



**Viewing Information**

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**3D Visualisation Note**

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H:B:A Environment



**Three Oaks Renewable Energy Park**  
Viewpoint 3: A614  
Photomontage



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H:B:A Environment



**Three Oaks Renewable Energy Park**  
**Viewpoint 4: PRoW just off Woldgate**  
**Existing View**



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**Three Oaks Renewable Energy Park**  
**Viewpoint 4: PRoW just off Woldgate**

**3D Model View**



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H:B:A Environment



**Three Oaks Renewable Energy Park**  
**Viewpoint 4: PRoW just off Woldgate**  
**Composite View**



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**Three Oaks Renewable Energy Park**  
**Viewpoint 4: PRoW just off Woldgate**  
**Photomontage**



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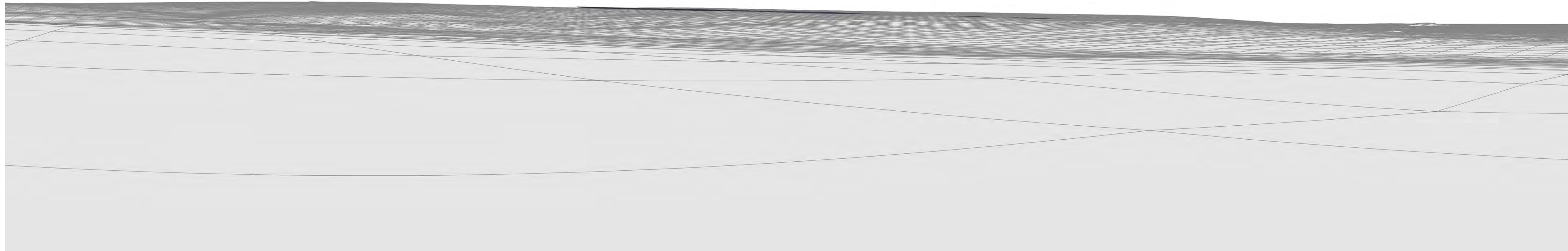
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H:B:A Environment



**Three Oaks Renewable Energy Park**  
Viewpoint 5: Back Lane, Burton Agnes  
Existing View



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# Three Oaks Renewable Energy Park

## Viewpoint 5: Back Lane, Burton Agnes

### 3D Model View



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**Three Oaks Renewable Energy Park**  
Viewpoint 5: Back Lane, Burton Agnes  
Composite View





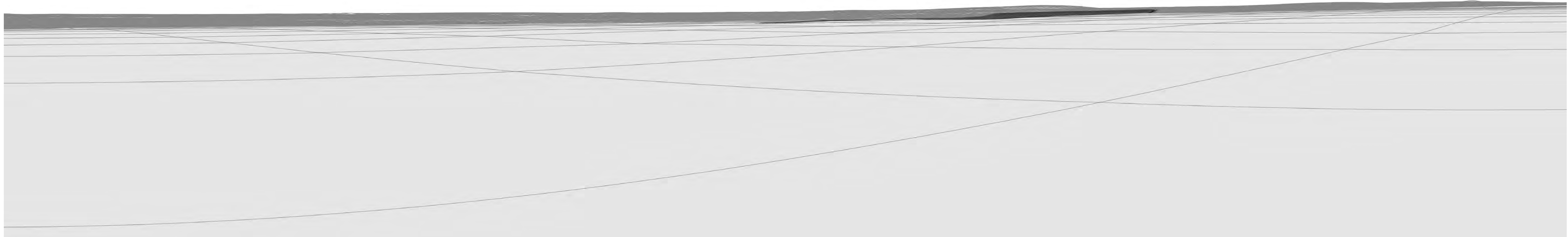
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**H:B:A Environment**  
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**Three Oaks Renewable Energy Park**  
**Viewpoint 6: Bridleway near Carnaby Temple**  
**Existing View**



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# Three Oaks Renewable Energy Park

## Viewpoint 6: Bridleway near Carnaby Temple

3D Model View



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**Three Oaks Renewable Energy Park**  
**Viewpoint 6: Bridleway near Carnaby Temple**  
**Composite View**



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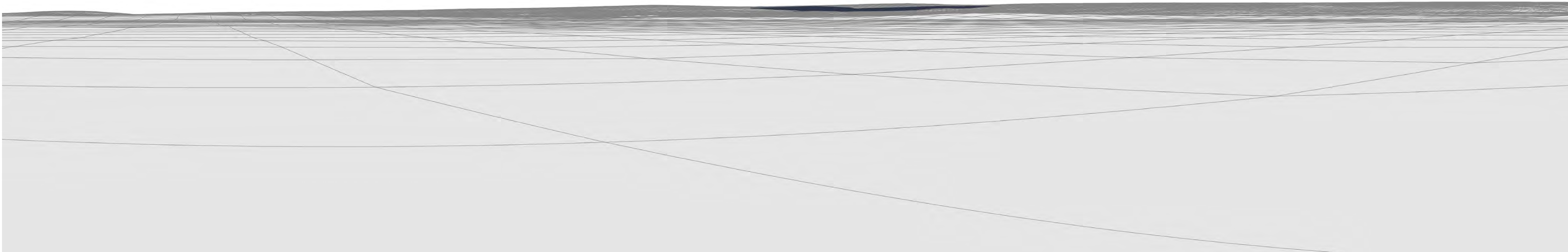
H:B:A Environment



# Three Oaks Renewable Energy Park

Viewpoint 7: A1038 near Fraisthorpe Wind Farm

Existing View



Viewing Information

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# Three Oaks Renewable Energy Park

Viewpoint 7: A1038 near Fraisthorpe Wind Farm

3D Model View



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**Three Oaks Renewable Energy Park**  
**Viewpoint 7: A1038 near Fraisthorpe Wind Farm**  
**Composite View**

## 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 ? from the University of ? (date) and a Master of Landscape Design (MLD) from the University of Sheffield? (date). 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 renewable energy projects including solar farms across the UK.

