TEMPLE OAKS RENEWABLE ENERGY PARK

Scoping Report

PREPARED ON BEHALF OF

RIDGE CLEAN ENERGY

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engena

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INTRODUCTION

1 This document, and accompanying figures, form the Scoping Report for a solar and Battery Energy Storage System project called the Temple Oaks Renewable Energy Park. The potential development is located on farmland within a disused former RAF airfield to the south-west of Folkingham, Lincolnshire. The location of the proposed development is shown in **Figure SR1** and **Plate 1 on page 3**.

2 Submitted to The Planning Inspectorate under the terms of The Infrastructure (Environmental Impact Assessment Regulations) 2017 as amended in 2018 (EIA Regulations), Regulation 10(1), this Scoping Report introduces the project, describes the proposal in more detail then presents the anticipated environmental assessments required for the scale and location of the proposal. This Scoping Report forms the formal request for a Scoping Opinion under Regulation 10(1) of the EIA Regulations.

3 This Scoping Report has been prepared in light of guidance provided within Planning Inspectorate's Advice Note 7 'Screening, Scoping and Preliminary Environmental information'.

Project Overview

4 The proposed project, to the south-west of Folkingham, includes an array of ground-mounted solar panels and ancillary infrastructure including inverters (located centrally or mounted behind the panels), transformer units, electrical infrastructure, 132kV substation, and temporary construction compound. In addition, a Battery Energy Storage System (BESS) would be included within the project.

5 It is anticipated that the proposed development would be generating electricity for a period of forty (40) years.

6 The potential solar farm would have an installed capacity of up to 240MW. The panels would be ground-mounted to a maximum height above ground of up to 3.5m.

7 At this early design stage it is predicted that the solar farm would have a potential annual yield of approximately 294 000MWh (based on early site designs/PVSyst modelling, numbers to 3 Significant Figures).

8 In terms of household electricity usage this would be sufficient to supply the equivalent annual electricity needs of approximately 75 000 homes, based on an average annual domestic consumption in East Midlands per household of 3 920kWh (DBEIS, 2021).

9 From the displacement of electricity generated using fossil fuels, the proposed development would offset the emission of a significant quantity of pollutants, particularly carbon dioxide, into the atmosphere. This reduction in emissions would contribute to the national legislation of zero net carbon emissions by 2050 and international reductions required under the latest

legally binding obligations agreed since Paris 2015 (COP21).

10 Electricity generated using a solar system varies throughout daytime hours according to changes in irradiance (or light levels). To complement this generation, a Battery Energy Storage System (BESS) is proposed.

11 The battery serves a number of purposes, including stabilising the generation as well as operating independently of the solar farm to provide energy during times of peak demand or system frequency instability.

12 The BESS would be rated at up to 480MWh and would therefore be capable of providing a 240MW output over a 2 hour period.

Design Iterations and EIA

13 It is highlighted that figures, areas and the layout itself presented in this report may change during the inherently iterative EIA process through which benefits from maximising renewable energy generation are balanced with identified potential impacts.

The Applicant

14 The Applicant for the proposed development will be a Special Purpose Vehicle (SPV) company of Ridge Clean Energy Limited.

15 Ridge Clean Energy (RCE) is a UK based clean energy company that originally formed as RidgeWind in 2003. The team has extensive experience in the development, construction and operation of clean energy projects across the UK, including solar, wind and associated infrastructure.

16 Engena Limited is an independent planning consultancy with development experience in the renewable energy industry dating back to the late 1990's. The company specialises in project planning, development management and environmental assessment. Engena is supporting Ridge Clean Energy with the provision of planning services.

17 RCE's mission is centred on net zero beginning within the local community, with a core part of their work being the creation of local initiatives that will have an enduring, positive impact.

18 RCE works with local groups and leaders to identify community needs and opportunities for support. Their focus centres on addressing local needs at a local level, as well as encouraging a community in its path to net zero.

Site Location

19 The potential area for development totals approximately 350ha (865 acres).

20 The site is fairly isolated from nearby settlements. The village of Folkingham is c.1.8km to the north-east; the hamlet of Keisby c.1km to the south-west; the hamlet of Lenton is c.1.9km to the west; and the village of Aslackby is c.1.9km east of the proposal.

21 The A15 runs in a north/south direction to the east of the proposed site.

22 The southern boundary of the site is bordered by woodland.

23 The nearest residential dwellings are located adjacent to minor roads surrounding the site and include (in clockwise order from north) Laughton Lodge (600m east), Laughton Hall Farm House (750m east), Villa Farm (856m south-west), Manor Farm (1.2km west), and Owens Barn Farm (620m north).

24 The site lies across three Parish Councils' area: Lenton, Keisby, Hanby, and Osgodby Parish on the western half of the site, Folkingham Parish in the north-east and the Parish of Aslackby and Laughton on the eastern section. A map showing the location of the site is at **Plate 1 on page 3** and **Figure SR1**.

25 There are numerous bridleways and public footpaths heading towards the site, however, these terminate at the site boundary. Searches of the definitive map confirm that there are no Public Rights of Way in existence across the former airfield (this is to be verified against the National Archives). The airfield runways and service tracks still exist intact.

26 In addition, site visits have shown that the site is well screened from outside views.

27 The Renewable Energy Park will connect to the National Grid Bulk Supply Point at Bicker Fen (c.15km to the north-east of the site as the crow flies).

28 The connection route will be underground within the highway departing from the north-east corner either north along West Street following the A15, then A52 east to Bicker Bar then along local roads to the location of the Bicker Fen Bulk Supply Point or east along Laughton Road North, north along A15, east along Billingborough Road, north along Mareham Lane, east along A52 to Bicker Bar, then along local roads to the Bicker Fen Bulk Supply Point (**Plate 2 on page 4**).

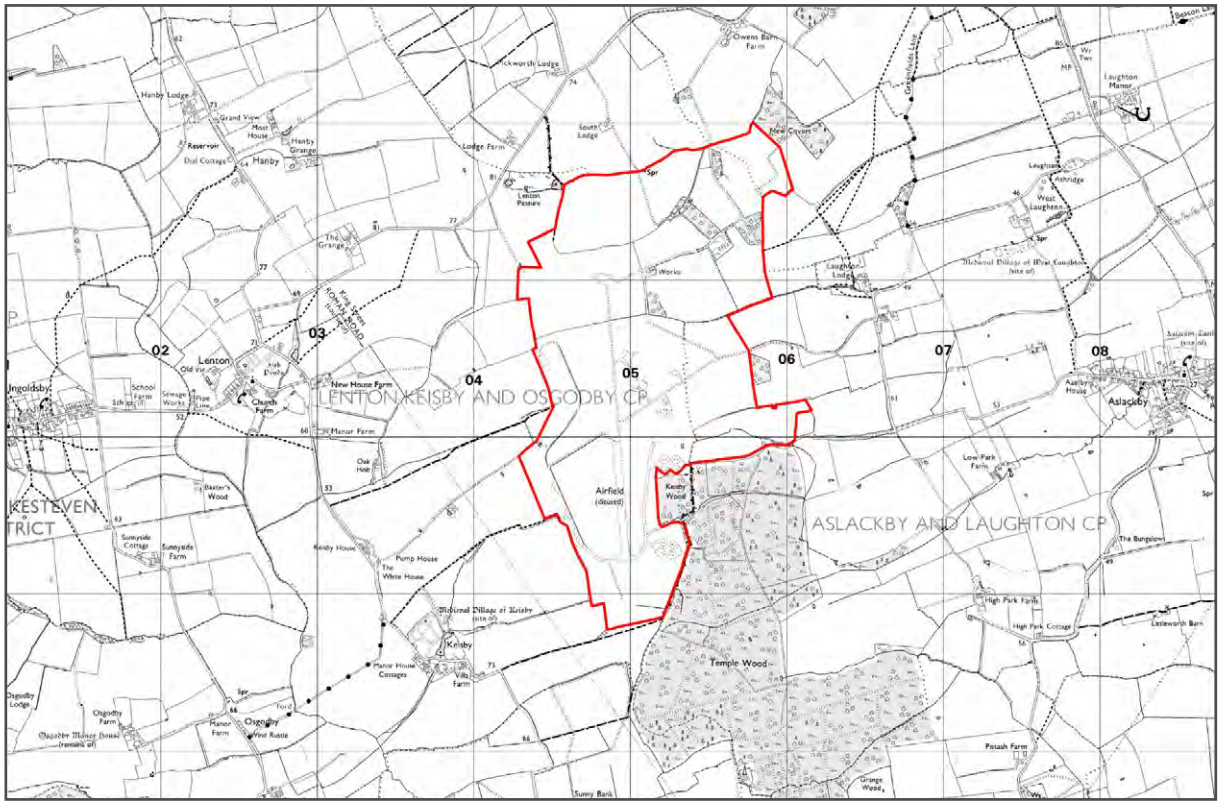


Plate 1 - *Potential Area for Solar Farm and Battery Energy Storage System (red line)*

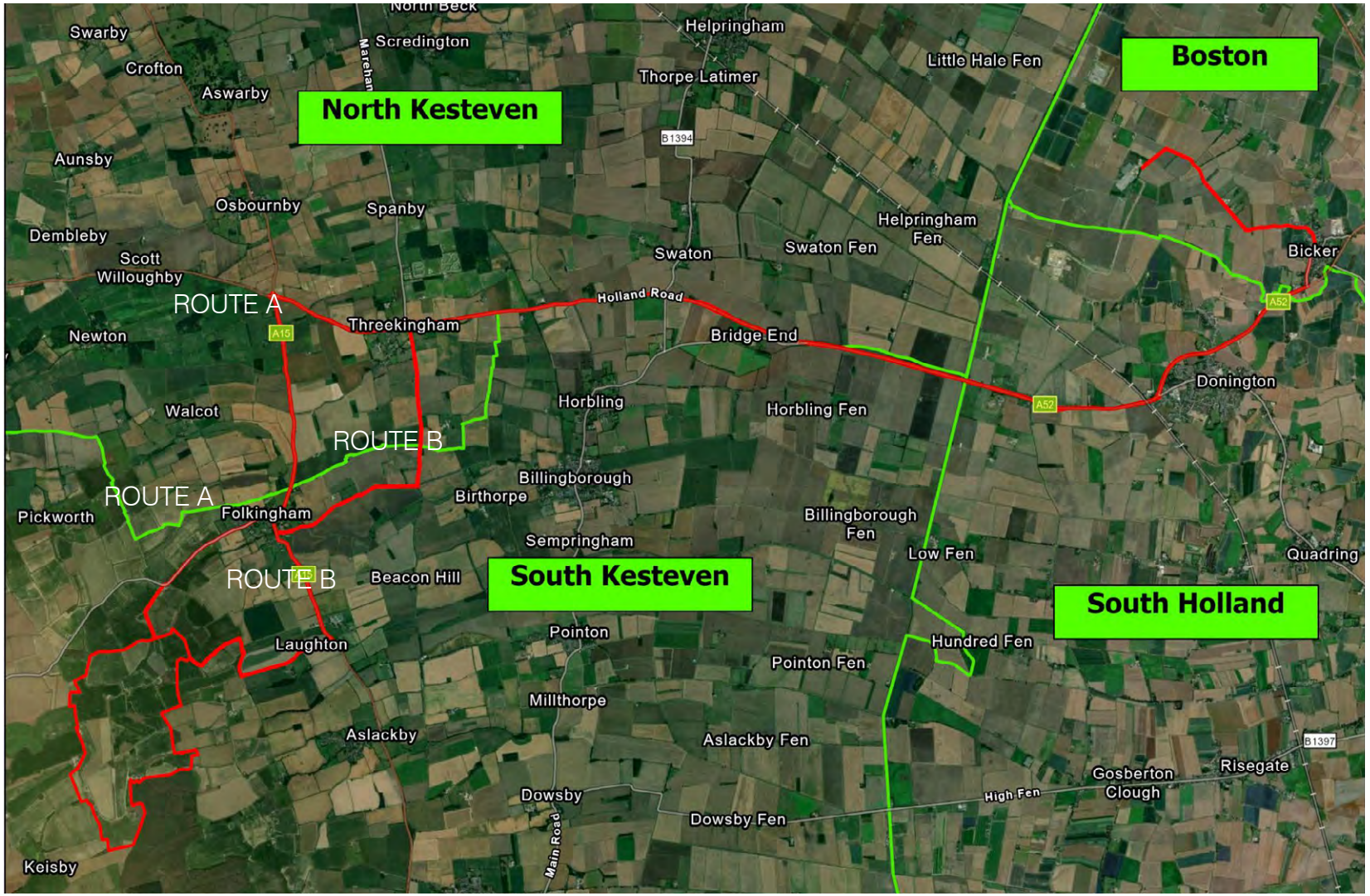


Plate 2 - *Alternative Grid Connection Routes*

THE PROPOSAL

Introduction

29 The proposed development would consist of solar panels that are ground mounted in rows and ancillary infrastructure including centralised inverters distributed across the site or inverters mounted behind the panels, transformers and temporary construction compounds. In addition, a Battery Energy Storage System would be located within the site.

Site Infrastructure

Solar Panels, Frames and Anchors

30 A site area of approximately 280ha (692 acres) is available for development. The ground-mounted solar photovoltaic panels would have an installed capacity of c.240MW. A typical solar panel array is shown in **Plate 3**.

31 The solar panels would be mounted on a frame and have a maximum height to panel top of up to 3.5m. The panel frames are fixed to the ground with ground anchors, or if necessary surface mounted feet.

32 Space between frames is provided for maintenance access and to avoid shading from neighbouring panels.

Plate 3 - *Typical Solar Array*

Access Tracks

33 Existing airfield and farm tracks and entrances would be utilised and upgraded where necessary to allow access to individual segments of the solar array.

34 Where sections of new, upgraded or widened access track are required this would have the appearance of typical vernacular farm tracks with a crushed stone running surface (**Plate 4**), this would be allowed to grass over in time. The running surface (likely 4m wide) is laid over a stone sub-surface which itself is typically constructed upon a geotextile membrane.

Plate 4 - *Typical New Site Access Track*

Solar Panel Inverters and Transformers

35 The solar panels generate Direct Current (DC) electricity, which must be converted to electricity with an Alternating Current (AC) before it is exported into the Local Distribution Network. This conversion would be undertaken by inverter units. Transformers raise the inverter output voltage to an intermediate voltage for transmission across the site.

36 At this early design stage, both central and string inverters are being considered for this site.

37 Central inverters are containerised inverter/transformer units, each approximately 6.06m long by 2.44m wide and 2.90m high (**Plate 5**). A typical centralised inverter is rated at approximately 3.0MVA, and therefore around 80 units would be required for a site of this size. If utilised, these would be located within the solar array, rather than the edge, and will therefore be largely screened by the panels.

Plate 5 - *Typical Central Inverter/Transformer (image courtesy of SMA Solar Technology AG)*

38 Alternatively, string inverters are located behind the panels, and mounted onto the frame (**Plate 6**). A typical string inverter is rated at approximately 250kVA, and therefore around 960 units would be required for a site of this size.

Plate 6 - *Typical string-inverter units*

39 A substation compound will contain equipment raising the intermediate site voltage to the export voltage of 132kV. Equipment will comprise the site transformer, switchgear, isolation and metering equipment. From here, the connection is made to the Bicker Fen National Grid Bulk Supply Point.

40 **Plate 7** shows an indicative 132kV substation compound.

Plate 7 - *Typical 132kV compound*

Temporary Construction Compound

41 For the duration of the construction (and decommissioning) period, a temporary compound would be required to provide secure storage of equipment and construction materials, welfare facilities and office accommodation for site staff. It is typical for a development of this scale that multiple rest areas are set up across the site to allow teams to work in parallel through the construction period.

Security Fence

42 A perimeter fence and CCTV system comprising inward-facing cameras would likely be installed to protect the solar panels and cabling from theft. A typical fence is shown at **Plate 8**.

43 No lighting is proposed within the solar farm. The CCTV cameras operate in infra-red mode at night time, which is not visible to the naked eye.

Plate 8 - *Typical Security Fence*

Battery Energy Storage System

44 There are various battery technologies available, each having their own arrangement of battery container units, power conversion systems, and transformers. Each battery container unit would house a set of battery modules.

45 In general, a 480MWh battery would comprise around 160 battery container units. Rated at 480MWh, the BESS would be able to provide a continuous 240MW output over a 2 hour period. An approximate area of 3ha will be required for this facility.

46 Each battery container unit is supported by Power Conversion System (PCS) units. These convert the Direct Current (DC) electricity of the battery to the Alternating Current (AC) electricity of the power network, and vice-versa, whilst discharging and charging.

47 Battery container units (**Plate 9 on page 8**) are typically spaced between 1m to 5m apart, depending upon the configuration of the support systems such as the PCS units and transformers. PCS units are normally located between each battery container unit pair.

48 A 33kV transformer typically serves two battery container units. This steps the system voltage up (or down) appropriately. Buildings housing switchgear and metering equipment are also located within the BESS compound. The BESS compound will be secured with palisade fencing.

Plate 9 - *Typical BESS*

49 Each battery container unit contains a temperature monitoring system that will shut down the module if a battery overheats. In the unlikely event of a system fire, a fire suppressant system ensures that the fire is self-contained within the module, and is quickly extinguished.

Operational Phase

50 The site would be remotely monitored and operated with the automated system alerting an engineer in case of component or system issue. Regular checks would be undertaken to ensure the panels, inverters, frames and fittings are all in good working order. The panels would be cleaned periodically to ensure maximum production.

51 During normal operations, personnel would visit the site approximately once a month, in a light van or four-wheel drive vehicle.

52 It is anticipated that the proposed development would be operating for a period of forty (40) years.

ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

53 The EIA Regulations apply to Nationally Significant Infrastructure Project (NSIP) Developments.

54 For certain types of major development (listed in Schedule 1) the regulations stipulate a mandatory requirement for an Environmental Impact Assessment to accompany an application.

55 For other types of development (as listed in Schedule 2) the requirement for EIA will need to be tested through Screening against a set of criteria (listed at Schedule 3) to determine the likelihood of significant environmental effects.

56 Solar Farms are included under *Category 3(a) - Industrial installations for the production of electricity, steam and hot water (unless included in Schedule 1)*.

EIA Screening

57 An Inception Meeting was held with the Planning Inspectorate on 24th September 2021, introducing the scheme. Under Regulation 8(1) of the EIA Regulations the Applicant notified the Secretary of State in writing that they propose to provide an ES in respect of the Temple Oaks Renewable Energy Park on 10th June, 2022.

58 Submission of this Scoping Report requesting a Scoping Opinion constitutes the next stage in the formal NSIP consenting process.

EIA Scoping

59 Under Sections 14(1)(a) and 15(2) of the Planning Act 2008, the Temple Oaks Renewable Energy Park is defined as a Nationally Significant Infrastructure Energy Project being an onshore electricity generation facility of greater than 50MW capacity. Ridge Clean Energy has opted to request a formal Scoping Opinion in accordance with Regulation 15 of the EIA Regulations. This provides the Planning Inspectorate the opportunity to confirm the scope of the EIA.

60 Regulation 15(2) outlines the minimum information required within the scoping request:

(i) a plan sufficient to identify the land;

(ii) a brief description of the nature and purpose of the development, including its location and technical capacity;

(iii) an explanation of the likely significant effects of the development on the environment; and

(iv) such other information or representations as the person making the request may wish to provide or make.

61 This scoping report has been prepared in accordance with Regulation 10(3) of the EIA Regulations and sets out the anticipated impacts of the proposal, and the necessary topics for the EIA and subsequent Environmental Statement (ES).

PROPOSED ASSESSMENTS AND DOCUMENTATION

Site Design

62 Through careful site selection, and an iterative considered approach to site design that aims to mitigate the potential impacts, the developer aims to minimise impacts and maximise generation capacity.

63 The initial suitability of the landholding for a solar farm and BESS, plus the initial site design within the boundaries of the landholding, was based on consideration of the following technical and environmental constraints as guided by National Planning Policy Framework (NPPF, 2021), National Planning Practice Guidance, the National Policy Statement for Renewable Energy Infrastructure (EN-3) (DECC, 2011), and common industry practice:

- Site capacity - the site is considered against a number of constraints to determine the land capacity. These considerations include: proximity to dwellings, designated sites, trees and ecological features, Public Rights of Way, and utilities infrastructure. For an array of solar panels, the panel rows should avoid shading each other, and should avoid shading from surrounding vegetation or built form by allowing a suitable separation between rows and from such features.
- Road access - there must be adequate access for the delivery vehicles used during construction.
- Electrical connection – it must be technically and economically viable to connect the site to the local electricity distribution system.

64 In considering typical industry practices, the additional technical and commercial criteria important to the successful development of a solar farm are:

- Land availability – the landowner must support the development of a renewable energy proposal on their land.
- Existing land use – it is important to work with consideration to the activities on the land to ensure that plant and equipment are positioned to minimise impacts on existing and future planned activities.
- Land quality – an agricultural land classification (ALC) survey of the site will establish the baseline soil environment.

65 Alongside the consideration of all technical, environmental and commercial site selection criteria, the developer takes a landscape and visual impacts-led approach to detailed site design.

Pre-Application Public Consultation

66 A comprehensive programme of pre-application Statutory and additional non-statutory consultation with the local community will be undertaken. The responses from the consultation will be considered in the final design and application.

67 The public consultation program will include public consultation events as well as other initiatives (e.g. leafletting, parish meetings and project website) designed to engage with nearby residents, parish councillors and the local community.

68 A Statement of Community Consultation will be prepared in consultation with stakeholders (including The Planning Inspectorate, South Kesteven Disctrict and Lincolnshire County Council).

Environmental Impact Assessment

69 It is envisaged that the EIA will assess the following factors to determine anticipated significant impacts as guided by policy and guidance. These topics will be reported within chapters of the Environmental Statement (ES) that will ultimately accompany any planning application.

Existing Conditions - Agricultural Land Classification

70 A detailed site survey has been undertaken and will be reported in full within this chapter of the ES. The land within the proposed development boundary has been identified as Grade 3b with some Non-Agricultural land.

71 The assessment includes:

- A review of the site environment and current agricultural use;
- Data search of published records of geology and soils across the site; and
- A detailed soil resource and agricultural quality survey at a sampling density of one observation per hectare.

Landscape and Visual Assessment

72 This section, provided in **Appendix A**, presents the scoping exercise that has been undertaken to inform the proposed scope of the landscape and visual impact assessment (LVIA) for the Temple Oaks Renewable Energy Park.

73 It introduces the site and proposed development and the competent experts who will undertake the LVIA, explains the purposes of the LVIA and the method of assessment, and sets out the scope and process of assessment for the LVIA, to suit the scale, nature and location of this proposed development. The approach to the assessment of cumulative effects is also considered.

74 This scoping exercise has been informed by fieldwork, aerial photography, Ordnance Survey maps, published studies, websites and a computer-generated zone of theoretical visibility (ZTV) based on terrain data only. All references are listed at the end of this Appendix.

Cultural Heritage & Historic Environment

75 The Historic Environment assessment will consider the potential physical and indirect effects of the Temple Oaks Renewable Energy Park upon potential and known designated and non-designated heritage assets as well as any potentially significant cumulative effects. A Historic Environment Desk Based Assessment (HEDBA) has been completed and has informed the EIA scoping exercise. The scoping of the

Historic Environment Assessment is provided in **Appendix B**, setting out:

- baseline conditions;
- assessment methodology;
- study area and proposed viewpoints;
- anticipated effects – construction and decommissioning and operation;
- potential mitigation;
- assumptions, limitations and uncertainties; and
- a summary of scope.

Ecology and Ornithology

76 The scoping of the Ecology and Ornithology Assessment is provided in **Appendix C**, setting out:

- baseline conditions (determined through desk-based assessment and site surveys),
- assessment methodology;
- Potential for 'Likely Significant Effects'; and
- consideration of cumulative effects.

Traffic and Transport

77 The scope of the Traffic and Transport assessment Is established in **Appendix D**.

78 This sets out:

- policy and guidance;
- current conditions;
- methodological approach;
- anticipated effects (to also include potential cumulative effects);
- potential mitigation;
- assumptions, limitations and uncertainties; and
- a summary of scope.

Noise

79 Detailed scoping of the noise assessment is provided in **Appendix E**. This sets out:

- baseline conditions;
- assessment methodology;
- anticipated noise effects (including also potential cumulative effects, where potentially significant);
- potential mitigation;
- assumptions, limitations and uncertainties; and
- a summary of scope.

Hydrology, Hydrogeology & Flood Risk

80 The scope of the Hydrological and Flood Risk Assessment is set out in **Appendix F** and comprises of:

- baseline conditions,
- assessment methodology;
- anticipated Effects – construction and decommissioning and operation (to also include potentially significant cumulative effects);
- potential mitigation;
- residual effects; and
- assumptions, limitations and uncertainties.

Glint and Glare

81 Glint and glare is a result of receptors seeing the reflection of the sun or its corona, respectively, in the PV panels.

82 A desktop assessment will be undertaken (in accordance with the

NPPG) informed by the proximity and orientation of the nearest dwellings, highways, railways and airfields.

83 The assessment will also follow the Building Research Establishment (BRE) document 'Planning Guidance for the Development of Large-Scale Ground Mounted Solar PV Systems' as well as The Civil Aviation Authority (CAA) published interim guidance on 'Solar Photovoltaic Systems'.

84 The US Federal Aviation Administration Policy Solar Guide (Federal Aviation Authority, 2010) incorporates a chapter on the impact and assessment of glint from solar panels. Consideration of the guidance will be included within the assessment.

85 The potential for significant effects (including cumulative where potentially significant) will be assessed for dwellings highways and railways within 1km and aviation interests within 30km.

86 The methodology will include development of the sun position and reflection model, determination of ocular impact, identification of receptors, analysis of the magnitude of impacts and assessment of the significance of identified impacts. Mitigation will be proposed where necessary and residual effects identified.

Socio-Economic Effects

87 This section of the EIA, and reported in the ES, will consider the potential for significant socio-economic effects of the proposed development during its construction, operation and decommissioning phases. The potential for significant impacts focuses on employment and contributions to the local and regional economy and contributions to the UK transition to net zero emissions.

BASELINE

Employment and the Economy

88 In terms of the existing employment baseline, ONS Labour Market Profile for Lincolnshire (ONS, 2020) reports that the relevant sectors comprise:

- construction - 13 000 employee jobs (4.7% of Lincolnshire total);
- Accommodation and Food services 22 000 employee jobs (7.9% of Lincolnshire total); and
- Transportation and storage - 12 000 employee jobs (4.3% of Lincolnshire total).

89 Employment in each sector has broadly followed regional and national trends in the time-series data with recent marginal rises in transport employment and falls in accommodation and food-services. It should be noted that the data relates to 2020 and this year and previous years will demonstrate a degree of volatility given global macro-economic effects following departure of the UK from the European Union and the SARS-CoV-2 pandemic.

90 The Committee on Climate Change (2017) stated that '*the UK low-carbon economy is already estimated to employ hundreds of thousands of people and contribute around 2-3% of GDP*'.

Transition to Net Zero Emissions

91 The UK's legally binding target, under the Climate Change Act 2008 (as amended) is to achieve net zero carbon emissions by 2050. It explains how the Sixth Carbon Budget ties in with the Energy White Paper (December 2020), the Government Response to the Future Homes Standard (January 2021) and the 10 Point Green Plan. With all new cars and vans to be fully electric from 2030 and heating in new

homes to be non-fossil fuel from 2025, electricity demand is set to increase from approximately 300TWh today to 360TWh in 2030, 460TWh in 2035 and 610TWh in 2050. In addition to this, to produce hydrogen for transport, an additional 120TWh is required by 2050.

92 In achieving the net zero goals, and adapting to the electrification of the transport and heating sectors, the UK electricity generation mix is also required to evolve from the current baseline. The historic and more recent situation is demonstrated in **Plate 10**.

