

Heckington Fen Solar Park

EN010123

Environmental Statement | Volume 3: Technical Appendices

Appendix 1.1: Heckington Fen Solar Park Scoping Report

Applicant: Ecotricity (Heck Fen Solar) Limited

Document Reference: 6.3.1.1

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February 2023



APPENDIX 1.1- HECKINGTON FEN SOLAR PARK SCOPING REPORT

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DEVELOPMENT CONSENT ORDER APPLICATION FOR GROUND MOUNTED SOLAR PANELS,
ENERGY STORAGE FACILITY, BELOW GROUND GRID CONNECTION TO BICKER FEN SUBSTATION
AND ALL ASSOCIATED INFRASTRUCTURE WORKS.

ENVIRONMENTAL IMPACT ASSESSMENT SCOPING REPORT

**LAND AT SIX HUNDREDS FARM, SIX HUNDREDS DROVE, EAST
HECKINGTON, SLEAFORD, LINCOLNSHIRE**

ON BEHALF OF ECOTRICITY (HECK FEN SOLAR) LIMITED

PLANNING ACT 2008 THE INFRASTRUCTURE PLANNING (ENVIRONMENTAL IMPACT ASSESSMENT) REGULATIONS 2017



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INTRODUCTION

Background

1.1 Ecotricity (Heck Fen Solar) Limited (“The Applicant”) has commissioned this Scoping Report relating to the Environmental Impact Assessment (EIA) of Heckington Fen Solar Park, a proposed ground mounted solar photovoltaic (PV) electricity generation and energy storage facility (the “Energy Park”) with an approximate capacity of 500 megawatts (MW) with a further 200-400MW of energy storage capacity on an area of agricultural land approximately 3.7km east of Heckington and 8.9km west of Boston within Lincolnshire. The area of land for the Energy Park measures 586.85 hectares (ha) (1450.13 acres). The EIA will also assess the cable route for the Grid connection and the above ground works needed for connection to the Bicker Fen substation. At the time of Scoping this proposal the final cable for the Grid connection has not been agreed. As a result, a wider corridor of land than needed is included within the EIA area. The Proposed Development will comprise of three elements; the Energy Park, Cable Route and above ground works at the National Grid Bicker Fen substation. These three elements form the Proposed Development for the EIA and the Development Consent Order Application (the “Development”).

- 1.2 The Energy Park location is shown in Figure 1 – Energy Park Site Location.
- 1.3 The Applicant wishes to confirm under Regulation 8(1)(b) of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (amended) (the “EIA Regulations”) that an Environmental Statement (ES) will be provided in respect of the application for consent for this Development.
- 1.4 This Scoping Request forms a formal request for a Scoping Opinion under Regulation 10(1) of the EIA Regulations.

Scope of the Environmental Impact Assessment

- 1.5 Table 1.1 sets out how the various environmental parameters as detailed within paragraph 4 and 5 of Schedule 4 of the EIA Regulations will be considered within the ES. Where a topic has been scoped out of the ES the reasoning has been provided.

TABLE 1.1 ENVIRONMENTAL PARAMETERS

EIA Topic	Scoped In / Out	How / Where addressed / Reason for Scoping Out
Population	Scoped In	To be assessed within the Socio-Economic Chapter
Human Health	Scoped In	To be assessed within the relevant technical assessments such as Air Quality and Noise. There is not to be a specific chapter within the ES that considers Human Health
Biodiversity	Scoped In	To be assessed within the Ecology & Ornithology chapter(s).
Land	Scoped In	To be assessed within the Land Use and Agricultural Chapter.
Soil	Scoped Out	There is no known history of soil contamination on the site. The land grade and structure of the soils on the Site will be assessed within the Land Use and Agriculture Chapter.
Water	Scoped In	To be assessed within the Hydrology, Hydrogeology, Flood Risk and Drainage Chapter.
Air	Scoped In	To be assessed within the Air Quality Chapter.
Climatic Factors	Scoped In	To be assessed within the Climate Change Chapter
Material Assets	Scoped Out	It is not considered that there are any further 'material assets' to those already addressed within other EIA topics.
Cultural Heritage including Architectural and Archaeological aspects.	Scoped In	To be assessed within with the Cultural Heritage and Archaeology chapter.
Landscape	Scoped In	To be assessed within the Landscape and Visual Impact Assessment and Residential Amenity Chapters.
Risk of Major Accidents and Disasters	Scoped Out	<p>The nature, scale and location of the Proposed Development is not considered to be vulnerable to or give rise to significant impacts in relation to the Risk of Accidents and Major Disasters ¹.</p> <p>Potential effects relating to soil conditions, surface water flooding and climate change are all considered in other chapters of the Environmental Statement.</p> <p>During all phases of the development (construction, operation and decommissioning) the developer would implement measures to be in accordance with the relevant health and safety legislation, regulations, and industry guidance to ensure that risks are suitably controlled and managed (for instance in relation to working near to overhead power lines or electrical infrastructure). A draft construction methodology will also be provided in the chapter on the 'Description of the Proposed Development', which would inform the Construction and Environmental Management Plan (CEMP). It is therefore considered that appropriate measures and controls could be achieved in line with the relevant legislation and processes to minimise risks to human and environmental receptors.</p>
Interrelationship between above factors	Scoped In	To be assessed within each topic chapter under the heading 'Cumulative and Interactive Effects'.

¹ No definition of 'major accidents and disasters' is provided in the EIA Regulations, however the IEMA Quality Mark Article on 'Assessing Risks of Major Accidents / Disasters in EIA' produced by WSP in 2016 provides the following definition "man-made and natural risks which are considered to be likely, and are anticipated to result in substantial harm that the normal functioning of the project is unable to cope with/rectify i.e. a significant effect."

1.6 The Summary section (Section 19) of this report will set out more detailed conclusions with regard to the details on the scope of each environmental topic within the ES and determine which areas are proposed to be scoped out of the EIA process.

The Applicant

1.7 Ecotricity was founded in 1995 as the world's first green energy company and now supplies customers across the UK from a growing portfolio of wind and sun parks, with all its electricity supply coming from 100% renewable energy. Ecotricity has introduced green gas to Britain and constructed Britain's first national network of electric vehicle charge points known as the Electric Highway. More recently, Ecotricity has become the first energy company in the UK to be recognised by the Vegan Society. Ecotricity also manufactures its own wind turbines in the Stroud Valleys and has a growing vegan food production company. Ecotricity is a high technology business, developing cutting edge green technology and energy for a low carbon future and generating a large number of knowledge intensive and highly skilled jobs within Gloucestershire and the UK.

1.8 Ecotricity (Heck Fen Solar) Limited, an Ecotricity company, has been formed to create and develop the Heckington Fen Solar Park.

IEMA Quality Mark

1.9 Pegasus Planning Group is an Institute of Environmental Management and Assessment (IEMA) Registered Impact Assessor and also holds the IEMA EIA Quality Mark as recognition of the quality EIA product and continuous training of our environmental consultants. A Statement of Competence will be included within the ES, outlining the relevant expertise or qualifications of the experts who prepared the ES.

Consenting Regime

1.10 The Development falls within the definition of a 'nationally significant infrastructure project' (NSIP) under Section 14(1)(a) and 15(2) of the Planning Act 2008 (the "Act") as the construction of a generating station with a capacity of more than 50MW, with a capacity in the region of 500MW.

1.11 The EIA requirement for NSIP developments is transposed into law through the EIA Regulations. The EIA Regulations specify which developments are required to undergo EIA and schemes relevant to the NSIP planning process are listed as either 'Schedule 1' or 'Schedule 2'. Those developments listed in Schedule 1 are always subject to an EIA, whilst developments listed in 'Schedule 2' must only be subject to an EIA if they are considered 'Likely to have significant effects on the environment by virtue of factors such as its nature, size or location².' The criteria on which this judgement must be made are set out in Schedule 3 of the EIA Regulations.

² The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017, Reg 3

1.12 The Applicant has determined, upon review of the EIA Regulations, that this Development should be accompanied by an EIA. As a result, no formal Screening process has been undertaken for this Development.

The Purpose of the Scoping Report

- 1.13 The EIA Regulations state at regulation 10(3) that a request for a Scoping Opinion should contain:
- “a plan sufficient to identify the land;
 - A description of the proposed development, including the location and technical capacity;
 - An explanation of the likely significant effects of the development on the environment; and
 - Such other information or representations as the person making the request may wish to provide or make.”
- 1.14 The guidance highlighted in Planning Inspectorate Advice Note 7 Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements has also been taken into account in the preparation of this Scoping Report.

- 1.15 Accordingly, this Scoping Report presents:
- a. A plan sufficient to identify the land for the main development (Figure 1) and the wider Environmental Impact Assessment Area (Figure 2);
 - b. A description of the Development (Section 2) and technical capacity (Section 2); and
 - c. An explanation of the likely significant effects of the Development on the environment (the Likely Environmental Effects sub-section of the technical sections 7 -18 of this Scoping Report).



FIGURE 1-ENERGY PARK SITE LOCATION PLAN

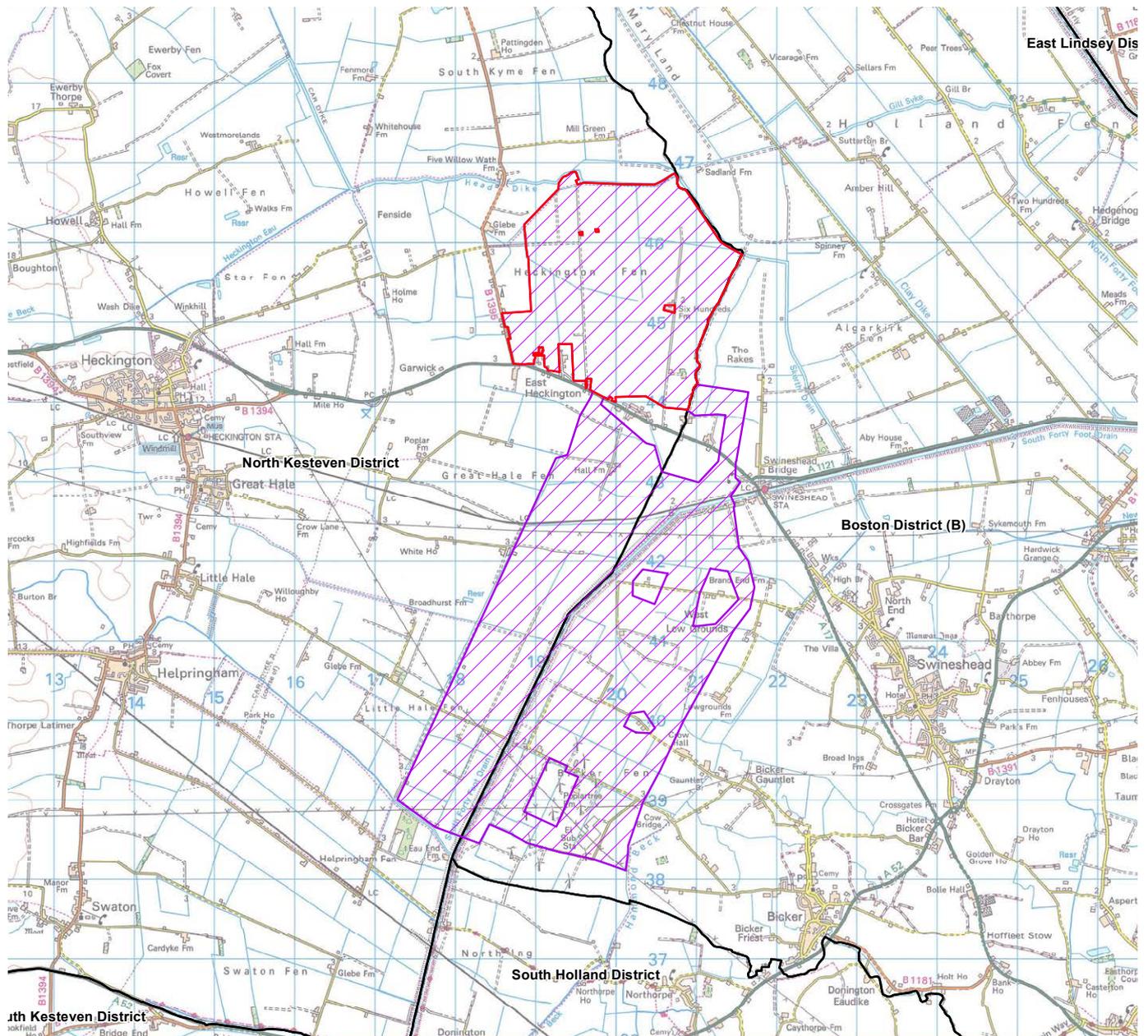


FIGURE 2 – ENVIRONMENTAL IMPACT ASSESSMENT AREA

2. PROJECT DESCRIPTION

The Development Site

- 2.1 The Energy Park site is bounded by Head Dike to the north, Holland Dike to the east, the A17 Sleaford to Holbeach road to the south and B1395 Side Bar Lane/ agricultural land to the west, extending to approximately 586 ha. The Energy Park site lies wholly within North Kesteven District, abutting Boston Borough boundary along the eastern edge. The Grid route connection lies wholly within the Boston Borough Council boundary.
- 2.2 Land within the Energy Park is in arable use and is subdivided into rectilinear parcels by long linear drainage ditches that lie principally north-south, connected east-west by shorter ditches including Labour in Vain Drain. The ditches have an engineered profile, colonised in part by emerging aquatic plant species. The Site is very flat and low-lying at between 2m and 3m Above Ordnance Datum (AOD) and is predominantly within Flood Zone 3, with a narrow ribbon of Flood Zones 2 and 1 occurring along the southern edge and south-western corner of the Site.
- 2.3 Six Hundreds Farm lies in the eastern third of the Energy Park site, with vehicular access gained from Six Hundreds Drove via the A17. Vehicular access is also provided via two other points further west of the A17 frontage at Rectory Farm and at Elm Grange, with tracks connecting to Crab Lane toward the northeast corner of the Energy Park site, and then to Side Bar Lane. The access tracks follow ditch alignments.
- 2.4 One public right of way (PROW) footpath HECK/15/1 runs along the northern boundary, crossing a small part (c.280m) of the Energy Park site; no other PROW occurs within the Energy Park site.
- 2.5 Overhead lines supported on wooden poles criss-cross the Energy Park site, running parallel to Six Hundreds Drove and the A17 in the south, and near the north-western boundary of the Site. An underground gas pipeline bisects the Energy Park site, extending south-north to the east of Rectory Farm.
- 2.6 Intermittent shrubs/hedgerows occur within or along the boundary of the Energy Park site, with tree cover limited to small woodland blocks in the eastern third of the Energy Park site.
- 2.7 There is one Scheduled Monument located 525m to the west of the Energy Park site boundary. This is called 'Settlement site 650yds (600m) E of Holme House'.
- 2.8 There are a small number of residential dwellings along the southern boundary of the Energy Park site. These properties front on to the A17. There is an extant planning consent, for a new additional needs school on the southern boundary. In recent months the old, dilapidated barn that was on this site has been demolished and new concrete footings are being laid. These works indicate that process on the construction of the new additional needs school has begun, but to date the opening date for the school has not been announced. There are further residential dwellings along the southwestern boundary of the Energy Park site, with a further cluster of properties approximately 420m from the edge of the Energy Park site boundary to the west. There is one property to north of the Energy Park

site although this is separated from the site by Head Dike-Skerth. There are no residential properties to the immediate east of the Energy Park site. Six Hundreds Farm is located within the Energy Park site boundary. This is not a residential property and is not inhabited. There are a series of small areas in the Energy Park site that are excluded from the Site boundary. These areas are a combination of farm buildings and infrastructure relating to the gas pipeline which crosses part of the Energy Park site.

- 2.9 The route for the proposed Grid Connection has not been finalised. At this time there are two route options being considered. Both run south from the Energy Park site, one to the east and one to the west of the South Forty Foot Drain. Both options connect into the existing Bicker Fen substation. As the assessment progresses it will be determined which of these routes will be progressed to the application stage.
- 2.10 Both of these routes run through similar agricultural land and some pass near to residential properties. Survey work of these two route options is being undertaken at this time to determine the optimum route. The wider area for the EIA, which includes both of these two route options is shown in Figure 2 and the scoping exercise has been undertaken based on this wider envelope.
- 2.11 It is proposed that the lifetime of this scheme will be 40 years.

Iterative Design and Rochdale Envelope

- 2.12 The Development design will evolve throughout the EIA process. An iterative design process will be utilised, whereby site-specific constraints and design criteria will be added to the site layout to guide the location of the Development infrastructure. If necessary, parts of the Development site may not be developed on in order to avoid, reduce or remove significant adverse effects.
- 2.13 The iterative design approach will take account of comments made during consultation, including those made in response to this Scoping Report. The ES will describe how the design of the Development has been influenced by such comments.
- 2.14 In order to maintain flexibility in the Development design, it is the Applicant's intention to use the 'Rochdale Envelope'³ approach within parameter ranges which will be defined in the Project Description chapter of the ES. The Advice Note 9 clarifies in section 4 that at the Scoping stage certain matters on the design might not yet be resolved due to an iterative design process. These parameters will be considered in detail by technical authors in the ES to ensure the realistic worst-case effects of the Development are assessed for each potential receptor. This is of particular importance to maintain flexibility due to the rapid pace of change in solar PV and energy storage technology. A similar approach was used for the Cleve Hill Solar Park that was determined through the NSIP process.

³ National Infrastructure Planning: Advice Note Nine: Rochdale Envelope

The Development Proposal

2.15 Solar PV and energy storage technologies are rapidly evolving. As a result, the project parameters are required to maintain the flexibility to allow the latest technology to be utilised at the time of construction.

2.16 The Development is likely to include the following infrastructure:

- (i) Solar PV modules;
- (ii) PV module mounting infrastructure;
- (iii) Inverters;
- (iv) Transformers;
- (v) Onsite cabling;
- (vi) Offsite underground cabling to connect the Energy Park site to Bicker Fen National Grid substation;
- (vii) Fencing and security measures;
- (viii) Access tracks and construction of new accesses onto the highway;
- (ix) Electrical substation improvements at Bicker Fen;
- (x) An electrical compound comprising:
 - An energy storage facility (expected to be formed of batteries storing electrical energy);
 - A substation and control building; and
 - Equipment facilitating electrical connection to the Bicker Fen National Grid infrastructure.

2.17 During the construction phase, one or more temporary construction compound(s) will be required as well as temporary roadways to facilitate access to all parts of the EIA Assessment Site.

2.18 Installing the Grid cable from the Energy Park to the National Grid Bicker Fen substation will involve digging a trench approximately 5-10m deep across a 25m wide easement within which the grid cable will be installed. The route will require crossing the South Forty Foot Drain Local Wildlife Site (LWS) and various smaller water courses as well as major roads, rail, high pressure gas main and potentially third-party grid connections. Certain crossing points will require directional drilling as appropriate although all works will be within the easement area.

2.19 In areas around the solar array and on other parts of the Development site, opportunities for landscaping, biodiversity enhancements and habitat management will be explored.

3. TECHNICAL SPECIFICATIONS

Solar PV Modules

- 3.1 Solar PV modules/panels convert sunlight into electrical current (as direct current (DC)). Individual modules/panels are typically 2m long and 1m wide and typically consist of a series of poly-crystalline cells which make up each panel (60 or 72 cells per panel) several panels make up one module. The module frame is typically built from anodised aluminium.
- 3.2 Each module could have a DC generating capacity of between 400-600watts (W), or more depending on advances in technology.
- 3.3 The number of modules required at the Development will be highly dependent upon the iterative layout design process, however the initial Indicative Site Layout is shown in Figure 3.
- 3.4 The modules are fixed into a mounting structure in groups known as “strings”. This mounting structure can be used for two different systems, a fixed panel system where the panels are fixed in one position and one angle, or a tracking system where the panel rotates on its axis to track the sun throughout the day. It has not yet been determined which technology or mounting system will be used on this development.
- 3.5 The number of modules which will make up each of the 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 due to accommodate future technology developments.

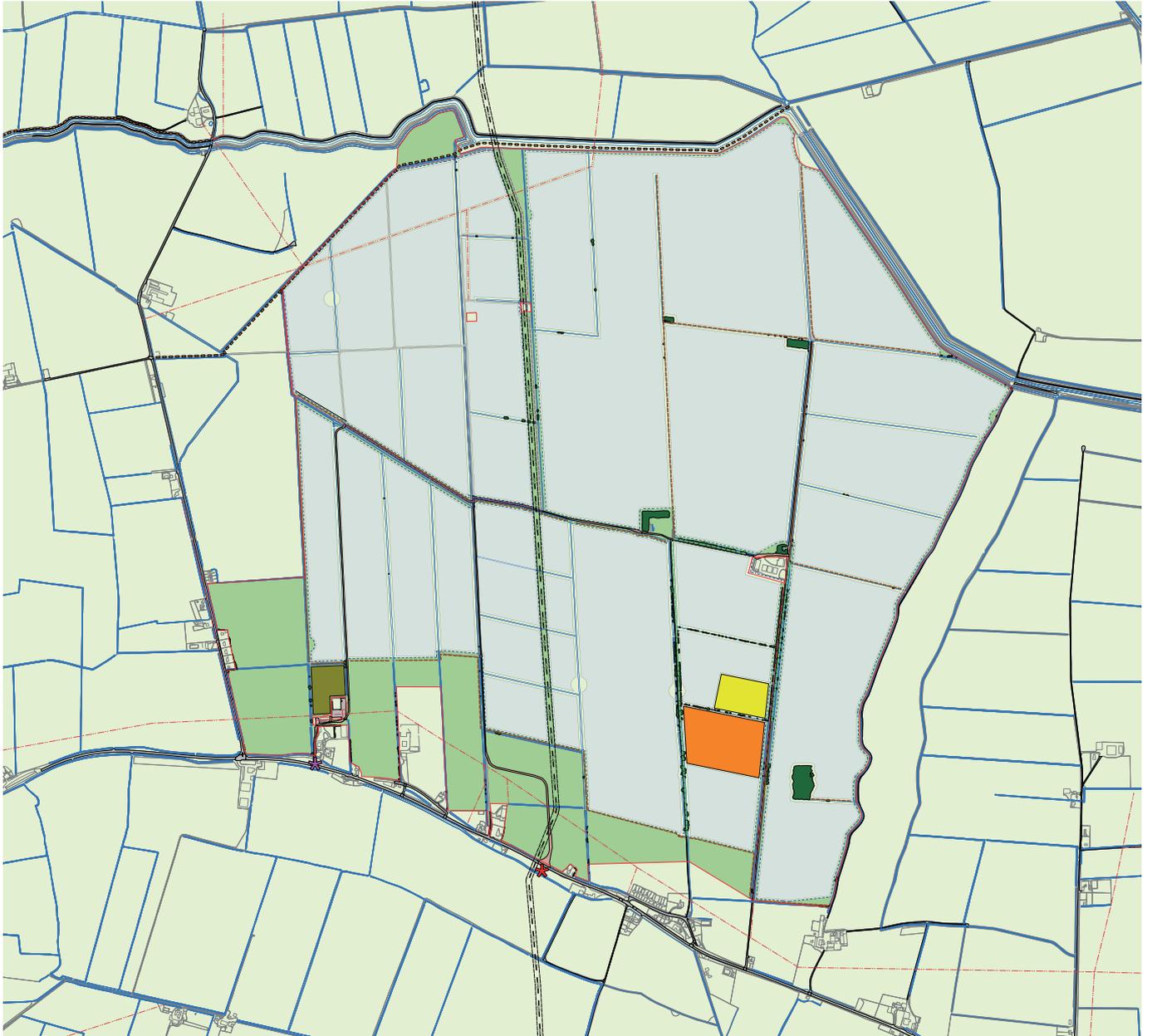


IMAGE OF A BIFACIAL SOLAR PANEL SYSTEM



IMAGE OF A TRACKER SOLAR PANEL SYSTEM ⁴

⁴ Images provided by Nextracker



- KEY**
- Site Boundary
 - Security Fence
 - ✱ Proposed Site Entrance
 - ✱ Temporary Access
 - Primary Access Track
 - Existing Road/Track
 - Solar Development Area
 - Public Right of Way
 - Proposed Permissive Footpath
 - Potential Biodiversity Net Gain (95.34ha: 16.24% gain)
 - Trees, Woodland and Hedgerows
 - New Hedgerow (8.78km)
 - Enhanced Hedgerow (1.98km)
 - Community Orchard
 - Ditch
 - Gas Pipeline
 - 11kV Overhead Line
 - Substation Area
 - Primary Energy Storage

FIGURE 3 - INITIAL INDICATIVE SITE LAYOUT

Module Mounting Structures

- 3.6 Each row of modules will be mounted on a rack supported by galvanised steel poles driven into the ground. Various mounting structures are available however, driven poles are currently expected to be the most likely foundation solution. Between each string of panels there could be an average separation distance of approximately 3.5m to maximise generation and allow sufficient access for maintenance.
- 3.7 The panel modules are likely to be mounted on structures with a clearance of a maximum of 2.2m and an upper height of a maximum of 4.5m. This upper height is subject to ongoing modelling for flood heights on the Energy Park site and may be reduced within the ES.

Inverters

- 3.8 Inverters are required to convert the DC electricity generated by the PV modules into alternating current (AC) which allows the electricity to be exported to the National Grid. Inverters are sized to deal with the level of voltage which is output from strings of PV modules.
- 3.9 Central inverters are large capacity inverters with ratings above 1MW. Due to their size, they are located in a central location surrounded by the solar cells to which they are connected. The unit itself tends to be containerised with associated control and switchgear equipment within a 4m x 3.5m x 2m container. Compared with string inverters, central inverters tend to offer better efficiencies and economies of scale for PV installations exceeding 20MW.
- 3.10 String inverters are much smaller units with a rating normally above 100kW and tend to be better suited for smaller multi-MW installations. The units are around 1m x 1m x 0.5m in size and are installed locally next to a string(s) of solar cells.
- 3.11 It is currently expected that central inverters will be used rather than string. Multiple central inverters, approximately 80-100, will be distributed throughout the Energy Park site and therefore are not shown on Figure 3 at this time.

Transformers

- 3.12 Transformers are required to control the voltage of the electricity generated across the Energy Park Development site and efficiently transmit the power to the Development substation. A number of transformers of various sizes and voltages will be needed and will be located throughout the Energy Park Development site.
- 3.13 For distribution power transformers, the approximate dimensions will be 7m x 10m x 10m. For sub-distribution power transformers, the approximate dimensions will be 7m x 4m x 3m.

Onsite cabling

- 3.14 Onsite electrical cabling is required to connect the PV modules to inverters and the inverters to the transformers onsite. Higher rated cables are then required between the transformers and the Development substation, and between the Development substation and the energy storage facilities onsite. Extra high voltage cables will then be required to export all of the electricity produced by the Development to the existing National Grid substation at Bicker Fen.
- 3.15 At this time it is being determined if all the onsite cables can be laid underground or if some sections will need to be above ground.
- 3.16 Data cables will also be installed, typically alongside electrical cables in order to allow for the monitoring of the Development during operation, such as the collection of solar data from pyranometers.

Offsite Cabling

- 3.17 The proposed connection point for this Development is the National Grid Bicker Fen substation. This is an existing 400kV substation that is located approximately 6km south of the Development site. The exact route for the cable route to connect the Development to this substation is still being determined. However, all of the new offsite cabling will be laid underground in trenches or ducting. At certain points along the route, it will be necessary to drill past 'obstacles' such as roads, watercourses and other utilities. There will be no new above ground power lines for the offsite cabling.
- 3.18 The cable routes are still being surveyed and so more detail on the extents and locations of the cable routes cannot be offered within this Scoping Request.
- 3.19 As this survey work is on going and discussions with National Grid on their preferred location of the connection point into their Bicker Fen substation there is no more detail that can be provided on this route at this time, not the depth of the required trench nor the number of cables. However, these uncertainties will be defined, where possible, within the ES and if still to be finalised can be captured and assessed effectively through the 'Rochdale Envelope' approach which is being used for this ES.

Fencing and Security Measures

- 3.20 A fence will enclose the operational areas of the Development. The fence is likely to be a metal mesh fence of approximately 3m in height. Pole mounted closed circuit television (CCTV) system, which will face towards the Energy Park and away from any land outside of the Development site will also be deployed around the perimeter of the site. These cameras will be mounted on poles of 3.5m height located within the perimeter fence.
- 3.21 It is likely that lighting on sensors for security purposes will be deployed around the energy storage area and potentially at any other pieces of critical infrastructure. No areas of the Development are proposed to be continuously lit during the operational phase of this development.

Access Tracks

- 3.22 Access to the Development is under review but a new, previously approved point of access off the A17 will be created. This sits on the most southern boundary of the Site. This access point will be used for both construction and operational traffic. It will require the creation of a new T junction with a visibility splay of 215m, which is commensurate with a 60mph speed limit, even though the A17 is a 50mph road.
- 3.23 Once on site the access track will continue northwards as shown on Figure 3 connecting with minor internal access roads which will serve each parcel of the solar development. These tracks will likely be made of crushed aggregate or other suitable reinforcement.

Energy Storage Facility

- 3.24 It is proposed to include an energy storage facility as an associated part of the electrical infrastructure of this Development. The energy storage is proposed to be located adjacent to the Development substation either in a series of individual containers or housed within a larger building(s). It is estimated at this time that the storage capacity of this site would be approximately 200-400MW. A maximum of 6.04 ha is set aside for this element of the Energy Park Development, with a maximum height of 4.5m.
- 3.25 The energy storage system includes batteries, inverters and system controllers but its final design has not yet been determined. Any system installed will be strenuously tested during the factory and pre-commissioning testing regime before being given the final sign off to energise.

Development Substation and Control Building

- 3.26 The Development substation will consist of electrical infrastructure such as the transformers, switchgear and metering equipment required to facilitate the export of electricity from the Development to the National Grid. The maximum dimensions of the main substation are proposed to be 180m x 130m x 15m. There may be smaller sub-stations distributed throughout the site with dimensions around 7m x 3m x 3m.
- 3.27 The Development substation is also expected to include a control building which will include office space and welfare facilities as well as operational monitoring and maintenance equipment. The dimensions of this control building and compound are dependent on further assessment work and so, in accordance

with the Rochdale Principle, cannot be stated in this Scoping Request but are expected to be approximately 10m x 10m x 3m.

Electricity Export Connection to National Grid

- 3.28 The electricity generated is expected to be exported via a connection from the Development to the existing National Grid Electricity Transmission (NGET) 400kV Bicker Fen substation.
- 3.29 This Development will require an extension of approximately 45m² to the substation either to the southwest or northeast (to be determined by National Grid). The installation of a new generation bay with electrical equipment for connection to the Transmission system will be required. The new equipment will look similar to the units already installed at the National Grid Bicker Fen site. It is expected that the maximum height of this new unit will be 15m, which is similar to the units already installed at Bicker Fen.

Rochdale Envelope

- 3.30 The details that have been listed above in Section 3 offer the known details of the Development at this time but have also tried where possible to indicate where the details of the scheme are not yet known.
- 3.31 However, these uncertainties will be defined, where possible, within the ES and if still to be finalised can be captured and assessed effectively through the 'Rochdale Envelope' approach which is being used for this ES.

4. PHASES OF DEVELOPMENT

Construction

4.1 The construction phase of the Development is currently anticipated to last up to 18 months but will be dependent on the final design and the findings of the access and traffic assessment. The types of construction activities that may be required include (but are not limited to):

- Importing of construction materials;
- Culverting some ditches on the Site;
- The establishment of the construction compound – this will likely move over the course of the construction process as each phase is built out;
- Creation of a new access point for the Site (A17);
- Installing the security fencing around the Site;
- Importing the PV panels and the energy storage equipment;
- Erection of PV frames and modules;
- Digging of cable trench and laying cables for connection to the National Grid Bicker Fen substation;
- Laying of overhead cables on Site and digging cable trenches and laying cables;
- Installing transformer cabins;
- Construction of onsite electrical infrastructure for the export of generated electricity
- New habitat creation; and
- Installing new technical equipment at the National Grid Bicker Fen substation.

Construction Traffic Management Plan

4.2 A draft Construction Traffic Management Plan (CTMP) will be developed as part of the EIA which will guide the delivery of materials and staff onto the Development Site during the construction phase. The principles of the draft CTMP will be available for comment as part of the consultation process to ensure that the comments of local residents and stakeholders are taken into account in its development.

Temporary Construction Compounds

4.3 A main temporary construction compound will likely be established close to the Development site entrance. Smaller temporary compounds will be located across the Development as the site is built out in its various phases, currently proposed to be 3. As each of these phases is completed it will be connected to Bicker Fen substation and start the export of electricity to the National Grid. For clarification, the construction process will take place as one continuous process, so when Phase 1 is completed, Phase 2 would start.

Temporary Roadways

4.4 Depending on weather conditions during construction, temporary roadways (e.g. plastic matting) may be utilised to access parts of the Development site.

Site Reinstatement and Habitat Enhancement

- 4.5 Depending on the season, work needed for habitat enhancement may start during or after construction is completed. A draft Landscape and Ecological Management Plan will be submitted as part of the EIA. This document will set out the proposals for the land and how it will be managed through the operational life of the scheme. It is proposed that the lifetime of this scheme will be 40 years.

Operation

- 4.6 During operation of the Development, human activity on the Site will be minimal and would be restricted principally to vegetation management, equipment maintenance and servicing, replacement of any components that fail and monitoring to ensure the continued effective operation of the Development.
- 4.7 There is a proposed 'Community Orchard' as part of the ecological enhancements of the Energy Park. At this time, it is hoped that children of the additional needs school, as well as other community groups, would be able to access this orchard. The access arrangements to such a community asset are still to be finalised, but will be discussed over the formal consultation process for this proposal. Local residents will also be able to use the proposed permissive footpath that would offer an extension to the existing footpath in the northwest corner of the Site (Ref: Heck/15/1).

Decommissioning

- 4.8 The Development will be decommissioned at the end of its approved operational phase. All PV modules, mounting poles, cabling, energy storage equipment, inverters, transformers etc would be removed from the Development. These items would be recycled or disposed of in accordance with good practice and market conditions at the time. A Decommissioning Plan, to include timescales (expected to take 6-12 months) and transportation methods would be agreed in advance with the Local Planning Authority.
- 4.9 At this time the applicant has been advised by National Grid that the additional electricity transformer unit that will be installed at the National Grid Bicker Fen substation for the Development will be removed as part of the decommissioning process. However, the extended concrete pad at Bicker Fen will remain. This extended concrete pad will be in the ownership of National Grid. Therefore, the larger footprint of Bicker Fen substation will remain after the solar park is decommissioned.
- 4.10 The effects of decommissioning are often similar to, or to a lesser magnitude than, the construction effects and will be considered where possible in the relevant sections of the ES. However, there can be a high degree of uncertainty regarding decommissioning as engineering approaches and technologies evolve over the operational life of the Development.

5. LEGISLATIVE AND PLANNING FRAMEWORK

Introduction

- 5.1 The ES will include a chapter setting out the legislative and planning framework. A summary of that framework at the time of writing this Scoping Report is provided in this section.
- 5.2 Under the Planning Act (2008) the Development constitutes an NSIP. The Development falls under the NSIP consenting regime because it consists of:
- “the construction or extension of a generating station” (Section 14 (1)(a) of the Act); and
 - “its capacity is more than 50 megawatts” (Section 15 (2) of the Act).
- 5.3 Section 105 of the Planning Act (2008) states the Secretary of State must have regard, as the decision maker to an application for an order granting development consent where a national policy statement (NPS) does not exist for the development, to any Local Impact Report and to any other matters which relate to and are important to the decision. This may include a variety of national planning and local planning documents, including other relevant NPSs.
- 5.4 Although there is not currently an NPS which provides specific policy in relation to solar PV and energy storage development, in previous applications where no NPS applies, the Secretary of State has applied relevant NPSs as if these NPSs governed the development in question ⁵. Therefore, three current NPSs which have provisions relevant to the Development, in the opinion of the authors, have been identified. The provisions of the NPSs considered relevant by the authors are outlined below, together with other considerations relevant to the

planning framework such as the draft NPS, which is expected to be enacted by the time this application and ES is submitted to PINS.

National Policy Statements

Overarching National Policy Statement for Energy (EN-1)

- 5.5 The overarching NPS for Energy (EN-1) ⁶ was adopted in July 2011 and sets out the overall national energy policy for delivering major energy infrastructure.
- 5.6 Part 2 of the statement sets out the Central Government policy context for major energy infrastructure. It comprises the need to meet legally binding targets to cut greenhouse gas emissions; transition to a low carbon economy; decarbonise the power sector; reform the electricity market; secure energy supplies; replace outdated energy infrastructure; and widen objectives of sustainable development.
- 5.7 Paragraph 3.2.3 sets out more detail around the importance that Central Government attaches to the need for new energy infrastructure and to its energy policy, including combatting climate change, by stating that:
- “The Government considers that, without significant amounts of new large-scale energy infrastructure, the objectives of its energy and climate change policy cannot be fulfilled.”***

⁵ See decisions on Triton Knoll Electrical System Order 2017, Tidal Lagoon (Swansea Bay) Order 2015, Glyn Rhonwy Pumped Storage Generating Station Order 2017, Cleve Hill Solar Park 2020 and Little Crow Solar Park 2021

⁶ Department of Energy and Climate Change July 2011, 'National Policy Statement for Energy (EN-1)

- 5.8 Paragraph 3.3.2 then states clearly that new generating capacity, because of the need to ensure energy security, is a key objective of Government energy policy:
- “The Government needs to ensure sufficient electricity generating capacity is available to meet maximum peak demand, with a safety margin or spare capacity to accommodate unexpectedly high demand and to mitigate risks such as unexpected plant closures and extreme weather events”***
- 5.9 The benefits of an energy mix in ensuring a secure energy supply are also recognised in that the characteristics of different types of electricity generation, including renewable energy and other technologies, can complement each other.
- 5.10 Part 4 sets out a number of assessment principles against which applications are to be decided, including the presumption to grant consent for applications for energy NSIPs, and the need to balance potential benefits against potential adverse impacts.
- 5.11 Paragraphs 4.2.2 and 4.2.3 provide national policy on what an ES for a NSIP project should contain:
- “To consider the potential effects, including benefits, of a proposal for a project, the IPC [now the Planning Inspectorate] 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.***
- 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.”***
- 5.12 Paragraph 4.2.4 then sets out how the assessment of the ES by the decision maker should be carried out:
- “When considering a proposal, the IPC 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 should request further information where necessary to ensure compliance with the EIA Directive.”***
- 5.13 Part 5 then sets out guidance on generic impacts for the Applicant’s assessment and decision-making on the application. These impacts concern air quality and emissions; biodiversity; aviation; coastal change; dust and various other pollution control related matters; flood risk; historic environment; landscape and visual; land use; noise and vibration; socio-economics; traffic and transport; waste; and water quality and resources.
- 5.14 Where these generic impacts are relevant to the Development, the proposed approach to the EIA is set out in the relevant technical section of this Scoping Report.

National Policy Statement on Renewable Energy Infrastructure (EN-3)

- 5.15 The National Policy Statement on Renewable Energy Infrastructure (EN-3)⁷ was adopted in July 2011 and provides national planning policy in respect of renewable energy infrastructure.
- 5.16 Paragraph 1.1.1 of EN-3 underlines the importance of the generation of electricity from renewable sources by stating:
- ‘Electricity generation from renewable sources of energy is an important element in the Government’s development of 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’***
- 5.17 Whilst EN-3 provides assessment and technology-specific information on certain renewable energy technologies, comprising biomass/waste, offshore wind and onshore wind, this does not include solar PV development (in the current (2011) version of EN-3).

