Little Crow
Solar Park

National significant infrastructure project in the Energy Sector

Little Crow Solar Park, Scunthorpe

PRELIMINARY ENVIRONMENTAL INFORMATION REPORT

MAIN STATEMENT

VOLUME 1

On behalf of INRG Solar (Little Crow) Ltd

November 2018

LITTLE CROW SOLAR PARK

LAND TO THE EAST OF STEEL WORKS, SCUNTHORPE

Preliminary Environmental Information Report

MAIN STATEMENT
VOLUME 1

PREFACE

This report has been produced for the purpose of providing Preliminary Environmental Information in relation to an application to be made to the Secretary of State for Department for Business, Energy & Industrial Strategy under Section 37 of the Planning Act 2008, seeking a Development Consent Order (DCO) for the Little Crow Solar Park. It is anticipated the application will be submitted Summer 2019.

This report forms part of a suite of documents supporting the statutory pre-application consultation for the Little Crow Solar Park under Sections 42 and 47 of the Planning Act 2008. The statutory consultation runs from **Monday 3rd December 2018 until 5pm on Monday 4th March 2019.**

The Preliminary Environmental Information Report [PEIR] has been coordinated by Pegasus Group and consists of the following documents:

- PEIR Volume 1: Main Written Statement
- PEIR Volume 2: Technical Appendices
- PEIR Non-Technical Summary

Copies of the consultation material, including the PEIR and drawings, may be inspected free of charge during the consultation period at the following locations and during normal working hours.

North Lincolnshire Council Civic Centre	Development Management Team Ashby Road, Scunthorpe, DN16 1AB
Scunthorpe Central Library	Carlton Street Scunthorpe, DN15 6TX
Park Library	Avenue Vivian Scunthorpe, DN15 8LG
Bottesford Library	Cambridge House, Cambridge Avenue, Bottesford, DN16 3LG

Electronic copies of the documents referred to above will also be available to download free of charge from Monday 3 December 2018 at the applicant's website www.littlecrowsolar.co.uk For paper copies of documents there will be a minimum charge of 25p per side (black and white) and 45p per side (colour).

Any representation in respect of the proposed development must be made in writing, stating the grounds of the response or representation, and give an address to which correspondence relating to the representation may be sent. Any person may comment on the proposals. Responses must be made before 5pm on Monday 4 March 2019.

Please send any representations or request for paper copies of documents to: -

Email: info@littlecrowsolar.co.uk
Postal: Little Crow Solar Park Development Team, Pegasus Group, Equinox North, Almondsbury, Bristol, BS32 4QL
Online: www.littlecrowsolar.co.uk

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LITTLE CROW SOLAR PARK

LAND TO THE EAST OF STEEL WORKS, SCUNTHORPE

Preliminary Environmental Information Report

Chapter 1

INTRODUCTION

1. INTRODUCTION

1.1 INTRODUCTION

1.1.1 This **Preliminary Environmental Information Report** (PEIR) has been prepared on behalf of INRG Solar (Little Crow) Ltd ("the applicant")[1] who propose to make an application under Section 37 of the Planning Act 2008 to the Secretary of State for Department for Business, Energy & Industrial Strategy (BEIS) for a Development Consent Order (DCO).

1.1.2 The application will relate to the construction, operation, maintenance and decommissioning of Little Crow Solar Park ("the development") a renewable led energy scheme. The main elements of the development will be the installation of a ground mounted solar park with a maximum design capacity of 150MWp (megawatts peak) and up to 90MW of battery storage covering an area of approximately 226 hectares. There will also be electrical connection infrastructure and the point of connection into the local electricity grid is directly to the 132kva electricity overhead pylon which already runs through the development site.

1.1.3 By virtue of its potential generating capacity, which stands at over 50 megawatts, the proposed development constitutes a Nationally Significant Infrastructure Project ("NSIP").

1.1.4 This chapter outlines the purpose and structure of the PEIR and provides an overview of the development and development process.

1.1.5 This chapter is supported by the following figures[2].

- **Figure 1.1** Site Location Plan.
- **Figure 1.2** Copy of Notice Publicising the proposed application for Development Consent Order[3]

1.1.6 This chapter is also supported by the following appendix: -

- **Appendix 1.1**: Statement of Community Consultation

1.2 THE PURPOSE OF DOCUMENT AND PRE-APPLICATION CONSULTATION

1.2.1 This PEIR is being published to accompany a formal pre-application consultation under Sections 42 and 43 of the Planning Act 2008 and follows previous informal consultation undertaken by the applicant throughout 2018. The formal pre-application consultation runs from Monday 3 December 2018 to Monday 4 March 2019 in accordance with the Little Crow Solar Park Statement of Community Consultation (SoCC).

[1] Founded in 2009, INRG Solar Ltd has established itself as one of the largest developers of solar parks in the UK, responsible for the development of dozens of solar parks with a total capacity of over 300 megawatts.

[2] Figures are presented either within or at the end of each chapter. The technical appendices are presented in the accompanying Volume 2 of the PEIR. For continuity, the figures and appendices are arranged and presented using the same chapter reference numbers.

[3] Regulation 4 Infrastructure Planning (Applications Prescribed Forms and Procedure) Regulations 2009. The Notice was published in the Scunthorpe Telegraph, The Times and London Gazette.

1.2.2 The SoCC sets out how the applicant proposes to consult people affected by the development or living in the vicinity about the proposed application. A copy of the SoCC is provided at Appendix 1.1 and it has been developed in consultation with North Lincolnshire Council.

1.2.3 The PEIR will be made available to the prescribed consultees, local authorities, and landowners and to members of the public and the wider community. This will enable the consultees, including the local community, to understand the main environmental effects and implications of the proposed development so as to inform their responses to consultation.

1.2.4 The information contained in this PEIR is 'preliminary' and may not represent the final project design or include the final environmental assessment considerations and conclusions. The applicant is seeking consultation responses to the information presented in order to continue to refine the development design and to continue to obtain information that will inform the final assessment of the impacts which will be contained with the Environmental Statement which will accompany the DCO application.

1.2.5 Preliminary Environmental Information is defined by Regulation 12(1) of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017: -

> (2) In this regulation, "preliminary environmental information" means information referred to in regulation 14(2) which—
>
> (a)has been compiled by the applicant; and
>
> (b)is reasonably required for the consultation bodies to develop an informed view of the likely significant environmental effects of the development (and of any associated development).

1.2.6 The focus of the PEI is to enable the local community to understand the environmental effects of the proposed development so as to inform their responses regarding the proposed development. This is reflected in the Department for Communities and Local Government (DCLG) Guidance which advises applicants to provide *"sufficient preliminary environmental information to enable consultees to develop* an *informed view of the project. The information required will be different for different types and sizes of projects and it may differ depending on the audience of a particular consultation. The key issue is that the information presented must provide clarity to all consultees".*[4]

1.3 THE CONSENTING PROCESS AND NATIONALLY SIGNIFICANT INFRASTRUCTURE PROJECTS

1.3.1 The Little Crow Solar Park represents a significant planning and investment project and is defined as a National Significant Infrastructure Project (NSIP) in accordance with the Planning Act 2008. INRG Solar (Little Crow) Ltd will apply to the Secretary of State for Business, Energy and Industrial Strategy, via the Planning Inspectorate, and if successful will be granted a Development Consent Order which authorises and permits the development.

1.3.2 INRG Solar (Little Crow) Ltd will seek powers in the DCO to construct, maintain, operate and then decommission the project. The Planning Inspectorate will consider the

[4] DCLG Guidance – Planning Act 2008: Guidance on the Pre-Application Process (January 2013), paragraph 73

application. Prior to submission of the application and during the examination period, interested parties will be entitled to raise their views and participate in the consenting process. When the examination has concluded, the Planning Inspectorate will make a recommendation to the Secretary of State having assessed the project in accordance with national policy and taking into account the local impact. The Secretary of State will then determine the application.

1.3.3 Below is a summary of how the DCO application process works and further information on the Planning Inspectorate and the planning process can be found here https://infrastructure.planninginspectorate.gov.uk

- **Pre-application** – INRG Solar (Little Crow) Ltd notifies and consults the public, statutory consultees and those with an interest in the affected land on its proposed application.
- **Submission** – INRG Solar (Little Crow) Ltd will review the feedback received during consultation and finalise the proposals taking the feedback into account. A DCO application will then be submitted to the Planning Inspectorate, who will appoint the examination team for the application.
- **Acceptance** – after the application is submitted, Planning Inspectorate will decide whether it is suitable for examination.
- **Pre-examination** – if accepted for examination, there will be an opportunity for people to register their interest in the application with the Planning Inspectorate. Anyone registered will be kept informed of the progress of the application by the Planning Inspectorate, including how they can provide comments. Planning Inspectorate will invite all those registered to a preliminary meeting that will explain the timetable and format of the examination.
- **Examination** – the examination lasts around six months. People who have registered their interest will be able to take part in the examination and send their comments to Planning Inspectorate.
- **Decision** – following the examination, the Planning Inspectorate will make its recommendation on the application to the Secretary of State, and the Secretary of State has the final decision as to whether consent is to be granted.

1.4 STRUCTURE AND CONTENTS OF THIS PEIR

1.4.1 This PEIR takes the form of a draft environmental statement[5]. A significant amount of survey work has been completed to date to inform the Environmental Impact Assessment (EIA), including ecological surveys, baseline landscape and visual surveys, and a ground investigation. At this stage not all of the detailed survey or assessment work required to inform the EIA have been completed. This PEIR therefore presents the environmental information available at this time, and our current understanding of the likely environmental effects of the development.

1.4.2 The PEIR is structured into three documents: -

DOCUMENT	AUTHOR / CONTRIBUTOR

[5] An Environmental Statement ("ES") is a document that sets out the findings of an Environmental Impact Assessment ("EIA"). An EIA is a process for identifying the likely significance of environmental effects (beneficial or adverse) arising from a Proposed Development, by comparing the existing environmental conditions prior to development (the baseline) with the environmental conditions during/following the construction, operational and decommissioning phases of a development should it proceed. The EIA is carried out prior to the submission of a planning application.

Non-Technical Summary		Coordinated by Pegasus Group
Volume 1 – Main Statement		Coordinated by Pegasus Group
Chapter 1	Introduction	Pegasus Group
Chapter 2	Assessment Methodology	Pegasus Group
Chapter 3	Site description	Pegasus Group
Chapter 4	Development description	Pegasus Group
Chapter 5	Policy context	Pegasus Group
Chapter 6	Landscape and visual impact assessment	Pegasus Group
Chapter 7	Ecology and Nature conservation	Clarkson and Woods Ecological Consultants
Chapter 8	Cultural Heritage and Archaeology	Cotswold Archeology
Chapter 9	Traffic and Transport	Transport Planning Associates
Chapter 10	Agriculture	Kernon Countryside Consultants
Chapter 11	Socio-economics	Pegasus Group
Volume 2 – Technical Appendices (that supports the main statement)		Coordinated by Pegasus Group

1.5 WHAT HAPPENS NEXT

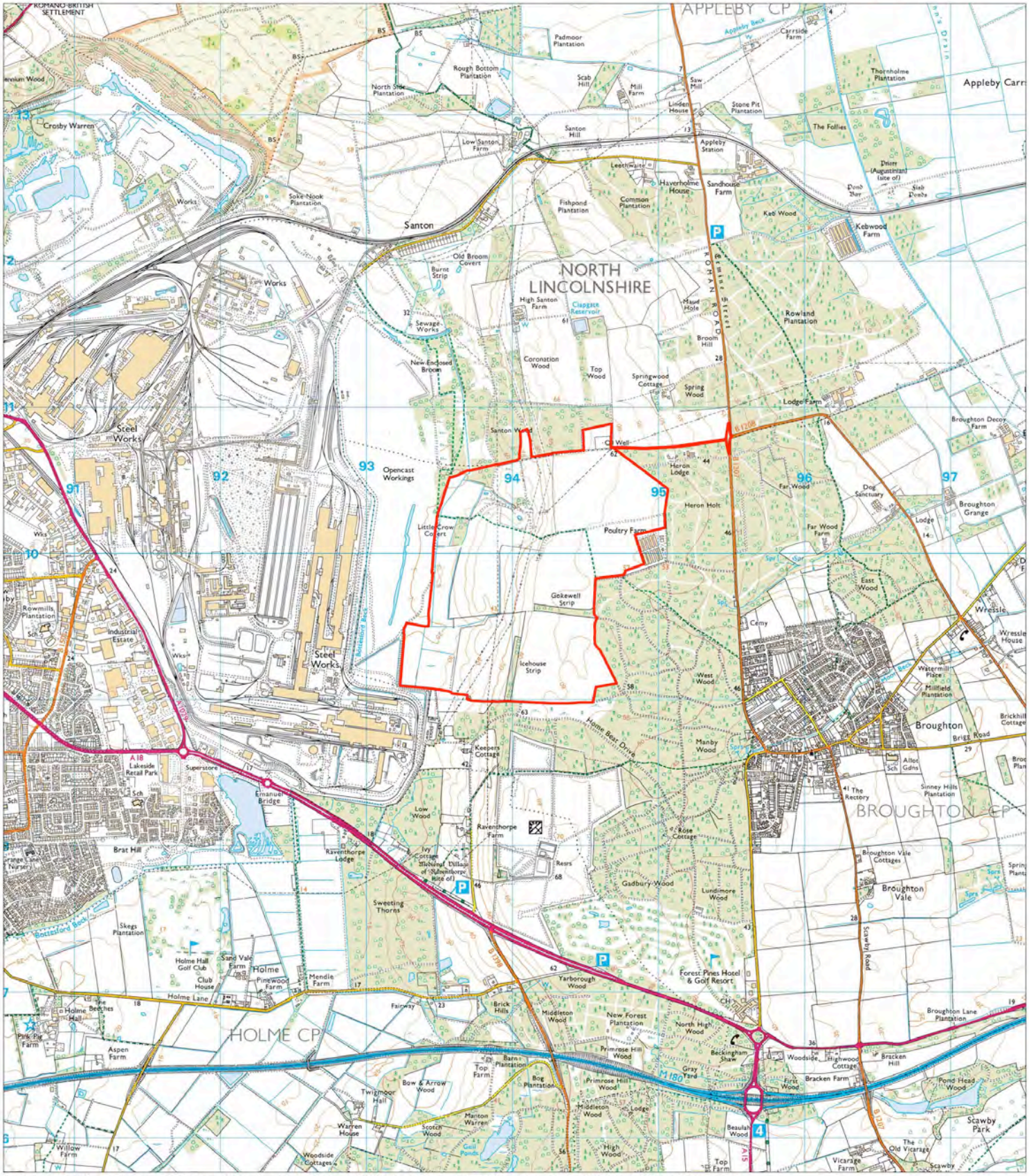
1.5.1 At the close of consultation, all responses received will be carefully considered and taken into account in the development of the project. If, as a result of the feedback, the project changes to such an extent that it is necessary to undertake further consultation, then this further consultation will be undertaken in accordance with the principles set out in the SoCC. If we are in position to finalise the application, then we aim to move forward and submit the application by Summer 2019. When the application has been accepted by PINS, INRG Solar (Little Crow) Ltd will advertise that the application has been submitted and accepted.

Figure 1.1

SITE LOCATION PLAN

KEY: SITE LOCATION PLAN

APPLICATION BOUNDARY



0 0.5 1.0Km

LITTLE CROW SOLAR PARK - SITE LOCATION PLAN

Pegasus Design

PLANNING | DESIGN | ENVIRONMENT | ECONOMICS | www.pegasusgroup.co.uk | TEAM/DRAWN BY: ADR | APPROVED BY: GR | DATE: 31/10/18 | SCALE: 1:25,000 @ A3 | DRWG: P18-0718_22 SHEET NO: _ REV: _ | CLIENT: INRG SOLAR LTD |

Figure 1.2

COPY OF NOTICE PUBLICISING THE PROPOSED APPLICATION FOR DEVELOPMENT CONSENT ORDER

Little Crow
Solar Park

Section 48 - Planning Act 2008

Little Crow Solar Park, Scunthorpe

Notice publicising a proposed application for a Development Consent Order

Regulations 4 Infrastructure Planning (Applications Prescribed Forms and Procedure) Regulations 2009 Development Consent Order and for Little Crow Solar Park, Scunthorpe.

Notice Publicising a proposed application for a development consent order (DCO)

Notice is hereby given that INRG Solar (Little Crow) Ltd of 93 Leigh Road, Eastleigh, Hampshire, S050 9DQ (the"the Applicant") proposes to make an application ("the Application") under section 37 of the Planning Act 2008 to the Secretary of State for Business, Energy & Industrial Strategy for a Development Consent Order.

The application relates to the construction, operation, maintenance and decommissioning of a renewable led energy scheme. The main element is the installation of a ground mounted solar park with a maximum design capacity of up to 150MWp (megawatts peak) and up to 90MW of battery storage covering an area of approximately 226 hectares. There will also be electrical connection infrastructure. The site is located to the east of the British Steel Works, Scunthorpe. Centred at National Grid Reference SE 94343 09820.

The scheme is an Environmental Impact Assessment development for the purposes of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. An Environmental Statement will be submitted as part of the application. Preliminary Environmental Information Reports (PEIR) form part of the consultation material.

Public consultation on the proposals take places from **Monday 3 December** until 5pm on **Monday 4 March 2019.** Copies of the consultation material, including the PEIR and drawings, may be inspected free of charge during the consultation period at the following locations and during normal working hours.

Location	Address	Standard Opening Hours
Scunthorpe Central Library	Carlton Street, Scunthorpe, North Lincolnshire, DN15 6TX	Monday: 9am-5pm Tuesday: 9am-5pm Wednesday: 9am-7pm Thursday: 9am-5pm Friday: 9am-5pm Saturday: 9am-4pm Closed on Bank Holidays
Park Library	Avenue Vivian, Scunthorpe, North Lincolnshire, DN15 8LG	Monday: 2pm-7pm Tuesday: closed Wednesday: 10am-1pm Thursday: closed Friday: 1pm-5pm Saturday: 10am-1pm Closed on Bank Holidays
Bottesford Library	Cambridge House, Cambridge Avenue, Bottesford, Scunthorpe, North Lincolnshire, DN16 3LG	Monday: 1pm-5pm Tuesday: closed Wednesday: 1pm-7pm Thursday: 10am-1pm Friday: 2pm-5pm Saturday: 10am-1pm Closed on Bank Holidays
North Lincolnshire Council Civic Centre	Development Managment Team, North Lincolnshire Council Civic Centre, Ashby Road, Scunthorpe, North Lincolnshire, DN16 1AB	Monday: 9am-5pm Tuesday: 9am-5pm Wednesday: 9am-5pm Thursday: 9am-5pm Friday: 9am-4.30pm Closed on Bank Holidays

Opening times have been checked, but they are dependant on the organisation itself any may be subject to change

Public drop-in sessions are planned for 11 December in Appleby, 12 December in Scunthorpe and 17 December in Broughton. Please see our Statement of Community Consultation for full details this is available at **www.littlecrowsolar.co.uk.** The drop-in sessions will provide an oppurtunity to find out more about the project team. If you have any queries or you need further information regarding the consultation process please call us on **01454 625 945.**

To obtain copy documents:
Electronic copies of the documents referred to above will also be available to download free of charge from Monday 3 December 2018 at the applicant's website **www.littlecrowsolar.co.uk** which also contains detailed information on the scheme including the consultation information.

For paper copies of the information there will be a charge of 25p per side (black and white) and 45p per side (colour). These can be requested by post from the **Little Crow Solar Park Development Team, Equinox North, Almonsbury, Bristol, BS32 4QL** or by email to **info@littlecrowsolar.co.uk**

Have your say:
Any response or representation in respect of the proposed application for the Development Consent Order must: be made in writing; state the grounds of the response or representation; and give an address to which correspondence relating to the response or representation may be sent.

Any person may comment on the proposals. Responses must be received **before 5pm** on **Monday 4 March 2019.**

Please supply any responses to:

Email:
info@littlecrowsolar.co.uk

Postal:
Little Crow Solar Park Development Team, Equinox North, Almonsbury, Bristol, BS32 4QL

LITTLE CROW SOLAR PARK

LAND TO THE EAST OF STEEL WORKS, SCUNTHORPE

Preliminary Environmental Information Report

Chapter 2

ASSESSMENT SCOPE AND METHODOLOGY

2 ASSESSMENT SCOPE AND METHODOLOGY TESTING

2.1 INTRODUCTION

2.1.1 This chapter of the PEIR explains the approach taken to assess and understand the potential environmental effects of the proposed development as part of the Environmental Impact Assessment (EIA). The approach taken in this PEIR is to report the latest findings of the EIA in the form of a draft environmental statement.

2.2 ENVIRONMENTAL IMPACT ASSESSMENT METHODOLOGY

2.2.1 The total process of assessing the environmental effects of a development project is based on a number of activities: -

- Review of the baseline situation through existing information, including data, reports, site surveys and desktop studies;
- Consideration of the relevant National Policy Statement (NPSs), National Planning Policy Framework and accompanying National Planning Practice Guidance, and the statutory extant and emerging development plan policies;
- Consideration of potential sensitive receptors;
- Identification of likely significant environmental effects and an evaluation of their duration and magnitude;
- Expert opinion;
- Modelling;
- Use of relevant technical and good practice guidance; and
- Specific informal consultations with appropriate bodies carried out throughout 2018.

2.2.2 Throughout the EIA process, the likely significant environmental effects of the development will be assessed and presented in technical chapters that broadly structured as follows: -

- **Introduction** – to introduce the topic under consideration, state the purpose of undertaking the assessment and set out those aspects of the development material to the topic assessment;
- **Assessment Approach** – to describe the method and scope of the assessment undertaken and responses to consultation in relation to method and scope in each case pertinent to the topic under consideration;
- **Baseline Conditions** – a description of the baseline conditions pertinent to the topic under consideration including baseline survey information;
- **Assessment of Likely Significant Effects** - identifying the likely effects, evaluation of those effects and assessment of their significance, including direct and indirect effects; permanent and temporary effects & short, medium and long term effects with regards to construction, operational, management and decommissioning phases;
- **Mitigation and Enhancement** - describing the mitigation strategies for the significant effects identified and noting any residual effects of the proposals;
- **Cumulative and In-combination Effects** - consideration of potential cumulative and in-combination effects with those of other developments; and
- **Summary** – a non-technical summary of the chapter, including baseline conditions, likely significant effects, mitigation, enhancement and conclusion.

2.3 DEVELOPMENT PARAMETERS

2.3.1 The development, which has been the subject of the preliminary environmental impact assessment, is described in detail within Chapter 4 which also sets out the preliminary parameters and controls defining those aspects of the development capable of having significant environmental effects, as defined by the Environmental Impact Assessment Regulations. Environmental effects have been evaluated with reference to definitive standards and legislation where available. Where it has not been possible to quantify effects, assessments have been based on available knowledge and professional judgment.

2.4 BASELINE

2.4.1 Establishing the baseline environmental conditions (i.e. the environment without the proposed development) is a necessary starting point for any assessment of potential change as a result of the development. The existing conditions for the study area have been identified by desk-based study and/or survey, or calculated by modelling to allow the assessment of changes that would be caused by the development.

2.4.2 For the assessment of environmental effects, the baseline needs to reflect the conditions that would exist in the absence of the development, at key stages of the development's implementation, operation, management and decommissioning. Therefore, it is necessary to estimate the changes that would occur over time, in the absence of the development. This includes the consideration of cumulative effects. In accordance to the EIA Regulations, the PEIR has given consideration to cumulative impacts. Cumulative assessment may include the impacts of other developments that are not currently in existence but may be by the time the development is implemented. North Lincolnshire Council provide the following advice on this matter on 30 October 2018: - *"With respect to proposals which are not currently in existence and may need to be taken into account as part of a cumulative impacts assessment the only major scheme that I am aware of which may have the potential to have cumulative environmental impacts is PA/2018/1316, a pending application for the retention of an existing wellsite for long-term hydrocarbon production at Lodge Farm, Clapp Gate, Appleby. The Council does maintain an up-to-date weekly list of submitted planning applications on its website and we would be able to carry out a search of recent planning approvals and pending planning applications in a specified Zone of Influence should this be required[1]"*. The existing wellsite is located approximately 1,400m to the east of the Little Crow Solar Park site and is assessed as part of the baseline condition. Technical chapters will consider any additional cumulative impacts resulting for the additional proposals where pertinent.

2.5 ASSESSMENT METHODOLOGY AND DETERMINING SIGNIFICANCE

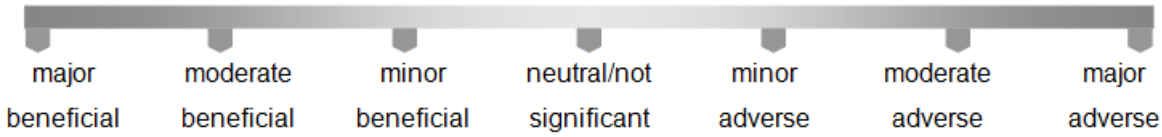
2.5.1 The likely effect that the development may have on receptors is influenced by a combination of the sensitivity of the receptor and the predicted magnitude of change

[1] Planning application PA/2018/1316 seeks consent for the retention of Wressle-1 wellsite and access track for the production of hydrocarbons, together with an extension of the site by 0.12 ha for the installation of additional security facilities; site reconfiguration to facilitate the installation of a new impermeable membrane, French drain and surface water interceptor; construction of a new bund, tanker loader plinth and internal roadway system; installation of up to two additional groundwater monitoring boreholes and deepening of three existing groundwater monitoring boreholes; well operation; installation of production facilities and equipment; instillation of gas engine and electrical grid connection; oil and gas production for a temporary period of 15 years; and restoration to arable land.

from the baseline condition (beneficial or adverse). 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.

2.5.2 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:-



2.5.3 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.

2.5.4 The broad criteria for determining magnitude are set out in **Table 2.2**.

Table 2.2: 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.

2.5.5 The sensitivity of a receptor is based on the relative importance of the receptor using the scale in **Table 2.3**.

Table 2.3: 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.

2.5.6 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 2.4** below, whereby effects assigned a rating of Major or Moderate would be considered as 'significant'.

Table 2.4: Degrees of Significance

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

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

2.5.8 A significance of effects would be assigned both before and after mitigation.

2.6 MITIGATION

2.6.1 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 (embedded mitigation) of the development and the methods of its construction from the outset. 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 judgment has been introduced to support these assumptions. A consideration of residual effects will take place after mitigation measures have been applied.

2.7 GENERAL ASSUMPTIONS AND LIMITATIONS

2.7.1 The principal assumptions that have been made and any limitations that have been identified in preparing this PEIR are set out below:

- All of the principal land uses adjoining the development site remain as present day, except where redevelopment proposals have been granted planning consent. In those cases it is assumed the redevelopment proposals will be implemented or would but for the development being implemented;
- Information received from third parties is complete and up to date;

- The design, construction and completed stages of the development will satisfy legislative requirements; and
- The requirements in the DCO will set out the mitigation where it is considered necessary to make the proposed development acceptable.

LITTLE CROW SOLAR PARK

LAND TO THE EAST OF STEEL WORKS, SCUNTHORPE

Preliminary Environmental Information Report

Chapter 3

THE DEVELOPMENT SITE AND ITS ENVIRONS

3 DEVELOPMENT SITE AND ITS ENVIRONS

3.1 INTRODUCTION

3.1.1 This PEIR chapter provides a description of the site and its surrounds.

3.1.2 The chapter is supported by the following technical appendices: -

- **Appendix 3.1** Flood Risk Assessment and Drainage Strategy
- **Appendix 3.2** Phase 1 Ground Conditions Desk Study

3.2 LOCATION OF SITE

3.2.1 The development site is located on a localised ridge between the settlements of Scunthorpe to the west and Broughton to the east. The village of Broughton is separated from the site by an extensive area of dense forestry and woodland. Between the main residential and commercial areas of Scunthorpe, directly adjacent to the western boundary of the site, lies the extensive industrial complex of the Scunthorpe Steel Works. To the north the ridge continues approximately 11km to the banks of the Humber Estuary. Also to the north is an area of heathland known as Risby Warren. To the south the ridge runs approximately 35km to the City of Lincoln. A Roman Road, Ermine Street runs adjacent to Broughton to the east of the site. A secondary scarp slope known locally within Scunthorpe as 'The Cliff' lies to the west. Away from Scunthorpe the landscape is largely rural.

3.2.2 The site extends to approximately 226 hectares and is comprised largely of arable fields which are bounded and heavily contained by dense woodland to the north, east and south which serve to provide significant screening of the site from the wider landscape. Phased forestry operations take place in the surrounding woodland.

3.3 PUBLIC RIGHTS OF WAY

3.3.1 A Public Right of Way (Footpath 214 on the Definitive Rights of Way map) crosses the site. The definitive rights of way show how the route, within the site, follows a mixture of field boundaries and the existing farm access.

3.3.2 The OS mapping does not correctly delineate the route through the site.

3.4 LANDFORM AND TOPOGRAPHY

3.4.1 In terms of landform the site lies on the edge of a localised ridge, raised slightly above the surrounding landscape, which would generally give potential for it to be visible from much of the wider landscape. However, as the site survey work has confirmed, surrounding woodland encloses much of the site, and therefore any views remain generally well contained.

3.4.2 The local ridge forms part of a wider scarp and vale topography. The site straddles part of the west facing scarp slope and the east facing limestone plateaux which runs eventually into the lower dip slope towards the River Ancholme.

3.5 LAND USE, BUILDINGS AND INFRASTRUCTURE

3.5.1 Land use across the site is predominantly agricultural with fields laid down to a mixture of arable and managed grassland. Some forestry operations are being undertaken within the surrounding woodland resulting in the storage of logs in piles next

to the main access track through the site. There is no built form within the site, but a poultry unit is located adjacent to the east of the site, whilst to the west the vast expanse of industrial development associated with the Scunthorpe steel industry lies adjacent to the site. This area extends for more than 2km beyond which the lies the urban area of Scunthorpe. Various utilities cut through the site and these include a water main; 33k overhead power lines[1]; and, a double row of 132kv overhead pylons. The lines pass through the adjacent woodland without opening up large gaps in which the site can be seen.

3.6 AGRICULTURAL LAND

3.6.1 The site is shown on the "provisional" Agricultural Land Classification map (MAFF 1983)[2] as undifferentiated Grade 3 land.

3.7 BIODIVERSITY FEATURES AND ENVIRONMENTAL DESIGNATIONS

3.7.1 The site generally comprises open arable farmland, which is surrounded by a network of hedgerows and ditches as well as extensive woodland plantations. The most frequently encountered habitat at the site consists of open arable farmland. The arable fields comprised a mixture of spring-sown cereals and oilseed rape, as well as game cover crops at the edge of some fields. Field margins are characterised by coarse, semi-improved grassland. This habitat is also encountered alongside farm tracks and in some areas of fields which had been left fallow.

3.7.2 Field boundary hedgerows are generally species-poor although the hedgerows varied in height, length, condition and management[3].

3.7.3 The northern, western and southern boundaries are bordered by woodland, mainly comprising semi-mature to mature plantation broadleaved woodland but with some coniferous elements and semi-natural woodland also present. Small pocket broadleaved woodland are also present in the west of the site. Broughton Far Wood Site of Special Scientific Interest (SSSI) and Broughton Alder Wood SSSI are located 820m and 920m east of the site boundary respectively. Broughton West Wood Local Wildlife Site (LWS) partially borders the east of the site, and is designated for its woodland habitat.

3.7.4 The proposed development site is a considerable distance from the Humber Estuary a Special Protection Area (SPA), Special Conservation Area (SAC) and Ramsar site. The area encompassing the SPA is situated approximately 11km north of the site at the closest point, whilst the SAC and Ramsar site is located 9km west at the closest point. It primarily receives its designation for its estuarine habitats, which support a range of associated species including internationally important assemblages of wintering and migratory birds.

3.8 CULTURAL HERITAGE

3.8.1 The site of the former medieval Gokewell Priory (NLHER ref. MLS1805) is located within the northern area of the site. This is a non-designated site and survives as above-ground remnant earthworks and potential belowground archaeological remains.

3.8.2 The landscape surrounding the site of the former medieval priory has undergone extensive change since the medieval period. The medieval field systems are no longer

[1] The existing wooden poles and steel masts along the route have been in situ for some time and are in the process of being replaced by Norther Powergrid Plc due to the age.
[2] MAFF (1983) Provisional ALC Northern Region, 1:250,000
[3] Under a forestry licence

extant, and the surrounding area is now made up of very large, modern blocks of agricultural land. The agricultural regimes have also changed noticeably since the medieval period, with more intensive ploughing and use of the land.

3.8.3 The designated heritage assets located within the 2km study area are set out below: -

- Scheduled Earthworks of Raventhorpe Medieval Settlement, located c.940m south of the Site (NHLE Ref: 1016426);
- Grade II Raventhorpe House, located c. 900m south of the Site (NHLE Ref: 1346807);
- Grade II Listed Springwood Cottage, located c.450m northeast of the Site (c.315m north of the access track (NHLE Ref: 1083734));
- Grade II Listed Stable Northeast of Springwood Cottage, located c.450m northeast of the Site (NHLE Ref: 1310038);
- Grade II Listed Stone Cottage and Adjoining Outbuildings, Broughton, located c.900m southeast of the Site (NHLE Ref: 1310013);
- Grade II Listed 66 High Street, Broughton, located c.1.5km southeast of the Site (NHLE Ref: 1083740);
- Grade I Listed Church of St Mary Broughton and the Grade II Listed Church Gates, located c.1.4km southeast of the Site (NHLE Refs: 1161801 and 1083741);
- Grade II Listed The Hollies, Broughton, located c.1.4km southeast of the Site (NHLE Ref: 1309931);
- Grade II Listed Broughton War Memorial, located c.1.5km southeast of the Site (NHLE Ref: 1391424);
- Grade II Listed Broughton Grange Farmhouse, located 1.9km east of the Site (NHLE Ref: 1083736); and
- Grade II Listed Coach House/Stable approximately 10m east of Broughton Grange Farmhouse, located 1.9km east of the Site (NHLE Ref: 1346496).

3.9 HYDROLOGY

3.9.1 The site is located in Flood Zone 1, at low risk of flooding, according to the Environment Agency Flood Map for Planning, consistent with its elevated location.

3.9.2 There are isolated ponding within a few areas in the site – indicative of the generally free-draining nature of the soil. In the west of the site the water is shown to issue from a spring line and flows westwards.

3.9.3 The site contains a number of watercourses, generally running north south along the slope, and linked by watercourses flowing down the slope. A detailed topographic survey has been undertaken of the site, and shows that the channels are well-defined and approximately 1m deep.

3.9.4 Localised areas up to 50m wide appear to have a very gentle fall to the east, and, leading through woodland. There are no evident watercourses or signs of surface water

flows to the east, indicating that the rainfall infiltrates into the ground where it lands, ie the shallow gradient allows infiltration.

3.10 GROUND CONDITIONS

3.10.1 The complete site area is classified as underlain by freely draining slightly acid sandy soils. These have typically low fertility arable land cover, and drain to groundwater. The complete site area is underlain by Newport 1 Type Soils. These are deep well drained sandy and coarse loamy soils. They are free draining and permeable in unconsolidated sands or gravels, which have a relatively high permeability and high storage capacity. They have a very low potential for ground movement (shrinkage or swelling). These soils will, by nature of their high permeability, readily transmit a wide range of pollutants because of the rapid drainage and low attenuation potential. The uppermost 300mm of the soil profile is sandy and 'light'.

3.10.2 Newport 1 Soils have typically an upper 250mm of dark brown slightly stony sandy loam or loamy sand, overlying brown slightly stony loamy sand or sand, with a weak fine subangular blocky structure. Below 500-550mm depth, these develop into yellowish red or brownish yellow slightly stony sand of single grain structure.

3.10.3 Historical maps revealed the following:

- 1885 to 1906 - Majority of site agricultural fields with drainage ditches in lower area. Gokewell Priory Farm with pond in northern area. Hummocky /marshy area in extreme lower southwest with pond. Several small scale excavations or pits in lower western area may indicate surface diggings for ironstone.

- 1948 to 1955 – No significant changes within the site

- 1968 to 1980 - Overhead powerlines constructed crossing SW to NE from substation within Iron & Steel Works to SW. Possible new drainage ditches (and small pond) within hummocky area in extreme northwest near Crow Covert. Clearance of Sodwall Plantation (possible ironstone workings)

- 1994 to 2002 Gokewell Priory Farm buildings demolished – exact date unclear from mapping. Opencast ironstone workings annotated in extreme SW site extension area.

- 2002 to 2014 No significant changes apparent within site. Maximum elevation of drainage ditches / surface water courses on this mapping at 36mAOD in north, 43mAOD centrally, 35mAOD central southern, and 30mAOD in southern area.

3.10.4 Any potential relevant contamination sources are therefore considered to be limited to remnant metals in soils within any localised backfilled ironstone pits, and air borne derived particulates from the extensive industrial complex to the west and southwest, remaining within shallow depth site topsoil. The Gokewell Priory Farm building area was demolished prior to 2002, and no specific development in that area is proposed. The hummocky areas west of this (near Crow and Little Crow Coverts) may relate to either this demolition or drainage works, or less likely to ironstone working. With regards to mineral extraction, preliminary understanding is that the ironstone is deemed to be unsuitable for either safeguarding and/or extraction and a desktop resource assessment would be submitted in support of the application.

3.11 AIR QUALITY

3.11.1 North Lincolnshire Council has declared an Air Quality Management Area (AQMA), which incorporates part of Scunthorpe town centre and an area east of Scunthorpe, including the Steel Works site. The development site is located within the AQMA.

LITTLE CROW SOLAR PARK

LAND TO THE EAST OF STEEL WORKS, SCUNTHORPE

Preliminary Environmental Information Report

Chapter 4

THE DEVELOPMENT

4 DEVELOPMENT PROPOSAL

4.1 INTRODUCTION

4.1.1 The main element of the proposal is the construction, operation, maintenance and decommissioning of a ground mounted solar park with a maximum design capacity of up to 150MWp (megawatts peak) and up to 90MW of battery storage capacity.

4.1.2 This chapter is supported by the following figures: -

- **Figure 4.1**: Indicative Layout Drawings
- **Figure 4.2:** Local Network Constraints

4.1.3 This chapter is also supported by the following preliminary technical appendices provided in Volume 2: -

- **Appendix 4.1**: Construction Traffic Management Plan
- **Appendix 4.2**: Landscape and Ecological Management Plan
- **Appendix 4.3**: De-Commissioning Plan
- **Appendix 4.4**: Network Constraints
- **Appendix 4.5**: Air Quality and Carbon Assessment
- **Appendix 4.6**: Draft Development Consent Order

4.1.4 The photovoltaic panels would be laid out in straight arrays set at an angle of c. 20 degrees from east to west across the field enclosures. The distance between the arrays would respond to topography but would typically be between 3.5 metres to 6 metres. The top north edges of the panels would be up to 3.5 metres above ground level and the lower edges of the panels would be approximately 0.8 metres above ground level. The arrays would be static.

4.1.5 Battery storage will allow the development to fully utilise the network connection capacity when the solar park is not exporting at peak capacity. Battery storage will be connected to the distribution terminals in the substation and consists of batteries that can store energy from and release electrical energy to the electricity network.

4.2 OPERATIONAL LIFESPAN

4.2.1 An operational lifespan of 35 years would be sought.

4.2.2 The solar and battery elements could either be delivered and connected to the electricity network independently of each other or at the same time. They could therefore be constructed and become operational either independently or at the same time. An operational lifespan of 35 years will be sought for each element and, subject to when they are constructed, the operational lifespans could run concurrently or interdependently. A single main substation compound will serve the whole development sand this will be required for the duration of the development.

4.2.3 The application proposal would also include a package of landscape, ecological and biodiversity benefits that could include the installation of barn owl boxes, bird nesting boxes, bee hives, log piles and other hibernacula such as small buried rubble

piles suitable for reptile species, amphibians and insect life. Development exclusion zone will be provided for the site of the former Gokewell Priory, no infrastructure will be placed within this zone and it is being promoted for biodiversity, planting and hedgerow enhancement.

4.2.4 Land between and beneath the panels would be used for biodiversity enhancements and seasonal sheep grazing. Tree planting would be introduced along the north east perimeter to bolster screening.

4.2.5 The arrays would be set within a 2.0m high security fence. The distance between the proposed fencing and existing hedges would vary across the site and at its minimum distance this would be circa 4m. Development would have an 15m buffer zone between the ancient woodland located to the east of the development site.

4.2.6 The security measures that will accompany the scheme include CCTV.

4.2.7 The existing woodland plantations that surround the various field enclosures would continue to be managed by the landowner as part of its woodland forestry licence. The hedgerows surrounding the field edges will likely be managed via the Landscape and Ecological Management Plan.

4.3 SUPPORTING INFRASTRUCTURE

4.3.1 There will also be electrical connection infrastructure and the substation compound would be centrally located within the site and to the east of the existing double row of 132kV overhead electricity pylons which traverse the site and duly provides the point of connection to the local electricity network.

4.3.2 The metal framework that houses the solar modules will be supported at intervals by double posts approximately 6m apart. The posts will be driven into the ground at an approximate depth of 1.5 m.

4.3.3 The cabling from each array will be concealed in trenches linking the modules to the transformers and then the main substation compound.

4.4 RENEWABLE ENERGY AND CARBON DISPLACEMENT

4.4.1 The solar park would generate clean renewable energy for the equivalent of over 40,000 homes a year. The anticipated CO2 displacement is around 50,000 tonnes per annum.

4.4.2 The proposal would provide a clean, renewable and sustainable form of electricity. It would make a valuable contribution to the generation of electricity at a local level. The scheme would add to the Council's progress in meeting its renewable energy target. It would also assist in meeting national targets.

4.5 ACCESS

4.5.1 It is proposed that construction traffic will arrive from the M180 junction 4, the A15, the A18, the B1208 and B1207 to the site access. From the M180 junction 4 vehicles will use the A15 northbound to the Briggate Lodge Roundabout and then travel east along the A18 towards Brigg. From the A18, vehicles will turn left onto the B1208. The B1208 measures between approximately 5.5 and six metres wide. Vehicles will travel along the B1208 to the junction with the B1207 and then continue straight ahead into the site access. No construction vehicles associated with the development proposal would travel through Broughton.

4.6 TEMPORARY CONSTRUCTION COMPOUND

4.6.1 During the construction phase, one main construction compound will serve the proposed development and this will be located off the main site entrance, thus reducing the distance delivery vehicles will need to travel after reaching the site's entrance. Construction phase is expected to take around 11 months, if the development is constructed in its entirety. The temporary compound will likely include: -

- Temporary portable buildings to be used for offices, welfare and toilet facilities
- Containerised storage areas
- Parking for construction vehicles and workers vehicles
- Temporary hardstanding
- Temporary gated compound
- Wheel washing facilities.

4.7 STATUTORY UNDERTAKERS

4.7.1 The provision of easements for the existing services that traverse the site, such as water pipes and overhead powerlines, are incorporated into the layout design.

4.8 SURFACE WATER DRAINAGE

4.8.1 The soil is shown to be free-draining, and the underlying soil is naturally drained by the springs which issue along the spring line. The mechanism would therefore be that rainfall infiltrates into the soil, and then follows a layer with low permeability and issues at a generally low rate over a prolonged period from the ground, forming a watercourse. It is proposed to retain the watercourses which issue from the spring line, and provide a minimum 8m buffer from top of bank with no development. Existing watercourses will be protected by silt fences if there is a risk of silt runoff occurring during the works, dependent on weather and prevailing characteristics. Swales will be formed within the site to reduce the risk of any runoff nuisance.

4.9 MITIGATION AND ENHANCEMENT

4.9.1 When the application is made, the description of development will be sufficiently developed to include design, size and locations of the different elements of the proposed development and this will include all mitigation and enhancement measures. The proposed ecological mitigation and enhancement measures are provided in the Landscape and Ecological Management Plan.

4.10 EIA FLEXIBILITY

4.10.1 The need for flexibility in design, layout and technology is identified in a number of National Policy Statements to address uncertainties inherent to the Proposed Development. This very pertinent to solar and battery industries due to the rapid pace of change in technology.

4.10.2 In order to maintain an element of flexibility when the planning application is submitted, the final description of development will set out maximum or a range of design parameters that will be used in the development's description. Such parameters will include the maximum height of the arrays, the maximum number and maximum size of supporting infrastructure and to allow the micro-siting of ancillary infrastructure.

4.11 OPERATION

4.11.1 During the operational phase, the activities on site would amount to servicing of plant and equipment and vegetation management. The Landscape and Ecological Management Plan sets out how the land would be managed throughout the operational phase of development.

4.12 DECOMMISSIONING

4.12.1 A decommissioning plan will support the application, it will set out details of the decommissioning programme to be carried out after a 35 year generation period, the proposed lifetime of the Development Consent Order, or following a prolonged period of cessation, whichever is the earliest. It will include the method for the removal of all the solar panels, cabins, structures, batteries, enclosures, equipment and all other apparatus above and below ground level from the site and details of their destination in terms of waste/recycling, and details of how the site is to be restored. Any elements that will not be removed will also be listed and this is anticipated to be limited to elements of the substation compound adopted by the District Network Operator.

4.12.2 The decommissioning of the proposal is expected to take 12 weeks and generating 80 vehicle movements per week.

4.13 COMPULSORY PURCHASE

4.13.1 A compulsory purchase provision may be incorporated into the DCO to reflect any mineral rights within the development site at time of submission.

4.14 TEMPORARY DIVERSION OF PUBLIC RIGHTS OF WAY

4.14.1 Temporary diversion of a section of the right of way traversing the site will be required during the construction and decommissioning periods in order to separate and keep apart members of the public from the construction / decommissioning vehicles and machinery. It is proposed that the temporary closure will be secured through the DCO and during the duration of the temporary closure an alternative path will be provided which will run around the perimeter of the site until it re-joins the PRoW at the site boundary.

4.15 SITE SELECTION

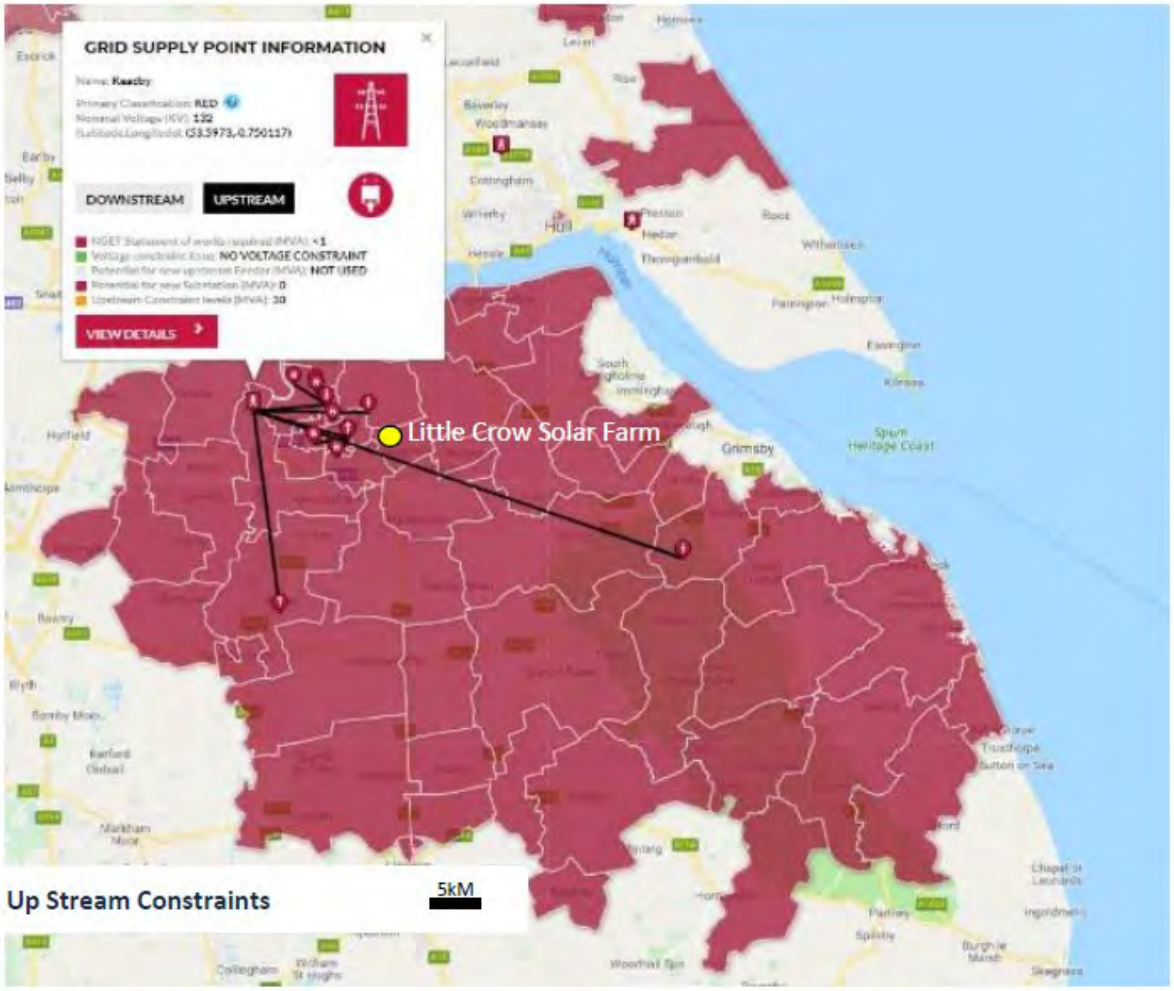
4.15.1 The remaining section of this chapter summarises the site selection process undertaken to identify the development area.

4.15.2 One of the biggest constraints which has to be considered when developing renewable led energy scheme is gaining a viable point of access to the utilities network. Gaining grid connection is very difficult and problematic and for energy proposals sourcing a site with viable grid connection is a reasonable constraint to take into account. Increasingly, electrical connections are being forced back to substations and Bulk Supply Points as the amount of renewable generation connected within the electrical lines has grown. For storage schemes the situation is more complex as the connecting substation must have sufficient export and import capacity. The proposed development will be served by an electrical (grid) looped connection to the existing short section of underground 132kV cables within the development site. Typically, the point of connection (POC) for a project of this size would be located outside the site boundary and in many instances would necessitate the laying of kilometres of underground cable at a substantial cost to connect to the electricity network and potentially rendering projects unviable. The Northern Power Grid (NPG) network section is known as Keadby – Broughton – Teed – Scawby Brook overhead 132kV line circuit.

4.15.3 The applicant has accepted the grid offer from NPG and secured the 99.9MW export capacity required for a project of this size. The grid offer accepted can only be used for the Little Crow Solar Farm and cannot under be transferred to any other site, as this would be deemed by the DNO as a significant alteration to the original application. The only viable connection voltage for a project of this size is 132kV and it requires the construction of a new 132kV sub-station on-site.

4.15.4 The 99.9MW capacity which has been secured by the applicant, has taken the NPG electricity network to its maximum fault level. Therefore, no further distributed generation connections can be connected on to NPG's existing electricity network, within the area highlighted red in figure 4.2 at this time without further significant reinforcement works to the electricity network.

Figure 4.2: Grid Network Constraints



4.15.5 The 99.9MW capacity has also taken the National Grid Electricity Transmission electricity network very close to and possibly over its network capability and will likely mean that NGET will need to install one SGT and in addition a 132kV switchboard to upgrade the Keadby substation. Accordingly, all energy scheme searches start with grid proximity and capacity availability with the incumbent, as this determines where a development can connect to the electricity grid.

4.15.6 Having established the point of connection, the development site itself was selected through an extensive site sieving exercise based on a range of technical,

environmental and economic factors. Whilst each issue is important on its own merits, for nationally significant infrastructure projects each factor must be weighted and measured against other sustainability considerations.

- Solar irradiation levels & shading – An important consideration is selecting a site of suitable shape, orientation and size that can accommodate the proposed development. Large open fields without vegetated boundaries reduce the impact that small fields can have on the layout design. Typically, buffers are left around field edges to vegetation due to shading, tree root protection zones and other constraints such as ditches which have an impact on the installed capacity of a PV array. So significantly less capacity can be sited within a group of smaller fields compared to fewer larger fields.

- Topography - The preference is for a site with a southerly aspect; however; northerly aspect sites cannot be dismissed. However, the outcome of selecting a site with a northerly aspect would be a need to increase the overall development footprint of the scheme (operational need to increase the distance between the arrays in order to avoid overshadowing of modules).

- Proximity to sensitive human receptors - This criterion requires an assessment of how the proposed development would relate to potentially sensitive human receptors on the site and in relation to neighbouring land uses including proximity to populated areas and or local villages.

- Site access during construction - In order to construct a large scale renewable led energy scheme, an appropriate access for construction vehicles must be available.

- Flood risk - Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere. Solar panels are categorised as water compatible and may be sited in flood zones 1, 2 3a and 3b. However, the ancillary components (such as Inverters and Substations) are not water compatible. Accordingly, whilst it is acceptable for part of the site to be located within a higher flood risk zone; locating entire sites within such zones should be avoided.

- Landscape considerations - The landscape and visual effects of energy projects will vary on a case by case basis according to the type of development, its location and the landscape setting of the proposed development. For example, the landscape setting may be industrial in nature with a predominance of vertical features, or it may be dominated by individual developments of lesser scale.

- Agricultural land - Ground mounted solar parks are temporary structures and as such they do not lead to the sterilisation of agricultural land. Accordingly, unlike residential development they do not constitute permanent development resulting in the permanent loss of agricultural land. For ground mounted solar parks, national policy seeks to minimise impact on best and most versatile agricultural land except where this would be inconsistent with other sustainability considerations.

- Heritage - Historic environment - It is preferable for solar PV development sites to have low levels of archaeological interest and a lack of designated sites, such as scheduled monuments, listed buildings and conservation areas within or adjacent to the site. Assets within or adjacent to a development site could have an impact on the location and design of an array. Proposals should demonstrate that no substantial harm is caused to heritage assets; where there is an impact on

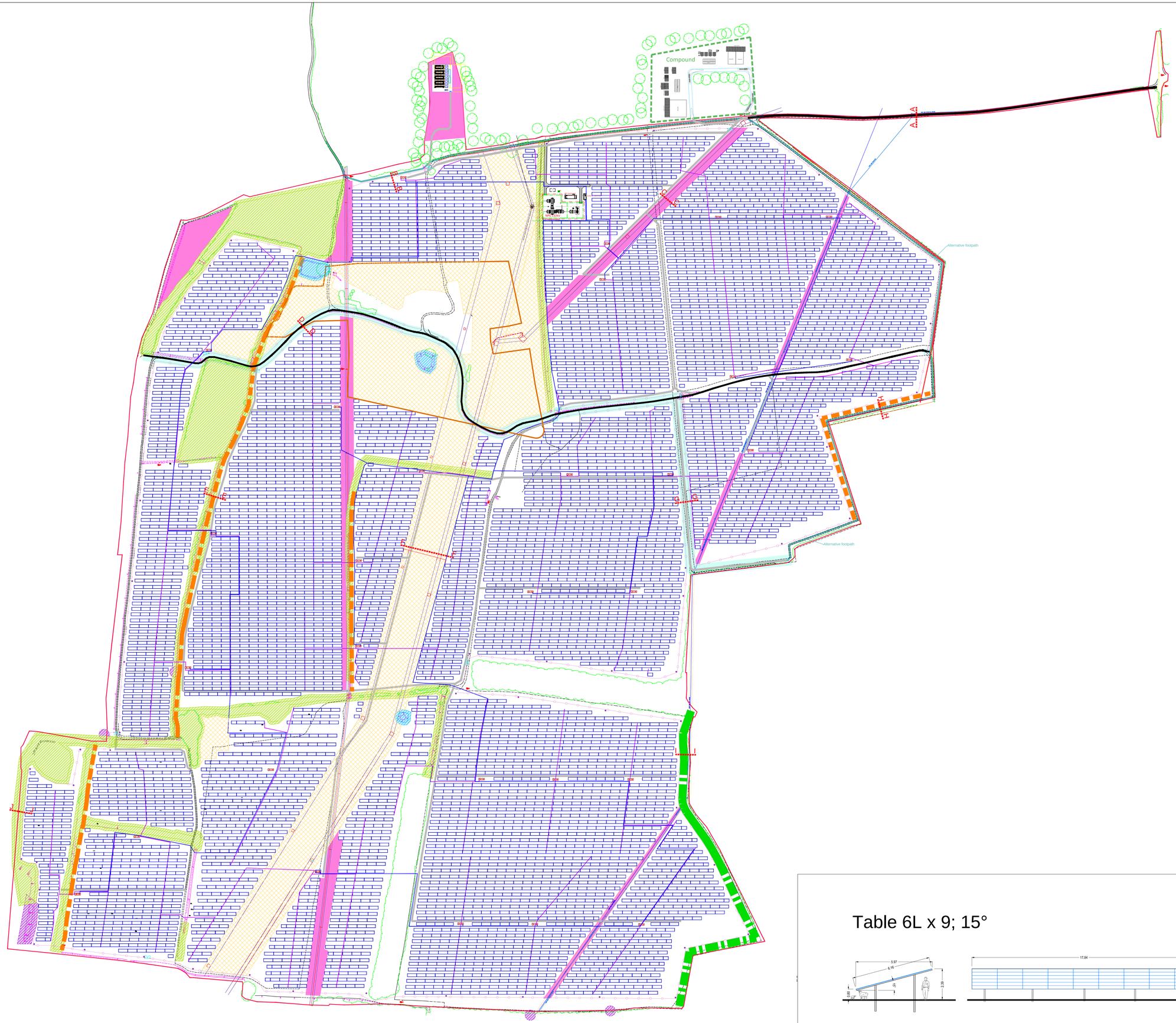
heritage assets relevant mitigation measures should be considered to lessen impact.