## Appendix 2: LVIA Method of Assessment

## Method of Assessment

### Introduction

- A2.1. This appendix describes the generic method of assessment used to predict the likely significant effects of proposed solar PV developments on the landscape resources and visual amenity of the development site and study area.
- A2.2. It describes the purpose of landscape and visual impact assessments (LVIAs), and 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, and the criteria used to assess the likely effects of the proposed development on landscape character and visual amenity in the viewpoint analysis and. It also provides the definitions of “significant effects” used to determine whether there are likely to be any significant effects on landscape resources 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 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 LVIAs 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 a 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, LVIA's 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 Pre-Application 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.
  - Initial Visibility and Viewpoint Appraisal - an intervisibility map is generated to identify the extent of the study area and preliminary viewpoints.
  - Landscape and Visual Baseline - the existing landscape resources (fabric, character and designations) and visual receptor locations within the study area 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.

- 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.
- 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 considers the effects of the construction, operational and decommissioning phases, taking into account the embedded and further mitigation, and is done in the context of the current landscape and visual baseline.
- Assessment of Effects on Landscape Resources - an assessment of the effects of the proposed development on landscape fabric, character and, if present in the study area, designations.
- Assessment of Effects on Visual Amenity - an assessment of the effects of the proposed development on the visual amenity of visual receptors in the study area.
- 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 (for EIA developments only).

## 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 /or Pre-Application 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 (for EIA developments) or pre-application consultation process (for non-EIA developments) 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) (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 an EIA development, the ES (and LVIA) must provide the information in Schedule 4 paragraphs 1 - 10. Where the screening opinion states 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 10).

A2.14. The EIA Regulations do not define “significant effects”, hence in this assessment, 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 LVIA for EIA developments. Some are specific to particular aspects of LVIA (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 LVIA and so are relevant for all development types in most locations within the UK.
- A2.20. Good practice guidance documents produced by the Landscape Institute which are relevant for this LVIA are:
- *Guidelines for Landscape and Visual Assessment* 3<sup>rd</sup> edition (LI/IEMA 2013), known as GLVIA3.
  - *Landscape Character Assessment: Technical Information Note 08/2015* (LI 2015), known as TIN 08/15.
  - *Assessing Landscape Value Outside National Designations: Technical Guidance Note 02/21* (LI 2021), known as TGN 02/21.
  - *Visual Representation of Development Proposals: Technical Guidance Note 06/19* (LI September 2019), known as TGN 06/19.

## GLVIA3

- A2.21. 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.

## TIN 08/2015

- A2.22. TIN 08/2015 provides information on the process of landscape character assessment and the guidance documents and landscape character assessments provided in England, Scotland, Wales and Northern Ireland.

## TGN 02/21

- A2.23. TGN 02/21 provides information and guidance for landscape professionals and



others who need to make judgements about the value of a landscape outside of national landscape designations in the context of the UK Town and Country Planning system and also for those who review those judgements. It identifies the stages in the planning process at which landscape value might be assessed, reviews the tools available to enable practitioners to assess landscape value and, in Table 1 (pp 7 - 11, TGN 02/21), presents a list of factors that could be considered when identifying landscape value, their definitions, examples of indicators of landscape value and of evidence/sources of information for each of these factors.

A2.24. These factors and their definitions are:

- Natural heritage - landscape with clear evidence of ecological, geological, geomorphological or physiographic interest which contribute positively to the landscape.
- Cultural heritage - landscape with clear evidence of archaeological, historical or cultural interest which contribute positively to the landscape.
- Landscape condition - landscape which is in a good physical state both with regard to the individual elements and overall landscape structure.
- Associations - landscape which is connected with notable people, events and the arts.
- Distinctiveness - landscape that has a strong sense of identity.
- Recreational - landscape offering recreational opportunities where experience of landscape is important.
- Perceptual (scenic) - landscape that appeals to the senses, primarily the visual sense.
- Perceptual (wildness and tranquillity) - landscape with a strong perceptual value notably wildness, tranquillity and/or dark skies.
- Functional - landscape which performs a clearly identifiable and valuable function, particularly in the healthy functioning of the landscape.

### **TGN 06/19**

A2.25. TGN 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.

- A2.26. Table 1 in TGN 06/19 sets out recommendations for the appropriate visualisation types to use for four categories of purposes and users (categories A - D). This planning application fits most closely into category B (a planning application for a non-EIA development accompanied by an LVA where there are concerns about landscape and visual amenity and effective mitigation is required) and the guidance recommends appropriate visualisation types 1 - 4 for category B (ie all four types could be appropriate, depending on the circumstances).
- A2.27. 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”.
- A2.28. Therefore, for non-EIA developments accompanied by an LVA (or LVIA), the appropriate type of visualisation is a matter of judgement, dependent on the proposed development, the user(s) and the planning stage reached.

## **Preliminary Visibility and Viewpoint Appraisal**

- A2.29. At an early stage in the design and assessment process, a “bare earth” intervisibility map is generated, extending a defined distance from the site (taking into account the nature of the topography and the likely visibility of the site), and overlaid onto the Ordnance Survey (OS) 1:25,000 Explorer map. This is generated using OS terrain 5 data and/or LIDAR data to create a digital terrain model (DTM), several target points across the site (at a height that represents the maximum solar PV array height) and an observer eye height, typically 1.8 mAGL.
- A2.30. This intervisibility map indicates the locations in the study area where the terrain would screen the target points (no colour over the base map), and the locations where the terrain would permit views of the target points. This intervisibility map suggests, based on screening by terrain only, the likely zones of theoretical visibility for solar PV panels on the site.
- A2.31. In addition to the terrain, a further degree of screening is provided by surface features such as built development and vegetation in the study area and so, based on the intervisibility map and fieldwork observations, preliminary viewpoints are selected and appraised and a suitable study area identified for the more detailed assessments.