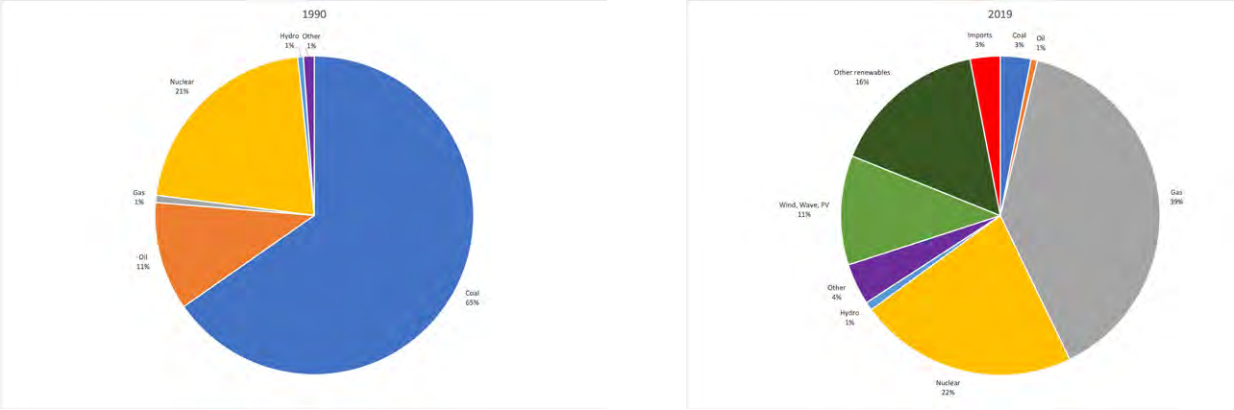


Plate 10 - *1990 Electricity Fuel Mix compared to 2019 Electricity Fuel Mix*

(Source: Digest of UK Energy Statistics (DTI, 2000)(BEIS, 2020a)

METHODOLOGY

93 There is no established methodology nor specific guidance as to the assessment of the significance of potential impacts on either employment, the economy or contributions to the transition to net zero emissions. The assessment will be based on professional judgement, combining the sensitivity of potential receptors to economic change, and the magnitude of the anticipated change associated with the construction, operation and decommissioning of the proposal.

94 The geographical scale at which impacts are identified will also be a consideration be they at the site, local, regional or national level. Potentially significant impacts are more likely at the site and local level, dependant on the established employment and economic baseline. Significant impacts at the site level are not likely to be judged significant in EIA terms.

Transition to Net Zero Emissions

95 Due to the nature of the scheme as a Nationally Significant Infrastructure Project, it is envisaged that the renewable energy park's contribution to the transition to net zero will be significant and at the national level.

POTENTIAL IMPACTS

Construction and Decommissioning

Employment and the Economy

96 The construction of the proposal is likely to have employment and economic impacts at the local and regional level through the award of construction contracts and associated sub-contracts.

97 It is likely that local companies will be best placed to source construction materials, labour, equipment and services, and

will have the skills and capacity to undertake many elements of the construction activities.

98 Suitably qualified and experienced local industry sectors would have the opportunity to be involved in areas of work including:

- civil engineering design;
- geotechnical ground investigations;
- civil works (access track construction, panel installation, substation building, cable trenching);
- onsite electrical network design;
- onsite electrical network installation and commissioning;
- aggregate supply;
- haulage;
- plant hire; and
- ancillary and tertiary sectors relating to supplies, accommodation, catering, etc.

99 The decommissioning of the site is an expedited reversal of the construction process and it is anticipated that the potential impacts would be reduced but comparable with additional opportunities for recycling facilities.

100 Construction of a scheme of this scale is likely to involve in the order of the equivalent to 252 worker-years (assuming 200 working days per year and an eight hour working day and equating to 252 workers necessary to work on site for one year to complete the construction). With an anticipated two-year construction period, this would equate to an equivalent construction workforce in the order of 126 persons on site. This has the potential to be significant at the local level, whilst not significant at the regional level given the established employment baseline.

101 The capital expenditure of a scheme of this scale is in the order of £500 000 per megawatt installed (applicable to both battery and solar elements). As such the capital expenditure on the scheme could be expected to be, at 2022 costs around £240 million. Balance of plant costs which are represented by the elements listed in paragraph 98 on page 15 are typically 15% meaning there is the potential to make available £36 million to the regional economy.

102 Cumulative impacts will be considered at the local and regional level.

Operation

Employment and the Economy

103 Operationally, a site of this nature requires nominal attendance being managed remotely. There will be opportunities for ground keeping, ecological habitat maintenance, cleaning and maintenance - these impacts are unlikely to be significant at anything beyond the site level.

104 Community benefits and business rates may have a locally significant benefit, whilst not a planning consideration.

Transition to Net Zero Emissions

105 Due to the nature of the scheme as a Nationally Significant Infrastructure Project, it is envisaged that the renewable energy park's contribution to the transition to net zero will be significant and at the national level. Cumulative impacts will be considered at the local, regional and national level.

PLANNING POLICY

106 All assessments undertaken through the EIA, and also supplementing the application, will take account of the national and local planning policies pertinent to both the local area, to climate change and to renewable energy. These policy documents will include:

- National and Regional Policy:
  - National Policy Statement (NPS) - EN1 - Overarching NPS for Energy (including recent draft amendments);
  - NPS - EN3 - Renewable Energy Infrastructure (including recent draft amendments); and
  - National Planning Policy Framework (NPPF).
- National Guidance:
  - National Planning Practice Guidance (online resource);
  - Planning Guidance for the Development of Large-Scale Ground Mounted Solar PV Systems (Building Research Establishment (BRE), 2014a);
  - Agricultural Good Practice Guidance for Solar Farms (Building Research Establishment (BRE), 2014b); and
  - BRE National Solar Centre Biodiversity Guidance for Solar Developments (Building Research Establishment (BRE), 2014c).
- Local Policy:
  - South Kesteven District Council Local Plan 2011-2036 (adopted January 2020);
  - the Renewable Energy Appendix which forms part of the Local Plan;
  - Lincolnshire Minerals and Waste Local Plan (adopted 2016);
  - 4th Lincolnshire Local Transport Plan (2013); and
  - Joint Lincolnshire Flood Risk and Water Management Strategy 2019-2050.

Proposed Format of Environmental Statement and Planning Submission

Environmental Statement

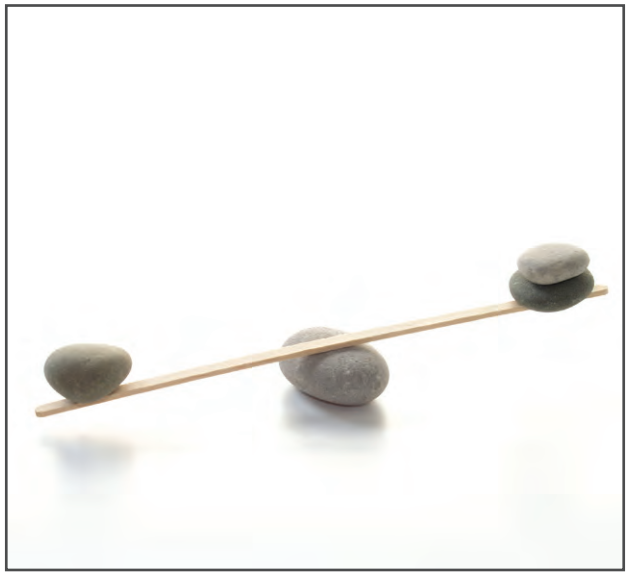
107 It is proposed that the findings of the Environmental Impact Assessment are presented within an electronic four volume, five part Environmental Statement (ES) consisting of:

- Volume 1: Non-Technical Summary – summarising the key issues and findings in a format which is easily accessible to a non-technical audience;
- Volume 2A: Written Statement – the detailed Environmental Statement, containing the independent specialist assessments, mitigation, and anticipated residual impacts (anticipated chapter list is provided at **Appendix G -** Draft ES Chapter List);
- Volume 2B: Appendices – where applicable, appendices supporting the Written Statement will be included within this section of the ES;

- Volume 3: Figures – an electronic A3 document containing the site layout figures, construction figures and other chapter specific figures referred to within the Written Statement; and
- Volume 4: Visualisations – presents the visualisations referred to in the Landscape and Visual Impact Assessment (LVIA) within the Written Statement, with a description of how to interpret them.

108 In addition to the four volume ES, the developer will also submit a Consultation Report detailing the community involvement Design and Access Statement and a Planning Appraisal Whilst not forming part of the ES, the Planning Appraisal will be a key document within the overall submission summarising the national, county and district policies relevant to the development.

109 In line with the move towards 'e-planning'. the developer proposes to submit the ES and associated application documents in online electronic format.



CONCLUSIONS

110 In accordance with Regulation 10(1) of The Infrastructure (Environmental Impact Assessment Regulations) 2017 as amended in 2018, an Environmental Impact Assessment (EIA) for the proposed Temple Oaks Renewable Energy Park will be prepared and the opinion as to the scope and level of detail of the information to be provided in the ES is formally requested.

111 It is proposed that the Environmental Statement will comprise assessments including landscape and visual, heritage and archaeology, Agricultural Land Classification, flood and surface water, glint and glare, noise, ecology, transport and traffic, and socio-economics. These assessments follow nationally accepted and tested methods and guidelines and will ensure that a thorough, robust application is presented to The Planning Inspectorate.

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APPENDIX A - LVIA SCOPING

Temple Oaks Renewable Energy Park, southwest of Folkingham, Lincolnshire

CONSTRUCTION OF SOLAR FARM, ACCESS & MAINTENANCE TRACKS, SUBSTATIONS, TRANSFORMERS, BATTERY STORAGE CONTAINERS, SECURITY FENCE AND GATES

PINS REF: EN010126

Landscape and Visual Impact Assessment

Draft 3

May 2022

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ENVIRONMENT

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Document Status

Date	File reference	Status	Reviewed by
26/05/2022	RCE01_LVIA_scoping report_d3	Draft 3 - for review	IB RC THT

Landscape and Visual Amenity

Introduction

1. This chapter presents a scoping exercise that has been undertaken to inform the proposed scope of the landscape and impact visual assessment (LVIA) for the Temple Oaks Renewable Energy Park (the "proposed development").

2. It introduces the site and proposed development and the competent experts who will undertake the LVIA, explains the purposes of the LVIA and the method of assessment, and sets out the scope and process of assessment for the LVIA, to suit the scale, nature and location of this proposed development.

3. This scoping exercise has been informed by fieldwork, aerial photography, Ordnance Survey maps, published studies, websites and a computer-generated zone of theoretical visibility (ZTV) based on terrain data only. All references are listed at the end of this chapter.

Development Site and Proposed Development

4. The development site is located approximately 1km south of the minor road between Ingoldsby and Folkingham in South Kesteven District, Lincolnshire and is likely to be accessed off this minor road via an existing concrete road between Owens Barn Farm and the site.

5. The site is on farmland within the former RAF Folkingham airfield and remnants of the airfield infrastructure are still evident including concrete roads and hardstandings. The majority of the site is currently in mixed agricultural use (arable and pasture) and there are several ponds and small blocks of woodland on the site, plus Keisby Wood and the extensive Temple Wood (part of the National Forest) to the immediate southeast of the site.

6. The indicative site area is approximately 348ha and the proposed development would occupy approximately 280ha (80%) of the total site area. The remainder of the site would be the existing woodlands, ponds, concrete roads, and National Grid gas pipeline route (which requires a 20m buffer).

7. The proposed development is shown on the *Initial Site Layout Plan* (Figure 2). It is a solar farm with an installed capacity of up to 240MW and an anticipated generating life of 40 years. It would consist of arrays of ground-mounted solar PV panels plus ancillary infrastructure including inverters (located centrally or mounted behind the panels), underground communication and transmission cables, and a compound housing a 132kV substation, transformer units and battery storage containers, all enclosed within security fencing and gates. There would also be an underground connection to the national electricity grid. The existing on-site concrete roads would be retained and additional access

tracks within the site may also be constructed. There would also be a number of temporary construction compounds.

Competent Experts

8. The LVIA will be undertaken by Kay Hawkins, Chartered Landscape Architect (CMLI) and Director of Hawkins Bell Associates Ltd (t/a H:B:A Environment), a landscape practice and environmental consultancy based in Shropshire. Kay has been undertaking LVIAs for a wide range of developments for over 30 years and has drafted this scoping chapter. Further information on her experience and expertise is provided in Appendix 1.

9. The photography and computer-generated graphics that will inform and illustrate the LVIA will be produced by Mike Spence and his team at MSEnvironmental, based in Oxenhope, West Yorkshire. Mike is a Chartered Landscape Architect (CMLI), Registered EIA Practitioner (REIA) and Fellow of the Royal Geographical Society (FRGS). Further information on Mike's expertise is also provided in Appendix 1.

Purposes of the LVIA

10. As explained in Appendix 2 – Method of Assessment, in accordance with the EIA Regulations, the LVIA will focus on identifying all "*likely significant effects*" (ie effects that are material to the decision-making process) and will identify the landscape and visual mitigation and enhancement measures to be embedded into the siting, design, construction, operation and decommissioning of this proposed development.

11. It is essential that the LVIA provides the environmental information (on the landscape and visual amenity baseline and effects) needed by the decision maker to inform their planning decision. Hence, it is important for the scope and approach of this LVIA to be agreed with the decision maker.

Method of Assessment

12. The LVIA will be undertaken in accordance with the method of assessment described in Appendix 2, with the scope and process of the assessment summarised below.

Scope and Process of Assessment

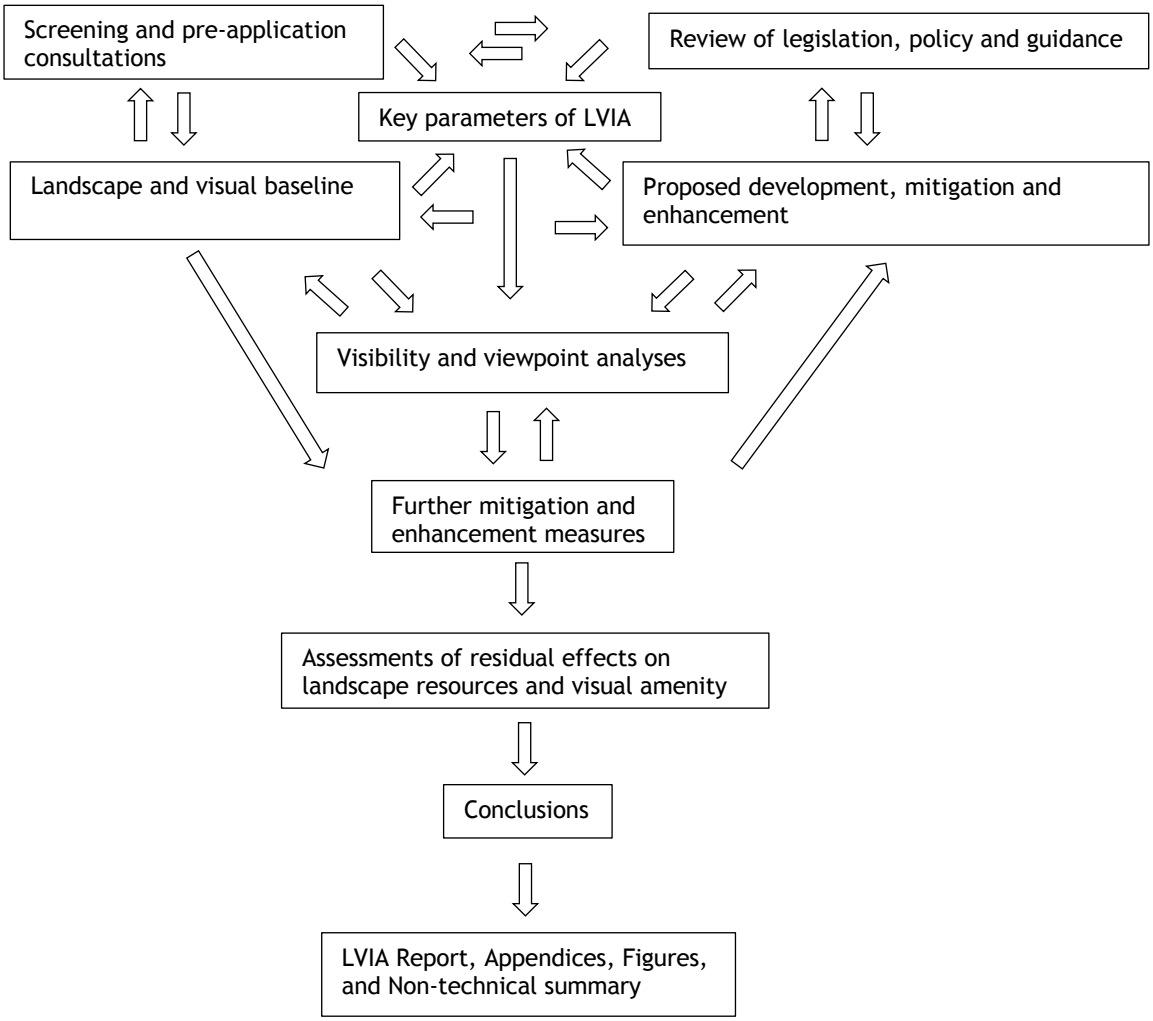
13. The LVIA will be an iterative process, undertaken in a series of stages, with each stage revisited during the assessment process so that the findings of each stage are incorporated into the proposed development and are taken into account in the assessments of residual effects (see Plate 1).

14. The process will involve consultations, document and data review, fieldwork observations and photography, computer modelling, computer-generated

visibility plans and visualisations, objective measurements and subjective professional judgement.

15. Fieldwork observations will be made in summer (to assess the screening effects of existing vegetation) and in winter (to assess the effects when deciduous vegetation is not in leaf).

Plate 1: Assessment Process



Scoping and Consultations

16. In addition to this scoping exercise with the Planning Inspectorate, other organisations and local individuals will be consulted for their knowledge on the landscape and visual amenity of the site and local area, including:

- Statutory consultees – Natural England, Lincolnshire County Council, South Kesteven District Council (SKDC) and neighbouring North Kesteven District Council (NKDC).
- Public – via public exhibitions.

Legislation, Policy and Good Practice Guidance

17. The LVIA will take into account the legislation, national and local policy context and good practice guidance relevant to an LVIA of this development type, scale and location. These include:

Legislation:

- *Planning Act 2008* (as amended) – this sets out the development consent regime for major infrastructure projects, referred to as Nationally Significant Infrastructure Projects (NSIPs).

- *The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017,* SI 2017/572, as amended by SI 2018 No 695 – this sets out the EIA process for infrastructure projects including the information to be included in an EIA (and LVIA) in Schedule 4.

- The Town and Country Planning and Infrastructure Planning (Environmental Impact Assessment) (Amendment) Regulations 2018, SI 2018 No 695 – which amends, amongst others, SI 2017/572.

National Policy and Guidance:

- *Overarching National Policy Statement for Energy* (NPS EN-1) (DECC July 2011a) – this sets out the Government's policy framework for NSIP energy developments. In particular, Section 4.6 (criteria for good design) and Section 5.10 (generic landscape and visual impacts).

- *Draft Overarching National Policy Statement for Energy* (draft NPS EN-1) (BEIS September 2021) – proposed updates to NPS EN-1. In particular, Section 4.6 (criteria for good design) and Section 5.10 (generic landscape and visual impacts).

- *Draft National Policy Statement for Renewable Energy Infrastructure* (draft NPS EN-3) (BEIS September 2021) – not yet adopted but includes a section on solar PV generation (which the current NPS EN-3 does not). In particular, Section 2.51 (landscape, visual and residential amenity).

Local Policy and Guidance:

- *South Kesteven Local Plan 2011 – 2036* (SKDC January 2020) – which sets out the planning policies for the South Kesteven District. In particular, Policies EN1 (landscape character), DE1 (promoting good quality design), RE1 (renewable energy generation) and Appendix 3 (Renewable Energy).

- *South Kesteven Landscape Character Assessment* (fpcr January 2007) – this identifies seven landscape character areas (LCAs) in South Kesteven. For each LCA, it provides a list of the key landscape characteristics, a detailed description, suggests generic levels of sensitivity to various development types (but not solar) and outlines landscape management objectives.

- *North Kesteven Landscape Character Assessment* (David Tyldesley & Associates September 2007) – this identifies four LCAs and 13 landscape character type sub-areas (LCTs). For each LCT, it lists the key landscape characteristics, provides a detailed description, describes pressures for change and landscape detractors and opportunities for enhancement.

Good Practice Guidance:

- *Guidelines for Landscape and Visual Assessment 3rd edition* (LI/IEMA 2013) (GLVIA3) – this provides guidance on landscape and visual impact assessment for all development types throughout the UK.

- Technical Guidance Note 06/19: *Visual Representation of Development Proposals* (LI September 2019) (TGN 06/19) – this aims to help landscape professionals, planning officers and stakeholders select the types of visualisations that are appropriate to the circumstances in which they will be used.

18. Lincolnshire County Council, South Kesteven District Council and North Kesteven District Council do not currently have any supplementary planning documents (SPDs) relating to EIA, LVIA or solar PV generation.

Landscape and Visual Baseline

Study Area

19. An initial study area of 3.5km radius, centred on the site has been selected for the purpose of this scoping exercise (see Plate 2) and is the proposed study area for the LVIA. This study area encompasses all locations within at least 2km of the site boundary and should ensure that all sensitive landscape resources and visual receptors that could be significantly affected by the proposed development are identified and assessed.

20. This study area is mainly within South Kesteven District with a small area within the far north of the study area extending into North Kesteven District.

Landscape Resources

21. The landscape resources of the site and study area consist of the landscape fabric of the site and the landscape character of the site and surrounding area. The site is not in or near any national or local landscape designations.

22. The landscape fabric of the site will be described and informed by fieldwork, aerial photography, the ecological Phase I habitat survey and local knowledge.

23. The landscape character of the site and surrounding area will be based on the LCAs and LCTs identified in the *South Kesteven Landscape Character Assessment* (fpcr January 2007) and the *North Kesteven Landscape Character Assessment* (David Tyldesley & Associates September 2007), supplemented by fieldwork observations and local knowledge. The site and most of the study

area are located in the *Kesteven Uplands LCA* with the eastern side of the study area extending into the adjacent *Fen Margin LCA*. The far north of the study area is in the *Central Plateau/Upland Plateau Fringe LCT*.

Visual Receptors

24. The visual receptor groups in the study area who experience the existing views and visual amenity of the study area include the following (all distances and directions noted below are from the site boundary to the nearest receptor location):

- Residents in surrounding farmsteads and other residential dwellings. Those within 1.5km of the site boundary include Laughton Lodge Farm (0.6km east), Laughton Hall Farmhouse (0.75km east), Low Park Farm which appears to be a group of at least four residential dwellings (1.3km east), The White House, a bungalow and Keisby House (1.1km west), Manor Farm, Manor Farm Barn and two cottages (1.4km west), The Stables and a row of cottages (which may now be one residential dwelling) at New House Farm (1.35km west), Lavinton (residential dwelling and farm shop) (1.4km west), The Grange and two bungalows (1.1km west), West View Barn at Lodge Farm (0.4km northwest), Pickworth Lodge (0.65km north), The Warren (0.9km northeast), a property to the northeast of The Warren (1.2km northeast) and The Range at Jubilee Cottages (1.45km northeast).

- Residents in properties owned by a site landowner – South Lodge (0.3km north, occupied by a landowner) and a pair of semi-detached properties at Owens Barn Farm (0.6km north, occupied by tenants).

- Residents in the nearby villages of Folkingham (1.7km northeast), Pickworth (1.8km north), Lenton (1.8km west) and Aslackby (1.8km east) and in the hamlets of Keisby (0.8km west) and Hawthorpe (1.2km south).

- Walkers on the Macmillan Way/Cross Britain Way and the South Kesteven Round long-distance footpaths, both of which follow the same route along a local public footpath between Folkingham and Pickworth in the far north of the study area (1.7km north).

- Equestrians on PLAP 9 Route Grantham East which follows the minor roads through Pickworth in the far north of the study area (2km north). This is one of twenty British Horse Society (BHS) Paralympic Legacy Access Project (PLAP) routes launched in September 2013 to commemorate the achievements of the Paralympics and Para World Carriage Driving Championships in 2012.

- Walkers, cyclists and equestrians on local public rights of way (PROWs) (footpaths, bridleways, restricted byways and other routes with public access) in the study area, several of which end at the site boundary. There are two PROWs that run alongside the red indicative site boundary shown

on the *Initial Site Layout Plan* (Figure 2) (a 350m length of bridleway along the northwest boundary and a 700m length of restricted byway between the southeast boundary and Temple Wood). Both of these will be retained and will remain outside the security fencing.

- Visitors to Low Farm Touring and Camping Park in Folkingham (1.8km northeast).

- Motorists on a 1.8km section of the A15 (1.95km east) and on the local road network around the site.

25. There are no Sustrans National Cycle Network routes in the study area.

Other Solar PV Installations

26. All existing built development in the study area will form part of the current landscape and visual baseline. There are no operational or permitted (but not yet built) large scale solar PV installations in the study area.

27. There is one small installed ground mounted solar PV project at Keisby House (Kingswood Builders), just over 1km west of the site, consisting of 5 rows of 40 panels, one row of which is visible from the minor road near The White House. There is also a very small solar PV project (4 rows of 14 panels) at Scotland Farmhouse on the west side of Ingoldsby (4.3km W of the site boundary) that has been approved with conditions. Due to screening by intervening topography, built development and vegetation, there is unlikely to be any intervisibility between these two sites and the proposed development, and very few publicly accessible locations in the surrounding area where either of these schemes and the proposed development would be visible.

Development, Mitigation and Enhancement

28. The construction, operational and decommissioning phases of the proposed development will be reviewed to identify those aspects and activities with the potential to significantly affect the landscape resources and/or visual amenity of the site and study area and to identify mitigation measures that would avoid, reduce or compensate for these effects. These mitigation measures will be embedded into the siting, design, construction, operation and decommissioning of the proposed development.

29. This analysis of the proposed development will also identify some landscape and visual enhancement measures that will also be incorporated into the proposed development.

Visibility and Viewpoint Analysis

Zone of Theoretical Visibility

30. A zone of theoretical visibility (ZTV) for the proposed development has been generated and is provided in Plate 2 below. This was generated by

MSEnvironmental using the LIDAR 2m digital terrain model (DTM) and Ordnance Survey (OS) terrain 5 data and 400 target points across the site located along the back lines of the PV panels shown on the *Initial Site Layout Plan* (Figure 2). The ZTV is overlaid onto the Ordnance Survey (OS) 1:25,000 Explorer map (digital raster data).

31. The ZTV identifies the locations in the study area where the terrain would screen the solar panels (no colour over the OS base map) and the locations where the terrain could permit views of 1 – 24% (green), 25 – 49% (blue), 50 – 74% (pink) and 75 – 100% (yellow) of these target points.

32. As this ZTV is based on terrain data only and does not take into account screening by surface features, such as buildings, hedgerows and woodlands, it shows theoretical areas of visibility that are much more extensive than the actual areas of visibility for the proposed development.

33. The theoretical visibility of the battery and substation compounds is not illustrated in the ZTV in Plate 2 and some structures within these compounds will be taller than the panels. Also, using 400 target points means there are areas of panels not included in the visibility modelling, so there may be some areas of visibility not captured in Plate 2.

