



# SI 2021 Technical Appendix 7.1

## Landscape and Visual Impact Assessment

### Methodology and Glossary



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## 1.1 Introduction

- 1.1.1 This appendix describes the methodology used within the landscape and visual impact assessment (LVIA) for the proposed Clashindarroch II Wind Farm (the 'proposed development') which comprises up to 14 turbines with a maximum blade tip height of 180m and associated infrastructure.
- 1.1.2 This appendix has been structured as follows:
- Overview of LVIA Methodology;
  - Data Sources and Site Survey;
  - Integrated Design and Assessment;
  - Assessing Landscape Effects;
  - Assessing Visual Effects;
  - Assessing Cumulative Landscape and Visual Effects;
  - Evaluation of Significance;
  - Nature of Effect and Nature of Effect;
  - Residential Visual Amenity Assessment;
  - Night-time Assessment; and
  - Production of Zone of Theoretical Visibility (ZTV)s and Visualisations.

## 1.2 Overview of LVIA Methodology

- 1.2.1 The LVIA assesses the likely effects of the proposed development on the landscape and visual resource, encompassing effects on landscape elements, characteristics and landscape character, designated landscapes, visual effects and cumulative effects.
- 1.2.2 Essentially, the landscape and visual effects (and whether they are significant) are determined by an assessment of the nature or 'sensitivity' of each receptor or group of receptors and the nature of the effect or 'magnitude of change' that would result from the proposed development. The evaluation of sensitivity takes account of the value and susceptibility of the receptor to the proposed development. This is combined with an assessment of the magnitude of change which takes account of factors such as the size and scale of the proposed change and the geographical extent. Other factors regarding the nature of the effect such as the duration of change and whether the effect is cumulative are also noted. By combining assessments of sensitivity and magnitude of change, a level of landscape or visual effect as well as the nature of that effect can be evaluated and the significance of the effect determined.
- 1.2.3 The resulting level of effect is described in terms of whether it is significant or not significant and the type or nature of effect is described as either direct or indirect; temporary or permanent (reversible); cumulative; and beneficial, neutral or adverse. The assessment has also considered the cumulative effects resulting from the proposed development in combination with other existing and consented wind farms, and wind farms at the planning application stage.
- 1.2.4 The time period for the assessment covers phases of development related to the construction of the proposed development and associated infrastructure, its operation for a period of 30 years, and decommissioning.

- 1.2.5 LVIA unavoidably involves a combination of both quantitative and subjective assessment and wherever possible a consensus of professional opinion has been sought through consultation, internal peer review, and the adoption of a systematic, impartial, and professional approach.

### Technical guidance and best practice

- 1.2.6 The methodology for the LVIA has been undertaken in accordance with the Landscape Institute and IEMA *Guidelines for Landscape and Visual Impact Assessment*, 3rd Edition (GLVIA 3). In addition to planning policy documents and other supporting technical guidance to the LVIA methodology includes, but is not limited to the following:
- *Siting and Designing Windfarms in the Landscape, Version 3a*, NatureScot, August 2017;
  - *Guidance: Spatial Planning for Onshore Wind Turbines – natural heritage considerations, Version 3a*, NatureScot, June 2015;
  - *Visual Representation of Windfarms, Version 2.2*, NatureScot, February 2017; and
  - *Guidance: Assessing the Cumulative Impact of Onshore Wind Energy Developments*, NatureScot, 2012;

### Defining the LVIA Study Area

- 1.2.7 The NatureScot guidance<sup>1</sup> advises that the LVIA Study Area for wind turbines of this height should be based on an area 45km distance from each of the proposed turbine locations as illustrated in **SI 2021 Figure 7.1**. The LVIA Study Area covers a circular area of 46,135m radius from the Site centre (based on a minimum 45km distance from each of the proposed turbines), although it may be noted that a reduced area of 40km was agreed through the scoping process with consultees.
- 1.2.8 It is important to note that the boundary of the LVIA Study Area is not the limit of potential visibility. Rather, it is an area defined by NatureScot, on the basis of research, to determine a suitable LVIA Study Area for the assessment of wind farms which will contain all likely significant landscape and visual effects.

## 1.3 Data Sources and Site Surveys

- 1.3.1 A list of the data sources used for this assessment is provided in **SI Chapter 7**.

### Desk-based and site survey work

- 1.3.2 The LVIA is informed by desk-based studies and site and field survey work undertaken within the LVIA study area.
- 1.3.3 A preliminary desk-based assessment was undertaken of landscape and visual receptors using a range of map-based data and related computer and digital analysis including Zone of Theoretical Visibility (ZTV), digital and / or surface terrain modelling and wireframe and street view software. This information used to inform initial assessments and focus the site survey work and likely locations for viewpoint photography and sequential route assessment. A series of site surveys was undertaken to verify the initial desk-based assessments which may only require simple assessment techniques to complete. This may be due to receptors falling outside the ZTV or confirmation of screening from vegetation and / or built form that means there would be no view of the proposed development.

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<sup>1</sup> Visual Representation of Wind Farms, Version 2.2, NatureScot (2017).

1.3.4 Site and field survey activities include:

- Field survey verification of landscape elements within the Site Boundary where potentially significant effects are likely;
- Field survey verification of the ZTV from landscape and visual receptor locations and transport and recreational routes through the LVIA study area;
- Visiting viewpoint locations and recording of panoramic baseline photography and subsequent visual assessment from the assessment viewpoints; and
- Field survey assessment and verification of likely landscape, visual and cumulative effects.

1.3.5 The viewpoint photography and visual assessment surveys were undertaken between May and August 2021, following strict Covid-19 guidelines.

1.3.6 All site survey work was undertaken in fair weather conditions with good to excellent visibility.

## 1.4 Integrated Design and Assessment

1.4.1 Design is an integrated and iterative part of the LVIA process. In particular the advice from the following documents, but not limited to, is relevant to the design in terms of the turbine scale, location / layout and where required aviation warning lights:

- NatureScot, February 2017. *Siting and Designing Wind Farms in the Landscape*, Guidance (Version 3); and
- NatureScot Natural Heritage, September 2020, *General pre-application and scoping advice for onshore wind farms Guidance*.

### Potential effects during Construction

1.4.2 A range of potential effects on the landscape and visual resource are likely during the construction of the proposed development over a period of up to 18 months. An appraisal of the potential effects helps to define the scope of the LVIA and develop an integrated design and mitigation response which can be embedded into the proposed development. The potential effects likely to result from construction are described below.