## **Landscape and Visual Baseline**

- A2.32. The site and study area are analysed to identify the existing landscape resources (fabric, character and designations) and visual receptor types and

locations within the study area. Resources and receptors outside the ZTV may be mentioned but not analysed in detail as these would not be affected by the development.

## Landscape Fabric

A2.33. The landscape features and elements on the site are identified and described from fieldwork observations, Ordnance Survey maps, aerial photography, the Phase I habitat survey and any other relevant published information in order to identify any important landscape features that could be affected by the proposed development.

## Landscape Character

A2.34. The published landscape character assessments for the area are used to identify suitable landscape units. Based on the definitions in GLVIA3 (Glossary p 157), these may be:

- Landscape character types (LCTs) - types of landscape that are relatively homogeneous in character, generic in nature and may occur in several locations within a study area, that share broadly similar combinations of geology, soils, topography, drainage patterns, historic and contemporary land uses, vegetation, field, road and settlement patterns, and perceptual and aesthetic attributes; or
- Landscape character areas (LCAs) - single unique areas which are discrete geographical areas of a particular landscape type.

A2.35. These are examined and analysed using fieldwork observations, Ordnance Survey maps, aerial photography, the landscape character assessment, the local plan and other published information to identify their:

- Locations - within the study area.
- Key characteristics - geology and soils, topography and drainage patterns, land uses, vegetation, field, road and settlement patterns.
- Aesthetic and perceptual factors - including scale, distinctiveness, diversity, enclosure, pattern, wildness, tranquillity, condition, scenic quality, sense of place, accessibility and rarity.
- Other development - existing developments that are part of the character of the landscape unit.
- Landscape designations and recreational opportunities - including National and local landscape designations, National Trails, long distance footpaths, cycle and bridle routes, local public rights of way (PROW), access land and permissive access.

- Natural heritage - evidence of ecological, geological, geomorphological or physiographic features of interest that contribute to landscape character.
- Cultural heritage - evidence of archaeological, historical or cultural features of interest that contribute to landscape character.
- Associations - evidence of connections with notable people, events and the arts.
- Function - clearly identifiable and valuable functions.
- Views - the nature of views and the extent to which these contribute to landscape character.
- Landscape policies and strategies - that guide landscape change.

A2.36. Each landscape unit is then evaluated to identify its value and susceptibility to the changes that could be brought about by a development of this nature, scale and location, in order to define its sensitivity to this type of development, using the criteria set out in the **Viewpoint Analysis** below (paras A2.54 - A2.59 and Tables A2.2 - A2.4).

### **Landscape and Planning Designations**

A2.37. The locations, extents, purposes and special characteristics of any landscape designations in the study area are identified and described based on relevant published information, fieldwork observations, Ordnance Survey maps and aerial photography.

A2.38. National statutory landscape designations (eg National Parks and Areas of Outstanding Natural Beauty (AONBs)) have statutory purposes and information on their special characteristics are usually available in published management plans. The purposes of local landscape designations are usually derived from relevant local plan policies and their special characteristics from the relevant landscape character assessment.

A2.39. The presence and extent of other land use/planning designations identified in the LDP may also be noted, where these have a landscape protection purpose or consequence.

### **Visual Receptors**

A2.40. The range of visual receptor types and locations within the study area are identified from fieldwork observations, Ordnance Survey maps, aerial photography and any other relevant published information.

A2.41. The viewpoint analysis represents a selection of the visual receptor types and locations which are evaluated to identify the value of the location and/or view and susceptibility of the receptors at these locations to the changes that could

be brought about by a development of this nature, scale and location, in order to define the sensitivity of the receptors at each viewpoint to this type of development, as per the criteria set out in the **Viewpoint Analysis** below (paras A2.67 - A2.74 and Tables A2.7 - A2.10).

## Proposed Development, Mitigation and Enhancement

- A2.42. 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.
- A2.43. 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, are identified and incorporated into the landscape and biodiversity mitigation, enhancement and management proposals for the site.

## Key Parameters

- A2.44. 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 as outlined in Table A2.1 below:

**Table A2.1: Key LVIA 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.

LVIA Parameters	Description
	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 can not 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.

## Visibility Analysis

### Zones of Theoretical Visibility

A2.45. A Technical Appendix explaining how the 3D model of the proposed development and the zones of theoretical visibility (ZTVs) are constructed is provided in Appendix 3. The ZTVs are based on terrain data only and do not take into account the screening effects of surface features.

A2.46. However, the ZTVs do identify the locations in the study area where the terrain 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

A2.47. 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

- A2.48. The ZTVs, 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.
- A2.49. 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.
- A2.50. The viewpoint analysis examines changes in landscape character and views that would occur as a consequence of the construction, operational and decommissioning phases of the proposed development at the agreed viewpoint locations in the surrounding area, taking into account the embedded mitigation (during the construction phase and early years of the operational phase) and then the further mitigation (which should have established and would be effective during the later years of the operational phase and during the decommissioning phase).
- A2.51. 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.
- A2.52. The criteria used to judge value, susceptibility, sensitivity, magnitude and significance of effects on landscape character and views in the viewpoint analysis are provided below.

## Effects on Landscape Character

- A2.53. The criteria used to judge landscape value, susceptibility, sensitivity, magnitude and significance of effects on landscape character are as follows:

### Landscape Value

- A2.54. National and local landscape designations are an indication of landscape 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. However, most undesignated landscapes are also locally valued by local people.
- A2.55. Therefore, in order to judge landscape value, both recognised landscape

designations and the factors identified in TGN 02/21 (natural heritage, cultural heritage, condition, associations, distinctiveness, recreational opportunities, perceptual factors (scenic beauty, wildness, tranquillity and dark skies), and function, see para A2.24 above) are taken into account and the criteria used to judge landscape value are provided in Table A2.2 below.

