches, fuses or circuit breakers. The purpose of the switchgears is to control and protect the staff and electrical infrastructure during service and maintenance. In general, the switchgears will be located within the central inverter container or adjacent to the transformer containers.

Battery Energy Storage System (BESS)

3.18. BESS will be used within the Proposed Development to maximise electricity generation by allowing the storage of energy generated during times of low demand to be exported and imported to the National Grid at times of high demand.

3.19. The BESS will be designed in accordance with latest guidance and policy, to ensure they operate safely. A management plan for battery safety will be prepared and submitted with the DCO Application.

3.20. In according with fire risk management a cooling system, will form part of the BESS, which is designed to regulate temperatures to safe conditions to minimise the risk of fire. Lincolnshire and Nottinghamshire Fire and Rescue services will be consulted as part of the DCO process. In addition, an Unplanned Atmospheric Emissions from BESS Report will be undertaken and submitted as part of the DCO Application which will consider the potential emissions and impact to air quality in the event of a fire.

3.21. The locations of the BESS have not yet been identified; however, they will be situated in areas that minimise potential visual and noise effects, whilst also being located outside of higher flood risk areas. Furthermore, the locations of the BESS will be located at a suitable distance from public right of ways (PRoW) and sensitive areas (such as Local Wildlife Sites and Schedule Monuments). The citing of the BESS will also take account of existing and proposed infrastructure (including proposed access roads within the Site) and will follow relevant health and safety regulation for safe use.

3.22. The typical dimensions of a containerised battery unit are 9.5m x 2.6m x 3.0m in height, however this will depend on the capcaity. The units will be located on areas of hard-standing (with typically, up to 1m deep foundations). An example of a BESS facility for illustrative purposes is shown in Figure 3-4.

Figure 3-4: Example of a BESS Facility

Photography taken from www.solarpowerportal.co.uk

Substations

3.23. To facilitate the export of electricity to the National Grid the Proposed Development will include substations with transformers to step up voltage levels from site voltage to National Grid voltage level. The substations will comprise electrical infrastructure such as the transformers, switchgear, protection devices, building and metering equipment required to facilitate the export of electricity from the Proposed Development to the National Grid. At this stage the number of substations is unknown and will be informed by technical and environmental aspects. The indicative size of a substation compound is 120m x 80m, with an approximate maximum height of 13m.

Foundations for Electrical Infrastructure

3.24. Foundations will be dependent on the local ground conditions and will be subject to engineering analysis. It is considered likely that electrical units will be placed on a concrete base. Details on the foundation design will be detailed in the DCO application.

Onsite Cabling

3.25. Onsite cabling will facilitate the transfer of electricity from the solar PV modules to the substations within the Site, as well as to connect to the existing High Marnham substation, which will export the electricity to the National Grid.

3.26. Low voltage cabling is required between the solar PV modules and transformers. Higher rated voltage cables are required between the transformers, switch gear and the substation. In addition, data cables will be required to allow for the monitoring and collection of data relating to the export of electricity during the facilities operation.

3.27. At this stage the precise method of cabling is unknown. The majority of cabling (low voltage cables) between the solar PV modules and the inverters are likely to be above ground level and fixed to the mounting structures. The higher voltage cabling is likely to be laid underground in trenches (which will subsequently be backfilled/ covered) according to British standards and regulations, with it being laid using an open-cut method or via horizontal directional drilling. The precise details of the cabling method, as well as its routing, will take account of technical and environmental aspects.

Electricity Export and Point of Connection to the National Electricity Transmission System

3.28. The Proposed Development will connect into the substation at High Marnham located to the southwest of the Site. This will allow the export of up to 740MW of electricity to and from the national electricity transmission system.

3.29. Areas of potential cable routes are identified in Appendix A. This will include cabling that will be required to cross the River Trent, thereby allowing a connection from the eastern parcels of the Proposed Development to the High Marnham substation. The cable route will consider technical and environmental aspects, as well as responses received from consultation.

3.30. The final cable route will be provided as part of the DCO application information.

Fencing, Security & Ancillary Infrastructure

3.31. Security fencing, likely to a maximum of 2.4m above ground level, will surround the Proposed Development. Areas such as the substations inside of the Proposed Development will be fenced according to British standard and regulations.

3.32. As shown in Figure 3-5 CCTV will be installed. Cameras will be mounted on poles, around the perimeter of the Site typically between 2 and 3m high.

Figure 3-5: Example of Pole Mounted CCTV

Photography undertaken by Ps Renewables 2023

3.33. There will be lighting, to the appropriate standards, of the substation and BESS compounds, albeit neither will be permanently lit and will only be lit when manned or in a health and safety emergency.

3.34. Details of the fencing, security and ancillary infrastructure, which will consider technical and environmental aspects, will be provided as part of the DCO application information.

3.35. The surface water drainage strategy will likely include underground pipes and potential for surface level treatment infrastructure.

Site Access

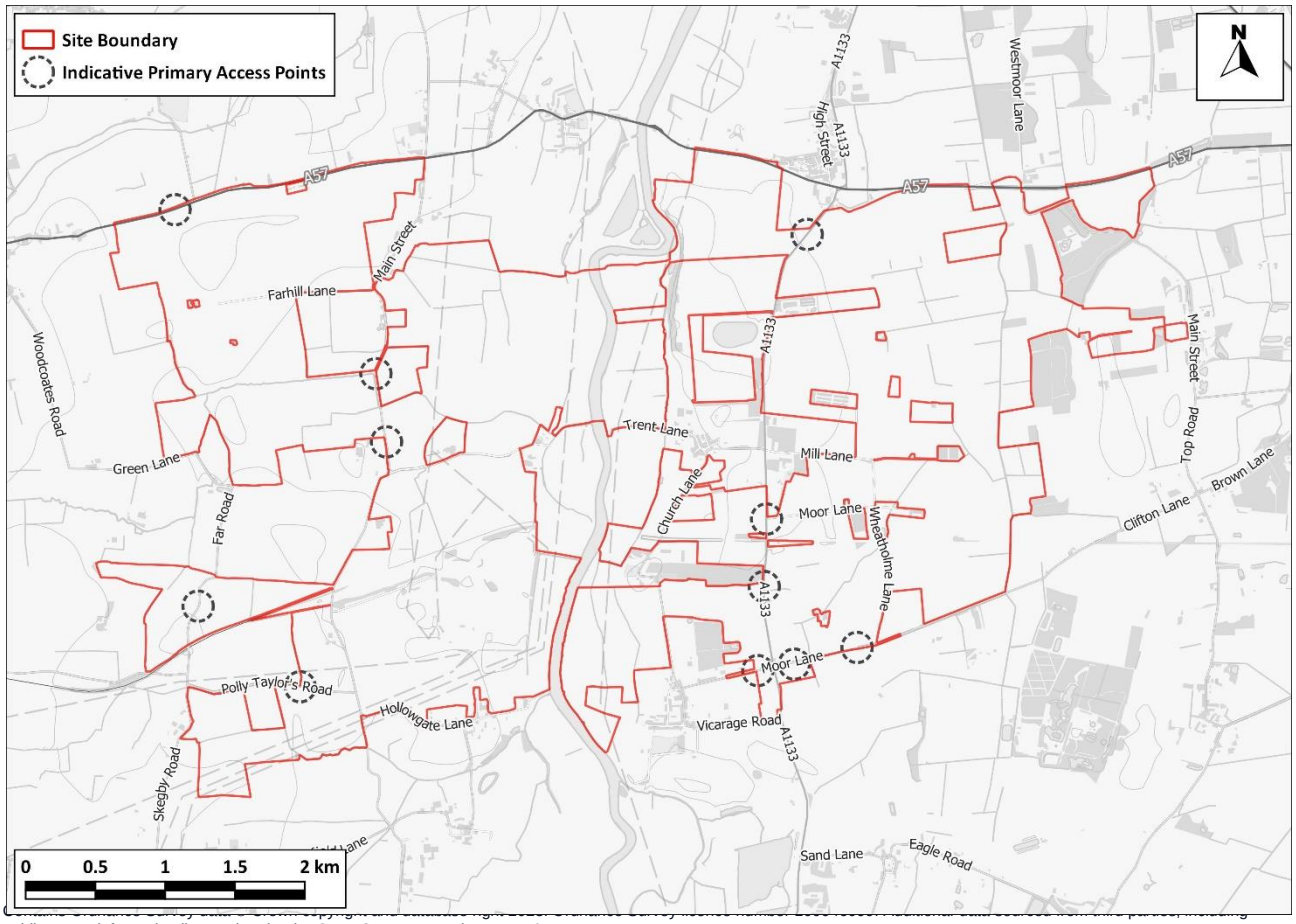
3.36. As shown in Figure 3-6, the primary points of access to the Site during the operation of the Proposed Development are expected to be:

- from the A57 into the western parcels; and
- from the A1133 into the eastern parcels.

3.37. Consultation and engagement will be undertaken with National Highways and the County Highways Authorities to inform the precise access design and locations.

3.38. Tracks within the Site boundaries for internal access and transportation are likely, and where it is feasible, to follow the alignment of existing agricultural tracks and field boundaries. These tracks will typically be constructed of permeable materials such as gravel and will have a maximum running width of up to approximately 6m thereby facilitating two-way HGV traffic.

Figure 3-6: Indicative Locations of Primary Access Points to the Site



Landscaping, habitat management and biodiversity enhancement

3.39. The existing hedgerows, woodland, ditches, ponds and field margins, as well as any other areas deemed to have environmental and in particular landscape or biodiversity value, will be, for the most part, retained within the layout of the solar arrays. Ensuring such will be a key priority of the detailed design stage with for example, existing breaks in hedgerows or ditch crossing points used rather than new ones created. Exceptions to this will be kept to a minimum but may occur where there is a need to create new access tracks, security fencing and cable routes and options do not exist.

3.40. The existing Public Rights of Way (PRoW) within the Site will be retained and incorporated into the design of the Proposed Development, although there may be the need for temporary closures and/or diversions during the course of construction and decommissioning, but these would be kept to a minimum. Where possible permitted paths will be included to improve recreational connectivity.

3.41. As shown in Appendix A, areas for biodiversity and landscape enhancement have been identified. The Proposed Development will achieve a Biodiversity Net Gain of in excess of 10% with details on how this is to be achieved being provided as part of the DCO application.

3.42. An Outline Landscape and Ecological Management Plan (LEMP) will also be submitted as part of the DCO Application; this document will set out the principles for the successful establishment and management of biodiversity and landscaping works.

Construction Phase of the Proposed Development

Construction Programme

3.43. At this stage it is anticipated that the construction phase will occur over approximately 18 months. Currently, although this will be influenced by a range of aspects including in particular the timing of submission and determination of the DCO, construction is currently planned to start in 2027 and end in 2029. The construction details will be provided as part of the DCO application information.

Construction Activities

3.44. Construction activities will include:

- Site preparation and access:
  - Transportation of construction materials, plant and equipment;
  - Set up of temporary on-site construction compounds and security fencing for the Site;
  - Road access upgrade and new road construction including haul roads;
  - Construction of cable crossing points over the River Trent;
  - Upgrading existing tracks and construction of new access roads within the Site;
  - Marking the location of infrastructure components; and
  - Targeted site clearance.
- Solar farm construction infrastructure:
  - Assembling module mounting structures and then mounting the modules themselves;
  - Installation of electric cabling, substations, inverters, transformer cabins, and battery storage units; and
  - Construction of the Substation compounds, BESS compounds, Collector Compounds and installation of equipment.
- Landscaping and habitat enhancement.
- Testing and commissioning.

Construction Site Access

3.45. Although the exact Site access points for construction are still be determined, it is known that there will be a different access for both the western and eastern portions of the Site. An access from the A57 to the north will serve the western portion of the Site which will provide connections to Main Street albeit whilst bypassing Ragnall. The eastern portion of the Site will be accessed from A1133, this being also from the north. Thereafter, it is proposed that the western and eastern portions of the Site will be accessed from within the Site, avoiding the routing of HGV traffic through the settlements of Ragnall and North and South Clifton, although it may be necessary to cross some minor roads within the Site, where fields are not adjoining.

3.46. An outline Construction Traffic Management Plan (CTMP) will be submitted as part of the DCO application within which there will be further detail on the routing and vehicle movements during the construction stage.

Temporary Construction Site Compounds

3.47. Temporary compounds for the storage of materials, plant and equipment, will be established before commencement of the main construction works. The compounds will also include staff welfare facilities, waste storage and wheel washing areas. The construction compounds will require lighting to ensure that they are safe and secure, especially during the winter months.

3.48. The location of the temporary construction site compounds, which will consider technical and environmental aspects, as well as feedback from consultation and engagement, will be provided as part of the DCO application information.

Abnormal Indivisible Loads

3.49. Where large scale High Voltage (HV) component loads are required for the electrical grid connection, these will be delivered as Abnormal Indivisible Loads (AIL). Detailed swept path analyses will be undertaken for the main constraint points on the route from the nearest suitable trunk road junction through to the proposed substation access junction to demonstrate that components can be delivered to Site and to identify any temporary road works which may be necessary, as well as identifying any additional temporary oversailing rights that might be needed. A Route Survey Report describing the route and the proposed operational management of the deliveries will be submitted as part of the DCO application.

Construction Traffic Management

3.50. The DCO application will be supported by an outline CTMP. This will include details on construction logistics and worker travel plans. Measures to control the delivery of materials, plant and equipment will also be included within the Plan.

Construction Environmental Management

3.51. An outline Construction Environmental Management Plan (CEMP) will be submitted as part of the DCO application. This will detail the legislation, guidance, best practice and mitigation measures to control and minimise environmental effects during construction. This includes reducing nuisance from:

- Noise and vibration;
- Dust and particulate generation;
- Runoff or contamination from contaminated soils (should there be any) on surface water or groundwater;
- Soil removal;
- Construction traffic; and
- Waste.

Soils Resource Management Plan

3.52. An outline Soils Resource Management Plan (SRMP) will be prepared and submitted with the DCO application. The SMP will follow the principles of best practice to maintain the physical properties of any soil that will be disturbed, with the aim of restoring the land to its pre-construction condition at the end of the lifetime of the Proposed Development.

Operational Phase of the Proposed Development

3.53. During the operational phase of the Proposed Development, onsite activities will include routine servicing, maintenance and replacement of plant and equipment as well as management of vegetation.

Maintenance

3.54. During the operational phase of the Proposed Development, minor maintenance works are expected to occur. This includes inspect, repair, adjust, alter, remove, refurbish, reconstruct, replace and improve any part of, but not remove, reconstruct or replace the whole of the solar infrastructure (including the BESS). Other maintenance includes clean, inspect and maintain internal roads, as well as manage vegetation.

Decommissioning Phase

3.55. The operational life of the Proposed Development is not proposed to be specified in the application and at this stage the Applicant is not seeking a time limited consent, although a decision will be made following the preparation of the EIA, depending on whether there are any effects which would justify limiting the time period of the consent.

3.56. At the end of the operational phase, above ground infrastructure will be dismantled and recycled or disposed of in accordance with best practice guidance and policy requirements at that time. In advance of decommissioning, the Applicant will produce and seek approval for a Decommissioning Environmental Management Plan (DEMP), which will be secured via a DCO requirement.

4. Planning Policy Context

Introduction

4.1. An overview of national, regional and local planning policy relevant to informing the scope of the EIA, is provided within this Chapter. Further information on planning policy where it is specific to a particular technical aspect, is provided within the aspect chapters themselves.

4.2. A review of relevant policy will be included within the Environmental Statement. Although adherence to planning policy will have often informed the assessment of effects as detailed within the ES, in particular helping to inform whether an effect is significant or not, absolute compliance of the Proposed Development with relevant planning policies will not be undertaken within the ES but will be set out in the Planning Statement which will also accompany the DCO application.

Planning Act 2008

4.3. The Proposed Development constitutes an NSIP, in accordance with the Planning Act 2008, as it comprises:

- The construction or extension of a generating station (Part 3, Section 14(1)(a)); and
- Its capacity is more than 50MW (Part 3, Section 15(2)I).

4.4. Therefore, a DCO application under the Planning Act 2008 is required to be made to PINS as the Examining Authority, for determination by the Secretary of State for Energy Security and Net Zero (DESNZ).

4.5. Section 104 of the Planning Act 2008 applies where a relevant National Policy Statement (NPS) has effect. At present, the Proposed Development's energy generating technology (i.e., solar) is not specifically considered by an NPS. This means that, at present, the DCO application for the Proposed Development would be determined under Section 105 of the Planning Act 2008, which applies where no NPS has effect. Under Section 105, the Secretary of State must have regard to any local impact report, any matters prescribed in relation to the Proposed Development and any other matters which the Secretary of State thinks are both important and relevant. However, the Government is currently consulting on revised versions of the energy NPSs. The consultation draft of NPS EN-3 (Renewable Energy) contains a chapter dedicated to solar energy technology. It is envisaged that the revised Energy NPSs will be adopted prior to the submission of the DCO application. Assuming that occurs, then the technology specific policy will be in place and Section 104 of the Planning Act 2008 would apply.

4.6. In accordance with Section 104(2) of the Planning Act 2008, the Secretary of State is required to have regard to any relevant NPS amongst other matters, when deciding whether or not to grant a DCO. The relevant NPS would be the newly adopted NPS EN-3.

4.7. An overview of the current and draft NPSs that will be considered from a planning policy perspective as part of undertaking the EIA are set out below.

National Policy Statement for Energy (EN-1)[4]

4.8. The Overarching NPS for Energy (EN-1), adopted by the Department of Energy and Climate Change (DECC) in July 2011, sets out the national policy for delivering major energy infrastructure in England and Wales. The NPS has effect in combination with the relevant technology specific NPS, National Policy for Renewable Energy Infrastructure (EN-3), and together they provide the primary basis for decisions made by the Examining Authority.

4.9. Part 3 of EN-1 identifies the need that exists for nationally significant energy infrastructure. With regards to decision making, paragraph 3.1.1. of EN-1 states how "*the UK needs all the types of energy infrastructure covered in this NPS in order to achieve energy security at the same time as dramatically reducing greenhouse gas emissions*".

4.10. Paragraph 3.1.2 states: "*It is for industry to propose new energy infrastructure projects within the strategic framework set by Government. The Government does not consider it appropriate for planning policy to set targets for or limits on different technologies*".

4.11. Paragraph 3.3.11 notes that renewable energy sources, such as solar, are intermittent and, as a result, back-up sources are required at times when the availability of intermittent renewable sources is low. Paragraph 3.3.12 goes on to identify how electrical storage technologies can be used to compensate for intermittence.

4.12. Paragraph 4.1.3 of the NPS EN-1 states that in considering any proposed development, and in particular when weighing its adverse impacts against its benefits, the Examining Authority should take into account:

- Its potential benefits including its contribution to meeting the need for energy infrastructure, job creation and any long-term or wider benefits; and
- Its potential adverse impacts, including any long-term and cumulative adverse impacts, as well as any measures to avoid, reduce or compensate for any adverse impacts.

4.13. Section 4.2 of the NPS EN-1 is related to the requirement for assessment of likely significant environmental effects and reporting within an Environmental Statement for projects that are subject to the European Environmental Impact Assessment Directive (85/337/EEC).

4.14. Paragraph 4.2.2 of the NPS states that: "*To consider the potential effects, including benefits, of a proposal for a project, the IPC [now PINS] will find it helpful if the applicant sets out information on the likely significant social and economic effects of the development, and shows how any likely significant negative effects would be avoided or mitigated. This information could include matters such as employment, equality, community cohesion and well-being.*"

4.15. Paragraph 4.3.2 continues: "*For the purposes of this NPS and the technology-specific NPSs the ES should cover the environmental, social and economic effects arising from pre-construction, construction, operation and decommissioning of the project*."

[4] Department of Energy and Climate Change (2011) Overarching National Policy Statement for Energy (EN-1)

4.16. Paragraph 4.2.4 states that when considering a proposal, the Examining Authority should: "*Satisfy itself that likely significant effects including any significant residual effects taking account of any proposed mitigation measures or any adverse effects of those measures, have been adequately assessed. In doing so the IPC should also examine whether the assessment distinguishes between the project stages and identifies any mitigation measures at those stages. The IPC [now PINS] should request further information where necessary to ensure compliance with the EIA Directive.*"

4.17. Where relevant, the EIA process will take into account the requirements of the relevant NPSs.

Draft Overarching National Policy Statement for Energy (EN-1)[5]

4.18. A review of the energy NPSs was announced in the 2020 Energy white paper: Powering our net zero future; as part of this review an updated Draft EN1 was consulted on, with the most recent draft published in March 2023. Applicable to the Proposed Development Paragraph 3.3.20 of the Draft EN1 states "*a secure, reliable, affordable, net zero consistent system in 2050 is likely to be composed predominantly of wind and solar*".

4.19. Paragraph 3.2.24 states that "*Applications for…solar above 50MW in England, or 350MW for either in Wales, will continue to be defined as NSIPs, requiring consent from the Secretary of State (see EN-3)*"

4.20. When weighing a project's impacts against its benefits, the Secretary of State should take into account of "*environmental, social and economic benefits and adverse impacts, at national, regional and local levels. These may be identified in this NPS, the relevant technology specific NPS, in the application or elsewhere (including in local impact reports, marine plans, and other material considerations.*"

4.21. Paragraph 4.2.10 states that "*The applicant must provide information proportionate to the scale of the project, ensuring the information is sufficient to meet the requirements of the EIA Regulations." At paragraph 4.2.12 the Draft EN1 states "Where some details are still to be finalised, the ES should, to the best of the applicant's knowledge, assess the likely worst-case environmental, social and economic effects of the proposed development to ensure that the impacts of the project as it may be constructed have been properly assessed.*"

National Policy Statement for Renewable Energy Infrastructure (EN-3)[6]

4.22. The NPS for Renewable Energy Infrastructure (EN-3), published by the DECC in July 2011, taken together with the Overarching NPS for Energy (EN-1), provides the primary basis for decisions by the Examining Authority on applications it receives for nationally significant renewable energy infrastructure.

[5] Department for Energy Security & Net Zero (2023) Draft Overarching National Policy Statement for Energy (EN-1)

[6] Department of Energy and Climate Change (2011) National Policy Statement for Renewable Energy Infrastructure (EN-3)

4.23. The importance of generation of electricity from renewable sources is stated at Paragraph 1.1.1 of NPS EN-3: "*Electricity generation from renewable sources of energy is an important element in the Government's transition to a low-carbon economy. There are ambitious renewable energy targets in place and a significant increase in generation from large-scale renewable energy infrastructure is necessary*".

4.24. At the time of publication of NPS EN-3, utility scale solar development was not feasible. Therefore, whilst providing an assessment and technology specific information on certain renewable energy technologies, NPS EN-3 does not include solar PV development, and only covers projects for biomass/waste and offshore and onshore wind.

Draft National Policy Statement on Renewable Energy Infrastructure (EN-3)[7]

4.25. As part of the NPS review a Draft EN3 was consulted on, with the most recent draft published in March 2023. Section 3.10 of Draft EN3 sets out assessment and technology specific information relating to solar photovoltaic generation. Paragraph 3.10.1 confirms *"the government has committed to sustained growth in solar capacity to ensure that we are on a pathway that allows us to meet net zero emissions. As such solar is a key part of the government's strategy for low-cost decarbonisation of the energy sector".*

4.26. In terms of site layout, design and appearance Draft EN3 states: *"..applicants will consider several factors when considering the design and layout of sites, including, proximity to available grid capacity to accommodate the scale of generation, orientation, topography, previous land – use and ability to mitigate environmental impacts and flood risk.*"

4.27. Draft EN3 sets out information that should be provided on relevant impacts, including but not limited to biodiversity and ecological conservation; landscape, visual and residential amenity; glint and glare; cultural heritage; construction including traffic and transport noise and vibration.

National Policy Statement for Electricity Networks Infrastructure (EN- 5)[8]

4.28. The NPS for Electricity Networks Infrastructure (EN-5) was published by the DECC in July 2011 and forms part of the suite of energy NPSs and is to be read in conjunction with the Overarching NPS for Energy (EN-1).

[7] Department for Energy Security & Net Zero (2023) Draft Policy Statement for Renewable Energy Infrastructure (EN-3)

[8] Department of Energy and Climate Change (2011) National Policy Statement for Electricity Networks Infrastructure (EN-5)

4.29. NPS EN-5 is relevant to the Proposed Development as the policy recognises electricity networks as "*transmission systems (the long distance transfer of electricity through 400kV and 275kV lines), and distribution systems (lower voltage lines from 132kV to 230V from transmission substations to the end-user) which can either be carried on towers/poles or undergrounded*" and "*associated infrastructure, e.g. substations (the essential link between generation, transmission, and the distribution systems that also allows circuits to be switched or voltage transformed to a useable level for the consumer) and converter stations to convert DC power to AC power and vice versa.*"

4.30. NPS EN-5 sets out further technology-specific considerations, in addition to those impacts covered in NPS EN-1, for: Biodiversity and Geological Conservation; Landscape and Visual; and Noise and Vibration.

4.31. Furthermore, NPS EN-5 sets out technology-specific considerations for the impact of electromagnetic frequencies (EMFs).

Draft National Policy Statement for Electricity Networks Infrastructure (EN- 5)[9]

4.32. As part of the NPS review, the latest draft of NPS EN-5 was published in March 2023. The policy statement recognises that new electricity networks required for electricity generation, storage and interconnection infrastructure are vital to achieving the nation's transition to net zero.

4.33. With regards to cable routing Draft EN5 states "*The applicant should consider and address routing and avoidance/minimisation of environmental impacts both onshore and offshore at an early stage in the development process*."

National Planning Policy

4.34. The National Planning Policy Framework (2023) (NPPF) sets out the government's planning policies for England and how these are expected to be applied. The NPPF does not contain specific policies for NSIPs as these are determined in accordance with the decision making framework in the Planning Act 2008 and any relevant NPSs, but it still can be an important and relevant matter for the purposes of the Secretary of State's decision making when determining the DCO application.

4.35. The NPPF also provides relevant context for individual assessment topics.

4.36. The paragraphs of particular relevance to the application and are as follows:

- Paragraph 8: *"Achieving sustainable development means that the planning system has three overarching objectives, which are interdependent and need to be pursued in mutually supportive ways (so that opportunities can be taken to secure net gains across each of the different objectives): … c): an environmental objective… protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy"*

[9] Department for Energy Security & Net Zero (2023) Draft Policy Statement for Electricity Networks Infrastructure (EN-5)

- Paragraph 155: *"To help increase the use and supply of renewable and low carbon energy and heat, plans should: … b) consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure their development"*
- Paragraph 158: *"When determining planning applications for renewable and low carbon development, local planning authorities should:*

  a) not require applicants to demonstrate the overall need for renewable or low carbon energy, and recognise that even small-scale projects provide a valuable contribution to cutting greenhouse gas emissions;

  b) approve the application if its impacts are (or can be made) acceptable."

Local Planning Policy

4.37. The relevant Local Development Plans for the area do not carry the same weight under the Planning Act 2008 in respect of decision making on NSIPs, as they do with determining planning applications under the Town Country Planning Act 1990. The NPSs are the primary consideration for NSIP applications. Nevertheless, the Development Plan is still a matter which can be considered important and relevant in deciding an application for a DCO, although in the event of any conflict, the NPS prevails.

4.38. The relevant Local Planning Policies of the adopted development plans for each of the 'host' planning authorities will be considered as part of the assessment.

Newark and Sherwood District Council, Local Development Framework, Allocations and Development Management, Development Plan Document (2013)[10]

4.39. The Allocations and Development Management Development Plan Document (2013), forms part of the district's Local Development Framework. This sets out housing, employment and retail needs in Newark and Sherwood to 2026 and beyond.

4.40. Relevant to the Proposed Development, Policy DM4, Renewable and Low Carbon Energy Generation states:

In order to achieve the commitment to carbon reduction set out in Core Policy 10, planning permission will be granted for renewable and low carbon energy generation development, as both stand alone projects and part of other development, its associated infrastructure and the retro-fitting of existing development, where its benefits are not outweighed by detrimental impact from the operation and maintenance of the development and through the installation process upon:

1. The landscape character or urban form of the district or the purposes of including land within the Green Belt arising from the individual or cumulative impact of proposals;

2. Southwell Views as defined in Policy So/PV or the setting of the Thurgarton Hundred Workhouse, as defined in Policy So/Wh;

[10] Newark and Sherwood District Council (2013) Local Development Framework, Allocations and Development Management, Development Plan Document

3. Heritage Assets and or their settings;

4. Amenity, including noise pollution, shadow flicker and electro-magnetic interference;

5. Highway safety;

6. The ecology of the local or wider area; or

7. Aviation interests of local or national importance.

Newark and Sherwood District Council, Amended Core Strategy Development Plan (2019)[11]

4.41. Part of the Local Development Framework, the Amended Core Strategy Development Plan (2019) sets out the issues that the Council and its partners will address over the next twenty years including the objectives and a number of policies to deliver them.

4.42. Core Policy 10 aims to "Promote energy generation from renewable and low-carbon sources, including community-led schemes, through supporting new development where it is able to demonstrate that its adverse impacts have been satisfactorily addressed. Policy DM4 'Renewable and Low Carbon Energy Generation' provides the framework against which the appropriateness of proposals will be assessed"

Central Lincolnshire Local Plan (2023)[12]

4.43. The Local Plan for Central Lincolnshire (2023) contains planning policies and allocations for the growth and regeneration of Central Lincolnshire over the next 20 years, this includes West Lindsey District Council (as well as the Local Authority areas of North Kesteven and the City of Lincoln).

4.44. Policy S14: Renewable Energy states:

"Proposals for solar thermal or photovoltaics panels and associated infrastructure to be installed on existing property will be under a presumption in favour of permission unless there is clear and demonstrable significant harm arising.

Proposals for ground based photovoltaics and associated infrastructure, including commercial large scale proposals, will be under a presumption in favour unless:

- *there is clear and demonstrable significant harm arising; or*
- *the proposal is (following a site specific soil assessment) to take place on Best and Most Versatile (BMV) agricultural land and does not meet the requirements of Policy S67; or*
- *the land is allocated for another purpose in this Local Plan or other statutory based document (such as a nature recovery strategy or a Local Transport Plan), and the proposal is not compatible with such other allocation.*

[11] Newark and Sherwood District Council (2019) Amended Core Strategy Development Plan

[12] Central Lincolnshire Local Plan (2023)

Proposals for ground based photovoltaics should be accompanied by evidence demonstrating how opportunities for delivering biodiversity net gain will be maximised in the scheme taking account of soil, natural features, existing habitats, and planting proposals accompanying the scheme to create new habitats linking into the nature recovery strategy."

4.45. Policy S67 then states:

"Proposals should protect the best and most versatile agricultural land so as to protect opportunities for food production and the continuance of the agricultural economy. With the exception of allocated sites, significant development resulting in the loss of the best and most versatile agricultural land will only be supported if:

a) The need for the proposed development has been clearly established and there is insufficient lower grade land available at that settlement (unless development of such lower grade land would be inconsistent with other sustainability considerations); and

b) The benefits and/or sustainability considerations outweigh the need to protect such land, when taking into account the economic and other benefits of the best and most versatile agricultural land; and

c) The impacts of the proposal upon ongoing agricultural operations have been minimised through the use of appropriate design solutions; and

d) Where feasible, once any development which is supported has ceased its useful life the land will be restored to its former use (this condition will be secured by planning condition where appropriate).

Where proposals are for sites of 1 hectare or larger, which would result in the loss of best and most versatile agricultural land, an agricultural land classification report should be submitted, setting out the justification for such a loss and how criterion b has been met."

Bassetlaw District Council (BDC) Local Development Framework, Publication Core Strategy and Development Management Policies (2010)[13]

4.46. The Bassetlaw District Council Local Development Framework, Publication Core Strategy and Development Management Policies (2010) sets out a vision for change in Bassetlaw to 2026, along with the place-specific policy approaches to be taken in order to achieve this vision. Policy DM10 Renewable and Low Carbon Energy states:

"*The Council will be supportive of proposals that seek to utilise renewable and low carbon energy to minimise CO_2 emissions. Such proposals will be expected to demonstrate regard to the Council's Energy Opportunities Diagram and Renewable and Low Carbon Energy Study (or subsequent replacement) when identifying options for achieving CO_2 emission reductions. Proposals for renewable and low carbon energy infrastructure will need to demonstrate that they:*

- *are compatible with policies to safeguard the built and natural environment, including heritage assets and their setting;*

[13] Bassetlaw District Council (2010) Local Development Framework, Publication Core Strategy and Development Management Policies

- *will not lead to the loss of or damage to high-grade agricultural land;*
- *are compatible with tourism and recreational facilities;*
- *will not result in unacceptable impacts in terms of visual appearance; landscape character; noise; shadow-flicker; watercourse engineering and hydrological impacts; pollution; traffic generation; or loss of features of recognised importance for biodiversity;*
- *will not result in an unacceptable cumulative impact in relation to the factors above.*

Large-scale renewable and low carbon energy proposals must provide full details of arrangements for decommissioning and reinstatement of the site if/when it ceases to operate."

Draft Bassetlaw Local Plan 2020-2038: Main Modifications Version, August 2023[14]

4.47. The Bassetlaw Local Plan sets out the spatial planning and policy framework for Bassetlaw District up to 2038. The Local Plan is at an advanced stage following several rounds of consultation and was submitted to the Secretary of State for Independent Examination in July 2022. The current version of the draft Local Plan is the Main Modifications as published in August 2023. Paragraph 10.2.5 of the draft Local Plan states:

"The green energy sector may be an appropriate part of the long term regeneration plans for the three power station sites at Marnham, Cottam (see Policy ST6) and West Burton because of each site's ability to provide direct connectivity to the national electricity grid via existing energy switching and/or transmission infrastructure. In these locations, proposals that are consistent with the new strategic policy where relevant and Policy ST51 and the wider development plan will be supported, however, this should not preclude the consideration of other uses, where consistent with other relevant policies in this Plan."

4.48. Paragraph 10.2.7 then states:

"Large scale ground mounted proposals for solar farms are capable of contributing substantially to total solar power generation nationally, and the District is currently experiencing an increase in interest for such schemes. This has the potential for adverse impacts, so in accordance with the UK Solar Photovoltaics Strategy, the preference is for future expansion of solar photovoltaics to be on commercial and industrial roof-space. Nevertheless, large scale ground mounted proposals may be acceptable subject to meeting the criteria in Policy ST51."

4.49. Policy SR51 states:

Policy ST51: Renewable Energy Generation supports development that generates, shares, transmits and/or stores zero carbon and/or low carbon renewable energy including community energy schemes, subject to the satisfactory resolution of all relevant site specific and cumulative impacts upon:

[14] Bassetlaw District Council (2023) Draft Bassetlaw Local Plan 2020-2038: Main Modifications Version, August 2023

a) location, setting and position in the wider landscape, resulting from its siting and scale;

b) natural and heritage assets and their settings;

c) air and water quality;

d) hydrology and hydrogeology;

e) the best and most versatile agricultural land;

f) existing highway capacity and highway safety;

g) noise, light, glare, smell, dust, emissions or flicker;

h) aviation and radar;

i) recreation and amenity."

5. Approach to EIA

The EIA Process

5.1. The ES will be prepared in accordance with the EIA Regulations; relevant planning and planning policy and guidance; PINS Advice Note Seven; and current best-practice EIA guidelines. Each technical topic chapter of the ES will be assessed in line with specific technical aspect methodologies and best-practice guidelines.

Rochdale Envelope

5.2. PINS Advice Note Nine on the 'Rochdale Envelope' (July 2018) provides guidance for handling applications for development consent under the Planning Act 2008. It recognises that during the early stages of scheme design, certain aspects may remain subject to change. A DCO application should therefore ensure that it contains a level of detail that enables a proper assessment of the environmental effects to be made. The extent of flexibility needed depends on the design progress when the detailed application is made. To accommodate this, technical assessments define an 'envelope' within which the project will unfold, featuring maximum and minimum parameters, so that an assessment of the reasonable worst case scenario can be undertaken. The parameters should be as realistic as possible to determine likely significant effects as accurately as is possible.

5.3. As per the reasoning above, it is the Applicant's intention to seek flexibility in the design and layout of the Proposed Development, by considering reasonable 'worst case' scenarios to determine likely significant effects.

Constraints Analysis and Design Process

5.4. As part of the EIA and design process all technical aspects will use the relevant environmental baseline conditions of a site and its surrounds in order to identify any environmental constraints and opportunities relevant to their aspect. This has and will continue to allow design principles to be created that will be used to support the development of the scheme so that important environmental considerations are taken into account during the design evolution. The inputs from this process will be included within the Preliminary Environmental Information Report (PEIR) and included as an Alternatives Chapter of the ES as required by Schedule 4(2) of the EIA Regulations.

Consultation

5.5. Sections 42, 47 and 48 of the Planning Act 2008 and Regulation 13 of the EIA Regulations require that certain statutory bodies, stakeholder groups and relevant land interests must be consulted as part of the pre-application process. As part of this process a PEIR will be produced and consulted upon.

5.6. Consultation alongside the EIA process is critical to the development of a comprehensive and proportionate ES. The views of statutory and non-statutory consultees are important to ensure that the EIA from the outset focuses on the environmental studies and to identify specific issues where there are likely significant environmental effects, and where further investigation is required.

5.7. The consultation, as an ongoing process, enables mitigation measures to be incorporated into the Proposed Development to avoid, reduce and offset adverse environmental effects and to optimise environmental benefits.

5.8. Early and ongoing engagement with consultees will be important to influence the design process of the Proposed Development by seeking an appropriate level of feedback from consultees, to ensure that comments are considered as part of the project design.

Stage One Non-Statutory Consultation

5.9. Stage One non-statutory consultation commenced on 27th September 2023 and closed on the 8th November 2023. As part of the consultation, public exhibitions were held in Newton on Trent (5th October), South Clifton (7th October), Dunham-on-Trent (10th October) and Normanton on Trent (12th October), and one online community webinar on the 11th October.

5.10. The aim of the non-statutory consultation was to introduce the Proposed Development to the local communities and statutory bodies; gather feedback on key issues and options; invite members of the public to ask questions and provide feedback on the early concept design; to find out local needs; and to engage with statutory bodies during the early stage of development proposals.

5.11. All responses received during consultation are being carefully considered and where appropriate, are being taken into account in the evolving design of the Proposed Development. The consultation responses will be recorded in a Consultation Report which will be submitted as part of the DCO application.

Statutory Consultation

5.12. In accordance with Sections 42 of the Planning Act 2008 and Regulation 13 of the EIA Regulations, statutory consultation will be undertaken and is expected to be held in Q2/Q3 2024. The aim of statutory consultation is to consult with statutory consultees on the proposed DCO application, including the current proposals, demonstrating how issues identified during earlier consultation have been accounted for and considered within the Proposed Development design; take formal feedback to ensure that regard has been had to the views of statutory consultees; and finalise and illustrate the position on key issues.

With specific regard to environmental effects, there is a requirement under the EIA Regulations to publicise and consult on Preliminary Environmental Information (PEI) for the scheme. The Applicant intends to consult on the PEI as part of its statutory consultation under the DCO process and will produce a PEIR. Although the level and detail of PEI is not prescribed it must include information that *'is reasonably required for the consultation bodies to develop an informed view of the likely significant environmental effects of the development (and of any associated development)'* (Regulation 12(2)(b) of the EIA Regulations).

Engagement to Date

5.13. A number of interactions with stakeholders have already taken place mostly to provide an introduction to the Proposed Development, obtain baseline environmental data and discuss preliminary baseline survey methodologies with them. Statutory bodies engaged include:

- Lincolnshire County Council (LCC);
- Nottinghamshire County Council (NCC);
- Newark and Sherwood District Council (NSDC);
- West Lindsey District Council (WLDC);
- Bassetlaw District Council (BDC);
- Planning Inspectorate (PINS); and
- Environment Agency.

5.14. Further to the above, as part of the EIA process, consultation and engagement will be undertaken with a range of statutory and non-statutory consultees. It is anticipated consultees will include, but not be limited to:

- South Clifton Parish Council;
- North Clifton Parish Council;
- Normanton on Trent with Marnham Parish Council;
- Denham with Ragnall, Fedborough and Darlton Parish Council;
- Newton on Trent Parish Council;
- Laneham Parish Council;
- Wigsley Parish Council;
- The Crown Estate Commissioners;
- Historic England;
- Natural England;
- National Highways;
- Lincolnshire Wildlife Trust;
- Nottinghamshire Wildlife Trust;
- Trent River Trust;
- Lincolnshire Rivers Trust;
- Anglian Water;
- Sustrans;
- Lincolnshire Fire and Rescue; and
- Nottinghamshire Fire and Rescue.

5.15. Details of specific technical engagement undertaken to date for each of the environmental aspects is provided in Chapters 6 to 17 of this Scoping Report.

Defining the Study Area

5.16. Study areas have been defined individually for each environmental aspect, taking into account the geographic scope of the potential impacts relevant to that aspect and the information required to assess those impacts. The proposed study areas are described within Chapters 6 to 17 of this EIA Scoping Report.

Baseline and Future Baseline

5.17. Appropriate and accurate baseline conditions (i.e. existing conditions on the Site and within its surrounds to an appropriately considered distance in the absence of the proposed development) need to be established in order to assess the likely significant environmental effects of the Proposed Development and to identify the most appropriate environmental measures to be employed to minimise any likely significant adverse effects.

5.18. Baseline information has been and will be collected and described by each technical aspect of the PEIR and ES. This will include existing and available information within the public domain, baseline surveys undertaken as part of the EIA process and additional information provided as part of the consultation process and form engagement. For the majority of the environmental aspects relevant baseline conditions will relate to the existing environmental conditions at the Site and in the local area.

5.19. As per the requirements of Schedule 4(3) of the EIA Regulations, consideration will also be given to future baseline conditions in particular how it will likely evolve in the future (i.e. in the opening year) but without the Proposed Development in place. The likely evolution of the baseline conditions will be described within each technical aspect chapter of the ES, with justification given as to why any change is assumed, and have also been described, where currently known, in the aspect specific Chapters (6-17) of this Scoping Report.

EIA Assessment Scenarios

5.20. An indicative construction programme for the Proposed Development building on the programme in Chapter 3, will be presented in the ES. This will include all stages of the construction phases including site preparation and ground works, construction and landscaping. To assess the likely significant environmental effects of the Proposed Development, the ES will document an assessment of the peak year of construction as this will provide a reasonable worst-case assessment.

5.21. As noted above the EIA will assess the maximum development parameters (or the parameters that represent the reasonable worst case for likely significant environmental effects should that be different). The effects of the completed Proposed Development will be assessed and documented within the ES for the first full year of operation and the year considered to be when maximum environmental effects occur. Each environmental aspect chapter will describe the worst case year as appropriate.