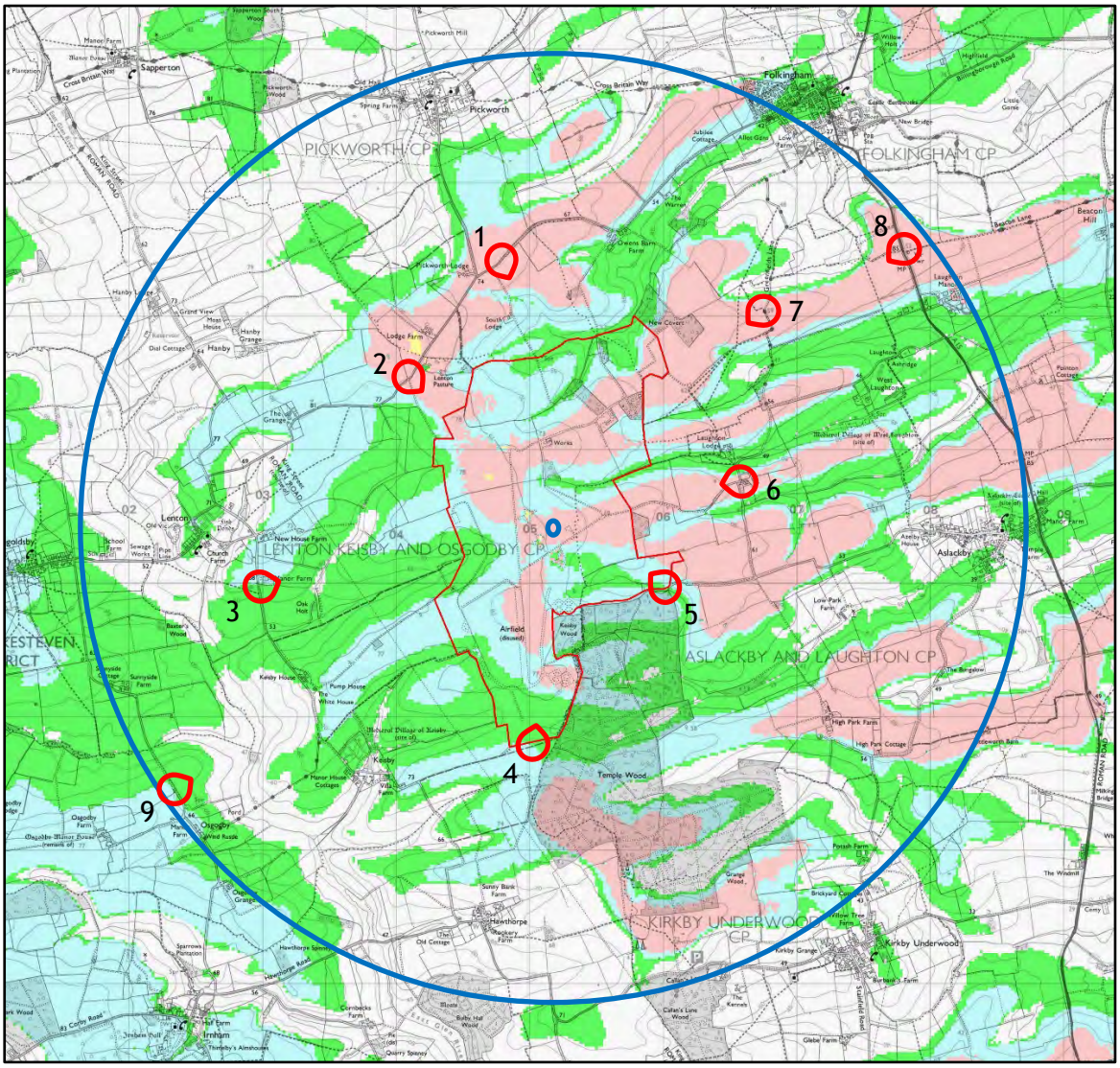
34. Therefore, to inform and illustrate the LVIA, the following ZTVs will be generated:

- ZTV 1- using the LIDAR 2m DTM and OS terrain 5 data and a 3D model of the proposed solar PV arrays to illustrate the theoretical visibility of the solar PV panels.
- ZTV 2 – using the LIDAR 2m DTM and OS terrain 5 data and a 3D model of the battery storage and substation compounds to illustrate the theoretical visibility of the battery storage and substation compounds.
- ZTV 3 – using the LIDAR 2m DTM and OS terrain 5 data, a 3D model of the proposed solar PV arrays and incorporating the screening effects of existing buildings, hedgerows, woodlands and tree belts to more accurately illustrate the actual extent of visibility of the solar PV panels.
- ZTV 4 - using the LIDAR 2m DTM and OS terrain 5 data and a 3D model of the battery storage and substation compounds and incorporating the screening effects of existing buildings, hedgerows, woodlands and tree belts to more accurately illustrate the actual extent of visibility of the battery storage and substation compounds.

35. A Technical Guidance Note explaining how the 3D model and ZTVs have been constructed will be provided in Appendix 3 of the LVIA.

36. However, for the purposes of this scoping exercise, the ZTV in Plate 2 below combined with observations in the study area have been sufficient to inform the selection of viewpoint locations described below.

Plate 2: ZTV and Suggested Viewpoint Locations



KEY:

ZTV: Proportion of solar PV panels that could be visible:

Green:	1-24%
Blue:	25-49%
Pink:	50-74%
Yellow:	75-100%

Extent of 3.5km radius study area centred on site

Site boundary

1 Viewpoint locations and numbers

Viewpoint Analysis

37. Nine viewpoint locations have been selected from publicly accessible locations to represent the more open views of the proposed development from two of the landscape character areas and some of the visual receptor locations in the study area. These are shown on Plate 2 above and listed in Table 1 below.

Table 1: Suggested Viewpoint Locations

No	Location	Easting Northing	Distance/ direction from site	Landscape character area or type	Receptors
1	Minor road between Pickworth Lodge and Owens Barn Farm	504840 332470	0.9km / N	Kesteven Uplands LCA	Motorists
2	Minor road between The Grange and Lodge Farm	504100 331530	0.36km / NW	Kesteven Uplands LCA	Motorists
3	Keisby Road south of Manor Farm	502970 329980	1.3km / W	Kesteven Uplands LCA	Residents Walkers, cyclists and equestrians Motorists
4	Bridleway near Temple Wood	505050 328780	0km / S	Kesteven Uplands LCA	Walkers, cyclists and equestrians
5	Minor road north of Temple Wood	506050 330000	0km / E	Kesteven Uplands LCA	Walkers, cyclists and equestrians Motorists
6	Minor road adjacent to Laughton Hall Farmhouse	506550 330750	0.7km / E	Kesteven Uplands LCA	Residents Walkers, cyclists and equestrians Motorists
7	Greenfields Lane (other route with public access)	506750 332040	0.8km / E	Kesteven Uplands LCA / Fen Margin LCA boundary	Walkers, cyclists and equestrians
8	A15 near Water Tower	507800 332480	1.95km / ENE	Fen Margin LCA	Motorists
9	Minor road near Osgodby	502340 328480	2.3km / WSW	Kesteven Uplands LCA	Residents Walkers, cyclists and equestrians Motorists

38. The ZTV suggests that there are unlikely to be any views from the *Central Plateau/Upland Plateau Fringe LCT* (in North Kesteven District) or from the long-distance footpaths and PLAP 9 equestrian route in the far north of the study area. The villages of Pickworth and Aslackby, and most of Folkingham

including the Low Farm Touring and Camping Park are also outside the ZTV so no viewpoints have been selected in these locations.

39. Most of the farmsteads and other residential dwellings that are in zones of theoretical visibility are located alongside or close to the minor roads in the study area and the viewpoints plus fieldwork observations will inform and illustrate the assessment of effects on views towards the development from these residential properties.

40. A viewpoint analysis will be undertaken in accordance with the method of assessment for the viewpoint analysis explained in Appendix 2. It will assess the likely changes in landscape character and views at each viewpoint location as a consequence of the construction and operational phases of the proposed development and will identify whether these changes would be significant. If the mitigation and enhancement measures incorporated into the proposed development include substantial new planting, then the consequential effects of this planting on the long-term effects of the proposed development after a period of establishment, for example after 10 years, will also be assessed at each viewpoint.

41. The viewpoint analysis will be illustrated by photo-panoramas of the existing view and computer-generated visualisations (photowires and photomontages) of the predicted view of the proposed development from each viewpoint. The Technical Guidance Note in Appendix 3 of the LVIA will also explain how the photographs have been taken and how the photo-panoramas and visualisations have been constructed.

42. The viewpoint visualisations will be Type 4, as defined in TGN 06/19. As the viewpoints are quite close to the site boundary, the visualisations will illustrate up to 180^0 included angles, displayed over up to two A1 sheets to achieve principal viewing distances of around 500mm.

Further Mitigation and Enhancement Measures

43. Based on the visibility and viewpoint analyses, measures to further mitigate effects on landscape and views and, where possible, enhance landscape fabric, landscape character, visual amenity and biodiversity will be identified and incorporated in the design of the development and into the viewpoint analysis.

44. The following sections of the LVIA will then describe and assess the residual effects of the proposed development incorporating all the mitigation and enhancement measures.

Assessment of Residual Effects on Landscape and Visual Amenity

45. An assessment will be undertaken of the residual effects of the proposed development (construction, operational and decommissioning stages), incorporating all the embedded mitigation and enhancement measures, on the

landscape fabric of the site, the character of each landscape character area, and a range of receptor types and locations. This will draw on the visibility and viewpoint analyses and other fieldwork observations and will be undertaken in accordance with the methods of assessment of residual effects on landscape fabric, character and visual amenity, as described in Appendix 2.

46. The viewpoint analysis will be based on a sample of locations so it will be necessary to undertake this further step in the assessment so that all likely significant effects of the proposed development (construction, operational and decommissioning phases) on the character of the landscape and on the visual amenity of receptors in the study area are identified.

47. The assessment of residual effects will also consider the extent to which these changes in landscape character and views would be mitigated after approximately 10 years once the proposed mitigation and enhancement measures have established.

Assessment of Cumulative Effects on Landscape and Visual Amenity

48. As explained in paras 26 - 27 above, there is one small operational ground mounted solar PV installation at Keisby House and one permitted but very small solar PV project at Scotland Farmhouse (4.3km W of the site boundary), neither of which are likely to be visible in conjunction with the proposed development from many publicly accessible locations.

49. Therefore, the proposed development would not result in any cumulative effects with other solar PV projects. However, if any large-scale ground mounted solar PV schemes are permitted within the study area prior to the completion of the LVIA, then potential cumulative effects with the proposed development will be examined and, if significant cumulative effects are likely, then a cumulative LVIA will be undertaken.

Conclusions

50. The LVIA will draw conclusions on the extent and degree of the predicted significant (adverse and beneficial) effects on landscape resources and visual amenity. Significant effects are not necessarily unacceptable effects. Whether the effects of a development on the environment are acceptable or unacceptable is a planning judgement made by the decision maker, taking into account the benefits of the scheme, its impacts on all environmental resources and receptors (of which landscape and visual amenity are just two aspects) and its national and local planning context.

51. Therefore, the LVIA will not discuss whether or not any predicted significant effects are acceptable but will provide the decision maker with the environmental information on landscape and visual amenity effects necessary to inform that judgement.

References

Legislation:

Planning Act 2008 (as amended)

The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017, SI 2017 No 572, as amended by SI 2018 No 695

The Town and Country Planning and Infrastructure Planning (Environmental Impact Assessment) (Amendment) Regulations 2018, SI 2018 No 695

Policy and Guidance:

BEIS (September 2021a) Draft Overarching National Policy Statement for Energy (draft NPS EN-1)

BEIS (September 2021b) Draft National Policy Statement for Renewable Energy Infrastructure (draft NPS EN-3)

David Tyldesley & Associates (September 2007) North Kesteven Landscape Character Assessment

DECC (July 2011a) Overarching National Policy Statement for Energy (NPS EN-1)

fpcr (January 2007) South Kesteven Landscape Character Assessment

Landscape Institute, Institute of Environmental Management & Assessment (April 2013) *Guidelines for Landscape and Visual Impact Assessment, 3rd Edition*

Landscape Institute (17 September 2019) Technical Guidance Note 06/19: *Visual Representation of Development Proposals*

South Kesteven District Council (January 2020) *South Kesteven Local Plan 2011 – 2036*

Environmental Baseline Data:

Google (current) google maps © Google 2022
https://www.google.co.uk/maps/

Ordnance Survey Explorer 1:25,000 map sheet no 248

Macmillan Way/Cross Britain Way
https://ldwa.org.uk/ldp/members/show_path.php?path_name=Macmillan+Way+-+Boston+to+Abbotsbury and http://www.macmillanway.org/

South Kesteven Round
https://ldwa.org.uk/ldp/members/show_path.php?path_name=South+Kesteven+Round

PLAP 9 Route Grantham East
https://www.bhs.org.uk/enjoy-riding/carriage-driving/route-9-south-west-lincs

Sustrans National Cycle Network
https://www.sustrans.org.uk/national-cycle-network

Site and Development Information:

Engena (September 2021) Temple Oaks Renewable Energy Park – *Site Introduction,* prepared on behalf of Ridge Clean Energy

Engena (2022) Temple Oaks Renewable Energy Park – Figure 2: *Initial Site Layout Plan,* prepared on behalf of Ridge Clean Energy

Appendix 1: Experience and Expertise

Kay Hawkins, BSc (Hons), BLD, CMLI

A1.1. Kay Hawkins is a Chartered Landscape Architect and member of the Landscape Institute (CMLI). She has a BSc (Hons) in Ecology from the University of Lancaster (1982) and a post-graduate Bachelor in Landscape Design (BLD) from the University of Manchester (1986). She is a Supervisor for candidates on the Landscape Institute's Pathway to Chartership and has been an Examiner for the Institute's Professional Practice examinations since 1996.

A1.2. Kay has over 35 years' experience in the design, assessment, management and implementation of environmental and development projects in the rural, urban and marine environments throughout the UK. These have included renewable energy projects, projects for the water industry, infrastructure projects, residential, leisure and recreational developments, industrial and commercial developments, land remediation schemes, waste management, mineral extraction and agriculture. She has worked with private and public sector clients, both in support of and in opposition to development proposals.

A1.3. She has been undertaking landscape and visual impact assessments (LVIAs) since before the implementation of the original UK Environmental Assessment (EIA) Regulations in 1988 and has developed a particular expertise in EIA and the assessment of effects on landscape, seascape, visual amenity and heritage assets. She has managed teams of experts undertaking EIAs, has prepared site selection and feasibility studies, screening and scoping reports and has undertaken consultations. She has undertaken and directed the production of landscape, seascape, visual, cumulative and cultural heritage assessments. She has also produced written representations, hearing statements and proofs of evidence and presented evidence at examinations in public (EiPs), hearings and public inquiries for 60 appeals throughout the UK.

A1.4. Based on the guidance on LVIA for England, Wales, Scotland and Northern Ireland, and on her professional judgement and experience, she has developed an approach to and methodologies for LVIA which she uses to assess the likely effects of various types and scales of development projects (both EIA and non-EIA). These methodologies have been regularly updated to ensure compliance with evolving guidance and have been rigorously tested by their use in numerous planning applications and appeals.

A1.5. She has also been involved in various research projects, policy and good practice guidance documents relating to EIA, LVIA, cumulative LVIA (CLVIA), photography and visualisations and has presented papers at conferences, seminars and on university courses.

A1.6. Alongside her consultancy work, she was also a part-time module tutor for the BA and MA landscape design courses at the University of Gloucestershire from 2017 – 2020, teaching professional practice and landscape planning and was a visiting lecturer for the MA landscape design course at Birmingham City University, teaching professional practice, landscape planning and landscape and visual impact assessment.

A1.7. She has also trained to be an Examining Authority for National Strategic Infrastructure Projects and was appointed to the pool of Appointable Persons at The Planning Inspectorate in 2016.

Mike Spence, BA (Hons), MLD, CMLI, REIA, FRGS

A1.8. Mike Spence is a Chartered Landscape Architect and member of the Landscape Institute (CMLI). He has a BA (Hons) in Geography from the University of Nottingham (1986) and a Master of Landscape Design (MLD) from the University of Manchester (1990). He has acted as technical advisor to the Landscape Institute's Technical Committee, providing expertise in photography and photomontages in LVIA since 2013 and was also a member of IEMA's Impact Assessment Steering Group (2019 – 2022).

A1.9. Mike and his team have worked on multiple NSIP projects including solar farms, transmission lines and power stations across the UK.

Appendix 2: LVIA Method of Assessment

Method of Assessment

Introduction

A2.1. This appendix describes the method of assessment used to predict the likely significant effects of the proposed development on the landscape resources and visual amenity of the site and study area.

A2.2. It describes the purposes of LVIAs, sets out the iterative assessment process, and explains each step in the process including the legislation, policy and good practice guidance on which the methodology and assessment is based, the criteria used to assess the likely effects of the proposed development on landscape character and visual amenity in the viewpoint analysis and the definitions of "significant effects" used to determine whether there are likely to be significant residual effects on landscape fabric, landscape character and visual amenity.

Purposes of LVIAs

A2.3. LVIAs have several purposes:

- To identify the likely significant effects (adverse and beneficial) of the proposed development on landscape resources and visual amenity (in accordance with the relevant legislation, policy and guidance, including the EIA Regulations, see paras A2.12 - A2.13 below).
- To identify the mitigation measures that would avoid, reduce or compensate for any likely adverse significant effects.
- To identify appropriate beneficial enhancement measures.
- To provide the environmental information (on landscape and visual amenity) needed by the decision maker to inform their planning decision.
- To provide a non-technical summary of the assessment.

A2.4. Landscape and visual mitigation and enhancement measures are normally embedded into the siting, design, construction, operation and, for time limited permissions, the decommissioning of proposed developments. Consequently, LVIAs are an integral part of the design and assessment process for EIA developments and are a useful tool for optimising the sustainability, appearance and functionality of all scales and types of development.

Assessment Process

A2.5. The nature of landscape and visual impact assessment (LVIA) requires both objective analysis and subjective professional judgement, should be thorough, robust, consistent and understandable by decision makers, consultees and the public. Therefore, it is important that an iterative, structured and transparent process is adopted and that all terms are clearly explained.

A2.6. Accordingly, this method of assessment is based on current legislation, policy and good practice guidance, uses fieldwork observations and published information, uses recognised data analysis techniques and quantifiable factors wherever possible and subjective professional judgement as necessary. All technical terms are clearly defined.

A2.7. It is also important to ensure that the mitigation and enhancement measures identified during the LVIA are embedded into the proposed development to limit any likely significant adverse effects on the local and wider environment. Hence, LVIAs are an iterative process that follow a series of stages, with each stage revisited during the assessment process. This enables the findings of each stage to be incorporated into the siting, design, construction, operation and, if appropriate, decommissioning of the proposed development and for these findings to be taken into account in the assessments of residual effects.

A2.8. This iterative process is undertaken in several stages:

- Screening – is undertaken with the local planning authority (LPA) or other determining authority (the "decision maker"), to determine whether a development is a Schedule 1 or Schedule 2 EIA development (under the EIA Regulations) or a non-EIA development.
- Scoping and Consultations – are undertaken with the decision maker, statutory and other consultees and the public to identify the landscape and visual issues of concern and the information required to inform the decision, ie the scope of the LVIA.
- Legislation, Policy and Guidance – current legislation, national and local policy and good practice guidance are reviewed to ensure that the LVIA addresses the legal requirements and policy context for the development type and follows the latest good practice guidance.

- Landscape and Visual Baseline - the existing landscape resources (fabric, character and designations) and visual receptor locations within the study are examined and assessed to identify their characteristics, value and susceptibility to the changes that could be brought about by the nature, scale and location of the development proposed, in order to define their generic sensitivity to the type of development proposed.
- Proposed Development, Mitigation and Enhancement – the construction, operational and decommissioning phases of the proposed development are examined to identify those aspects that could bring about changes to the landscape and visual baseline, allowing for the mitigation and enhancement measures already embedded into the siting and design of the proposed development, and the further mitigation and enhancement measures recommended by the assessment.
- Key Parameters – the scope of the LVIA is informed by the preceding stages.
- Visibility Analysis – computer-generated zones of theoretical visibility (ZTVs) and fieldwork observations are used to identify the locations in the surrounding area where the proposed development could be visible (based on terrain) and would be visible (taking into account the screening effects of surface features), which informs the selection of viewpoints.
- Viewpoint Analysis – an assessment of the effects of the proposed development on landscape character and views at locations that represent the main landscape resources and visual receptor types and locations in the study area is undertaken. This may consider the effects of the construction phase and the effects of the operational phase separately.
- Further Mitigation and Enhancement - based on the visibility and viewpoint analyses, measures to further mitigate effects on landscape and views and, where possible, enhance landscape fabric, landscape character and biodiversity are identified and incorporated into the design of the development.
- Assessment of Residual Effects on Landscape Resources - an assessment of the residual effects of the proposed development on landscape fabric, character and, if present in the study area, designations is undertaken.

- Assessment of Residual Effects on Visual Amenity - an assessment of the residual effects of the proposed development on the visual amenity of visual receptors in the study area is undertaken.
- Non-Technical Summary – a non-technical description of the assessment and the effects of the proposed development on landscape resources and visual amenity is provided.

Screening

A2.9. A screening request is submitted to the decision maker (LPA or other determining authority), with the information defined in Schedule 3 of the EIA Regulations, and with a request for a screening opinion to determine whether the proposed development is a Schedule 1 or Schedule 2 EIA development (under the EIA Regulations) or a non-EIA development.

A2.10. Where a decision maker states in its screening opinion that, due to the scale and nature of the proposed development and its location, the proposed development is a non-EIA development and a full EIA is not required, it may still request impact assessments on various topics including an LVIA.

Scoping and Consultations

A2.11. To ensure that the LVIA focusses on the identification of the likely significant effects (in accordance with the EIA Regulations) and provides the decision maker with the environmental information (on landscape and visual amenity) needed to inform their planning decision, a scoping or pre-application consultation process is undertaken. This may include formal and informal consultations with the LPA planning and landscape officers (or other determining authority), with statutory and other consultees, and with the public.

Legislation, Policy and Guidance

Legislation

A2.12. Planning applications for developments in England that come under *The Town and Country Planning Act 1990*, are subject to the requirements of *The Town and Country Planning (Environmental Impact Assessment) Regulations 2017* (as amended 2018) (the EIA Regulations). Amongst other matters, the EIA

Regulations define the EIA process, described the nature and scale of "EIA developments" (Schedules 1 and 2) and describe the information to be provided in a screening request (Schedule 3) and in an Environmental Statement (ES) (Schedule 4).

A2.13. Where a decision maker confirms in its screening opinion that the proposed development is not an EIA development but still requires an LVIA to accompany the planning application, the requirements in Schedule 4 paragraphs 1 - 10, are used to guide the method of assessment and scope of the LVIA as follows:

- Paragraph 1 (a), (b) and (c): A description of the location, physical characteristics of the proposed development and the main characteristics of the operational phase, that could have a significant effect on landscape and/or visual amenity (see LVIA Section 6).
- Paragraph 3 and 4: A description of the relevant aspects of the current environmental baseline, in terms of landscape resources and visual receptors (see LVIA Section 5).
- Paragraph 5: A description of the likely significant effects of the development on the landscape and visual aspects of the environmental baseline resulting from the construction and operation of the proposed development, including effects that would be direct or indirect, discrete or cumulative, short, medium or long-term, permanent or temporary and beneficial (positive) or adverse (negative) (see LVIA Sections 7 - 9). This site is not sufficiently close to any other EU country or territory for there to be any transboundary effects.
- Paragraph 6: A description of the forecasting methods or evidence, used to identify and assess the significant effect on landscape and visual amenity, including details of difficulties encountered and any uncertainties involved (see LVIA Section 2 and this Appendix 2).
- Paragraph 7: A description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on landscape and visual amenity and, where appropriate, any proposed monitoring arrangements (see LVIA Section 6).
- Paragraph 9: Non-technical summary of the information provided (see NTS).

- Paragraph 10: Reference list detailing the sources used for the descriptions and assessment (see LVIA Section 11).

A2.14. The EIA Regulations do not define "significant effects", hence in this assessment, the landscape and visual effects described as "significant effects" are defined as those changes to the baseline resources and/or receptors of sufficient magnitude to be a material planning matter and which should, therefore, be taken into account in the decision-making process.

National Policy

A2.15. Planning applications for developments in England that come under *The Town and Country Planning Act 1990*, are subject to the policies in the *National Planning Policy Framework* (NPPF, MHCLG July 2021). This sets out the Government's planning policies for England and how these should be applied.

A2.16. Various planning policies in the NPPF can influence the scope and approach of an LVIA and those that are relevant to this assessment and proposed development and landscape proposals are set out in Section 4 of the LVIA.

Local Policy and Guidance

A2.17. Local planning policy and guidance produced by LPAs are consulted to guide the scope of an LVIA, in particular:

- Local development plan (LDP) – including the Core Strategy and Site Allocations and Management of Development (SAMDev) Plans.
- Supplementary Planning Documents – in particular, design guides and landscape character assessments.

A2.18. Adopted LDPs and SPDs carry more weight than draft versions of these documents but, in the absence of adopted documents, the draft versions may be consulted for guidance. The LDP documents and SPDs relevant to this LVIA are set out in Section 4 of the LVIA.

Good Practice Guidance

A2.19. Several guidance documents have been published by the Landscape Institute, Natural England, Nature Scot, Natural Resources Wales and other statutory consultees to provide good practice guidance on LVIAs for EIA developments.

A2.20. Some are specific to particular aspects of LVIAs (eg landscape character assessment, visualisations or cumulative impact assessment), to particular development types (eg wind farms), to particular locations (eg to urban, rural or coastal environments) or to particular jurisdictions (eg to England, Scotland, Wales or Northern Ireland). Others are generic and provide more general guidance on LVIAs and so are relevant for all development types in most locations within the UK.

A2.21. Two good practice guidance documents produced by the Landscape Institute which are relevant for this LVIA are:

- *Guidelines for Landscape and Visual Assessment* 3rd edition (LI/IEMA 2013), known as GLVIA3.
- Technical Guidance Note 06/19: *Visual Representation of Development Proposals* (LI September 2019), known as TGN 06/19.

A2.22. GLVIA3 provides guidance on landscape and visual impact assessment for all development types throughout the UK. It notes (para 1.17, LI/IEMA 2013) that the European Union Directive on EIA (enacted in England by the EIA Regulations 1988 – 2017) places an emphasis on the identification of **likely significant** environmental effects. It advises that this requires an approach that is in proportion to the scale of the project being assessed and the nature of its likely effects and that judgement needs to be exercised at all stages to ensure that the scale of the assessment is appropriate and proportional. It notes that this applies to appraisals of landscape and visual effects for sub-EIA developments as well as those that are part of a formal EIA assessment.

A2.23. Technical Guidance Note 06/19 aims to help landscape professionals, planning officers and other stakeholders to select the types of visualisations that are appropriate to the circumstances in which they will be used. It defines four types of visualisations (Types 1 – 4) where Type 1 is an annotated viewpoint photograph, Type 2 is a wireline (wireframe) based on a 3D model, Type 3 is a photomontage and photowire (wireframe overlaid on a photograph), and Type 4 is a photomontage and photowire using surveyed locations and reproduced at verifiable scales.

A2.24. Table 1 in TGN 06/19 recommends the appropriate visualisation types to use for four categories of purposes and users (categories A – D).

A2.25. Earlier in the guidance it is stated (para 1.2.9) that "visualisations should provide the viewer with a fair representation of what would be likely to be seen if the proposed development is implemented and should portray the proposal in scale with its surroundings. In the context of landscape/townscape and visual impact assessment, it is crucial that visualisations are objective and sufficiently accurate for the task in hand. In short, visualisations should be fit for purpose".

A2.26. Therefore, the appropriate type of visualisation is a matter of judgement, dependent on the proposed development, the user(s) and the planning stage reached.

Landscape and Visual Baseline

A2.27. Fieldwork observations, the published landscape character assessment for the area, Ordnance Survey maps and aerial photography are used to identify the existing landscape resources (fabric and character) and visual types and receptor locations within the study. These are examined and assessed to identify their characteristics, value and susceptibility to the changes that could be brought about by a development of this nature, scale and location, in order to define their sensitivity to this type of development, using the criteria set out in the **Viewpoint Analysis** below.