**Table A2.2: Landscape Value**

Landscape Value	Description
<b>International value</b>	A landscape designated at an international level, eg a World Heritage Site, the purposes of which include landscape and/or recreational opportunities.
<b>National value</b>	A landscape 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 an undesignated landscape where the landscape is very rich in natural and/or cultural heritage assets which are designated at a national level and which form highly distinctive landscape features, where the landscape is in very good physical condition, has very strong associations with famous people or historical events, offers nationally recognised recreational opportunities (eg open access land, National Trails), is very distinctive with a very strong sense of place and very strong perceptual qualities (scenic, wildness, tranquillity and dark skies) and which is essential to the healthy functioning of natural systems.
<b>County/Borough/District value</b>	Local landscape designations in Local Development Plans and Regional Parks. Or an undesignated landscape where the landscape is rich in natural and/or cultural heritage assets which are designated at a County/Borough/District level and which form distinctive landscape features, where the landscape is in good physical condition, may have strong associations with famous people or historical events, offers County/Borough/District level recreational opportunities (eg long distance trails), is distinctive with a strong sense of place and strong perceptual qualities (scenic, wildness, tranquillity and dark skies) and which contributes to the healthy functioning of natural systems.
<b>Local value</b>	An undesignated landscape that has natural and/or cultural heritage assets which form distinctive landscape features, where the landscape is in good physical condition, may have associations with famous people or historical events, offers local recreational opportunities (eg local PROW, village greens, recreational fields), has a good sense of place and perceptual qualities (scenic, wildness, tranquillity and dark skies) and displays evidence of responsible use and value.
<b>Unvalued</b>	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

A2.56. 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.

A2.57. 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
<b>Very susceptible</b>	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.
<b>Susceptible</b>	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.
<b>Moderate susceptibility</b>	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.
<b>Slight susceptibility</b>	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.
<b>Negligible susceptibility</b>	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.

A2.58. 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

A2.59. 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, pp 88 - 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 <b>international or national value</b> and/or with features, elements, areas or special qualities of international or national value, that could be <b>very susceptible</b> to the type, scale and location of development proposed.
High/medium sensitivity	A landscape with <b>national or County/Borough/District value</b> and/or with features, elements, areas or special qualities of national value, that could be <b>susceptible</b> to the type, scale and location of development proposed.
Medium sensitivity	A landscape with <b>County/Borough/District or local value</b> and/or with features, elements, areas or special qualities of County/Borough/District or local value, that could have a <b>moderate susceptibility</b> to the type, scale and location of development proposed.
Medium/low sensitivity	A landscape with <b>local value</b> and/or with features, elements, areas or special qualities of local value, that could have a <b>slight susceptibility</b> to the type, scale and location of development proposed.
Low sensitivity	A landscape that is <b>unvalued</b> and/or with features, elements, areas or special qualities that are unvalued, and that could have a <b>negligible susceptibility</b> to the type, scale and location of development proposed.

### Magnitude of Change in Landscape Character

A2.60. 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, p 90 - 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
<b>Very substantial adverse [or beneficial]</b>	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.
<b>Substantial adverse [or beneficial]</b>	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.
<b>Moderate adverse [or beneficial]</b>	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.

<b>Slight adverse [or beneficial]</b>	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.
<b>Negligible adverse [or beneficial]</b>	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.
<b>No change</b>	Where the proposed development would not be visible or would not result in any discernible change in landscape character.

A2.61. Where the combination of factors at a viewpoint fits between two of the magnitude of change levels defined above, then interim levels may be selected, ie very substantial/substantial, substantial/moderate, moderate/slight and slight/negligible.

### Significance of Effects on Landscape Character

A2.62. The effects on landscape character are then derived by combining the sensitivity and magnitude in accordance with the matrix in Table A2.6 below.

A2.63. 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. Where the magnitude of change is “no change”, then the effects on landscape character will be “none” for all sensitivity levels.

**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
<b>High</b>	Major++	Major+	Major	Maj/mod+	Maj/mod	Mod+	Mod	Mod/min+	Mod/min
<b>High/medium</b>	Major+	Major	Maj/mod+	Maj/mod	Mod+	Mod	Mod/min+	Mod/min	Minor+
<b>Medium</b>	Major	Maj/mod+	Maj/mod	Mod+	Mod	Mod/min+	Mod/min	Minor+	Minor
<b>Medium/low</b>	Maj/mod+	Maj/mod	Mod+	Mod	Mod/min+	Mod/min	Minor+	Minor	Min/neg+
<b>Low</b>	Maj/mod	Mod+	Mod	Mod/min+	Mod/min	Minor+	Minor	Minor/neg+	Min/neg

A2.64. 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 2017, DCLG 2017).

A2.65. With regards to landscape character, the effects of a proposed development are 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 same landscape unit), 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-instated to its pre-development character) or irreversible (if the changes to landscape character and visual amenity cannot be reversed).

### Effects on Views

A2.66. The criteria used to judge value, susceptibility, sensitivity, magnitude and significance of effects on views are as follows.

### Location Value

A2.67. 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.

A2.68. 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
<b>National value</b>	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.
<b>County/Borough/District value</b>	A popular view promoted in visitor guides and/or in a landscape designated in the Local Development Plan.
<b>Community value</b>	A popular view in an undesignated landscape which is locally valued and displays evidence of responsible use and value.

<b>Private value</b>	A private view, eg from a residential property, that is likely to be valued by the occupants.
<b>Unvalued</b>	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

A2.69. 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.