- Biodiversity and geological conservation - When assessing a potential solar PV site, national and international nature conservation designations such as Sites of Special Scientific Interest (SSSI), Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar wetland sites and nature reserves are generally avoided as site locations. Areas adjacent to such designations may have potential for development depending on the nature of the designation and of the land potentially subject to development.

- Commercial Agreement with the Landowner - In order to implement a solar PV development, the agreement of the landowner is required. In the case of an NSIP development it could be possible to proceed without this, however in the case of the Development, commercial terms have been agreed with the landowner for the construction and operation of a solar PV and battery storage facility on the land.

Figure 4.1

DRAWING PACK



N

W E

S

Electrical design

Station A

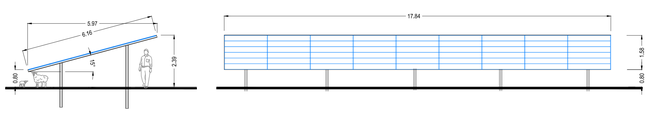
Inverter:
AC-Combiner:
Strings:
Panels:

Meter
50 0 50 100
1:2500

Key

- Table
- Existing Access Track
- New Access Track
- Public Footpath (gap = 15,00m)
- Buffer Woodland (15,0m)
- Swales (Buffer 8,00m)
- Pond (Buffer 5,00m)
- Hedges (Buffer 5,00m)
- Badger Zone (Buffer 20,00m)
- Zone for Winter Birds : 22,5ha
- Zone for Arable Weeds / Species Rich Grasslands : 5,4ha
- Transformer Station
- Construction Area
- Exclusion Zone Archeological
- Fence
- Gate / Entrance
- Trench AC
- Trench MV
- CCTV
- Alternative Footpath

Table 6L x 9; 15°



Section Scale
1:100

Regulations 2009 Document Paragraph Reference Number

Regulation 5(2)(o)

PROJECT NAME

Little Crow Solar Park

DRAWING	DRAWING N°
Table layout	A10B0C0

GEOGRAPHICAL SITE:

COORDINATES	53.5773° N	0.5786° W
NN/MSL	60.0m	
SUNANGLE	13.42°	
DATE	21.12.2017 / 12:00	

SITE SYSTEM:

SYSTEMLAYOUT	6L x 9	6L x 5
NUMBER OF TABLES	6.449 pc	345 pc
PANEL ORIENTATION	Landscape	
NUMBER OF PANELS	357.561	

CHANGE

DATE	CHANGE
10.07.2018	Addet 50MW Battery
16.07.2018	moved Fence and roads
02.08.2018	divers. changes
08.08.2018	divers. changes

SITE TECHNOLOGY:

MODULE NAME	
MODULE SIZE	
MODULE POWER	380 W
TYPE OF PANELS	POLY
ANGLE OF PANELS	15°
TABLESHADOW	1.0 m
ROWDISTANCES	

DRAW

	DATE	NAME
DRAW	01.06.2018	M. Riedel
DRAW	10.07.2018	M. Riedel
DRAW	16.07.2018	M. Riedel
DRAW	02.08.2018	M. Riedel
DRAW	08.08.2018	
DRAW		
CHECK		
CHECK		

SITE TOTAL POWER

DC POWER	135.87 MWp
AC-POWER nom.	
AC-POWER max.	

Signature:

Scale	1:2500
Paper size	A0

GREENCELLS GROUP

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tel: +49 (0)30 761 642 0
fax: +49 (0)30 761 642 1
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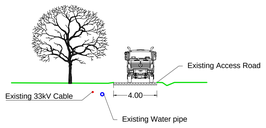
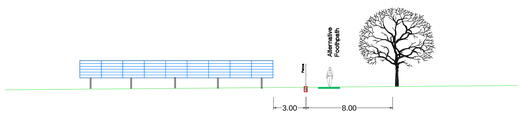
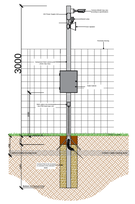
info@greencells.de

Section A



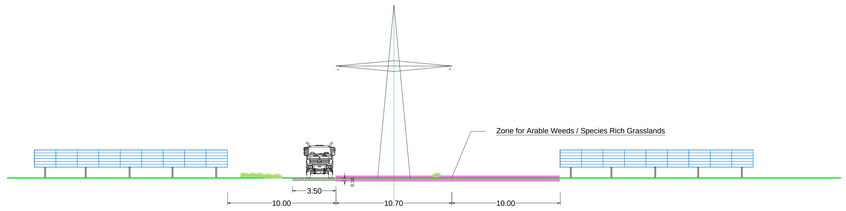
Section B

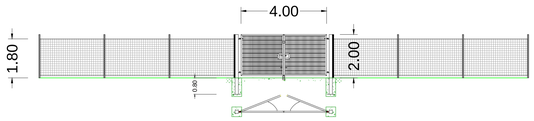




CCTV Detail
Scale 1:50

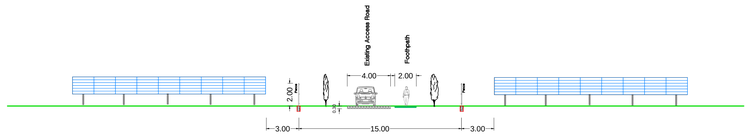
Section C



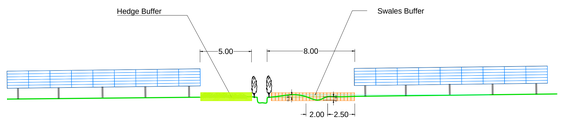


Fence and Gate Detail
Scale 1:100

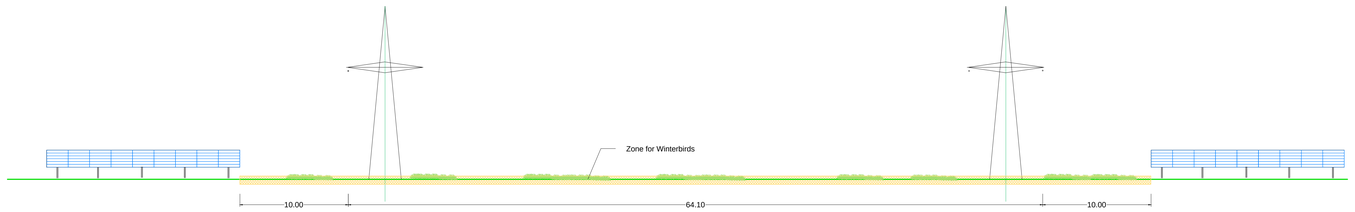
Section D + G



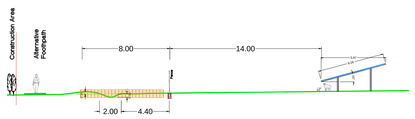
Section E



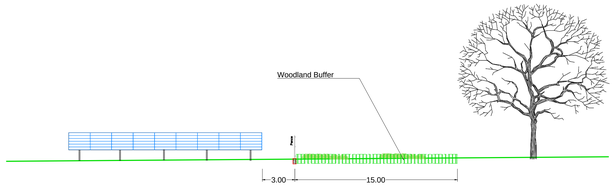
Section F

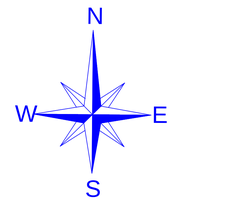


Section H



Section I





Electrical design

Station A

Inverter:
AC-Combiner:
Strings:
Panels:

Key

- Public Footpath (gap = 15,00m)
- Buffer Woodland (15,0m)
- Swales (Buffer 8,00m)
- Pond (Buffer 5,00m)
- Hedges (Buffer 5,00m)
- Badger Zone (Buffer 20,00m)
- Zone for Grass and Birds

Regulations 2009 Document Paragraph Reference Number

Regulation 5(2)(o)

PROJECT NAME

Little Crow Solar Park

DRAWING	DRAWING N°
Details	A02B0C0

GEOGRAPHICAL SITE:

COORDINATES	53.5773° N 0.5786° W
NN/MSL	60.0m
SUNANGLE	13.42°
DATE	21.12.2017 / 12:00

SITE SYSTEM:

SYSTEMLAYOUT	6L x 9	6L x 5
NUMBER OF TABLES	6.449 pc	345 pc
PANEL ORIENTATION	Landscape	
NUMBER OF PANELS	357.561	

CHANGE

DATE	CHANGE

SITE TECHNOLOGY:

MODULE NAME	
MODULE SIZE	
MODULE POWER	380 W
TYPE OF PANELS	POLY
ANGLE OF PANELS	15°
TABLESHADOW	1.0 m
ROWDISTANCES	

DRAW

	DATE	NAME
DRAW	10.08.2018	M. Riedel
DRAW		
DRAW		
DRAW		
DRAW		
DRAW		
CHECK		
CHECK		

SITE TOTAL POWER

DC POWER	135.87 MWp
AC-POWER nom.	
AC-POWER max.	

Signature:

Scale	1:200
Paper size	A0

GREENCELLS GROUP

LITTLE CROW SOLAR PARK

LAND TO THE EAST OF STEEL WORKS, SCUNTHORPE

Preliminary Environmental Information Report

Chapter 5

LEGISLATION, CLIMATE CHANGE, ENERGY PLANNING POLICY & GUIDANCE

5. LEGISLATION, CLIMATE CHANGE, ENERGY PLANNING POLICY & GUIDANCE

5.1 INTRODUCTION

5.1.1 This PEIR chapter provides an overview of the planning regulatory & policy framework which sets the basis for decision-taking for nationally significant energy infrastructure projects.

5.2 THE PLANNING REGULATORY FRAMEWORK

5.2.1 The Planning Act 2008 introduced a new system for consulting on, examining and determining whether consent should be granted for NSIPs.

5.2.2 The main legislative and procedural requirements relating to NSIPs are set out within the following:

- The Planning Act 2008
- The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (the APFP Regulations)
- The Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 (the 2009 EIA Regulations) and The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the 2017 EIA Regulations)

5.3 NATIONAL POLICY

5.3.1 National Policy Statements are the overarching policy documents for the Examining Authority to take into account when determining an application for nationally significant energy infrastructure and form the basis for determination of decisions. The application must therefore demonstrate accordance with the relevant National Policy Statements. In the case of renewable energy projects the following National Policy Statements must be taken into account:

- EN-1: Overarching National Policy Statement for Energy
- EN-3: National Policy Statement for Renewable Energy Infrastructure

5.4 OVERARCHING NATIONAL POLICY STATEMENT FOR ENERGY (EN-1) DATED JULY 2011

5.4.1 The National Policy Statement for Energy (EN-1) sets out the national policy for energy infrastructure, which encompasses renewable energy schemes generating more than 50MW. EN-1 is part of a suite of national policy statements issued by the Secretary of State for Energy and Climate Change and ratified by Parliament. It has effect in combination with the relevant technology specific NPS, National Policy for Renewable Energy Infrastructure (EN-3), and together they provide the primary basis for consenting made by the Examining Authority.

5.4.2 EN-1 is divided into five parts:

5.4.3 Part 1 sets out the background to the policy document. Paragraph 1.71 identify how all energy NPSs have been subject to an Appraisal of Sustainability ("AoS"), as required by the Planning Act 2008. The key points from the AoS for EN-1, as set out at paragraph 1.7.2, are: -

- The energy NPSs should speed up the transition to a low carbon economy and thus help realise UK climate change commitments sooner that continuation under the current planning system.
- The energy NPSs are likely to contribute positively towards improving the vitality and competitiveness of the UK energy market by providing greater clarity for developers which should improve the UK's security of supply and, less directly, have a positive effects for the health and well-being in the medium to longer term through helping to secure affordable supplies of energy and minimizing fuel poverty, positive medium and long term effects are also likely for equalities;
- The development of new energy infrastructure, at the scale and speed required to meet the current and future need, is likely to have some negative effects on biodiversity, landscape/visual amenity and cultural heritage. However the significance of these effects and the effectiveness of mitigation possibilities is uncertain at the strategic and non-locationally specific level at which EN-1 to EN-5 are pitched. Short-term construction impacts are also likely through an increased use of raw materials and resources and negative effects on the economy due to impacts on existing land and sea uses. In general, it should be possible to mitigate satisfactorily the most significant potential negative effects of new energy infrastructure consented in accordance with the energy NPSs, and they explain ways in which this can be done; however, the impacts on landscape/visual amenity in particular will sometimes be hard to mitigate.
- Paragraph 1.7.11 of EN-1 identifies how the principal area in which consenting new energy infrastructure in accordance with the energy NPSs is likely to lead to adverse effects which cannot always be satisfactorily mitigated.

5.4.4 Part 2 of EN-1 sets out the Government policy on energy and energy development infrastructure. It confirms the following

- Government is committed to meeting its legally binding target to cut greenhouse gas emissions by at least 80% by 2050, compared to 1990 levels
- the need to effect a transition to a low carbon economy so as to reduce greenhouse gas emissions; and
- the importance of maintaining secure and reliable energy supplies as older fossil fuel generating plant closes as the UK moves towards a low carbon economy
- Government's wider objective for energy infrastructure includes contributing to sustainable development and ensuring that energy infrastructure is safe.

5.4.5 Paragraph 2.2.27 of the EN-1 goes on to state *"Sustainable development is relevant not just in terms of addressing climate change, but because the way energy infrastructure is deployed affects the well-being of society and the economy".*

5.4.6 Part 3 of EN-1 defines and sets out the need that exists for nationally significant energy infrastructure. With regards to decision making, paragraph 3.1.1. of EN1-1, states how *"the UK needs all the types of energy infrastructure covered in this NPS in order to achieve energy security at the same time as dramatically reducing greenhouse gas emissions"*.

5.4.7 Paragraph 3.1.2 states *"It is for industry to propose new energy infrastructure projects within the strategic framework set by Government. The Government does not consider it appropriate for planning policy to set targets for or limits on different technologies".* It then goes on to identify how NSIP applications should therefore be assessed on the basis that the Government has already demonstrated that there is a need for those types of infrastructure and that the scale and urgency of that need is as described in the EN-1.

5.4.8 In terms of the planning balance, paragraph 3.1.4 of EN1 states *"The [determining authority] should give substantial weight to the contribution which projects would make*

towards satisfying this need when considering applications for development consent under the Planning Act 2008".

5.4.9 Section 3.3 of the EN1 discusses the need for new nationally significant electricity infrastructure projects. The key reasons why Government believes there is an urgent need for new electricity NSIPs are identified as: -

- Meeting the energy security and carbon reduction objectives;
- Need to replace closing electricity generating capacity;
- The need for more electricity capacity to support an increased supply from renewables.
- Future increases in electricity demand; and
- The urgency of the need for new electricity capacity**.**

5.4.10 Paragraph 3.3.11 identifies how renewable sources, such as solar, are intermittent and as such will require back-up sources at times when the availability of intermittent renewable sources is low. Paragraph 3.3.12 goes on to identify how electrical storage technologies can be used to compensate for the intermittence.

5.4.11 Part 3.4 of EN-1 specifically discusses the role of renewable energy and states: -

> The UK has committed to sourcing 15% of its total energy (across the sectors of transport, electricity and heat) from renewable sources by 202040 and new projects need to continue to come forward urgently to ensure that we meet this target. Projections suggest that by 2020 about 30% or more of our electricity generation – both centralised and small-scale – could come from renewable sources, compared to 6.7% in 200942. The Committee on Climate Change in Phase 1 of its advice to Government in September 2010 agreed that the UK 2020 target was appropriate, and should not be increased. Phase 2 was published in May 2011 and provided recommendations on the post 2020 ambition for renewables in the UK, and possible pathways to maximise their contribution to the 2050 carbon reduction targets.
>
> Large scale deployment of renewables will help the UK to tackle climate change, reducing the UK's emissions of carbon dioxide by over 750 million tonnes by 2030. It will also deliver up to half a million jobs by 2020 in the renewables sector…

5.4.12 With regards to the urgency for renewables, paragraph 3.4.5 explains that in order to hit the 2020 target and to largely decarbonize the power sector by 2030, it is necessary to bring forward new renewable electricity generation projects as soon as possible. It goes on to state *"The need for new renewable electricity generation projects is therefore urgent"*.

5.4.13 Part 4 of EN-1 sets out certain strategic principles to be applied in respect of nationally significant energy infrastructure schemes

5.4.14 Paragraph 4.1.2 states how the determining authority should start with the presumption in favor of granting consent to applications for energy NSIPs. That presumption applies unless any more specific and relevant polices set out in the relevant NPSs clearly indicate that consent should be refused.

5.4.15 The presumption is also subject to the provisions of the Planning Act 2008.

5.4.16 Paragraph 4.1.4 of EN-1 states how in considering any proposed development, and in particular when weighing its adverse impacts against its benefits, the determining authority should take into account: -

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

5.4.17 Development consent obligations that are agreed with local authority are considered through paragraph 4.1.8 and this states that the determining authority may take these into account provided that they are relevant to planning, necessary to make the proposed development acceptable in planning terms, directly relates to the proposed development, fairly and reasonably related in scale and kind to the proposed development, and reasonable in all other respects.

5.4.18 Part 4.4 deal with alternatives. Paragraph 4.4.1 states *"From a policy perspective this NPS does not contain any general requirement to consider alternatives or to establish whether the proposed project represents the best option".*

5.4.19 That said paragraph 4.4.2 identified how applicants are obliged to include in their ES, as a matter of fact, information about the main alternatives they have studied and this should include an indication of the main reasons for the applicant's choice, taking into account the environmental, social and economic effects.

5.4.20 Paragraph 4.4.3 goes on to state that where there is a policy or legal requirement to consider alternatives the applicant should describe the alternatives considered in compliance with these requirements. Given the level and urgency of need for new energy infrastructure, the IPC should, subject to any relevant legal requirements (e.g. under the Habitats Directive) which indicate otherwise, be guided by the following principles when deciding what weight should be given to alternatives: -

- the consideration of alternatives in order to comply with policy requirements should be carried out in a proportionate manner;
- the determining authority should be guided in considering alternative proposals by whether there is a realistic prospect of the alternative delivering the same infrastructure capacity (including energy security and climate change benefits) in the same timescale as the proposed development;
- where (as in the case of renewables) legislation imposes a specific quantitative target for particular technologies the determining authority should not reject an application for development on one site simply because fewer adverse impacts would result from developing similar infrastructure on another suitable site, and it should have regard as appropriate to the possibility that all suitable sites for energy infrastructure of the type proposed may be needed for future proposals;
- alternatives not among the main alternatives studied by the applicant (as reflected in the ES) should only be considered to the extent that the determining authority thinks they are both important and relevant to its decision;
- alternative proposals which mean the necessary development could not proceed, for example because the alternative proposals are not commercially viable or alternative proposals for sites would not be physically suitable, can be excluded on the grounds that they are not important and relevant to the determining authority's decision;
- alternative proposals which are vague or inchoate can be excluded on the grounds that they are not important and relevant to the IPC's decision; and
- it is intended that potential alternatives to a proposed development should, wherever possible, be identified before an application is made to the determining authority in respect of it (so as to allow appropriate consultation and the development of a suitable evidence base in relation to any alternatives which are particularly relevant).

Therefore where an alternative is first put forward by a third party after an application has been made, the determining authority may place the onus on the person proposing the alternative to provide the evidence for its suitability as such and the determining authority should not necessarily expect the applicant to have assessed it.

5.4.21 On the issue of design for energy infrastructure, paragraph 4.5.1 of the EN-1 identifies how (inter alia) *"Applying "good design" to energy projects should produce sustainable infrastructure sensitive to place, efficient in the use of natural resources and energy used in their construction and operation, matched by an appearance that demonstrates good* aesthetic *as far as possible. It is acknowledged, however that the nature of much energy infrastructure development will often limit the extent to which it can contribute to the enhancement of the quality of the area".*

5.4.22 The relationship between design and function is explored through paragraph 4.5.3 and states *"In the light of the above, and given the importance which the Planning Act 2008 places on good design and sustainability, the IPC needs to be satisfied that energy* infrastructure *developments are sustainable and, having regard to regulatory and other constraints, are as attractive, durable and adaptable (including taking account of natural hazards such as flooding) as they can be. In so doing, the IPC should satisfy itself that the applicant has taken into account both functionality (including fitness for purpose and sustainability) and aesthetics (including its contribution to the quality of the area in which it would be located) as far as possible. Whilst the applicant may not have any or very limited choice in the physical appearance of some energy infrastructure, there may be opportunities for the applicant to demonstrate good design in terms of siting relative to existing landscape character, landform and vegetation. Furthermore, the design and sensitive use of materials in any associated development such as electricity substations will assist in ensuring that such development contributes to the quality of the area".*

5.4.23 Paragraph 4.9.1 of the EN-1 recognises that *"The connection of a proposed electricity generation plant to the electricity network is an important consideration for applicants wanting to construct or extend generation plant*". It goes on to state how *"In the market* system*, it is for the applicant to ensure that there will be necessary infrastructure and capacity within an existing or planned transmission or distribution network to accommodate the electricity generated"*. This is an important consideration when considering alternatives as the applicant has secured a point of connection within the confides of the development site.

5.4.24 Part 5 of the EN-1 sets out the generic impacts that may or may not be pertinent to specific projects, these are lists as: -

Table 5.1 EN-1 Generic Impacts.

Topic	**Commentary**
Land use	With regards to agricultural land classification, para 5.10.8 states how applicants should seek to minimize impacts on the best and most versatile agricultural land except where this would be inconsistent with other sustainability considerations. Paragraph 5.10.15 identifies how the determining authority should ensure that applicants provide justification when locating sites on best and most versatile agricultural land. With regards to mitigation, EN-1 states that there may be ,little that can be done to mitigate the direct effects of an energy project on the existing use of the proposed site.

Landscape and Visual	Paragraph 5.9.8 sets out that for nationally significant energy infrastructure, projects need to be designed carefully, having regard to siting, operational and other relevant constraints the aim should be to minimize harm to the landscape, providing reasonable mitigation where possible and appropriate.
Biodiversity and geological conservation	As a general principle, development should aim to avoid significant harm to biodiversity and geological conservation interests, including through mitigation and consideration of reasonable alternatives; where significant harm cannot be avoided, then appropriate compensation measures should be sought.
Historic Environment	Paragraph 5.8.8 states that as part of the ES the applicant should provide a description of the significance of the heritage assets assessed by the proposed development and the contribution of their setting to that significance. The level of detail should be proportionate to the importance of the heritage asset and no more than is sufficient to understand the potential impact of the proposal on the significance of the heritage asset. Paragraph 5.8.12 goes on to state that in considering the impact of the proposed development on any heritage asset, the determining authority should take into account the particular nature of the significance of the heritage assets and the value that they hold for this and future generations. This understanding should be used to avoid or minimize conflict between conservation of that significance and proposals for development.
Dust, odour, artificial lighting	Paragraph 5.6.3 of EN-1 recognises that for energy NSIP, some impacts on amenity for local communities is likely to be unavoidable. The aim should be to keep impacts to a minimum, and at a level that is acceptable.
Flood Risk	Applications for energy projects of 1 hectare of greater in flood zone 1 should be accompanied by a flood risk assessment. The surface water drainage arrangements for any project should be such that the volumes and peal flow rate of surface water leaving the site are no greater than the rate prior to the proposed project, unless specific off-site arrangements are made and results in the same net effect.
Air Quality and Emission	Paragraph 5.2.6 states *"Where the project is likely to have adverse effects on air quality the applicant should undertake an assessment of the impacts of the proposed project as part of the Environmental Statement".* The ES should describe: any significant air emissions, their mitigation and any residual effects distinguishing between the project stages and taking account of any significant emissions from any road traffic generated by the project; the predicted absolute emission levels of the proposed project, after mitigation methods have

	been applied; existing air quality levels and the relative change in air quality from existing levels; and any potential eutrophication impacts.
Socio Economic	Paragraph 5.12.3 states *"Where the project is likely to have socio-economic impacts at local or regional levels, the applicant should undertake and include in their application an assessment of these impacts as part of the ES".* The effects should consider: the creation of jobs and training opportunities; the provision of additional local services and improvements to local infrastructure, including the provision of educational and visitor facilities; effects on tourism; the impact of a changing influx of workers during the different construction, operation and decommissioning phases of the energy infrastructure. This could change the local population dynamics and could alter the demand for services and facilities in the settlements nearest to the construction work (including community facilities and physical infrastructure such as energy, water, transport and waste). There could also be effects on social cohesion depending on how populations and service provision change as a result of the development; and cumulative effects – if development consent were to be granted to for a number of projects within a region and these were developed in a similar timeframe, there could be some short-term negative effects, for example a potential shortage of construction workers to meet the needs of other industries and major projects within the region.
Traffic and Transport	With regards to decision taking, EN-1 recognises that a new energy NSIP may give rise to substantial impacts on the surrounding transport infrastructure and the Planning Inspectorate should therefore ensure that the applicant has sought to mitigate these impacts, including during the construction phase of the development. Where the proposed mitigation measures are insufficient to reduce the impact on the transport infrastructure to acceptable levels, the IPC should consider requirements to mitigate adverse impacts on transport networks arising from the development.
Water Quality	Where the project is likely to have effects on the water environment, the applicant should undertake an assessment of the existing status of, and impacts of the proposed project on, water quality, water resources and physical characteristics of the water environment as part of the ES or equivalent

5.5 NATIONAL POLICY STATEMENT FOR RENEWABLE ENERGY INFRASTRUCTURE (EN-3)

5.5.1 EN-3 contains policies specifically relating to specific renewable energy infrastructure and it is designed to be read in conjunction with EN-1. The document focuses on schemes relating to onshore wind, offshore wind and energy from biomass. Paragraph 1.8.2 states that the NPS does not cover any other types of renewable energy generation that were technically viable over 50MW onshore when the document was published in July 2011. The

emergence of large scale ground mounted solar projects therefore follows the publication of this document.

5.6 NATIONAL PLANNING POLICY FRAMEWORK 2018 (2ND EDITION)

5.6.1 The revision to the Framework, which came into force on 24 July 2018, has affected both its contents and structure whereby the document is now set into 17 topic based chapters. Overall, for the NPPF 2nd edition, the over-arching presumption in favour of sustainable development remains. Material for this development is how Government has placed a greater emphasis on the delivery of infrastructure, including energy and how this is integral towards fulfilling the economic arm of achieving sustainable development[1].

5.6.2 Paragraph 8 of the Framework identifies how the planning system has three overarching objectives towards achieving sustainable development.

5.6.3 The revised NPPF stated how these objectives re interdependent and need to be pursued in mutually supportive ways so that opportunities can be taken to secure net gains across each of the different objectives. Paragraph 8(a) 'an economic objective' has been strengthened and the NPPF now makes it clearer how *"identifying and coordinating provision of infrastructure"* is integral towards fulfilling the economic arm of achieving sustainable development. The three overarching objectives are listed as:-

- an economic objective – to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure;
- a social objective – to support strong, vibrant and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering a well-designed and safe built environment, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being; and
- an environmental objective – to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.

5.6.4 Paragraph 9 advises how these overarching objectives should be delivered through the preparation and implementation of plans and the application of policies in the Framework. Paragraph 10 states "So that sustainable development is pursued in a positive way, at the heart of the Framework is a presumption in favour of sustainable development".

5.6.5 Paragraph 15 of the Framework sets out how the planning system should be genuinely plan-led. It goes on to state how succinct and up-to-date plans should provide a positive vision for the future of each and provide a framework for assessing the economic, social and environmental priorities. Paragraph 16 set out how plans should be prepared with the objective of contributing to the achievement of sustainable development. Paragraph 20 identifies how, in line with the presumption on favour of sustainable development, plans should make sufficient provision for the provision of infrastructure and energy.

[1] See NPPF 2nd edition paragraph 6 which introduces how the recommendations of the National Infrastructure Committee may be material when deciding applications, and Paragraph 8(a).

5.6.6 The identification and delivery of energy schemes is therefore acknowledged by the NPPF 2nd edition as one of the strategic policies that contributes towards achieving the presumption on favour of sustainable development.

5.6.7 Paragraph 80 confirms the Government's commitment to supporting sustainable economic growth and states (inter alia) *"Planning policies and decisions should help create the conditions in which businesses can invest, expand and adapt. Significant weight should be placed on the need to support economic growth and productivity, taking into account both local business needs and wider opportunities for development. The approach taken should allow each area to build on its strengths, counter any weaknesses and address the challenges of the future"*.

5.6.8 Paragraph 83, supporting a prosperous rural economy, is also pertinent as the Development Plan identifies the site as being located in open countryside, it states how planning decisions should enable the sustainable growth of all types of businesses in the rural areas; and the development and diversification of agricultural and other land-based rural businesses.

5.6.9 Section 14 of the NPPF relates to meeting the challenge of climate change, flooding and coastal change. Paragraph 150 of the NPPF sets out the planning policy perspective with regards to increasing the use and supply of renewable and low carbon energy. Through the paragraph, Government requires the decision maker to:-

- provide a positive strategy for energy from these sources, that maximises the potential for suitable development, while ensuring that adverse impacts are addressed satisfactorily (including cumulative landscape and visual impacts);
- consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure their development; and
- identify opportunities for development to draw its energy supply from decentralised, renewable or low carbon energy supply systems and for co-locating potential heat customers and suppliers.

5.6.10 Section 15 of the NPPF relates to conservation and enhancement of the natural environment. Paragraph 170 highlights that new development should be prevented from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability. It identifies how decisions should provide net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures.

5.6.11 The Framework has deleted its specific policy paragraph that dealt with land quality (former paragraph 112) and the issue of best and most versatile agricultural land is now dealt with by footnote 53 which states "Where significant development of agricultural land is demonstrated to be necessary, areas of poorer quality land should be preferred to those of a higher quality".

5.6.12 Annex 2 of the Framework provides a glossary of terms and defines 'best and most versatile agricultural land' as land in grades 1, 2 and 3a of the Agricultural Land Classification. The Provisional 1988 ALC survey identifies the application site as being Grade 4 agricultural land, which is poor quality agricultural land.

5.6.13 Overall, the Framework 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.

5.7 NATIONAL PLANNING PRACTICE GUIDANCE SUITE

5.7.1 On 6 March 2014 the Department for Communities and Local Government (DCLG) launched this planning practice guidance web-based resource. The guidance documents cancelled by its launch included the July 2013 edition of the 'Planning Practice Guidance for Renewable Energy'. The suite provides planning guidance on various planning policy and development management topics. The key topics relevant to this application are:

- Climate Change; and
- Renewable and low carbon energy.

Practical Guidance on Climate Change (**last updated 27 March 2015**)

5.7.2 Government's Practical Guidance on Climate Change identifies how addressing climate change is one of the core land use planning principles which the National Planning Policy Framework expects to underpin in both plan-making and decision-taking. Paragraph 3 sets out examples of mitigating climate change by reducing emissions, these include (i) Providing renewable and low carbon energy technologies and (ii) providing opportunities for decentralised energy. The development proposal achieves both.

5.7.3 Paragraph 5 of the guidance identifies how impacts of climate change needs to be taken into account in a realistic way. It goes on to state that local planning authorities should consider identifying no or low cost responses to climate change that also deliver other benefits. In this instance the proposals is applicant led; and as such there is no financial costs associated with the delivery of this response to climate change for the local planning authority. Furthermore, as stated elsewhere in this statement, Paragraph 7 recognises that all land uses have their own challenges for reducing carbon emissions and different sectors have different options for mitigation. It states *"measures for reducing emissions in agricultural related development include anaerobic digestion, improved slurry and manure storage and improvements to buildings"*

Renewable and Low Carbon Energy (**last updated 18 June 2015**)

5.7.4 This guidance reaffirms Government's commitment towards increasing the amount of renewable energy and low carbon technologies within the UK.

5.7.5 Paragraph 1 states: "*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. 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*".

5.8 CLIMATE CHANGE

5.8.1 The background to the current drive to increase the use of renewable sources of energy has its roots in the recognition that the burning of fossil fuels has an adverse effect on the climate of the world as a whole and that global measures are required to deal with it. The extensive use of fossil fuels that accompanied the industrialisation of the world's economy has released large volumes of CO2 back into the atmosphere. The accumulation of greenhouse gases in the upper atmosphere reduces the planet's ability to reflect solar radiation back into space, resulting in a gradual increase in mean global air temperature.

5.8.2 The scientific evidence on climate change is summarised in 'Climate Change Explained' first published on 23 October 2014 by the Department of Energy and Climate Change. To

summarise, it states that there is clear evidence to show that climate change is happening. Measurements show that the average temperature at the Earth's surface has risen by about 0.8°C over the last century. 13 of the 14 warmest years on record have occurred in the 21st century and in the last 30 years each decade has been hotter than the previous one. This change in temperature hasn't been the same everywhere; the increase has been greater over land than over the oceans and has been particularly fast in the Arctic.

5.8.3 The UK is already affected by rising temperatures. The average temperature in Britain is now 1 Deg C higher than it was 100 years ago and 0.5 Deg C higher than it was in the 1970s.

5.8.4 Although it is clear that the climate is warming in the long-term, note that temperatures aren't expected to rise every single year. Natural fluctuations will still cause unusually cold years and seasons. Along with warming at the Earth's surface, many other changes in the climate are occurring:

- warming oceans;
- melting polar ice and glaciers;
- rising sea levels; and
- more extreme weather events.

5.8.5 Rising levels of carbon dioxide and other gases, such as methane, in the atmosphere create a 'greenhouse effect', trapping the Sun's energy and causing the Earth, and in particular the oceans, to warm. Heating of the oceans accounts for over nine tenths of the trapped energy. Scientists have known about this greenhouse effect since the 19th Century.

5.8.6 The higher the amounts of greenhouse gases in the atmosphere, the warmer the Earth becomes. Recent climate change is happening largely as a result of this warming, with smaller contributions from natural influences like variations in the Sun's output.

5.8.7 Carbon dioxide levels have increased by more than 40% since before the industrial revolution. Other greenhouse gases have increased by similarly large amounts. All the evidence shows that this increase in greenhouse gases is almost entirely due to human activity. The increase is mainly caused by:

- burning of fossil fuels for energy;
- agriculture and deforestation;
- the manufacture of cement, chemicals and metals; and

5.8.8 About 43% of the carbon dioxide produced goes into the atmosphere, and the rest is absorbed by plants and the oceans. Deforestation reduces the number of trees absorbing carbon dioxide and releases the carbon contained in those trees.

5.8.9 The government advise that if action is now taken to radically reduce greenhouse gas emissions, there's a good chance that we can limit average global temperature rises to 2 Deg C. By taking action now we could:-

- Avoid burdening future generations with greater impacts and costs of climate change;
- Enable economies to cope better by mitigating environmental risks and improving energy efficiency there will be wider benefits to health, energy security and biodiversity; and
- Benefit economically because if we delay acting on emissions, it will only mean more radical intervention in the future at greater cost.

5.8.10 It is also recognised that taking action now can also help to achieve long-term, sustainable economic growth from a low-carbon economy.

5.9 UK LEGISLATIVE CONTEXT

5.9.1 The objectives of the UK renewable energy policies are in accordance with the overall European policy objectives. These are focused on a number of key climate change challenges, these include:-

- The reduction of CO2 emissions to tackle climate change;
- The promotion of competitive energy markets in the UK; and
- Security of decentralised energy supplies.

5.10 CLIMATE CHANGE ACT 2008

5.10.1 The Climate Change Act 2008 gives Ministers the power to issue guidance to reporting authorities on:

- assessing the current and projected impacts of climate change;
- preparing proposals and policies for adapting to climate change;
- co-operating with other organisations for that purpose

5.10.2 The Act sets the legally binding target of an 80% cut in greenhouse gas emissions by 2050, and sets a carbon budgeting system that caps emissions over five year periods.

5.10.3 The two key aims of the Act are to:

- improve carbon management, helping the transition towards a low-carbon economy in the UK
- demonstrate UK leadership internationally, signalling commitment to taking our share of responsibility for reducing global emissions in the context of developing international negotiations.

5.10.4 The UK Committee on Climate Change advises the government on progress on tackling climate change.

5.11 STATUTORY INSTRUMENT (2011 NO. 243) – THE PROMOTION OF THE USE OF ENERGY FROM RENEWABLE SOURCES REGULATIONS 2011 (FEBRUARY 2011)

5.11.1 Statutory Instrument No. 243 (The Promotion of the Use of Energy from Renewable Sources Regulations) came in to force on the 14th March 2011. This Regulation places a duty on the Secretary of State to ensure that the renewables share in 2020 is at least 15%. Regulation 4(1) places a duty on the Secretary of State to introduce measures effectively designed to ensure the indicative targets for the share of energy from renewable sources set out in the Schedule (below), are met. Regulations 4(2) and 4(3) modify that duty in the event that an indicative target is missed.

INDICATIVE TARGET PERIOD	PERCENTAGE
1ST JANUARY 2011 TO 31ST DECEMBER 2012	4%
1ST JANUARY 2013 TO 31ST DECEMBER 2014	4.5%
1ST JANUARY 2015 TO 31ST DECEMBER 2016	7.5%

1ST JANUARY 2017 TO 31ST DECEMBER 2018	10.2%

5.12 UK RENEWABLE ENERGY STRATEGY

5.12.1 The 'UK Renewable Energy Strategy' was published in July 2009 by DECC, identifying how to radically increase renewable energy use in the UK as part of an overall strategy for tackling climate change. This strategy would also meet the UK's European obligations and legally binding targets to ensure that 15% of our energy comes from renewable sources by 2020.

5.13 ENERGY SECURITY STRATEGY

5.13.1 This document was published in November 2012 and provides a detailed and open assessment of the UK's current energy security, outlines work already underway to safeguard our energy security, and sets out the policy which the Government is putting in place to ensure that our energy supplies remain secure.

5.13.2 Whilst the document identified that total UK energy demand 'is predicted to fall by 7 per cent between 2011 and 2020'; it also recognises that demand for 'electricity is likely to increase by at least 30 per cent and potentially by 100 per cent as much of our heating and transportation becomes electrified'

5.13.3 One of the key goals of the Energy Security Strategy is to decarbonise electricity supply which will help reduce UK reliance on international fossil fuel.

5.13.4 The UK Government recognises that increasing the amount of energy UK gets from low–carbon technologies will help make sure the UK has a secure supply of energy.

5.14 UK RENEWABLE ENERGY ROADMAP UPDATE (NOVEMBER 2013 EDITION)

5.14.1 The Government first published the Renewable Energy Roadmap in July 2011 which sets out the path to achieve the UK's headline renewable energy target.

5.14.2 The Roadmap has been updated on two occasions since July 2011, once in 2012 and most recently in November 2013. In these updates sustainable biomass electricity has been included as one of the key technologies to help create a balanced UK energy mix.

5.14.3 Paragraph 103 of the roadmap recognises how DECC continues to support innovation in bioenergy technologies.

5.15 CLEAN GROWTH STRATEGY (DATED OCTOBER 2017)

5.15.1 The Clean Growth Strategy, published in October 2017, provides the Government's latest position on solar parks and sets out a comprehensive set of policies and proposals that aim to accelerate the pace of "clean growth", i.e. deliver increased economic growth and decreased emissions.

5.15.2 To achieve the clean growth, the Government identifies how the UK will need to nurture low carbon technologies, processes and systems that are as cheap as possible, this includes subsidy free ground mounted solar parks as achieved by this development proposal. The Government places significant emphasis on securing increased investment across the energy systems whilst minimising, as much as possible, the public costs for securing such investments and makes multiple references to how they are seeking the delivery of solar

without subsidy. Moreover, page 99 specifically states how *"Government want to see more people investing in solar without government support".*

5.16 DIGEST OF UNITED KINGDOM ENERGY STATISTICS (JULY 2017 EDITION)

5.16.1 This Digest, also referred to as DUKES, is an essential source of energy information providing figures on the UK's overall energy performance, production and consumption. The digest is published annually and the latest edition was published in July 2017. The salient points of the report are: -

- In 2016, fossil fuels remain the dominant source of energy supply which accounted for 81.5% of energy used;
- In 2016, overall net import accounted for 36 per cent of the energy used in the UK.
- During 2016, the supply of renewable energy only accounted for 8.9 per cent of final energy consumption on the EU agreed basis. This represents a significant challenge for the UK to increase its share of renewable energy by a further 6.1 per cent to meet its 2020 target of 15 per cent**.**

5.17 ENERGY ACT (NOVEMBER 2012)

5.17.1 By way of background, the Energy Bill was introduced by the Coalition Government in November 2012 and aimed to *"power low-carbon economic growth for the UK".* The Secretary of State for Energy and Climate Change confirmed the introduction of the Energy Bill to the House of Commons alongside the Annual Energy Statement. The Bill sought to establish a legislative framework for delivering secure, affordable and low carbon energy throughout Great Britain. At its core is the need to ensure that, as old power plants are taken off line, the UK remains able to generate enough energy to meet its needs even if demand increases. Doing this while also decarbonising requires significant investment in new infrastructure to be brought forward. The Bill was duly progressed through Parliament and received the Royal Assent on 18 December 2013.

5.17.2 With regard to setting a decarbonization target, the Act allows the Secretary of State to set or amend a decarbonisation target range, being a target range for the level of carbon intensity of the electricity generation sector. The earliest that a decarbonisation target range could be set for is 2030, and the decision of whether to exercise that power would be taken in 2016, after the Committee on Climate Change has provided advice on the Fifth Carbon Budget.

5.17.3 In the meantime, the objectives of the Electricity Market Reform (EMR) to which the Secretary of State will have regard when carrying out the key EMR functions are:

- the carbon reduction targets as set out in the climate change act 2008, which include a 34% reduction by 2020 and 80% reduction by 2050;
- to ensure a security of energy supply (including through diversification of energy mix);
- the cost to consumers; and
- the legally binding EU targets for 15% of UK energy to be supplied from renewable sources by 2020.

LITTLE CROW SOLAR PARK

LAND TO THE EAST OF STEEL WORKS, SCUNTHORPE

Preliminary Environmental Information Report

Chapter 6

LANDSCAPE AND VISUAL

6 LANDSCAPE AND VISUAL IMPACT

6.1 INTRODUCTION

6.1.1 This chapter of the PEIR sets out the Landscape and Visual Impact Assessment (LVIA) Technical Chapter in relation to the proposed development of an approximately 150 megawatts peak (MWp) solar farm with 90MW of battery storage over a site area of c. 226 hectares. The site is located to the east of Scunthorpe Steelworks. The assessment has been carried out by Chartered member of the Landscape Institute.

6.1.2 The purpose of this LVIA is to review the development site and its surrounding context in order to describe and identify the relative level of effects arising as a result of the proposed development, in relation to:

- the features and character of the local landscape; and
- the visual amenity of people who view the site.

6.1.3 The judgements provided within the LVIA may then inform the planning balance to be carried out by the determining authority.

6.1.4 This chapter is supported by the following Figures:

- **Figure 6.1** Site Context
- **Figure 6.2** Topography
- **Figure 6.3** LVIA Viewpoints
- **Figure 6.4** Environmental Designations
- **Figure 6.5** Landscape Character Areas
- **Figure 6.6** Landscape Masterplan/Mitigation Plan

6.1.5 This chapter is also supported by the following Technical Appendices:

- **Appendix 6.1** Assessment Criteria
- **Appendix 6.2** Assessment Viewpoint Photographs
- **Appendix 6.3** Viewpoint Assessment

6.2 ASSESSMENT APPROACH

Methodology

6.2.1 In accordance with published guidance, landscape and visual effects are assessed separately, although the procedure for assessing each of these is closely linked. A clear distinction has been drawn between landscape and visual effects as described below:

- Landscape effects relate to the effects of the proposals on the physical and other characteristics of the landscape as a resource in its own right and its resulting character and quality;

- Visual effects relate to the effects on specific views experienced by visual receptors and on visual amenity more generally.

Landscape and Visual Impact Assessment Process

6.2.2 The assessment of landscape effects follows a recognised process set out below:

- Identify the baseline landscape resource (i.e. individual landscape elements and landscape character) and its value;
- Describe any mitigation measures proposed to avoid, reduce and ameliorate potential adverse impacts and to maximise the beneficial impacts of the development;
- Evaluate the sensitivity of the landscape resource to the type of development proposed;
- Identify predicted landscape impacts of the development;
- Evaluate the magnitude of change to the baseline landscape resource; and
- Assess the level of residual effect of the development on the landscape. Apply any mitigation required to make the proposed development acceptable.

6.2.3 The assessment of visual effects follows a similar process as set out below:

- Identify a 'bare earth' Zone of Theoretical Visibility (ZTV) for the development using digital terrain data (i.e. the geographical area where views of the development are theoretically possible with a bare earth scenario);
- Identify potential visual receptors for the development (i.e. groups of people who would have views of the development);
- Describe any mitigation measures proposed to avoid, reduce and ameliorate potential adverse impacts and to maximise the beneficial impacts of the development;
- Evaluate the sensitivity of the visual receptor groups to the type of development proposed;
- Describe the nature of the baseline views (usually illustrated by a photograph) and the predicted visual impacts of the development on the views of each receptor group;
- Evaluate the magnitude of change in the view of the receptor groups;
- Assess the level of residual effects on the views from representative receptor groups and on overall visual amenity.

Baseline Information and Assumptions

6.2.4 The baseline landscape resource and visual receptors were identified in part through a desk-based study of published landscape character studies, relevant planning policy guidance, aerial photography and Ordnance Survey mapping. In addition, site visits were conducted during August 2017 and January 2018 when the viewpoint photographs were taken.

6.2.5 Access during site visits was restricted to publicly accessible locations and within the land ownership of the client. No access was possible to private properties, which were assessed from the nearest available publicly accessible vantage point. Therefore some assumptions have been made regarding views from private properties. These assumptions have been based on professional experience and interpretation of available desktop data as well as land use and vegetation present at the time of the site visits.

Study Area

6.2.6 Following preliminary desktop research and field work, the study area for the LVIA (used to understand the wider context of the site's location) was taken to be 5km from the site. Any views of the proposed development beyond this distance would be negligible and unlikely to give rise to any effects greater than minor.

Assessment of Significance

6.2.7 This LVIA takes the precautionary approach that all effects, unless stated otherwise, are assessed as adverse. The criteria used as guidance in assessing the significance of the effects of the development are outlined in Appendix 6.1.

Legislative and Policy Framework

6.2.8 A full and detailed consideration of planning policy is contained in the accompanying Planning Statement. This section provides an overview of the planning policy framework relevant to the landscape and visual matters considered in this LVIA.

6.2.9 At a national level The National Planning Policy Framework (NPPF 2, 2018) sets out the priorities for planning in England and places significant emphasis on the presumption in favour of sustainable development. At a local level, the current development plan consists of the 'North Lincolnshire Local Plan' (adopted 2003) and the emerging documents of the Local Development Framework.

National Planning Policy

National Planning Policy Framework (July 2018)

6.2.10 The NPPF sets out the Government's national policy on land use planning in England. The primary principle of the NPPF is the presumption in favour of sustainable development, which is set out at Paragraph 10 as follows:

> **"So that sustainable development is pursued in a positive way, at the heart of the Framework is a presumption in favour of sustainable development (paragraph 11)."**

6.2.11 "For **plan-making** this means that:

> **a) plans should positively seek opportunities to meet the development needs of their area, and be sufficiently flexible to adapt to rapid change;**
>
> **b) strategic policies should, as a minimum, provide for objectively assessed needs for housing and other uses, as well as any needs that cannot be met within neighbouring areas, unless:**
>
> **i. the application of policies in this Framework that protect areas or assets of particular importance provides a strong reason for**

restricting the overall scale, type or distribution of development in the plan area; or

ii. any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in this Framework taken as a whole.

6.2.12 For decision-taking this means:

c) approving development proposals that accord with an up-to-date development plan without delay; or

d) where there are no relevant development plan policies, or the policies which are most important for determining the application are out-of-date, granting permission unless:

i. the application of policies in this Framework that protect areas or assets of particular importance provides a clear reason for refusing the development proposed; or

ii. any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in this Framework taken as a whole."

6.2.13 Section 12: Achieving well designed places - Paragraph 127 states that:

"Planning policies and decisions should ensure that developments:

a) will function well and add to the overall quality of the area, not just for the short term but over the lifetime of the development;

b) are visually attractive as a result of good architecture, layout and appropriate and effective landscaping;

c) are sympathetic to local character and history, including the surrounding built environment and landscape setting, while not preventing or discouraging appropriate innovation or change (such as increased densities);

d) establish or maintain a strong sense of place, using the arrangement of streets, spaces, building types and materials to create attractive, welcoming and distinctive places to live, work and visit;

e) optimise the potential of the site to accommodate and sustain an appropriate amount and mix of development (including green and other public space) and support local facilities and transport networks; and

f) create places that are safe, inclusive and accessible and which promote health and well-being, with a high standard of amenity for existing and future users; and where crime and disorder, and the fear of crime, do not undermine the quality of life or community cohesion and resilience."

6.2.14 Section 15 Conserving and enhancing the natural environment - Paragraph 170 states that the planning policies and decisions should contribute to and enhance the natural and local environment by:

> **"a) protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);**
>
> **b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;**
>
> **c) maintaining the character of the undeveloped coast, while improving public access to it where appropriate;**
>
> **d) minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;**
>
> **e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and**
>
> **f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate."**

6.2.15 The Framework states at paragraph 171 that:

> **'Plans should: distinguish between the hierarchy of international, national and locally designated sites; allocate land with the least environmental or amenity value, where consistent with other policies in this Framework; take a strategic approach to maintaining and enhancing networks of habitats and green infrastructure; and plan for the enhancement of natural capital at a catchment or landscape scale across local authority boundaries.'**

Planning Practice Guidance

6.2.16 The Government has published online Planning Practice Guidance (PPG) which for the first time provides all planning practice guidance in one web-based resource.

6.2.17 The PPG draws heavily on the NPPF and other relevant Planning Policy Guidance and also reiterates that Landscape Character Assessment should be used as a tool to help understand the character and local distinctiveness of the landscape and the features that give it a sense of place.

Local Planning Policy

North Lincolnshire Local Plan

6.2.18 At a local level, the current development plan consists of the 'North Lincolnshire Local Plan' (adopted 2003) and the emerging documents of the Local Development Framework. Relevant policies with respect to landscape and visual matters include:

- LC7 Landscape Protection

- LC12 Protection of Trees, Woodland and Hedgerows
- LC15 Landscape Enhancement

Limitations to the Assessment

6.2.19 There are inherent limitations to any photomontage visualisations included as part of Landscape and Visual Impact Assessments, which are well known and understood. However, whilst they form a useful guide to assist with the LVIA process, none of the assessments set out in this report are reliant on any visual material and instead are based on the professional judgement of the landscape architect undertaking the assessment.

6.3 BASELINE CONDITIONS

Site Description and Context

6.3.1 The site is located on a localised ridge between the settlements of Scunthorpe to the west and Broughton to the east as shown on **Figure 6.2** Topography. The village of Broughton is separated from the site by an extensive area of dense woodland. Between the main residential and commercial areas of Scunthorpe, directly adjacent to the western boundary of the site, lies the extensive industrial complex of the Scunthorpe Steelworks. To the north the ridge continues approximately 11km to the banks of the Humber Estuary. Also to the north is an area of heathland known as Risby Warren. To the south the ridge runs approximately 35km to the City of Lincoln. A Roman Road, Ermine Street runs adjacent to Broughton to the east of the site. A secondary scarp slope known locally within Scunthorpe as 'The Cliff' lies to the west. Away from Scunthorpe the landscape is largely rural.

6.3.2 The site is comprised of arable fields which are bounded and heavily contained by dense woodland to the north, east and west which serve to provide significant screening of the site from the wider landscape. During the site work, forestry operations were being undertaken in the surrounding woodland and logs were being stored in piles. It is not however apparent that any areas are being clear felled in such a manner that would open up any additional views of the site.

Baseline Survey Information

The Site and its Landscape Features

6.3.3 This section provides a description of the landscape features within the proposed development site and their context within the surrounding study area. The landscape context of the site and immediate surrounding area is shown in **Figure 6.1** Site Context.

6.3.4 A Public Right of Way (Footpath 214 on the Definitive Rights of Way map) crosses the site. Site work identified that, as it is used on the ground, the route does not follow the exact alignment as it is shown on OS mapping, and instead follows the line of a track which runs within site. (This diversion to the track is shown on the Definitive Map).

Landform and Topography

6.3.5 In terms of landform the site lies on the edge of a localised ridge, raised slightly above the surrounding landscape, which would generally give potential for it to be visible from much of the wider landscape. However, as the site survey work has confirmed, surrounding woodland encloses much of the site, and therefore any views remain generally well contained.

6.3.6 The local ridge forms part of a wider scarp and vale topography as shown on the section on **Figure 6.2** Topography. The site straddles part of the west facing scarp slope and the east facing limestone plateaux which runs eventually into the lower dip slope towards the River Ancholme.

Land Use, Buildings and Infrastructure

6.3.7 Land use across the site is agricultural, comprising fields laid down to a mixture of arable and managed grassland. Some forestry operations are being undertaken within the surrounding woodland resulting in the storage of logs in piles next to the main access track through the site. There is no built form within the site, but a poultry unit is located adjacent to the east of the site, whilst to the west the vast expanse of industrial development associated with the Scunthorpe steel industry lies adjacent to the site. This area extends for more than 2km beyond which the lies the main residential and commercial urban area of Scunthorpe.

6.3.8 A triple row of power lines cuts across the site. The lines pass through the adjacent woodland but without opening up large gaps through which the site can be seen.

Landscape Character

6.3.9 Landscape Character is an expression of pattern within the landscape resulting from particular combinations of the natural and historical factors that make one place different from another. This results in areas that have a unity of character and a distinctive sense of place when viewed from a landscape-wide perspective.

6.3.10 Published Landscape Character Assessments that cover the proposed development site have been interrogated and are detailed below, (see also **Figure 6.5** Landscape Character):

- Natural England National Character Area Profiles, (NCA 45 Northern Lincolnshire Edge with Coversands);
- North Lincolnshire Landscape Character Assessment & Guidelines, North Lincolnshire Council, 1999 (SPG5)

National Character Areas (NCA)

6.3.11 The site falls within NCA 45: Northern Lincolnshire Edge with Coversands. Key characteristics presented in the character area description are as follows:

"NCA 45: Northern Linclonshire Edge with Coversands:

- **Elevated arable landscape with a distinct limestone cliff running north–south, the scarp slope providing extensive long views out to the west.**
- **Double scarp around Scunthorpe of ironstone, and extensive areasof wind-blown sand, the Coversands, giving rise to infertile soils supporting heathland, acid grassland and oak/birch woodlands, with rare species such as woodlark and grayling butterfly.**
- **Underlying limestone supporting small areas of calcareous grassland.**
- **Few watercourses on the plateau, which lies between the rivers Trent and Ancholme which flow into the Humber, and is cut through in the south by the River Witham.**

- **Productive soils on limestone plateau giving rise to a large-scale landscape of arable cultivation with extensive rectilinear fields and few boundaries of clipped hedges or rubble limestone, supporting birds such as grey partridge and corn bunting.**

- **Semi-natural habitats of acid and calcareous grassland and broadleaved woodland are small and fragmented, and often associated with disused quarries.**

- **Limited woodland cover, with patches of both broadleaves and conifers associated with infertile sandy soils, elsewhere occasional shelterbelts.**

- **Long, straight roads and tracks, often with wide verges; Ermine Street follows the route of a key Roman north–south route.**

- **Nucleated medieval settlement patterns following major routes, especially Ermine Street; sparse on higher land, with springline villages along the foot of the Cliff and some estates and parklands.**

- **Other development comprises the major settlements of Lincoln and Scunthorpe, with their prominent landmarks of the cathedral and steelworks, and several active and re-used airfields prominent on the ridgetop.**

- **Vernacular architecture and walling, especially in villages, of local warm-coloured limestone with dark brown pantiles.**

- **Several ground features, especially on the plateau, include prehistoric burial mounds, Roman artefacts and abandoned medieval villages.**

6.3.12 Whilst this national scale assessment is useful in providing a broad contextual overview of landscape character, it is not intended to be applicable at a site-specific level and therefore it would be unlikely that the site displayed all of the above characteristics. However, the site is part of an elevated arable landscape overlaying the limestone ridge with limited field boundaries, Risby Warren to the north of the site area is formed from Coversands deposits, Ermine Street a Roman Road lies to the east of the site area and the Scunthorpe Steelworks complex to the west of the site is very prominent. These elements are typical of the landscape character and context in which the site is located. In terms of characteristics which are a-typical of the wider NCA, of particular note are the extensive coniferous woodlands immediately surrounding much of the site.

6.3.13 The proposed development would only be visible from a very small proportion of the wider landscape within NCA 45, and at this scale would not result in any change to key identified landscape characteristics. It has therefore been determined appropriate not to assess the effects at this scale further and instead to focus the assessment on the more local scale character assessments discussed below.