National Planning Policy Statement for Electricity Networks (EN-5)

- 5.18 The National Policy Statement on Electricity Networks Infrastructure (EN-5) was adopted in July 2011. Whilst EN-5 principally covers above ground electricity lines of 132 kV or above, paragraph 1.8.2 confirms that EN-5 will also be relevant if the electricity network constitutes an associated development for which consent is sought, such as a generating station. EN-5 is therefore relevant to the Development, as a grid connection is proposed.

- 5.19 Part 2 of EN-5 sets out a number of assessment and technology specific matters. Paragraph 2.2.2 points out that the location of electricity networks will often be determined by the particular generating station and the existing electricity network. Part 2 sets out particular generic impacts concerning biodiversity and geological conservation, landscape and visual, noise and vibration, and electric and magnetic field effects.

- 5.20 Where these generic impacts are relevant to the Development, the proposed approach under the ES to address the technical matter is set out in the relevant technical section of this Scoping Report.

- 5.21 In 2021 The Department for Business, Energy, and Industrial Strategy (BEIS) consulted on a suite of new draft national policy statements for energy infrastructure. These include specific policies relating to, and supporting, solar energy.

Draft Overarching National Policy Statement for Energy (EN-1) – September 2021

- 5.22 Draft NPS (EN1) recognises that:
- ‘To produce enough energy required for the UK and ensure it can be transported to where it is needed, a significant amount of infrastructure is needed at both local and national scale. High quality infrastructure is crucial for economic growth, boosting productivity and competitiveness.’ (para. 2.1.2)***

⁷ Department of Energy and Climate Change, July 2011, “ National Policy Statement for Renewable Energy Infrastructure (EN- 3

- 5.23 The draft EN-1 NPS then goes on to look into the development constraints on renewable energy within the UK and how these constraints should be considered and assessed to enable sound planning decisions. It states:
- ‘Applicants should seek to minimise impacts on the best and most versatile agricultural land (defined as land in grades 1, 2 and 3a of the Agricultural Land Classification) and preferably use land in areas of poorer quality (grades 3b, 4 and 5) except where this would be inconsistent with other sustainability considerations. Applicants should also identify any effects and seek to minimise impacts on soil quality taking into account any mitigation measures proposed.’ (para. 5.11.8)***
- 5.24 The Draft NPS confirms that the Secretary of State should ensure that applicants do not site their scheme on the best and most versatile agricultural land without justification. The document states that:
- ‘Little weight should be given to the loss of poorer quality agricultural land (in grades 3b, 4 and 5), except in areas (such as uplands) where particular agricultural practices may themselves contribute to the quality and character of the environment or the local economy.’ (para. 5.11.14).***
- 5.25 On the issue of best and most versatile agricultural land, the Draft NPS for Renewable Energy (EN-3) states that
- ‘land type should not be a predominating factor in determining the suitability of the site location’ (para. 2.48.13)***
- 5.26 Draft EN-3 also states that
- ‘whilst the development of ground mounted solar arrays is not prohibited on sites of agricultural land classified 1, 2 and 3a, the impacts of such are expected to be considered.’ (para 2.48.15).***
- 5.27 The Draft NPS recognises that
- ‘where previous management of the site has involved intensive agricultural practice, solar sites can deliver significant ecosystem services value in the form of drainage, flood attenuation, natural wetland habitat, and water quality management.’ (para. 2.50.11).***
- 5.28 The Draft NPS continues:
- ‘The maximum impact case scenario will be assessed, and the Secretary of State will consider the maximum adverse effects in its consideration of the application and consent.’ (para. 2.50.11).***
- 5.29 Although this NPS is in draft format at this stage, it is expected that by the time this application is submitted for consideration to the Secretary of State the draft NPS of EN-1, EN-3 and EN-5 will have been adopted. Therefore, in the preparation of this ES it is proposed that all assessment methodologies should strive to follow the advice provided within these draft National Planning Statements.
- Draft National Policy Statement for Renewable Energy Infrastructure (EN3) – September 2021**
- 5.30 Draft NPS (EN3) recognises that:
- ‘Solar farms are one of the most established renewable electricity technologies in the UK and the cheapest form of electricity generation worldwide. Solar farms can be built quickly and, coupled with consistent reductions in the***

cost of materials and improvements in the efficiency of panels, large-scale solar is now viable in some cases to deploy subsidy-free and at little to no extra cost to the consumer. 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' (para. 2.47.1)

5.31 At the time of writing, these revised policies remain in draft and are not yet adopted policy. It is expected that the revised suite of energy NPSs will come into force in the early part of 2022 and in advance of the submission of the Application. In the meantime, these draft NPS remain an important and relevant considerations in preparing the environmental chapters.

Climate Change and Net Zero

5.32 The Climate Change Act 2008 commits the UK Government by law to reducing greenhouse gas emissions by at least 100% of 1990 levels (net zero) by 2050. In April 2021, the Government announced that it will seek to reduce emissions by 78% by 2035 compared to 1990 levels as part of its sixth carbon budget.

5.33 The UK's carbon budgets place a restriction on the total amount of greenhouse gases the UK can emit over a five-year period. The UK is currently in the third carbon budget period (2018 to 2022). In 2021 the Climate Change Committee ⁸ (an independent statutory body established under the Climate Change Act 2008) reported that the UK is currently on track to meet its target of a 37% reduction in

emissions compared to 1990 by 2022, but not to meet its targets outlined by the fourth and fifth carbon budgets; a 51% reduction compared to 1990 levels by 2025 and a 57% reduction compared to 1990 levels by 2030. The Committee said that the Government will have to 'introduce more challenging measures' if the UK is to meet future carbon budgets and the net zero target for 2050.

5.34 In October 2021 the Government published its Net Zero Strategy ⁹ which sets out policies and proposals for meeting the carbon budget targets and its vision for a decarbonised economy by 2050. The document states that low carbon power is expected to become the predominant form of energy in 2050; accounting for approximately 50% or higher share of final energy consumption (up from 10% in 2019) as it displaces petrol in light vehicles and gas for heat in homes. The Net Zero Strategy is intended to accompany the Government's Ten Point Plan for Green Industrial Revolution (November 2020) ¹⁰ which sets out its plans to put the UK at the forefront of the global green economy.

5.35 The Energy White Paper 2020 ¹¹ sets out the UK Government's goal of a fully decarbonised, reliable, and low-cost power system by 2050. Although the White Paper envisaged achieving an overwhelmingly decarbonised power system during the 2030s, the Government revised ambition sets 2035 as the date by which all the UK's electricity will need to come from low carbon sources, subject to security of supply, whilst meeting a 40-60% increase in demand.

⁸ Committee on Climate Change- 2021 Progress Report to Parliament

⁹ Net Zero Strategy: Build Back Greener- HM Government, October 2021

¹⁰ Ten Point Plan for a Green Industrial Revolution – HM Government, November 2020

¹¹ Energy White Paper – Department for Business, Energy & Industrial Strategy, December 2020

National Planning Policy Framework

5.36 The National Planning Policy Framework ("the NPPF") was revised on 20th July 2021 and is a material consideration in planning decisions. Whilst the NPPF does not contain any specific policies for NSIP development, paragraph 5 of the NPPF states that, as well as the NPSs, NSIPs are to be determined in accordance with:

"any other matters that are relevant (which may include the National Planning Policy Framework)."

5.37 The NPPF sets out that the purpose of the planning system is to contribute to the achievement of sustainable development, which can be summarised as meeting the needs of the present without compromising the ability of future generations to meet their own needs. The UK and members of the United Nations have agreed to pursue the 17 Global Goals for Sustainable Development in the period to 2030 – these address social progress, economic well-being and environmental protection. There are number of specific instances under the NPPF where this presumption does not apply, including as set out by paragraph 182, where development requires Appropriate Assessment under the Birds or Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna ("the Habitats Directive").

5.38 Paragraph 152 of the NPPF applies a number of core planning principles that are to underpin planning decision making, including the following which is specifically relevant to renewable energy development:

"support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change."

It should help to: shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, including conversion of existing buildings; and support renewable and low carbon energy and associated infrastructure".

5.39 Chapter 14 sets out the objectives for planning in meeting the challenge of climate change. Paragraph 152 states that planning is identified as playing a key role in helping shape places to secure radical reductions in greenhouse emissions, minimising vulnerability and providing resilience to the impacts of climate change, and supporting the delivery of renewable and low carbon energy and associated infrastructure. This is central to all three strands of sustainable development.

5.40 Whilst the Local Planning Authorities (LPAs) are not the determining authority, paragraph 156 of the NPPF sets out that in order to increase the use and supply of renewable energy LPAs need to recognise the responsibility of all communities to contribute to energy generation from renewable sources. Paragraph 158 then makes it clear that LPAs should not require applicants to demonstrate the overall need for renewable energy.

5.41 The NPPF also provides guidance on a number of environmental matters; where these matters are relevant to the Development, the proposed approach to the EIA to address the technical matter is set out in the relevant section of this Scoping Report. The ES Planning Chapter will describe all relevant matters contained within the NPPF.

- 5.42 Chapter 15 of the NPPF sets out the objectives for the planning system in conserving and enhancing the natural environment. Paragraph 174 states that the planning system should contribute to and enhance the natural and local environment by, protecting and enhancing valued landscapes, geological conservation interests and soils; recognising the wider benefits of ecosystem services; and minimising impacts on biodiversity where possible. Paragraph 180 states when determining applications, LPAs should seek to conserve and enhance biodiversity by encouraging opportunities to incorporate biodiversity in and around developments. Paragraph 120 states that planning policies and decisions should encourage the effective use of land by re-using that which has previously been developed, provided that it is not of high environmental value.
- 5.43 Paragraph 174 states that LPAs should take into account the economic and other benefits of the best and most versatile (BMV) agricultural land. The footnote at paragraph 175 notes that where significant development of agricultural land is demonstrated to be necessary, LPAs should seek to use areas of poorer quality.
- 5.44 The NPPF also provides guidance on the weight to be given to policies in existing plans and emerging plans. Paragraph 219 states that beyond the 12-month period after the NPPF was introduced, that the weight to be given to relevant policies in existing plans will depend on their degree of consistency with the NPPF. Paragraph 48 states the weight to be given to relevant policies in emerging plans will depend on the stage of preparation of the plan, the extent to which there are unresolved

objections and the degree of consistency with the NPPF.

National Planning Practice Guidance (NPPG)

- 5.45 The NPPG pulls together planning practice guidance for all planning related matters. The Planning Practice Guidance for Renewable and Low Carbon Energy dates from June 2015. The opening paragraph of the NPPG insofar as it relates to renewable and low carbon energy proposals states that:
- ‘increasing the amount of energy from renewable and low carbon technologies will help to make sure the UK has a secure energy supply, reduce greenhouse gas emissions to slow down climate change and stimulate investment in new jobs and businesses.’***
- 5.46 The NPPG further notes that planning has an important role in the delivery of new renewable and low carbon energy infrastructure in locations where the local environmental impact is acceptable.
- 5.47 In considering applications, paragraph 7 of the NPPG makes it clear that:
- the need for renewable or low carbon energy does not automatically override environmental protections;
 - cumulative impacts require particular attention, especially the increasing impact that wind turbines and large-scale solar farms can have on landscape and local amenity as the number of turbines and solar arrays in an area increases;
 - local topography is an important factor in assessing whether wind turbines and large-scale solar farms could have a damaging effect on landscape and

recognise that the impact can be as great in predominately flat landscapes as in hilly or mountainous areas;

- great care should be taken to ensure heritage assets are conserved in a manner appropriate to their significance, including the impact of proposals on views important to their setting;
- proposals in National Parks and Areas of Outstanding Natural Beauty, and in areas close to them where there could be an adverse impact on the protected area, will need careful consideration;
- protecting local amenity is an important consideration which should be given proper weight in planning decisions.

5.48 Paragraph 13 of the NPPG sets out the particular planning considerations relating to large scale ground-mounted solar photovoltaic farms. It states that these can have a negative impact on the rural environment, particularly in undulating landscapes. However, the NPPG notes that the visual impact of a well-planned and well-screened solar farm can be properly addressed within the landscape if planned sensitively. In providing further guidance on the particular factors that a local planning authority will need to consider in the assessment of large-scale solar farms, the NPPG advises:

- encouraging the effective use of land by focusing large scale solar farms on previously developed and non-agricultural land, provided that it is not of high environmental value;
- where a proposal involves greenfield land, whether (i) the proposed use of any agricultural land has been shown to be necessary and poorer quality land has been used in preference to

higher quality land; and (ii) the proposal allows for continued agricultural use where applicable and/or encourages biodiversity improvements around arrays. (See also speech by the Minister for Energy and Climate Change, the Rt Hon Gregory Barker MP, to the solar PV industry on 25 April 2013 and written ministerial statement on solar energy: protecting the local and global environment made on 25th March 2015)

- that solar farms are normally temporary structures and planning conditions can be used to ensure that the installations are removed when no longer in use and the land is restored to its previous use;
- that the proposal's visual impact, the effect on landscape of glint and glare and on neighbouring uses and aircraft safety should be considered;
- the extent to which there may be additional impacts if solar arrays follow the daily movement of the sun;
- the need for, and impact of, security measures such as lights and fencing;
- great care should be taken to ensure heritage assets are conserved in a manner appropriate to their significance, including the impact of proposals on views important to their setting. Depending on their scale, design and prominence, a large-scale solar farm within the setting of a heritage asset may cause substantial harm to the significance of the asset;
- the potential to mitigate landscape and visual impacts through, for example, screening with native hedges;
- the energy generating potential, which can vary for a number of reasons including, latitude and aspect.

5.49 The guidance adds that the approach to assessing cumulative landscape and visual impact of large-scale solar farms is likely to be the same as assessing the impact of wind turbines. However, in the case of ground-mounted solar panels it should be noted that with effective screening and appropriate land topography the area of a zone of visual influence could be zero.

Local Development Plans

5.50 The Development Plan does not carry the same weight under the Act in respect of decision making on NSIPs as it does with the determination of planning applications that are made under the Town and Country Planning Act 1990. Although the NPSs are the primary consideration for NSIP applications, the Development Plan is still an important consideration. In relation to this proposal, the scheme sits within two local authority areas, North Kesteven and Boston, and the county authority of Lincolnshire County Council, each of which is subject to its own Development Plan regime.

North Kesteven

5.51 The relevant Development Plan comprises the Central Lincolnshire Local Plan, adopted by the Central Lincolnshire Joint Strategic Planning Committee (CLJSPC) on 24 April 2017, and replacing the Local Plans of the North Kesteven District Council, the City of Lincoln, and West Lindsey District Council.

Central Lincolnshire Local Plan

5.52 The Local Plan contains the following policies of most relevance, based on the proposed land-use of the Development and designations on the Proposals Map.

5.53 Policy LP1 - Presumption in Favour of Sustainable Development sets out a desire to deliver sustainable growth that brings benefits for all sectors of the community. When considering development proposals, the Central Lincolnshire districts of West Lindsey, Lincoln City and North Kesteven will take a positive approach that reflects the presumption in favour of sustainable development contained in the NPPF. The districts will always work proactively with applicants to find solutions which means that proposals can be approved wherever possible, and to secure development that improves the economic, social and environmental conditions in Central Lincolnshire.

5.54 LP2 - The Spatial Strategy and Settlement Hierarchy advises that;

'the spatial strategy will focus on delivering sustainable growth for Central Lincolnshire that meets the needs for homes and jobs, regenerates places and communities, and supports necessary improvements to facilities, services and infrastructure. Decisions on investment in services and facilities, and on the location and scale of development, will be assisted by a Central Lincolnshire Settlement Hierarchy. Renewable energy generation is listed as one of the land uses that are acceptable in principle within the countryside elements of the hierarchy.'

5.55 LP13 - Accessibility and Transport states that;

‘all developments should demonstrate, where appropriate, that they have had regard to the [listed] criteria’. An appropriate Transport Statement / Assessment and/ or Travel Plan should be submitted with proposals, with the precise form being dependent on the scale and nature of development and agreed through early discussion with the local planning or highway authority.’

5.56 LP14 - Managing Water Resources & Flood Risk states that ‘all development proposals will be considered against the NPPF, including application of the sequential and, if necessary, the exception test. Through appropriate consultation and option appraisal, development proposals should demonstrate:

“a. that they are informed by and take account of the best available information from all sources of flood risk and by site specific flood risk assessments where appropriate;

b. that there is no unacceptable increased risk of flooding to the development site or to existing properties;

c. that the development will be safe during its lifetime, does not affect the integrity of existing flood defences and any necessary flood mitigation measures have been agreed with the relevant bodies;

d. that the adoption, ongoing maintenance and management of any mitigation measures have been considered and any necessary agreements are in place;

e. how proposals have taken a positive approach to reducing overall flood risk

and have considered the potential to contribute towards solutions for the wider area; and

f. that they have incorporated Sustainable Drainage Systems (SuDS) in to the proposals unless they can be shown to be impractical.”

5.57 LP17 - Landscape, Townscape & Views states that to protect and enhance the intrinsic value of our landscape and townscape, including the setting of settlements, proposals should have particular regard to maintaining and responding positively to any natural and man-made features within the landscape and townscape which positively contribute to the character of the area, such as (but not limited to) historic buildings and monuments, other landmark buildings, topography, trees and woodland, hedgerows, walls, water features, field patterns and intervisibility between rural historic settlements. Where a proposal may result in significant harm, it may, exceptionally, be permitted if the overriding benefits of the development demonstrably outweigh the harm: in such circumstances the harm should be minimised and mitigated.

5.58 The Policy also states that:

“All development proposals should take account of views in to, out of and within development areas: schemes should be designed (through considerate development, layout and design) to preserve or enhance key local views and vistas, and create new public views where possible. Particular consideration should be given to views of significant buildings and views within landscapes which are more sensitive to change due to their open, exposed nature and extensive

intervisibility from various viewpoints.”

- 5.59 The Policy advises that in considering the impacts of a proposal, the cumulative impacts as well as the individual impacts will be considered.
- 5.60 LP18 - Climate Change and Low Carbon Living states that development proposals will be considered more favourably if the scheme would make a positive and significant contribution towards one or more of a number of principles which are listed in order of preference under the policy). The third of these is 'Energy production', where development could provide site based decentralised or renewable energy infrastructure. The infrastructure should be assimilated into the proposal through careful consideration of design. Where the infrastructure may not be inconspicuous, the impact will be considered against the contribution it will make. Proposals which are poorly designed and/or located and which have a detrimental impact on the landscape, the amenity of residents, or the natural and built environment, will be refused.
- 5.61 LP19 - Renewable Energy Proposals states that proposals for non-wind renewable technology will be assessed on their merits, with the impacts, both individual and cumulative, considered against the benefits of the scheme, taking account of the following:
- The surrounding landscape and townscape;
 - Heritage assets;
 - Ecology and diversity;
 - Residential and visual amenity;
 - Safety, including ensuring no adverse highway impact;
- MoD operations, including having no unacceptable impact on the operation of aircraft movement or operational radar; and
 - Agricultural Land Classification (including a presumption against photovoltaic solar farm proposals on the best and most versatile agricultural land).
- 5.62 Proposals will be supported where the benefit of the development outweighs the harm caused and it is demonstrated that any harm will be mitigated as far as is reasonably possible.
- 5.63 LP21 - Biodiversity and Geodiversity states that all development should: protect, manage and enhance the network of habitats, species and sites of international, national and local importance (statutory and non-statutory), including sites that meet the criteria for selection as a Local Site; minimise impacts on biodiversity and geodiversity; and seek to deliver a net gain in biodiversity and geodiversity.
- 5.64 LP21 states also that:
- 'Development proposals should create new habitats, and links between habitats, in line with Biodiversity Opportunity Mapping evidence to maintain a network of wildlife sites and corridors to minimise habitat fragmentation and provide opportunities for species to respond and adapt to climate change. Development should seek to preserve, restore and re-create priority habitats, ecological networks and the protection and recovery of priority species set out in the Lincolnshire Biodiversity Action Plan and Geodiversity Action Plan. Development proposals should ensure opportunities are taken to retain, protect and enhance***

biodiversity and geodiversity features proportionate to their scale, through site layout, design of new buildings and proposals for existing buildings.'

5.65 LP21 also addresses the issue of mitigation:

'Any development which could have an adverse effect on sites with designated features and / or protected species, either individually or cumulatively, will require an assessment as required by the relevant legislation or national planning guidance. Where any potential adverse effects to the biodiversity or geodiversity value of designated sites are identified, the proposal will not normally be permitted. Development proposals will only be supported if the benefits of the development clearly outweigh the harm to the habitat and/or species.'

5.66 LP21 also states that:

In exceptional circumstances, where adverse impacts are demonstrated to be unavoidable, developers will be required to ensure that impacts are appropriately mitigated, with compensation measures towards loss of habitat used only as a last resort where there is no alternative. Where any mitigation and compensation measures are required, they should be in place before development activities start that may disturb protected or important habitats and species.'

5.67 LP25 - The Historic Environment states that development proposals should protect, conserve and seek opportunities to enhance the historic environment of Central Lincolnshire. In instances where a development proposal would affect the significance of a heritage asset (whether designated or non-designated), including

any contribution made by its setting, the applicant will be required to undertake a number of actions, in a manner proportionate to the asset's significance.

5.68 LP26 - Design and Amenity states that:

'All development, including extensions and alterations to existing buildings, must achieve high quality sustainable design that contributes positively to local character, landscape and townscape, and supports diversity, equality and access for all. Development proposals will be assessed against a number of relevant design and amenity criteria.'

5.69 Part E of LP55 - Development in the Countryside sets out the basis on which proposals for non-residential developments will be supported in rural locations, provided that:

- a. The rural location of the enterprise is justifiable to maintain or enhance the rural economy or the location is justified by means of proximity to existing established businesses or natural features;***
- b. The location of the enterprise is suitable in terms of accessibility;***
- c. The location of the enterprise would not result in conflict with neighbouring uses; and***
- d. The development is of a size and scale commensurate with the proposed use and with the rural character of the location***

5.70 Part F of LP55 – Agricultural Diversification states that:

'Proposals involving farm-based diversification will be permitted, provided that the proposal will support farm enterprises and providing that the development is:

- a. In an appropriate location for the proposed use;**
- b. Of a scale appropriate to its location; and**
- c. Of a scale appropriate to the business need.'**

- 5.71 Part G of Policy LP55 states that:
- '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, development affecting the best and most versatile agricultural land will only be permitted if:**
- a. 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 impacts of the proposal upon ongoing agricultural operations have been minimised through the use of appropriate design solutions; and**
 - c. Where feasible, once any development which is permitted has ceased its useful life the land will be restored to its former use, and will be of at least equal quality to that which existed prior to the development taken place (this requirement will be secured by planning condition where appropriate).**

- 5.72 The Local Plan Review 2019 is proposed to replace the Local Plan adopted in 2017. It addresses a range of issues including climate change. An Issues and Options consultation in June and July 2019 was followed by a Draft Local Plan consultation between 30 June and 24 August 2021.

Boston Borough Council

South East Lincolnshire Local Plan 2011-2036

- 5.73 The Joint Strategic Planning Committee comprises of Boston Borough, South Holland District and Lincolnshire County Councils who collectively have created a single Local Plan for Southeast Lincolnshire. The Local Plan 2011-2036 was adopted in March 2019. The Local Plan contains the following policies of most relevance, based on the proposed land-use of the Development and designations on the Proposals Map:
- 5.74 Policy 31 – Climate Change and Renewable and Low Carbon Energy states that with the exception of Wind Energy the development of renewable energy facilities, associated infrastructure and the integration of decentralised technologies on existing or proposed structures will be permitted provided, individually, or cumulatively, there would be no significant harm to:
1. visual amenity, landscape character or quality, or skyscape considerations;
 2. residential amenity in respect of: noise, fumes, odour, vibration, shadow flicker, sunlight reflection, broadcast interference, traffic;
 3. highway safety (including public rights of way);
 4. agricultural land take;
 5. aviation and radar safety;
 6. heritage assets including their setting; and
 7. the natural environment. Provision should be made for post-construction monitoring and the removal of the facility

and reinstatement of the site if the development ceases to be operational.

5.75 Policy 28 - The Natural Environment seeks to protect internationally, nationally or locally-designated sites and protected or priority habitats and species as well as addressing gaps in the ecological network. Section 2 specially relates to nationally or locally designated sites:

a. development proposals that would directly or indirectly adversely affect these assets will not be permitted unless:

i. there are no alternative sites that would cause less or no harm; and

ii. the benefits of the development at the proposed site, clearly outweigh the adverse impacts on the features of the site and the wider network of natural habitats; and

iii. suitable prevention, mitigation and compensation measures are provided.

5.76 Section 3 specifically relates to addressing gaps in the ecological network: a. by ensuring that all development proposals shall provide an overall net gain in biodiversity. Four criteria for completing this are listed.

5.77 The Plan advises that that South East Lincolnshire's progress in relation to the Government target for 30% of electricity used from renewable sources, 15% of all energy used from renewable sources and the 34% cut in greenhouse gases by 2020 and 80% by 2050 is contained within the 'South East Lincolnshire's Carbon Challenge' (para. 7.5.7).

5.78 The Plan advises also that South East Lincolnshire is within The Fens National Character Area. The Local Plan Area is notable for its large-scale, flat, open

landscape with extensive vistas to level horizons. The level, open topography shapes the impression of huge skies which convey a strong sense of place, tranquillity and inspiration. Planning proposals shall assess their implications against the information contained in the:- Landscape Character Assessment of Boston Borough or the Strategic Landscape Capacity Study for South Holland, as well as the Lincolnshire Historic Landscape Characterisation Project, the Lincolnshire Historic Environment Record (HER), the Boston Town and Rural Historic Environment Baseline Studies and the Conservation Area appraisals (see Policy 29: The Historic Environment) to protect landscape character and quality, skyline and visual amenity.

5.79 Policy 29 – The Historic Environment states that to respect the historical legacy, varied character and appearance of South East Lincolnshire's historic environment, development proposals will conserve and enhance the character and appearance of designated and non-designated heritage assets, such as important known archaeology or that found during development, historic buildings, conservation areas, scheduled monuments, street patterns, streetscapes, landscapes, parks (including Registered Parks and Gardens), river frontages, structures and their settings through high-quality sensitive design.

5.80 In relation to development proposals, Policy 29 states that where a development proposal would affect the significance of a heritage asset (whether designated or non-designated), including any contribution made to its setting, it should be informed by proportionate historic environment

assessments and evaluations (such as heritage impact assessments, desk-based appraisals, field evaluation and historic building reports) that:

- 1. identify all heritage assets likely to be affected by the proposal;***
- 2. explain the nature and degree of any effect on elements that contribute to their significance and demonstrating how, in order of preference, any harm will be avoided, minimised or mitigated;***
- 3. provide a clear explanation and justification for the proposal in order for the harm to be weighed against public benefits; and***
- 4. demonstrate that all reasonable efforts have been made to sustain the existing use, find new uses, or mitigate the extent of the harm to the significance of the asset; and whether the works proposed are the minimum required to secure the long-term use of the asset.***

6. ENVIRONMENTAL IMPACT ASSESSMENT

EIA Process and Methodology

- 6.1 The purpose of the EIA is to identify the likely 'significance' of environmental effects (beneficial or adverse) arising from a Proposed Development. In broad terms, environmental effects are described as:
- Adverse – detrimental or negative effects to an environmental resource or receptor;
 - Beneficial – advantageous or positive effect to an environmental resource or receptor; or
 - Negligible – a neutral effect to an environmental resource or receptor.
- 6.2 It is proposed that the significance of environmental effects (adverse, negligible/neutral or beneficial) would be described in accordance with the following 7-point scale:-
- 6.3 Significance reflects the relationship between two factors:
- The magnitude or severity of an effect (i.e. the actual change taking place to the environment); and
 - The sensitivity, importance or value of the resource or receptor.
- 6.4 The broad criteria for determining magnitude are set out in Table 6.1.
- 6.5 It is worth noting that the degrees of magnitude defined in the table below can be both positive and negative, as a development can result in a positive effect on the environment.
- 6.6 The sensitivity of a receptor is based on the relative importance of the receptor using the scale in Table 6.2.

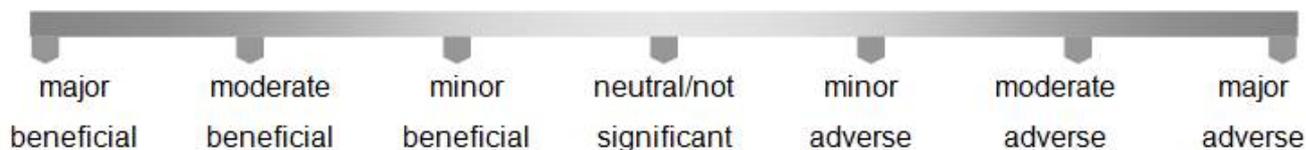


TABLE 6.1: DEGREES OF MAGNITUDE AND THEIR CRITERIA

Magnitude of Effect	Criteria
High	Total loss or major/substantial alteration to elements/features of the baseline (pre-development) conditions such that the post development character/composition/attributes will be fundamentally changed.
Medium	Loss or alteration to one or more elements/features of the baseline conditions such that post development character/composition/attributes of the baseline will be materially changed.
Low	A minor shift away from baseline conditions. Change arising from the loss/alteration will be discernible / detectable but the underlying character / composition / attributes of the baseline condition will be similar to the pre-development.
Negligible	Very little change from baseline conditions. Change not material, barely distinguishable or indistinguishable, approximating to a 'no change' situation.

TABLE 6.2: DEGREES OF SENSITIVITY AND THEIR CRITERIA

Sensitivity	Criteria
High	The receptor / resource has little ability to absorb change without fundamentally altering its present character, or is of international or national importance.
Medium	The receptor / resource has moderate capacity to absorb change without significantly altering its present character, or is of high and more than local (but not national or international) importance.
Low	The receptor / resource is tolerant of change without detrimental effect, is of low or local importance.
Negligible	The receptor / resource can accommodate change without material effect, is of limited importance.

6.7 Placement within the 7-point significance scale would be derived from the interaction of the receptor’s sensitivity and the magnitude of change likely to be experienced (as above), assigned in accordance with Table 6.3 below, whereby effects assigned a rating of Major or Moderate would be considered as ‘significant’.

TABLE 6.3: LEVEL OF EFFECT

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

6.8 The above magnitude and significance criteria are provided as a guide for specialists to categorise the significance of effects within the ES. Where discipline-specific methodology has been applied that differs from the generic criteria above, this will be clearly explained within the given chapter under the heading of Assessment Approach in the ES.

6.9 As can be seen from Table 6.3 when an environmental effect is assessed as having a major or moderate degree of significance it is deemed to be “significant”. These are the shaded cells in Table 6.3. When such a significant effect occurs consideration of mitigation solutions or enhancements to minimise the effect (which can include design alterations) will be considered. It should be noted at this point that mitigation can come in

the form of embedded design through design alteration to resolve a significant effect and mitigation through additional measures. Once these mitigations and enhancements have been assessed the degree of significance may decrease to minor/moderate, minor or negligible. If such a level of environmental effect occurs the Proposed Development is no longer considered as creating a “significant effect”. If an environmental effect remains “significant” (i.e. major/moderate) the assessing planning authority must weigh up the planning balance and determine if this significant, negative/positive environmental effect is outweighed by some other planning gain prior to determining the planning application.

6.10 A level of effects would be assigned both before and after mitigation.

Mitigation

- 6.11 Standard measures and the adoption of construction best practice methods to avoid, minimise or manage adverse environmental effects, or to ensure realisation of beneficial effects, are assumed to have been incorporated into the design of the Development and the methods of its construction from the outset.
- 6.12 Where mitigation measures are proposed that are specific to an environmental theme (i.e. ecological measures incorporated into the landscaping scheme, exclusion of areas of archaeological significance from development etc) and incorporated into the design.
- 6.13 Where the assessment of the Development has identified potential for adverse environmental effects, the scope for mitigation of those effects, for example by way of compensatory measures, has been considered and is outlined in the appropriate technical chapter. It is assumed that such measures would be subject to appropriate DCO requirements.
- 6.14 Where the effectiveness of the mitigation proposed has been considered uncertain, or where it depends upon assumptions of operating procedures, then data and/or professional judgement has been introduced to support these assumptions.

Residual Effects

- 6.15 The assessment process will conclude with an examination of the residual effects after mitigation has been applied, i.e. the overall predicted (likely) effects of the Development.

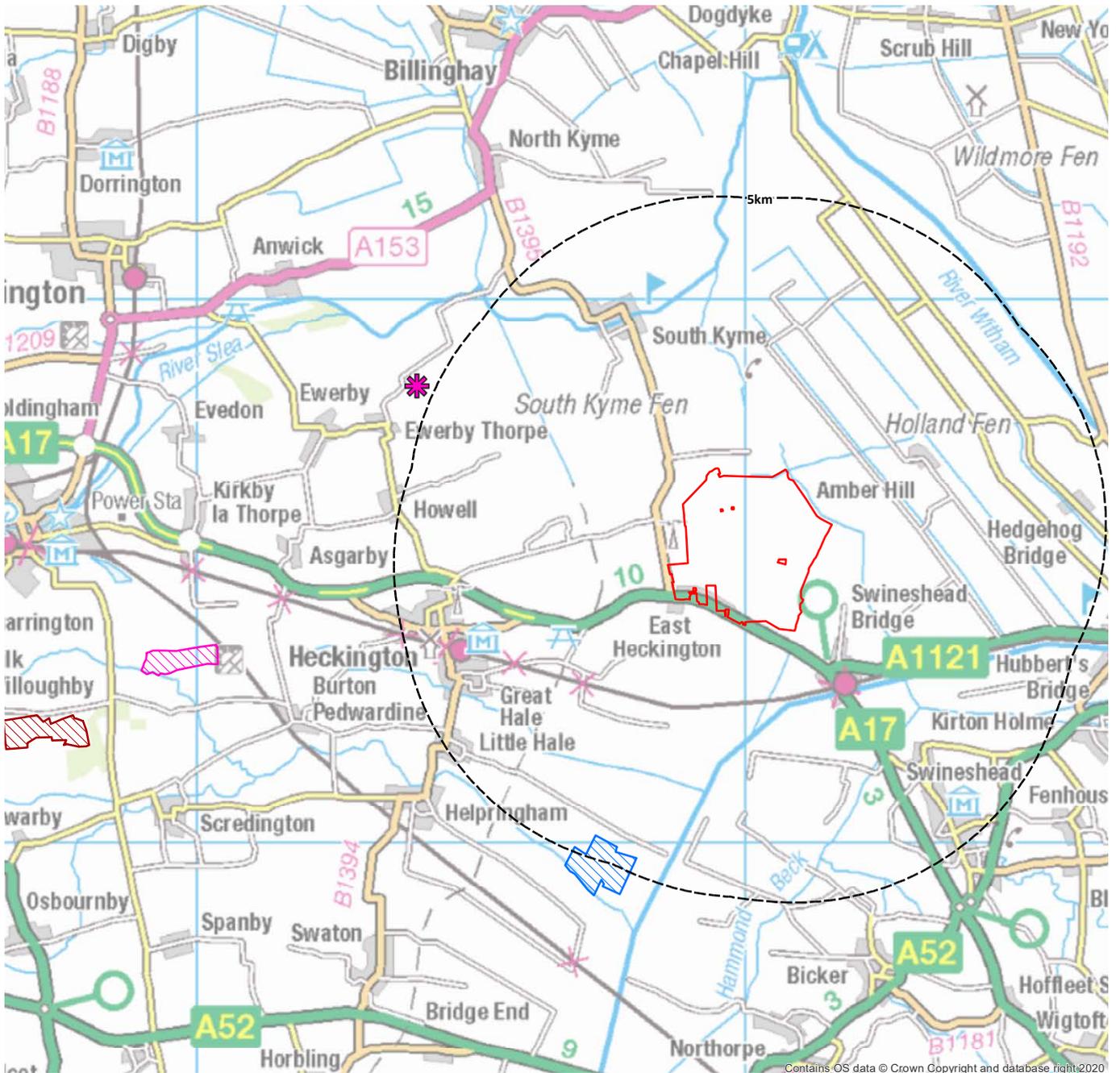
CUMULATIVE AND IN COMBINATION EFFECTS

Cumulative Effects

- 6.16 Within EIA, cumulative effects are generally considered to arise from the combination of effects from the Proposed Development and from other proposed or permitted schemes in the vicinity, acting together to generate elevated levels of effects. Examples of these kinds of effects that can be readily appreciated could include:
- Traffic generated from developments, affecting the surrounding road network;
 - Air quality effects from developments; and
 - Discharges to the water environment.
- 6.17 In order to determine the assessment area for the visual assessment a Screened Zone of Theoretical Visibility (SZTV) was applied to the EIA Assessment Area. This looked at the maximum solar panel height of 4.5m. There is the potential that other elements of the development would be taller than 4.5m, but these would be set back from the Energy Park boundaries and so it was deemed at this stage to consider the expanse of the panels rather than the maximum height of a locally occurring structures within the Energy Park site.. This looked at 5km area to determine the likelihood of a cumulative effect being visible from outside of this area and considered both North Kesteven District and Boston Borough Council's planning registers. This SZTV has shown that there are few, even theoretical opportunities to see the Development from over 5km away from the site and it has therefore been determined reasonable to consider possible cumulative developments

within this area. If a wider cumulative assessment area is needed for a specific environmental topic this will be highlighted in their assessment text. For reference, the Ecology and Ornithology Assessment will be assessing a 10km area for the ecological cumulative impact. This larger area has been confirmed by AECOM who are the environmental advisors for North Kesteven District Council (NKDC) for this application.

- 6.18 A list of known developments to be considered with regards cumulative effects has been compiled and is presented within Table 6.4 and shown in Figure 4. This list will be reviewed as the EIA process continues and if further major application sites enter the planning system within this 5km area they will be added to the cumulative assessment. Also, if any of these cumulative sites are “built out” they will no longer be cumulative, but instead will form the baseline. At this time the table below includes sites that have been screened but not yet submitted as a planning application. Unless otherwise agreed, developments whose applications for consent have not yet been submitted at the time of finalising the ES are unlikely to be included in the cumulative assessments given the large degree of uncertainty over the likelihood of an application being submitted and the final design of those sites.



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KEY

- Site Boundary
- ✱ Land at Ewerby Thorpe - Screening 14/1034/EIASCR
- Land at Little Hale Fen - Screening 21/1337/EIASCR
- Land South Of Gorse Lane Silk Willoughby Approved - 19/0060/FUL
- Land to the North of White Cross Lane - Approved 19/0863/FUL

FIGURE 4 - CUMULATIVE SITES PLAN

- 6.19 All of the sites in Table 6.4 below are large scale ground mounted solar. At this time there are no known major developments within 5km of the Development site that are not solar farm developments. As stated above, if by the time of submission any major applications, which are not solar, come forward to planning they will be included within the cumulative assessment.
- 6.20 These cumulative sites will be considered within each specialist technical chapter rather than as a standalone chapter within the ES.