Proposed Development and Mitigation

A2.28. The siting, design, construction and operational phases of the proposed development are examined to identify those aspects that could bring about changes to the landscape and visual baseline, allowing for the mitigation and enhancement measures already embedded into the siting and design of the proposed development. In addition, any further mitigation and enhancement measures that could be incorporated into the proposed development, to further reduce the likelihood of significant effects on landscape and visual amenity, have been identified and incorporated into the landscape and biodiversity enhancement and management plan.

Key Parameters

A2.29. The scoping and pre-application consultations, the legislation, national and local policy context and good practice guidance, the nature of the landscape

and visual baseline, and the scale, nature and location of the proposed development, guides the scope of the LVIA and the key parameters that need to be considered (plus the additional parameters that need to be considered if a CLVIA is required) as outlined in Table A2.1 below:

Table A2.1: Key LVIA and CLVIA Parameters

LVIA Parameters	**Description**
Study area(s)	The geographical/spatial limits/areas within which significant effects (including cumulative effects) are likely, usually defined as a radius extending from the centre or boundary of the proposed development, and which may be different for the different resources and receptors.
Baselines	The current landscape and visual baselines of the study area(s), against which the predicted changes should be assessed. All existing developments in the study area (including operational and under-construction projects) are part of the current baseline. In accordance with the EIA Regulations, the likely evolution of the baseline due to natural changes (including climate change) should also be considered.
Landscape resources	Landscape resources (landscape fabric, landscape character, landscape designations) in the baseline and/or on which the proposed development is likely to have significant effects.
Visual receptors	The visual receptor groups and locations in the baseline and/or on whose views and visual amenity the proposed development is likely to have significant effects.
Viewpoints	Publicly accessible locations at a range of distances and directions from the proposed development selected to represent the landscape resources and visual receptor types and locations in the study area. As per GLVIA3 (para 6.19) these can be a: Representative viewpoint – representing a range of views from a landscape resource and/or visual receptor location/group. Specific viewpoint – chosen to illustrate the view from key location. Illustrative viewpoint – chosen to illustrate a particular effect, eg restricted visibility at a certain location.
Aspects of proposed development	Aspects of the proposed development (elements and activities) which are likely to give rise to significant effects on landscape and/or visual amenity. These can be aspects of the construction and operational phases and, for time limited permissions, the decommissioning phase.
Temporal limits	The timescales to be taken into account in the assessment, eg the length of the construction, operational and decommissioning phases, and the timescale selected to illustrate the effectiveness of the mitigation measures.
Nature of effects	Direct – physical effects, eg effects on the landscape fabric and character of the development site. Indirect – visual effects eg effects on landscape character and visual amenity off-site. Discrete – effects arising as a result of the proposed development only. Short, medium or long-term temporary – effects that are finite and/or reversible and can be defined in terms of known timescales. Permanent – effects which cannot be reversed.

	Beneficial – effects that are likely to have a positive effect on the quality of the resource or amenity of the receptor. Adverse - effects that are likely to have a negative effect on the quality of the resource or amenity of the receptor Transboundary – effects that are likely to extend across country borders.
CLVIA Parameters	**Description**
Cumulative effects	As explained in GLVIA3 (paras 7.6 – 7.8), these can be: Intra-project (within project) cumulative effects – arising from the combination of landscape and visual and other topic effects (eg noise + visual effects, hydrology + landscape effects). Inter-project (between project) cumulative effects – arising from the effects of the proposed development in the context of, or combined with, another development on landscape and visual amenity.
Types of development	The types of development to be included in an inter-project cumulative assessment - usually the same types of development, ie other solar farms where a solar farm is proposed (GLVIA3, para 7.10).
Status of developments	The status of the developments to be included in inter-project cumulative assessments: Permitted developments – developments with an extant planning permission but which are not yet built. Other proposed developments – developments with a validated planning application or outstanding appeal. Operational and under construction developments are already included in the *current baseline* for the LVIA.
Baseline(s)	The landscape and visual baseline(s) against which the predicted cumulative effects should be assessed are: Likely future baseline – current baseline plus *permitted developments*. Possible future baseline – the likely future baseline plus *other proposed developments*.
Nature of effects	Cumulative - effects arising as a result of the proposed development in the context of, or in combination with, other developments. Direct, indirect, short, medium or long-term temporary, permanent, beneficial, adverse and transboundary (as defined in the LVIA parameters above).
Types of cumulative effects	Additional – effects of the proposed development in the context of the likely future or possible future baselines. Combined – effects of the proposed development in combination with another proposed development not included in the likely future or possible future baseline, eg another similar development that does not yet have a validated planning application or outstanding appeal.

Visibility Analysis

ZTV

A2.30. Zones of Theoretical Visibility (ZTVs) are a valuable tool to identify from where the development will not be visible, based on bare earth terrain data, the height of the proposed infrastructure, the height of the receptor and the availability of a line of sight between the two.

A2.31. ZTVs based on terrain data only do not take into account the screening effects of surface features. However, a terrain based ZTV does identify the locations in the study area where topography would screen the proposed development, and the locations where the terrain would permit views of at least parts of the proposed development. This enables the fieldwork observations to concentrate on those locations where there could be views of the proposed development.

Fieldwork Observations

A2.32. Fieldwork observations from the site looking outwards to the surrounding landscape and from the surrounding area looking into the site are undertaken to identify current intervisibility between the site and the surrounding landscape (taking into account the screening by existing surface features such as buildings, hedgerows and woodlands) and the locations in the surrounding area where visual receptors may gain views of the proposed development.

Viewpoint Analysis

A2.33. The ZTV, fieldwork observations and landscape and visual baseline inform the selection of viewpoint locations, selected to represent the landscape resources and visual receptor locations in the study area. These viewpoint locations are agreed with the Council (or other determining authority).

A2.34. The viewpoint analysis is effectively a sampling exercise and does not identify all possible views of the proposed development but, together with other fieldwork observations, informs the assessments of residual effects on landscape resources and visual amenity across the study area.

A2.35. The viewpoint analysis examines changes in landscape character and views that would occur as a consequence of the construction and operational phases of the proposed development at the agreed viewpoint locations in the surrounding area.

A2.36. The predicted effects on landscape character and/or views at each viewpoint are assessed separately but follow the same assessment process as outlined below, and in accordance with GLVIA3. Firstly, the sensitivity of the location is derived from the value attached to the location or view, together with the susceptibility to change (of the landscape resource or visual receptor group).

This is then combined with the predicted magnitude of change (in landscape character or in the view) in order to predict the overall effects (on landscape character or views) and whether these predicted effects would be significant.

Effects on Landscape Character

A2.37. The criteria used to judge landscape value, susceptibility, sensitivity, magnitude and significance of effects on landscape character are as follows:

Landscape Value

A2.38. Most landscapes are locally valued by local people. Landscape and recreation designations are an indication of landscape and recreational value over and above local value, as they are areas that have been recognised for their particular scenic beauty and/or recreational potential. They are also usually landscapes within which a higher level of development control is in place for the purpose of protecting those qualities. The criteria used to judge landscape value are provided in Table A2.2 below.

Table A2.2: Landscape Value

Landscape Value	Description
International value	Where the landscape is designated at an international level, eg a World Heritage Site, and the purposes of which include landscape and/or recreational opportunities.
National value	Where the landscape is designated at a national level, eg National Parks (England, Scotland and Wales), Areas of Outstanding Natural Beauty (England, Wales and NI), National Scenic Areas (Scotland) and Heritage Coasts (England and Wales) or where a landscape feature is designated at a national level, eg Scheduled Monument, and forms a highly distinctive landscape feature.
County/Borough/ District value	Regional Parks, landscape designations in Structure, Unitary or Local Development Plans or a landscape feature that is designated at a County/Borough/District level and forms a distinctive landscape feature. Or: Undesignated landscapes where the condition is very good, the scenic quality and sense of place are very strong, it is a very good example of its type, with its key characteristics very evident, there are important natural and historic assets at a County level, and evidence of particular recreational value (eg National or long distance trails) and rare in a County context.
Local value	For undesignated landscapes and landscape features which are locally valued, and display evidence of responsible use and value, where the condition is good, the scenic quality is pleasant, it is a good example of its type, with its key characteristics clearly recognisable, there are locally important natural and historic assets, and evidence of recreational activity (eg good PROW network) but not rare in a County context.
Unvalued	Where the landscape and/or landscape features have been despoiled and there is evidence that society does not value the landscape and/or landscape features, eg fly tipping, abandoned cars, litter, vandalism, etc.

Landscape Susceptibility

A2.39. The susceptibility of a landscape unit to change depends on:

- The key characteristics of the landscape (including physical/natural and cultural/social elements, and aesthetic and perceptual factors), and the clarity and robustness of these characteristics.
- Nature of views (visual enclosure/openness of views, and the extent to which views contribute to landscape character).
- Landscape planning policies and strategies for the landscape unit.
- The nature of the changes to landscape character and views that would be brought about by a development (based on the inherent characteristics of the development type, and the scale and location of the development proposed) and the compatibility of these changes with the above factors.

A2.40. The criteria used to judge landscape susceptibility are provided in Table A2.3 below.

Table A2.3: Landscape Susceptibility to Proposed Development Type

Landscape Susceptibility	Description
Very susceptible	Where the clarity of the key characteristics is very strongly expressed and/or their robustness to change is fragile and/or views are an essential characteristic, and/or policies and strategies aim to achieve "no change" to landscape character, and the changes to landscape character that could be brought about by a development of the type, scale and location proposed would be incompatible with these factors.
Susceptible	Where the clarity of the key characteristics is strongly expressed and/or their robustness to change is weak and/or views are an important characteristic and/or policies and strategies aim to conserve the key characteristics, and the changes to landscape character that could be brought about by a development of the type, scale and location proposed would have a poor compatibility with these factors.
Moderate susceptibility	Where the clarity of the key characteristics is clearly expressed and/or their robustness to change is moderately strong and/or views contribute to landscape character and/or policies and strategies promote or accept limited changes to key characteristics, and the changes to landscape character that could be brought about by a development of the type, scale and location proposed would have a limited degree of compatibility with these factors.
Slight susceptibility	Where the clarity of the key characteristics is vaguely expressed and/or their robustness to change is strong and/or views are incidental to landscape character and/or policies and strategies promote or accept that the landscape could evolve, and the changes to landscape character that could be brought about by a development of the type, scale and location proposed would have a degree of compatibility with these factors.
Negligible susceptibility	Where the key characteristics are muddled and/or their robustness to change is very strong and/or views are irrelevant to landscape character and/or policies and strategies promote or accept major changes to key characteristics and the changes to landscape character that could be brought about by a development of the type, scale and location proposed would have some compatibility with these factors.

A2.41. It should be noted that susceptibility depends not just on the type and scale of the proposed development but also on its location. Consequently, the susceptibility of a landscape unit can vary depending on whether it is the host landscape unit or an adjacent or more distant unit.

Landscape Sensitivity

A2.42. In accordance with GLVIA3, the sensitivity of each landscape unit is judged on the basis of its *value* and its *susceptibility to change* (GLVIA3, paras 5.39 – 5.47, pp88 – 90, LI/IEMA 2013). Accordingly, the judgements on value and susceptibility are combined to give levels of sensitivity as in Table A2.4 below.

Table A2.4: Landscape Sensitivity to Proposed Development Type

Landscape Sensitivity	Description
High sensitivity	A landscape with **international or national value** and/or with features, elements, areas or special qualities of international or national value, that could be **very susceptible** to the type, scale and location of development proposed.
High/medium sensitivity	A landscape with **national or County/Borough/District value** and/or with features, elements, areas or special qualities of national value, that could be **susceptible** to the type, scale and location of development proposed.
Medium sensitivity	A landscape with **County/Borough/District or local value** and/or with features, elements, areas or special qualities of County/Borough/District or local value, that could have a **moderate susceptibility** to the type, scale and location of development proposed.
Medium/low sensitivity	A landscape with **local value** and/or with features, elements, areas or special qualities of local value, that could have a **slight susceptibility** to the type, scale and location of development proposed.
Low sensitivity	A landscape that is **unvalued** and/or with features, elements, areas or special qualities that are unvalued, and that could have a **negligible susceptibility** to the type, scale and location of development proposed.

Magnitude of Change in Landscape Character

A2.43. The magnitude of change to landscape character depends on the scale or degree of change to the landscape resource and the nature, geographical extent, duration and reversibility of the effects that would be brought about by the proposed development (see GLVIA3, paras 5.48 – 5.52, p90 - 91, LI/IEMA 2013). Accordingly, the judgements of magnitude are based on the criteria in Table A2.5 below.

Table A2.5: Magnitude of Change to Landscape Character

Magnitude of Change	Description
Very substantial adverse [or beneficial]	Where the proposed development would become a defining characteristic of the landscape, would override and be in stark contrast with [or would substantially enhance] the existing landscape context, would be in the context of no similar structures [or would reinstate particularly valued features that had been previously lost or degraded] and would be a dominant additional feature(s) which would be permanent or present for a long, albeit temporary and reversible, time frame.
Substantial adverse [or beneficial]	Where the proposed development would become a key characteristic of the landscape, would compete with and detract from [or enhance] the existing landscape context, would be in the context of few similar structures [or would reinstate particularly valued features that had been previously lost or degraded] and would be a prominent additional feature(s) which would be permanent or present for a long, albeit temporary and reversible, time frame.
Moderate adverse [or beneficial]	Where the proposed development would become a characteristic of the landscape and would contrast with [or complement] the existing landscape context, may be in the context of a few similar structures [and/or would reinstate valued features that had been previously lost or degraded] and would be a visible additional feature(s) which would be permanent or present for a long, albeit temporary and reversible, time frame.
Slight adverse [or beneficial]	Where the proposed development would become a characteristic of the views from this landscape and would contrast with [or complement] the existing landscape context, may be in the context of some similar structures [and/or would reinstate features that had been previously lost or degraded] and would be a noticeable additional feature(s) which would be permanent or present for a long, albeit temporary and reversible, time frame.
Negligible adverse [or beneficial]	Where the proposed development may contrast with [or would complement] the existing landscape context, may be in the context of several similar structures [and/or would reinstate minor features that had been previously lost or degraded] and would be a barely discernible additional feature(s) which would be permanent or present for a long, albeit temporary and reversible, time frame.
No change	Where the proposed development would not be visible or would not result in any discernible change in landscape character.

Significance of Effects on Landscape Character

A2.44. The effects on landscape character are then derived by combining the sensitivity and magnitude in accordance with the matrix in Table A2.6 below.

A2.45. In the following table, where overall effects are predicted to be major/moderate or higher, there are likely to be significant changes in landscape character. Overall effects of moderate+ may be significant if these apply to an extended area or location, and overall effects of moderate may contribute to significance if combined with greater changes in the same general location, whereas moderate/minor+ or lower changes are unlikely to result in significant changes to landscape character.

Table A2.6: Assessment of Effects on Landscape Character

LANDSCAPE SENSITIVITY	MAGNITUDE OF CHANGE								
	V sub	**V sub/ sub**	**Sub**	**Sub/ mod**	**Mod**	**Mod/ slight**	**Slight**	**Slight/ neg**	**Neg**
High	Major++	Major+	Major	Maj/ mod+	Maj/ mod	Mod+	Mod	Mod/ min+	Mod/ min
High/ medium	Major+	Major	Maj/ mod+	Maj/ mod	Mod+	Mod	Mod/ min+	Mod/ min	Minor+
Medium	Major	Maj/ mod+	Maj/ mod	Mod+	Mod	Mod/ min+	Mod/ min	Minor+	Minor
Medium/ low	Maj/ mod+	Maj/ mod	Mod+	Mod	Mod/ min+	Mod/ min	Minor+	Minor	Min/ neg+
Low	Maj/ mod	Mod+	Mod	Mod/ min+	Mod/ min	Minor+	Minor	Minor/ neg+	Min/ neg

A2.46. The nature of the predicted significant effects on landscape character can be: direct/indirect, secondary, individual/ cumulative (additional or combined), short/medium/long-term, temporary/permanent, intermittent/continuous, reversible/irreversible and/or adverse/beneficial effects (based on Schedule 4 of the EIA Regulations 2011, DCLG 2011).

A2.47. With regards to landscape character, the effects of a proposed development is generally considered to be direct (within the host landscape), indirect (on neighbouring landscapes), individual (when in isolation), cumulative (when there are other similar types of development in the landscape), temporary (if a time limited permission) or permanent, intermittent (if elements of the development are not always present) or continuous and either reversible (if the landscape can re-reinstated to its pre-development character) or irreversible (if the changes to landscape character and visual amenity cannot be reversed).

Effects on Views

A2.48. The criteria used to judge value, susceptibility, sensitivity, magnitude and significance of effects on views are as follows.

Location Value

A2.49. The value attached to a location or to a particular view at a location can influence the purpose and expectation of receptors at the location, and the judgement of value takes into account:

- Recognised value - for example, by the presence of planning designations or designated heritage assets.
- Indicators of value – to individuals, communities and society generally, for example, the popularity of the location and views as indicated by visitor numbers, the inclusion in guidebooks or on tourist maps, the provision of visitor facilities and references in literature and art.

A2.50. The value of a location and/or view is described as in Table A2.7 below.

Table A2.7: Value of Location or Particular View

Value of Location or View	Description
National value	A recognised scenic view in a landscape that has been designated at a national level, eg National Parks (England, Scotland and Wales), Areas of Outstanding Natural Beauty (England, Wales and NI), National Scenic Areas (Scotland) and Heritage Coasts (England and Wales), or a view of or from a distinctive landscape feature designated at the national level, eg Scheduled Monument, Grade I Listed Building, Grade I Listed Garden.
County/Borough/ District value	A popular view promoted in visitor guides and/or in a landscape designated in Structure, Unitary or Local Development Plans.
Community value	A popular view in an undesignated landscape which is locally valued and displays evidence of responsible use and value.
Private value	A private view, eg from a residential property, that is likely to be valued by the occupants.
Unvalued	Where the landscape has been despoiled and there is evidence that society does not value the view or landscape, eg fly tipping, abandoned cars, litter, etc.

Receptor Susceptibility

A2.51. Susceptibility to changes in a view will vary between receptor groups and the judgement of susceptibility takes into account:

- Receptor location, occupation or activity – for example, relaxing at home, undertaking leisure, recreational or sporting activities, or at work, etc.
- Movement of receptor and duration and frequency of view experience - whether receptors would be stationary or moving (which influences how long they would be exposed to the change at any one time) and whether receptors are exposed to the view daily, frequently, occasionally or rarely.
- Focus of attention or interest – where their attention would be focussed at the location, which depends on their orientation and/or direction of

travel, the nature of the landscape and existing views and their visual amenity.

A2.52. The susceptibility of each receptor group at each location is judged in terms of five levels of susceptibility, as provided in Table A2.8 below.

Table A2.8: Visual Receptor Susceptibility to Proposed Development Type

Receptor Susceptibility	Description
Very susceptible	Where the receptor would be stationary or moving slowly, would be exposed to the change daily and for much of each day and the focus of their attention or interest would be towards the view of the proposed development.
Susceptible	Where the receptor would be stationary or moving slowly, would be exposed to the change frequently and for sustained periods and the focus of their attention or interest would be towards the view of the proposed development.
Moderate susceptibility	Where the receptor would be moving steadily, would be exposed to the change infrequently and for short periods, and the focus of their attention or interest may be towards the view of the proposed development.
Slight susceptibility	Where the receptor would be moving swiftly, would be exposed to the change occasionally and for very short periods, and the focus of their attention or interest may be oblique to the view of the proposed development.
Negligible susceptibility	Where the receptor would be moving swiftly, would be exposed to the change rarely and for very short periods, and the focus of their attention or interest would be oblique to or away from the view of the proposed development.

Receptor Sensitivity

A2.53. All visual receptors are people and assumed to be equally sensitive to change. However, the location and activities of visual receptors influence the way in which they experience the landscape and views, the extent to which views of the surrounding landscape may contribute to their existing visual amenity, the value they place on these views and their susceptibility to changes in these views. Accordingly, at any one location there may be different levels of sensitivity for the different receptor groups, the sensitivity may vary depending on the direction of the view, and any one receptor group may be accorded different levels of sensitivity at different locations.

A2.54. Some of the above factors for susceptibility and value will vary even within the same receptor group (eg some walkers on access land may visit only once, others may walk there every day). Therefore, the judgement on sensitivity for each receptor group at each viewpoint location assumes a worst-case scenario

in terms of both the value attached to the views at that location and the susceptibility of each receptor group to changes in those views.

A2.55. In accordance with GLVIA3, the sensitivity of each visual receptor group is judged on the basis of the *value* of the location and the *susceptibility to change* of the visual receptor group (GLVIA3, paras 6.31 – 5.37, pp113 – 114, LI/IEMA 2013). Accordingly, the judgements on value and susceptibility are combined to give levels of sensitivity as in Table A2.9 below.

Table A2.9: Receptor Location Sensitivity to Proposed Development Type

Receptor Sensitivity	Description
High sensitivity	At a location with **National value** and where receptors would be very susceptible or susceptible to change. At a **private location** where receptors are likely to highly value the view and would be very susceptible or susceptible to change. At a location with **County/Borough/District value** and where receptors would be very susceptible to change.
High/medium sensitivity	At a location with **National value** and where receptors would be susceptible or moderately susceptible to change. At a **private location** where receptors are likely to value the view and would be susceptible or moderately susceptible to change. At a location with **County/Borough/District value** and where receptors would be susceptible to change. At a location with **local community value** and where receptors would be very susceptible or susceptible to change
Medium sensitivity	At a location with **National value** and where receptors would be slightly susceptible to change. At a **private location** where receptors are likely to place some value on the view and would be moderately or slightly susceptible to change. At a location with **County/Borough/District value** and where receptors would be moderately susceptible to change. At a location with **local community value** and where receptors would be susceptible or moderately susceptible to change.
Medium/ low sensitivity	At a location with **County/Borough/District value** and where receptors would be slightly susceptible to change. At a location with **local community value** and where receptors would be moderately or slightly susceptible to change.
Low sensitivity	At a location with **local community value** and where receptors would have negligible susceptibility to change At a location that appears to be **unvalued** and where receptors are likely to have slight or negligible susceptibility.

A2.56. Some typical receptor location sensitivities are provided in Table A2.10 below.

Table A2.10: Receptor Location Sensitivity to Proposed Development Type

Receptor group		Location sensitivity
Zone receptors	Residents	***High*** - would view the proposed development in the primary views from their property (eg main windows and gardens), would be stationary or moving slowly about their property, would see the development on a daily basis, could be orientated towards the development, and would value these views. ***High/medium*** - would view the proposed development in the secondary views from their property (eg driveway), would be stationary or moving slowly at these locations, would see the development on a daily basis, could be orientated towards the development, and would value these views. ***Medium*** - would view the proposed development from very limited locations on their property (eg single attic window), would be stationary or moving slowly at these locations, would see the development on a daily basis, could be orientated towards the development, and would value these views.
Zone and linear receptors	Recreational receptors	***High*** - are stationery or moving slowly (eg walking, cycling or horse riding), can be orientated towards the development, are at that location primarily in order to enjoy the view, on a nationally designated route, regional long-distance route and/or in a landscape nationally designated for its scenic value. ***High/medium*** - are stationery or moving slowly (eg walking, cycling or horse riding), can be orientated towards the development, are at that location primarily in order to enjoy the view but also for other purposes, at scenic vantage points, on access land, locally promoted route or local right of way. ***Medium*** - are stationery or moving slowly, can be orientated towards the development, may be at that location in order to enjoy the view but may have other purposes (eg playing sport), or where the main view is not in the direction of the development, on a local right of way, beach, sports field or other leisure/ recreational facility.
Zone receptors	Outdoor workers and school children	***Medium*** - outdoor workers and school children in locations where they may be moving slowly, can be orientated towards the development, may experience the view on a daily basis, may be at that location in order to enjoy the view but will have other purposes. ***Medium/low*** - outdoor workers in locations where they may be moving slowly, can be orientated towards the development, may experience the view on a daily basis, but are at that location primarily to undertake activities unconnected with the view.
	Indoor workers	***Low*** - indoor receptors with limited views in this direction, that are in that location primarily to undertake activities unconnected with the view.
Linear receptors	Road and rail users (motorists, passengers, bus and train travellers)	***High/medium*** – in locations where they are moving steadily/swiftly, can be orientated towards the development, are likely to be at that location in order to enjoy the view, in a landscape that is nationally designated and/or on a nationally recognised scenic route. ***Medium*** - in locations where they are moving steadily/swiftly, can be orientated towards the development, may be at that location in order to enjoy the view but may also have other purposes (eg journey to work), in a landscape that is not nationally designated for its scenic value and/or not on a nationally recognised scenic route. ***Medium/low*** - in locations where they are moving swiftly, with a direction of travel that is oblique or side on to the development, are likely to be travelling for a purpose other than in order to enjoy the view (eg journey to work), in a landscape that is not designated.

Magnitude of Change in a View

A2.57. The magnitude of the change in a view is a judgement based on a series of measured parameters which, in order to assess the worst case, assumes that the visual receptors are being exposed to the change for the first time and in excellent visibility (30km+).

A2.58. Computer-generated visualisations (where used), fieldwork observations and professional judgement are used to identify a largely quantifiable set of parameters, which include:

- Distance and direction of the viewpoint from the development.
- Extent/proportion of the development visible from the viewpoint.
- Field of view occupied by the development (horizontal and vertical angles of view).
- Context of the view, existing visual amenity and the degree of contrast with the existing landscape and built elements (background, composition, pattern, scale and mass, form, line, movement, colour, texture, etc).
- Scale of change with respect to the loss or addition of features in the view. This includes the scale of the development relative to the scale of the landscape, field pattern, etc and whether the development would be dominant, prominent, visible/conspicuous, noticeable/apparent, discernible or barely discernible.
- Nature of change, particularly in relation to existing visual amenity and the composition of the view, such as changes to skyline, creation of a new visual focus, introduction of new man-made elements, changes to visual simplicity or complexity, alteration of visual scale or changes to the degree of visual enclosure.
- Duration and nature of the effect, eg direct/indirect, secondary, individual/cumulative (additional or combined), short/medium/long-term, temporary/permanent, intermittent/continuous, reversible/irreversible (as related to the nature of the development, not the receptor activity).

A2.59. For each viewpoint location, the parameters in para A2.58 above are examined, the findings combined, and the assessment of magnitude judged using a scale of: very substantial, substantial, moderate, slight and negligible.

Where necessary, the intermediate levels of very substantial/substantial, substantial/moderate, moderate/slight and slight/negligible are also used. Each level of magnitude approximates to the combinations of parameters provided in Table A2.11 below.

Table A2.11: Magnitude of Change in a View

Magnitude of Change	Description
Very substantial	Where the proposed development would be close to the viewpoint, visible in its entirety, would occupy more than one sector of the view (<90˚), the development would be in stark contrast to the landscape context (particularly in terms of scale and an absence of similar structures), such that it would be a dominant new feature which would be permanent or present for a long, albeit temporary and reversible, time frame.
Substantial	Where the proposed development would be in the near distance, visible in its entirety or partly screened, would occupy the majority of one sector of the view (up to approx. 90˚), the development would contrast with the landscape context (particularly in terms of scale and few if any similar structures), such that it would be a prominent new feature which would be permanent or present for a long, albeit temporary and reversible, time frame.
Moderate	Where the proposed development would be in the middle distance, visible/conspicuous in its entirety or partly screened, would occupy up to one half of one sector of the view (up to approx. 45˚), the development may contrast with the landscape context (particularly in terms of scale and few similar structures) or may be in the context of similar structures but a visible additional feature which would be permanent or present for a long, albeit temporary and reversible, time frame.
Slight	Where the proposed development would be in the distance, noticeable in its entirety or partly screened, would occupy a small part of one sector of the view (up to approx. 23˚), the development may contrast with the landscape context (particularly in terms of scale and few similar structures) or may be in the context of similar structures but a noticeable/ apparent additional feature which would be permanent or present for a long, albeit temporary and reversible, time frame.
Negligible	Where the proposed development would be in the far distance, partly or largely screened, would occupy a very small part of one sector of the view (up to approx. 12˚), the development may contrast with the landscape context (particularly in terms of scale and few similar structures) or may be in the context of similar structures but a barely discernible additional feature which would be permanent or present for a long, albeit temporary and reversible, time frame.