North Lincolnshire Landscape Character Assessment (LCA) & Guidelines, (1999)

6.3.14 The North Lincolnshire LCA identifies six Character Areas that cover North Lincolnshire, each of which are further sub-divided into component local landscape types. The site is located in the 'North Lincolnshire Edge Character Area'. This Character Area is sub divided into 11 local landscape types of which two, Wooded Scarp Slope (WWS) which contains the lower (western portion of the site) and Heathy Woodland (HW) witch contains the upper (eastern portion of the site) are of relevance to the site, as shown in Figure 4

Landscape Character. The key characteristics of these landscape types, (of relevance to the proposals) are identified as:

Table 6.1: Landscape Types within site area.

Wooded Scarp Slope (Western portion of the site)	Heathy Woodland (Eastern portion of the site)
i) Sinuous scarp slope overlain by coversands and designated as an Area of High Landscape Value. ii) West facing slopes are extensively wooded with small areas of arable farmland, pasture, scrub and rough grass. iii) Where vegetation is limited, views towards Scunthorpe are extensive, otherwise the landscape is well enclosed and of intimate scale. iv) Significant areas have been left to nature, resulting in mainly deciduous woodland with birch, pine, larch, oak, gorse and rhododendron. v) Ecologically important area, with three sites of Nature Conservation Interest.	i) Elevated, gently undulating landscape of deciduous and coniferous woodland containing areas of open scrub and heathland. ii) Attractive character, intimate and enclosed, within the woodland contrasting with more open heath areas. iii) Contains three SSSIs (Broughton Far Wood, Broughton Alder Wood and Risby Warren) and is designated as an Area of High Landscape Value. Ancient replanted woodland at Far Wood, West Wood and Spring Wood. iv) Views to the west towards Scunthorpe restricted by vegetation. v) Local historical interest provided by Ermine Street, a Roman road that bisects the woodland.

6.3.15 Within the North Lincolnshire Landscape Character Assessment & Guidelines (1999) the site lies within the 'Lincolnshire Edge' Character Area, and straddles the 'Heathy Woodland' and 'Wooded Scarp Slope' sub areas. The following extract from Part 1 of the Character Assessment under Landcover and Wildlife is of note in relation to the character of the site:

> ***'Much of the area close to Scunthorpe is blighted by current and former industrial activity. The former rural landscape structure has been lost and the present appearance is degraded and unattractive. However, in the more rural landscape away from Scunthorpe the scenery has been degraded by agricultural intensification. Despite this, woodland blocks remain locally prominent landscape elements.'***

6.3.16 In Part 2 of the Landscape Character Assessment, Landscape Strategy and Guidelines. The document notes for the Heathy Woodland Landscape Type that in peripheral woodland areas, consideration should be given to the restoration of lowland heathland. Under Wooded Scarp Slope the document notes that the development of hedgerows should be encouraged particularly where linking with woodland blocks, to maximise possibilities for habitat linkage and wildlife dispersal.

6.3.17 The site lies within a landscape which is characterised by the adjacent large scale industrial area and the electrical power which the area draws in from the national grid. It

lies within a farmland area surrounding the town and industry of Scunthorpe, in which in addition to views of the town and the steel works, pylons cut across the landscape and views include other large scale industry and wind turbines beyond.

6.3.18 The character of the site is also in part influenced by the adjacent woodland, the extent of which is notable in a Lincolnshire context. There are also valuable heathland habitats in the wider landscape to north, but the site is in intensive arable production, in keeping with much of the local farmland.

Landscape Designations

6.3.19 There are no Landscape designations within the site. (See **Figure 6.4** Landscape Designations) As referenced under Heathy Woodland in the north Lincolnshire Character Assessment (See Table 6.1 above) the eastern two thirds of the site previously fell within an area designated in the North Lincolnshire Local Plan (Adopted May 2003) as an Area of High Landscape Value however this policy was not saved in September 2007 when the Adopted Local Plan was reviewed. Portions of the woodland to the east of the site are designated as Ancient Woodland.

6.3.20 The assessment of potential effects on features and designated areas concerned with the historic environment (such as World Heritage Sites, Scheduled Ancient Monuments, Listed Buildings and Conservation Areas) does not form part of this assessment. The identification of these however can be important in providing an indication of the value and quality of the wider landscape character as well as an indication of potential sensitive visual receptors and areas from where existing views towards the site are potentially more sensitive to change.

Conservation Areas

6.3.21 The site does not lie within or adjacent to a Conservation area. Four Conservation Areas lie within the 5km study area as illustrated on **Figure 6.4** Landscape Designations, At Appleby to the north, Scawby to the south and two in Scunthorpe.

Scheduled Monuments

6.3.22 There are no Scheduled Monuments within the site. The closest lies to the south of the site at Raventhorpe medieval settlement earthworks immediately south west of Raventhorpe Farm.

Listed Buildings

6.3.23 There are no Listed Buildings within the site. The site and grounds of the former Manby Hall lies to the immediate south west of the site. This property fell into total ruin in the Mid part of the last century it is no longer standing, it is not subject to a statutory designation

Baseline Visual Receptors

Extent of Visibility

6.3.24 In general, the position of the site on a localised ridge ought to make it notable in the landscape but the woodland surrounding the site limits the potential for views to the north, east and south. Furthermore, the large built form of the Steelworks to the west of the site, particularly the long rolling mills, limits the majority of potential views from the town.

6.3.25 A 'screened ' Zone of Theoretical Visibility (ZTV) plan (**Figure 6.3** LVIA Viewpoints) has been produced which illustrates the theoretical extent of where the proposed development would be visible from, assuming 100% visibility, and includes the screening effect from vegetation and buildings. This has been generated on the assumption that the proposed panels would have a height of 3m. Indicative woodland and Building heights are modelled at 15m an 8m respectively.

6.3.26 The screened ZTV plan is a tool to help illustrate locations where views of the proposed development would not be possible so as to allow the focus of baseline studies to be made on those locations where views are theoretically possible.

6.3.27 Following desktop research and site visits, it is evident that the extent of actual visibility of the proposed development is even less than is suggested by the screened ZTV plan. Visibility would generally be limited to the immediate environs of the site owing to the combined effect of topography, built form particularly in terms of the large buildings associated with the steel works and the mature plantation woodlands surrounding much of the site.

General views and screening elements

6.3.28 As noted above views within the wider landscape beyond the site are restricted by the scarp and vale topography, and the influence of screening elements in the immediate environs of the site.

6.3.29 To the north, the site is largely enclosed by plantation woodland. A series of power lines cut across the site but the resulting channels through the woodland do not open strong lines of visibility into the site. To the north of the woodland immediately surrounding the site are further woodland blocks surrounding further agricultural fields. Two residential properties lie within the farmland to the north of the site, High Santon Farm and Springwood Cottage. The screened ZTV indicates that there is some potential for views of the scheme from the boundaries of Spring Wood Cottage. In the wider more open agricultural landscape to the north beyond mosaic scrubland landscape of Risby Warren the screened ZTV indicates some potential for views from areas along Risby Road and to the south of Appleby.

6.3.30 To the east woodland cover is even stronger with a thick plantation woodland occupying all the land between the site and the settlement of Broughton approximately 1km to the east. A series of permissive footpaths run through the main body of this woodland. A public right of way runs north west from Broughton through the woodland where it exits adjacent to the north eastern portion of the site and then crosses through the site area towards the settlement of Santon to the north and the Steel Works. Views from the pathways within the woodland are very limited and contained by the vegetation. As well as the vegetation restricting views from the east the topography also serves to limit visibility. The site largely lies across the scarp slope angled towards the west. The screened ZTV indicates patches of potential visibility in the wider landscape (Figure 5). A residential property Herron Lodge lies within the woodland from which no potential views are available.

6.3.31 To the south, woodland also wraps almost continually around the southern perimeter of the site. A series of power lines cut through the woodland but again very limited views are gained of the site area along these corridors. To the south of the perimeter woodland the landscape becomes more open where the land use is predominantly arable. A portion of this ground is now occupied by the Ravensthorpe Solar Farm which is visible from the adjacent A18 to the south and sections of the M180 also to the south. The screened ZTV indicates potential for views of the proposal area from the more open farmland areas to the south west.

6.3.32 To the immediate west lies the extensive estate of the Scunthorpe Steel Works including the furnaces and the rolling mills. This creates a large area of mixed industrial use including buildings, pipes, railways, gas holders and chimneys between the site and the main commercial and residential areas of the settlement of Scunthorpe. The screened ZTV indicates that the majority of potential visibility lies within the area occupied by the Steel works with more limited potential within the settlement of Scunthorpe itself.

6.3.33 The most notable views of the site are therefore limited to the public footpath running through and across the site. There would be very limited visibility in the wider landscape, often limited to possible glimpsed views through very limited breaks in the forestry.

6.3.34 It is noted that there are views of the existing solar development at Raventhorpe Farm in views from the M180 to the south of the site, but the site lies behind a band of woodland and intervening steelworks buildings which serve to restrict the potential for any cumulative visibility between the two schemes.

6.3.35 It is also recognised that from the Wolds landscape to the east of the site views can be gained of large scale buildings within steel works which lie beyond the site. However, it is understood that the proposed panels would be too low lying to be seen above adjacent woodland and unlike the steelworks would generally not be visible from this area.

6.3.36 Views from within Scunthorpe would most likely be limited to those people living in the upper stories of the high rise residential blocks, as other views from lower lying areas would largely be screened out by steel works and other large sheds on eastern side of town.

Visual Receptors

6.3.37 As outlined above a number of potential visual receptors exist within the wider landscape. Those that formed the initial basis of the fieldwork study were identified through ZTV analysis and desk based study in advance of the site visit. Through fieldwork observations and an understanding of screening elements and general visibility, the majority of those originally identified were discounted due to an absence of views.

6.3.38 A number of viewpoint locations have been considered to help represent the nature of views towards the site from the surrounding landscape. The following 11 viewpoint locations have been considered, as illustrated at **Figure 6.3** and presented in Assessment Viewpoint Photographs at **Appendix 6.2**. A viewpoint assessment is also set out at **Appendix 6.3**.

6.3.39 In line with good practice for LVIA, consultation took place with the local authority North Lincolnshire Council regarding the selection of viewpoints for the LVIA via a Preliminary Landscape and Visual Report submitted as part of the pre-application consultation process.

Table 6.2: Viewpoints

Viewpoint Number	Viewpoint Name
1	Footpath 214, near Little Crow Covert
2	Footpath 214, south eastern boundary of the site
3	Footpath 212, near Raventhorpe Farm

Viewpoint Number	Viewpoint Name
4	Risby Road, near High Risby
5	A1029, Winterton Road, Scunthorpe
6	Lakeside Parkway, Scunthorpe
7	Holme Lane, Overbridge of M180 motorway
8	Central Park, Scunthorpe
9	Carr Lane, near Worlaby Carrs Farm
10	Holme Lane, Messingham
11	B1207, south of Appleby

Residential receptors

6.3.40 The number of residential properties which offer the potential for residents to experience views towards the site in close proximity to the site are very limited. Those properties which may experience a view of the proposals are Spring Wood Cottage to the north of the site area. The Screened ZTV indicates some limited potential for views of the periphery of settlements at Appleby and along Risby Road to the north, around Worlably Cars Farm to the north east, within the settlement of Scunthorpe to the west (most likely people living in the upper stories of the high rise residential blocks), and the periphery of Messingham to the south west.

Users of publicly accessible paths

6.3.41 Footpath 214 runs through the site area from the woodland to the east of the site to Santon and the edge of the of the Steel Works to the north west. There is also a footpath south of the site area FP 212 with potential for views from the section to the immediate south of the site. The whole route runs from the A18 via Ravensthope west of the existing solar farm into and through the woods south of Footpath 214 into Broughton.

6.3.42 There are several other public footpaths in the vicinity of the site including a network of permissive paths through West Wood to the east of the site. The screened ZTV indicates that none of these routes have the potential to gain views of the proposals.

6.3.43 Within the wider landscape the screened ZTV incorporates some very limited sections of footpaths to the north around Viewpoint 4 at Risby Road, to the east around viewpoint 9 where a footpath runs along the bank of the River Ancholme and to the south west around viewpoints 7 and 10 around the M180 and north of Messingham.

Users of the transport network

6.3.44 Due to the high degree of screening by topography and vegetation present around the site, the number of roads from which motorists and passengers are likely to experience views is very limited. The screened ZTV indicates that the main routes that would have the potential to experience views of the site would be a short section of the M180 to the south of the site, a section of Risby Road to the north between Scunthorpe and Appleby, some sections of Holme Lane and Northfield Road around Messingham in the vicinity of Viewpoints 7&9. Viewpoint 9 is located at the end of Carr Lane where it crosses the railway

line between Scunthorpe and Barnetby. The screened ZTV indicates that all other road users in the wider landscape including those within the residential and commercial areas of Scunthorpe, (represented by Viewpoints 5,6 and 8) would have potential to gain no more than glimpsed views from local roads.

Users of recreational sites

6.3.45 There are no recreational sites within the study area, beyond the local footpath network detailed above, which would have the potential to gain views of the site.

6.4 ASSESSMENT OF LIKELY SIGNIFICANT EFFECTS

6.4.1 The assessment of effects firstly assesses the sensitivity of the landscape resource or visual receptor. An assessment is then made as to the magnitude of the change, in terms of its scale or size.

6.4.2 The assessments of sensitivity of the receptor and magnitude of change are then combined with the duration of the effect and the reversibility of the effect, to assist in determining the relative level of effect on each landscape feature, character area or visual amenity.

Description of the Development

6.4.3 The proposed development is the construction of an approximately 150 Megawatts peak (MWp) solar farm over approximately 226 hectares. The main element of Little Crow Solar Park would be photovoltaic panels with managed grassland below. Also proposed is up to 90 Megawatts of battery storage so that electricity can be stored and distributed to the grid when required.

6.4.4 There will be electrical connection infrastructure, the point connection to the grid is the existing local 132kva electrical network which runs through the proposed site. Land will be provided within the site for ecological mitigation and enhancement, with particular consideration to fauna, flora and bird species. Land between and beneath the panels would be used for biodiversity enhancements and seasonal sheep grazing. Tree planting would be introduced along the north east section of the development boundary.

6.4.5 The photovoltaic panels would be laid out in straight arrays set at an angle of c. 20 degrees from east to west across the fields enclosures. The distance between the arrays would respond to topography but would typically be between 3.5 metres to 6 metres. The top north edges of the panels would be up to 3.5 metres above ground level and the south lower edges of the panels would be approximately 0.8 metres above ground level. The arrays would be static.

6.4.6 The arrays would be set within a 2.0m high security fence. The distance between the proposed fencing and existing hedges would vary across the site and at its minimum distance this would be circa 4m. Development would have an 15m buffer zone between the ancient woodland located to the east of the development site.

6.4.7 The security measures that will accompany the scheme include CCTV.

6.4.8 The existing woodland plantations that surround the various field enclosures would continue to be managed by the landowner as part of its woodland forestry licence. The hedgerows surrounding the field edges will likely be managed via the Landscape and Ecological Management Plan.

Construction

6.4.9 It is recognised that there would be some additional temporary, non-permanent effects during the construction of the proposed development, over and above those assessed as permanent effects associated with the operational phase. The effects would relate to the movement of plant and materials on site during the construction period.

Effects on Landscape Features

6.4.10 There would be no additional temporary effects to the existing landscape features during the construction phase of the development beyond those considered within the assessment of operation stage effects discussed below.

Effects on Landscape Character

6.4.11 The movement of construction vehicles, personnel and materials as the new Solar Park is constructed would be the only additional construction phase effects on landscape character of note. Within the site and the immediate local area it is considered that there would be an additional medium magnitude of change (over that during the operation phase described below). This would result in a temporary moderate additional effect on landscape character, over and above the permanent effects described below. The construction effects within the site and its immediate locality would be significant, but would be temporary in nature.

6.4.12 Beyond the immediate vicinity of the site, it is assessed that there would be no greater than an additional low magnitude of change, resulting in no higher than a moderate/minor temporary effect on landscape character, which is not significant.

Effects on Visual Amenity

6.4.13 The movement of construction vehicles, personnel and materials as the new Solar Park is constructed would be the only additional construction phase effects on visual amenity of note. Those using the PROW network which passes through and in close proximity to the site would generally be the only visual receptors where there would be any notable view of these construction elements. These receptors would experience an additional medium magnitude of change on views as a result of the construction activities. This would result in a moderate temporary visual effect over and above the permanent visual effects described below. These additional effects would be significant, but would be temporary in nature.

6.4.14 Beyond the immediate site environs, it is assessed that there would be no greater than an additional low magnitude of change on views during the construction phase, resulting in no higher than a moderate/minor additional temporary effect, which is not significant.

Operation

6.4.15 The effects on Landscape Features, Landscape Character and Visual Receptors in relation to the operational phase of the Proposed Development are discussed in turn below.

Effects on Landscape Features

Effects on Landform and Topography

6.4.16 The landform of the site forms part of a wider large scale topographical landscape feature at a site specific scale the sensitivity of the landform is judged to be medium.

6.4.17 The panels would be installed across the existing fields with minimum disturbance to the ground levels. The only excavations required are those to install the feet of the panels, there is no requirement for any ground re-profiling or remodelling. As such, although effects are considered to endure for the length of the installation the magnitude of change is assessed as very low resulting in a negligible level of effect to landform and topography, which is not significant.

Effects on Land Use, Buildings and Infrastructure

6.4.18 The key change would be to the land use i.e. from an area of agricultural fields to a solar farm with grassland below the panels. The sensitivity of the agricultural land use is judged to be low in that arable land use of this type is common and extensive within this area. The agricultural use of the site would change from a mix of largely arable fields to an area of solar panels over a land cover of managed grassland.

6.4.19 No trees or hedgerows would be removed as part of the proposals. As part of the landscape and mitigation proposals extensive lengths of native hedgerows are proposed adjacent to site fencing along the public rights of way with the ground cover beneath the panels managed as a variety of species rich grasslands reflecting local soil types.

6.4.20 The magnitude of change on land use is judged as high resulting in a moderate level of effect which is not significant due to the continuation of a similar land cover beneath the panels.

Effects on Landscape Character

6.4.21 The level of effect on landscape character is assessed through determining the sensitivity of the landscape character to a change of the type proposed and the magnitude (scale) of the change. These factors are then combined with the duration and reversibility of the effect, to establish the level of effect on landscape character.

6.4.22 In Landscape and Visual Impact Assessment sensitivity is assessed through a consideration of both the susceptibility to a development of the type proposed and the value attached to the landscape. In the case of the potential for effects on landscape character, susceptibility means the ability to accommodate the proposed development without undue consequences for the existing characteristics of the site.

6.4.23 The landscape in which the proposed development is located is considered to be of medium susceptibility to the proposed solar development, as the large scale, broad nature, gently undulating landform and simple, consistent landcover of the landscape which forms the site, are key characteristics that would be capable of successfully accommodating or co-existing with such a development.

6.4.24 In terms of landscape value, what is meant by the value of the landscape in a Landscape and Visual Impact Assessment is the relative value that is attached to the landscape by society as a whole, bearing in mind that different stakeholders may have differing values regarding any given landscape. Consideration of whether there are any formal landscape designations covering a landscape is one element of considering the value, but also relevant is the condition of the landscape, its rarity in the local area, the recreational value it provides, and any ecological or heritage importance the landscape may hold. These are considered alongside its perceptual qualities (such as tranquillity) and any associations which may be held with the landscape, such as if it has been highlighted in art, music or poetry.

6.4.25 The landscape value of landscape in which the site is located is assessed as medium, due to the landscape being undesignated and the lack of valued features within the site beyond the single public footpath route which passes through the site and is the

only publicly accessible element of the site. It is acknowledged that the site has in the past formed part of a local 'Area of High Landscape Value' which provides some indication that it may be within a landscape which is of greater value than other areas of North Lincolnshire. However, this designation has not been part of the adopted Development Plan place since 2007 and it is therefore appropriate to consider the value of the site on its individual merits which identify a landscape of some value, but not one which is out of the ordinary within its surrounding landscape context.

6.4.26 With regard to the medium susceptibility and medium value of the landscape it is therefore considered that the landscape is of medium sensitivity to the development proposed.

6.4.27 The screened ZTV on **Figure 6.3** indicates that the site is theoretically visible from parts of the landscape which lie within several different published Landscape Character Types and Areas. However, the screened ZTV does not account for the screening effects of all vegetation and built form, with hedgerows and smaller areas of trees not being picked up within its analysis. As such, the actual potential for any visibility of the proposals in the character areas beyond the site itself is very limited. This was established during the field work undertaken to these areas as part of the LVIA assessment process.

6.4.28 It was therefore determined at an early stage in the assessment process that there was no potential for any more than a very low impact and a negligible effect on landscape character beyond the immediate environs of the boundary of the site. This is further demonstrated in the photography provided for the LVIA assessment viewpoints, in which the very limited visibility of the proposals beyond the site is clearly demonstrated.

6.4.29 The potential for effects on landscape character is therefore restricted to the local character of the site and its immediate surroundings, and the two published landscape character areas which cover parts of the site: 'Heathy Woodland' and 'Wooded Scarp Slope'. Each of these areas are discussed in turn below.

Effect on the Landscape Character of the Site and Immediate Surroundings

6.4.30 The character of the site is one of an agricultural, healthland landscape, surrounded by woodland to the north, east and south and a large industrial steelworks complex on the lower ground to the west. It is a functional, primarily arable landscape, typical of much of the landscape of North Lincolnshire.

6.4.31 The introduction of the solar panels would represent a direct and notable change to the land use to the site, and notwithstanding that the ground beneath the panels would be managed as grassland, it is acknowledged that for the lifetime of the development there would be a high magnitude of impact and a major effect on landscape character within the site and its immediate surroundings.

6.4.32 However, the potential for this effect to extend to any notable degree beyond the site is greatly restricted by the surrounding landuse. To the north, east and south, potential effects would for the most part be curtailed by the adjacent areas of mature woodland. Similarly, to the west, the steelworks complex, which begins also immediately to the boundary of the site, would have a similar effect in providing a barrier which would limit the potential for wider effects on the character of the landscape to occur.

Effect on Landscape Character Areas in the Wider Landscape Surrounding the site

6.4.33 Heathy Woodland Landscape Type: This character area covers the higher ground of the healthland in the vicinity of the site and follows a broadly north-south alignment along the ridge landform. As the name suggests other than the proposed development site the landscape is for the most part covered in woodland. As such, this woodland serves to

prevent any effects on landscape extending much beyond the immediate boundaries of the site. The sensitivity of the Heathy Woodland Landscape in the vicinity of the site is considered to be medium and it is acknowledged that within the site itself there would be a localised major effect on landscape character for the lifetime of the development. However, when this is considered in the context of landscape character area as a whole, it is not considered that the primary characteristics of the character area, in particular the woodland, would be diminished by the effects identified on one localised part of the character area.

6.4.34 Wooded Scarp Slope Landscape Type: This character area covers a relatively narrow section of the gentle western slope of the heathland ridge, which runs on a north-south alignment through the landscape of this part of North Lincolnshire. The character area in the vicinity of the site is partly wooded and partly arable in its nature, but is heavily influenced by the large steelworks complex which lies immediately adjacent to its west. Again, for that part of the character area in which the site is located, it is acknowledged that there would be a localised major effect on landscape character for the lifetime of the development. However, with regard to the proximity of the steelworks complex to the west, any effects would not extend beyond the immediate boundaries of the site. Indeed in the context of the steelworks which serve to heavily influence the landscape of the scarp slope, the effects of the scheme would be limited, and the steelwork would remain the primary influence on the character of the landscape of the slope in this locality.

Summary

6.4.35 Overall, it is considered that the potential for effects on landscape character would be extremely limited and localised. Effects would be restricted to a major effect that would not extend beyond the site and its immediate surroundings within the Heathy Woodland and Wooded Scarp Slope character areas. There would be no more than a negligible effect on landscape character on any of the published character areas in the surrounding landscape.

6.4.36 In addition, the nature of the site, being located within a landscape which is surrounded by woodland on three sides and a large industrial complex on the other, is such that notwithstanding the scale of the development, the primary characteristics of the local and wider landscape, including the character areas in which the site is located, would not be diminished.

Effects on Visual Amenity

6.4.37 The assessment of visual effects considers the potential for changes in views and visual amenity. The aim is to establish the area in which the development may be visible, the different groups of people who may experience views of the development, the places where they will be affected and the nature of the views and visual amenity (meaning the overall quality and pleasantness to a view).

6.4.38 In accordance with GLVIA3, the assessment of visual effects begins with an assessment of the sensitivity of each visual receptor to residential development. An assessment is then made as to the magnitude of the change in terms of its scale or size. The assessments of receptor sensitivity and magnitude of change are then combined with the duration of the effect and the reversibility of the effect, to assist in determining the relative level of effect on each visual receptor.

6.4.39 The visual effects of the proposed development on key visual receptors are assessed below. Consideration has been given to seasonal variations in the visibility of the development and these are described where necessary.

6.4.40 During the fieldwork stage of this assessment (September 2017 and January 2018), a series of photographs were taken for a number of assessment viewpoints. These have been included within this assessment as a means of illustrating the visual issues discussed within this LVIA. The photograph locations are illustrated on **Figure 6.3**) with photographs presented in **Appendix 6.2** and a Viewpoint Assessment presented in **Appendix 6.3**, the effects identified in which are summarised below.

Table 6.3: Summary of Viewpoint Assessment

Viewpoint Number	Viewpoint Name	Sensitivity	Magnitude	Level of Effect	Significant (yes/no)
1	Footpath 214, near Little Crow Covert	High	High	Major	Yes
2	Footpath 214, south eastern boundary of the site	High	High	Major	Yes
3	Footpath 212, near Raventhorpe Farm	High	Very Low	Moderate/Minor	No
4	Risby Road, near High Risby	Medium	No Change	None	No
5	A1029, Winterton Road, Scunthorpe	Low	No Change	None	No
6	Lakeside Parkway, Scunthorpe	Medium	No Change	None	No
7	Holme Lane, Overbridge of M180 motorway	Medium	No Change	None	No
8	Central Park, Scunthorpe	Medium	No Change	None	No
9	Carr Lane, near Worlaby Carrs Farm	Medium	No Change	None	No
10	Holme Lane, Messingham	Medium	No Change	None	No
11	B1207, south of Appleby	Medium	No Change	None	No

Effects on Residential Receptors

6.4.41 Residential receptors (at their property) are generally considered to be of high sensitivity to a change in their view. It is generally accepted however that sensitivity decreases within upper floors due to the use of upper storeys generally not being

associated with primary living spaces. As a precautionary approach, the default position adopted is that residential receptor sensitivity is high.

6.4.42 There is only one property within close proximity to the site that may have potential to gain views of the site. Spring Wood Cottage is located approximately 450m north east of the northern site boundary. The property is enclosed by relatively strong vegetation. A small gap in the woodland surrounding the site to accommodate a power line traversing the site allows some potential for views to be gained towards the northern portion of the site area. The magnitude of any potential visual impact is judged to be no higher than low resulting in a no higher than moderate affect which is judged to be not significant. This small gap in the intervening vegetation could potentially be mitigated with a section of new hedgerow planting which would reduce the potential magnitude to very low and the resulting effect to moderate/minor which is not significant.

6.4.43 Other properties with potential for residents to gain views of the proposed development lie on the periphery of settlements in the wider landscape. Site work has determined that no views would be gained of the proposed site from settlements to the north and east. Properties on the northern edge of Messingham to the south west of the site may be able to discern a small portion of the site, however these views would be seen in the context of the extensive views of the steel works and the existing Solar farm at Ravensthorpe which are also available from this location. The potential magnitude of effect is judged to be very low in that there would be the introduction of minor new features into the landscape, resulting in no more than moderate effects which would not be significant.

6.4.44 There are several high-rise blocks in Scunthorpe from the upper storeys of which residents may be able to gain high level views towards the site area. Any available views would also contain views of the steelworks complex in the mid ground with the proposed solar farm extending up the landform towards the enclosing trees behind. Any views of the existing fields comprising the site area would be altered to coverage by solar panels. However, the magnitude of change on resident's views from these locations is judged to be no greater than low, comprising the introduction of new features in the landscape over 2km away behind the steelworks. This would result in no greater than a moderate effect which is not significant.

Effects on Publicly Accessible Paths

6.4.45 Whilst there is likely to be variation in terms of receptor sensitivity and visual effects experienced along a route (in part dependant on the angle and direction of the view) the assessment considers a worst-case scenario whereby recreational users of all public footpaths and cycle routes are considered to be of high sensitivity to changes in their view.

6.4.46 Footpath 214 runs through the site area from the woodland to the east of the site to Santon and the edge of the of the Steel Works to the north west. The footpath begins on the periphery of Broughton approximately 1km to the east, it runs through an area of very dense woodland with only occasional clearings and fire paths. No views of the site are gained until the walker emerges from the woodland directly into the site area. The route would continue through the body of the solar farm via a path at this point and then onto the main track through the site.

6.4.47 The path emerges into the site at an elevated position just behind the upper portion of the scarp slope restricting views out to the west, as illustrated in Viewpoint 2, (See **Appendix 6.2**) the path generally follows the contour before joining the main track which then falls in elevation revealing open views of the eastern portion of Scunthorpe. At the bottom of the slope the path re-enters a further area of woodland to the north west of the site as illustrated by viewpoint 1 and views of the site area are quickly lost as the path continues to the hamlet of Santon immediately adjacent to the Steelworks complex.

6.4.48 The effects on walkers using this route as it passes through the site area itself are judged to be high. The route would be defined on both sides by fencing associated with the solar park, the effects of the fencing will be softened slightly by new native hedgerows planted adjacent to the path offset to allow wide grassy verges on both sides of the path. The panels and fencing would restrict views out and channel them along the routes in comparison to what is currently a relatively open area of agricultural fields from which open views can be gained. The resulting effect is judged to be major and significant on this route as it passes directly through the site, quickly reducing to slight/none as the user enters the adjacent woodland areas.

6.4.49 Footpath 212 lies to the immediate south of the site and is represented by Viewpoint 3. The whole route runs from the A18 via Ravensthope west of the existing solar farm into and through the woods south of Footpath 214 into Broughton. The potential for views of the development are limited to glimpses through a gap in the woodland to the south of the site where a line of pylons passes. This would represent no more than a minor effect.

6.4.50 Field work has established that potential visibility of the site in the wider landscape is very limited, therefore no other publically accessible routes would experience any more than a negligible visual effect.

Effects on Transport Routes

6.4.51 Due to the high degree of screening by topography and vegetation present around the site, the number of roads from which motorists and passengers are likely to experience views is very limited. Field work has established that no routes would have the potential to experience any more than a negligible visual effect.

Decommissioning

6.4.52 The effects during the decommissioning phase would be similar to those outlined in the Construction section above, with levels of effect gradually reducing rather than increasing as the development is dismantled. The movement of vehicles, personnel and materials as the Solar Park is removed would result in a temporary moderate additional effect on the landscape character of the site, over and above the permanent effects. There would also be an additional medium magnitude of change on views from the PROW network passing through the site as a result of the decommissioning activities.

6.5 MITIGATION AND ENHANCEMENT

6.5.1 In order to reduce the likelihood of significant adverse landscape and visual effects, mitigation has been included within the design of the proposals. This included consideration of the location of the site, which due to its location adjacent to woodland is screened from large parts of the landscape.

6.5.2 In addition, the design of the proposals has also included for a series of landscape proposals which are illustrated in Figure 6.6. In summary, this plan illustrates the following measures which would be included as part of the proposals:

- New native hedgerow planting adjacent to the proposed security fencing along the line of the existing footpath, (public right of way).
- Gaping up of existing native hedgerows within the site adjacent to the footpath.
- Sowing of wildflower seed along the margins between the footpath and the hedgerows/ security fence boundaries.

Table 6.4: Mitigation

Ref	Measure to avoid, reduce or manage any adverse effects and/or to deliver beneficial effects	How measure would be secured		
		By Design	By S.106	By Condition
1	Location of site in an area which limits potential visibility	X		
2	Planting of new sections of hedgerow adjacent to the footpath through the site and a small section on the northern boundary of the site.			x
3	Sowing of wildflower seed to increase species diversity in the verges adjacent to the footpath.			x

6.5.3 The Assessment of Likely Significant Effects in Section 6.4 above takes into account the mitigation measures described above, within the assessment of each receptor, in order to establish the residual effects.

6.6 CUMULATIVE AND IN-COMBINATION EFFECTS

6.6.1 Other solar energy schemes in the surrounding landscape which are already operational, such as the Ravensthorpe scheme, have been considered to form part of the baseline environment against which the development has been assessed. Notwithstanding this, it is relevant to also consider the overall effect of the developments in combination. Having considered the potential for effects on both landscape character and visual amenity it is not considered that there are any significant cumulative effects above and beyond those identified for the Little Crow scheme of itself. Whilst there may be a small number of locations where the Little Crow scheme would be seen in combination with other solar energy development, these locations would be highly limited in nature.

6.6.2 A review has also been undertaken of any other solar energy developments in the vicinity of the site which are currently in planning, or consented but yet to be constructed, which might have the potential for cumulative effects to arise. It is not considered that there are any such schemes which would have the potential to give rise to significant cumulative effects in combination with the Little Crow development.

6.7 SUMMARY

Introduction

6.7.1 This LVIA has considered the potential landscape and visual effects of the proposed little Crow Solar Park development. An appropriate sized study area of 5km has been selected, based on the scale of the proposed development, and a Zone of Theoretical Visibility (ZTV) has been produced to help to identify the landscape and visual receptors with the potential for significant effects.

6.7.2 The effects on landscape features, landscape character and visual amenity have been assessed, taking into account the mitigation described in Section 6.5 above.

6.7.3 Finally, any cumulative effects have been considered in relation to the proposed development and any other similar developments of relevance.

Baseline Conditions

6.7.4 Land use across the site is agricultural predominantly agricultural fields laid down to a mixture of arable and managed grassland.

6.7.5 The site lies within a landscape which is characterised by the adjacent large scale industrial area and the electrical power which the area draws in from the national grid. It lies within a farmland area surrounding the town and industry of Scunthorpe, in which in addition to views of the town and the steel works, pylons cut across the landscape and views include other large scale industry and wind turbines beyond.

6.7.6 The number of locations which offer the potential for views towards the proposed development are very limited, in part due to the surrounding woodland.

Likely Significant Effects

Landscape Character

6.7.7 The introduction of the solar panels would represent a direct and notable change to the land use to the site, and notwithstanding that the ground beneath the panels would be managed as grassland, it is acknowledged that for the lifetime of the development there would be a significant effect on landscape character within the site and its immediate surroundings.

Visual Amenity

6.7.8 Footpath 214 runs through the site area from the woodland to the east of the site to Santon and the edge of the of the Steel Works to the north west. The effects on walkers using this route as it passes through the site area itself are judged to be significant. The route would be defined on both sides by fencing associated with the solar park, albeit that the effects of the fencing will be softened slightly by new native hedgerows planted adjacent to the path offset to allow wide grassy verges on both sides of the path.

6.7.9 Aside from this footpath route, there would be no other significant effects on visual receptors arising from the proposals.

Mitigation and Enhancement

6.7.10 In order to reduce the likelihood of significant adverse landscape and visual effects, mitigation has been included within the design of the proposals. This included consideration of the location of the site, which due to its location adjacent to woodland is screened from large parts of the landscape.

6.7.11 In addition, the design of the proposals has also included for a series of landscape proposals which include the planting of new hedgerows along the security fences adjacent to the public right of way through the site and the sowing of wildflower seed in the margins between the path and the hedges.

Conclusion

6.7.12 It is important to appreciate that some effect on landscape character and visual amenity is an inherent consequence of a new development of this type and scale. However, in this case, any potential for adverse effects is limited by existing vegetation as well as the topography of the landscape. As such, for a scheme of its scale the landscape and visual impacts arising are highly limited. Those limited effects which have been identified should therefore be balanced against the benefits of the proposed development

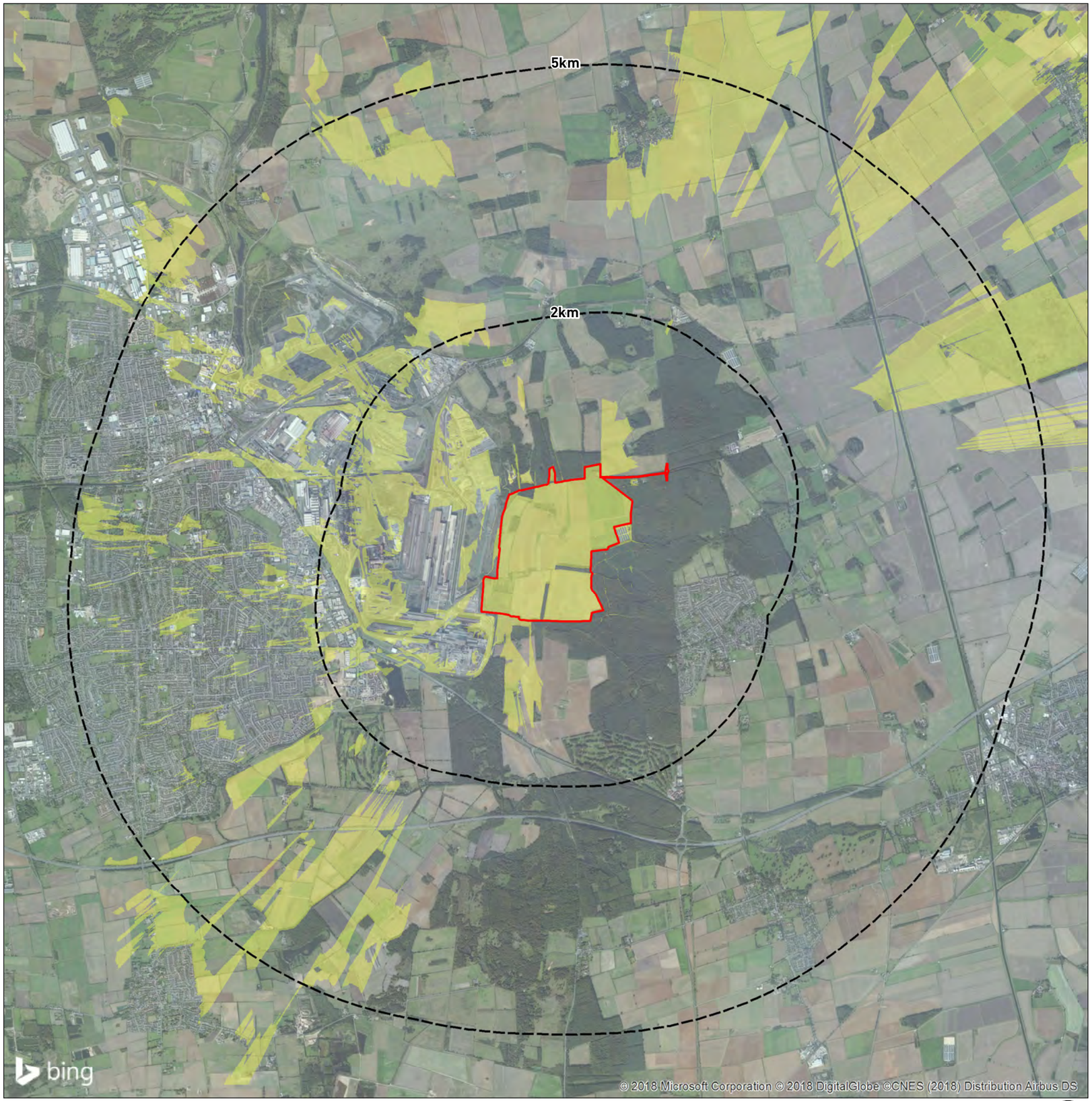
6.7.13 **Table 6.5** provides a summary of the identified effects.

Table 6.5: Summary of Effects, Mitigation and Residual Effects.

Receptor / Receiving Environment	Description of Effect	Nature of Effect	Sensitivity	Magnitude of Effect	Mitigation / Enhancement Measures	Significance of Residual Effects
Construction						
Landscape Features	*no additional temporary effects to the existing landscape features beyond those considered within the assessment of operation stage effects discussed below*					
Landscape Character	Direct and Indirect Impact	Permanent	Medium	Temporary additional medium magnitude of change on landscape character of the site.	Planting of new hedgerows, and wildflower seeding adjacent to the proposed security fencing.	Moderate temporary effect on landscape character of the site itself, over and above the permanent effects described below.
Visual Receptors	Indirect Impact	Permanent	High	Temporary additional medium magnitude of change on views to users of the PROW passing through the site.		Moderate temporary visual effect over and above the permanent visual effects described below.
Operation						
Landscape Features	Direct Impact	Permanent	Low	High	Planting of new hedgerows and wildflower seeding adjacent to the proposed security fencing.	Moderate (not significant)
Landscape Character	Direct and Indirect Impact	Permanent	Medium	High (within the site and its immediate environs only)		Major (within the site and its immediate environs only)
Visual Receptors	Indirect Impact	Permanent	High	High (users of the PROW passing through the site only)		Major (users of the PROW passing through the site only)
Cumulative and In-combination						
No significant cumulative landscape or visual effects have been identified						

Figure 6.1

SITE CONTEXT



PLANNING | DESIGN | ENVIRONMENT | ECONOMICS

 T 01285 641717 www.pegasuspg.co.uk

0 2 km

N

KEY

Site Boundary

Screened ZTV - 3m Development Height

Screened ZTV Production Information -
- DTM data used in calculations is OS Terrain 5 that has been combined with OS Open Map Local data for woodland and buildings to create a Digital Surface Model (DSM).

- Indicative Woodland and Building heights are modelled at 15m and 8m respectively.
- Viewer height set at 1.7m
- Calculations include earth curvature and light refraction

N.B. This Zone of Theoretical Visibility (ZTV) image illustrates the theoretical extent of where the development will be visible from, assuming 100% visibility, and includes the screening effect from vegetation and buildings, based on the assumptions stated above.

Revisions:
First Issue- 22/01/2018 JS
A - (31/07/2018 JS) Boundary updated
B - (20/11/2018 AD) Revised red line

Figure 6.1 Site Context

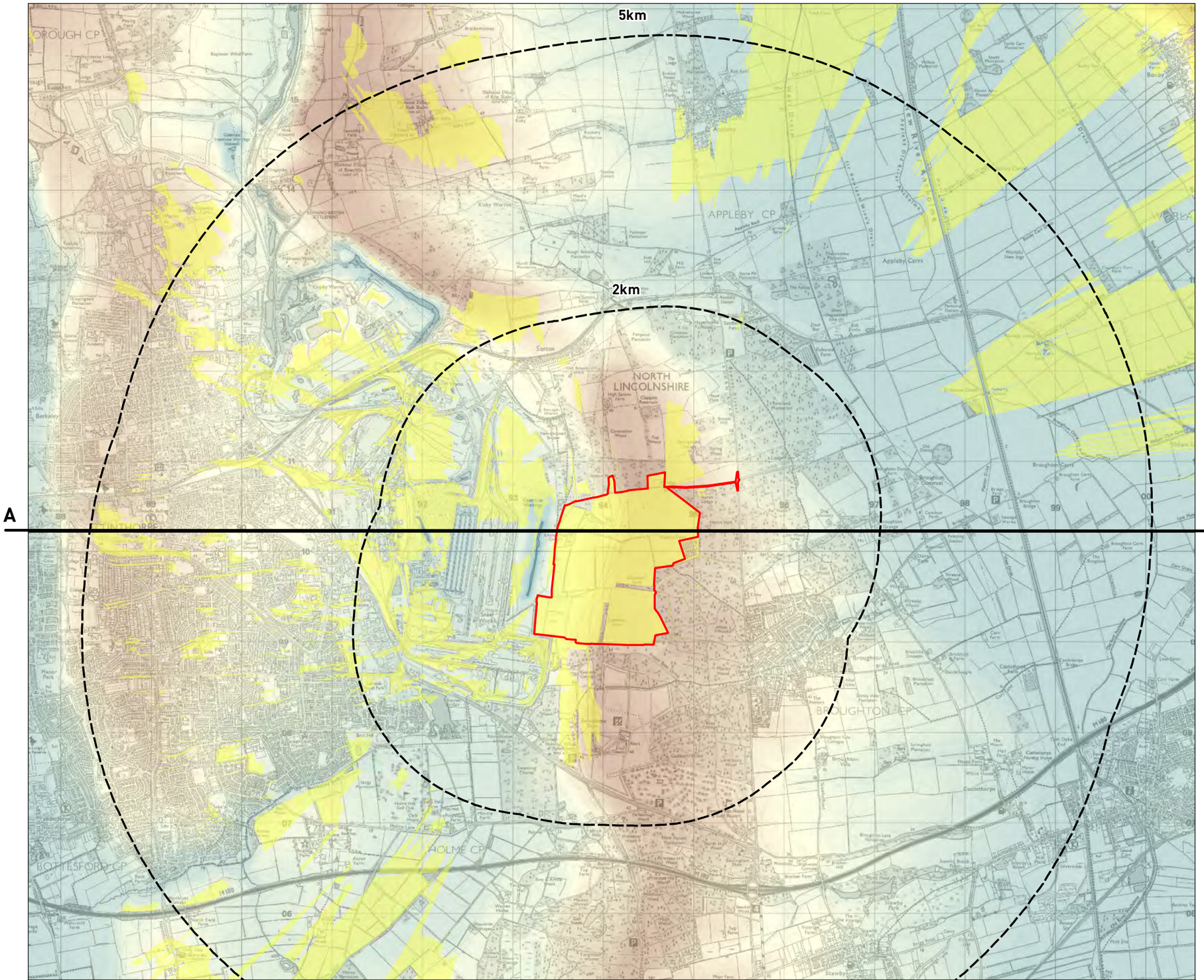
Little Crow Solar Park, Scunthorpe

Client:	INRG Solar Ltd		
DRWG No:	**P17-0718_03**	Sheet No: **-**	REV: **B**
Drawn by:	AD	Approved by:	KC
Date:	20/11/2018		
Scale:	1:50,000 @ A3 1:25,000 @ A1		

Pegasus Environment

Figure 6.2

TOPOGRAPHY



KEY

Site Boundary

Screened ZTV - 3m Development Height

DTM (metres above ordnance datum)

High : 82.2423

Low : -12.91

Screened ZTV Production Information -
- DTM data used in calculations is OS Terrain 5 that has been combined with OS Open Map Local data for woodland and buildings to create a Digital Surface Model (DSM).

- Indicative Woodland and Building heights are modelled at 15m and 8m respectively.
- Viewer height set at 1.7m
- Calculations include earth curvature and light refraction

N.B. This Zone of Theoretical Visibility (ZTV) image illustrates the theoretical extent of where the development will be visible from, assuming 100% visibility, and includes the screening effect from vegetation and buildings, based on the assumptions stated above.

PLANNING | DESIGN | ENVIRONMENT | ECONOMICS

0 2 km

N

Revisions:
First Issue- 22/01/2018 JS
A - (31//07/2018 JS) Boundary amended
B - (20/11/2018 AD) Revised red line

Figure 6.2 Topography

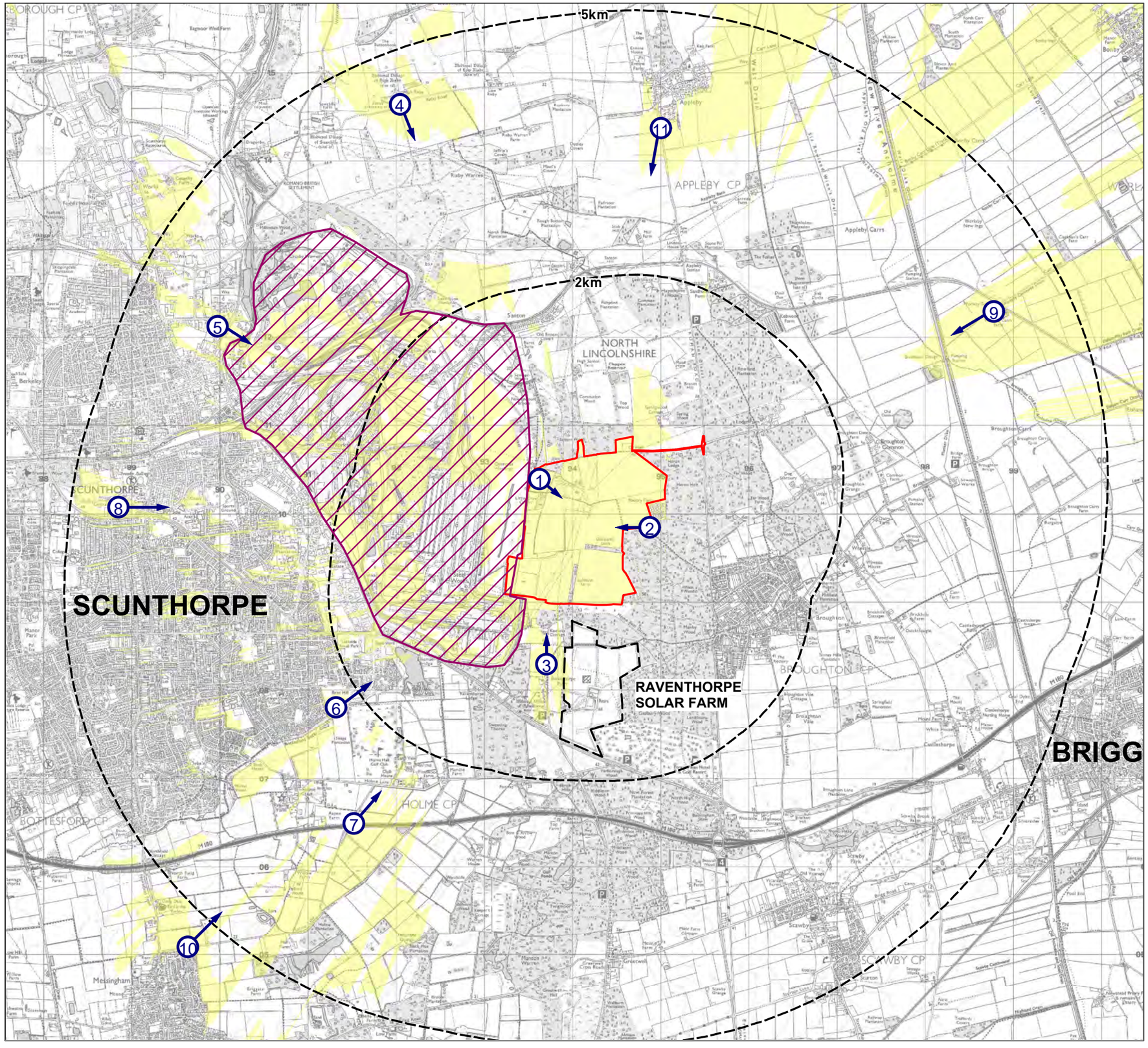
Little Crow Solar Park, Scunthorpe

Client:	INRG Solar Ltd		
DRWG No:	**P17-0718_04**	Sheet No: **-**	REV: **B**
Drawn by:	AD	Approved by:	KC
Date:	20/11/2018		
Scale:	1:45,000 @ A3		

Pegasus Environment

Figure 6.3

LVIA VIEWPOINTS



KEY

- Site Boundary
- Screened ZTV - 3m Development Height
- Industrial area with no publicly accessible viewing points
- Proposed Assessment Viewpoints

Screened ZTV Production Information -
- DTM data used in calculations is OS Terrain 5 that has been combined with OS Open Map Local data for woodland and buildings to create a Digital Surface Model (DSM).

- Indicative Woodland and Building heights are modelled at 15m and 8m respectively.
- Viewer height set at 1.7m
- Calculations include earth curvature and light refraction

N.B. This Zone of Theoretical Visibility (ZTV) image illustrates the theoretical extent of where the development will be visible from, assuming 100% visibility, and includes the screening effect from vegetation and buildings, based on the assumptions stated above.

PLANNING | DESIGN | ENVIRONMENT | ECONOMICS

0 2 km

N

FIGURE 6.3 -
LVIA VIEWPOINTS

LITTLE CROW SOLAR PARK

Client: INRG Solar Ltd

DRWG No: P17-0718_02 REV: B

Drawn by : CB Approved by: DT

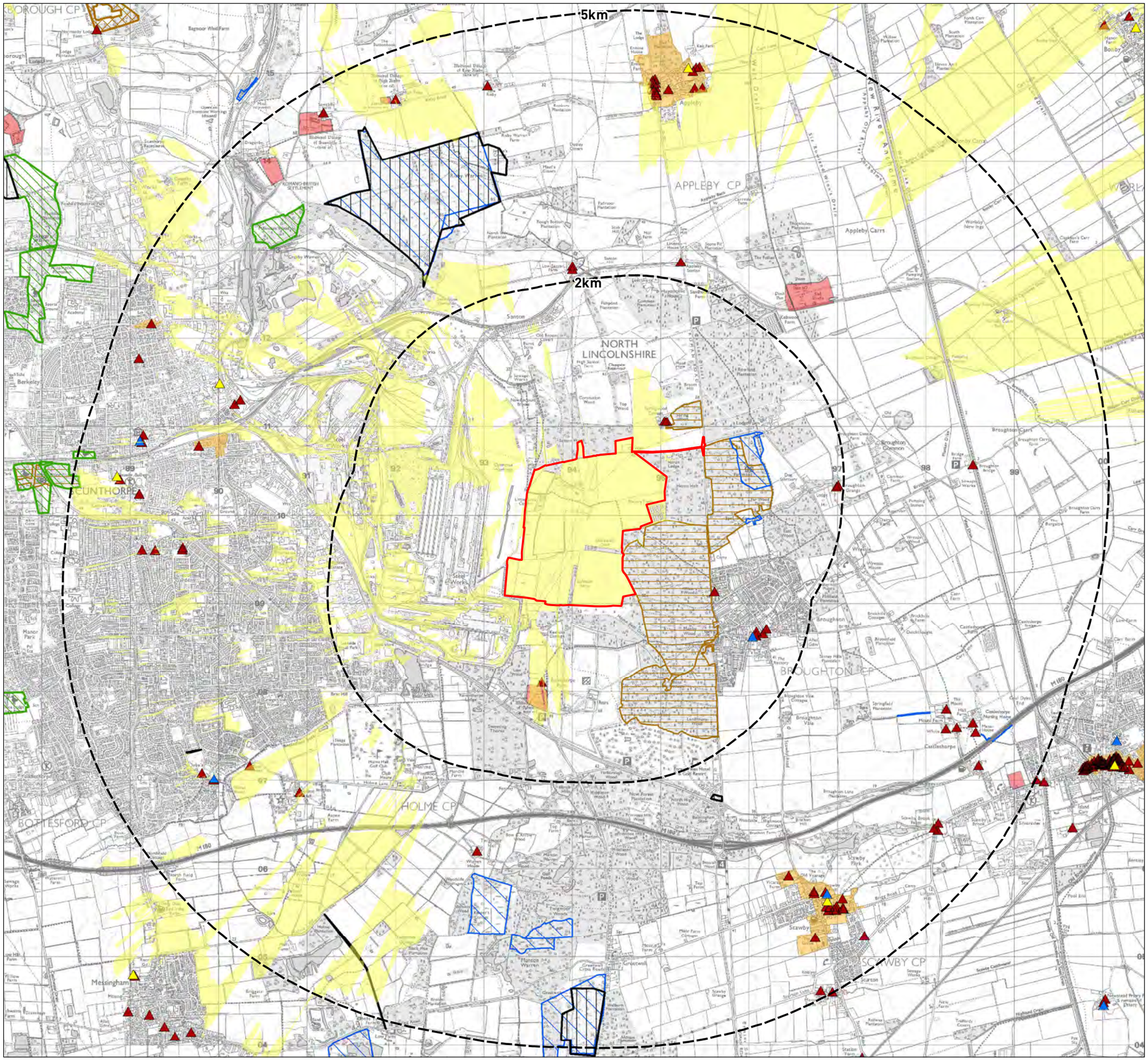
Date: 15/09/2017

Scale: 1:45,000 @ A3

Pegasus Environment

Figure 6.4

ENVIRONMENTAL DESIGNATIONS



KEY

- Site Boundary
- Screened ZTV - 3m Development Height
- Open Access Land / Registered Common Land
- Grade I Listed Building
- Grade II* Listed Building
- Grade II Listed Building
- Country Park
- Scheduled Monument
- Local Nature Reserve (LNR)
- Site of Special Scientific Interest (SSSI)
- Ancient Woodland
- Conservation Area

Screened ZTV Production Information -
- DTM data used in calculations is OS Terrain 5 that has been combined with OS Open Map Local data for woodland and buildings to create a Digital Surface Model (DSM).

- Indicative Woodland and Building heights are modelled at 15m and 8m respectively.
- Viewer height set at 1.7m
- Calculations include earth curvature and light refraction

N.B. This Zone of Theoretical Visibility (ZTV) image illustrates the theoretical extent of where the development will be visible from, assuming 100% visibility, and includes the screening effect from vegetation and buildings, based on the assumptions stated above.