TABLE 6.4: PROJECTS CONSIDERED IN THE CUMULATIVE ASSESSMENT

Site	Nature of Development/Planning Status
Land At Little Hale Fen	21/1337/EIASCRC – Screening Opinion Proposed solar farm (up to 49.995MW generating capacity) and associated infrastructure including grid connection cabling to Bicker Fen Substation. Determined that this proposal was not an EIA. (October 2021)
Land To the North Of White Cross Lane, Burton Gorse, Sleaford	19/0863/FUL – Proposed Solar Farm (32MW) and associated development including substation, inverter cabins, switchgear and communication buildings and access tracks. Approved 7th October 2021
Land South Of Gorse Lane Silk Willoughby Sleaford Lincolnshire	19/0060/FUL Erection of Solar PV park (circa 20MW) electricity generating capacity including inverters, substations, office building, store, perimeter fencing, access tracks, temporary construction compound and associated development. Approved April 2019
Land At Ewerby Thorpe	14/1034/EIASCRC – Screening Opinion Erection of solar array with generating capacity of up to 28MW and associated infrastructure Determined that this proposal was not EIA (July 2014)
Land North West Of Bicker, Vicarage Drove Solar Farm	B/21/0443 Proposed construction and operation of a solar photovoltaic farm, battery storage and associated infrastructure, including inverters, batteries, substation compound, security cameras, fencing, access tracks and landscaping. Validated 5th October 2021 – not yet determined

Site Selection and Consideration of Alternatives

- 6.21 The EIA Regulations (Schedule 4, Paragraph 2) require for inclusion in an ES: ***“A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects”***
- 6.22 The main alternatives to the Proposed Development which the Applicant has considered include:
- The ‘No Development’ Alternative; and
 - Alternative Designs.
- 6.23 The applicant has an existing option to lease on the Energy Park Site due to a previous planning permission for the a 66MW wind park (Ref:09/1067/S36). This remains a valid consent (subject to BEIS approving an application to extend the life of the permission) but has not been able to be progressed due to a ‘Grampian Condition’ that requires radar mitigation. As no viable mitigation has been identified which is likely to be acceptable to the MOD the wind park cannot be built out. As a result, this approved wind park will not form part of the baseline as the Applicant has committed to not building the wind turbines and associated infrastructure if the proposed Energy Park is consented and built.
- 6.24 The Applicant has therefore looked at the Energy Park site to determine if any other form of renewable energy generation can be installed. Various environmental constraints were applied to the Energy Park site to determine if it was viable for ground mounted solar development. Initial environmental constraint assessment work determined that the Energy Park site is suitable for ground mounted solar development.
- 6.25 The ES requires that ‘Alternative Sites’ are considered as part of the assessment process. As a result, these same environmental constraints will be applied to the land form within a similar distance (up to 9km) to the connection at National Grid Bicker Fen substation to determine if another area of land would be a viable alternative site for a solar park development of this scale and with this generation capacity.
- 6.26 The ES will also consider the alternative design process for this Site and the design iterations that will be progressed as detailed environmental information is formulated for the Development site.
- 6.27 The alternative assessment within this ES will not consider alternative technologies on any of the alternative sites that are identified, nor will it consider alternative renewable energy sources. It has already been determined that the Energy Park site is suitable for large scale onshore wind power (bar a Grampian Condition) but that this would not be built out if the Energy Park becomes operational.

Determining the Baseline

6.28 The specifics of how the baseline will be determined for each environmental assessment topic is outlined in the relevant technical topic within this Scoping Request. However, the following main steps will be taken:

- Data search for Historical Records within and in 5-10km (depending on topic) of the EIA Site as shown on Figure 2;
- GIS mapping for known environmental assets within the EIA Site and assessment area (e.g. mapping of heritage assets);
- Planning Application search for Energy Park site and surrounding area to determine planning decisions that need to be considered within the baseline and those that form the cumulative assessment;
- Confirmation that the approved 66MW wind farm on the Energy Park Site will not form part of the baseline as it will not be built if the Energy Park is constructed;
- Review of planning policy;
- Site surveys to gather information on the current environmental status of the EIA assessment area;
- Topographic survey of the whole of the Energy Park site to determine ground levels; and
- Determining and mapping the existing environmental constraints on the EIA site and its immediate surrounding area (e.g. proximity of residential dwellings).

Structure of the Environmental Statement

- 6.29 6.7.1 The Applicant has appointed a team of specialist consultants to consider planning and environmental matters in relation to the Proposed Development and to provide input into the production of this Scoping Report, as listed in Table 6.5 below. The technical assessment work undertaken by each of the consultants listed has directly informed the consideration of likely significant effects within their respective disciplines.

TABLE 6.5 CONSULTANT TEAM

Discipline	Company
Planning	Pegasus Group
Environmental Impact Assessment	Pegasus Group
Landscape and Visual	Pegasus Group
Transport and Access	Pegasus Group
Flood Risk and Drainage	JBA Consulting
Ecology and Ornithology	Ecotricity
Archaeology and Cultural Heritage	Pegasus Group
Socio Economic	Pegasus Group
Air Quality	Hoare Lea
Arboriculture	To be confirmed
Agriculture	Kernon Countryside Consultants
Noise and Vibration	Hoare Lea
Climate Change	LUC
Glint & Glare	To be confirmed

6.30 The proposed structure of the ES is set out in Table 6.6.

TABLE 6.6 PROPOSED STRUCTURE OF THE ENVIRONMENTAL STATEMENT

Non-Technical Summary	
Chapter 1	Introduction
Chapter 2	EIA Methodology & Public Consultation
Chapter 3	Site Description, Site Selection and Iterative Design Process
Chapter 4	Proposed Development
Chapter 5	Planning Policy
Chapter 6	Landscape and Visual Impact
Chapter 7	Residential Amenity
Chapter 8	Ecology
Chapter 9	Ornithology
Chapter 10	Hydrology, Hydrogeology and Flood Risk
Chapter 11	Cultural Heritage
Chapter 12	Socio Economic
Chapter 13	Noise
Chapter 14	Climate Change
Chapter 15	Transport & Access
Chapter 16	Air Quality
Chapter 17	Agriculture
Chapter 18	Glint & Glare
Chapter 19	Miscellaneous – to include Major Accidents & Disasters, H&S at Work, Telecoms, TV & Utilities
Chapter 20	Summary
Chapter 21	Glossary

6.31 As stated above, cumulative impacts would be included within each technical assessment chapter and then summarised in the Summary chapter.

6.32 As detailed under Schedule 4(4) of the EIA Regulations the possible impacts on human health may be deemed necessary to form part of the ES. At this time the reasonable views on the potential impact

on human health from this development would be limited to possible noise and air/dust pollution from the construction phase and through construction traffic. This potential impact will be considered within the relevant technical chapters, rather than as a standalone chapter within the ES.

- 6.33 For completeness, the opening section of the ES will present the following information.

Introduction

- 6.34 Chapters 1-3 of the ES will provide an introduction to the ES, the assessment scope and methodology and details of the Application Site location and current use and alternative designs considered.
- 6.35 In accordance with the EIA Regulations this chapter of the ES will include an outline of the main reasonable alternatives studied by the Applicant which are relevant to the proposed development and its specific characteristics and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects (Regulation 14(2) and Schedule 4 of the EIA Regulations).

Proposed Development

- 6.36 Chapter 4 will provide a comprehensive description of the Proposed Development, including consideration of construction and operation.

Planning Policy

- 6.37 Chapter 5 will provide a summary of the planning policy that should be considered when determining this planning application. It will outline National through to Local policy.

7. LANDSCAPE AND VISUAL IMPACT AND RESIDENTIAL AMENITY

Introduction

7.1 This section sets out the proposed scope and assessment methodology for the Landscape and Visual chapter of the ES for the proposed solar and energy storage development at Heckington Fen, Lincolnshire.

Preliminary Baseline Conditions

The Development Site

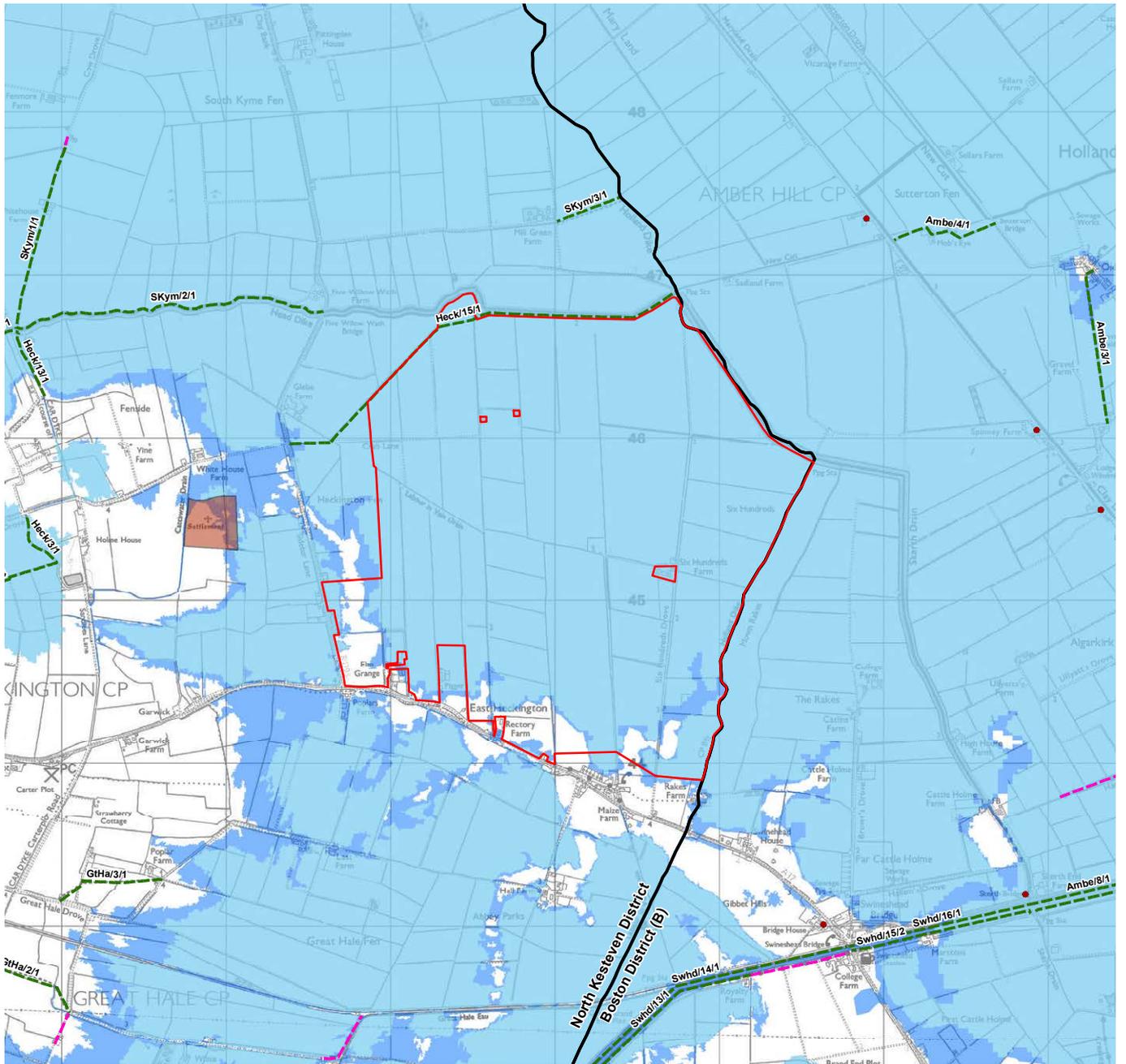
7.2 The Energy Park site is bounded by Head Dike to the north, Holland Dike to the east, the A17 Sleaford to Holbeach road to the south and B1395 Side Bar Lane/ agricultural land to the west, extending to approximately 586 ha (Figure 1). The Development site lies wholly within North Kesteven District (NKDC), abutting Boston Borough Council boundary along the eastern edge. The grid route connection lies wholly within Boston Borough Council (BBC).

7.3 Land within the Energy Park is in arable use and is subdivided into rectilinear parcels by long linear drainage ditches that lie principally north-south, connected east-west by shorter ditches including Labour in Vain Drain. The Energy Park site is very flat and low-lying at between 2m and 3m AOD and is predominantly within Flood Zone 3, with a narrow ribbon of Flood Zones 2 and 1 occurring along the southern edge and south-western corner of the Energy Park site. Flood Risk (Figure 6).

7.4 Six Hundreds Farm lies in the eastern third of the Energy Park site, with access gained from Six Hundreds Drove via the A17.

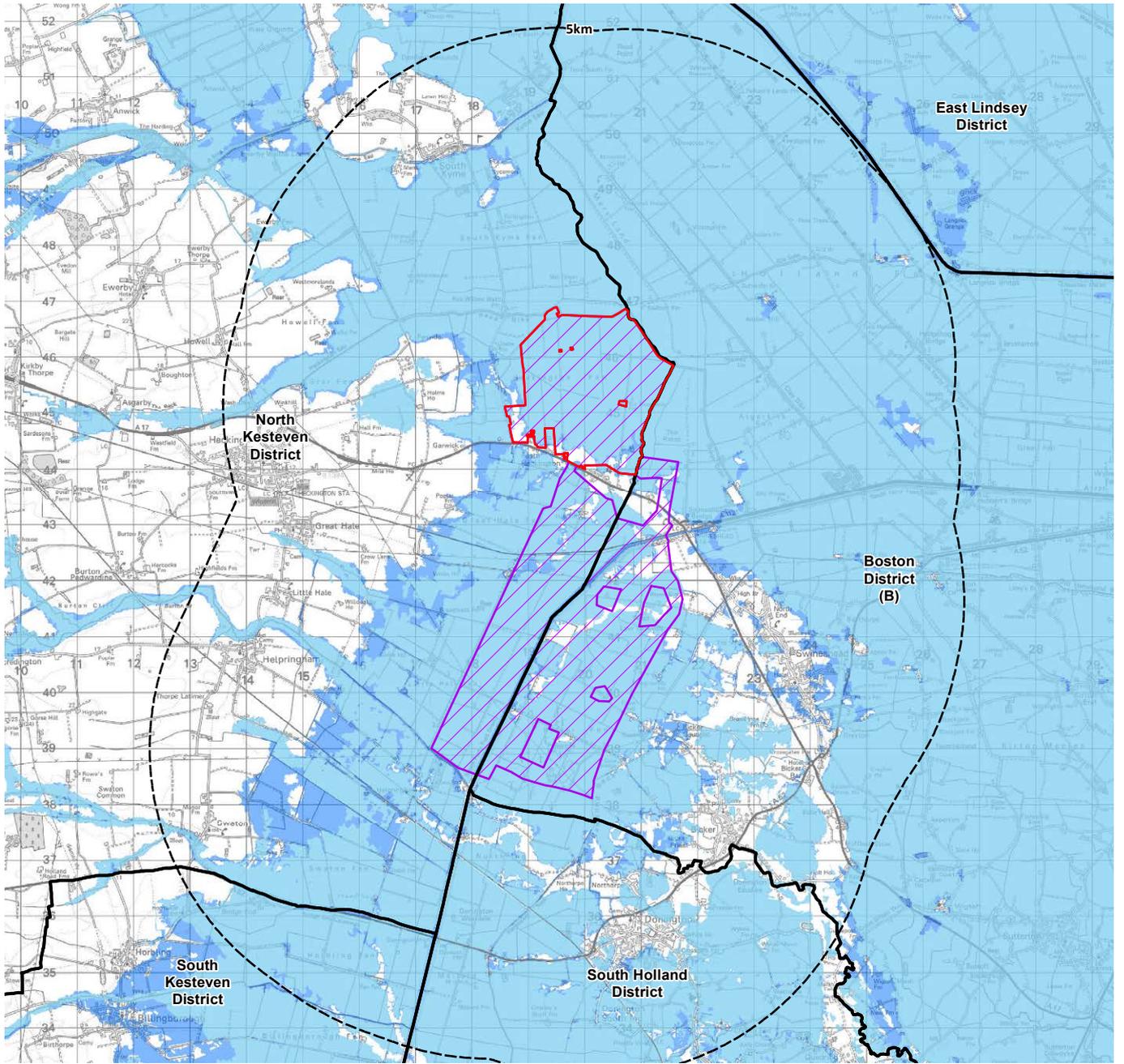
Two further access tracks lie off the A17 adjacent Rectory Farm in the centre of the Energy Park site and at Elm Grange in the southwest corner, these in turn connect to Crab Lane toward the northeast corner of the Energy Park site, and then to Side Bar Lane.

7.5 One public right of way (PROW) footpath HECK/15/1 runs along the northern boundary, crossing a small part (c.280m) of the Energy Park site; no other PROW occurs within the Energy Park site. These features can be seen on the Environmental Designations Plan Figure 5.



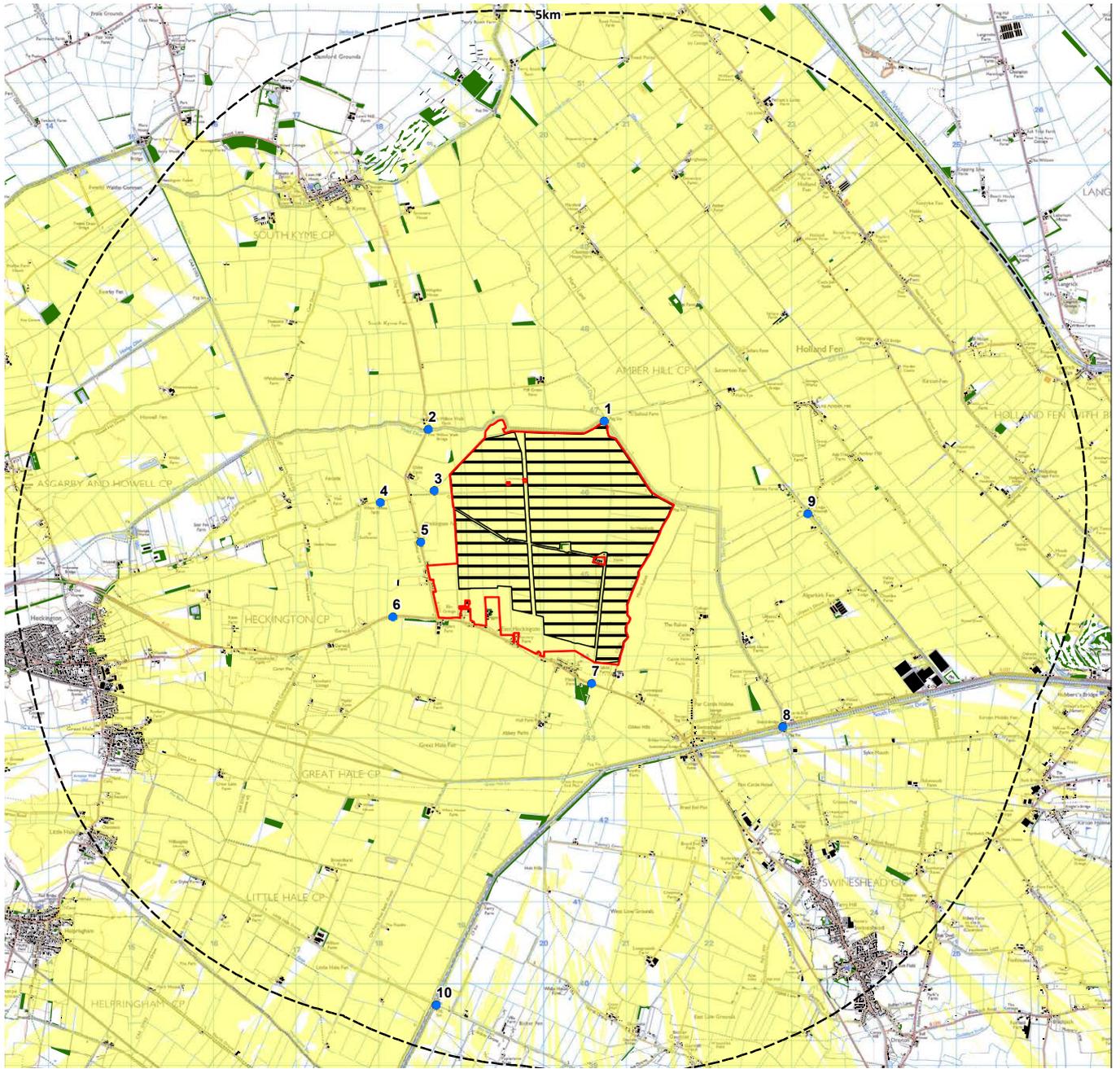
- KEY**
- Site Boundary
 - Local Authority Boundary
 - Public Right of Way
 - Other Routes with Public Access
 - Grade II Listed Building
 - Scheduled Monument
 - EA Flood Zone 3
 - EA Flood Zone 2

FIGURE 5 - ENVIRONMENTAL DESIGNATIONS PLAN



KEY	
	Site Boundary
	Local Authority Boundary
	EIA Assessment Area
	EA Flood Zone 3
	EA Flood Zone 2

FIGURE 6 – FLOOD RISK PLAN



0 2.5 km



KEY

-  Site Boundary
-  Proposed Area of Development
-  Proposed Viewpoint Location
-  OS Open Map Local Buildings
-  OS Open Map Local Woodland
-  ZTV - 4.5m High Development Visible

FIGURE 7 – SCREENED ZTV AND PROPOSED VIEWPOINT LOCATION PLAN

- 7.6 Overhead lines supported on wooden poles criss-cross the Energy Park site, running parallel to Six Hundreds Drove and the A17 and bisecting the north western corner of the Energy Park site. An underground gas pipeline bisects the Energy Park Site, extending south-north to the east of Rectory Farm.
- 7.7 Intermittent shrubs/hedgerows occur within or along the boundary of the Energy Park Site, with tree cover limited to small woodland blocks in the eastern third of the Site.

Surrounding Area

- 7.8 Sporadic linear residential (2-storey houses and bungalows) and commercial development occur at East Heckington, along the A17 and Side Bar Lane.
- 7.9 Street lights (approximately 10m high) flank the A17 through East Heckington.

Visual Context

- 7.10 Visual receptors include residential properties and farmhouses along the A17 and Side Bar Lane, farmhouses to the north of Head Dike and east of Holland Dike; PROW users of footpath HECK/15/1; and road users travelling along the A17 and Side Bar Lane.
- 7.11 Locally occurring built form and trees/shrubs screen views toward the Energy Park Site, but the flat landform and scarcity of trees and/or hedgerows allows open views into and across the Energy Park Site from the much of the surrounding transport routes and publicly accessible locations Screened ZTV (see Figure 7). Views from nearby residential and commercial properties are partly screened by tree and shrub planting within the curtilage of those properties.

National Landscape Character Areas

- 7.12 The Energy Park falls within National Character Area 46 The Fens, shown on Landscape Character Areas (Figure 8). Key characteristics of relevance to the Development site are described at pages 7-8:

“Expansive, flat, open, low-lying wetland landscape influenced by the Wash estuary, and offering extensive vistas to level horizons and huge skies throughout, provides a sense of rural remoteness and tranquillity...”

Overall, woodland cover is sparse, notably a few small woodland blocks, occasional avenues alongside roads, isolated field trees and shelterbelts of poplar, willow and occasionally leylandii hedges around farmsteads, and numerous orchards around Wisbech. Various alders, notably grey alder, are also used in shelterbelts and roadside avenues.

The predominant land use is arable – wheat, root crops, bulbs, vegetables and market gardening made possible by actively draining reclaimed land areas. Associated horticultural glasshouses are a significant feature. Beef cattle graze narrow enclosures along the banks of rivers and dykes and on parts of the salt marsh and sea banks.

Open fields, bounded by a network of drains and the distinctive hierarchy of rivers (some embanked), have a strong influence on the geometric/rectilinear landscape pattern. The structures create local enclosure and a slightly raised landform, which is mirrored in the road network that largely follows the edges of the system of large fields. The drains and ditches are also an important ecological

network important for invertebrates, fish including spined loach, and macrophytes...

Settlements and isolated farmsteads are mostly located on the modestly elevated ‘geological islands’ and the low, sinuous roddon banks (infilled ancient watercourses within fens). Elsewhere, villages tend to be dispersed ribbon settlements along the main arterial routes through the settled fens, and scattered farms remain as relics of earlier agricultural settlements. Domestic architecture mostly dates from after 1750 and comprises a mix of late Georgian-style brick houses and 20th-century bungalows.”

- 7.13 The cable route will fall within either further Fens landscape character area or an area called ‘A1-Holland Reclaimed Fen’. However, as stated earlier all cabling for the Grid connection will be via underground cabling.

Local Landscape Character Areas

- 7.14 In the North Kesteven Landscape Character Assessment ¹² [LCA] shown on Landscape Designations Plan (Figure 9), paragraph 1.6 states:

“There are no nationally designated landscape areas within North Kesteven.”

- 7.15 The LCA identifies three broad landscape character types within the district running north-south; the site falls within The Fens Regional Landscape Character Type in the east of the district, and the Fenland Landscape Character Sub-Area. Stated Key Characteristics at paragraph 9.1 are:

“The Fenland landscape sub-area occupies the whole of the eastern part of the District from the Lincoln gap to the boundary with south Kesteven near Swanton.

¹² (David Tyldesley and Associates for North Kesteven District Council, September 2007 – accessed via NKDC website 13th Dec 2021).

Low lying very flat relief.

Occasional small islands of slightly higher land.

Very large, rich arable fields divided up by drainage channels.

A hierarchy of rivers and drains and ditches creating linear patterns across the landscape.

The geometric road pattern follows the drainage pattern with small roads raised above the level of the fields, running from east to west.

Generally extensive vistas to level horizons and huge skies, apart from the north easterly direction where the Lincolnshire Wolds provide a marked "Upland" horizon.

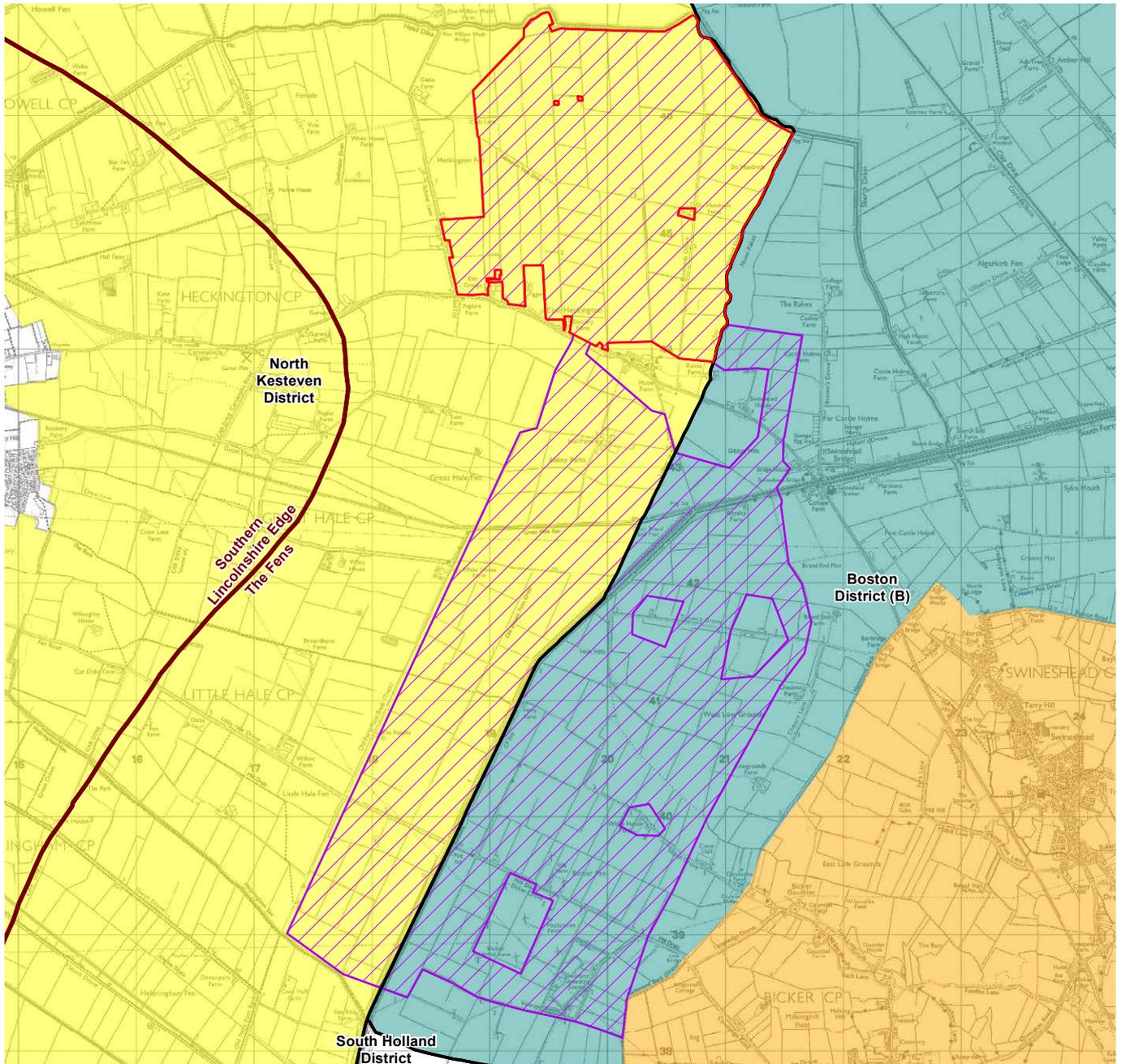
Sparse woodland cover though some occasional trees surrounding farmsteads and some shelter belts, particularly poplars.

Intensively farmed and managed it is almost entirely a man-made landscape.

Except for scattered farmsteads and farm buildings the sub-area is unsettled.

Prominent power lines and large-scale agricultural buildings"

- 7.16 The Energy Park site displays these key characteristics.



0 2 km



KEY

-  Site Boundary
-  National Character Areas
-  Local Authority Boundary
-  EIA Assessment Area

North Kesteven Landscape Character Assessment 2007

 The Fens - 13: Fenland

Landscape Character Assessment of Boston 2009

 A1 - Holland Reclaimed Fen

 B1 - Bicker to Wyberton Settled Fen

FIGURE 8 - LANDSCAPE CHARACTER AREAS

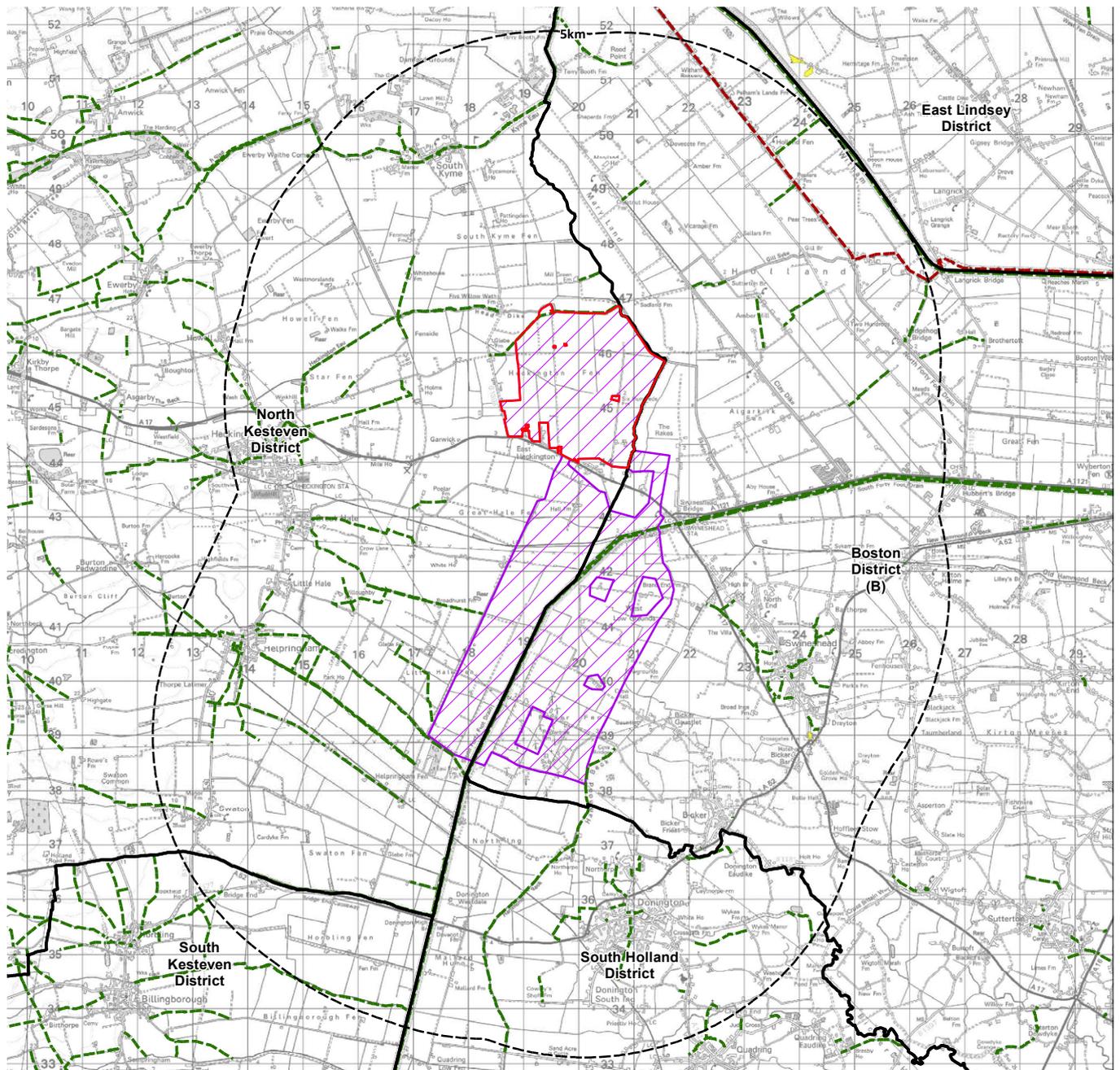


FIGURE 9 - LANDSCAPE DESIGNATIONS PLAN

Likely Significant Effects

- 7.17 The North Kesteven Landscape Character notes that this is a sparsely settled area of flat landscape with few woodlands. Delineation and subdivision of land is primarily by drainage ditches, with some hedgerows occurring within the Site.
- 7.18 Likely significant effects may occur from construction and operation of the proposed solar farm arising from a high magnitude of change with the introduction of solar farm infrastructure and proposed landscape planting (hedgerows) in a very flat and visually open landscape.
- 7.19 A night-time assessment will also take place to take into account any effects that may occur at night (mainly through lighting on the Energy Park site). At this time lighting is expected to be very limited when the Energy Park is operational.

Mitigation and Enhancements

- 7.20 The proposed layout of the Energy Park (shown of Figure 3) incorporates a number of built-in mitigation measures such as reduction in the extent of the area for the solar panels and energy storage and refinements to the layout to provide physical separation from nearby residential and commercial properties. These refinements have come about through onsite assessments and using the topographic data to understand the levels of the Energy Park site and locate items of electrical equipment on the higher areas of ground. At this stage these elements that have been considered in the design would be considered as 'masterplanning' rather than mitigation through design and the landscape and visual assessment is ongoing and may inform further design mitigation once it has been completed.
- 7.21 Footpath HECK/15/1 would remain open and useable throughout construction and operation of the Energy Park. Land to the north of footpath HECK/15/1 would remain as land for ecological net gain, with proposed solar panels limited to land to the south. A 10m wayleave is to be retained along the gas pipeline corridor; it is proposed to establish a permissive footpath along a section of this corridor, which would be seeded and managed to promote biodiversity. The new permissive footpath would extend to about 2.9km, looping back to join Crab Lane.
- 7.22 Offsets from internal and boundary watercourses and vegetation are proposed to safeguard these features and to ensure continued maintenance access.
- 7.23 Existing trees are sparse within the Site, but these would be protected throughout construction and operation of the proposed development. Existing intermittent hedgerows within the eastern area of the Site would be protected and enhanced with gapping-up using appropriate species, totalling a length of around 2km. New hedgerows would be established along the southern and western edges of the solar panels, and within the Site to provide more than 9km of new hedgerows.
- 7.24 The proposed substation compound and energy storage area are proposed to be located toward the southeast corner of the Energy Park Site. Some visual screening would be provided by an existing woodland block.

Assessment Methodology

- 7.25 The detailed Methodology for the LVIA is set out at Appendix A to this document.
- 7.26 This LVIA would be undertaken with regards to best practice as outlined within the following publications:
- Guidelines for Landscape and Visual Impact Assessment (3rd Edition, 2013) - Landscape Institute / Institute of Environmental Management and Assessment;
 - Visual Representation of Development Proposals (2019) - Landscape Institute Technical Guidance Note 06/19;
 - An Approach to Landscape Character Assessment (2014) - Natural England;
 - An Approach to Landscape Sensitivity Assessment - To Inform Spatial Planning and Land Management (2019) - Natural England.
- 7.27 The Study Area for the Landscape and Visual Impact Assessment (LVIA) would cover a 5km radius from the proposed solar park. However, the main focus of the assessment would be a radius of 1km from the Energy Park as it is considered that even with clear visibility the proposals would not be readily perceptible in the generally flat landscape beyond this distance.
- 7.28 A large area of land to the south of the redline boundary for the Energy Park has been identified for a potential underground cable route to connect it to the National Grid substation at Bicker Fen. Whilst the exact cable route has yet to be designed, it is anticipated that the extent of the land area available would enable the developer to avoid the removal of any significant landscape features (such as isolated /small areas of trees or short sections of hedgerow). Therefore, the LVIA will primarily focus on the potential landscape and visual amenity effects of the Energy Park and not of the operational stages of the underground cable route. The LVIA will consider the construction effects of the laying of the new Grid cable and the construction, operation and decommissioning phase of the new above ground equipment at the National Grid Bicker Fen substation.
- 7.29 The Methodology at Appendix A sets out criteria for the assessment of:
- Overall sensitivity of landscape and visual receptors, with regard to value and susceptibility;
 - Effects on Landscape Elements;
 - Effects on Landscape Character;
 - Effects on Visual Amenity; and,
 - Significance of Landscape and Visual Effects.
- 7.30 In order to determine the assessment area for the visual assessment a Screened Zone of Theoretical Visibility (SZTV) was applied to the EIA Assessment Area. This looked at the maximum solar panel height of 4.5m. There is the potential that other elements of the development would be taller than 4.5m, but these would be set back from the Energy Park boundaries and so it was deemed at this stage to consider the expanse of the panels rather than the maximum height of locally occurring structures within the Energy Park site.

- 7.31 A range of representative viewpoint locations which would inform the LVIA of the solar park are set out on the Screened Zone of Theoretical Visibility (SZTV) and Proposed Viewpoint Locations Plan at Figure 7.
- 7.32 It should be noted that the SZTV identifies locations from where there would be a theoretical direct line of sight towards the proposed solar park, based on available topography data and OS mapping. The extent to which the proposed development is actually visible would be ascertained during site visits and assessed as part of the LVIA.
- 7.33 The selected viewpoints are all from publicly accessible locations such as public rights of way and the roads network. The viewpoints are not intended to be an exhaustive list of locations from where the proposed solar park may be visible. However, they are representative of different distances from the Site and directions of view. The proposed viewpoint locations would be discussed and agreed with landscape officers at North Kesteven District Council and Boston Borough Council.
- 7.34 Photomontages would be produced from an agreed selection of the viewpoint locations.
- 7.35 A separate Residential Visual Amenity Assessment (RVAA) will be carried out and would follow on from the findings of the LVIA.
- 7.36 The scope and study area of residential properties included within the RVAA would be informed by the findings of the LVIA, postcode data and consultations with North Kesteven District Council, Boston Borough Council and Lincolnshire County Council together with subsequent requests from the residents themselves following a public consultation event.
- 7.37 Residential properties to be included within the scope of the RVAA would be confirmed based on the findings of the LVIA. However, given the type and scale of the Energy Park and the dispersed nature of the surrounding residential properties, the likelihood of any significant visual effects is anticipated to be restricted to those within the immediate surroundings of the site, due mainly to the predominantly flat local topography and the limited vertical elevation of the proposed solar arrays and energy storage equipment.
- 7.38 The proposed methodology for the RVAA is set out at Appendix B to this document. It is based on the following best practice guidance:
- the Landscape Institute’s ‘Guidelines for Landscape and Visual Impact Assessment’ 3rd Edition (GLVIA3); and,
 - ‘Residential Visual Amenity Assessment (RVAA) Technical Guidance Note 2/19’ (LI TGN 2/19).
- 7.39 The RVAA would consider whether the visual effect of the proposed Energy Park has exceeded the Residential Amenity Threshold. In order to cross this threshold, the visual effects arising from the proposed Energy Park would need to be of such a degree and significance that the residential property would be uninhabitable due to the effects on living conditions.