- **Landscape Effects:**
  - ▶ Effects on landscape elements, features and patterns (including, but not limited to soils, landform, ground vegetation, hedgerows / field boundaries, trees / forestry and buildings) as a result of land preparation including site clearance and earthworks.
  - ▶ Effects on landscape character and key characteristics, including perceptual characteristics and qualities as a result of construction activities. The construction activities are likely to include the presence of construction staff and machinery, cranes, vehicle movements, contractors' facilities and site access associated with the proposed development.
  - ▶ Effects on the special landscape qualities and integrity of designated landscapes as a result of the above construction activities.
- **Visual Effects:**
  - ▶ Effects on the views and visual amenity experienced by people undertaking various activities at various locations, distances and directions from the proposed land preparation and construction activities. These visual effects could be experienced from one location or

sequentially as part of a route through the landscape such as a cycle route or long-distance footpath.

- **Cumulative effects:**

- ▶ Cumulative effects could occur as a result of multiple wind farm construction activities affecting a landscape or visual receptor.

1.4.3 Mitigation and design responses may include a range of design decisions about the location, form, process and timing of construction related infrastructure / operations to mitigate potential landscape and visual effects (avoid, reduce or compensate) as well as reference to a range of best practice behaviours and processes undertaken as part of construction site operation.

## Potential Effects during Operation

1.4.4 The potential effects during operation relate principally to the presence of the proposed development and its on-going maintenance during the 30-year operational period. This is likely to lead to long-term (reversible) effects on landscape and visual receptors.

1.4.5 Mitigation and design responses may include landscape / architectural design strategies which aim to control the physical appearance of the proposed development in terms of its scale, form, colour and number of components. Examples include Landscape Mitigation Plans, choice of project colour scheme, or focus on particular aspects such as a Lighting Strategy to reduce effects on the night-time environment.

1.4.6 Landscape Mitigation Plans illustrate and explain a range of landscape design and management techniques that may be employed to mitigate the effects of proposed development by enhancing and controlling its landscape setting and visual appearance. Examples include landscape planting and management plans, habitat management plans and integrated forestry design and management plans, all of which can relate to 'on-site' and off-site' interventions.

## Potential Effects during Decommissioning

1.4.7 The proposed development would be decommissioned and the land reinstated, leading to a whole or partial reversal of the landscape and visual effects.

# 1.5 Assessing Landscape Effects

1.3.1 Landscape Effects are defined by the Landscape Institute in GLVIA 3, paragraphs 5.1 and 5.2 as follows:

*"An assessment of landscape effects deals with the effects of change and development on landscape as a resource. The concern ... is with how the proposal will affect the elements that make up the landscape, the aesthetic and perceptual aspects of the landscape and its distinctive character. ... The area of landscape that should be covered in assessing landscape effects should include the site itself and the full extent of the wider landscape around it which the development may influence in a significant manner."*

## Landscape character

1.5.1 GLVIA 3, paragraph 5.4, advises that Landscape Character Assessment should be regarded as the main source for baseline studies and identifies the following factors which combine to create areas of distinct landscape character:

- *"the elements that make up the landscape in the study area including:*

- ▶ *physical influences – geology, soils, landform, drainage and water bodies;*
- ▶ *landcover, including different types of vegetation and patterns and types of tree cover; and*
- ▶ *the influence of human activity, including landuse and management, the character of settlements and buildings, and pattern and type of fields and enclosure.*
- ▶ *The aesthetic and perceptual aspects of the landscape – such as, for example, its scale, complexity, openness, tranquillity or wildness;*
- ▶ *The overall character of the landscape in the study area, including any distinctive Landscape Character Types or Areas that can be identified, and the particular combinations of elements and aesthetic and perceptual aspects that make each distinctive, usually by identification as key characteristics of the landscape.”*

## Landscape effects

1.5.2 The potential landscape effects, occurring during the construction, operation and decommissioning periods of the proposed development may therefore include, but are not restricted to the following:

- **Changes to landscape elements:** The addition of new elements (wind turbines for example) or the removal of existing elements such as trees, vegetation and buildings and other characteristic elements or valued features of the landscape character;
- **Changes to landscape qualities:** Degradation or erosion of landscape elements and patterns and perceptual characteristics, particularly those that form key characteristic elements of the landscape character or contribute to the landscape value;
- **Changes to landscape character:** Landscape character may be affected through the incremental effect on characteristic elements, landscape patterns and qualities (including perceptual characteristics) and the addition of new features, the magnitude of which is sufficient to alter the overall landscape character within a particular area;
- **Changes to designated landscapes:** Including nationally and locally designated landscapes and Wild Land Areas (WLA) that would affect the special landscape qualities underpinning these areas and their integrity; and
- **Cumulative landscape effects:** Where more than one development of a similar type may lead to a cumulative landscape effect.

1.5.3 Development may have a direct effect on the landscape as well as an indirect effect which would be perceived from the wider landscape, outside the immediate site area and its associated landscape character/ designation. Landscape effects also have to be recognised in terms of natural and manmade processes which can change or alter the landscape over time.

## Evaluating landscape sensitivity to change

1.5.4 The assessment of sensitivity takes account of the landscape value and the susceptibility of the receptor to the proposed development.

1.5.5 Landscape sensitivity often varies in response to both the type and phase of the development proposed and its location, such that landscape sensitivity needs to be considered on a case by case basis. It should not be confused with 'inherent sensitivity' where areas of the landscape may be referred to as inherently of 'high' or 'low' sensitivity. For example, a National Park may be described as inherently of high sensitivity on account of its designation and value, although it may prove to be less sensitive or susceptible to particular development, and of variable sensitivity across

its geographical area. Alternatively, an undesignated landscape may be of high sensitivity to a particular development regardless of the lack of local or national designation.