Revisions:
First Issue- 22/01/2018 JS
A - (31/07/2018 JS) Boundary amended
B - (20/11/2018 AD) Revised red line

Figure 6.4
Environmental Designations Plan

Little Crow Solar Park, Scunthorpe

Client:	INRG Solar Ltd		
DRWG No:	**P17-0718_05**	Sheet No: **-**	REV: **B**
Drawn by:	AD	Approved by:	KC
Date:	20/11/2018		
Scale:	1:45,000 @ A3		

Pegasus Environment

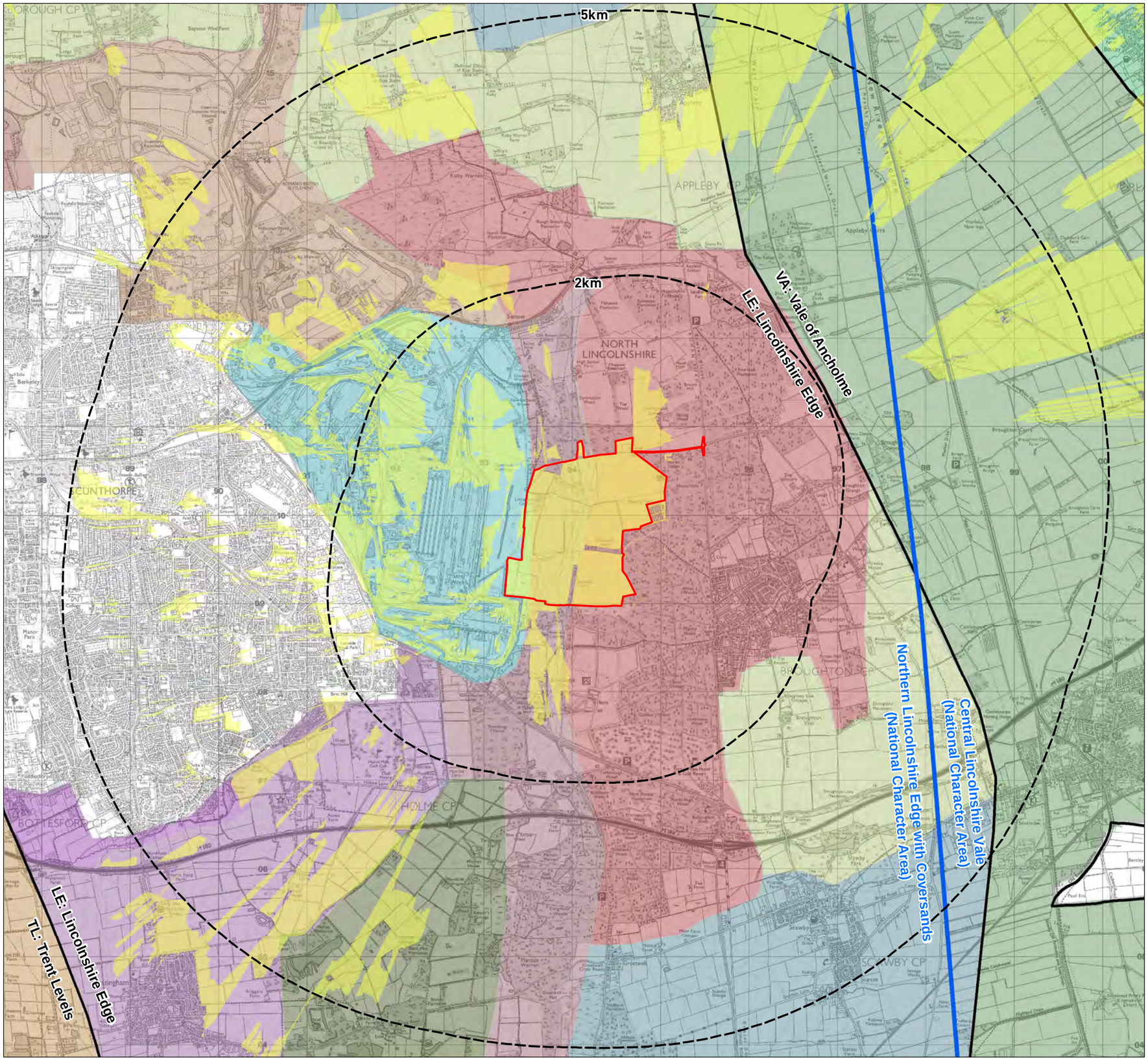
PLANNING | DESIGN | ENVIRONMENT | ECONOMICS

0 2 km

N

Figure 6.5

LANDSCAPE CHARACTER AREAS



KEY

- Site
- Screened ZTV - 3m Development Height
- National Landscape Character Areas
- Regional Character Areas - North Lincolnshire Landscape Charcter Assessment (1999)

North Lincolnshire Landscape Character Assessment (1999)

Local Landscape

- Despoiled Landscape
- Elevated Open Farmland
- Elevated Wooded Farmland
- Farmed Urban Fringe
- Flat Valley Bottom Farmland
- Heathy Woodland
- Industrial Landscape
- Open Undulating Farmland
- Steep Wooded Scarp Slope
- Wooded Farmed Scarp Slope
- Wooded Scarp Slope
- Wooded Springline Farmland
- Wooded Undulating Farmland

Screened ZTV Production Information -
- DTM data used in calculations is OS Terrain 5 that has been combined with OS Open Map Local data for woodland and buildings to create a Digital Surface Model (DSM).

- Indicative Woodland and Building heights are modelled at 15m and 8m respectively.
- Viewer height set at 1.7m
- Calculations include earth curvature and light refraction

N.B. This Zone of Theoretical Visibility (ZTV) image illustrates the theoretical extent of where the development will be visible from, assuming 100% visibility, and includes the screening effect from vegetation and buildings, based on the assumptions stated above.

Revisions:
First Issue- 22/01/2018 JS
A - (31/07/2018 JS) Boundary amended
B - (20/11/2018 AD) Revised red line

Figure 6.5
Landscape Character Areas

Little Crow Solar Park, Scunthorpe

Client: INRG Solar Ltd
DRWG No: **P17-0718_06** Sheet No: **-** REV: **B**
Drawn by: AD Approved by: KC
Date: 20/11/2018
Scale: 1:45,000 @ A3

Pegasus Environment

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Figure 6.6

LANDSCAPE MASTERPLAN / MITIGATION PLAN

Figure 6.6 -
Landscape Mitigation Plan

LITTLE CROW SOLAR PARK

Client: INRG REV: -

DRWG No: P17-0718_100

Drawn by: KG Approved by: KC

Date: 26/07/2018

Scale: 1:3000 @ A0

Pegasus

LITTLE CROW SOLAR PARK

LAND TO THE EAST OF STEEL WORKS, SCUNTHORPE

Preliminary Environmental Information Report

Chapter 7

ECOLOGY AND NATURE CONSERVATION

ECOLOGY AND NATURE CONSERVATION

7.1 INTRODUCTION

7.1.1 This chapter of the PEIR the likely effects of the Proposed Development on the ecology of the Site.

7.1.2 The chapter describes the assessment methodology; the baseline conditions currently existing at the Application Site and surroundings; the likely significant ecological effects; the mitigation measures required to prevent, reduce or offset any significant adverse effects; and the likely residual effects after these measures have been employed. Ecological impacts cannot be confirmed for decommissioning as the ecological constraints at the point of decommissioning are extremely difficult to predict at this stage. This will be informed by surveys carried out as part of the landscape and ecological management plan.

7.1.3 This chapter has been prepared by Clarkson and Woods:

- Author – Peter Timms BSc MSc ACIEEM (Senior Ecologist)
- Review – Tom Clarkson BSc MSc DIC MCIEEM (Managing Director)
- Review – Harry Fox BSc MCIEEM (Principal Ecologist)

7.1.4 The competence of all field surveyors has been assessed by Clarkson and Woods with respect to the CIEEM Competencies for Species Survey (CSS). Field surveyors contributing to the surveys were as follows.

- Peter Timms BSc MSc ACIEEM
- Harry Fox BSc MCIEEM
- Chris Poole BSc GradCIEEM
- Phil Bowater BSc ACIEEM
- Mike Hockey BSc GradCIEEM
- Paul Kennedy ACIEEM
- Steven Miller Associate CIEEM

7.1.5 This chapter is supported by the following figures

- **Figure 7.1:** Phase 1 Habitat Map and Target Notes
- **Figure 7.2**: Designated Sites for Nature Conservation with 1km

7.1.6 This chapter is also supported by the following appendices: -

- **Appendix 7.1**: Extended phase 1, arable plants, great crested newts & water Vole Survey Report
- **Appendix 7.2**: Wintering birds surveys

- **Appendix 7.3**: Breeding Birds Surveys
- **Appendix 7.4**: Bat Survey Activity

7.2 CONSULTATION

7.2.1 This document functions as a preliminary environmental information report and formal Scoping with the Planning Inspectorate will be undertaken at the appropriate time.

7.2.2 Andrew Taylor, Project Officer (Ecologist) from the Environment Team at North Lincolnshire Council (NLC), was consulted in January 2017 regarding the expected scope of survey works.

7.2.3 Pre-application advice was also sought from Natural England in January 2018, who requested that an assessment of the potential for construction phase impacts on Broughton Far Wood SSSI is made, and for a Construction Management Plan (or equivalent) to include measures to avoid potential impacts.

7.2.4 Natural England further advised that the site lied adjacent to Far Wood Ancient Replanted Woodland, and that appropriate survey and avoidance/mitigation measures are included within the application to avoid unacceptable damage to the woodland, with reference to Natural England/Forestry Commission joint standing advice[1].

7.2.5 Further pre-application advice on the scope and methods of ecological surveys undertaken, as well as advice on proposed mitigation/enhancement was received by Natural England and NLC in September and October 2018 respectively. Both parties were satisfied with the survey effort and the scope of the draft Environmental Statement chapter, and also agreed with the broad approach to mitigation/enhancement with further detailed recommendations for ecological mitigation/enhancement provided.

7.3 ASSESSMENT APPROACH

Assessment Methodology

Assessment of Ecological Importance

7.3.1 The standard approach applied in the UK to Ecological Impact Assessment (EcIA) is that developed by the Chartered Institute of Ecology and Environmental Management (CIEEM) in 2016 and revised in 2018[2]. This methodology has been used to evaluate existing conditions, and to assess the significance of likely effects on ecological features that may arise during construction and operation of the proposed development. This involves determining the importance of each ecological feature and undertaking an impact assessment pre and post-implementation of mitigation measures.

7.3.2 When assessing the baseline biodiversity importance of natural features found on the site, the following characteristics are considered:

- Animal or plant species which are rare or uncommon, either internationally, nationally or more locally;
- Ecosystems which provide the habitats required by the above species;

[1] https://www.gov.uk/guidance/ancient-woodland-and-veteran-trees-protection-surveys-licences [accessed 25/01/2018]
[2] CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. CIEEM, Winchester.

- Species that are afforded legal protection;
- Endemic or locally distinct sub-populations of a species;
- Habitat diversity, connectivity and/ or other synergistic associations;
- Species of Principal Importance under the Natural Environment and Rural Communities (NERC) Act;
- Notably large populations or concentrations of animals considered uncommon or threatened in a wider context;
- Plant communities that are considered to be typical of valued natural/ semi-natural vegetation types;
- Species at the edge of their range; and
- Species-rich assemblages of plants or animals.

7.3.3 Habitats and species identified in the baseline conditions will all be attributed with an ecological importance. The importance or potential importance of an ecological feature will be described according to its importance in a geographical context i.e. (International, National, Regional, Metropolitan/County, and Local importance). An intermediary category of 'District' importance has been derived and will apply where a feature is present on or adjacent to the site, and is considered to be of higher importance to nature conservation than in a 'Local' context, but is considered to be of lower importance on a 'County' scale. Furthermore, a category of 'Site' importance will be applied to a feature which is present or potentially present at the site, but where the importance to nature conservation of the feature is of relatively low value in the context of the wider landscape. A further 'Negligible' category will be assigned to features of no particular intrinsic nature conservation importance.

7.3.4 Additional weight is given to habitats or species that are given special protection under domestic or international law, especially those for which sites have been designated. This includes specially protected features such as hedgerows (Hedgerow Regulations) and trees (Tree Preservation Orders). Non-statutory designated sites also attract special consideration.

7.3.5 Published selection criteria, contained within the selection of Biological Sites of Special Scientific Interest (SSSI), can also be referred to, to aid the assessment of importance. Where significant habitats, such as Ancient Woodland, do not carry a designation, these are nevertheless considered at a specified geographic level.

7.3.6 For the purposes of this assessment, only receptors identified within the baseline conditions as being of Local importance or above will be considered 'Important Ecological Features (IEFs)' in line with the guidelines set out by CIEEM. The impacts of the proposed development will only be assessed on those IEFs with importance equal to, or higher than local level. Appropriate mitigation may be proposed for non-IEF where it is necessary to ensure offences are not committed under relevant legislation.

Characterisation of Impacts

7.3.7 When assessing the impact of the development and changes to the baseline conditions on site, predictions will be made which focus solely on the zone of influence whilst taking into consideration the lifetime of the development. The zone of influence has been assessed separately for each individual receptor.

7.3.8 Each potential impact on an IEF will be assessed at its respective geographical scale and, where appropriate, using following parameters:

- Positive or negative (whether the impact will have a Positive or Negative effect);
- Magnitude (the size of the impact);
- Extent (area over which impact occurs);
- Duration (time impact expected to last before recovery);
- Reversibility (an impact may be permanent or temporary); and
- Timing and frequency (impact may be seasonal e.g. bird nesting season).

Mitigation Measures

7.3.9 Mitigation measures are described where adverse effects are identified upon the IEFs. The mitigation measures will aim to reduce the overall effect value. It is not always possible to fully mitigate an adverse effect to neutral levels. An assessment of residual effects which takes account of the proposed mitigation is then made. Due consideration is given to the reliability of mitigation measures and the likelihood that they will achieve their stated goals, using the terms defined above.

7.3.10 Mitigation measures are also identified for species which did not qualify as IEF but which are afforded legal protection under the Wildlife and Countryside Act (1981) or other legislation, and as such will require certain precautionary methodologies to ensure offences are not committed.

Assessment of Significance

7.3.11 Following the methodology described by CIEEM, an ecologically significant effect is defined as *"an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general. Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. national/local nature conservation policy) or more wide-ranging (enhancement of biodiversity). Effects can be considered significant at a wide range of scales from international to local*". Significance will be described as being 'significant' or 'not significant'.

Survey Methodology

Desk Study

7.3.12 Data has been purchased from the Lincolnshire Environmental Records Centre (LERC) on 3rd August 2017. This included data on protected species; red data book species; Species of Principal Importance; local Biodiversity Action Plan species and invasive species within 2km of the site. Records for notable and/or protected species within 1 - 2 km are usually considered to be of greatest relevance within most studies as this is usually the distance encompassing the typical home ranges of most of the species studied. Details of locally designated sites within 1km were also obtained. Due to the the nature of the proposals, non-statutorily designated sites beyond 1km are unlikely to be within the zone of influence of the development.

Field Surveys

7.3.13 Field surveys undertaken to inform this chapter are summarised in Table 7.1 below Field survey methods are described in detail in the relevant Appendices

Table 7.1: Summary of Field Surveys

Survey	Methodology	Timing	Details (Results & Methods)
Extended Phase 1 Habitat Survey	Extended Phase 1 survey based on JNCC (2010)[3] and IEA (1995)[4] guidance Including hedgerow assessment, walkover assessment for value of the site for protected and notable species e.g. badgers, roosting bats, reptiles and invertebrates etc.	Over 4 days in July, August & September 2017	Appendix 7.1
Great Crested Newt Habitat Suitability Index (HSI) and eDNA testing	HSI assessment in accordance with Oldham et al. (2000)[5] Great crested newt eDNA survey in accordance with Biggs et al. (2014) [6]	Over 2 visits in April & June 2018	Within the extended phase 1 survey - Appendix 7.1
Arable Plants Survey	Survey based on Plantlife Important Arable Plant Areas Methodology[7], adapted for EIA purposes	1 visit in June 2018	Within the extended phase 1 survey - Appendix 7.1

[3] JNCC (2010) Handbook for Phase 1 habitat survey – a technique for environmental audit. Joint Nature Conservation Committee, Peterborough

[4] Institute of Environmental Assessment (1995). Guidelines for Baseline Ecological Assessment. E & FN Spon, London.

[5] Evaluating the suitability of habitat for the great crested newt (Triturus cristatus) (2000) Oldham et al. Herpetological Journal 10:143-155.

[6] Biggs J, Ewald N, Valentini A, Gaboriaud C, Griffiths RA, Foster J, Wilkinson J, Arnett A, Williams P and Dunn F (2014). Analytical and methodological development for improved surveillance of the Great Crested Newt. Defra Project WC1067. Freshwater Habitats Trust: Oxford.

[7] Byfield,A.J. & Wilson, P. J. (2005). Important Arable Plant Areas: identifying priority sites for arable plant conservation in the United Kingdom. Plantlife International, Salisbury, UK

Survey	Methodology	Timing	Details (Results & Methods)
Water Vole Survey	Based on guidance provided by the Mammal Society in Dean et al. (2016)[8]	2 visits in September 2017 and April 2018	Within the extended phase 1 survey - Appendix 7.1
Wintering Bird Survey	Survey adapted from British Trust for Ornithology (BTO) Farmland Bird Survey methodology (e.g Gillings et al.)[9]	4 visits during November 2017 to February 2018	Appendix 7.2
Breeding Birds Survey	Surveys adapted from BTO Common Bird Census methodology[10]	3 visits during April to June 2018	Appendix 7.3
Bat Activity Survey	Manual Transect and Automated Detector Survey based on protocol described by the Bat Conservation Trust (2016)[11]	2 manual transects and 2 automated detector surveys, April to June 2018	Appendix 7.4

Limitations

7.3.14 Limitations specific to the surveys conducted are given in the appropriate technical appendices

Legislative and Policy Framework

European Level Legislation

[8] Dean, M., Strachan, R., Gow, D. and Andrews, R. (2016) The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series). The Mammal Society, London

[9] Gillings, S., Wilson, A.M., Conway, G.J., Vickery, J.A., and Fuller R.J. (2008) Winter Farmland Bird Survey – Research Report No. 494. BTO, Thetford

[10] Bibby, C.J., Burgess, N.D., Hill, D.A. and Mustoe, S.H. (2000). Bird Census Techniques. Academic Press, London

[11] Collins, J. (ed) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn).

7.3.15 The Habitats Directive: Adopted by the EC in 1992, Council Directive 92/43/EEC concerning the conservation of natural habitats and wild flora and fauna was transposed into UK legislation through the Conservation (Natural Habitats, & c.) Regulations 1994. This has been superseded by the Conservation of Habitats and Species Regulations 2017. Habitats listed under Annex I and species listed under Annex II (including otter and some species of bat) receive special legal protection. This is partly implemented through the creation of a network of protected sites (known through Europe as the Natura 2000 network of Sites of Community Importance) which in the UK is made up of Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) which are designated under the Birds Directive (Directive 79/409/EEC, now superseded by Directive 2009/147/EC). Under Regulation 48(1) of the Habitats Directive, all developments with the potential to affect a European site must undergo an assessment (known as an Appropriate Assessment) to determine the potential to cause harm to the features for which the SAC or SPA was designated.

National Level Legislation and Policy

7.3.16 Legislation and policy documents relevant to ecology and nature conservation at a national level applicable to this development are:

- Wildlife and Countryside Act, 1981 (as amended);
- Natural Environment and Rural Communities (NERC) Act, 2006;
- Protection of Badgers Act, 1992;
- Countryside and Rights of Way Act, 2000;
- Wild Mammals (Protection) Act, 1996.
- Overarching National Policy Statement for Energy (EN-1), 2011

Other Guidance and Relevant Documents

- BRE (2014) Biodiversity Guidance for Solar Developments. Eds G E Parker and L Greene;
- Natural England Technical Information Note TIN101 (2011) Solar Parks: Maximising Environmental Benefits. Natural England;
- Eaton MA, Brown AF, Noble DG, Musgrove AJ, Hearn R, Aebischer NJ, Gibbons DW, Evans A and Gregory RD (2009) Birds of Conservation Concern 3: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man. British Birds 102, pp296-341.
- Montag H, Parker G and Clarkson T (2016) The Effect of Solar Farms on Local Biodiversity: A Comparative Study. Clarkson and Woods and Wychwood Biodiversity.
- Natural England (2017) Evidence Review of the Impact of Solar Farms on Birds, Bats and General Ecology (NEER012) 1st Edition.

Local Level Policy

Core Strategy

7.3.17 The key policies in the North Lincolnshire Core Strategy (adopted June 2011) relevant to ecology and nature conservation issues are:

Policy CS17: Biodiversity

> The council will promote effective stewardship of North Lincolnshire's wildlife through:
>
> 1. Safeguarding national and international protected sites for nature conservation from inappropriate development.
>
> 2. Appropriate consideration being given to European and nationally important habitats and species.
>
> 3. Maintaining and promoting a North Lincolnshire network of local wildlife sites and corridors, links and stepping stones between areas of natural green space.
>
> 4. Ensuring development retains, protects and enhances features of biological and geological interest and provides for the appropriate management of these features.
>
> 5. Ensuring development seeks to produce a net gain in biodiversity by designing in wildlife, and ensuring any unavoidable impacts are appropriately mitigated for.
>
> 6. Supporting wildlife enhancements that contribute to the habitat restoration targets set out in the North Lincolnshire's Nature Map and in national, regional and local biodiversity action plans.
>
> 7. Improving access to and education/interpretation of biodiversity sites for tourism and the local population, providing their ecological integrity is not harmed.

Supplementary Planning Document - Planning for Solar Photovoltaic (PV) Development.

7.3.18 The key polices in the SPD (January 2016) relevant to ecology and nature conservation are:

Policy E: Assessing Cumulative Impacts

> Cumulative impact of renewable energy development is a key planning issue for North Lincolnshire. Developers must ensure that a full assessment of cumulative impacts (in particular cumulative landscape impacts and cumulative visual impacts) is undertaken when putting together their proposals and submitting planning applications.
>
> Accordingly, developers should refer to the Planning Practice Guidance – Renewable and Low Carbon Energy when assessing the cumulative landscape and visual impacts of their proposals in addition to the requirements of policy 10 of the adopted Supplementary Planning Document – Planning for Renewable Energy Development (November 2011). Where cumulative impacts are considered to be unacceptable, proposals will be refused.

Policy G: Biodiversity

As set out in paragraphs 6.9 to 6.18 as well as Policy 1 of the adopted Supplementary Planning Document – Planning for Renewable Energy Development (November 2011), developers are required to assess the impact of all aspects of the proposed development including the solar farm, transport routes, other infrastructure and proposed grid connections on area's designated biodiversity sites, habitats and species. Where development does impact on these assets, developers should identify measures to avoid or mitigate harm to them and secure their conservation and enhancement. Ecological and biodiversity surveys should be provided as part of planning applications (see Annex 1). Biodiversity enhancement proposals should be submitted with all solar farm applications. Where significant harm cannot be mitigated or avoided, or compensated for proposals will be refused.

Proposals located in internationally, nationally or locally designated sites for nature conservation will not be permitted.

Where habitat creation is proposed as mitigation, compensation or planning gain, the underlying survey information should be adequate for regulatory authorities to assess whether the proposals are feasible. In addition to information on species and habitats, it will also be necessary to measure physical conditions including (but not exclusively) soil conditions and hydrology. Where applicable, the applicant should follow the standards set out in Natural England Technical Information Notes.

Any enhancements proposed as planning gain must be additional to the enhancements already proposed under agri-environment schemes.

In undertaking ecological/biodiversity surveys and assessments, developers should contact the council's Ecologist to discuss the council's requirements.

North Lincolnshire Local Plan

7.3.19 The North Lincolnshire Local Plan was adopted in May 2003 and is used to make planning decisions, although is gradually being replaced by the Local Development Framework. The following saved policies are relevant to ecology and nature conservation:

LC2 – Sites of Special Scientific Interest and National Nature Reserves

Proposals for development in, or likely to affect, Sites of Special Scientific Interest will be subject to special scrutiny. Where such development may have an adverse effect, directly or indirectly on the SSSI, it will not be permitted unless the reasons for the development clearly outweigh the nature conservation value of the site itself and the national policy to safeguard the national network of such sites.

Where a site is a National Nature Reserve (NNR) or a site identified under the Nature Conservation Review (NCR) or Geological Conservation Review (GCR) particular regard will be paid to the individual site's national importance.

In all cases where development is permitted which would damage the nature conservation value of the site, such damage should be kept to a minimum. Where development is permitted the use of conditions or planning obligations to ensure the protection and enhancement of the site's nature conservation value and other appropriate compensatory measures will be considered

LC4 – Development Affecting Sites of Local Nature Conservation Importance

Any development or land use change which is likely to have an adverse impact on a Local Nature Reserve, a Site of Importance for Nature Conservation or a Regionally Important Geological Site will not be approved unless it can be clearly demonstrated that there are reasons for the proposal which outweigh the need to safeguard the intrinsic nature conservation value of the site or feature.

In all cases where development is permitted which may damage the nature conservation value of the site, such damage shall be kept to a minimum. Where development is permitted the use of conditions or planning obligations to ensure the protection and enhancement of the site's nature conservation value and other appropriate compensatory measures will be considered.

LC5 – Species Protection

Planning permission will not be granted for development or land use changes which would have an adverse impact on badgers or species protected by Schedules 1, 5 or 8 of the Wildlife and Countryside Act 1981 (as amended). Where development is permitted that may have an effect on those species, conditions or the use of planning agreements will be considered to:

i) facilitate the survival of individual members of the species; and

ii) reduce disturbance to a minimum; and

iii) provide adequate alternative habitats to sustain at least the current levels of population.

LC12 – Protection of Trees, Woodland and Hedgerow

Proposals for all new development will, wherever possible ensure the retention of trees, woodland and hedgerows. Particular regard will be given to the protection of these features within the setting of settlements, the protection of ancient woodlands and historic hedgerows and the amenity value of trees within built up areas. Tree preservation orders will be made where trees which contribute to local amenity or local landscape character are at risk. Landscaping and tree and hedgerow planting schemes will be required to accompany applications for new development where it is appropriate to the development and its setting.

Biodiversity Action Plan

7.3.20 The Lincolnshire Local Biodiversity Action Plan (LBAP) lists the following local habitats and species which are, or could be, relevant to the site:

Habitats

- Arable field margins
- Hedgerows and hedgerow trees

- Lowland dry acid grassland
- Ponds, lakes and reservoirs
- Lowland mixed deciduous woodland

Species

- Bats
- Farmland birds
- Newts
- Water Vole

7.4 BASELINE CONDITIONS

7.4.1 This section outlines the designated sites, habitats and species considered to be ecological features.

Overview of Application Site

7.4.2 The Application Site consists of 17 predominantly arable fields bordered by a network of hedgerows and extensive woodland plantations. The land gradually slopes to the western edge of the site. Grassland, scrub and ruderal habitat are also present in discrete areas around the site.

7.4.3 The wider landscape is characterised by the industrial steelworkings to the west of the site, and further arable farmland and plantation woodland to the north and east. Beyond the woodland to the south lies a solar array with 39MW capacity constructed in 2015.

Designated Sites

International Statutorily Designated Sites Within 10km

Humber Estuary Special Area of Conservation (SAC), Special Protection Area (SPA) and Ramsar Site

7.4.4 The Humber Estuary is designated a Special Protection Area (SPA), Special Conservation Area (SAC) and Ramsar site. The area encompassing the SPA is situated approximately 11km north of the site at the closest point, whilst the SAC and Ramsar site is located 9km west at the closest point. It primarily receives its designation for its estuarine habitats, which support a range of associated species including internationally important assemblages of wintering and migratory birds.

7.4.5 The application site is situated a considerable distance from the Humber Estuary, and contains markedly different habitats to the estuarine habitats cited within the relevant designations, and the application site is highly unlikely to represent functionally linked habitat for the wildlife supported by the designated sites. Disturbance effects on wading and overwintering species is unlikely at such significant distances.

7.4.6 The Humber Estuary SAC, SPA and Ramsar site is considered to be outside of the zone of influence of the proposals and are not considered further within the assessment. Following preliminary consultation with the North Lincolnshire Ecologist and Natural

England, both of these parties were of the opinion that the proposals will not significantly impacts the interest features of the Humber Estuary designated sites.

National statutorily designated sites within 5km

7.4.7 Five Sites of Special Scientific Interest (SSSIs) are located within 5km of the application site, and are described below:

Broughton Far Wood SSSI

7.4.8 This is an extensive block of commercial woodland located approximately 820m east of the proposed solar array, although it is 350m from the site access (which will utilise an existing farm track). This is designated for its rich woodland canopy and ground flora, as well as its areas of herb-rich limestone grassland in the north east corner.

7.4.9 The SSSI is separated from the application site by further woodland plantation, arable fields and the B1207 road. The distances and the intervening landscape between the application site and the SSSI is highly likely to attenuate any direct impacts on the ecological integrity of the SSSI.

7.4.10 There lies potential for the indirect impacts during construction however, as the main access route for construction vehicles will follow the B1208 which lies adjacent to the northern boundary of the SSSI.

Broughton Alder Wood SSSI

7.4.11 Situated approximately 1km east of the main development site, and is designated for its wet, alder *Alnus glutinosa* woodland and associated fen and spring habitats and flora. It is separated from the development site by extensive plantation woodland, the B1207 road, and a poultry farm. The distances and intervening landscape between this SSSI means direct or indirect impacts as a result of the proposals are highly unlikely to occur, and the SSSI is considered to be outside of the zone of influence

Risby Warren SSSI

7.4.12 This is a remnant area of heathland which supports a variety of associated plant communities, include dune, heathland, acid and calcareous grassland which are affected by airborne pollution from the nearby industrial sites. Tree cover on the SSSI comprises coniferous shelter belt planting and as well as scattered birch *Betula sp.* and gorse *Ulex europaeus*. This is located approximately 2.65km north west of the site and is separated from the application site by plantation woodland, agricultural farmland, heavy industry and quarry workings. Given the distance and landscape lying between Risby Warren and the application site, the SSSI is considered to be outside of the zone of influence of the proposals.

Manton and Twigmoor SSSI

7.4.13 This comprises a complex of three separate sites, which are located approximately 3.1km south of the site at the closest point. Important habitats supported by the SSSI include heathland, acid grassland and wetland features, with wet woodland also present. Together the site components support a diverse range of associated floral species. The intervening landscape comprises woodland plantations, an existing solar array, a golf course and the busy A18 and M180 roads. This SSSI is considered to be beyond zone of influence of the development.

Castlethorpe Tufas SSSI

7.4.14 This is situated approximately 3.4km and is designated for its' geological interest, and is not considered further within this assessment.

Non-statutorily designated sites within 1km

7.4.15 Eleven locally designated sites for nature conservation are located within 1km of the application, which are described in Table 7.2. Of these, eight are Local Wildlife Sites (LWSs) selected by the Greater Lincolnshire Nature Partnership due to their importance for wildlife at a local level. Three sites are Sites of Nature Conservation Interest (SNCIs), the status of which has been superseded by the LWSs, but these sites retain SNCI status until they have been assessed against the LWS criteria. A map of designated sites within 1km of the application site is presented in Figure 2.

Table 7.2: Non-statutorily designated sites within 1km of the application site

Site	Designation	Description	Size (ha)	Distance and bearing from site
Manby Wood	LWS	Botanically diverse wooded area, primarily consisting of broadleaved plantation with small areas of young coniferous plantation. Supports a variety of associated ground flora.	80.1	Adjacent to south-eastern boundary of site
Heron Holt	LWS	Woodland with parts containing diverse range of deciduous species and structural variety, with other parts consisting of dense pine and sycamore plantation. Supports a variety of woodland ground flora.	33.3	Adjacent to eastern boundary of site
Broughton West Wood	LWS	Mostly mature deciduous plantation, representative of re-planted ancient woodland, with substantial areas of younger growth and some coniferous elements. Very rich in woodland botany.	83.8	Adjacent to eastern boundary of site
Santon Wood East	LWS	A strip of field edge woodland connecting two planted woodland blocks of varying age and structure, which contains some ancient woodland indicator species.	6.77ha	Adjacent to northern site boundary
Broughton Far Wood	LWS	Botanically diverse plantation woodland containing mature or maturing broadleaved trees with some pine in places.	50.8	440m east

Site	Designation	Description	Size (ha)	Distance and bearing from site
Gadbury and Lundimore Woods	LWS	Mixed plantation woodland considered to represent re-planted ancient woodland, supporting diverse ground flora. Known to support common pipistrelle *Pipistrellus pipistrellus* bat roosts.	81.5	450m south
Rowland Planation	LWS	Dominated by botanically-poor woodland plantation, although supports some areas with richer ground flora, and also contains diverse grassland rides and a small area of wetland	121	560m east
Far Wood Farm Meadow	LWS	An area of marsh, drier grassland and coarse vegetation formally cropped for hay. Supports diverse range of flush and grassland botany.	1.9	800m east
Santon Wood	SNCI	Deciduous plantation woodland managed for forestry. Contains some good woodland ground flora.	101	Adjacent to north western boundary, contains part of the application site
Broughton West Wood	SNCI	Two strips of woodland shelter belts, predominantly consisting of deciduous plantation woodland with a small element of coniferous growth. Occasionally diverse woodland ground flora found in some areas. Support a wide range of typical woodland bird species.	6	Adjacent to south eastern boundary of site
Spring Wood Broughton	SNCI	Dense coniferous plantation woodland with very little ground flora	9.2	230m north of site access

7.4.16 Brougton West Wood LWS, Manby Wood LWS, Heron Holt LWS, Broughton West Wood SNCI and Santon Wood SNCI are all included in this assessment primarily due to their proximity to the application site. Parts of Manby Wood LWS and Broughton West

Wood are considered to represent Plantations on Ancient Woodland Sites (PAWS) as identified using the Natural England/DEFRA web-based MAGIC database[12].

7.4.17 Broughton Far Wood LWS and Rowland Plantation are also included within this assessment, as they border the B1208 road which is expected to be the main route for construction site traffic travelling to and from the site, which may result in indirect impacts occurring. Broughton Far Wood LWS also comprises PAWS woodland.

7.4.18 The remaining locally designated sites are considered to be of sufficient distance from the site that no direct or indirect impacts are likely to occur as a result of the development proposals, and are therefore considered to be outside of the zone of influence.

Habitats

7.4.19 A Phase 1 Habitat Map is provided in Figure 1.

Arable

Arable fields

7.4.20 This was the most frequently encountered habitat at the site, accounting for approximately 210ha of the land within the survey area. At the time of survey, the arable fields comprised a mix of winter barley, early wheat, vining peas and rapeseed, as well as game cover crops at the edge of some fields.

7.4.21 The land within the cultivated arable fields holds very little intrinsic value for biodiversity and is considered to be of **Negligible Importance**

Arable Field Margins

7.4.22 The margins of the arable fields were generally narrow (0.5m to 2m wide) and comprised typical coarse grasses and herbaceous species.

7.4.23 Uncultivated strips of grassland 2-6m wide were noted on either side of farm tracks running though the site and at some headlands around arable fields, particularly in the north east of the site. The vegetation within these habitats was similar in composition to the rest of the arable field margins described above, although evidence that this habitat was subject to less frequent disturbance was noted; a layer of thatch was present and a higher abundance of floral species was present. For the purposes of this assessment, these grassland strips were considered to represent semi-improved grassland although they have been included under the broad habitat type of Arable Field Margins.

7.4.24 The total extent of arable margin habitat at the site was approximately 3ha. Although the arable weed species recorded on site were generally widespread species typical of such habitat, henbane *Hyoscyamus niger*, which was recorded in the north western corner of the site, is classified as Vulnerable on the vascular plant Red Data Book for Great Britain[13]. A species is Vulnerable when it is not Critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium term future.

7.4.25 Arable field margins are a priority habitat identified as a conservation target both locally and nationally. Consequently, this habitat is assessed to be of **Local Importance.**

[12] www.MAGIC.gov.uk
[13] Cheffings, C.M. & Farrell, L. (2005) Species Status Report No 7: The Vascular plant red data list for Great Britain. Joint Nature Conservation Committee, Peterborough.

Poor Semi-improved Grassland

7.4.26 Three parcels of agricultural land in the south west of the site were dominated by tall rank grasses and herbs. In damper areas, rushes such as soft rush *Juncus effusis* and toad rush *Juncus bufonius* were noted. Although this habitat may support notable species occasionally, it is readily-establishing and was not considered to offer elevated ecological compared to habitats within the wider landscape.

7.4.27 A small (~0.3ha) area of semi-improved grassland containing abundant orchids was present in south eastern corner of the site, around the edges of a raised circular mound at and extending east of this feature. Common spotted orchid *Dactylorhiza fuchsia* was frequently encountered as was northern or southern marsh orchid *Dactylorhiza praetermissa* / *Dactylorhiza purpurella*, as well as occasional bee orchid *Ophrys apifera*, Although these orchid species are widespread in the UK and can be found in a range of habitats, the presence of these signifies this area as likely to have been subject to less improvement than the other grassland habitat present at the site. This area lies outside of the construction zone and thus is not expected to be impacted by the development.

7.4.28 This habitat is considered to be of **Site Importance** for biodiversity.

Improved Grassland

7.4.29 A block of mown improved grassland measuring approximately 3.5ha and dominated by cock's foot was present towards the east of the site. This habitat offered only limited value for wildlife and was considered to be of **Negligible Importance**.

Semi-natural Broad-leaved Woodland

7.4.30 Much of the site was bordered by woodland, although the majority of woodland habitat comprised planted mixed/broadleaved woodland (see below). However, just beyond the western site boundary lay a strip of semi-natural riparian woodland on the banks of a stream, sloping down some 5-10m to the stream below and covering an area of approximately 1.5ha. This habitat comprised semi-mature oak *Quercus robur*, silver birch *Betula pendula*, hawthorn *Crataegus monogyna*, goat willow *Salix caprea*, alder *Alnus glutinosa* and elder *Sambucus nigra*.

7.4.31 An area of this habitat measuring 0.25ha was also present at the junction of three hedgerows in the south west of the site, which comprised mature oak, lime *Tilia sp* hawthorn, elder, silver birch and grey willow, and an understorey of enchanter's nightshade *Circaea lutetiana* and wood avens *Geum urbanum*.

7.4.32 Although relatively small in extent, this habitat is likely to be of value to a range of wildlife associated with woodland and is considered to be of **Local Importance**

Plantation Broad-leaved Woodland

7.4.33 Much of the woodland beyond the northern and south eastern boundary of the site comprised planted broadleaved trees as well as a roughly rectangular area of 1.75 ha in between arable land within the western area of the site.

7.4.34 Although this varied in age and species composition between different areas of the site, generally speaking this comprised abundant semi-mature to mature ash *Fraxinus excelsior*, oak, Norway maple *Acer platanoides*, poplar *Populus* sp., silver birch and sycamore *Acer pseudoplanatus* with hawthorn, blackthorn *Prunus spinosa*, sweet chestnut *Castanea sativa*, hazel *Corylus avellana* also frequently encountered with an associated ground flora noted at the edges of the woodlands close to the site boundary, including

species such as bramble *Rubus fruticosus*, ivy *Hedera helix*, wood avens, lords-and-ladies *Arum maculatu*m, and nettle.

7.4.35 Much of this habitat at the site boundaries are locally designated Sites of Nature Conservation Interest (see above). This habitat also represents Lowland Mixed Deciduous Woodland, which is a local and national priority habitat. The extent of this habitat which lies outside of the designated sites is classed as being of **Local Importance.**

Plantation Mixed Woodland

7.4.36 Although predominantly consisting of broad-leaved species, parts of the woodland bordering the southern and western parts of the site contain a large element of coniferous plantation. Species such as larch *Larix decidua*, scot's pine *Pinus sylvestris* and Corscian pine *Pinus nigra* were recorded in these areas amongst the broadleaved species described above. The woodland beyond the south east corner of the site, within Broughton Far Wood LWS and Manby Wood LWS known as 'Far Wood') is classed as 'plantations on ancient woodland sites' (PAWS), and the understorey in this area was noted to be more representative of mature woodland, with species such as enchanter's nightshade, green alkanet *Pentaglottis sempervirens* and dog's mercury *Mercurialis perennis* noted.

7.4.37 A small area of this habitat (approx. 0.1 ha) was present within the central northern part of the site, and comprised planted larch, poplar *Populus* sp. and *cypress* trees with young hawthorn and elder.

7.4.38 This habitat is likely to support a wide range of associated wildlife. Much of this habitat forms part of designated Local Wildlife Sites. The remaining extent of this habitat within and adjacent to the site does not meet the priority habitat criteria and is considered to be of **Site Importance**.

Plantation Coniferous Woodland

7.4.39 An area of woodland comprising entirely of planted larch was present beyond the southern boundary of the site. This habitat was relatively small in extent (approx. 1.1ha) and low in both species composition and structural diversity, and provided fewer opportunities for wildlife compared to the other types of woodland at the site. This habitat is consequently considered to be of **Site Importance**.

Scrub

7.4.40 Areas of dense, unmanaged scrub were occasionally encountered in the centre of the site, as well as more frequently along the western site boundary. In most places, this habitat usually comprised semi-mature hawthorn, bramble, blackthorn, elder and young willow. Scattered stands of scrub were occasionally encountered elsewhere at the site, such as at field margins and along ditch banks. Although this habitat is likely to support a range of protected and notable wildlife species, it is readily establishing and frequently found in the wider landscape. This habitat is assessed to be of **Site Importance**.

Hedgerows

7.4.41 The agricultural fields were bordered in parts by a network of hedgerows. The majority were poor in terms of species diversity, although species-rich hedgerows are present at the site. The hedgerows also varied in structural diversity; some were relatively intact whereas frequent gaps were noted in others, and trees were present in some, with others being managed at a uniform height. In total, the hedgerow habitat at the site measured approximately 4.2km in length.

7.4.42 The hedgerows are likely to be of importance for a wide range of associated wildlife, and provide connective links to between valuable habitat within and adjacent to the site. Hedgerows in general are a priority habitat for Lincolnshire as well as on a national scale. This habitat is therefore considered to be of **Local Importance.**

Ponds

7.4.43 Five ponds were present within the survey area. Two of the ponds appeared to be ephemeral and dried up during spring and early summer (A small field pond present at the northern edge of the site was shallow, heavily silted and overshaded by an adjacent tree, with very little aquatic vegetation present. The remaining two ponds were larger, more open and likely to hold water year-round, and were seen to support a range of marginal and aquatic vegetation.

7.4.44 Two further ponds were noted off-site but within 500m, situated approximately 100m west and 330m south respectively. These have not been surveyed at the time of writing due to a lack of permissible access.

7.4.45 The ponds are likely to support a variety of associated wildlife and are considered to be of **Local Importance**

Scattered Broadleaved Trees

7.4.46 A small number (5) of semi-mature to mature trees were present at the site which were not associated with adjacent woodland or field boundaries. These generally comprised ash trees, with an oak, a horse chestnut *Aesculus hippocastanum* and a white willow *Salix alba* also present. None of the trees were considered to represent good examples of veteran trees, as they were generally similar in age and size to the trees at the nearby woodland and hedgerows, and did not occupy prominent positions in the landscape.

7.4.47 A number of self-seeded young sycamore and ash trees were scattered around the edge of the area of bare ground containing the former oil well in the north east of the site.

7.4.48 The trees are considered to be of **Site Importance** for biodiversity.

Tall Ruderal

7.4.49 Discrete parts of the site outside of the cultivated fields were dominated by tall ruderal species, particularly nettle, great willowherb, meadowsweet *Filipendula ulmaria*, mugwort, burdock marsh thistle, ragwort and hogweed.

7.4.50 This habitat is relatively small in extent and easily replaceable in the short-term, and is considered to be of **Site Importance** for biodiversity.

Ditches

7.4.51 A network of drainage ditches were present at some of the field boundaries. At the time of survey, nearly all of the ditches were dry or held very little water, although aquatic/marginal vegetation could be seen which indicated seasonal inundation with water.

7.4.52 A ditch running along the western site boundary was deeper and wider than most of the other ditches and was considered to hold water permanently. Two of the other ditches held running water which flowed east-west towards lower land beyond the western site boundary, eventually into a former opencast workings to the west of the site.

7.4.53 The ditches have the potential to support a range of protected species and species of conservation concern. This habitat is considered to be of **Local Importance**.

Species

Badgers

7.4.54 The data search revealed several records of badger setts in the local area. A total of four badger setts were discovered within or adjacent to the site as well as field signs such as latrines, snuffle holes, hairs and mammal paths.. At the time of writing, the setts recorded on site were categorised into the following types:

- One Main Sett;
- One Subsidiary Sett; and
- Two Outlying Setts

7.4.55 The arable fields, grassland and woodland habitats within the site are likely to represent key foraging grounds for local group(s) of badgers present.

7.4.56 Badgers are a widespread species and considered to be of **Site Importance**, and receive protection under the relevant legislation.

Bats

7.4.57 The data search revealed a number of existing records of at least 6 species of bat from the desk study area.

7.4.58 The majority of the trees present within and adjacent to the site were either not mature enough, or did not display signs of damage or decay which usually leads to potential roosting features (PRFs) forming within trees. Four trees at the site were however identified as having 'low' or 'moderate' potential to support roosting bats according to the categorisation described by the Bat Conservation Trust[14]. Three additional trees noted during the initial Phase 1 Surveys in 2017 as having 'low' roost potential were felled by during the winter months (January to March) of 2018.

7.4.59 Three bat activity surveys and static detector surveys were undertaken to establish the baseline conditions with regards to bats on site; in particular to establish the use of the site by foraging/commuting bats and the assemblage of bats present.

7.4.60 The surveys identified the presence of at least five bat species using the site: common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *P. pygmaeus*, noctule *Nyctalus noctula*, Myotis species *Myotis sp*, and brown long eared *Plecotus auritus*.

7.4.61 The activity surveys identified the hedgerows and woodland edges as being of most value for foraging/commuting bats. Overall, for an area of arable land surrounded by woodland and hedgerows, generally low levels of bat activity were recorded at the site. Moderate common pipistrelle activity was however recorded in some areas, particularly at the woodland at the western site boundary, where the highest number of bat passed were recorded. Bat activity was lowest at the hedgerow/scrub network in the south western corner. Bat activity within the interior of the arable/grassland fields was minimal.

[14] Collins, J. (ed) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn).

7.4.62 The assessment of importance of the site for foraging and commuting bats employs the methodology described by Wray et. al (2010)[15]. Following this criteria, the values of the site for the various species recorded range between 14 and 17. The average score when all species found within the site were considered together was 15.8. This would place the site within the **Local** level of geographic importance.

Otter

7.4.63 The data search did not reveal any recent (post-2000) records of otter within 2km. The ditches on site are unlikely to be used by otters if present in the locality, being either dry or holding shallow water, which would not provide the sources of prey needed to sustain a population of this species at the site. It is considered that otters are highly unlikely to occur at the site and this species has been scoped out of this assessment.

Water Voles

7.4.64 The data search returned 7 records of water vole from within 2km, the most recent of which was from 2013. The ditches and ponds at the site have potential to be used by water voles, with suitable foraging and burrowing habitat present, although the fact that most of the ditches were dry reduces the value of the site somewhat for water voles, as they generally favour features which hold water permanently. Detailed surveys for water voles undertaken in September 2017 and April 2018 did not identify any evidence of the presence of this species. It is considered that water voles are likely to be absent from the site and this species has been scoped out of this assessment.

Brown Hare

7.4.65 Small numbers (up to eight individuals) of brown hare have been recorded using the arable fields during the surveys completed to date. The mosaic of open fields, woodland and hedgerow provides optimal habitat for this species. This species is a priority species targeted for conservation nationally, and is considered to be of **Local Importance**.

Breeding Birds

7.4.66 Breeding bird surveys have been undertaken between April and July 2018. In total, 55 bird species were recorded using the site during the survey. 21 of the 55 species are listed as species of conservation concern, being either red listed or amber listed according to the British Trust for Ornithology's (BTO) studies into population declines among British birds within the last 30 years[16]. Several farmland bird species recorded at the site are targets for conservation both locally, as part of the Lincolnshire LBAP, as well as nationally. These include lapwing *Vanellus vanellus*, yellow wagtail *Motacilla flava*, skylark *Alauda arvensis*, linnet *Linaria cannabina*, yellowhammer *Emberiza citrinella*, reed bunting *Emberiza schoeniclus* and bullfinch *Pyrrhula pyrrhula*.

7.4.67 Birds breeding within the site can be divided into two different categories; namely ground nesting birds that potentially breed within the open fields, and which require open sightlines for predator avoidance during nesting, and other bird species which nest within boundary vegetation such as hedgerows, trees and scrub. This assessment will separately

[15] Wray, S., Wells, D., Long, E. and Mitchell-Jones, T. (2010). Valuing Bats in Ecological Impact Assessment. In Practice, December 2010. Chartered Institute of Ecology and Environmental Management.

[16] Birds of Conservation Concern 4: the population status of birds in the UK, Channel Islands and Isle of Man. Mark Eaton, Nicholas Aebischer, Andy Brown, Richard Hearn, Leigh Lock, Andy Musgrove, David Noble, David Stroud and Richard Gregory

assess the impacts on ground nesting birds and other breeding birds, as the proposals are likely to affect these two different categories in distinct ways.

7.4.68 Most of the bird species recorded at the site were found to be associated with the boundary habitats, predominantly within the woodland, hedgerows, scrub and wetland features. The exceptions to this were skylark, yellow wagtail, lapwing, meadow pipit and reed bunting, which were considered to be nesting within the open fields.

7.4.69 The approximate number of territories considered to be present at the site for these species (of open habitats) are as follows:

- Skylark - 25 territories.
- Yellow wagtail – up to 3 territories
- Lapwing – 1 or 2 territories
- Meadow pipit – 1 or 2 territories
- Reed Bunting - 3 territories

7.4.70 The open field habitats, particularly the large arable cereal fields in the north east of the site, were considered to provide optimal habitat for nesting skylarks which is reflected in the large number of territories recorded at the site. A possible three yellow wagtail territories, again focussed within the north eastern arable fields, is also a notable record for this species which is of elevated conservation concern nationally. Although all these species are relatively widespread in Lincolnshire, due to the assemblage of ground nesting bird species using the site during the breeding season, particularly the large number of skylark, the site has been assessed as having **District Importance** for breeding birds of open farmland

7.4.71 The woodland, hedgerows, trees and scrub habitats at the field boundaries at the site were found to be used for breeding by a range of species of conservation concern, generally in small to moderate numbers. This includes yellowhammer, linnet, bullfinch, willow warbler *Phylloscopus trochilus*, mistle thrush *Turdus viscivorus*, song thrush *Turdus philomelos*, dunnock *Prunella modularis* and kestrel *Falco tinnunculus*. Overall, the assemblage of breeding bird species associated with boundary habitats is assessed as being of **Local Importance**

Wintering Birds

7.4.72 Wintering bird surveys were undertaken between November 2017 and February 2018. In total, 51 bird species were recorded using the site during the survey. 24 of the 51 species are listed as species of conservation concern, being either red listed or amber listed by the BTO. Several farmland bird species recorded at the site are targets for conservation both locally, as part of the Lincolnshire LBAP, as well as nationally. These include lapwing, starling, *Sturnus vulgaris*, skylark, linnet *Linaria cannabina*, yellowhammer, reed bunting and bullfinch.

7.4.73 As for breeding birds within the site can be divided into bird species of open farmland which require open sightlines for foraging and predator detection within fields, and other bird species which utilise boundary habitats for foraging and shelter, such as hedgerows and woodland. This assessment will separately assess the impacts on wintering bird species of open farmland and other wintering birds, as the proposals are likely to affect these two different categories in significantly distinct ways.

7.4.74 Most of the bird species recorded at the site were found to be associated with the boundary habitats. However some species of conservation concern which are known to rely on or regularly use open arable fields for foraging and roosting were recorded on site area either as part of large flocks (lapwing and skylark) or as small, loose flocks and individuals (such as meadow pipit). Skylark were recorded in moderate to large numbers (peak count of 159).The consistent presence of large numbers skylarks shows the site is of noteworthy importance to local wintering populations of this species. Lapwing were present in relatively large numbers (peak count of 109) on two survey visits, although their absence from the two remaining visits indicates that the site is at least in part used in conjunction with other suitable fields in the surrounding landscape.

7.4.75 Consequently, the site can be valued as being of **District Importance** for wintering birds of open country (in particular skylark and to a lesser extent lapwing).

7.4.76 The remainder of the bird activity recorded can be attributed to species more closely associated with hedgerow and woodland habitats and those birds of open country which seek shelter within dense hedgerows such as thrushes, finches, and other small passerines. Of these species, a healthy assemblage was present predominantly within these boundary features, including some species of conservation concern. Although species of conservation concern were noted, these were generally present in small numbers and no noteworthy relative abundance of a species was recorded. The site can be valued as being of **Site Importance** to wintering birds of woodland and hedgerows.

Amphibians

Great Crested Newts

7.4.77 The ponds present on site have potential to be used by great crested newts *Triturus cristatus* during the breeding period. However, an eDNA survey of all of the ponds on site did not return a positive result for great crested newt DNA within the ponds, signifying the likely absence of this species from the site (see Appendix 7.1). It is considered that great crested newts are likely to be absent from the site and this species has been scoped out of this assessment.

Other amphibians

7.4.78 The aquatic habitats on site are likely to be used by more widespread amphibian species, such as common toad *Bufo bufo* (a priority species). Hedgerows, woodland and scrub habitats elsewhere at the site could represent foraging and sheltering habitats for this species although again the arable fields are unlikely to be used by this species, and as such common toad (if present) is likely to be of **Site Importance**.

Reptiles

7.4.79 No recent records of reptiles were revealed by the desk study.

7.4.80 The hedgerows, scrub, woodland edges, ditches and grassland areas offer some value for foraging and sheltering widespread reptile species, such as slow worm *Anguis fragilis* and grass snake *Natrix helvetica*. However, the large expanses of arable land were considered to offer poor suitability for reptiles.

7.4.81 As suitable habitat for reptiles was restricted to the margin and boundary habitats, reptiles are likely to be in small numbers if present and restricted to these areas. Reptiles are considered most likely to be of **Site Importance** if present.

Invertebrates

7.4.82 The data search revealed a number of existing records of notable butterfly and moth species from within the local area. Habitats at the margins and boundaries of the field are likely to be of value for a range of invertebrate species typical of woodland edge and hedgerows, and a number of such species belonging to the order Lepidoptera were recorded during the surveys to date, including cinnabar moth *Tyria jacobaeae*, (a priority species). The ponds and ditches on site are also likely to support a range of aquatic invertebrates. However, assemblages of invertebrates supported by the arable fields comprising the vast majority of the site are likely to be poor, particularly for pollinating species.