Significance Criteria

- 7.40 The significance criteria for the topics of LVIA and Residential Amenity can be found in Appendix A and B.

Assessment of Cumulative Effects

- 7.41 Identification of third-party solar farm and energy developments within the vicinity of the Application Site that may have the potential to give rise to cumulative effects will be agreed with North Kesteven District Council, Boston Borough Council and Lincolnshire County Council. The cumulative and any in-combination effects on landscape and visual receptors arising from the combined effects of the proposed development and the identified third party developments will be described. Where there are no cumulative effects, this will also be stated.
- 7.42 The cumulative assessment will be supported by a Cumulative Sites Plan Figure 4 which will identify the location of the agreed third-party sites, and a Cumulative ZTV will be prepared for each (in combination with the proposed development). The Cumulative ZTVs will be used to inform Cumulative Viewpoint selection that will be subject to assessment. The sites that have been identified to date within the assessment area are stated in Table 6.4 in Section 6 and shown of Figure 4 of this Scoping Request.

- 7.43 With respect to cumulative effects on landscape resources the Guidelines for Landscape and Visual Impact states:
- “7.19 Cumulative landscape effects may result from adding new types of change or from increasing or extending the effects of the main project when it is considered in isolation. For example, the landscape effects of the main project may be judged of relatively low significance when taken on their own, but when taken together with the effects of other schemes, usually of the same type, the cumulative landscape effects may become more significant.”***
- 7.44 With respect to visual matters, cumulative effects arise where the visibility of other proposals overlaps with that of the Proposed Development to incur an incremental effect. Cumulative effects relate to landscape character and visual amenity. Within cumulative assessment, the proposals may be viewed in combination, in succession, or sequentially.
- 7.45 Cumulative effects on landscape features and elements, landscape character and night-time character will also be described.

8. ECOLOGY & ORNITHOLOGY

Introduction

- 8.1 The ecology and ornithology chapter of the ES will assess the likely impact of the Development upon ecological resources within and surrounding the proposed development site and the grid connection area. This section sets out the proposed approach that will be taken in the assessment, together with a summary of information that is currently available regarding the ecological value of the site.
- 8.2 This report will provide an overview of the proposed assessment methodology for an EIA, the relevant legislation and guidance, and the current baseline conditions at the site in relation to ecology and ornithology. The report also considers the potential impacts of the proposed development and the further surveys required to complete the EIA for the proposed development.
- 8.3 The exact grid connection route has not been finalised however an outline of potential effects and survey requirements is considered. Figure 2 accompanying this report shows the proposed Development site, and grid connection corridors being considered within the EIA Area.

Preliminary Baseline Conditions

- 8.4 The following further work has been identified to complete the assessment:

Solar and Energy Storage

- Completion of Phase 1 Survey
- A Phase 2 botanical survey of water course and to assess the presence of scarce arable species
- Reptile surveys
- Great crested newt surveys
- Completion of badger surveys
- Completion of otter and water vole surveys
- Bat surveys starting in autumn 2021 extending into spring and summer 2022 (activity transects and static recorder survey).
- Bat roost assessment of any trees or structures within corridor of grid connection route
- Wintering bird surveys

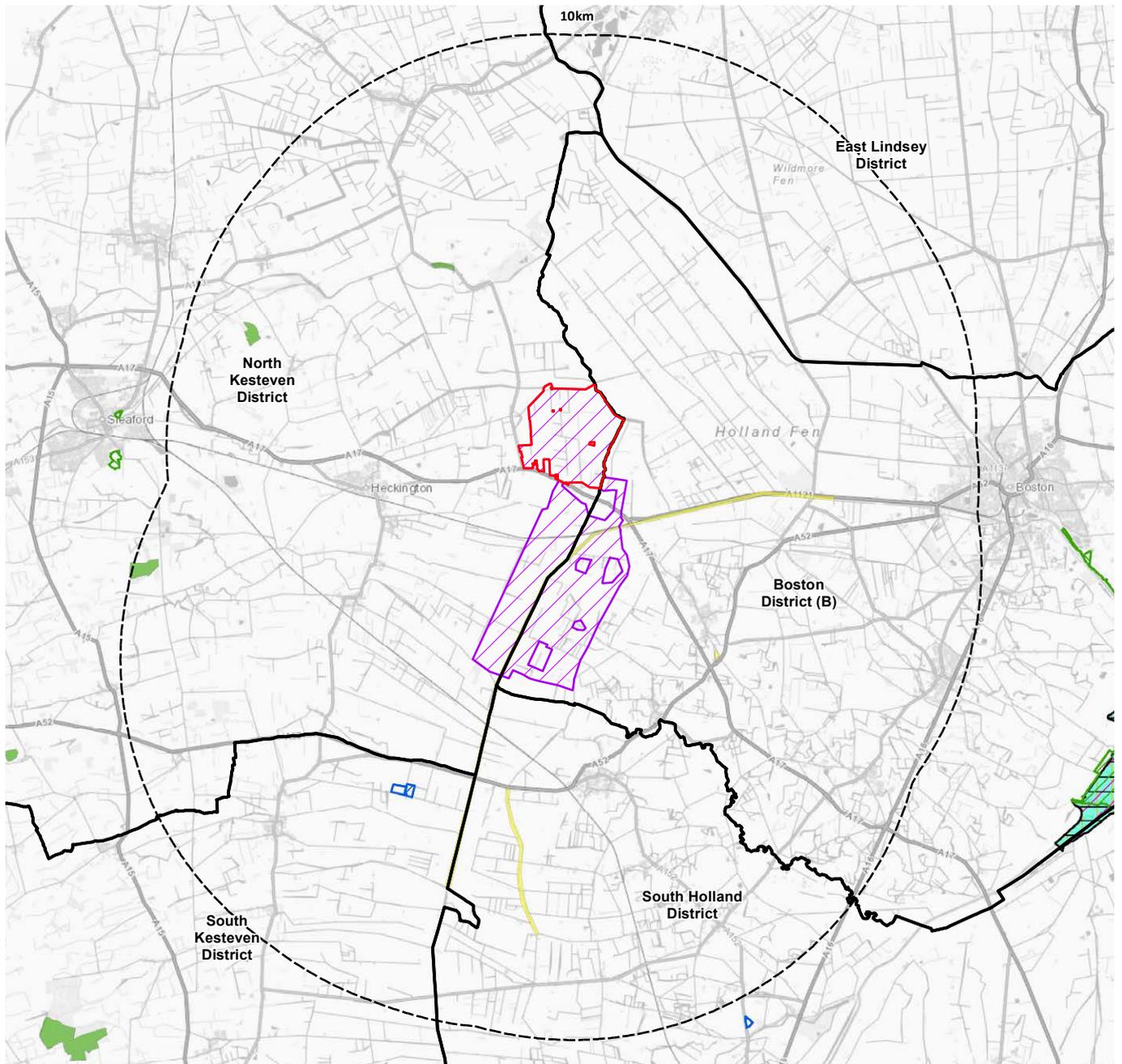
Grid Connection Route

- Phase 1 survey of grid connection route and botanical surveys if considered appropriate
- Reptile and Amphibian surveys if considered appropriate after Phase 1 survey. This will include eDNA survey in suitable water bodies that are located within the EIA site and within 50m of it (access allowing)
- Bat roost assessment of any trees or structures within corridor of grid connection route
- Badger survey of grid connection route
- Otter and water vole survey of grid connection route
- Breeding bird survey of grid connection route
- Wintering bird Surveys

- 8.5 Permission was granted for a 22-wind turbine wind park on the site in February 2013. As part of that application many ecological surveys and assessments were undertaken, including ornithological surveys conducted in 2007/8 and then updated in 2014/15. Ecological surveys were conducted in 2009/10 and then updated in 2017/18. The cumulative impact of the wind turbines is not assessed as these will not be built if the solar park is consented and subsequently constructed.
- 8.6 A high-level walk over survey of a potential grid connection route was carried out in 2017, whilst this was in relation to the wind park, the route is expected to be similar.
- 8.7 Whilst most of these surveys are now considered to be out of date, they do provide useful background data. There has been little change in the use of the land (intensive arable production) since these surveys were completed, therefore it is unlikely that there have been any significant changes in the ecology of the area.
- 8.8 The habitat surveys completed have been conducted adopting the methods outlined in the Handbook for Phase 1 Habitat Survey published by the Nature Conservancy Council (2010). This technique provides an inventory of the basic habitat types present and allows identification of areas of greater potential that might warrant further study. The ornithological surveys were conducted following the survey guidelines at the time and included a breeding bird survey, surveys to investigate use of the area during the non-breeding period and vantage point surveys to assess bird flightlines and use of the area by foraging birds.

Designated Sites: Desk Study

- 8.9 There are no European statutory designated sites (Ramsar, Special Areas of Conservation (SAC) & Special Protection Areas (SPA) or national sites Site of Special Scientific Interest (SSSI), National Nature Reserve (NNR), Local Nature Reserve (LNR) within 10km of the site. The nearest SSSI is Horbling Fen SSSI located 11.5km to the southwest of the site, designated for its geological interest. The Wash, situated approximately 17km to the southeast of the site at its nearest point, is the nearest SAC, SPA and Ramsar site.
- 8.10 There are no non-statutory designations within the site. Cole's Lane Ponds LWS is located 6km southeast of the site. The site consists of two ponds surrounded by bankside trees and scrub. There is an area of wet grassland to the west and north of the smaller pond. The South Forty Foot Drain LWS is located approximately 1km to the south of the site. This is a man-made watercourse with bankside vegetation comprising rough neutral grassland, scrub, and trees. The site is a good corridor linking the centre of Boston with the River Witham. Heckington Grassland Site of Nature Conservation Interest (SNCI) is located approximately 5km to the east of the site. This site consists of grassland bordered by hedgerows and is used by a variety of breeding and over-wintering birds. Old Wood South Kyme SNCI is located approximately 5km to the north of the site, and is an area of woodland with Ash coppice, scrub, Elm, and tall herbs. Figure 10: Ecological Designations Plan, is a plan that shows the location of these designations.



KEY

	Site Boundary
	Local Authority Boundary
	EIA Assessment Area
	Local Nature Reserve (LNR)
	National Nature Reserve (NNR)
	RAMSAR
	Special Area of Conservation (SAC)
	Special Protection Area (SPA)
	Site of Special Scientific Interest (SSSI)
	Ancient Woodland
	RSPB Reserve
	Local Wildlife Site

FIGURE 10 – ECOLOGICAL DESIGNATIONS PLAN

Priority Habitats

- 8.11 Priority habitats are present within the site in the form of short sections of hedgerow, and potentially also arable field margins where these are managed for biodiversity under Stewardship agreements.
- 8.12 The Energy Park site is not located within an area identified within the Local Plan policies map as an area suitable for landscape scale biodiversity enhancement but there are several small woodlands that are individually identified as suitable for enhancement. These woodlands would not be affected by the proposed development, so there are no conflicts in relation to any defined "Biodiversity Opportunity Areas".

Agri-Environment Schemes

- 8.13 Approximately 10.5ha of the Energy Park site are held under agri-environmental schemes, in the form of enhanced headlands by way of buffer strips.

Desk Study Protected Species

- 8.14 Environmental records for sites obtained in 2018 revealed the following items, it should be noted that for the ES these records will be reviewed and presented for information up to 2022:

Amphibians

- 8.15 One great-crested newt record dating back to 1977 from the 1km grid square to the west of the site. Several common amphibian records were revealed from the area surrounding the site but not within the site.

Reptiles

- 8.16 Two historical grass snake records were revealed from the 1km grid square north of the site, dating from 1977.

Mammals (except Bats)

- 8.17 There are numerous mammal records including water vole, otter, brown hare, badger within 5km of the site but only records of brown hare within the site.

Bats

- 8.18 There are records of at least 11 species of bat within 15km of the site (Common pipistrelle, Soprano pipistrelle, Brown Long Eared, Leisler's Natterer's, Whiskered, Serotine, Noctule and Myotis sps) but no records from within the site.
- 8.19 A further request as the ES progresses will be made to the Lincolnshire Environmental Records Centre (LERC) to update these records.

Phase 1 Habitat Survey

- 8.20 A phase 1 habitat survey was carried out during site visits in 2009 and 2010. An updated phase 1 habitat survey was carried out in 2017 and 2018. A further phase 1 habitat survey has been commissioned in 2021 which will include the Grid connection route in 2022.
- 8.21 This solar park development site is made up of approximately 586ha of farmland situated in the Fens Natural Area. The area comprises largely of Six Hundreds Farm situated to the south and west of the main Head Dike-Skerth Drain and north of the A17 trunk road. The farm consists of arable farmland with large open fields growing winter wheat, winter barley and winter sown oilseed rape. The arable fields are generally cultivated right up to the field margins resulting in very few areas of botanical or ecological importance.

Hedges, Woodland, and Individual Trees

- 8.22 There are three plantations of mainly small young deciduous trees within the site, largely to provide pheasant cover. These are located to the north, northwest and west of Six Hundreds Farm. The plantation south of Six Hundreds Farm is more mature and contains some standard Ash and Oak trees. There are two short lengths (in total approximately 380m) of species-poor hedgerows on the site, to the south of Six Hundreds Farm, with Hawthorn, Blackthorn, Ash, Dog Rose, and Bramble; and there are a few standard trees and areas of scattered scrub.

Drainage Ditches

- 8.23 The land is drained by a network of drainage ditches which also act as field boundaries; many of these are less than 1m deep and 1.5m wide. Some of these hold water on a permanent basis and others are only seasonally wet ditches. Many of the dry ditches were choked with vegetation including *Typha*, sedges, rank grasses and some bramble. Some of the major drains present were more than 2m deep and up to 3.5m wide and permanently held water and contained plants such as Frogbit (*Hydrocharis morsus-ranae*) and Broad-leaved Pondweed (*Potamogeton natans*) as well as *Phragmites* and other riparian vegetation. The main drainage ditches are managed by Black Sluice Internal Drainage Board, and the remainder are maintained every year by the landowner.
- 8.24 Head Dike-Skerth Drain is an Environment Agency main river which runs along the northern edge of Six Hundreds Farm before passing in a north-west to south-eastern direction separating Six Hundreds

Farm from Spinney Farm. Head Dike-Skerth Drain is a large, deep, canalised permanently wet drain approximately 5m wide with steep sides. There are two pumping stations just off the northern site boundary which allow the water level of the drains across the site to be regulated by moving water into the Head Dike-Skerth Drain. Permanently wet drains approximately 2m wide run parallel to the Head Dike-Skerth Drain on each side. Holland Dyke forms the eastern boundary of the site. This is also a permanently wet drain which drains into Head Dike-Skerth Drain at Trinity College Pumping Station.

Grassland

- 8.25 The arable fields were generally cultivated right up to the field margins resulting in very few areas of botanical or ecological importance. A few of the intensively farmed arable fields and most of the tracks were bordered by broad rough species grassland. Head Dike-Skerth Drain runs between two built-up earth banks, with smaller drains on either side. These banks are grassed and used for grazing sheep and cattle.

Buildings

- 8.26 There are 12 buildings on the site. At Six Hundreds Farm buildings there were four modern agricultural barns, a single storey barn/stables, a two-storey barn, an open-fronted barn, a small electricity building and two semi-detached disused two storey houses, the houses had an overgrown mature garden with fruit trees, surrounded by tall hedges. These buildings will remain on the site if the solar park became operational.

Species surveys

Flora

- 8.27 None of the plant species recorded during the survey are specifically protected by the Wildlife and Countryside Act (WCA) 1981 (as amended) or considered rare nationally or locally (e.g., Preston et al. 2002). Also, none are listed as Species of Principal Biological Importance on Section 41 of the NERC Act 2006 or as Priority Species listed on the national BAP (UK BAP 2007). These surveys will be updated.

Amphibians

- 8.28 Common frog, and common toad were recorded in several of the sections of drains surveyed. No great crested newts were recorded during trapping in 2009. However, in one of water samples collected in 2017 returned a 1 in 12 potential for the presence of great crested newt DNA.

Reptiles

- 8.29 The site is largely unsuitable for reptiles due to the lack of suitable rough grassy areas for foraging or breeding. No casual observations of basking reptiles were made at the site during the phase 1 visits. The grassy banks adjacent to the canalised Head Dike-Skerth Drain may possibly support a relict population of reptiles. However, this area is beyond the development footprint and will not be affected by the solar park construction.

Water vole

- 8.30 Some of the ditches on the site, which permanently hold water appeared to provide potentially suitable habitat for water voles. However, no evidence of water voles was observed at the site. American mink (*Neovison vison*), a major predator of water voles, were recorded on the site

in 2009. During the 2018 survey mink were again observed and numerous scats (dropping) were recorded. This indicated a resident population of mink. Mink can cause the extinction of water vole populations and prevent re-colonisation. Their continued presence along with the fact that large parts of the ditch network are only seasonally wet, may explain the lack of water voles.

Hazel dormouse

- 8.31 There is no habitat suitable for hazel dormice within the site, and no historic evidence of the presence of hazel dormice in the area.

Bats

- 8.32 Extensive surveys in 2009/10 recorded a low number of (common pipistrelle) bats using the site. Out of a total of 97 hours of bat transect surveys only 212 bat passes were recorded on the site. Activity concentrated around Holland Dike and Head Dike-Skerth Drain, the larger woodland block and the buildings. Records of small numbers of myotis bats (likely to be Daubenton's (*Myotis daubentonii*)) and a possible brown long-eared bat were observed on the site. The highest concentration of bats was along the banks of Head Dike-Skerth Drain to the north of the site.
- 8.33 Extensive surveys in 2009 recorded a low number of (common pipistrelle) bats using the site. Out of a total of 97 hours of bat transect surveys only 212 bat passes were recorded on the site. Activity concentrated around Holland Dike and Head Dike-Skerth Drain, the larger woodland block and the buildings. Records of small numbers of myotis bats (likely to be Daubenton's (*Myotis daubentonii*)) and a possible brown

long-eared bat were observed on the site. The highest concentration of bats was along the banks of Head Dike-Skerth Drain to the north of the site.

- 8.34 Static bat detectors were deployed in 2017 in six locations representing different habitat across the site (a total 140 detector nights). This recorded a low level of common pipistrelle activity, a very low level of myotis sp. bat (most probably Daubenton's bat) and one Serotine bat pass. Bat activity was found to be virtually entirely associated with water courses, woodland, hedgerows, and ditches with no evidence of use of open field areas.
- 8.35 The extended phase 1 survey in April 2018 recorded no significant change in the extent of suitable bat foraging habitat on the site and no significant changes in building where small common pipistrelle bat roosts were identified in 2009. The 2018 survey recorded no significant change in potential bat roost sites in trees identified in 2009.
- 8.36 The continued intensive arable cultivation across Lincolnshire and associated use of pesticides combined with national declines in flying invertebrates (food source of bats) means that unless there is change in habitat this will continue to provide poor foraging habitat for bats.

Badger

- 8.37 In April 2018 a total of six badger setts were recorded within the surveys area along with seven latrines. There were two larger setts with multiple active holes, whilst the remainder were single hole outlier setts. No badgers were recorded on the site in 2009. All the setts are within hedge banks or ditch banks and not within arable fields. The latrines, which are used by badgers for marking territory boundaries, were very well used in certain parts of the site indicating that there are probably two separate badger clans using the site. Initial results from the surveys in 2021 indicate that badgers are still present on the site although some of the setts identified in 2017 are no longer being used.

Bird surveys

- 8.38 Surveys in 2009 covered a larger area than the proposed solar park. There was a total of 54 species recorded during the breeding bird survey of which 44 species (959 pairs) bred. In 2021 the breeding bird survey covered only the solar park area. This survey recorded 40 species (645 pairs) of 32 species. Wintering bird surveys conducted during 2009/10 recorded 92 species. The majority of wintering birds were recorded flying over the site or in the riparian habitat along the major water courses on the boundary of the site. However large numbers of wood pigeon and blackhead gull were recorded using the open arable fields along with skylark and the occasional flocks of lapwing and golden plover.

Grid Connection Route

- 8.39 The exact route of the grid connection has yet to be agreed. It is assumed it will be to the substation approximately 7km to the south of the site boundary. This will involve a trench approximately 5-10m deep across a 25m wide easement within which the grid connection will be installed. The route will require crossing the South Forty Foot Drain LWS and various smaller water courses and well as major roads, rail, high pressure gas main and potentially third-party grid connections. These crossing points will require direct drilling as appropriate although all works will be within the easement area.
- 8.40 In 2017 a walk over survey of a broad corridor was carried out. This indicated that the habitat within the corridor was similar to that found on the site being largely intensive arable farmland divided by wet and dry ditches and the occasional hedgerow. The bird fauna was made up of common farmland birds with addition of common wetland birds on the South Forty Foot Drain. There is potential habitat for badger, otter, water vole, reptiles and amphibians. During the 2017 walk over survey badger setts were recorded on the east and west bank of the South Forty Foot Drain.
- 8.41 The following further work has been identified to complete the assessment:

Solar and Energy Storage

- Completion of Phase 1 Survey
- A Phase 2 botanical survey of water course and to assess the presence of scarce arable species
- Reptile surveys
- Great crested newt surveys
- Completion of badger surveys
- Completion of otter and water vole surveys
- Bat surveys starting in autumn 2021 extending into spring and summer 2022 (activity transects and static recorder survey).
- Bat roost assessment of any trees or structures within corridor of grid connection route
- Wintering bird surveys

Grid Connection Route

- Phase 1 survey of grid connection route and survey botanical surveys if considered appropriate
- Reptile and Amphibian surveys if considered after Phase 1 survey. This will include eDNA survey if suitable water bodies are located within the Development or within 50m (access allowing)
- Bat roost assessment of any trees or structures within corridor of grid connection route
- Badger survey of grid connection route
- Otter and water vole survey of grid connection route
- Breeding bird survey of grid connection route
- Wintering bird Surveys

Summary

8.42 The site is an intensively managed arable site to produce grain, oils, and beans, the vast majority of which is exported to mainland Europe for animal feedstocks. Overall, the site is of low nature conservation value and supports a low density of common farmland birds and low density of bats. The riparian habitat along drains and the main river provide some habitat of slightly higher biodiversity importance

Likely Significant Effects

8.43 Whilst subject to detailed design the proposed site area at present is approximately 586ha with the solar park extending to approximately 491ha. This area includes approximately 2.42ha for the substation and energy storage (6.04ha). Outside of the solar park there will be approximately 95ha of arable farmland enhanced to create new wildlife habitat plus a further 1.8ha in the form of a community orchard and a further 10.9km of new / enhanced hedgerow.

8.44 The solar panels will be placed at least 9m from all ditches and water course within what is currently arable farmland. At this time there is not planned to be any removal of existing hedgerows, woodlands, or buildings within the site.

Grid Connection Route

8.45 The grid connection is estimated to be around 6.8 and 9km in length. The easement is expected to be no more than 25m wide. This will be a temporary land use and will be returned to original land use following construction.

Potential Effects of the Development

8.46 Removal of native vegetation, which may result in the loss or fragmentation of habitat and consequently displacement or death of fauna species. The solar panels, fencing, substation, and energy storage will all be located within open arable fields although access tracks and ditches crossings may impact on habitat surrounding the arable fields. However, the grid route may require removal and replacement of hedgerows.

8.47 Although there is no intention to remove any trees or hedgerows from this Development, as surveys continue items might be removed if they are dead or cause a health and safety risk to workers on the Development site. These removals would have the potential to impact on bat populations using the site due to removal of mature trees suitable for roosting and hedgerows suitable for foraging. The exact grid route is still to be determined and may require the removal and replacements of short sections of hedgerows.

8.48 Disturbance could occur to breeding birds due to any necessary tree and hedgerow removal. As stated above there is not intended to be any removal of existing tree or hedgerows on Energy Park site. Of the 646 pairs of breeding birds recorded in spring 2021 only 118 pairs of two species (skylark & yellow wagtail) were recorded breeding in open fields. Thus, for most breeding birds there is limited risk of disturbance although there is potential risk of disturbance to two species during the breeding season and potential loss of habitat. If significant effects are identified appropriate mitigation measure will be identified.

- 8.49 There is the potential for disturbance to badgers due to construction close to their setts. The survey works undertaken in 2021 has identified that none of the setts were present in 2008, indicating that they are likely to be 'outlier setts'. As a result by the time the Energy Park is constructed these setts may no longer be in use or may have located to other areas within the Energy Park site. It is proposed that prior to any construction taking place the locations of the setts will be surveyed again. It is proposed that within the design of the Energy Park a 30m buffer to any sett will be applied to ensure that panels and other infrastructure items are located suitable distances from the setts. There is also the potential for disturbance to otters and water voles during construction if the survey work determines that these species are present.
- 8.50 There is also the potential for indirect impacts on flora and fauna including fragmentation of habitat, altered hydrology, change in microclimate and pollution. There is a potential increased risk of contaminated run-off throughout construction, with potential to impact on habitats within water courses and potential introduction of weedy and invasive species.
- 8.51 There is the potential for noise pollution during and after construction which may affect bird activity, and light pollution during construction may also affect bat activity on the site.
- 8.52 The species assessment will consider the effects of the solar panels and associated infrastructure on birds, bats, and general ecology during the operation of the proposed development.
- 8.53 The potential for the Energy Park to attract or displace populations, and impacts associated with collision risk and barrier effects, will be assessed where significant effects are likely to occur.
- 8.54 The potential impact of the security fencing in relation to potential barrier to mammal movements will be assessed. Badger are known to be present on the Energy Park site and appropriate mitigation measures, such as mammal gates, will be considered.
- 8.55 There will be a detailed assessment of potential impacts of the solar development on Internal Drainage Board (IDB) controlled water courses in particular in relation to proximity to water courses and impact of fencing.
- Potential Effects of Grid Connection**
- 8.56 The Grid route may require removal and replacements of short sections of hedgerows. It is unlikely that there will be long term impacts. However, the grid connection route will cross numerous water courses and drainage ditches including the South Forty Foot Drain. The IDB will be consulted to ascertain the need for specific assessment where crossing of IDB controlled water courses is identified. It is likely that direct drilling beneath relevant water courses will be adopted to minimise any potential effects.
- 8.57 Ecotricity is committed to implementing accepted best practice guidelines during construction, operation, and decommissioning phases; best practice will enable any effects on ecology to be avoided or minimised.

- 8.58 Where significant effects on ecology are identified, measures to prevent, reduce and, mitigate these effects will be proposed. Measures may include:
- the appointment of an Ecological Clerk of Works (ECoW) during the construction phase.
 - strict adherence to Pollution Prevention Guidance and construction best practice guidelines.
 - implementation of effective water management during all phases of the development via a site drainage plan and measures to control and treat any waste waters before release into the wider environment.
 - rapid reinstatement of habitats through the construction phase, to enable successful regeneration of natural habitats as swiftly as possible.
 - careful timing of construction activities to avoid potential effects on protected species and
 - regular ecological surveys for all protected species and implementation of appropriate mitigation, through consultation with the relevant statutory organisations, as required.
- 8.59 The Environment Act has recently been passed by parliament which includes a requirement for NSIPs to deliver Biodiversity Net Gain (BNG), although detailed secondary legislation and guidance has yet to be published. A full BNG calculation using Biodiversity Metric 3 will accompany a draft Landscape and Ecological Management Plan (LEMP) as part of the EIA submission. Details of the LEMP will be finalised after all the surveys and assessment have been completed however it is likely to include:
- Creation of species-rich grasslands within solar park area.
 - Creation of approximately 95 ha of new habitat in areas around the solar park including:
 - Creation and species rich grassland and scrub habitat for pollinators;
 - Creation of habitats to southwest of solar park to provide both new wildlife habitat and visual screening; and
 - Potentially a Community Orchard
 - Integration of bat roosting boxes into appropriate built structures and suitable trees;
 - Retention and creation of bat commuting and foraging corridors along appropriate routes and hedgerows throughout the site;
 - Creation of suitable habitat for reptiles;
 - Creation of artificial holts for otters;
 - New hedgerows;
 - Enhancement of existing gappy hedgerows;
 - Positive conservation management of existing hedgerows; and
 - Public access and interpretation within parts of the solar park. This will be designed to minimise any disturbance by walkers and particularly dogs to the core BNG area.

- 8.60 Consultation shall be undertaken with the following organisations, to ensure appropriate management of potential impacts to protected species and habitats:
- Lincolnshire County Council;
 - Boston Borough Council;
 - North Kesteven District Council;
 - Natural England;
 - Environment Agency;
 - Royal Society for the Protection of Birds;
 - Lincolnshire Wildlife Trust; and
 - Buglife.

Assessment Methodology

- 8.61 The approach taken to the assessment of ecological and ornithological effects will follow the Chartered Institute of Ecology and Environmental Management's (CIEEM) Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland. These guidelines set out the process for assessment through the following stages:
- 8.62 Describing the ecological baseline through survey and desk study;
- Identifying and evaluating 'Important Ecological Features' (IEFs);
 - Identifying and characterising the likely effects on IEFs;
 - Determining the significance of effects in the absence of mitigation;
 - Describing mitigation, compensation measures associated with the development and assessing residual significance;
 - Proposed biodiversity net gain (BNG); and
 - Identification of monitoring requirements.

- 8.63 The Ecology and Ornithology ES chapters will form the ecological assessment. The ES chapters will be supported by technical appendices detailing the desk study results, consultation, survey methodologies and results (including figures, tables, photographs, and maps).

- 8.64 Where necessary, the chapter and technical appendices will be supported by Confidential Annexes containing sensitive information that should not be presented in the public domain in order to prevent harm to protected species.

- 8.65 The chapters will include measures to mitigate likely adverse effects, either by sensitive design or applied techniques, and will outline measures to enhance biodiversity, as well as the requirement for associated monitoring and adaptive management.

- 8.66 A standalone Biodiversity Net Gain Report and draft Landscape and Ecological Management Plan will be submitted with the ES to summarise the proposed approach to land management within the Development site, including mitigation and enhancement measures as necessary.

Relevant Legislation and Guidance

- 8.67 The ecological assessment will be carried out in accordance with the requirements set out in the following legislation and guidelines:
- The Conservation of Habitats and Species Regulations 2010 ("the Habitats Regulations");
 - Planning Inspectorate Advice Note Ten in relation to Habitats Regulations Assessment (HRA);

- Council Directive 2009/147/EC on the Conservation of Wild Birds (“the Birds Directive”);
- Wildlife and Countryside Act 1981 (as amended);
- Natural Environment and Rural Communities Act (NERC) 2006;
- National Planning Policy Framework (2021);
- National Policy Statements (NPS) EN-1, EN-3 and EN-5 and their new drafts;
- Environment Act (2021) and subsequent regulation as they are adopted;
- UK Post-2010 Biodiversity Framework, which supersedes and subsumes the UK Biodiversity Action Plan (UK BAP);
- Lincolnshire Biodiversity Action Plan;
- National Pollinator Strategy;
- CIEEM Guidelines for Ecological Impact Assessment in the United Kingdom (2016);
- Natural England Evidence Review of the impact on solar farms on birds, bats and general ecology 2016;
- Solar Parks: maximising environmental benefits (TN101);
- Royal Society for the Protection of Birds (RSPB) guidance on solar power; and
- Greater Lincolnshire Local Nature Recovery Strategies.

- Updated Desk Based Assessment**
- 8.68 The desk-based assessment for the original wind park application will be updated to gather any relevant, pre-existing information relating to the Development site. Good EIA practice includes identification of any new statutory and non-statutory designated sites of nature conservation interest within a potential zone of influence of the Development, as well as collation of historical species records in the area.
- 8.69 These records will inform ongoing survey efforts and provide a historical and regional context for the assessment. In the first instance, records of notable and protected species will be obtained from the LERC and National Biodiversity Network. In light of initial requests and survey results, further information and data requests will be made to other sources, such as specialist species recorders.
- General Approach**
- 8.70 The assessment methodology has been developed with reference to the CIEEM Guidelines for Ecological Impact Assessment in the United Kingdom and from considerable experience of Ecological Impact Assessments (EclA) relating to similar developments throughout the UK.

Significance Criteria

Determining Sensitivity Value

- 8.71 The baseline conditions will be examined and IEFs identified based on their conservation status and the local populations observed. The nature conservation value of the ecological interests is defined according to Table 8.1.

TABLE 8.1: APPROACH TO DETERMINING SENSITIVITY VALUE OF ECOLOGICAL RECEPTORS

Level of value	Ecological features
International	An internationally designated site (e.g., SAC/SPA/Ramsar) or site meeting criteria for international designations. This includes candidate site species present in internationally important numbers (e.g. >1% of biogeographic populations).
National	A nationally designated site SSSI, or a NNR, or sites meeting the criteria for national designation. Species present in nationally important numbers (e.g. >1% UK population). Cited species that are connected to SSSI or NNR. Large areas of priority habitats listed on Annex 1 of the Habitats Directive and smaller areas of such habitats that are essential to maintain the viability of that ecological resource. Birds of Conservation Concern.
Regional	Species present in regionally important numbers (e.g. >1% regional population). County, vice-county or other local authority-wide area
Local	Sites designated as LNRs, LWS, or equivalent that may be designated according to criteria at the local authority level. Other species or habitat of conservation interest, e.g. species or habitat include in Local Nature Recovery Strategies.
Less than local	Usually widespread and common habitats and species. Receptors falling below local value are not considered in detail in the assessment process unless they have policy implications for the Development e.g. legally/protected species.

Identifying effects and determining magnitude

8.72 An effect is defined as a change in distribution or status of a receptor as a result of the Proposed Development and can be adverse, neutral or positive. In assessing the magnitude of likely effects, the identified effect will be characterised according to the sensitivity of the receptor and the potential for recovery from temporary adverse conditions, taking into account the fact that different sources of change can result in reversible, permanent or temporary effects, that different effects have different probabilities of occurring, and that some changes may be positive (beneficial). The criteria that will be used in the assessment for describing the overall magnitude of a likely effect are summarised in Table 8.2.

TABLE 8.2: EFFECT MAGNITUDE

Effect Magnitude	Description
High Negative	High effects may include those that result in large-scale, long-term or permanent, usually irreversible changes in a receptor, and likely to change its ecological integrity. These effects are likely to result in overall changes in the conservation status of a habitat or species population at the location(s) under consideration. In terms of extent, they will typically affect more than 20% of the area of a habitat receptor, or lead to the loss of more than 20% of a defined population in the case of a species receptor.
Medium Negative	Medium effects may include moderate-scale permanent changes in a receptor, or larger-scale temporary changes, which may in some circumstances be considered to change the integrity of a receptor. This may mean that there are temporary changes in the conservation status of a habitat or population at the location(s) under consideration, but these are usually reversible and unlikely to be long-term. In terms of extent they will typically affect between 5% and 20% of the area of a habitat receptor, or lead to the loss of between 5% and 20% of a defined population in the case of a species receptor.
Low Negative	Low effects may include those that are small in magnitude, result in small scale temporary changes and where integrity is not affected and are typically reversible. These effects are unlikely to result in overall changes in the conservation status of a habitat or species population at the location(s) under consideration, but it does not exclude the possibility that mitigation or compensation will be required. In terms of extent they will typically affect between 1% and 5% of the area of a habitat receptor, or lead to the loss of between 1% and 5% of a defined population in the case of a species receptor.
Neutral / Negligible	There is no perceptible change in the ecological receptor. As a guide, less than 1% of the population or area is predicted to be affected.
Positive	The changes in the ecological receptor are considered to be beneficial. This may include an increase in area or quality of habitat or an increase in species diversity or population size

8.73 In the case of designated sites with quantified populations, magnitude will be assessed against the size of the cited population and/or the most recently reported population size in the common standards monitoring (CSM) cycle. Effects on populations outside designated sites will be assessed within an appropriate geographical scale, typically either at a national scale, or at the regional scale.

Determining Significance

8.74 In accordance with the CIEEM guidelines, a significant effect, in ecological terms, is defined as ‘an effect that either supports or undermines biodiversity conservation objectives for ‘important ecological features’.

8.75 The term ‘integrity’ is used in accordance with the definition adopted for designated sites, as the “...coherence of ecological structure and function...that enables it to sustain the habitat, complex of habitats and/or levels of populations of species for which it was classified”. For non-designated sites/species this can be amended to “the coherence of ecological structure and function, that enables it [in this case, the area being considered; e.g., region] to maintain the levels of populations of species in its/their pre-development condition”. Maintaining integrity therefore refers to the maintenance of the conservation status of a habitat or species population at a specific location or geographical scale.

8.76 The approach adopted will aim to determine whether an effect is significant or not significant on the basis of a discussion of the variables that characterise it. The significance of an effect is linked to the geographical scale at which the receptor is valued but does not necessarily depend on the value of the receptor or its legal protection.

Assessment of Cumulative Effects

8.77 The purpose of a cumulative effect assessment is to identify effects that might not be significant on their own but become significant when considered in combination with effects from other plans or developments. A search radius of 10 km from the Proposed Development site boundary will be applied for the cumulative assessment and all developments likely to impact ecological receptors will be considered. This area of search is twice the area of search for designated sites considered in the assessment of effects of the Development in isolation. This wider search area has been agreed with AECOM who are the environmental consultants NKDC have brought on board to assist them in the assessment of this Development.

9. HYDROLOGY, HYDROGEOLOGY, FLOOD RISK & DRAINAGE

Introduction

9.1 This section of the ES will be prepared by Jeremy Benn Associates Limited (JBA) and the scoping assessment detailed below provides information in terms of the scoping for the hydrogeology, hydrogeology and flood risk section within the relevant chapter of the ES. The ES chapter will identify and describe the nature and significance of the effects likely to arise in relation to hydrogeology during both the construction and operational phases. The chapter will set out the existing baseline environment in relation to hydrogeology and assesses the potential impacts of the construction and operation of the Heckington Fen Energy Park and the Grid cable route on groundwater quality and levels.

Preliminary Baseline Conditions

Location and topography

- 9.2 The proposed development area is located near Heckington Fen in Lincolnshire, approximately 6km east of the village of Heckington and 11km west of Boston. The A17 borders the south of the site, while Labour in Vain (drainage channel) border the western side. The north of the site is bordered by Head Dike and Skerth Drain, while the eastern side is bordered by agricultural field boundaries.
- 9.3 The extent of the study area for this assessment is shown in Figure 11: Energy Park Topography Plan (below).
- 9.4 The majority of the Energy Park site is within Flood Zone 3, with some sections of the Energy Park falling within Flood Zone 2 and Flood Zone 1. These areas can be seen on the Environmental Designations Plan Figure 5.
- 9.5 The Energy Park is situated on the Lincolnshire Fens, a coastal plain in the east of England which comprises a large area of broad flat marshland supporting a rich biodiversity. Topography within the Energy Park is only a few metres above sea level and slopes very gently towards the north-east. The lowest point is at 0.77m AOD in the northern part adjacent to Head Dike, while the highest point is 3.3m AOD at the southern border. This can be seen on the Energy Park Location Plan at Figure 1.