### Value of the Landscape Receptor

1.5.6 The value of a landscape receptor is a reflection of the value that society attaches to that landscape. The assessment of the landscape value is classified as high, medium or low and the basis for this assessment is made clear using evidence and professional judgement, based on the following range of factors:

- **Landscape designations:** A receptor that lies within the boundary of a recognised landscape related planning designation will be of increased value, depending on the proportion of the receptor that is affected and the level of importance of the designation which may be international, national, regional or local. The absence of designation does not however preclude value, as an undesignated landscape receptor may be valued as a resource at a local level;
- **Landscape quality:** The quality of a landscape receptor is a reflection of its attributes, such as scenic quality, sense of place, rarity and representativeness and the extent to which its valued attributes have remained intact. A landscape with consistent, intact, well-defined and distinctive attributes is considered to be of higher quality and, in turn, higher value, than a landscape where the introduction of elements has detracted from its character; and
- **Landscape experience:** The experiential qualities that can be evoked by a landscape receptor can add to its value. These responses relate to a number of factors including cultural associations that may exist in art, literature or history; the recreational value of the landscape, or the iconic status of the landscape in its own right; and its contribution of other values such as nature conservation or archaeology.

### Landscape Susceptibility to Change

1.5.7 The susceptibility of a landscape receptor to change is a reflection of its ability to accommodate the changes that will occur as a result of the proposed development without undue consequences for the maintenance of the baseline situation and / or the achievement of landscape planning policies and strategies. Some landscape receptors are better able to accommodate development than others due to certain characteristics that are indicative of capacity to accommodate change. These characteristics may or may not also be special landscape qualities that underpin designated landscapes.

1.5.8 The assessment of the susceptibility of the landscape receptor to change is classified as high, medium or low and the basis for this assessment is made clear using evidence and professional judgement. Indicators of landscape susceptibility to the type of development proposed (wind farm construction, operation and decommissioning) are based on the following criteria:

- **Overall Strength and Robustness:** Collectively the overall characteristics and qualities of a particular landscape result in a strong and robust landscape that is capable of reasonably accommodating the proposed development without undue adverse effects on the special landscape qualities (in the case of a designated landscape) or the key characteristics for which an area of landscape character or a particular element it is valued;
- **Landscape Scale and Topography:** The scale and topography are large enough to physically accommodate the development footprint without the requirement of invasive earthworks or drainage. Topographical features such as narrow valleys or more complex and small-scale landforms such as drumlins, incised river valleys / gorges, cliffs or rock outcrops are likely to be more susceptible to this type of development than broad, homogenous topography;

- **Openness** in the landscape may increase susceptibility to change because it can result in wider visibility of the proposed development, however open landscape may also be larger in scale and simple, which would decrease susceptibility. Conversely enclosed landscapes can offer more screening potential, limiting visibility to a smaller area, however they may also be smaller scale and more complex which would increase susceptibility;
- **Land Cover Pattern:** Ancient and mature or long-established vegetation such as mature trees, woodland and protected hedgerows are likely to be more susceptible to the proposed development, particularly where these elements form part of a valued characteristic landscape pattern or feature. Conversely grassland / or forestry are likely to be less susceptible to wind farm development;
- **Skyline:** Prominent and distinctive skylines and horizons with important landmark features that are identified in the landscape character assessment, are generally considered to be more susceptible to wind farm development in comparison to broad, simple skylines which lack landmark features or contain other infrastructure features;
- **Relationship with other Development and Landmarks:** Contemporary landscapes where there are existing wind energy developments or other forms of development (industry, mineral extraction or electrical grid connections) that already have a characterising influence result in a lower susceptibility to development in comparison to areas characterised by smaller scale, historic development and landmarks (historic villages with dense settlement patterns and associated buildings such as church towers). It should be noted that existing wind energy development is time limited and subject to decommissioning;
- **Rationale:** Some site locations have an obvious visual rationale for the proposed development in terms of the available space, access, simplicity and relationship to other similar forms of development. Conversely a site may appear overly constrained and require greater engineering or additional construction activity to accommodate the proposed development with lower design quality and few embedded environmental measures;
- **Remoteness, Naturalness, Wildness / Tranquillity:** Notably landscapes that are acknowledged to be particularly scenic, wild or tranquil are generally considered to be more susceptible to development in comparison to ordinary, cultivated or forested / developed landscapes where perceptions of 'wildness' are less tangible. Landscapes which are either remote or appear natural may vary in their susceptibility to development; and
- **Landscape Context and Adjacent Landscapes:** The extent to which the proposed development will influence landscape receptors across the study area relates to the associations that exist between the landscape receptor within which the proposed development is located and the landscape receptor from which the proposed development is being experienced. In some situations, this association will be strong, where the landscapes are directly related. For example, adjacent areas of landscape character may share or 'borrow' a high number of common characteristics. Landscape elements may be linked to or associated with wider landscape patterns such as individual trees forming part of an avenue or pattern of woodland corridors, for example. In other situations, the association between adjacent landscapes will be weak. The context and visual connection to areas of adjacent landscape character or designations has a bearing on the susceptibility to development.

### Landscape Sensitivity Rating

- 1.5.9 An overall sensitivity assessment of the landscape receptor is made by combining the assessment of the value of the landscape character receptor and its susceptibility to change. The evaluation of landscape sensitivity is described as 'High', 'Medium', 'Low' or 'Negligible' and is drawn from the consideration of a range of criteria that indicate landscape value and susceptibility. In reality

'Negligible' landscape sensitivity has not be used for this assessment or the previous EIAR. The basis for the assessment is made clear using evidence and professional judgement in the evaluation of sensitivity for each receptor.

1.5.10 Criteria that tend towards higher or lower sensitivity are set out in **Table 7.1.1**.

Table 7.1.1 Landscape Sensitivity to Change

Value / Susceptibility criteria	<p><b>Level of value/susceptibility ranging from 'High' to 'Medium' to 'Low'</b></p> <p><b>High</b>      <b>Medium</b>      <b>Low</b></p>
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**Value – Landscape Value is determined by consideration a range of indicators/criteria with examples as follows:**

<b>Designation</b>	Designated landscapes/elements with national policy level protection or defined for their natural beauty. Evidence that the landscape/element is valued or used substantially for recreational activity.	Landscapes without formal designation. Despoiled or degraded landscape with little or no evidence of being valued by the community. Elements that are uncharacteristic such as non-natives or self-seeded vegetation that may need to be cleared.
<b>Quality</b>	Higher quality landscapes/elements with consistent, intact and well-defined, distinctive attributes.	Lower quality and indistinct landscapes/elements or features that detract from its inherent attributes.
<b>Rarity</b>	Rare or unique landscape character types, features or elements.	Widespread or 'common' landscape character types, features or elements.
<b>Aesthetic/ scenic</b>	Aesthetic/scenic or perceptual aspects of designated wildlife, ecological or cultural heritage features that contribute to landscape character.	Limited wildlife, ecological or cultural heritage features, or limited contribution to landscape character.
<b>Perceptual qualities</b>	Landscape with perceptual qualities of wildness, remoteness or tranquillity.	Limited or no evidence that the landscape is used for recreational activity.
<b>Cultural associations</b>	Landscape with strong cultural associations that contributes to scenic quality.	Landscape with few cultural associations.