7.4.83 Overall, it is considered that invertebrates using the site and immediately adjacent habitat are of **Local Importance.**

7.4.84 The following table (Table 7.3) provides a summary of the evaluation of ecological features based on the CIEEM guidelines 2016, as set out within the previous text. Those sites, habitats and species considered to be 'Important Ecological Features' which are to be taken forward in this assessment are highlighted in green:

Table 7.3: Summary of Evaluation

Ecological Feature	Evaluation	Ecological Value	Important Ecological Feature?
Humber Estuary SPA & Ramsar	Considered to be outside of the zone of influence principally due to the distance from site but also due to nature of interconnecting habitats between.	International Importance	No
Broughton Far Wood SSSI	Largely outside of the zone of influence, although construction traffic will be directed along the B1208 Road, which runs adjacent to the northern edge	National Importance	Yes
Broughton Alder Wood SSSI, Risby Warren SSSI, Manton and Twigmoor SSSI	Considered to be outside of the zone of influence principally due to the distance from site but also due to nature of interconnecting habitats between	National Importance	No
Heron Holt LWS, Broughton West Wood LWS, Manby Wood LWS, Santon Wood East LWS	Adjacent to the site, comprising botanically diverse woodland. Parts of Manby Wood and Broughton West Wood represent Plantation on Ancient Woodland Sites (PAWS).	County Importance	Yes
Broughton Far Wood LWS, Rowland Plantation LWS	Largely outside of the zone of influence, although construction traffic will be directed along the B1208 Road, which runs adjacent to the edges of these sites.	County Importance	Yes

Ecological Feature	Evaluation	Ecological Value	Important Ecological Feature?
Gadbury and Lundimore Woods LWS	Considered to be outside of the zone of influence principally due to the distance from site.	County Importance	No
Broughton West Wood SNCI & Santon Wood SNCI	Adjacent to the site, comprising botanically diverse woodland. A parcel of arable land contained within Santon Wood SNCI is included within the construction zone.	County Importance	Yes
Spring Wood, Broughton SNCI	Considered to be outside of the zone of influence principally due to the distance from site.	County Importance	No
Arable Land	Does not fit into LBAP or HPI criteria	Negligible Importance	No
Arable Field Margin	LBAP priority habitat Habitat of Principal Importance (HPI) under the NERC Act	Local Importance	Yes
Poor semi-improved grassland	Does not fit into LBAP or HPI criteria	Site Importance	No
Improved grassland	Does not fit into LBAP or HPI criteria	Negligible Importance	No

Ecological Feature	Evaluation	Ecological Value	Important Ecological Feature?
Semi-natural Broadleaved Woodland	LBAP priority habitat Habitat of Principal Importance (HPI) under the NERC Act	Local Importance	Yes
Plantation Broadleaved Woodland (outside of designated sites)	LBAP priority habitat Habitat of Principal Importance (HPI) under the NERC Act	Local Importance	Yes
Plantation Mixed Woodland (outside of designated sites)	Does not fit into LBAP or HPI criteria	Site Importance	No
Plantation Coniferous Woodland	Does not fit into LBAP or HPI criteria	Site Importance	No
Scrub	Does not fit into LBAP or HPI criteria	Site Importance	No
Hedgerows	LBAP priority habitat Habitat of Principal Importance (HPI) under the NERC Act 2006	Local Importance	Yes
Ponds	LBAP priority habitat Habitat of Principal Importance (HPI) under the NERC Act 2006	Local Importance	Yes

Ecological Feature	Evaluation	Ecological Value	Important Ecological Feature?
Ditches	LBAP habitat	Local Importance	Yes
Tall Ruderals	Does not fit into LBAP or HPI criteria	Site Importance	No
Scattered Broadleaved Tree	Not veteran trees, do not fit LBAP or HPI criteria	Site Importance	No
Badgers	Badgers are a widespread species in but are protected under the Protection of Badgers Act 1992 (as amended)	Site Importance	Not an IEF but included due to legislative protection
Bats	Five species recorded on site. All are LBAP priority species (group) and three species are Species of Principal Importance (SPIs) (Soprano pipistrelle, brown long-eared bat and noctule). Bats are protected under the Conservation of Habitats and Species Regulations 2017.	Local Importance	Yes
Otter & Water Vole	Considered to be absent from the site	N/A	No
Brown Hare	Small to medium population present at the site. Species of Principal Importance (SPI) under the NERC Act 2006	Local	Yes

Ecological Feature	Evaluation	Ecological Value	Important Ecological Feature?
Breeding birds – open habitats	Assemblage containing Red listed Birds of Conservation Concern; Skylark (with approximately 25 territories) yellow wagtail (3 territories), lapwing (1 or 2 territories). Amber listed; meadow pipit (1 or 2 territories) and reed bunting (3 territories) Skylark, yellow wagtail, lapwing and reed bunting are SPIs	District Importance	Yes
Breeding birds – boundary habitats	Assemblage containing 8 Birds of Conservation Concern of association with hedgerows and woodland, generally in low to modest numbers.	Local Importance	Yes
Wintering birds – open habitats	Assemblage containing Red listed Birds of Conservation Concern; Skylark (peak count of 159 birds) lapwing (peak count of 109) (3 territories). Amber listed; meadow pipit (peak count of 21). Skylark and lapwing are SPIs.	District Importance	Yes

Ecological Feature	Evaluation	Ecological Value	Important Ecological Feature?
Wintering birds – boundary habitats	A healthy assemblage present predominantly within these boundary features, including some species of conservation concern. Although species of conservation concern were noted, these were generally present in small numbers and no noteworthy relative abundance of a species was recorded.	Site Importance	No
Amphibians	Great crested newts considered to be absent from the site. Ponds on site may provide breeding habitat for widespread amphibian species.	Site Importance	No
Reptiles	If present, likely to be in small numbers and restricted to margin habitats	Site Importance	No
Invertebrates	Mosaic of habitats on site likely to support a range of farmland, woodland and aquatic invertebrates although majority of site is suboptimal. Cinnabar Moth (and SPI) recorded on site.	Local Importance	Yes

7.5 Scheme Description

7.5.1 As described within Chapter 4, the scheme will comprise the installation of rows of solar panels mounted on a metal framework which is piled into the ground to a depth of around 1.5m. Cables linking the rows of panels are buried in the ground within trenches. Further cables are used to link areas of panels to inverters which are constructed on concrete pads, which are then linked to a sub-station. Access tracks are required, which involve the laying of aggregate. An area to the north of the main site will be utilised to store batteries.

7.5.2 Design measures proposed that have ecological influence include:

- Routing access tracks through along existing farm tracks and through existing field entrances where possible
- A minimum 4m buffer between hedgerow and security fencing;
- Approximately 1.5km of new, native double hedgerows, will be planted along either side of the existing track/PRoW which runs east to west across the site to screen the PV array from public view. These hedgerows will increase connectivity and foraging opportunities for a range of species including, birds, bats, and small mammals; additional planting will be provided to the north easterly edge of the site
- Creation of 4m wide, 400mm deep swales along some field boundaries
- Operationally, the land beneath the solar array will be sown with grassland and will grazed by sheep;
- Operation of the array requires minimal intervention and as such levels of disturbance (light, noise and human presence) upon wildlife within the area will be minimal during the operational phase;
- An environmentally-conscious approach to construction, which will be implemented through a Construction Environmental Management Plan (CEMP) to be prepared. The CEMP will detail measures and approaches to be adopted which will limit the likelihood of impacts upon retained habitats through damage, pollution and disturbance;
- A Landscape and Ecological Management Plan (LEMP) will be prepared to specify how the habitats within the operational array will be managed. A low level of post-construction site management and monitoring will be specified, designed to reduce interference with created and retained habitats while promoting their establishment and biodiversity contribution.

7.6 ASSESSMENT OF EFFECTS AND MITIGATION MEASURES

7.6.1 This section identifies and characterises potential impacts of the development on each Important Ecological Feature identified in the preceding section. Measures to avoid and mitigate for these impacts are described, which includes any measures already incorporated into the scheme design. An assessment is made of the significance of any residual effects after mitigation measures have been accounted for.

Decommissioning Effects

7.6.2 Effects associated with decommissioning of the site have not been assessed for each ecological features. The effects of removal of the array would likely be similar to those during the construction phase.

7.6.3 It is acknowledged that the site is likely to change significantly over 35 years of operation and prediction of the baseline conditions at this point is considered unreliable. The removal of intensive agricultural practices and implementation of enhancements, as set out later in this chapter, will have an effect on the habitats which might establish on the site and the species which may colonise. It will therefore be necessary to conduct a further ecological survey prior to decommissioning in order to record the presence of protected and notable species and habitats. There may be requirements for species-specific surveys and mitigation in order that works are carried out in line with current planning policy and wildlife legislation.

Designated Sites

Broughton Far Wood SSSI, Broughton Far Wood LWS & Rowland Plantation LWS.

Construction Phase Impacts

7.6.4 The application site is considered to be of sufficient distance (at least 430m away) from these designated sites that direct impacts (e.g. habitat loss, disturbance etc.) will not occur. However, these sites all border the B1208 Road which is expected to the main route for construction site traffic approaching and leaving the site.

7.6.5 There is the potential for some dust and soil generated from site construction activities to be deposited on to the edges of the woodlands causing degradation of these habitats. Such effects would be temporary and reversible in the short-term. It should also be noted that a certain amount of dust and litter deposition would already occur via day to day traffic travelling along this road.

Operation Phase Impacts

7.6.6 On completion of the development, vehicles travelling to and from site are expected to be minimal, and movement of traffic alongside these sites would not be significantly greater than baseline levels.

Mitigation Measures

7.6.7 A CEMP to be prepared for the site will detail the measures required to minimise the potential for dust and spoil deposition on site and on nearby woodlands. This will include how dust-generating activities will be minimised, ensuring stockpiles of spoil and site materials will be stored away from the main site entrance, and provision for washing down the wheels of vehicles before leaving site. Furthermore, notices requesting drivers to ensure that all wagons and truck loads are covered and that wheels have been washed before leaving site will be erected.

Residual Effects

7.6.8 The mitigation implemented will ensure that the designated sites situated along the edges of the main route for site traffic will be protected from adverse impacts during construction. A **Neutral** effect is anticipated, which is **Not Significant**.

Heron Holt LWS, Broughton West Wood LWS, Manby Wood LWS & Santon Wood East LWS

Construction Phase Impacts

7.6.9 The application site boundary lies outside of the boundaries of these locally-designated sites, and the development will not result in direct loss of habitat. However, there is potential for damage or compaction to tree roots when installing the fencing and array structures. This negative impact would affect only the outer edges (approximately

5m wide) of the woodland, comprising a length of approximately 2km (of which 550m is PAWS in Broughton West Wood), which would in total affect up to 0.49% of the habitat with the combined LWS areas[17]. This includes the woodland edge contained with Santon Wood East bordering the north of the proposed construction site compound area in the north east of the site. Damage to roots may lead to permanent, irreversible damage resulting in the death of the tree. It would be expected to take over 35 years for a new mature tree to take the place of the lost tree, so the duration of the impact would be beyond the lifetime of the array.

7.6.10 Construction activities could lead to a small amount of noise and possibly light disturbance to the species within the woodland, however, this would be temporary and would only affect the margins of the woodland. There is the potential for some dust deposition or runoff on the hedgerow flora generated by the traffic moving into and around the construction zone. Such effects would be temporary and reversible in the short-term. It should also be noted that a certain amount of noise disturbance, dust deposition and runoff would be anticipated as a result of routine annual agricultural activities as well as that associated with the poultry farm to the east of the site, and as such effects are likely to be similar to the current baseline conditions.

7.6.11 In the absence of mitigation, it is considered the construction activities could have a detrimental effect on the adjacent LWSs, primarily due to the impacts of incidental damage to woodland species on the edge of the woodland, particularly where this comprises PAWS.

Operation Phase Impacts

7.6.12 Regular movement of traffic adjacent to the woodland edges is not anticipated during operation of the array and the potential for damage and disturbance (e.g. noise & vibration) is anticipated to be the same as the current baseline level of risk associated with the regular farming activities on site. As such the potential operational site management effects on the LWSs are considered to be neutral

7.6.13 The cessation of intensive arable farming practices, including spraying crops with pesticides & herbicides, is likely to be of benefit to the woodland habitat at the edge of the site as these currently will be subject to spray drift. In particular, this would encourage the growth of woodland ground flora within woodland edge habitats. This impact would last for at least the duration of the array, although intensive arable farming practices are expected to return after decommissioning.

Mitigation Measures

7.6.14 In order to avoid impacts on trees at the edges of woodland, an adequately protective buffer zone which remains free from development will be demarcated from the edge of the woodland. Due consideration is given to the reliability of mitigation measures and the likelihood that they will achieve their stated goals.

7.6.15 Current Natural England standing advice[18] states that a minimum buffer zone of at least 15 metres should be retained between ancient woodland and development sites. Given that the majority of Broughton West Wood adjacent to the site comprise PAWS, a 15m fenced buffer zone will be retained from this LWS, as this is likely to comprise the most sensitive woodland edge habitat represented at the site.

[17] 2km x 5m =1ha. Combined total hectares of LWSs = 203.97ha. (1/203.97) x100 = 0.49

[18] https://www.gov.uk/guidance/ancient-woodland-and-veteran-trees-protection-surveys-licences [accessed 25/01/2018]

7.6.16 At all other woodland edges, a minimum buffer zone of either the root protection area or the shading zone (whichever is greater) of trees at the edges of these woodlands will be implemented and would be adequate to avoid the identified impact of root damage/compaction.

7.6.17 All fencing, including temporary site compound security fencing, will be installed prior to construction commencing, in order to demarcate the buffer between the woodland and construction area. Construction crew will be informed that no materials should be stored or vehicles driven within this area via a toolbox talk delivered to all key construction staff at the commencement of construction

7.6.18 In this way, the tree roots and important ground flora and fungi which may be present at the woodland edge, will be protected from inadvertent damage during construction.

7.6.19 A CEMP to be prepared for the site will detail the measures required to minimise the dust deposition and run-off which may affect the woodland habitat. This will include how dust-generating activities will be avoided, ensuring stockpiles of spoil and site materials will be stored away from field boundaries, restrictions on working close to woodlands during periods of heavy rain and the installation of silt fencing and/or temporary drainage channels if necessary.

Residual Effects

7.6.20 The mitigation implemented will ensure that the designated sites will be protected from adverse impacts during construction. The operational scheme is likely to deliver a beneficial effect on the woodland edge ground flora due to the cessation of arable farming practices, although this would affect a small proportion of the sites and so a residual **Neutral** effect is anticipated, which is **Not Significant**.

Broughton West Wood SCNI & Santon Wood SNCI

Construction

7.6.21 The application site includes part of the area covered by Santon Wood SNCI, including a parcel of arable land approximately 4ha in size in the north east of the construction zone, which appears to have been unwooded since at least the 19th century from a study of historic OS maps. Santon Wood SNCI also includes a rectangular area of approximately 0.9ha currently comprising an arable field, which from correspondence with the landowner has been in arable production at least since the 1970s when the land was bought. A proportion of this area will be given over to battery power storage. It is not clear why these two arable parcels lie within the area covered by the SNCI, which is designated for woodland habitat. The construction of the array/battery storage will entirely be sited in the existing arable land and there will be no loss or fragmentation of the woodland habitat for which the SNCI is designated. Siting the array and batteries in these two locations will therefore not have resulting impacts on the intrinsic nature conservation value of the site.

7.6.22 A medium volt cable (approximately 1m wide) will be routed through the 'Icehouse Strip' planation woodland which comprises part of Broughton West Wood SNCI. This will involve temporary excavation which is then backfilled and reinstated once the cable is laid. In the absence of mitigation, this work could result in damage to a small number of trees and root systems along the cable trench route.

7.6.23 Otherwise, construction phase activities are likely to have the same detrimental impacts on these designated sites as for the LWSs described above; namely, damage to tree roots at the edge of the woodlands and habitat degradation through dust/run-off

deposition. This could affect approximately 3.34km of woodland along the outer edges (approximately the first 5m) of these SNCIs combined, which equates to up to 1.56% of the area within[19]. This include the eastern edge of Santon Wood SNCI. which will border the temporary construction site compound in the north east of the site.

Operation Phase

7.6.24 The operational phase impacts on the SNCIs are likely to be same as the operational impacts on the LWSs. These are likely to result in a beneficial effect, primarily as a result of cessation of intensive arable farming practices and the resulting lack of spray drift on the woodland edges.

Mitigation Measures

7.6.25 Damage to a small number of trees and root systems along the cable route running through Icehouse Strip will be avoided by programming this work to take place after planned harvesting of trees within this area (as part of the routine commercial forestry works) but prior to replanting taking place. Temporary excavation will thus avoid the root protection zones of trees within this SNCI. Precautionary measures adopted as part of the CEMP will ensure that the cable route has minimal impact on ecology. This will include a walkover of the route by an ecologist to ensure features of ecological interest (e.g. badger setts) are avoided, with the final cable route adjusted if necessary. Due consideration is given to the reliability of mitigation measures and the likelihood that they will achieve their stated goals.

7.6.26 In order to avoid impacts on trees at the edges of woodland, an adequately protective buffer zone which remains free from development will be demarcated from the edge of the woodland through installation of perimeter fencing and site compound security fencing.

7.6.27 A minimum buffer zone of either the root protection area or the shading zone (whichever is greater) of trees at the edges of these woodlands will be implemented and would be adequate to avoid the identified impact of root damage/compaction.

7.6.28 The fencing will be installed prior to construction commencing, in order to demarcate the buffer between the woodland and construction area. Construction crew will be informed that no materials should be stored or vehicles driven within this area via a toolbox talk delivered to all key construction staff at the commencement of construction

7.6.29 In this way, the tree roots and important ground flora which may be present at the woodland edge, will be protected from inadvertent damage during construction.

7.6.30 A CEMP to be prepared for the site will detail the measures required to minimise the dust deposition and run-off which may affect the woodland habitat. This will include how dust-generating activities will be avoided, ensuring stockpiles of spoil and site materials will be stored away from field boundaries, restrictions on working close to woodlands during periods of heavy rain and the installation of silt fencing and/or temporary drainage channels if necessary.

Residual Effects

7.6.31 The mitigation implemented will ensure that the designated sites will be protected from adverse impacts during construction. The operational scheme is likely to deliver a beneficial effect on the woodland ground flora due to the cessation of arable farming

[19] 3.34km x 5m = 1.67ha. Combined total hectares of SNCIs = 107ha. (1.67/107) x100 = 1.56

practices, although this would affect a small proportion of the sites and so a residual **Neutral** effect is anticipated, which is **Not Significant**.

Arable Field Margins – Local Importance

Construction Phase

7.6.32 Site clearance activities and cessation of arable farming practices across the site would result in the loss of cultivated arable field margin habitats. Although strips of low input, tussocky grassland at the edges of the field are likely to develop, which are included in the broad definition of arable field margin, much of the existing unique flora and fauna supported by field margins which are periodically or annually cultivated would be lost (include henbane, a species vulnerable to extinction). The entire loss of this habitat at the site could give rise to a potentially significant impact in the absence of mitigation.

Operation Phase

7.6.33 Any retained arable margin which is not lost during the construction phase, including grassland strips at the edge of the array, could become at risk from a reduction in habitat quality through lack of periodic management. Cessation of management in these areas risks encroachment by scrub or through becoming dominated by low numbers of vigorous grass and ruderal species, at the expense of a variety of other floral species currently present in these areas. However, retained arable margin habitat is likely to benefit from the cessation of intensive arable practices such as herbicide and fertiliser application.

Mitigation Measures

7.6.34 In order to continue to provide suitable conditions for arable plants to germinate, flower and disperse seed, approximately 2.5ha of land at the site which will not be constructed on will be specifically managed for the benefit of arable plants. This includes the roughly 0.8ha triangular parcel of land in the north western corner of the site where henbane (a species vulnerable to extinction in the future) was recorded. These areas will be cultivated in spring each year for the lifetime of the array, to a depth of 150mm and left undisturbed to naturally regenerate. There will be no routine application of herbicides, but where a pernicious weed burden becomes an issue, targeted herbicide application will be necessary. The cultivation timing and/or depth can also be adjusted to control germination of problematic weeds. The management described would provide favourable conditions for arable weed species (including henbane) as well as preventing these areas becoming overrun by problem species.

7.6.35 The detailed management measures to provide for arable plants will be prescribed within a site-wide LEMP prepared for the operational site, in order that it forms part of the management duties of the operating company. Due consideration is given to the reliability of mitigation measures and the likelihood that they will achieve their stated goals.

Residual Effects

7.6.36 Assuming the successful implementation of the mitigation measures described, the site will continue to support approximately 2.5ha of land in favourable condition for flowering arable plant species to thrive, which is approaching the same coverage of this habitat currently present. The long-term management of these areas will be critical. The retained habitat is likely to benefit from the cessation in non-selective herbicide and fertiliser application. An overall Neutral residual impact is anticipated which is not significant.

Semi-Natural Broadleaved Woodland - Local Importance

Construction Phase

7.6.37 Construction phase activities are likely to have the same impacts on woodland habitats as for the woodland contained within the LWSs and SNCIs described above; namely, damage to tree roots at the edge of the woodlands and habitat degradation through dust/run-off deposition. This could affect approximately 1.5km of edge at this habitat.

Operation Phase

7.6.38 The operational phase impacts on the LWSs and SNCIs described above are likely to be same as the operational impacts on the remaining woodland areas at the site. Therefore, there will be a beneficial effect on these features, primarily as a result of cessation of intensive arable farming practices and the resulting lack of spray drift having detrimental impacts on the woodland edge flora.

Mitigation Measures

7.6.39 In order to avoid impacts on trees at the edges of woodland, an adequately protective buffer zone which remains free from development will be demarcated from the edge of the woodland through installation of perimeter fencing.

7.6.40 A minimum buffer zone of either the root protection area or the shading zone (whichever is greater) of trees at the edges of these woodlands will be implemented and would be adequate to avoid the identified impact of root damage/compaction.

7.6.41 The fencing will be installed prior to construction commencing, in order to demarcate the buffer between the woodland and construction area. Construction crew will be informed that no materials should be stored or vehicles driven within this area via a toolbox talk delivered to all key construction staff at the commencement of construction

7.6.42 In this way, the tree roots and important ground flora which may be present at the woodland edge, will be protected from inadvertent damage during construction.

7.6.43 A CEMP to be prepared for the site will detail the measures required to minimise the dust deposition and run-off which may affect the woodland habitat. This will include how dust-generating activities will be avoided, ensuring stockpiles of spoil and site materials will be stored away from field boundaries, restrictions on working close to woodlands during periods of heavy rain and the installation of silt fencing and/or temporary drainage channels if necessary. Due consideration is given to the reliability of mitigation measures and the likelihood that they will achieve their stated goals.

Residual Effects

7.6.44 The mitigation implemented will ensure that the woodland areas will be protected from adverse impacts during construction. A residual **neutral** effect is anticipated, which is **Not Significant**.

Plantation Broadleaved Woodland (outside of Designated Sites) - Local Importance

Construction Phase

7.6.45 Construction phase activities are likely to have the same impacts on woodland habitats as for the woodland contained within the LWSs and SNCIs described above; namely, damage to tree roots at the edge of the woodlands and habitat degradation through dust/run-off deposition.

Operation Phase

7.6.46 The operational phase impacts on the LWSs and SNCIs described above are likely to be same as the operational impacts on the remaining woodland areas at the site. Therefore, there will be a beneficial effect on these features, primarily as a result of cessation of intensive arable farming practices and the resulting lack of spray drift having detrimental impacts on the woodland edge flora.

Mitigation Measures

7.6.47 In order to avoid impacts on trees at the edges of woodland, an adequately protective buffer zone which remains free from development will be demarcated from the edge of the woodland through installation of perimeter fencing.

7.6.48 A minimum buffer zone of either the root protection area or the shading zone (whichever is greater) of trees at the edges of these woodlands will be implemented and would be adequate to avoid the identified impact of root damage/compaction.

7.6.49 The fencing will be installed prior to construction commencing, in order to demarcate the buffer between the woodland and construction area. Construction crew will be informed that no materials should be stored or vehicles driven within this area via a toolbox talk delivered to all key construction staff at the commencement of construction

7.6.50 In this way, the tree roots and important ground flora which may be present at the woodland edge, will be protected from inadvertent damage during construction.

7.6.51 A CEMP to be prepared for the site will detail the measures required to minimise the dust deposition and run-off which may affect the woodland habitat. This will include how dust-generating activities will be avoided, ensuring stockpiles of spoil and site materials will be stored away from field boundaries, restrictions on working close to woodlands during periods of heavy rain and the installation of silt fencing and/or temporary drainage channels if necessary.

Residual Effects

7.6.52 The mitigation implemented will ensure that the woodland areas will be protected from adverse impacts during construction. A residual **neutral** effect is anticipated, which is **Not Significant**.

Hedgerows

Construction Phase

7.6.53 The scheme will avoid and minimise direct impacts upon hedgerows by utilising existing gateways for access. Where breaches within hedgerows will be necessary, these will be 5m wide. Currently, two breaches for access are expected in existing hedgerows. In addition, several small (approximately 1m wide) breaches will be necessary for underground cabling across the site. It is predicted that nine such breaches in the existing hedgerow network will be needed. The loss of circa 20m (2x~5m and 9x1m sections) in total would only represent a tiny fraction of the total hedgerow habitat on site. As such habitat loss is expected to have a neutral effect on hedgerows. The small size of the gaps will not result in fragmentation of this habitat.

7.6.54 There is a small risk of accidental damage to the hedgerows, either as a result of vehicles colliding with hedgerows or via vehicular damage to the flora at the hedgerow bases. Erection of security fencing around the site will limit any damage to hedgerows at

the perimeter of the site, although interior hedgerow may be at higher risk where protective fencing is inadequate.

7.6.55 There is the potential for some dust deposition or runoff on the hedgerow flora generated by the traffic moving into and around the construction zone. Such effects would be temporary and reversible in the short-term. It should also be noted that a certain amount of dust deposition and runoff would be anticipated as a result of routine annual agricultural activities and as such effects are likely to be similar to the current baseline conditions. Nevertheless, given the large extent of this habitat present at the site (4.2km) effects from dust deposition and/ or run-off are considered to be have potential to result in adverse impacts.

Operational Phase

7.6.56 Regular movement of traffic adjacent to the hedgerow network is not anticipated during operation of the array and the potential for damage and disturbance (e.g. noise & vibration) is anticipated to be the same as the current baseline level of risk associated with the regular farming activities on site. As such the potential operational site management effects on hedgerows are considered to be neutral

7.6.57 The cessation of intensive arable farming practices, including spraying crops with pesticides & herbicides, is likely to be of benefit to hedgerow habitats on site, particular the ground flora at hedgerow bases.

7.6.58 The creation of 1.5km of new, native double hedgerow along the PRoW will increase the connectivity of this habitat and the woodland at the east and northwest of the site, and lead to an approximately 35% gain in hedgerow length on site (currently approximately 4.2km of hedgerow on site).

Mitigation Measures

7.6.59 Impacts resulting from dust deposition and runoff will be reduced through the implementation of a CEMP. This will set out restrictions on working during heavy rain and installation of a silt fence if required, and measures designed to minimise dust generating activities on site. .

7.6.60 The security fencing will be installed prior to construction commencing a minimum 4m from the hedgerows. This will act as protective fencing during construction and all contractors will be briefed to ensure that vehicles are not driven within this buffer or construction materials stored here.

7.6.61 All internal hedgerows will be protected through the installation of stock proof fencing, placed at least 4m from the hedgerow. This will act as protective fencing during construction for hedgerow which would not otherwise be protected by security fencing. Where small (~1m) gaps need to be created for cable trenches, on completion these will be backfilled and the hedge replanted with locally appropriate species.

7.6.62 Subsequent to the implementation of the mitigation measures, it is thought that the detrimental impacts associated with the construction phase can be reduced to neutral.

7.6.63 The LEMP prepared for the site will prescribe ongoing management for new and retained hedgerows to maximise their biodiversity value in the long-term. This will include rotational cutting of the hedgerows to ensure a diversity of habitats on the site each year and the aim at maintaining hedgerows at a minimum height of 2m as this has been demonstrated to be important for promoting the biodiversity value of hedgerows[20].

[20] (Environmental Stewardship Farm Environment Plan Guidance 005. 2005).

Residual Effects

7.6.64 The mitigation described will seek to ensure potential construction related impacts are avoided. The planting of 1.5km of new, native hedgerow will significantly increase the extent of this habitat and improve connectivity across the site, and overall there is expected to be residual beneficial effect on hedgerows which is **significant at a Local Level**

Ponds

Construction Phase

7.6.65 All ponds will be retained as part of the proposals. The ponds are situated relatively close to boundary habitats and as such it is considered that the installation of panels around ponds would not result in fragmentation of habitat

7.6.66 There is a risk of degradation of the retained pond habitat through dust deposition and runoff during construction activities. This could damage the habitat within and surrounding the ponds as well as affecting the species which inhabit them. This impact would be temporary, as it would be the result of construction activities close to the pond only. However, there is the risk that runoff could affect the water quality of the entire pond and so all species which inhabit it. This effect would be reversible in the medium-term.

Operational Phase

7.6.67 During the operational life of the array, there is likely to be little impact on the standing water present on the site. No loss or fragmentation of habitat will occur and noise will be at a minimum. There has been some concern that solar panels can attract flying invertebrates which lay their eggs in water, as they may mistake the polarised light reflected from the panels for water[21] although such effects are principally theoretical and untested within 'real life scenarios'. However, the ponds are of relatively small size and are unlikely to support large assemblages of these invertebrates. The array will also not obscure or hinder access to the ponds by such flying invertebrates.

7.6.68 There is a risk that the ponds may become damaged should sheep be utilised for grazing post construction as is expected. Sheep may poach pond habitats causing extensive damage to the adjacent vegetation and increased turbidity of the water.

Mitigation Measures

7.6.69 The negative impacts of possible dust deposition and runoff on the ponds within the site will be mitigated for by the implementation of the CEMP. This will restrict working during periods of heavy rain and outline the installation of silt fencing, if required.

7.6.70 The CEMP will also outline a working methodology to ensure that as little vehicular movement as possible occurs close to the ponds, thus reducing the risk of mortality of any species which may use this habitat and also reducing dust deposition and runoff and steps to be taken to limit the likelihood of pollution or spillage events.

7.6.71 Contractors will be provided with a toolbox talk prior to construction focusing on ensuring that this buffer is maintained during construction. This buffer will be demarcated through the installation of permanent stock proof fencing prior to construction commencing.

[21] Horváth G., Blahó M., Egri A., Kriska G., Seres I., Robertson B. (2010). Reducing the maladaptive attractiveness of solar panels to polarotactic insects. *Conservation Biology*, 24: 1644–1653

7.6.72 The mitigation implemented will ensure that the retained ponds are protected during construction.

7.6.73 In order to prevent poaching impacts on ponds by sheep during the operational lifespan of the array, stock proof fencing will be erected around all ponds prior to introducing sheep to the site, and will be maintained and repaired as necessary. Gates will provided if necessary to allow long-term management of ponds as and when needed.

7.6.74 During the lifetime of the array, no fertilisers, herbicides or pesticides will be utilised within the site and so the water quality within the ponds may improve.

Residual Effects

7.6.75 The ponds and wildlife species within them will be protected from construction phase impacts by implementing the described measures described. Following construction, the water quality within the ponds is expected to improve slightly resulting in an overall beneficial impact, albeit a **Non-Significant** one.

Ditches

Construction Phase

7.6.76 The scheme will avoid and minimise direct impacts upon ditches by utilising existing crossings for access where possible. One new crossing for access will be created, which will impact 5m of existing ditch habitat although will not obstruct water flow along the ditch. In addition, in six places within the ditch network, approximately 1m wide sections of the banksides and channel will be temporarily excavated for laying of cable, before being re-instated. The combined loss of a 5m section of bankside for new access, as well as 6x1m temporary loss at cable route crossings would only represent a tiny fraction of the total ditch habitat on site. As such habitat loss is expected to have a neutral effect on ditches. The small size of the crossing required will not result in fragmentation of this habitat.

7.6.77 There is a risk that the existing habitat may be damaged or degraded, through direct construction damage or indirect impacts through release of sediments or dust deposition into the ditch network at the site which could flow into other ditches. Although pollution events are considered unlikely if they were to occur they could potentially have a detrimental effect affecting the quality of habitats on site and down-stream for the short-medium term. It should also be noted that a certain amount of dust deposition and runoff would be anticipated as a result of routine annual agricultural activities and as such effects are likely to be similar to the current baseline conditions. Nevertheless, given the large extent of this habitat present at the site (8.9km) effects from dust deposition and/ or run-off are considered to be have potential to result in detrimental impacts.

Operational Phase

7.6.78 Operation of the site will require minimal input with only occasional maintenance visits expected. Most vehicles will utilise the access tracks and any disturbance to the ground is likely to of a similar magnitude to that already caused through regular agricultural management practices.

7.6.79 The cessation of arable farming practices, including a subsequent reduction in spraying and application of fertiliser to the land, could result in the improvement of water quality with the ditches.

Mitigation Measures

7.6.80 An undeveloped buffer zone of at least 6m will be established from the top of the ditch banks, although in places shallow (up to 400mm) swales will be constructed within this buffer.

7.6.81 The negative impacts of possible spoil deposition and runoff on the ditches within/adjacent to the site will be mitigated for by the implementation of the CEMP, including during swale creation and when ditch crossings are created. This will restrict working during periods of heavy rain and outline the installation of silt fencing, if required. Significant chemicals or fuels are not required on site. The CEMP will describe best-practice pollution prevention guidelines to avoid/minimise the risks of pollution or sedimentation events occurring.

7.6.82 Contractors will be provided with a toolbox talk prior to construction focusing on ensuring that this buffer is maintained during construction.

7.6.83 The condition of ditches will be periodically monitored during construction by an ecological clerk of works with remedial measures taken where damage is identified.

Residual Effects

7.6.84 With pollution prevention measures in place, any unlikely pollution events can be mitigated and so the residual effect is considered **Not Significant**.

Badgers

Construction Phase

7.6.85 Active badger setts have been identified at and within boundary habitats, in particular around the south western area of the site. The underground excavations associated with this sett may extend out into the construction zone. There is, therefore, some potential for damage to some of the tunnel network associated with the sett. It should be noted that this would constitute an offence and as such mitigation measures will be applied to avoid these offences. In view of the legal requirements the implementation of such mitigation is assumed for the purposes of the assessment.

7.6.86 A small amount of disturbance may occur in terms of noise and vibration but this will be temporary in nature and would be a result of construction activities close to the sett.

7.6.87 During construction works, if deep trenches are left open overnight or high voltage machinery is present, there may be potential for incidental injury or mortality to badgers exploring the site during the night.

7.6.88 During the construction phase the availability and quality of foraging habitat will be adversely affected by the works. Although feasibly the entire approx. 200ha of land expected to be within the development could represent badger foraging grounds, it is likely that the areas concentrated around the southern and western parts of the site, close to the recorded setts, form the key foraging areas for the local social group of badgers. The temporary loss of habitats are anticipated to be similar in effect to the regular agricultural activities that take place on the site with the habitat becoming suitable for foraging badgers once works in a particular area are complete. Security fencing erected at the project outset may restrict badger movements into the site.

Operation Phase

7.6.89 The cessation of intensive arable farming and expected reversion of land to sheep-grazed grassland is likely to increase the value of the land within the array for foraging

badgers, provided they have continued access to the site. In particular, the lack of disturbance (from ploughing/harvesting etc.) and provision of year round grassland foraging opportunities would represent better quality habitat than currently exists within the arable fields, which generally offer only seasonal foraging opportunities.

Mitigation Measures

7.6.90 The badger setts at the present at the site boundaries are at risk of damage during construction works. Damage to setts will be avoided by provision of adequately protective exclusion zone around the sett demarked by temporary, robust fencing with warning sign attached. The size of the buffer zones will be proportionate the to the size and status of the setts, but will be at least 5m from the closest sett entrance, and will be 20m from the nearest entrance of the main sett and subsidiary setts at the south western boundary of the site. All contractors will be informed about the presence of the setts via a toolbox talk delivered by an ecologist prior to construction. No machinery will be driven within this buffer or materials stored in the area.

7.6.91 This buffer will also reduce any impacts resulting from noise and vibrations which may affect the setts.

7.6.92 Permanent or temporary exclusion of the outlying badger setts is not anticipated to be required. However, given that the outlying setts identified are of low status in the event an exclusion was required it seems unlikely that the temporary or permanent loss of these setts would result in significant adverse impacts upon badgers. Clearly such exclusions would need to be undertaken via a Natural England development licence.

7.6.93 The loss of foraging habitat for badgers during construction of the array will be a temporary impact. Badgers will still have access into the construction site and in view of the nature of development it is considered highly unlikely that all opportunities for foraging within the construction site will be 'lost'. Gaps of 100-150mm in height will be maintained beneath fencing for badger to dig under the fence; where necessary (e.g. where natural undulations in the ground do not allow) gaps to be created. Mammal gates will not be provided as these are generally ineffective and unnecessary given that security fencing will not be buried and badgers will be able to 'push under' the security fence. As such it is not considered that the arrays will inhibit the free movement of badgers through the landscape.

7.6.94 The CEMP will outline measures to be taken to reduce the probability of incidental mortality of badgers, including the installation of planks in any excavations which are left open overnight.

7.6.95 Although the badger active period will not conflict with the working construction hours, the CEMP will also outline additional precautions to minimise effects on badgers such as the implementation of a 10mph speed limit on site during construction.

Residual Effects

7.6.96 The above measures will reduce the minor negative effects on badgers during construction to neutral. Grassland management of the land within the array, delivered as part of a LEMP, will ensure this habitat represents suitable foraging grounds for the lifespan of the array, and residual effects will remain have an overall beneficial effect which is **Not Significant**.

Bats

Construction Phase Impacts

7.6.97 The hedgerows and woodland were considered to be of highest value for foraging and commuting bats using the site, and the wetland features provide additional foraging opportunities.

7.6.98 Minor losses of hedgerow which are proposed are considered unlikely to significantly fragment foraging or commuting routes and unlikely to have an impact upon the favourable conservation status of bats present within the site.

7.6.99 No significant lighting is expected to be required during the construction phase. However, during winter artificial lighting may be required within the construction zone due to the short day lengths. If this is the case, light may spill onto hedgerows. However, as bats are in hibernation during the winter months, they are unlikely to be affected. Therefore it is anticipated that fragmentation of habitat as a result of light pollution will not occur.

7.6.100 Eight trees were identified during the initial visits which were suitable for roosting bats. Three trees with 'low' bat roost potential were removed during the winter months in early 2018. Although reasonably unlikely to support bat roosts based on the results of the ground-based assessment, it would be appropriate to adopt a precautionary principle and assume that in the absence of mitigation, a minor loss of roosting opportunities would occur as a result of the removal of the three trees. The remaining trees will be retained and so no further loss of potential roosting sites will occur. There may be some impact in terms of noise and vibration should bats be roosting within retained trees on site or at the woodland edges. This would occur during construction activities close to the trees/woodland. This disturbance would be temporary and bats are likely to have alternative roosting locations, and effects are likely to be no greater than those associated with the usual agricultural activities which occur within the arable fields.

Operational Phase

7.6.101 It is not thought that the noise from inverters or substations will have an effect on navigating bats, and minimal lighting will be required during the operation of the array and so fragmentation of habitat as a result of noise/light pollution will not occur.

7.6.102 The cessation of intensive arable farming practices (particularly insecticide spraying) and reversion of the land to permanent (for at least the duration of the array) sheep-grazed grassland can be expected to result in increased numbers and diversity of invertebrates at the site, including prey species for the local population of bats. However, there has been some concern raised that the presence of solar panels may have detrimental impacts on bats when echolocating, for instance by confusing solar panels for water bodies. Studies into this potential impact do not suggest that this would result in detrimental impacts on bat populations however[22][23]. One preliminary study found no beneficial effects on bat abundance within solar arrays compared to control sites[24].

7.6.103 Approximately 1.5km of new, native hedgerow planting is to be created at the site. This will greatly improve the ability of bats to navigate across the site, as well as increasing foraging opportunities for this species.

Mitigation Measures

[22] Greif, S., and Siemers, B. M. (2010) Innate recognition of water bodies in echolocating bats. *Nat. Commun*. 2(1):107

[23] Russo, D., Cistrone, L., and Jones, G. (2012) Sensory ecology of water detection by bats: a field experiment. *PLoS ONE*. 7(10): e48144

[24] Montag, H, Parker, G & Clarkson, T. (2016) The Effects of Solar Farms on Local Biodiversity: A Comparative Study

7.6.104 In order to adequately mitigate for the loss of three trees with 'low' bat roost potential, a minimum of nine (three per tree lost) long lasting ('woodcrete' or similar) bat roosting boxes will be installed on suitably mature retained trees within the site, as set out within LEMP

7.6.105 Minor losses of hedgerows and the temporary reduction in the suitability of parts of the site for foraging bats during construction was noted but such effects are anticipated to be neutral upon the conservation status of bats within the area. The maintenance of the most important features at the site for foraging/commuting bats will mitigate for the temporary loss of suboptimal habitat across the arable fields

Residual Effects

Grassland management within the array, as well as new hedgerow planting delivered as part of a LEMP, will increase habitat quality for foraging bats for the lifespan of the array, although as reported above, preliminary research has so far not identified positive impacts of solar arrays on bats. Residual effects will remain be Neutral which is **Not Significant**.

Brown Hare

Construction Phase

7.6.106 Brown hares do not utilise burrows and instead raise their young leverets in scrapes (shallow indentations in the middle of fields). Although the leverets are precocial from birth, there is still a small risk of injury or mortality from construction activities. Hares breed between January and August and during these periods impacts upon hares may be slightly greater than at other times of year.

7.6.107 Hares are highly mobile, and the temporary loss of habitats (up to 209ha) within the array during construction are anticipated to be similar in effect to the regular agricultural activities that take place on the site with the habitat becoming suitable for hares once works in a particular area are complete. Security fencing erected at the project outset may restrict hare movement into the site.

7.6.108 It is therefore considered that in the absence of mitigation, there may be an adverse impact associated with the potential for incidental mortality of brown hares.

Operational Phase

7.6.109 Operationally, the cessation of intensive arable farming and expected reversion of land to sheep grazed grassland is likely to benefit hares, particularly as a result of the lack of disturbance from ploughing and harvesting. The solar panels are also likely to be attractive sheltering features for brown hares avoiding predators and inclement weather, and a preliminary study found evidence that hares were more abundant within solar arrays compared to control sites nearby[25]. This impact will last for at least the lifespan of the array and will result in a **Minor Beneficial** effect on brown hare.

Mitigation Measures

7.6.110 A risk of incidental mortality of young brown hare was identified during the construction phase; this will be minimised through adopting a speed limit of 10mph across the site to reduce the possibility of incidental mortality, as prescribed within the CEMP. Construction traffic will generally be confined to the main access roads.

[25] Montag, H, Parker, G & Clarkson, T. (2016) The Effects of Solar Farms on Local Biodiversity: A Comparative Study

7.6.111 The provision of access for small mammals, as described under the 'Badgers' subheading above, will ensure hares are able to have continued access to the site.

7.6.112 No negative impacts are anticipated on brown hares during operation. Grassland management within the array, delivered as part of a LEMP, will increase habitat quality for foraging and breeding brown hares, who are also likely to use the panels for cover from predators.

Residual effects

7.6.113 Due to the expected increase in foraging and sheltering opportunities available for brown hare within the operational site, residual effects are expected to be beneficial, which is considered **Significant at a Local** level.

Breeding Birds – (Ground Nesting Birds of Open Farmland)

Construction Phase Impacts

7.6.114 The following notable bird species which nest in open habitats were identified during breeding bird surveys undertaken at the site:

- Skylark (Approximately 25 territories)
- Yellow Wagtail (Approximately 3 territories)
- Lapwing (1 or 2 territories)
- Meadow pipit (1 or 2 territories)
- Reed bunting (3 territories)

7.6.115 Habitat for ground nesting birds would be lost at least temporarily during site clearance and construction activities. Furthermore, these species need to monitor surrounding habitat for potential predators, and as a result, the site is unlikely to offer such optimal habitat for nesting post development given the presence of panels which would disrupt sightlines. The exception to this is reed bunting, which is less sensitive to the loss of open sightlines for monitoring predators than the other species.

7.6.116 There is a general lack of scientific evidence of how ground nesting birds such as skylark use solar arrays. There is emerging evidence which indicates that solar arrays provide valuable foraging habitat for birds, including skylarks and other ground nesting birds.

7.6.117 Skylarks have been recorded using land within solar arrays for nesting and for foraging. A preliminary study co-authored by Clarkson and Woods ecologists identified skylarks using land within solar arrays for foraging during the summer months, at comparative (and sometime higher) levels to that of control sites[12].Other incidental observations of skylarks foraging within solar arrays have been recorded by Clarkson and Woods ecologists whilst undertaking monitoring of solar arrays on various sites around the country. In almost every site monitored (Clarkson and Woods have monitored in excess of 30 large scale solar arrays) skylark have been seen foraging within or perching on array panels. Furthermore, at least three sites are known (not derived from Clarkson and Woods surveys) where skylark have been observed to be using nesting sites within arrays.

7.6.118 However, it should be pointed out that the above observations are generally derived from early-stage monitoring following completion of construction and as such, the effects of strong nest-site fidelity within skylarks cannot be ruled out. Such an effect may

explain why a small proportion of birds remain within seemingly sub-optimal habitat following an abrupt change in suitability, therefore further monitoring data will be essential to determine long-term effects within these developments. In addition, land-use changes on surrounding land may confound or contribute to skylarks choosing to use habitats under solar parks. Consequently, it is necessary to adopt a precautionary principle and so it is reasonable to assume that the array site will support a significantly reduced number of skylark than the site currently supports. For the purposes of this assessment it is assumed that a small proportion of nesting will persist but that the number of birds that the area will support will decline due to a loss of suitable habitat. This assessment principle has been extended to apply to lapwing, yellow wagtail and meadow pipit, although the numbers of nesting pairs for these species are far lower than that of skylark, so the impacts and mitigation are less severe.

7.6.119 It is noted that there is an abundance of open, arable farmland within the surrounding 5km, which would be expected to absorb a proportion of the breeding skylark population that would be displaced from the site.

7.6.120 There is also the potential for incidental injury or mortality to adults, young and eggs as a result of construction activities, or disturbance causing adults to abandon the nests, should construction extend into the breeding season. Therefore, in the absence of mitigation the combined impacts of habitat loss, disturbance, incidental mortality, injury and incidental damage of nests would be considered a significant adverse effect.

Operational Phase Impacts

7.6.121 The impact of loss of habitat for ground nesting birds is assessed as part of the construction of the array. There will be no further habitat loss for this receptor during the operation of the array, and operational site maintenance will result in minimal disturbance. The cessation of intensive arable farming practices (particularly insecticide spraying) and reversion of the land to permanent (for at least the duration of the array) sheep-grazed grassland can be expected to result in increased numbers and diversity of foraging resources for ground nesting birds, such as invertebrates and some seed bearing plant species.

Mitigation Measures

7.6.122 In order to avoid the effects of disturbance and mortality as far as possible, Following the last harvest prior to construction and prior to the 1st March, all vegetation within the construction zone in the arable fields will be cut to ground level to discourage ground nesting birds from beginning nest building. The area will also be regularly rolled to flatten vegetation to ground level. This vegetation will be kept below 100mm until construction commences through regular management as appropriate. Should vegetation be over 100mm when construction commences, a qualified ecologist will conduct a nesting bird check. In the event that vegetation has grown to a height of over 100mm at the beginning of construction in any of the fields (during key bird besting season of March to August inclusive), a pre-construction site inspection by an ecologist would be required to ensure that no nesting birds are present. In the unlikely event that nesting birds are found despite the above mitigation, no works will occur within a suitable buffer (minimum 50m radius) around the nest until an ecologist has confirmed that the chicks have fledged. This will minimise the risk of damaging nests of ground nesting birds.

7.6.123 With the extent of the arrays within the proposals, it is not possible to entirely mitigate for the loss of large open areas of habitat for all of the ground nesting birds recorded using the construction zone. It is likely that at least some skylark, lapwing, meadow pipit, yellow wagtail and reed bunting will continue to utilise the narrow strips between the panel strings and at field margins at least for foraging. If such habitats are assumed to be used the creation of a low intensity sheep-grazed grassland will benefit

these species by increasing the quality of foraging habitats, primarily due to the anticipated boost in abundance and diversity of invertebrate prey species.

7.6.124 Approximately 20 hectares of retained, open land within the array will be provided within the middle of the site, which will remain free of panels. This will comprise a strip of land running roughly north-south through the middle of the site, which is at least 85m in width, as well as a larger area in the centre of the northern part of the site as set out within the LEMP. This area is proposed to be managed as grassland under a sheep-grazed grazing regime, which will be restricted during the key bird breeding season.

7.6.125 The retention of circa 20ha of open land managed in this way is expected to offer sufficient habitat within the site for all yellow wagtail, lapwing, meadow pipit and reed bunting territories recorded on site. The different species will occupy the same habitat and readily overlap territories where suitable habitat is present.

7.6.126 It is considered that this land specifically managed for ground nesting birds will also be suitable for a proportion of the skylark population currently inhabiting the site, although the size of the retained open land will not be able to support the approx. 25 skylark territories considered to be the current baseline. It is predicted that this habitat. under a lightly grazed management regime, would provide optimal vegetation height and structure for skylarks to nest within, and thus could support a density of territories close to the upper range of territory densities found on lowland farmland (0.5 pairs per hectare[26][27]). This would therefore be expected to provide suitable habitat for approximately 10 pairs of skylark. As previously discussed, there is anecdotal evidence of skylarks exhibiting nesting behaviour within solar arrays. Taking this into account, it is predicted that a factor of 25% of the existing skylark population (i.e. 6-7 pairs) may continue to nest within the array strings, particularly where wider easements are retained.

7.6.127 The lack of regular disturbance of land within the array site will help to ensure those birds that nest within both the array and the retained open areas are more likely to successfully rear broods without risk of damage by agricultural activity.

7.6.128 Foraging and nesting behaviour displayed by ground nesting bird species has been observed within solar arrays by Clarkson and Woods, and therefore the increase in quality of foraging within the array will be expected to an increased success of brood rearing at any nests within the site as well as within the nearby landscape off-site. As such, the significant adverse effects identified upon ground nesting birds can be reduced with the mitigation measures proposed. However, given the highly reduced land available for nesting skylark, of which the site currently supports a good population, it cannot be confidently stated that this would not result in a residual neutral effect for this species.

Residual Effects

7.6.129 The impact of direct mortality on ground nesting birds will be mitigated by manipulating the habitat prior to and during the breeding season to discourage bird from nesting prior to commencing on site. The improvement in habitat quality for foraging birds would also be expected to boost the breeding success rates of birds nesting within the site and nearby farmland. Although the effect of habitat loss on the majority of ground nesting birds recorded using the site will be mitigated for by the retention of suitable nesting habitat at open space within the middle of the site, a residual adverse impact on the

[26] Poulsen J.G., Sotherton N.W. & Aebischer N.J. (1998) Comparative nesting and feeding ecology of skylarks *Alauda arvensis* on arable farmland in southern England with special reference to set-aside. Journal of Applied Ecology, 35, 131-147

[27] P.F. Donald , A.D. Evans , D.L. Buckingham , L.B. Muirhead & J.D. Wilson (2001) Factors affecting the territory distribution of Skylarks *Alauda arvensis* breeding on lowlandfarmland, Bird Study, 48:3, 271-278,

population of skylark is expected as the site may not continue to support the current numbers using the site. For this IEF overall, a minor residual adverse impact is predicted, although this is considered to be **Not Significant** on this IEF as a whole. .

Breeding Birds - Other

Construction Phase

7.6.130 Eight bird species of conservation concern were believed to be using boundary habitats for breeding and there is the potential for indirect impacts on these species during construction works. The disturbance from noise and vibration may deter species from nesting close to the construction area or, as a worst case, cause abandonment of nests. This is considered unlikely as the birds will be habituated to some level of disturbance from agricultural machinery and the most disturbing construction activities (piling steel frames and digging trenches) will occur some way from hedgerows (at least 10m) and will be of short duration.

7.6.131 There is also the unlikely potential for construction vehicles to damage boundary features, or for this habitat to be degraded through dust or runoff (as discussed within the Hedgerows & Woodland sections above). This may affect the suitability of this habitat for nesting and may cause damage to any active nests.

7.6.132 Small sections (approximately 10m in total) of hedgerow require removal for new access and one cable trench. Should birds be nesting within this habitat at the time of removal there is the potential to destroy nests or cause mortality to birds. The loss of this small area of habitat for breeding birds is unlikely to affect foraging or breeding habitat availability.

Operation Phase Impacts

7.6.133 The operational scheme will require minimal upkeep and any disturbance effects from maintenance works are likely to be of a low severity in line with those already present due to agricultural management practices. The cessation of intensive arable farming practices (particularly insecticide spraying) and reversion of the land to permanent (for at least the duration of the array) sheep-grazed grassland can be expected to result in increased numbers and diversity of foraging resources for breeding birds, including invertebrates and some seed bearing plant species. These bird species are also likely to benefit from the presence of structures for perching and cover provided by the solar panels as has been recorded at other solar arrays[28].

7.6.134 Approximately 1.5km of new, native hedgerow planting is to be created at the site. This will greatly increase the foraging and nesting habitat available for bird species which use this habitat.

7.6.135 The reversion of land beneath the panels from arable to low-intensity sheep grazed grassland is expected to boost the abundance of small mammals, which would increase the foraging value of the site for birds of prey recorded at the site, including kestrel.

Mitigation Measures

7.6.136 A buffer of at least 4m will be maintained from all boundary features, to be delineated using security or temporary fencing. This buffer will be larger alongside

[28] Montag, H, Parker, G & Clarkson, T. (2016) The Effects of Solar Farms on Local Biodiversity: A Comparative Study.

woodland areas. This will prevent damage to this habitat during construction. Details to protect these features will be outlined within the CEMP.

7.6.137 Should the removal of sections of hedgerow be required during the main nesting season (March to August inclusive, these will first be subject to a nesting bird check by an experienced ecologist no more than 48hrs prior to the work being done to ensure no active birds nests are present. If active nests are found, these will be monitored until fledging and the works delayed until this time. Otherwise, alternative locations for breaches will be identified and the same check undertaken. This will be outlined within the CEMP prepared for the site.

7.6.138 The LEMP to be prepared will ensure the value of new/retained habitats for breeding birds is realised in the long-term.

Residual Effects

7.6.139 Very few detrimental impacts are likely to occur both during construction and operation on birds breeding within the boundary features. With appropriate mitigation in place, as well as the expected increase in foraging value of the site and new nesting opportunities within the hedgerow, a residual beneficial impact is expected, which is **Significant at a Local scale.**

Wintering Birds – of Open Farmland

Construction Phase

7.6.140 Baseline levels of disturbance associated with regular farming activity on the site mean that bird populations are likely to be, to a degree, habituated to disturbance from regular farming practices within the site. However construction will last longer than typical farming activities and there will be an increase in levels of noise and human activity.

7.6.141 This impact is unavoidable although will be short term and temporary in nature. Following the completion of development, the operational site will be subject to minimal visits for maintenance, which will likely constitute lower disturbance levels than that associated with existing agricultural practices.

7.6.142 The development has the potential to detrimentally impact moderate to large numbers of skylark and lapwing, through habitat loss and/or degradation in habitat quality.

7.6.143 The presence of the solar panels would likely obstruct vertical and horizontal sightlines required by flocks of lapwing for predator detection. Consequently, it is considered unlikely that this species would continue to forage to the same extent within the grassland habitats proposed to be created beneath the panels due to the reduced ability to monitor for predators.

7.6.144 The impact of habitat loss/degradation is also likely to affect skylarks, which also generally require open sightlines for monitoring predators. As stated above for breeding birds, there is some emerging evidence that skylark will forage amongst solar arrays, although it is also reasonable to assume that the array site will support a significantly reduced number of skylark than the site currently supports.

7.6.145 It is observed that an abundance of similar arable land is present within a 5km radius of the site and would likely have the capacity to receive some increase in foraging pressure by these species resulting from the displacement from the site.

7.6.146 Other bird species observed foraging within the open habitats such as redwing, fieldfare, stock dove, starling and gulls can be expected to continue to utilise the habitats

beneath the panels as these birds are considered to be more resilient to restricted sightlines. Although food sources in the form of spilled seed from arable stubble will be lost from within the array, the cessation of intensive arable farming and introduction of grassland meadow will boost invertebrate prey sources and will not preclude foraging within the site for these species.

Operational Phase

7.6.147 The impact of loss of habitat for wintering birds is assessed as part of the construction of the array. There will be no further habitat loss for this receptor during the operation of the array, and operational site maintenance will result in minimal disturbance. Approximately 1.5km of new, native hedgerow planting is to be created at the site. This will greatly increase the foraging and nesting habitat available for bird species which use this habitat.

Mitigation Measures

7.6.148 The cessation of intensive arable activities within the array and reversion to grassland and under a sheep-grazing regime is likely to benefit those species which will utilise the solar array for winter foraging as the invertebrate and seed load is likely to increase.

7.6.149 Approximately 20 hectares of retained, open land within the array will be provided within the middle of the site, which will remain free of panels. The majority of this is at least 80m in width, and sited away from tall woodland. This area is also proposed to be managed as grassland under a sheep-grazed grazing regime.

7.6.150 The retention of circa 20ha of open land suitable for use by flocks of wintering birds, in addition to the expected increase in foraging value at the managed in this way is expected to offer sufficient habitat within the site for the wintering bird species of open farmland which currently use the site, particular the moderate to large flocks of lapwing and skylark recorded using the site.

Residual Effects

The development is likely to affect two species of wintering birds which are specialists of open habitats (lapwing and skylark).The impact of habitat loss/degradation for flocks of wintering birds of open farmland will be mitigated for by the increase in foraging value of the land within the array, as well as within areas of open land retained and managed for farmland birds. Although a residual detrimental impact is expected on these two species, the mitigation proposed is expected to reduce this effect to **Non-Significant** Levels.

Invertebrates

Construction Phase

7.6.151 The arable habitat to be lost did not offer habitat of elevated value for invertebrate assemblages so there will be very few impacts resulting from habitat loss for this feature. However, if plant species associated with arable margin habitat is removed from the site, this will adversely impact species which are regularly associated with these plants.

7.6.152 Construction activities may result in dust/sediment deposition leading to degradation of the varied habitats at the field boundaries, including woodland, hedgerows, and aquatic habitats, which were considered to the most value habitats for invertebrates. Effects of this are only likely to be temporary, although could end up being felt in the long-term if aquatic habitats are seriously affected.

Operational Phase

7.6.153 The cessation of intensive arable farming practices (particularly insecticide spraying) and reversion of the land to permanent (for at least the duration of the array) sheep-grazed grassland can be expected to result in increased diversity and numbers and diversity of invertebrates at the site. This includes a number of pollinating of butterfly and bee species[29] which have been shown to have increased diversity and abundance in solar arrays compared to control plots. Given the large extent of habitat that will likely increase in quality, the operational impacts of the development will have beneficial effects on a range of invertebrates

Mitigation Measures

7.6.154 The mitigation measures set out to protect the key habitats for invertebrates, including hedgerows, woodland and aquatic habitats, will ensure these features are protected from damage and degradation during construction, and will lead to a residual Neutral effect on the key invertebrate assemblages using the site.

7.6.155 During the operation of the array, the change of land use from the existing arable habitat underneath the array to grassland subject to minimal disturbance and managed under a LEMP will lead to an increase in the quality of the habitats across the site for invertebrates, particularly due to the cessation in spraying of crops.

Residual Effects

7.6.156 Very few detrimental impacts are likely to occur impacts are likely to occur both during construction and operation on invertebrates within the boundary features. With the expected increase in value of the site as a result of cessation of arable farming activities, a residual beneficial impact is expected, which is **Significant at a Local scale**.