Significance of Effects on Views

A2.60. For each receptor group, the sensitivity of the location is combined with the predicted magnitude of change to determine the overall change in the view and whether there is likely to be a significant change in the view at that location. In most cases, the overall change in the view can be derived by combining the sensitivity and magnitude in accordance with the matrix in Table A2.12 below.

A2.61. In the following table, where overall effects are predicted to be major/moderate or higher, there are likely to be significant changes in the view. Overall effects of moderate+ may be significant if experienced over a sustained length of a route or over most of a zone, area or location, and overall effects of moderate may contribute to significance if combined with greater changes at the same location, whereas moderate/minor+ or lower changes are unlikely to result in significant changes to views.

Table A2.12: Assessment of Effects on Views

RECEPTOR SENSITIVITY	MAGNITUDE OF CHANGE								
	V sub	**V sub/ sub**	**Sub**	**Sub/ mod**	**Mod**	**Mod/ slight**	**Slight**	**Slight/ neg**	**Neg**
High	Major++	Major+	Major	Maj/ mod+	Maj/ mod	Mod+	Mod	Mod/ min+	Mod/ min
High/ medium	Major+	Major	Maj/ mod+	Maj/ mod	Mod+	Mod	Mod/ min+	Mod/ min	Minor+
Medium	Major	Maj/ mod+	Maj/ mod	Mod+	Mod	Mod/ min+	Mod/ min	Minor+	Minor
Medium/ low	Maj/ mod+	Maj/ mod	Mod+	Mod	Mod/ min+	Mod/ min	Minor+	Minor	Min/ neg+
Low	Maj/ mod	Mod+	Mod	Mod/ min+	Mod/ min	Minor+	Minor	Minor/ neg+	Min/ neg

A2.62. In accordance with Schedule 4 of the EIA Regulations (DCLG 2017), the nature of the predicted significant effects on views can be described as direct/indirect, discrete/cumulative (additional or combined), short/medium/long-term, temporary/permanent, intermittent/continuous, reversible/irreversible and adverse/beneficial.

A2.63. With regards to views, the effects of a proposed development are generally direct, discrete (when seen in isolation), cumulative (when there are other similar types of development in the view), temporary (if a time limited permission) or permanent, intermittent (when seen in several different views along a route) or continuous (when seen at a stationary viewpoint) and either reversible (if the view can re-reinstated to its pre-development character) or irreversible (if the changes to the view cannot be reversed).

Assessments of Residual Effects

Landscape Fabric

A2.64. The assessment of effects on landscape fabric considers the existing landscape elements and features on the site and surrounding area and the predicted direct (physical) effects of the proposed development on the site landscape, during both the construction and operational phases, taking into account the landscape and biodiversity mitigation and enhancement measures incorporated into the design, and makes a judgement as to whether there is likely to be any significant beneficial or adverse effects on landscape fabric based on the following definitions:

- Significant beneficial effects on landscape fabric would occur where the proposed development would result in the improvement of existing important/mature/diverse/distinctive landscape elements on the site, or would result in the reinstatement of landscape features which had previously been lost or degraded as the result of agricultural operations or other development.
- Significant adverse effects on landscape fabric would occur where the proposed development would result in the permanent loss (or long-term temporary loss) of important/mature/diverse/distinctive components and the effects cannot be adequately mitigated.

Landscape Character

A2.65. The assessment of effects on landscape character considers the landscape context, the characteristics of the proposed development, the visibility and viewpoint analyses and other fieldwork observations. It then predicts the degree and extent of the likely significant adverse or beneficial effects on landscape character as a consequence of the addition of the proposed development, either directly (into the host landscape) or indirectly (into views from the surrounding landscapes), based on the following definitions:

- Significant beneficial effects on landscape character are likely to occur where the proposed development would materially enhance the quality (condition) of the landscape, would complement the existing character and/or where particularly valued characteristics, previously lost or degraded, would be reinstated.

- Significant adverse effects on landscape character are likely to occur where the proposed development would become a key characteristic of the landscape, would contrast with the existing character, and/or where existing key characteristics would be permanently (or long term temporarily) lost or changed, and cannot be adequately mitigated.

Visual Amenity

A2.66. The assessment of effects on visual amenity draws on the landscape and visual baseline, the characteristics of the proposed development, the visibility and viewpoint analyses and other fieldwork observations, and makes a judgement as to whether there are likely to be any significant effects on the visual amenity of the main visual receptor groups and locations in the study area, based on the following definition:

- Significant effects on visual amenity can occur where a development would result in significant effects on the primary view(s) at a location or along a route and the view(s) is one that is valued and can be appreciated by receptors that are at that location for purposes that include the appreciation of the view(s).

A2.67. As part of the assessment, a judgement is made as to whether the predicted effects on visual amenity would be perceived by local people as beneficial, neutral or adverse.

Acceptability of Significant Effects

A2.68. Significant effects are not necessarily unacceptable effects. Whether the effects of a development on the environment are acceptable or unacceptable is a planning judgement made by the decision maker, taking into account the benefits of the scheme, its impacts on all environmental resources and receptors (of which landscape and visual amenity are just two aspects) and its national and local planning context.

A2.69. Therefore, this assessment does not discuss whether or not any predicted significant effects are acceptable but does provide the decision maker with the environmental information on landscape and visual impacts necessary to inform that judgement.

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APPENDIX B - HISTORIC ENVIRONMENT SCOPING

Introduction

The Historic Environment chapter will consider the potential physical and indirect effects of the Temple Oaks Renewable Energy Park and its grid connection route upon potential and known designated and non-designated heritage assets. A Historic Environment Desk Based Assessment (HEDBA) has been completed and will inform the scoping and EIA processes.

The study area used in this assessment is a 1km buffer from the site boundary (the area within the being referred to as the Study Site). A site visit was undertaken on 6th April 2022 when the conditions were bright and cloudy with good visibility though occasional rain showers temporarily reduced the long-range views.

Baseline Conditions

The HEDBA has confirmed that the Study Site does not contain any designated archaeological remains. The search of the Lincolnshire Historic Environment Record and other sources identified the following undesignated heritage assets and potential for archaeology within the Study Site:

- In 1999 a watching brief was conducted through parts of the Study Site and wider study area as part of the Ingoldsby to Pickworth Mains Replacement Scheme (Water) (ELI4380). No archaeology was identified.
- Within the Study Site is a cropmark (MLI88402), most likely to be Prehistoric on the basis of morphology, and a findspot of a flint flake (MLI8538). There is general Prehistoric activity across the wider area, whilst the cropmarks indicate more specific use of the landscape. There is moderate potential for finds or features of Prehistoric date within the Study Site.
- No Roman archaeology is known within the Study Site. Within the wider area is Kjng Street Roman Road. Although Roman roads often have associated sites, the distance to King Street, c350m to the west,, makes it unlikely that any would be located within the Study Site. Therefore the potential for Roman archaeology within the Study Site is assessed as low.
- There are no Saxon or early Medieval remains documented within the Study Site, although it is possible that those of medieval date had origins within this earlier period. The Domesday Book refers to the settlement of Avethorpe, which is likely to have been located within the Study Site, but there are no further location references. The potential for early Medieval archaeology is therefore considered low.
- The deserted medieval hamlet of Little Lavington, with areas of ridge and furrow, and the site of a moated grange close to the eastern site boundary are shown by the National Mapping Programme (NMP), Lidar (NLP DTM 2019 at 1m resolution) and aerial photography (Google Earth August 2020) to exist to some extent sub-surface. Documentary LHER records refer to these remains and also indicate significant activity across the Study Site (MLI33771, MLI33772, MLI84178). Although these were not observed on the surface during site visit as the Study Site had been ploughed and sown with crops the potential for medieval finds and features is high.
- The post medieval is characterised by demolished, or significantly redeveloped, farmsteads. Within the Study Site, three are known, Lenton Lodge (MLI121677), Keisby Lodge (MLI121685) and an unnamed farmstead (MLI121679) as well as a stone building known from a scatter of limestone (MLI82373). Lenton and Keisby Lodges and the former settlement of Lavington are shown on 18th and 19th century mapping. No visible remains of these were observed during the site visit, however they are likely to survive sub-surface, along with associated estate or agricultural remains. The potential for post-medieval archaeology is therefore high.
- The former RAF Folkingham occupied the site from 1940, when it was a decoy airfield (82374). It was operational from 1942-46 and then again from 1959-63 when it was a base for Intermediate Range Ballistic ('Thor') Missiles. A possible searchlight battery is located to the northeast of the Study Site (MLI88824). The former RAF installations appear to be upstanding but aerial photography suggests they were more extensive and further remains could survive sub-surface.

Designated and Non-Designated Built Heritage Assets

There are no designated heritage assets located within the Study Site boundary or within the wider study area. There are no non-designated heritage assets within the Study Site but within the 1km buffer from the Study Site boundary ten potential non-designated heritage assets were identified. Beyond the 1 km buffer, and

included for completeness, there were a number of assets that owing to their relationship to the Study Site or their higher designation denoting their sensitivity to change within their setting, were considered by the HEDBA. The distances of these from the Study Site are given in the table below. Of these, the following heritage assets have the potential to be impacted by development of the Study Site. Impacts would be limited to changes in the setting of the built heritage assets.

Table 1: Built heritage assets potentially impacted by the proposed development.

Reference Number	Name and Proximity to the Study Site Boundary
NHLE 1261913	Manor Farm House Located c. 1200 metres southwest
NHLE 1253206	Church of St. Peter Located c. 1800 metres west
NHLE 1253286	Church of St Andrew, Pickworth Located c. 2000 metres north
NHLE 1062733	Church of St. Andrew, Folkingham Located c. 2200 metres northeast
HER MLI121625	Owens Barn Farm Located c. 695 metres north
HER MLI121626	The Warren Located c. 920 metres northeast
HER MLI121666	Laughton Lodge Located c. 740 metres east
HER MLI121667	Unnamed Farmstead Located c. 740 metres east
HER MLI121636	South Lodge (Pickworth South Lodge) Located c. 300 metres north
HER MLI82374	RAF Folkingham Located within the Study Site boundary

Assessment Methodology, Study Area and Proposed Viewpoints

The following data sources have been used in the compilation of the baseline data:

- Lincolnshire Historic Environment Record (LHER).
- National Heritage List for England held by Historic England.
- Historic mapping.
- Previous archaeological evaluation and excavation records relating to sites in and immediately adjacent to the study area.
- Such other published works, reports and other information relevant to the desk-based assessment.
- National Mapping Programme (NMP) data.
- Online aerial photography including Google Earth.
- An assessment of any Lidar holdings held by the Environment Agency for the study area.
- Portable Antiquities Scheme (PAS) data, available from the PAS website; and
- Site walkover.

The assessment of likely significant effects on historic environment resources of the Study Site and grid connection route will be conducted in line with the latest and most comprehensive guidance provided. These documents do not provide a prescriptive approach to assessment but identify principles and good practice that have been applied in the methodology for the assessment:

- Scheduled Monuments – Identifying, protecting, conserving and investigating nationally important archaeological sites under the Ancient Monuments and Archaeological Areas Act 1979 (Department for Digital, Culture, Media and Sport (DCMS) 2010);
- Scheduled Monuments & nationally important but non-scheduled monuments (DCMS 2013);
- Principles of Selection for Listing Buildings (DCMS 2018);
- Conservation Principles – Policies and Guidance for the Sustainable Management of the Historic Environment (English Heritage 2008);
- Design Manual for Roads and Bridges Volume 11; Section 3; Part 2 'Cultural Heritage' (DMRB) (Highways Agency 2019);
- Historic Environment Good Practice Advice in Planning Note Managing Significance in Decision-Taking in the Historic Environment (Historic England 2015);
- Historic Environment Good Practice Advice in Planning Note 3 The Setting of Heritage Assets (Historic England 2017);
- Seeing the History in the View – A Method for Assessing Heritage Significance in Views (Historic England 2011);
- Standard and Guidance for Historic Environment Desk-based Assessments (Institute for Archaeologists 2014) (updated in January 2017); and
- Code of Conduct (Chartered Institute for Archaeologists [CIfA] [revised edition] 2014).

The results of the HEDBA have been used to assess the effects of the Proposed Development, including construction, operational and decommissioning effects, on archaeological and built heritage features against clearly defined criteria. The magnitude of change for heritage assets potentially affected by the Proposed Development is determined in accordance with best practice and Historic England guidance (Historic England 2017).

The significance of a heritage asset is assessed in terms of national, regional or local statutory or non-statutory protection and grading of the asset. For non-designated archaeological assets determination of significance will use the Secretary of State's non-statutory criteria and professional judgement.

Table 2: Criteria determining the importance of a heritage asset.

Importance	Description
International	Archaeological sites or monuments of international importance, including World Heritage Sites. Structures and buildings inscribed as of universal importance as World Heritage Sites. Other buildings or structures of recognised international importance.
National	Ancient monuments scheduled under the Ancient Monuments and Archaeological Areas Act 1979, or archaeological sites and remains of comparable quality, assessed with reference to the Secretary of State's non-statutory criteria. Listed Buildings. Non-designated built assets of national importance, assessed with reference to the Secretary of State's published Principles of Selection for Listing Buildings.
Regional/ County	Archaeological sites and remains which, while not of national importance, score well against most of the Secretary of State's criteria Conservation Areas.
Local	Archaeological sites that score less well against the Secretary of State's criteria. Historic buildings on a 'local list'. Non-designated built assets of local significance.
None	Areas in which investigative techniques have produced negligible or only minimal evidence for archaeological remains, or where previous large-scale disturbance or removal of deposits can be demonstrated.

The magnitude of impact / change is a product of the extent of development impact on an asset. Effects are rated as High, Medium, Low and Negligible/Neutral. Effects be direct or indirect, adverse or beneficial. The criteria for assessing the magnitude of impact are set out in Table 3.

Table 3: Magnitude of Impact upon archaeological and built heritage assets.

Magnitude	Direct Impacts	Indirect Impacts
High Adverse	Demolition of built heritage assets or demolition within a Conservation Area. Complete removal of an archaeological site.	Radical transformation of the setting of an archaeological monument. Substantially harmful change in the setting of a built heritage asset or Conservation Area.
Medium Adverse	Harmful alteration (but not demolition) of a built heritage asset or alterations to a building in a Conservation Area. Removal of a major part of an archaeological site and loss of research potential.	Less than substantial harm to the setting of a built heritage asset or Conservation Area. Partial transformation of the setting of an archaeological site e.g. the introduction of significant noise or vibration levels to an archaeological monument leading to changes to amenity use, accessibility or appreciation of an archaeological site.

Magnitude	Direct Impacts	Indirect Impacts
Low Adverse	Alterations to a built heritage asset or Conservation Area resulting in minor harm. Removal of an archaeological site where a minor part of its total area is removed but the site retains a significant future research potential.	Minor harm to the setting of an archaeological monument or built heritage asset or Conservation Area.
Negligible/ Neutral	Negligible impact from changes in use, amenity or access. Negligible direct impact to the built heritage asset or Conservation Area.	Negligible perceptible change to the setting of a building, archaeological site or Conservation Area.
Low Beneficial	Alterations to a built heritage asset or Conservation Area resulting in minor beneficial impacts. Land use change resulting in improved conditions for the protection of archaeological remains.	Minor enhancement to the setting of a built heritage asset or Conservation Area. Decrease in visual or noise intrusion on the setting of a building, archaeological site or monument.
Medium Beneficial	Alterations to a built heritage asset or Conservation Area resulting in moderate beneficial impacts. Land use change resulting in improved conditions for the protection of archaeological remains plus interpretation measures (heritage trails, etc.)	Significant reduction or removal of visual or noise intrusion on the setting of a building, archaeological site or monument. Improvement of the wider landscape setting of a built heritage asset, Conservation Area, archaeological site or monument. Improvement of the cultural heritage amenity, access or use of a built heritage asset, archaeological site or monument. Moderate enhancement to the setting of the built heritage asset and Conservation Area.
High Beneficial	Arrest of physical damage or decay to a built heritage asset or structure. Alteration to a built heritage asset or Conservation Area resulting in significant beneficial impact.	Significant enhancement to the setting of a built heritage asset. Conservation Area or archaeological site, its cultural heritage amenity and access or use.

The significance of the impact of the Proposed Development on archaeological and built heritage assets is determined by the significance of the asset and the magnitude of impact to the asset. Table 4 below presents a matrix that demonstrates how the significance of impact will be established:

Table 4: Evaluation of Significance of Effect

Heritage significance / Importance of asset	Magnitude of Impact			
	High	**Medium**	**Low**	**Negligible / Neutral**
International Importance	Substantial/ Major	Major	Major	Negligible
National Importance	Major	Major/ Moderate	Moderate	Negligible
Regional/County Importance	Major/ Moderate	Moderate/ Minor	Minor	Negligible
Local Importance	Minor	Minor	Negligible	Negligible
Negligible Importance	Negligible	Negligible	Negligible	Negligible
'Substantial', 'Major' and 'Moderate' levels of effect are 'significant' in the context of the EIA Regulations. 'Minor' and 'Negligible' are not significant in the context of the EIA Regulations.				
The levels of effect could potentially be positive, neutral or negative.				

Once impacts have been identified, the means by which they can be avoided through design will be explored as a priority. If impacts cannot be avoided through design, then alternative strategies, which may include site investigation and recording, will be proposed. The residual impacts following the implementation of these measures will then be defined and significance criteria applied. All potential impacts and mitigation will be assessed against and informed by national and local planning guidance including the NPPF.

The following study areas have been chosen for the archaeological impact assessment and built heritage settings assessment. There are no strict parameters for the setting of study areas. This has been defined based on professional judgement, and experience of potential significant direct and indirect effects likely to arise from the Proposed Development:

A 1km radius has been used in the HEDBA to identify designated or non-designated heritage assets which might be directly or indirectly impacted by the Proposed Development and inform the potential for previously unrecorded archaeological remains. The study area has been extended to 2.2km where, owing to their relationship to the Study Site or their higher designation denoting their sensitivity to change within their setting, additional built heritage assets were considered by the HEDBA.

Anticipated Effects – Construction and Decommissioning and Operation

Piling, installation and removal of foundations, cable runs and the grid connection route will all have a sub-surface negative impact on any archaeology, for which there is moderate or high potential for the Prehistoric, medieval and post-medieval periods. The main features of Little Lavington and the moated grange are known from aerial photography and Lidar but the level of survival, detailed features and extent of these, and the location of Lenton Lodge, are not well defined. Sub-surface works would have a direct negative impact on these features though archaeological investigation in advance of construction would add to our knowledge and understanding of them.

Geophysical survey was recommended in the HEDBA as an initial means of identifying the location and extent of the potential remains identified above and any that cannot be predicted by existing records. The results of the survey could further define the significance of any archaeology. Until the results of the geophysical survey are known, there is not enough information on the potential archaeology to discount significant effects from sub-surface development works. Therefore, archaeology is scoped into the ES.

The final route of the grid connection between Temple Oaks Renewable Energy Park and Bicker Fen has yet to be determined but will principally follow highways or verges. Consideration of the potential archaeological impacts of the final route will be included in the ES chapter.

Designated Built Heritage Assets

The Grade II listed Manor Farm House is located c. 1.2km southwest of the Study Site boundary. It had 19th century ownership and functional links to the Study Site, though these have now been severed. Manor Farm House and the Study Site do not share intervisibility, but the site does form part of its wider rural setting, contributing in a small way to the asset's significance by providing it with its rural context. However, it is considered that the asset's significance primarily derives from its architectural special interest. It is considered that the proposals will have limited impact on the significance of the asset, preserving it from harm and it will not be considered further within the EIA or reported in the ES.

The Grade I listed Churches of St. Andrew, Pickworth and St. Andrew, Folkingham are located c. 2km and 2.2km north and northwest of the Study Site respectively. The significance of these heritage assets derives principally from their early date and the intactness of their built fabric which generates their historic and architectural special interest. The assets derive communal (illustrative) value from their historic and present-day function and they contribute towards the group value of the other buildings within the historic cores of both villages. The churches share no intervisibility with the Study Site at ground level due to the local topography, intervening natural screening and built form. Only long ranging views of the churches spire and tower are afforded from the north and north-eastern areas of the Study Site, and they have some landmark status in terms of their impact on their wider environs. It is considered that although the proposals represent a change within this wider setting, it will have little to no impact on their significance, therefore preserving them from harm. They will scoped out of any further discussion as part of the EIA or ES chapter.

The Grade I listed Church of St. Peter, Lenton is located c. 1.8km west of the Study Site boundary. Dating from the 13th century, it principally derives its significance from its architectural and historic special interest. A level of communal value is also generated by its historic and current function as a place of worship. Due to the local topography and intervening natural screening, there is limited to no visibility with the Study Site at ground level from the church. At the western boundary of the Study Site there are glimpsed views of the church's spire above the intervening trees and hedgerows. However, due to the asset's distance from the Study Site, lack of historic land ownership and functional links combined with the limited intervisibility, the Study Site is considered to play only a negligible role in the asset's overall significance. It is therefore considered that the proposals will have a limited impact on this significance and will preserve the asset from harm and it will not be considered further within the EIA or reported in the ES.

Non-Designated Built Heritage Assets

Owens Barn Farm, The Warren and South Lodge are located between 300 – 920 metres north of the Study Site's northern boundary and share limited levels of intervisibility with the Study Site. None of the assets share any historic functional links with the site, with only Owens Barn Farm having an historic ownership link. The assets date from the mid – late 19th century, have been partially altered and have a number of modern agricultural farm structures making up the existing arrangement of buildings within their plots. For these reasons, it is considered that their significance historically and architecturally is limited, with the Study Site contributing in a limited way to their wider rural setting. It is therefore considered that the level of harm produced will be negligible and these assets are scoped out of the EIA and will not be reported in the ES.

Laughton Lodge and the Unnamed Farmstead are located c. 740 metres east of the eastern boundary of the Study Site and date from the 19th century. No definitive historic ownership or functional links with the Study Site have been found. Visually, the connection between the assets and the Study Site is of long ranging views interrupted by intervening hedgerows and trees. As such, the Study Site is considered to make a limited contribution to their significance forming part of their wider rural and agricultural context. The level of harm will be negligible and they are scoped out of the EIA process.

RAF Folkingham occupied much of the land that now comprises the Study Site and was used as a decoy airfield from 1942-46. For a period between 1959 and 1963 it was a base for Intermediate Range Ballistic ('Thor') Missiles. Following its decommissioning, large areas of the airfield were turned over for agricultural use and the majority of the associated infrastructure was partially or completely removed. However, large sections of the runway, bomb stores and other related but unidentified upstanding concrete structures are still extant. These structures, although in varying states of repair do provide the site with a level of historic and illustrative significance. It is therefore considered that the loss of these elements through the development of the site would produce a moderate level of harm to that significance. Physical effects to the structures could occur at construction stage through demolition, partial removal or alteration or through the vibration and tracking effects of heavy machinery. At operational stage, the solar panels may interrupt the intervisibility and

appreciation of the group value of the structures. The potential effects and moderate level of harm to their significance means that the upstanding remains of RAF Folkingham are scoped into the EIA and will be discussed in the ES.

As none of the heritage assets are scoped into the EIA process because of effects to their setting, no viewpoints are proposed. However, the intervisibility of RAF Folkingham structures is a consideration and cross-referencing with any LVIA visualisations of the proposals should be undertaken within the ES chapter.

Potential Mitigation

Geophysical survey will be used to assist in determining the potential and extent of any archaeology. Depending on the results of the geophysical survey, a further programme of archaeological investigation, may be needed to mitigate the impacts of the proposed development, satisfy the requirements of the NPPF and meet the NSIP standards.

Mitigation by design is an option to preserve archaeology in situ, either as a conscious economical choice or because the potential significance indicated by geophysical survey or other investigation warrants its preservation.

Archaeological investigation as a means of mitigation may be appropriate for some or all of the grid connection, once the final route has been determined.

Historic Building Recording of RAF Folkingham structures may be appropriate to draw together the level of survival and an understanding of the phasing, relationships and significance of each of the structures.

Careful design may also remove, minimise or mitigate physical impacts to structures relating to RAF Folkingham by allowing them to remain or creating a buffer around them. The siting of the solar panels should also be sympathetic to the intervisibility of the structures during the operational stage. Construction methods using track matting and exclusion zones could also mitigate or minimise physical impacts during this stage.

Assumptions, Limitations and Uncertainties.

Within the HEDBA assessment, sources and methods used to understand the potential have inherent limitations. Aerial photographic evidence is limited by seasonal, agricultural, meteorological and environmental factors which impact upon the visibility of archaeological features from the air. Therefore, photographs may not indicate the full extent of archaeological features.

Lidar data show topographic features which survive as earthworks. The resolution of the data, the time of year collected, and vegetation cover of the area surveyed all impact upon the visibility of archaeological features within the data. For these reasons, Lidar data is best collected in the winter months when vegetation is at its thinnest, giving the laser the best opportunity to reach and return from the grounds surface. Similarly, the higher the resolution of the data the more likely archaeological features will be identified, the resolution depicts the frequency at which readings are collected and therefore the more readings that are taken increases the accuracy of the survey. It is generally agreed that a 1m resolution or better is preferred for archaeological survey, however features may still be visible in 2m+ data sets. Lidar assessment will not identify archaeological features beneath the ground surface, nor will it identify cropmarks if these do not also survive as earthworks.

Aerial imagery assessment is a non-intrusive survey technique and therefore features cannot be securely dated to a particular archaeological period using this method. Assessment of the morphology of features can assist in their identification and interpretation, however secure dating can only be achieved through intrusive survey.

Utilising HER data has a presumption that the monument exists as described, unless it is noted that the source is documentary or that destruction has occurred. Often the inclusion of a monument within the HER is a snapshot in time and subsequent change has historically not been systematically reflected in the database unless an event such as development has highlighted the need for an update. Many of the records originated before or were created at the instigation of the HER database, usually in paper format. Digitising records and improvements in mapping are also points where errors in translation could have occurred. Whilst HER data is a good starting point, it cannot be assumed that it is perfect and that monuments are exactly as described or even still upstanding.

Geophysical survey as well as intrusive investigation also have their own limitations. As the exact specification of these methods are not yet known, the limitations cannot yet be described. They will be included within the results and/or ES chapter as appropriate.

Summary

Archaeological Assets

No statutory designations (Scheduled Ancient Monuments, Registered Battlefields or World Heritage Sites) are located within or adjacent to the Study Site boundary. None are recorded within the 1km study area. As such the assessment has not identified any designated archaeological assets which will be negatively impacted by the proposed development.

A review of the available evidence has confirmed that the Study Site has a moderate potential to contain Prehistoric archaeology and high potential for medieval and post-medieval finds and features. There is low potential for all other periods. The significance of any such archaeology is likely to be local to regional, adding data beyond simple findspots or unknown details to existing documentary records. The opportunity to more precisely define its character may be considered beneficial. The development would have a negative physical impact if archaeology were present and therefore it is scoped into the EIA and will be reported in the ES chapter.

Geophysical survey will be used to better determine the potential and extent of any archaeology. Further mitigation options including design solutions and archaeological investigation can then be put in place as appropriate.

Built Heritage Assets

The assessment has not identified any designated built heritage assets which will be negatively impacted by the proposed development and it is proposed that these, plus all but one non-designated built heritage asset, will be scoped out of the EIA and will not be reported in the ES.

There is the potential for a moderate level of harm to the extant structures relating to the non-designated RAF Folkingham and therefore it is scoped into the EIA and ES chapter. However, it is considered that this harm could be mitigated through the recording and retention of these assets and with careful design, there is the potential for them to be incorporated into the layout of the proposals.