5.22. Within the ES there will also be an assessment made of the decommissioning phase of the Proposed Development. As above, for the purposes of the EIA the decommissioning assessment will be based on an assumption that the Proposed Development will be operational for 45-years. The assessment does not assume that the operational phase will be limited to 45 years as the solar infrastructure may continue to be operating successfully and safely beyond this period. However, this timeframe is a realistic timeframe based on current practices and will be used as an approximate to assess the likely significant effects from the decommissioning phase. Further information on the decommissioning phase, is presented in each of the technical aspects detailed in Chapter 6 to 17.

5.23. It is noted the at the time that decommissioning would take place, the regulatory framework, good industry practices and the future baseline could have altered. Consequently, as detailed in Chapter 3, the Applicant will implement a Decommissioning and Environmental Management Plan (DEMP), which will be secured via a DCO requirement that will set out the measures in place to ensure, based on current understanding, there will be no likely significant effects.

Prediction of Likely Effects and Determining Significance

5.24. Determining the potential for significant effects needs, generally, an aspect specific approach and these methodologies are detailed within the aspect specific chapters (6-17) themselves. However, there are certain common elements that occur in defining the appropriate scope for the detailed assessment.

5.25. Understanding the policy and legal position with regard to a specific environmental aspect is fundamental to determining the likelihood of significant effects occurring. As such the assessment of effects for every aspect will be informed by a detailed review of existing policy including that at national, regional and local level. In addition, relevant legal requirements will be identified.

5.26. Knowledge of the baseline environment, specific to the technical aspect being considered is also required. At this scoping stage the level of baseline collection is appropriate to allow the gaining of an understanding of whether the Proposed Development has the potential to cause significant effects. In many cases this means that there has been a reliance on desk study data and as such, in the future, and to inform the detailed assessment as will be documented within the ES, further baseline data will be collected. Arising from an analysis of the baseline data will come the identification of sensitive receptors that could be affected by the Proposed Development. At this Scoping stage sensitive receptors have been identified and are noted within the aspect specific Chapter (6-17) albeit with the collection of more detailed baseline information these may be subject to some change.

5.27. Establishing the potential for a significant effect to occur, and therefore which effects should be subject to detailed assessment, has been informed by aspect specific guidance often validated by a relevant professional body. The same will be used to inform the detailed assessment as will be documented within the ES. Generally, guidance, in reaching a conclusion on whether an effect could be significant, requires consideration of the sensitivity of a receptor to change, and importantly consideration of the predicted magnitude of change.

5.28. Consideration will be paid to the opportunity to introduce environmental measures (and mitigation) that will help to avoid or reduce the potential for an adverse significant effect to occur.

5.29. Summary of effect tables that summarise the likely significant effects associated with each of the environmental aspects will be provided in the ES at the end of each aspect assessment chapter. These tables will detail sensitive receptors, additional mitigation measures and residual effects. A distinction will be made between direct, indirect, secondary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects. Cumulative effects will be considered as a single coordinated assessment.

Cumulative Effects

5.30. Schedule 4(5)(e) of the EIA Regulations states that the ES should include "*a description of the likely significant effects of the development on the environment resulting from… the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources*".

5.31. Following the above screening criteria, the potential cumulative effects will follow PINS Advice Note Seventeen on cumulative effects assessment relevant to nationally significant infrastructure projects. The staged approach detailed in Advice Note Seventeen considers the level of certainty of surrounding projects and the need to assess development plans and future development consents; acknowledging that there will be limited information available on the relevant proposals to base such assessment on.

5.32. Details of the cumulative schemes to be considered within the detailed assessment will be identified based on information available on the local authorities planning registers and on PINS website and discussed during the consultation stages. The current criteria for inclusion in the study are as follows:

- other projects within the local vicinity (at this stage assumed to be within 5km of the Proposed Development):
- that have planning permission (or development consent) but are not yet built; or
- schemes where a planning application (or DCO application) has been submitted but a decision not yet made; or
- major projects likely to occur due to existing policy.

5.33. It should be recognised that many of the projects that will fall within the categories under the first two bullets above maybe so small that cumulative effects would be highly unlikely. An example of this would be a house extension or similar. Using professional judgement, projects will therefore be screened for their potential to act in a cumulative way with the Proposed Development with only those where such potential exists considered further. This screening exercise will be detailed within the ES and will also be consulted upon as part of pre-application discussions with the host authorities.

5.34. Each technical aspect of the ES will consider the potential for cumulative effects associated with the schemes identified (for example cumulative assessment of traffic effects from nearby projects that are of a significant scale (and where traffic flows are publicly available)). A Cumulative Assessment will be presented as a separate chapter of the PEIR and ES.

5.35. Regulation 4(5) states that the EIA must identify, describe and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of the proposed development on population and human health, biodiversity, land, soil, water, air and climate, material assets, cultural heritage and the landscape. Regulation 5(2)(e) refers to the need to assess '*the interaction between those factors*". The following types of cumulative effects will be considered in accordance with the EIA Regulations and best practice guidance:

- Combined effects occur when a similar type of effect, for example noise, occurs albeit from differing sources e.g. from both road traffic and aircraft noise. Within the ES, combined effects will be dealt with in the relevant technical aspect Chapter.
- Interactive effects occur when a number of separate effects, for example noise and air quality, together interact to cause an effect to a particular receptor, for example a protected species. Within the ES that will be produced interactive effects will be dealt with either in the relevant technical aspect Chapter (such as the example for protected species would be included in the Biodiversity Chapter), or where they have the potential to affect human health, then within the Health Chapter.

Transboundary Effects

5.36. Regulation 32 of the EIA Regulations require the consideration of any likely significant effects in the environment of another European Economic Area (EEA) member state. Guidance of the consideration of transboundary effects is provided in the PINS' Advice Note 12 'Transboundary Impacts and Process', published in December 2020.

5.37. Due to the nature and location of Proposed Development, it is not anticipated that the Proposed Development has the potential to result in any likely significant effects on the environment of another European Economic Association (EEA) State. Therefore, a transboundary screening matrix has not been included within this EIA Scoping Report and transboundary effects are proposed to be scoped out of any future assessment.

Environmental Statement

5.38. In accordance with Schedule 4 (Regulation 18(3)) of the EIA Regulations and PINS Advice Note Seven, the EIA process will be documented in an ES which will describe the Proposed Development, give full details of the EIA methodology and any technical methodologies and data used in support of the assessment; detail any mitigation and enhancement measures that have been employed; present the assessment of likely significant environmental effects; and provide a schedule of proposed mitigation and monitoring arrangements.

5.39. The ES will present an assessment of the cumulative effects and impact interactions as described in each of the topic sections in Chapters 6 to 17.

Volume I: Main ES Text and Supporting Drawings

5.40. This Volume will comprise the main ES text and supporting drawings and will include the following:

- A description of the methodology and approach to EIA;
- A detailed description of the Proposed Development, including details on of the construction and operational phases;
- A description of the evolution of the design process, including a review of the main layout options and reasonable alternatives along with an indication of the main reasons for selecting the chosen option.
- A detailed assessment methodology for each environmental topic scoped into the EIA;
- A description of the current baseline environment and an outline of the likely evolution thereof without implementation of the development for each environmental topic;
- A description of the embedded environmental measures proposed;
- An assessment of predicted environmental effects during the construction, operational and decommissioning phases;
- A description of the expected significant effects of the development on the environment; and
- An assessment of cumulative effects.

Volume II: Technical Appendices

5.41. Volume II will include all technical data required to support the assessment conclusions set out in Volume I.

Volume III: Non-Technical Summary

5.42. A Non-Technical Summary (NTS) will be prepared which will convey the key findings of the EIA in a clear and concise format (in non-technical language) to allow the public to understand the description of the Proposed Development, the significant effects likely to arise from the Proposed Development and the embedded environmental measures.

Content of the ES

5.43. The proposed content of Volume I of the ES is likely to be outlined as follows (or similar):

- Introduction;
- Description of Site and Context;
- Site Selection and Alternatives;
- Description of Proposed Development;
- Consultation;
- Legislative and Planning Policy;

- EIA Methodology including details of assumptions and/or limitations;
- Environmental Aspect Assessments;
- Cumulative Assessment; and
- Summary of Effects and Embedded Measures including details of how mitigation will be secured.

5.44. Each of the technical assessments will be set out in the following format (or similar):

- Introduction:
- List of relevant legislation and planning policies;
- Assessment methodology, including a summary of consultation undertaken, explanation of how responds to EIA Scoping Opinion, list of sources of information & guidance documents, details of the study area, assessment process/criteria and any assumption limitations;
- Baseline description of the Site (current state of the environment (baseline) and an outline of the likely evolution thereof without the implementation of the Proposed Development (future baseline);
- Proposed enhancement and monitoring measures
- Assessment of potential effects;
- Summary; and
- List of references.

Environmental Aspects

5.45. Following a review of environmental surveys and preliminary appraisal work to date, it is proposed that the EIA need only to focus on the following environmental aspects where significant effects are likely to occur. This includes the following technical aspects, which are discussed in Chapters 6 to 17. Scoped out aspects are dealt with in Chapter 18:

- Biodiversity;
- Hydrology and Hydrogeology;
- Land and Soils;
- Buried Heritage;
- Cultural Heritage;
- Landscape and Visual;
- Transport and Access;
- Air Quality;
- Carbon and Climate Change;

- Noise and Vibration
- Human Health; and
- Socio-Economics.

6. Biodiversity

Introduction

6.1. This Chapter of the Scoping Report presents the scope of the environmental assessment for Biodiversity. Specifically, the Chapter presents the policy and legislative context, the approach to collecting baseline data and then an overview of the relevant baseline conditions within the Site and surrounding area, based on current knowledge and understanding. It concludes by setting out the scope of assessment including, with justification, those ecological matters that are proposed to be scoped out and in for detailed assessment and concludes by outlining the method that will be used to undertake the detailed assessment.

Review of Policy, Legislation and Relevant Guidance

6.2. Legislation, planning policy and guidance relating to biodiversity, and relevant to the Proposed Development comprises:

Legislation

- The Environment Act (2021)
- Conservation of Habitats and Species Regulations (2017) (as amended)
- Natural Environment and Rural Communities Act (2006) (as amended)
- Countryside and Rights of Way Act (2000) (as amended)
- Hedgerows Regulations (1997)
- Protection of Badgers Act (1992) (as amended)
- Wildlife & Countryside Act (1981) (as amended)

National Planning Policy

- Overarching National Policy Statement for Energy (EN-1) (2011) – specifically paragraphs 5.3.3, 5.3.4, 5.3.11, 5.3.13, 5.3.14 and 5.3.18.
- Draft Overarching National Policy Statement for Energy (EN-1) (2023) - specifically paragraphs 4.5.2, 4.5.5, 5.4.19, 5.4.21, 5.4.36, 5.4.54.
- Draft National Policy Statement for Renewable Energy Infrastructure (EN-3) (2023) - specifically paragraphs 3.10.66 to 3.10.74
- National Planning Policy Framework (2023) - specifically paragraphs 179 and 180.

Local Planning Policy

- Newark and Sherwood District Council (2013), Local Development Framework, Allocations and Development Management, Development Plan Document - – specifically Policy DM7 and DM8.
- Newark and Sherwood District Council (2019), Amended Core Strategy Development Plan – specifically Core Policy 12.

- Central Lincolnshire Local Plan (2023) – specifically Policies S59, S60 and S61.
- Bassetlaw District Council (2010) Local Development Framework, Publication Core Strategy and Development Management Policies- specifically Policy DM9.
- Draft Bassetlaw Local Plan (2023) 2020-2038: Main Modifications Version, August 2023 -specifically Policy ST39, ST40, ST41.

National Guidance

- Planning Practice Guidance (2023) – Guidance Natural Environment (2019)
- Charted Institute Ecology and Environmental Management (2018, updated 2022) Guidelines for Ecological Impact Assessment in the UK and Ireland
- British Standards Institution (2013) Biodiversity — Code of Practice for Planning and Development (BS 42020:2013)

Local Guidance

- Lincolnshire Biodiversity Partnership (2011) Lincolnshire Biodiversity Action Plan 2011 – 2020 (3rd Edition).
- Nottinghamshire Biodiversity Action Group (date unknown) Local Biodiversity Action Plan.

Baseline Conditions

Approach to Collection of Baseline Data

6.3. Baseline data collection for the Site began in 2023 with a desk study and field survey programme. The desk study was undertaken to gather existing information on statutory and non-statutory sites (known as Local Wildlife Sites (LWS) in Lincolnshire and Nottinghamshire) designated for nature conservation reasons, Habitats and Species of Principal Importance and legally protected, controlled or otherwise notable species within the Site or in the area over which effects on ecological features of the development could be realised (referred to as the Zone of Influence or ZoI).

6.4. Table 6-1 describes the ecological features for which desktop data was collected, the relevant ZoI for each ecological feature and the sources of the information.

Table 6-1: Ecological Features, ZoI and Information Sources

Ecological Feature	ZOI	Data Sources
European Sites[15]	10	Magic.gov.uk[16]

[15] Following UK Government advice this includes Special Areas of Conservation (SAC), Special Protection Areas (SPA), proposed SAC, potential SPA, Ramsar sites and proposed Ramsar sites. SAC and SPA are protected via legislation, whilst the other sites are treated comparatively through policy. This is set out in: https://www.gov.uk/guidance/habitats-regulations-assessments-protecting-a-european-site#European-sites

[16] https://magic.defra.gov.uk/magicmap.aspx

		Natural England's designated sites website[17]
Sites of Special Scientific Interest (SSSI) and National Nature Reserves (NNR)	2 (or relevant SSSI Impact Risk Zones (IRZ) where relevant)	Magic.gov.uk Natural England's designated sites website
Local Nature Reserves	2	Magic.gov.uk Natural England's designated sites website
LWS	2	GLNP[18] and NBGRC[19]
Habitats of Principal Importance / Ancient Woodland	1	Priority Habitat Inventory and Ancient Woodland Inventory - provided on Magic.gov.uk and Forestry Commission Map Browser
Legally protected and notable species - bats and aquatic mammals (otter and water vole)	2	GLNP and NGBRC European Protected Species licence returns - provided on Magic.gov.uk
Legally protected and notable species – all other species	2	GLNP and NGBRC European Protected Species licence returns - provided on Magic.gov.uk
Waterbodies (ponds, wet ditches, lakes) inside or within 500m of the Site	0.5	Satellite imagery and Ordnance Survey mapping
Veteran trees	0.5	Ancient Tree Inventory[20]

[17] https://designatedsites.naturalengland.org.uk/

[18] Greater Lincolnshire Nature Partnership

[19] Nottinghamshire Biological and Geological Records Centre

[20] https://ati.woodlandtrust.org.uk/

European Sites[21]	10	Magic.gov.uk[22] Natural England's designated sites website[23]
Sites of Special Scientific Interest (SSSI) and National Nature Reserves (NNR)	2 (or relevant SSSI Impact Risk Zones (IRZ) where relevant)	Magic.gov.uk Natural England's designated sites website
Local Nature Reserves	2	Magic.gov.uk Natural England's designated sites website
LWS	2	GLNP[24] and NBGRC[25]
Habitats of Principal Importance / Ancient Woodland	1	Priority Habitat Inventory and Ancient Woodland Inventory - provided on Magic.gov.uk and Forestry Commission Map Browser
Legally protected and notable species - bats and aquatic mammals (otter and water vole)	2	GLNP and NGBRC European Protected Species licence returns - provided on Magic.gov.uk
Legally protected and notable species – all other species	2	GLNP and NGBRC European Protected Species licence returns - provided on Magic.gov.uk

[21] Following UK Government advice this includes Special Areas of Conservation (SAC), Special Protection Areas (SPA), proposed SAC, potential SPA, Ramsar sites and proposed Ramsar sites. SAC and SPA are protected via legislation, whilst the other sites are treated comparatively through policy. See https://www.gov.uk/guidance/habitats-regulations-assessments-protecting-a-european-site#European-sites

[22] https://magic.defra.gov.uk/magicmap.aspx

[23] https://designatedsites.naturalengland.org.uk/

[24] Greater Lincolnshire Nature Partnership

[25] Nottinghamshire Biological and Geological Records Centre

Waterbodies (ponds, wet ditches, lakes) inside or within 500m of the Site	0.5	Satellite imagery and Ordnance Survey mapping
Veteran trees	0.5	Ancient Tree Inventory[26]

6.5. A range of ecology surveys have been completed, are ongoing or are planned for the Site. These are:

Extended Phase 1 Habitat Survey and Habitat Condition Assessment

6.6. A Phase 1 habitat survey was completed in 2023. This survey is best practice for mapping habitats within and adjacent to a site using the method developed and published by the Joint Nature Conservation Committee (JNCC) (2010)[27]. This method was adopted and extended to include identifying and mapping the potential the Site holds for legally protected or otherwise notable (in a legal and planning context i.e. designated sites or those recognised in national and local policy) species (including invasive non-native species (INNS)) based on the habitats found and the regional context. This information was used to scope and focus the species-specific elements of the field survey programme.

Breeding Birdy Survey

6.7. A territory mapping survey following an amended version of the British Trust for Ornithology's (BTO) common bird census (CBC) methodology (Gilbert et al., 1998[28]) was undertaken across six visits between late March and July 2023. Given the majority of the Site is used for intensive farming with limited habitats, this number of visits was considered sufficient. Whilst the level of survey effort is lower than the usual ten visits for the CBC methodology as outlined by the BTO, it is in line with that recommended for development projects by the Bird Survey & Assessment Steering Group[29].

6.8. The location of each bird detected (visually and / or aurally) was mapped using the standard two-letter BTO codes, and bird activity was recorded using standard behaviour codes (Marchant, 1983[30]). The Site was sampled across five large areas, as opposed to being subject to full Site coverage. This was justified and considered representative on the basis of the expansive nature of the Site and its general homogeneity (i.e. dominated by large arable fields).

[26] https://ati.woodlandtrust.org.uk/

[27] Joint Nature Conservation Committee (2010) (Updated 2016),'Handbook for Phase 1 Habitat Survey – A Technique for Environmental Audit'.

[28] Gilbert, G., Gibbons, D.W. & Evans, J. (1998) Bird Monitoring Methods: A Manual of Techniques for Key UK Species. RSPB, Sandy, Bedfordshire

[29] Bird Survey & Assessment Steering Group (2023) Bird Survey Guidelines for assessing ecological impacts, v1.1.0. https://birdsurveyguidelines.org [accessed March 2023]

[30] Marchant, J.H. (1983) BTO Common Bird Census Instructions. BTO, Tring

Non-Breeding Bird Survey

6.9. Non-breeding bird surveys are ongoing and are primarily focused on the recording of any waders and wildfowl associated with the catchment of the River Trent that may use the arable fields for foraging, loafing or roosting. In addition, other target species of interest such as flocks of wintering thrushes or aggregations of gulls are also being recorded. The method follows the non-breeding walkover survey method as described by the Bird Survey & Assessment Steering Group[31]. It uses transects and the scanning (visual observations) of habitats to record the type, number and behaviour of birds seen using the survey area. These surveys began in September 2023 and will continue through to March 2024.

Bat Surveys

6.10. Bat surveys were devised following the Bat Conservation Trust's 'Bat Surveys for Professional Ecologists Good Practice Guidelines'[32] and taking account of the fourth edition of this guidance[33]. Prior to surveys beginning, a licensed bat surveyor determined that the Site comprised habitats that were generally of low suitability for bats. Following this, three transects were devised to sample bat activity across the area's within the Site most likely to be suitable for bats to provide an understanding of the bats present and general levels of activity. In addition, a full survey of every field across the Site was not considered necessary taking account of the Proposed Development early design principles that seek to retain, enhance and create habitats that are used most frequently by bats (e.g. linear features). The transects were subject to bat activity surveys in spring, summer and autumn. On each transect two static bat detectors were also installed and left in-situ to record for a period of five nights per season. In addition, a preliminary ground level roost assessment of trees and buildings within and close to the Site was undertaken.

Badger Survey

6.11. A badger survey was undertaken concurrently with the extended Phase 1 habitat survey. Surveyors, independently of habitat recording tasks, searched for signs of badger activity including setts, feeding signs, latrines and footprints in line with Scottish Badgers (2018) "Surveying for Badgers – Good Practice Guidelines, version 1", which is the latest comprehensive guidance for use. The exception to this was that the badger survey was undertaken across spring, summer and early autumn due to the large scale of the Site.

[31] Bird Survey & Assessment Steering Group (2023), Bird Survey Guidelines for assessing ecological impacts, v.1.1.0

[32] Bat Conservation Trust (2016), 'Bat Surveys for Professional Ecologists Good Practice Guidelines' third edition (Collins (ed.)).

[33] Bat Conservation Trust (2023), 'Bat Surveys for Professional Ecologists Good Practice Guidelines' fourth edition (Collins (ed.)).

Riparian Mammal Survey (Otter and Water Vole)

6.12. Riparian mammals were surveyed along the River Trent, on the wet ditches within the Site and around the waterbodies present. The surveys were undertaken concurrently with the extended Phase 1 habitat survey and surveyors searched for the signs of activity that are described for water vole in the "Water Vole Mitigation Handbook"[34] and for otter in "Monitoring the Otter" (Chanin, 2003)[35]. Taking account of likely distance of travel away from the River Trent, areas up to 250m away from water, where suitable habitat exists, were also investigated for potential to support otter natal holts.

Great Crested Newts

6.13. Great crested newt surveys were undertaken between April and June 2023 at the ten waterbodies located on the Site. These waterbodies were subject to a Habitat Suitability Index (Oldham et al. 2000[36]) and sampling for environmental DNA (eDNA). The eDNA samples were collected using testing kits that were sent to SureScreen Scientifics Ltd for laboratory analysis. The sampling procedure followed the method developed by Biggs et al. (2014)[37] and additional instructions provided with the sampling kits.

Common Reptiles

6.14. It is noted that common reptiles such as common lizard and slow worm may be present on the Site. However, no survey for this group has been proposed and specified as solar development can be undertaken sympathetically to reptiles to ensure legislative compliance and provide long term benefits in terms of better habitat quality given the current arable condition of the Site.

[34] Dean, M., Strachan, R., Gow, D. & Andrews, R. (2016). The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series). Eds Fiona Matthews and Paul Chanin. The Mammal Society, London.

[35] Chanin, P. (2003). Monitoring the Otter. Lutra lutra. Conserving Natura 2000 Rivers Monitoring Series No 10. Peterborough, English Nature.

[36] Oldham, R.S., Keeble, J., Swan, M.J.S. and Jeffcote, M., (2000). Evaluating the suitability of habitat for the great crested newt (Triturus cristatus). Herpetological Journal, 10(4), p.143-155

[37] Biggs J, Ewald N, Valentini A, Gaboriaud C, Griffiths RA, Foster J, Wilkinson J, Arnett A, Williams P and Dunn F, (2014). Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (Triturus cristatus) environmental DNA. Freshwater Habitats Trust, Oxford.

Relevant Baseline Conditions

Extended Phase 1 Habitat Survey and Habitat Condition Assessment

6.15. There are no European sites within 10km of the Site boundary, with the closest SSSI being approximately 1.9km to the south. This designation is Spalford Warren SSSI, which is cited for being one of the best remaining examples of grassland heath in Nottinghamshire and the wider midlands region. The Site is overlapped by SSSI Impact Risk Zones (IRZ) for a number of SSSIs (all but one of these SSSIs being over 2km distant from the nearest boundary of the Site). However, the types of development highlighted by the IRZs for further consideration does not include solar installations. This suggests that the potential effects of the Proposed Development in this location is not considered to be a risk to nearby SSSIs.

6.16. There are twelve LWS immediately adjacent to the Site, although none within areas identified for potential development. These LWS have all been designated for their botanical interest[38] and are:

- 1/94 – Darnsyke Marsh
- 2/444 – Skegby Road Triangle
- 2/486 – Dunham Dubs
- 2/653 – Road Wood
- 2/654 – West Wood
- 2/655 – Dunham Oxbow
- 2/656 – Fledborough Holme
- 5/133 – Fledborough to Harby Dismantled Railway
- 5/141 – Lodge Farm Grassland, Thorney
- 5/2170 – South Clifton Grassland
- 5/2171 – North Clifton Church
- 5/3437 – Marnham Railway Yard

6.17. The Site supports a range of habitats, although it is dominated by arable fields that make up the vast majority of the Site area. Most arable fields present are intensively managed with either little or no grass margins around the cropped edge. The fields are bounded by a range of intact and defunct hedgerows. In general, species richness is greater to the east of the River Trent. A number of the hedgerows support standard trees and some are associated with ditches (mainly dry). Where hedgerows are not present the fields are often bound by strips of semi-improved grassland and tall ruderal vegetation that are likely to be growing along the line of a previous hedgerow. In these locations there are occasionally fence lines.

[38] Note detailed descriptions of habitats within these LWS was not supplied by NGBRC

6.18. There are a relatively small number of woodland blocks across the area, both within and adjacent to the boundary of the Site. These woodlands are all considered to be of plantation origin with all but one comprising of a mix of broadleaved species. Towards the eastern extent of the Site lies the only coniferous plantation mapped.

6.19. The River Trent corridor supports a mixture of habitats with sheep grazed pasture common. Some of this area is shown on the Priority Habitats Inventory as coastal and floodplain grazing marsh. However, much of what is mapped has been converted to arable land with notable exceptions being the Fledborough Holme LWS. In places, scattered scrub is present along and close to the river bank. The topography suggests that earth works have been undertaken to provide flood defences along the majority of the river front in this area.

6.20. Other habitats on or adjacent to the Site include a small number of ponds, small lakes and agricultural reservoirs, as well as a network of wet ditches (mainly close to South Clifton). These ditches, the river and some of the ponds/lakes have the potential to support water vole and otter although no signs have been recorded.

Breeding Birdy Survey

6.21. Breeding bird surveys identified a range of common and widespread farmland species using the Site. However, there was also sightings of notable species including breeding turtle dove, Cetti's warbler, yellow wagtails, yellowhammer, quail and hobby, and foraging barn owl and peregrine (both observed mainly off Site). Skylark were also observed breeding within arable fields. Given the majority of the Site is used for intensive farming with limited habitats the density of breeding birds is generally considered likely to be low.

Non-Breeding Bird Survey

6.22. The non-breeding bird surveys are ongoing. The desk study suggests that waders such as golden plover, green sandpiper and Eurasian curlew, and wildfowl such as wigeon and teal are likely to be present (particularly in the vicinity of the River Trent and its margins). Early observations from the non-breeding bird surveys suggest cormorant are common in this area.

Bat Surveys

6.23. At the time of writing, the bat surveys are ongoing on the Site and are due to complete in October 2023 with reporting available in Q4 2023. The Site (and surrounds) include a number of trees and buildings that could be used by roosting bats. Although detailed analysis has not been completed, anecdotal observation suggests that bat activity levels are typical of expansive farmland habitats being relatively low. Species identified to date include common and soprano pipistrelle, noctule, myotis species and brown long-eared bat. As would be expected the majority of activity is focused around existing hedgerows, woodland edge and freshwater habitats. Early results of the bat surveys concur with the type of species identified from the desk study.

Badger Survey

6.24. Badger activity was common across the area with setts and foraging signs encountered regularly. Setts were sometime dug in flat ground around the edges of fields when there were no banks to burrow into. It is likely that due to the scale of the Site there is more than one clan present.

Riparian Mammal Survey (Otter and Water Vole)

6.25. The desk study returned a small number of otter records along the River Trent corridor (including from within the Site) and a larger number of water vole records (alongside sightings of American mink). Further survey for water vole and otter will be undertaken in 2024.

Great Crested Newts

No great crested newt were identified from the eDNA surveys. This accords with the desk study that has very few records of great crested newt (four records all north of the A57) present within the ZoI and none from within the Site boundary.

Environmental Measures

6.26. The Proposed Development provides opportunities for delivering Biodiversity Net Gain (measured using Natural England's Biodiversity Metric 4.0) at a scale in keeping with the Lawton Principles (i.e. more, bigger, better and joined up). The scale of the Proposed Development allows for the opportunity to link the existing LWS with other habitats that will be managed in a way to promote biodiversity, with existing corridors such as the River Trent (running north / south) and the national cycle route across the Fledborough Viaduct (running east / west) also providing the opportunity to join up with other habitats of value from further afield. The size of the Site provides an opportunity to provide biodiverse habitats across an area many times the size of a typical SSSI or LWS. Although the variety of habitats that could be created within the solar array would be limited, the opportunities that it could provide for invertebrates, breeding birds, herptiles and bats could be large enough to support notable changes in the size of local populations.

6.27. Within the Site boundary there will be three broad opportunities, these being:

- Habitat enhancement and creation outside of areas of development (i.e. land set aside for biodiversity and other green infrastructure);
- Habitat enhancement and creation within areas of development; and
- Species-specific opportunities aimed at improving local provision.

6.28. The corridor of the River Trent provides an opportunity to seek to create habitats that are of greater biodiversity value than are currently present. Although there are no detailed designs currently present this could include the restoration of areas of coastal and floodplain grazing marsh (a national and local conservation priority), creation of scrapes and temporary pools for waders and wildfowl (providing habitat for notable breeding and non-breeding birds), creation of new hedgerows (a Habitat of Principal Importance (HPI)) and planting of new stands of woodland.

6.29. Within solar farms there is the opportunity to create a range of habitats dependent on the Site's location. Around tracksides and in the stand-off between infrastructure and field boundaries wild bird cover, conservation headlands and pollinator mixes sown in strips akin to current agri-environment schemes can be established. These provide opportunities for a range of species including invertebrates, birds and bats through the provision of greater food resources. In other locations species rich grassland can be created. The grassland can have a variety of different characters dependent on location (e.g. meadow style grasslands adjacent to solar arrays, with more shade and drought tolerant communities around the panels) and management type (e.g. different grazing and cutting regimes). The aim of the design will be to ensure various different grassland types to ensure a variety of opportunities are available to local flora and fauna.

6.30. There is also the opportunity to create species or species group specific features to aid local conservation efforts. This could include the creation and management of turtle dove (a national and local conservation priority) strips aimed at providing a good supply of small weed seeds, sandy banks for burrowing Hymenoptera (including some Species Protection Index (SPI)), hibernacula for herptiles (including some SPI) and enhancement of the existing ditch network for water vole (a national and local conservation priority).

6.31. Through the outputs of field survey work and technical engagement with nature conservation stakeholders the measures likely to be of most conservation benefit and in line with local priorities will be identified. The Ecological Impact Assessment that will be included as a Chapter within the ES, its appendices and related documents will provide information on how BNG and other biodiversity measures will be secured and an outline of the proposed management and monitoring measures.

Scope of Assessment

Important Receptors Identified

6.32. The ecological features[39] identified to date for consideration are based on the desk study, field survey results to date and professional judgement. Dependent on the outcome of further survey and technical engagement this list may need to be amended prior to detailed assessment work commencing. Ecological features have been identified where potential effects (both negative and positive) may occur through either the construction, operational or decommissioning phases of the Proposed Development.

6.33. A Study Area for the Ecological Impact Assessment (EcIA) has been defined for the Site, plus the ZoI that are identified in Table 6-1. Once details on the approach to construction and operation are available these ZoI may be revised. The scope and extent will be discussed and agreed with Natural England during consultation.

6.34. The ecological features requiring detailed assessment are:

- Local Wildlife Sites adjacent to the Site;
- Habitats of Principal Importance – in particular hedgerows, coastal and floodplain grazing marsh and river/riparian habitats;

[39] Ecological features is the term used within the CIEEM EcIA guidance to refer to receptors.

- Other habitats – including plantation woodland, ditches and ponds;
- The breeding bird community – particularly species on the red and amber lists of Birds of Conservation Concern 5[40];
- Non-breeding birds – dependent on type and distribution of species identified during the field survey;
- Bats – consideration particularly associated with fragmentation and losses and gains in foraging opportunity;
- Badgers – with particular emphasis on legislative compliance and welfare; and
- Riparian mammals - consideration particularly associated with fragmentation and losses and gains in habitat quality.

Likely Significant Effects Scoped Out from Detailed Assessment

6.35. Table 6-2 presents the elements which have been scoped out from the detailed assessment, as it is considered no likely significant effects will occur.

Table 6-2: Likely Significant Effects Scoped out from the Biodiversity Detailed Assessment

Elements Scoped Out	Justification
Construction and Decommissioning Emissions (Traffic and Construction Plant)	Emissions from plant and delivery traffic during the construction and decommissioning phases can lead to habitat change through nutrient deposition, acidification and direct toxicity. However, they are proposed to be scoped out of the assessment. This is because there are no European sites within 200m of roads on which a detectable rise in traffic would be predicted during the construction phase. There are two SSSI within 200m of the A1133 (Spalford Warren SSSI and Besthorpe Warren SSSI), however these are south of the Site on a stretch of road that is unlikely to be a major construction traffic route given access from the A57 is proposed. Further, construction and decommissioning traffic can be discounted as the increase in traffic will be temporary and limited ensuring that the extent of the effect will be low, temporary and reversible. This justification equally applies to LWS present within the area.

[40] Stanbury, A.J., Eaton, M.A., Aebischer, N.J., Balmer, D., Brown, A.F., Douse, A., Lindley, P., MuCulloch, N., Noble, D.G. & Win, I. (2021) Birds of Conservation Concern 5. British Birds 114.

Electro-magnetic fields (EMF)	The effects of electro-magnetic fields (EMF) from buried cables can result in environmental changes in close proximity to cables through soil heating (altering habitat composition) and magnetic fields discouraging certain species from moving through the area. However, cabling for solar farms is no different to those already in position across the country (e.g. connections for on and offshore wind farms, parts of the national grid and district network distribution system and other solar farms) and there is no evidence to suggest they have an effect on ecological features. Heating of the soil would occur over a small area only with typical estimates of measurable changes in temperature being at most between 1 and 1.5m from the cable thus making any potential effect highly localised.

Likely Significant Effects Scoped into the Detailed Assessment

6.36. The construction, operational and decommissioning phases of a solar farm may result in a range of potential likely significant effects that require detailed assessment which include:

- Temporary land take and habitat degradation during construction;
- Permanent land take and habitat loss / degradation associated with presence of permanent infrastructure;
- Fragmentation of semi-natural habitats due to habitat loss / degradation and reduction in landscape permeability due to the presence of infrastructure;
- Increases in noise, vibration and human presence during the construction and decommissioning phases resulting in disturbance of fauna;
- Increases in temporary and permanent lighting through all phases of the Proposed Development resulting in disturbance of fauna;
- Changes in ground water levels and surface water movement patterns due to imposition of temporary and permanent drainage resulting in habitat degradation;
- Accidental spread of invasive non-native species due to construction activity;
- Pollution of terrestrial and freshwater habitats through loss of chemicals and fines / dust from the Site, particularly during construction and decommissioning;
- Changes in hydrology (ground water levels and surface water run-off rates) resulting in habitat change.

Methodology proposed to Undertake Detailed Assessment

Further Baseline Data

6.37. Some baseline surveys, most specifically non-breeding bird surveys are continuing. In addition, further baseline data required to inform the assessment is detailed below. It should, however, be noted that the processing of field data gathered in 2023 may suggest that further survey effort is required.

6.38. The following additional surveys may be required depending on the development design:

- Hedgerow survey (based on the Hedgerows Regulations 1997) in any locations where hedgerows may require removal (this is expected to be minimal and largely associated with widening existing field access points where necessary)
- Additional otter and water vole survey in any locations where culverting is required to facilitate the delivery of construction tracks / Site access.

6.39. At this juncture it is not considered necessary to repeat any other surveys to provide additional data. Although the breeding bird and bat surveys did not cover the whole area, both taking a sampling approach, the understanding needed to design appropriate mitigation measures and enhancements has been achieved.

Approach to Ecological Impact Assessment

6.40. The approach to EcIA follows the guidance published by CIEEM (2018, updated 2022) although changes in terminology and structure will be adopted where reasonable and not in conflict with the referenced guidance and best practice to align with the general approach used within other technical chapters within the Environmental Statement (ES).

6.41. The first stage in the assessment is to determine the importance of the ecological features identified on the Site or within the ZoI. The CIEEM guidance requires that each ecological feature is conferred importance against a geographic scale. The level of importance is conferred by the relation of the ecological feature to UK legislation and policy. The geographical levels that will be considered for the assessment of the Proposed Development are:

- International
- National (i.e. UK / England)
- County (i.e. Nottinghamshire and Lincolnshire)
- District (i.e. West Lindsey, Bassetlaw and Newark & Sherwood)
- Local (i.e. the Site and immediate surrounds)
- Negligible

6.42. This level of importance will also be qualified with a secondary geographic scale (using the same terminology) to highlight where a project level effect may operate on a smaller scale only (e.g. effects that could alter the status of a local population, but remain negligible at a regional or national level). This judgement will be informed by information on the extent and population size, population trends and distribution of the ecological features in question.

6.43. All ecological features determined to be of negligible importance will automatically be excluded from detailed assessment, with the exception of legally protected species for which mitigation measures may be required to ensure compliance with legislation.

6.44. Ecological features of local importance or above will then be considered individually for inclusion with the detailed assessment. Through an understanding of the activities associated with the Proposed Development and the resulting environmental changes, it is possible to identify ecological features that may be subject to potentially significant effects. Where no potential for significant effects is identified, following the imposition of typical project level embedded mitigation measures (e.g. pollution prevention measures), ecological features will be scoped out of further detailed assessment.

6.45. Those ecological features taken forward for more detailed assessment will be considered in line with CIEEM guidelines. CIEEM (2018, updated 2022) defines a significant effect as one 'that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general'.

6.46. When considering likely significant effects on ecological features, whether these are negative or positive, the following characteristics of environmental change will be taken into account:

- extent – the spatial or geographical area over which the environmental change may occur;
- magnitude – the size, amount, intensity or volume of the environmental change;
- duration – the length of time over which the environmental change may occur;
- frequency – the number of times an environmental change may occur;
- timing – the periods of the day / year / season during which an environmental change may occur; and
- reversibility – whether the environmental change can be reversed through restoration actions or regeneration.

6.47. Both negative and positive effects are assessed as being significant if the favourable conservation status of an ecological feature would be altered as a result of the Proposed Development. Conservation status is defined in CIEEM 2018 (in paragraph 5.3.2) as follows:

'habitats - conservation status is determined by the sum of the influences acting on the habitat that may affect its extent, structure and functions as well as its distribution and its typical species within a given geographical area'; and

'species - conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area'.

6.48. Professional judgement will be used, in light of the available evidence, to determine whether the conservation status of an ecological feature will be altered either negatively or positively.

6.49. When considering designated sites, it is their integrity, as well as qualifying features and conservation status, that is considered. This is defined as '*the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified*.'

6.50. The assessment of effects on integrity will draw upon the assessment of effects on the conservation status of the features for which the site has been designated.

6.51. Where likely significant adverse effects are identified, environmental measures, including mitigation, will be incorporated into the project where practicable. These will be described in detail, including providing information on how they will be secured and their expected efficacy.

6.52. Each ecological feature will be considered across all phases of the Proposed Development to ensure potential outcomes are considered realistically.

7. Hydrology and Hydrogeology

Introduction

7.1. This Chapter of the Scoping Report presents the scope of the environmental assessment for Hydrology and Hydrogeology. Specifically, the Chapter presents the policy and legislative context, the approach to collecting baseline data and then an overview of the relevant baseline conditions within the Site and surrounding area, based on current knowledge and understanding. It concludes by setting out the scope of assessment including, with justification, those hydrology and hydrogeology matters that are proposed to be scoped out and in for detailed assessment and concludes by outlining the method that will be used to undertake the detailed assessment.

Review of Policy, Legislation and Relevant Guidance

7.2. Legislation, planning policy and guidance relating to hydrology and hydrogeology, and relevant to the Proposed Development comprises:

Legislation

- The European Water Framework Directive (WFD) (2000).
- Flood Directive (2007).
- Environmental Protection Act (1990).
- Water Resources Act (1991) as amended 2009.
- Land Drainage Act (1991).
- Environment Act (1995).
- Water Act (2014).
- The Groundwater (England and Wales) Regulations (2009).
- The Flood Risk Regulations (2009).

National Planning Policy

- Overarching National Policy Statement for Energy (EN-1) (2011) – specific reference to Part 5, Section 5.7, which relates to Flood Risk.
- Draft Overarching National Policy Statement for Energy (EN-1) (2023) – specific reference to Part 5, Section 5.8, which relates to Flood Risk.
- Draft National Policy Statement for Renewable Energy Infrastructure (EN-3) (2023) - specifically paragraphs 2.3.1 to 2.3.4
- Draft National Policy Statement for Renewable Energy Infrastructure (EN-3) (2023) - specifically paragraphs 3.10.15, 3.10.75
- National Planning Policy Framework (2023) specific reference to Section 14.

Local Planning Policy

- Newark & Sherwood District Council, Amended Core Strategy Development Plan (2019). Core Policy 9 and Core Policy 10.
- Central Lincolnshire Local Plan (2023). Policies S20 and S21.
- Bassetlaw District Council (2010) Publication Core Strategy and Development Management Policies. Policy DM12
- Draft Bassetlaw Local Plan 2020-2038: Main Modifications Version, August 2023. Policy ST52 and ST53.

National Guidance

- Planning Practice Guidance (2023) Flood Risk and Coastal Change Planning Practice Guidance (PPG) (updated 2022).
- DEFRA Non-statutory technical standards for sustainable drainage systems (2015).
- Construction Industry Research and Information Association (CIRIA) Report C753 The SuDS Manual (2015)

Local Guidance

- Bassetlaw District Level 1 Strategic Flood Risk Assessment (SFRA) (2019).
- Newark and Sherwood District Level 1 SFRA (2016).
- West Lindsey Level 1 SFRA (2009).
- Lincolnshire Sustainable Drainage Design and Evaluation Guide (2018).

Baseline Conditions

Approach to Collection of Baseline Data

7.3. The baseline conditions of the Site and surroundings have been established using the following sources of information:

- Visual inspection of the Site to assess flood risk based on topography and existing natural drainage regime.
- Ordnance Survey (OS) maps and British Geological Survey[41] maps.
- Environment Agency (EA) Flood Map for Planning, Surface Water Flood Risk Mapping, and Reservoir Flood Risk Mapping[42].
- BGS Aquifer Designations, EA Groundwater Vulnerability Mapping, and Source Protection Zone Mapping[43].

41 British Geological Survey Geology of Britain 3D (Geology Of Britain 3D) https://mapapps.bgs.ac.uk/geologyofbritain3d/

42 Environment Agency Flood Map for Planning available at www.flood-map-for-planning.service.gov.uk

43 MagicMap.go.uk [online]. Available at: https://magic.defra.gov.uk/magicmap.aspx

- Bassetlaw District Level 1 SFRA (2019), Newark and Sherwood District Level 1 SFRA (2016) and West Lindsey District Level 1 SFRA (2009).
- Topographic levels from the EA 1 metre (m) LiDAR[44] (2022).
- Consultation with East Midlands EA on the 13th September, receipt and analysis of Tidal Trent (2023) Hydraulic Model.
- Soilscapes Online Soil Viewer[45].