Enhancement

7.6.157 Acid grassland seed mixes sown at easements between panels spread around the site will contain larval food plants and nectar sources for adults of a variety of target pollinating invertebrate species, including grayling *Hipparchia semele*, wall *Lasiommata megera* and small heath *Coenonympha pamphilus* which are known to be present at Yarborough Quarry to the north west of the site.

7.7 CUMULATIVE IMPACTS

7.7.1 Solar developments within 10km of the site were searched for using the North Lincolnshire Council online planning register[30]. The following have been identified:

- Raventhorpe Farm, 38MW capacity over 69.870ha. Located approximately 230m south of the application site. Active; and
- Flixborough Solar Farm, 5.99MW capacity over 12.9ha. Located approximately 7.42km north west of the application site. Active.

[29] Montag, H, Parker, G & Clarkson, T. (2016) The Effects of Solar Farms on Local Biodiveristy: A Comparative Study.

[30] North Lincolnshire Council online planning register: http://www.northlincs.gov.uk/planning-and-environment/planning/search-and-comment-on-planning-applications/

7.7.2 Both of these sites are active arrays and as such the potential for cumulative effects of dust/run-off deposition, damage to habitats and disturbance to wildlife associated with construction of the array is negligible.

7.7.3 The intervening landscape between the Flixborough site and the application site primarily consists of the steel works, further industrial estates and residential areas of Scunthorpe. This fragmented landscape combined with the considerable distance between the sites means that the Flixborough site is not considered to pose cumulative impacts on any of the ecological receptors identified within this chapter.

7.7.4 The Raventhorpe Farm site 230m to the south identified potential impacts on farmland birds of open grassland. Following breeding and wintering bird surveys undertaken at the site, skylark and grey partridge were recorded nesting in the site, with small numbers of wintering lapwing also found to use the site. The Environmental Statement[31] prepared for Raventhorpe Farm balanced the reduction in available habitat for lapwing with the likely increase in habitat quality for other birds of open farmland. It is likely that the proposals will have cumulative impacts (both adverse and beneficial) on the same species of farmland birds which use/have used both sites.

7.7.5 Loss of arable field margins was also identified as a potential impact at the Raventhorpe Farm site. However, the mitigation/compensation designed at this site has sought to reduce this impact to a minimal level, through retaining areas of cultivated, uncropped land which lie outside of sheep grazed areas. As such no cumulative impact impacts are considered likely on this feature, although this depends on the success of management.

7.7.6 Cessation of intensive farming is often an inherent beneficial ecological impact of solar farm developments, resulting in more diverse grassland swards and associated invertebrates with their predatory species across a range of wildlife taxa. These developments may therefore have landscape-scale cumulative beneficial effects for a wide range of species.

Enhancements

7.7.7 The scheme will deliver a range of ecological enhancements intended to benefit a variety of features important for nature conservation, including, but not limited to, several of the IEFs.

7.7.8 These enhancements will be designed to deliver additional ecological benefits beyond those expected to occur as a result of the mitigation measures and scheme design described above.

7.7.9 Acid grassland seed mixes sown at easements between panels spread around the site will contain larval food plants and nectar sources for adults of a variety of target pollinating invertebrate species which are listed as Species of Principle Importance, including grayling *Hipparchia semele*, wall *Lasiommata megera* and small heath *Coenonympha pamphilus* which are known to be present at Yarborough Quarry to the north west of the site.

7.7.10 In addition to the 9 bat boxes to be installed as mitigation for the loss of trees at the site, 30 long lasting bat roosting features will be installed on suitable mature trees within and adjacent to the site to increase the roosting opportunities available for birds. A variety of boxes are commercially available and will be adopted in order to attract the

[31]Solar Park on Land at Raventhorpe Farm, Scunthorpe – Environmental Statement Volume 1: Main Report (August 2014) Kinetica Solar

different species of bats recorded using the site. These will be maintained for at least the duration of the array.

7.7.11 30 long-lasting bird boxes designed to attract a range of bird species of conservation concern will be installed on suitably mature trees within and adjacent ot the site. This will enhance the sited value for breeding birds which occupy boxes and holes in trees. These will be maintained for at least the duration of the array.

7.7.12 Details of the creation/installation of ecological enhancement and prescriptions for the long-term management and maintenance will be described within the LEMP prepared for the site.

Table 7.4: Residual Effects Summary

Important Ecological Feature	Geographic frame of reference	Phase	Mitigation Measures	Residual Effects	Significance
Broughton Far Wood SSSI, Broughton Far Wood LWS & Rowland Plantation LWS	National/County	Construction	Implementation of CEMP to prevent deposition of dust and spoil on woodland edges along main traffic routes	Neutral	Not Significant
		Operation	No adverse effects and no specific mitigation required or proposed.	Neutral	Not Significant
Heron Holt Wood LWS, Broughton West Wood LWS, Manby Wood LWS, and Santon Wood East (including PAWS)	County	Construction	Fenced buffer zone maintained at least 15m from PAWS, and RPZ/shading zone from other woodland Implementation of protection measures and precautionary working methods prescribed within the CEMP	Neutral	Not Significant
		Operation	No adverse effects and no specific mitigation required or proposed Cessation of intensive arable farming	Positive	Not Significant

Important Ecological Feature	Geographic frame of reference	Phase	Mitigation Measures	Residual Effects	Significance
Broughton West Wood SNCI & Santon Wood SNCI	County	Construction	Laying of cable through Broughton West Wood SNCI to be timed after forestry harvesting but prior to replanting Fenced Buffer zone maintained from edge of woodland Implementation of protection measures and precautionary working methods prescribed within the CEMP	Neutral	Not Significant
		Operation	No adverse effects and no specific mitigation required or proposed Cessation of intensive arable farming	Positive	Not Significant
Arable Field Margins	Local	Construction	Retention of circa 3ha of land specifically managed for arable plants outside of panels. Habitat creation measures delivered via LEMP.	Neutral	Not Significant
		Operation	Long-term management of arable plant as prescribed by LEMP	Neutral	Not Significant
• Hedgerows	Local	Construction	Implementation of protection measures and precautionary working methods described in the CEMP	Neutral	Not Significant

Important Ecological Feature	Geographic frame of reference	Phase	Mitigation Measures	Residual Effects	Significance
		Operation	Creation and management of retained and new (circa 1.5km) a habitat via LEMP Cessation of intensive arable practices	Positive	**Significant at a Local Level**
Semi-natural broadleaved woodland	Local	Construction	Protection of woodland including adequate fenced buffer zones. Implementation of CEMP	Neutral	Not Significant
		Operation	No adverse effects and no specific mitigation required or proposed Cessation of intensive arable farming	Positive	Not Significant
Plantation broadleaved woodland	Local	Construction	Protection of woodland including adequate fenced buffer zones. Implementation of CEMP	Neutral	Not Significant
		Operation	No adverse effects and no specific mitigation required or proposed Cessation of intensive arable farming	Positive	Not Significant
Ponds	Local	Construction	Implementation of protection measures and precautionary working methods described via CEMP	Neutral	Not Significant

Important Ecological Feature	Geographic frame of reference	Phase	Mitigation Measures	Residual Effects	Significance
		Operation	Installation of stock proof fencing (where necessary) around ponds. Cessation of intensive arable farming	Positive	Not Significant
Ditches	Local	Construction	Implementation of protection measures and precautionary working methods described in the CEMP	Neutral	Not Significant
		Operation	Management of retained hedgerows and new connected habitats via LEMP Cessation of intensive arable farming	Positive	Not Significant
Badgers	Site	Construction	Protection of setts through implementation of adequate buffer zones. Ensure badgers are able to continue to use the construction site, provide 'mammal gaps' within perimeter fencing if necessary. Low traffic speeds within site	Neutral	Not Significant
		Operation	Management of new and retained habitat via LEMP	Positive	Not Significant

Important Ecological Feature	Geographic frame of reference	Phase	Mitigation Measures	Residual Effects	Significance
Bats	Local	Construction	Installation of bat roost boxes on trees Retention of highest value foraging habitats (hedgerows, woodland, ponds) and adoption of protective measure via CEMP	Neutral	Not Significant
		Operation	Management of new and retained habitat via LEMP	Neutral	Not Significant
Brown Hare	Local	Construction	Implementation of protection measures and precautionary working methods as part of a CEMP. Ensure haress are able to continue to use the construction site, provide 'mammal gaps' within perimeter fencing if necessary Low traffic speeds within site	Neutral	Not Significant

Important Ecological Feature	Geographic frame of reference	Phase	Mitigation Measures	Residual Effects	Significance
		Operation	Management of new and retained habitat via LEMP	Positive	**Significant at Local Level**
Breeding Birds – of Open Farmland	Local	Construction	Maintenance of habitat as unsuitable for ground nesting birds prior to, and during, construction. Partial retention of nesting habitat in areas free of panels (circa 20ha) and enhancement of site within panels to boost foraging opportunities. Habitat creation measures delivered via LEMP.	Adverse	Not Significant
		Operation	Management of retained and new habitats via LEMP	Neutral	Not Significant

Important Ecological Feature	Geographic frame of reference	Phase	Mitigation Measures	Residual Effects	Significance
Breeding Birds (other)	Local	Construction	Timing habitat clearance to avoid nesting birds. Protect key features through implementation of fenced buffer zones at boundary habitats Creation/planting of new habitats (circa 1.5km of new hedgerow). Enhancement of site within panels to boost foraging opportunities.	Neutral	Not Significant
		Operation	Management of new and retained habitat via LEMP	Positive	**Significant at Local level**
Wintering Birds (Of Open Farmland)	District	Construction	Partial retention of nesting habitat in areas free of panels (circa 20ha) and enhancement of site within panels to boost foraging opportunities. Habitat creation measures delivered via LEMP.	Neutral	Not Significant
		Operation	Management of retained and new habitats via LEMP	Neutral	Not Significant

Important Ecological Feature	Geographic frame of reference	Phase	Mitigation Measures	Residual Effects	Significance
Invertebrates	Local	Construction	Implementation of protection measures and precautionary working methods described in the CEMP	Neutral	Not Significant
		Operation	Management of retained and new habitats via LEMP	Positive	**Significant at Local Level**

7.8 SUMMARY

Introduction

7.8.1 This ES has been prepared by Clarkson and Woods using survey data gathered from an extended Phase 1 habitats survey, great crested newt eDNA survey, bat activity survey, water vole survey, arable plants survey, wintering bird surveys and breeding bird surveys. The chapter identified important ecological features which have been confirmed as being present, or are likely to be present and assesses the impacts of the installation of a solar array on these features. Where impacts are identified, mitigation measures are proposed that are considered necessary to reduce any adverse impacts to non-significant levels. Ecological enhancement measures are also proposed, so that the proposed development enhances the biodiversity value of the site.

Baseline Conditions

7.8.2 The suite of ecological surveys undertaken to date identified a range of habitats on/immediately adjacent to the site; however, the majority of habitat within the construction zone (arable and semi-improved grassland) were of low ecological value. The habitats within and adjacent to the site were assessed as being suitable for a variety of notable and protected species. A number of designated sites were present immediately adjacent to the site and/or within the zone of influence of the development.

7.8.3 A total of 20 "Important Ecological Features" (IEFs) were identified: Broughton Far Wood SSSI, Heron Holt LWS, Broughton West Wood LWS, Manby Wood LWS, Broughton Far Wood LWS, Rowland Plantation LWS, Broughton West Wood SNCI, Santon Wood SNCI, arable field margins, semi-natural broadleaved woodland, plantation broadleaved woodland, hedgerows, ponds, ditches, bats, brown hare, breeding birds of open habitats, breeding birds of boundary habitats, wintering birds of open habitats and invertebrates. Mitigation for badgers has also been included due to a requirement for legal compliance.

Likely Impacts

7.8.4 Impacts were considered at both the construction and operational phases of the project. Key sources of impacts during construction were identified to be habitat loss, fragmentation, disturbance of species through noise and vibration, degradation of habitats by pollution or dust deposition and the incidental mortality of species during construction. Fewer operational phase effects were noted as post construction activity at the site would be minimal. However the loss or modification of the habitat during operation which will occur during the construction phase will persist for certain species throughout the operational phase, potentially having long-term adverse effects. Conversely for other species and habitats the long-term operation of the site is anticipated to be beneficial, even within the implementation of mitigation and enhancement measures.

7.8.5 The key effects likely to result in significant adverse effects were mainly associated with habitat loss (as a result of construction activities), incidental damage to habitats and mortality of animals during construction, degradation of habitats resulting from dust/runoff/collision and disturbance of species utilising adjacent habitats.

7.8.6 Operational phase effects were considered to be generally neutral although uncertainty in the conclusions was noted, in particular with respect to the adverse effects of the development on ground nesting birds.

7.8.7 Beneficial effects have been identified through cessation of intensive arable farming practices, as well creation of native, species-rich hedgerows on site which will improve connectivity as well as foraging and nesting/ sheltering habitat for a range of species.

Mitigation

7.8.8 A number of mitigation measures have been identified that are considered essential to reduce or eliminate potential adverse effects from both the construction and operational phases. The key mitigation measure to minimise construction related effects will be the preparation and implementation of a Construction Environmental Management Plan (CEMP). This will outline measures to be undertaken to avoid impacts such as runoff, dust deposition and accidental damage. It will also outline habitat manipulation prescriptions in order to avoid impacts on ground nesting birds during construction.

7.8.9 A toolbox talk will be provided to all construction personnel prior to construction commencing in order to ensure that all contractors are aware of the presence of protected species or sensitive habitats and measures to take to avoid impacts.

7.8.10 Site security/ stock-proof fencing will be installed prior to construction commencing, which will maintain a minimum buffer of 4m from field boundaries (larger alongside woodland and wetland features); no vehicles will be driven or construction materials stored within this buffer. This will protect the boundary habitats and species therein during construction activities.

7.8.11 Gaps will be provided in the base of the site security fencing to allow mammals access into the site.

7.8.12 A Landscape and Ecological Management Plan (LEMP) will be prepared in order to outline how the site will be managed post construction in order to maximise its ecological value. This includes conservation management of grassland to increase its species richness and ensure land is available for use by ground nesting birds, and management of hedgerows to maximise their value for wildlife. Other measures will include the retention and ongoing management of land for arable plants species. Bat and bird boxes will also be installed and hedgerows in-filled where appropriate.

Conclusions

7.8.13 With the successful implementation of the mitigation measures adverse impacts upon the ecological features identified can largely be reduced to a non-significant level.

7.8.14 The creation of new habitats of greater biodiversity value than the current habitats within the site and the implementation of the LEMP present the opportunity to enhance the biodiversity value of the area. As such it is anticipated that during the operational phase the development will result in a minor beneficial enhancement of hedgerows through appropriate management and new planting, as well as minor beneficial impacts on woodland habitats, invertebrates, and non-ground nesting birds.

Figure 7.1

PHASE 1 HABITAT MAP AND TARGET NOTES


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F1
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F17
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I
0 100 200 300 400 500 m
Key:
Arable
Poor Semi-impro -ved Grassland
Improved Grass -land
Semi-natural Broad -leaved Woodland
Plantation Broad -leaved Woodland
Plantation Mixed Woodland
Plantation Conifer -ous Woodland
Bare Ground
Ponds
Dense Scrub
Tall Ruderals
Semi-improved Grassland
Species-rich Intact Hedgerow w Trees
Species-rich Defunct Hedgerow w Trees
Species-poor Defunct Hedgerow w Trees
Species-poor Intact Hedgerow w Trees
Species-poor Defunct Hedgerow
Species-poor Intact Hedgerow
Scattered BL tree
Running Water
Wet Ditch
Dry Ditch
Track
Site Boundary
Target Note
Field No.
CLARKSON & WOODS
ECOLOGICAL CONSULTANTS
Project
Little Crow Solar
Title
Phase 1 Habitat Map
Project Number
5642
Scale
See Scale Bar
Date
05/07/18

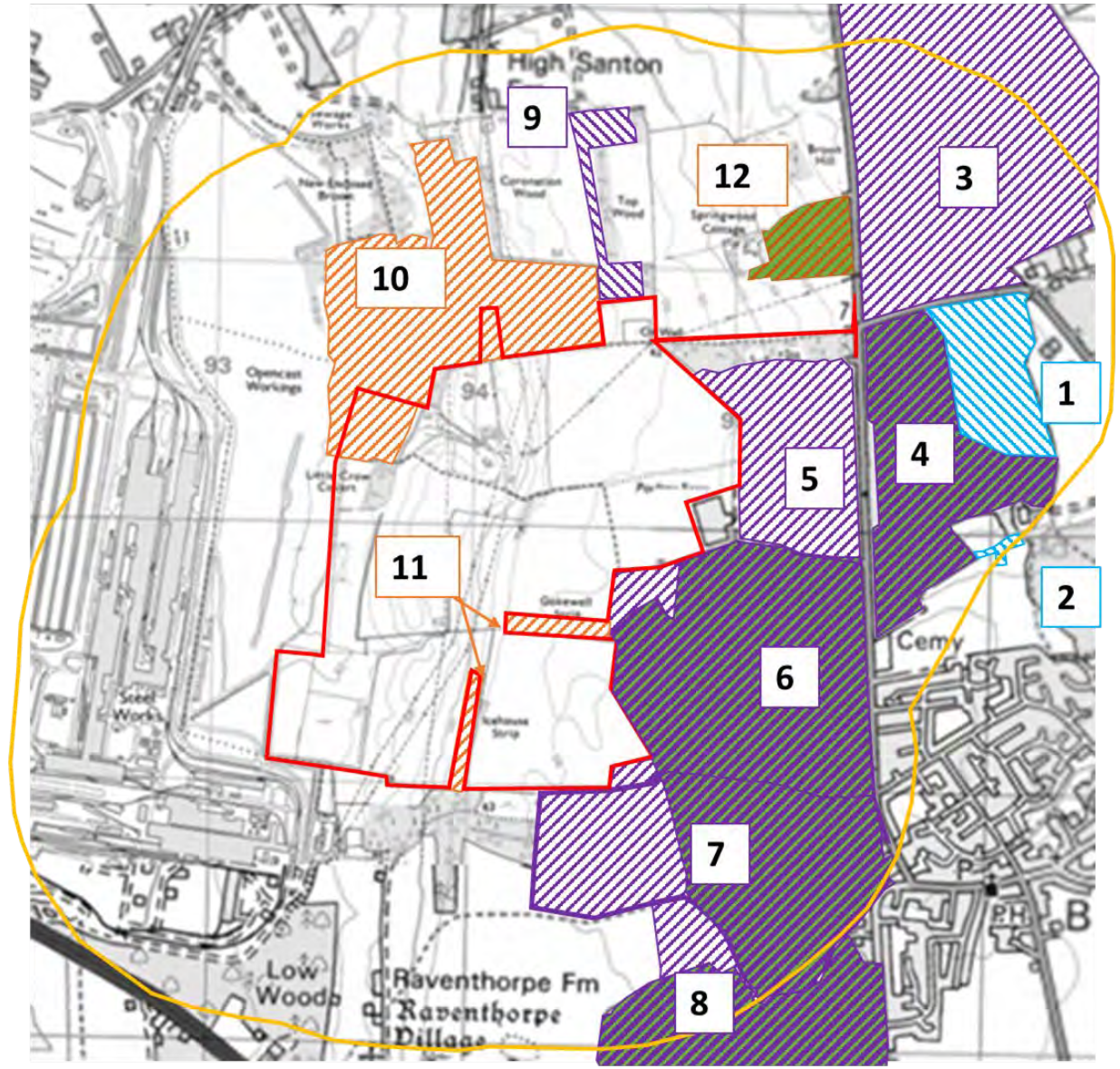
Table 7.5: Figure 1 Target Notes

No.	Description
TN1	Shallow valley area sloping down to a small stream. Covered with tall ruderal species with scattered young willow, hawthorn and bramble scrub
TN2	Mature oak tree with small number of Potential Roost Features (PRFs) such as loose, peeling bark, vertical frost cracks, rot holes and woodpecker holes. Considered to hold Moderate Potential for roosting bats
TN3	Dilapidated brick structure within dense hawthorn scrub
TN4	Mosaic of scrub, tall ruderals and poor SI grassland with farm track running through the middle. Occasional semi-mature ash tree scattered amongst scrub.
TN5	Mature oak tree with no obvious PRFs seen from the ground, but is of an age and size that PRFs may be present further up. Considered to hold Low Potential for roosting bats
TN6	Brown hares seen frequently
TN7	Badger latrine pit
TN8	One entrance Outlying badger sett approximately 8m south of woodland edge. Active, with fresh spoil heap, footprints and guard hairs. Tunnel leading north.
TN9	Brick structure in disrepair within scrub area.
TN10	Badger sett within the northern ditch bank amongst hawthorn scrub. One well-used entrance, three partially-used entrances and 2 disused entrances. Considered to represent a Subsidiary sett
TN11	Raised circular mound approximately 2m tall. Vegetated by course grasses and ruderal/herbaceous species, including false oat grass, cock's foot, hogweed, autumn hawkbit *Leontodon autumnalis*, creeping thistle and ragwort
TN12	Badger sett in raised bund. Comprising at least eleven entrances, of which four were well-used, five were partially-used, and two were disused. Fresh latrines, bedding, spoil and guard hairs present. Lots of paths leading into impenetrable bramble scrub. Considered to represent a Main sett
TN13	Raised bund reaching approximately 15m tall in far south west corner of the site. Vegetated with a mix of dense bramble scrub, course grasses and ruderal species.

TN14	Badger sett comprising one disused entrance running underneath hedgerow. Outlying sett.
TN15	Area in north edge of Field F11 around the edge of circular mound (TN11) containing frequent northern marsh orchid, and occasional bee orchid.
TN16	Poultry Farm
TN17	Fenced area of bare ground at a former oil well, used for storing hay bales at the time of survey, Several self-seeded sycamore, ash and blackthorn trees scattered around the edges

Figure 7.2

DESIGNATED SITES FOR NATURE CONSERVATION WITH 1KM



Key:

- Site of Special Scientific Interest (SSSI)
- Local Wildlife Site (LWS)
- LWS & Plantation on Ancient Woodland Site (PAWS)
- Site of Nature Conservation Interest (SNCI)
- SNCI & PAWS
- Site Boundary
- Approx. 1km search buffer

CLARKSON & WOODS
ECOLOGICAL CONSULTANTS

Project
Little Crow Solar

Title
Map of Nearby Sites Designated for Nature Conservation

Project Number
5642

Scale
Not to Scale

Date
10/07/18

Table 7.6: Designated Sites Shown in Figure 2

No.	Site
1	Broughton Far Wood SSSI
2	Broughton Alder Wood SSSI
3	Rowland Plantation LWS
4	Broughton Far Wood LWS (containing PAWS)
5	Heron Holt LWS
6	Broughton West Wood LWS (containing PAWS)
7	Manby Wood LWS (containing PAWS)
8	Gadbury and Lundimore Woods (containing PAWS)
9	Santon Wood East LWS
10	Santon Wood SNCI
11	Broughton West Wood SNCI
12	Spring Wood, Broughton SNCI (containing PAWS)

LITTLE CROW SOLAR PARK

LAND TO THE EAST OF STEEL WORKS, SCUNTHORPE

Preliminary Environmental Information Report

Chapter 8

CULTURAL HERITAGE

8 CULTURAL HERITAGE

8.1 INTRODUCTION

8.1.1 This Chapter of the PEIR presents an assessment of the likely effects of the Proposed Development upon archaeological remains within the Application Site and the designated assets within its surroundings.

8.1.2 The main element of the Proposed Development is the installation of a ground mounted solar park, with a capacity of up to 150MWp and up to 90MW of battery storage capacity. Each photovoltaic panel will be spaced at 3.5m-6m apart. Supporting infrastructure includes a substation compound, access roads, cable trenches, and a security fence, across an area of 226.81 ha. An operational lifespan of 35 years will be sought for each element. Further detail on the Proposed Development is available in Chapter 4.

8.1.3 A description of the methodology used in the assessment is provided. This is followed by a description of the relevant baseline conditions of the Application Site and the study area, together with the assessment of the likely effects of the Proposed Development. Appropriate mitigation measures are then identified in order to avoid, reduce or offset any adverse effects and/or provide enhancement. Taking account of the mitigation measures, the likely significance of residual effects is described, followed by a summary of likely significant cumulative effects.

8.1.4 The Chapter is accompanied by the following appendices.

- **Appendix 8.1**: Little Crow, Santon, North Lincolnshire – Cultural Heritage Baseline Study (Pegasus Group, November 2018).
- **Appendix 8.2**: Little Crow, Santon, North Lincolnshire – Geophysical Survey Report (SUMO, September 2018).
- **Appendix 8.3**: Little Crow Solar Park, Scunthorpe, North Lincolnshire – Archaeological Watching Brief (Cotswold Archaeology, November 2018).
- **Appendix 8.4**: Little Crow Solar Park, Scunthorpe, North Lincolnshire – Archaeological Fieldwalking Survey (Cotswold Archaeology, November 2018).

8.2 ASSESSMENT APPROACH

Methodology

Guidance Documents

8.2.1 This PEIR Chapter, the Heritage Assessment (**Appendix 8.1**) and the methodology for the assessment of development effects have been informed by the following documents:

- National Planning Policy Framework (NPPF; 2018)1;
- NPPF Planning Practice Guidance: Conserving and enhancing historic environment (March 2014)2;

[1] Ministry of Housing, Communities and Local Government (2018) National Planning Policy Framework

[2] Department for Communities and Local Government (2014) National Planning Policy Guidance: Conserving and Enhancing the Historic Environment

- Standard and Guidance for Historic Environment Desk-Based Assessment, published by the Chartered Institute for Archaeologists (CIfA)[3];
- Historic England's Conservation Principles: Policies and Guidance for the Sustainable Management of the Historic Environment (published by English Heritage in 2008)4;
- Historic England's Historic Environment Good Practice Advice in Planning Note 2: Managing Significance in Decision Taking (2015)5;
- Historic England's Historic Environment Good Practice Advice in Planning Note 3: The Setting of Heritage Assets (2017)[6].

Sources of Information

8.2.2 In order to collect historic environment data for the purposes of this Chapter, a minimum 1km study area around the Application Site was adopted in the Heritage Baseline, as this area was considered to provide sufficient contextual information about the Application Site and its surrounding landscape, from which to assess the archaeological potential and potential impacts on the archaeological resource. This study area is shown on Figure 1 of **Appendix 8.1**.

8.2.3 The following sources of publicly available archaeological and historical information were consulted as part of the preparation of the Heritage Assessment (**Appendix 8.1**):

- National Heritage List for England for designated heritage assets, such as Listed Buildings and Scheduled Monuments;
- Historic England Archive (formerly known as AMIE) data for information on non-designated heritage assets;
- North Lincolnshire Historic Environment Record (HER) for records of archaeology and heritage sites, finds and events recorded within the study area;
- Online sources, including British Geological Survey (BGS) and additional historic mapping.

8.2.4 Recent investigative works at the Application Site have also contributed to the understanding of the archaeological potential, and will be referred to in this Chapter where appropriate. These works are outlined below, and full reports are available in **Appendices 8.2 – 8.4**.

8.2.5 A geophysical survey was undertaken at the Application Site in July - September 2018. This encompassed all accessible areas proposed for direct impact. The results of the survey will be referred to where appropriate in this Chapter. The full survey report is available in **Appendix 8.2**.

8.2.6 In addition, ground investigation works undertaken at the Application Site were subject to a watching brief in September 2018. Nineteen of a total 23 test pits were monitored. No features, deposits, or artefacts of archaeological interest were encountered during these works. The full watching brief report is available in **Appendix 8.3**.

[3] Chartered Institute for Archaeologists (2014) Standard and Guidance for Historic Environment Desk-Based Assessment, http://www.archaeologists.net/sites/default/files/CIfAS%26GDBA_3.pdf

[4] English Heritage (2008) Conservation Principles: Policies and Guidance for the Sustainable Management of the Historic Environment, English Heritage

[5] Historic England (2015) Historic Environment Good Practice Advice in Planning Note 2: Managing Significance in Decision Taking

[6] Historic England (2017) Historic Environment Good Practice Advice in Planning Note 3: The Setting of Heritage Assets (Second Edition)

8.2.7 Further, a 24.4% sample of the Application Site was subject to archaeological fieldwalking in September 2018. Of the 19kg of artefacts were recorded, only 3.6% were considered to be of archaeological interest and significance, including 11 prehistoric flint artefacts and 12th – 16th century pottery focussed in the south of the Application Site. A small assemblage of Roman material was also recorded in the north and south of the Application Site. The results of the fieldwalking will be referred to where appropriate in this Chapter. The full report is available in **Appendix 8.4**.

8.2.8 Further information with regard to the methodologies utilised for these works can be found in their respective appendices, as referred to above.

Settings Assessment

8.2.9 The document Historic Environment Good Practice Advice in Planning Guidance Note 3: The Setting of Heritage Assets[6] provides the key industry-standard guidance on setting and development management, including assessment of the implications of development proposals of the significance of heritage assets. In relation to development within the setting of a heritage asset, the guidance states that the protection of the setting of designated assets does not necessarily preclude change.

8.2.10 A staged approach is recommended for settings assessment as this has been utilised as part of the Heritage Assessment, which provides details of the methodologies used (**Appendix 8.1**). In summary, step 1 requires heritage assets which may be affected by development to be identified. Step 2 of the settings process includes an assessment whether, how and to what degree the setting makes a contribution to the significance of the heritage assets, with the assessment of the effect of a development of the significance of an asset carried out as part of Step 3.

Consultation

8.2.11 Tim Allen, Inspector of Ancient Monuments at Historic England, provided pre-application advice on 21 September 2018 (ref PA00875765). Mr Allen's comments state that he finds the Proposed Development to be acceptable, taking into account the lack of direct impact to Gokewell Priory. He also states that the in-direct impact to this asset is acceptable when considered against the direct impact of ongoing cultivation, provided that a case for public benefit can be made. No objection was made to the Proposed Development.

8.2.12 Alison Williams, Historic Environment Officer at North Lincolnshire Council, has been consulted on the Proposed Development plans and the archaeological investigation required at the Application Site. It was agreed during consultation that the land around Gokewell Priory would be exempt of any direct impact associated with the Proposed Development. The scope of work at the Application Site thus far (geophysical survey, fieldwalking, and a watching brief) was agreed in advance of the work, and likewise the scope for a forthcoming scheme of evaluation trenching has likewise been agreed.

8.2.13 This Chapter has been revised based on pre-application advice from Alison Williams, dated 13 September 2018.

8.3 ASSESSMENT OF SIGNIFICANCE

Assessment of Significance of Heritage Assets

8.3.1 Heritage assets are defined by 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. Heritage**

assets include designated heritage assets, and assets identified by the local planning authority (including local listing)".

8.3.2 Heritage significance is defined as the value of a heritage asset to this and future generations because of their heritage interest. That interest may be archaeological, architectural, artistic or historic in nature. The assessment of significance within this chapter has been guided primarily by the key industry-standard policies and guidance contained in Conservation Principles, where it is described with reference to the following four key forms of value:

- Evidential value is derived from the potential of a place to yield evidence about past human activity. It is primarily associated with the physical remains or the historic fabric of the heritage asset. This value is proportionate to the potential of the asset to contribute to the understanding of the past. When there are no written records, such physical remains, including archaeological deposits, may provide the only source of information about the past;
- Historical value derives from the ways in which past people, events and aspects of life can be connected through a site to the present. It can be illustrative or associative in attribution. The illustrative aspect relates to the ability of the asset to provide links and insights into past communities and their activities. The associative aspect derives from the association of the asset with a notable historic family, person, event or movement;
- Aesthetic value is derived from the ways in which people draw intellectual and sensory stimulation from a place. This value may have developed through conscious design or be the result of the fortuitous evolution of the place over time. This aspect may include the physical form of the asset as well as its location within the setting; and
- Communal value, which derives from the meaning of a place for the people who relate to it. The commemorative and symbolic aspects of this value reflect the meanings of a heritage asset for the people who draw part of their identity from it or have emotional links to it (such as memorials raised by community effort). The social aspect of this value is associated with places perceived as source of identity or distinctiveness and spiritual value is attached to places of worship.

8.3.3 Significance derives not only from a heritage asset's physical fabric, but also from its setting. The setting of a heritage asset is defined as the surroundings within which it is experienced; its extent is not fixed and may change as the asset and its surroundings evolve. However, setting is not a heritage asset in its own right, nor is it a heritage designation in its own right. Its importance lies in what it contributes to the significance of the heritage asset. This contribution may be positive, negative or neutral.

8.3.4 Paragraph 189 of the NPPF is clear in its recognition of the need for local planning authorities to require an applicant to describe the significance of any heritage assets affected, including any contribution made by their setting. It further states that local planning authorities should require a field evaluation in addition to an appropriate desk-based assessment, where proposals include or have the potential to include heritage assets of archaeological interest. It is also unequivocal on the matter of scope, as it mentions that the level of detail should be proportionate to the importance of the asset, and no more than sufficient to understand the potential impact of a development on that significance. The results of a forthcoming field evaluation at the Application Site will inform an addendum to this Chapter in due course, at which time an assessment of significance and potential impact to any assets of archaeological interest within the Application Site will be provided in line with paragraph 8.2.1.

8.3.5 The way in which heritage significance is expressed within this PEIR Chapter has been specifically developed, based on good practice, to ensure that it is fully aligned with

the Planning (Listed Buildings and Conservation Area) Act 1990[7], the NPPF and Historic England's Historic Environment Good Practice Advice in Planning Note 2: Managing Significance in Decision-Taking in the Historic Environment[8].

8.3.6 The statements of significance development for each of the assets reflect the language of the Planning Act 1990, utilising terms such as character and appearance (of Conservation Areas), and architectural and historic interest (of Listed Buildings). Further frames of reference, found within Conservation Principles, allow for terms such as 'evidential', 'historical', 'aesthetic' and 'communal' to be used to convey the many heritage values that combine to make up the heritage significance of an asset.

8.3.7 The statements of significance describe 'what matters and why', i.e. which aspects of an asset and its setting contribute to the heritage significance of the asset and how. Although the statements rightly acknowledge the fabric of heritage assets as representing the principal embodiment and physical manifestation of their heritage significance, the surroundings of the assets, and the ways in which they can be experienced, often contribute to their overall significance. This will be assessed in line with the settings assessment methodology (**Appendix 8.5**).

8.3.8 Although terms such as High, Medium or Low value, and National, Regional or Local importance are often adopted in EIA to express a summary description of the 'relative significance' heritage assets, they are not universally recognised or accepted terms within heritage sector guidance and amongst heritage professionals. This is because these concepts require complex definitions to properly allow for their application, and do not directly relate to the language or key tests required in determining planning applications or heritage consents.

8.3.9 The criteria adopted for this PEIR Chapter are laid out in **Table 8.1**, with terminology used derived directly from the NPPF. The language used in this PEIR Chapter is entirely consistent with the NPPF and the Planning Act 1990, and provides the decision-maker with sufficient information to understand how change could bring benefit or harm to the heritage significance of an asset(s), thus enabling an informed judgement to be reached.

Table 8.1: Criteria for Assessing the Significance of Heritage Assets

Heritage Significance	Description of Criteria
Designated heritage assets of the highest significance	As defined in the NPPF, these include: Scheduled Monuments, Protected Wreck Sites, Battlefields, Grade I and II* Listed Buildings, Grade I and II* Registered Parks and Gardens, and World Heritage Sites. Heritage assets displaying considerable evidential, historic, aesthetic or communal value, as identified by Conservation Principles, which are of comparable significance to designated heritage assets of the highest significance, would also fall within this category.
Designated heritage assets of less than the highest significance	In accordance with the NPPF, these include, by elimination, Grade II Listed Buildings, Conservation Areas and Grade II Registered Parks and Gardens.

[7] Planning (Listed Buildings and Conservation Areas) Act 1990 Act of UK Parliament

[8] Historic England (2015) Historic Environment Good Practice Advice in Planning Note 2: Managing Significance in Decision Taking

Heritage Significance	Description of Criteria
Non-designated heritage assets; significance confirmed	Heritage assets, the significance of which has been ascertained through sufficient evaluation and assessment.
Non-designated heritage assets; significance to be confirmed	Heritage assets the significance of which has not yet been ascertained through sufficient evaluation and assessment.
Negligible	Remains that have been sufficiently demonstrated to have no archaeological interest as defined in the NPPF Glossary.

Assessment of Development Effects

8.3.10 The methodology employed here moves away from the more traditional 'scalar', quantitative, matrix-led approach, adopting a descriptive, qualitative presentation of the findings of the assessment. This is because the descriptions of anticipated development impacts upon heritage assets are qualitative rather than quantitative and the adopted approach allows for greater accuracy in understanding the potential harm the proposed development may cause to the significance of heritage assets. As with the approach adopted in assessing heritage significance of heritage assets, this approach directly reflects key concepts in planning policy and heritage guidance with regard to the assessment of development effects upon heritage assets. It therefore offers an appropriate way to define such effects. Clear statements of significance (the 'what matters and why' approach), and a sound understanding of the character of the proposed development, as presented in this assessment methodology, allow for a transparent articulation of the nature/degree of any identified effects.

8.3.11 The effects of the Proposed Development arise as a result of change to the heritage assets. The significance of a heritage asset can be harmed or lost through alteration, destruction or development within its setting. In terms of harm though changes to setting, as clearly illustrated within the NPPF, any attempt to convey the impact or harm of a development has to be framed within the tightly-defined parameters of harm to the significance of the heritage asset itself. This is a fundamental principle. In summary, a project could bring about change within the setting of a heritage asset, resulting in harm to its significance, or the way in which that significance is experienced. References such as 'harm to setting' are therefore avoided.

8.3.12 The assessment of the effect of the development upon cultural heritage resource takes into account numerous factors, including the scale of development, the type and extent of physical disturbance and the visual effects. The development effects may be:

- Direct or indirect. Direct effects arise from physical change to the resource, which affects its physical remains or fabric (i.e. excavations which may affect the archaeological remains or alterations to historic buildings). Indirect effects relate to changes within the setting of heritage assets;
- Permanent or temporary. Due to their character, direct effects upon the physical remains of heritage assets are permanent, and not reversible. However, effects on the settings of heritage assets may be temporary, if the development has a limited lifespan. These temporary effects can be short, medium or long-term.
- Beneficial, when the development leads to the enhancement of the heritage resource, or adverse, when it results in harm to, or loss of, the significance of a heritage asset. If the resource will not be affected by the proposed development, there will be no impact.

8.3.13 To further assist in the decision-making process, the following approach to the assessment of effects upon heritage assets (Table 7.2) is adopted. This has been done in

order to improve the intelligibility of the assessment results for purposes of quick reference and ready comprehension. The language used here is entirely consistent with the NPPF and the Planning Act 1990, and provides sufficient information to reach informed judgement.

Table 8.2: Magnitude of Effect upon Heritage Assets

Level of Effect	Description	Applicable Policies
Heritage Benefit	The proposals would enhance the heritage significance of a heritage asset.	Enhancing the significance of a heritage asset is a desirable development outcome in respect of heritage. It is consistent with key policy and guidance, including the NPPF paragraphs 185, 192 and 200.
No harm (neutral effect)	The proposals would preserve the significance of a heritage asset.	Preserving a Listed Building and its setting is consistent with Section 66 of the Planning (Listed Buildings and Conservation Areas) Act 1990. Preserving or enhancing the character or appearance of a Conservation Area is consistent with Section 72 of the Act. Sustaining the significance of a heritage asset is consistent with paragraph 185 of the NPPF and should be at the core of any material local planning policies in respect of heritage.
Less than Substantial Harm	The proposals would result in a restricted level of harm to the significance of a heritage asset, such that the asset's contributing heritage values would be largely preserved (lower end). The proposals would lead to a notable level of harm to the significance of a heritage asset. A reduced, but appreciable, degree of its heritage significance would remain (upper end).	In accordance with the NPPF, in determining an application, this level of harm upon designated heritage assets (or assets of equivalent significance) should be weighed against the public benefits of the proposals (paragraph 196). Proposals involving change to a Listed Building or its setting, or any features of special architectural or historic interest which it possesses, or change to the character or appearance of Conservation Areas, must also be considered within the context of the Planning Act 1990. Paragraph 197 of the NPPF states that the in determining planning application, the effects of the proposed development on the significance of non-designated heritage assets needs to be taken into account. A balanced judgement is required to weigh direct or indirect impacts on non-designated assets, having regard for the scale of harm and the significance of the asset.
Substantial Harm	The proposals would very much reduce the heritage	Paragraphs 193, 194 and 195 of the NPPF state that substantial harm or loss to designated heritage assets of the

Level of Effect	Description	Applicable Policies
	asset's significance or vitiate that significance altogether.	highest significance should be wholly exceptional (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) and to assets of less than highest significance (grade II Listed Buildings, or grade II Registered Parks or Gardens) – exceptional. Proposed development leading to such harm to designated heritage assets should be refused unless it is demonstrated that this substantial harm is necessary to achieve substantial public benefits. The effects of the proposed development on the significance of non-designated heritage assets will require a balanced judgement to weigh direct or indirect impacts on non-designated assets, having regard for the scale of harm and the significance of the asset (paragraph 197).

8.3.14 In line with EIA best practice, it is considered that 'substantial harm' to designated heritage asset would equate to a significant adverse effect in line with the language used within the Town and Country Planning (Environmental Impact Assessment) Regulations 2011 (as amended 2015). 'Less than substantial harm' to designated heritage assets could also trigger the same significant effect, but no prescriptive criteria are proposed to prejudge this threshold, leaving it to professional judgement. With regard to the harm to non-designated assets, professional judgment will be used to ascertain whether the significant effect is triggered, taking into account the relative significance of such assets as well as the level of harm upon them.

Mitigation Measures and Residual Effects

8.3.15 When effects upon the cultural heritage resource have been identified, mitigation measures are proposed in order to prevent, reduce or offset any significant effects. It may also be possible to enhance heritage assets as part of the development. In such circumstances, the weight given to the heritage values of the asset should be proportionate to the significance of the asset and the development effect upon it. In order to assess residual effects following the implementation of the mitigation measures upon the significance of heritage assets, professional judgement is used.

8.4 LEGISLATIVE AND POLICY FRAMEWORK

8.4.1 The key legislative and policy documents are summarised below, with further details provided in **Appendix 8.5**.

Planning (Listed Buildings and Conservation Areas) Act 1990

8.4.2 The Planning (Listed Buildings and Conservation Areas) Act 1990[9] states that "**in considering whether to grant planning permission 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 that it possesses**" (Section 66).

National Planning Policy Framework (NPPF)

8.4.3 The principal national guidance on the importance, management and safeguarding of the historic environment recourse within the planning process in the NPPF Section 16: Conserving and enhancing the historic environment[10]. The aim of this section is to ensure that Local Planning Authorities (LPA), developers and owners of heritage assets adopt a holistic and consistent approach to conserving the historic environment.

8.4.4 Heritage assets include designated and non-designated sites, and policies within the NPPF relate to both the treatment of heritage assets themselves, and of their settings, both of which are a material consideration in development decision making.

8.4.5 LPA are urged to request applicants to describe the significance of any heritage assets affected by a proposed development, including any contribution made to significance by their setting. The level of detail required in the assessment should be proportionate to the importance of the assets, and no more than sufficient to understand the potential effects of the proposal on their significance.

8.4.6 The key tenets of the NPPF are:

- when considering the effect of a development on the significance of a designated heritage asset, great weight should be given to the asset's conservation. The more important the asset, the greater the weight should be (Paragraph 193);
- significance can be harmed or lost through alteration or destruction of the heritage asset or development within its setting. As heritage assets are irreplaceable, any harm or loss should require clear and convincing justification. Substantial harm to, or loss of, a Grade II listed building, park or garden should be exceptional. Substantial harm to, or loss of, designated heritage assets of the highest significance, should be wholly exceptional (Paragraph 194);
- where a proposed development 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 (Paragraph 196); and
- with regard to non-designated heritage assets, a balanced judgement will be required having due regard to the scale of any harm or loss, and to the significance of the heritage asset affected (Paragraph 197).

Overarching National Policy Statement for Energy (EN-1)

8.4.7 Section 5.8 of the Overarching National Policy Statement for Energy (EN-1) states that 'the construction, operation and decommissioning of energy infrastructure has the potential to result in adverse impacts on the historic environment' (Paragraph 5.8.1). It then continues to define heritage assets, how the potential impact of development should be assessed, and how this should be regarded in decision making, before detailing why and how to record heritage assets in advance of development. The general principles of the Policy in section 5.8 broadly reflect those of the NPPF, as above.

[9] Planning (Listed Buildings and Conservation Areas) Act 1990 Act of UK Parliament

[10] Ministry of Housing, Communities and Local Government (2018) National Planning Policy Framework

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

8.4.8 Further policy on impact assessment principles is provided in EN-3. Paragraph 2.5.33 states that in sites with national designations, 'consent for renewable energy projects should only be granted where it can be demonstrated that the objectives of designation of the area will not be compromised by the development, and any significant adverse effects on the qualities for which the area has been designated are clearly outweighed by the environmental, social and economic benefits.

8.4.9 Paragraph 2.5.34 describes how any impact to the historic environment (as set out in section 5.8 of EN-1) should be weighed against the 'positive role that large-scale renewable projects play in the mitigation of climate change, the delivery of energy security and the urgency of meeting the national targets for renewable energy supply and emissions reductions'.

Local Planning Policy

8.4.10 The Application Site is located within North Lincolnshire Council. Although in the process of being replaced by the Local Development Framework, the North Lincolnshire Local Plan (adopted in March 2003)[11] comprises the primary planning policy document against which planning proposals within the LPA are currently assessed. Those policies which are relevant to heritage include:

- Policy HE5: Development affecting Listed Buildings;
- Policy HE8: Ancient Monuments; and
- Policy HE9: Archaeological Evaluation.

8.5 SCOPING CRITERIA

8.5.1 Prior to the preparation of this PEIR Chapter, a Heritage Assessment (**Appendix 8.1**) was undertaken, which identified the cultural heritage resource receptors that may be sensitive to the Proposed Development and as such need to be considered (scoped in) within the ES. As a consequence, the Cultural Heritage Chapter considers the following potential effects:

- Construction Phase – buried archaeological remains;
- Operational Phase – potential effects on designated heritage assets through development within their setting; and
- De-Commissioning Phase - buried archaeological remains.

8.6 LIMITATIONS TO THE ASSESSMENT

8.6.1 This assessment work is principally based on a desk-based study and utilised secondary information derived from a variety of sources, only some of which have been directly examined for the purpose of this assessment. The assumption is made that this data, as well as that derived from other secondary sources, is reasonably accurate. The records held by the HER and Historic England are not a record of all surviving heritage assets, but a record of the discovery of a wide range of archaeological and historical components of the historic environment. The information held within it is not complete and does not preclude the subsequent discovery of further elements of the historic environment that are, at present, unknown.

8.6.2 At present, the process of understanding of the archaeological potential within the Application Site is ongoing. A field evaluation will be undertaken at the Application Site in

[11] North Lincolnshire Local Plan http://www.northlincs.gov.uk/planning-and-environment/planning-policy/local-plan/north-lincolnshire-local-plan/#

accordance with NPPF 198 and Local Plan policies CS6 and HE9. The results of the evaluation will be provided as an addendum to this Chapter, and will inform an updated assessment of significance and impact.

8.7 BASELINE CONDITIONS

Site Description and Context

8.7.1 This section of the PEIR Chapter presents a summary of the historical and archaeological background of the Application Site, based on the Heritage Assessment (**Appendix 8.1**) and previous archaeological works. Heritage assets discussed below are illustrated on Figures 1, 2 and 3 of **Appendix 8.1**.

8.7.2 The Application Site is located on an area of multiple bands of differing mudstone and limestone bedrock running in a north-south alignment comprising Charmouth Mudstone, Marlstone Rock Formation, Whitby Mudstone, Grantham Formation, Lower Lincolnshire Limestone and Kirton Cementstone Beds. Superficial deposits of the Sutton Sand Formation are recorded sporadically across the Application Site.

8.7.3 The Application Site is located on the western face of a north south aligned ridge which extends from High Santon to Sawton. The eastern extent of the Application Site is located upon the high point of the ridge at a height of c 60m aOD sloping downwards to c 25m aOD at the western boundary.

Baseline Survey Information

Prehistoric and Romano-British

8.7.4 The North Lincolnshire HER records three prehistoric features within the Application Site, a possible round barrow, a section of the prehistoric route corridor known as the Jurassic Way, and a collection of flints discovered prior to 1976, but with an uncertain provenance (**Appendix 8.1**: Figure 2, MLS22718, MLS20003 and MLS6695). The geophysical survey identified an apparent ring ditch in the east of the Application Site, although it did not corelate to the recorded position of the round barrow recorded by the HER and is likely to represent a different feature (**Appendix 8.2**).

8.7.5 The fieldwalking within the Application Site (**Appendix 8.4**) led to the recovery of 11 pieces of Neolithic or Bronze Age worked flint, the majority of which were recorded in the south of the Application Site.

8.7.6 In addition to the recorded prehistoric features from within the Application Site, prehistoric material has been recovered from the wider study area, comprising worked flint and sherds of pottery recovered to the south east of the Application Site (**Appendix 8.1**: Figure 2, MLS7556, MLS7563, MLS1822, MLS22657 and MLS1818).

8.7.7 The only evidence of possible Roman activity within the Application Site comprises of a very small assemblage of Roman material recovered during the fieldwalking (**Appendix 8.4**). This comprised local greyware pottery in the north and south of the Application Site, and a very small collection of possible Roman ceramic building material in the south-central area of the Application Site.

8.7.8 Beyond the Application Site, the route of Ermine Street, a major Roman road, runs from north to south to the east of the Application Site (**Appendix 8.1**: Figure 2, MLS100). Within the wider study area, fieldwalking and archaeological investigations have identified areas of Roman activity centred in particular around Raventhorpe to the south (**Appendix 8.1**: Figure 2, MLS26070, MLS26071, MLS26072 and MLS1819).

Early Medieval and Medieval

8.7.9 The fieldwalking within the Application Site (**Appendix 8.4**) recovered 35 sherds of 12th to 16th century pottery. These were largely focussed in the south of the Site, although some were recorded immediately to the south of Gokewell Priory. This priory was a small Cistercian nunnery founded in the 12th century and dissolved following the Dissolution of the Monasteries in 1536 (**Appendix 8.1**: Figure 2, MLS1805). The site of the priory later formed the location for Gokewell Priory Farm, with material from the Priory reused in the farm buildings. Archaeological works undertaken in the 1970s in relation to the Priory Farm, during which earthworks to the south and west of the farm were recorded, included a photographic record of the farm area (**Appendix 8.1**: Figure 3, ELS4211 and ELS2566).

8.7.10 The deserted medieval village of Manby (**Appendix 8.1**: Figure 2, MLS1806), which has its origins in the early medieval period, is located to the south of the Application Site and the possible remnants of ridge and furrow, which extend into the southern area of the Application Site, are likely to represent the open fields of the village during this period. Further south, the Scheduled Monument of Raventhorpe (**Appendix 8.1**: Figure 1) is another example of a deserted medieval village which has its origins in the early medieval period.

Post Medieval and Modern

8.7.11 Following the dissolution of Gokewell Priory, the material was reused to create Gokewell Priory Farm (**Appendix 8.1**: Figure 2, MLS1027 and MLS25419), also labelled as Cokewell on mapping. The exact date of construction is unknown but it was certainly constructed by the early 19th century, as is demonstrated by its depiction on the 1842 Tithe Map (**Appendix 8.1**: Plate 18). The Tithe Map and apportionment illustrate that Gokewell Priory Farm was the only area of development within the Application Site during the post-medieval period, the remaining areas under a mixture of arable and pasture agricultural use.

8.7.12 Late 19th and 20th century Ordnance Survey mapping shows the Application Site to have remained undeveloped although the HER records the site of a World War II Heavy Anti-Aircraft Battery as being located within the eastern area of the Application Site (**Appendix 8.1**: Figure 2, MLS21408).

8.7.13 Gokewell Priory Farm was demolished in the 1980s and the site cleared. The Application Site has since been used almost exclusively for arable cultivation.

8.7.14 The geophysical survey undertaken at the Application Site (**Appendix 8.2**) identified a number of former field boundaries, which correspond with boundaries shown on historic Ordnance Survey maps.

Undated

8.7.15 The Heritage Assessment also records a number of potential archaeological features of uncertain date within the Application Site. These comprise two possible medieval stock enclosures in the southern extent of the Application Site (**Appendix 8.1**: Figure 2, MLS21941 and MLS21943) and an incomplete ovoid ditch within the north western area (**Appendix 8.1**: Figure 2, MLS22780), which may be associated with the plantation of woodland to commemorate Queen Victoria in the late 19th century.

8.7.16 The geophysical survey (**Appendix 8.2**) identified a number of potential undated heritage assets, including possible linear ditches in the north-east, south-west, and south-east, and possible former field boundaries (not shown on any available historic maps) in the centre and south-west of the Application Site. Undated evidence of ploughing has also been identified throughout the Application Site.

The Setting of Heritage Assets

Summary of Designated Heritage Assets

8.7.17 Designated heritage assets within 2km of the Application Site include the Scheduled Monument of Raventhorpe medieval settlement, the Grade I Listed Church of St Mary Broughton and ten Grade II Listed Buildings located to the north, east and south of the Application Site (**Appendix 8.1**: Figure 1). The closest assets to the Application Site comprise two Grade II Listed Buildings, Springwood Cottage and barn located c 650m to the north east of the Application Site and Raventhorpe House (a Grade II Listed Building) and the Scheduled Monument of Raventhorpe medieval village, both located c 870m to the south of the Application Site.

8.7.18 The walkover survey carried out as part of the Heritage Assessment has established that there would no non-physical effects on any of the designated heritage assets located within the environs of the Site. The Heritage Assessment concluded that the Application Site does not form part of the setting of any of the heritage assets which contribute to their significance, nor is there any intervisibility between the Application Site and any of the assets due to the distance, topography and tree cover. The Proposed Development will therefore not result in any change that will cause harm to the setting of any of the heritage assets, and as such the proposals are considered to be in accordance with statutory requirements.

8.7.19 The detailed settings assessment, the conclusions of which have been summarised within this PEIR Chapter, is included within the Heritage Assessment (**Appendix 8.1**; chapter 7).

Summary of Non-Designated Heritage Assets

8.7.20 The site of the former medieval Gokewell Priory (Appendix 8.1: Figure 2, MLS1805) is located within the northern area of the Application Site, although this asset, and a buffer area, is not proposed for development. The remains of the priory comprise above-ground remnant earthworks and potential below-ground archaeological remains, and this asset principally derives its significance from the archaeological interest and evidential value of said remains.

8.7.21 Some of the potential archaeological features identified in the results of geophysical survey (**Appendix 8.2**) may not be subject to direct impact as a result of the proposed development, but may be susceptible to in-direct development effects. However, an impact assessment cannot be taken forward until more information becomes available as a result of further work at the Application Site; the results of the forthcoming archaeological evaluation will allow for a better understanding of the significance of these potential features, which is essential to assessing the potential in-direct impact.

Assets Scoped Out of the Settings Assessment

8.7.22 It was determined that there would be no in-direct harm to the significance of any other non-designated heritage assets as a result of the proposed development. With reference to the Historic Environment Good Practice Advice in Planning Guidance Note 3: The Setting of Heritage Assets[6]: 'Heritage assets that comprise only buried remains may not be readily appreciated by a casual observer. They nonetheless retain a presence in the landscape and, like other heritage assets, **may** have a setting' (our emphasis). The guidance also makes it clear that change within the landscape around a particular asset '….is likely to affect the contribution made by setting to the significance of the heritage asset.' It also makes it clear that for buried archaeology one of the key considerations is the history of the landscape within which they sit; 'the long-term continuity in the use of

the land that surrounds them.' In this case, most of the non-designated heritage assets of archaeological interest surrounding the Site have no surface presence and nonetheless, the landscape within which they are present has been fundamentally changed over time. As such, it can be concluded that setting makes no contribution to the significance on the non-designated heritage assets of archaeological interest within or close to the Application Site.

Significance of Identified Sensitive Receptors

8.7.23 The following section discusses the heritage significance of potential sensitive cultural heritage receptors with regard to the Proposed Development. This is also summarised in **Table 8.4**, below.

Known and Potential Archaeological Remains

8.7.24 The assessment of significance is informed by the results of the Heritage Assessment (**Appendix 8.1**). It should be noted that whilst the Heritage Assessment recorded a number of potential archaeological features within the Application Site, there remains the potential for further hitherto unidentified remains to be present. As it is not possible to ascertain the heritage significance of any potential assets without any investigations, the significance of any such feature remains uncertain. However, any such remains, based on the known archaeological potential of the Application Site, would unlikely be of highest significance and would most probably comprise non-designated heritage assets.

8.7.25 However, following the forthcoming results of field evaluation at the Application Site, it is thought that there is a limited potential for any further undiscovered archaeological remains to be present.

Cropmarks of a round barrow – prehistoric date

8.7.26 The possible remains of a prehistoric round barrow have been identified within the central area of the Application Site as cropmarks seen on aerial photographs. There were no upstanding physical remains identified within the Site visit, nor have there been any archaeological investigations undertaken to ground truth this feature. However, archaeological remains associated with this asset are likely to be present within the location specified by the HER, and further such remains may also be present within the Application Site. A possible ring ditch was identified in the results of the geophysical survey (**Appendix 8.2**), although no such evidence was recorded at the suggested location of the cropmark.