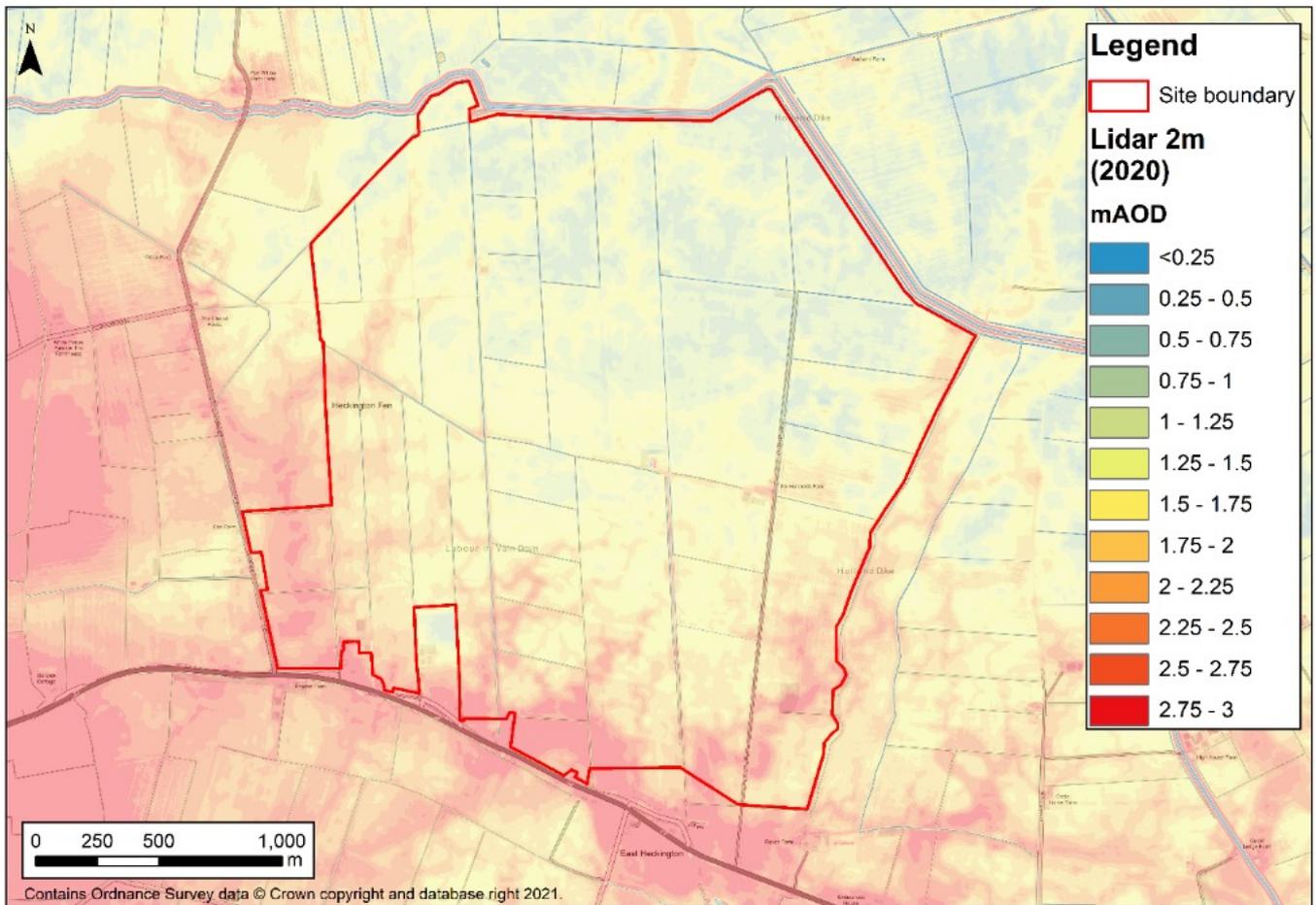


FIGURE 11: ENERGY PARK TOPOGRAPHY PLAN

Geology and soils

- 9.6 Information on the soils and geology of the site and surrounding area has been derived from Soilscales online viewer, 1:50,000 British Geological Survey (BGS) geology mapping (BGS online map viewer) and the BGS online borehole archive. The geology beneath the site is summarised in Table 9.1.

Soils

- 9.7 Soils are described as loamy and clayey floodplain soils of coastal flats with naturally high groundwater. Fertility is lime-rich to moderate, and the soils are mostly drained into marginal ditches in most fields.

Made Ground

- 9.8 Made Ground refers to lithology that is made up of artificial material, or the reworking of natural material used to create a new landform. Made Ground is likely to be present in areas of historic and present residential and industrial buildings, where the ground may have been prepared for construction. Also, it is commonly contained in areas of landfill or other waste management sites.
- 9.9 It is unlikely that Made Ground exists beneath the site boundary.

Superficial geology

- 9.10 The BGS 1:50000 mapping indicates that the Energy Park site is entirely underlain by tidal flat deposits comprising a consolidated soft silty clay, with layers of peat, sand and basal gravel. Approximately 500 m to the west of the Energy Park site, deposits of glacial till overlay the tidal flats and extend 7 km to the south-west.
- 9.11 A BGS borehole record (BGS Ref: TF24SW2) located approximately 1.5 km east of the

Energy Park site documented the tidal flat deposits as comprising 2.6m of grey clay underlain by black silt and gravels. Located on the Energy Park site's southern boundary, another BGS borehole (BGS Ref: TF14SE2) recorded 2.44 m of silt underlain by 1.27 m of sands and gravels.

- 9.12 The thickness of the deposits increases from ~4 m on the southern boundary of the Energy Park, to 13 m at a location 3.4 km to the east, and up to 16 m thick some 4km to the north.
- 9.13 Therefore, from the borehole records it is anticipated that the tidal flat deposits within the south-west part of the Energy Park site are around 4 m thick and increase in thickness towards the north-east of Energy Park.

Bedrock geology

- 9.14 The BGS geology mapping shows that the bedrock underlying the Energy Park comprises the Jurassic age West Walton Formation in the south-west half and the Amphill Clay Formation in the north-east half. The West Walton Formation is described by the BGS as comprising calcareous mudstones, silty mudstone and siltstones, with subordinate fine-grained sandstones and argillaceous limestones. It is estimated to be up to 20-40 m in thickness and dips approximately 5 degrees to the east.
- 9.15 Conformably overlying the West Walton Formation, the Amphill Clay Formation consists of smooth or slightly silty mudstone with grey argillaceous limestone nodules and is estimated to be up to 50m in thickness.
- 9.16 BGS borehole records (BGS Ref: TF14SE2; TF14SE4/A) located on the West Walton Formation, documented the bedrock as

comprising brown-grey clay, with sporadic argillaceous limestone nodules down to 135 metres below ground level (mbgl). At depths greater than 100 mbgl, the records noted the clay becoming slightly sandy with stone beds present. However, the borehole records did not distinguish the West Walton Formation from the underlying Oxford Clay Formation. Hence, the thickness of West Walton at the Energy Park site is unknown. Groundwater was encountered in the West Walton Formation at 71 mbgl (Ref: TF14SE4/B).

- 9.17 Two borehole records located on the Amphill Formation approximately 4 km to north of the Energy Park site (BGS Ref: TF15SE28; TF25SW14) described the bedrock as comprising hard, dark olive grey, laminated silty clays with shell fragments.

Mining and mineral extraction

- 9.18 The Coal Authority online viewer ¹³ has been reviewed for the area. The Energy Park site is not within a Coal Authority Mining Reporting Area and there are no mine entry records shown within the Energy Park boundary.

Summary of site geology

9.19 A summary of the geological stratigraphy likely to be present at the site is shown in Table 9.1.

TABLE 9 1: STRATIGRAPHY OF LITHOLOGIES UNDERLYING THE SITE

Age	Formation/Group	Description	Thickness
Quaternary Period	Tidal flats	Grey clay underlain by black silt and gravels.* Layers of peat and silty clay may also be present**	~4m, increasing towards the north-east*
Jurassic	Amphill Clay Formation (Ancholme Group)	Mudstone, mainly smooth or slightly silty, pale to medium grey with argillaceous limestone (cementstone) nodules; some rhythmic alternations of dark grey mudstone in the lower part; topmost beds are typically pale grey marls with cementstone.**	Up to 50m**
	West Walton Formation (Ancholme Group)	Brown-grey clay, with sporadic argillaceous limestone nodules. Clay becoming slightly sandy at greater depths, with stone beds present.**	20-40m**

Sources:

*BGS borehole log records

**BGS Online Lexicon of Named Rock Units

Hydrogeology

Aquifer designation and vulnerability

- 9.20 The superficial tidal flat deposits are classified as 'unproductive' by the Environment Agency (EA). However, BGS borehole record TF24NW2, 3.4 km east of the site, is noted to have encountered groundwater within layers of silty sand. The groundwater here is likely to form part of perched aquifer, where water is found within higher permeability silty sandy layers surrounding by lower permeability silty clays.
- 9.21 Both the West Walton and Amphill Clay Formations are also classified as 'unproductive'. Most borehole records did not encounter any groundwater. However, one borehole (Ref: TF14SE4/B), located 1.6 km south-west of the site found a small quantity of water at a depth of 71 mbgl within a thin limestone bed. At this depth, the water was likely found within the underlying Oxford Clay Formation.
- 9.22 The EA's catchment data explorer shows that the site does not lie within a groundwater management catchment.

TABLE 9.2- AQUIFER DESIGNATIONS

Group	Formation	Classification
Superficial	Tidal flats	Unproductive
Bedrock	Amphill Clay Formation	Unproductive
	West Walton Formation	Unproductive

Groundwater source protection zones

- 9.23 Source Protection Zones (SPZs) are used to protect areas of vulnerable groundwater that is used for abstraction and where water quality is of high importance (such as drinking water abstractions). SPZs are categorised into three zones, 1-3, with 1 being of highest risk of contamination, and 3 representing the lowest risk but still within the groundwater catchment.
- 9.24 There are no SPZs recorded within 2 km of the site. The closest is located approximately 8.5 km to the west.
- is negligible groundwater flow within the site area down to depths of at least 70-100 mbgl. At this depth, the Kellaways Formation, which underlies the Oxford Clay Formation, forms a confined Secondary A aquifer below the site.

Groundwater abstraction and discharges

Aquifer properties and groundwater flow

- 9.25 Since both the superficial deposits and bedrock lithologies underlying the site are designated as 'unproductive', there
- 9.26 Data requests were made to both the EA and NKDC. NKDC have stated that they have no details on local ground water abstractions and have advised that local checks are also made by the EA. Once this information is received it will be used in the assessment to determine the baseline of the site and then determine if the Development will have any effect on the groundwater abstraction and discharges.

Likely Significant Effects

- 9.27 Construction activities on the Energy Park will include the clearance of vegetation, topsoil stripping, establishment of compound areas, excavation and site levelling/re-profiling to create development platforms, preparation of site roads and construction of foundations. In the areas for Grid cables to be laid expected works are limited to digging open trenches, which will be back filled once the cable is laid or where needed Grid cables will be direct drilled under existing features. There may be the need to create access tracks to appropriate points along this new Grid route. The flood risk effect and surface water drainage effect of these new access roads will be determined.
- 9.28 Compaction of the ground caused by construction plant and an increase in the extent of impermeable surfaces associated with access roads and compound areas have the potential to impact upon the rate of surface water infiltration to the aquifer below.
- 9.29 Construction activities also have the potential to give rise to the contamination of waters resulting from spilled hydrocarbons/petrochemicals from construction plant.
- 9.30 During the operational phase, there is the potential for the contamination of water resulting from the flushing of silts and hydrocarbons from areas of hardstanding.

Likely mitigation measures

- 9.31 The development proposals will include measures to prevent, reduce and offset significant adverse effects upon hydrology, drainage and flood risk with regards to the surface water receptors. Being 'built-in' to the proposals from the outset, the assessment of the significance of effects will include consideration of these 'embedded' mitigation measures. Such measures are likely to include protecting critical infrastructure from flood risk. However, specific measures are not anticipated to be required for the groundwater environment.
- 9.32 The EIA supporting the application is likely to include a Construction Environmental Management Plan (CEMP). Any construction phase mitigation measures would be secured through implementation of the measures set out in this document.
- 9.33 In terms of operational phase mitigation measures, whilst a surface water management strategy is anticipated, again measures relating to groundwater are unlikely to be anticipated for the proposed development.

Assessment Methodology

- 9.34 Characterisation of the hydrogeological baseline will depend on a review of readily available online resources such as geological and hydrogeological mapping, as well as obtaining Freedom of Information (Fol) requests for groundwater data and water supplies.
- 9.35 Consultation with key stakeholders (Lead Local Flood Authority (LLFA), EA and IDB) have begun and will confirm the scope of any technical work required to inform the chapter, agree assessment methodologies and the design principles to be applied to ascertain compliance with the relevant policy, legislation and guidance in respect of hydrogeological issues.
- 9.36 A walkover survey will be undertaken to facilitate an understanding of the baseline water environment and the general landform of the site and surrounding area and to define the scope/specifications of technical assessments/surveys. Nonetheless, it is not anticipated that any additional surveys will be required with respect to the groundwater environment for the proposed development.
- 9.37 The assessment will be undertaken in accordance with the current legislation and policy guidance that is relevant to the groundwater environment.
- 9.38 The methodology for the assessment of potential impacts follows the generic EIA methodology guided by IEMA (2016) and current government guidance, and is based on the following principles:
- The type of effect (long-term, short-term, or intermittent; positive, negative or neutral);
 - The probability of effect occurring;
 - Receptor sensitivity; and
- The magnitude (severity) of the effect.
- 9.39 In addition to this assessment will look to follow the planning policy guidance in the NPPF, NPG and draft NPG's, Land Drainage Act 1991 and the Water Framework Directive.
- 9.40 A test for the implications for the development for Flood Risk will be completed as required under Planning Policy. This will form part of the planning bundle but will sit outside of the EIA. This is required as the Energy Park site is mainly within Flood Zone 3 and part within Flood Zone 2. Planning Policy requires the need for any Flood Risk Assessment to demonstrate that it can pass such a test and show that despite the increased flood risk of the site it is still the 'best' location for the development.

Significance Criteria

Principal receptors and their sensitivity

- 9.41 Following the data gathering and analysis, potential hydrogeological receptors have been identified around the development area. These include all groundwater features downstream/down gradient of the development areas that may be potentially affected by activities associated with the proposed development. The approach adopted for identification of receptors involved separating those that could potentially be significantly affected from those that will not be affected, on account of the benefit of environmental measures incorporated in the proposed developments, or due to their location outside of the relevant surface water or groundwater catchments.

9.42 From consideration of the Scoping Opinion and baseline characterisation, a sensitivity classification has been allocated to each identified hydrogeological receptor, and these are set out in Table 9 3.

TABLE 9 3 - SUMMARY OF POTENTIAL ENVIRONMENTAL RECEPTORS

Receptor Type	Receptor	Sensitivity	Reasoning
Groundwater	Superficial tidal flat deposits	Very low	Unproductive aquifer with very limited groundwater flow. Any groundwater present will be locally perched
	West Walton Formation and Ampthill Clay Formation (unproductive aquifer)	Very low	Unproductive aquifer with very limited groundwater flow. Any groundwater present will be locally perched

Assessment of Cumulative Effects

9.43 In accordance with national planning policy, other development schemes within the catchment of the Head Dike/Skerth Drain will be expected to incorporate measures to ensure that development does not increase flood risk elsewhere. This area will, in some locations, expand beyond the proposed 5km cumulative assessment area. Similarly, and relevant to the groundwater environment, these other development schemes will be required to include measures to provide pollution control such that water quality is not adversely affected.

9.44 On account of policy requirements, it is envisaged that the Proposed Development will be categorised as ‘nil detriment’ in terms of off-site/downstream hydrogeology related impacts. On this basis, it is highly unlikely that there will be any cumulative effects within the catchment of the Head Dike/Skerth Drain and the low productivity aquifers that underlie it.

10. CULTURAL HERITAGE

Introduction

- 10.1 This section sets out the proposed scope and assessment methodology for the Cultural Heritage chapter of the ES for the proposed solar and energy storage development at Heckington Fen, Lincolnshire.
- 10.2 A staged programme of archaeology and built heritage assessment will be undertaken to provide information regarding the significance of heritage assets and the potential impact of the proposed development thereupon, as detailed in paragraph 194 of the NPPF (2021). The first stage will comprise a Heritage Desk-Based Assessment (DBA) providing an historic environment baseline, an archaeological assessment, and setting assessments. The second stage will comprise a geophysical survey: a remote-sensing technique to prospect for buried archaeological remains within the site. The need for, and scope and timing of, intrusive investigations (e.g. trial trenching) and mitigation will be negotiated and agreed with Lincolnshire County Council Archaeology Officers once the heritage desk-based assessment and geophysical survey are complete.

Preliminary Baseline Conditions

Archaeology

- 10.3 From an initial review of Lincolnshire Historic Environment Record (HER) data, which was procured in August 2021 for a 2km radius measured from the boundaries of the main site area, it is noted that much evidence for prehistoric and Roman settlement and activity is recorded c.0.5-1.5km to the west of the site (e.g. HER

refs. MLI60731, MLI90708, MLI84683) and that indications of Roman salt-working were identified in the centre of the site by a geophysical survey carried out for a previous proposal for wind turbines here (HER refs. MLI87647, MLI87891, MLI87892) (Figure 12). Although not yet added to the HER, recent and ongoing archaeological work to the east of the site has revealed further evidence of Roman activity in this location.

Built Heritage (Setting)

- 10.4 One Scheduled Monument and four Grade II Listed Buildings lie within a 2km radius of the main site (Figure 13). From an initial review, it is considered that the following designated heritage assets may be sensitive to the development proposals: Scheduled Monument of 'Settlement site 650yds (600m) E of Holme House' (NHLE ref. 1004927) located c.525m west of the site; and the Grade II Listed Building of St John the Baptist (NHLE ref. 1360489) located c.1km north-east of the site.
- 10.5 It is acknowledged that other designated heritage assets within and/or outlying a 2km radius of the site may also be sensitive, especially given the flat and low-lying landscape character allowing for long-ranging views towards/from assets and so these will be considered within the assessment. The main assessment area will be 5km from the EIA Area. If there are any heritage assets just outside this 5km assessment area, professional judgement will be used to determine if they need to be included within the assessment.

Likely Significant Effects

- 10.6 The Proposed Development comprises the construction of a ground mounted solar park and energy storage facility with associated equipment and infrastructure, new underground Grid cable from the Energy Park to National Grid Bicker Fen substation and above ground works at the National Grid substation.
- 10.7 Ground clearance and preparation, piling for solar arrays, excavation of cable trenches and drainage runs, provision of access, and landscaping may truncate and/or remove buried archaeological remains within the Energy Park and result in varying degrees of harm to their heritage significance. Given their finite nature, development effects upon any buried archaeological remains within the site would be direct, long-term, permanent, and adverse.
- 10.8 The Proposed Development may alter the setting of designated heritage assets such that could result in a degree of harm to their heritage significance. Such effects would be indirect, temporary in terms of being limited to the operational lifespan of the Energy Park, and adverse.

Assessment Methodology

Planning Legislation

- 10.9 This application will be for a Development Consent Order (DCO) and the planning context of the assessment will be considered in that context. Legislation relating to the built historic environment is primarily set out within the Planning (Listed Buildings and Conservation Areas) Act 1990, which provides statutory protection for Listed Buildings and Conservation Areas.

- 10.10 Section 66(1) of the Planning (Listed Buildings and Conservation Areas) Act 1990 states that:

“In considering whether to grant planning permission [or permission in principle] for development which affects a listed building or its setting, the local planning authority or, as the case may be, the Secretary of State, shall have special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses.”

- 10.11 With regards to development within Conservation Areas, Section 72 (1) of the Planning (Listed Buildings and Conservation Areas) Act 1990 states:

“In the exercise, with respect to any buildings or other land in a conservation area, of any powers under any of the provisions mentioned in subsection (2), special attention shall be paid to the desirability of preserving or enhancing the character or appearance of that area.”

- 10.12 Notwithstanding the statutory presumption set out within the Planning (Listed Buildings and Conservation Area) Act 1990, Section 38(6) of the Planning and Compulsory Purchase Act 2004 requires that all planning applications are determined in accordance with the Development Plan unless material considerations indicate otherwise.

- 10.13 National policy and guidance are set out in the Government’s National Planning Policy Framework (NPPF) published in July 2021. The NPPF needs to be read as a whole and is intended to promote the concept of delivering sustainable development.

10.14 Heritage assets are defined in Annex 2 of the NPPF as:

“A building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest. It includes designated heritage assets and assets identified by the Local Planning Authority (including Local Listing)”

10.15 The NPPF goes on to define a designated heritage asset as a:

“World Heritage Site, Scheduled Monument, Listed Building, Protected Wreck Site, Registered Park and Garden, Registered Battlefield or Conservation Area designated under relevant legislation”

10.16 Section 16 of the NPPF relates to ‘Conserving and enhancing the historic environment’ and states at paragraph 195 that:

“Local planning authorities should identify and assess the particular significance of any heritage asset that may be affected by a proposal (including by development affecting the setting of a heritage asset) taking account of the available evidence and any necessary expertise. They should take this into account when considering the impact of a proposal on a heritage asset, to avoid or minimise any conflict between the heritage asset’s conservation and any aspect of the proposal”.

10.17 Paragraph 197 goes on to state that:

“In determining planning applications, local planning authorities should take account of:

- ***the desirability of sustaining and***

enhancing the significance of heritage assets and putting them to viable uses consistent with their conservation;

- ***the positive contribution that conservation of heritage assets can make to sustainable communities including their economic vitality; and***
- ***the desirability of new development making a positive contribution to local character and distinctiveness”.***

10.18 With regard to the impact of proposals on the significance of a heritage asset, paragraphs 199 and 200 are relevant and read as follows:

“When considering the impact of a proposed development on the significance of a designated heritage asset, great weight should be given to the asset’s conservation (and the more important the asset, the greater the weight should be). This is irrespective of whether any potential harm amounts to substantial harm, total loss or less than substantial harm to its significance.

Any harm to, or loss of, the significance of a designated heritage asset (from its alteration or destruction, or from development within its setting), should require clear and convincing justification. Substantial harm to or loss of:

- a) grade II listed buildings, or grade II registered parks or gardens, should be exceptional;***
- b) assets of the highest significance, notably scheduled monuments, protected wreck sites, registered battlefields, grade I and II* listed buildings, grade I and II* registered parks and gardens, and World Heritage Sites, should be wholly***

exceptional”.

10.19 Paragraph 201 reads as follows:

“Where a proposed development will lead to substantial harm to (or total loss of significance of) a designated heritage asset, local planning authorities should refuse consent, unless it can be demonstrated that the substantial harm or total loss is necessary to achieve substantial public benefits that outweigh that harm or loss, or all of the following apply:

- a) the nature of the heritage asset prevents all reasonable uses of the site; and**
- b) no viable use of the heritage asset itself can be found in the medium term through appropriate marketing that will enable its conservation; and**
- c) conservation by grant-funding or some form of not for profit, charitable or public ownership is demonstrably not possible; and**
- d) the harm or loss is outweighed by the benefit of bringing the site back into use”.**

10.20 Paragraph 202 goes on to state:

“Where a development proposal will lead to less than substantial harm to the significance of a designated heritage asset, this harm should be weighed against the public benefits of the proposal including, where appropriate, securing its optimum viable use”.

10.21 Paragraph 203 of the NPPF states that:

“The effect of an application on the significance of a non-designated heritage asset should be taken into account in determining the application. In weighing applications that directly or indirectly affect non-designated heritage assets, a balanced judgement will be required having regard to the scale of any harm or loss and the significance of the heritage asset”.

10.22 As per footnote 63 of the NPPF, non-designated assets of archaeological interest which are demonstrably of equivalent significance to a Scheduled Monument will be subject to the policies for designated heritage assets.

10.23 Overall, the NPPF confirms that the primary objective of development management is to foster the delivery of sustainable development, not to hinder or prevent it. Local Authorities should approach development management decisions positively, looking for solutions rather than problems so that applications can be approved wherever it is practical to do so.

10.24 Additionally, securing the optimum viable use of sites and achieving public benefits are also key material considerations for application proposals.

Guidance

- 10.25 All work will be undertaken in accordance with all relevant heritage industry guidance and best practice, including:
- Standard and Guidance for Historic Environment Desk-Based Assessment (Chartered Institute for Archaeologists (CIfA) 2014);
 - Planning Practice Guidance (PPG) 'Conserving and Enhancing the Historic Environment' (MHCLG, updated February 2018);
 - Historic Environment Good Practice Advice in Planning Note 1: The Historic Environment in Local Plans (Historic England 2015);
 - Historic England Advice Note 12: Statements of Heritage Significance: Analysing Significance in Heritage Assets (Historic England 2019);
 - Historic Environment Good Practice Advice in Planning Note 3: The Setting of Heritage Assets (2nd Edition; Historic England 2017);
 - Geophysical Survey in Archaeological Field Evaluation (English Heritage 2008);
 - Standard and Guidance for Archaeological Geophysical Survey (CIfA 2014); and
 - Guidelines for the use of geophysics in archaeology: questions to ask and points to consider (EAC 2015).

Assessment Methodology

- 10.26 The historic environment baseline will be informed by detailed analysis of the received Lincolnshire Historic Environment Record data; selected reports of previous archaeological investigations; historic aerial photographs of the site, held by Historic England Archives; historic maps and relevant documentary records of the site, held by Lincolnshire Archives and available online; and a site walkover survey, with any above-ground remains of archaeological or historic interest being subject to a descriptive and photographic record. The archaeological assessment will identify and describe known heritage assets within the site and study area (including any features observed during the site walkover), consider the potential for currently-unknown buried archaeological remains within the site, and assess their possible level of significance and the likely nature and scale of development impacts thereupon.
- 10.27 The setting assessments will seek to establish if and to what degree the site contributes through setting to the significance of designated heritage assets, assess the likely impacts of the proposed development thereupon, and identify design measures to mitigate harm as appropriate. The assessments will be undertaken in accordance with the industry-standard methodology provided by Historic England in their Good Practice Advice in Planning Note 3: The Setting of Heritage Assets (2017). This promotes an iterative approach as follows:
- Step 1: assess which assets would be affected and identify their setting.
 - Step 2: assess the degree to which these settings and views make a contribution

to the significance of the heritage asset(s) or allow significance to be appreciated.

- Step 3: assess the effects of the proposed development, whether beneficial or harmful, on that significance or on the ability to appreciate it.
- Step 4: explore ways to maximise enhancement and avoid or minimise harm.
- Step 5: monitor outcomes.

10.28 The setting assessments will consider all designated heritage assets located within a minimum 2km radius measured from the boundaries of the main site area. The assets will be identified through a search of the National Heritage List for England (NHLE). Zone of Theoretical Visibility models prepared as part of the Landscape and Visual Impact Assessment (LVIA) will be used to assist with scoping (Step 1). Photomontages may be prepared by the LVIA to illustrate visibility of the proposed development. A shortlist of assets requiring full detailed assessment (Steps 2 to 4) and the location of viewpoints for any photomontages will be agreed with the LPA's Conservation Officer and Historic England.

10.29 A geophysical survey will be carried out across the main development site as part of the EIA. Given the size of the site, the constraints posed by agricultural regimes, and the project timetable, the area will be divided into four parcels and each awarded to a different contractor. The same survey type and data collection technique will be used across the entire site, and each contractor will prepare a Written Scheme of Investigation. for the approval of

Lincolnshire County Council Archaeology Officers prior to commencement. Pegasus will act as Quality Assurance on all written outputs to ensure consistency and will prepare a summary note of the results to facilitate dialogue with the LPA regarding further archaeological investigation and/or mitigation. In line with the approaches taken elsewhere the geophysical survey of the underground cable route will be undertaken if the scheme is consented and prior to construction commencing

EIA Approach

10.30 The archaeology and heritage assessments will consider the following potential effects:

- Construction Phase: physical (direct) effects upon buried archaeological remains within the site as a result of truncation;
- Construction Phase: non-physical (indirect) effects upon the significance of heritage assets within the site environs as a result of changes to setting; and
- Operational Phase: non-physical (indirect) effects upon the significance of heritage assets within the site environs as a result of changes to setting.

Significance Criteria

10.31 The impact assessments will consider the following in respect of each identified heritage receptor (asset):

- the asset's heritage significance;
- the anticipated level of harm to that significance (comparable to 'magnitude'); and
- whether that level of harm would comprise a significant effect.

10.32 Determination of each of the above has been undertaken in accordance with a robust methodology, formulated within the context of current best practice, recent case law, the relevant statute and policy provisions, and key professional guidance. The rationale for each is set out within the following three sections, alongside the relevant criteria and terminology used in their articulation.

Determining Heritage Significance

10.33 In accordance with the levels of significance articulated in the NPPF (2021), three levels of heritage significance are identified and will be utilised for the purposes of the assessment. These are presented in Table 10.1.

TABLE 10.1 HERITAGE SIGNIFICANCE

Significance	Qualifying Criteria
Designated heritage assets of the highest significance	Grade I and II* Listed Buildings, Grade I and II* Registered Parks and Gardens, Scheduled Monuments, Protected Wreck Sites, World Heritage Sites and Registered Battlefields. Conservation Areas of especial historic interest. *Also, non-designated archaeological remains of demonstrably equivalent significance to that of Scheduled Monuments (NPPF (2021) footnote 68).
Designated heritage assets of less than the highest significance	Grade II Listed Buildings and Grade II Registered Parks and Gardens. The majority of Conservation Areas.
Non-designated heritage assets	Buildings, monuments, sites, places, areas or landscapes identified as having a degree of significance meriting consideration in planning decisions, but which are not formally designated heritage assets (as defined within the PPG).

10.34 Sites, buildings or areas that have no heritage significance would not be considered heritage assets under the provisions of the NPPF (2021) and would not be considered as heritage receptors for the purposes of EIA.

Determining Level of Harm to Heritage Significance

- 10.35 Potential development effects upon the significance of known and potential heritage assets identified within the site will be determined with reference to harm and/or benefit, as defined within the NPPF (2021). The identification of harm would apply where the proposals would be anticipated to reduce an asset's heritage significance. The identification of heritage benefit would apply where the proposals would be anticipated to enhance (increase) heritage significance.
- 10.36 Where harm to the significance of a designated heritage asset is identified, it will be discussed in terms of it being either 'substantial' or 'less than substantial', as per the terms of NPPF (2021) paragraphs 200 and 201. The NPPF does not apply these same harm criteria to non-designated heritage assets.
- 10.37 Harm to the significance of non-designated heritage assets is treated separately under NPPF (2021) paragraph 203, which requires that in weighing applications that directly or indirectly affect non-designated heritage assets, "a balanced judgement will be required having regard to the scale of any harm or loss and the significance of the heritage asset".
- 10.38 The methodology that will be adopted for the purposes of EIA in identifying levels of development effect upon the significance of designated and non-designated heritage assets will directly reflect the NPPF's position and language in this regard (Table 10.2).
- 10.39 Professional judgement is used in defining the anticipated level of harm to the significance of non-designated heritage assets for the purposes of the present chapter; all determinations are fully qualified within the text.
- ### **Assessment of Significant Effects ('Significance of Effect')**
- 10.40 In determining whether any identified harm to heritage significance would translate into a significant effect for purposes of EIA, a quantitative matrix-led approach will be avoided as this would over-simplify the assessment findings. Instead, determinations will be based upon professional judgement and will be presented qualitatively and with full justification. This approach directly reflects key concepts in current planning policy and heritage guidance and is advocated by Historic England.
- 10.41 Ultimately, a statement of whether any identified harm does or does not represent a significant effect will be provided in respect of each cultural heritage receptor using the following terminology: 'Significant' or 'Not Significant'.
- ### **Assessment of Cumulative Effects**
- 10.42 All proposed and permitted development schemes within a 5km radius of the site will be considered for the assessment of cumulative and in-combination effects.

TABLE 10.2 LEVEL OF HERITAGE HARM / BENEFIT

Level of Harm / Benefit	Qualifying Criteria
Heritage Benefit	The asset's significance would be enhanced and/or better revealed. This would weigh in favour of the Proposed Development in the planning balance. It would be a desirable outcome, consistent with all key policy objectives and industry guidance provisions.
No Harm	The asset's significance would be preserved. This would be consistent with the NPPF's core sustainability objective, as well as all other relevant statute and policy provisions, including the Planning (Listed Buildings & Conservation Areas) Act (1990) s.66(1) and s.72(1), and NPPF (2021) paragraphs 199–208.
Less than Substantial Harm	The designated asset's significance would be reduced, but still, on balance, substantively preserved. Where 'less than substantial' harm has been identified, an attempt is made to qualify more precisely that level of harm, with reference to the heritage interests defined within the PPG and Statements of Heritage Significance: Analysing Significance in Heritage Assets (Historic England 2019). NPPF (2021) paragraph 202 provides that such less than substantial harm should be 'weighed against the public benefits of the proposal including, where appropriate, securing its optimum viable use'.
Substantial Harm	The designated asset's significance would be subject to such a serious impact (reduction) that its significance would be "either vitiated altogether or very much reduced" (2013 High Court Ruling). Substantial public benefit or satisfaction of the four criteria provided within NPPF (2021) paragraph 201 would be required to outweigh this level of harm. Without this, the NPPF directs that consent should be refused.
Harm to Non-Designated Heritage Assets	Harm to the significance of a non-designated heritage asset would comprise a material consideration for the decision-taker. As per NPPF (2021) paragraph 203, a balanced judgement would be required having regard to the scale of any harm or loss and the significance of the heritage asset.

11. SOCIO ECONOMICS

Introduction

11.1 This chapter will consider the socio-economic effects of the Proposed Development. Likely significant effects on social and economic conditions will arise directly from the uses provided as well as the employment opportunities created both during the construction and following the completion of the Development.

Preliminary Baseline Conditions

Economic Development Policy

11.2 The UK has a central policy objective of achieving “strong, sustainable and balanced growth”, as stated in Build Back Better: Our Plan for Growth (2021) which sets out a range of ambitions relating to national economic development designed to realise this core policy objective. The ambitions contained within the Plan for Growth emphasise the need to stimulate growth through the private sector, broaden the UK’s economic base and to promote investment, skills development and employment creation across the UK as a whole. In addition to the general focus on economic growth nationally there is a clear policy emphasis on securing economic benefits arising from changes in the energy mix and investment in renewable energy developments.

11.3 These policy needs are further emphasised by their translation into relevant local planning policies for economic growth.

Likely Significant Effects

11.4 The assessment will consider the effect of the Development on socio-economic and receptors during the three phases of the development: construction, operation and decommissioning.

Construction Phase

11.5 During construction phase, direct effects on socio economic receptors could arise through:

- Transport and onsite assembly/ installation of the components: spend on the transport and installation could stimulate economic impacts in the UK in the form of jobs and GVA supported in this part by the Development supply chain. The scale and spatial distribution of these direct impacts will depend on the locations of the companies carrying out the activities and where they source their labour from.
- Construction of associated infrastructure: Any investment in access tracks and other supporting infrastructure would support jobs and GVA in its supply chain. Again, the scale and spatial distribution of the impact will depend on the location of the contractors and the areas of which they source their labour.

11.6 In addition to these direct impacts there is scope for indirect effects on socio economics. These indirect effects will occur in the supply chain of the companies providing goods and services to the development. It is difficult to predict the likely scale of indirect effects, but it is likely to be some impact associated with activities that take place to the Development site.

Operational Phase

- 11.7 Once constructed, there will be an ongoing requirement for operation and maintenance which could stimulate impacts in a similar way to the construction activities, but to a much lesser extent. These impacts are expected to be modest overall. The applicant already has their O&M branch based in Louth, Lincolnshire. The operation of the scheme will continue to require the employment and possible expansion of the team within the County.
- 11.8 There will be community features included within the final Indicative Site Layout. At this time, the draft Indicative Site Layout Plan (Figure 3) has a community orchard and an extension to the PROW through the creation of a permissive footpath that would create a loop walk in the local area. To date the local area has a limited public rights of way routes due to historical drainage issues in the wider landscape. It is proposed that access to the community orchard would be accessed via agreement with the Parish Council for certain community groups.

Decommissioning

- 11.9 The operational phase of the Development is expected to last for 40 years. Once this has passed the Energy Park Site will need to be decommissioned. The cost of this additional activity could generate further direct and indirect socio-economic impacts and effects similar to those of the construction phase. However, the scale of these impacts is outside of the scope of this assessment due to the uncertainty over the nature and costs of this activity, particularly as the sector, engineering approaches and technologies evolve over the lifetime of the Energy Park.

Assessment Methodology

- 11.10 There is no legislation relevant to the assessment of socio-economic effects, but national planning and economic development policy are a relevant consideration in the scoping assessment for socio-economic effects.
- 11.11 The methodology has been developed with reference to good practice EIA guidelines, such as that published by IEMA and from considerable experience of socio-economic impact assessment of similar developments.
- 11.12 The socio-economic assessment will consider the extent to which the impacts set out above will materialise within the three primary areas:
- The local planning authorities where the whole of Development is located (Lincolnshire County Council, North Kesteven District Council and Boston Borough Council)
 - The Lincolnshire Region
 - The National Impact area – England
- 11.13 To gain a clear understanding of the scale and nature of the proposed socio-economic effects, published statistical information and bespoke research sources will be used to establish existing conditions and indicate where the Proposed Development is likely to have an effect in the future. Consultation with appropriate bodies will be undertaken to establish current baseline conditions with respect to local facilities and capacities. These will include, but are not limited to, Local Planning Authorities, County Council, Police Force, Fire Service, Education Facilities and Health Services etc.

11.14 The socio-economic effect of the Proposed Development will be evaluated by:

- assessing the effect of the economically active elements of the residential population on the labour market and the prospects for employment;
- reassessing the effect of the Proposed Development on recreational and leisure facilities; and
- consulting the local authority, community groups, business representatives and police as appropriate.

11.15 Where necessary, as a result of these assessments, mitigation strategies will be devised to ensure adequate and/or enhanced facilities and services provision for residents of the area.

Significance Criteria

11.16 The process for determining significance for this Development would follow the criteria outlined in Section 6 of this Scoping Request.

Assessment of Cumulative Effects

11.17 As proposed within the wider ES methodology the cumulative assessment area is 5km. There are a number of solar farm sites that fall within this 5km area and all will be considered within the cumulative assessment to determine if the socio-economic impacts generated by them during construction would have a cumulative impact or either construction or operational phases of the Proposed Development.

12. NOISE

Introduction

- 12.1 During construction, noise and vibration could arise from both activities on the Energy Park site and the Grid cable route and National Grid Bicker Fen substation. These would include items such as the construction of onsite access tracks, solar panels, energy storage units, the substation, new Grid cable route and associated infrastructure at Bicker Fen substation. The movement of construction traffic relates to traffic both on the Energy Park site and travelling on public roads to and from the whole of the Development will also be considered.
- 12.2 During operation of the Energy Park, the main potential source of noise would be associated with electrical and mechanical plant; both the equipment located within the individual solar arrays and that proposed at the onsite substation and energy storage area. It is considered likely that an additional electrical unit will be required at the Bicker Fen substation. This will be considered as part of the assessment. Operation of the Energy Park may also be associated with some light vehicle traffic for maintenance purposes.

Preliminary Baseline Conditions

- 12.3 The baseline noise environment at and around the Energy Park was previously characterised as part of the assessment of the Heckington Fen Wind Park development. This included a detailed noise survey over a period of several weeks between March and April 2011.
- 12.4 The noise environment in the surrounding area is generally characterised by 'natural' sources, such as wind disturbed vegetation, birds and farm animals.

Occasional military aircraft were also noted and, to the south of the site, road traffic on the A17 and A1121 is a significant source of noise. Intermittent local road and agricultural vehicle movements were also noted in the vicinity of the Energy Park.

- 12.5 Since the previous survey in 2011, it is considered unlikely that the background noise environment in the area would have changed significantly, outside of the periods of restrictions associated with the Covid-19 pandemic. Therefore, the previous survey undertaken is considered representative of the noise environment for noise-sensitive receptors neighbouring the Energy Park site. Measurements undertaken at locations distant from the A17 will be considered representative of similar receptors along the proposed cable connection route.

Guidance

- 12.6 The Noise Policy Statement for England (NPSE, DEFRA, 2010) and NPPF, NPS and draft NPS include general planning guidance on noise and introduces the principles of adverse noise effects (which should be mitigated and reduced to a minimum) and significant adverse noise effects (which should be avoided). The NPPF also notes that tranquil areas which have remained relatively undisturbed by noise and which are prized for their recreational and amenity value should be identified and protected.
- 12.7 The online Planning Practice Guidance (PPG, Department for Communities and Local Government, 2014, updated 2019) provides more detailed information on the relevance of noise to the planning process and on defining effect thresholds, although these are not precisely defined and need to

be considered on a case-by-case basis.