Relevant Baseline Conditions

Topography

7.4. Given the scale of the Site, the topography varies considerably across its extent with highest levels at approximately 28m Above Ordnance Datum (AOD) at hills east of the Trent, to 4m AOD along the banks of the River Trent.

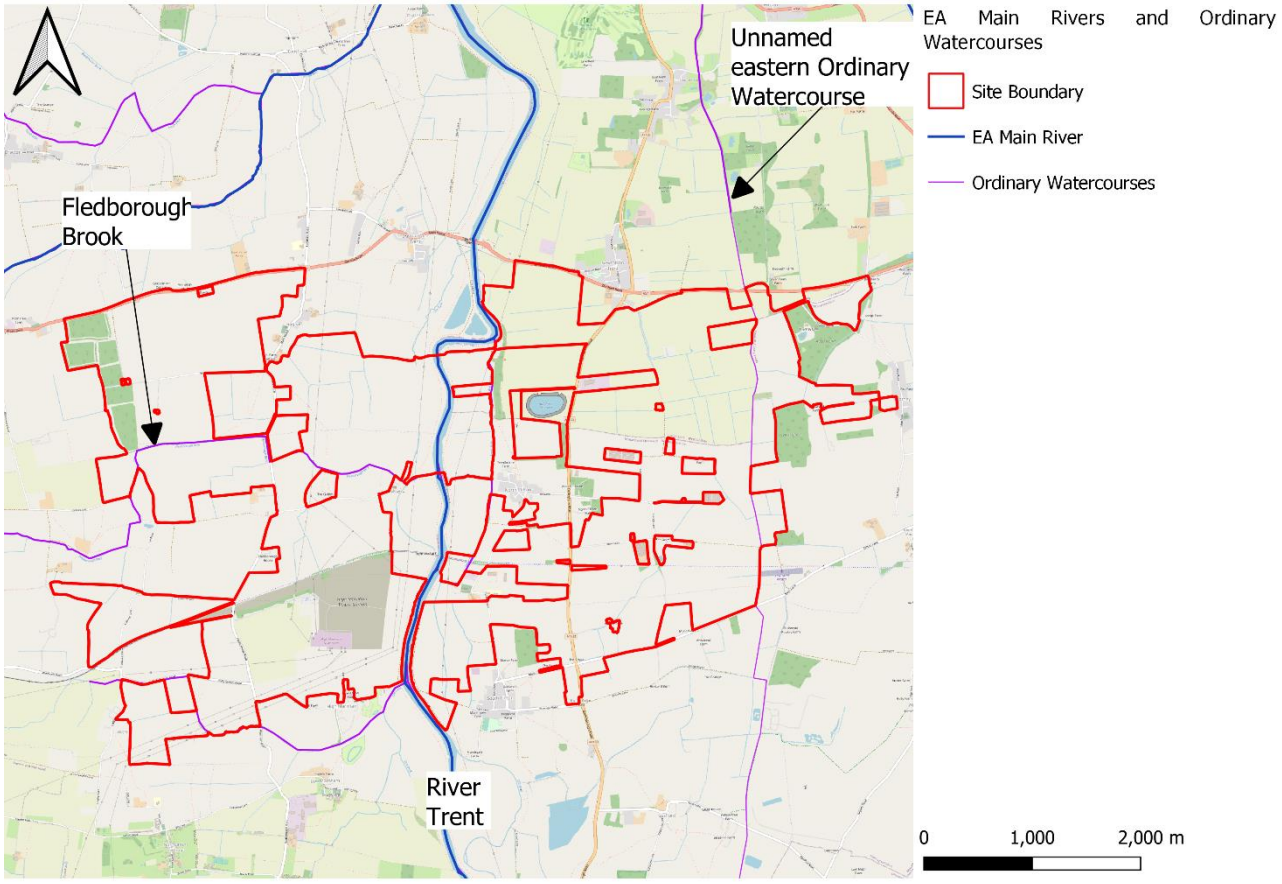
Existing Watercourses

7.5. The Site is bisected by the River Trent which is classified as a main river by the EA and flows from south to north. In addition to the River Trent, there are a number of named and unnamed ordinary watercourses which flow through the Site, these are illustrated in Figure 7-1.

44 Department for Environment Food and Rural Affairs, 2022. DTM 1m LiDAR data, available: https://environment.data.gov.uk/DefraDataDownload/?Mode=survey

45 Cranfield University. Available at: https://www.landis.org.uk/soilscapes/

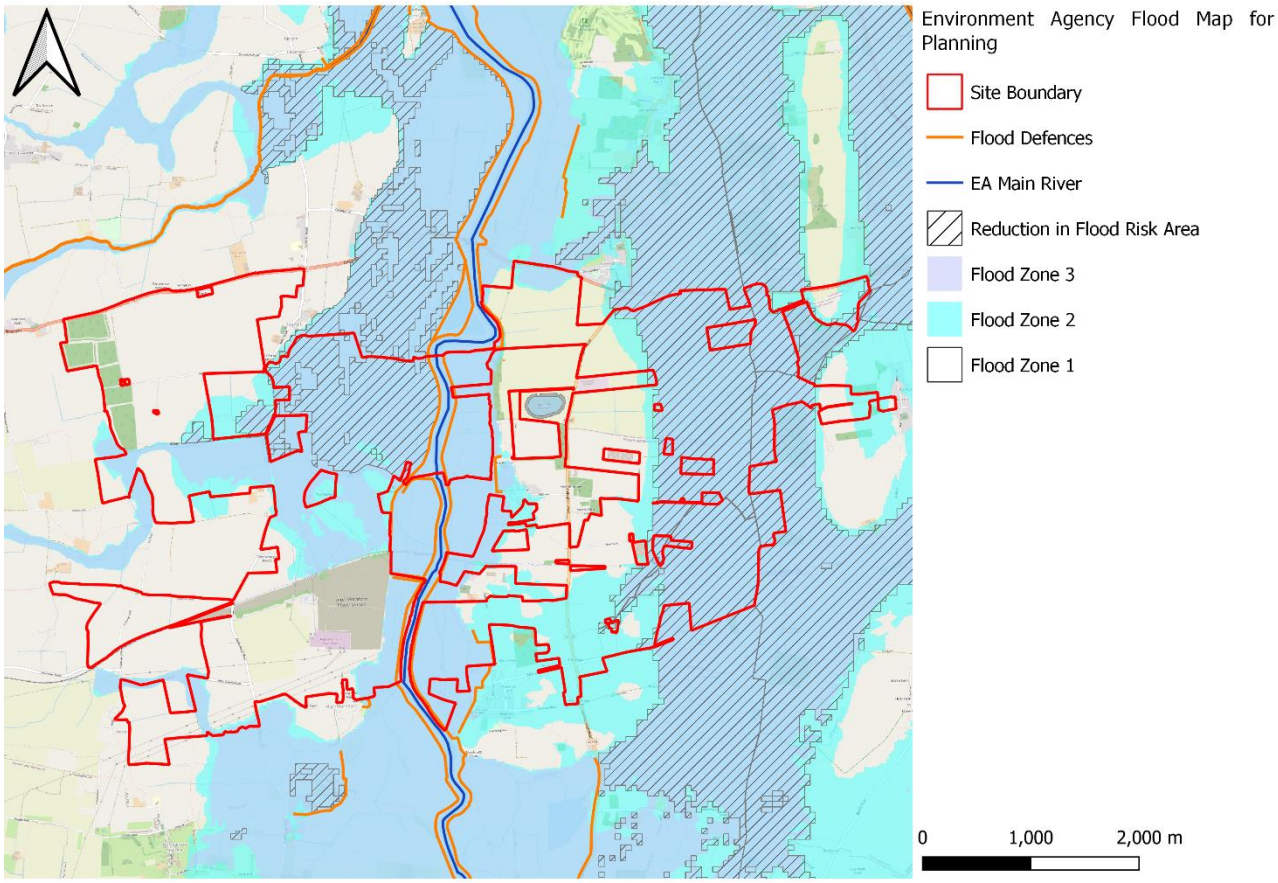
Figure 7-1 Environment Agency Main Rivers and Ordinary Watercourses within Vicinity of the Site



Flood Risk

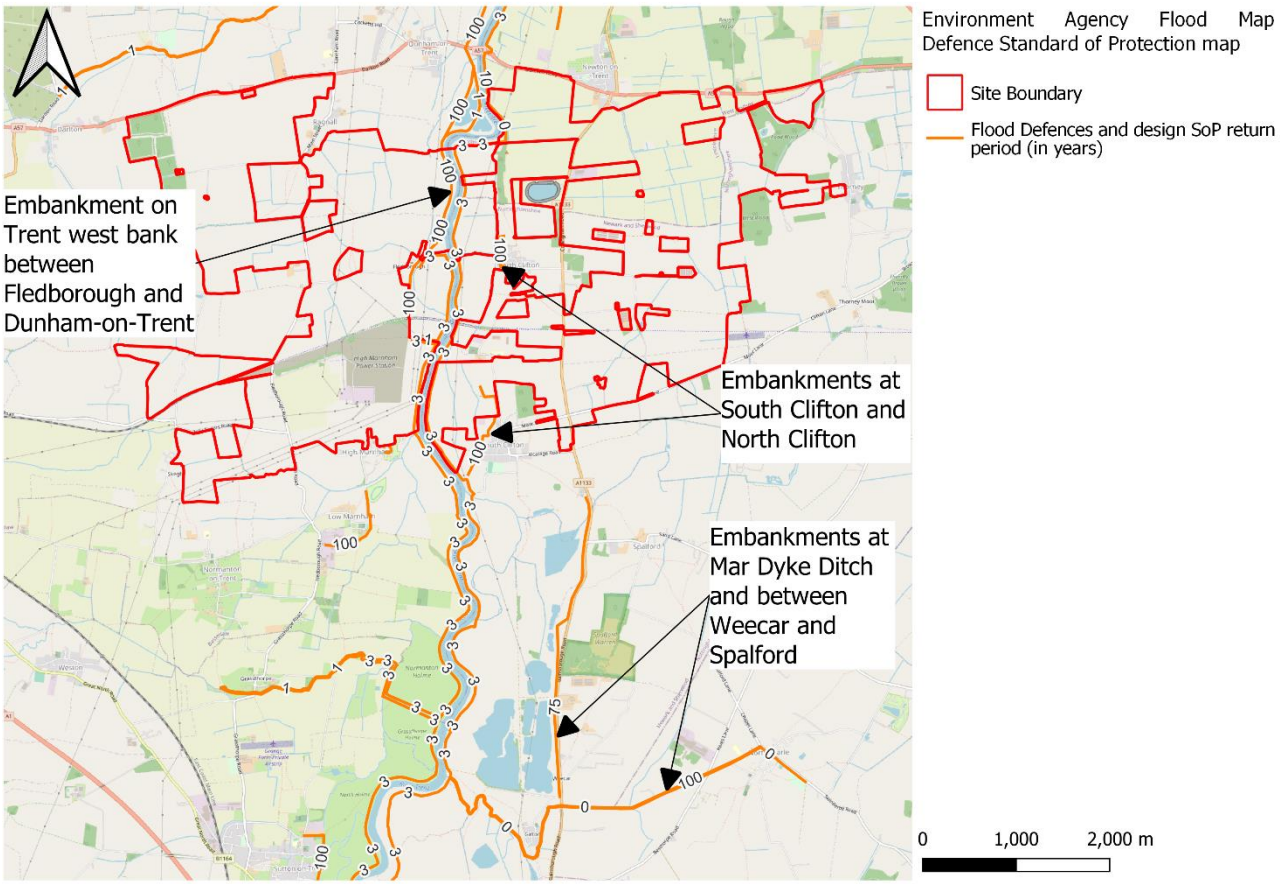
7.6. According to the EA's Flood Map for Planning, large areas of the Site are shown to be within Flood Zones 2 and 3, indicating a medium and high probability of flooding from tidal and fluvial sources (see Figure 7-2). This flooding is considered to originate and be predominantly associated with the River Trent which flows through the centre of the Site, however as set out previously, there are a number of ordinary watercourses within the Site which are hydraulically connected to the River Trent.

Figure 7-2 Environment Agency Flood Map for Planning



7.7. The EA's Flood Map for Planning shows the presence of flood defences, both on the banks of River Trent and set back from its main channel. The Standard of Protection (SoP) these defences provide varies from the 1 in 3 year level, up to the 1 in 100 year, as shown on Figure 7-3. A number of areas within the Site therefore benefit from these defences and these areas are illustrated in Figure 7-2 above by the hatch indicating "*Reduction in Risk of Flooding from Rivers and Sea due to Defences*".

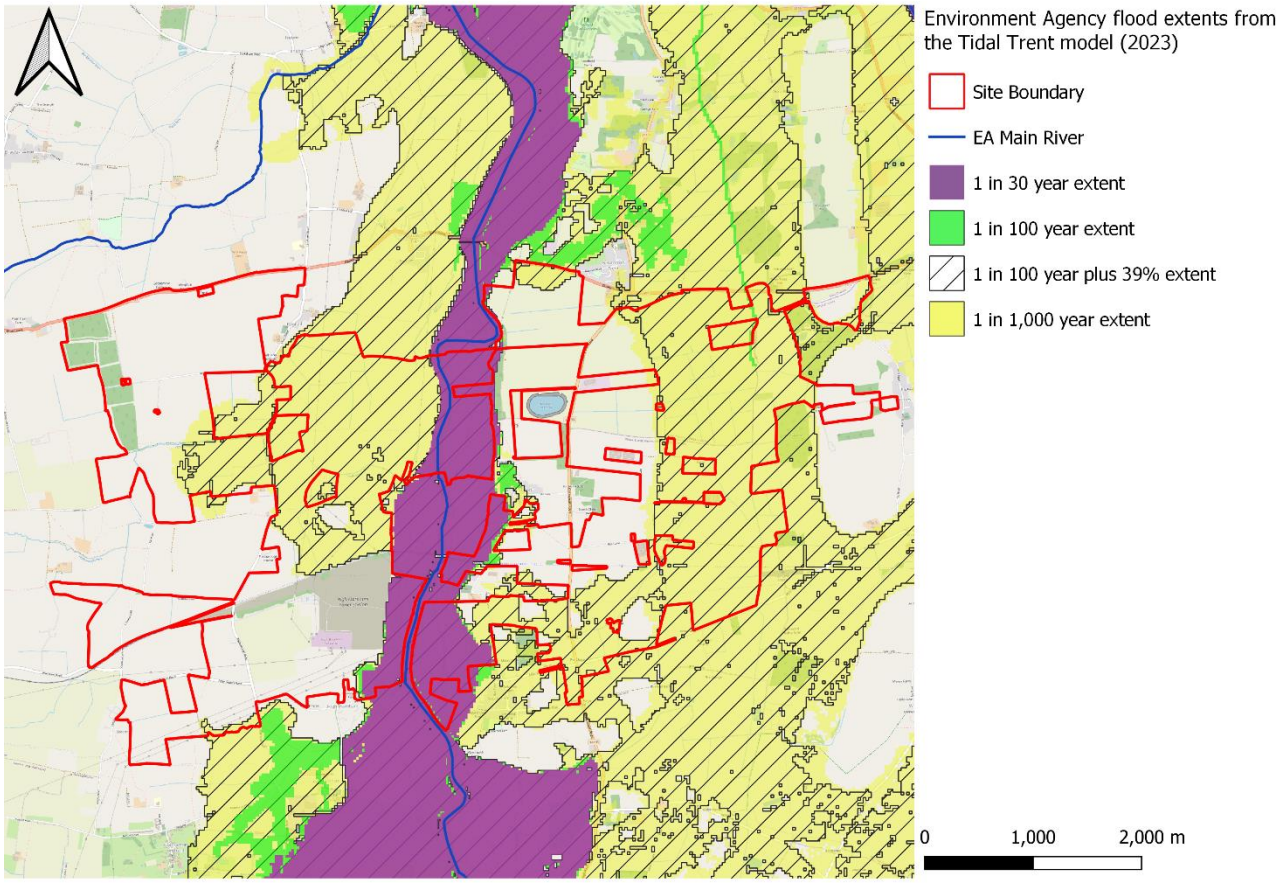
Figure 7-3 Environment Agency Flood Defence Standard of Protection



7.8. Through engagement with East Midlands EA on the 13th September 2023, results from the Tidal Trent Hydraulic Model defended scenario have been provided and these have been reviewed to assess flood risk at the Site for a number of different scenarios. Based on this review it has been established that the largest flood extents occur in the fluvially dominated scenario rather than the tidal. It is noted however that the fluvially dominated scenario does include consideration of a 1 in 2 year tidal influence.

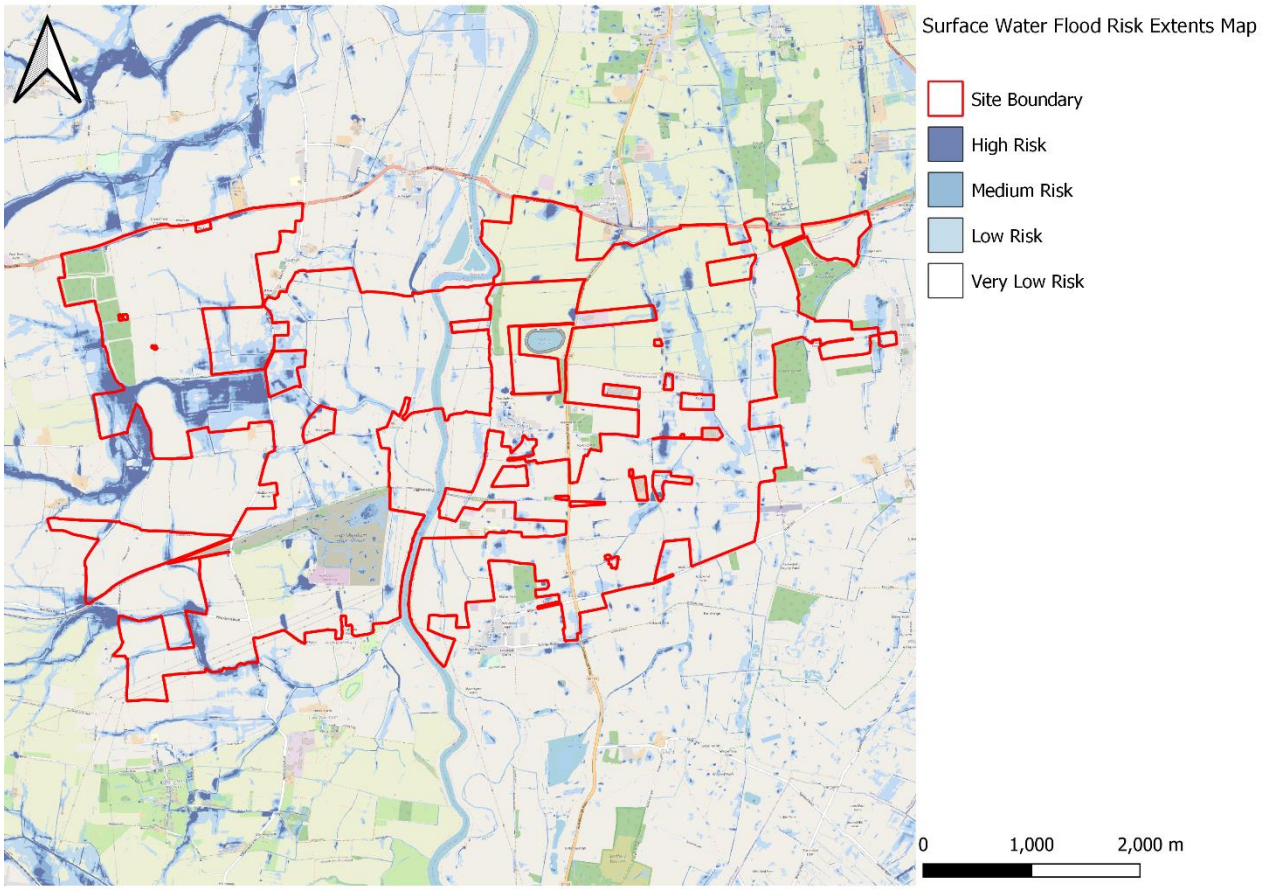
7.9. Annex 3 of the NPPF confirms that solar farms are classified as essential infrastructure and the fluvial climate change requirement is therefore the higher central allowance. The design flood event for the Site is therefore the 1 in 100 year plus 39% climate change fluvial event. The use of this design flood event for the design of the Proposed Development was discussed with the EA and agreed during the engagement meeting on the 13th September 2023. As shown in Figure 7-4, this event covers large areas to the east and central areas within the Site. The depth of flooding in the design event varies from greater than 4m in the vicinity of the River Trent to less than 0.5m in the east and west.

Figure 7-4 Defended Scenario Fluvial Flood Extents



7.10. The EA Flood Risk from Surface Water mapping indicates the majority of the Site is at very low risk of flooding from fluvial sources (see Figure 7-5). There are however localised areas within the Site which are shown to be at low, medium and high risk, which are largely associated with the Fledborough Beck in the west and unnamed Ordinary Watercourses in the southwest and east of the Site.

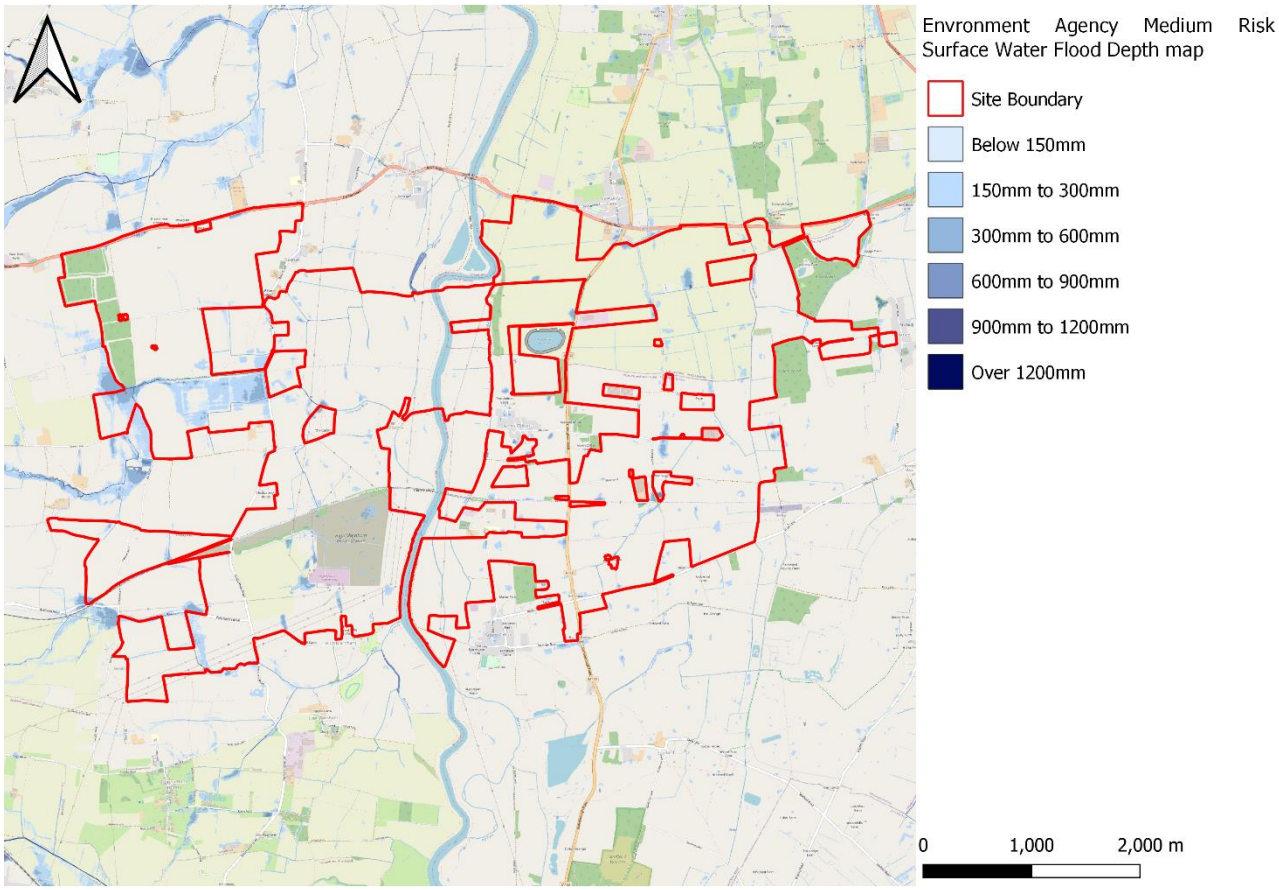
Figure 7-5 Environment Agency Flood Risk from Surface Water map



7.11. Review of the Medium Risk Surface Water Flood depth map shows that flood depths outside of these channels are generally below 300mm, however there are localised areas where flood depths of up to 900mm are experienced (see Figure 7-6).

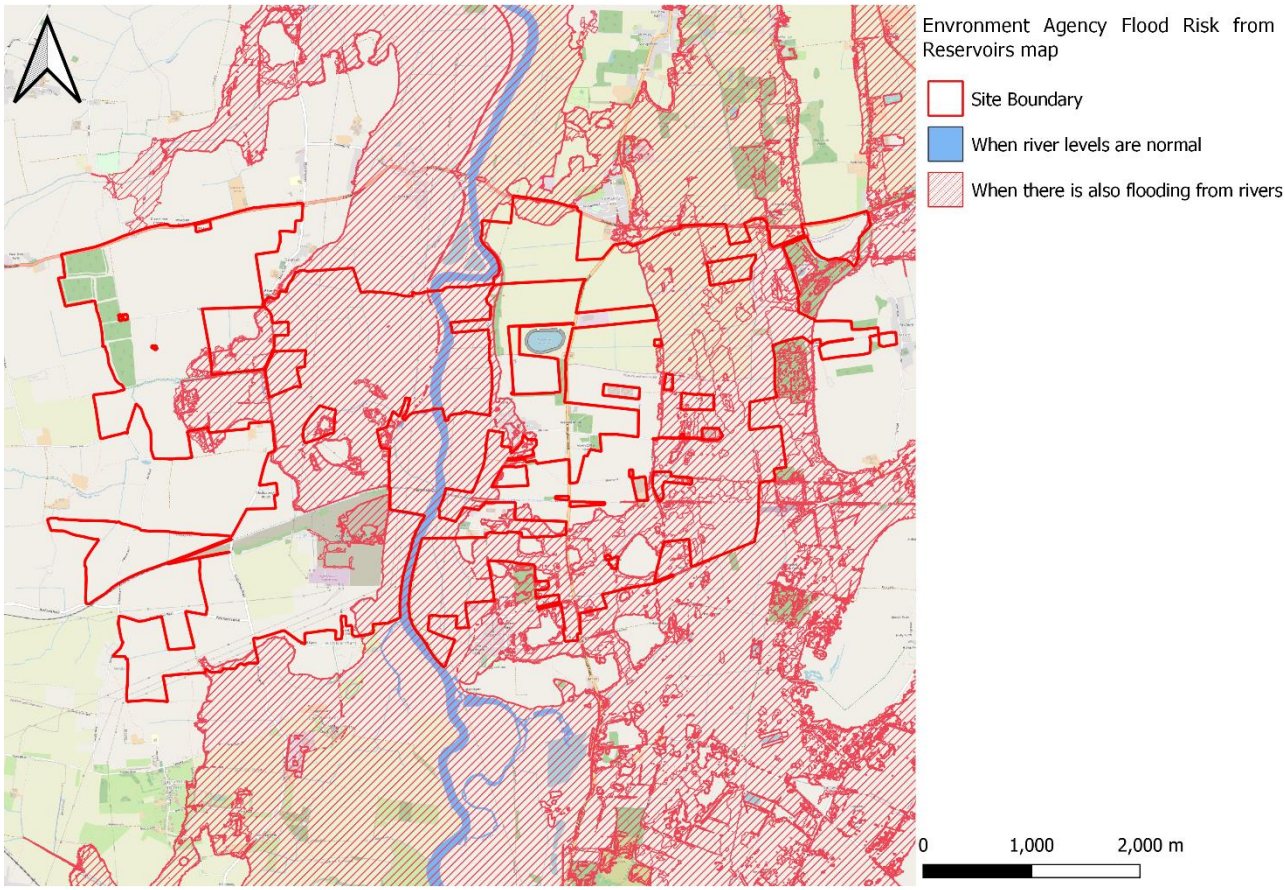
7.12. The risk of flooding from surface water is therefore in general considered to be low.

Figure 7-6 Environment Agency Medium Risk Surface Water Flood Depth Map



7.13. The EA Flood Risk from Reservoirs mapping indicates that no flooding would be experienced at the Site when river levels are normal. When there is also flooding from rivers, however, large areas within the central and eastern areas of the Site are affected (see Figure 7-7). It is worth noting that reservoirs are maintained to a high standard and are inspected regularly, and as such the chance of reservoir failure is considered to be extremely low.

Figure 7-7 Environment Agency Flood Risk from Reservoirs Map



7.14. Mapping from the Bassetlaw Level 1 SFRA shows that the areas of the Site west of the River Trent lie where there is a susceptibility to groundwater flooding ranging from greater than 75% to less than 25% (see Appendix 1 of the SFRA). The areas of highest susceptibility are closest to the Trent's western bank, which is anticipated to be due to the permeable Alluvium superficial deposits. No data or mapping for groundwater flooding was available to inform scoping for areas of the Site east of the Trent.

Existing Drainage Arrangement

7.15. The vast majority of the Site is entirely greenfield in nature and therefore there is not anticipated to be any formal surface water drainage networks in place to drain the Site. It is anticipated therefore that precipitation at the Site simply infiltrates to the ground with any additional runoff being directed to the existing network of ordinary watercourses and field drains which ultimately discharge to the River Trent.

Geology and Hydrogeology

7.16. According to the British Geological Survey (BGS) online geology mapping, the Site is generally underlain by bedrock geology of Mercia Mudstone Group (consisting of mudstone). The far east of the Site is underlain by bedrock geology of Penarth Group (consisting of mudstone), and Scunthorpe Mudstone Formation (consisting of mudstone and limestone interbedded).

7.17. Furthermore, the BGS mapping indicates that the Site is underlain by a combination of superficial deposits, consisting of the following:

- Holme Pierrepont Sand and Gravel Member (consisting of sand and gravel);
- Alluvium (consisting of clay, silt, sand and gravel);
- Blown Sand (consisting of sand) and
- Till (consisting of Diamicton).

7.18. There are also large areas across the Site where no superficial deposits are present.

7.19. The EA aquifer designation mapping indicates the following:

- Bedrock geology of Mercia Mudstone Group as a Secondary B aquifer;
- Bedrock geology of Penarth Group as a Secondary Undifferentiated aquifer;
- Superficial geology as a Secondary A aquifer.

7.20. The EA Groundwater Vulnerability Mapping shows that the entire Site has medium-high to high vulnerability to pollutant discharge at ground level. BGS Source Protection Zone (SPZ) mapping shows the majority of the Site is situated outside of any SPZ, however, there are limited areas in the far north which are situated within Zone I (Inner Protection Zone), Zone I (Subsurface Activity) and Zone II (Subsurface Activity).

Environmental Measures

7.21. In general, it is proposed that no land raising will be undertaken as part of the Proposed Development to ensure that there is no increase in flood risk to the Site or surrounding areas. Should any local land raising be required across the Site, then level for level floodplain compensation will be provided to ensure there is no increase in flood risk.

7.22. At this stage, it is proposed that solar panels will not be provided in areas where flood depths exceed 1.5m. Solar panels provided within the flood extents however, will be raised on frames to be a minimum of 1.8m above the ground surface therefore ensuring that a 300mm freeboard is provided between the lowest point of the panel and the flood level. By raising the panels, it is ensured that they will remain operational during a flood event and will ensure that flood water can continue to flow through the development.

7.23. It is proposed that suitable offsets will be provided from the top of bank of all main rivers and ordinary watercourses within the Site to ensure that ecological corridors are maintained and access for maintenance works is provided.

7.24. The Site as existing is drained by a network of ordinary watercourses and field drains which ultimately discharge to the River Trent. Although drainage proposals for solar farms are typically fairly limited on the basis that the inclusion of developments of this type will have little to no effect when compared to the greenfield scenario, it is proposed that Sustainable Drainage Systems (SuDS) will be incorporated where it is possible and appropriate, thereby ensuring a natural drainage solution occurs.

7.25. In particular, SuDS will be provided to accommodate runoff from any proposed permanent hardstanding areas. These features will provide water quantity, quality, amenity and biodiversity benefits.

Scope of Assessment

Important Receptors Identified

7.26. Following baseline reviews, the following important receptors have been identified and would be considered within the assessment:

- Users of both the construction site (i.e. construction workers) and of the completed development in relation to flood risk from all sources.
- Off Site areas in relation to flood risk from all sources.
- Existing watercourses on and adjacent to the Site with respect to surface water discharge rates, volume, and quality of runoff.
- The surrounding Anglian Water and Severn Trent water mains with regard to potable water capacity/supply.

Likely Significant Effects Scoped Out from Detailed Assessment

7.27. Table 7-1 presents the elements which have been scoped out from the detailed assessment, as it is considered no likely significant effects will occur.

Table 7-1: Potential Likely Significant Effects Scoped out from the Hydrology and Hydrogeology Detailed Assessment

Elements Scoped Out	Justification
Foul Water	No assessment is proposed of the effect that increased foul flows will have on the capacity of the surrounding Anglian Water and Severn Trent network and wastewater treatment works. Construction impacts will be temporary and using existing foul water infrastructure or more often, would be served by welfare facilities that are unconnected to the mains, thus meaning that there would be only very limited foul flow increases. The potential for increases during operation are also limited with maintenance of the Proposed Development being undertaken by a limited number of people and comprising only repairs and cleaning of the panels and other infrastructure. As a result, it is proposed to scope out the effect of changes to the foul water network from detailed assessment.

	Construction activities have the potential to result in increased localised flood risk due to earthworks. Changes in flood risk from the construction of the Proposed Development will be managed by the good practice principles which will be outlined in a Construction Environmental Management Plan (CEMP), which will include a Construction Surface Water Management Plan and awareness training / talks for construction workers so that they are aware of the risks and how to mitigate them through working practices. It is also anticipated that a temporary drainage system will be implemented during construction. With the measures set out in the CEMP it is considered no likely significant effects will occur and therefore it is proposed to exclude it from the scope of the EIA.
Construction and Decommissioning	Construction activities (e.g. soil stripping activities / trench excavations for cables on-site) have the potential to result in silt aden runoff, resulting in the sedimentation and pollution of local watercourses. Silt / soil laden runoff produced during construction activities will be controlled through the implementation of the CEMP and the provision of a Construction Drainage Management Plan. The CEMP will be informed by the Environment Agency's Pollution Prevention Guidelines and will include the prevention measures stated above. Therefore, watercourse pollution as a result of silt laden runoff from construction activities is not considered to be a potentially significant environmental effect and therefore it is proposed to exclude it from the scope of the EIA. Construction activities have the potential to result in chemical spillages, resulting in the pollution of local watercourses. Spillages which could occur during construction activities will be controlled through the implementation of the CEMP. The CEMP will be informed by the Environment Agency's Pollution Prevention Guidelines and will include the prevention measures stated above. Therefore, water pollution as a result of chemical spillages used during construction activities is not considered to be a potentially significant environmental effect and therefore it is proposed to exclude it from the scope of the EIA.

Construction activities have the potential to result in cement and concrete dusts being mobilised in surface water runoff, resulting in the pollution of local watercourses. Particle laden runoff which could occur during construction activities will be controlled through the implementation of the CEMP. The CEMP will be informed by the Environment Agency's Pollution Prevention Guidelines and will include the prevention measures stated above. Therefore watercourse pollution as a result of cements and concretes being mobilised in surface water runoff as a result of construction activities is not considered to be a potentially significant environmental effect and therefore it is proposed to exclude it from the scope of the EIA.

The potential effects during decommissioning will be similar to those expected during the construction phase, as listed above. With appropriate management plans and measures in place, which will be considered and set out in the Decommissioning Environmental Management Plan, it is anticipated that there will not be any significant effects to flood risk or water quality as a result of the decommissioning works. As such, the impact of the decommissioning works on flood risk and water quality is proposed to be excluded from the scope of the EIA.

Likely Significant Effects Scoped into the Detailed Assessment

7.28. It is anticipated that the following effects would be considered as part of the assessment:

- Flood risk effects on users of the Site during operational phases.
- Flood risk effects to areas off Site.
- Effects of changes in quality and quantity of surface water runoff from the Site to the surrounding watercourses as a result of the proposals. It is anticipated that because the proposed drainage regime at the Site will mimic the existing greenfield scenario as far as is reasonably practical, including SuDS where appropriate to ensure that the quantity and quality of runoff will match the greenfield situation, that there will be no significant effects as a result but nevertheless the proposal is to undertake an assessment that should confirm this[46].
- The effect that the Proposed Development will have on the hydrogeology and groundwater flows.

[46] Please note that assuming that the assessment shows that there will be no significant effects, a Water Framework Directive (WFD) assessment will not be undertaken in support of the application. This is as the works would not cause or contribute to deterioration of the status of the existing watercourses or jeopardise the watercourses achieving good status.

- The effect that increased potable water demand would have on the surrounding Anglian Water and Severn Trent water network.

Methodology proposed to Undertake Detailed Assessment

Further Baseline Data

7.29. In order to inform the assessment, a detailed review of the baseline conditions will be undertaken to ensure that all aspects of the important receptors are understood, and the effects can be assessed accurately. As well as baseline research, consultation beyond that already undertaken will be progressed with the following to ensure that a detailed knowledge of the existing and future site is understood.

- Further consultation with the EA to obtain all relevant flood risk information associated with the Site and surrounding areas.
- Consultation with Nottinghamshire County Council (NCC) and Lincolnshire County Council (LCC) to obtain relevant flood risk information and to discuss the approach to surface water drainage.

Operation

7.30. As part of the DCO application, an NPPF compliant Flood Risk Assessment (FRA) and an accompanying Drainage Strategy would be prepared which would take account of the above baseline research and consultation responses into account.

7.31. The principles of the assessment would be agreed in collaboration with the design team, and discussed throughout design development, to ensure that related flood risk and drainage aspects are inherently incorporated within the masterplan. The scope of the FRA and Drainage Strategy assessments would include:

- Consideration of the likely significant effects of flooding to the Site and identification of any necessary mitigation measures.
- Residual risks after implementation of any necessary mitigation measures, allowing for the future impacts of climate change.
- Qualitative consideration of any effects on the flow of groundwater beneath the Site.
- SuDS considered appropriate for inclusion within the Proposed Development.

7.32. An assessment of potable water supply to serve the Proposed Development would also be provided.

7.33. The above research, consultation, and reviews of the FRA (including Drainage Strategy) will be used to determine and conclude the impacts that the potential effects would have on the receptors identified.

7.34. The potential for groundwater contamination and any mitigation required will be covered within the Land and Soils Chapter.

Assumptions, Limitations and Uncertainties

7.35. Appropriate undefended and defence breach data for the relevant climate change allowance and return periods are yet to be obtained from the EA. Further data and clarification from the EA will be requested on these elements.

7.36. The design peak flow allowance for the Site has been considered as plus 39% during the 1 in 100 year event. This takes into account the proposed lifespan of the Proposed Development, and its location predominantly within the Lower Trent and Erewash Management Catchment. The corresponding allowance for the neighbouring Witham Management Catchment is plus 32%. The plus 39% allowance is therefore conservative and was set out to the EA during consultation on the 13th September 2023 who agreed with the approach.

7.37. The majority of the Site is situated within the Trent Valley Internal Drainage Board (IDB). IDBs require water levels to be managed at a certain level, and any works are required to be offset from watercourses from a distance which may be greater than EA or LPA requirements. Consultation will be undertaken with the IDB to confirm their requirements.

7.38. Consideration of Site topography has been based on EA 1m LiDAR (2022).

7.39. From consultation with the EA on 13th September, it was discussed that any cable routing under or over the River Trent Main Channel may require environmental permits as necessary from the EA.

8. Land and Soils

Introduction

8.1. This Chapter of the Scoping Report presents the scope of detailed environmental assessment for Land and Soils. Specifically, the Chapter presents the policy and legislative context, the approach to collecting baseline data and then an overview of the relevant baseline conditions within the Site and surrounding area, based on current knowledge and understanding. It concludes by setting out the scope of assessment including, with justification, the matters that are proposed to be scoped out and in for detailed assessment and concludes by outlining the method that will be used to undertake the detailed assessment.

Review of Policy, Legislation and Relevant Guidance

8.2. Legislation, planning policy and guidance relating to land and soils, and pertinent to the Proposed Development comprises:

Legislation

- Environmental Protection Act, 1990
- Control of Pollution Act, 1974
- Environmental Permitting Regulations 2016 (as amended)

National Planning Policy

- Overarching National Policy Statement for Energy (EN-1) (2011) – specific reference to Part 5, Section 5.10, which relates to land use including open space, green infrastructure and Green Belt.
- Draft Overarching National Policy Statement for Energy (EN-1) (2023) – specific reference to Part 5, Section 5.11, which relates to land use.
- Draft National Policy Statement for Renewable Energy Infrastructure (EN-3) (2023) - specifically paragraphs 3.10.13 to 3.10.19, 3.10.188, 3.10.136
- The National Planning Policy Framework, 2023 – paragraphs 153-158, pages 45-46.
- A Green Future: Our 25 Year Plan to Improve the Environment
- Town and Country Planning (Development Management Procedure) (England) Order 2015

Local Planning Policy

- Newark and Sherwood District Council, Local Development Framework, Allocations and Development Management, Development Plan Document (2013) – Policy DM8
- Central Lincolnshire Local Plan (2023) – section 11.8, BMV Land, page 149-150
- Bassetlaw District Council (2010) Local Development Framework, Publication Core Strategy and Development Management Policies – Policy DM10: Renewable and Low Carbon Energy

- Draft Bassetlaw Local Plan (2023) 2020-2038: Main Modifications Version, August 2023 - Strategic objectives, paragraph 4.17; Policy ST1: Bassetlaw's Spatial Strategy; Policy ST51: Renewable Energy Generation

National Guidance

- Planning Practice Guidance (2023) – Renewable and Low Carbon Energy Guidance
- Natural England (1988) 'Agricultural land Classification of England and Wales: Revised criteria for grading the quality of agricultural land (ALC011)
- Natural England (2017) Likelihood of Best and Most versatile Agricultural Land

Baseline Conditions

Approach to Collection of Baseline Data

8.3. For the purposes of the scoping report, baseline Agricultural Land Classification (ALC) has been established by reference to the Provisional ALC Map of England and ALC Grades – Post 1988 Survey. These data are available online[47].