8.7.27 These features would be of evidential and historical (illustrative) value in their contribution towards our understanding of the nature and extent of prehistoric activity within the local landscape and would constitute non-designated heritage assets of archaeological interest.

Artefact scatters – prehistoric date

8.7.28 The results of the archaeological fieldwalking at the Application Site (**Appendix 8.4**) show that there is a potential for the recovery of prehistoric artefacts. However, these are not expected to be in situ. The chance finds of isolated artefacts, whilst indicating a presence within the wider area, are of limited evidential value, and would be of limited archaeological significance.

Jurassic Way Trackway – prehistoric date

8.7.29 The line of the prehistoric Jurassic Way trackway from Lincoln to Winteringham has been conjectured as passing through the Application Site. The location of the Site upon the high ground of a natural ridgeway does suggest a suitable location for an early route of movement but its alignment through the Application Site is conjectural and there is a very limited potential for archaeological remains associated with the route to remain in situ. However, if remains were to be encountered they would be of archaeological interest.

Agricultural remains associated with Manby DMV

8.7.30 Ridge and furrow earthworks have been identified within the south of the Application Site although there were no upstanding remains identified during the Site visit. Modern agricultural ploughing techniques are likely to have removed any upstanding earthworks associated with these features, although archaeological remains may survive beneath the plough soil. The ridge and furrow are believed to be associated with the deserted medieval village of Manby to the south, but the presence of tree cover along the southern boundary of the Application Site provides a tangible barrier between the DMV and the ridge and furrow remains.

8.7.31 The majority of the Application Site was depicted as agricultural land on the Tithe Map and the whole Application Site has the potential to contain early medieval – modern agricultural remains, such as infilled boundary and drainage ditches or infilled furrows relating to further areas of ridge and furrow cultivation.

8.7.32 It is likely that any archaeological remains associated with the ridge and furrow may survive within the Application Site. Such remains have little potential to contribute towards our understanding of medieval and post-medieval farming practices and would at most comprise non-designated heritage assets of limited archaeological interest.

Cistercian Priory and Gokewell Priory Farm – medieval /post-medieval date

8.7.33 The site of a Cistercian priory is documented as lying beneath the remains of Gokewell Priory Farm, limited upstanding remains of which are visible within the Application Site. Whilst the later farm buildings reused the architectural fabric of the priory, leaving no original upstanding remains, it is likely that archaeological remains associated with the earlier priory survive within the area of the farm.

8.7.34 The heritage significance of such remains associated with early medieval activity would derive from their evidential and historic values contributing towards our understanding of ecclesiastical land use during the early medieval and medieval periods. Whilst such remains would be of heritage significance, they are unlikely to be of sufficient archaeological interest to comprise heritage assets of the highest significance and would constitute non-designated heritage assets of archaeological interest.

8.7.35 The Heritage Assessment (**Appendix 8.1**) concluded that the present agricultural setting of Gokewell Priory, makes contribution to its illustrative historical value (discussed below).

Artefact scatters – medieval – post-medieval date

8.7.36 Archaeological fieldwalking at the Application Site (**Appendix 8.4**) identified a small amount of 12th to 16th century pottery. This was focussed in the south of the Application Site, with some directly south of Gokewell Priory. However, it is expected that these artefacts would have been dispersed from their original location through centuries of agricultural activity within the Application Site, and these are not expected to be of great archaeological interest.

Heavy Anti-Aircraft Battery – modern date

8.7.37 The site of a heavy anti-aircraft battery has been recorded in documentary sources as being located within the eastern area of the Application Site. There is no upstanding evidence to identify the location of the asset, although large pieces of concrete seen within the plough soil may be associated with the structure. Archaeological remains associated with the military use of the Application Site would be unlikely to be of more than local significance.

Unidentified cropmarks and earthworks – uncertain date

8.7.38 Aerial photographs and Lidar analysis have identified three possibly archaeological features within the western and south-western area of the Application Site. The exact nature and date of these features remains uncertain, although their form and location suggest possible medieval enclosures, which would suggest them to be of evidential and historical (illustrative) value in their contribution towards our understanding of the nature and extent of activity within the local landscape. If these features are representative of archaeological remains, regardless of date or function, they would most likely constitute non-designated heritage assets of archaeological interest.

Geophysical survey anomalies

8.7.39 A number of potential archaeological features have been identified in the results of a geophysical survey undertaken at the Application Site (**Appendix 8.2**). Additional potential archaeological features identified include linear ditches, former field boundaries (some of which are shown on historic maps), and plough marks. The significance of these potential features is yet to be confirmed, but based on their form in the survey results, they are not anticipated to be of the highest significance.

Designated Heritage Assets

8.7.40 As outlined above, the Proposed Development of the Application Site is not deemed likely to impact on the settings of any designated assets to an extent that it alters the significance of the asset and as such there are no identified designated sensitive receptors. Full details are included within the Heritage Assessment (**Appendix 8.1**).

8.8 ASSESSMENT OF LIKELY SIGNIFICANT EFFECTS

Identification of the Effects of the Proposed Development

Construction Phase Effects

8.8.1 The physical effects of the Proposed Development upon the known and as yet unidentified archaeological resource (to be confirmed following field evaluation) would primarily result from groundworks associated with the construction of the Proposed Development, which might include:

- Any preconstruction ground investigation works;
- Installation of the solar panel modules/mounting system structures;
- Excavation of any service trenches; and
- Any stripping and excavations associated with the creation of the battery storage area and substantial area.

8.8.2 Whilst there may be some temporary impacts during the construction phase upon the designated heritage assets (i.e. scaffolding; movement of machinery), these impacts will be relatively limited and temporary when compared with the completed development and therefore it was considered that the discussion of impacts upon designated heritage assets should refer to the Proposed Development in its Operation Phase.

8.8.3 Development Plans do not propose any modules within the area occupied by the remains of the Priory Farm and as such there should be no impact on any in situ remains associated with the medieval priory.

Any effects to potential archaeological features identified in the results of the geophysical survey will be assessed following the completion of the forthcoming trench evaluation. The results of the evaluation will provide further information on these potential assets, which will allow an informed assessment of significance and a detailed assessment of construction phase effects to be undertaken. This assessment will be provided as an addendum to this Chapter in due course.

Operation Phase Effects

8.8.4 No additional direct impacts upon the buried archaeological remains are anticipated following the completion of the Proposed Development. As such, these receptors are scoped out of discussion as part of the Operation Phase.

8.8.5 The Heritage Assessment (**Appendix 8.1**) also concluded that the present agricultural setting of Gokewell Priory, while modern in character, is considered to make a moderate contribution to its illustrative historical value by enabling its former location within an agricultural landscape to be appreciated. However, the introduction of the Proposed Development is not considered likely to result in a significant adverse effect overall.

8.8.6 With regard the potential non-physical effects upon heritage assets, it has been demonstrated within the Heritage Statement (**Appendix 8.1**) that the Proposed Development will not introduce change into the wider environs of any known heritage assets, such that their setting would change to the degree that it impacts upon their significance.

De-Commissioning Phase Effects

8.8.7 The methodology for removing the mounting system structures is provided in the De-Commissioning Statement. This will involve vibrating the post and lifting it at the same time using a post removal tool attached to a small tracked excavator. Likewise, trenches excavated for the insertion of cabling will be re-cut to the same parameters as in the construction phase. This is expected to result in little or no additional impact to any buried archaeological resource subsequent to the impacts of the construction phase.

8.8.8 As per the construction phase, there may be some temporary in-direct impact to heritage assets susceptible to in-direct impact. Likewise, these impacts will be relatively limited and temporary when compared with the lifespan of the solar farm.

Evaluation of Identified Effects

Construction

8.8.9 The effects of the Proposed Development upon the known and potential archaeological resource within the Application Site would be direct, permanent, irreversible and adverse and are likely to result in complete or partial loss of heritage significance of any potential buried archaeological features or deposits.

8.8.10 As a result of the construction activities, the archaeological remains are likely to be removed. Within the footprint of the Proposed Development, this includes a number of known and potential non-designated heritage assets of archaeological interest. This includes the HER record of a prehistoric round barrow and trackway, and a modern military

feature, and potential previously unrecorded archaeological remains of uncertain significance identified in the results of geophysical survey. The site of the medieval priory is not proposed for development.

8.8.11 The construction activities would lead to harm or total loss of significance of these non-designated heritage assets and without the implementation of appropriate mitigation, this would result in a Significant Adverse Effect.

Operation

8.8.12 As described above, it has been established in the Heritage Assessment (**Appendix 8.1**) that the Proposed Development would not affect the significance of any heritage assets within the environs of the Application Site and as such there would be no development effects upon these assets (Neutral Effects).

8.9 MITIGATION AND ENHANCEMENT

8.9.1 Where significant effects are anticipated, mitigation may be necessary to adequately address these effects, in order to reduce or offset the harm (effect on) to the importance (significance) of non-designated heritage assets.

8.9.2 The NPPF makes the following provisions in respect of impacts to the significance of non-designated heritage assets: "**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**" (Paragraph 197). It also states that local councils should "**require developers to record and advance understanding of the significance of any heritage assets to be lost (wholly or in part) in a manner proportionate to their importance and the impact**" (Paragraph 200).

Mitigation by Design

8.9.3 The Heritage Assessment (**Appendix 8.1**) has established that the Proposed Development would not lead to harm to any heritage assets located in the vicinity of the Application Site (Neutral Effect) and no further mitigation with regard to these assets is required (either by design or as additional mitigation).

Additional Mitigation

8.9.4 The impacts upon the archaeological remains, which may lead to substantial effects, would occur during the construction phase and therefore any mitigation considered necessary would be implemented prior to or during this phase of development.

8.9.5 The avoidance of any direct impact to Gokewell Priory represents consideration for mitigation by design at an early stage. As no concentrations of potentially highly significant archaeological remains have been identified (i.e. remains of significance commensurate with designated heritage assets of highest significance) within the Application Site, it is considered that mitigation through preservation in situ would not be required for any additional assets. Thus, any damage to the archaeological resource resulting from construction could be satisfactorily mitigated by preservation by record.

8.9.6 A proportionate programme of archaeological survey and mitigation, by means of field investigation and recording, would be agreed in liaison with the archaeological advisor to the LPA. In order to fully understand the significance of archaeological remains that

may be affected, a programme of archaeological evaluation is ongoing and the results of this work, which will be provided as an addendum, will inform the scope of the appropriate and proportionate mitigation strategy.

8.9.7 Following this, an appropriate and proportionate mitigation strategy would be determined in consultation with the archaeological advisor, and if appropriate, could be implemented as a condition of an approved planning application. Such mitigation strategies, proportionate to the significance of the individual assets affected, will ensure that they are subject to preservation by record at an appropriate stage in the development process. This will partially offset their loss through the knowledge gained through the investigations. For the archaeological remains the mitigation may include, as appropriate, excavation, strip map and sample investigation, or archaeological monitoring of ground works during construction (known as a watching brief), with appropriate post-excavation analysis and dissemination of results.

8.9.8 The mitigation strategies discussed above will partially offset the loss of the archaeological resource through the knowledge gained in the course of the investigations. This will, to an extent, reduce the effects on archaeological remains.

Table 8.3: Mitigation

Ref	Measure to avoid, reduce or manage any adverse effects and/or to deliver beneficial effects	How measure would be secured		
		By Design	By S.106	By Condition
1	Non-designated heritage assets subject to direct impact			X

Enhancements

8.9.9 An additional benefit offered by archaeological works may be implemented following the investigations, including the promotion of local history in schools and local communities, and the enhancement of the public's understanding of past activities in their local area through appropriate signage, interpretation, exhibitions and/or talks.

8.10 CUMULATIVE AND IN-COMBINATION EFFECTS

8.10.1 The only potential consideration in terms of any cumulative effects to heritage assets as a result of the Proposed Development comprises of the 80ha solar farm at Ravensthorpe. However, taking into consideration the mitigation measures associated with both developments, there are no anticipated Significant Adverse Effects to cultural heritage resulting from cumulative effects.

8.11 SUMMARY

Introduction

8.11.1 This Chapter has considered the likely significant effects of the Proposed Development upon the cultural heritage resource, including buried archaeological remains within the Application Site and heritage assets (including Scheduled Monuments and Listed Buildings) located within the Application Site's environs. It has been established that subject to appropriate mitigation being implemented, the Proposed Development would not result in significant adverse effects upon the cultural heritage resource within the Application Site and in its surroundings.

Baseline Conditions

8.11.2 The heritage resource which has been considered within this Chapter includes the known and potential buried archaeological remains which may be affected as part of the construction stage and heritage assets, located within and in the environs of the Application Site, which could potentially be affected as a result of change within the settings of these assets introduced following the completion of the Proposed Development.

Likely Significant Effects

8.11.3 It has been established that the Proposed Development has the potential to affect known archaeological remains associated with possible prehistoric and medieval archaeological remains as well as potential previously unrecorded archaeological remains. The excavation of cable trenches and building foundations, the insertion of new roads, and inserting/removing the mounting system structures (and any associated landscaping or services) have the potential to truncate or totally remove the archaeological remains within their footprint. Such effects would result in harm to or total loss of significance of these buried archaeological features, leading to a Significant Adverse Effect.

Mitigation and Enhancement

8.11.4 It has been established that the Proposed Development would not lead to harm to any heritage assets located in the vicinity of the Application Site, including the Scheduled Raventhorpe deserted medieval village, and no further mitigation with regard to these assets is required (Neutral Effect). Likewise, there are not anticipated to be any significant effects to Gokewell Priory as a result of the proposed development within its setting.

8.11.5 The Proposed Development has the potential to affect potential archaeological remains associated with prehistoric activity, the remains of a military feature and potential previously unrecorded archaeological remains. However, there will be no direct impact to Gokewell Priory given that the Proposed Development excludes this area from development. The results of a forthcoming field evaluation will provide further information on the presence and significance of heritage assets within the Application Site. Based on present knowledge, it is not anticipated that any remains would be of the highest heritage significance, such that preservation in situ would be required. It is expected that any potential harm to the non-designated heritage assets present could be satisfactorily mitigated by preservation by record.

Conclusion

8.11.6 The Proposed Development at the Application Site, if the mitigation measures identified are implemented, is considered acceptable and there would be no adverse significant residual effects. The results of a forthcoming archaeological trench evaluation within the Application Site are expected to further support this conclusion. There would be no harm to the heritage assets in the vicinity of the Application Site and harm to archaeological remains within the Application Site can be adequately mitigated by way of preservation by record.

8.11.7 **Table 8.4** provides a summary of effects, mitigation and residual effects.

Table 8.4: Summary of Effects, Mitigation and Residual Effects.

Receptor / Receiving Environment	Description of Effect	Nature of Effect *	Sensitivity Value **	Magnitude of Effect **	Geographical Importance ***	Significance of Effects ****	Mitigation / Enhancement Measures	Residual Effects ****
Construction								
Non-designated heritage assets; significance to be confirmed	TBC	Permanent						
Operation								
Raventhorpe medieval settlement	In-direct	Temporary	Not Applicable	Not Applicable	National	None	Not Applicable	Not Applicable
Listed Buildings within 2km	In-direct	Temporary	Not Applicable	Not Applicable	National	None	Not Applicable	Not Applicable
Gokewell Priory	In-direct	Temporary	Not Applicable	Not Applicable	County or National (depending on below-ground remains)	Minor adverse	Promote site history in local area Provide interpretations boards/exhibitions	Negligible
De-Commissioning								
Not Applicable								
Cumulative and In-combination								
Not Applicable								

Notes:

* Enter either: Permanent or Temporary / Direct or Indirect
** Only enter a value where a sensitivity v magnitude effects has been used – otherwise 'Not Applicable'
*** Enter either: International, European, United Kingdom, Regional, County, Borough/District or Local
**** Enter either: Major / Moderate / Minor / Negligible AND state whether Beneficial or Adverse (unless negligible)

LITTLE CROW SOLAR PARK

LAND TO THE EAST OF STEEL WORKS, SCUNTHORPE

Preliminary Environmental Information Report

Chapter 9

TRANSPORT AND ACCESS

9 TRANSPORT AND ACCESS

9.1 INTRODUCTION

9.1.1 This chapter of the PEIR considers the likely significant effects of the development in terms of transport and access. This chapter is not intended to be read as a standalone assessment and reference should be made to the other chapters within the PEIR.

9.1.2 The chapter describes the assessment methodology; the baseline conditions at the site and surroundings; the likely significant effects on the environment; the mitigation measures required to prevent, reduce or offset any significant adverse effects; and the likely residual effects after these measures have been employed.

9.1.3 This chapter is supported by the following figures:

- **Figure 9.1**: Proposed Study Area (Construction Route to Site)

9.1.4 This chapter is also supported by the following technical appendices: -

- **Appendix 9.1** B1207 Automatic Traffic Count
- **Appendix 9.2** Preliminary Transport Statement

9.2 LEGISLATIVE AND POLICY FRAMEWORK

9.2.1 The assessment has been carried out in accordance with "Guidance on Transport Assessments", prepared by the Department for Transport (DfT) in March 2007 (Ref 11.1) (which is now archived but still considered relevant), "Guidelines for the Environmental Assessment for Road Traffic", Institute of Environmental Management and Assessment (IEMA) (Ref 11.2) and the Design Manual for Roads and Bridges (DMRB), Highways England (Ref 11.3).

9.2.2 The proposals have also been considered in the context of the following documents:

- National Planning Policy Framework (2012);
- National Planning Practice Guidelines (2014);
- National Policy Statement for Energy (EN-1);
- National Policy Statement for Renewable Energy Infrastructure (EN-3);
- North Lincolnshire Local Plan (2003) and Saved Policies (2007);
- North Lincolnshire Core Strategy (2011);
- North Lincolnshire Local Transport Plan (2011)
- North Lincolnshire Planning for Renewable Energy SPD (2011)

9.2.3 The main thrust of up-to-date policy contained within these documents is to reduce car dependency by making walking and cycling trips easier and by encouraging public transport trips between housing, jobs, shops and services. In particular, encouragement is given to development that is designed and located to reduce average journey lengths.

9.2.4 In relation to the proposed renewable led energy development, National Policy Statement EN-1 states that *"if a project is likely to have significant transport implications, the applicant's ES should include a transport assessment, using the NATA/WebTAG139 methodology stipulated in Department for Transport guidance, or any successor to such methodology. Where appropriate, the applicant should prepare a travel plan including demand management measures to mitigate transport impacts".*

9.2.5 In relation to the movement of construction materials, National Policy Statement EN-3 states *"Government policy encourages multi-modal transport and the IPC should expect materials (fuel and residues) to be transported by water or rail routes where possible…*

Road transport may be required to connect the site to the rail network, waterway or port. Therefore, any application should incorporate suitable access leading off from the main highway network. If the existing access is inadequate and the applicant has proposed new infrastructure, the IPC will need to be satisfied that the impacts of the new infrastructure are acceptable as set out in Section 5.13 of EN-1"

9.2.6 The North Lincolnshire Planning for Renewable Energy SPD states that schemes need to demonstrate how any environmental effect can be minimised through the construction process.

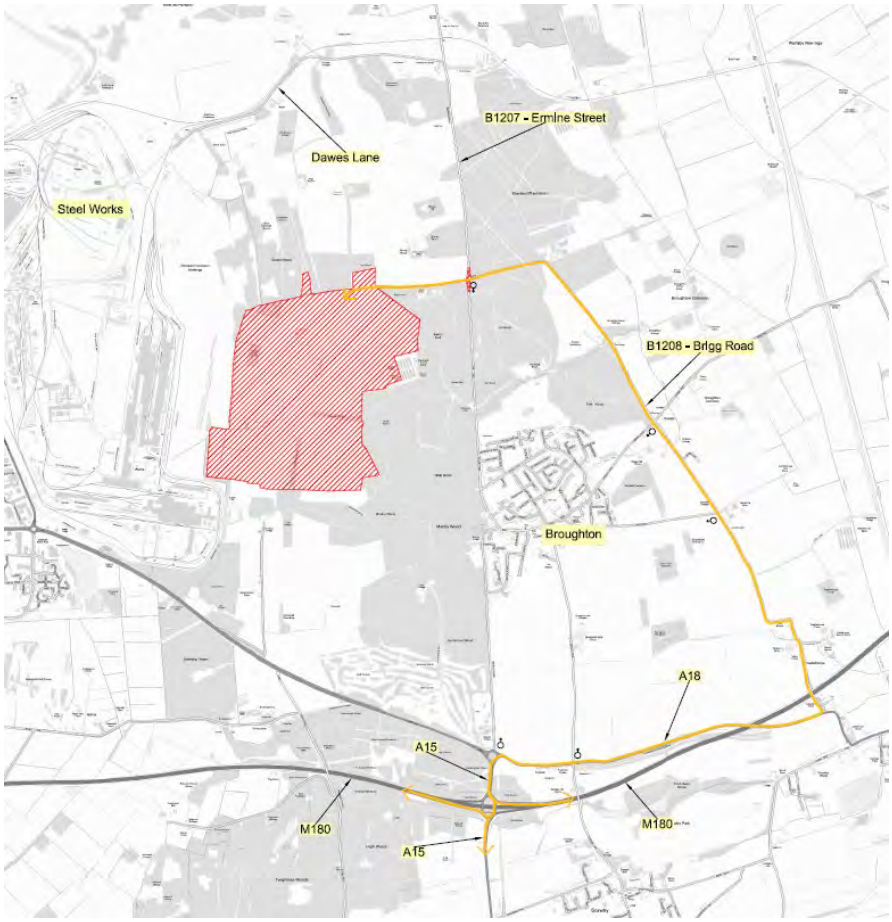
9.2.7 In transport and access terms, the effect of the construction phase will be more significant compared to the operational phase, which is not expected to generate any significant traffic movement.

9.3 STUDY AREA

9.3.1 It is proposed that Study Area for the site should follow the proposed construction traffic route to the site from M180. This route is shown in **Figure 9.1**, and comprises the following links:

- A15;
- A18; and
- B1208 Brigg Road.

Figure 9.1: Proposed Study Area (Construction Route to Site)



9.3.2 The roads leading to the site already serve HGVs associated with the Steel Works, which is accessible from Dawes Lane to the north of the site. The proposed construction traffic route is therefore considered to be suitable for use by the relatively low number of HGVs that will be associated with the construction period. The likelihood of background traffic being delayed significantly is low.

9.4 CONSULTATION

9.4.1 A summary of consultation responses to date are summarised in Table 9.1 below. This will be updated to include any additional consultation responses as part of the final ES.

Table 9.1: Summary of Consultation

Consultee	Summary of response	How response has been addressed

North Lincolnshire Council	*"I would suggest that the Transport Statement and CTMP should cover both the construction and operational phases and address the following:*
	• *details of the scheme*
	• *number of staff working on site*
	• *deliveries to the site*
	  o *number of vehicle movements per day*
	  o *day/hours of operation*
	  o *any abnormal loads*
	• *proposed routeing to the site from the M180*
	  o *reasons for choosing this route and how it will be enforced*
	• *proposed measures to ensure safe movement of all vehicles at the site access/B1208/B1207 crossroads, i.e. both delivery vehicles accessing the site and those travelling along the B1207*
	• *a before/after condition survey of the highway network may be required*
	• *the proposed connection point to the national grid"*
		All of these elements have been included within the Construction Traffic Management Plan that has supported the submission and which will be a condition of any approval.

Highways England	*"[Highways England] has reviewed the [draft] CTMP and ES, paying due cognisance to the level of impact at the Strategic Road Network. Having considered the proposed trip generation during the construction and operational phases of the development proposals, it is not considered that there will be a severe impact upon the capacity, operation and safety of the SRN.*	Information on peak hour construction vehicle movement is included in the CTMP.

	However, more clarity is required regarding the following information, which should be included within the CTMP submitted as part of the subsequent planning submission: • *HGV movements within the AM and PM peaks; and* • *Construction worker movements within the AM and PM peaks".*	

9.5 ASSESSMENT METHODOLOGY

9.5.1 The following transport and access issues investigated within this PEIR Chapter are:

- Severance;
- Driver Delay;
- Pedestrian Delay;
- Pedestrian Amenity (including Fear and Intimidation); and
- Accidents and Safety;

9.5.2 Following the assessment of effects, transport mitigation measures are described which will further mitigate the potential impacts of the development. An assessment of residual effects following implementation of these mitigation measures is then provided.

Types of Impact

Severance

9.5.3 IEMA Guidance defines severance as *"the perceived division that can occur within a community when it becomes separated by a major traffic artery"* (Para 4.27, Ref 11.2) that 'separates people from places', for example difficulties crossing existing roads or the physical barrier of the road itself.

9.5.4 There are no predictive formulae which give simple relationships between traffic factors and levels of significance. Nevertheless, there are a range of indicators for determining significance of the relief from severance. IEMA guidance suggests "*that changes in traffic flow of 30%, 60% and 90% are regarding as producing slight, moderate and substantial changes in severance respectively"* (Para 4.31, Ref 11.2). The guidance also suggests that 'marginal changes in traffic flows are, by themselves, unlikely to create or remove severance'.

Driver Delay

9.5.5 IEMA Guidance states that *"delays are only likely to be significant when the traffic on the network surrounding the development is already at, or close to, the capacity of the system*" (Para 4.34, Ref 11.2). As such, the impact of the proposed development on driver delay will be considered in relation to background traffic. Junction assessment modelling can be used to estimate increased vehicle delays at junctions if necessary.

Pedestrian Delay

9.5.6 IEMA Guidance states that *"changes in the volume, composition or speed of traffic may affect the ability of people to cross roads. In general increases in traffic levels are likely to lead to increases in delay"* (Para 4.35, Ref 11.2). There are a range of local factors that affect pedestrian delay including the level of pedestrian activity, visibility and general physical conditions of the site. However, IEMA Guidance does not set out thresholds for judging the significance of changes in levels of delay, and suggests that the assessor uses their judgement to determine whether pedestrian delay is a significant impact.

Pedestrian Amenity (including Fear and Intimidation)

9.5.7 Pedestrian amenity is broadly described in the IEMA Guidelines as "the relative pleasantness of a journey" (Para 4.39, Ref 11.2) and can be affected by traffic flow, composition and footway widths. This definition includes pedestrian fear and intimidation and can be considered a much broader category when considering the overall relationship between pedestrians and traffic. The Guidelines suggest that a threshold for judging this would be *"where the traffic flows (or its lorry component) is halved or doubled"* (Para 4.39, Ref 11.2).

Accidents and Safety

9.5.8 The IEMA guidelines do not include any definition in relation to accidents and safety, suggesting that professional judgement will be needed to assess the implications of local circumstance, or factors which may increase or decrease the risk of accidents.

Assessment of Significance

9.5.9 The assessment of potential impacts as a result of the Application Site will take into account both the construction and operational phases. The significance level attributed to each impact will be assessed based on the magnitude of change due to the development, and the sensitivity of the affected receptor to change.

9.5.10 There are four categories of impact significance considered, which are negligible (i.e. imperceptible), Minor significance (i.e. not noteworthy or material), Moderate significance (i.e. noteworthy or material) and Major significance (i.e. extremely noteworthy or material).

Traffic Flows

9.5.11 The IEMA Guidelines (Ref 11.2) set out two rules which have been used as threshold impacts to define the scale and extent of this assessment as follows:

- Rule 1: Include highway links where traffic flows will increase by more than 30% (or where the number of HGVs will increase by more than 30%); and
  Rule 2: Include any other specifically sensitive areas where traffic flows have increased by 10% or more.

9.5.12 It is worth noting that, on roads where traffic flows are low, any increase in traffic flow may result in a predicted increase that would be higher than the IEMA Guidelines. However, it is important to consider any overall increase in road traffic in relation to the capacity of the road.

9.5.13 The IEMA Guidance states that *"For many effects there are no simple rules or formulae which define the thresholds of significance and there is, therefore, a need for interpretation and judgement on the part of the assessor, backed up by data or quantified information wherever possible",* and *"those preparing the Environmental Statement will need to make it clear how they have defined whether a change is considered significant or not"* (paragraph 4.5, Ref 11.2).

9.5.14 The Guidelines identify general thresholds for traffic flow increases of 10% and 30%. Where the predicted increase in traffic / HGV flow is lower than these thresholds then the significance of the effects can be considered to be low or not significant and further detailed assessment is not required. However, to ensure a relative assessment of the increase in traffic flows in environmental terms the following criteria defined in Tables 9.2 and 9.3 are used to determine magnitude of impact and receptor sensitivity respectively.

Table 9.2 Sensitivity / Importance of the Identified Environmental Receptor

Magnitude	Definition
Very High	Receptors of greatest sensitivity to traffic flows, such as schools, playgrounds, accident blackspots, retirement homes, areas with no footways with high pedestrian footfall
High	Traffic flow sensitive receptors, such as congested junctions, residential areas, hospitals, shopping areas with active frontages, narrow footways, parks and recreational areas
Medium	Receptors with some sensitivity to traffic flow, such as conservation areas, listed buildings, tourist attractions, and residential areas
Low	Receptors with low sensitivity to traffic flows, and those distant from affected roads
Very Low	Road network not affected.

Table 9.3 Magnitude of Impact on the Identified Environmental Receptor

Magnitude	Definition
Very High	Changes to peak or 24hr traffic within the Study Area by 30% or more
High	Changes to peak or 24hr traffic within the Study Area by between 20% and 30%
Medium	Changes to peak or 24hr traffic within the Study Area by between 10% and 20%
Low	Changes to peak or 24hr traffic within the Study Area up to 10%
Very Low	No Change (+/- daily Variation)

9.5.15 The magnitude and receptor sensitivity have been compared to determine the overall significance. The table is duplicated below for ease of reference.

Table 9.4 Significance of Potential Effects

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

9.5.16 With reference to the links and junctions identified in paragraph 9.3.1, it is considered that the entire network represents a low sensitivity receptor. This is due to the location of the roads, away from settlements, and the fact that they already carry a significant amount of HGVs to the steel works sites. In addition, the level of pedestrian activity of the roads are not considered to be high enough to represent major receptor sensitivity.

9.5.17 The significance of potential effects is determined by the magnitude of the impact and the sensitivity of the receptor. A major and moderate significance of potential effects is considered to be "significant" in EIA terms.

9.5.18 Negligible, low, minor and high significances as categorised can either be beneficial (positive, i.e. reduction in traffic flows), negligible (no real impact) or adverse (negative, i.e. increase in traffic flows). They can be temporary or permanent and have an effect for the short, medium or long term. The definitions of which are as follows:

- A short term effect – an effect that will be experienced for 0-5 years;
- A medium term effect – an effect that will be experienced for 5-15 years; and
- A long term effect – an effect that will be experienced for 15 years onwards.

9.6 BASELINE CONDITIONS

Site Description and Context

9.6.1 The site currently comprises approximately 226 hectares of predominantly agricultural land located approximately 2.1 kilometres north of the village of Broughton. Junction 4 of the M180 is approximately 4.5 kilometres to the south.

Accident Analysis

9.6.2 As part of the final ES, a full review of personal injury accident data will be undertaken for the links within the study area.

9.7 ASSUMPTIONS AND LIMITATIONS

9.7.1 A number of assumptions are made when establishing the traffic generation of the site, both during construction and during operation. However, worst case assumptions have been made in a number of instances. For example, the peak construction period has been assessed to derive a worst case assessment of the effects of the construction period.

9.8 ASSESSMENT OF EFFECTS

Environmental Assessment: Construction Phase

9.8.1 This section summarises the potential effects associated with the movement of construction traffic.

Traffic Flows

9.8.2 The applicant has advised that the construction period will take approximately 11 months (up to 47 weeks). Construction activities will likely be carried out Monday to Friday 0800-1800 and between 0800 and 1330 on Saturdays.

9.8.3 The construction phase for the solar farm includes the preparation of the site, installing the access tracks, erection of security fencing, assembly and erection of the PV strings, installation of the inverters/transformers and grid connection.

9.8.4 The construction of the battery storage facility will include the preparation of the site, installation of the access roads, erection of security fencing, assembly of the battery system, and installation of the switch-room and grid connection.

9.8.5 The components which are required to construct the solar farm will arrive in 40ft containers by 15.4m long articulated vehicles. From experience elsewhere, the applicant has confirmed that around 140 15.4m articulated vehicles are required for every 10MWp at the site, split equally between the modules and mounting structures. The site is proposed to generate 135.87MWp and as such this will equate to around 1,903 deliveries by 15.4m articulated vehicles. Assuming all deliveries arrive within a 47 week period and Monday to Saturday, this equates to, on average, around seven deliveries (14 movements) per day by the largest vehicle.

9.8.6 Inverter stations will be delivered to the site through the construction period. These are likely to be up to 11m in length. The proposed solar farm will have a total of 48 inverters. It is assumed that the inverters will be transported individually due to their weight and as such this would equate to a total of 48 deliveries.

9.8.7 In addition, the Distribution Network Operator (DNO) will install a switchgear cabinet, which connects the underground grid connection cable of the solar farm to the distribution network. It is typically no larger than 6m long, 2.55m wide and 2.6m high. The cabinet will arrive at the site by the smallest possible vehicle, which could be a 10m rigid lorry. A total of one delivery is required.

9.8.8 It is likely that the material required for the access tracks will arrive by 10m rigid vehicles. The precise number will depend on the type and the amount of material required, but for the purpose of this assessment we have assumed that one delivery is required per five acres, resulting in a total of 104 deliveries.

9.8.9 A number of front end JCBs will also be required to transport equipment around the site, and to distribute stone as necessary. This is a similar size to a tractor and will either be transported to the site or be driven to the site.

9.8.10 A maximum of up to 100 construction workers are anticipated to be on site during peak times during the construction period. A temporary construction compound will be provided and will provide storage, parking for contractors and turning for HGVs. The location where staff will travel from is unknown at this stage as it will depend on the appointed contractor. However, it is envisaged that a number of the non-local workforce will stay at local accommodation and be transported to the site by minibuses to minimise the impact on the strategic and local highway network.

9.8.11 Components which are required to construct the battery storage facility will arrive in 20ft containers by 16.5 metre long articulated vehicles. Each of the battery units will require four containers measuring 6.1m x 2.4m, and a TRAFO/Inverter unit measuring up to 6.1m x 2.4m. Two containers and Inverter Units will therefore arrive per delivery. It is forecast that there will be a total of approximately 18 deliveries for the entire site.

9.8.12 In summary, the following heavy goods movements could be associated with the construction period of the solar farm, as set out in **Table 9.5**.

Table 9.5 Heavy Goods Vehicle Movements (Total Construction Period)

Activity	Type of Vehicle	Total Number of Deliveries over Construction Period
Solar Farm		
Solar Modules & Mounting Structures	16.5m Articulated	1,903 (3,806 two-way movements)
Inverters	12m Rigid	48 (96 two-way movements)
DNO Substation	10m Rigid	1 (2 two-way movements)
Customer Switchgear Cabinet	10m Rigid	1 (2 two-way movements)
Control Room Cabinet	10m Rigid	1 (2 two-way movements)
Access Tracks	15.4m Articulated	104 (208 two-way movements)
General	Front End JCB by low loader	4 (8 two-way movements)
Battery Storage		
Battery Modules	16.5m Articulated	18 (36 two-way movements)
General Deliveries (cables, fencing etc.)	16.5m Articulated	65 (130 two-way movements)
Onsite Construction Equipment	16.5m Articulated	10 (20 two-way movements)
Total		2,155 (4,310 two way movements)*
Total HGV Movements per day		**16 (32 two way movements)**
Total LGV Movements per day		10-14

*Deliveries take place over a 47 week period (282 working days)

9.8.13 In addition to the HGV movements identified above, there will also be a small number of construction movements associated with smaller vehicles such as the collection of skips for waste management and the transportation of construction workers and sub-contractors. It is likely that that there could be up to 10-14 LGV movements per day. This includes minibuses transporting construction workers.

9.8.14 As stated, the two rules set out in the IEMA Guidelines (Ref 11.2) require further assessment where traffic flows/HGVs increase by more than 30% (or 10% for a sensitive area). The addition of 32 HGV movements and between 10-14 LGV movements to the

highway network over a daily period will not exceed this threshold. Therefore, there will not be a significant environmental effect as a result of construction vehicle traffic.

9.8.15 The IEMA Guidelines (Ref 11.2) set out two rules which have been used as threshold impacts to define the scale and extent of this assessment as follows:

- Rule 1: Include highway links where traffic flows will increase by more than 30% (or where the number of HGVs will increase by more than 30%); and
- Rule 2: Include any other specifically sensitive areas where traffic flows have increased by 10% or more.

9.8.16 It is also important to note that during the construction phase the effects assessed are temporary (short to medium term) and not permanent, and this affects the significance attached to them.

9.8.17 In light of the above, all environmental effects in relation to transportation for the construction phases are considered to be negligible.

Environmental Assessment: Operational Phase

9.8.18 After commissioning, general maintenance of the site could be carried out by the existing farm estates. However, there are anticipated to be around four visits to the site a year (one per quarter) for additional equipment maintenance. These would typically be made by light van or 4x4 type vehicles. Whilst the contractor's compound will have been removed, space will remain within the site on the access tracks for such a vehicle to turn around to ensure that reversing will not occur onto the highway.

9.8.17 As there will only be one vehicle visit for maintenance every three months, it is considered that the effects of the operational phase in terms of transportation will be negligible. The cumulative effect is therefore also considered to be negligible.

9.9 MITIGATION AND MONITORING

Construction Period

9.9.1 A Construction Traffic Management Plan (CTMP) will be implemented during the construction phase of the development. The aim of the CTMP is to minimise the effect of the construction phase on the highway network. It will contain a package of agreed mitigation measures which could include the following:

- The setup of a booking system to ensure that vehicle arrivals/departures are scheduled to avoid peak traffic periods on the local highway network, and to ensure only one vehicle arrives at a time;
- Installation of signs to direct construction vehicles associated with the development along the route. Delivery drivers, contractors and visitors will be provided with a route plan in advance of delivering to site to ensure that vehicles follow the identified route;
- Advisory signs informing contractors and visitors that parking is not permitted on-street on the B1207 or on the site access track;
- All signage and barriers on the agreed haulage route will be inspected twice daily by the site manager (once in the morning and once at lunchtime), to ensure they are kept in a well maintained condition and located in safe and appropriate locations;
- A compound area for contractors will be set up on-site including appropriate parking spaces. Contractors and visitors will be advised that parking facilities will be provided on-site in advance of visiting the site and that they should not park on-street;

- A wheel wash will be provided which hoses down vehicles so that no construction vehicles exiting the site compound will take mud or debris onto the local highway network;
- A road sweeper will be provided for surrounding local roads along the construction traffic route to alleviate any residual debris generated during the construction phase;
- The site will be secured at all times with Heras fencing;
- A requirement for engines to be switched off on-site when not in use;
- Spraying of areas with water supplied as and when conditions dictate to prevent dust;
- Vehicles carrying waste material off-site to be sheeted;
- Turning areas will be provided to ensure vehicles can exit the site in a forward gear;
- Banksmen will be provided at the site access to indicate to construction traffic when it is safe for them to enter and exit the site;
- All residents of Brigg Road, along the construction traffic route, will be provided with contact details of the Site Manager, which will also be provided on a site-board at the entrance to the site; and
- Site operatives will be encouraged to use sustainable forms of travel, such as walking, cycling, public transport or car sharing where possible.

Operational Phase

9.9.2 No additional mitigation is required during the operational phase due to the low transport impact of site maintenance.

Decommissioning phase

9.9.3 A decommissioning plan will be implemented during the decommissioning phase of the development. The aim of the decommissioning plan is to, amongst other things, minimise the effect of the removal phase on the highway network.

9.10 SUMMARY OF RESIDUAL EFFECTS

Construction and Decommissioning Phases

9.10.1 All residual environmental effects in relation to transportation for the construction and decommissioning phases are considered to be negligible.

Operational Phase

9.10.2 All residual environmental effects in relation to transportation for the operational phases are considered to be negligible.

Table 9.6 Summary of Effects, Mitigation and Residual Effects

Receptor / Receiving Environment	Description of Effect	Nature of Effect *	Sensitivity Value **	Magnitude of Effect **	Geographical Importance ***	Significance of Effects ****	Mitigation / Enhancement Measures	Residual Effects ****
Construction								
A15	Vehicle movements	Temporary	Not Applicable	Not Applicable	Regional	Negligible	Not Applicable	Negligible
A18	Vehicle movements	Temporary	Not Applicable	Not Applicable	Regional	Negligible	Not Applicable	Negligible
B1208 Brigg Road	Vehicle movements	Temporary	Not Applicable	Not Applicable	Regional	Negligible	Not Applicable	Negligible
Operation								
A15	Vehicle movements	Permanent	Not Applicable	Not Applicable	Regional	Negligible	Not Applicable	Negligible
A18	Vehicle movements	Permanent	Not Applicable	Not Applicable	Regional	Negligible	Not Applicable	Negligible
B1208 Brigg Road	Vehicle movements	Permanent	Not Applicable	Not Applicable	Regional	Negligible	Not Applicable	Negligible
Cumulative and In-combination								
A15	Vehicle movements	Permanent	Not Applicable	Not Applicable	Regional	Negligible	Not Applicable	Negligible
A18	Vehicle movements	Permanent	Not Applicable	Not Applicable	Regional	Negligible	Not Applicable	Negligible
B1208 Brigg Road	Vehicle movements	Permanent	Not Applicable	Not Applicable	Regional	Negligible	Not Applicable	Negligible

Notes:

* Enter either: Permanent or Temporary / Direct or Indirect

** Only enter a value where a sensitivity v magnitude effects has been used – otherwise 'Not Applicable'

*** Enter either: International, European, United Kingdom, Regional, County, Borough/District or Local

**** Enter either: Major / Moderate / Minor / Negligible AND state whether Beneficial or Adverse (unless negligible)

LITTLE CROW SOLAR PARK

LAND TO THE EAST OF STEEL WORKS, SCUNTHORPE

Preliminary Environmental Information Report

Chapter 10

AGRICULTURAL CIRCUMSTANCES

10 AGRICULTURAL CIRCUMSTANCES

10.1 INTRODUCTION

10.1.1 This PEIR Chapter assesses the potential significant effects of the development on agricultural land and farm businesses.

10.1.2 This chapter describes the assessment methodology, the baseline conditions currently existing at the development site, the likely significant environmental effects during the construction and operation of the development, the mitigation measures required to prevent, reduce or offset any significant adverse effects, and the likely residual effects after these measures have been employed.

10.1.3 This chapter is accompanied by the following figure: -

- **Figure 10.1** MAFF (1983) Provisional ALC Northern Region, 1:250,000

10.2 ASSESSMENT APPROACH

Methodology

10.2.1 This assessment has considered two key agricultural circumstances at the development site:

- the effects of the development on agricultural land; and
- the effects of the development on farm businesses.

10.2.2 The assessment of the effects on agricultural land and farm businesses has been carried out in three stages. Firstly, the magnitude of the potential effect has been considered. Secondly, the importance / sensitivity of the receptor has been considered. Thirdly, the significance of the effects has been determined by the interaction of the magnitude and sensitivity.

10.2.3 There are no defined thresholds for assessing the effects of non-agricultural development on agricultural assets. The National Planning Policy Framework[1] (the NPPF) states that "**planning policies and decisions should contribute to and enhance the natural and local environment by … recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land[2], and of trees and woodland**". Identification and consideration of BMV agricultural land is therefore necessary and the loss of BMV is a measure of the effect of proposed development The thresholds set out in the following tables have been developed over time and are based on professional judgement and accepted best practice.

10.2.4 The magnitude of the effects of the Proposed Development has been assessed against the criteria set out in **Table 10.1**.

[1] Department for Communities and Local Government (2018) National Planning Policy Framework (revised)

[2] Best and Most Versatile agricultural land is defined in Annex 2 of the NPPF as land in Grades 1, 2 and 3a of the Agricultural Land Classification (ALC). Identification and consideration of BMV agricultural land is therefore necessary and the loss of BMV is a measure of the effect of proposed development

Table 10.1: Methodology for Determining Magnitude of Effect

Magnitude of Effect	Definition	
	Effects on Agricultural Land	**Effects on Farm Businesses**
High	The Proposed Development would directly lead to the loss of over 50 ha of BMV agricultural land.	The effect of the Proposed Development would either render a full-time agricultural business non-viable or result in very significant changes to its day-to-day management and operation, or result in a closure of a part-time farm business.
Medium	The Proposed Development would directly lead to the loss of between 20 ha and 50 ha of BMV agricultural land.	The Proposed Development would either require significant changes in the day-to-day management of a full-time agricultural business, or very significant changes to a part-time farm business.
Low	The Proposed Development would directly lead to the loss of less than 20 of BMV agricultural land or the loss of any quantity of non-BMV land (Grades 3b, 4 and 5).	The Proposed Development would require only moderate to minor changes in the day-to-day management or structure of a full-time agricultural business or would have a significant effect on a part-time business.
Negligible	No permanent adverse effect on agricultural land.	The Proposed Development would require only negligible changes to a full-time agricultural business, or minor to negligible effects on a part-time business.

10.2.5 The methodology for determining the sensitivity of the receptors is set out in **Table 10.2**. Two receptors have been identified: agricultural land and farm businesses. The sensitivity of these receptors is defined by the quality of the agricultural land and the scale of the farm business. BMV agricultural land is of national importance whilst poorer quality agricultural land (non-BMV) and farm businesses are of local importance.

Table 10.2: Methodology for Determining Sensitivity of Receptors

Sensitivity	Receptor
High	Land resources are matters of potentially national importance, as identified in the NPPF. The BMV agricultural land (Grades 1, 2 and 3a) is of national importance. The effect on land resources is a combination of the quantum

Sensitivity	Receptor
	and quality of agricultural land affected, relative to both the national resource and the relative availability of land of that quality locally. Land resources of BMV quality should therefore be classified as being of high environmental value (sensitivity).
Medium	Land that is of poorer quality, Grades 3b, 4 and 5, is of lower sensitivity and is afforded no special protection in the NPPF. It is nevertheless a finite resource of local importance and so is regarded as of moderate sensitivity. Full-time farm businesses are of medium sensitivity, as the way that farms are operated will vary over time according to ownership, security of tenure and local and international economic factors. Farm businesses are tolerant of some change without detriment to their character.
Low	Part-time farm businesses are of low sensitivity. The way that farms are operated will vary over time according to ownership, security of tenure and local and international economic factors. Farm businesses are tolerant of some change without detriment to their character.

10.2.6 The significance of the effects of the Proposed Development has been determined by the interaction of the magnitude of the effect and the sensitivity of the receptor, as set out in the matrix at **Table 10.3**.

Table 10.3: Significance Matrix

Magnitude	Sensitivity		
	High	Medium	Low
High	Major Adverse / Beneficial	Moderate Adverse / Beneficial	Minor Adverse / Beneficial
Medium	Moderate Adverse / Beneficial	Minor Adverse / Beneficial	Minor Adverse / Beneficial
Low	Minor Adverse / Beneficial	Minor Adverse / Beneficial	Minor Adverse / Beneficial
Negligible	Negligible	Negligible	Negligible

Assessment of Significance

10.2.7 There is no definition of 'significance' in EIA or in the NPPF regarding the loss of agricultural land. However, the loss of 20 ha or more of BMV agricultural land for non-agricultural purposes, and which is not in accordance with the provisions of a development plan, requires consultation with Natural England (as set out in the Policy section below). Based on this threshold and on professional experience, the loss of 20 ha or more of BMV agricultural land would be identified as a significant adverse effect in EIA terms, i.e. an effect of moderate adverse significance and above (as per the matrix at **Table 10.3**).

10.2.8 With regards the impacts of development on farm businesses, the definitions are based on professional judgement. For instance, very significant changes in the day-to-day operation of a full time farm unit is considered a significant adverse effect, i.e. an effect of moderate adverse significance (as per the matrix at **Table 10.3**).

10.3 LEGISLATIVE AND POLICY FRAMEWORK

National Planning Policy Framework

10.3.1 National planning policy governing the non-agricultural development of agricultural land is set out in the NPPF. Paragraph 171 of the NPPF identifies that development plans should allocate land with the least environmental value. Footnote 53 identifies that *"where significant development of agricultural land*" is necessary, areas of poorer quality should be preferred to those of a higher quality.

10.3.2 Paragraph 170 a) of the NPPF advises that the planning system should protect and enhance valued soils in a manner commensurate with their statutory status or identified quality in the development plan.

Planning Practice Guidance[3]

10.3.3 The national Planning Practice Guidance (PPG) identifies BMV land as *"the land which is the most flexible, productive and efficient in response to inputs and which can best deliver food and non-food crops for future generations".*

10.3.4 At paragraph 8-025-20140306[4], the PPG notes that *"soil is an essential finite resource that provides important 'ecosystem services' for example as a growing medium for food, timber and other crops, as a store for carbon and water, as a reservoir of biodiversity and as a buffer against pollution".* The PPG provides a link to the 'Construction Code of Practice for the Sustainable Use of Soils on Construction Sites'[5] which forms part of the Government's 'Safeguarding our Soils' strategy[6].

10.3.5 At paragraph 5-013-20150327 it is noted that where a proposal involves greenfield land *"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*". It is required that *"the proposal allows for continued agricultural use where applicable and/or encourages biodiversity improvements around arrays".*

Local Planning Policy

10.3.6 There is no saved policy in the North Lincolnshire Local Plan (2003) relating to development of agricultural land. There is no policy governing agricultural land in the Core Strategy (2011).

10.3.7 The North Lincolnshire Supplementary Planning Document "Planning for Solar Photovoltaic (PV) Development" (January 2016)[7] advises in section 5.1 that development that involves agricultural land needs to be demonstrated to be necessary, and poorer quality land needs to be used rather than land of a higher quality (ALC Grades 1, 2 and 3a).

10.3.8 This is encompassed into Policy C which notes that land involving Grades 1, 2 and 3a will need to be justified by the most compelling evidence. Proposals should allow for

[3] Department for Communities and Local Government (2014) Planning Practice Guidance online suite paragraph 8-026-20140306: How can planning take account of the quality of agricultural land?

[4] Department for Communities and Local Government (2014) Planning Practice Guidance online suite paragraph 8-025-20140306: Should planning take account of soil?

[5] Department for Environment, Food and Rural Affairs (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites

[6] Department for Environment, Food and Rural Affairs (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites

[7] North Lincolnshire Council (2016) Planning for Solar Photovoltaic (PV) Development

complimentary use of the land around the solar PV array for agriculture, for example grazing, or for biodiversity enhancement/habitat creation.

Legislative Context

10.3.9 The Town and Country Planning (Development Management Procedure) (England) Order 2015[8] sets out the requirement for consultation with Natural England where development of agricultural land is proposed. Natural England should be consulted where *"development which is not for agricultural purposes and is not in accordance with the provisions of a development plan involves the loss of not less than 20 hectares of grades 1, 2 or 3a agricultural land which is for the time being used (or was last used) for agricultural purposes"* or where the loss of less than 20 hectares of BMV agricultural land *"is likely to lead to a further loss of agricultural land amounting cumulatively to 20 hectares or more"* (bullet point 'y' of Schedule 4). Further guidance is provided in the "Guide to Assessing Development Proposals on Agricultural Land", 16th January 2018[9].

Limitations to the Assessment

10.3.10 The development site extends to 226 ha, of which agricultural land excluding tracks and woodland/tree belts accounts for around 210 hectares (ha). Provisional agricultural land classification maps ALC have been used for this preliminary assessment and a full soil survey will form part for the final application submission.

10.4 BASELINE CONDITIONS

10.4.1 Three baseline conditions are assessed:

- agricultural land;
- farm businesses and land management techniques; and
- fixed assets or infrastructure.

10.4.2 Baseline information was gathered through a combination of desk study and field survey, mostly carried out in August 2017. The agents for the main landowners were interviewed in person.

Agricultural Land

10.4.3 The ALC system provides a framework for classifying land according to the extent to which its physical or chemical characteristics impose long-term limitations on agricultural use. The ALC system divides agricultural land into five grades (Grade 1 'excellent' to Grade 5 'very poor'), with Grade 3 subdivided into Subgrade 3a 'Good' and Subgrade 3b 'Moderate'. ALC is based upon an assessment of limiting factors, including soils, climate and other physical limitations and the way in which these factors interact. The Grade or Subgrade of land is determined by the most limiting factor present. Natural England estimate that around 42% of all agricultural land in England is of BMV quality[10].

10.4.4 Across England, Grades 1 and 2 amount to about 16.9% of all land. Natural England's estimate of 21% of land in England being of Subgrade 3a suggests that about 40% of Grade 3 land nationally is expected to fall within Subgrade 3a.

[8] The Town and Country Planning (Development Management Procedure) (England) Order 2015

[9] Natural England (2018)

[10] Natural England (2012) Technical Information Note 049 Agricultural Land Classification: protecting the best and most versatile agricultural land

10.4.5 Within Lincolnshire the proportion is much higher. The statistics are compared in Table 10.4 below.

Table 10.4: Comparison of Proportions of Land by ALC Grade

Grade	England			North Lincolnshire		
	Area (ha)	Percentage	Estimate (%)	Area (ha)	Percentage	Estimate (%)
1	354,562	2.7		8,249	9.7	
2	1,848,874	14.2		37,177	43.8	
3	6,290,210	48.2		31,237	36.8	
Estimate 3a			(19.3)			(14.7)
3b			(28.9)			(22.1)
4	1,839,581	14.1		1,382	1.6	
5	1,100,305	8.4		11	0.0	
Non-agric	655,856	5.0		3,612	4.3	
Urban	951,424	7.3		3,245	3.8	
BMV as a percentage of all land			36.2			68.2
BMV as a percentage of agricultural land			41.3			74.2

10.4.6 On that basis, nationally about 36.2% of all land falls within the BMV category. In North Lincolnshire the equivalent percentage is about 68.2%.

10.4.7 The provisional agricultural land quality of the area around Scunthorpe is shown on the ALC map reproduced in Figure 10.1.

10.4.8 The current guidelines and criteria for ALC were published by the Ministry of Agriculture, Fisheries and Food (MAFF) in 1988[11].

10.4.9 The site is shown on the "provisional" ALC map (MAFF 1983)[12] as undifferentiated Grade 3 land. Provisional ALC maps are not sufficiently accurate to allow a full assessment of a site and should not be used for other than general guidance at a strategic level. Accordingly, the ALC grading has been undertaken and the results will form part for the final application submission.

Farm Businesses

10.4.10 Two farm businesses are affected.

10.4.11 The majority of the site, some 192 ha, is owned by the Brocklesby Estate. The Estate has owned the land since the 1970s. The agricultural land in the Santon area extends to about 280 ha and is all in arable production, set aside or fallow. Approximately 120 ha of woodland is owned. The wider Estate farms over about 10,000 hectares. Consequently the land at Santon forms a small percentage of the Estate only.

10.4.12 The land within the site is farmed in hand using contractors, and has been for the last two years. This arrangement is expected to continue. Arable produce harvested on the land is hauled either to the Brocklesby Estate at Kirmington, or is taken to the contractor's farmyard at Roxby.

10.4.13 In the past the land has been let out under two agricultural tenancies. It has been mostly used for arable farming. It is known that woodchip has been added to the soil, and outdoor pigs have been reared, in an endeavour to increase the moisture retentivity of the soil by increasing organic matter levels.

10.4.14 One field on the north-eastern part of the site, north of the poultry farm, is in arable use and is owned by a neighbouring arable farmer. This is a large mostly arable farming business based nearby on the edge of Broughton and farming land north of the site and to the east. They farm one field within the proposed site.

Fixed Assets or Infrastructure

10.4.15 Some of the land may have been the subject of underfield drainage schemes installed in the 1970's, but the details (if any) are not now known. None of the land is fenced and none of the fields are provided with water. The site is crossed by a number of services, including electricity. Trespass is not a significant issue across the site.

10.5 POTENTIAL EFFECTS

Assessment Approach

10.5.1 Three potential effects have been identified:

- effects on agricultural land, notably the potential effect on agricultural land as a national and local resource;
- effects on the occupying agricultural businesses, notably the effects of non-agricultural development on the viability of the farm businesses operating within the site; and

[11] MAFF (1988) Agricultural Land Classification of England and Wales: Revised Guidelines and Criteria for Grading the Quality of Agricultural Land'

[12] MAFF (1983) Provisional ALC Northern Region, 1:250,000

- effects on agricultural infrastructure and assets.

10.5.2 The effects are split into construction phase and operational phase effects. Most impacts on agricultural interests occur at the construction stage and remain throughout the operational phase, and are therefore assessed at the construction phase.

10.5.3 The installation of solar panels will not be permanent. Accordingly, the effect will last as long as the operational phase, in terms of the impacts on farm businesses. In terms of the impact on soils and agricultural land quality, the use of these resources will be curtailed during the operational phase, but the long-term use of these resources, and the land quality, will be resumed after the operational phase.

Construction

Effects on the Agricultural Land Resource

10.5.4 The proposed development does not lead to a loss of the land resource, as the installation of solar panels on legs, pneumatically driven into the soil, does not cause any long-term disruption to the soil resource. The connection of electrical cabling involving trenching can lead to some small, localised disruption to soils but the process is not dissimilar from the installation of field drains, and is not significant. The agricultural land readily recovers from such small disturbances.