**Susceptibility – Landscape Susceptibility is determined by consideration a range of indicators/criteria with examples as follows:**

<b>Strength and robustness</b>	Fragile landscape vulnerable and lacking the ability to accommodate change.	Robust landscape, able to accommodate change or loss of features without undue adverse effects.
<b>Landscape Scale</b>	A landscape of a suitably large enough scale and simplicity to accommodate the proposed development.	A smaller scale and complex landscape that may require further engineering to accommodate the proposed development.
<b>Openness/ Enclosure</b>	An open landscape with limited screening and higher susceptibility to the proposed development.	An enclosed landscape with screening and lower susceptibility to the proposed development.
<b>Reinstatement</b>	Lower value, non-characteristic landcover and elements capable of rapid reinstatement or replacement.	Higher value, characteristic landcover and elements that cannot be easily reinstated or replaced.
<b>Skyline</b>	Distinctive undeveloped skylines with landmark features.	Developed, nondistinctive skylines.

Value / Susceptibility criteria	Level of value/susceptibility ranging from 'High' to 'Medium' to 'Low'	
	High	Low
<b>Association</b>	Weak and indirect association. Other development may be of a smaller scale or historic.	Strong or direct association other similar contemporary developments/landscape character.
<b>Rationale</b>	Strong landscape rationale and opportunity with high degree of design quality and/or environmental measures.	Landscape with numerous environmental and technical constraints and fewer environmental measures.
<b>Perceptual Qualities</b>	Perceptual qualities associated with particular scenic qualities, wildness or tranquillity.	Contemporary, cultivated/settled or developed landscapes are likely to have a lower susceptibility.
<b>Landscape Context</b>	Adjacent landscape character context connected by borrowed character and views.	Host landscape character is separate from surrounding/adjacent landscape character
<b>Sensitivity</b>	<b>Sensitivity drawn from consideration of the above Value and Susceptibility criteria with the final conclusion on the level of Sensitivity ranging from 'High' to 'Medium' to 'Low'.</b>	

## Landscape Magnitude of Change

1.5.11 The magnitude of change affecting landscape receptors is an expression of the scale of change that would result from the proposed development. In assessing the magnitude of change the assessment has focused on the size or scale of change and its geographical extent. The duration and reversibility are stated separately in relation to the assessed effects (i.e. as short / medium / long-term and temporary or permanent) and contribute towards the assessment of significance.

### Size or Scale of Change

1.5.12 This criterion relates to the size or scale of change to the landscape that would arise as a result of the proposed development, based on the following factors:

- **Landscape Elements:** The degree to which the landscape elements or pattern of elements that makes up the landscape character would be altered by the proposed development, through the loss, alteration or addition of elements in the landscape. The magnitude of change would generally be higher if the features that make up the landscape character are extensively removed or altered, and / or if many new components are added to the landscape;
- **Landscape Characteristics:** The extent to which the effect of the proposed development change, (physically or perceptually) the key characteristics of the landscape which may be important to its distinctive character. This may include, for example, the scale of the landform, its relative simplicity, complexity or irregularity, the nature of the landscape context, the grain or orientation of the landscape, the degree to which the receptor is influenced by external features and the juxtaposition of the proposed development in relation to these key characteristics;
- **Landscape Character / Designation:** The degree to which landscape character receptors would be changed by the addition of the proposed development. If the proposed development is located in a landscape receptor that is already affected by other similar development, this may reduce the magnitude of change if there is a high level of integration and the developments form a unified and cohesive feature in the landscape. In the case of designated landscapes, the degree of change is considered in light of the effects on the special landscape qualities which underpin the designation and the effect on the integrity of the designation.

All landscapes change over time and much of that change is managed or planned. Often landscapes will have management objectives for 'protection' or 'accommodation' of development. The scale of change may be localised, or occurring over parts of an area, or more widespread affecting whole landscape character areas and their overall integrity. Developmental change may be time limited or permanent; and

- **Distance:** The size and scale of change is also strongly influenced by the proximity of the proposed development to the receptor and the extent to which the development can be seen as a characterising influence on the landscape. Consequently, the scale or magnitude of change is likely to be lower in respect of landscape receptors that are distant from the proposed development and / or screened by intervening landform, vegetation and built form to the extent that the scale of their influence on landscape receptors is small or limited. Conversely, landscapes closest to the proposed development are likely to be most affected. Host landscapes (where the proposed development is located within a 'host' landscape character unit) would be directly affected whilst adjacent areas of landscape character would be indirectly affected.

### Geographical Extent

1.5.13 Landscape effects are described in terms of the geographical extent or physical area that would be affected (described as a linear or area measurement). This should not be confused with the scale of the development or its physical footprint. The manner in which the geographical extent of the landscape effect is described for different landscape receptors is explained as follows:

- **Landscape Elements:** The geographical extent of landscape elements may be objectively measured in terms of numbers, area or linear measurement. For example, the number of trees, area of woodland / or length of hedgerow affected may be recorded;
- **Landscape Character / Characteristics:** The extent of the effects on landscape character will vary depending on the specific nature of the proposed development. This is not simply an expression of visibility or the extent of the ZTV. It is a specific assessment of the extent of landscape character that would be changed by the proposed development in terms of its character, key characteristics and elements; and
- **Landscape Designations:** In the case of a designated landscape, this refers to the extent the special landscape qualities of the designation are affected and whether this can be defined in terms of area or linear measurements, or subjectively (with the support of panel and / or peer review) and whether the integrity of the designation is affected.

### Duration and Reversibility

1.5.14 The duration and reversibility of landscape effects is based on the period over which the proposed development is likely to exist (during construction and operation) and the extent to which it would be removed (during decommissioning) and the effects reversed at the end of that period. Long-term, medium-term and short-term landscape effects are defined as follows:

- **Temporary Development:** This includes time limited short and medium term development, such as activities related to the construction and decommissioning:
  - ▶ Short-term – 1 to 5 years, and
  - ▶ Medium-term – 5-10 years.
- **Permanent and Long-term Development:** This includes permanent development (where no decommissioning, removal or reinstatement is planned) and in this case long-term development where the proposed development would operate for up to 30 years, prior to

decommissioning. Consequentially, both permanent and long-term development have been assessed in the same manner as permanent development.