Relevant Baseline Conditions

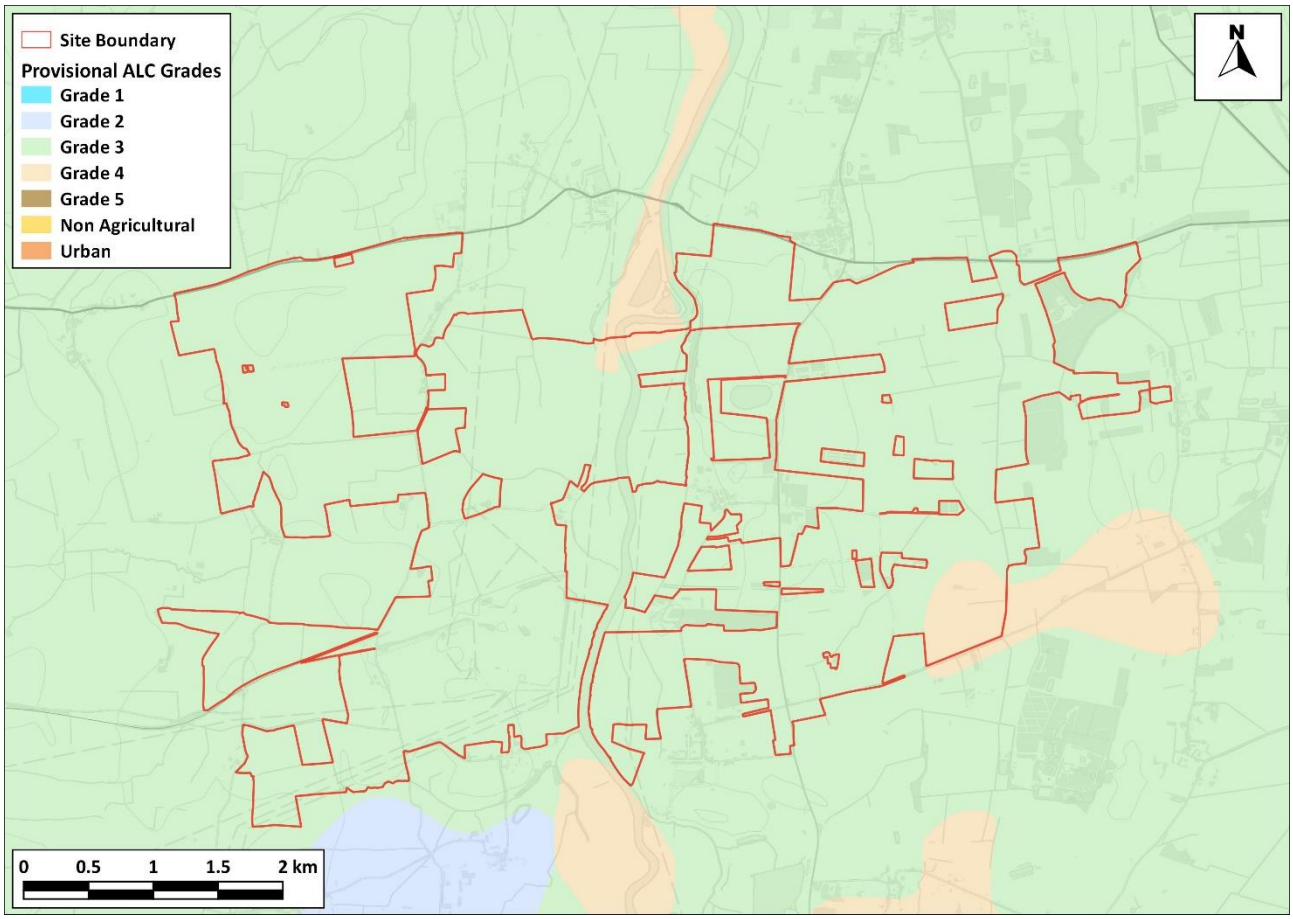
8.4. The ALC system provides a framework for classifying land according to the extent to which its physical or chemical characteristics impose long-term limitations on agricultural use. This system classifies land into five basic grades, Grade 1 land being the highest quality and Grade 5 the lowest quality. Land in Grade 3 is sub-divided into Subgrades 3a and 3b, to identify good quality agricultural land from moderate quality land. The 'best and most versatile' (BMV) agricultural land falls into Grades 1, 2 and Subgrade 3a.

8.5. The Provisional ALC Map of England grades land using the ALC methodology pre-1988, with good to moderate quality land reported as Grade 3. The Grade 3 band was split into two sub-grades in the 1988 updated revised guidelines, with good quality land recorded as sub-grade 3a and moderate quality land as sub-grade 3b. As shown in Figure 8-1 (which is the same as Figure 2-2 but has been repeated for ease), according to the Provisional ALC Map of England, the land within the Site is almost entirely graded as Grade 3.

8.6. As the term 'BMV' refers to land defined as Grade 1, 2, or 3a, it is not possible to assess whether land mapped by the Provisional ALC Map of England as Grade 3 is BMV or not, as the ALC Map does not provide a subset for Grade 3 (i.e. areas distinguished as either 3a or 3b).

[47] Available at : ttps://environment.data.gov.uk/DefraDataDownload/?mapService=NE/AgriculturalLandClassificationProvisionalEngland&Mode=spatial

Figure 8-1: Agricultural Land Classifications across the Site



8.7. Natural England's 'Likelihood of BMV Agricultural Land – Strategic Scale Map' systematically assessed on a regional basis in accordance with the current classification criteria (MAFF, 1988) using a combination of ALC data derived from site surveys (post 1988), provisional ALC map data, climatic data and published Soil Survey and Land Research Centre (now National Soil Resources Institute) information, to give an assessment for each of the likely proportion of 'best and most versatile' agricultural land to be encountered, according to the following categories:

- High likelihood of BMV (>60% BMV)
- Moderate likelihood (20-60% BMV) and
- Low likelihood (<=20% BMV).

8.8. This considers that BMV is highly likely to occur in a band down the centre of the eastern half of the Site, moderately likely to occur to the west and south of Ragnall and that there is a low likelihood of BMV occurring to the immediate east and west of the River Trent and down the eastern side of the Site.

8.9. A review of the Natural England ALC database found no records of existing ALC surveys within the Site. An ALC survey has been completed to the south of South Clifton, approximately 1km south of the Site boundary, which followed the post 1988 guidelines. Whilst this survey is outside of the Site, the results provide further context in terms of ALC results for the local area. Consequently, soils at this location are mapped as being similar to those found within the Site and the area mapped as Grade 3 by the Provisional ALC Map of England. This survey graded almost all of the land as either subgrade 3a or 3b. Six further post 1988 ALC surveys are reported by Natural England within approximately 10km of the south of the Site, each mapped by the Provisional ALC Map of England as being of Grade 3 quality. In each instance, the survey reported land of almost entirely subgrade 3a and 3b quality.

Environmental Measures

8.10. The Proposed Development will include a Soil Resource Management Plan (SRMP) and outline Decommissioning Environmental Management Plan (ODEMP). These documents will set out the measures to be included within the Proposed Development so that damage to land, soils and groundwater can be minimised during the construction and decommissioning phases, resulting in land retaining its original quality and BMV status. Such measures will include:

- All works will be in compliance with the Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (2009) regulations and works will be assessed by suitably qualified individuals during these phases in order to minimise impacts of the construction works on the soil.
- Soil management during works will incorporate guidelines for soil handling, to include replacement of soil in temporary laydown areas.
- During construction works, surface water drains should be designed to carry only uncontaminated water. Foul drains should carry contaminated water to a sewage treatment works under suitable discharge consent.
- Concrete mixing would be undertaken in designated areas to minimise the potential for impact on watercourses.

8.11. Adherence to the requirements of the SRMP and ODEMP will be monitored by appropriately qualified personnel, including a soil scientist.

Scope of Assessment

Important Receptors Identified

8.12. The Site consists of primarily agricultural land and therefore agricultural land is considered to be the main receptor.

Likely Significant Effects Scoped Out from Detailed Assessment

8.13. Table 8-1 presents the elements which have been scoped out from the detailed assessment, as it is considered no likely significant effects will occur.

Table 8-1: Likely Significant Effects Scoped Out from the Land and Soil Detailed Assessment

Elements Scoped Out	Justification
Physical damage to the soil (operational phase).	There is likely to be limited trafficking and disturbance of soil during the operational phase of the Proposed Development and risk of soil damage is unlikely to occur. Therefore, this aspect will not be considered further within the EIA or reported in the ES.
Land and groundwater contamination (construction, operation and decommissioning stages).	The Site history indicates that land use has been predominantly agricultural. There are no recorded current or historical landfill sites within the Site, the closest being at the High Marnham Power Station where waste was accepted between 1978 to 1994. There are no records of mineral extraction with the Site. Ground works associated with the construction of the Proposed Development will be managed by the good practice principles which will be outlined in a Construction Environmental Management Plan (CEMP). With the measures set out in the CEMP it is considered no likely significant effects will occur as a result of existing contamination and therefore it is proposed to exclude it from the scope of the EIA. Any issues relating to contamination resulting from project activities will be controlled by measures as set out in the SRMP and the ODEMP e.g., issues relating to storage and use of fuels and sediment runoff. The use of the measures set out in these documents will ensure that there will no likely significant effects. Therefore, this aspect will not be considered further within the EIA or reported in the ES.

Likely Significant Effects Scoped into the Detailed Assessment

8.14. It is anticipated that the following effects would be considered as part of the assessment:

- Reduction in soil quality (construction and decommissioning stages):

  There is potential for construction activities to adversely impact upon soil quality, particularly small areas of land under solar farm infrastructure (small buildings, concreted areas etc.). All works will require careful management to ensure the protection and conservation of soil resources. Appropriate handling of soils during construction and decommissioning will be prescribed in the SRMP and ODEMP to ensure that physical damage to soils is minimised.

- Loss of Best and Most Versatile agricultural land:

There is potential for works to adversely impact upon BMV land, downgrading it to non-BMV status, as a result of a reduction in quality of the land for agriculture. However, we would propose a soils management plan to ensure that this does not happen which will be included as a mitigation measure. It should be noted that no land will be permanently lost from agriculture as the scheme is temporary, albeit is assumed that decommissioning will be at least 45 years in the future.

Methodology proposed to Undertake Detailed Assessment

Further Baseline Data

8.15. A desk study of soils and climatic information will be undertaken using reference material held by ADAS and available online, followed by detailed fieldwork to study soil and site limitations. The fieldwork is being undertaken from October 2023, using a hand held 50mm diameter "Dutch" auger and/or spade to a maximum depth of 1.2m. In addition, soil pits will be excavated, to determine subsoil characteristics which could not be identified from the auger sample. The survey is anticipated to be completed in Q1 2024. Preliminary information will be reported in the PEIR to give consultees an opportunity to understand what likely significant effects may occur. The full results will be reported in the ES and will be presented in mapped and tabular form, identifying the distribution of lands of the various grades across the whole site and providing summary statistics on the relative occurrence of each grade.

Assessment of Impacts

8.16. The results of the survey work will be presented in the ES chapter and the impact in terms of land loss will be assessed in accordance with the magnitude and significance criteria presented below. Recommendations for mitigation will be presented as required and residual effects assessed accordingly.

Significance of Effects

8.17. The significance of impact on agricultural land will depend on the amount to be lost due to the Proposed Development. There is little current guidance on what area of loss is considered significant, however, 20ha is the threshold adopted in The Town and Country Planning (Development Management Procedure) (England) Order 2010 (as amended) for Local Planning Authorities to consult Natural England before granting planning permission for a non-agricultural development that is not consistent with an adopted local plan, which would involve the loss of Grades 1, 2 or 3a agricultural land. This threshold is taken into consideration in the assessment of the magnitude of impacts as shown in Table 1 below. The significance of effect is then determined by considering the magnitude of effect against the sensitivity of the receptor as shown in Tables 8-2 and 8-3 below. Effects above moderate level of significance are considered to be significant.

8.18. Where there is a permanent loss of over 20 ha or more of BMV agricultural land (i.e. through areas of enhancement), the effects will be considered as a potential significant adverse effect.

Table 8-2. Sensitivity of Receptor

Sensitivity	Characteristics*
High	Grades 1, 2 (best and most versatile agricultural land)
Medium	Sub-Grade 3a (best and most versatile agricultural land)
Low	Sub-Grade 3b, Grades 4, 5

*as informed by the ALC survey

Table 8-3. Magnitude of Impact

Magnitude	Area of Effect*
High	≥ 50 ha
Medium	20 – < 50 ha
Low	5 – < 20 ha

*as informed by the amount of land as classified in Table 8-1 within the Proposed Development

Table 8-4. Matrix for Determining Significance

Magnitude of Impact[a]	Sensitivity of Receptor[b]		
	High	Medium	Low
High	Very Large	Large	Moderate
Medium	Large	Moderate	Slight
Low	Moderate	Slight	Neutral
Negligible	Slight	Neutral	Neutral

[a] as detailed in Table 8-2

[b] as detailed in Table 8- 3

Construction and Decommissioning

8.19. An assessment of the construction and decommission phases of the Proposed Development on agricultural land will be undertaken taking account of the measures set out in the SRMP and ODEMP.

Operation

8.20. No additional mitigation measures will be expected to be required during the operation phase beyond the embedded mitigation incorporated into the design of the SRMP.

Assumptions, Limitations and Uncertainties

8.21. Only provisional ALC grades and BMV status data are available at this stage of the EIA process. Confirmation of agricultural land quality and BMV status will be confirmed by a detailed Agricultural Land Classification survey to be undertaken prior to the production of the PEIR/ES and inform the SRMP.

9. Buried Heritage

Introduction

9.1. This Chapter of the Scoping Report presents the scope of detailed environmental assessment for Buried Heritage. Specially, the Chapter presents the policy and legislative context, the approach to collecting baseline data and then an overview of the relevant baseline conditions within the Site and surrounding area, based on current knowledge and understanding. It concludes by setting out the scope of assessment including, with justification, those buried heritage matters that are proposed to be scoped out and in for detailed assessment and concludes by outlining the method that will be used to undertake the detailed assessment.

Review of Policy, Legislation and Relevant Guidance

9.2. Legislation, planning policy and guidance relating to buried heritage and pertinent to the Proposed Development comprises:

Legislation

- Ancient Monuments and Archaeological Areas Act 1979 – Part I Ancient Monuments: Protection of Scheduled Monuments

National Planning Policy

- Overarching National Policy Statement for Energy (EN-1) (2011) – specific reference to Part 5, Section 5.8 which relates to the historic environment;
- Draft Overarching National Policy Statement for Energy (EN-1) (2023) – specific reference to Section 5.9;
- Draft National Policy Statement for Renewable Energy Infrastructure (EN-3) – specific reference to paragraph 3.3.8 and 3.10.98 - 3.10.110;
- Draft National Policy Statement for Electricity Networks Infrastructure (EN- 5) (2023) – specific reference to paragraph 2.2.6; and
- National Planning Policy Framework (2023) – specific reference to Section 16: Conserving and Enhancing the Historic Environment.

Local Planning Policy

- Newark and Sherwood District Council, Local Development Framework, Allocations and Development Management, Development Plan Document (2013) – specifically Policy DM4 and DM9
- Newark and Sherwood District Council (2019), Amended Core Strategy Development Plan – specifically Core Policy 14: Historic Environment.
- Central Lincolnshire Local Plan (2023) – specifically Policy S57: The Historic Environment.
- Bassetlaw District Council (2010) Local Development Framework, Publication Core Strategy and Development Management Policies – specific reference to Policy DM8: The Historic Environment.

- Draft Bassetlaw Local Plan (2023) 2020-2038: Main Modifications Version, August 2023. Policy 43: Designated and Non-Designated Heritage Assets.

National Guidance

- Planning Practice Guidance (2023) – Historic Environment (2019)
- English Heritage (2008) Conservation Principles, Policies and Guidance
- Historic England (2015) Managing Significance in Decision-Taking in the Historic Environment – Historic Environment Good Practice Advice in Planning: 1. The Historic Environment in Local Plans
- Historic England (2015) Managing Significance in Decision-Taking in the Historic Environment – Historic Environment Good Practice Advice in Planning: 2. Historic England and Historic Environment Forum
- Historic England (2017) The Setting of Heritage Assets – Historic Environment Good Practice Advice in Planning: 3. Historic England and Historic Environment Forum
- Historic England (2020) Good Practice in Planning 4: Enabling Development and Heritage Assets
- Historic England (2022) Planning and Archaeology: Historic England Advice Note 17

Baseline Conditions

Approach to Collection of Baseline Data

9.3. For the purposes of this Scoping Report the archaeological baseline conditions have been established using the following information:

- Lincolnshire and Nottinghamshire Historic Environment Record (HER) Heritage Gateway (heritagegateway.org.uk);
- British Geological Society data (geologyviewer.bgs.ac.uk);
- Excavation summaries using the Archaeological Data Service (archaeologydataservice.ac.uk);
- Geographical and basic topographical layout using Google Maps (www.google.co.uk/maps) and Light Detection And Ranging (LIDAR) imagery[48] (www.lidarfinder.com).

Relevant Baseline Conditions

9.4. As discussed in Chapter 2, the Site spans multiple fields, of mostly arable farmland, on either side of the River Trent which runs approximately north–south through the Site. The land rises to the east and west of the low-lying Trent floodplain which is more extensive on the River's eastern bank. A sharper escarpment marks the eastern limit of the floodplain, which runs just to the west of North Clifton village.

[48] High resolution 3-D representation mapping of the Earth

9.5. The underlying bedrock geology of the Site is Mercia Mudstone throughout, however superficial (upper) geology varies. The floodplain either side of the Trent consists of alluvial clay, silt, sand and gravel deposits laid down up to 11.8 thousand years ago. Elsewhere, the superficial geology consists of Holme Pierrepont Sand and Gravel Member, laid down 2.5 million to 11.8 thousand years ago, Blown Sand deposits formed between 2.588 million years ago and the present, and further alluvial deposits alongside the Trent's tributaries, such as those along the Fledborough Beck in the western part of the Site.

9.6. The buried alluvial deposits along the River Trent have the archaeological potential to include the survival of palaeoenvironmental remains dating to the prehistoric Holocene (post ice age). This can include (and not limited to) waterlogged seeds, pollen, macro fossils along with sedimentological examination. They may also contain indicators of human activity and early landscape management. Human activity may also be present from the terrace gravels that flank the river in the form of flint tool or tool working remains. The HER contains reference to an assessment being undertaken in the early 1990s for the future management and preservation of archaeological and palaeoenvironmental remains along the Trent floodplain and gravel terraces.

9.7. The Site includes areas of known prehistoric settlement and activity. Excavations at Newton Cliff, just to the north of North Clifton within the Site, identified significant remains spanning the late Mesolithic to late Neolithic/early Bronze Age. Remains of a late Mesolithic structure, waste pits and flint tool production debris were uncovered along with evidence of a Neolithic structure and Bronze Age features including flintworking and cropmarks. These results could represent intermittent occupation, perhaps seasonal, during prehistory. Its position, on the drier escarpment overlooking the resource rich River Trent, would have made it an attractive location during the period.

9.8. Neolithic and Bronze Age flintworking, along with cropmarks of potentially contemporary enclosures, have also been identified in the south eastern part of the Site. Aerial photography and geophysical survey in the north eastern area of the Site has identified possible Iron Age enclosures visible as crop marks. Excavations on the southern part of the Site, close to South Clifton, as part of the Empingham to Hannington pipeline construction, uncovered settlements dating to the Iron Age and Roman periods as well as evidence of Saxon burials and cremations.

9.9. The most notable known Roman remains on the Site are those of the Vexillation Fortress and marching camps. This area is a protected Scheduled Monument (along with a Royal Monitoring Corps observation post, List Entry Number 1003608) and is located to the south west of Newton on Trent, on the eastern bank of the River Trent where the river bends sharply. The fortress dates from the 1st century AD, during the military conquest of Britannia by the Roman Army and forms a rare subset of Roman defensive sites. Excavations to the north of the fortress uncovered a number of 2nd century Romano-British kilns. The observation post, which forms part of the monument, was principally a Cold War era monitoring station for spotting enemy aircraft and reporting nuclear explosions and the resultant spread of radioactive fallout in the event of nuclear attack. It was in use between 1961 and 1991. A Roman Road was excavated just to the north of the Site (south of Dunham-on-Trent) and possible Roman settlement remains have been identified on aerial photographs to the south of the A57, within the central western part of the Site itself.

9.10. The north western part of the Site contains Whimpton Moor medieval village and moated site, which is also protected as a Scheduled Monument (List Entry Number 1017567). The monument includes the earthwork and buried remains of Whimpton Moor medieval village and the moated site. The earthworks represent former house platforms, boundaries, ponds, a moated dwelling and remains of ridge and furrow cultivation. Similar remains, of a shrunken medieval village, are known at Skegby Manor close to the south western edge of the Site. In and around the Site are active settlements with known Saxon or medieval origins such as Fledborough, South Clifton and High Marnham. Remnants of ridge and furrow cultivation have been noted as visible crop marks variously across the Site. Most of the Site likely continued as farmland into the post medieval period to the present day.

9.11. To summarise, the Site contains two Scheduled Monuments, dating from the Roman, medieval and modern periods. There are also multiple, non-designated archaeological assets, which date to the Mesolithic, Neolithic, Bronze Age, Iron Age, Roman, Saxon, Medieval and Post Medieval periods. Given the presence of these assets, the size of the Site and its undeveloped nature, there is a high potential that further, previously unknown remains survive.

Environmental Measures

9.12. The Proposed Development provides the opportunity to learn more about the archaeology of the Site and surrounding area. This will consist of work required prior to construction, including desk based and proportionate site investigations/excavations which will enhance the archaeological record of the area.

9.13. As shown in Appendix A, the Proposed Development will not include solar and associated infrastructure on the scheduled monuments. Design offsets will be included within the Proposed Development such that there will be no likely significant effects on the scheduled monuments. The details of the setbacks will be set out in the PEIR and will be consulted upon.

9.14. Such work also provides the opportunity for public engagement and outreach. The forms of engagement and outreach are numerous but may include site tours, media pieces such as news articles, local talks and online presentations, schools and college visits, site information boards, interpretive reconstruction/visualisation or app based digital and spatial information. The form of engagement/outreach will depend on the nature of the archaeological remains present but the principal aim will be, where possible, to engage as wide and diverse a population as possible on any archaeological findings.

Scope of Assessment

Important Receptors Identified

9.15. Potential receptors identified consist of below ground archaeological remains spanning from the Mesolithic period to the post medieval period. Receptors will potentially be affected by intrusive, below ground works of the Proposed Development. This will primarily occur during the construction phase. Receptors will not be affected during the operational phase.

9.16. The study area for the technical assessment will include the proposed Order Limits Area of the Site itself and an area extending out from the Site edge to be defined in consultation with the county HER officers.

Likely Significant Effects Scoped Out from Detailed Assessment

9.17. Table 9-1 presents the elements which have been scoped out from the detailed assessment, as it is considered no likely significant effects will occur.

Table 9-1: Likely Significant Effects Scoped out from the Buried Heritage Detailed Assessment

Elements Scoped Out	Justification
Operational Phase	It is anticipated the during operation (including maintenance) there will be no below ground works. Therefore, there will be no affect to archaeological receptors and as such there will be no likely significant effects to buried heritage.

Likely Significant Effects Scoped into the Detailed Assessment

9.18. All effects that may significantly impact upon potential archaeological remains within the Site will be scoped into the assessment. This will primarily consist of works that penetrate the ground surface as they have the potential to damage and/or remove archaeological deposits, features and finds. These will likely all occur during the construction phase and include activities such as (but not limited to) piling, excavation of service trenches, foundations or any other element, probing, coring, ground levelling, road construction, compound construction, below ground demolition. Conversely, draft NPS EN-3 recognises that "*solar PV developments may have a positive effect, for example archaeological assets may be protected by a solar PV farm as the site is removed from regular ploughing and shoes or low-level piling is stipulated*", Other effects to be considered that may significantly impact upon archaeological receptors include ground loading and vibration.

Methodology proposed to Undertake Detailed Assessment

Further Baseline Data

9.19. The technical assessment will consist of an Archaeological Desk Based Assessment (DBA) covering the whole Site utilising a pre-determined study area radius extending out from it. This will be compiled using a full HER data search and by analysing historic mapping, aerial photography, LIDAR, previous assessments and fieldwork reports along with consultation with the relevant Local Authority Archaeological Advisors. The DBA will help identify areas of the site with a higher archaeological potential, and those with a lower potential.

9.20. The archaeological ES chapter will be based on the DBA which will be included as a technical appendix within the ES.

Construction

9.21. It is anticipated that in advance of construction, assessment of the Site, further to that of the DBA, will be required in accordance with policy in NPS EN-1 and draft NPS EN-3 and where relevant the NPPF, Section 16 and the relevant local planning policies as referenced above. This further assessment will likely consist of physical investigations in areas of the Site that have been identified as having higher archaeological potential by the DBA and in consultation with the Local Authority Archaeological Advisors. Physical assessment may consist of the excavation of targetted trial trenches and/or geophysical survey.

9.22. If these field investigations identify significant archaeological remains, archaeological mitigation may be required prior to construction. This typically consists of archaeological excavation, recording and publication and would be secured as appropriate via a control mechanism or requirement in or secured through the draft DCO. In areas where highly significant remains are identified, preservation in situ may be required. No development is proposed within the Scheduled Monuments as per the Ancient Monuments and Archaeological Areas Act 1979.

Operation

9.23. As detailed in Table 9-2, it is not considered there will not be likely significant effects on archaeological receptors during the operational phase and an assessment has been scoped out.

Decommissioning

9.24. It is unlikely the decommissioning phase will result in any impact to archaeological receptors. It is however proposed that the Applicant will implement a Decommissioning and Environmental Management Plan (DEMP), which will be secured via a DCO requirement that will set out the measures in place to ensure, based on current understanding, there will be no likely significant effects to buried heritage. These details will be considered within the PEIR and ES.

10. Cultural Heritage

Introduction

10.1. This Chapter of the Scoping Report presents the scope of the environmental assessment for Cultural Heritage. Specifically, the Chapter presents the policy and legislative context, the approach to collecting baseline data and then an overview of the relevant baseline conditions within the Site and surrounding area, based on current knowledge and understanding. It concludes by setting out the scope of assessment including, with justification, those cultural heritage matters that are proposed to be scoped out and in for detailed assessment and concludes by outlining the method that will be used to undertake the detailed assessment.

Review of Policy, Legislation and Relevant Guidance

10.2. Legislation, planning policy and guidance relating to cultural heritage, and pertinent to the Proposed Development comprises:

Legislation

- Infrastructure Planning (Decisions) Regulations 2010 – specific reference to Regulation 3[49]; and
- Planning (Listed Building and Conservation Areas) Act 1990 (excluding normal planning procedures, which are disapplied by the DCO, which if granted, would encompass all of the normal consents)[50].

National Planning Policy

- Overarching National Policy Statement for Energy (EN-1) (2011) – specific reference to Part 5, Section 5.8 which relates to the historic environment;
- Draft Overarching National Policy Statement for Energy (EN-1) (2023) – specific reference to Section 5.9;
- Draft National Policy Statement for Renewable Energy Infrastructure (EN-3) – specific reference to paragraph 3.3.8 and 3.10.98 - 3.10.110;
- Draft National Policy Statement for Electricity Networks Infrastructure (EN- 5) (2023) – specific reference to paragraph 2.2.6; and
- National Planning Policy Framework (2023) – specific reference to Section 16: Conserving and Enhancing the Historic Environment.

Local Planning Policy

- Newark and Sherwood District Council (2013), Local Development Framework, Allocations and Development Management, Development Plan Document - specifically Policy DM4 and DM9

[49] Her Majesty's Stationary Office (2010) Infrastructure Planning (Decisions) Regulations 2010

[50] Her Majesty's Stationary Office (1990) Planning (Listed Buildings and Conservation Areas) Act

- Newark and Sherwood District Council (2019), Amended Core Strategy Development Plan – specifically Core Policy 14: Historic Environment.
- Central Lincolnshire Local Plan (2023) – specifically Policy S57: The Historic Environment.
- Bassetlaw District Council (2010) Local Development Framework, Publication Core Strategy and Development Management Policies – specific reference to Policy DM8: The Historic Environment.
- Draft Bassetlaw Local Plan (2023) 2020-2038: Main Modifications Version, August 2023. Policy 43: Designated and Non-Designated Heritage Assets.

National Guidance

- Planning Practice Guidance (2023), Historic Environment (2019)
- Historic England (2015), Managing Significance in Decision-Taking in the Historic Environment – Historic Environment Good Practice Advice in Planning: 1. The Historic Environment in Local Plans ('GPA2');
- Historic England (2015) Historic Environment Good Practice Advice in Planning Note 3. The Setting of Heritage Assets, Second Edition ('GPA3');
- Historic England (2021) Historic Environment Advice Note 15. Commercial Renewable Energy Development and the Historic Environment ('HEAN15', Historic England);
- Historic England (2008) Conservation Principles, Policies and Guidance;
- IEMA (2021) Principles of Cultural Heritage Impact Assessment[51]; and
- UNESCO (2022) Guidance and Toolkit for Impact Assessments in a World Heritage Context[52].

Baseline Conditions

Approach to Collection of Baseline Data

10.3. For the basis of the scoping report, the following sources have been utilised to define the baseline of the cultural heritage assessment:

- National Heritage List for England (NHLE, Historic England) for data on nationally designated heritage assets;
- Nottinghamshire County Council Historic Environment Record (HER) for data on designated and non-designated heritage assets within Newark and Sherwood and Bassetlaw;

[51] Available at: https://www.iema.net/articles/principles-of-cultural-heritage-impact-assessment

[52] Available at: https://whc.unesco.org/en/guidance-toolkit-impact-assessments/

- Bassetlaw's Database of Non Designated Heritage Assets (2019) and Unregistered Parks and Gardens (2017) for further information on non-designated heritage assets within Bassetlaw;
- Lincolnshire County Council Historic Environment Record (HER) for data on designated and non-designated heritage assets within West Lindsey;
- Historic cartography, including national Ordnance Survey maps and local 19th century Tithe Maps. These sources inform the baseline understanding on the historic representation of the current landscape and its uses.

10.4. There is an emerging requirement in Draft EN-1 (paragraph 5.9.9) to consider historic landscape character studies and so the following have also been reviewed:

- Historic Landscape Characterisation Project for Lincolnshire (English Heritage and Lincolnshire County Council, 2011);
- Newark and Sherwood Landscape Character Study, Appendix R Landscape History (Newark and Sherwood District Council, 2013); and
- Bassetlaw Landscape Character Assessment (Bassetlaw District Council, 2009).

10.5. This research was supplemented by fieldwork undertaken in June 2023, including a site walkthrough and photographic recording.

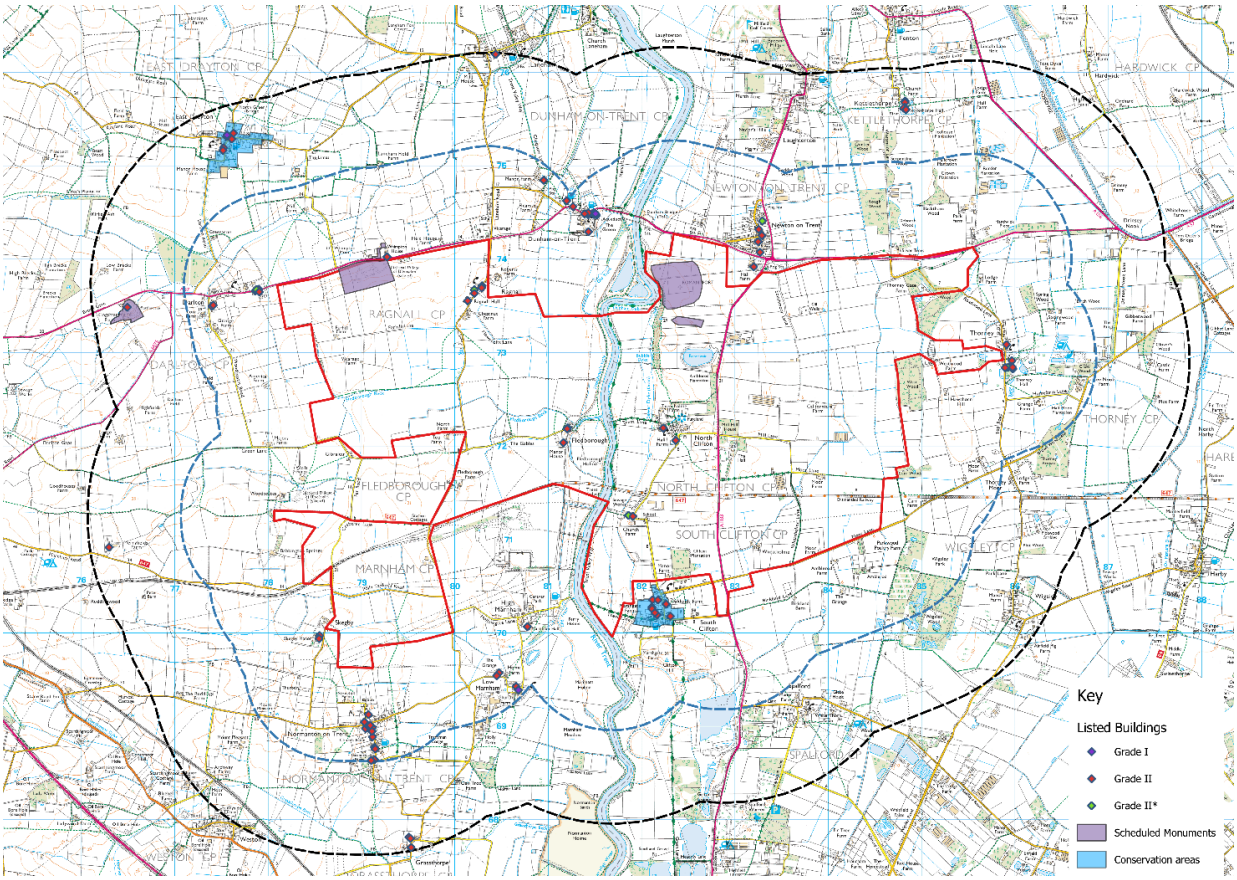
10.6. A study area of 2km has been identified for built heritage assets. Within this study area, non-designated heritage assets ('NDHA') will be considered within a 1km radius only and a more selective approach will be taken to designated assets beyond 1km, subject to their significance, setting and nature of anticipated effects. This will allow for consideration of all built heritage assets whose significance and setting may be affected, albeit in a proportionate manner in line with NPS EN-1 paragraph 5.8.8.

Relevant Baseline Conditions

10.7. The relevant heritage assets have been mapped using GIS at Figure 10-1 and Figure 10-2.

Designated Heritage Assets

Figure 10-1: Designated Heritage Assets



Note: Redline shows the approximate site location. The blue line represents the 1km study area and the black line the 2km study area.

10.8. As discussed in Chapter 9, there are two Scheduled Monuments within the Site boundary:

- Roman Vexillation Fortress, Two Roman Marching Camps and a Royal Observers Corps Monitoring Post, Newton on Trent (NHLE: 1003608); and
- Whimpton Moor Medieval Village and Moated Site, Ragnall (NHLE: 1017567).

10.9. There are two further Scheduled Monuments within the 2km study area: Ringwork at Kingshaugh Farm, East Markham (NHLE: 1018619); and Cross in St Peter and St Paul's Churchyard, Kettlethorpe (NHLE: 1018289).

10.10. There are three Grade I listed buildings within the 1km study area: Church of St Gregory in Fledborough (NHLE: 1045689); Church of St Wilfred in Low Marnham (NHLE: 1276534); and Church of St Oswald in Dunham-on-Trent (NHLE: 1370101). There is one Grade I listed building in the 2km study area: Church of St Peter in East Drayton (NHLE: 1212946).

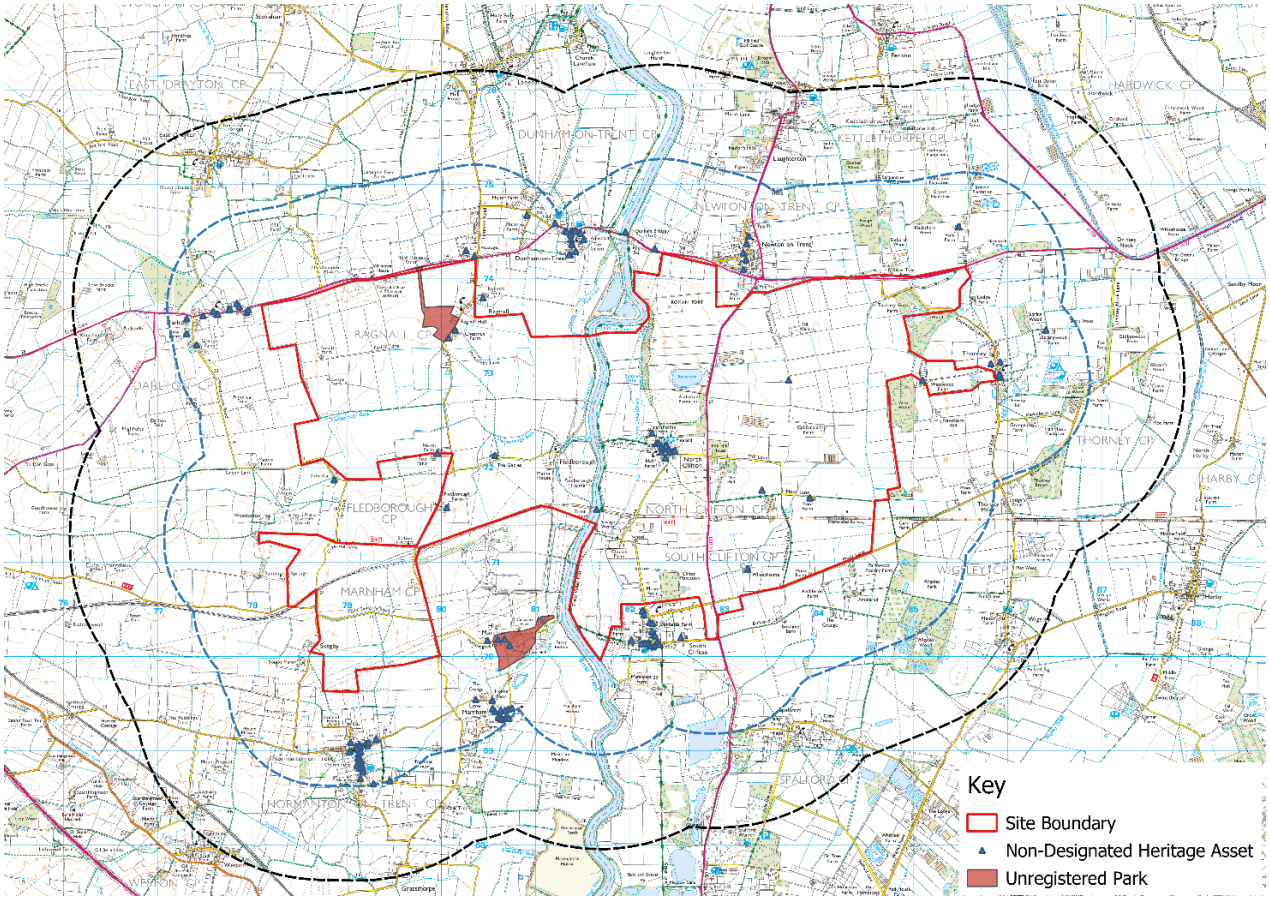
10.11. There are six Grade II* listed buildings within the 1km study area, all of which are churches, including: Church of St George in North and South Clifton (NHLE: 1046053); Church of St Leonard in Ragnall (NHLE: 1233804); Church of St Giles in Darlton (NHLE: 1212465); Church of St Helen in Thorney (NHLE: 1302452); Church of St Matthew in Normanton (NHLE: 1233792); and Church of St Peter in Newton-on-Trent (NHLE: 1064109). There is one Grade II* listed structure within the 2km study area: Gateway at Kettlethorpe Hall (NHLE: 1147172).

10.12. There are 61 Grade II listed buildings within the 1km study area, nearly all of which are collected within the settlements and are generally former farmhouses, halls and cottages. Amongst these, there are also three war memorials and several structures associated with churches (i.e. headstones and lychgates). There are fifteen Grade II listed buildings within the 2km study area.

10.13. There is a Conservation Area within the 1km study area, South Clifton, which contains eight of the Grade II listed buildings. There is one Conservation Area within the 2km study area, East Drayton, which contains the Grade I listed Church of St Peter and five of the Grade II listed buildings.

Non-Designated Heritage Assets

Figure 10-2: Non-Designated Heritage Assets



Note: Redline shows the approximate site location. The blue line represents the 1km study area and the black line the 2km study area.

10.14. There are 126 NDHAs (built heritage only) within a 1km study area, the largest of these being Fledborough Viaduct, which includes the sustran Routes and spans across the River Trent (running east / west) to the south of the Site (see Chapter 2 for details). In addition, there are 4 Unregistered Park & Gardens ('UPG'):

- Marnham Hall: the grounds surrounding the Grade II listed Manor House, including two NDHAs, Barns at Hall Farm and Trent View Farm;
- Ragnall Hall: the grounds of the Grade II listed Ragnall Hall and outbuildings, and former drive approach to north;
- Grounds at The Hall: the former grounds of a now-lost Hall in North Clifton; and
- Grounds at Thorney Hall: the grounds surrounding the non-designated Thorney Hall.

Environmental Measures

10.15. In a cultural heritage context, the key tests are to preserve or enhance the setting and significance (value) of heritage assets. Therefore, as set out in HEAN15, good design generally means avoiding direct permanent physical loss and mitigating potential harm to heritage assets and their settings by understanding and taking into account the key features which contribute to the value of heritage assets and their setting in the design, such as key views. In this case, design mitigation, such as the use of tactical landscaping and planting, also has the potential to reduce the visual influence of existing power infrastructure in the settings of heritage assets and therefore may lead to some localised enhancements in line with GPA3.

10.16. There is opportunity to increase the appreciation of the significance (value) of heritage assets by enhancing their public accessibility, interpretation and experience (see Chapter 9 for further details on Buried Heritage Environmental Measures). This may be particularly relevant for the Scheduled Monuments within the Site.

10.17. NPS EN-1 paragraph 5.8.18, Draft NPS EN-1 paragraph 5.9.20 and NPPF paragraphs 199-202 identify that any adverse effects to heritage assets should be weighed against the wider benefits of the application. As such, where adverse effects to heritage assets are unavoidable, opportunities will be sought to enhance the wider beneficial effects of the application in heritage terms.