A2.70. 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
<b>Very susceptible</b>	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.
<b>Susceptible</b>	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.
<b>Moderate susceptibility</b>	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.
<b>Slight susceptibility</b>	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.
<b>Negligible susceptibility</b>	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

- A2.71. 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.
- A2.72. 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.
- A2.73. 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
<b>High sensitivity</b>	<p>At a location with <b>National value</b> and where receptors would be very susceptible or susceptible to change.</p> <p>At a <b>private location</b> where receptors are likely to highly value the view and would be very susceptible or susceptible to change.</p> <p>At a location with <b>County/Borough/District value</b> and where receptors would be very susceptible to change.</p>
<b>High/medium sensitivity</b>	<p>At a location with <b>National value</b> and where receptors would be susceptible or moderately susceptible to change.</p> <p>At a <b>private location</b> where receptors are likely to value the view and would be susceptible or moderately susceptible to change.</p> <p>At a location with <b>County/Borough/District value</b> and where receptors would be susceptible to change.</p> <p>At a location with <b>local community value</b> and where receptors would be very susceptible or susceptible to change.</p>
<b>Medium sensitivity</b>	<p>At a location with <b>National value</b> and where receptors would be slightly susceptible to change.</p> <p>At a <b>private location</b> where receptors are likely to place some value on the view and would be moderately or slightly susceptible to change.</p> <p>At a location with <b>County/Borough/District value</b> and where receptors would be moderately susceptible to change.</p> <p>At a location with <b>local community value</b> and where receptors would be susceptible or moderately susceptible to change.</p>

<b>Medium/ low sensitivity</b>	At a location with <b>County/Borough/District value</b> and where receptors would be slightly susceptible to change. At a location with <b>local community value</b> and where receptors would be moderately or slightly susceptible to change.
<b>Low sensitivity</b>	At a location with <b>local community value</b> and where receptors would have negligible susceptibility to change At a location that appears to be <b>unvalued</b> and where receptors are likely to have slight or negligible susceptibility.

A2.74. 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	<b>High</b> - 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. <b>High/medium</b> - 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. <b>Medium</b> - 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.
	Recreational receptors	<b>High</b> - 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. <b>High/medium</b> - 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. <b>Medium</b> - 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	<b>Medium</b> - 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. <b>Medium/low</b> - 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	<b>Low</b> - indoor receptors with limited views in this direction, that are in that location primarily to undertake activities unconnected with the view.

Linear receptors	<p>Road and rail users (motorists, passengers, bus and train travellers)</p>	<p><i>High/medium</i> - 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.</p> <p><i>Medium</i> - 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.</p> <p><i>Medium/low</i> - 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.</p>
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### Magnitude of Change in a View

A2.75. 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+).

A2.76. 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).

A2.77. For each viewpoint location, the parameters in para A2.76 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
<b>Very substantial</b>	Where the proposed development would be close to the viewpoint, visible in its entirety, would occupy almost the entire view, 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.
<b>Substantial</b>	Where the proposed development would be in the near distance, visible in its entirety or partly screened, would occupy the majority of the view, 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.
<b>Moderate</b>	Where the proposed development would be in the middle distance, visible/conspicuous in its entirety or partly screened, would occupy up to half the view, 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.
<b>Slight</b>	Where the proposed development would be in the distance, noticeable in its entirety or partly screened, would occupy a small part of the view, 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.
<b>Negligible</b>	Where the proposed development would be in the far distance, partly or largely screened, would occupy a very small part of the view, 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.
<b>No change</b>	Where the proposed development would not be visible or would not result in any discernible change in the view.

A2.78. Where the combination of factors at a viewpoint fits between two of the magnitude of change levels defined above, then interim levels may be selected, ie very substantial/substantial, substantial/moderate, moderate/slight and slight/negligible.

### Significance of Effects on Views

A2.79. 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.

A2.80. 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. Where the magnitude of change is “no change”, then the effects on views will be “none” for all sensitivity levels.

**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
<b>High</b>	Major++	Major+	Major	Maj/ mod+	Maj/ mod	Mod+	Mod	Mod/ min+	Mod/ min
<b>High/ medium</b>	Major+	Major	Maj/ mod+	Maj/ mod	Mod+	Mod	Mod/ min+	Mod/ min	Minor+
<b>Medium</b>	Major	Maj/ mod+	Maj/ mod	Mod+	Mod	Mod/ min+	Mod/ min	Minor+	Minor
<b>Medium/ low</b>	Maj/ mod+	Maj/ mod	Mod+	Mod	Mod/ min+	Mod/ min	Minor+	Minor	Min/ neg+
<b>Low</b>	Maj/ mod	Mod+	Mod	Mod/ min+	Mod/ min	Minor+	Minor	Minor/ neg+	Min/ neg

A2.81. 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.

A2.82. 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-instated to its pre-development character) or irreversible (if the changes to the view cannot be reversed).

## Assessments of Effects

### Effects on Landscape Fabric

A2.83. 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.

### Effects on Landscape Character

A2.84. 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.

## Effects on Landscape Designations

A2.85. The assessment of effects on landscape designations considers the special characteristics and purposes of these designations, the characteristics of the proposed development, the visibility and viewpoint analyses, the assessments of residual effects on landscape fabric and character and visual amenity and other fieldwork observations, and makes a judgement as to whether there are likely to be any significant beneficial or adverse effects on the purposes of the designations based on the following definitions:

- Significant beneficial effects are likely to occur where the proposed development would bring about a significant change in the special characteristics that underpin the purposes of the designation, and that change would significantly enhance the ability of the designation to fulfil those purposes.
- Significant adverse effects are likely to occur where the proposed development would bring about a significant change in the special characteristics that underpin the purposes of the designation, and that change would significantly compromise the ability of the designation to fulfil those purposes.

## Effects on Visual Amenity

A2.86. 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).

A2.87. 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

A2.88. 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.

A2.89. 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.

## **Appendix 3: Technical Appendix for the Photography, 3D model, ZTVs and Visualisations**



## Appendix 3

Technical Photography,  
3D Modelling and Verified Visualisations

Three Oaks Renewable Energy Park

Carnaby

August 2022

H:B:A Environment

engena

RIDGE  
CLEAN  
ENERGY

Landscape  
Institute  
Registered  
Practice

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## Introduction

**Mike Spence BA (Hons), MLD, CMLI, REIA, FRGS** is a one of the UK's leading independent exponents of technical photography, verified photomontages and visualisations. Since 2013 Mike has been a technical advisor to the Landscape Institute on 'photography and photomontage in landscape and visual impact assessment', and has been undertaking this work for over 25 years. He is one of the main authors of the Landscape Institute's TGN 06/19 and provided technical support to Scottish Natural Heritage on their windfarm visualisation guidance. His background as a Chartered Landscape Architect, Registered EIA Practitioner and Fellow of the Royal Geographic Society working on strategic infrastructure projects has meant that the accuracy of the visualisation work is paramount, and technical photography, together with extensive surveying experience and detailed 3D modelling using real world co-ordinates ensures that the visualisations produced follow a clear and transparent methodology to ensure they are as accurate as possible.