APPENDIX C - ECOLOGY AND ORNITHOLOGY SCOPING

Proposed Temple Oaks Renewable Energy Park

Scoping Report: Ecology

Baseline Information: Desk Study

A desk study is being undertaken to provide information on the ecological interest of the proposed development site, its surrounds and the grid connection route, including the locations of any relevant statutory protected sites within 5km of the site for all statutory protected nature conservation sites, within 20 km of the site for internationally important sites such as Special Protection Areas (SPA), Special Areas for Conservation (SAC) and Ramsar Sites, and 2km from the site for other non-statutory sites.

The proposed development site is predominantly arable farmland (on a disused airfield), with an extensive area of broad-leaved woodland (Temple Wood) abutting the south-east of the indicative site boundary. The grid connection route is primarily along highway or highway verge.

The following sources of information are being used for the desk study:

- Natural England website - statutory designated site boundaries, including Sites of Special Scientific Interest (SSSI) and SSSI citation details.
- Joint Nature Conservation Committee (JNCC) website – European protected site boundaries and designations (SPA/SAC/Ramsar).
- Wetland Bird Survey annual reports (Frost *et al.* 2021).
- Lincolnshire Environmental Records Centre (LERC) – data on local wildlife sites and protected species.

Baseline Information: Field Surveys

A programme of ecological field surveys of the site itself is being undertaken to inform the baseline for the ecological impact assessment. This includes:

Breeding Bird Surveys – initial surveys were undertaken in 2021, with further work being carried out in 2022. The surveys comprise:

- *Breeding Bird Walkover Surveys* - the main breeding bird walkover surveys follow the standard Common Birds Census methodology (Gilbert *et al*. 1998). Four survey visits were carried out in 2021 (monthly visits, April-July) and six are being undertaken in 2022 (at approximately fortnightly intervals during mid-April – mid-July). The surveys are covering a buffer zone of 500m around the indicative site boundary where access/viewing is possible (see Figure 1). All bird locations and behaviour are being mapped to 1:10,000 scale, using the standard British Trust for Ornithology (BTO) Common Birds Census notation. All species are being recorded. In addition, the survey effort per unit area is being standardised to make the surveys as repeatable as possible, recording systematically for approximately 2 hours per km^2. The surveys avoid strong winds, heavy rain, fog and low cloud. Birds are being located by walking, listening and scanning by eye and with binoculars. Standard BTO notation is being used to record the birds' activities; singing, calling, carrying nest material, nests or young found, repetitively alarmed adults, disturbance displaying, carrying food or in territorial dispute.
- *Breeding Season Vantage Point Surveys* – these surveys are being carried out during April-August 2022 to enable flight activity at the site to be quantified and any particularly important areas for

key species to be identified (following the standard SNH 2017 methodology). A single vantage point is being used, with 36 hours' surveys during April-August (see Figure 1 for its location and viewshed). All flight lines of target species are being mapped, and the flight height of each flock recorded.

Wintering Bird Surveys – approximately fortnightly survey visits were made from September 2020 through to March 2021 (14 surveys in total), to quantify the bird populations using the development site and its surrounds. Each survey visit included:

- Counts of the wintering birds in and around the development site. These comprised 'look-see' (Gilbert *et al*. 1998) field-by-field mapping counts (covering the development site and a wider buffer of 1km, where access/viewing was possible, see Figure 1).
- Vantage Point Surveys to enable flight activity to be quantified. A single vantage point was used with 42 hours' surveys during autumn/winter (including roost flight observations at dawn/dusk). All flight lines of target species were mapped, and the flight height of each flock recorded.
- Weather conditions during all observations were recorded, and visits made to cover a representative range of visibilities, wind speeds and directions.
- Habitat/crop mapping: mapping of the habitats and crop types available in the study area was carried out during the first visit and then again at approximately 2-month intervals through the season, so that habitat availability could be determined and taken into account in the analyses.

Given the habitats present on site, it was considered unlikely that there would be sufficient waterfowl feeding activity at night (or any possible link to any SPA) to trigger the need for night surveys following Natural England standing advice[1].

Extended Phase 1 Habitat Survey

This is scheduled to be undertaken during May 2022. It will follow JNCC (2016) standards but will also be consistent with the UK Habitat Classification (UKHAB, Butcher *et al*. 2020)). It will include identification and mapping of the vegetation communities present within the study area. The study area boundary for this work will include a 100m buffer outside the site boundary (where access/viewing is possible).

This survey will also include a habitat suitability assessment for protected species, including bats (including roost site potential), badgers, water voles, otters, reptiles and amphibians, which will inform the need for further specific surveys.

Protected Species Surveys

These will be carried out as required following standard Natural England-recommended survey methodologies, with the survey requirement to be informed by the extended Phase 1 survey.

Scope of Assessment

The key issues for the assessment of potential ecological effects relating to the proposed development will be as follows:

- Habitat loss during construction.

[1] https://www.gov.uk/guidance/wild-birds-surveys-and-monitoring-for-onshore-wind-farms#if-you-have-to-survey-and-monitor-at-night

- Pollution from noise, vibration, dust, surface water run-off during construction.
- Disturbance/harm during construction.
- Change in habitat during operational phase (dependent on the management of the site after construction), including potential for beneficial effects through biodiversity enhancement.
- Disturbance during operation (if species are displaced as a result of the presence of the solar panels).
- Disturbance/harm during decommissioning.

Key valued ecological receptors for the assessment will be identified using the following criteria:

- European Protected Species, protected under The Conservation of Species and Habitats Regulations 2010;
- Bird species listed in Annex 1 of the EU Birds Directive;
- Other bird species listed on Schedule 1 of the 1981 Wildlife & Countryside Act;
- Species protected under Schedule 5 of the Wildlife and Countryside Act 1981;
- Priority Habitats identified under the Natural Environment and Rural Communities Act (2006) Section 41 as habitats of principal importance; and
- Red-listed species on the Birds of Conservation Concern list (Stanbury *et al*. 2021), or other national/international red lists.

The ecological assessment will give particular consideration to all species/communities recorded during the baseline surveys that meet any of these criteria.

No ecological issues will be scoped out from this assessment at this initial stage.

Assessment Methodology

The assessment will include a full evaluation of the ecological importance of the development site and its surrounds and identification of any particularly sensitive areas. It will be carried out with reference to the assessment methodology produced by the Chartered Institute for Ecological and Environmental Management (2018) and with reference to Natural England standing advice[2].

The assessment will also consider the potential need for avoidance of key ecological receptors, mitigation measures, if required, and an assessment of the residual effects.

The following documents will be taken into account in the ecological assessment:

- The Wildlife and Countryside Act 1981, as amended;
- The Countryside and Rights of Way [CRoW] Act 2000;
- The Environment Act 2021;
- EU Council Directive 79/409/EEC and 2009/147/EC on the Conservation of wild birds (the 'Birds Directive');
- EU Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora (the 'Habitats Directive');
- Environmental Impact Assessment Directive 85/337/EEC, as amended (the EIA Directive);

[2] https://www.gov.uk/guidance/wild-birds-advice-for-making-planning-decisions

- The Conservation of Habitats and Species Regulations 2017 (the 'Habitats Regulations'), which consolidate the Conservation of Habitats and Species Regulations 2010 with subsequent amendments and translates the Birds and Habitats Directives into UK Law;
- Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended);
- The National Planning Policy Framework (Ministry of Housing, Communities and Local Government, updated July 2021);
- 'Managing Natura 2000 Sites' (European Communities 2000), which gives guidance on the implementation of the Birds and Habitats Directives;
- Guidelines for Ecological Impact Assessment in the UK and Ireland; Terrestrial, Freshwater and Coastal (CIEEM 2018);
- Assessing connectivity with Special Protection Areas (SPAs) (SNH 2016);
- Birds of Conservation Concern (BoCC) 5: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man (Stanbury *et al*. 2021);
- Natural Environment and Rural Communities Act (2006);
- The UK Post-2010 Biodiversity Framework.

The significance of the potential effects of the Proposed Development will be classified by professional consideration of the value of the receptor and the magnitude of impact. The sensitivity (conservation importance, as defined in Table 1) of the receptors present in the study area will be identified, then the magnitude of the possible effect on those receptors determined (as described in Table 2).

Table 1: Sensitivity (conservation importance) of bird species

Sensitivity	**Definitions**
Very High	Cited interest of SPAs, SACs and SSSIs. Cited means mentioned in the citation text for those protected sites as a species for which the site is designated (SPAs/SACs) or notified (SSSIs).
High	Other species that contribute to the integrity of an SPA or SSSI. A local population of more than 1% of the national population of a species. Any ecologically sensitive species, e.g. large birds of prey or rare birds (<300 breeding pairs in the UK). EU Birds Directive Annex 1, EU Habitats Directive priority habitat/species and/or Wildlife and Countryside Act (W&C Act) Schedule 1 species (if not covered above). Other specially protected species.
Medium	Regionally important population of a species, either because of population size or distributional context. UK BAP priority species (if not covered above).
Low	Any other species of conservation interest, e.g. species listed on the Birds of Conservation Concern not covered above.
Nil	Green-listed species (Eaton et al. 2009) of favourable conservation status.

Table 2: Definition of terms relating to the magnitude of ornithological impacts

Magnitude	Definition
Very High	Total loss or very major alteration to key elements/ features of the baseline conditions such that post development character/ composition/ attributes will be fundamentally changed and may be lost from the site altogether. Guide: >80% of population/habitat lost
High	Major alteration to key elements/ features of the baseline (pre-development) conditions such that post development character/composition/attributes will be fundamentally changed. Guide: 20-80% of population/habitat lost
Medium	Loss or alteration to one or more key elements/features of the baseline conditions such that post development character/ composition/ attributes of baseline will be partially changed. Guide: 5-20% of population/habitat lost
Low	Minor shift away from baseline conditions. Change arising from the loss/ alteration will be discernible but underlying character/ composition/ attributes of baseline condition will be similar to pre-development circumstances/patterns. Guide: 1-5% of population/habitat lost
Negligible	Very slight change from baseline condition. Change barely distinguishable, approximating to the "no change" situation. Guide: <1% of population/habitat lost

The combined assessment of the magnitude of an impact and the sensitivity of the receptor has been used to determine whether or not an adverse impact is significant. These two criteria have been cross-tabulated to assess the overall significance of that impact (Table 3). This gives a guide as to the determination of significance, though a final assessment will still be subject to professional judgment.

Table 3: Matrix of magnitude of impact and sensitivity used to test the significance of impacts. The significance category of each combination is shown in each cell. Shaded cells indicate potentially significant impacts in terms of the EIA Regulations.

		SENSITIVITY			
		Very high	**High**	**Medium**	**Low**
MAGNITUDE	**Very high**	Very high	Very high	High	Medium
	High	Very high	Very high	Medium	Low
	Medium	Very high	High	Low	Very low
	Low	Medium	Low	Low	Very low
	Negligible	Low	Very low	Very low	Very low

The interpretation of these significance categories is as follows:

- Very low and low are not normally of concern, though normal design care should be exercised to minimise adverse effects;
- Very high and high represent adverse effects on bird populations which are regarded as significant for the purposes of EIA;
- Medium represents a potentially significant adverse effect on which professional judgment will be made, though for which it is likely that mitigation will reduce it below the significance threshold.

Desk Study: Initial Results

Statutory Designations: International and Nationally Important Sites

There are three statutory designated nationally important sites in the search area around the proposed development (5 km for nationally important SSSIs). All distances are given to the nearest point of the indicative site boundary:

- **Sapperton and Pickworth Woods SSSI** – 2.4km north-west – three ancient semi-natural woodlands which have developed on the heavy soils of the Midland Clay Belt. The woods contain representative examples of wet-ash-maple woodland and acid pedunculate oak-ash-hazel woodland, characteristic woodland types of the Kesteven Plateau. Notified for its botanical interest.
- **Dunsby Wood SSSI** – 4.2km south-east–west ash-maple woodland, especially characteristic of the calcareous soils of the Midland Clay Belt. It is one of a group of ancient semi-natural woodlands lying on the Kesteven Plateau. Notified for its botanical interest and its diverse fungi community.
- **The Hermitage SSSI** - 4.3km south-west– site of a moated hermitage that includes examples of both rare and threatened grassland types. Calcareous clay and loam pasture and an area of base-rich marsh have developed on underlying alluvium and glacial boulder clay. Notified for its botanical interest.

There are no internationally important nature conservation sites (SPAs, SACs or Ramsar sites) within 20km of the site.

Other Sites/Priority Habitats

Local Nature Reserves

There are no Local Nature Reserves (LNR) within 2km of the site.

Local Wildlife Sites

Six Local Wildlife Sites (LWS) are located within 2km of the site. None are within the site boundary itself. As above, all distances are given to the nearest point of the indicative site boundary:

- **Keisby Wood LWS** – bounded by the indicative site boundary to the north and west - mature, diverse and species rich semi-natural woodland, with excellent structural diversity that supports a good range of ancient woodland indicators including swathes of bluebells, wild garlic, dog's mercury and moschatel. Numerous large oak trees and numerous coppiced ash, hazel and small leaved lime are present. Wetter areas support lush dense growth of willows, tall herbs and scrub, whilst smaller undulations, potentially former ditch boundaries, support an abundance of wild garlic and ferns. Several deep, man-made, ponds occur within the wood. Wet ditches also define the northern and southern boundaries of the wood.
- **Temple Wood LWS** – abuts to the southern edge of the indicative site boundary – an extensive native plantation with ancient woodland regrowth, wet woodland, scrub, species-rich hedgerows, neutral grassland, drains, spring/flush and ponds.
- **Lenton Pasture LWS** – 60m north-west from the site – a small area of woodland planted in the 1940s, which has established into a semi-natural habitat. The canopy is dominated by ash, with occasional oak and field maple. Hawthorn, blackthorn and hazel created a relatively dense shrub layer with brambles, nettles and cleavers dominating the ground flora. There are four ponds

within the site, the larger three being at the woodland's edge with areas of grassland surrounding them.

- **Greenfields Lane LWS** – 1.3km north-east from the site - calcareous grassland.
- **Bulby Hall Wood LWS** – 1.7km south from the site - replanted ancient woodland site of oak and ash standards with mature hazel and field maple coppice. Some areas have been planted with beech, Scots pine and larch.
- **Callan's Lane Wood LWS** – 1.9km south from the site - mature native plantation of mixed deciduous species on an ancient woodland site, with ancient woodland regrowth, wet woodland, scrub and ponds.

Ancient Woodland

There are no sites on the Ancient Woodland Register within the site itself. Temple Wood, which lies on the south-eastern edge of the site is partly ancient woodland, with the nearest lying 70m from the site boundary. The Bulby Hall Wood LWS and Callan's Lane Wood LWS are also both ancient woodlands (1.7km and 1.9km from the site respectively).

Other Priority Habitats

Deciduous woodland - in addition to the ancient woodland, there are further areas of deciduous woodland scattered over the 2km zone around the site, including several within the site itself.

Good quality semi-improved grassland – small patches of this habitat are found 1km east from the site, 1.6km west and 1.9km to the north.

No other priority habitats were found within 2km of the site.

Protected Species Records (LERC)

Badger – this was the only protected species recorded from within the site from the LERC database. Given the habitat present and its distribution in the local area, it is likely that this species is widespread and that specific baseline surveys will be required (to be confirmed after the Extended Phase 1 survey).

Great Crested Newt (searches included LERC plus NE licence return and eDNA databases) – there were no records within 500m of the indicative site boundary. The nearest was 1km east and there are other records 1.2km south-west and 1.9km north, but no others within 2km. Habitat suitability will be assessed as part of the Phase 1 survey.

Bats – common pipistrelle, noctule, lesser noctule, brown long-eared bat, Daubenton's bat, and Natterer's bat have all been reported within 500m of the indicative site boundary, and the site is likely to be used by a range of bat species for foraging and roosting. There are additionally two records of western barbastelle within 2km (around Temple Wood, 1.1km south). A bat roost potential survey will be undertaken as part of the Phase 1 survey. It is planned that the development will be designed to avoid any loss of important bat habitat or potential roost sites, and the scheme will deliver a habitat gain for these species (through conversion of arable habitat to grassland and improved management of field margins), so no additional surveys will be required (though this will be confirmed after the Phase 1 survey).

Otter – there are four records from the LERC database within 2km, all to the south-west of the site. The closest was 1.7km from the indicative site boundary. The availability of suitable habitat for this species on site will be checked during the Phase 1 survey and the need for any specific surveys for this species determined.

Water vole – there were three LERC records of this species within 2km of the indicative site boundary, 1.7km south-west from the site and 1.8km to the north. As for otter, the availability of suitable habitat for this species on site will be checked during the Phase 1 survey and the need for any specific surveys for this species determined.

Butterflies – two protected butterfly species, brown hairstreak and purple emperor have been recorded within 500m of the indicative site boundary. Both have been recorded within Temple Wood to the south of the site. Another protected butterfly species (white-letter hairstreak) has been recorded 1.7km north-east from the site. None of these would be likely to be affected by the development, so would not require any specific surveys.

Potential for 'Likely Significant Effects'

The main potential effects of the construction phase of the Proposed Development on ecology are considered to be:

- Habitat loss during construction.
- Pollution from noise, vibration, dust, surface water run-off during construction.
- Disturbance/harm during construction.

The main potential effects of the operation of the Proposed Development on ecology are considered to be:

- Change in habitat during operational phase (dependent on the management of the site after construction), including potential for beneficial effects through biodiversity enhancement.
- Disturbance during operation (if species are displaced as a result of the presence of the solar panels).

Cumulative Effects

No projects have been identified at present that could contribute to any cumulative ecological effects with the proposed development, so there is currently no need for an ecological cumulative assessment is considered to be required. However, this will be reviewed three months prior to the submission of the planning application to ensure that this still remains the case (or if not produce a cumulative ecological assessment).

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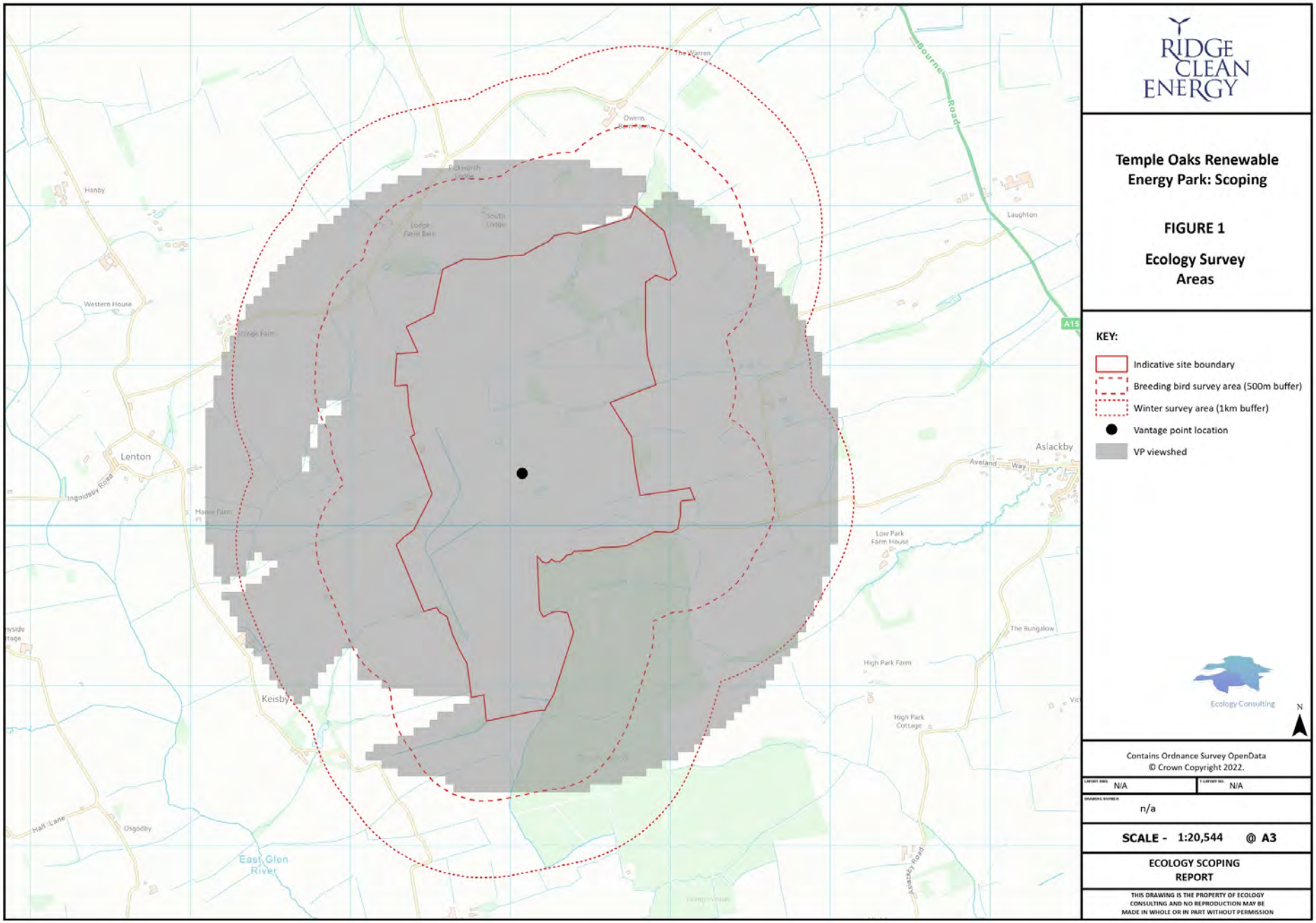
RIDGE CLEAN ENERGY
Temple Oaks Renewable Energy Park: Scoping
FIGURE 1
Ecology Survey Areas
KEY:
Indicative site boundary
Breeding bird survey area (500m buffer)
Winter survey area (1km buffer)
Vantage point location
VP viewshed
Ecology Consulting
N
Contains Ordnance Survey OpenData
© Crown Copyright 2022.
N/A
N/A
n/a
SCALE - 1:20,544 @ A3
ECOLOGY SCOPING REPORT
THIS DRAWING IS THE PROPERTY OF ECOLOGY CONSULTING AND NO REPRODUCTION MAY BE MADE IN WHOLE OR IN PART WITHOUT PERMISSION
Bourne Road
Laughton
Aslackby
Aveland Way
Lenton
Ingoldsby Road
Keisby
Osgodby
Hall Lane
East Glen River
Aslackby Road
Hanby
Western House
Lodge Farm Barn
South Lodge
Low Park Farm House
The Bungalow
High Park Farm
High Park Cottage
A15

APPENDIX D - TRANSPORT SCOPING

1.0 Transportation

Introduction

1.1 The Transport Chapter of the Environmental Statement (ES) for Temple Oaks Renewable Energy Park will be produced by Stuart Michael Associates Ltd (SMA). It will describe the transport elements required for the construction, operation and decommissioning of the Proposed Development. The Assessment will consider the potential effects, proposed mitigation and potential residual effects on the surrounding environment, which could arise on the transport network as a result of the Proposed Development during both the construction and decommissioning and operational phases.

1.2 The chapter will contain detailed analysis of travel characteristics associated with the Proposed Development. The Assessment will include a comprehensive Traffic Impact Assessment (TIA), which will assess the percentage change in traffic flows for all links on the surrounding road network. This will be provided for peak hours as well as Annual Average Daily Traffic (AADT), to inform the Assessment.

1.3 Mitigation will be proposed and residual impacts assessed.

1.4 A draft Construction Traffic Management Plan (CTMP) will also be prepared to support the Application in consultation with the Local Highway Authority (LHA).

Policies & Guidance

National Planning Policy Framework (NPPF 2021)

1.5 Chapter 9 of the NPPF outlines the government's policy approach to promoting sustainable transport and assessing the transport impact of new developments.

1.6 The NPPF (paragraph 110) requires that new developments should provide safe and suitable access to the site for all users and ensure that "*any significant impacts from the development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree*."

1.7 The NPPF (paragraph 111) states that: "Development should only be prevented or refused on highway grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe".

Guidance

1.8 The following guidance will inform the assessment of the potential environmental impacts of transport associated with the Proposed Development:

- The Institute of Environmental Management and Assessment (IEMA): Guidelines for the Environmental Assessment of Road Traffic: This document provides guidance on the thresholds for determining when and where there is potential for transport environmental impacts.
- The Design Manual for Roads and Bridges (DMRB): LA 102 Screening Projects for Environmental Impact Assessment: sets out the requirements on screening projects for Environmental Impact Assessment.
- The Design Manual for Roads and Bridges (DMRB): LA 104 Environmental Assessment and Monitoring: sets out the requirements for environmental

assessment of projects, including reporting and monitoring of significant adverse environmental effects.

Current Conditions

1.9 To understand the existing traffic characteristics a comprehensive package of traffic counts are to be commissioned, the scope of which are to be agreed with the Local Highways Authority in due course.

1.10 Traffic data in the form of Automatic Traffic Counts (ATC), to provide 7 days of classified traffic volumes and speeds on links, and Manual Classified Counts (MCC) which will provide classified volumes and queues. The latter will inform the Assessment for the peak hours within the study area. These may include some or all of the following (subject to confirmation with the Highways Authority) and form the extent of the Study Area:

- ATC on the A15, in proximity to the Laughton junction;
- ATC on West Street, Folkingham
- ATC on Billingborough Road;
- ATC on the A15, Sleaford Road (north of Folkingham);
- ATC on the A52, east of Mareham Lane;
- ATC on Low Gate Lane;
- ATC on Ing Drove/Rookery Road;
- MCC at A15/A52 roundabout;
- MCC at A15/Laughton priority junction;
- MCC at A15, Sleaford Road/West Street priority junction;
- MCC at A52/Mareham Lane priority junction;
- MCC at A52/Station Street Roundabout; *and*
- MCC at A52/Drury Lane priority junction.

1.11 The ATCs will be undertaken over a 2 week period outside of school holidays periods and during a 'neutral' month as set out within NPPF. Vehicle speeds will also be recorded. The MCC will be undertaken between the hours of 07:00-19:00 on either a Tuesday or Thursday and again will be completed outside of school holiday periods.

1.12 Consideration will be given to the most appropriate point of access into the site for construction traffic and connections from the site to the grid. Full details of the proposed access would be provided within the ES Chapter and supporting Transport Assessment.

1.13 As part of the assessment, a detailed analysis of local accident records will be completed.

Methodological Approach

1.14 The assessment will be based on guidance in National Planning Practice Guidelines, the National Planning Policy Framework (2021), the Institute of Environmental Assessments "Guidelines for the Environmental Assessment of Traffic" and the Highways England Design Manual for Roads and Bridges (DMRB), with reference to Manual for Streets (MfS). Relevant regional and local policy documents, will also be referred to. The

criteria, methodology and thresholds of the assessment will be established from a combination of these documents.

1.15 As per the guidance, the assessment will review the development impact upon:

- Driver severance and delay;
- Pedestrian severance and delay;
- Pedestrian amenity;
- Accidents and safety; *and*
- Hazardous and dangerous loads.

1.16 The assessment will consider the impact of the development in relation to a period where the development impact is anticipated to be highest. This will be dependent upon the profile of the baseline data and could be peak hours, or potentially AADT. This will be identified within the ES Chapter.

1.17 The scope of highway network to be assessed will be based on the two Rules set out in the IEMA: Guidelines for the Environmental Assessment of Road Traffic:

- Rule 1: include highway links where flows increase by more than 30% (or where the number of heavy goods vehicles will increase by more than 30%);
- Rule 2: include any other specifically sensitive areas where traffic flows have increased by 10% or more.

1.18 Sensitive areas include hospitals, schools, churches and historical buildings.

1.19 Traffic impacts will be assessed for both operational development trips and temporary construction and decommissioning trips.

Anticipated Effects

1.20 The levels of significance used to inform decisions regarding impacts and mitigation are as follows:

- Major effect: where the Proposed Development could be expected to have a substantial effect (either positive or negative) in terms of driver delay, severance, pedestrian delay, pedestrian amenity or safety in relation to sensitive receptors;
- Moderate effect: where the Proposed Development could be expected to have a noticeable effect (either positive or negative) in terms of driver delay, severance, pedestrian delay, pedestrian amenity or safety in relation to sensitive receptors;
- Minor effect: where the Proposed Development could be expected to result in a small, barely noticeable effect (either positive or negative) in terms of driver delay, severance, pedestrian delay, pedestrian amenity or safety in relation to sensitive receptors; *and*
- Negligible: where no discernible effect is expected as a result of the Proposed Development in terms of driver delay, severance, pedestrian delay, pedestrian amenity or safety in relation to sensitive receptors.