Scope of Assessment

Important Receptors Identified

10.18. The following designated heritage assets are considered to have the potential to be affected by the Proposed Development:

- Roman Vexillation Fortress (Scheduled Monument);
- Whimpton Moor Medieval Village (Scheduled Monument);
- Whimpton House (Grade II);
- Church of St Leonard, Ragnall (Grade II*) and associated gateway (Grade II) - *these will be grouped for the purposes of assessment;*
- Ragnall Hall and attached outbuildings (Grade II);

- Ragnall House (Grade II) and Barn at Ragnall Stables (Grade II) - *these will be grouped for the purposes of assessment;*
- Church of St Gregory, Fledborough (Grade I) and associated Headstones (Grade II) - *these will be grouped for the purposes of assessment*;
- Manor House, Fledborough (Grade II);
- Church of St George, North and South Clifton (Grade II*) and Lychgate and Railings (Grade II) – *these will be grouped for the purposes of assessment;*
- Trent Lane Farmhouse, North Clifton (Grade II);
- Hall Farmhouse, North Clifton (Grade II);
- South Clifton Conservation Area and associated heritage assets within the Area (eight Grade II listed buildings and thirteen NDHAs) – *these will be grouped for the purposes of assessment;*
- Marnham Hall (Grade II);
- Hall Farmhouse, Newton on Trent (Grade II);
- Church of St Helen, Thorney (Grade II*);
- Firs Farmhouse (Grade II);
- Church of St Oswald, Dunham-on-Trent (Grade I);
- Church of St Giles, Darlton (Grade II*) ;
- Pigeoncote and Attached Stable Blocks and Outbuilding at Hall Farm, Darlton (Grade II);
- Skegby Manor (Grade II) and Pigeoncote at Skegby Manor (Grade II) - *these will be grouped for the purposes of assessment;*
- Church of St Matthew, Normanton (Grade II*);
- East Drayton Conservation Area and associated heritage assets, including the Church of St Peter (Grade I) - *these will be grouped for the purposes of assessment; and*
- Ringwork at Kingshaugh Farm (Scheduled Monument).

10.19. The following non-designated heritage assets (NDHAs) are considered to have the potential to be affected by the Proposed Development:

- Ragnall Hall UPG;
- Marnham Hall UPG and associated NDHAs within it;
- Grounds at The Hall UPG;
- The Gables Farm Buildings, Fledborough;
- Top Farmhouse and Farm Buildings, Fledborough;

- Fledborough House Farm Buildings;
- Gibraltar Farm;
- Grouping of 3 NDHAs in Ragnall - these will be grouped for the purposes of assessment;
- The Old School, Laneham Road and the Vicarage, Darlton Road - these will be grouped for the purposes of assessment;
- Police House, Darlton Road;
- Grouping of ten NDHAs in North Clifton – these will be grouped for the purposes of assessment;
- Wheatholme Farm;
- Moor Barn Farm, Moor Lane;
- Moor Farm Barn, Moor Lane;
- Westwood Farm Barn, Thorney; and
- The Vicarage, Thorney.

Likely Significant Effects Scoped Out from Detailed Assessment

10.20. Given the size of the scheme, a 1km study area for non-designated heritage assets and 2km study area for designated heritage assets is considered to be reasonable to ensure any potentially significant effects are understood. This will be agreed during consultation with Historic England and the relevant Local Planning Authorities. However, following on from fieldwork and an initial desk-based appraisal, it is possible to take a more nuanced and assessment-based approach to scoping. This draws on a high-level understanding of significance (value) and setting for the heritage assets identified within the study areas and scopes out those where the contribution of their settings to their significance (value) is unlikely to be significantly affected (in EIA terms).

10.21. As such, the following are proposed to be scoped out which will be agreed with Historic England and the relevant Local Planning Authorities via consultation:

- The Cross in St Peter and St Paul's Churchyard, Kettlethorpe, as this Scheduled Monument is best appreciated in its immediate village setting in relation to the Church and associated structures. The visual and perceptual separation from the Site means that this asset is unlikely to be affected by the Proposed Development.
- All Grade II listed buildings outside of the 1km study area due to the nature of these assets being predominantly farm buildings where the contribution of their immediate rural settings would not be affected due to the distance from the Site (and in many cases, screening by intervening development or dense field boundaries). Otherwise, they are former halls, houses and cottages where their settings primarily relate to the settlement they are within (see below).

- Heritage assets where their setting predominantly comprises their respective villages which either have a strong sense of enclosure or are separated from the Site by intervening development and/or landscape and so are unlikely to be affected. This applies to all Grade II listed heritage assets and NDHAs (except where otherwise specified above) in Thorney, Normanton on Trent, Darlton and Dunham-on-Trent.
- All heritage assets in Newton-on-Trent and Kettlethorpe due to the eastern part of the A57 Dunham Road providing a strong perceptual and visual separation from the Site, as observed during fieldwork.
- Heritage assets where power infrastructure is already very present in their wider settings and the further addition of solar panels and cable routes in their wider settings is unlikely to materially affect their significance (value), i.e. all heritage assets in Low Marnham. However, while heritage assets in High Marnham are in closer proximity to established power infrastructure, it is because of that proximity that the potential changing nature of this infrastructure (i.e. new cable routes) may materially affect their settings and so these assets are included in the assessment.

Likely Significant Effects Scoped into the Detailed Assessment

10.22. The following are considered to have the potential for likely significant effects taking into account the assets identified:

- Visual effects to setting of heritage assets from introduction of solar panels and associated built infrastructure, such as BESS (see Chapter 3 for further details), including:
  - Long/open views of church towers, particularly views of Churches of St Gregory (Fledborough), St George (North/South Clifton) and St Leonard (Ragnall);
  - View corridors where the association between heritage assets is key (i.e.. Church of St George and South Clifton Conservation Area) or where heritage assets are appreciated from elevated positions (i.e. views from the Roman Vexillation Fortress Scheduled Monument or from Fledborough Viaduct).
- Effects to the understanding of Scheduled Monuments within their settings (both visual and associative) for those within the Site boundary (Roman Vexillation Fortress and Whimpton Moor Medieval Village.
- Effects to historic landscape character where it contributes to the setting of heritage assets. This includes the potential encroachment of historic farmland ownership and ‘industrialisation’ of rural settings (albeit noting that the landscape is already fairly industrial/power-focussed).
- Increase of noise, dust and traffic movement associated with construction works which may be relevant where it affects the tranquillity or character of the setting of a heritage asset.

10.23. While NDHAs are relevant considerations under NPS EN-1, it is considered unlikely that effects to the settings of these will lead to significant effects in EIA terms due to their low value.

Methodology proposed to Undertake Detailed Assessment

Further Baseline Data

10.24. Further desk-based and archival research is also planned to ensure a comprehensive understanding of the value and settings of identified built heritage assets. This will include detailed analysis of the Nottinghamshire and Lincolnshire Historic Environment Record data, relevant documentary records and historic aerial photography.

10.25. Further fieldwork in the form of a site walkovers and photographic recording will be undertaken in both summer and winter to fully understand any seasonal changes to settings and visibility.

10.26. A Zone of Theoretical Visibility prepared as part of the Landscape and Visual Impact Assessment (LVIA) will be used to assist with further scoping and understanding potential visual effects on identified heritage assets.

10.27. A final shortlist of assets requiring full detailed assessment and a selection of viewpoints for heritage-focussed photomontages to support the understanding of potential effects will be agreed with the relevant LPA Conservation Officers and Historic England.

Construction and Decommissioning

10.28. Under the requirements of NPS EN-1, the draft NPS' and NPPF, and of other useful relevant guidance, such as IEMA's Principles for Cultural Heritage Impact Assessment and Historic England's Good Practice Advice in Planning Notes (GPAs), the process of heritage impact assessments can be summarised as involving three parts:

- Understanding the heritage values (significance) of identified designated and non-designated heritage assets and their settings;
- Understanding the nature and extent of potential effects to heritage values (significance) and settings of identified heritage assets; and
- Making a judgement on the impact that the proposals may have on heritage value (significance) and setting.

Value

10.29. NPS EN-1 defines a heritage asset as, '*Those elements of the historic environment that hold value to this and future generations because of their historic, archaeological, architectural or artistic interest are called 'heritage assets'. A heritage asset may be any building, monument, site, place, area or landscape, or any combination of these. The sum of the heritage interests that a heritage asset holds is referred to as its significance*' (para 5.8.2). Heritage assets can be designated or non-designated. For the purposes of this assessment and to avoid conflict with the EIA use of the term 'significance', the heritage significance will be referred to as 'value'.

10.30. EN-1 requires the significance (value) of any heritage asset that may be affected by the Proposed Development to be identified and assessed (para 5.8.11-12). The methodology used here for understanding value draws from the approach set out in Historic England's 'Conservation Principles' and NPPF Annex 2 by identifying and describing the components which contribute to the heritage interests. In line with IEMA's 'Principles', the final part of understanding the value of a heritage asset is identifying its importance which is an informed professional judgement that can be scaled (as per table 1 at Appendix 2). This scale is informed by designation of an asset.

Assessing Effects

10.31. Legislative and policy requirements for the assessment of effects on heritage assets require the assessor to establish whether the value (heritage significance) is preserved, better revealed/enhanced or harmed as a result of new development.

10.32. There are two ways in which new development can affect heritage assets:

- by physical changes to the fabric, use and visual appearance of designated or non-non-designated heritage assets (known as direct effects); and
- by changes to the setting of designated or non-designated heritage assets in the vicinity (known as indirect effects).

10.33. The approach to assessing the setting follows the staged approach set out in Historic England's GPA3 to assessing the setting of heritage assets.

10.34. The magnitude of change is a combination of (i) the size and scale of the potential change; and (ii) the duration of the change and its reversibility i.e. effects during the construction phase are likely to be temporary effects, whereas effects during operation would span for the duration of the development. At this stage, it is not proposed that any consent be limited, although the panels and associated infrastructure are inherently temporary and will eventually be removed. The magnitude of change can be high, medium, low or very low. The effects to heritage assets during the decommissioning phase are likely to be of a much lesser magnitude of change than construction effects as they would be temporary and would likely be returning to a baseline position by removing development from the setting of heritage assets.

10.35. The significance of the effects on heritage assets is established by combining judgements about the value of the receptors affected with the magnitude of the change, in order to identify the potential effect. For the purposes of EIA, major and moderate effects are considered to be significant effects.

10.36. Once the significance of the potential effect has been classified, consideration is given to the extent mitigation and/or enhancement has been achieved through design and whether the qualitative nature of the resultant effect is, therefore, 'beneficial', 'adverse' or 'neutral'.

10.37. Beneficial effects occur when the Proposed Development would enhance the significance (value) and contribution of the setting to significance of heritage assets, in line with Regulation 3 of the Infrastructure Planning (Decisions) Regulations 2010, NPS EN-1 (para 5.8.13) and NPPF (para.192).

10.38. Adverse effects occur when the Proposed Development would harm the setting or significance of heritage assets. Within NPS EN-1 (5.8.14) and the NPPF (paras.199-202), impacts affecting the value of heritage assets are considered in terms of harm, and there is a requirement to determine whether the level of harm to designated heritage assets amounts to 'substantial harm' or 'less than substantial harm'. There is no direct correlation between the classification of effect as reported in the ES and the level of harm caused to heritage value, however in general terms, major adverse may equate to substantial harm and moderate or minor adverse may equate to different levels on the spectrum of less-than-substantial harm. For any harm to non-designated heritage assets NPPF paragraph 203 requires balanced judgement with regard to scale of harm or loss and significance.

10.39. Neutral effects occur when the Proposed Development would: preserve (or not materially affect) the setting or significance of heritage assets; or where there is considered to be an equal balance between beneficial and adverse heritage effects.

10.40. Pursuant to NPS EN-1 (para 5.8.15), any harmful impact to the significance of a designated heritage asset should be weighed against the public benefits of the Scheme.

Operation

10.41. The same methodology will be used during both construction and operation (including maintenance) to assess potential effects. The only difference will be the nature of effects that will be assessed.

Assumptions, Limitations and Uncertainties

10.42. It is assumed that there will be some level of access to all identified heritage assets to fully understand their value and setting, particularly if not visible from publicly accessible vantage points. In the event that access is not available, professional judgement will be used, based on available research and data.

11. Landscape and Visual

Introduction

11.1. This Chapter of the Scoping Report presents the scope of detailed environmental assessment for landscape and visual matters. Landscape effects relate to changes to the landscape as a resource, including physical changes to the fabric or individual elements of the landscape, its aesthetic or perceptual qualities, and landscape character. Visual effects relate to changes to existing views of identified visual receptors (people), from the loss or addition of features within their view due to the construction, operational and decommissioning phases of the Proposed Development. For example, this may be residents, or people travelling on Public Rights of Way (PRoW).

11.2. This Chapter presents the policy and legislative context relevant to landscape and visual matters, the approach to collecting baseline data, and an overview of the relevant baseline conditions within the Site and surrounding area, based on current knowledge and understanding. It concludes by setting out the scope of assessment including, with justification, those that are proposed to be scoped out and in for detailed assessment and concludes by outlining the method that will be used to undertake the detailed assessment.

11.3. The Landscape and Visual Impact Assessment (LVIA) will be undertaken in accordance with the Guidelines for Landscape and Visual Impact Assessment, Third Edition, 2013[53] (GLVIA 3) and with reference to other environmental topics including Ecology and Cultural Heritage, along with other technical studies such as Glint and Glare Assessments and Arboricultural Assessments, if required.

Review of Policy, Legislation and Relevant Guidance

11.4. Legislation, planning policy and guidance relating to landscape and visual matters, and pertinent to the Scheme comprises:

National Planning Policy

- Overarching National Policy Statement for Energy (EN-1) (2011) – specifically paragraphs 4.5.1 and Section 5.9
- Draft Overarching National Policy Statement for Energy (EN-1) (2023) – specific reference to Section 4.5 and Paragraphs 5.10.1
- National Policy Statement for Renewable Energy Infrastructure (EN-3) (2011) – specifically paragraph 2.4.2
- Draft National Policy Statement for Renewable Energy Infrastructure (EN-3) – in particular paragraphs 3.10.89 and 3.10.91
- National Policy Statement for Electricity Networks Infrastructure (EN-5) (2011), I particular reference to the Horlock Rules in paragraph 2.9.18.

[53] Landscape Institute and Institute of Environmental Management and Assessment (2013) Guidelines for Landscape and Visual Impact Assessment, Third Edition. London: Landscape Institute

- Draft National Policy Statement for Electricity Networks Infrastructure (EN- 5) (2023) - notably paragraph 2.2.5
- National Planning Policy Framework (2023) in particular paragraph 130

Local Planning Policy

- Newark and Sherwood District Council (2013), Local Development Framework, Allocations and Development Management, Development Plan Document - specifically Policy DM8
- Newark and Sherwood District Council (2019), Amended Core Strategy Development Plan – specifically Core Policy 12 and 13.
- Central Lincolnshire Local Plan (2023) – specifically
  - Policy S14: Renewable Energy
  - Policy S53: Design and Amenity.
  - Policy S58: Protecting Lincoln, Gainsborough and Sleaford's Setting and Character
  - Policy S59: Green and Blue Infrastructure Network.
  - Policy S60: Protecting Biodiversity and Geodiversity
  - Policy S61: Biodiversity Opportunity and Delivering Measurable Net Gains
  - Policy S.62: Area of Outstanding Natural Beauty and Areas of Great Landscape Value
  - Policy S63: Green Wedge
  - Policy S66: Trees, Woodland and Hedgerows
- Bassetlaw District Council (2010) Local Development Framework, Publication Core Strategy and Development Management Policies, including
  - Policy DM4: Design & Character
  - Policy DM9: Green Infrastructure; Biodiversity & Geodiversity; Landscape; Open Space & Sports Facilities
  - Policy DM10: Renewable & Low Carbon Energy
- Draft Bassetlaw Local Plan (2023) 2020-2038: Main Modifications Version, August 2023, including:
  - Policy ST37: Landscape Character
  - Policy ST38: Green Gaps
  - Policy ST39: Green and Blue Infrastructure
  - Policy ST40: Biodiversity and Geodiversity
  - Policy 41: Trees, Woodlands and Hedgerows

- Policy 48: Protecting Amenity

National Guidance

- Planning Practice Guidance (2019), Natural Environment, which sets out the benefits of landscape character assessments and the importance of considering green infrastructure in the early stages of schemes.
- Planning Practice Guidance (2023), Renewable and Low Carbon Energy, which identifies several LVIA considerations, including visual impact, mitigation through screening and glint and glare.

Baseline Conditions

Approach to Collection of Baseline Data

11.5. For the purposes of the Scoping Report, landscape and visual baseline conditions have been established through a desk based review of published information, including Ordnance Survey (OS) maps, aerial imagery, topographical data, and published Landscape Character Assessments. An initial site walkover was undertaken in June 2023, has also informed this Scoping Report.

11.6. In accordance with GLVIA 3 the study area will include *"the site itself and the full extent of the wider landscape around it which the proposed development may influence in a significant manner". GLVIA 3 explains that this will "usually be based on the extent of Landscape Character Areas likely to be significantly affected… [or be based] on the extent of the area from which the development is potentially visible… or a combination of the two".*

11.7. GLVIA 3 sets out that, at the scoping stage, the Study Area will be preliminary and may change as more detailed analysis is undertaken, discussion with LPAs is progressed, and the design of the Proposed Development is developed. At this stage, taking account of the local topography and view distances to the Proposed Development, the preliminary LVIA study area extends up to 2km from the Site boundary to cover land broadly located between:

- East Drayton, Laneham, Laugherton and Kettlethorpe in the north;
- Fossdyke Navigation, Glover's Wood and Thorney Brown Wood in the east;
- Spalford Warren and Grassthorpe in the south; and
- Weston and Darlton Gliding Club in the west.

Relevant Baseline Conditions

11.8. This section provides an overview of the landscape and visual features and characteristics across the preliminary Study Area.

Landscape Context

Landform and Hydrology

11.9. The River Trent flows through the centre of the preliminary LVIA study area from north to south. The river corridor marks the lowest point of the preliminary Study Area at approximately 5m Above Ordnance Datum (AOD). Land to the west rises gradually, with some minor fluctuations, to a local high point of 47m AOD, immediately south of Darlton Gliding Club on the western edge of the preliminary Study Area.

11.10. Land east of the River Trent is mostly level at a height of between 5m AOD and 10m AOD. Newton Cliff, a local high point at 23m AOD, is located towards the northern part of the Site, south of Newton on Trent. Clifton Hill, immediately south of South Clifton, also forms a local high point at 23m AOD.

11.11. Two watercourses, namely North Beck and Fossdyke Navigation, cross the northern part of the preliminary Study Area, connecting to the River Trent. Numerous field drains cross the Site and the wider preliminary Study Area.

Land Use, Infrastructure and Settlement

11.12. Land within the preliminary LVIA study area is mostly in arable agricultural use. Several chicken sheds are located close to the Site, east of the A1133.

11.13. Two A-roads cross the preliminary Study Area. The A57 crosses from east to west across the northern part, providing the only vehicular crossing over the River Trent within the study area via a toll bridge. The A1133 extends north and south from Newton on Trent, running parallel to the River Trent, approximately 1km to the east. Fledborough Road, which becomes Main Street, forms the main north / south route on the western side of the River Trent. A series of local roads cross the wider study area, connecting small hamlets and villages.

11.14. A large number of pylons and overhead lines cross the preliminary Study Area. A single line follows the eastern side of the River Trent from Cottam Power Station, located north of the preliminary Study Area. Two lines of pylons extend north / south on the western side of the River Trent, with a further three lines entering the preliminary Study Area from the south west. These lines converge at High Marnham substation.

11.15. Several villages are located across the preliminary Study Area. Ragnall, Fledborough, North Cliffton and South Cliffton are located close to the Site boundary. The following villages and hamlets are located outside of the Site and beyond the preliminary study area:

- Laneham, Laughterton, Kettlethorpe, Dunham on Trent and Newton on Trent in the north;
- Thorney and Wigsley in the east;
- Spalford, High Marnham, Low Marnham and Normanton on Trent in the south; and
- Darlton in the west.
- Several isolated farmsteads are also located across the study area.
- Vegetation Patterns

11.16. A series of small to medium sized woodlands are located east of the River Trent, broadly between Kettlethorpe in the north and Wigsley in the south. This group of woodlands includes Fough Wood, Road Wood, West Wood, Thorney Brown and Wigsley Wood. Smaller blocks of woodland are located around the villages of North and South Cliffton. There is no woodland on land west of the River Trent.

11.17. Occasional hedgerows form the boundaries to fields; however these are typically fragmented. Clumps of trees and scrub line the River Trent corridor, with notable concentrations of vegetation at the Trent Washlands Nature Reserve.

Public Rights of Way

11.18. The Trent Valley Way extends for 174km from Nottingham in the south, to the Humber Estuary. This long distance route follows the eastern edge of the River Trent through the preliminary Study Area.

11.19. National Cycle Route 647 follows a disused railway that crosses through the centre of the Site from east to west. The route is mostly elevated above the surrounding landscape and crosses the River Trent over the Fledborough viaduct.

11.20. Several footpaths and bridleways cross the Site, namely:

- Darlton BW1
- Ragnall FP1m FP2 and FP4
- Fledborough FP7
- Marnham FP4
- NWoT 98/1 and 99/1
- North Cliffton FP1, FP3, FP4, BW11 and BOAT 12
- South Cliffton FP1, BOAT 13

11.21. A series of footpaths make up the PRoW network across outside of the Site and beyond the preliminary Study Area.

Tranquillity

11.22. With reference to CPRE's Tranquillity Map[54], infrastructure corridors and settlements across the preliminary Study Area typically reduce the level of tranquillity. Areas not crossed by main roads are shown to be the most tranquil. This distribution was confirmed via the initial field work which found the preliminary Study Area to afford areas of tranquillity away from the A57 and A1133.

Designations

11.23. Neither the Site nor the preliminary Study Area are covered by any statutory or local landscape designations (i.e. National Parks or Areas of Outstanding Natural Beauty).

[54] https://www.cpre.org.uk/wp-content/uploads/2019/11/tranquillity_map_england_regional_boundaries_1.pdf

11.24. The village of South Cliffton is designated as a Conservation Area and is located on the eastern Site boundary.

Landscape Character

Published Landscape Character Assessments and Related Studies

11.25. The preliminary Study Area and the Site are covered by several Landscape Character Assessments and related studies, as set out below. These documents will inform the landscape baseline and the iterative design process.

National level

11.26. At the national level, the Site is covered by Natural England's National Character Area 48: Trent and Belvoir Vales[55] (NCA 48).

County level

11.27. The western part of the study area is covered by the Nottinghamshire Landscape Character Assessment (2009)[56] which defines County Character Areas (CCAs). CCAs are sub-divided into Landscape Description Units (LDUs) which are then further divided into Landscape Character Parcels (LCPs). Draft Policy Zones (DPZs) are then defined, comprising LCPs which exhibit similar key characteristics.

11.28. The following areas from the Nottinghamshire Landscape Character Assessment are located within the preliminary Study Area:

- Newark and Sherwood:
    - Trent Washlands CCA
        - River Meadowlands LDU
            - Trent Washlands 25 LCP
                - TW PZ 17: Besthorpe River Meadowlands DPZ
    - East Nottinghamshire Sandlands CCA
        - Village Farmlands LDU
            - East Nottinghamshire Sandlands 30 LCP
                - ES PZ 01: North Clifton Village Farmlands DPZ
                - ES PZ 02: Wigsley Village Farmlands DPZ
- Bassetlaw:
    - Trent Washlands CCA
        - LDU 274 and 415
            - Trent Washlands 28 LCP

[55] https://publications.naturalengland.org.uk/publication/7030006?category=587130

[56] https://www.bassetlaw.gov.uk/planning-and-building/planning-services/planning-policy/core-strategy-and-development-policies/core-strategy-adopted-development-plan/submission-documents/landscape-character-assessments-study/

- Trent Washlands 29 LCP
  - TW PZ 17 – Besthorpe River Meadowlands
  - TW PZ 18 – Low Marnham, Carlton and Sutton on Trent River
  - TW PZ 20 Dunham on Trent Village Farmlands
  - TW PZ 43 Grassthorpe River Meadowlands
  - TW PZ 44 Fledborough Holme River Meadowlands
  - TW PZ 45: Dunham Laneham River Meadowlands
- Mid Nottinghamshire Farmlands
  - LDU 105 and 127
    - MN 21 LCP
    - MN27 LCP
    - MN28 LCP
    - MN29 LCP
    - MN30 LCP
    - MN32 LCP
      - MN PZ 12: Normanton-on-Trent
      - MN PZ 09: East Drayton

11.29. The north eastern part of the preliminary study area is within West Lindsey. The West Lindsey Character Assessment[57], published in 1999, details the character of the landscape across the district.

11.30. The Trent Valley Landscape Character Area (LCA) falls within the Study Area.

Extent of Visibility

11.31. The combination of a relatively flat landform and typically low levels of vegetative cover result in an open landscape across much of the preliminary Study Area. The following section describes the typical extent of visibility experienced across the preliminary Study Area.

11.32. The height and extent of hedgerows and trees on the southern boundary of the A57 varies, resulting in some views being channelled along the road corridor, whilst other locations afford more open and long range views southward, towards the Site. Views of the Site from land north of the A57 are mostly screened by foreground vegetation and local undulations in topography.

[57] https://www.west-lindsey.gov.uk/planning-building-control/planning/planning-policy/evidence-base-monitoring/landscape-character-assessment

11.33. Land within the eastern part of the Site, and further east, includes areas of woodland, resulting in a more enclosed character, limiting the extent to which the Site is visible. Woodland located on, or in close proximity to, the Site boundary plays a particular role in limiting visibility, namely Road Wood, West Wood and Wigsley Wood.

11.34. Much of the disused railway, stretching across the preliminary Study Area from east to west, is flanked by mature trees and scrub vegetation. Parts of the route are also elevated on Fledborough viaduct. This combination typically truncates long northerly views of the Site, albeit parts of the Site located south of the route are visible in close range views from the local road network.

11.35. The landscape in the west of the preliminary Study Area is mostly flat and open, affording longer distance views across the Site from footpaths that cross open fields. Views from the local road network are typically truncated, or filtered, by hedgerows lining the network.

Environmental Measures

11.36. The Proposed Development will include new planting as part of the landscape design and mitigation strategy. This new planting presents the opportunity to contribute to a number of the Proposed Development's Design Principles, in particular, there is an opportunity to:

- Protect and improve the local environment: by strengthening the local green infrastructure network, by diversifying the range of species on Site and creating new vegetated corridors and connections across the landscape;
- Protect and enhance places of value: by designing mitigation planting to reduce the influence of existing power infrastructure on the character of the landscape; and
- Create new places of amenity and ecological value: by providing new multifunctional green assets that are accessible to the public, such as wetlands or areas for recreation.

Scope of Assessment

Important Receptors Identified

11.37. Table 11-1 sets out the potential landscape and visual receptors that have been identified across the 2km preliminary Study Area and which will therefore be considered in the LVIA.

Table 1 Landscape and Visual Receptors to be Scoped In

Receptor Group	Receptor	Notes
Landscape receptors		
National Character Areas	NCA 48: Trent and Belvoir Vales	N/A

Landscape Character Areas within Newark and Sherwood	TW PZ 17 Besthorpe River Meadownlands ES PZ 01: North Clifton Village Farmlands ES PZ 02: Wigsley Village Farmlands	The Policy Zones defined within the character assessment provide the most detailed analysis of the landscape and guidance on its future management. It is therefore proposed that the Policy Zones are the most appropriate unit for assessment, however this will be agreed with Newark and Sherwood through consultation.
Landscape Character Areas within Bassetlaw	TW PZ 17 – Besthorpe River Meadowlands TW PZ 18 – Low Marnham, Carlton and Sutton on Trent River TW PZ 20 Dunham on Trent Village Farmlands TW PZ 43 Grassthorpe River Meadowlands TW PZ 44 Fledborough Holme River Meadowlands TW PZ 45: Dunham Laneham River Meadowlands MN PZ 12: Normanton-on-Trent MN PZ 09: East Drayton	The Policy Zones defined within the character assessment provide the most detailed analysis of the landscape and guidance on its future management. It is therefore proposed that the Policy Zones are the most appropriate unit for assessment, however this will be agreed with Bassetlaw through consultation.
Landscape Character Areas within West Lindsey	Trent Valley LCA	N/A

Local Landscape Character Areas (LLCAs)	The scale and distribution of the LLCAs is to be defined through further desk based research and field work.	The scale, age and level of detail contained within the published landscape character assessments varies between local authorities. Local Landscape Character Areas (LLCAs) will therefore be defined to provide a consistent and up to date description of landscape character across the preliminary study area.
Visual receptors		
Residents of villages	People living in the villages of: East Trayton, Darlton, Dunham on Trent, Ragnall, Fledborough, High Marnham, Normaton on Trent, Low Marnham, Spalford, South Clifton, North Clifton, Newton on Trent, Laughterton, Kettlethorpe, Thorney and Wigsley.	A range of representative viewpoints will be selected to record the visual amenity experienced from these villages. These will be identified following further field work. The number and distribution of the representative viewpoints will be agreed through consultation with the local authorities.
Residents of farmsteads/individual houses close to the Site	People living in: Laneham Field Farm, Farhill Farm, Vicarage Farm, America Farm, Fledborough Farm, Westwood Farm, The Gables, The Hall, Manor House, Moor Farm (north and south), The Grange, North Farm, Top Farm, Church Farm, 1 Collingham Road, and Station Cottages. People living in dwellings fronting onto the A57, Vicarage Road.	A range of representative viewpoints will be selected to record the visual amenity experienced from these properties. These will be identified following further field work. The number and distribution of the representative viewpoints will be agreed through consultation with the local authorities.

People travelling on the PRoW network	People using the Trent Valley Way, such as walkers, cyclists and equestrian users, and people walking on local footpaths, including on Clifton Hill. People cycling on NCR 647	A range of representative viewpoints will be selected to record the visual amenity experienced from these PRoW. These will be identified following further field work. The number and distribution of the representative viewpoints will be agreed through consultation with the local authorities.
People travelling on the local road network	People travelling on A57, A1133 and the local road network.	A range of representative viewpoints will be selected to record the visual amenity experienced from these roads. These will be identified following further field work. The number and distribution of the representative viewpoints will be agreed through consultation with the local authorities.

Likely Significant Effects Scoped Out from Detailed Assessment

11.38. Table 11-2 presents the elements which have been scoped out from the detailed assessment, as it is considered no likely significant effects will occur.

Table 11-2: Likely Significant Effects Scoped out from the Landscape and Visual Detailed Assessment

Elements Scoped Out	Justification
National and Local landscape designations	There are no national or local landscape designations across, or close to, the Site. National landscape designations are therefore scoped out of the LVIA.
Lighting	Any lighting during the construction and decommissioning phases will be directional, temporary and only used during working hours. When used, lighting will be designed to minimise potential for light spillage beyond the Site, particularly towards houses, roads and ecological habitats, in so far as it is reasonably practicable. These details, to ensure there are no likely significant effects, will be set out in the Construction Environmental Management Plan and Demolition Environmental Management Plan.

	During operation any lighting will be directed at infrastructure and only triggered by motion detection or manually during emergencies. As such, a quantitative lighting assessment is scoped out of the assessment. The effect of lighting will be considered as part of the Proposed Development, rather than as a stand alone assessment, and will therefore be included in the description of effects on landscape character and visual amenity.

11.39. No potential landscape or visual receptors located within the preliminary LVIA study area are proposed to be scoped out. Should it become apparent, through the design and assessment process, that there would be no potential for significant adverse landscape or visual effects on a receptor, the receptor will be scoped out, following consultation with the relevant LPA.

Likely Significant Effects Scoped into the Detailed Assessment

11.40. The Proposed Development has the potential to result in temporary significant adverse landscape effects during the construction phase, due to alterations to surface landform and vegetation from open agricultural land to built form, the presence of construction machinery, introduction of construction compounds and access routes, and associated reductions in tranquillity due to increased activity and noise. These aspects of the construction phase also have the potential to result in temporary significant adverse visual effects, due to the changes in the composition of views, in comparison to views of fields and general farming activity.

11.41. The Proposed Development has the potential to result in significant adverse landscape effects during operation due to the change in land use resulting from the presence and massing of the solar panels and associated structures, although the Proposed Development is reversible. Similarly, the Proposed Development has potential to result in significant adverse visual effects resulting from the introduction of solar panels and associated infrastructure into people's views.

11.42. The Proposed Development also has the potential to result in beneficial landscape and visual effects in the longer term, resulting from changes to land cover and new planting.

11.43. The decommissioning phase has the potential to result in significant adverse landscape and visual effects, similar to the construction phase, due to the presence of machinery and general activity to remove the panels and associated structures.

11.44. The LVIA will inform the iterative design process of the Proposed Development. Embedded design measures will be included to reduce significant effects, specifically with regard to the siting and layout of the solar panels and associated structures (taking account of the Glint and Glare Technical Assessment); as well as the colour and tone of associated structures to minimise their visibility and perceived scale in people's views.

11.45. The LVIA will also seek opportunities for new green infrastructure, including new planting and recreational access, to be embedded into the Proposed Development, connecting into the wider green infrastructure network.

11.46. The relevant landscape and visual measures will be set out in the LVIA.

Methodology proposed to Undertake Detailed Assessment

Further Baseline Data

11.47. Further fieldwork will be undertaken in winter and summer conditions throughout the design and assessment process. The fieldwork will be informed by Zones of Theoretical Visibility (ZTV) mapping, which will model the key structures in the context of the local landform and surface features, such as buildings and vegetation.

11.48. The findings of the fieldwork and desk based analysis will be presented to the LPAs, seeking their agreement of the visual receptors who have potential to be impacted by the Proposed Development, and the locations of viewpoints that will represent their views.

11.49. Photography will be captured from each representative viewpoint in both summer and winter conditions, showing the effect of the seasons on the potential visibility of the Proposed Development. This photography will be undertaken in accordance with the methodology for Type 1 photographs as set out in the Landscape Institute's Technical Guidance Note 06/19 Visual Representation of Development Proposals.

Assessment methodology for Construction, Operation and Decommissioning

11.50. The LVIA will be undertaken in accordance with the following best practice guidance:

- GLVIA;
- The Landscape Institute's Technical Guidance Note 02/21: Assessing Landscape Value Outside National Designations, 202158; and
- The Landscape Institute's Technical Guidance Note 06/19: Visual Representation of Development Proposals, 2019[59].

11.51. These publications form a standard reference for undertaking LVIA for renewable energy schemes in the UK.

11.52. The LVIA will also refer to:

- An Approach to Landscape Character Assessment[60], by Natural England;
- Infrastructure Technical Guidance Note 04/2020[61] by the Landscape Institute;

[58] https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2021/05/tgn-02-21-assessing-landscape-value-outside-national-designations.pdf

[59] https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2019/09/LI_TGN-06-19_Visual_Representation.pdf

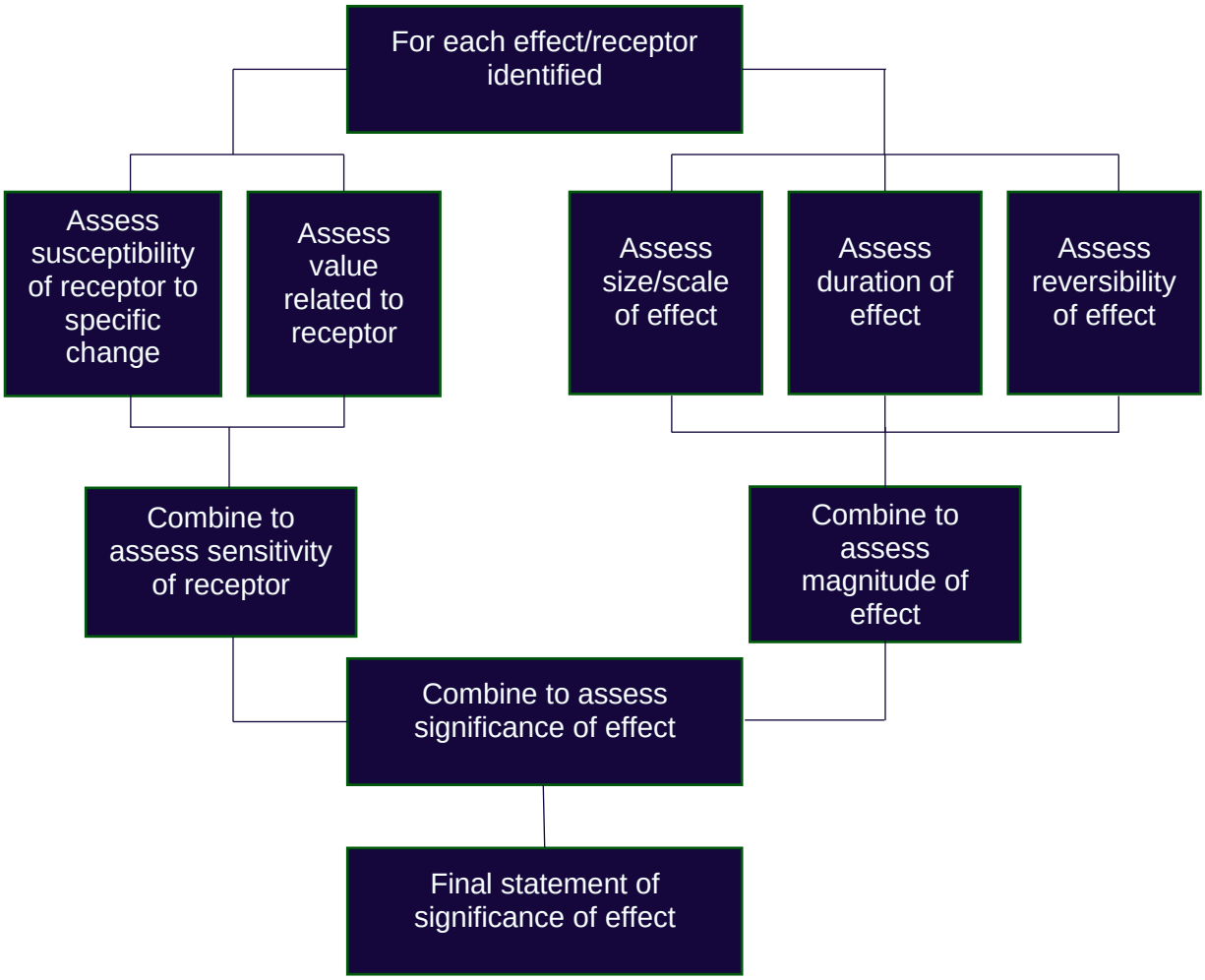
[60] https://assets.publishing.service.gov.uk/media/5aabd31340f0b64ab4b7576e/landscape-character-assessment.pdf

[61] https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2018/01/LI-Infrastructure-TGN-FINAL-200924.pdf

- Tranquillity Technical Guidance Note 2017[62] by the Landscape Institute; and
- Technical Guidance Note 2/19: 'Residential Visual Amenity Assessment' (2019)[63] by the Landscape Institute.

11.53. The LVIA methodology will be presented to the LPAs to receive their comment and seek their agreement where possible. The methodology will reflect the process set out in Figure 3.5 of GLVIA3 as shown below:

Figure 11-1: Overview of LVIA Methodology



11.54. In accordance with the GLVIA 3 process, the LVIA methodology will include the following key stages:

[62] https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2017/02/Tranquillity-An-Overview-1-DH.pdf

[63] https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2019/03/tgn-02-2019-rvaa.pdf

- A baseline review of published landscape assessments, studies, relevant supporting evidence base documents, aerial photography, mapping and fieldwork to identify the landscape and visual baseline and receptors. These shall be presented to the LPAs to seek their agreement of the scope of the LVIA, including the extent of the study area.
- An assessment of the sensitivity of landscape and visual receptors, based on an assessment of their respective value and susceptibility to change.
- An assessment of the magnitude of impact resulting from the Proposed Development during construction, Year 1, Year 15 (to determine the likely significance effects of landscaping, taking account of vegetation maturity), and decommissioning. The assessment of magnitude of impact will consider the scale, duration, and reversibility of the impact. Short term durations are considered to be two years or less; medium term durations are considered to be between two and five years; and long-term durations are considered to be more than five years.
- Combination of the receptor's sensitivity and the magnitude of impact experienced to determine the resultant level of effect.
- An assessment of the significance of the effect to the landscape and visual receptors identified. It is proposed that effects judged to be moderate and major will be considered to be significant.
- The LVIA will review the Glint and Glare Assessment to include consideration of how glint and / or glare impacts might contribute to landscape or visual effects.
- The LVIA will assess the potential visual effects to different types of visual receptor, including residential receptors, i.e. private views (albeit assessed from publicly accessible locations). In the event that the visual assessment identifies major adverse effects on residents at year 15 of operation (i.e. major adverse visual effects that have not been mitigated), a Residential Visual Amenity Assessment will be undertaken in line with the Landscape Institute's Technical Guidance Note 2/19: 'Residential Visual Amenity Assessment. However as discussed in the Environmental Measures, the impact of the Proposed Development on visual receptors have been considered at the design stages, in order to avoid likely significant effects.

Assumptions, Limitations and Uncertainties

11.55. All fieldwork will be undertaken from publicly accessible locations. Professional judgement will be used to assess residents' views, aided by aerial photography and fieldwork observations.

11.56. For the construction phase assessment, a reasonable worst case approach will be undertaken, which is assumed construction activity will occur in winter and will be undertaken across the Site at the same time. In reality, it is likely works will be undertaken sequentially and construction in some plots is likely to be complete whilst others are on-going. PRoW which cross the Site boundary will be kept open or temporarily closed for short periods of time only, and therefore recreational receptors along these routes will be assessed for the construction phase.

11.57. For the year 1 operational assessment, the assumption is that the Proposed Development will be operational in winter conditions. This represents a reasonable worst case assessment. The year 15 assessment will assume summer conditions and the establishment of planting included in the landscape design. This represents an assessment of the completed and operational development.

11.58. For the decommissioning assessment, the assumptions are the Scheme is no longer operational, and the solar panels and associated structures and equipment are being removed in a manner similar to the construction phase, requiring machinery and localised excavation.

12. Transport and Access

Introduction

12.1. This Chapter of the Scoping Report presents the scope of the environmental assessment for Transport and Access. Specifically, the Chapter presents the policy and legislative context, the approach to collecting baseline data and then an overview of the relevant baseline conditions within the Site and surrounding area, based on current knowledge and understanding. It concludes by setting out the scope of assessment including, with justification, the transport and access matters that are proposed to be scoped out and in for detailed assessment and concludes by outlining the method that will be used to undertake the detailed assessment.

12.2. The Transport and Access Chapter will be supported by a standalone Transport Assessment report and technical figures.

12.3. The key issues for consideration as part of the assessment will be:

- The temporary change in traffic flows and the resultant, temporary effects on the road network within the Study Area during the construction phase;
- The design of any new access infrastructure; and
- The consideration of appropriate and practical mitigation measures to offset any temporary effects during the construction phase.

12.4. During operation there will be limited number of transport trips to the Proposed Development, limited to maintenance of the solar infrastructure. As such the assessment will consider the effects on transport link users and residents during the construction and decommissioning phases only.