Recent projects include the UNESCO World Heritage Sites at Kew Royal Botanic Gardens, Fountains Abbey for The National Trust, and Derwent Valley Mills for Amber Valley Borough Council. Mike has also been working closely with Bath City Council on proposed development in the UNESCO World Heritage City of Bath. Mike's work and objective technical checks have been used at numerous Public Inquiries and Planning Hearings, on behalf of both local authorities and developers.

In November 2021 HBA Environment contacted MSE to request Technical Photography, GNSS/RTK Surveying, 3D Modelling and Visualisation support for the proposed Three Oaks Renewable Energy Park, near Carnaby.

## Verified Photography and 3D Modelling

The photographs were taken with a full frame camera (Canon EOS 5D Mark III) and 50mm lens combination consistent with Landscape Institute's TGN 06/19, GLVIA3 and the emerging understanding of the requirement for technical photography for visualisation work. As part of the work 7 viewpoints were identified providing views of the site and visited on 1 January 2022. The weather was good with clear visibility.

### Technical Photography

The camera was mounted on a Manfrotto 303 SPH panoramic tripod head, levelled using a Manfrotto Leveller, supported on a Manfrotto Tripod. The tripod head was levelled using a spirit level, to avoid pitch and roll. The camera was set with the centre of the lens 1.60m above ground level. Photographs were taken in Manual mode with an aperture of f/8 or f/11 and a fixed focal length throughout. The panoramic tripod head was set with increments to give approximately 50% overlap between frames. Photographs were taken in both landscape and portrait format. From each photograph location a full 360 degree field of view was taken centred around a nodal point. The nodal point was set to avoid any problems of foreground parallax. A Sigma 50mm f/1.4 lens was used for all viewpoint photographs.



Single Frame 50mm photograph is insufficient to capture the wide spread of a solar farm in the view. Instead a panorama is created by stitching multiple 50mm images together:



50mm lens full 360 degree panorama



Extracted 90 degree portion

For each 360 degree panorama the images were cylindrically corrected and stitched together. This allowed an accurate 90, 180 or 270 degree cylindrical view to be extracted from the full panorama, to illustrate the wider 'landscape setting' of the development.

Technical information for the camera locations is provided for each viewpoint in Appendix 7.3.1.

## Surveying

The position of each camera location was surveyed using Spectra Precision GNSS equipment with Real Time Kinematic Correction (RTK) which achieves an accuracy down to 1cm in eastings, northings and height (metres Above Ordnance Datum). The equipment included Spectra Precision SP80 GNSS smart antennae with Panasonic Toughpad data recorder. Points were saved using DigiTerra software. A photograph of the camera location was taken.



## 3D Modelling

MSEnvironmental constructed a geo-referenced 3D model using Rhino 3D from a 3D DWG and PDFs supplied by Ridge Clean Energy together with LIDAR 2m DTM data. The model was geo-referenced and placed in the correct geographic coordinate system (OSGB36) using ground heights to correspond with the survey and site layout.

Camera locations surveyed on site were added to the geo-referenced 3D model.

LIDAR DSM data and target points were taken from the existing features in the view and built into the 3D model. This allowed the horizontal and vertical alignment of the photograph and 3D model to be checked, cross-referenced and verified.

Cylindrical renders generated using V-Ray for Rhino were exported from the 3D modelling software and used to overlay the single frame planar images.

Target points from both the photograph and the model view were aligned to ensure a precise fit between the two images.

The results are presented as a sequence of visualisations as follows:

### 1. Existing View



### 2. 3D Model View



### 3. Composite 3D Model Photo-Overlay View



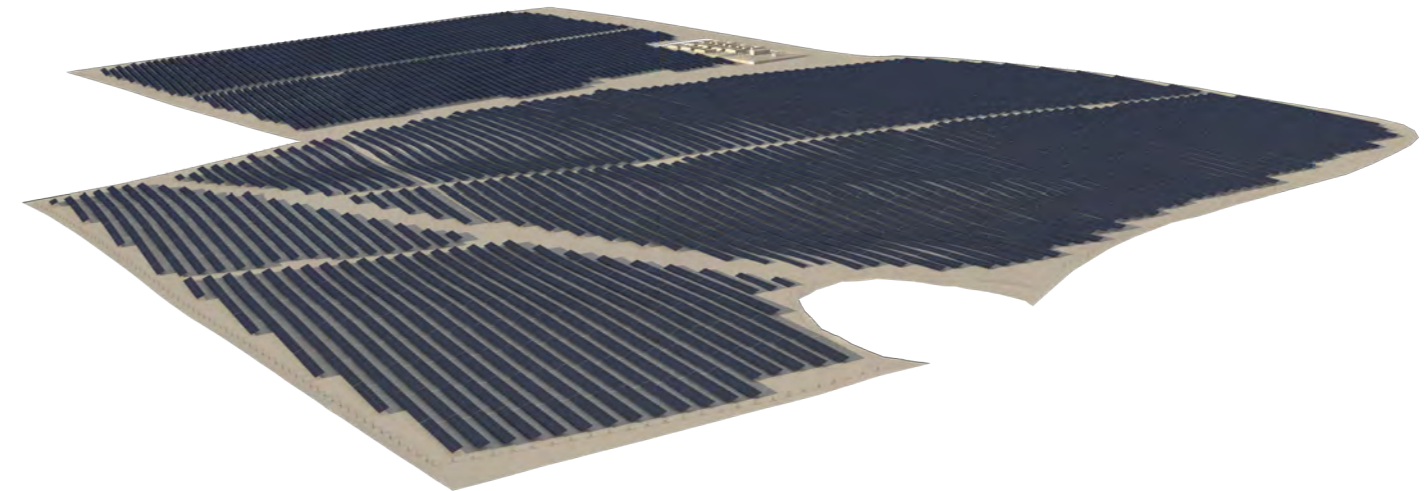
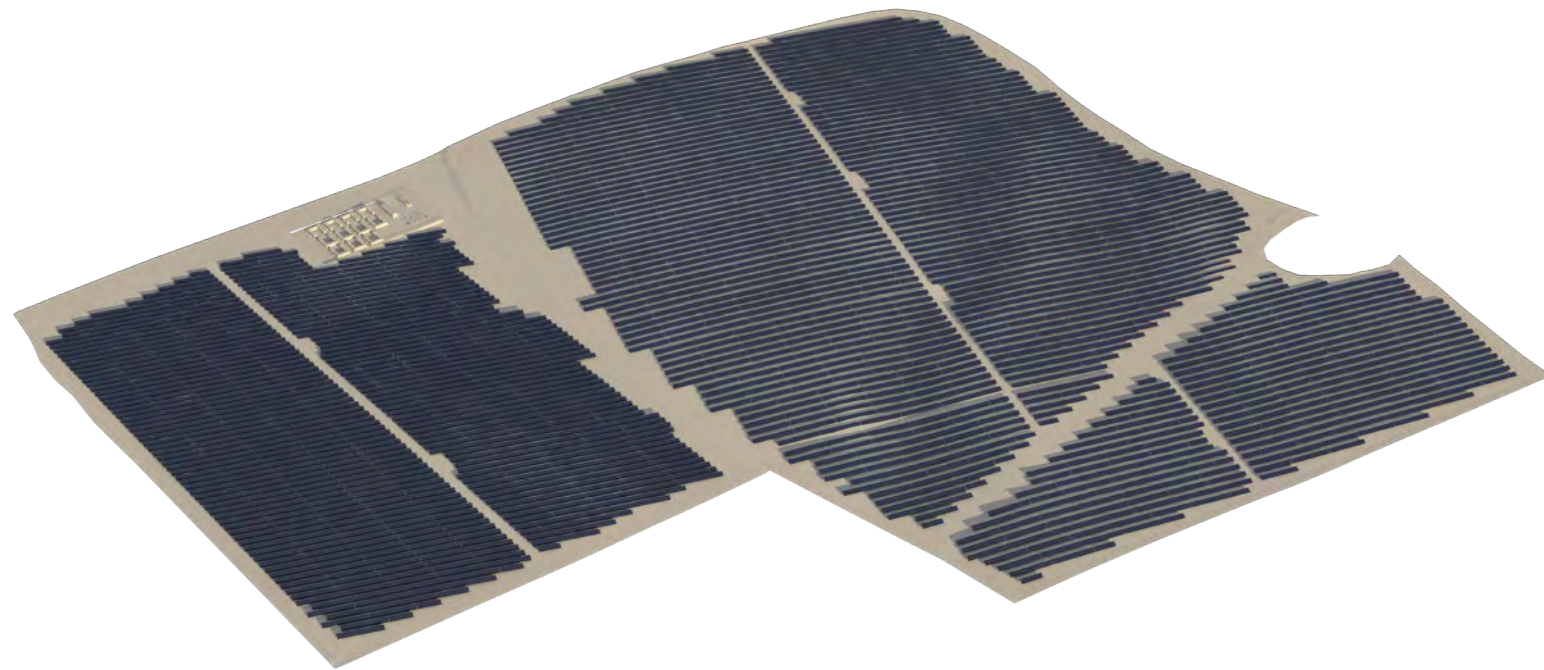
### 4. Photomontage



The topography of the site has been generated from a site topographical survey supplied by Engena. The surrounding landform has been created using 2m LIDAR DTM data, with triangulated surfaces generated using Rhinoterrain.

The 3D Model was built in Rhino 3D by MSE. The model is fully geo-referenced and positioned to correspond with the site layout and elevations supplied in the planning application drawings:

### Proposed Three Oaks Layout Model on the LIDAR DTM



## Planar vs Cylindrical Projection

All photographs are taken as a series of single frame planar images. A planar image is a single frame image which has a single point of perspective lying centrally in the image. The limitation of single frame images is that they have a limited horizontal field of view. To allow a wider field of view we stitch the individual planar images using software, such as PTGUI which automatically corrects the geometry to give a cylindrical panoramic image. To undertake this accurately the use of a levelled tripod and panoramic tripod head set up to avoid foreground parallax is necessary.

A full 360 degree panorama is taken with overlapping images. These images are stitched together and cylindrically projected, as if the panorama was being located in the inner face of a cylinder.

The 3D model views are rendered out in cylindrical projection to allow the precise image re-mapping to match the cylindrical photograph.

## 3D Modelling software

The work has largely been undertaken using Rhino 3D. All 3D modelling has been undertaken in metres and geo-referenced to align with OSGB36. RESOFT Windfarm was also used which is a 3D modelling package which we use to check on vertical alignment of the 3D model. This is also set up to OSGB36. RESOFT Windfarm has been used to generate the geometric grid from LIDAR DTM data present in all 3D model visualisations.

VRay for Rhino has been used for rendering. The use of a sunlight system adds a 3 dimensional effect with shadow, to understand the form and materials of the proposed solar panels, fencing and ancillary development.

## Viewing Printed Images

The visualisations have been prepared to be printed at A1 wide by A4 high (841mm x 297mm), to fully show the limits of the proposed solar farm development within its local landscape context.

## Calculation of Visibility (ZTVs)

GIS viewshed software has been used to calculate visibility of the proposed development. A landform model has been constructed using Environment Agency 2m LIDAR Digital Terrain Model (DTM) data. 200 target points have been set at points along the panels at a height of 3m. An observer's eye height of 1.6m has been used.