- 12.8 Professional Practice Guidance on Planning and Noise (ProPG, Association of Noise Consultants, Institute of Acoustics, Chartered Institute of Environmental Health, 2017) provides practitioners guidance on a recommended approach to the management of noise in the context of the planning system. Although focussed on new residential development, it encourages good acoustic design processes and highlights the importance of considering noise as an early part of development design.
- 12.9 BS 5228 Parts 1 and 2 (British Standard Institute, 2009, amended 2014) provide guidance on a range of considerations relating to construction noise and vibration including general control measures, estimating likely levels and example criteria.
- 12.10 BS 4142 (British Standard Institute, 2014 amended 2019) provides an objective method for rating the likelihood of complaint from industrial and commercial operations. It also describes the means of determining noise levels from fixed plant installations and determining the background noise levels that prevail on a site. Current Government advice to local planning authorities in England refers to BS 4142 as being the appropriate guidance for assessing commercial operations and fixed building services plant noise.
- 12.11 Operational noise and its propagation can be modelled using the standard methodology set out in ISO 9613-2: Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation’ (International Standards Organisation, 1996). Reference will also be made against the draft EN-1

Section 5.14 and draft EN-3 Section 2.54.1, if these drafts have come into force at time of completion of the ES.

Approach/Proposed Scope of Assessment

Study Area

- 12.12 The assessment will consider noise sensitive residential locations in the vicinity of the Energy Park and cable connection route, which are considered highly sensitive to noise due to the rural nature of the area, there are a limited number of properties within the local area. There is also a planning consent for a new additional needs school on land next to the southern boundary of the site. This school is not yet built or operational, but its presence will be considered within the noise assessment as a highly sensitive future receptor.
- 12.13 Based on experience of similar developments, noise-sensitive locations will be considered within a region of approximately 250m from the boundary of the potential solar development areas and 1km from the proposed on-site substation and energy storage area. Along the cable connection route, dwellings within a 500m distance of particularly noisy works and additional plant proposed at the Bicker Fen substation (if relevant) will be considered.

Desk and field survey methods

- 12.14 A desktop review will be undertaken using available mapping and address data of the potential noise-sensitive receptors in the study area.
- 12.15 As discussed above, the previous survey data measured at a representative sample of the noise-sensitive receptors closest to the Energy Park site can be referenced to

characterise existing baseline noise levels in the area for the purpose of assessing the potential noise impacts of the Energy Park site.

Consultation

- 12.16 The approach to baseline noise characterisation and impact assessment methodology will be discussed with the Environmental Health Departments of both North Kesteven District Council and Boston Borough Council.

Likely Significant Effects

- 12.17 Operational noise effects would be associated with electrical and mechanical plant proposed as part of the Development. Whilst noise produced by the solar arrays themselves is expected to be minimal, associated electrical plant such as transformers and inverters can generate noise which is typically tonal in nature, making it potentially more noticeable. The proposed on-site substation and energy storage area can include larger electrical plant (also tonal in nature and with higher noise emissions), as well as ancillary cooling units, which will also require particular consideration. Discussion with National Grid indicate that there is the need for additional electrical equipment for the connection to the National Grid Bicker Fen substation. The presence of this additional equipment will also need to be taken into account.
- 12.18 There is a potential for adverse impacts to be created if some of these plant items are not suitably located or designed. Potential noise levels will be predicted on the basis of representative noise data for the plant units potentially installed, on a worst-case basis. The model will be developed using the ISO 9613-2 methodology based on the

supplied data, indicative layout information and experience of similar installations. These predicted levels will be assessed relative to the existing baseline background noise levels at the relevant receptors, accounting for the potential character of the noise, in accordance with BS 4142. The greater the difference between predicted operational noise levels and baseline levels, the greater the impact (after also accounting for a number of contextual factors).

- 12.19 Primary mitigation will first involve reviewing the design of the Energy Park site to maximise (where possible) the distance from areas including noise-generating plant from noise-sensitive receptors. The detailed design of the Energy Park, including final plant locations and selections, can be controlled through DCO requirements to achieve suitable noise limits at neighbouring noise-sensitive properties.
- 12.20 In assessing the effects impacts of construction or decommissioning noise and vibration, it is accepted that the associated works are of a temporary nature. Assessment of the temporary effects impacts of construction is primarily aimed at understanding the need for dedicated management measures and, if so, the types of measures that are required.
- 12.21 Although most on-site construction activities will be limited in intensity and extent (see below), some works along the connection route to the Bicker Fen substation could be associated with potentially significant impacts. Specifically, horizontal drilling may be required in some areas along this route. The potential impacts associated with this activity will

be predicted by referencing typical activity emission levels and likely variations in noise levels at surrounding receiver locations, using the methodology set out in BS 5228 Part 1. This standard also provides guidance on assessing the resulting noise levels based on a range of considerations including the absolute level of the noise. If considered necessary, suitable mitigation and management measures can be secured in the CEMP through planning conditions.

Issues Proposed to be Scoped Out

- 12.22 In this instance, the nature of the works to construct or decommission the Energy Park infrastructure is such that activities will be limited to a relatively low intensity and/or duration. Construction and decommissioning noise is therefore not expected to represent a significant effect provided that appropriate working methods and hours are adhered to (aside from potential impacts of the cable connection route considered above).
- 12.23 Similarly, the intensity of traffic associated with the construction, particularly heavy goods vehicles which are most likely to generate adverse noise impacts, is expected to be relatively limited. For roads that already include moderate to high traffic levels, the potential for significant noise effects due to changes in traffic flow associated with the construction or decommission would require large increases of 30% or more in the baseline traffic levels (overall or HGV only) which is considered unlikely. For roads that currently include more limited levels of traffic, although a traffic increase due to construction may be noticeable it would be associated with low absolute noise levels such that their temporary impact is also unlikely to be significant.
- 12.24 Although some construction activities, such as piling operations or vibratory rolling techniques, can generate vibration levels in close proximity to their use, they are considered unlikely to be used at the Energy Park or with such a limited extent that significant levels are unlikely. Occasional momentary vibration can arise when heavy vehicles pass dwellings at very short separation distances, but again this is not sufficient to constitute a risk of significant effects in this instance. The situation for the decommissioning phase would be similar.
- 12.25 Accordingly, site-specific predictions and assessments of construction or decommissioning noise and vibration are not warranted in this instance for most activities (aside those set out above). Suitable management and enhancement measures will however be described in the CEMP and CTMP, final versions of which can be controlled as DCO requirements, to control hours of the works and minimise noise and vibration impacts of construction/decommissioning activities and associated traffic.
- 12.26 Vehicular movements during the operational phase of the Site would be very limited and unlikely to be associated with any significant noise effects and so can also be scoped out.
- 12.27 Based on experience of similar installations, the plant likely to be used at the Site would generate insignificant levels of vibration at the boundary of the Site and so this aspect can also be scoped.

Assessment Methodology

Overview of Assessment of Significance

- 12.28 Residential receptors are considered highly sensitive. Magnitude of impact scale will be defined on the basis of the principles set out in the NPSE and PPG planning guidance: this will be determined using thresholds of Lowest Observed Adverse Effect Level (LOAEL) and Significant Observed Adverse Effect Level (SOAEL). These thresholds will be based on the above-referenced guidance documents and the draft NPS.
- 12.29 The sensitivity of the receptor and the magnitude of impact will both be used to determine the significance of effect. Moderate or major levels of effect are considered to be significant within the meaning of the EIA Regulations and mitigation will be considered. Minor or negligible effects are not considered significant, but enhancement measures will be considered to minimise the effects where possible.

Significance Criteria

- 12.30 The process for determining significance for this Development would follow the criteria outlined in Section 6 of this Scoping Request except that a low and medium magnitude of impact for a highly sensitive receptor would represent minor and moderate effects respectively.

Assessment of Cumulative Effects

- 13.1 As proposed within the wider ES methodology the cumulative assessment area is 5km. There are a number of solar farm sites that fall within this 5km area and all will be considered within the cumulative assessment to determine if the noise generated by them is likely to have a cumulative impact on either construction or operational phases of the Development.

13. CLIMATE CHANGE

Introduction

13.2 Climate change is regarded as an important environmental, social and economic policy concern and this is relevant to project level assessment and decision-making. Therefore, in line with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended in 2018) (the 'EIA Regulations'), the assessment will consider the following:

- Emissions reduction¹⁴: the potential effects of the Proposed Development on climate change, with measures included in the project to reduce the emissions of both direct and indirect greenhouse gases (GHGs); and
- Climate change adaptation: both the vulnerability of the Proposed Development to climate change and also the implications of climate change for the predicted impacts of the project, as assessed by the other topic specialists ('in-combination climate impacts').

13.3 The two direct forms of GHG emissions are:

- Carbon dioxide (CO₂), nitrogen oxide (NO_x) and aerosol particulate matter (PM) emissions arising from road traffic during the construction and operational phases; and
- CO₂ emissions from the use of onsite combustion plant during construction and operation.

13.4 The two indirect forms of GHG emissions are:

- Off-site CO₂ emissions arising from the demand for energy produced using fossil fuels (e.g. electricity for heating, cooling, lighting and charging electric vehicles); and,
- Embodied carbon arising from the materials and systems which form the temporary and permanent structures and is a result of the extraction and manufacture of materials, fabrication, transport to site, waste and also the future demolition and potential for re-use.

13.5 Whilst particulate matter is not precisely a GHG, it is important to consider emissions of PM, as these are light-absorbing and consequently contribute to the rise in global temperatures (positive radiative forcing), but conversely also reflect a portion of the sunlight and so play a role in increasing the albedo, which moderates the temperature increase (negative radiative forcing). PM associated with vehicles is predominately in the form of black carbon or soot, which when released into the atmosphere will act to absorb heat and have a warming effect on the climate. Dust generally refers to larger particles (>10 µm in diameter) and whilst this will have the same warming effect, it will likely be less due to the increased weight of the particles causing deposition to ground to occur quickly.

13.6 Climate change is a relatively new topic in EIA. Guidance is evolving and there is no prescribed way in which climate change should be incorporated into an ES. However, in line with best practice, the proposed assessment reflects the IEMA's 'Environmental Impact Assessment Guide

¹⁴ Also known as 'climate change mitigation' and this is not to be confused with EIA mitigation. Climate change mitigation seeks to specifically reduce a development's GHG emissions. EIA mitigation is measures that aim to avoid, prevent, reduce or offset any identified significant adverse effects of a development

to: Assessing Greenhouse Gas Emissions and Evaluating their Significance (IEMA Guidance 2017) and IEMA's 'Environmental Impact Assessment Guide to: Climate Change Resilience and Adaption' (2020) (IEMA Guidance (2020)).

- 13.7 To ensure both emissions reduction and climate change adaptation are fully considered it is proposed that the ES chapter is split into two sections for clarity on likely effects.

Preliminary Baseline Conditions

- 13.8 Data on greenhouse gas (GHG) emissions is available from the National Atmospheric Emissions Inventory. As this data presents information on GHG emissions at a local authority scale, it cannot be related directly to the assessment of emissions associated with the Proposed Development. It does, however, provide useful context with respect to the key current sources of GHG emissions in the surrounding area. The Proposed Development is located within the administrative boundary of North Kesteven District Council, with the exemption of the Grid connection which lies wholly within Boston Borough Council. As such, the assessment will provide a breakdown of available GHG emissions from sectors relevant to the Proposed Development within these two administrative areas.
- 13.9 The baseline for direct and indirect CO₂ emissions will also consider the current site use, including existing carbon stock and/or release of GHG emissions. If available, the baseline for direct emissions associated with transportation will reflect the existing use of the site and immediate surrounds of the area.

- 13.10 The effects of a changing climate on the Proposed Development will largely be assessed in relation to the site as defined by the site boundary and its immediate surroundings.

- 13.11 The assessment for climate change adaptation will use future baseline weather conditions in the final decade of the Proposed Development's life-cycle (40 years), as it is considered appropriate to undertake the assessment based on the full construction and operational phase timescales. As such, the assessment will ascertain whether these conditions would affect the Proposed Development or potentially alter other predicted impacts of the project. The UK Climate Projections (UKCP18)¹⁵ highlight key changes in weather conditions that may affect the Proposed Development or exacerbate other predicted impacts if not considered as part of the project design and elsewhere in the ES:

- Summers will become hotter and drier;
- Winters will become milder and wetter;
- Soils will become drier on average;
- Snowfall and the number of very cold days will decrease; and
- Storms, heavy and extreme rainfall days (rainfall greater than 25mm) and heatwaves will become more frequent.

- 13.12 If necessary, sea level rise and storm surges will also be considered, using the relevant UKCP18 data.

15 Met Office (2021) UK Climate Change Projections 18 Key Results <https://www.metoffice.gov.uk/research/approach/collaboration/ukcp/ukcp18-project-news/index>

Likely Significant Effects

Emissions Reduction

- 13.13 The generation of GHG emissions during construction will be inevitable. Embodied GHG emissions will also be generated during the production of the solar panels and associated infrastructure. However, these emissions will be offset during the early operational years of the Development, which will have an overall net positive significant effect on emissions reduction. The Development is for the installation of around 500MW of solar electricity generation and approximately 200-400MWh of energy storage, and as such would be one of the largest solar schemes in the UK. Such a development would lead to a significant reduction in CO₂ released from the generation of electricity from fossil fuel sources, with the creation of an energy storage facility enabling the renewably generated electricity to be released on to the Grid when it is required.
- 13.14 Alongside the installation of the renewable energy the land will be removed from intensive agriculture. Currently, to retain the fertility of the soil for arable farming, chemical fertilisers are applied to the land. The production of fertilisers is energy intensive and commonly involves the combustion of fossil fuels. In addition to this, the application of fertiliser generates nitrous oxide (NO_x) which is a GHG. NO_x has a far greater global warming potential than CO₂ [265 times more by weight as CO₂]. Use of these fertilisers will discontinue for a 40 year period, which will also result in the land reaching organic status when returned to arable crop production after decommissioning.

- 13.15 During the operational lifetime, it is intended that a low-density flock of sheep will graze the site. There is also a considerable area of the site that is to be used for ecological enhancements and habitat creation. It is expected that these measures will also have a positive effect in terms of carbon sequestration and storage.

Climate Adaptation

- 13.16 The IEMA Guidance (2020) states that there are two key elements to assessing climate change adaptation in EIA:
- Project resilience: described as “the risks of changes in the climate to the project (i.e. the resilience or conversely the vulnerability of a project to future climate changes).”
 - In-combination effects: described as “the extent to which climate exacerbates or ameliorates the effects of the project on the environment.”
- 13.17 Adopting a precautionary approach, prior to detailed consideration of proposed mitigation measures, both are scoped in for further assessment at this stage (as detailed further below under ‘Assessment Methodology’).

Assessment Methodology

Legislation, guidance and policy

- 13.18 In addition to the IEMA guidance the following legislation, guidance and policy will be referred to:
- The Paris Agreement 2015;
 - The Glasgow Climate Pact 2021;
 - The UK Climate Change Act 2008;
 - The Carbon Budgets Order 2009;
 - Overarching National Policy Statement for Energy (EN-1);
 - Draft National Policy Statement for Renewable Energy Infrastructure (EN-3);
 - National Policy Statement for Electricity Networks Infrastructure (EN-5);
 - National Planning Policy Framework 2021;
 - The Building Regulations Approved Document Part L, Current Requirements: Part L 2013 Incorporating 2016 Amendments;
 - National Planning Practice Guidance 2019;
 - The Central Lincolnshire Local Plan 2012-2036 (Adopted 2017);
 - The Central Lincolnshire Local Plan Review; and,
 - North Kesteven District Council's Climate Emergency Strategy and Action Plan 2020.

Emissions Reduction

- 13.19 The approach to the assessment will be best practice and in accordance with IEMA Guidance (2017). The guidance presents a series of principles developed by IEMA, stating that all GHG emissions are arguably significant and contribute to climate change, with combined effects bringing

us closer to the scientifically defined environmental limit for climate change.

- 13.20 The assessment will consider the emissions of the Proposed Development based on a full life-cycle GHG assessment and ways in which these emissions can be reduced. This covers all direct GHG emissions arising from activities undertaken on the site during the construction, operation and maintenance, and decommissioning of the Proposed Development, as well as indirect emissions embedded within the construction materials arising as a result of the energy used for their production, and emissions arising from the transportation of materials, waste and construction workers.
- 13.21 The emissions reduction assessment will be a quantified assessment where possible. The global climate will be the direct receptor. Direct impacts upon the global climate will have subsequent effects on global ecosystems and the species which they support.
- 13.22 The approach to the assessment will consider the full life-cycle of the Proposed Development and potential sources of GHG emissions. GHG emissions offset through the production of lower carbon electricity compared to grid average emissions during the operational phase will be accounted for within the GHG emissions calculations.
- 13.23 Baseline and full life-cycle GHG emissions will be quantified using a calculation-based methodology aligned with the GHG Protocol¹⁶.

¹⁶ World Business Council for Sustainable Development and World Resources Institute (2001) The GHG Protocol, A Corporate Accounting and Reporting Standard.

Significance of Effects

- 13.24 With respect to emissions reduction, there are no established thresholds for assessing the significance of the contribution an individual project can make towards climate change. However, section 6 of the IEMA Guidance (2017) states:
- “GHG emissions have a combined environmental effect that is approaching a scientifically defined environmental limit, as such any GHG emissions or reductions from a project might be considered to be significant.”***
- 13.25 Appendix C of the IEMA Guidance (2017) also refers to the following principles:
- “Where GHG emissions cannot be avoided, the EIA should aim to reduce residual significance of a project’s emissions at all stages.”***
- “Where GHG emissions remain significant but cannot be farther reduced... approaches to compensate the project’s remaining emissions should be considered.”***
- 13.26 The significance of likely effects (including beneficial effects) will therefore be determined by using baseline road traffic data and with reference to stated commitments to reasonable and deliverable measures to reduce emissions in accordance with established thresholds and/or other benchmarks for performance, including relevant policy and guidance.
- 13.27 In line with IEMA Guidance (2017), mitigation will be considered as early as possible in accordance with the hierarchy for managing project related GHG emissions: (1) Avoid, (2) Reduce, (3) Substitute and (4) Compensate.

Climate Change Adaptation

- 13.28 The approach will reflect IEMA Guidance (2020). The guidance presents a framework for the consideration of climate change resilience and adaptation in EIA.
- 13.29 This Guidance states that there are two key elements to assessing climate change adaptation in EIA:
- Project resilience: described as “the risks of changes in the climate to the project (i.e. the resilience or conversely the vulnerability of a project to future climate changes.”
 - In-combination effects: described as “the extent to which climate exacerbates or ameliorates the effects of the project on the environment.”
- 13.30 Consistent with the guidance, the approach will describe future climate scenarios that will be developed through the use of the UKCP18 high emissions scenario (RCP8.5 - Representative Concentration Pathways) for the final decade of the Proposed Development’s operational life (40 years), which will be utilised for the future baseline. The projected change in the range of climatic conditions will be the 50% and 90% probability as per the IEMA Guidance (2020) which considers this RCP to provide a suitably conservative approach. This RCP will be used to indicate the projected temperature, and precipitation in the administrative region of the East Midlands which encompasses the Proposed Development and study area.
- 13.31 For in combination effects, the assessment will consider the effects on receptors under the current conditions and the future proposed climate conditions. It will include receptors from other technical topics that are likely to be affected by the

changes in annual mean temperatures and annual changes in summer and winter precipitation. In particular, the assessment will identify whether the potential impacts of the Proposed Development will be better or worse under the future baseline, altering the vulnerability of receptors and the identified significance of effects.

Significance of Effects

13.32 As there is no legislative definition of 'significance', the conclusion as to whether an effect is significant and its magnitude comes down to professional judgement, reflecting the determination of magnitude and sensitivity. For project resilience, significance should reflect the aims/purpose of the project. For example, as an energy project such as this has the purpose of providing electricity supply, an impact which temporarily removes this supply should be considered potentially significant. For in-combination climate impacts, this judgement should be guided by the significance criteria established for the individual topic areas.

13.33 The receptor in terms of project resilience to climate change will be the Proposed Development itself and land within the area as defined by the site boundary.

Topics Potentially Scoped in for Further Assessment

13.34 Project resilience is scoped in for further assessment as projected climate change has the potential to impact on the project's ability to supply electricity.

13.35 For in-combination effects, each environmental topic chapter's respective effects and corresponding mitigation measures will be considered as part of the assessment. Environmental topic chapters will consider the future proposed climate

conditions; however these changes will be more relevant to receptors identified in some topic chapters than others. The assessment of in-combination effects in the ES will include proportionate discussion on the potential for significant effects on identified receptors and justify the topic chapters which have been scoped out of the assessment.

13.36 At this stage, it is not possible to say conclusively which topics will be scoped into the assessment as there is insufficient data available on likely effects. However, the following topics may require further consideration. Scoping is intended to act as an iterative process so will continue as the assessment work progresses.

13.37 Landscape and Visual Amenity: Implications of changes in average temperatures, precipitation and extreme weather events will be given further consideration for landscape character, including any proposed planting associated with the Proposed Development.

13.38 Cultural Heritage: consideration will be given as to whether changes in temperature and rainfall patterns could affect above and below ground heritage assets. For example, waterlogged archaeological sites are susceptible to changes and fluctuations within the water table.

13.39 Flooding and Drainage: consideration of climate change will form an integral part of the assessment of flood risk and will be cross-referenced in this assessment. Decreased rainfall could also lead to seasonal and prolonged drying out of watercourses which may affect groundwater recharge and aquatic ecology.

13.40 Ecology: increased rainfall and flooding events, coupled with rising temperatures, may modify UK flora and fauna over time, with shifts in species' ranges. Natural England's 'Climate Change Risk Assessment and Adaptation Plan' sets out the risks and threats posed by current climate change projections. In association with the RSPB, Natural England has also published a Climate Change Adaptation Manual which details the potential effects of climate change on different habitat types.

Topics Potentially Scoped out for Further Assessment

13.41 At this stage, it is anticipated that the following topics will not require further consideration. Scoping is intended to act as an iterative process, however, so will continue as the assessment work progresses.

13.42 Air Quality: An increase in winter rainfall and/or in heavy rain days could lead to a possible decrease in relevant pollutant concentrations, with a decrease in summer rainfall leading to a possible increase in concentrations. Overall, however, at this stage, it is not anticipated that air quality conditions at the Site will fail to meet relevant air quality objectives as a consequence of projected climate change.

13.43 Noise: As a result of higher temperatures, any building services equipment that provides cooling for components of the Proposed Development will be required to operate at a higher intensity and for longer periods in the future, resulting in increased noise emissions. However, at this stage, this is not considered likely to increase the significance of overall noise emissions associated with the development.

13.44 Transport and Access: Increased rainfall/storms have the potential to lead to traffic disruption during flooding episodes. Increased summer temperatures may cause some disruption and discomfort, although this is unlikely to be a significant concern, particularly for the operational phase of the development.

13.45 Ground Conditions: The projected increase in rainfall/possible storm events has the potential to result in the mobilisation of ground contaminants when the soil is saturated leading to potential consequences for human health or water quality. During the projected warmer and drier summers, there is potential for soil to become airborne leading to impacts on air quality and human health. However, as the site is not considered to be contaminated, it is likely that this topic can be scoped out of the climate change adaptation assessment.

13.46 Socio-Economics and Human Health: Recent flooding events in the UK highlighted the extent to which economic activity and human welfare can be affected by flooding from increased rainfall. Temperatures are also likely to increase, which may lead to overheating concerns, particularly during construction. However, at this stage, it is considered that this topic can be scoped out of the climate change adaptation assessment.

Significance Criteria

- 13.47 The process for determining significance for this Development has been defined in the earlier in this section for Climate Change.

Assessment of Cumulative Effects

- 13.48 With respect to emissions reduction, climate change is, in essence, a cumulative effect and all GHG emissions from projects are arguably significant to the receptor (the global climate). All developments which will be included in the cumulative assessment are likely to involve the generation of direct, indirect and embodied greenhouse gas emissions during construction and further emissions during operation. It is not possible to compare the level of these emissions against a 'baseline' of those associated with the previous use of the sites, or any existing developments which would be replaced by the new developments. However, it is considered appropriate to assume that all developments will be required to meet relevant standards for emissions reduction and to comply with related planning policy. On this basis, it is considered appropriate to assume that any applications that are consented include 'reasonable' measures to avoid, reduce and/or offset the generation of GHG emissions and therefore that no significant cumulative effects will be anticipated.

- 13.49 Climate change adaptation is largely a project specific consideration, namely the resilience of the project in question to climate change and the extent to which projected climate change could alter the predicted impact judgements. Project resilience is not likely to be affected by the presence of other developments and therefore will be scoped out of the cumulative assessment. In relation to the other ES technical assessments and possible interactions with other developments, potential cumulative 'in combination climate impacts' will be given further consideration as the assessment work progresses.

14. TRANSPORT & ACCESS

Introduction

- 14.1 The Transport and Access chapter of the EIA will be prepared with reference to the Institute of Environmental Assessment (IEMA) 'Guidelines for the Environmental Assessment of Road Traffic', as appropriate.
- 14.2 This section of the Scoping Report sets out the proposed methodology for the assessment of the proposed development against transportation matters. In particular, the methodology would consider the potential effects of the proposed development on the local highway network.

Relevant Policy and Guidance

- 14.3 The transport impact of the proposed development will be considered with reference to local and national guidance and policy contained in the NPS and draft NPS, National Planning Practice Guidance (NPPG), National Planning Policy Framework (NPPF), IEMA Guidelines for the Environmental Assessment of Road Traffic, the Design Manual for Roads and Bridges and the 4th Lincolnshire Local Transport Plan (2013), as appropriate.



FIGURE 14 – INDICATIVE TRAFFIC LINK LOCATIONS

Preliminary Baseline Conditions

- 14.4 At this stage, it is proposed that Annual Average Daily Traffic (AADT) will be assessed at three links along the A17. Automatic Traffic Count (ATC) surveys will be carried out to provide the baseline traffic flows at each link. It is not considered necessary to extend the assessment to the B1395 or Six Hundreds Drove, given that both the construction and operational access is proposed direct from the A17. It is therefore anticipated that there will be no traffic impact in these locations. The proposed link extents are indicatively shown previously at Figure 14.
- 14.5 Given the temporary nature of the construction traffic, it is considered appropriate to consider this against the baseline survey year, which is anticipated to be in 2022. A future year of 2027 is proposed for the consideration of operational traffic, on the basis that all construction activities at the site will be complete. Subject to the highway authority's views, we will write separately in due course to agree an appropriate Trip End Model Presentation Program] (TEMPro) growth rate.

Likely Significant Effects

- 14.6 Access to the Energy Park is proposed via a new priority junction with the A17, in the position of the previously consented wind farm access. This new access point has not yet been built. This access will be used for both construction and operational purposes of the Energy Park. Whilst this access is being constructed, temporary access is proposed via an existing vehicular access with the A17 which currently provides access to land adjacent to Elm Grange Studios. Access via this route will cease once the main access is completed.
- 14.7 Access will also be required for construction of the new Grid cable route. This route has not yet been determined, but the ES will consider the access routes the construction team will need to take to complete the necessary works for laying of the cable. The Application will also need construction and operational access to the Bicker Fen substation to install and maintain the new equipment at this existing substation. There is already access to this substation and it is being determined with National Grid if it is possible to continue to use this existing access track.
- 14.8 The proposals will also be supported by a draft Construction Traffic Management Plan (CTMP). This will summarise the traffic movements anticipated throughout the construction period and the associated mitigation measures to be agreed with the highway authority at LCC. A scope for the draft CTMP will be agreed with LCC in due course.

- 14.9 Operational traffic will be minimal. There will be a need for regular maintenance checks for the electrical equipment and energy storage facility on the Energy Park. There will also be those involved in the maintenance of the ecological enhancement areas and the shepherd with his flock for grazing the site. The number of vehicles needed for the operational phases is not known at this time, but they are expected to be no more than a few vehicle movements each day.
- 14.10 The traffic for the decommissioning period is expected to be similar to the movement numbers in construction. However, the decommissioning period is expected to around 6-12 months, so less than the construction phase (estimated to be 18mths).
- 14.11 The minimal traffic movements for the operation of the Development would not lead to an increase in traffic number of 30% which is a threshold IEMA uses to determine if an impact has the potential to be significant (see below in methodology). It is therefore proposed to scope out the operational transport requirements of the Development from the Environmental Assessment as there is little likelihood that these will form a significant environmental effect.

Assessment Methodology

- 14.12 IEMA rules will be applied to define the threshold impacts for development traffic which will inform the scale and extent of the transport chapter work. On this basis, links where the traffic flows are expected to increase by more than 30%, or where HGV flows are expected to increase by more than 30% as a result of the proposed development will be considered. Links in proximity to sensitive receptors, where traffic flows are expected to increase by more than 10% as a result of the proposed development will also be considered. Sites that are considered to be sensitive receptors with reference to IEMA are Conservation Areas, schools, health facilities, community facilities and congested junctions. Any sensitive receptors will be agreed with the highway authority at LCC in due course.
- 14.13 Where the predicted increase in traffic and HGV flow is lower than these thresholds then the significance of the effects can be considered to be low or not significant, then it is considered that detailed assessment is not required.
- 14.14 The transport chapter would provide an assessment of the predicted impact on the local highway network by using pre-defined significance criteria set out within the IEMA guidance. Those criteria will be based on the net change in journeys as a result of construction and operational traffic values and any mitigation to be delivered as part of the proposals. The significance criteria would establish the magnitude of any beneficial or adverse effects the proposed development will have on the transport network.

- 14.15 Liaison will take place with highway officers at the highway authority as appropriate.
- 14.16 In summary, with reference to the IEMA guidance, it will consider the forecast impacts of the proposed Development on the following throughout the construction phase of the development:
- driver severance and delay.
 - accidents and safety.
 - hazardous and dangerous loads; and
 - dust and dirt
- 14.17 Given that there are anticipated to be limited pedestrians within the vicinity of the site (noting the absence of footway provision on the northern side of the A17), it is not considered necessary to consider the impacts of the development on:
- pedestrian severance;
 - pedestrian delay.
 - pedestrian amenity; and
 - fear / intimidation.
- 14.18 The residual impacts of the scheme, taking into account any proposed mitigation would then be assessed and confirmed. Other impacts including noise and vibration will be considered by other disciplines throughout the EIA.

Preliminary discussions of mitigation and enhancement measures

- 14.19 With regards to the completed and operational Proposed Development, many mitigation measures are embedded into the design of the scheme. If further likely significant effects are determined, where possible, mitigation measures will be proposed so that residual effects are not significant

Significance Criteria

- 14.20 The process for determining significance for this Development would follow the criteria outlined in Section 6 of this Scoping Request.

Assessment of Cumulative Effects

- 14.21 Discussions are in the early stages with the two Local Planning Authorities and the County Council Highway team to determine what sites they wish to see in any cumulative assessment for construction traffic.
- 14.22 At this time, it is proposed to include all those sites which are listed in Section 6 of this Scoping Report. If further sites are requested by the Highways Department at the County Council, they will also be included within the cumulative assessment.

15. AIR QUALITY

Introduction

15.1 An Air Quality Assessment will be undertaken by the Applicant's air quality consultants, Hoare Lea, to determine the likely significant air quality effects as a result of the Proposed Development and assess their significance. The proposed method of assessment for identifying likely significant environmental effects associated with construction, operation and decommissioning phases of the Proposed Development is described in this chapter. The Air Quality Assessment will address impacts from the EIA Assessment Area as a whole. The results of the assessment will be presented in the ES and relevant mitigation measures considered to address any adverse significant effects and to minimise harm to nearby receptors. The residual effects will be assessed and presented in the ES.

Preliminary Baseline Conditions

Local Air Quality Monitoring

15.2 The EIA Assessment Area is located approximately 11.3 km west of its nearest Air Quality Management Area (AQMA), 'Haven Bridge AQMA' which is located in Boston Borough Council's (BBC) administrative area and which has been declared for exceedances of the annual mean nitrogen dioxide (NO₂) air quality objective (AQO).

15.3 The EIA Assessment Area is partly located within North Kesteven District Council's (NKDC) administrative area and partly within BBC's. The EIA Assessment Area is also located in close proximity to the administrative areas of East Lindley District Council (ELDC), South Kesteven District Council (SKDC) and South Holland District Council (SHDC).

15.4 Automatic monitoring is currently undertaken by SHDC, but not by NKDC, SKDC or BBC. Monitoring data for ELDC is currently unavailable and as such the number of monitoring sites that are in operation is unknown at this stage.

15.5 SHDC operate two automatic monitoring stations within its administrative area, the closest of which is CM1 which is located 16.2 km away from the EIA Assessment Area, respectively. Recent monitoring data from 2015 to 2020 for automatic monitoring station CM1 and a visual representation of the location of the automatic monitoring station is shown in Figure 15.

15.6 The pollutant concentrations recorded in 2020 are not considered to be representative of "normal" air quality conditions. Whilst it is expected that as a result of the COVID-19 pandemic behaviours will change in the future, the impact of this on air quality long-term is currently unknown and therefore the use of 2020 data will be omitted from any analysis, but has been included for information.

TABLE 15.1: AUTOMATIC MONITORING DATA

Automatic Monitoring Station and Distance (km) from EIA Assessment Area (approx.)	Objective	2015	2016	2017	2018	2019	2020
NO₂							
CM1 (SHDC), Spalding	Annual mean (µg/m ³)	10.5	12.7	10.8	9.4	9.3	8.5
Monkhouse School, 16.2 km, Urban Background	Number of hours with concentrations >200 µg/m ³	0	0	0	0	0	0
PM₁₀							
CM1 (SHDC), Spalding	Annual mean (µg/m ³)	15.4	13.5	11.8	13.1	13.7	10.8
Monkhouse School, 16.2 km, Urban Background	Number of days with concentrations > 50 µg/m ³	1	2	0	1	0	0

- 15.7 Further to this, a wide network of diffusion tubes is utilised by NKDC, SKDC, BBC and SHDC to monitor annual mean NO₂ concentrations across their administrative areas.
- 15.8 There are no diffusion tubes located in the immediate vicinity of the EIA Assessment Area, however there are two diffusion tubes located between approximately 2.5km and 4.5 km distant, with one situated in NKDC's administrative area and the other in SHDC's provides the latest annual mean NO₂ concentrations at the nearest diffusion tube locations to the EIA Assessment Area for the years 2019 and 2020. The locations of the diffusion tubes are illustrated in Figure 15.

FIGURE 15 DIFFUSION TUBE LOCATIONS AND AUTOMATIC MONITORING STATIONS IN THE VICINITY OF THE EIA AREA. CONTAINS OS DATA © CROWN COPYRIGHT AND DATABASE RIGHTS 2021

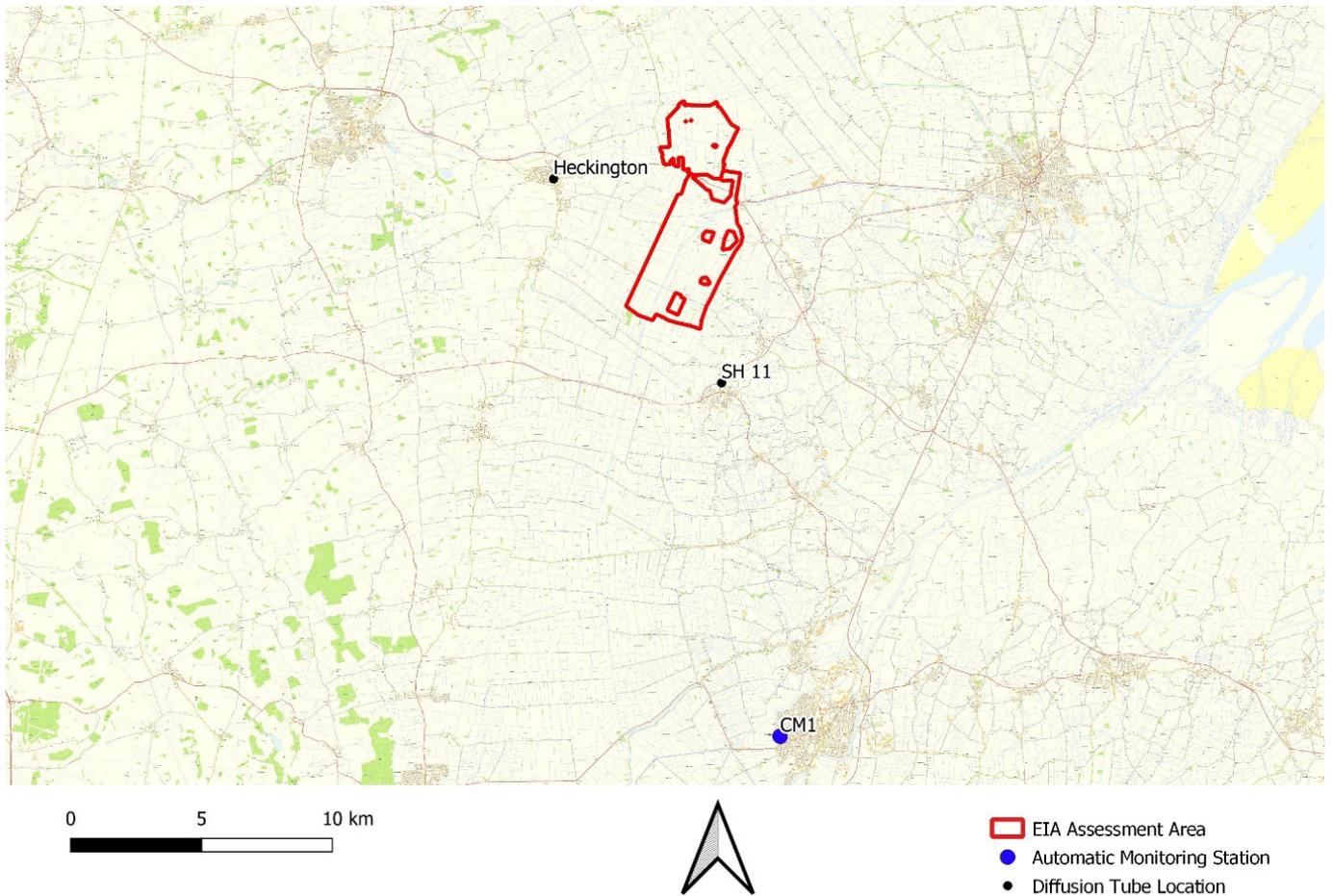


TABLE 15.2: DIFFUSION TUBE DATA

Diffusion Tube ID	Diffusion Tube Name	Site Type	Distance from EIA Assessment Area	2019	2020
Heckington (NKDC)	Heckington	Kerbside	4.3	17.3	14.6
SH 11 (SHDC)	A52 Donington	Roadside	2.5	15.5	-

15.9 As noted above, monitoring data for 2020 has been included for information only. There have been no exceedances of the annual mean NO₂ objective of 40 µg/m³ at either diffusion tube near in 2019, which is the only year with available monitoring data at these locations. The location with the highest concentration in 2019 was Heckington, located at the intersection between B1394 Station Road and B1394 Boston Road, monitoring 17.3 µg/m³ or 43% of the annual mean objective. As such it is considered likely that no exceedances of the annual mean objective will be experienced in the vicinity of the EIA Assessment Area.

15.10 The 1-hour mean AQO for NO₂ is 200 µg/m³ and should not be exceeded more than 18 times within a year under the AQMA. In line with Local Air Quality Management Technical Guidance (LAQM.TG(16))¹⁷, exceedances of the 1-hour mean NO₂ objective are unlikely to occur where the annual mean concentration is below 60 µg/m³. Concentrations at nearby diffusion tubes shown show that the 1-hour mean NO₂ objective is unlikely to be exceeded at these locations.