1.21 It is anticipated that the Proposed Development would have impacts upon the operation of the A15, A52 and some local roads in proximity to the site and the point of connection near Bicker Bar.

1.22 Within the Assessment, trip generation, distribution and the flow of traffic along the A15 and A52 will be considered. Following which, the Rule 1 and 2 scoping assessment tables will be provided in full to inform the detailed scope of the EIA assessment.

Potential Mitigation

1.23 Subject to the conclusions drawn from the above assessments, any necessary mitigation measures would be proposed and outlined within the ES Chapter.

1.24 It is anticipated that existing roads may require improvements and junctions created to provide access into the site for construction/maintenance traffic from the existing highway network.

1.25 To manage the temporary impacts during the construction period, a draft CTMP will be prepared and the mitigation effect of this will be set out against the level of anticipated impact. Residual impacts will be assessed in terms of their significance.

Assumptions, Limitation and Uncertainties

1.26 The EIA process is designed to enable informed decision-making based on the best available information about the environmental implications of a proposed development at the time of writing. However, there will always be some uncertainty inherent in the scale and nature of the predicted environmental effects as a result of the level of detailed information available at the time of assessment, and/or the limitations of the prediction processes.

1.27 The following assumptions will be made during the EIA process:

- The principal land uses adjacent to the site remain unchanged during the course of the Proposed Development's lifetime; *and*
- Information provided by third parties, including publicly available information and databases, are correct at the time of submission.

1.28 There is also the potential for a degree of uncertainty as certain aspects of the Proposed Development may be subject to change until submission of the Planning Application and subsequent detailed design being finalised. This uncertainty can, for example, come in the form of the exact location of cabling running between the site and point of connection to the grid.

1.29 Information relating to the construction of the Proposed Development will be developed by the project team based on professional judgement and outline design works, on the most likely methods of construction, plant, access routes and working areas for the purposes of the EIA. It is, however, acknowledged that the final choice on construction methods would be for the contractors to determine and may differ from those used in this assessment. As such, the draft CTMP would be finalised in consultation with the Local Highways Authority prior to the commencement of construction.

Summary

1.30 The key issues to be considered as part of the Assessment will be the impacts associated with the Proposed Development during the construction, operational and decommissioning stages.

1.31 During the construction stage, it is envisaged that there will be a need for deliveries and employees' traffic movements to support the various construction processes on site which would form the main potential impacts on the existing highway network and areas along the A15 and A52 corridors, plus the centre of Folkingham.

1.32 During the construction phase the additional impact of hazardous and dangerous loads or indeed dust and dirt on the highway are likely to be other impacts that can be mitigated for and controlled through the CTMP.

1.33 During the operational stage, anticipated monthly maintenance visits will require access to the site by light van or four-wheel drive vehicle. Again the impacts of this will be assessed as part of the traffic impact assessment.

1.34 In advance of the assessment, detailed discussions will be held with the Local Highway Authority (LHA) to ensure the assessments are appropriate.

1.35 During the preparation of the Transport Assessment, CTMP and other inputs, detailed discussions will be held with the Highway Authority to ensure the assessments are appropriate and that suitable mitigation is in place to resolve any identified impact as far as it being practicable to do so.

1.36 The Assessment will be summarised, indicating the anticipated impact during the peak hours and over the day for each link within the study area. These impacts will be assessed against the IEA guidance Rules 1 and 2 both with and without mitigation in place and the significance of residual impacts assessed.

APPENDIX E - NOISE SCOPING

TEMPLE OAKS RENEWABLE ENERGY PARK

NOISE REPORT FOR SCOPING

Acoustics Report A1894 R01

25th May 2022

Report for:	Engena Attention: Ian Booker
Prepared by: Gavin Irvine BSc MIOA Director	Checked by: David O'Neill BSc(Hons) CEng MSc MIOA Director
Issue/Revision number A1894 R01	Date 25/05/2022

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Contents

1 Introduction

Ion Acoustics is appointed to advise on noise issues in relation to the proposed Temple Oaks Renewable Energy Park on agricultural land previously occupied by RAF Folkingham. The facility comprises solar panels, battery storage units and associated electrical equipment such as inverters and transformers.

Solar farms are not normally considered noisy and the panels themselves do not generate any significant noise. However, various electrical components, such as inverters and transformers, and the cooling systems within the battery units can emit relatively low levels of noise. As such, operational noise levels will be assessed using computer modelling to determine noise levels at nearby noise-sensitive receptors.

Similarly, the transportation of equipment and components will increase noise levels on local roads and there can be some noise associated with pushing in the solar panel frame supports and other associated construction work. However any construction noise will be temporary and carried out during normal working hours only.

A noise chapter will be provided in the Environmental Statement (ES) so that these issues may be considered. This report is prepared to provide an initial scoping assessment of construction and decommissioning noise and operational noise issues.

2 Baseline Conditions

The site is in a largely rural area with the former airfield converted mainly to agricultural fields. Some of the old airfield runway is still visible in the form of access tracks. There are some large agricultural barns to the west of the site which are probably used for livestock.

As the site is away from major roads and conurbations, it is expected that background noise levels in the area are low, with noise levels determined by the wind in the trees, distant roads and sporadic agricultural activity.

The nearest residential dwellings are located adjacent to minor roads surrounding the site and include Laughton Lodge (Lodge Farm) (approximately 560m to the east) and South Lodge and West View Barn at 330m and 450m to the north. There are various properties to the west at typically 1km from the site boundary.

A noise survey will be carried out as part of the Environmental Impact Assessment (EIA) to determine noise levels at the nearest residential locations. This would include positions representative of Laughton Lodge and South Lodge.

3 Assessment Methodology

3.1 National Planning Policy Framework (NPPF)

In 2012 the National Planning Policy Framework (NPPF) replaced a number of Planning Policy Statements with a single document which is intended to promote sustainable development. The NPPF was revised in July 2021[1] and certain aspects of the guidance changed.

The NPPF sets out the Government's planning policies for England. The document is generally not prescriptive and does not provide noise criteria. Instead, it places the onus on local authorities

[1] https://www.gov.uk/government/publications/national-planning-policy-framework--2

to develop their own local plans and policies. Sections of the NPPF relating to noise are stated below:

174. Planning policies and decisions should contribute to and enhance the natural and local environment by:

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.

185. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;

b) identify and protect areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason;

3.2 Noise Policy Statement for England (NPSE)

The Noise Policy Statement for England (NPSE)[2] sets out the Government's policy on environmental, neighbourhood and neighbour noise for England. The policy has three aims:

- *"avoid significant adverse impacts on health and quality of life;*
- *mitigate and minimise adverse impacts on health and quality of life; and*
- *where possible, contribute to the improvement of health and quality of life.*

The NPSE introduces the following terms which are also used in the NPPF:

"NOEL – No Observed Effect Level

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur."

However, neither the NPSE nor the NPPF Planning Practice Guidance defines numeric bounds for NOEL, LOAEL or SOAEL. The boundary of each effect level should be defined for each situation and location.

2 Noise Policy Statement for England (DEFRA) available at:
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69533/pb13750-noise-policy.pdf

Further Government planning advice is available online[3]. The online guidance refers to the NPPF and NPSE and presents a noise assessment hierarchy table to provide further information on the boundaries between NOEL, LOAEL and SOAEL. This is shown below in Table 1.

Table 1: Noise Assessment Hierarchy Table

Perception	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level			
Not noticeable	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

3.3 Local Authority Guidance

South Kesteven District Council, which is the local planning authority, has published a "Renewable Energy Appendix" as part of the local plan. The Appendix notes the following in respect of noise:

[3] See https://www.gov.uk/guidance/noise--2

Noise may be emitted from the operation of active solar technology, for example from the operation of the associated invertors. Furthermore, 'tracker' solar technology which follows the daily movement of the sun may result in additional noise impact.

Further to this, the document includes a "Solar Energy Criterion 5" which states:

The Council will require solar farm proposals to:

a) Be strategically sited so as to minimise the noise experienced by nearby residents and occupiers of business premises and important buildings (including, but not limited to hospitals and schools)

b) In any instance, operate with minimal noise output to avoid undue disturbance to nearby residents, wildlife and livestock. Where necessary, mitigation measures, such as the establishment of vegetation buffers for example, should be used to prevent adverse noise impact.

There are no specific numerical criteria in the Council's guidance in relation noise and construction noise is not mentioned. However it is expected that the national guidance above and BS 4142 would be used when considering operational noise.

3.4 BS4142: 2014 +A1: 2019 – Assessment Principles

The standard method for assessing noise of a commercial or industrial nature affecting housing, is British Standard BS 4142 "Method for rating and assessing industrial and commercial sound". A BS 4142 assessment is typically made by determining the difference between the industrial noise under consideration and the background sound level as represented by the L_{A90} parameter, determined in the absence of the industrial noise. The L_{A90} parameter is defined as the level exceeded for 90% of the measurement time, representing the underlying noise in the absence of short duration noise events such as dog barks or individual cars passing.

The industrial noise under consideration is assessed in terms of the ambient noise level, L_{Aeq}, but a character correction penalty can be applied where the noise exhibits certain characteristics such as distinguishable tones, impulsiveness or, if the noise is distinctively intermittent. The ambient noise level, L_{Aeq} is defined as the steady-state noise level with the same energy as the actual fluctuating sound over the same time period. It is effectively the average noise level during the period. The industrial noise level (L_{Aeq}) with the character correction (if necessary) is known as rating level, L_{Ar}, and the difference between the background noise and the rating level is determined to make the BS 4142 assessment. The standard then states:

a) "Typically, the greater the difference, the greater the magnitude of the impact.

b) A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.

c) A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.

d) The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context."

The standard outlines a number of methods for defining appropriate 'character corrections' to determine the rating levels to account for tonal qualities, impulsive qualities, other sound characteristics and/or intermittency.

The standard also highlights the importance of considering the context in which a sound occurs. The standard indicates that factors including the absolute sound level, the character of the sound, the sensitivity of the receptor and the existing acoustic character of the area should be considered when assessing the noise impact. The absolute sound level is of particular importance where the measured background sound levels are low, which is typically taken as L_{A90} 30dB and below. In regard to low sound levels, the standard states:

> *"Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night."*

3.5 BS 8233: 2014 and WHO criteria

British Standard BS 8233: 2014[4] and the World Health Organisation (WHO) provide absolute noise criteria to protect residential amenity. These are detailed in Table 2 below.

Table 2: WHO / BS 8233: 2014 Guideline Noise Levels for External Noise

Location	Critical Health Effect	07:00 to 23:00	23:00 to 07:00
Outside Bedroom Windows	Sleep Disturbance (Windows Open)	--	45dB $L_{Aeq,\ 8hours}$ (1)
Amenity Spaces (Gardens / Patios)	Moderate Annoyance Serious Annoyance	50dB $L_{Aeq,\ 16\ hours}$ (2) 55dB $L_{Aeq,\ 16\ hours}$ (2)	--
Notes: (1) From WHO Community Noise Guidelines (1999) (2) BS 8233: 2014 and WHO Community Noise Guidelines			

The daytime limits apply to relatively anonymous noises without character and are commonly applied to traffic noise. The WHO night-time threshold of 45 dB $L_{Aeq,\ 8hr}$ represents an 8-hour L_{Aeq} outside noise-sensitive rooms to prevent sleep disturbance. The WHO limit is a level at 1m from the façade. Therefore, the equivalent free-field level would be approximately 3dB lower, that is 42 dB L_{Aeq}.

3.6 Absolute Noise Level Assessment

In instances of low rating noise levels, BS4142 indicates that assessment in line with absolute noise limits might be as, or more, appropriate than a relative assessment.

Such criteria would be relevant if the noise survey indicates that existing noise levels are low and can be set separately for the day and night-time periods. While the solar farm will be operational mainly during the day, during the summer months the solar farm might operate from 5am in a period normally considered to be part of the night. The battery units may often be charged at night during periods of low demand.

[4] British Standards Institution (2014) BS 8233:2014: Guidance on sound insulation and noise reduction for buildings

Night-time Noise Targets

To ensure the proposed development is not a significant or prohibiting factor in achieving the relevant WHO night-time values at sensitive residential receptors, noise generated by the development would need to be approximately 10dB below the guidance levels in Table 2.

Therefore, a target of 32 dB L_{Aeq} (free field) is proposed at night at residential receptors where background noise levels are otherwise low. This is set on the basis of the night-time noise limit to ensure that sleep is protected. Specifically this is based on a value 10dB below the L_{Aeq} 45dB façade limit from WHO guidance, corrected for façade levels (ie 45-3-10 = 32). This limit is a low absolute level which will protect amenity irrespective of the background noise level.

Daytime Noise Targets

During the daytime, even in rural areas, occasions when the background noise would be less than 30 dB L_{A90} would be rare. To avoid adverse impacts, BS 4142 advises that the rating level of the noise should not exceed a level of 5dB above the background noise (subject to context). Therefore the rating level should not exceed 35 dB L_{Ar}. Again this daytime limit is considered to be sufficiently low to protect amenity irrespective of the background noise level.

3.7 Proposed Operational Noise Targets

Therefore two absolute limits could be derived in the absence of a noise survey or if the noise survey indicates that existing background noise levels are otherwise low.

- Hours of Sunshine (Generally Daytime) 35 dB L_{Ar}
- Hours of Darkness (Generally Night-time) 32 dB L_{Ar}

The noise limits are set in terms of the BS 4142 rating noise level dB L_{Ar} and therefore include any penalties of character in the noise (tonality etc). These noise limits should be agreed with the Council.

3.8 Construction Noise

The following legislation and standards are of particular relevance to construction noise:

- The Control of Pollution Act 1974 (CoPA 1974);
- BS 5228: 2009 Code of Practice for Noise and Vibration Control on Construction and Open Sites.

CoPA 1974 provides local authorities in England and Wales with powers to control noise and vibration from construction sites. Section 60 of the Act enables a Local Authority to serve a notice to a contractor of its requirements for the control of site noise. Section 61 of the Act allows for those carrying out construction work to apply to the Local Authority in advance for consent to carry out the works.

Construction noise can be assessed using British Standard BS 5228 which provides a calculation method and general guidance on controlling noise and vibration from construction sites. This standard:

- Refers to the need for the protection against noise and vibration of persons living and working in the vicinity of and those working on construction sites;

- Recommends procedures for noise and vibration control in respect of construction operations; and
- Stresses the importance of community relations, stating that early establishment and maintenance of these relations throughout the site operations will go some way towards allaying people's fears.

There are no noise limits within the main text of BS 5228 and in fact, the preferred approach is to use best practicable means to reduce noise rather than setting limits. This means that everything practicable should be done to reduce noise. This strategy will be adopted here.

However, Annex E of the BS 5228-1 gives "example criteria for the assessment of the significance of noise effects" e.g. for use in Environmental Statements. For quiet areas, where the existing ambient noise levels are low, a significant noise effect is deemed to occur if the construction noise (plus the ambient noise) exceeds the following threshold values:

- 65 dB L_{Aeq} Daytime (07.00-19.00) and Saturdays (07.00-13.00)
- 55 dB L_{Aeq} Evenings and Weekends (19.00-23.00 Weekdays, 13.00-23.00 Saturdays and 07.00-23.00 Sundays
- 45 dB L_{Aeq} Night-time (23.00-07.00)

These values can be used in a preliminary assessment to assess the significance of any construction works.

Noise can also occur during construction from traffic on local roads during the transportation of construction materials, solar panels and batteries. Where traffic data is available the increase in noise due to construction traffic can be calculated according the Government guidance "The calculation of road traffic noise" (CRTN).

The acceptability of construction noise is likely to be affected by the location of the site relative to the noise sensitive premises; existing ambient noise levels; the duration and working hours of site operations; the characteristics of the noise produced and the attitude of local residents to the site operator.

Given that construction noise is generally not substantial and that it is a short-term effect, typically occurring in the daytime, it is not always necessary to consider construction noise within the scope of an Environmental Impact Assessment and it is proposed that a construction noise assessment is excluded from the EIA. The local planning authority would confirm whether this is appropriate.

4 Anticipated Noise Effects

4.1 Operational Noise

The proposed development is for a renewable energy facility. This will include the following noise generating equipment.

For the solar farm

- 1000 String inverter units; and,
- Additional solar transformers;

The string inverters and transformers are distributed across the site but in respect of the string inverters installed behind the panels. The panels therefore shield noise from the string inverters

to some extent, with the amount of shielding depending on direction. The orientation of the panels ensures there is most shielding to the south and north whereas other directions are less shielded. The effect of the panels is included in the computer modelling. Rather than adding 1000 sources to the computer model, 100 string inverters have been modelled with 10dB added to the source noise level data so each source actually represents 10 inverters. Over a large area, this is a suitable approximation of the noise for modelling purposes.

The nature of solar farms is such that electricity is only generated during daylight hours. This may extend into times considered to be part of the night (that is early mornings before 07:00 hours) and during evenings (after 19:00 hours) during the summer. Note that the early morning periods would often coincide with the dawn chorus. The solar farm would not be operational at the quietest times of the night, nor during the late evening when most people would be trying to get to sleep.

For the battery storage

- Around 700 CATL Battery Units
- 176 Inverters / Transformers (Conversion Units)
- A single Distribution Network Operator (DNO) transformer station located to the east of the battery site.

For most of the time, the batteries make no noise and the batteries are in a quiescent mode neither charging nor discharging. However the CATL units are water-cooled to allow the units to be cooled when required during charging or discharging. Two cooling modes are indicated: a) when the water is circulated with the pump and "forced cooling" when a chiller unit allows the water temperature to be reduced. Two noise levels, one for each cooling mode are provided by the manufacturer. These have been converted to an assumed sound power level using the parallelopiped method in BS EN ISO 3744-10. The sound power levels for each of the two modes of cooling are below:

- Forced Cooling Mode 83 dB L_{WA}
- Normal Cooling 62 dB L_{WA}

The battery units would typically operate (discharge) at periods of peak demand. This is typically dark winter evenings when people have returned from work and are cooking. The batteries would be charged during periods of low demand or when the solar farm is at peak capacity. Note however the facility is required to be available on a 24-hour basis so that it is available to compensate for problems elsewhere in the grid.

A preliminary noise model has been constructed using IMMI[5] noise modelling software to predict noise levels to the nearest noise-sensitive receptor locations. Within the modelling software, propagation of noise has been calculated in accordance with ISO 9613-2[6] with the following input parameters:

- Downwind propagation (noise levels under crosswind and upwind conditions will be less);
- Soft ground between the noise source and the receiver locations (G = 1.0),
- Ambient air temperature of 10°C and 70% Relative Humidity; and,

[5] IMMI noise mapping https://www.immi.eu/en/noise-mapping-with-immi.html
[6] ISO 9613-2: Acoustics – Attenuation of sound during propagation outdoors: Part 2: General method of calculation

- Barriers and screening influence including the effect of the solar panels calculated in accordance with ISO 9613-2.

The equipment details have been taken from manufacturer's data and from library data used on previous assessments. In the event that different equipment is specified, it will be designed to the same noise limits. In most cases, the manufacturer's information does not provide any information on tonality. However it is known that inverters and transformers can produce tones. For the inverters, this would be generally high frequency tones which are readily dissipated by atmospheric absorption. Tonality is considered later on in this assessment.

4.2 Modelling Scenarios

To carry out the assessment, two scenarios have been modelled as follows:

Daytime: with Solar Farm and Batteries Operating: String Inverters, 6 solar transformers, DNO Transformer, battery inverters, CATL units on Forced Cooling Mode

Night-time: Batteries Operating: Battery Inverters, CATL units on normal cooling mode, DNO Transformer

The daytime operation therefore represents the worst-case with all sources operating and with the CATL battery units operating on forced cooling mode.

During the night-time it is assumed that the solar farm would not operate and as there will be cooler temperatures it is assumed the CATL units can operate in their quieter mode without forced cooling.

The noise predictions are presented in the first instance as a daytime noise contour plot in Figure 1 below, showing the predicted daytime noise levels (dB L_{Aeq}) and the nearest houses. The contours assume that all equipment is running at full capacity, which is only likely to occur in the middle of a sunny day when all plant is operating at 100%.

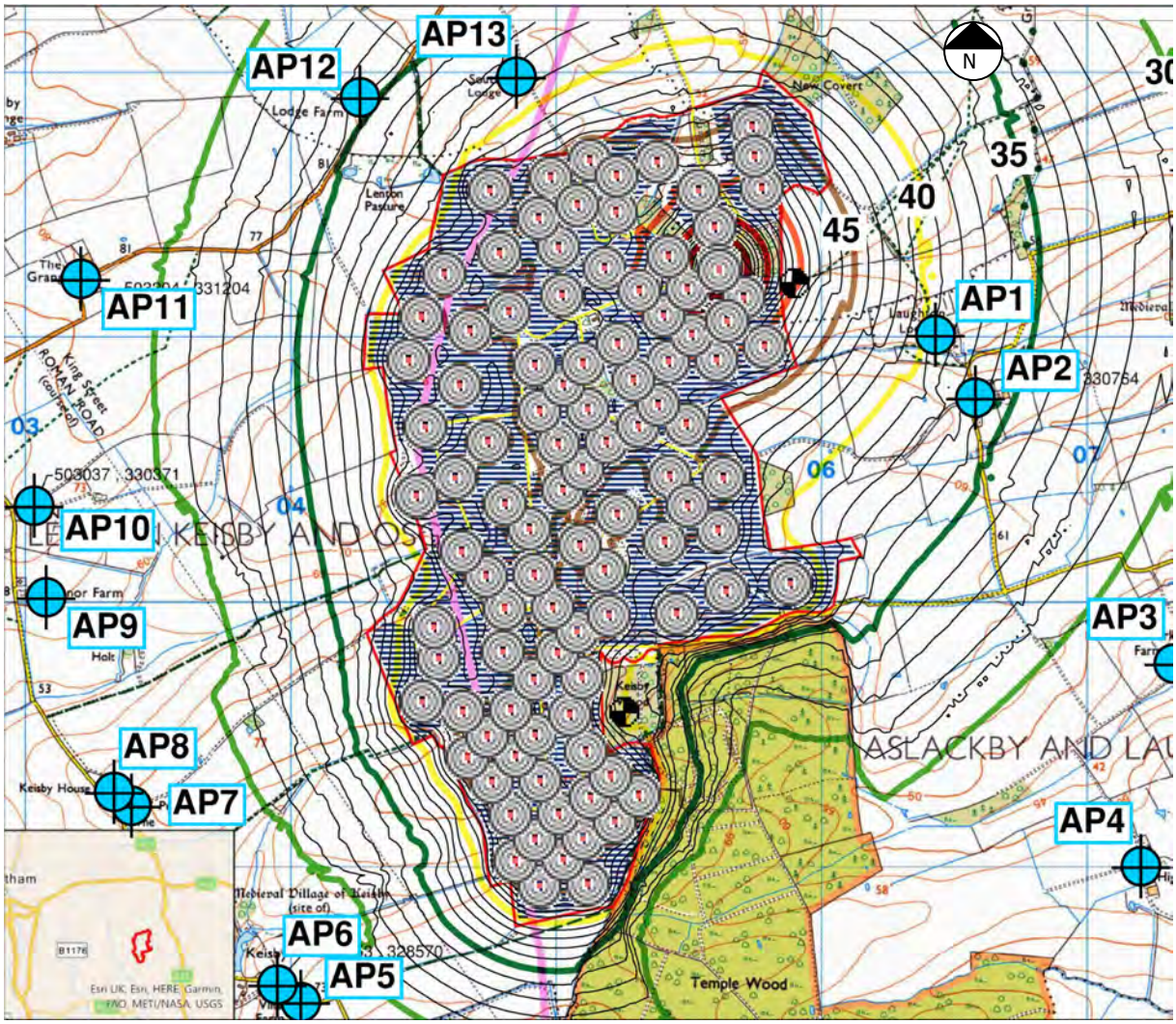

Figure 1: Indicative Daytime Noise Contour Plot, dB L_{Aeq}

It is reiterated, that the noise levels assume all plant and equipment is operating at 100%. While it is possible that the solar equipment might be operational early in the morning it would not be operating at 100% and therefore the operational scenario presented above is unlikely to occur during the normal night period 23.00 to 07.00 and not when people are trying to get to sleep. For the typical night-time scenario, only sources around the battery compound would be operating and noise levels are much lower.

In addition to predicting the noise contours, the model has been used to calculate specific noise levels at the third-party receptor locations shown above. The predicted noise levels are given in Table 3 for the daytime and night-time scenario.

Table 3: Predicted Noise Levels

Assessment Position	Daytime L_{Aeq}	Night-time L_{Aeq}
AP1 - Lodge Farm GF West	39	29
AP2 - Laughton Hall Farmhouse 1 GF West	37	30
AP3 - Low Park Farm 1 GF S/W	28	15
AP4 - High Park Farm 1 GF West	25	12
AP5 - Keisby - House east 1 GF North	28	10
AP6 - Keisby - Villa Farm 1 GF East	26	10
AP7 - The White House 1 GF N/E	27	10
AP8 - Keisby House 1 GF N/E	26	10
AP9 - Manor Farm 1 GF N/E	26	12
AP10 - Farm House 1 GF East	27	12
AP11 The Grange 1 GF East	28	14
AP12 West View Barn 1 GF S/E	34	24
AP13 -South Lodge 1 GF S/E	39	30

Table 3 above indicates that night-time noise levels with the CATL units operating in normal cooling and no contribution from the string inverters are much lower. However the daytime scenario indicates noise levels greater than the suggested 35 dB L_{Aeq} daytime threshold. The predicted noise levels are not particularly high and it may be that background noise levels during the operational hours are equivalent. This can be determined with a background noise survey; it is proposed to carry out such a survey which will be included in the ES Noise Chapter.

As indicated above, the inverter, and potentially the transformer unit, may generate some tonal content therefore could warrant a rating level correction in accordance with BS4142. The predicted specific noise levels, presented in Figure 1 and Table 3 above demonstrate low predicted noise levels at the nearest receptors therefore any tonal content is likely to be masked to some degree by the prevailing ambient noise climate. A more detailed consideration of tones will be provided in the main Environmental Impact Assessment.

The renewable energy park will not generate any other identifiable characteristics i.e. intermittency, impulses and/or 'other' characteristics. No further other character corrections have been applied in the calculation of the rating noise level.

In terms of the noise exposure hierarchy table (Table 1 above), noise generated by the renewable energy park could be, at worst, above the Lower Observed Adverse Effect Level. In such cases mitigation is required to reduce noise levels as far as is practical.

5 Potential Mitigation

In principle, mitigation, where required, is best provided at source. A more detailed assessment of the equipment noise levels will be carried out during the EIA stage to refine a mitigation strategy – for example, it may not be required that all 700 CATL units are operating in forced cooling mode.

In addition, it will be relatively easy to provide a noise barrier around the battery compound where the CATL battery units and the battery inverter units are located.

The string inverters for the solar farm are already screened by the panels but further information on the noise levels and the layout can be considered. The model at present includes for an even distribution of the noise sources around the site but it will be possible to a certain extent to position the inverters away from the most sensitive properties.

All of these factors will be considered during the EIA process.

6 Assumptions, Limitations Uncertainties

At present desktop computer modelling has been carried out for indicative noise levels of the typical equipment found on solar farms. The prediction methodology in ISO 9613-2 is thought to be accurate to ±3dB but further uncertainty can occur in the source noise levels.

The noise source data used is understood to represent the various plant items operating at 100% capacity which is only expected to occur during peak daytime periods. The equipment source levels will be considered during the EIA process.

A noise survey will be carried out during the EIA process so that the operational noise levels can be assessed relative to existing baseline noise levels. This will provide a more robust assessment.