10.5.5 Nevertheless the proposed development will lead to the reduction of use of up to 211 ha of land for the duration of the solar park. This effect commences at the construction phase. Whilst the land will in part continue to be farmed, with sheep being grazed, it will not be possible to use it for field-scale arable cropping.

10.5.6 The effect of this, if it is treated as alternative use of agricultural land (albeit that the resource is not lost and will be available should the panels be removed and at the end of the term), is of high magnitude of high sensitivity, and consequently of major adverse significance.

10.5.7 In that context the alternative use, were it to be so considered of undifferentiated grade 3, in the context of land of equal or higher quality predominantly in the area, has a proportionately reduced impact.

10.5.8 The impact must also be considered against the guidance in the NPPG. There are locational constraints to the siting of large scale solar PV installations due to grid connectivity restrictions and this will influence and reduce locational flexibility. In the local context of Scunthorpe and North Lincolnshire, land of poorer quality is not considered likely to be available in similar quantities.

Effects on the Occupying Farm Business

10.5.9 The majority of the site is occupied by the Brocklesby Estate, and is farmed on contract. They will retain over 100 ha of agricultural land in the Santon area, plus extensive woodland. The land is farmed from a distance, with crops taken either to Roxton or Kirmington at harvest time. Overall the Estate farms over about 10,000 ha, so the agricultural land impact is minor.

10.5.10 There will be a reduction in the amount of land being farmed for arable crops, but in the context of both the estate and the contractor's business, the effects will be limited, and will have a moderate to minor impact on the business.

10.5.11 There are no farm buildings affected, the land forms the edge of the estate, and there will be no severance of access to other land.

10.5.12 The land around the panels will in part continue to be farmed, with sheep used to graze below the panels in combination with management of areas for wildlife enhancement. This will create employment for local shepherds.

10.5.13 Overall, therefore, the effect on the Estate is of low magnitude, on an interest of medium sensitivity leading to an impact of minor adverse significance.

10.5.14 The removal of a single field from the adjoining substantial arable farm will similarly reduce farmed land, and have a resultant impact on the scale of the overall business, but it will be also minor in the context of that farm. Therefore that too is an impact of low magnitude on a receptor of medium sensitivity, leading to an impact of minor adverse significance.

10.5.15 The reduction of land in arable cropping will be balanced by an increase in the land being farmed under grassland management, with sheep grazing intended around much of the site. There will be balancing economic and employment benefits arising from the management of sheep and the management and maintenance of the grassland.

10.5.16 Additionally, both landowners will benefit from an additional source of income which will diversify their income source and help buffer the uncertainties faced with Brexit.

10.5.17 Therefore the individually minor adverse impacts on the two farm businesses due to reduced arable land are balanced by employment and diversification benefits, leading to an overall **Negligible** impact of agricultural land.

Fixed Assets and Infrastructure

10.5.18 There are no adverse impacts on farm buildings, field drainage, water supplies, farm accesses, irrigation or other fixed infrastructure.

Operation

10.5.19 The impacts identified at the start of the construction phase will continue throughout the operational phase.

10.5.20 The land will not be capable of arable farming but will be capable of being farmed, and will be farmed, for sheep grazing. The underlying agricultural land resource will not be adversely affected. Over time the return of the land to grassland will allow a build up of organic matter levels, which will have long-term benefits for the soil.

10.5.21 Whilst the occupying farm businesses will not be able to use this land for arable use during the operational phase, that will be balanced by the use of the land for sheep farming. The farms will also benefit from diversified sources of income which will help overall farm/estate viability.

10.6 MITIGATION AND ENHANCEMENT

Construction

Agricultural Land Resources

10.6.1 The soils are generally light and sandy and able to be trafficked and disturbed over a wide period of the year. Any damage to soil structure during construction will generally

rectify naturally over the period of a few years, but by taking care not to construct when or if the ground is particularly wet will mitigate potential impacts. The development will benefit land use in terms of the health and structure of the soil which will improve through the re-establishment of organic matter, which will have suffered due to years of intensive agriculture. The long-term impact of the development on land use, in terms of soil quality, will be positive and minor and not significant.

Farm Businesses

10.6.2 The farm businesses affected will experience a reduced arable area, but will be able to run sheep under the panels. In neither case is the reduction in arable area significant to the overall viability of the occupying businesses, being in both cases only a small proportion of each farm. Overall mitigation is neither possible nor necessary.

Operation

10.6.3 No further mitigation during the operational phase is thought to be necessary.

Decommissioning

10.6.4 The development will benefit land use in terms of the health and structure of the soil which will improve through the re-establishment of organic matter, which will have suffered due to years of intensive agriculture. The long-term impact of the development on land use, in terms of soil quality after decommissioning, will be positive and minor and not significant.

10.7 RESIDUAL EFFECTS

Construction

10.7.1 The reduction in the utility of the agricultural land will commence at the start of the construction phase.

10.7.2 That must be assessed in the context of land quality in the area. North Lincolnshire contains a high proportion of BMV agricultural land, some 74.2% of agricultural land (of which almost four fifths is Grades 1 and 2). Consequently, whilst the quantum of BMV land involved leads to a major adverse impact, in the local context the site is considered to represents some of the poorer quality land in this general area, within connection distance of the substation.

10.7.3 Two farm businesses would lose land. In both cases this a minor disruption to the business, given the scale of the farms involved. There are no impacts on farm buildings, drainage, water supplies or accesses. The impacts are therefore of minor adverse significance. The reduction in arable area will be countered by sheep farming across the site, and there will be benefits from diversified sources of income. The overall impact is **Negligible**.

Operation

10.7.4 The changes to land use at construction phase would continue throughout the operational phase until completion of the decommissioning phase.

10.7.5 The agricultural land is not permanently affected. It will be farmed for sheep farming throughout the operational phase. There will be benefits for the soil and through increases in organic matter as a result of long-term grassland reversion. On removal of the panels the land could be returned to arable farming. The land has been the subject of

attempts to increase organic matter content in the past, and there will inevitably be long-term organic matter benefits from the land being in grassland use for a long time. The land will continue to be farmed throughout the operational phase.

Decommissioning

10.7.6 The long-term impact of the development on land use, in terms of soil quality after decommissioning, will be positive and minor and not significant.

10.8 SUMMARY

Methodology

10.8.1 The potential effects on agricultural resources have been assessed through study of available soils and climate data and interview of affected farming businesses.

Baseline Conditions

10.8.2 The development site is shown on the "provisional" ALC map (MAFF 1983)13 as undifferentiated Grade 3 land. This potential intermixture of land grades affects the ability to exploit the land quality. The land is all down to arable cropping as part of two large arable farms.

Likely Significant Effects

10.8.3 The land will, in part, be farmed by sheep, and so will continue in agricultural use. The land resource would not be damaged significantly by the installation of the panels, and so would be available long-term for agricultural use. In its local context, the development site may comprise some of the poorer quality land available.

10.8.4 The effects on the two farm businesses are expected to be beneficial. There will be some benefits for soil organic matter long-term.

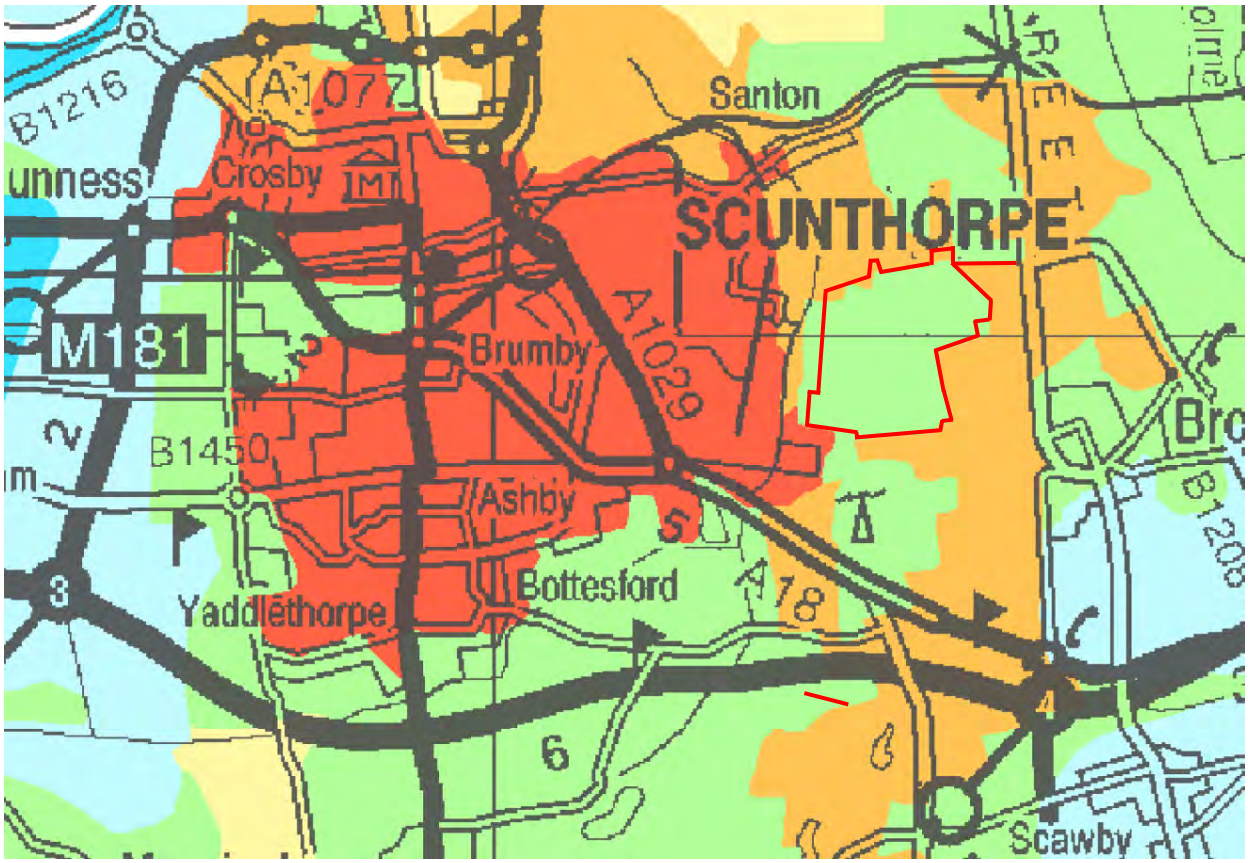
[13] MAFF (1983) Provisional ALC Northern Region, 1:250,000

Figure 10.1

EXTRACT OF PROVISIONAL ALC MAP

PROVISIONAL AGRICULTURAL LAND CLASSIFICATION MAP WITH SITE INDICATED (APPROXIMATELY)

Original Scale 1:250,000, MAFF 1983



Map not to scale

KEY:

Grade		*Description*
1		Excellent
2		Very Good
3		Good to Moderate
4		Poor
5		Very Poor

Non-Agricultural Land

	Other land primarily in non-agricultural use
	Land predominantly in urban use

LITTLE CROW SOLAR PARK

LAND TO THE EAST OF STEEL WORKS, SCUNTHORPE

Preliminary Environmental Information Report

Chapter 11

SOCIO ECONOMIC

11 SOCIO ECONOMIC ISSUES

11.1 INTRODUCTION

11.1.1 This PEIR chapter establishes the baseline Socio Economic conditions and then considers the likely socio-economic effects of the proposed development.

11.1.2 The considerations of this chapter are mostly related to the effects of the proposed development upon the human population who will live within the vicinity of the development site.

11.1.3 This assessment is made by examining the potential effects on the population anticipated as a result of the proposed development and, in turn, assessing the effect that this could have on relevant services and facilities and the economy. It identifies the socio-economic baseline in relation to key issues, specifically the economy and labour force, and the potential effects that could occur, both direct and indirect, arising from the construction (temporary effects) and operation (permanent effects) of the proposed Development.

11.2 ASSESSMENT APPROACH

Methodology

11.2.1 There is no specific guidance available which establishes a methodology for undertaking an Environmental Impact Assessment (EIA) of the socio economic effects of a proposed development. Accordingly, the approach adopted for this assessment is based on professional experience and best practice, and in consideration of the policy requirements/tests set out within the National Planning Policy Framework (NPPF) and local planning policy.

11.2.2 The Infrastructure Planning (Environment Impact Assessment) Regulations 20171[1] state that an ES should contain *"A description of the factors specified in* regulation *5(2) likely to be significantly affected by the development: population."*

11.2.3 Following this guidance, the assessment specifically includes the following:

11.2.4 Identification of the socio economic baseline in respect of each of the key socio economic issues identified, focussing on the characteristics of the economy and labour force. These characteristics have been used as a measure for assessing future changes associated with or resulting from the Proposed Development.

- Qualification of the full range of socio economic effects, both direct and indirect, arising from the construction (temporary effects) and operation (permanent effects) of the Proposed Development.

11.2.5 The baseline information has been collated with reference to the following:

- NPPF[2]; and
- Office of National Statistics (ONS) data (various outputs as individually referenced in this chapter).

[1] *The Infrastructure Planning (Environmental Impact Assessment Regulations 2017)*, available from: http://www.legislation.gov.uk/uksi/2017/572/pdfs/uksi_20170572_en.pdf
[2] *National Planning Policy Framework*: HM Government, July 2018.

Assessment of Significance

11.2.6 The first step in the assessment is to identify the sensitivity of the receptors. In socio economic assessments, receptors are not sensitive to changing environmental conditions in the same way as many environmental receptors are. To address this, the assessment draws on a combination of measurable indicators and a consideration of the importance of the receptor in policy terms to gauge the receptor's sensitivity. For example, the number of jobs in the area may increase as new developments are completed and occupied by businesses. This is considered alongside the weight attached to these issues in local policy. For example, the Local Plan may have identified that employment and business growth as a particular priority. Table 11.1 shows the sensitivity criteria followed in this assessment.

Table 11.1: Sensitivity Criteria

Sensitivity	Evidence for Sensitivity Assessment
High	Evidence of direct and significant socio-economic challenges relating to receptor. Accorded a high priority in local, regional or national economic regeneration policy.
Medium	Some evidence of socio-economic challenges linked to receptor, which may be indirect. Change relating to receptor has medium priority in local, regional and national economic and regeneration policy.
Low	Little evidence of socio-economic challenges relating to receptor. Receptor is accorded a low priority in local, regional and national economic and regeneration policy.
Negligible	No socio-economic issues relating to receptor. Receptor is not considered a priority in local, regional and national economic development and regeneration policy.

11.2.7 The magnitude of change upon each receptor has been determined by considering the predicted deviation from baseline conditions, both before and, if required, after mitigation. The criteria used for the assessment of magnitude of change, which can be either positive (beneficial) or negative (adverse) are shown in Table 11.2.

Table 11.2: Magnitude of Change Criteria

Magnitude of Impact	Description / Criteria
Substantial	Proposed development would cause a large change to existing socio-economic conditions in terms of absolute and/or percentage change.
Moderate	Proposed development would cause a moderate change to existing socio-economic conditions in terms of absolute or percentage change.

Magnitude of Impact	Description / Criteria
Minor	Proposed development would cause a minor change to existing socio-economic conditions in terms of absolute and or percentage change.
Negligible	No discernible change in baseline socio-economic conditions.

11.2.8 In reporting the effects of significance resulting from the Proposed Development, at construction and operational stages, the assessment contextualises both the sensitivity of the receptor and the magnitude of change. The method uses the matrix shown in Table 11.3.

Table 11.3: Significance Matrix

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

11.2.9 Using this scale, effects identified as major or moderate are regarded as being significant. Effects of minor or lesser significance are also identified but regarded as not significant.

Legislative and Policy Framework

11.2.10 Full details on the planning policy context are provided in **Chapter 5** of the environmental statement, however from a socio economic perspective it is worth noting that guidance on producing EIAs published by the European Commission and UK Government suggests that the possible socio economic effects that should be considered are those relating to changes in population, such as changes in the demand for housing and services like schools and recreation facilities.

Scoping Criteria

11.2.11 The scope and contents of this socio-economic assessment are based on professional experience and best practice. Consideration has been given only to the following socio-economic factors for which there is a potential for likely significant effects or which are relevant to assessing these effects:

- Construction Phase – local employment opportunities.
- Operational Phase – local employment opportunities.

- Operational Phase – socio economic characteristics of local population.

Extent of Study Area

11.2.12 The assessment primarily focuses on the effects in the local authority area of North Lincolnshire and the ward within which the proposed development is located (Frodingham). Where appropriate, benchmark data at a regional and national level are also provided.

Limitations to the Assessment

11.2.13 Baseline information is derived from the latest available statistics, however, there is often a time-lag associated with the publication of this data.

11.3 BASELINE CONDITIONS

Site Description and Context

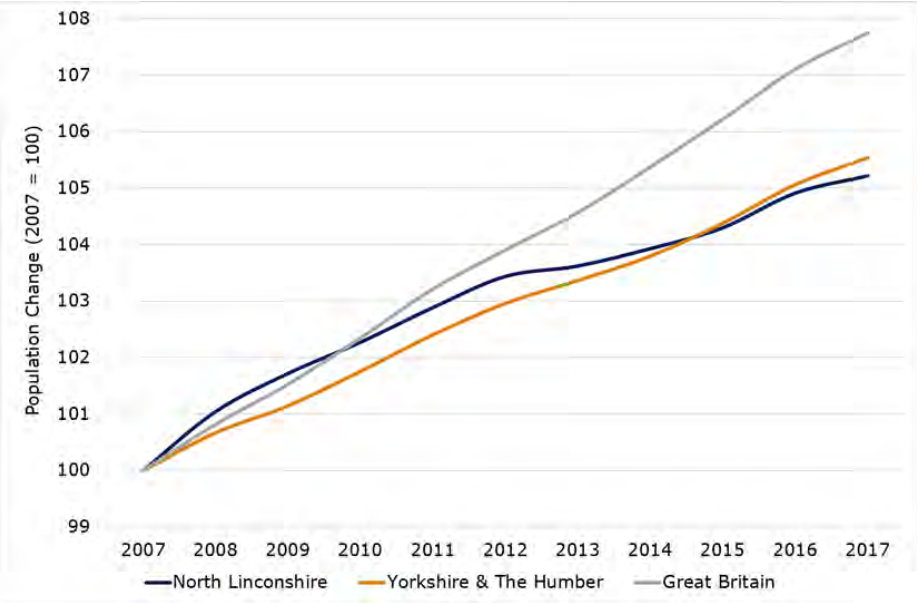
11.3.1 A detailed description of the site and its surrounding context is provided within **Chapter 3** and therefore has not been repeated. However, the details of the proposed development as pertinent to the socio-economic assessment are: a 150MW solar photovoltaic (PV) Farm and up to 90MW battery storage facility will be developed on the land at Little Crow Farm in Scunthorpe, North Lincolnshire.

Baseline Survey Information

Population

11.3.2 Based on data from the Census, the population of Frodingham ward was around 8,200 in 2011. Data from the 2017 ONS Mid-Year Population Estimates show that, the total population of North Lincolnshire is around 171,300. Figure 11.1 shows population change between 2007 and 2017. Over this timeframe, North Lincolnshire's population grew by 5.2% – equating to 8,500 more people. The corresponding rises for Yorkshire and The Humber and Great Britain over the same period were 5.5% and 7.7% respectively.

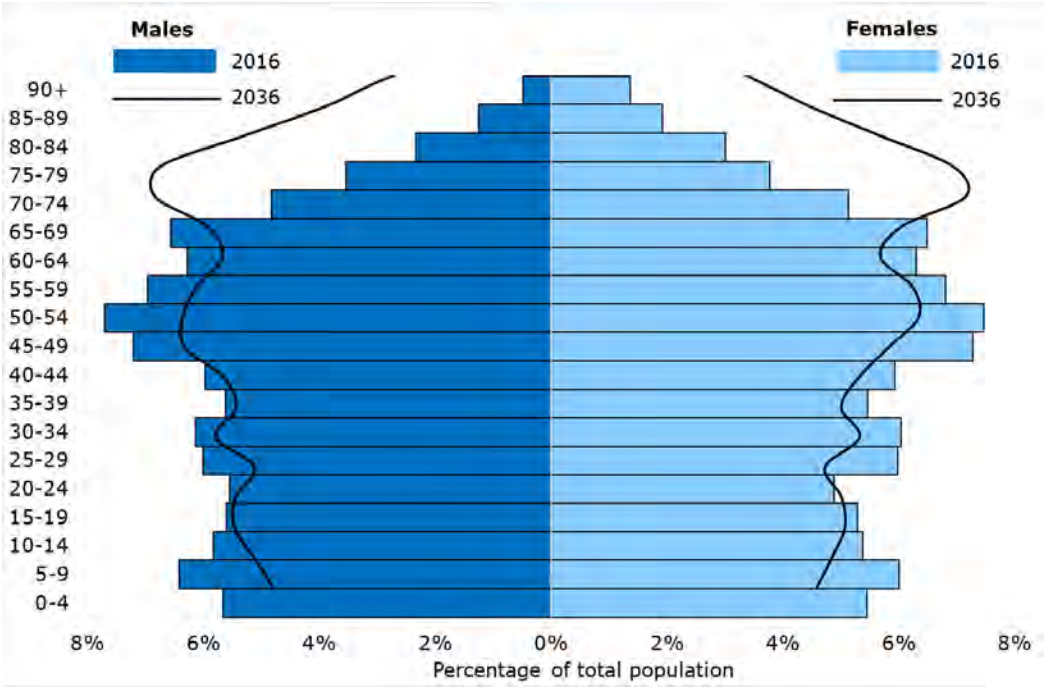
Figure 11.1: Population change, 2007-17
Source: ONS, Mid-Year Population Estimates



11.3.3 Data on population change by age in North Lincolnshire shows that from 2007 to 2017, the young dependant population group (aged 0 to 15) increased by around 900 (2.9% growth), the number of economically active people (16-64) increased by about 100 (0.1% growth) and people aged 65+ increased by approximately 7,500 (a rise of 26.9%). All three age groups experienced growth over the same timeframe in Yorkshire and The Humber and UK, although the 65+ cohort grew fastest in both areas – by 21.1% in Yorkshire and The Humber and 23.0% in the UK.

11.3.4 The latest ONS population projections (2016-based) were published in May 2017 and these indicate that the population of North Lincolnshire is predicted to increase steadily – by around 5,600 between 2016 and 2036 (a 3.3% increase). Population growth in Yorkshire and The Humber (5.9%) and England (10.2%) is expected to be higher over the same period. In North Lincolnshire between 2016 and 2036, the population aged 65+ is expected to rise by just over 15,200 (43.8%). The 16-64 cohort is projected to decline by around 6,400 (6.15), while the number of people aged 0-15 is estimated to decrease by 3,300 (10.5%) over the same time period. Figure 11.2 presents a population pyramid for North Lincolnshire between 2016 and 2036, highlighting a long-term contraction in the young population and a rise in the number of elderly people.

Figure 11.2: Population projections, 2016-36

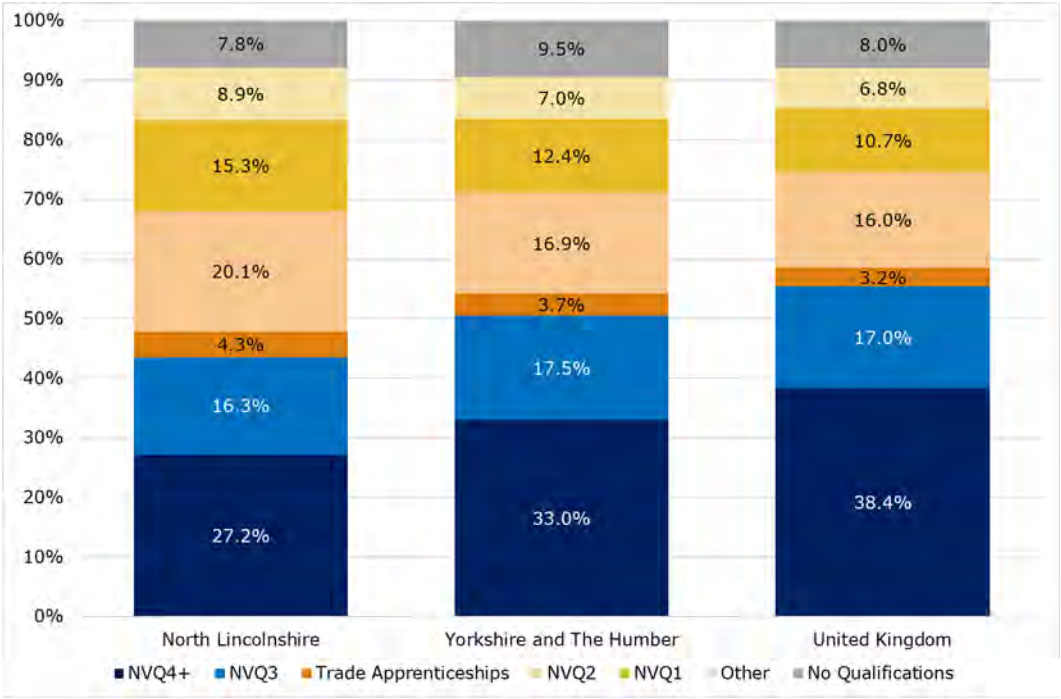


Source: ONS, Mid-Year Population Estimates

Skills

11.3.5 In 2017, 27.2% of working age residents (16-64) in North Lincolnshire had a degree level qualification or higher (NVQ4+); 16.3% had NVQ3 only, which equates to 2 A Levels and 4 AS Levels; and 20.1% had NVQ2 only (5+ GCSEs or equivalent). Around 7.8% of the District's population had no qualifications. Yorkshire and The Humber region and the UK have a greater proportion of people aged 16-64 with higher level (NVQ4+) qualifications – 33.0% and 38.4% respectively. North Lincolnshire has a lower proportion of working age residents with no qualifications compared with the UK (8.0% versus 7.8%), and the region (9.5%). Figure 11.3 shows the full skills breakdown.

Figure 11.3: Skill Levels of the Resident Working Age (16-64) Population, 2017



Source: Annual Population Survey, January-December 2017

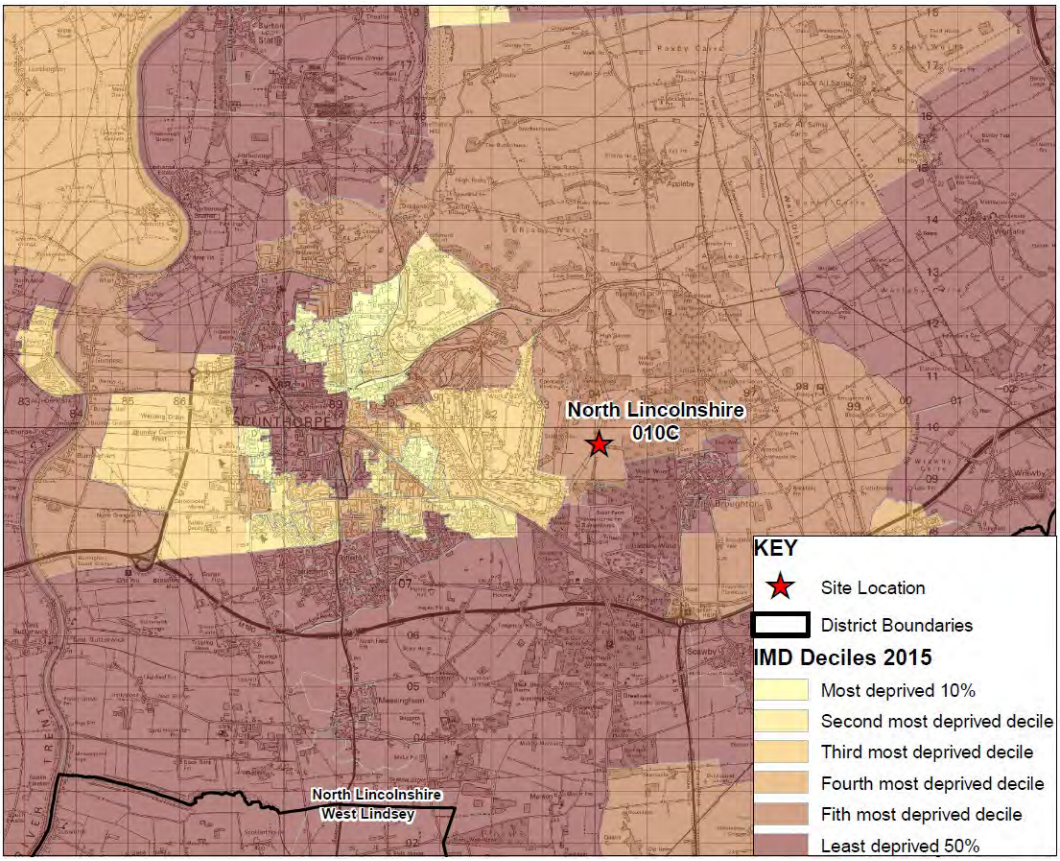
Deprivation

11.3.6 The Index of Multiple Deprivation 2015[3] provides an indication of the average levels of deprivation for LSOAs (Lower layer Super Output Area) across England. The Index provides an overall assessment of the average levels of deprivation as well as an assessment against particular domains of deprivation.

11.3.7 The Application Site falls within the North Lincolnshire 010C LSOA. The area has medium levels of deprivation, ranking at 14,964, falling inside the fifth most deprived decile amongst the 32,844 LSOAs nationally (see Figure 11.4). The LSOA is within the 30% most deprived areas nationally for education, skills and training; and living environment. However, it is within the 10% least deprived areas nationally for Barriers to Housing and Services.

[3] September 2015, English Indices of Deprivation 2015, Department for Communities and Local Government.

Figure 11.4: Index of Multiple Deprivation for Site Location, 2015



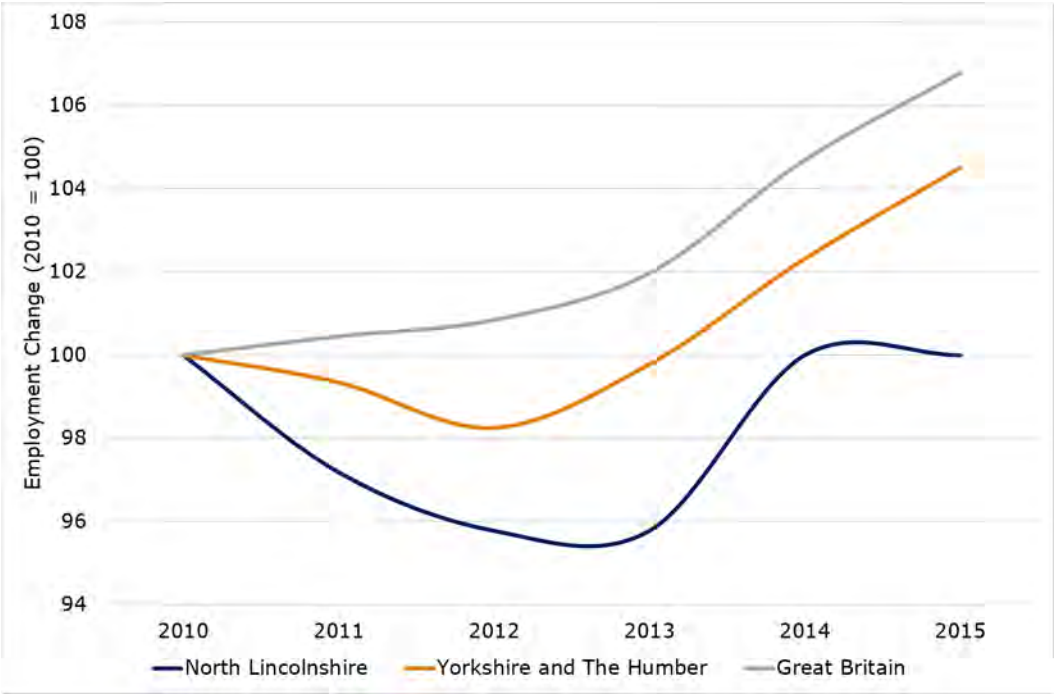
Source: Ministry of Housing, Communities & Local Government

Employment

11.3.8 Based on data from the 2016 Business Register & Employment Survey, published by ONS, 72,000 people work in North Lincolnshire (7,000 (10.0%) of which work in Frodingham ward). Overall, between 2010 and 2015, employment in North Lincolnshire remained flat. While it fluctuated in the intervening years, job numbers in 2010 were 71,000 – the same as 2015. Yorkshire and The Humber and Great Britain saw increases of 4.5% (103,000 jobs) and 6.8% (1.9million jobs) respectively over the same timeframe (see Figure 11.5)[4].

[4] 2016 jobs data are also available, however due to changes in the methodology they are not comparable with figures dating back to 2010. Jobs growth has therefore been analysed over the period 2010-15 to allow for like-for-like comparison.

Figure 11.5: Employment Change, 2010-15

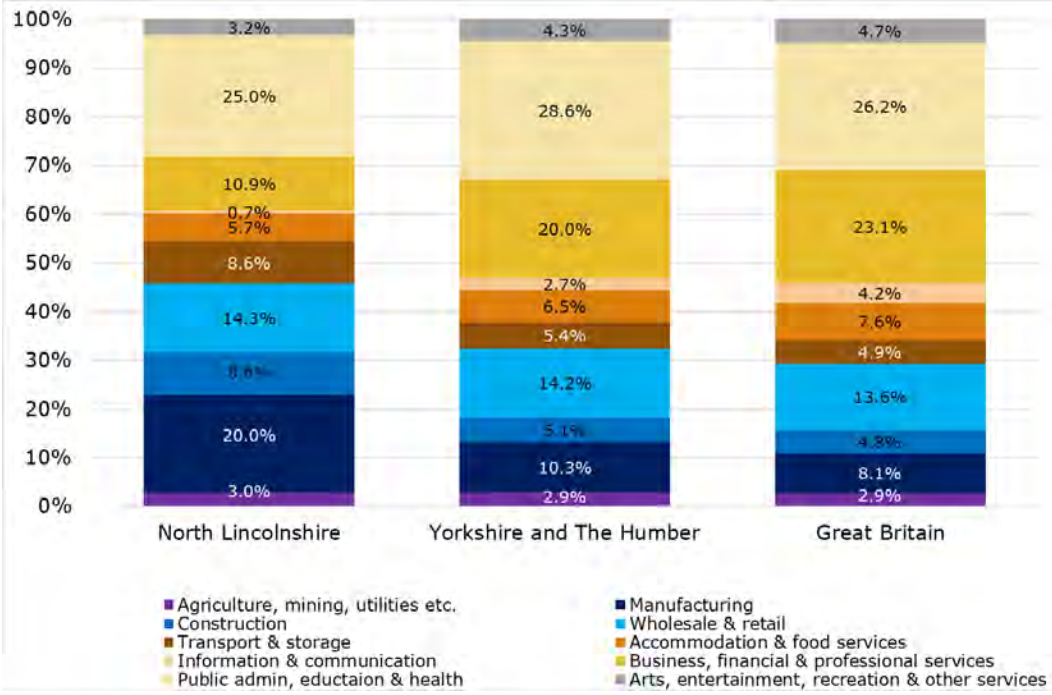


Source: Office for National Statistics – Business Register & Employment Survey

11.3.9 The largest sector in North Lincolnshire as of 2016 is public administration, education and health, with 17,500 jobs – representing 25.0% of total employment. Job numbers in the sector decreased by 2,500 between 2010 and 2015. Between 2015 and 2016, jobs in the sector remained the same (17,500).

11.3.10 In terms of overall size, health is followed by two sectors – manufacturing (which supports 14,000 jobs in the District – 20.0%) and wholesale and retail (which supports 10,000 jobs (14.3%) in North Lincolnshire). The construction sector, which is likely to see employment opportunities during the Proposed Development's build phase, supports around 6,000 jobs in North Lincolnshire. This equates to approximately 8.6% of total employment in the District, above the corresponding shares for Yorkshire and The Humber (5.1%) and the UK (4.8%). Figure 11.6 presents the sector employment share in further detail.

Figure 11.6: Sector Employment Share, 2016



Source: Office for National Statistics – Business Register & Employment Survey

Business Base

11.3.11 The total number of businesses in North Lincolnshire has increased by 500 since 2010 (8.2% growth). This was below the increases seen in Yorkshire and The Humber (18.0%) and UK (21.6%) over the same timeframe (see Table 11.4).

Table 11.4: Change in business numbers, 2010-17

Area	2010	2017	Absolute Change	% Change
North Lincolnshire	6,120	6,620	500	8.2%
Yorkshire and The Humber	187,810	221,560	33,750	18.0%
United Kingdom	2,574,225	3,129,385	555,160	21.6%

Source: ONS, UK Business Count

11.3.12 In terms of business share by size, North Lincolnshire is broadly in line with Yorkshire and The Humber. The District has a slightly lower proportion of micro businesses – 82.3% (between 0 and 9 employees) than the UK – 84.5% - and a slightly higher proposition of small (10 to 49 employees) and medium-sized (50 to 249 employees) businesses than the national average (see Table 11.5).

Table 11.5: Business share by size, 2017

Area	Micro (0 to 9)	Small (10 to 49)	Medium-sized (50 to 249)	Large (250+)
North Lincolnshire	82.3%	14.3%	3.7%	0.5%
Yorkshire and The Humber	82.6%	14.0%	3.6%	0.4%
United Kingdom	84.5%	12.6%	3.0%	0.4%

Source: ONS, UK Business Count

Wages

11.3.13 For residents of North Lincolnshire, the median annual gross wage for full-time workers is £27,265, as of 2017. This is around £1,500 lower than that of the UK (£28,758), but around £1,000 below the regional figure (£26,236). Since 2010, gross annual wages for full-time workers who are residents of North Lincolnshire have increased by approximately £1,700 – an increase of 6.9%. This is lower than the growth seen in Yorkshire and The Humber (9.5% – around £2,300), and the UK (11.1% – around £2,900)[5].

11.3.14 For workers in North Lincolnshire, the median annual gross wage for full-time jobs (£27,505 in 2017) is around £1,200 lower than the UK median (£28,758), but £1,200 above Yorkshire and The Humber median (£26,258). Between 2010 and 2017, residents' wages in North Lincolnshire increased by 6.4% (£1,643), lower than the growth seen in Yorkshire and The Humber (£2,402 – 10.1%) and the UK (11.1% – around £2,900[6]) over the same period[7].

Commuting[8]

11.3.15 Just over 50,400 people live and work in North Lincolnshire. There are a substantial number of people travelling into North Lincolnshire from surrounding/neighbouring areas to work – around 12,600. This includes around 3,800 from North East Lincolnshire, 2,600 from Doncaster and 1,400 from West Lindsey.

11.3.16 There is also a high number of residents commuting out for work – around 12,000. This includes almost 4,700 working in North East Lincolnshire, over 2,900 in West Lindsey, 2,000 in Doncaster and just over 1,100 in East Riding of Yorkshire.

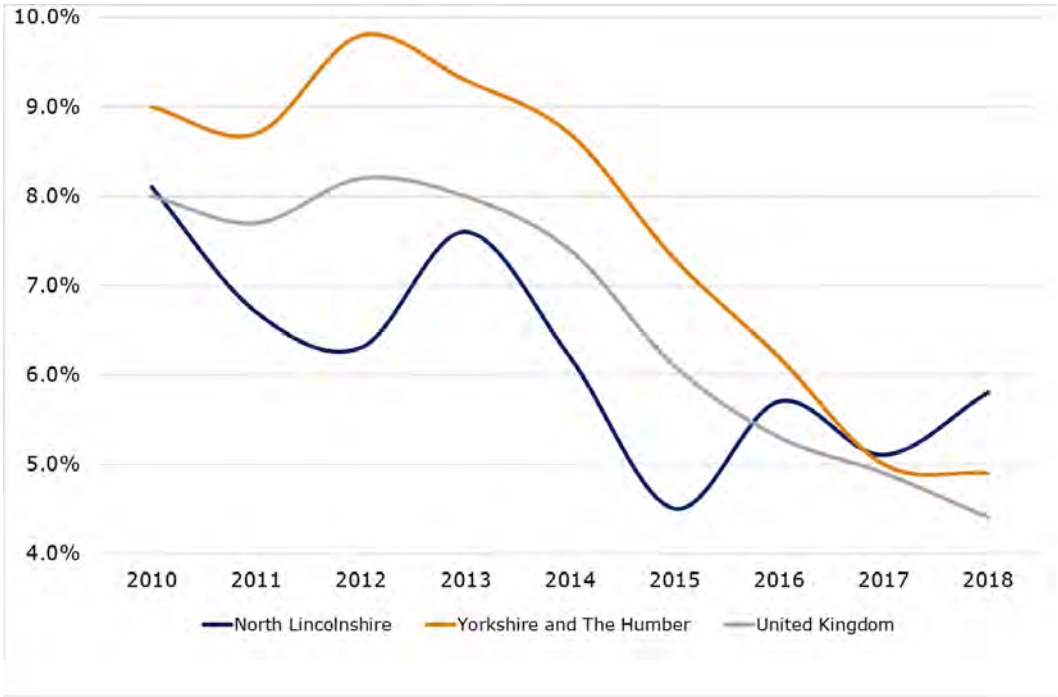
11.3.17 The overall figure for out-commuters (15,778) is higher than the figure for in-commuters (14,802), giving a net outflow of just under 1,000 commuters.

Unemployment

11.3.18 Overall, the unemployment rate in North Lincolnshire fell between 2010 and 2018 (see Figure 11.7). As of April 2017-March 2018, the unemployment rate for people aged 16-64 in North Lincolnshire was 5.8%. Compared with the figure of 8.1% for 2010, this represents a substantial improvement. However, the rate did increase slightly between 2017 and 2018 (by 0.7 percentage points, from 5.1% to 5.8%). The unemployment rate in North Lincolnshire is higher than the regional rate (4.9%) and the UK average of 4.4%[9].

[5] Data sourced from Annual Survey of Hours & Earnings (Resident Analysis) for 2010 and 2017, published by ONS.
[6] Resident and workplace-based wages are both the same at a UK level, hence the reported changes in paragraphs 6.3.12 and 6.3.13 are the same.
[7] Data sourced from Annual Survey of Hours & Earnings (Workplace Analysis) for 2010 and 2017, published by ONS.
[8] Based on travel to work data from the 2011 Census.
[9] Unemployment data sourced from Annual Population Survey (April 2017-March 2018), published by ONS.

Figure 11.7: Unemployment Rate (16-64), 2010-2018



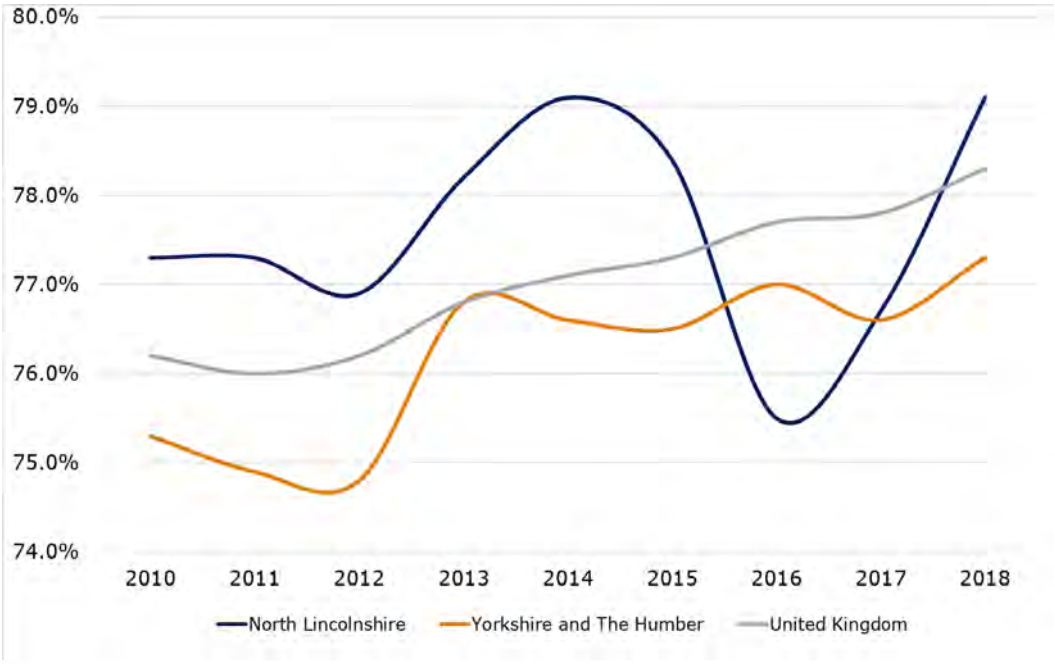
Source: Office for National Statistics – Annual Population Survey

Economic Activity

11.3.19 The economic activity rate in North Lincolnshire is 79.1%, based on ONS data for April 2017-March 2018. This is 0.8 percentage points than the rate in the UK, which is 78.3%. It is also above Yorkshire and The Humber average of 77.3%[10]. Although the rate of economic activity dropped to a low point of 76.7% in 2016, it recovered to the peak of 79.1% in 2018 (See Figure 11.8).

[10] Economic activity data sourced from Annual Population Survey, published by ONS.

Figure 11.8: Economic Activity Rate (16-64), 2010-2018



Source: Office for National Statistics – Annual Population Survey

11.4 ASSESSMENT OF LIKELY SIGNIFICANT EFFECTS

Construction

11.4.1 The socio economic effects will apply largely during the construction phase of the solar park. The effects of decommissioning would be similar to, or often of a lesser magnitude than construction effects. However, there can be a high degree of uncertainty regarding decommissioning as engineering approaches and technologies are likely to change over the operational life of the development.

Economy

11.4.2 Economic benefits will arise through the provision of temporary jobs during the construction phase at the site. Research published in 2014 by the Centre for Economic & Business Research (Cebr) on solar powered growth in the UK[11] highlighted analysis by the Solar Trade Association on the cost of solar energy. The analysis estimated that by 2016, the capital investment cost of building one megawatt of solar power for a large-scale development[12] would be around £800,000. Assuming this price is broadly similar in 2018, when applied to the proposed development (both the 150MW of solar and up to 90MW of battery storage) this equates to a capital cost of £160million.

11.4.3 In a design and access statement by TGC renewables associated with a planning application (15/00588/FUL) for a proposed 21MW solar farm on the land at Radbrook Pastures in Stratford-on-Avon[13], it is noted that solar farms create opportunities for local businesses through the supply chain, including aggregates suppliers, security and monitoring during operation, farming and landscaping contractors and other aspects of the construction process, such as fencing. The report goes on to quote a 2014 solar farm

[11] *Solar powered growth in the UK – the macroeconomic benefits for the UK of investment in solar PV*: Cebr (report for the Solar Trade Association), September 2014.
[12] Cebr's report noted that large-scale arrays usually have a capacity of at least 1MW.
[13] *Planning, Design & Access Statement – Proposed Solar Farm on Land at Radbrook Pastures:* TGC Renewables, August 2018.

appeal decision: APP/K1128/A/13/2206258, which states that solar farms: *"Would provide some support for the construction industry and local contractors/suppliers could be engaged during the construction and eventual decommissioning stages. Some construction workers may also use some local services. Furthermore, the scheme would generate additional income for the landowners, enhancing farm incomes and possibly diversifying some farm* businesses*. This would accord with the Government's objective of promoting a strong rural economy. In addition, the development would assist in increasing the security and diversity of electricity supply. These economic benefits are important considerations that can be given much weight"* (Paragraph 17).

11.4.4 In the Construction and Traffic Management Plan associated with the proposed development in Scunthorpe[14], Transport Planning Associates (TPA) state that there will be a maximum of 100 construction workers on-site during the peak times during the construction period, which the plan states will be 11 months. In the *solar powered growth in the UK* report, Cebr[15] give an employment multiplier for large-scale solar PV investments of 2.33 – i.e. for every job supported on-site, 1.33 indirect/induced jobs are supported in the wider economy. Applying this multiplier to the 100 on-site jobs, the Proposed Development could support 133 temporary jobs in the wider economy during the eleven month build phase.

11.4.5 In total, the proposed development could support 233 temporary jobs, both direct jobs on-site and indirect/induced roles in the wider economy, during the construction period.

Gross value added

11.4.6 The contribution of the site to economic output has been calculated by taking the 100 on-site jobs associated with the scheme, and multiplying this by an estimate of average levels of gross value added (GVA) per construction employee in Yorkshire and The Humber. The estimated 133 indirect/induced jobs have been multiplied by the average GVA per job in the region overall. Adding these together, it is estimated that during the construction of the proposed development, the GVA associated with the 233 temporary jobs supported on-site and in the wider economy during the construction phase is around £6.3million.

Significance of construction impacts

11.4.7 The significance of the effect is assessed as follows:

- The sensitivity of the receptor (temporary employment in the economy) is assessed as being **low**, in line with the criteria set out in Table 11.1. As demonstrated in the baseline section (paragraph 11.3.10), the construction sector supports around 6,000 jobs in North Lincolnshire, meaning there should be a readily available market to meet the requirement of on-site construction jobs during the build phase.

- The magnitude of the impact is assessed as **substantial**, in line with the criteria in Table 11.2, firstly due to the significant capital investment of £160million. Secondly, the 233 on-site and indirect/induced jobs that the development is expected to generate, represents around 19.0% of employment in Frodsham ward (1.8% in North Lincolnshire).

[14] *Construction Traffic Management Plan: INGR Solar (Little Crow) Ltd:* Transport Planning Associates, July 2018.
[15] *Solar powered growth in the UK – the macroeconomic benefits for the UK of investment in solar PV*: Cebr (report for the Solar Trade Association), September 2014.

- The significance of the temporary effect is therefore considered to be **moderate and beneficial in the short-term.**

Operation

11.4.8 The main socio economic effects of the operational phase can be placed into two categories – employment and gross value added.

Employment

11.4.9 Details of permanent on-site jobs supported by the proposed development are still to be finalised. However, the numbers are not expected to be significant, and a maximum of 10 gross full-time equivalent (FTE) jobs has been used to inform this socio economic chapter.

11.4.10 For consistency, to arrive at a net estimate for job creation, the same multiplier has been applied as the on-site construction jobs (1.33, as per the Cebr report). Applying this multiplier to the estimated 10 gross FTE jobs, it is estimated that the scheme will support around 13 net additional FTE jobs in North Lincolnshire and the wider economy once it is built and fully operational.

Gross value added

11.4.11 The contribution of the site to economic output has been calculated by taking the job creation associated with the scheme, and multiplying this by an estimate of average levels of GVA per employee in Yorkshire and The Humber. It is estimated that once operational and fully occupied, GVA associated with the direct, indirect and induced jobs will be around £660,000 per annum.

11.4.12 Looking at the economic output contribution over a longer timeframe, over a ten-year period the additional GVA associated with the permanent jobs supported on-site is estimated to be £5.7million (present value)[16].

Other Benefits

11.4.13 Using data on regional and local authority electricity consumption published by the Department for Business, Energy and Industrial Strategy[17], it has been possible to calculate the site-specific capacity for solar parks. For the proposed development in North Lincolnshire, 150MW of solar park capacity is estimated to power around 40,200 UK homes per annum. It is also estimated that the scheme could offset over 50,000 tonnes of CO_2 per annum, or 1.6million tonnes over the next 25 years. This is even before any potential impacts of the battery storage element of the proposed development are taken into account.

11.4.14 A design and access statement produced as part of a planning application for a solar farm in Stratford-upon-Avon[18] lists a number of wider economic benefits associated with solar power. These are as follows:

[16] Where future benefits are calculated over a 10-year timeframe, they have been discounted to produce a present value. This is the discounted value of a stream of either future costs or benefits. A standard discount rate is used to convert all costs and benefits to present values. Using the Treasury's Green Book, the recommended discount rate is 3.5%.
[17] *Regional and local authority electricity consumption statistics*: Department for Business, Energy and Industrial Strategy, January 2018.
[18] *Planning, Design & Access Statement – Proposed Solar Farm on Land at Radbrook Pastures:* TGC Renewables, August 2018.

- Additional investment of £40billion is expected in renewable energy generation projects up to 2020, boosting energy security, reducing reliance on imported fossil fuels and supporting up to 200,000 jobs by 2020.
- TGC present data published by the Centre for Economic and Business Research (Cebr) that states, by 2030 British Solar could provide 60GW of power, supplying 18 million homes and supporting an average of 49,900 jobs per annum – nearly twice as many jobs as new nuclear and more than twice as many as on-shore wind, per unit of energy generated. The research found that, with bold government backing, by 2030, solar farms could contribute £25.5billion to the UK economy and put £425million back into consumers' pockets through reduced energy costs.

Significance of operational impacts

11.4.15 The significance of the effect has been assessed as follows:

- The creation of direct, indirect and induced employment is a **permanent beneficial effect** on North Lincolnshire's economy and labour supply receptor.

- The sensitivity of the receptor (employment at the solar park & within the wider economy) is assessed as being **medium**, in line with the criteria set out in Table 11.1. The proposed development will create new jobs in the local economy, which is important given employment in North Lincolnshire has remained flat in recent years.

- The magnitude of the impact is assessed as **moderate**, in line with the criteria in Table 11.2, due to the large level of investment associated with the proposed development (£160million), along with the small increase in permanent employment the scheme will create and the annual contribution it will make to economic output.

- The significance of the permanent effect is therefore considered to be a **long-term moderate positive impact.**

Decommissioning

11.4.16 The effects of decommissioning would be similar to, or often of a lesser magnitude than construction effects. However, there can be a high degree of uncertainty regarding decommissioning as engineering approaches and technologies are likely to change over the operational life of the development.

11.5 MITIGATION, ENHANCEMENT AND RESIDUAL EFFECTS

Mitigation by Design

11.5.1 There are no identified negative effects associated with the proposed development. When the proposed development is considered in isolation it may generate a small number of additional commuting flows although this is considered to be outweighed by the other positive effects that the proposed development would have on the economy.

Additional Mitigation

11.5.2 Due to the beneficial impacts identified in this assessment, no specific mitigation measures have been identified. The specific operational requirements of the proposed development have been carefully considered to ensure the proposed design provides the

best and most efficient layout required, resulting in the socio-economic benefits that have been identified.

Enhancements

11.5.3 Without mitigation being proposed, there will be no enhancements arising from such mitigation.

Residual Effects

11.5.4 Given no specific mitigation measures are required, the 'residual' effects remain as those identified in the above section.

11.6 CUMULATIVE AND IN-COMBINATION EFFECTS

11.6.1 There are no other proposed developments in close proximity to the site, meaning there are no cumulative effects to consider.

11.7 SUMMARY

Introduction

11.7.1 This chapter has assessed the socio-economic impacts arising from the proposed development of a new 150 MW solar park, with up to 90 MW of battery storage in Santon, North Lincolnshire.

Baseline Conditions

11.7.2 North Lincolnshire has an older population when compared with the regional and national picture, while jobs growth has been flat over the last five years. Wages are also below the UK average, but higher than Yorkshire and The Humber as a whole. North Lincolnshire is also faced with the issue of having a net outflow of commuters who work in other parts of the region. The flat labour market and net out-commuters would suggest that more developments that create new employment opportunities are needed to support growth in the District.

Likely Significant Effects

11.7.3 In respect of the construction phase, the assessment indicates that the proposed development will have the following temporary effects:

- **233** direct and indirect/induced construction jobs and indirect/induced supply chain jobs over the construction programme.
- **£6.3million** of gross value added over the construction programme.
- **£160million** of direct capital investment during the construction programme.

11.7.4 In EIA terms, these impacts are considered to have a significant beneficial effect in the short-term.

11.7.5 In respect of the operational phase, the assessment suggests that the proposed development will have the following permanent effects:

- **13** net additional jobs in the North Lincolnshire economy.
- **£660,000** of gross value added per annum in the North Lincolnshire economy or **£5.7million** over ten years (present value).

11.7.6 The effects of decommissioning would be similar to, or often of a lesser magnitude than construction effects. However, there can be a high degree of uncertainty regarding decommissioning as engineering approaches and technologies are likely to change over the operational life of the development.

11.7.7 In EIA terms, these impacts are considered to have a significant beneficial effect in the long-term.

Mitigation and Enhancement

11.7.8 There are no identified negative effects associated with the proposed development. When the Proposed Development is considered in isolation it may generate a small number of additional commuting flows although this is considered to be outweighed by the other positive effects that the proposed development would have on the economy.

Conclusion

11.7.9 Overall the proposed development is considered to provide significant positive effects.

Table 11.6: Summary of Effects, Mitigation and Residual Effects.

Receptor / Receiving Environment	Description of Effect	Nature of Effect *	Sensitivity Value **	Magnitude of Effect **	Geographical Importance ***	Significance of Effects ****	Mitigation / Enhancement Measures	Residual Effects ****
Construction								
Construction jobs	Increase in employment in the construction sector	Temporary	Low	Substantial	District	Moderate beneficial	N/A	N/A
Operation								
Direct employment	Increase in local employment	Permanent	Medium	Moderate	District	Moderate beneficial	N/A	N/A
Decommissioning								
Construction jobs	Increase in employment in the construction sector	Temporary	Low	Substantial	District	Moderate beneficial	N/A	N/A
Cumulative and In-combination								
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Notes:

* Enter either: Permanent or Temporary / Direct or Indirect

** Only enter a value where a sensitivity v magnitude effects has been used – otherwise 'Not Applicable'

*** Enter either: International, European, United Kingdom, Regional, County, Borough/District or Local

**** Enter either: Major / Moderate / Minor / Negligible AND state whether Beneficial or Adverse (unless negligible)