A second calculation has been made of the substation, using the same landform data and eye height. The results illustrate maximum theoretical visibility, and do not include the screening effects of buildings or vegetation.

## Summary

This work has been undertaken in accordance with the Landscape Institute TGN 06/19 and the developing understanding of visualisation work. The accuracy of camera locations and 3D modelling conforms with Type 4 (the highest level of accuracy). The 3D modelling has been produced to AVR3 (photo-realistic).

The photography has been undertaken in a robust manner, using professional full frame sensor DSLR and 50mm lens with panoramic head and tripod. The camera position has been surveyed using highly accurate GNSS equipment, giving high levels of accuracy of camera location. The 3D model has been built in Rhino 3D. An additional check on the vertical scaling has been undertaken using RESOFT Windfarm. The resultant visualisations are highly accurate,

The sheets are set up to be printed at the true monocular viewing distance of 50cm. So the images will appear true to scale when viewed on site with one eye.

The photography, surveying and 3D modelling have followed a transparent methodology, and the resultant visualisations are considered robust and fit for purpose to illustrate the positioning, and scale and massing of the proposed scheme in its local context.

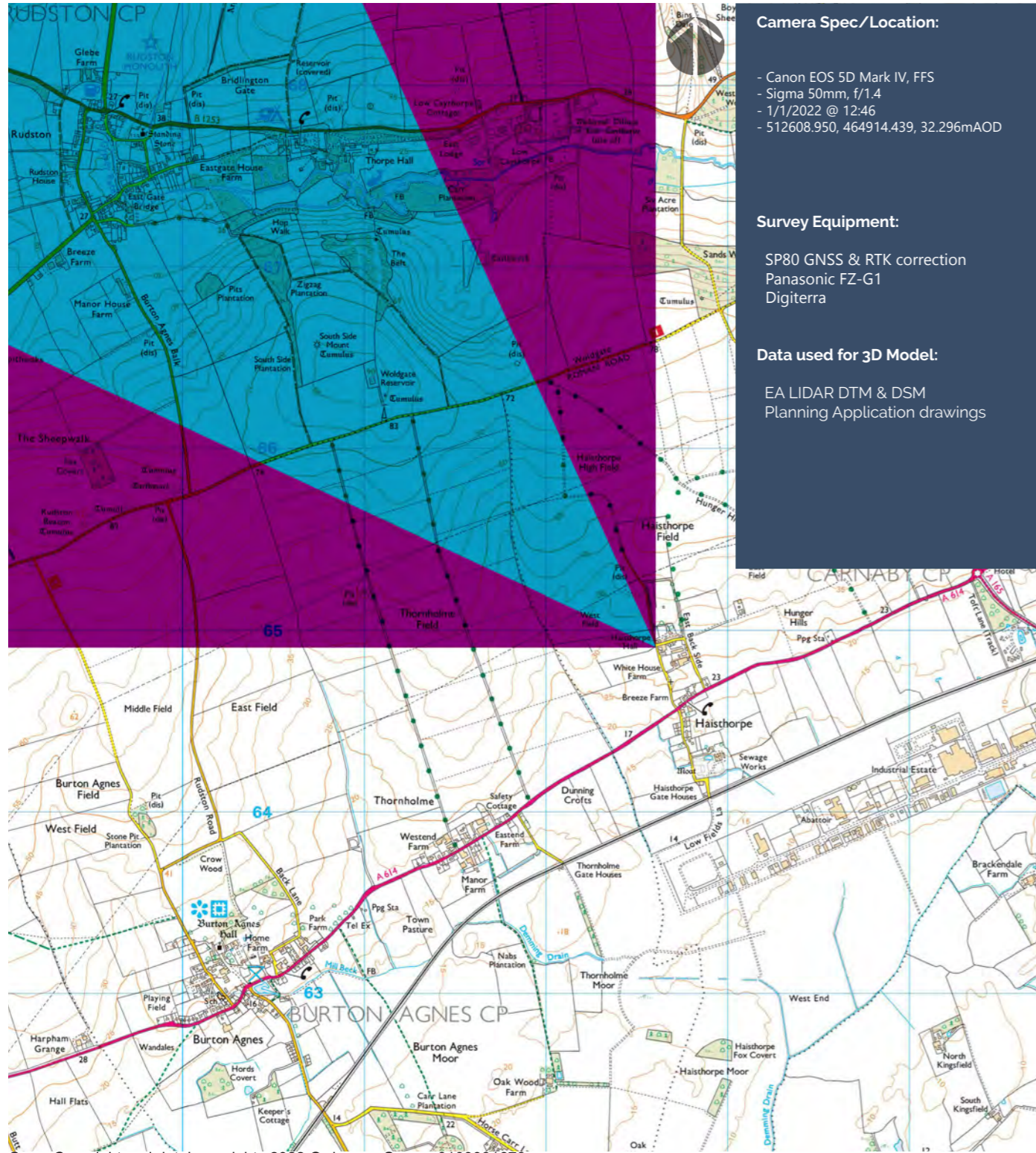
The visibility calculations use highly detailed LIDAR DTM data and helpful in understanding maximum theoretical visibility, without visual buffers.



M.A.Spence BA(Hons), MLD, CMLI, REIA, FRGS 3 August 2022  
**Principal, MSEnvironmental**



## Camera Location:



### Camera Spec/Location:

- Canon EOS 5D Mark IV, FFS
- Sigma 50mm, f/1.4
- 1/1/2022 @ 12:46
- 512608.950, 464914.439, 32.296mAO

### Survey Equipment:

- SP80 GNSS & RTK correction
- Panasonic FZ-G1
- Digiterra

### Data used for 3D Model:

- EA LIDAR DTM & DSM
- Planning Application drawings

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## Tripod:



50mm Lens Planar Projection (actual 49.7mm; 39.9 deg HFOV)



Point of Perspective

Point of Perspective

Point of Perspective

Point of Perspective

Viewpoint 1 Single Frame 50mm image