- 1.5.15 Reversibility is a separate consideration concerning the prospects and practicality of a particular effect being reversed, it is not a factor that is considered as part of this assessment. Some forms of development, such as housing can be considered as permanent, whereas other forms of development such as wind farms can be considered as reversible because they have a limited operational life and after their removal the land would be restored. Mineral workings for example may be partially reversible with the landscape restored, although not completed the same as the original. In the case of this development, the application is for a 30-year operation period, beyond which the project would be decommissioned and many of the effects would be reversed.

### Landscape Magnitude of Change Rating

- 1.5.16 The 'magnitude' or 'degree of change' resulting from the proposed development is described as 'Substantial', 'Moderate', 'Slight', 'Negligible' or 'Zero'. In assessing the magnitude of change the assessment has focused on the size or scale of change and its geographical extent. The duration and reversibility are stated separately in relation to the assessed effects (i.e. as short / medium / long-term and temporary or permanent). The basis for the assessment of magnitude for each receptor is made clear using evidence and professional judgement.
- 1.5.17 The levels of magnitude of change that can occur are defined in **Table 7.1.2**.

Table 7.1.2 Landscape Magnitude of change Ratings

Magnitude of landscape change	Examples of Landscape Magnitude
<b>Substantial</b>	<p>Size / Scale: A large-scale change and major loss of key landscape elements / characteristics or the addition of large scale or numerous new and uncharacteristic features or elements that would affect the landscape character and the special landscape qualities of a landscape designation. Directly affecting a host landscape receptor or indirectly affecting a nearby receptor.</p> <p>Geographical extent: The size or scale of change would typically, but not always affect a large geographical extent or area and may be close to the proposed development.</p>
<b>Substantial-Moderate</b>	Intermediate rating with combination of criteria from high or medium magnitude.
<b>Moderate</b>	<p>Size / Scale: A medium scale change and moderate loss of some key landscape elements / characteristics or the addition of some new medium scale uncharacteristic features or elements that could partially affect the landscape character and the special landscape qualities of a landscape designation. Directly affecting a host landscape receptor or indirectly affecting a nearby receptor.</p> <p>Geographical extent: The size or scale of landscape change would typically, but not always affect a more localised geographical extent at an intermediate distance from the proposed development.</p>
<b>Moderate -slight</b>	Intermediate rating with combination of criteria from medium or low magnitude.
<b>Slight</b>	<p>Size / Scale: A small-scale change and minor loss of a few landscape elements / non key characteristics, or the addition of some new small-scale features or elements of limited characterising influence on landscape character / designations.</p> <p>Geographical extent: There may be a small partial change in landscape character, typically, but not always affecting a localised geographical extent at some distance from the proposed development.</p>

Magnitude of landscape change	Examples of Landscape Magnitude
<b>Slight-Negligible</b>	Intermediate rating with combination of criteria from low to negligible magnitude.
<b>Negligible to Zero</b>	Size / Scale: A very small-scale change that may include the loss or addition of some landscape elements of limited characterising influence. The landscape characteristics and character would be unaffected. Geographical extent: Typically affecting a very small geographical extent at greater distance from the proposed development.

## Evaluating landscape effects and significance

- 1.5.18 The level of landscape effect is evaluated through the combination of landscape sensitivity and magnitude of change. Once the level of effect has been assessed, and the nature of the effect determined (whether this is direct / indirect; its duration, temporary / permanent; and whether it is beneficial / neutral / adverse or cumulative) a judgement is then made as to whether the level of effect is 'significant' or 'not significant' as required by the relevant EIA Regulations. This process is assisted by the matrix illustrated in **Table 7.1.5** which is used to guide the assessment. The factors considered in the evaluation of the sensitivity and the magnitude of the change resulting from the proposed development and their conclusion, will be presented in a comprehensive, clear and transparent manner.
- 1.5.19 The assessment sets out for each receptor the level of the effect, the nature of the effect (whether this is direct / indirect; its duration, temporary / permanent; and whether it is beneficial / neutral / adverse or cumulative) and whether it is significant or not.

### Significant Landscape Effects

- 1.5.20 A significant effect would occur where the combination of the variables results in the proposed development having a defining effect on the landscape receptor, or where changes of a lower magnitude affect a landscape receptor that is of particularly high sensitivity. A major loss or irreversible effect over an extensive area of landscape character, affecting landscape elements, characteristics and / or perceptual aspects that are key to a nationally valued landscape are likely to be significant as described in GLVIA 3 paragraph 5.56.

### Non-Significant Landscape Effects

- 1.5.21 A non-significant effect would occur where the effect of the proposed development is not defining, and the landscape character of the receptor continues to be characterised principally by its baseline characteristics. Equally a small-scale change experienced by a receptor of high sensitivity may not significantly affect the special landscape quality or integrity of a designation. Reversible effects, on elements, characteristics and character that are of small-scale or affecting lower value receptors are unlikely to be significant as described in GLVIA 3 paragraph 5.56.

## 1.6 Assessing Visual Effects

- 1.6.1 Visual Effects are concerned wholly with the effect of the development on views, and the general visual amenity and are defined by the Landscape Institute in GLVIA 3, paragraphs 6.1 as follows:
- "An assessment of visual effects deals with the effects of change and development on views available to people and their visual amenity. The concern ... is with assessing how the surroundings of individuals or groups of people may be specifically affected by changes in the context and character of views."*

- 1.6.2 Visual effects are identified for different receptors (people) who would experience the view at their place of residence, within their community, during recreational activities, at work, or when travelling through the area. The visual effects may include the following:
- Visual effect: a change to an existing static view, sequential views, or wider visual amenity as a result of development or the loss of particular landscape elements or features already present in the view; and
  - Cumulative visual effects: the cumulative or incremental visibility of similar types of development may combine to have a cumulative visual effect.
- 1.6.3 The level of visual effect (and whether this is significant) is determined through consideration of the sensitivity of each visual receptor (or range of sensitivities for receptor groups) and the magnitude of change that would be brought about by the construction, operation and decommissioning of the proposed development.