Defra Predicted Concentrations

15.11 The background concentrations have been obtained from the national maps published by Defra¹⁸. These estimated concentrations are produced on a 1km by 1km grid basis for the whole of the UK. The EIA Assessment Area falls into 36 grid squares. Predicted concentrations for these grid squares for NO₂, PM₁₀ and PM_{2.5} are provided in Table 15.3 for 2021.

TABLE 15.3 ESTIMATED ANNUAL MEAN BACKGROUND CONCENTRATIONS IN 2021 IN µg/m³

Year	Background		
	NO ₂	PM ₁₀	PM _{2.5}
2022	6.4–7.6	15.2–16.0	8.2–8.7

15.12 It can be seen that the modelled background NO₂ concentrations are below the objective levels for NO₂, PM₁₀ and PM_{2.5} in 2022.

Baseline Surveys

15.13 An air quality monitoring survey is proposed to gain a better understanding of NO₂ concentrations in the vicinity of the EIA Assessment Area. Monitoring will be undertaken using diffusion tubes in triplicate (i.e. three tubes in each location) for a period of six months in line with the Defra Diffusion Tube Calendar. The data collected would be used to inform model verification if dispersion modelling is required. Monitoring locations will be informed by likely construction vehicle routing and discussed and agreed with Environmental Health Officers at both BBC and NKDC prior to commencement.

¹⁷ Defra (2021) Local Air Quality Management Technical Guidance (TG16) – [online] (Last accessed: 03/12/2021), Available at: <https://laqm.defra.gov.uk/documents/LAQM-TG16-April-21-v1.pdf>

¹⁸ Defra (2018) Background Pollution Maps – [online], (Last accessed: 03/12/2021), Available: <http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html>

Likely Significant Effects

Construction and Decommissioning Phase Emissions

- 15.14 During the construction and decommissioning phases of the Proposed Development, there is potential for air quality impacts associated with road traffic emissions from construction vehicles.
- 15.15 The impacts of the decommissioning phase are often similar to, or of a lesser magnitude than the concentrations generated during the construction phase. Therefore, decommissioning will not be assessed separately.

Operational Phase Emissions

- 15.16 Limited effects may occur in the operational stage of this development from the movement of vehicles over the site for maintenance.

Issues Proposed to be Scoped Out

- 15.17 The following aspects are proposed to be scoped out of the air quality ES Chapter as they are expected to have no likely significant effects:
- Impacts to air quality at sensitive human and ecological receptors due to fugitive dust emission during the construction phase as mitigation is expected to be inherent. A construction dust risk assessment will be undertaken to inform appropriate mitigation and appended to the outline Construction Environmental Management Plan (oCEMP) as detailed below;
 - Impacts to air quality at sensitive human and ecological receptors from non-road mobile machinery (NRMM) as emissions of NO_x and PM₁₀ will be required to adhere to emissions standards, therefore the effects of construction plant on local air quality would be insignificant; and
 - Impacts to air quality at sensitive human and ecological receptors from the operational phase of the Proposed Development as traffic flows are expected to be minimal and no combustion plant will be present on site.

¹⁹ DECC (2011) Overarching National Policy Statement for Energy [online] (Last accessed: 03/12/2021), Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf

Assessment Methodology

Legislation and Guidance

- 15.18 The Air Quality Assessment will be undertaken in line with the following legislation and guidance documents:
- National Policy Statement (NPS) EN-1 (2011)¹⁹ and draft NPS (2021)²⁰;
 - National Policy Statement (NPS) EN-3 (2011)²¹ and draft NPS EN-3 (2021) ²² ;
 - The National Planning Policy Framework (NPPF) 2021²³;
 - Planning Practice Guidance (PPG)²⁴;
 - Institute of Air Quality Management (IAQM) Guidance on the Assessment of Dust from Demolition and Construction²⁵;
 - Environmental Protection UK (EPUK), and IAQM Land-Use Planning & Development Control: Planning for Air Quality ²⁶;
 - Defra Local Air Quality Management Technical Guidance (LAQM.TG(16))¹⁶ ;
 - Central Lincolnshire Local Plan (2017)²⁷; and
 - South East Lincolnshire Local Plan (2019)²⁸.

19 DECC (2011) Overarching National Policy Statement for Energy [online] [Last accessed: 03/12/2021], Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf

20 Department for Business, Energy and Industrial Strategy (2020) Draft Overarching National Policy Statement for Energy - [online] [Last accessed: 03/12/2021], Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015233/en-1-draft-for-consultation.pdf

21 DECC (2011) National Policy Statement for Renewable Energy Infrastructure [online] [Last accessed: 03/12/2021], Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/37048/1940-nps-renewable-energy-en3.pdf

22 Department for Business, Energy and Industrial Strategy (2020) - [online] [Last accessed: 03/12/2021], Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015236/en-3-draft-for-consultation.pdf

23 Ministry of Housing, Communities & Local Government (2021) National Planning Policy Framework, Department for Communities and Local Governments, London

24 Ministry of Housing, Communities & Local Government (2019) Planning Practice Guidance, London

25 Institute of Air Quality Management (2016) Guidance on the assessment of dust from demolition and construction v1.1 – [online], [Last accessed: 03/12/2021], Available at: iaqm.co.uk/text/guidance/construction-dust-2014.pdf

26 Environmental Protection UK and Institute of Air Quality Management (2017), Land-Use Planning & Development Control: Planning For Air Quality v1.2 – [online] [Last accessed: 03/12/2021], Available at: iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf

27 Central Lincolnshire (2017) Central Lincolnshire Local Plan – [online] [Last accessed: 03/12/2021], Available at: <https://www.n-kesteven.gov.uk/EasySiteWeb/GatewayLink.aspx?allId=54815>

28 South East Lincolnshire (2019) South East Lincolnshire Local Plan – [online] [Last accessed: 03/12/2021], Available at: [REDACTED]

Study Area

- 15.19 The study area will cover a wide zone of influence (i.e. 5km from the EIA Assessment Area). The diffusion tube monitoring and detailed dispersion modelling that are proposed to be undertaken for the construction phase, if required, will be included within this zone.

Potential Sensitive Receptors

- 15.20 IAQM guidance advises the need for a construction dust assessment if there are human receptors within 50m of the boundary of the site, or within 50m of construction vehicle trackout routes, and if there are ecological receptors within 50m of the site boundary or the trackout routes. There are sensitive human receptors within 50m of the site boundary and within 50m of the potential construction vehicle routes, however, there are no ecological sites within the 50m distance of the site or trackout routes.
- 15.21 The impacts from road emissions during the construction phase at sensitive human receptors along construction routes will be considered where the change in traffic flows exceed the relevant EPUK/IAQM criteria. At this stage it is not considered likely that there will be any sensitive ecological receptors within 200m of any roads affected by construction traffic. This will be confirmed with Transport Consultants and Ecologists for the Proposed Development.
- 15.22 The sensitive receptors that will be considered in the Air Quality Assessment include the existing sensitive receptors in the vicinity of the EIA Assessment Area and potential construction routes, including residential properties and schools

Potential Effects

Construction and Decommissioning Dust

- 15.23 The works being undertaken during the construction phase include earthworks, construction and trackout. It is anticipated that dust and particulate matter emissions produced during construction phase activities would be inherently controlled through the implementation of an outline Construction Environmental Management Plan (oCEMP). Therefore, the effects of dust and particulate matter emissions released during the construction phase of the Proposed Development from on-site activities are unlikely to be considered significant and have been scoped out of the ES.

Construction and Decommissioning Traffic

- 15.24 Construction traffic generation is unknown at this time, but subject to traffic generation this may require modelling in order to assess its impacts.
- 15.25 If the change in flow exceeds the criteria in the EPUK and IAQM guidance document 'Land Use Planning and Development Control: Planning for Air Quality' (January 2017), i.e. greater than 100 Heavy Duty Vehicles (HDVs) as an annual average daily traffic (AADT) (outside of an AQMA), then the impact of the traffic on existing receptors will be assessed quantitatively.
- 15.26 If required, dispersion modelling will be used to predict concentrations of NO₂, PM₁₀ and PM_{2.5} at sensitive receptors adjacent to roads affected by the Proposed Development. Modelling will be carried out following Government guidance and using an appropriate model ('ADMS-roads'). Dispersion modelling calculations will be

verified using data gathered in the baseline air quality survey and Local Authority monitoring stations, where appropriate.

- 15.27 Model predicted concentrations would be compared to the current statutory standards and objectives. The air quality impact at existing sensitive human and ecological receptors will be described using terms outlined in the EPUK/IAQM guidance. These terms are derived from the percentage change in concentration relative to the air quality assessment level and with the total long-term average concentration during the construction of the Proposed Development. The EPUK/IAQM impact descriptors are Substantial, Moderate, Slight and Negligible.
- 15.28 Appointed transport consultants for the Proposed Development will provide construction traffic data. If construction traffic flows do not exceed the above criteria, impacts will be scoped out of the assessment, however this will be determined when data becomes available and agreed with the Environmental Health Officer at the Local Planning Authority.

Significance Criteria

Construction and Decommissioning Phases

- 15.29 The significance of effects at sensitive receptors will be described as Major, Moderate, Minor or Negligible. The assessment of likely significant effects to sensitive receptors will consider the sensitivity of the receptor and the magnitude of change to determine its significance, on a scale of large or high, medium, small or low and negligible. Professional judgement is used throughout this process.

Assessment of Cumulative Effects

- 15.30 Discussions are in the early stages with the two Local Planning Authorities Environmental Health teams to determine what sites they wish to see in any cumulative assessment for air quality impacts due to construction traffic, if dispersion modelling is required.
- 15.31 At this time, it is proposed to include all those sites listed in Section 6 of this Scoping Report that will be operational at the peak construction year. If further sites are required by the Environmental Health Teams of the Local Councils, they will also be included within the cumulative assessment.

16. LAND USE AND AGRICULTURE

Introduction

16.1 This topic considers the potential effects of the Proposed Development on agricultural land and businesses. In particular the topic considers the agricultural land quality of the area, and the extent to which land quality and soil resources will be affected.

Preliminary Baseline Conditions

16.2 Agricultural land can be graded according to its inherent limitations for agricultural use. Grade 1 is excellent quality and Grade 5 is very poor quality. Grade 3 is divided into subgrades 3a “good” and 3b “moderate” quality land. Grades 1, 2 and 3a are defined as the “best and most versatile” in the NPPF.

16.3 The Proposed Development site is shown on the published “provisional” Agricultural Land Classification (ALC) maps, published in the 1970’s, as a mixture of Grade 1 “excellent” and Grade 2 “very good” quality.

16.4 Natural England published a strategic map showing predictive likelihood of Best and Most Versatile land (BMV) for the region in 2017. The Development site is shown on the predictive maps as mostly in the “high likelihood of BMV (>60% area BMV)”, as is all the land surrounding.

16.5 Land on the eastern edge of Heckington has been graded in the past as Grades 2 and subgrade 3a, but no survey data was available for this site.

16.6 In order to inform the assessment, we have carried out an Agricultural Land Classification survey. Given the size of the Development site the survey has been carried out at a semi-detailed scale. This has involved 138 auger locations on a regular 200 metre grid across the site.

The Development site is 586ha in size. No auger measurements were taken for the EIA area where the cable route to Bicker Fen will be laid. This was not included as the cable will be laid via underground trenching/moling and so there will be no loss of agricultural land.

16.7 In addition, the farming circumstances of the farm businesses involved will be investigated via interview and site survey as appropriate.

Likely Significant Effects

16.8 The Energy Park has the potential to affect the agricultural land quality of the site. This could result in the temporary loss of the arable use of the agricultural land of BMV or lower quality (operational life is 40 years) on the Energy Park. The Energy Park site will be farmed during the operational lifetime as sheep grazing. This could be mitigated by careful construction methodologies, including during the decommissioning stage. This will be considered within the assessment. There will be no long-term effects on the land used for the laying of the Grid cable to Bicker Fen as after the trench is dug and cable laid it will return to its current land use.

16.9 The proposed Development has the potential for adverse and beneficial economic impacts for the businesses affected, and this will be considered and assessed.

Assessment Methodology

16.10 The assessment will consider the agricultural land quality of the site, and the extent to which the proposed Development will affect the inherent land quality. It will consider the method of construction and the impact this would have on soil

qualities. It will consider the potential for removal of the panels and therefore the reversibility of the impact, and it will consider the extent to which agricultural use can continue during the life of the proposed development.

16.11 The potential loss of agricultural land will be considered by reference to the guidance in the NPPF (2021), The Town and Country Planning (Development Management Procedure) (England) Order 2015, Planning Practice Guidance, the Local Plan, and the draft NPS.

16.12 Implications of solar farm developments on agricultural land are considered further in draft NPS EN-3 and the national Planning Practice Guidance (PPG): Renewable and Low Carbon Energy, June 2015. Paragraph 013²⁹ of this guidance sets out a number of factors that should be considered by the Local Planning Authority (LPA) in the determination of a planning application for large-scale solar farms. The second bullet of which states that:

“where a proposal involves greenfield land, whether (i) the proposed use of any agricultural land has been shown to be necessary and poorer quality land has been used in preference to higher quality land; and (ii) the proposal allows for continued agricultural use where applicable and/or encourages biodiversity improvements around arrays. See also a speech by the Minister for Energy and Climate Change, the Rt Hon Gregory Barker MP, to the solar PV industry on 25 April 2013³⁰ and written ministerial statement on solar energy: protecting the local and global environment made on 25 March 2015.”³¹

16.13 Draft EN-3, at paragraph 2.48.13, however recognises that “land type should not be a predominating factor in determining the suitability of the site location.”

16.14 This Energy Park is utilising an area of over 586ha of agricultural land. Of this 490ha is currently proposed to be used for energy generation and the remaining area to be used for ecological enhancements. Of this 490ha, for the energy generation, 51% of the site is Grade 3b land or below and therefore considered to be poorer quality land. The remaining 49% of the area for energy generation is a combination of Grade 3a (124.36ha), Grade 2 (54.22ha) and Grade 1 (33.1ha) land which is considered Best and Most Versatile (BMV).

16.15 As a result, the ES will include a site search exercise that will consider other areas of land within a similar connection distance to the National Grid Bicker Fen substation, which are of a similar size to the Energy Park (490ha) and are not BMV land. Such a site search will help to demonstrate that the Energy Park site is not an unreasonable site for an Energy Park development when considering the constraint of agricultural land grade.

16.16 Such a site search exercise will show the acceptability of the Energy Park site for compliance with this draft NPS. The site search will be prepared and will accompany the DCO application.

16.17 There is no set methodology for such a site search exercise to determine acceptability against the PPG or draft NPS. However, many solar farm applications have completed such a site search, which have been considered by Local Planning Authorities and PINS and deemed compliant when determining ground mounted solar farm application.

29 NPPG: Renewable and Low Carbon Energy, Paragraph 013, reference ID: 5-013-20150327 (as at 27/03/2015)

30 Speech by the Minister for Energy and Climate Change: www.gov.uk/government/speeches/gregory-barker-speech-to-the-large-scale-solar-conference

31 Written Ministerial Statement on Solar Energy: Protecting the local and global environment: [REDACTED]

16.18 It is proposed that the constraints to be applied to the site search exercise for Agricultural Land Classification are as follows:

- Site must be within 8km from the National Grid Bicker Fen substation. The Heckington Fen Development site is proposing to connect into the Bicker Fen substation and new underground Grid cabling of approximately 8km will be required to make this connection. There is known grid capacity at this substation and for a development of this size there would not be capacity at a lower grid connection for example, 132kV or 33kV;
- Aspect of the land facing south-east through to south west;
- None of the alternative sites are to be allocated under the Local Plans for other purposes, such as residential;
- 100m buffer from residential development, 10m buffer to other existing buildings, 10m buffer for roads either side and 10m buffer from railway lines either side;
- No Ecological designations on the site – such as SSSI, SAC, SPA, NNR, LNR, Ancient Woodlands, Woodland, RSPB Reserves or Ramsar;
- Landscape and Heritage Assets such as Conservation Areas, Green Belt, AONB, World Heritage Sites, Schedule Monuments, Listed Buildings, Battlefields, Open Access and Registered Common Land, Country Parks and Registered Parks and Gardens are to be avoided;
- Agricultural Land Classification – sites that are low Grade (Grade 3b, 4 and 5 or Previously Developed). As this Energy Park site has Grade 2 within it Grade 3a

land/sites will also be considered;

- Similar Area of land (490ha) to allow for a similar size scheme of development; and
- Sites within Flood Zone 2 and 3 land.

Significance Criteria

- 16.19 Land of “best and most versatile” quality is considered to be a receptor of high sensitivity. Whilst Natural England estimate that BMV land accounts for 42% of farmland in England³², such that this is not a rare resource, it is nevertheless identified as a resource worthy of protection. Land of subgrade 3b, 4 and 5 is considered to be a resource of moderate/medium sensitivity.
- 16.20 Full-time farm businesses are considered to be a resource of moderate/medium sensitivity. Farms can normally adapt to change brought about by a raft of different factors, and accordingly are not highly sensitive to change. Part-time farm businesses are considered to be of low sensitivity. Consultation with LCC and their members has identified concerns about the loss of agricultural land for developments. This consultation has requested that the economic effects the loss of the agricultural element of the land (from arable to low intensity grazing) is considered.
- 16.21 In terms of magnitude of impacts, for this assessment it is proposed that the loss of more than 50 ha of BMV land will be considered to be a large/major magnitude, losses of 20-50 ha are of moderate/medium magnitude and losses of less than 20 ha to be of low magnitude. This magnitude criteria is set by Natural England advice that within the Local Authority planning system they only seek

³² Natural England Technical Information Note 049, 2012

to be consulted on planning application where 20+ha of agricultural land is to be lost through a change of use. Below 20ha (even if the land is BMV) Natural England do not require to be consulted.

Assessment of Cumulative Effects

- 16.22 Consideration will be given to the cumulative sites that are identified in Section 6 of this Scoping Report and any additional ground mounted solar sites, within a 5km area that have entered the planning system by the time this application is submitted. Consideration will not be given to other forms of development that may be removing 20ha or more of BMV agricultural land for their development.
- 16.23 Sites which come forward which are smaller than 20ha will not be included within the cumulative assessment as a development of this size would not normally be considered for its impact for loss of agricultural land within the UK planning system as Natural England do not require to be consulted on areas of agricultural land less than 20ha (regardless of agricultural grade).

17. GLINT AND GLARE

Introduction

- 17.1 A glint and glare assessment will be undertaken to assess the likely impact of solar reflection on receptors within the Development's surrounding environment.
- 17.2 Glint and glare in this context is the effect of reflected sunlight causing harm or discomfort to a sensitive receptor. A glint can be defined as the momentary receipt of a bridge of light and a glare can be defined as the receipt of a bright light over an extended or continuous period of time .

Preliminary Baseline Conditions

- 17.3 There are currently no solar PV modules in the vicinity of the proposed Development, and therefore no glint and glare effects associated with them. Other reflection effects occur from windows, glasshouses, car windscreens and water bodies, including the sea.

Likely Significant Effects

Relevant Legislation Guidelines and Policy

- 17.4 Glint and glare assessments are sometimes required to accompany planning applications for solar developments, depending on the determining planning authority's judgement for their need. There are no guidelines setting out a particular methodological approach.
- 17.5 The draft NPS EN-3 states in Section 2.52: ***"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..."***

17.6 There is no evidence that glint and glare for solar farms interferes in any way with aviation navigation or pilot and aircraft visibility or safety. Therefore, the Secretary of State is unlikely to give any weight to claims of aviation interference as a result of glint and glare from solar farms."

17.7 A geometric assessment will be undertaken to identify the potential for solar reflections to impact on sensitive receptors such as properties and vehicles moving along the road network. The assessment is proposed to be limited to ground based receptors and will exclude aviation receptors. The nearest active airfield is Boston Aerodrome which is 14km to the east. At this distance significant glint and glare impacts are extremely unlikely which is supported by the sentiment of the draft EN-3.

Assessment Methodology

- 17.8 The proposed assessment methodology will adhere to the following sequence:
- 1. Identify the receptors of concern;***
 - 2. Choose appropriate receptor locations based on the above;***
 - 3. Define the proposed solar park area and choose an appropriate assessment resolution;***
 - 4. Undertake geometric calculations to determine whether a solar reflection may occur, and if so, when it will occur;***
 - 5. If a reflection can occur, determine whether the reflecting panels will be visible from the identified receptor location. If the panels are not visible from the location then no reflection can occur;***
 - 6. If it calculated that a reflection will occur, consider the location of the solar reflection with respect to the location***

of the sun in the sky, its angle above the horizontal and the time of day the reflection could occur;

7. Consider both the solar reflection from the proposed solar park and the location of the direct sunlight with the respect of the receptor's position;

8. Consider the solar reflection with respect to the published studies; and

9. Determine whether the solar reflection is likely to be a significant nuisance or a hazard to safety;

10. Propose mitigation in the event that a significant impact is identified.

Significance Criteria

- 17.9 The process for determining significance for this Development would follow the criteria outlined in Section 6 of this Scoping Request.

Assessment of Cumulative Effects

- 17.10 Discussions are in the early stages with the two Local Planning Authority' (NKDC & BBC)s Environmental Health teams to determine what sites they wish to see in any cumulative assessment for operational glint and glare.
- 17.11 At this time, it is proposed to include all the sites which are listed in Section 6 of this Scoping Report. If further sites are requested by the Environmental Health Teams of the Local Councils, they will also be included within the cumulative assessment.

18. MISCELLANEOUS ISSUES

Introduction

18.1 This chapter will consider minor topics that can be grouped into a single chapter to ensure that they are considered in the EIA process, but at this time their effects are expected to not be significant, or they can be resolved with a technical design mitigation so they will not result in a significant residual effect. The topics that are to be included within the chapter are:

- Electric, Magnetic and Electromagnetic Fields;
- Telecommunications, Television Reception and Utilities; and
- Waste

Preliminary Baseline Conditions

Electric, Magnetic and Electromagnetic Fields

18.2 Power frequency electric magnetic and electromagnetic fields (EMFs) arise from generation, transmission, distribution and use electricity and occur around power lines and electricity cables and around domestic, office or industrial equipment that uses electricity. Electric fields are the result of voltages applied to electrical conductors and equipment. Fences, scrubs and buildings can block electric fields. Magnetic fields are produced by the flow of current, however, most materials do not readily block magnetic fields. The intensity of both electric fields and magnetic fields diminishes with increasing distance from the source.

18.3 Electric fields depend on the operating voltage of the equipment. Magnetic fields depend on the electrical currents flowing and are not significantly limited by most common materials. Typically, ground level

magnetic fields from underground cables fall much more rapidly with distance than those from a corresponding overhead line but can be higher at small distances from the cable.

Telecommunications, Television Reception and Utilities

18.4 Solar parks have the potential to affect the existing utility infrastructure below ground. To identify any existing infrastructure constraints, both consultation and desk-based studies will be undertaken. Consultation with the relevant telecommunication and utility providers is a routine part of the solar development and consultees will include water, gas and electricity utilities providers and telecommunications providers as appropriate.

18.5 There is a known high pressure gas pipeline that runs through a section of the site. This is shown on Figure 3: Initial Indicative Site Layout.

Waste

18.6 At this stage the exact quantities and types of waste likely to be generated during the construction and decommissioning stages are not known. However, it is expected that the waste streams will include:

- Welfare facility waste;
- Waste chemicals, fuels and oil;
- Waste metal;
- Waste water from dewatering and excavations;
- Waste water from cleaning activities (e.g. wheel wash);
- Packaging; and
- General construction waste (e.g. paper, cardboard wood etc)

Likely Significant Effects

Electric, Magnetic and Electromagnetic Fields

- 18.7 The Department for Business, Energy and Industrial Strategy (BEIS) guidance states that 'overhead power lines at voltage up to and including 132kV, underground cables at voltages up to and including 132kV and substations at and beyond the publicly accessible perimeter' are not capable of exceeding the International Commission on Non-Ionizing Radiation Protection (ICNIRP) exposure guidelines and therefore no assessment is required for these and other type of infrastructure listed on the Energy Networks Association website .
- 18.8 Therefore, the scope of the assessment of EMFs in the ES will be limited to the operational impact/consideration of any cables associated with the Development which exceed 132kV. The only part of the development likely to exceed this voltage is the underground export cables between the onsite substation and the existing National Grid Bicker Fen substation which will likely be an underground 400kV cable.

Telecommunications, Television Reception and Utilities

- 18.9 18.3.3 AA occur if the utilities on the Energy Park site were not correctly mapped and therefore the piled foundations broke any of the underground infrastructure that could be crossing the Site. Once this information is known through consultation and the appropriate mapping of these constraints for any layout design, the risk of a significant effect will be removed.

Waste

- 18.10 Creation of any waste in the construction and decommissioning phases of the development will need to be removed from the Development site and disposed of correctly and according to lawful requirements at that time. If items can be recycled this will be the first-choice option for the Development.
- 18.11 The Transport and Access Chapter of the ES will consider the transport movements of the waste created by the Development.
- 18.12 Given that the operators receiving the waste materials resulting from the Development will be subject to their own regulating procedures, there is no requirement for further consideration of waste to be undertaken, beyond the volume of traffic generated during the construction phase resulting from its transportation.

Assessment Methodology

Electric, Magnetic and Electromagnetic Fields

- 18.13 There is no direct statutory provision in the planning system relating to protection from EMFs. Guidance published in 2012 by the then Department for Energy and Climate Change (DECC) (which became part of the Department for Business, Energy & Industrial Strategy in July 2016) suggests that guidelines for both public and occupational exposure published by the (ICNIRP) in 1998 should be taken into account .

Telecommunications, Television Reception and Utilities

- 18.14 Consultation will be made with the relevant utility companies to determine the infrastructure that crosses the site. This information will be used to inform the layout design.

Waste

- 18.15 A Site Waste Management Plan (SWMP) will be created before the scheme is constructed and then decommissioned. It is anticipated that this detail will be secured via DCO requirement and would not be included within the ES due to the parameter outline of the EIA process rather than an assessment against a detailed design.

Significance Criteria

- 18.16 The process for determining significance for the Miscellaneous topics would follow the criteria outlined in Section 6 of this Scoping Request.

Assessment of Cumulative Effects

- 18.17 It is not expected that there will be any cumulative effects for any of these Miscellaneous topics. However, the cumulative sites that have been listed in Section 6 of this Scoping Report will be considered as well as any more that have entered the planning system before planning submission and are deemed necessary for inclusion.

Waste

- 18.18 Consultation with the Planning Inspectorate (PINS) in December 2021 raised the need to include waste within the cumulative assessment. Discussions highlighted a wish for the waste streams from the cumulative solar farm sites, if being built out and decommissioned at the same time, to be considered within the ES.
- 18.19 It is the Applicant's intention that at decommissioning, if technically possible, the components of the solar panels should be recycled. Currently there is not the national demand for solar panel recycling on a commercial scale and so investment has not been in developing a UK based recycling facility for solar panels. The technology for solar panel recycling is still at the research and design stage. Industry predictions are that the demand and design will have progressed by 2030, so that a UK based solar panel recycling plant should be operational.
- 18.20 Such cumulative waste stream options will be considered at the decommissioning phase and would be outlined in the decommissioning plan that would be required via DCO requirement. An assessment of this phase at this stage would not offer a realistic conclusion of the significance of the waste/recycling stream for this development and will therefore be scoped out of this assessment.

19. SUMMARY & CONCLUSIONS

- 19.1 A summary chapter will be included at the end of the ES, providing a synopsis of the findings of the EIA. This will include, as discussed with PINS in the pre-planning consultation, a summary of the cumulative impacts from this Development.
- 19.2 A statement outlining the relevant experience and competence of the experts who have undertaken the assessment and prepared the technical chapters within the ES will also be included.
- 19.3 A non-technical summary of the findings will also be prepared, as required by the EIA Regulations.
- 19.4 This Scoping Report represents notification under Regulation 8(1)(b) of the EIA Regulations that the applicant will undertake an EIA in respect of the Scheme and produce an ES to report the findings of the EIA.
- 19.5 It also represents a formal application to PINS under Regulation 10 of the EIA Regulations for a 'Scoping Opinion' as to the information to be provided within the ES that will form part of the DCO application. The report has identified the environmental effects that are considered to have the potential to be significant and proposes the approach to be used in assessment that will be undertaken for the EIA to characterise and understand the significance of these effects. The prescribed consultees are invited to consider the contents of this report and comment accordingly with the statutory 42 day time period.
- 19.6 For clarification, Table 19.1 presents a summary of the proposed scope of the technical topics as well as which elements of these topics that are proposed to be scoped out and the rationale behind this decision.

TABLE 19.1: SUMMARY OF PROPOSED SCOPE OF TECHNICAL TOPICS

Environmental Topic	Proposed Scope of Assessment	Element Proposed to be Scoped Out of Assessment	Rationale for Scoping Out
Landscape & Visual	Assessment of likely effects on landscape features and character (including night time), and views and visual amenity during construction, operation and decommissioning. Photomontages from key viewpoints will be prepared in year 1 and 15 of operation.	Lighting Assessment for Construction, Operation and Decommissioning	Any lighting during the construction phase would be temporary and lighting during operation would be limited to doorway and emergency lighting at the onsite substation to ensure 24/7 safe access in needed.
Ecology & Ornithology	<p>The EclA will include consideration of designated sites and protected and/or notable habitats and species. Effects considered include habitat loss, disturbance and indirect impacts such as water course pollution during construction.</p> <p>Operational effects include disturbance during maintenance and management of the new habitat areas. Phase 1 ecology surveys are being undertaken and further surveys will be undertaken for the whole of the Development site.</p>	None	N/A
Hydrology, Hydrogeology, Flood Risk & Drainage	<p>Hydrological modelling of the Energy Park site will be completed to determine the surface water flood levels. Consultation with LLFA, IDB and Environment Agency (EA) will be completed to ensure the design of the Energy Park is compliant with flood risk and drainage needs. Coastal and Surface Water flooding will be considered in all phases of the Development.</p> <p>Flooding will be considered in all phases of the Development.</p>	None	N/A

Environmental Topic	Proposed Scope of Assessment	Element Proposed to be Scoped Out of Assessment	Rationale for Scoping Out
Cultural Heritage	<p>It is proposed to undertake an assessment of impact on both the physical effects on heritage assets (on the Energy Park site) and effects on the setting including changes to visual intrusion, noise, severance, access and amenity.</p> <p>Archaeological assessment work is proposed to take place as geophysical survey on the Energy Park site. Any further physical survey assessment work will be determined following consultation with Historic England and Lincolnshire County Archaeologist. The assessment area for determining assets to be considered will be 5km from the EIA Area.</p>	No pre-determination physical assessment of the land to be used for the Cable Route to connect to National Grid Bicker Fen substation.	Any effects due to the trenching work and cable laying to below ground assets would be minimal and can effectively be mitigated through a watching brief. Such an approach has been deemed acceptable for other DCO Energy Schemes such as Cleve Hill Solar Farm and Little Crow Solar Farm.
Socio Economics	Assessment of effects including temporary employment during construction and decommissioning, creation of long-term employment opportunities during the operational phase and change of land use and improved permissive access to the Energy Park site through footpath and Community Orchard.	None	N/A
Noise & Vibration	<p>Baseline noise monitoring data from the 2011 noise survey will be undertaken at locations representative of surrounding noise sensitive receptors.</p> <p>An assessment of operational plant noise will be undertaken.</p>	<p>Noise Assessment for the construction process and construction traffic.</p> <p>Noise Assessment for vehicles linked to the Operational Phase of the Energy Park including the Grid Connection.</p> <p>Ground-borne vibration from the construction, operation and decommissioning of the scheme.</p>	<p>Noise from the construction process and traffic movements can be effectively controlled via DCO requirements and good operating practices.</p> <p>Traffic movements to the Development will be minimal and unlikely to lead to any significant effect.</p> <p>No major vibration sources are envisaged to be introduced as part of the Development and as such there will be no associated vibration effects.</p>

Environmental Topic	Proposed Scope of Assessment	Element Proposed to be Scoped Out of Assessment	Rationale for Scoping Out
Climate Change	Assessment will consider the effects from emissions reductions and climate change adaptation from the Development.	<p>Alterations in air quality conditions as a consequence of climate change.</p> <p>Increases in noise from cooling equipment due to higher temperatures.</p> <p>Increases in rainfall which could lead to a flooding episodes on the Development Site which in turn effect delivery options.</p> <p>Airborne particulates from soil increasing through changes in climate factors.</p> <p>Effects of higher temperatures in summer months on the construction teams and the need for climate change adaptation.</p>	<p>Rainfall may increase in winter and decrease in summer. However, it is not expected that air quality condition will fail to meet relevant objectives.</p> <p>Unlikely that an increase in the operating hours or intensity of any cooling equipment would lead to a significant effect on overall noise conditions</p> <p>Flooding implications of the development are to be assessed in the Hydrology, Hydrogeology, Flood Risk and Drainage section of the ES.</p> <p>The effects on Human Health are already to be assessed in Air Quality and Noise Chapters of the ES and there is no evidence of existing soil contamination that could effect health through becoming airborne.</p> <p>Temperatures may become higher in the summer months for construction works but appropriate guidelines for the protection of the workers on the Development Site would remove any significant effect.</p>
Transport & Access	<p>Construction vehicle movements associated with the Development will be established and assessed in terms of impact on the local highway network. This will include an assessment of the impact on driver severance, driver delay, accidents & safety, hazardous & dangerous loads and dirt and dust.</p> <p>Criteria/requirements for the above assessment will be considered and discussed with the Local Highway Authority given the temporary construction impacts.</p>	<p>Within the construction phase the assessment will not consider the impact on pedestrian severance, pedestrian delay, pedestrian amenity and fear/intimidation.</p> <p>Operational vehicle movements due to low numbers of vehicles.</p> <p>Assessment for the decommissioning phase due to uncertainties in relation to future traffic flows and transport infrastructure.</p>	<p>There is no footpath provision on the northern side of the A17 at the Energy Park access, therefore there will be limited pedestrians within the vicinity of the Energy Park site.</p> <p>Operational vehicle movements will be scoped out due to low vehicle numbers.</p> <p>Decommissioning will be scoped out due to uncertainties in relation to future traffic flows and transport.</p>
Air Quality	Qualitative dust assessment to identify measures to be included within an outline CTMP. Suitable mitigation measures for construction and decommissioning plant and motorised equipment to be included within the outline CTMP.	<p>Impacts to air quality at sensitive human and ecological receptors from construction and decommissioning process.</p> <p>Impacts to air quality at sensitive human and ecological receptors from non-road mobile machinery.</p> <p>Impacts to air quality at sensitive human and ecological receptors from the operational phase of the Development.</p>	<p>Any dust or emissions particles that are released as part of the construction of the decommissioning process would be dealt with by an outline CTMP.</p> <p>Emissions of NO_x and PM₁₀ will be required to adhere to emissions standards and therefore effects on local air quality would be insignificant.</p> <p>Traffic flows are expected to be minimal, and no combustion plant will be present on the Development site.</p>

Environmental Topic	Proposed Scope of Assessment	Element Proposed to be Scoped Out of Assessment	Rationale for Scoping Out
Land Use & Agriculture	An Agricultural Land Classification survey of the Energy Park site has determined that it includes BMV land. A site search will be applied to consider other sites within a similar distance to the National Grid Bicker Fen substation of a lower agricultural land grade (3a-5), but with the potential to generate a comparable level of renewable energy generation.	No ALC survey will be undertaken on land where the new Grid cable is to be laid.	Once the cable is laid the land will return to its current use and so there will be no loss or alteration to land use.
Glint & Glare	An assessment will be undertaken to identify the potential for solar reflections to impact on sensitive receptors for both orientation options to inform design development.	Aviation Facilities	Draft NPS EN-3 states that there is no evidence that glint and glare effects aviation interests.
Waste	Description of the potential streams of waste of construction and decommissioning phases and estimated volumes.	No consideration of the waste from the site once it has been passed to waste operators.	Waste operators are subject to their own regulating procedures.
Telecommunications	To identify any existing telecoms infrastructure constraints, operators will be consulted and a desk-based assessment will be completed.	Operational and Decommissioning Phases	Once these services have been correctly mapped any piled foundations would avoid breaking any of the underground infrastructure. Later phases would not have this risk attached to them.
Electric, Magnetic & Electromagnetic	Survey to determine the electric fields of new cables laid with an operating voltage of 132kV or above.	No cables less than 132kV during construction and decommissioning phases.	Effects are no found for lower voltage cables and would not be present when the cables are not operating.

19.7 There are further environmental topics that are proposed to be scoped out of the ES. Some of these topics have been defined by the possible factors outlined in Schedule 4 (4) of the EIA Regulations. They are summarised below in Table 19.2.