Review of Policy, Legislation and Relevant Guidance

12.5. Legislation, planning policy and guidance relating to transport and access, and pertinent to the Proposed Development comprises:

National Planning Policy

- Overarching National Policy Statement for Energy (EN-1) (2011) - specific reference to Part 5, Section 5.13 which relates to traffic and transport;
- Draft Overarching National Policy Statement for Energy (EN-1) (2023) – specific reference to Section 5.14;
- Draft National Policy Statement for Renewable Energy Infrastructure (EN-3) – specific reference to paragraph 3.10.111 to 30.10.117 and 3.10.130 to 30.10.135
- National Planning Policy Framework (2023) – specific reference in particular Section 9.

Local Planning Policy

- Newark and Sherwood District Council (2013), Local Development Framework, Allocations and Development Management, Development Plan Document - specifically Policy DM5

- Central Lincolnshire Local Plan (2023) – specifically Policy S47: Accessibility and Transport
- Bassetlaw District Council (2010) Local Development Framework, Publication Core Strategy and Development Management Policies – specific reference to DM13: Sustainable Transport
- Draft Bassetlaw Local Plan (2023) 2020-2038: Main Modifications Version, August 2023. Policy ST51: Renewable Energy Generation and Policy S54: Transport Infrastructure
- Lincolnshire County Council (2021) Local Transport Plan 5.
- Nottinghamshire County Council (2011) Nottinghamshire Local Transport Plan 2011 - 2026

National Guidance

- National Highways (2020) Design Manual for Roads & Bridges (DMRB);
- Planning Practice Guidance (2014) “Travel Plans, Transport Assessments and Statements”;
- Institute of Environmental Assessment (IEA) (1993), The Guidelines for the Environmental Assessment of Road Traffic; and
- Institute of Environmental Management and Assessment (IEMA) (2023) Environmental Assessment of Traffic and Movement.

Local Guidance

- Nottinghamshire County Council (2021) The Nottinghamshire Highway Design Guide.

Baseline Conditions

Approach to Collection of Baseline Data

12.6. For the purposes of this scoping report the baseline conditions have been established by carrying out a review of Lincolnshire and Nottinghamshire County Council’s local authority websites relating to existing transport infrastructure and a review of current geographical information.

Relevant Baseline Conditions

12.7. In terms of the Strategic Road Network (SRN), the A1 which connects Blyth to the north and to Stamford in the south, is located approximately 8km to the east from the centre of the Site. The A1 forms a junction with the A57, which connects Markham Moor to Lincoln. The A57 is located on the northern boundary, approximately 2.5km from the centre of the Site. The A57 runs eastwards before forming a junction with the A46 to the east of the Site. The A1133 is located within the eastern part of the Site, approximately 1.5km to the east from the centre of the Site, and connects Torksey Lock with Winthorpe, where it then joins the A46.

12.8. The Trent Valley Way extends for 174km from Nottingham in the south, to the Humber Estuary. This long-distance footpath route follows the eastern edge of the River Trent as it runs through the Site. In addition, there are several footpaths and bridleways that cross the Site.

12.9. Located within the Site and approximately 500m south of the centre of the Site, is the Sustrans Cycle Route 647. This path is part of the National Cycle Network (NCN) and is a disused railway line associated with the former Lancashire, Derbyshire and East Coast Railway, which runs east-west and that connected Lincoln to the east with Tuxford to the west. Crossing over the River Trent, the Sustrans Route includes Fledborough Viaduct consisting of masonry arches. This is one of a few river crossing opportunities in the locality.

12.10. There are no railway stations located within 5km from the centre of the Site. There are several local bus services within Tuxford, Sutton on Trent and North Scarle, these provide limited opportunities for travel to and from the Site.

Environmental Measures

12.11. It is considered that enhancements to existing PRoW and the inclusion of permitted paths could be delivered as part of the Proposed Development. Traffic impacts of the Proposed Development are temporary in nature, and limited to the construction of the Proposed Development, and as such, the Applicant is not currently proposing further transport enhancements.

12.12. As discussed in Chapter 5, the Proposed Development will include the production of a CTMP, this will include details on construction logistics and worker travel plans to reduce any adverse likely significant effects from the generation of construction traffic. In addition, the DCO application will also be supported by a Framework Abnormal Load Transport Management Plan which will set out the traffic management for large loads.

12.13. Where access is required, the Proposed Development will ensure the design includes suitable access arrangements with full consideration given to the road safety of all road users.

Scope of Assessment

12.14. The extent of the study area will be developed from the likely origin and destination points for construction staff and materials. The exact site access junction details have yet to be finalised, however the access strategy is based upon the need to avoid traffic causing unnecessary disruption and distress to sensitive receptors and communities.

12.15. The western portion of the Proposed Development will be accessed from the A57 to the north, providing connections to Main Street, bypassing Ragnall. The eastern portions will be accessed from A1133 also from the north.

12.16. Locally sourced material will be used where feasible and traffic will avoid impacting on local communities as far is possible. It is proposed to ensure that minimal traffic passes from one side of the site to the other via Dunham, over the Dunham Toll Bridge.

Important Receptors Identified

12.17. As above, the assessment will consider the effects on transport link users and residents within the Study Area during the construction and decommissioning phases only.

12.18. The study area is based upon proposed construction routes for material deliveries and will include the following road links:

- A57 between its junction with the A1 at Markham Moor and the A46 at Lincoln;
- A1133 between its junction with the A57 and Collingham;
- Main Street, between its junction with the A57 and Low Marnham;
- Polly Taylor Road, between its junction with Main Street and its junction with Skegby Road; and
- Crabtree Lane / Skegby Road between Skegby and the proposed western site access junction.

12.19. Construction traffic will include staff and material deliveries to and from the Proposed Development. The greatest concentration will occur at the Site access junctions.

Likely Significant Effects Scoped Out from Detailed Assessment

12.20. The operational phase will result in occasional traffic maintaining the solar arrays and BESS. The traffic associated with this phase will be insufficient to trigger the 30% threshold for assessment a set out in the Institute of Environmental Management and Assessment (IEMA) guidance (discussed further below) and as such, it is proposed that this phase can be scoped out of the assessment.

Likely Significant Effects Scoped into the Detailed Assessment

12.21. As above the assessment will consider the effects during the construction and decommissioning phases only. The following receptors will be considered in the assessment:

- Users of the A57;
- Users of the A1133;
- Users of the local road network;
- Residents of Darlton, along the A57 corridor;
- Residents of Dunham on Trent, along the A57 corridor;
- Residents of Newton on Trent, along the A57 corridor;
- Residents of Ragnall; and
- Residents living alongside the local road network.

12.22. These will be confirmed once the construction traffic impact review has been undertaken.

Methodology proposed to Undertake Detailed Assessment

Further Baseline Data

12.23. Data for use in the assessment will include the following desk top sources:

- Active travel data from OS mapping, Lincolnshire CC PRoW Interactive map, Nottinghamshire County Council PRoW map and the Sustrans National Cycle Route (NCR) map;
- The online accident statistics database Crashmap.co.uk;
- Online public transport timetables for services operating on the study area roads;
- Department for Transport (DfT) traffic count data for the study area network; and
- Aerial photography, OS mapping and other map data sources.

12.24. Further traffic flow information will be obtained from new Automatic Traffic Count (ATC) surveys undertaken at various locations within the Study Area, to help determine overall traffic flows in the area and at sensitive locations.

12.25. The baseline traffic survey information obtained from the DfT or new traffic surveys will be factored using Low National Road Traffic Forecast (NRTF) Low growth assumptions to develop a future year baseline traffic flow for use in the assessment.

Approach to Assessment

12.26. The assessment would be undertaken in accordance with the Institute of Environmental Management and Assessment (IEMA) Environmental Assessment of Traffic and Movement (2023).

12.27. This guidance notes two rules to be used as a screening process to identify the appropriate extent of the assessment area and likelihood of impacts. These are:

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

12.28. Where the predicted increase in traffic flow is lower than these thresholds, then the impact is considered insignificant and as such, no further assessments are required.

12.29. Where construction traffic flows meet or exceed these thresholds, the significance of traffic and transport effects (including any cumulative development) will be determined by assessing the sensitivity of receptors against the magnitude of change to categorise significance as Major, Moderate, Minor or Negligible (see Table 12-1).

12.30. The scope to the Transport Assessment will depend upon the anticipated number of construction trips. The approach will be agreed in consultation with the relevant authorities.

12.31. Where large scale High Voltage (HV) component loads are required for the electrical grid connection, these will be delivered as Abnormal Indivisible Loads (AIL). Detailed swept path analyses will be undertaken for the main constraint points on the route from the nearest suitable trunk road junction through to the proposed substation access junction to demonstrate that components can be delivered to Site and to identify any temporary road works which may be necessary. A Route Survey Report describing the route and the proposed operational management of the deliveries will be submitted in support of the application.

Construction and Decommissioning

12.32. The Institute of Environmental Management and Assessment (IEMA) Environmental Assessment of Traffic and Movement (2023) will be used to characterise the environmental traffic and transport effects (off-site effects) and the assessment of significance of major new developments. The guidelines are intended to complement professional judgement and the experience of trained assessors.

12.33. In terms of traffic and transport impacts, the receptors are the users of the roads within the study area and the locations through which those roads pass.

12.34. The sensitivity of receptors is detailed in the following summary table.

Table 12-1 Classification of Receptor Sensitivity

Sensitivity of Receptor	Road User Definition
High	Where the road is a minor rural road, not constructed to accommodate frequent use by HGVs. Includes roads with traffic control signals, waiting and loading restrictions, traffic calming measures.
Medium	Where the road is a local A or B class road, capable of regular use by HGV traffic. Includes roads where there is some traffic calming or traffic management measures.
Low	Where the road is Trunk or A-class, constructed to accommodate significant HGV composition. Includes roads with little or no traffic calming or traffic management measures.
Negligible	Where roads have no adjacent settlements. Includes new strategic trunk roads that would be little affected by additional traffic and suitable for Abnormal Loads and new strategic trunk road junctions capable of accommodating Abnormal Loads.

Sensitivity of Receptor	Criteria for Residents / Locations
High	Where a location is a large rural settlement containing a high number of community and public services and facilities.
Medium	Where a location is an intermediate sized rural settlement, containing some community or public facilities and services.
Low	Where a location is a small rural settlement, few community or public facilities or services.

Sensitivity of Receptor	Criteria for Residents / Locations
Negligible	Where a location includes individual dwellings or scattered settlements with no facilities.

12.35. The IEMA Guidelines identify the key impacts that are most important when assessing the magnitude of traffic impacts from an individual development. The impacts and levels of magnitude are discussed below:

- Severance – the IEMA Guidance advises that, "The Department for Transport has historically set out a range of indicators for determining the significance of severance. Changes in traffic flow of 30%, 60% and 90% are regarded as producing 'slight', 'moderate' and 'substantial' changes in severance respectively. Although these thresholds no longer appear in Department for Transport guidance, they have not been superseded by subsequent changes to guidance and are established through planning case law. However, caution needs to be observed when applying these thresholds as very low baseline flows are unlikely to experience severance impacts even with high percentage changes in traffic." (Para 3.16). The Guidelines acknowledge that changes in traffic flows should be used cautiously, stating that "*the assessment of severance should pay full regard to specific local conditions, e.g. sensitivity of adjacent land uses, prevalence of vulnerable people, whether or not crossing facilities are provided, traffic signal settings, etc*." (Para 3.17).
- Driver delay – the IEMA Guidelines note that these delays are only likely to be "*significant when the traffic on the network surrounding the development is already at, or close to, the capacity of the system*" (Para 3.20).
- Pedestrian delay (incorporating delay to all non-motorised users) – the IEMA Guidance advises that "pedestrian delay and severance are closely related effects and can be grouped together. Changes in the volume, composition or speed of traffic may affect the ability of people to cross roads. In general, increases in traffic levels are likely to lead to greater increases in delay. Delays will also depend on the general level of pedestrian activity, visibility and general physical conditions of the development site." (Para 3.24). Furthermore, the guidance advises that *"…it is not considered wise to set down definitive thresholds. Instead it is recommended that the competent traffic and movement expert use their judgement to determine whether pedestrian delay constitutes a significant effect*." (Para 3.26).
- Non-motorised user amenity – the IEMA Guidance advises that, "*The 1993 Guidelines suggest that a tentative threshold for judging the significance of changes in pedestrian amenity would be where the traffic flow (or HGV component) is halved or doubled. Although these thresholds no longer appear in Department for Transport guidance, they have not been superseded by subsequent changes to guidance and are established through planning case law*." (Para 3.30).

- Fear and intimidation – there are no commonly agreed thresholds for estimating levels of fear and intimidation, from known traffic and physical conditions. However, as the impact is considered to be sensitive to traffic flow, changes in traffic flow of 30%, 60% and 90% are regarded as producing minor, moderate and substantial changes respectively in the guidelines. (Para 2.19). As such, this has been used to assess the potential impacts associated with construction activities around fear and intimidation on people in close proximity to the proposed development.
- Road safety – professional judgement would be used to assess the implications of local circumstances, or factors which may elevate or lessen risks of accidents. In line with the IEMA Guidance, those areas of collision clusters would be subject to detailed review.
- Road safety audits – it would be proposed to undertake any necessary Road Safety Audits (RSA) post consent and it is considered that this can be secured via a planning condition.
- Large loads – the movement of the AILs associated with the construction of the Proposed Development will be considered in full, within a separate route survey assessment, which identifies physical mitigation measures required to accommodate the predicted loads. Additional mitigation in terms of addressing potential impacts on sensitive receptors are included as standard within Section 11.7 Mitigation.

12.36. While not specifically identified, as more vulnerable road user, cyclists are considered in similar terms to pedestrians.

12.37. The significance of effects are determined using the following matrix in Table 12-2.

Table 12-2 Significance Criteria

		Magnitude of Change			
		High	**Medium**	**Low**	**Negligible**
Receptor Sensitivity	**High**	Major	Major	Moderate	Minor
	Medium	Major	Moderate	Minor	Negligible
	Low	Moderate	Minor	Negligible	Negligible
	Negligible	Minor	Negligible	Negligible	Negligible

Assumptions, Limitations and Uncertainties

12.38. The assessment of construction traffic will assume the use of standard construction techniques commensurate for the type of works being undertaken. The final techniques, plant selection and programme are expected to be determined by the appointed contractor, in consultation with relevant authorities prior to commencement of construction.

13. Air Quality

Introduction

13.1. This Chapter of the Scoping Report presents the scope of the environmental assessment for Air Quality. Specifically, the Chapter presents the policy and legislative context, the approach to collecting baseline data and then an overview of the relevant baseline conditions within the Site and surrounding area, based on current knowledge and understanding. It concludes by setting out the scope of assessment including, with justification, those matters that are proposed to be scoped out and in for detailed assessment and concludes by outlining the method that will be used to undertake the detailed assessment.

13.2. The Proposed Development will lead to temporary emissions of dust from the construction, which could impact on local amenity, the health of local residents and sensitive ecological sites. During construction and operation there will also be emissions associated with increased road traffic movements, which could also affect health and ecological sites. The principal pollutants of concern from road traffic sources are nitrogen dioxide (NO_2), and particulate matter (PM_{10} and $PM_{2.5}$).

13.3. Human health issues related to air quality will be considered in the Health Section of the Environmental Statement, with the proposed scope for Human Health found in Chapter 16.

Review of Policy, Legislation and Relevant Guidance

13.4. Legislation, planning policy and guidance relating to air quality, and pertinent to the Proposed Development comprises:

Legislation

- EU Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe;
- The Environmental Protection Act (1990);
- Part IV of the Environment Act (1995);
- The Clean Air Act (1993);
- The Air Quality (England) Regulations (2000);
- The Air Quality (England) (Amendment) Regulations (2002); and
- The Air Quality Standards Regulations (2010).

National Planning Policy

- Overarching National Policy Statement for Energy (EN-1) (2011) – specific reference to Part 5, Section 5.2 which relates to air quality and emissions;
- Draft Overarching National Policy Statement for Energy (EN-1) (2023) – specific reference to Section 5.2; and

- National Planning Policy Framework (2023) – specific reference to Section 15: Conserving and Enhancing the Natural Environment.
- The Environment Act 2021 (2021);
- Environmental Improvement Plan (2023).
- National Planning Policy Framework (2021);
- Clean Air Strategy (2019);
- Air Quality Strategy (2007);
- Air Quality Strategy (2023);
- The Environmental Targets (Fine Particulate Matter) (England) Regulations 2022
- Reducing Emissions from Road Transport: Road to Zero Strategy (2017); and
- National Air Quality Plan (2017)64 and Supplement (2018).

Local Planning Policy

- Newark and Sherwood District Council (2013), Local Development Framework, Allocations and Development Management, Development Plan Document - specifically Policy DM10
- Central Lincolnshire Local Plan (2023) – specifically Policy S14 and Policy S53
- Bassetlaw District Council (2010) Local Development Framework, Publication Core Strategy and Development Management Policies – specific reference to Policy DM10: Renewable and Low Carbon Energy.
- Draft Bassetlaw Local Plan (2023) 2020-2038: Main Modifications Version, August 2023. Policy ST51: Renewable Energy Generation

National Guidance

- Planning Practice Guidance (2023), Air Quality (2019)
- Environmental Protection UK (EPUK) & Institute of Air Quality Management (IAQM) Guidance: Land-Use Planning & Development Control: Planning for Air Quality (2017);
- IAQM Guidance on the Assessment of Dust from Demolition and Construction (2016); and
- Defra Local Air Quality Management Technical Guidance (TG(22)) (2022).

[64] Defra (2017) Air quality plan for nitrogen dioxide (NO2) in the UK, Available: https://www.gov.uk/government/publications/air-quality-plan-for-nitrogen-dioxide-no2-in-uk-2017.

Baseline Conditions

Approach to Collection of Baseline Data

13.5. For the purposes of the scoping report, air quality baseline conditions have been established using a number of approaches:

- Industrial and waste management sources that may affect the area have been identified using Defra's Pollutant Release and Transfer Register[65];
- Information on existing air quality has been obtained by collating the results of monitoring carried out by three local authorities;
- Background concentrations have been defined using 2023 Defra's 2018-based background maps[66]. These cover the whole of the UK on a 1x1 km grid and are intended to be representative of air quality conditions away from major roads or other significant sources of emissions; and
- Whether or not there are any exceedances of the annual mean limit value for NO_2 in the study area has been identified using the maps of roadside concentrations published by Defra[67] [68]. These are the maps used by the UK Government, together with the results from national Automatic Urban and Rural Network (AURN) monitoring sites that operate to the required data quality standards, to identify and report exceedances of the limit value. The national maps of roadside PM_{10} and $PM_{2.5}$ concentrations[68], which are available for the years 2009 to 2019, show no exceedances of the limit values anywhere in the UK in 2019.

13.6. With regards to the $PM_{2.5}$ targets, in March 2023, the Department for Levelling Up, Housing and Communities (DLUHC, 2023) explained that the new PM2.5 targets will:

"*need to be integrated into the planning system, and in setting out planning guidance for local authorities and businesses, we will consider the specific characteristics of PM2.5. The guidance will be forthcoming in due course, until then we expect local authorities to continue to assess local air quality impacts in accordance with existing guidance.*"

13.7. For the time being, therefore, no assessment is required, and indeed no robust assessment is possible, in relation to the new $PM_{2.5}$ targets and they are not considered further.

[65] Defra (2023) UK Pollutant Release and Transfer Register, Available: http://prtr.defra.gov.uk/map-search.

[66] Defra (2023) Local Air Quality Management (LAQM) Support Website, Available: http://laqm.defra.gov.uk/.

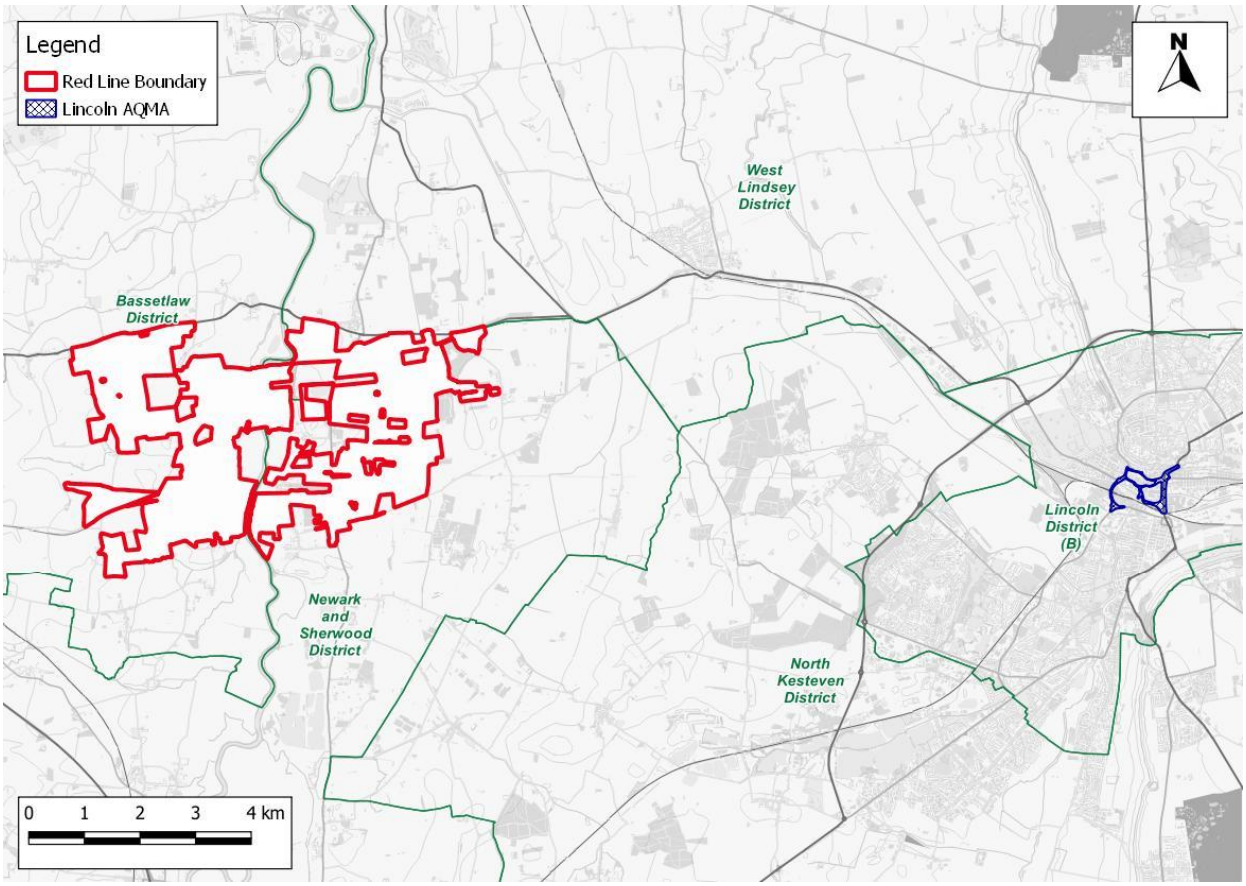
[67] Defra (2020) 2020 NO2 projections data (2018 reference year), Available: https://uk-air.defra.gov.uk/library/no2ten/2020-no2-pm-projections-from-2018-data.

[68] Defra (2023) UK Ambient Air Quality Interactive Map, Available: https://uk-air.defra.gov.uk/data/gis-mapping.

Relevant Baseline Conditions

13.8. The Proposed Development falls partially within the administrative boundaries of Bassetlaw District Council (BDC), West Lindsey District Council (WLDC) and Newark and Sherwood District Council (NSDC). The nearest Air Quality Management Area (AQMA) to the Site is located in Lincoln city centre, approximately 11 km to the east, and the Proposed Development is not expected to affect air quality within this area. The location and setting of the Site are presented in Figure 13-1.

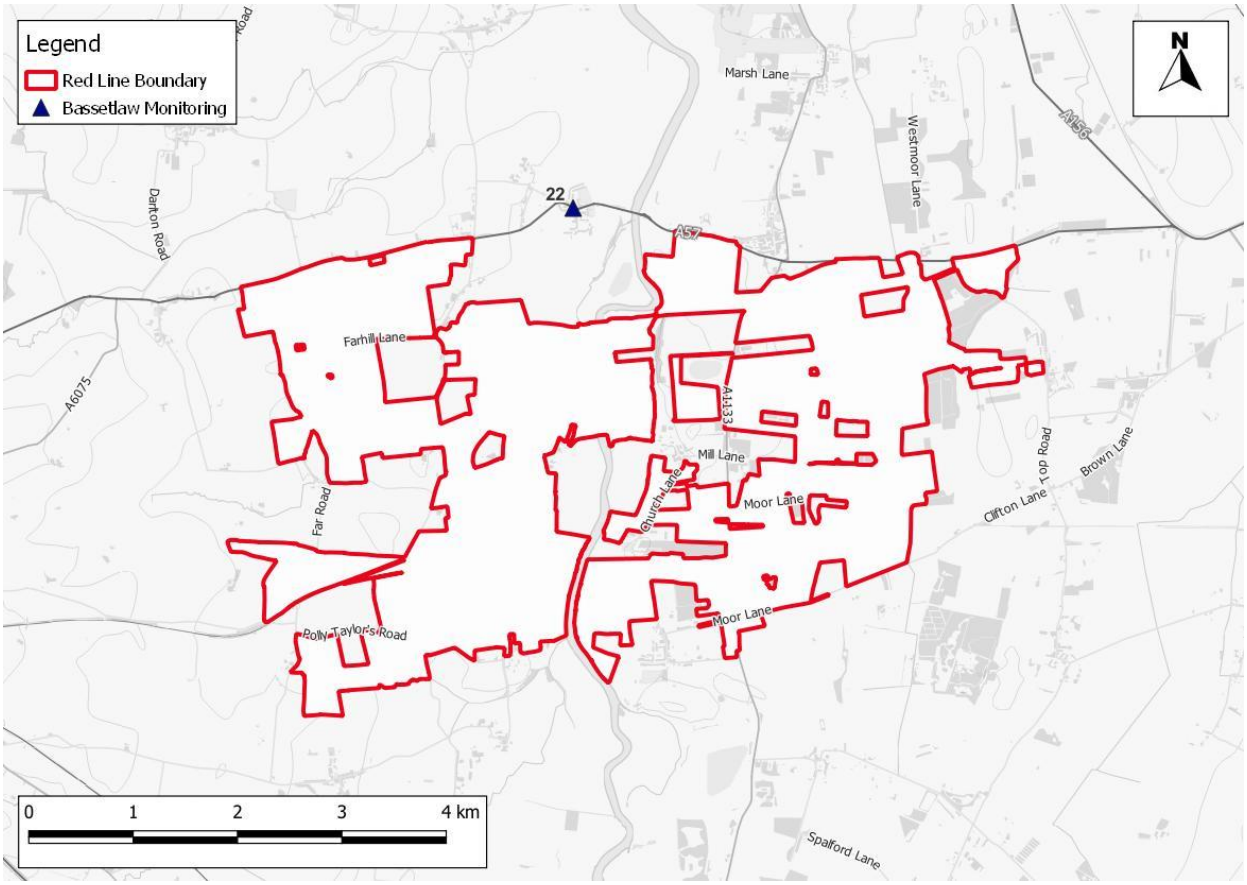
Figure 13-1: Site Location and Setting in Context of Air Quality



13.9. No significant industrial sources have been identified that are likely to affect the Proposed Development, in terms of air quality.

13.10. BDC monitors air quality throughout its administrative boundary using a network of NO_2 diffusion tubes, of which one site (Site 22) is located on the A57 south of Dunham on Trent. The location of the monitor in relation to the Proposed Development is shown in Figure 13-2 and annual mean NO_2 results for 2015 to 2021 are shown in Table 13-1. Results have been taken from BDC's 2020 and 2022 Air Quality Annual Status Reports[69] [70].

Figure 13-2: Air Quality Monitoring Location



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13.11. WLDC and NSDC also monitor air quality using diffusion tubes, although the monitoring sites nearest to the Proposed Development are located over 14 km to the north and 13 km to the west, respectively, so are not considered to be representative of conditions in the study area.

[69] Bassetlaw District Council (2020), 2020 Air Quality Annual Status Report, Available: https://data.bassetlaw.gov.uk/air-quality-management.aspx

[70] Bassetlaw District Council (2022), 2022 Air Quality Annual Status Report, Available: https://data.bassetlaw.gov.uk/air-quality-management.aspx

Table 13-1: Summary of Annual Mean NO2 Monitoring (2015-2021) (µg/m^3)

Site ID	Site Type	Location	2015	2016	2017	2018	2019	2020	2021
22	Roadside	Dunham, Little Styrrup 22	25.9	25.9	25.2	24.1	23.5	17.6	18.1
Objective			**40**						

13.12. As shown in Table 13-1, there have been no recorded exceedances of the annual mean NO_2 objective (of 40 µg/m^3) at the nearby monitoring site since at least 2015, with measured concentrations well below the air quality objective for the protection of human health. Concentrations have therefore also remained well below 60 µg/m^3, indicating that exceedances of the 1-hour mean NO_2 objective are unlikely to have occurred (according to methodology set out in Defra's LAQM.TG(22) guidance**Error! Bookmark not defined.**). There has been a slight decrease in concentrations observed since 2015, which is in line with trends observed nationally.

13.13. While 2020 and 2021 results have been presented for completeness, they will not be relied upon in any way as they are unlikely to be representative of 'typical' air quality conditions due to the impact of the COVID-19 pandemic on traffic volumes and thus pollutant concentrations.

13.14. No monitoring of PM_{10} or $PM_{2.5}$ concentrations is carried out by any of the nearby local authorities, but based on the rural location of the Site away from any major sources of emissions, the baseline pollutant concentrations are expected to be close to background levels.

13.15. There are no AURN monitoring sites[71] within 1 km of the Site with which to identify exceedances of the annual mean NO_2 limit value. Defra's roadside annual mean NO_2 concentrations, which are used to identify and report exceedances of the limit value, do not identify any exceedances within the study area in 2019. As such, there is considered to be no risk of a limit value exceedance in the vicinity of the Proposed Development by the time that it is operational.

13.16. Estimated background concentrations in the study area, derived from Defra's 2018-based background maps[66], are set out in Table 13-2 and are all well below the objectives for all pollutants. A range of values is presented as the study area covers multiple 1x1 km grid squares. As these predictions were made using 2018 data, they do not include any allowance for changes in activity due to the COVID-19 pandemic; they are therefore expected to be pessimistic and overestimate background concentrations to the extent that they are affected by the pandemic.

[71] Defra (2023) Defra AURN Archive, Available: https://uk-air.defra.gov.uk/interactive-map?network=aurn.

Table 13-2: Estimated Annual Mean Background Concentrations in 2019 (µg/m^3)

Year	NO_2	PM_{10}	$PM_{2.5}$
2019	8.2 – 10.8	15.9 – 17.4	8.7 – 9.2
Objective	**40**	**40**	**20** [a]

[a] The 20 µg/m^3 $PM_{2.5}$ objective, which was to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

13.17. Air quality is generally expected to improve with time, for example due to more stringent emissions standards for motor vehicles. As such, the likely evolution of the baseline conditions if the Proposed Development comes forward with cumulative schemes, or if the Proposed Development did not come forward, will be considered.

Scope of Assessment

Assessment Criteria

13.18. There are no formal assessment criteria for the assessment of the effects from dust emissions. In the absence of formal criteria, the approach developed by the IAQM will be used.

13.19. The Government has established a set of air quality standards and objectives to protect human health, which will be used in the assessment of the effects of emissions from road traffic. The 'standards' are set as concentrations below which effects are unlikely even in sensitive population groups, or below which risks to public health would be exceedingly small. They are based purely upon the scientific and medical evidence of the effects of an individual pollutant. The 'objectives' set out the extent to which the Government expects the standards to be achieved by a certain date. They take account of economic efficiency, practicability, technical feasibility and timescale. The objectives for use by local authorities are prescribed within the Air Quality (England) Regulations (2000) and the Air Quality (England) (Amendment) Regulations (2002).

13.20. The UK-wide objectives for nitrogen dioxide and PM_{10} were to have been achieved by 2005 and 2004 respectively, and continue to apply in all future years thereafter. Measurements across the UK have shown that the 1-hour nitrogen dioxide objective is unlikely to be exceeded at roadside locations where the annual mean concentration is below 60 µg/m^3. Measurements have also shown that the 24-hour mean PM_{10} objective could be exceeded at roadside locations where the annual mean concentration is above 32 µg/m^3.

13.21. The objectives apply at locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the objective. Defra explains where these objectives will apply in its LAQM.TG(22) guidance**Error! Bookmark not defined.**. The annual mean objectives for NO_2 and PM_{10} are considered to apply at the façades of residential properties, schools, hospitals etc.; they do not apply at hotels. The 24-hour mean objective for PM_{10} is considered to apply at the same locations as the annual mean objective, as well as in gardens of residential properties and at hotels. The 1-hour mean objective for NO_2 applies wherever members of the public might regularly spend 1-hour or more, including outdoor eating locations and pavements of busy shopping streets.

13.22. For $PM_{2.5}$, the objective set by Defra for local authorities is to work toward reducing concentrations without setting any specific numerical value. In the absence of a numerical objective, it is convention to assess local air quality impacts against the EU limit value of 20 µg/m^3. The limit values for NO_2 and PM_{10} are the same as the objectives.

Important Receptors Identified

13.23. As set out in the IAQM's Guidance on the Assessment of Dust from Demolition and Construction[Error! Bookmark not defined.] the construction dust risk assessment will consider the potential for impacts on sensitive receptors located within 350m of the Site boundary, and within 50m of the routes anticipated to be used by construction vehicles up to 500m from the Site exit(s). For the construction dust assessment, relevant receptors in the study area include residential properties (high sensitivity receptors) as well as places of work (medium sensitivity receptors).

13.24. For the assessment of impacts of airborne emissions from vehicles associated with the Proposed Development, existing sensitive receptors will be identified based on detailed maps, satellite imagery and plans of the Proposed Development. Existing receptors will include residential properties and schools in the study area. Receptors will be identified to represent a range of exposure, at worst-case locations with respect to air quality impacts. All receptors where the air quality objectives apply will be considered to be 'high' sensitivity receptors. It is not possible to detail specific receptors at this stage as information on the routing and volume of additional traffic is not yet available.

Likely Significant Effects Scoped Out from Detailed Assessment

13.25. Table 13-3 presents the elements which have been scoped out from the detailed assessment, as it is considered no likely significant effects will occur.

Table 13-3: Likely Significant Effects Scoped out from the Air Quality Detailed Assessment

Elements Scoped Out	Justification
Construction and Decommissioning Plant Emissions	Emissions from plant associated with construction and decommissioning will not be explicitly modelled or assessed, as the relevant guidance from the IAQM24 states that "*experience from assessing the exhaust emissions from on-site plant (also known as non-road mobile machinery or NRMM) […] suggests that they are unlikely to make a significant impact on local air quality and in the vast majority of cases they will not need to be quantitatively assessed*". Significant effects as a result of NRMM emissions will thus be scoped out. However, suitable mitigation measures for site plant will be presented as part of the environmental measures based on advice presented in the IAQM guidance documents.

Operational Effects	The operation of the Proposed Development will not result in any direct emissions to air. There will be a small number of operational traffic movements associated with maintaining the solar farm, the number is likely to well below the screening thresholds for a detailed air quality assessment set out in the EPUK / IAQM guidance[23]; thus, the Proposed Development will likely not result in any significant effects during operation and has been scoped out.
Ecological Effects	As detailed in Chapter 6, there are no European sites within 200m of roads on which a detectable rise in traffic would be predicted during the construction and decommissioning phases. There are two SSSI within 200m of the A1133 (Spalford Warren SSSI and Besthorpe Warren SSSI), however these are south of the Site on a stretch of road that is unlikely to be a major construction and decommissioning traffic route given access from the A57 is proposed. Further, construction and decommissioning traffic can be discounted as the increase in traffic will be temporary and limited ensuring that the extent of the effect will be low, temporary and reversible. This justification equally applies to LWS present within the area. Given these reasoning the effects of changes in air quality on designated ecological sites have also been scoped out.

Likely Significant Effects Scoped into the Detailed Assessment

13.26. Potential air quality effects that will be considered in relation to the construction and operation of the Proposed Development include:

- Impacts on dust soiling and PM_{10} emissions during the enabling, construction and decommissioning of the Proposed Development, at existing sensitive receptors; and
- Impacts of NO_2, PM_{10} and $PM_{2.5}$ emissions from vehicles associated with the enabling and construction, and decommissioning, of the Proposed Development during the peak year, at existing sensitive receptors.

Methodology proposed to Undertake Detailed Assessment

Further Baseline Data

13.27. Further baseline pollutant concentrations in the peak year of construction at existing receptors will be predicted using the ADMS-Roads dispersion model, which will be used in the air quality assessment to contextualise the impacts of the Proposed Development and determine the significance of any effects. Details of the model inputs, assumptions and the verification method are set out below. Where assumptions are made, a realistic worst-case approach will be adopted.

Construction

13.28. The dispersion model ADMS-Roads will be used to quantify the impacts that road traffic emissions (associated with existing and development-generated road traffic) will have on air quality at existing receptor locations. Vehicle emissions will be derived using Defra's latest Emission Factor Toolkit (EFT) (v11.0).

13.29. The model will be used to predict annual mean concentrations of NO_2, PM_{10} and $PM_{2.5}$ at representative likely worst-case existing receptors, which will in turn also be used to assess the likelihood of exceedances of the 1-hour mean NO_2 objective and 24-hour mean PM_{10} objective according to the methodology set out in LAQM.TG(22).

13.30. The assessment will be based on the likely worst-case option with respect to traffic generation for the assessment of the impacts of the Proposed Development on existing local air quality (i.e. the year of construction or decommissioning predicted to generate the greatest number of additional vehicle trips).

13.31. The scenarios that will be considered as part the assessment will include:

- Current baseline scenario (the year 2019 or 2022 will be considered to correspond to the most recent year of data unaffected by the COVID pandemic);
- Peak year of construction – without the Proposed Development, but including traffic associated with relevant cumulative schemes, this being the future baseline; and
- Peak year of construction– with the Proposed Development and including traffic associated with relevant cumulative schemes, this being the assessment case.

13.32. An important element of the modelling study will be to verify the model output against measured results. This will be undertaken using the existing nearby diffusion tube monitor operated by BDC (located at the roadside of the A57 in Dunham on Trent), and an adjustment factor will be determined in line with the methodology set out in Defra's TG(22)**Error! Bookmark not defined.** guidance document.

13.33. Meteorological data will be taken from either the Waddington or Scampton meteorological monitoring stations, which are the nearest and most representative meteorological sites to the Proposed Development. Meteorological data for 2019 or 2022 (depending on the baseline year) will be used in the dispersion model to match the latest year of suitable local monitoring data.

13.34. Background pollutant concentrations will be determined using data derived from the Defra background maps.

13.35. There is no official guidance in the UK in relation to development control on how to describe air quality impacts and effects, nor how to assess their significance. The approach developed jointly by EPUK and the IAQM**Error! Bookmark not defined.** will therefore be used. This includes defining descriptors of the impacts at individual receptors, which take account of the percentage change in concentrations relative to the relevant air quality objective, rounded to the nearest whole number, and the absolute concentration relative to the objective. The overall significance of the air quality effects is then determined using professional judgement, giving consideration to various factors including the frequency, duration and magnitude of the predicted impacts, their relationship to appropriate air quality objectives and the high sensitivity of the receptors.

Decommissioning

13.36. Dependent on the availability of information relating to the decommissioning phase of the Proposed Development, an assessment of the decommissioning phase will follow the same approach as the above construction phase.

Assumptions, Limitations and Uncertainties

13.37. The road traffic emissions dispersion model used in the assessment is dependent upon the traffic data that have been input, which will have inherent uncertainties associated with them.

13.38. Predicting pollutant concentrations in a future year will always be subject to greater uncertainty. For obvious reasons, the model cannot be verified in the future, and it is necessary to rely on a series of projections provided by DfT and Defra as to what will happen to traffic volumes, background pollutant concentrations and vehicle emissions. Historically, Defra's EFT had a tendency to over-state emissions reductions into the future. However, analysis of the most recent versions of Defra's EFT carried out by AQC[72] [73], suggest that, on balance, these versions are unlikely to over-state the rate at which NOx emissions decline in the future at an 'average' site in the UK. In practice, the balance of evidence suggests that NOx concentrations are most likely to decline more quickly in the future, on average, than predicted by the EFT, especially against a base year of 2016 or later. Using EFT v11.0 for future-year forecasts in this report thus provides a robust assessment, given that the model has been verified against measurements made in 2019.

13.39. Forecasts of future-year concentrations are usually based on measurements made during a recent year. They then take account of projected changes over time to factors such as the composition of the vehicle fleet and the uptake of other new technologies, as well as population increases etc. In early 2020, activity in the UK was disrupted by the Covid-19 pandemic. As a result, concentrations of traffic-related air pollutants fell appreciably[74]. While the pandemic may cause long-lasting changes to travel activity patterns, it is reasonable to expect a return to more typical activity levels in the future. 2020 is thus likely to present as an atypically low pollution year for roadside pollutant concentrations, although recent analysis of 2021 data indicates that concentrations in that year were less affected[75].

13.40. There are then additional uncertainties, as models are required to simplify real-world conditions into a series of algorithms. At all stages of the assessment, a reasonable worst-case approach will be adopted to ensure the conclusions are robust.

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[72] AQC (2020) Performance of Defra's Emission Factor Toolkit 2013-2019, Available: https://www.aqconsultants.co.uk/CMSPages/GetFile.aspx?guid=7fba769d-f1df-49c4-a2e7-f3dd6f316ec1.

[73] AQC (2020) Comparison of EFT v10 with EFT v9, Available: https://www.aqconsultants.co.uk/CMSPages/GetFile.aspx?guid=9d6b50e1-3897-46cf-90f1-3669c6814f1d.

[74] Defra Air Quality Expert Group (2020) Estimation of changes in air pollution emissions, concentrations and exposure during the COVID-19 outbreak in the UK- Rapid evidence review, Available: https://uk-air.defra.gov.uk/assets/documents/reports/cat09/2007010844_Estimation_of_Changes_in_Air_Pollution_During_COVID-19_outbreak_in_the_UK.pdf.

[75] AQC (2022) Trends in UK NOx and NO2 Concentrations through the COVID-19 Pandemic: January 2022

13.41. The following key assumptions will be made in the air quality assessment to facilitate a reasonable worst-case assessment of likely significant effects:

- That the Waddington and Scampton meteorological monitoring stations appropriately represent conditions in the study area; and
- That travel activity patterns in the future assessment years will return to historically-normal levels (i.e. pre-pandemic) with no long-lasting changes to travel behaviour.