### Zone of Theoretical Visibility (ZTV)

- 1.6.4 Plans mapping the Zone of Theoretical Visibility (ZTV) are used to analyse the extent of theoretical visibility of development or part of a development, across the LVIA Study Area and to assist with viewpoint selection. The ZTV does not however, take account of the screening effects of buildings, localised landform and vegetation, unless specifically noted (see individual figures). As a result, there may be roads, tracks and footpaths within the study area which, although shown as falling within the ZTV, are screened or filtered by built form and vegetation, which would otherwise preclude visibility.
- 1.6.5 The ZTVs provide a starting point in the assessment process and accordingly tend towards giving a 'worst case' or greatest calculation of the theoretical visibility.

### Viewpoint Analysis

- 1.6.6 Viewpoint analysis is used to assist the assessment and is conducted from selected viewpoints within the LVIA Study Area. The purpose of this is to assess both the level of visual effect for particular receptors and to help guide the design process and focus the assessment. A range of viewpoints are examined in detail and analysed to determine whether a significant visual effect would occur. By considering the viewpoints in order of distance it is possible to define a threshold or outer geographical limit, beyond which significant effects would be unlikely.
- 1.6.7 The assessment involves visiting the viewpoint location and viewing wirelines and photomontages prepared for each viewpoint location. The fieldwork is conducted in periods of fine weather with good visibility and considers seasonal changes such as reduced leaf cover or hedgerow maintenance.
- 1.6.8 A summary table of the findings is also provided in order of distance from the development site. This summary table assists in defining the direction, elevation, geographical spread and nature of the potential visual effects and identifies areas where significant effects are likely to occur. This approach seeks to provide clarity and confidence to consultees and decision makers by allowing the detailed judgements on the magnitude of visual change to be more readily scrutinised and understood.

### Evaluating Visual Sensitivity to Change

- 1.6.9 In accordance with paragraphs 6.31-6.37 of GLVIA 3, the sensitivity of visual receptors is determined by a combination of the value of the view and the susceptibility of the visual receptors to the change likely to result from the proposed development on the view and visual amenity.

## Value of the view

1.6.10 The value of a view or series of views reflects the recognition and importance attached either formally through identification on mapping or being subject to planning designations, or informally through the value which society attaches to the view(s). The value of a view is classified as high, medium or low and negligible the basis for this assessment is made clear using evidence and professional judgement, based on the following criteria:

- **Formal recognition:** The value of views can be formally recognised through their identification on OS or tourist maps as formal viewpoints, sign-posted and with facilities provided to add to the enjoyment of the viewpoint such as parking, seating and interpretation boards. Specific views may be afforded protection in local planning policy and recognised as valued views. Specific views can also be cited as being of importance in relation to landscape or heritage planning designations, for example the value of a view would be increased if it presents an important vista from a designed landscape or lies within or overlooks a designated area, which implies a greater value to the visible landscape; and
- **Informal recognition:** Views that are well-known at a local level and / or have particular scenic qualities can have an increased value, even if there is no formal recognition or designation. Views or viewpoints are sometimes informally recognised through references in art or literature and this can also add to their value. A viewpoint that is visited and appreciated by a large number of people would generally have greater importance than one gained by very few people.

## Susceptibility to Change

1.6.11 Susceptibility relates to the nature of the viewer experiencing the view and how susceptible they are to the potential effects of the proposed development. A judgement to determine the level of susceptibility therefore relates to the nature of the viewer and their experience from that particular viewpoint or series of viewpoints, classified as high, medium or low and based on the following criteria:

- **Nature of the viewer:** The nature of the viewer is defined by the occupation or activity of the viewer at the viewpoint or series of viewpoints. The most common groups of viewers considered in the visual assessment include residents, motorists, and people taking part in recreational activity or working. Viewers, whose attention is focused on the landscape, or with static long-term views, are likely to have a higher sensitivity. Viewers travelling in cars or on trains would tend to have a lower sensitivity as their view is transient and moving. The least sensitive viewers are usually people at their place of work as they are generally less sensitive to changes in views.
- **Experience of the viewer:** The experience of the visual receptor relates to the extent to which the viewer's attention or interest may be focused on the view and the visual amenity they experience at a particular location. The susceptibility of the viewer to change arising from the proposed development may be influenced by the viewer's attention or interest in the view, which may be focused in a particular direction, from a static or transitory position and over a long or short duration. For example, if the principal outlook from a settlement is aligned directly towards the proposed development, the experience of the visual receptor would be altered more notably than if the experience relates to a glimpsed view seen at an oblique angle from a car travelling at high speed. The visual amenity experienced by the viewer varies depending on the presence and relationship of visible elements, features or patterns experienced in the view and the degree to which the landscape in the view may accommodate the proposed development.

## Visual Sensitivity Rating

- 1.6.12 An overall level of sensitivity is applied for each visual receptor or view, classified as 'High', 'Medium', 'Low' or 'Negligible' by combining individual assessments of the value of the view and the susceptibility of the visual receptor to change. In reality however 'Negligible' sensitivity was not used in this assessment or the previous EIAR. Each visual receptor, meaning the particular person or group of people likely to be affected at a specific viewpoint, is assessed in terms of their sensitivity. The basis for the assessments is made clear using evidence and professional judgement in the evaluation of each receptor. Criteria that tend towards higher or lower sensitivity are set out in **Table 7.1.3**.