TABLE 19.2: SUMMARY OF TECHNICAL TOPICS ‘SCOPED OUT’ OF ES

Environmental Topic	Rationale for ‘Scoping Out’ of the ES
Major Accidents and Disasters	<p>As the design of the Development evolves in preparation for the DCO application, it will become clear that there are no real risks or serious possibilities of a Major Accident or Disaster event interacting with the Development. There are various health and safety considerations particularly for workers during construction and decommissioning of the Development. Workers are in the closest proximity to the Development and as a result are considered to be the most at-risk group. Comprehensive health and safety assessments are an essential part of the construction process and would be carried out prior to construction by the contractor in accordance with legislation.</p> <p>The construction of the Development would be managed in accordance with the Health and Safety at Work Act 1974 and would comply with all other relevant Health and Safety Regulations, including:</p> <ul style="list-style-type: none"> • The Construction (Health, Safety and Welfare) Regulations, 1996: • Construction (Design and Management) Regulations 2015; and • Electricity Safety, Quality and Continuity Regulations, 2002. <p>The Development would operate to Health and Safety Executive ‘Health and safety in the new energy economy: Meeting the challenge of major change” published in August 2010.</p> <p>The risk of a major accident from surface water flooding or coastal defence breach will also be mitigated through design and appropriate management strategies for the Energy Park site during construction, operation and decommissioning.</p> <p>There are three main battery storage options currently used within the industry. These are Li-ion, LIP/LEP (Lithium-Ion Phosphate) and Flow Storage technologies.</p> <ul style="list-style-type: none"> • Li-ion is an established technology that has been used in mobile phones/laptops and electric vehicles for many decades and can be scaled up to utilise it for storage on a Site such as this. The battery cells are housed in purpose-made containers, which include an extremely efficient and intelligent management system as well as state of the art cooling and fire suppression systems. • The systems can detect the off-gases predating the thermal runaway event and shut down the malfunctioning cell/rack safely. The sensors used to do this are sensitive down to 1pmm (parts per million) • Lithium-Ion Phosphate as a technology has a higher thermal runaway temperature threshold and hence, improved battery safety. • Flow Storage uses electrolyte in an aqueous form which is inherently safe and non-flammable. Flow batteries are housed in similar purpose-made containers with slightly different management and support systems but ultimately functioning in the same as the Li-ion batteries. <p>There is a potential fire risk associated with certain types of batteries such as lithium ion, which is reduced by cooling systems designed to regulate temperatures to within safe parameters.</p> <p>The battery manufacturers undertake extensive testing and analysis to assess fire risk, from which the following recommendations are made:</p>

Environmental Topic	Rationale for 'Scoping Out' of the ES
	<ul style="list-style-type: none"> • Do not install batteries where temperatures routinely approach or exceed 80°C – this would not occur at the Energy Park Site; • Do not install batteries near heating equipment or heat sources – this would not occur at the Energy Park Site; • Protect the installation area from flooding – it is likely that this will be done on the Energy Park Site with the introduction of mitigations which would prevent or reduce the flow of water across the Energy Park Site; and • Ensure that installation areas comply with the appropriate local fire, electrical and building code requirements – this would be case with the Energy Park Site. <p>Systems such as multi-spectrum infrared flame detectors and suppression features would be installed to detect and suppress fire to minimise the effect of any fire. The Energy Park design will include adequate separation between battery stations to ensure that an isolated fire would not become widespread and lead to a major incident.</p> <p>The risk of fire is small and therefore not likely to lead to any major accidents or disasters as this has been mitigated by the design of the equipment and the design of the Energy Park site.</p> <p>Once the system is commissioned, regardless of the technology used, the whole installation will report to and be monitored continuously by a central Operations and Maintenance Centre where engineers and technology experts will ensure that it is operating optimally and safely 24 hours a day, 7 days a week.</p> <p>It is therefore proposed that this will be scoped out of the ES.</p>
Soil	<p>There is no history of soil contamination on the Development site nor have activities taken place that would be a high risk to unknown soil contamination as the Energy Park site has always been in agricultural land use. Therefore, there is no reason to expect any form of land contamination of the Energy Park site. The land grade and soil structure of the Energy Park will be considered and contained within the Land Use and Agricultural Chapter of the ES.</p>
Material Assets	<p>It is not considered that there are any further 'material assets' to those already addressed within the other EIA topics.</p>
Human Health	<p>The possible effect on human health will be considered within the ES but not within its own standalone chapter. It will be considered within the Noise and Air Quality Assessments and therefore the scope of effects on Human Health have been shaped by their assessment criteria and scope of works.</p>

20. GLOSSARY

AADT	Annual Average Daily Traffic	ELDC	East Lindley District Council
AC	alternating current	EMF	electromagnetic fields
ALC	Agricultural Land Classification	EN1	Overarching National Policy Statement for Energy
AOD	above ordnance datum	EN3	National Policy Statement for Renewable Energy
AQMA	Air Quality Management Area	EN5	National Policy Statement for Electricity Networks Infrastructure
AQO	Air quality objective	EPUK	Environmental Protection UK
ATC	Automatic Traffic Count	ES	Environmental Statement
BAP	Biodiversity Action Plan	FoI	Freedom of Information
BBC	Boston Borough Council	GHG	greenhouse gases
BEIS	The Department of Business, Energy and Industrial Strategy	GIS	Geographic Information System
BGS	British Geological Survey	Ha	hectare
BMV	Best and Most Versatile	HDV	Heavy Duty Vehicles
BNG	Biodiversity Net Gain	HER	Historic Environment Record
CCTV	close circuit television	IAQM	Institute of Air Quality Management
CEMP	Construction Environmental Management Plan	ICNIRP	International Commission on Non-Ionizing Radiation Protection
CIEEM	Chartered Institute of Ecology and Environmental Management	IDB	Internal Drainage Board
CIfA	Chartered Institute for Archaeologists	IEF	Important Ecological Features
CLJSPC	Central Lincolnshire Joint Strategic Planning Committee	IEMA	Institute of Environmental Management and Assessment
CO2	Carbon dioxide	IPC	Now the Planning Inspectorate
CTMP	Construction Traffic Management Plan	LCA	Landscape Character Area
DBA	Desk-Based Assessment	LCC	Lincolnshire County Council
DC	direct current	LEMP	Landscape and Ecological Management Plan
DCO	Development Consent Order	LERC	Lincolnshire Environmental Records Centre
DECC	Department for Energy and Climate Change	LIP/LEP	Lithium-Ion Phosphate
EA	Environment Agency	LLFA	Lead Local Flood Authority
ECoW	Ecological Clerk of Works	LNR	Local Nature Reserve
EIA	Environmental Impact Assessment		

LOAEL	Lowest Observed Adverse Effect Level	SNCI	Site of Nature Conservation Interest
LPA	Local Planning Authority	SOAEL	Significant Observed Adverse Effect Level
LWS	Local Wildlife Site	SPA	Special Protection Area
LVIA	Landscape and Visual Impact Assessment	SPZ	Source Protection Zones
mblg	metres below ground level	SSSI	Site of Special Scientific Interest
MOD	Ministry of Defence	SWMP	Site Waste Management Plan
N2O	nitrous oxide	SZTV	Screened Zone of Theoretical Influence
NERC	Natural Environment and Rural Communities Act	TEMPro	Trip End Model Presentation Program
NGET	National Grid Electricity Transmission	UKCP18	UK Climate Projections 2018
NHLE	National Heritage List for England	W	watts
NKDC	North Kesteven District Council	WCA	Wildlife and Countryside Act
NNR	National Nature Reserve	ZTV	Zone of Theoretical Influence
NOx	nitrogen oxide	µm	micrometre
NPPF	National Planning Policy Framework		
NPPG	National Planning Policy Guidance		
NPS	National Policy Statement		
NRMM	non-road mobile machinery		
NSIP	Nationally Significant Infrastructure Project		
oCEMP	Outline Construction Environmental Management Plan		
MW	Megawatt		
PM	particulate matter		
PPG	Planning Practice Guidance		
PROW	Public right of way		
PV	Photovoltaic		
RCP	Representative Concentration Pathways		
RVAA	Residential Visual Amenity Assessment		
SAC	Special Area of Conservation		
SHDC	South Holland District Council		
SKDC	South Kesteven District Council		



APPENDIX A:

**SAMPLE LANDSCAPE AND VISUAL IMPACT
ASSESSMENT METHODOLOGY**

1. LANDSCAPE AND VISUAL IMPACT ASSESSMENT METHODOLOGY

1.1 This Landscape and Visual Impact Assessment (LVIA) has been undertaken with regards to best practice as outlined within the following publications:

- Guidelines for Landscape and Visual Impact Assessment (3rd Edition, 2013) - Landscape Institute / Institute of Environmental Management and Assessment;
- Visual Representation of Development Proposals (2019) - Landscape Institute Technical Guidance Note 06/19;
- An Approach to Landscape Character Assessment (2014) - Natural England;
- An Approach to Landscape Sensitivity Assessment - To Inform Spatial Planning and Land Management (2019) - Natural England.

1.2 GLVIA3 states within paragraph 1.1 that "Landscape and Visual Impact Assessment (LVIA) is a tool used to identify and assess the significance of and the effects of change resulting from development on both the landscape as an environmental resource in its own right and on people's views and visual amenity." ¹

1.3 GLVIA3 also states within paragraph 1.17 that when identifying landscape and visual effects there is a "need for an approach that is in proportion to the scale of the project that is being assessed and the nature of the likely effects. Judgement needs to be exercised at all stages in terms of the scale of investigation that is appropriate and proportional." ²

1.4 GLVIA3 recognises within paragraph 2.23 that "professional judgement is a very important part of LVIA. While there is some scope for quantitative measurement of some relatively objective matters much of the assessment must rely on qualitative judgements" ³ undertaken by a landscape consultant or a Chartered Member of the Landscape Institute (CMLI).

1.5 GLVIA3 notes in paragraph 1.3 that "LVIA may be carried out either formally, as part of an Environmental Impact Assessment (EIA), or informally, as a contribution to the 'appraisal' of development proposals and planning applications." ⁴

¹ Para 1.1, Page 4, GLVIA, 3rd Edition

² Para 1.17, Page 9, GLVIA, 3rd Edition

³ Para 2.23, Page 21, GLVIA, 3rd Edition

⁴ Para 1.3, Page 4, GLVIA, 3rd Edition

1.6 The effects on cultural heritage and ecology are not considered within this LVIA.

Study Area

1.7 The study area for this LVIA covers a 5km radius from the site. However, the main focus of the assessment was taken as a radius of 1km from the site as it is considered that even with clear visibility the proposals would not be readily perceptible in the landscape beyond this distance.

Effects Assessed

1.8 Landscape and visual effects are assessed through professional judgements on the sensitivity of landscape elements, character and visual receptors combined with the predicted magnitude of change arising from the proposals. The landscape and visual effects have been assessed in the following sections:

- Effects on landscape elements;
- Effects on landscape character; and
- Effects on visual amenity.

1.9 Sensitivity is defined in GLVIA3 as “a term applied to specific receptors, combining judgments of susceptibility of the receptor to a specific type of change or development proposed and the value related to that receptor.”⁵ Various factors in relation to the value and susceptibility of landscape elements, character, visual receptors or representative viewpoints are considered below and cross referenced to determine the overall sensitivity as shown in **Table 1**:

Table 1, Overall sensitivity of landscape and visual receptors				
	VALUE			
		HIGH	MEDIUM	LOW
SUSCEPTIBILITY	HIGH	High	High	Medium
	MEDIUM	High	Medium	Medium
	LOW	Medium	Medium	Low

⁵ Glossary, Page 158, GLVIA, 3rd Edition

1.10 Magnitude of change is defined in GLVIA3 as “a term that combines judgements about the size and scale of the effect, the extent over which it occurs, whether it is reversible or irreversible and whether it is short or long term in duration.”⁶ Various factors contribute to the magnitude of change on landscape elements, character, visual receptors and representative viewpoints.

1.11 The sensitivity of the landscape and visual receptor and the magnitude of change arising from the proposals are cross referenced in Table 11 to determine the overall degree of landscape and visual effects.

2. EFFECTS ON LANDSCAPE ELEMENTS

2.1 The effects on landscape elements are limited to within the site and includes the direct physical change to the fabric of the land, such as the removal of woodland, hedgerows or grassland to allow for the proposals.

Sensitivity of Landscape Elements

2.2 Sensitivity is determined by a combination of the value that is attached to a landscape element and the susceptibility of the landscape element to changes that would arise as a result of the proposals – see pages 88-90 of GLVIA3. Both value and susceptibility are assessed on a scale of high, medium or low.

2.3 The criteria for assessing the value of landscape elements and landscape character is shown in **Table 2:**

Table 2, Criteria for assessing the value of landscape elements and landscape character	
HIGH	<p>Designated landscape including but not limited to World Heritage Sites, National Parks, Areas of Outstanding Natural Beauty considered to be an important component of the country’s character experienced by a high number of people.</p> <p>Landscape condition is good and components are generally maintained to a high standard.</p> <p>In terms of seclusion, enclosure by land use, traffic and movement, light pollution and presence/absence of major infrastructure, the landscape has an elevated level of tranquillity.</p> <p>Rare or distinctive landscape elements and features are key components that contribute to the landscape character of the area.</p>

⁶ Glossary, Page 158, GLVIA, 3rd Edition

MEDIUM	<p>Undesignated landscape including urban fringe and rural countryside considered to be a distinctive component of the national or local landscape character.</p> <p>Landscape condition is fair and components are generally well maintained.</p> <p>In terms of seclusion, enclosure by land use, traffic and movement, light pollution and presence/absence of major infrastructure, the landscape has a moderate level of tranquillity.</p> <p>Rare or distinctive landscape elements and features are notable components that contribute to the character of the area.</p>
LOW	<p>Undesignated landscape including urban fringe and rural countryside considered to be of unremarkable character.</p> <p>Landscape condition may be poor and components poorly maintained or damaged.</p> <p>In terms of seclusion, enclosure by land use, traffic and movement, light pollution and presence/absence of major infrastructure, the landscape has limited levels of tranquillity.</p> <p>Rare or distinctive elements and features are not notable components that contribute to the landscape character of the area.</p>

2.4 The criteria for assessing the susceptibility of landscape elements and landscape character is shown in **Table 3**:

Table 3, Criteria for assessing landscape susceptibility	
HIGH	<p>Scale of enclosure – landscapes with a low capacity to accommodate the type of development being proposed owing to the interactions of topography, vegetation cover, built form, etc.</p> <p>Nature of land use – landscapes with no or little existing reference or context to the type of development being proposed.</p> <p>Nature of existing elements – landscapes with components that are not easily replaced or substituted (e.g. ancient woodland, mature trees, historic parkland, etc).</p> <p>Nature of existing features – landscapes where detracting features, major infrastructure or industry is not present or where present has a limited influence on landscape character.</p>
MEDIUM	<p>Scale of enclosure – landscapes with a medium capacity to accommodate the type of development being proposed owing to the interactions of topography, vegetation cover, built form, etc.</p>

	<p>Nature of land use – landscapes with some existing reference or context to the type of development being proposed.</p> <p>Nature of existing elements – landscapes with components that are easily replaced or substituted.</p> <p>Nature of existing features – landscapes where detracting features, major infrastructure or industry is present and has a noticeable influence on landscape character.</p>
LOW	<p>Scale of enclosure – landscapes with a high capacity to accommodate the type of development being proposed owing to the interactions of topography, vegetation cover, built form, etc.</p> <p>Nature of land use – landscapes with extensive existing reference or context to the type of development being proposed.</p> <p>Nature of existing features – landscapes where detracting features or major infrastructure is present and has a dominating influence on the landscape.</p>

2.5 Various factors in relation to the value and susceptibility of landscape elements are assessed and cross referenced to determine the overall sensitivity as shown in **Table 1**.

2.6 Sensitivity is defined in GLVIA3 as “a term applied to specific receptors, combining judgments of susceptibility of the receptor to a specific type of change or development proposed and the value related to that receptor.”⁷ The definitions for high, medium, low landscape sensitivity are shown in **Table 4**:

Table 4: Criteria for assessing landscape sensitivity	
HIGH	<p>Landscape element or character area defined as being of high value combined with a high or medium susceptibility to change.</p> <p>Landscape element or character area defined as being of medium value combined with a high susceptibility to change.</p>
MEDIUM	<p>Landscape element or character area defined as being of high value combined with a low susceptibility to change.</p> <p>Landscape element or character area defined as being of medium value combined with a medium or low susceptibility to change.</p> <p>Landscape element or character area defined as being of low value</p>

⁷ Glossary, Page 158, GLVIA, 3rd Edition

	combined with a high or medium susceptibility to change.
LOW	Landscape element or character area defined as being of low value combined with a low susceptibility to change.

Magnitude of Change on Landscape Elements

2.7 Professional judgement has been used to determine the magnitude of change on individual landscape elements within the site as shown in **Table 5**.

Table 5: Criteria for assessing magnitude of change for landscape elements	
HIGH	Total loss/gain of a landscape element.
MEDIUM	Partial loss/gain or alteration to part of a landscape element.
LOW	Minor loss/gain or alteration to part of a landscape element.
NEGLIGIBLE	No loss/gain or very limited alteration to part of a landscape element.

3. EFFECTS ON LANDSCAPE CHARACTER

3.1 Landscape character is defined as the “distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse.”⁸

3.2 The assessment of effects on landscape character considers how the introduction of new landscape elements physically alters the landform, landcover, landscape pattern and perceptual attributes of the site or how visibility of the proposals changes the way in which the landscape character is perceived.

⁸ Glossary, Page 157, GLVIA, 3rd Edition

Sensitivity of Landscape Character

- 3.3 Sensitivity is determined by a combination of the value that is attached to a landscape and the susceptibility of the landscape to changes that would arise as a result of the proposals – see pages 88-90 of GLVIA3. Both value and susceptibility are assessed on a scale of high, medium or low.
- 3.4 The criteria for assessing the value of landscape character is shown in **Table 2**.
- 3.5 The criteria for assessing the susceptibility of landscape character is shown in **Table 3**.
- 3.6 The overall sensitivity is determined through cross referencing the value and susceptibility of landscape character as shown in **Table 1**.

Magnitude of Change on Landscape Character

- 3.7 Professional judgement has been used to determine the magnitude of change on landscape character as shown in **Table 6**:

Table 6, Criteria for assessing magnitude of change on landscape character	
HIGH	Introduction of major new elements into the landscape or some major change to the scale, landform, landcover or pattern of the landscape.
MEDIUM	Introduction of some notable new elements into the landscape or some notable change to the scale, landform, landcover or pattern of the landscape.
LOW	Introduction of minor new elements into the landscape or some minor change to the scale, landform, landcover or pattern of the landscape.
NEGLIGIBLE	No notable or appreciable introduction of new elements into the landscape or change to the scale, landform, landcover or pattern of the landscape.

4. EFFECTS ON VISUAL AMENITY

- 4.1 Visual amenity is defined within GLVIA3 as the “overall pleasantness of the views people enjoy of their surroundings, which provides an attractive visual setting or

backdrop for the enjoyment of activities of the people living, working, recreating, visiting or travelling through an area.”⁹

- 4.2 The effects on visual amenity considers the changes in views arising from the proposals in relation to visual receptors including settlements, residential properties, transport routes, recreational facilities and attractions; and representative viewpoints or specific locations within the study area as agreed with the Local Planning Authority.

Sensitivity of Visual Receptors

- 4.3 Sensitivity is determined by a combination of the value that is attached to a view and the susceptibility of the visual receptor to changes in that view that would arise as a result of the proposals – see pages 113-114 of GLVIA3. Both value and susceptibility are assessed on a scale of high, medium or low.
- 4.4 The criteria for assessing the value of views are shown in **Table 7:**

Table 7, Criteria for assessing the value of views	
HIGH	Views with high scenic value within designated landscapes including but not limited to World Heritage Sites, National Parks, Areas of Outstanding Natural Beauty, etc. Likely to include key viewpoints on OS maps or reference within guidebooks, provision of facilities, presence of interpretation boards, etc.
MEDIUM	Views with moderate scenic value within undesignated landscape including urban fringe and rural countryside.
LOW	Views with unremarkable scenic value within undesignated landscape with partly degraded visual quality and detractors.

- 4.5 The criteria for assessing the susceptibility of views are shown in **Table 8:**

⁹ Page 158, Glossary, GLVIA3

Table 8, Criteria for assessing visual susceptibility	
HIGH	Includes occupiers of residential properties and people engaged in recreational activities in the countryside using public rights of way (PROW).
MEDIUM	Includes people engaged in outdoor sporting activities and people travelling through the landscape on minor roads and trains.
LOW	Includes people at places of work e.g. industrial and commercial premises and people travelling through the landscape on major roads and motorways.

4.6 Sensitivity is defined in GLVIA3 as “a term applied to specific receptors, combining judgments of susceptibility of the receptor to a specific type of change or development proposed and the value related to that receptor.”¹⁰ The definitions for high, medium, low visual sensitivity are shown in **Table 9**:

Table 9, Criteria for assessing visual sensitivity	
HIGH	Visual receptor defined as being of high value combined with a high or medium susceptibility to change. Visual receptor defined as being of medium value combined with a high susceptibility to change.
MEDIUM	Visual receptor defined as being of high value combined with a low susceptibility to change. Visual receptor defined as being of medium value combined with a medium or low susceptibility to change. Visual receptor defined as being of low value combined with a high or medium susceptibility to change.
LOW	Visual receptor defined as being of low value combined with a low susceptibility to change.

¹⁰ Glossary, Page 158, GLVIA, 3rd Edition

Magnitude of Change on Visual Receptors

4.7 Professional judgement has been used to determine the magnitude of change on visual receptors as shown in **Table 10**:

Table 10, Criteria for assessing magnitude of change for visual receptors	
HIGH	Major change in the view that has a defining influence on the overall view with many visual receptors affected.
MEDIUM	Some change in the view that is clearly visible and forms an important but not defining element in the view.
LOW	Some change in the view that is appreciable with few visual receptors affected.
NEGLIGIBLE	No notable change in the view.

5. SIGNIFICANCE OF LANDSCAPE AND VISUAL EFFECTS

5.1 The likely significance of effects is dependent on all of the factors considered in the sensitivity and the magnitude of change upon the relevant landscape and visual receptors. These factors are assimilated to assess whether or not the Proposed Development will have a likely significant or not significant effect. The variables considered in the evaluation of the sensitivity and the magnitude of change is reviewed holistically to inform the professional judgement of significance.

5.2 A likely **significant** effect will occur where the combination of the variables results in the Proposed Development having a definitive effect on the view. A **not significant** effect will occur where the appearance of the Proposed Development is not definitive, and the effect continues to be defined principally by its baseline condition.

5.3 Within **Table 11** below, the major effects highlighted in grey are considered to be significant in terms of the EIA Regulations. It should be noted that whilst an individual effect may be significant, it does not necessarily follow that the Proposed Development would be unacceptable in the planning balance. The cross referencing

of the sensitivity and magnitude of change on the landscape and visual receptor determines the significance of effect as shown in **Table 11**:

Table 11, Significance of landscape and visual effects

		Sensitivity		
		HIGH	MEDIUM	LOW
Magnitude of Change	HIGH	Major	Major	Moderate
	MEDIUM	Major	Moderate	Minor
	LOW	Moderate	Minor	Minor
	NEGLIGIBLE	Negligible	Negligible	Negligible

6. TYPICAL DESCRIPTORS OF LANDSCAPE EFFECTS

6.1 The typical descriptors of the landscape effects are detailed within **Table 12**:

Table 12, Typical Descriptors of Landscape Effects

MAJOR BENEFICIAL	<p>The landscape resource has a high sensitivity with the proposals representing a high beneficial magnitude of change and/or the proposed changes would:</p> <ul style="list-style-type: none"> - enhance the character (including value) of the landscape; - enhance the restoration of characteristic features and elements lost as a result of changes from inappropriate management or development; - enable a sense of place to be enhanced.
MODERATE BENEFICIAL	<p>The landscape resource has a medium sensitivity with the proposals representing a medium beneficial magnitude of change and/or the proposed changes would:</p> <ul style="list-style-type: none"> - enhance the character (including value) of the landscape; - enable the restoration of characteristic features and elements partially lost or diminished as a result of changes from inappropriate management or development; - enable a sense of place to be restored.
MINOR BENEFICIAL	<p>The landscape resource has a low sensitivity with the proposals representing a low beneficial magnitude of change and/or the proposed changes would:</p> <ul style="list-style-type: none"> - complement the character (including value) of the landscape; - maintain or enhance characteristic features or elements; - enable some sense of place to be restored.

NEGLIGIBLE	<p>The proposed changes would (on balance) maintain the character (including value) of the landscape and would:</p> <ul style="list-style-type: none"> - be in keeping with landscape character and blend in with characteristic features and elements; - Enable a sense of place to be maintained.
NO CHANGE / NEUTRAL	<p>The proposed changes would not be visible and there would be no discernible change to landscape character.</p>
MINOR ADVERSE	<p>The landscape resource has a low sensitivity with the proposal representing a low adverse magnitude of change and/or the proposed changes would:</p> <ul style="list-style-type: none"> - not quite fit the character (including value) of the landscape; - be a variance with characteristic features and elements; - detract from sense of place.
MODERATE ADVERSE	<p>The landscape resource has a medium sensitivity with the proposals representing a medium adverse magnitude of change and/or the proposed changes would:</p> <ul style="list-style-type: none"> - conflict with the character (including value) of the landscape; - have an adverse effect on characteristic features or elements; - diminish a sense of place.
MAJOR ADVERSE	<p>The landscape resource has a high sensitivity with the proposals representing a high adverse magnitude of change and/or the proposed changes would:</p> <ul style="list-style-type: none"> - be at variance with the character (including value) of the landscape; - degrade or diminish the integrity of a range of characteristic features and elements or cause them to be lost; - change a sense of place.

7. TYPICAL DESCRIPTORS OF VISUAL EFFECTS

7.1 The typical descriptors of the visual effects are detailed within **Table 13**:

Table 13, Typical Descriptors of Visual Effects

MAJOR BENEFICIAL	<p>The visual receptor is of high sensitivity with the proposals representing a high magnitude of change and/or the proposals would result in a major improvement in the view.</p>
MODERATE BENEFICIAL	<p>The visual receptor is of medium sensitivity with the proposals representing a medium magnitude of change and/or the proposals would result in a clear improvement in the view.</p>
MINOR BENEFICIAL	<p>The visual receptor is of low sensitivity with the proposals representing a low magnitude of change and/or the proposals would result in a slight improvement in the view.</p>

NEGLIGIBLE	The proposed changes would be in keeping with, and would maintain, the existing view or where (on balance) the proposed changes would maintain the quality of the view (which may include adverse effects which are offset by beneficial effects for the same receptor) or due to distance from the receptor, the proposed change would be barely perceptible to the naked eye.
NO CHANGE/ NEUTRAL	The proposed changes would not be visible and there would be no change to the view.
MINOR ADVERSE	The visual receptor is of low sensitivity with the proposals representing a low magnitude of change and/or the proposals would result in a slight deterioration in the view.
MODERATE ADVERSE	The visual receptor is of medium sensitivity with the proposals representing a medium magnitude of change and/or the proposals would result in a clear deterioration in the view.
MAJOR ADVERSE	The visual receptor is of high sensitivity with the proposals representing a high magnitude of change and/or the proposals would result in a major deterioration in the view.

8. NATURE OF EFFECTS

8.1 GLVIA3 includes an entry that states “effects can be described as positive or negative (or in some cases neutral) in their consequences for views and visual amenity.”¹¹ GLVIA3 does not, however, state how negative or positive effects should be assessed, and this therefore becomes a matter of professional judgement supported by site specific justification within the LVIA.

¹¹ Para 6.29, Page 113, GLVIA 3rd Edition



APPENDIX B:

**SAMPLE RESIDENTIAL VISUAL AMENITY
ASSESSMENT METHODOLOGY**

1. RESIDENTIAL VISUAL AMENITY ASSESSMENT METHODOLOGY

1.1 The Residential Visual Amenity Assessment (RVAA) would draw upon the overarching best practice within the Landscape Institute's 'Guidelines for Landscape and Visual Impact Assessment' 3rd Edition (GLVIA3) and 'Residential Visual Amenity Assessment (RVAA) Technical Guidance Note 2/19' (LI TGN 2/19).

1.2 The Technical Guidance Note advises in paragraph 1.6 that:

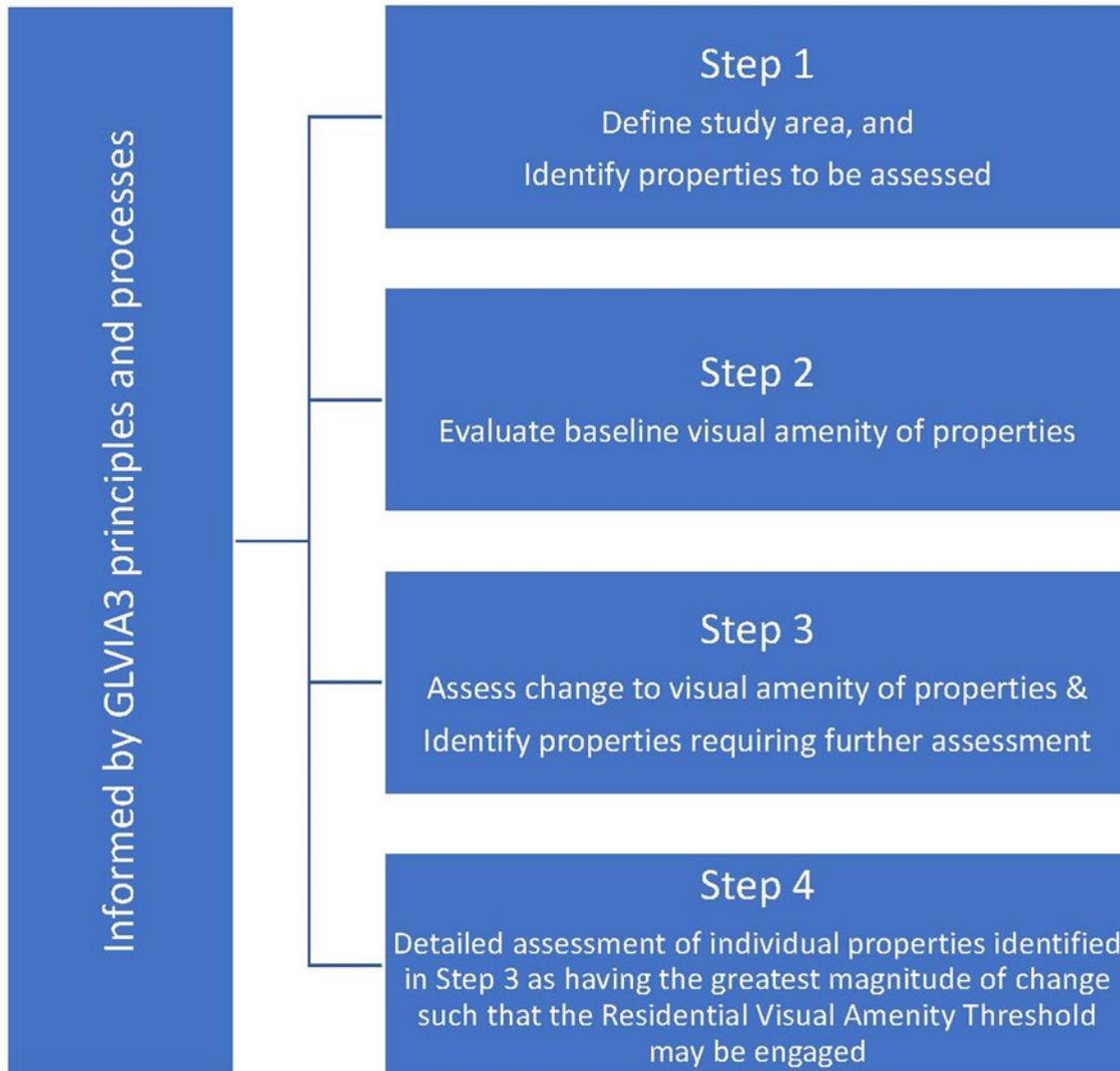
"It is not uncommon for significant adverse effects on views and visual amenity to be experienced by people at their place of residence as a result of introducing new development in the landscape. In itself this does not necessarily cause a planning concern. However, there are situations where the effect on the outlook / visual amenity of a residential property is so great that it is not generally considered to be in the public interest to permit such conditions where they did not exist before." ¹²

1.3 In accordance with the LI TGN 2/19, the RVAA would comprise a four stage process including:

- 1) Definition of the scope and study area for the assessment – informed by the description of the Proposed Development, defining the study area extent and scope of the assessment with respect to the properties to be included;
- 2) Evaluation of the baseline visual amenity for the surrounding residential properties – having regard to the landscape and visual context and the development proposed;
- 3) Assessment of the likely change to the visual amenity of the residential properties in accordance with GLVIA3 principles and processes; and
- 4) Further assessment in respect of the acceptable threshold for residential visual amenity and living conditions in the public interest.

1.4 The process is summarised within the diagram below as an extract on page 7 of the Technical Guidance Note 2/19 as shown below:

¹² Paragraph 1.6, Technical Guidance Note 2/19, Residential Visual Amenity Assessment



Definition of the Scope and Study Area

1.5 The scope and study area of residential properties included within the RVAA would be informed by the findings of the LVIA, post code data and consultations with North Kesteven District Council and Boston Borough Council, together with subsequent requests from the residents themselves following a public consultation event.

1.6 The LI TGN 2/19 advises in Paragraph 4.4:

“There are no standard criteria for defining the RVAA study area nor for the scope of the RVAA, which should be determined on a case-by-case basis taking both the type and scale of proposed development, as well as the landscape and visual context, into account.”

1.7 LI TGN 2/19 continues at paragraph 4.5 that:

“...Simply being able to see a proposed development from a property is no reason to include it in the RVAA.”

1.8 Paragraph 4.7 of LI TGN 2/19 further advises that:

“...However, other development types including potentially very large but lower profile structures and developments such as road schemes and housing are unlikely to require RVAA, except potentially of properties in very close proximity (50-250m) to the development....”

1.9 Residential properties to be included within the scope of the RVAA would be confirmed based on the findings of the Landscape and Visual Impact Assessment. However, given the type and scale of the proposed solar PV development and the dispersed nature of the surrounding residential properties, the likelihood of any significant visual effects is anticipated to be restricted to those within the immediate surroundings of the site, due mainly to the predominantly flat local topography and the limited vertical elevation of the proposed solar arrays (to a maximum height of +4.5 metres above ground level (AGL)).

1.10 Furthermore, with regard to the **Indicative Site Layout Plan at Figure 3**, it is noted that areas of Potential Biodiversity Net Gain area are proposed which would provide separation between the proposed solar panels and the residential properties adjacent to the Site’s proposed red line boundary.

1.11 A large area of land to the south of the solar park has been identified for a potential underground cable route to connect it to the substation at Bicker Fen. Whilst the exact cable route has yet to be designed, it is anticipated that the extent of the land area available would enable the developer to avoid the removal of any significant landscape features (such as isolated / small areas of trees or short sections of hedgerow). Therefore, the RVAA will focus on the potential visual amenity effects of the solar arrays and associated infrastructure, and not of the underground cable route.

1.12 At this stage it is anticipated that the scope of the RVAA would encompass residential properties located in close proximity to the red line boundary of the solar park:

- 1) To the south - along of the A17 (eg to the north of Maize Farm; Rectory Farm; Elm Grange and any residential property associated with the ‘Piggery’ identified on the OS mapping);

- 2) To the west of the redline boundary - along Sidebar Lane (the B1395) as far north as the junction with Littleworth Drove;
- 3) To the east of the redline boundary – Rakes Farm; and,
- 4) Within the redline boundary itself – Six Hundreds Farm.

1.13 It is noted that (based on OS mapping), there do not appear to be any residential properties adjacent to the north of the redline boundary.

1.14 Distant views of the solar PV development may be perceptible beyond the extent of these residential properties within the study area. However, even with clear visibility, the effects on residential visual amenity and living conditions are not anticipated to be significant or unacceptable beyond this identified scope.

1.15 Where appropriate and in line with the guidance set out at paragraph 4.8 within LI TGN 2/19, the effects on clusters of similar properties may be considered through the assessment of representative visual amenity, rather than from each individual property:

“Properties are normally assessed individually, but if their outlook and / or views are in all aspects the same (for example if a development is visible from the rear gardens only of a small row of houses) they could be assessed as one (group)....”

1.16 Letters would be sent to each of the identified residential properties (based upon post code data) to request access to the individual properties, curtilages and private gardens for the assessment. If no response is received, ‘proxy viewpoints’ would be undertaken from publicly accessible locations as close as possible to the residential property in question. If this is not possible, proxy viewpoints would be undertaken from within the site itself facing back towards the residential property.

Evaluation of the Baseline Visual Amenity

1.17 The evaluation of baseline visual amenity would consider the type, nature, extent and quality of the existing views from the residential properties including building curtilages, private gardens and driveways. LI TGN 2/19 advises in paragraph 4.11 that:

“When evaluating the baseline, it is recommended that the following aspects are considered:

- **the nature and extent of all potentially available existing views from the property and its garden / domestic curtilage, including the proximity and**

relationship of the property to surrounding landform, landcover and visual foci. This may include primary / main views from the property or domestic curtilage, as well as secondary / peripheral views; and

- **views as experienced when arriving at or leaving the property, for example from private driveways / access tracks.”¹³**

1.18 In accordance with the principles and processes of GLVIA3, the visual effects would be determined by cross-referencing the sensitivity of the visual receptor with the magnitude of change arising from the proposed solar PV development. Residential properties are generally considered to be of high sensitivity within GLVIA3. However, TGN 2/19 advocates a further detailed review and refined survey of the residential properties in question with regards to the potential sensitivities in relation to the proposed solar PV development.

1.19 Higher sensitivity areas of the residential properties might include:

- Views from ground floor windows on principal elevations of the building and are likely to correspond to primary living rooms such as lounge, dining rooms, kitchens or conservatories; and
- Views from rear gardens or heavily frequented parts of a garden where an appreciation of the surrounding landscape is likely to be fundamental to the enjoyment of the space.

1.20 Lower sensitivity areas of the residential properties might include:

- Views from upper floor windows on principal elevations of the building likely to correspond to bedrooms and study / office rooms;
- Views from front gardens or parts of the curtilage to the building where it is likely that the focus of attention is on an activity such as gardening rather than on the surrounding landscape;
- Views from windows on side elevations and from windows likely to correspond to utility rooms, bathrooms, etc; and
- Views from parts of the garden or building curtilage with a purely functional purpose such as a driveway or storage area, etc or land worked as part of a business.

¹³ Paragraph 4.11, Technical Guidance Note 2/19, Residential Visual Amenity Assessment

Assessment of the Magnitude of Change on the Residential Properties

1.21 Visual amenity is defined within GLVIA3 as:

“The overall pleasantness of the views people enjoy of their surroundings, which provides an attractive visual setting or backdrop for the enjoyment of activities of the people living, working, recreating, visiting or travelling through an area.”¹⁴

1.22 Visual effects on the surrounding residential properties could potentially arise through the introduction of the solar arrays, energy storage structures, security fencing, CCTV poles, transformer boxes, access tracks etc located within the proposed solar PV development. The solar arrays are typically of lower profile and elevation with the panels fixed at a maximum height of +4.5 metres above ground level (AGL). The tallest element of the Proposed Development would be the main substation with maximum proposed dimensions of 180m x 130m x 15m.

1.23 Visual effects can also arise through the removal of landscape features such as woodlands, hedgerows or trees to expose views of the solar arrays. However, there are few such features within the red line boundary of the solar farm.

1.24 In general terms, the magnitude of change on the residential properties will decrease with increasing distance from the site and due to the proportion of intervening landform, buildings, woodlands, hedgerows and trees within the view. The magnitude of change arising from the solar PV development also considers any proposed landscape and visual mitigation measures (such as the proposed Potential Biodiversity Net Gain areas) as a residual effect. Other influencing factors affecting the magnitude of change might include:

- Whether the view of the solar arrays is in a direct or oblique angle from the primary orientation or active frontage of the property;
- The extent to which the view is obstructed by vegetation, landform or other built structures; and
- The extent to which the current view is influenced by existing built structures (e.g. buildings, roads, pylons and transmission lines, etc).

1.25 The magnitude of change on the surrounding residential properties would be assessed on the following scale:

¹⁴ Page 158, Glossary, GLVIA3

- High – a change in the view that on balance has a defining influence on the overall visual amenity of the residential receptor;
- Medium – some change in the view that on balance is clearly visible and forms an important but not a defining influence on the overall visual amenity of the residential receptor;
- Low – some change in the view that on balance is visible although has a subservient influence on the overall visual amenity of the residential receptor; and
- Negligible – no change or small to imperceptible visual influence on the overall visual amenity of the residential receptor.

1.26 The likely significance of effects is dependent on all of the factors considered in the sensitivity and the magnitude of change upon the residential receptors. These factors are assimilated to assess whether or not the proposed solar PV development will have a likely significant or not significant effect. The variables considered in the evaluation of the sensitivity and the magnitude of change is reviewed holistically to inform the professional judgement of significance.

1.27 A likely significant effect will occur where the combination of the variables results in the Proposed Development having a definitive effect on the view. A not significant effect will occur where the appearance of the Proposed Development is not definitive, and the effect continues to be defined principally by its baseline condition.

1.28 The matrix below demonstrates the relationship between sensitivity and magnitude of change based on the specific criteria given. At all times, professional judgement is used to determine the overall significance of visual effects. The major effects highlighted in dark grey are considered to be significant in terms of the EIA Regulations. The moderate effects highlighted in light grey are potentially significant, and a summary justification is provided as to whether the effect in question is significant or not significant. It should be noted that whilst an individual effect may be significant, it does not necessarily follow that the proposed solar PV development would be unacceptable, either in terms of the public interest test or when considering the planning balance in relation to the other benefits arising from the solar PV development.

1.29 The relationship between sensitivity and magnitude of change is indicated within the schedule below:

		Sensitivity		
		HIGH	MEDIUM	LOW
Magnitude of Change	HIGH	Major	Major	Moderate
	MEDIUM	Major	Moderate	Minor
	LOW	Moderate	Minor	Minor
	NEGLIGIBLE	Negligible	Negligible	Negligible

1.30 Judgement concerning the acceptable threshold for living conditions and residential visual amenity in the public interest

1.31 In this final stage, and only for those residential properties identified as experiencing a major significant effect in the previous stage, a further judgement is required to determine whether the visual effect in question has exceeded the Residential Amenity Threshold. LI TGN 2/19 advises that this is a matter for professional judgement explained in narrative with clear, unambiguous and rational conclusions. The visual effects arising from the Proposed Development would need to be of such a degree and significance that the residential property would be uninhabitable due to the effects on living conditions.



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