14. Carbon and Climate Change

Introduction

14.1. This Chapter of the Scoping Report presents the scope of the environmental assessment for Carbon and Climate Change. Specifically, the Chapter presents the policy and legislative context, the approach to collecting baseline data and then an overview of the relevant baseline conditions within the Site and surrounding area, based on current knowledge and understanding. It concludes by setting out the scope of assessment including, with justification, those carbon and climate change matters that are proposed to be scoped out and in for detailed assessment and concludes by outlining the method that will be used to undertake the detailed assessment.

14.2. Within this Chapter, the term 'carbon' is used to describe all greenhouse gas (GHG) emissions, i.e. all emissions which might contribute to climate change, the predominant contributor of which is carbon dioxide (CO_2).

Review of Policy, Legislation and Relevant Guidance

14.3. Legislation, planning policy and guidance relating to climate change, and pertinent to the Proposed Development comprises:

Legislation

- Climate Change Act 2008[76] and 2050 Target Amendment Order (2019); and
- The Carbon Budget Order 2021.

National Planning Policy

- Overarching National Policy Statement for Energy (EN-1) (2011) – specific reference to Section 4.8 which relates to climate change adaption;
- Draft Overarching National Policy Statement for Energy (EN-1) (2023)[77] – specific reference to Part 5, Section 5.3 which relates to greenhouse gas emissions;
- Draft National Policy Statement for Electricity Networks Infrastructure (EN- 5) (2023) – specific reference to paragraph 2.2.6; and
- National Planning Policy Framework (2023) Section 14;

Local Planning Policy

- Newark and Sherwood District Council (2013), Local Development Framework, Allocations and Development Management, Development Plan Document - specifically Policy DM4
- Central Lincolnshire Local Plan (2023) – specifically Policy S11 Embodied Carbon.

[76] Her Majesty's Stationery Office (2008) The Climate Change Act 2008.

[77] Department for Energy Security & Net Zero (2023) Overarching National Policy Statement for Energy (EN-1). Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1147380/NPS_EN-1.pdf

- Bassetlaw District Council (2010) Local Development Framework, Publication Core Strategy and Development Management Policies – specific reference to Policy DM10: Renewable and Low Carbon Energy.
- Draft Bassetlaw Local Plan (2023) 2020-2038: Main Modifications Version, August 2023. Policy ST51: Renewable Energy Generation and Policy ST50: Reducing Carbon Emissions, Climate Change Mitigation and Adaptation.

Guidance

- Planning Practice Guidance (2023), Climate Change, published (12 June 2014, last updated 15 March 2019.
- Institute of Environmental Management and Assessment (IEMA) EIA Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance (2022);
- IEMA (2020) EIA Guide to: Climate Change Resilience and Adaptation
- Royal Institute of Chartered Surveyors (RICS) (2017) Whole Life Carbon Assessment for the Built Environment; and
- PAS 2080:2023 Carbon Management in Buildings and Infrastructure.

Baseline Conditions

14.4. The baseline for the carbon and climate change assessment will be related to the current activities at the Site, which includes carbon emissions from farming activities. Where possible, carbon from these existing activities will be calculated. However, where information cannot be obtained to provide a worst-case carbon assessment, the baseline for carbon emissions will be assumed to be zero. This is a valid approach as detailed in the IEMA Guidance**Error! Bookmark not defined.** as it will result in a worst-case quantification of the net change in carbon emissions. Additionally, a comparison of the carbon emissions associated with the construction and operation of the Proposed Development will be made to the equivalent average lifecycle emissions associated with the baseline UK national grid electricity supply.

14.5. The assessment of climate resilience and adaptation will focus on the future climatic changes in metrological conditions. Information will be obtained from the Met Office climate projections for the UK (UKCP18); details contained in technical studies included in the ES (flood risk and drainage, air quality and noise and vibration) and from reliable data sources.

Environmental Measures

14.6. Given the nature of the Proposed Development, its main contribution to enhancing the environment is in aiding the UK's transition to a net zero electricity grid. Other minor contributions, such as reducing the carbon emissions associated with the construction and operation of the Proposed Development, will be detailed in the EIA.

Scope of Assessment

Important Receptors Identified

14.7. The assessment of effects on climate change will consider the release of carbon from activities associated with the Proposed Development. Carbon has the potential to affect climate change through, for example, an increase in global temperature.

14.8. The assessment of carbon will not include identification of sensitive receptors, as carbon emissions do not directly affect specific locations, but lead to indirect effects by contributing to climate change. Impacts on specific areas will not be included within this assessment, since the effects of carbon emissions will affect the global atmosphere, and therefore need to be considered in a total context, rather than on localised areas.

14.9. The assessment of climate resilience and adaptation will focus on the Proposed Development itself as the sensitive receptor.

Likely Significant Effects Scoped Out from Detailed Assessment

14.10. The carbon and climate change assessment will include an assessment of the effects of carbon emissions on climate, as well as the potential effects associated with the resilience and adaptation of the Proposed Development to future climate change.

14.11. As all carbon emissions have the potential to affect climate change it is not typical to attempt to distinguish effects for carbon emissions from construction and operational phases separately. The carbon assessment will therefore examine all carbon emissions associated with the construction and operation of the Proposed Development and the resultant effects on climate change.

14.12. The carbon assessment will include a detailed footprint of key construction and operational phase carbon emissions. The emissions sources included in the assessment are described in detail later in this Chapter. It is proposed to scope out some minor carbon emissions sources from the assessment. These sources will only make up a very small component of the total Proposed Development carbon footprint and their exclusion will therefore not materially affect the assessment. IEMA guidance acknowledges that emissions sources that combine to contribute less than 5% of a project's carbon emissions can typically be excluded from the assessment. The proposed exclusions for the carbon assessment are:

- carbon emissions from the treatment and disposal of waste materials during both construction and operation. These will form a very small component of the carbon footprint of the Proposed Development and will be minimised through standard best practice including the implementation of Site Waste Management Plans;
- carbon emissions associated with water use (including water treatment and supply (pumping)). The Proposed Development (during construction or operation) will not have a substantial potable water consumption and therefore these emissions are expected to result in very small contributions to the total carbon footprint; and
- carbon emissions from decommissioning of the Proposed Development at the end of its operational life are scoped out. Decommissioning is, for the purposes of this assessment considered to be at least 45 years in the future, by which time the UK Government has committed to a net zero economy (to occur by 2050). It is likely in 45 years there will be new technology and recycling facilities. The emissions associated with decommissioning of the Proposed Development are therefore anticipated to be net zero even though the mechanisms to achieve this are not yet clearly defined.

14.13. Exclusion of these sources from the carbon footprint will not prevent these emissions sources being considered in the environmental measures included for the Proposed Development, in line with IEMA guidance.

Likely Significant Effects Scoped into the Detailed Assessment

14.14. The potential carbon and climate change effects associated with the Proposed Development that will be assessed in the ES, are:

- effects of carbon emissions during construction and operation of the Proposed Development on climate change; and
- effects associated with the resilience and adaptation of the Proposed Development to future climate change.

14.15. In terms of the carbon emissions assessment, the following key emissions sources associated with the Proposed Development will be included in the assessment:

- embodied carbon in construction materials used to construct the Proposed Development;
- carbon emissions from construction transport;
- carbon emissions from construction phase electricity and fuel consumption;
- carbon emissions from operational transport including road traffic;
- carbon emissions from the operational phase energy consumption and generation; and
- carbon emissions from repair, maintenance and replacement of components of the Proposed Development during its lifetime; and
- carbon emissions from the operational phase energy consumption and emissions saved as a result of clean energy generated by the Proposed Development and transported to the Grid thereby supporting the greening of the UK's energy supply.

Methodology proposed to Undertake Detailed Assessment

Carbon Assessment

14.16. The carbon assessment will utilise the following approaches:

- The embodied carbon from construction will be calculated to account for carbon emissions arising from the manufacture and production of construction materials. The assessment of embodied carbon covers "cradle to gate" emissions (i.e. carbon emissions from the extraction of raw materials through to finished construction products). Embodied carbon emissions will be calculated using a range of sources including University of Bath Inventory of Carbon and Energy, product Environmental Performance Declarations, and published lifecycle assessment reports and research where relevant;

- Carbon emissions from electricity and fuel use during construction will be estimated based on predicted construction phase electricity consumption and fuel usage, using carbon emissions factors published by the Department for Energy Security & Net Zero (DESNZ)78;
- Carbon emissions from road transport (during both construction and operation) will be calculated using carbon factors for transport modes derived from DfT's Webtag tool79;
- Carbon emissions associated with the repair, maintenance and replacement of components of the Proposed Development during its lifetime will be calculated using the same data and resources used to calculate embodied carbon, taking account of the anticipated lifetime and replacement frequency of key components of the Proposed Development including PV panels, inverters, transformers, structures, cables and Battery Energy Storage Systems (BESS); and
- Carbon emissions savings from the electricity generated by the Proposed Development will be calculated through comparison to the current carbon intensity of fossil fuel power generation (Combined Cycle Gas Turbines – CCGT). This comparison is relevant as the electricity generated by the Proposed Development will replace energy from fossil fuel combustion as part of the UK's transition to Net Zero. Carbon emissions factors for CCGT will be obtained from the latest Government UK energy fuel mix disclosure tables.

14.17. Where possible, the net increase in carbon emissions during operation will be calculated by comparison to the existing, baseline emissions.

Assessment of Significance

14.18. The approach to defining likely significant effects will be carried out in three steps, in accordance with the 2022 IEMA guidelines on assessing greenhouse gas emissions and evaluating their significance:

- The first step is to compare the Proposed Development's carbon emissions in the opening year to the baseline carbon emissions to determine whether there is a net increase or decrease in carbon emissions as a result of the Proposed Development;
- The second step is to compare the calculated change in emissions to local and regional carbon emissions for context; and
- The third step applies expert judgment on the significance of those emissions taking into account the changes in emissions, their contribution to relevant carbon budgets, their consistency with relevant policy, and an evaluation of the environmental measures proposed to avoid, reduce and compensate carbon emissions.

[78] Department for Energy Security & Net Zero (2023) Greenhouse gas emissions factors for company reporting 2023. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1166236/ghg-conversion-factors-2023-condensed-set-update.xlsx

[79] Department for Transport (2023) TAG data book. Available: https://assets.publishing.service.gov.uk/media/646f8c844a892b000c746ba4/tag-data-book-v1.21-may-2023-v1.0.xlsm

14.19. The assessment will be undertaken in line with the IEMA guidelines, taking account of all relevant national, regional and local policies relating to carbon emissions and climate change. The level of significance will be taken using the criteria as defined in the IEMA guidelines in combination with professional judgement.

14.20. In relation to carbon mitigation, the approach will be to follow best practice principles to avoid and reduce carbon emissions in order to minimise the carbon impacts of the Proposed Development as far as is commercially and technically viable.

Climate Resilience and Adaptation Assessment

14.21. The assessment of the resilience and adaptation of the Proposed Development to future changes in climate will be undertaken in accordance with the methodology described in IEMA guidance.

14.22. The assessment will draw on technical input from a number of other technical assessments such as flood risk and drainage, air quality, and noise and vibration.

14.23. The assessment will analyse Met Office climate projections for the UK (UKCP18) to identify likely future changes in local climate and will set out the measures incorporated into the design of the Proposed Development that will ensure the Proposed Development is resilient to future climate risks such as increased extreme weather events and warmer summer temperatures.

Assumptions, Limitations and Uncertainties

Carbon Assessment

14.24. It is necessary to make a number of assumptions when undertaking a GHG assessment; assumptions made will generally seek to reflect a realistic worst-case scenario. Key assumptions include:

- Embodied carbon emissions will be based on the latest design at the point of submission of the PEIR and subsequent ES, and will use the latest available embodied carbon data and resources to estimate the embodied carbon associated with the Proposed Development;
- The calculation of construction transport emissions will make a number of high level assumptions about the type and the origin and destination of these vehicles, including imports of components to the UK. To overcome uncertainty, assumptions will be designed to overestimate rather than underestimate emissions where necessary;
- The calculation of lifetime electricity generated by the Proposed Development will rely on assumptions regarding the likely performance degradation of PV panels during their lifetime, to ensure the total lifetime electricity generation is not overestimated; and
- Emissions for repair, maintenance and replacement of the Proposed Development during its lifetime will be based on current carbon emissions factors and will therefore not account for future decarbonisation in the manufacturing sector, making the assessment worst-case.

Climate Resilience and Adaptation Assessment

14.25. The assessment will provide a broad indication of the potential impacts of climate change on the Proposed Development based on a qualitative assessment and professional judgement using knowledge of similar schemes. The UKCP18 projections are the most up-to-date projections of climate change for the UK.

14.26. UKCP18 provides probabilistic projections of future climate for a range of emissions scenarios. Future GHGs emissions, and resulting pathway, are uncertain. A precautionary approach, consistent with IEMA guidance will therefore be adopted here by selecting a high emissions scenario (RCP8.5).

14.27. Any further research, analysis or decision-making should take account of the accuracies and uncertainties associated with climate projections. Any future decision-making based on this analysis should consider the most up-to-date projections and range of literature, evidence and research available at the time.

14.28. The embedded adaptation measures will be based on information provided in the Project Description. The determination of significance will be undertaken under the assumption that industry design standards will be adhered to where detailed design information is unavailable.

15. Noise and Vibration

Introduction

15.1. This Chapter of the Scoping Report presents the scope of the environmental assessment for Noise and Vibration. Specifically, the Chapter presents the policy and legislative context, the approach to collecting baseline data and then an overview of the relevant baseline conditions within the Site and surrounding area, based on current knowledge and understanding. It concludes by setting out the scope of assessment including, with justification, those noise and vibration matters that are proposed to be scoped out and in for detailed assessment and concludes by outlining the method that will be used to undertake the detailed assessment.

Review of Policy, Legislation and Relevant Guidance

15.2. Legislation, planning policy and guidance relating to noise and vibration, and pertinent to the Proposed Development comprises:

Legislation

- Environmental Protection Act, 1990;
- Control of Pollution Act, 1974.

National Planning Policy

- Overarching National Policy Statement for Energy (EN-1), in particular section 5.11, Noise.
- Draft Overarching National Policy Statement for Energy (EN-1) (2023) – specific reference to Section 5.12
- Draft National Policy Statement for Renewable Energy Infrastructure (EN-3) – specific reference to paragraph 3.10.153
- The National Planning Policy Framework (2023) - in particular paragraph 174 e) (in relation to preventing unacceptable levels of noise) and paragraph 185 (in relation to protection of tranquil areas).
- The Noise Policy Statement for England, 2010.

Local Planning Policy

- Newark and Sherwood District Council (2013), Local Development Framework, Allocations and Development Management, Development Plan Document - specifically Policy DM4
- Central Lincolnshire Local Plan (2023) – specifically Policy S14, Renewable Energy.
- Bassetlaw District Council (2010) Local Development Framework, Publication Core Strategy and Development Management Policies – specific reference to Policy DM10: Renewable and Low Carbon Energy.

- Draft Bassetlaw Local Plan (2023) 2020-2038: Main Modifications Version, August 2023 - in particular Policy ST51, Renewable Energy Generation and Policy 48, Protecting Amenity.

National Guidance

- Planning Practice Guidance (2023), Noise ('PPG', 2019).
- British Standard BS 4142, Methods for rating and assessing industrial and commercial sound, 2014 + 2019 Amendments;
- British Standard BS 5228, Code of practice for noise and vibration control on construction and open sites – Part 1: Noise and Part 2: Vibration, 2009 + 2014 Amendments;
- British Standard BS 7445, Description and measurement of environmental noise, Guide to quantities and procedures, 2003;
- BS 6472, Guide to evaluation of human exposure to vibration in buildings, Part 1, Vibration sources other than blasting, 2008;
- BS 7385, Evaluation and measurement for vibration in buildings – Guide to damage levels from groundborne vibration, 1993;
- British Standard BS 8233, Guidance on sound insulation and noise reduction for buildings, 2014;
- Calculation of Road Traffic Noise, Department of Transport, Welsh Office, 1988;
- Design Manual for Roads and Bridges, Sustainability and Environment Appraisal, LA 111, Noise and Vibration, 2020.

Baseline Conditions

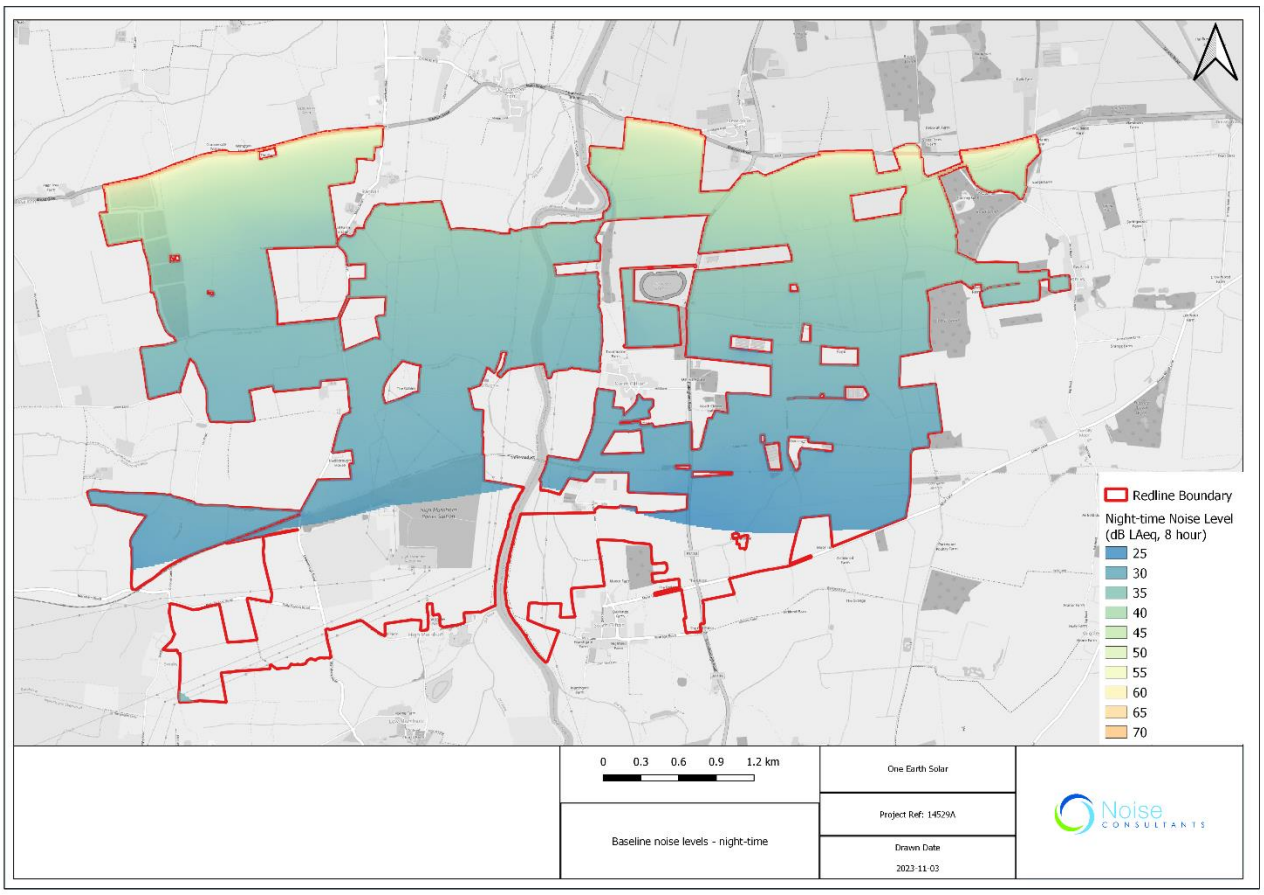
Approach to Collection of Baseline Data

15.3. For the purposes of the scoping report, baseline noise levels have been established by reference to strategic noise mapping for the local area. This data is available online through the Extrium website portal (http://www.extrium.co.uk/noiseviewer.html) and provides information in relation to the likely levels of noise from roads and railways, as well as Noise Important Areas.

Relevant Baseline Conditions

15.4. As shown in Figure 15-1, from the initial review of currently available information, existing noise sources in the vicinity of the Site are likely to be related to infrequent agricultural activity and transport sources. Baseline noise levels are therefore likely to be low, particularly during the night.

Figure 15-1: Strategic Noise Mapping - Baseline Noise Levels during Night-Time



15.5. The main existing sources of noise that are likely to affect the Site and surrounding area are the A57, immediately adjacent to the northern Site boundary, the A1 approximately 8km to the west from the centre of Site and the East Coast Main Line, approximately 3 km to the western boundary of the Site. It is likely that there is also some noise from the existing High Marnham 275 kV substation and the associated electricity grid infrastructure, however this source is not included in the strategic noise mapping data and cannot be readily quantified without site-specific noise surveys.

15.6. Without the Proposed Development, future baseline ambient noise levels are likely to experience a gradual increase over time, primarily due to growth in road traffic. On low-speed roads (e.g., <30mph), changes in car technology may partially offset some of the expected noise level increases that arise from aforementioned traffic growth. However, noise generated from tyre-road interaction dominates on higher speed roads and therefore, expected growth in road traffic on major roads (i.e., the A1 and A57) is likely to lead to a slight, but not significant increase in ambient (L_{Aeq}) noise levels regardless of changes in technology. Importantly, the assessment methodology for some aspects of the Proposed Development relies upon the quantification of background (L_{A90}) sound levels. Background sound levels at existing receptors around the Site are not considered likely to experience material change in the future baseline compared to existing.

Environmental Measures

15.7. Since the project will not be altering the existing road or rail network, or the existing High Marnham substation, the main existing sources of noise in the local area will be unaffected and therefore there will be little opportunity for enhancements to the existing noise environment due to the Proposed Development.

15.8. Where possible, noise sources within the Proposed Development will be located away from sensitive noise receptors and appropriate noise attenuation will be included within the technical design of equipment.

Scope of Assessment

Important Receptors Identified

15.9. Residential receptors are of greatest importance in relation to the noise and vibration assessment. As detailed in Chapter 2, there are several villages in the vicinity of the Proposed Development, including Ragnall, Newton on Trent, Thorney, North Clifton, South Clifton, Normanton on Trent, Skegby and Fledborough. In addition, there are individual residential properties located at various points around the Site. All of these villages and individual properties are considered to be sensitive receptors in noise terms.

15.10. There are also a small number of non-residential receptors that may be considered sensitive in certain circumstances, such as places of worship (e.g. St George and the Martyr North and South Clifton Church and St Gregory's Church, Fledborough), and schools (e.g. North Clifton Primary School and St Matthews Church of England Primary School, Normanton on Trent). These non-residential receptors will be included in the assessment on a case-by-case basis, once further details of likely traffic routing and locations of potentially noise generating plant are known.

15.11. Currently, details of future noise sensitive receptors (i.e. those that are currently proposed, or extant approved but not built/occupied) are limited. Where relevant and necessary, these receptors will be included in the detailed assessment.

Likely Significant Effects Scoped Out from Detailed Assessment

15.12. Table 15-1 presents the elements which have been scoped out from the detailed assessment, as it is considered no likely significant effects will occur.

Table 15-1: Likely Significant Effects Scoped out from the Noise and Vibration Detailed Assessment

Elements Scoped Out	Justification
On Site Construction and Decommissioning Traffic	Experience suggests that there will not be significant levels of vibration generated at sensitive receptor locations due to construction and decommissioning traffic movements. For haul roads within the Site, the Construction Environmental Management Plan and Decommissioning Environmental Management Plan will set out the measures and maintenance plans to ensure these roads are well-maintained and will not be a source of vibration from construction and decommissioning traffic. It is therefore proposed that the effects of vibration from construction and decommissioning traffic within the Site is scoped out of the detailed assessment.
Operational Traffic and Cable Routes	It is anticipated that only minimal numbers of road traffic movements would be generated by the Site once it is in operation (see Chapter 12 for further details). As such, it is proposed that noise and vibration from operational road traffic are scoped out of the detailed assessment. Similarly, no noise or vibration will be generated by cable routes within the Site during operation, therefore it is proposed that noise and vibration associated with cable routes be scoped out of the detailed assessment.
Solar PV Arrays	Solar PV arrays do not make use of any plant or equipment that generates significant vibration levels during operation. As such, vibration from the operation of plant and equipment within the Site is proposed to be scoped out of the detailed assessment.

Likely Significant Effects Scoped into the Detailed Assessment

15.13. Traffic movements to and from the Site during the construction phase have the potential to result in likely significant effects at sensitive receptors, depending on the proximity of construction traffic routes to receptors and the volume of vehicle movements required during construction. Consequently, the likely effects of construction traffic noise will be scoped into the detailed assessment.

15.14. Construction activities within the Site have the potential to generate likely significant noise and vibration effects at nearby sensitive receptors, dependant on the precise nature and location of the construction work required. As such, the effects of both noise and vibration generated during construction activities are proposed to be scoped into the detailed assessment. This will include the assessment of noise and vibration generated by all construction activities, including construction of the proposed solar farm, construction of any required ancillary equipment such as substation equipment, battery storage equipment, construction of cable routes and Site access roads.

15.15. Whilst the solar PV arrays are not a noise emission source when in operation, there is the potential for adverse noise impacts to be generated by ancillary equipment such as substations and battery storage equipment. The effect of operational noise from the Proposed Development is proposed to be scoped into the detailed assessment.

Methodology proposed to Undertake Detailed Assessment

Further Baseline Data

15.16. A baseline noise survey will be undertaken to characterise the existing ambient noise environment. This will include unattended measurements of the existing ambient noise levels at locations representative of the noise sensitive receptors, together with additional attended sample measurements as required. The monitoring locations will be discussed and agreed where possible with representatives of Bassetlaw, Newark and Sherwood and Central Lincolnshire Local Authorities prior to the survey taking place, however the monitoring locations will be subject to variation depending on local site conditions.

15.17. It is currently anticipated that up to seven monitoring locations will be required in order to adequately capture baseline noise conditions in the vicinity of the entirety of the the Site. The baseline noise survey will be undertaken in accordance with BS 7445:2003. Unattended measurements will be undertaken for a period of 4-7 days, inclusive of typical weekday and weekend periods. Monitoring locations will include positions that are representative of baseline conditions at noise sensitive receptor positions that have the potential to experience noise from fixed plant and equipment associated with the Proposed Development. Currently, these areas could include Newton on Trent, Thorney, North Clifton, South Clifton, Fledborough, Normanton on Trent, Skegby and Ragnall.

Construction

15.18. The definition of appropriate assessment criterion and noise metrics for the purpose of identifying likely significant effects will take into account pertinent national policies, standards and guidance, as described previously in this report.

15.19. 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 criterion. Calculations will be informed by indicative plant lists, working methods and proposed phasing plans. 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 15-2.

Table 15-2 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 $L_{Aeq,12h}$	70 dB $L_{Aeq,12h}$	75 dB $L_{Aeq,12h}$
	Residential	Evening	55 dB $L_{Aeq,4h}$	60 dB $L_{Aeq,4h}$	65 dB $L_{Aeq,4h}$
	Residential	Night	45 dB $L_{Aeq,8hr}$	50 dB $L_{Aeq,8hr}$	55 dB $L_{Aeq,8hr}$

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

15.20. 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.

15.21. The Category C noise thresholds are assumed to align with a Significant Observed Adverse Effect Level (SOAEL) and is an approach consistent with other major UK infrastructure projects.

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

15.23. 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).

15.24. The night-time Category C (SOAEL) of 55 dB $L_{Aeq,8hr}$ is consistent with advice presented within the WHO Night Noise Guidelines for Europe (WHO NNG, 2009).

15.25. The Unacceptable Adverse Effect Level (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.

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

15.27. Development related noise exposures which fall between LOAEL and SOAEL have the potential to constitute a likely 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

15.28. Table 15-3 provides noise level categories between the LOAEL and UAEL thresholds that are proposed to be used for the assessment of construction noise.

Table15-3: 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 From Construction Plant

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

Construction Vibration

15.30. 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 standards and guidance referenced in this Standard (e.g. BS 6472-1:2008 and BS 7385-2:1993).

15.31. 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.

15.32. 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}).

15.33. 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.

15.34. Table 15-4 provides presents a summary of the assessment criteria that are proposed to be adopted as the basis for the construction vibration assessment, given in terms of human response and derived based on guidance within BS 5228-2:2009+A1:2014 and BS 7385:1993.

Table 15-4 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

15.35. A likely significant effect from construction vibration is proposed to be 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

15.36. 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). The assessment criteria proposed to be used in the construction traffic assessment are summarised in Table 15-5.

Table 15-5: Thresholds of Potential Effect Criteria (outdoor, free-field noise levels unless otherwise stated)

Noise Source	Period	LOAEL	SOAEL	UAEL
Operational and Construction Road Traffic	Daytime	55 dB $L_{A10,18h\ (façade)}$	68 dB $L_{A10,18h\ (façade)}$	71 dB $L_{Aeq,12h}$
	Night-time	40 dB $L_{night,\ outside}$	55 dB $L_{night,\ outside}$	66 dB $L_{Aeq,4h}$

Noise Exposure Classifications

15.37. Table 15-6 provides noise level categories between the LOAEL and UAEL thresholds.

Table 15-6: 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 From Construction Road Traffic Noise

15.38. 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.

15.39. Potential impacts associated with road traffic during the construction phase will be short-term. Proposed assessment criteria for the change in road traffic noise level for the short-term are derived from methodologies advocated in LA 111, as summarised in Table 15-7.

Table 15-7: Change in Noise Level Categories

Noise Change Category	Short-term Change in Road Traffic Noise (dB $L_{A10,18hr}$, or L_{night})
Negligible	<1 dB
Low	1 – 2.9 dB
Medium	3 – 4.9 dB
High	5 – 10 dB
Very High	>10 dB

Decommissioning

15.40. Dependent on the availability of information relating to the decommissioning phase of the Proposed Development, an assessment of the decommissioning phase will follow the same approach as the above construction phase.

Operation

15.41. The assessment of operational noise 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 set out above.

15.42. Operational noise at the identified sensitive receptors will be assessed against criterion developed using methodologies advocated in BS 4142, 2019. 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.

15.43. 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 a likely significant effect in EIA terms is likely to occur, subject to factors relating to context.

15.44. The LOAEL threshold is exceeded where the rating level is equal to or exceeds the background sound level. Table 15-8 summarises the threshold levels relating to operational sound.

Table 15-8: 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

15.45. 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 best practicable means (BPM); and
- The duration of the effect.

Assumptions, Limitations and Uncertainties

15.46. At this stage of the project, limitations and uncertainties related to noise are due to details of precise design of the Proposed Development, the quantities, locations and specifications of potentially noise generating plant and equipment (both during construction and operation) being currently unavailable. As the design develops, this information will become available, however it is likely that further uncertainties and limitations will be identified as more information becomes available. These will be identified in the ES wherever relevant.

16. Human Health

Introduction

16.1. This Chapter of the Scoping Report presents the scope of the environmental Cassessment for Health. Specifically, the Chapter presents the policy and legislative context, the approach to collecting baseline data and then an overview of the relevant baseline conditions within the Site and surrounding area, based on current knowledge and understanding. It concludes by setting out the scope of assessment including, with justification, those health matters that are proposed to be scoped out and in for detailed assessment and concludes by outlining the method that will be used to undertake the detailed assessment.

Review of Policy, Legislation and Relevant Guidance

16.2. Legislation, planning policy and guidance relating to health, and pertinent to the Proposed Development comprises:

Legislation

- The Planning Act 2008 - Introduced the DCO system for NSIPs and sets out provisions for EIA; and
- The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 – Section 5(2) requires EIAs to identify, describe and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of the proposed development on human health.

National Planning Policy

- Overarching National Policy Statement for Energy (EN-1) (2011) – Section 4.13 sets out the assessment principles for health.
- Draft Overarching National Policy Statement for Energy (EN-1) (2023) – Section 4.3 sets out the assessment principles for health.
- National Policy Statement for Renewable Energy EN-3 (2011) – The NPS provides the primary basis for decisions on renewable energy DCO applications.
- Draft National Policy Statement for Renewable Energy EN-3 (2023) – Section 3.10 provides the primary basis for decisions on solar photovoltaic DCO applications.
- National Planning Policy Framework (2023) – Paragraph 92c states that decisions should aim to enable and support healthy lifestyles, especially where this would address identified local health and well-being needs. Paragraph 93b states that decisions should take into account and support the delivery of local strategies to improve health, social and cultural well-being for all sections of the community.

Local Planning Policy

- Newark and Sherwood District Council (2013), Local Development Framework, Allocations and Development Management, Development Plan Document – specifically Policy DM4.

- Newark and Sherwood District Council (2019), Amended Core Strategy Development Plan – Sets the strategic policies for guiding development in the district up to 2033
- Central Lincolnshire Local Plan (2023) – specifically Policy S54
- Bassetlaw District Council (2010) Local Development Framework, Publication Core Strategy and Development Management Policies – specifically Policy DM10
- Draft Bassetlaw Local Plan 2020 – 2038 Main Modifications (2023) – in particular Section 9 and Policy ST44.

National Guidance

- Planning Practice Guidance (2023) – Provides further guidance on promoting health and safe communities and mentions health impact assessments as a useful tool to use where there are expected to be significant impacts.
- IEMA Determining Significance for Human Health In Environmental Impact Assessment (2022) – Provides guidance on consideration of health as a topic within an EIA.

Local Guidance

- Central Lincolnshire Health Impact Assessment for Planning Applications Guidance Note (2023) – Provides guidance on the on the implementation of Policy S54 in the Central Lincolnshire Local Plan.

Baseline Conditions

Approach to Collection of Baseline Data

16.3. For the purposes of the scoping report, baseline health conditions have been established by referencing public health data for Newark and Sherwood, Bassetlaw and West Lindsey districts by the Office for Health Improvement and Disparities (OHID). Reference is also made to the joint health and wellbeing strategies for Nottinghamshire (i.e. Bassetlaw and Newark and Sherwood) and for Lincolnshire (i.e. West Lindsey).

Relevant Baseline Conditions

16.4. As discussed in Chapter 2, the Site is predominantly agricultural land with the River Trent running north-south through the centre. The nearest residential communities are Dunham, Fledborough, North Clifton, Ragnall, Newton on Trent, Thorney, South Clifton, High Marnham, Low Marnham and Normanton on Trent. It also falls within the district boundaries of Newark and Sherwood, Bassetlaw and West Lindsey.

16.5. Relevant health indicators for the local authorities and England as a comparator are set out in Table 16-1 below using the latest OHID public health data. It shows that life expectancy in Bassetlaw is significantly lower in Bassetlaw than England, whilst life expectancy in West Lindsey is slightly higher. Particular issues include circulatory diseases in West Lindsey, childhood obesity in Bassetlaw and self-harm in Newark and Sherwood.

Table 16-1 Health Profile of Local Authorities and England

Indicator	Bassetlaw	Newark and Sherwood	West Lindsey	England
Male life expectancy (years)	78.8	79.7	79.7	79.5
Female life expectancy (years)	82.1	82.8	83.5	83.2
All deaths from circulatory diseases (SMR[80])	103.1	98.4	109.2	100.0
All deaths from respiratory diseases (SMR)	101.0	97.3	83.5	100.0
Emergency hospital admissions for intentional self-harm (SAR)	98.0	104.7	71.3	100.0
Percentage of people who reported having a limiting long term illness or disability	18.5	20.3	19.9	17.6
Reception: Prevalence of obesity	11.0	10.1	10.9	9.9
Year 6: Prevalence of obesity	24.2	20.5	18.8	21.6

[80] Standardised Mortality Ratio (SMR) and Standardised Admission Ratio (SAR) are statistical measures to compare the mortality and admission rates in a specific population to a standard population. England has an SMR and SAR of 100, indicating that the observed number of deaths is exactly what would be expected based on the standard population. A ratio greater than 100 suggests that the observed rate in the study population is higher than expected, while a ratio less than 100 suggests lower rates than expected.

16.6. The administrative areas of Bassetlaw and Newark and Sherwood are covered by the Nottinghamshire Joint Health and Wellbeing Strategy 2022-2026. Following detailed research and community consultation across Nottinghamshire, it sets out the factors which are having the greatest impact on people's health and wellbeing, and which account for some of the biggest variations or inequalities. The key challenges and areas of focus are identified as (i) child health, (ii) mental health, (iii) good food, (iv) homelessness, (v) tobacco, (vi) reducing alcohol, (vii) domestic abuse), (viii) healthy weight) and (ix) air quality.

16.7. West Lindsey is covered by the Joint Health and Wellbeing Strategy for Lincolnshire (2023). The priorities and areas which were highlighted as being the most important health and wellbeing issues facing the county are (i) mental health and emotional wellbeing – children & young people, (ii) mental health – adults, (iii) carers, (iv) physical activity, (v) housing and health, (vi) healthy weight and (vii) dementia.

Environmental Measures

16.8. Consideration of health effects will be factored into the design process from the outset. This approach will prioritise the provision of inherent design features which embed enhancements into the Proposed Development, rather than solely mitigating adverse impacts. Although currently at an early stage of design, there may be opportunities to provide publicly accessible green spaces and permissive paths which can be used for recreation and physical activity, particularly along the River Trent. There will be opportunities for new hedge and tree planting, as well as wider biodiversity enhancements which can also have positive health effects.

16.9. There is an urgent and quantifiable need for the deployment of renewable energy generation and the UK Government has committed to a net zero economy to occur by 2050. At a global level the Proposed Development will assist in adapting to climate change, and reverse the decline of our natural environment, thereby leading the world to a greener, more sustainable future for future generations.

Scope of Assessment

Important Receptors Identified

16.10. An important receptor to be considered in the assessment will be the vulnerable or priority groups identified through the baseline analysis, as well as the general population in the aforementioned impact areas as a comparator. The Wales Health Impact Assessment Support Unit is the most recent and comprehensive document that provides a non-exhaustive list of suggested vulnerable groups who may be more disadvantaged, including:

- Age related groups: Children and young people, Older people;
- Income related groups: People on low income, Economically inactive, Unemployed/workless, People who are unable to work due to ill health;
- Groups who suffer discrimination or other social disadvantage: People with physical or learning disabilities/difficulties, Refugee groups, People seeking asylum, Travellers, Single parent families, Lesbian and gay and transgender people, Black and minority ethnic groups, Religious groups;

- Geographical groups: People living in areas known to exhibit poor economic and/or health indicators, People living in isolated/over-populated areas, People unable to access services and facilities.

16.11. These groups will be considered sensitive receptors for the purpose of the assessment.

16.12. The assessment will also draw on receptors identified in the technical assessments of other ES chapters as appropriate.

Likely Significant Effects Scoped Out from Detailed Assessment

16.13. Health is the result of a complex interaction of a wide range of different determinants, from an individual's genetic make-up, to lifestyles and behaviours, and the communities, local economy, built and natural environments to global ecosystem trends. Table 5.1 of the Institute of Environmental Management and Assessment (IEMA) Guide to: Effective Scoping of Human Health in Environmental Impact Assessment (2022) includes a non-exhaustive list of wider determinants of health associated with the WHO definition.

16.14. Solar farms such as the Proposed Development are designed, operated and maintained safely, and are not known to be linked with or represent a serious risk to public health. Many of the key determinants of human health will not be applicable in this case, or will be assessed throughout other chapters, namely Noise and Vibration, Landscape and Visual, Air Quality, Land and Soils, Socio-Economics, Transport and Access, Climate Change and Hydrology and Hydrogeology chapters. With this considered, the wider determinants used by IEMA and the Office for Health Improvement and Disparities, which are considered should be scoped out from detailed assessment are listed in Table 16-2.

Table 16-2 Consideration of Wider Determinants of Health to be Scoped Out

Categories	Wider determinants of health	Consideration and discussion
Health related behaviours	Risk taking behaviours	During all phases, all people based on the Site will be professional workers and all contractors and operators on site will have strict health and safety protocols enforced. These policies and practices can cover issues including alcohol, cigarettes, non-prescribed drugs, problem gambling and communicable illness.
	Diet and nutrition (including access to healthy affordable food)	The proposal will result in the temporary long-term reduction in agricultural land. As the Site represents less than 0.0001% of the UK's Utilised Agricultural Area[81] it is unlikely to significantly affect the availability and affordability of food. However, some of the Site may constitute as Best and Most Versatile Agricultural Land, and any likely

[81] Defra (2022) Agriculture in the United Kingdom

		significant effects of the Proposed Development on agricultural land will be assessed within the Land and Soils Chapter.
Social environment	Housing and access to good quality affordable housing	The proposals will not result in the loss or provision of any dwellings, with the vast majority of the workforce are expected to already be residents of the East Midlands region. No significant or widespread effects on housing availability and affordability are expected.
	Relocation	The Proposed Development does not involve any population displacement or relocation and will not require compulsory purchase of homes or community facilities.
	Community safety	All contractors and operators on site will enforce strict health and safety protocols and working practices to minimise injury risk for both the workforce and the general public, as well as policies on modern slavery and discrimination. Due to the potential for electrical hazards as well as the high value of equipment, the Site will be secured with fencing and monitoring systems to prevent unauthorised access and ensure safety. Risks and associated proposed mitigation will be reported in the ES where appropriate. If any surface works are required to access routes during the construction phase, these can be resurfaced to a high standard to minimise injury risk through a legal agreement. Safe working practices will be secured through a Construction Environmental Management Plan (CEMP) (an outline CEMP will be submitted as part of the DCO application. The potential for widespread actual or perceived crime that could affect population health is unlikely.

	Community cohesion, social participation, interaction and support	The Proposed Development will not directly affect indoor or outdoor community assets and meeting places, for voluntary, social, cultural or spiritual participation. The preparation of the Development Consent Order application will be supported and informed by an extensive programme of community engagement which will seek feedback from all sections of the community and enable all to voice their comments. The community response to visual landscape change is discussed under 'Community identity, culture, resilience and influence' determinant in Table 16-3.
	Community severance and community engagement	The Proposed Development is unlikely to significantly affect how people in surrounding communities know or trust their neighbours. The existing communities will remain connected to others through physical access route and digital connectivity, with access to community facilities considered under the 'Access and connections to local public and key services and facilities' determinant in Table 16-3. There may be psychological severance with some settlements experiencing a sense of enclosure by surrounding development. The Landscape and Visual chapter will assess the impact from these settlements with mitigation measures secured to soften views and minimise effects. The community response to visual landscape change is discussed under 'community identity, culture, resilience and influence' determinant in Table 16-3. Public participation can improve the development of a development's design and associated detailed environmental assessment, thereby increasing the total welfare (including anxieties) of different interest groups in a community and enabling infrastructure which is more acceptable to communities. Mental wellbeing will be considered in the Human Health ES chapter and the preparation of the DCO application will be supported and informed by an extensive programme of community engagement.