Table 7.1.3 Visual sensitivity to change

Value/ Susceptibility criteria	Level of value / susceptibility ranging from 'High' to 'Medium' to 'Low'	
	High	Low
<b>Value – is determined by consideration a range of indicators/criteria with examples as follows:</b>		
<b>Map/tourist information</b>	Specific viewpoint identified in OS maps and/or tourist information and signage.	Viewpoint not identified in OS maps or tourist information and signage.
<b>Facilities</b>	Facilities provided at viewpoint to aid the enjoyment of the view.	No facilities provided at viewpoint to aid enjoyment of the view.
<b>Planning recognition</b>	View afforded protection in planning policy.	View is not afforded protection in planning policy.
<b>Landscape value</b>	View is within or overlooks a designated landscape, which implies a higher value to the visible landscape.	View is not within, nor does it overlook, a designated landscape.
<b>Recognition</b>	View has informal recognition and well- known at a local level, as having particular scenic qualities.	View has no informal recognition and is not known as having particular scenic qualities.
<b>Art/Literature</b>	View or viewpoint is recognised through references in art or literature.	View or viewpoint is not recognised in references in art or literature.
<b>Scenic Quality</b>	View has high scenic qualities relating to the content and composition of the visible landscape.	View has low scenic qualities relating to the content and composition of the visible landscape.
<b>Susceptibility – is determined by consideration a range of indicators/criteria with examples as follows:</b>		
<b>Activity of the viewer</b>	Viewer who is likely or liable to be influenced by the proposed development such as residents, walkers, or tourists (including road users on designated tourist routes), whose main attention and interest may be on their surroundings.	Viewer who is un or less likely to be influenced by the proposed development such as viewers whose attention is not focused on their surroundings (e.g. people at work, or team sports). Road users are usually assessed as an intermediate category (Medium) unless on a designated tourist route.
<b>Nature of the View</b>	Residents that gain static, long-term views of the development in their principal outlook.	Mobile viewers whose views are transient and dynamic (e.g. travelling in cars or on trains with glimpsed views).
<b>Direction/ Field of View</b>	A view that is focused in a specific directional vista, with notable features of interest in a particular part of the view.	Open views with no specific point of interest.
	Viewers are focused on the experience of a high level of visual amenity at the location due to its overall pleasantness as an attractive visual setting or backdrop to activities.	The visual amenity experienced at the location by viewers is less pleasant or attractive than might otherwise be the case.



- **Consistency of image:** The consistency of image of the proposed development in relation to other developments. The magnitude of change for the proposed development is likely to be lower if it appears broadly similar to other developments in the landscape in terms of its scale, form and general appearance. New development is more likely to appear as logical components of the landscape with a strong rationale for their location.
- **Skyline / Background:** Whether the proposed development would be viewed against the skyline or a background landscape may affect the level of contrast and magnitude. For example, skyline developments may appear more noticeable, particularly where they affect open and undeveloped horizons. Conversely, development may also appear more noticeable when viewed against a darker background landscape, such as forestry. In these cases, the magnitude of change would tend to be higher.

If the proposed development adds to an already developed skyline the magnitude of change would tend to be lower.

- **Number:** Generally, the greater the number of separate development components seen simultaneously or sequentially, the higher the magnitude of change and this may lead to whole project effects (for example the visual effect of the turbines and the substation). Further cumulative effects would occur in the case of separate, existing developments and their spatial relationship to each other would affect the context and magnitude of change for proposed development. For example, development that appears as an extension to an existing development or related to it, would tend to result in a lower magnitude of change than a separate, new development.
- **Nature of Visibility:** The nature of visibility is a further factor for consideration. The proposed development may be subject to various phases of development change and the manner in which the development may be viewed could be intermittent or continuous and / or seasonally, due to periodic management or leaf fall.

## Geographical Extent

1.6.15

The geographic extent over which the visual effects would be experienced is also assessed. This is distinct from the size or scale of effect and is described in terms of the physical area or location over which it would be experienced (described as a linear or area measurement). The extent of the effects would vary according to the specific nature of the proposed development and is principally assessed through ZTV, field survey and viewpoint analysis of the extent of visibility likely to be experienced by visual receptors. The geographical extent of visual effects is described as per the following examples:

- The geographical extent can be described as an area measurement or proportion of the total receptor affected. For example, effects on people within a particular area such as a golf course or area of common land can be illustrated via a 'representative viewpoint' that represents a similar visual effect, likely to be experienced by larger numbers of people within that area. The geographical extent of that visual effect can be expressed as approximately '5 hectares' or '10%' of the common land or a golf course area;
- The geographical extent can be described as a linear measurement (m or km) according to the length of route affected. For example, effects on people travelling on a route through the landscape such as a road or footpath can be illustrated via a 'representative viewpoint' that represents a similar visual effect, likely to be experienced by larger numbers of people along that route. The geographical extent of that visual effect can be expressed as approximately '2km' or '10%' of the total length of the route; and

- The geographical extent of a visual effect experienced from a specific viewpoint may be limited to that location alone. (An example of a 'specific viewpoint' is a public viewpoint recommended in tourist literature such as a well visited hill summit. An example of an 'illustrative viewpoint' is a particular location within a built up or well vegetated area where an uncharacteristically open view exists).

### Duration and Reversibility

- 1.6.16 The duration or time period over which a visual effect is likely to occur is judged on a scale of 'short', 'medium' or 'long' term and is assessed for the proposed development as per the method set out previously in relation to landscape effects.
- 1.6.17 Reversibility is a separate consideration previously noted.

### Visual Magnitude of Change Rating

- 1.6.18 The 'magnitude' or 'degree of change' resulting from the proposed development is described as 'Substantial', 'Moderate', 'Slight', 'Negligible' or 'Zero'. In assessing the magnitude of change the assessment has focused on the size or scale of change and its geographical extent. The duration and reversibility are stated separately in relation to the assessed effects (i.e. as short / medium / long-term and temporary / permanent). The basis for the assessment of magnitude for each receptor is made clear using evidence and professional judgement and some examples of the levels of magnitude of change that can occur on views are defined in **Table 7.1.4**.

Table 7.1.4 Visual Magnitude of change

Magnitude of landscape change	Examples of Visual Magnitude
<b>Substantial</b>	<p>Size and Scale: A very large - large and dominant change to the view.</p> <p>Number: Involving the loss/addition of a large number of features / elements.</p> <p>Distance: Typically appearing closer to the viewer in the fore to mid-ground.</p> <p>FoV: Affecting a large vertical and wide horizontal FoV.</p> <p>Nature of Visibility: Multiple phase development, continuously and sequentially visible.</p> <p>Contrast: Strong degree of contrast with surroundings, little / no screening.</p> <p>Skyline: Visible on the skyline as a new feature.</p> <p>Consistency of Image: Contrasting with other existing developments, lacking in visual rationale.</p> <p>Typically experienced from representative viewpoints illustrating a visual effect likely to be experienced by larger numbers of people, relative to the activity, affecting a large area or length / proportion of route. May also be experienced from a specific viewpoint.</p>
<b>Substantial-moderate</b>	Intermediate rating with combination of criteria from high or medium magnitude of change category.
<b>Moderate</b>	<p>Size and Scale: A medium and prominent change to the view.</p> <p>Number: Involving the loss/addition of a number of features / elements.</p> <p>Distance: Typically appearing in the middle ground.</p> <p>FoV: Affecting a medium vertical and a medium horizontal FoV.</p> <p>Nature of Visibility: Multiple phase development, intermittently and sequentially visible.</p> <p>Contrast: Contrast with surroundings and may benefit from some screening.</p> <p>Skyline: Visible on the skyline along with other features.</p> <p>Consistency of Image: Different from other existing developments, some visual rationale.</p>