At present, it is not intended to address construction noise during the EIA as construction noise levels are temporary and noise occurs during the daytime only. Best practicable means can be used to control construction noise and a Construction Environmental Management Plan (CEMP) will be prepared detailing how environmental effects can be managed. This will include noise.

7 Summary

A desktop noise assessment for scoping has been carried out for the proposed Temple Oaks Renewable Energy Park. The nearest noise sensitive receptors have been identified and preliminary predictions made to these locations for a typical daytime and night-time operating scenario. At present the scheme has been assessed relative to absolute noise limits which are sufficiently low to protect amenity irrespective of the background noise. Noise levels are slightly higher than the suggested limits but mitigation will be possible and no significant effects are anticipated. During the EIA stage a background noise survey will be carried out which will allow limits to be set relative to the background noise if appropriate. Any local authority guidance will be taken into account.

APPENDIX F - FLOOD RISK AND DRAINAGE

Temple Oaks
Flood Risk & Drainage Scoping Report

30th June 2022
Version 2.0
RAB: 2941FRD

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Quality Control

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Checked	G.M. Wilson
Approved	G.M. Wilson

Revision History

Version	Date	Amendments	Issued to
1.0	30.06.2022	First issue	Ian Booker, Engena Limited

Contents

1.0 Introduction

RAB Consultants has prepared this Flood Risk and Drainage Scoping Report in support of the proposed development of a solar energy farm and battery energy storage system at Temple Oaks Renewable Energy Park near Folkingham, Lincolnshire.

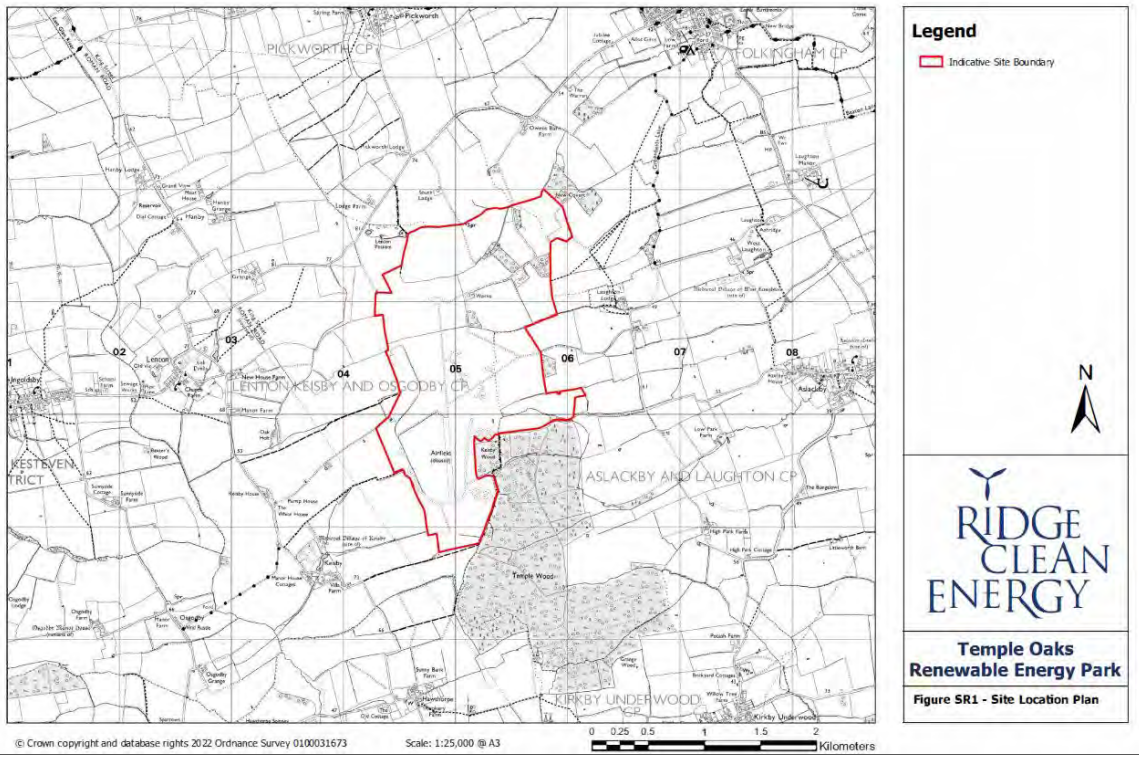
The purpose of this report is to support a scoping report at the proposed site. The scope of the work is to provide an initial high-level appraisal of flood risk and drainage challenges that will be encountered when a full Flood Risk Assessment is produced as part of a future planning application.

2.0 Site details

2.1 Site location

TABLE 1: SITE LOCATION

Site address:	Temple Oaks Renewable Energy Park, Folkingham, NG33 4HG
Site area:	350 ha
Existing land use:	Former RAF airfield and agriculture land
OS NGR:	TF 04855 30438
Local Planning Authority:	South Kesteven District Council



2.2 Site description

The proposed site comprises of a former RAF airfield and agricultural land. It is isolated from nearby settlements. The village of Folkingham is 1.8km northeast; the hamlet of Kesiby is 1km to the southwest; the hamlet of Lenton is 1.9km to the west; and the village of Aslackby is 1.9km east of the site. The surrounding environment is predominantly greenfield or agricultural, with a few isolated dwellings and farm buildings.

The proposed site is mainly agricultural land comprising of large fields between the concrete roads and access tracks of the former RAF airfield. These access tracks and redundant runway are now used to store scrapped vehicles. Access to the site can be achieved via several unnamed roads from the A15 to the east and Ingoldsby Road to the northwest.

2.3 Development proposal

It is understood that it is proposed to construct an array of solar panels across the site (See Table 1 for site plan), with associated infrastructure including access tracks, transformers, substations and a battery energy storage system.

3.0 Flood Risk

3.1 Sequential test

According to the Environment Agency's Flood Map for Planning the site lies in Flood Zone 1, which is described in the NPPF as land having a less than 1 in 1,000 annual probability of river or sea flooding (less than 0.1% Annual Exceedance Probability (AEP)).

The NPPF follows a sequential risk-based approach in determining the suitability of land for development in flood risk areas, with the intention of steering all new development to the lowest flood risk areas. NPPF Planning Practice Guidance (PPG) Table 2 confirms the 'Flood risk vulnerability classification' of a site, depending upon the proposed usage. This classification is subsequently applied to Table 3 'Flood risk vulnerability and flood zone compatibility' to determine whether:

- The proposed development is suitable for the flood zone in which it is located; and
- Whether an Exception Test is required for the proposed development.

The proposed development is classed as 'essential infrastructure' in accordance with NPPF PPG. The development is therefore appropriate for the Flood Zone. Neither a Sequential Test nor Exception Test are required as the development is in Flood Zone 1, the lowest risk zone.

3.2 Planning Policy and flood record review

- South Kesteven District Council Local Plan (2011 – 2036).
- South Kesteven District Council Local Plan (2011 – 2036) Renewable Energy Appendix 3.
- South Kesteven District Council Local Plan (2011 – 2036 Infrastructure Delivery Plan).
- Central Lincolnshire Local Plan (April 2017).
- Central Lincolnshire Strategic Environmental Assessment (April 2017).
- Lincolnshire Development roads and Sustainable Drainage Approach (2021).

The documents above identify the need for site specific flood risk assessments to inform flood risk from all types of flooding, to and from developments. They require the assessment to consider the vulnerability of users, consider the impacts of climate change and confirm whether flood risk is increased elsewhere. In addition, local flood risk management strategies and surface water management plans should be considered when assessing local flood risk. South Kesteven District Council Local Plan (2011 – 2036), Objective 13 outlines that flood risk and water management are a key part of adaption to climate change and all development needs to identify and manage flood risk issues, through appropriate design, layout and on-site water management. The above policies also identify and support measures to mitigate flood risk through sustainable surface water management. The South Kesteven District Council Local Plan also includes a standalone document in Appendix 3 which focuses on renewable energy and includes a dedicated section to solar technologies.

South Kesteven District Council published a Strategic Flood Risk Assessment (SFRA) in June 2017. There is no indication of the proposed site being affected by flooding in the report.

The Environment Agency hold no record of flooding affecting the proposed site.

No information of floods affecting the site was found during internet searches.

3.3 Fluvial (Rivers)

The site is located in Flood Zone 1, the lowest risk zone according to the Environment Agency's Flood Map for Planning (Figure 1 and Figure 2). The nearest watercourse is the East Glen River located approximately 2km to the west of the site.

The Marse Dike, Pointon Lode, Ouse Mere Lode and the Old Beck are located over 2km to the east / northeast / southeast of the site. It appears that these watercourses and numerous dikes to the east all drain into the North Sea approximately 40km to the east.

In addition, there is a network of drainage ditches within the site and the surrounding area. The drainage ditches are expected to show a surface water response and risk rather than fluvial. This risk will therefore be explored in more detail in Section 3.6 below.

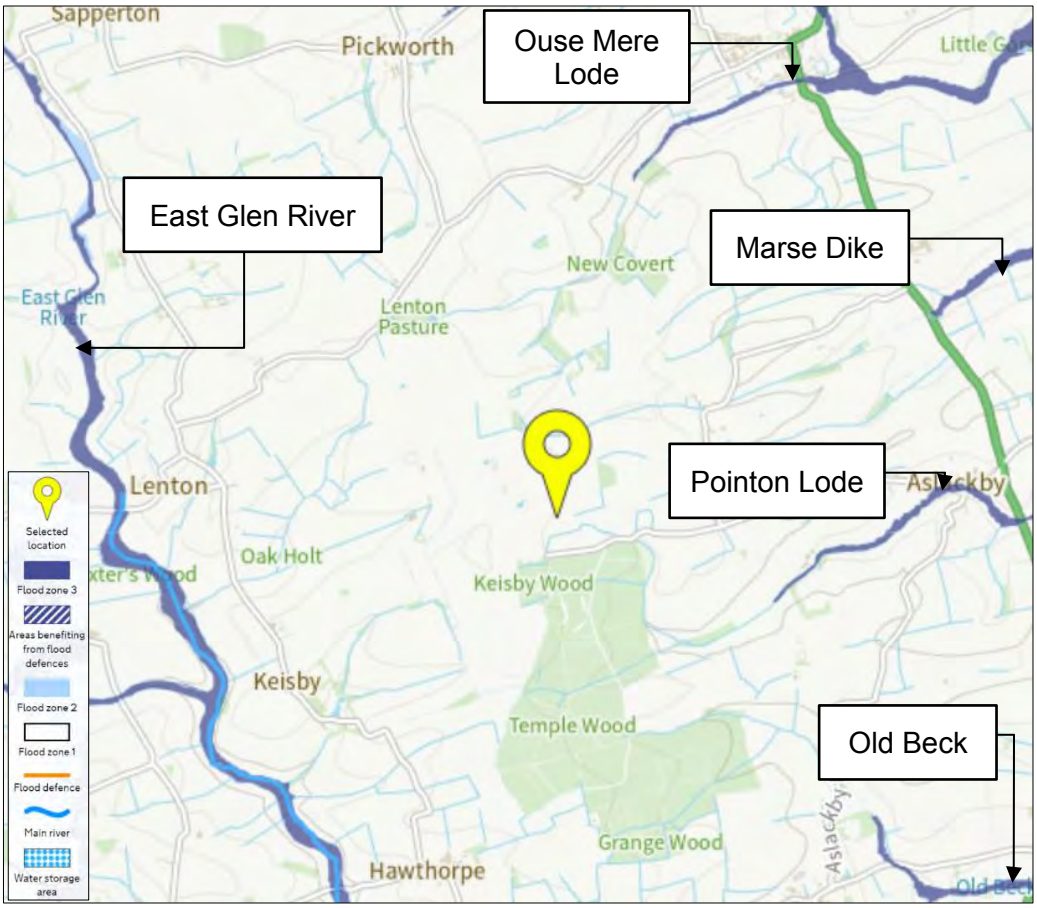


FIGURE 1: SCREEN SHOT OF THE ENVIRONMENT AGENCY'S FLOOD MAP FOR PLANNING ON 01.04.2022

FIGURE 2: SCREEN SHOT OF THE ENVIRONMENT AGENCY'S FLOOD MAP FOR PLANNING WITH GOOGLE MAPS

3.3.1 Climate Change Impact on Fluvial Risk

The Environment Agency guidance document 'Flood risk assessments: climate change allowances' was released in February 2016 and updated in July 2021. It includes statistical increases on peak fluvial flows by Management Catchment and allowance categories based on epochs and development vulnerability classification. Referring to the NPPF PPG, the development is classified as 'essential infrastructure' and has an expected lifetime of 40 years. In this case as the site is located in Flood Zone 1 the peak river flow allowances are not applicable.

The guidance also relates to peak rainfall intensity allowance, which is relevant for surface water flooding. For the '2050s' it is recommended that both the 'Central' allowance of 20% and 'Upper End' allowance of 40% are used.

3.4 Flood defence breach or overtopping

3.4.1 Breach Risk

The site does not benefit from flood defences, so there is no breach flood risk for the site.

3.4.2 Overtopping Risk

The site does not benefit from flood defences, so there is no overtopping flood risk for the site.

3.5 Coastal/Tidal

The site is not affected by coastal or tidal flood risk.

3.6 Pluvial (Surface water)

The Environment Agency Surface Water Flood Map (Figure 3) identifies the majority of the site to be at 'very low' risk from surface water flooding. The map also depicts localised areas of low, medium and high-risk areas. These areas are associated with a series of drainage ditches across the site. For all risk categories the Environment Agency Surface Water Flood Map shows the expected depths to be below 300mm.

The SFRA makes no mention of surface water flooding issues at or near the site, which is unsurprising given the remote rural location of the proposed site.

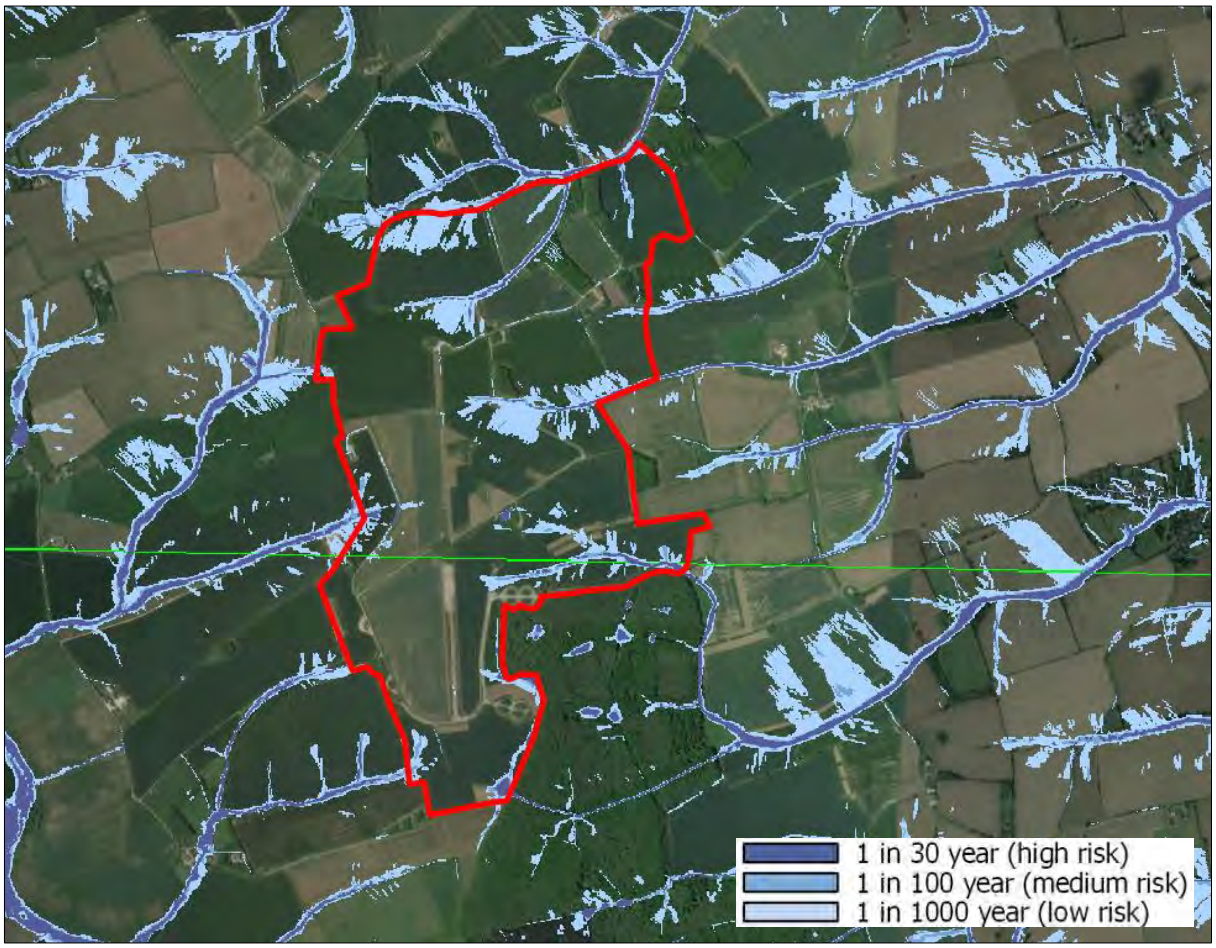


FIGURE 3: Screen shot of the Environment Agency's Risk of Flooding from Surface Water overlayed with Google Maps

TABLE 2: ENVIRONMENT AGENCY SURFACE WATER RISK CATEGORIES

Surface Water Risk Category	Surface water flooding Annual Exceedance Probability
Very Low	< 0.1%
Low	Between 1% and 0.1% (1 in 100 years and 1 in 1000 years)
Medium	Between 1% and 3.3% (1 in 100 years and 1 in 30 years)
High	> 3.3% (1 in 30 years)

3.7 Artificial water bodies

The Environment Agency Reservoir Flood Map identifies that the proposed site is not at risk of flooding from this source.

There are no canals near the site that could pose a risk.

3.8 Groundwater

The groundwater susceptibility map in the 2017 SFRA indicates that the proposed site is located in an area classified as being at <25% susceptible to groundwater flooding. The SFRA states that there have been two records of groundwater flooding in South Kesteven, both located in urban areas.

Based on this information, a further assessment of groundwater flooding is not required.

3.9 Sewers

The Risk of Hydraulic sewer flood map in the 2017 SFRA indicates that the proposed site is categorised as 0, the lowest risk. Given the rural nature of the proposed site, no sewers are expected to be present.

Based on this information, a further assessment of sewer flooding is not required.

4.0 Risk Mitigation Recommendations

A preliminary appraisal of flood risk to the site from all sources has been made based on the available data. Localised surface water flood flow paths have been identified as a risk which will need to be mitigated. These flow paths are associated with a network of drainage ditches across the site and are shown to pose a low risk with shallow depth (less than 300mm).

A sequential approach should be taken when allocating land use within the site, to keep the most vulnerable structures away from the flood risk areas and to keep the surface flow routes unobstructed. Any proposed access tracks should also be located away from these flow paths / drainage ditches. If an access track must cross a channel, then a suitable assessment of risk and mitigation should be made.

An assessment will be needed of the impact of the development on rainfall runoff from the site, with proportionate mitigation applied in line with normal SuDS best practice.

It is concluded that the site offers scope to deliver a safe and sustainable solar scheme with battery energy storage system. Any proposed scheme will need to be designed taking into account the points identified in this scoping study. A full Flood Risk Assessment with accompanying Drainage Strategy will be needed to support planning.

APPENDIX G - DRAFT ES CHAPTERS LIST

1 - Introduction

2 - Development Rationale

3 - Site Selection and Design

4 - Existing Conditions (*including Agricultural Land*)

5 - Environmental Impact Assessment

6 - Development Proposal

7 - Construction, Operation and Decommissioning

8 - Traffic and Access

9 - Hydrology and Flood Risk Assessment

10 - Ecology and Ornithology

11 - Landscape and Visual Impact Assessment

12 - Archaeology and Cultural Heritage

13 - Noise

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15 - Socio-Economics and Sustainability

16 - Avoidance and Mitigation

17 - Summary of Residual Impacts

18 - Glossary and Acronyms

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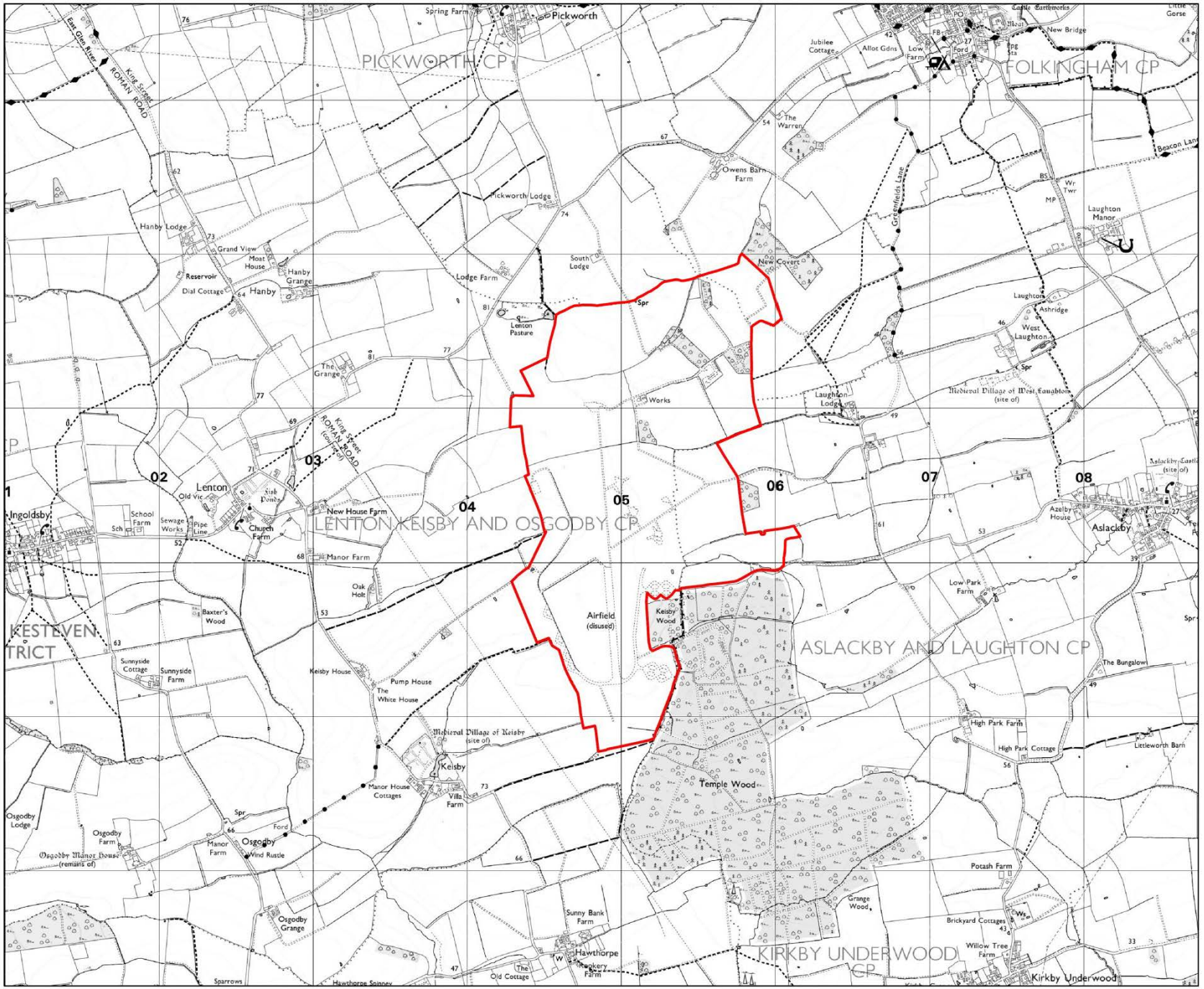

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Legend

Indicative Site Boundary

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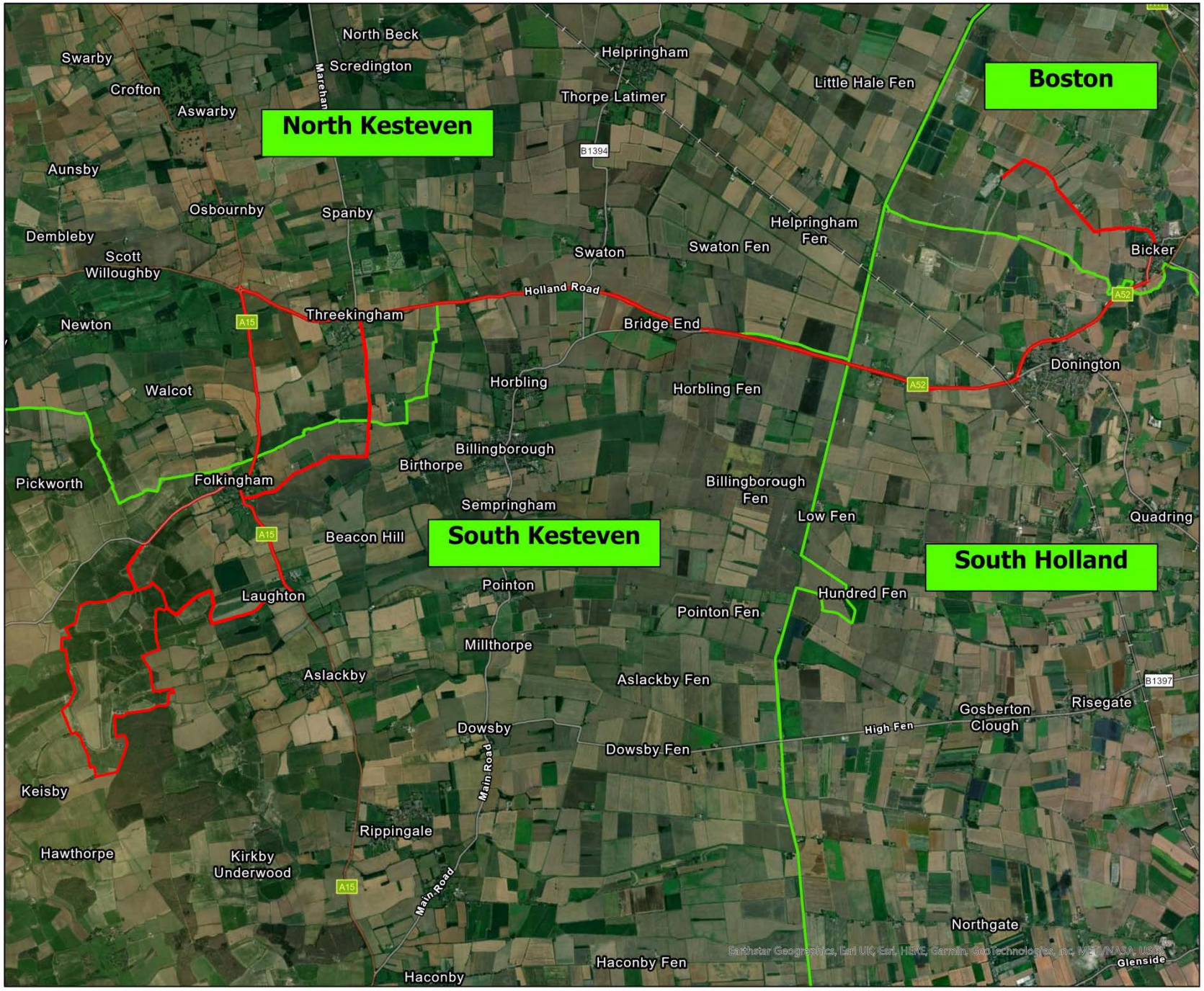
Temple Oaks Renewable Energy Park

Figure SR1 - Site Location Plan



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Legend

- DCO Site Boundary
- District Boundary

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Temple Oaks Renewable Energy Park

Figure SR2 - Site Location & Grid Connection Route