Economic environment	Regeneration	The Proposed Development does not involve the demolition or rebuilding of any deprived neighbourhoods.
	Employment and income	It is not expected to significantly affect family structures, roles or relationships, by operating appropriate equal employment policies. The supply chain would also be expected to operate appropriate policies related to equality and health and safety, for both workers and the general population. Working conditions can be appropriately managed through health and safety policies and industry best-practice. As such, these issues would be scoped out.
	Education and training	As there would be no change in population, there is unlikely to be any significant health impact on schools and educational providers, and these issues would be scoped out.
	Connections to jobs	The vast majority of the workforce is expected to currently reside in the East Midlands region, with travel modes for the expectant workforce to be assessed in the Transport and Access chapter. However, this matter may be scoped into the Human Health chapter if the Transport and Access chapter indicates a significant impact.
	Tourism and leisure industries	The Proposed Development is not expected to have any significant effects on the tourism sector and existing leisure developments (see Chapter 17).
Bio-physical environment	Water quality or availability	The Hydrology and Hydrogeology chapter will assess how the Proposed Development affects water resources. The project would adopt standard best practice to minimise pollution risk issues. However, the effect on the health of vulnerable groups may be scoped into the Human Health chapter if the Hydrology and Hydrogeology chapter indicates significant effects to human health.

	Land quality and use	The Proposed Development will involve limited excavation works during the construction phase. The operational phase will temporarily take agricultural land out of use and remain fallow for the long-term. The Land and Soils chapter will assess how the proposals will affect land quality and if it indicates significant effects to human health, then this matter may be scoped into the Health chapter.
	Air quality	With the implementation of a Construction Environmental Management Plan there will be no significant dust or traffic emissions during the operational phase which would affect air quality. As such, health effects should be scoped out during this phase.
	Radiation	Long-standing exposure limit and health protection guidelines for electric and magnetic fields (EMF), have been developed by the International Commission on Non-Ionizing Radiation Protection and have a high safety margin. The Proposed Development will comply with these guidelines.
Institutional and built environment	Health and social care services	The proposals will not result in the loss or provision of any dwellings and associated population. The vast majority of the workforce are expected to already be residents of the East Midlands region with existing access to healthcare and social care services.
	Quality of built environment and natural environment	The location of the Site is within a rural and semi-rural setting, although the electricity generated by the Proposed Development will predominantly be used to temporarily power the built environment. The landscape and visual impacts on the natural environment will be considered in the Landscape and Visual chapter, with mitigation measures secured to minimise impacts. The community response to visual landscape change is assessed under the 'Community identity, culture, resilience and influence' determinant in Table 16.3.

Likely Significant Effects Scoped into the Detailed Assessment

16.15. The potential effects on wider determinants of health used by IEMA and the Office for Health Improvement and Disparities, which are considered should be scoped in for detailed assessment are listed in Table 16-3.

Table 16-3 Consideration of Wider Determinants of Health to be Scoped In

Categories	Wider determinants of health	Consideration and discussion
Health related behaviours	Physical activity (including opportunities for access by walking and cycling)	Construction works may temporarily disrupt use of public rights of way, and therefore opportunities for physical activity. Any potential physical impacts will be assessed in the Transport and Access chapter with mitigation measures secured to minimise disruption. The Landscape and Visual chapter will also consider the impact on landscape amenity and suggested mitigation which could minimise adverse impacts on how these recreational routes are enjoyed and behavioural use. The Health chapter will assess the effect of any changes to the public rights of way on the ability for the receptors to undertake physical activity during the construction phase, and the Health chapter will cross-reference to the Transport and Access and the Landscape and Visual chapters where appropriate. During operation the Proposed Development will not reduce any land used for physical activity.
Social environment	Access and connections to local public and key services and facilities	Any potential temporary disruptions to access routes during the construction phase will be assessed in the Transport and Access chapter and the ES will cross-reference where appropriate. The Health chapter will assess the impact in health terms of any changes to how vulnerable groups access and connect to local services during the construction phase. During operation the Proposed Development will not directly reduce any land used for or access to local public and key services and facilities.

	Access and connections to the natural environment, open space, leisure and play	Any potential temporary disruptions to access routes during the construction phase will be assessed in the Transport and Access chapter and cross-referenced where appropriate. The Health chapter will assess the impact in health terms of any changes to how vulnerable groups access and connect to the natural environment, open space, leisure and play opportunities. During operation the Proposed Development will not directly reduce any land used for or access to open space, leisure and play. Whilst long-term access and connections to the natural environment will be maintained, the impact on landscape amenity and associated enjoyment will be considered in the Landscape and Visual chapter with mitigation measures secured to minimise impacts. The final design may also include additional areas and recreation routes with public access along the River Trent.
	Transport modes, access and connections, as well as links between communities	Construction works may temporarily disrupt use of public rights of way and roads through cable laying or movements by heavy goods vehicles. Any potential disturbance and safety impacts will be assessed in the Transport and Access chapter and the Health chapter will cross-reference where appropriate. The Health chapter will assess the effect in health terms of any changes to how vulnerable groups access and connect to other settlements and communities.

	Community identity, culture, resilience and influence	The Proposed Development will not result in any demographic changes which would strongly influence on community identity, nor will it result in long-term changes to lighting, overshadowing and reflections; and the attractiveness of public spaces and buildings. The key change will be the visual landscape of the area, which will be considered in the Landscape and Visual chapter with mitigation measures secured to minimise impacts. The Health chapter will cross-reference to the Landscape and Visual chapter where appropriate. Another key issue is the sense of control within the community and how this can affect anxieties. The Health chapter will assess the impact on mental wellbeing of the receptors, and the preparation of the Development Consent Order application will be informed by an extensive programme of community engagement.
Economic environment	Education and training	Through all phases of the Proposed Development, there will be opportunities to improve educational and skills attainment of the workforce, which may be targeted at vulnerable or priority groups. The Proposed Development also presents opportunities to educate the general public about renewable energy generation by holding open days and information display boards around the Site. The Health chapter will assess the effect of education and training opportunities on the health of vulnerable groups.
	Employment and income	The Proposed Development will provide numerous direct and indirect opportunities for employment and higher incomes, which can potentially be particularly beneficial for some vulnerable or priority groups. This would be during all phases of development and outlined in the Socio-Economics chapter, albeit the greatest impacts would be expected during construction. The Health chapter will cross-reference to the Socio-Economics chapter where appropriate. The Health chapter will assess the effect of improving employment opportunities and income on the health of vulnerable groups.

	Local business activity	The Proposed Development could support the diversification of agricultural land and growth of rural businesses by providing an additional source of steady earnings which can help stabilise incomes during lower yields or market fluctuations. In addition to supporting a more resilient financial situation, a diversified income can also encourage farmers to invest in more sustainable agricultural practices. Other local businesses may also benefit during the construction and operational phases by supplying materials and services. The Socio-Economics chapter will assess the economic effects of the Proposed Development, and the Health chapter will assess the effect in health terms of any changes in business activity. This matter may be scoped out of the Health chapter if the Socio-Economics chapter indicates no significant change in local business activity. The Health chapter will cross-reference to the Socio-Economics chapter where appropriate.
Bio-physical environment	Climate change mitigation and adaption	The Climate Change chapter will assess how the Proposed Development responds to the challenges of climate change which will affect current and future global populations. The Health chapter will cross-reference to the Climate Change chapter where appropriate. Embodied carbon and other emissions which can alter the climate are not expected to be of a scale to have a health impact during the construction phase. During the operational phase the renewable energy generated will assist in transitioning towards net zero. The Health chapter will assess how the contribution towards net zero targets affects the physical and mental health of receptors during the operational phase.
	Air quality	There would be localised dust and construction traffic emissions during the construction phase. The Air Quality chapter will assess how the Proposed Development will affect local air pollution, including opportunities to contribute to maintaining a good standard of air quality and setting out mitigation measures. The Health chapter will assess the effect of emissions on health of the identified receptors during the construction phase, and will cross-reference to the Air Quality chapter where appropriate.

	Noise and vibration	The Noise and Vibration chapter will assess how the Proposed Development affects the existing sound environment and associated impacts. The Health chapter will assess the effect of noise and vibration on health of the identified receptors (including mental wellbeing), and will cross-reference to the Noise and Vibration chapter where appropriate.
	Radiation	Fears of a causal link between EMFs and cancers and other diseases or that they disrupt the operation of pacemakers can generate community anxieties. Impacts on mental wellbeing will be scoped into the Health chapter, and the community engagement process will include non-technical information to explain how the balance of scientific evidence suggests EMFs are safe.
Institutional and built environment	Wider societal infrastructure and resource	The project will contribute towards a clean and resilient electricity infrastructure; to generate the energy which society depends on for good population health. A reliable supply of renewable electricity is required in relation to numerous societal factors such as food production and safety, thermal comfort, healthcare, education, income generation and socialising. As will be outlined throughout the ES, it could provide significant contributions in terms of economic development, climate change mitigation; and protection or enhancement of the natural environment (e.g. biodiversity, access to natural spaces and habitats). The Health chapter will assess the effect in health terms of the project's contribution towards wider societal infrastructure and will cross-reference to other ES chapters where appropriate.
	Health and social care services	There would be a larger workforce on site during the construction phase. Whilst the vast majority of are expected to already be residents of the East Midlands region with existing access to healthcare, some may want to temporarily register with local GP facilities. As such, the Health chapter will assess the effect on GP availability within the Trent Care, IMP, Newark and Retford & Villages Primary Care Networks during the construction phase.

Methodology proposed to Undertake Detailed Assessment

Further Baseline Data

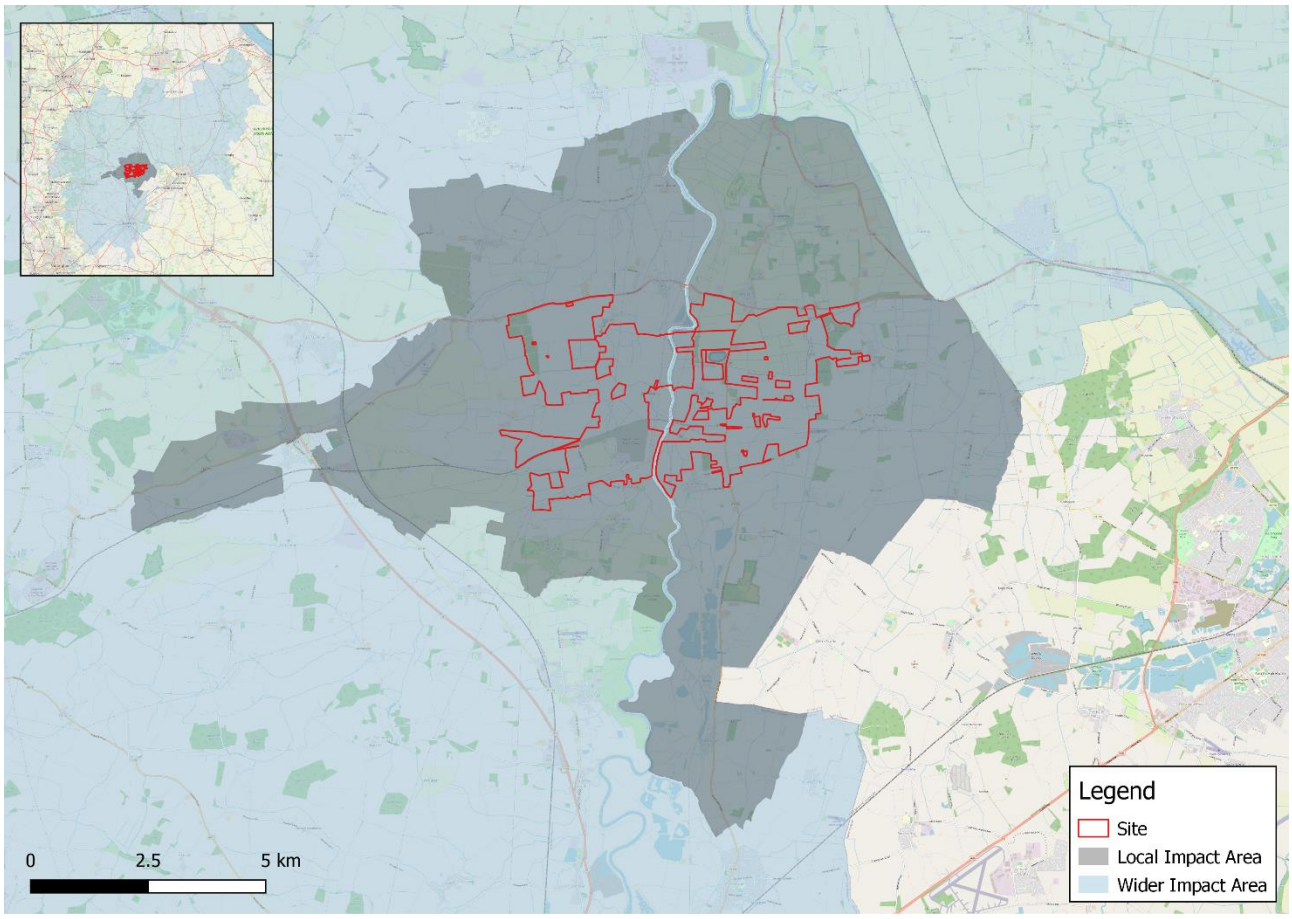
16.16. The detailed assessment in the Health Chapter will first establish a baseline position of the health profile of the local population, local priorities and strategies, socio-economic and environmental conditions and infrastructure. This will draw upon the other ES chapters and include GIS mapping as appropriate.

16.17. The best-known definition of health was produced by the World Health Organisation (WHO) as “Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity”.

16.18. When analysing baseline health conditions and assessing the effects on health (including mental wellbeing and health inequalities), the geographical scope of the assessment must be clearly defined. It is likely that the most significant effects will predominantly be felt close to the Site, particularly those concerning social infrastructure. Spatial characteristics, walking distances, socio-economic characteristics and the neighbourhood character area all indicate that the strongest functional relationships are most likely to be within the Site’s immediate surrounding area or a distance of 800m (equivalent to a 10-minute walk). The four Lower Layer Super Output Areas where the Site is located (Bassetlaw 015D, Bassetlaw 015F, Newark and Sherwood 004C, West Lindsey 007C) are to form the ‘Local Impact Area’ for the assessment as this area represents the most appropriate statistical fit.

16.19. It is acknowledged that some of the Proposed Development effects will be spread over a broader geographical area, for this reason, the wider local authority administrative areas of Bassetlaw, Newark and Sherwood and West Lindsey will be used as the Wider Impact Area. Figure 16-1 presents the areas of local and wider impacts considered in the assessment.

Figure 16-1 Local and Wider Impact Areas



Note: Redline shows the approximate site location

16.20. Published health data within the public domain will be collated from sources such as the Office for Health Improvement and Disparities (OHID), Office for National Statistics (ONS), the relevant local authorities, the NHS and other recognised sources or through community engagement and liaising with key stakeholders such as Public Health teams within the local authorities.

16.21. The baseline health profile will focus on relevant physical and mental health indicators, socio-economic and labour market conditions, provision of community infrastructure, as well as the location of nearby hospitals and the capacity of GP facilities. It will also consider feedback relating to health and wellbeing matters received through the statutory and non-statutory community engagement process. This process of collating and reviewing relevant baseline data will enable vulnerable or “priority groups” to be identified.

16.22. Whilst it is not anticipated that further baseline data will need to be collected, future planned provision of community infrastructure will be checked to inform the baseline assessment.

Construction, Operation and Decommissioning

16.23. The methodology for the detailed assessment is set out below and will be the same for all phases of the Proposed Development.

16.24. The detailed assessment will examine the potential effects of the Proposed Development on health outcomes on the identified receptors using an assessment criteria matrix based on the wider determinants and assessment criteria set out in the NHS HUDU's Rapid Health Impact Assessment Tool; WHIASU's Health Impact Assessment - A Practical Guide; the NMWIADU's Mental Wellbeing Impact Assessment Toolkit and Central Lincolnshire's Health Impact Assessment for Planning Applications Guidance Note (2023). Only the criteria relevant to the wider determinants considered to be scoped in from Table 16.3 above will be assessed. Both direct and indirect effects will be considered across the construction and operation phases of the Proposed Development.

16.25. Where an effect is identified, the likely duration, location and significance will be highlighted. The health effects will be assessed in the context of the baseline position, as well as the nature and context of the effect, taking account of the sensitivity of the identified receptor (i.e. the existing population and identified vulnerable/ priority groups).

16.26. The sensitivity of receptors will be considered on a scale of very low sensitivity (very high capacity to adapt), low sensitivity (easily adapt to change), moderate sensitivity (limited capacity to adapt) and high sensitivity (do not easily adapt to change). In identifying the sensitivity, factors including the capacity to accept or respond to change and the local position, local needs and vulnerable/ priority groups will be taken into account.

16.27. The impacts of the Proposed Development will be identified as 'beneficial', 'neutral' or 'adverse' and defined as follows:

- Beneficial - A positive and/or advantageous impact to a minor, moderate or major magnitude;
- Neutral - No obvious significant effect;
- Adverse - A negative and/or disadvantageous/ detrimental impact to a minor, moderate or major magnitude.

16.28. In instances where effects are identified, the following definitions of significance will be applied:

- Major - the Development could be expected to have a substantial impact, either positive or negative, on health. This effect is considered to be 'significant';
- Moderate - the Development could be expected to have notable impact, either positive or negative, on health. This effect is considered to be 'significant';
- Minor – the Development could be expected to have a barely perceptible impact, either positive or negative, on health. This effect is considered to be 'not significant';
- Negligible – the Development could be expected to have no discernible impact, either positive or negative, on health. This effect is considered to be 'not significant'.

16.29. The impact significance matrix set out in Table 16-4 will be used to determine the significance of an effect. This impact significance matrix aligns with the IEMA Guide to: Determining Significance For Human Health In Environmental Impact Assessment (2022).

Table 16-4 Magnitude and Sensitivity

Magnitude	Sensitivity: High	Sensitivity: Moderate	Sensitivity: Low	Sensitivity: Very Low
Major	Major (Significant)	Major – Moderate (Significant)	Moderate - Minor (Significant)	Minor - Negligible
Moderate	Major – Moderate (Significant)	Moderate (Significant)	Minor	Minor - Negligible
Minor	Moderate - Minor (Significant)	Minor	Minor	Negligible
Negligible	Minor - Negligible	Minor - Negligible	Negligible	Negligible

16.30. Due to the nature of the Proposed Development all impacts are likely to be temporary unless stated otherwise. In terms of temporary impacts, the duration can be determined as follows:

- Short term - less than 5 years;
- Medium term - 5-15 years; or
- Long term - more than 15 years.

16.31. Where an impact is identified, enhancement and mitigation measures are recommended to either enhance or secure a positive impact or mitigate against a negative impact. Mitigation measures can include planning or non-planning measures and actions. Monitoring of effects will be proposed where appropriate.

16.32. The assessment will then determine the in-combination (intra-project) effects through further analysis. All identified effects (excluding negligible effects) will be collated for each receptor to produce a list of relevant determinants of health and their level of effect. This will provide a narrative of likely interactions and describe the need for any further mitigation necessary.

16.33. The assessment will also determine cumulative (inter-project) effects. A list of relevant reasonably foreseeable cumulative projects will be provided for each determinant of health. It will provide a combined level of effect to reflect the likely implications for public health. The priority will be the identification of likely significant effects and describing any further mitigation necessary.

Figure 16-2 Summary of Overall Methodology

Assumptions, Limitations and Uncertainties

16.34. It should be noted that the boundaries of the aforementioned impact areas may be adjusted for certain receptors depending on:

- The availability of data (e.g. OHID public health data is not available for LSOAs and therefore data from the relevant electoral wards of Torksey, Collingham and Tuxford & Trent will be utilised);
- To align with other technical assessments within the EIA and DCO application (e.g. Air Quality Assessment or the Noise and Vibration Assessment); or
- Where it would more appropriate to review alternative boundaries (e.g. capacity of GP facilities may be expanded to nearby Primary Care Networks).

16.35. The identified impact areas and scale will be highlighted throughout the assessment, along with the relevant data sources, assumptions and limitations. The latest available data will be used; however, it should be noted that many data sources are frequently updated and could be subject to change from the time of drafting or during the Development Consent Order process.

17. Socio-Economics

Introduction

17.1. This Chapter of the Scoping Report presents the scope of the environmental assessment for Socio-Economics. Specifically, the Chapter presents the policy and legislative context, the approach to collecting baseline data and then an overview of the relevant baseline conditions within the Site and surrounding area, based on current knowledge and understanding. It concludes by setting out the scope of assessment including, with justification, those socio-economic matters that are proposed to be scoped out and in for detailed assessment and concludes by outlining the method that will be used to undertake the detailed assessment.

Review of Policy, Legislation and Relevant Guidance

17.2. Legislation, planning policy and guidance relating to socio-economics, and pertinent to the Proposed Development comprises:

National Planning Policy

- Overarching National Policy Statement for Energy (EN-1)– specific reference to Section 5.12, which relates to Socio-Economics
- Draft Overarching National Policy Statement for Energy (EN-1) (2023) – specific reference to Section 5.13;
- Draft National Policy Statement for Renewable Energy Infrastructure (EN-3) – specific reference to paragraph 3.10.60
- National Planning Policy Framework (NPPF) (2023) – specific reference to Section 6: Building a strong, competitive economy, Section 12: Achieving well designed places and Section 15: Conserving and enhancing the natural environment;

Local Planning Policy

- Central Lincolnshire Local Plan (2023) – specifically Policies S10: Supporting a Circular Economy, S5: Development in the Countryside; and Policy S28: Spatial Strategy for Employment
- Bassetlaw District Council (2010) Local Development Framework, Publication Core Strategy and Development Management Policies – specific reference to Policy DM10: Renewable & Low Carbon Energy.
- Draft Bassetlaw Local Plan (2023) 2020-2038: Main Modifications Version, August 2023 specific reference to Policy DST51: Renewable Energy Generation.

National Guidance

- HM Treasury (2022) The Green Book: Central Government Guidance on Appraisal and Evaluation.
- Institute of Environmental Management and Assessment (2015) Environmental Impact Assessment Guide to Shaping Quality Development.

Baseline Conditions

Approach to Collection of Baseline Data

17.3. The potentially likely significant effects of the Proposed Development will be assessed against a relevant baseline scenario, taking into account social and economic conditions at different spatial levels. Those used in the baseline set out below are:

- Site (where relevant data are available);
- Lower-Layer Super Output Area (LSOA);
- District;
- Region; and
- National.

17.4. Baseline conditions have been determined for a range of key indicators and measures, namely:

- Demographics;
- Labour market;
- Local economy;
- Housing;
- Deprivation;
- Agricultural land classification and supply; and
- Education and Skills.

17.5. A range of sources has been used to establish the existing socio-economic conditions within the study area:

- 2011 and 2021 Census Data[82];
- Labour Force Survey[83];
- Annual Population Survey[84];

[82] Office for National Statistics (2011) 2011 Census. Available: https://www.ons.gov.uk/census/2011census/2011censusdata

[83] Office for National Statistics (2022) Labour Force Survey. Available: https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/methodologies/annualpopulationsurveyapsqmi

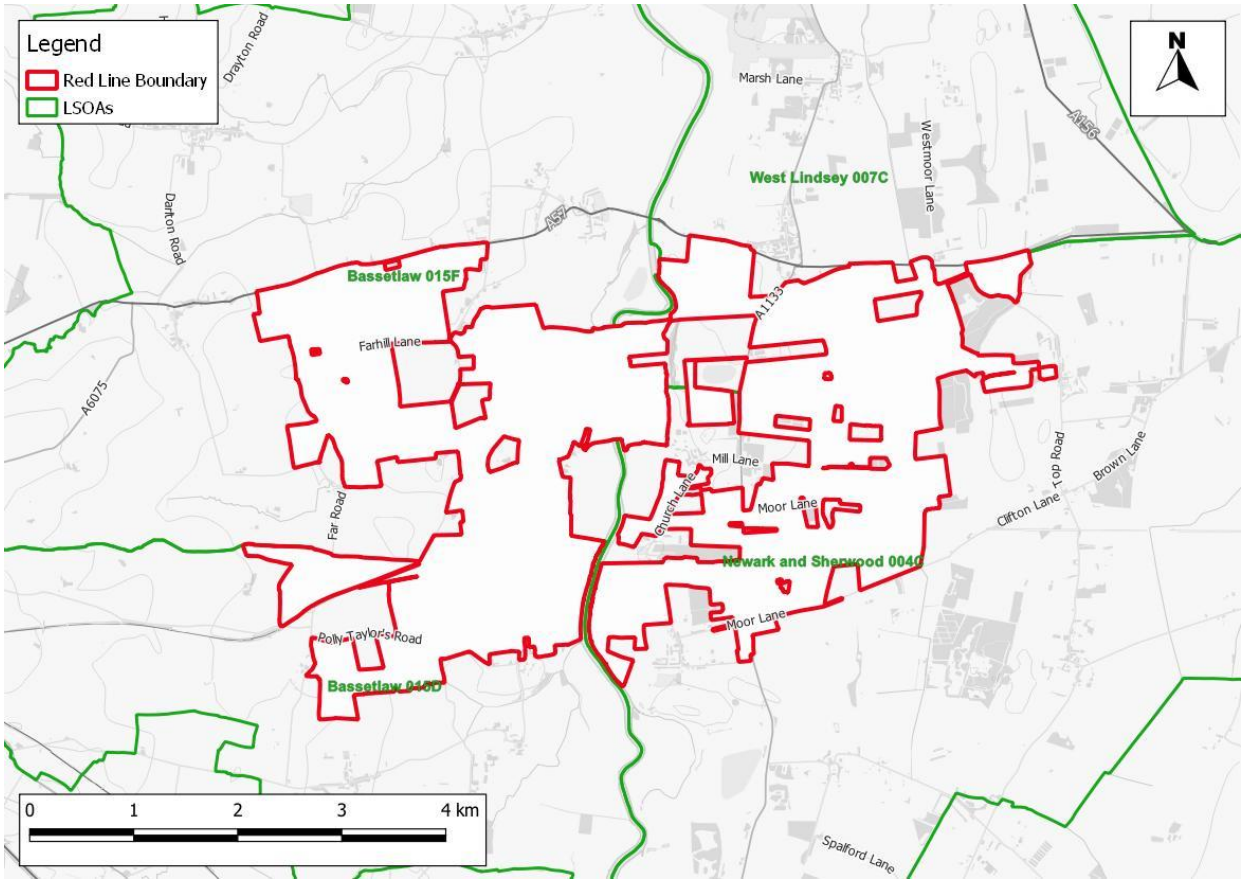
[84] Office for National Statistics (2022) Annual Population Survey. Available: https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/methodologies/annualpopulationsurveyapsqmi

- Business Register and Employment Survey[85];
- Office for National Statistics Nomis[86]; and
- Agricultural Land Classification[87].

Relevant Baseline Conditions

17.6. As discussed in Chapter 2, the Site is located to the east and west of he River Trent, extending broadly to the A57 in the north, South Clifton to the south, Skegby to the west and Thorney to the east. It spans two counties, Nottinghamshire and Lincolnshire, and three local authority districts: Bassetlaw, Newark and Sherwood, and West Lindsey. It also spans four LSOAs: E01028037, E01028039, E01026409 and E01028317 (presented in Figure 17.1), hereafter referred to collectively as the 'local area'. The Site is currently predominantly used for agriculture.

Figure 17-1: Site Location and LSOA Boundaries



[85] Office for National Statistics (2022) Business Register and Employment Survey. Available: https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/methodologies/annualpopulationsurveyapsqmi

[86] Office for National Statistics (2023) Nomis. Available: https://www.nomisweb.co.uk/

[87] Ministry of Agriculture, Fisheries and Food (1988) Agricultural Land Classification of England and Wales. Available: https://www.data.gov.uk/dataset/c002ceea-d650-4408-b302-939e9b88eb0b/agricultural-land-classification-alc-grades-post-1988-survey-polygons

17.7. The population of Bassetlaw was 118,400 in 2021, having increased (by 4.8%) from 113,000 in 2011. Over the same period, the population of Newark and Sherwood increased (by 7.3%) from 115,000 to 123,400, and the population of West Lindsey increased (by 4.6%) from 136,700 to 143,000. In 2011, the combined population of the local area was 5,631, of which 83.4% were aged 16 or older, compared to 64.3% in the East Midlands and 64.7% in Great Britain.

17.8. Bassetlaw is the 129th most deprived out of the 316 national boroughs with 12% of the local population being income deprived. Newark and Sherwood is the 155th most deprived with 10.9% and West Lindsey is the 56th with 16.2%.

17.9. Gross Value Added (GVA) per head in Bassetlaw in 2019 (the most recent year for which data are available) was £19,969, compared to £21,068 in Newark and Sherwood, and £15,907 in West Lindsey. These are all lower than the UK average in 2019 of £27,001.

17.10. In 2021, 31.2% of working age residents in Bassetlaw had a degree level qualification or higher (National Vocational Qualification (NVQ) Level 4+), significantly lower than the East Midlands average (35.7%) and Great Britain average (43.6%). The figure for Newark and Sherwood was 32.5% and for West Lindsey was 24.4%. Similarly, the proportion of residents in Bassetlaw with no qualifications was 9.3%, which is significantly higher than the average for the East Midlands (7.5%) and Great Britain (6.6%). The respective figures for Newark and Sherwood, West Lindsey and the local area are 12.2%, 18.8% and 19.9%.

17.11. The industries which employ the most people in Bassetlaw are manufacturing (18.4% of jobs), motoring (16.3%) and healthcare (14.3%). These industrial groups are also prominent in Newark and Sherwood with 12.2% of jobs in manufacturing, 14.3% in motoring, 12.2% in healthcare and also 12.2% in hospitality. For West Lindsey, the figures are 18.2% in motoring, 18.2% in hospitality, 11.4% in health and 10.2% in manufacturing. For the local area, the industries with the largest workforces in 2011 were motoring (15.4%) healthcare (12.7%) and manufacturing (10.2%).

17.12. Electricity, Gas, Steam and Air Conditioning Supply provided only 1.6% of the employment in the local area in 2011. This was higher than the rates for both the East Midlands (0.8%) and Great Britain (0.4%). In total, approximately 2,861 people were employed in the local area in 2011.

17.13. In 2011, according to the Annual Population Survey, the unemployment rates (i.e. number of people aged 16 and over who are economically inactive) in Bassetlaw, Newark and Sherwood and West Lindsey were 8.8%, 6.4% and 8.5%, respectively. By January 2021, these had decreased to 3.6%, 4.7% and 4.2%, respectively.

17.14. In 2021, the rate of working age residents was 60.5% in Bassetlaw, 60.4% in Newark and Sherwood and 54.8% in West Lindsey, compared to the East Midlands average of 62.3% and Great Britain average of 62.9%.

17.15. In the local area, in 2011 there were 2,494 residential properties of which 97.3% were houses and only 2.7% were flats or other types (such as caravans). In Bassetlaw, Newark and Sherwood and West Lindsey, 92.4%, 91.2% and 93.8% of dwellings were houses, respectively. In the UK as a whole, 77.0% of residential properties were houses, 22.6% were flats and 0.4% were other types.

17.16. There are a number of Public Rights of Way (PRoW) which pass through or close to the Site. A 650 m section of bridleway crosses the Site close to the easternmost extent of the Site and to the west of Carr Wood; a 1.1 km section of bridleway crosses the Site towards its westernmost extent, to the south west of Ragnall; and several other bridleways follow the routes of minor roads through or alongside the Site. Numerous footpaths pass through the site, most notably along both the eastern and western banks of the River Trent, around Bubble Dyke to the north of North Clifton and to the south of Ragnall. A route on the National Cycle Network, which follows the route of the disused Lancashire, Derbyshire and East Coast Railway, passes from east to west across the Site, crossing the River Trent at the Fledborough Viaduct and following the northern site boundary of the former High Marnham Power Station.

Environment Measures

17.17. The Proposed Development has the potential to significantly affect the local area in a beneficial way, initially through the consideration of good design principles to ensure that any benefits are maximised. These beneficial effects may be either temporary, for example during the construction and decommissioning phases of the Proposed Development, or permanent during operation.

17.18. Opportunities to enhance beneficial socio-economic effects may include:

- A temporary increase in employment opportunities for relevant construction and decommissioning trades and associated supply chains;
- The diversification of revenue for landowners;
- The optimisation of land use, with potential dual use of land for both the Proposed Development and agriculture; and
- An increase in renewable energy production and resultant contributions towards both achieving net zero targets and energy security.

Scope of Assessment

Important Receptors Identified

17.19. The assessment will primarily focus on the effects on people in the local authority areas of Bassetlaw, Newark and Sherwood, and West Lindsey, as well as the local area within which the Proposed Development is located. Where relevant, however, baseline data and potential effects at regional and national levels will also be provided. Whilst people are ultimately the receptors to any effects, how they are impacted will be assessed as well as the scale of any impacts and the spatial scale at which the impacts are most relevant.

Likely Significant Effects Scoped Out from Detailed Assessment

17.20. The effects of the Proposed Development on school places will not be assessed as the operational phase is not expected to result in a permanent increase in local population; thus, the demand for school places should not be affected.

Likely Significant Effects Scoped into the Detailed Assessment

17.21. Potential socio-economic effects that will be considered in relation to the construction, decommissioning and operational phases of the Proposed Development include:

- impacts of temporary employment during the construction phase of the Proposed Development on the local workforce;
- impacts of a permanent increase in economic activity during the operational phase of the Proposed Development, including the impacts of dual land use and income diversification on the landowners;
- impacts of permanent employment during the operational phase of the Proposed Development, including consideration of changes to any existing employment on-site (e.g. agricultural), on the local workforce;
- impacts of temporary use of local accommodation by construction workers using short-term accommodation, on the owners and other visitors to the local area;
- impacts of permanent loss of, or temporary changes to, local amenity on local users, including displacement of PRoWs, community and recreational facilities, visual impacts and local character; and
- impacts of temporary or permanent changes of land use within the Site and any resultant impacts, such as the displacement of agricultural land uses and employment on the local economy.

Methodology proposed to Undertake Detailed Assessment

Further Baseline Data

17.22. A review of relevant national, regional and local policies will be carried out to identify the key issues relevant to the Proposed Development.

17.23. In addition to the baseline conditions set out above, the assessment of effects will determine baseline conditions for social infrastructure (including healthcare and other public services).

17.24. Data may be used at the ward or county level. Where the ‘Zone of Influence’ of the Proposed Development differs from these spatial levels, as is often the case when considering the impact on social infrastructure, other metrics such as proximity, travel distances and/or defined planning areas may be more appropriate and will be considered in the baseline scenario.

Construction, Decommissioning and Operation

17.25. The assessment of effects will consider the following in relation to the impacts of the Proposed Development on baseline conditions:

- The likely scale and duration of impacts of the Proposed Development and any relevant Cumulative Schemes (the approach to cumulative schemes is detailed in Chapter 5); and
- The sensitivity of the sensitive receptors to the impacts.

17.26. Based on the information available on the baseline conditions, sensitivity of the area and magnitude of any socio-economic impacts, and in the context of local and national policies, professional judgement will be used to evaluate the significance of potential socio-economic effects. There is no published guidance to define the significance of socio-economics effects, but it is recognised that effects are categorised based upon the relationship between the magnitude of effect and the sensitivity of the receptors in question, in line with published Environmental Impact Assessment (EIA) guidance.

17.27. The assessment will aim to quantify effects where possible, although where this is not possible some effects will be assessed qualitatively. Effects are defined as follows:

- Beneficial classifications of effect indicate an advantageous or positive effect on the defined receptors within the study area;
- Negligible classifications of effect indicate no perceived effects on the defined receptors within the Study Area;
- Adverse classifications of effect indicate a disadvantageous or negative effect on the defined receptors within the Study Area; and
- No effect classifications indicate that there are no changes to baseline conditions.

17.28. The receptors in the study area for each potential effect will be defined according to the appropriate spatial scale, which may differ for each potential effect. It may be relevant to assess the significance of certain effects at multiple spatial scales (e.g. both locally and regionally).

17.29. Based on consideration of the above, where an effect is assessed as being adverse or beneficial, the scale of the effect will be categorised using the following criteria:

- Minor: the Proposed Development will cause a minor change in existing baseline conditions in terms of absolute and/or a small number of receptors will be affected;
- Moderate: the Proposed Development will cause a noticeable change in existing baseline conditions and/or a moderate number of receptors will be affected; and
- Major: the Proposed Development will cause a large change in existing baseline conditions and/or the majority of receptors will be affected.

17.30. Effects which are found to be moderate or major, whether adverse or beneficial, will be considered to be ‘significant’.

Assumptions, Limitations and Uncertainties

There will be a number of assumptions, limitations and uncertainties associated with the assessment of likely significant effects. Where relevant, good practice guidance and professional judgment will be used to ensure a reasonable worst-case approach is adopted.

18. Environmental Topics Scoped Out

18.1. There are a number of environmental aspects which, it is proposed, are scoped out of the detailed assessment that will be presented in the ES. This because it is considered that there can be no significant effects occurring to any receptor as a result of these aspects. In accordance with PINS Advice Note Seven, Table 18-1 sets out each of the aspects that it is proposed are scoped out from detailed assessment, with justification provided on why this is considered to be the case.

Table 18-1: Technical Aspects Scoped Out

Technical Aspect	Justification
Glint and Glare	The solar PV modules are designed to absorb as much of the sunlight that illuminates them as is possible, rather than reflecting sunlight. Any light reflecting from them results in the loss of energy output and therefore makes them less efficient. As a result, they are dark in colour, have anti-reflective coatings and are manufactured with low-iron, ultra-clear glass with specialised coatings and textures that enable maximum absorption. The metal frames are also treated with specialised coatings to minimise reflection. In addition, the Proposed Development Design Principles have been devised to further ensure that the potential for glint and glare effects do not occur. This includes imposing appropriate separation distances from the new infrastructure to any sensitive receptor, and the introduction of new landscaping that will act as a screen, ensuring that local sensitive receptors, in particular residential properties but not limited to these, cannot view the new infrastructure. Detailed geometric analysis will be undertaken using a bespoke glint and glare model to ensure that any reflected sunlight that does still occur from the solar PV modules, despite all the measures implemented, will be directed away from locations that will make it noticeable to any sensitive receptors. The results of the geometric analysis will influence the design and layout of the Proposed Development to reduce the potential for glint and glare occurring to sensitive receptors within the locality.

	For all these reasons it is considered that there will be no significant effects from glint and glare. However it is acknowledged the National Policy Statement EN-3 states in Section 2.52.4: "*Solar PV panels are designed to absorb, not reflect, irradiation. However, the Secretary of State should assess the potential impact on glint and glare on nearby homes and motorists".* It is therefore proposed a detailed stand-alone Glint and Glare assessment report will be included as a technical appendix to the ES, and details will be provided in the PEIR. A description of the relevant design measures and safety considerations related specifically to Glint and Glare will also be included within the Proposed Development description chapter of the ES.
Risk of Major Accidents and Disasters	'Accidents' are considered to be an occurrence resulting from uncontrolled events in the course of construction and operation of a development (e.g. major emission, fire or explosion). 'Disasters' are considered to be naturally occurring extreme weather events or ground related hazard events (e.g. subsidence, landslide, earthquake). Given the nature and type of development, it is considered that the Proposed Development is unlikely to result in any type of major accident/ disaster. There is a strict legislative framework that governs construction activities so as to ensure risks are clearly managed to an acceptable level. A variety of guidance, including to ensure pollution prevention, also exists. Bearing all these in mind, a Construction Environmental Management Plan will be produced, to be submitted to PINS for approval prior to construction commencing, that will detail the measures that will be implemented to ensure that major accidents are avoided. The Proposed Development will be designed and operated in accordance with all legislative requirements that relate to this type of facility. As discussed in Chapter 3, a management plan for battery safety will be prepared and submitted with the DCO Application. This Plan will detail the regulatory guidance reviewed and how these will be responded to, so as to ensure that all safety concerns around the BESS element of the Proposed Development are addressed in so far as is reasonably practicable. During operation, safety processes will be reviewed, and if required, updated to ensure that the operations do not increase the risk or result in a major accident.

	The location of the Site is outside of an area where natural disasters have historically occurred. It is not an area at high risk from major earthquakes or subsidence, or because of the Site's flat nature, likely to suffer from landslides. Parts of the Site do flood albeit the Proposed Development, including the way it is constructed and operated, is being designed so as to withstand any flooding should it occur. Furthermore, the infrastructure associated with solar is considered of low susceptibility to the impact of natural disasters. There is limited potential for a disaster occurring at a solar farm to create a hazardous pollution risk, with limited need for hazardous substances in solar farm operation. It is battery storage where the highest risk of such occurs, but with good design and simple measures implemented, the risk of such will be managed. As a result, it is considered that there can be no significant effect as a result of a natural disaster and as such it is scoped out of detailed assessment.
Waste	Waste will inevitably be generated as a consequence of the enabling and construction works for the Proposed Development. However, waste strategies including extensive commitments to reduce the generation of waste and to divert waste from landfill will be considered and set out in the ES. Furthermore, a Site Waste Management Plan (SWMP) will be prepared for the enabling and construction works. This will ensure that construction waste arisings will be effectively controlled, and that good Site management practice will be implemented to minimise the generation of waste and maximise the reuse or recycling of waste materials that arise from the construction where practicable. Once operational, very limited waste and only associated with maintenance operations is expected to be produced by the Proposed Development. As a result it is not proposed that a Chapter specifically related to the assessment of waste will be provided. However, the product of waste and its transportation from the Site will be considered within the relevant ES chapters including, in particular, that for traffic and transport.

Wind Microclimate	It is proposed to 'scope out' Wind Microclimate from detailed assessment. The potential for likely significant effects in relation to Wind Microclimate is generally assessed in respect of the Lawson Comfort Criteria to determine the differing level of impact on assessed locations. The generation of significant Wind Microclimate effects is typically associated with taller developments in highly urbanised environments. Given the low-rise nature of the Proposed Development, the off-site wind conditions are likely to remain broadly similar, and as a result the construction and operation of the Proposed Development is unlikely to generate any pedestrian comfort on the PRoWs or safety exceedances due to the alteration of on-site wind conditions. As such no technical assessment of Wind Microclimate is considered necessary in respect of the Proposed Development and this aspect is scoped out of the EIA.

Appendices

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Appendix A

EAST
AYTON

DUNHAM

NEWTON ON TRENT

RAGNALL

RIVER TRENT

Trent Valley Way

THORNEY

NORTH CLIFTON

FLEDBOROUGH

Sustrans Route 647

Trent Valley Way

SOUTH CLIFTON

HIGH
MARNHAM

SKEGBY

LOW
MARNHAM

NORMANTON ON
TRENT

SPALFORD

Site boundary

Existing woodland

Existing watercourse

Existing trees/tree belt

Existing hedgerow

Existing water body

Existing National Grid substation

Existing overhead lines

Public Right of Way

Trent Valley Way

Sustrans Cycle Route

Scheduled Monument
/ potential buffer

Potential area for mitigation,
enhancement, cable routes
and access

Potential solar and associated
infrastructure

Potential area of search for
cable routes

Offset from existing utilities

0 1km 2km

one earth

solar farm