Magnitude of landscape change	Examples of Visual Magnitude	
	Typically experienced from representative viewpoints illustrating a visual effect likely to be experienced by a medium number of people, relative to the activity, affecting a medium area or length / proportion of route. May also be experienced from a specific viewpoint.	
<b>Moderate-Slight</b>	Intermediate rating with combination of criteria from medium or low magnitude of change category.	
<b>Slight</b>	Size and Scale: Number: Distance: FoV: Nature of Visibility: Contrast: Skyline: Consistency of Image:	A small / noticeable change, easily missed by the casual observer. Involving the loss/addition of a small number of features / elements. Typically appearing in the background. Affecting a small vertical and a narrow horizontal FoV. Simple, single development, intermittently and infrequently visible. Some parity / 'fits' with surroundings and some screening. Partly visible on a developed skyline or not visible on the skyline. Similar from other existing developments with visual rationale, appearing reasonably well accommodated within its surroundings. Typically experienced from illustrative viewpoints likely to be experienced by low numbers of people, relative to the activity, affecting a smaller area or length / proportion of route. May also be experienced from a specific viewpoint.
<b>Slight-Negligible</b>	Intermediate rating with combination of criteria from low to negligible magnitude of change category.	
<b>Negligible to Zero</b>	Size and Scale: Number: Distance: FoV: Nature of Visibility: Contrast: Skyline: Consistency of Image:	A small or negligible change, need to 'look for it'. Involving the loss/addition of a small number of features / elements. Typically appearing in the far distance. Affecting a small vertical and a very narrow horizontal FoV. Simple, single development, intermittently and infrequently visible. Blends with surroundings and / or is well screened. Partly visible on a developed skyline or not visible on the skyline. Similar from other existing developments with strong visual rationale, appearing well accommodated within its surroundings. Typically experienced from illustrative viewpoints likely to be experienced by low numbers of people, relative to the activity, affecting a smaller area or length / proportion of route. May also be experienced from a specific viewpoint.

## Evaluating visual effects and significance

- 1.6.19 The level of visual effect is evaluated through the combination of visual sensitivity and magnitude of change. Once the level of effect has been assessed, and the nature of the effect determined (whether this is direct / indirect; its duration, temporary / permanent; and whether it is beneficial / neutral / adverse or cumulative) a judgement is then made as to whether the level of effect is 'significant' or 'not significant' as required by the relevant EIA Regulations. This process is assisted by the matrix illustrated in **Table 7.1.5** which is used to guide the assessment. The factors considered in the evaluation of the sensitivity and the magnitude of the change resulting from the proposed development and their conclusion, is presented in a comprehensive, clear and transparent manner.

### Significant Visual Effects

- 1.6.20 A significant effect is more likely to occur where a combination of the variables results in the proposed development having a defining effect on the view or visual amenity or where changes affect a visual receptor that is of high sensitivity as described in GLVIA 3 paragraph 6.44.

## Non-Significant Visual Effects

- 1.6.21 A non-significant effect is more likely to occur where a combination of the variables results in the proposed development having a non-defining effect on the view or visual amenity or where changes affect a visual receptor that is of low sensitivity as described in GLVIA 3 paragraph 6.44.

## Weather conditions

- 1.6.22 The assessment of visual effects is undertaken in clear weather with good to excellent visibility. This means that the viewpoint assessment represents a fair assessment of the likely visual effects.

## 1.7 Assessing Cumulative Landscape and Visual Effects

- 1.7.1 The assessment of cumulative effects is essentially the same as for the main assessment of the 'solus' or primary landscape and visual effects, in that the level of landscape and visual effect is determined by assessing the sensitivity of the landscape or visual receptor and the magnitude of change. Cumulative assessment, however, considers the magnitude of change posed by multiple development.
- 1.7.2 A cumulative landscape or visual effect simply means that more than one type of development is present or visible within the landscape. Other forms of existing development and land use such as woodland and forestry, patterns of agriculture, built form, and settlements already have a cumulative effect on the existing landscape that is already accepted or taken for granted. These features often contribute strongly to the existing character, forming a positive or adverse component of the local landscape. Landscapes, however, will have a finite capacity for cumulative development, beyond which further new development would result in landscape character change and could result in the creation of a 'wind farm landscape' where wind farms have become the dominant characteristic.
- 1.7.3 Detailed guidance on the cumulative assessment of wind farm development is provided in the NatureScot document '*Guidance: Assessing the Cumulative Impact of Onshore Wind Energy Developments*' (2012). This assessment distinguishes between 'additional' cumulative effects that would result from adding the proposed development to other cumulative wind farm development and 'combined' cumulative effects that assess the total cumulative effect of the proposed development and other cumulative wind farm development. In the latter case a significant cumulative effect may result from the proposed development or one of more other existing, under-construction or consented wind farms, or other wind farm applications. In those cases, the main contributing wind farm(s) is identified in the assessment.
- 1.7.4 Types of cumulative effect are defined as follows:
- Cumulative Landscape Effects: Where more than one wind development may have an effect on a landscape designation or particular area of landscape character;
  - Cumulative Visual Effects: the cumulative or incremental visibility of similar types of development that may combine to have a cumulative visual effect. These can be further defined as follows:
    - ▶ Simultaneous or combined: where two or more developments may be viewed from a single fixed viewpoint simultaneously, within the viewer's field of view and without requiring them to turn their head<sup>2</sup>;

<sup>2</sup> Note: A person's field of view is variable but is approximately 90° when facing in one direction.

- ▶ Successive or repetitive: where two or more developments may be viewed from a single viewpoint successively as the viewer turns their head or swivels through 360°; and
- ▶ Sequential: where a number of developments may be viewed sequentially or repeatedly at increased frequency, from a range of locations when travelling along a route within the LVIA Study Area.

1.7.5 The NatureScot document *'Siting and Designing Wind farms in the Landscape' (Version 3a)* explains that the development of multiple wind farms within a particular area may create different types of cumulative effect, that can be described as follows:

*"The wind farms are seen as separate isolated features within the landscape character type, too infrequent and of insufficient significance to be perceived as a characteristic of the area;*

*The wind farms are seen as a key characteristic of the landscape, but not of sufficient dominance to be a defining characteristic of the area; [a landscape with wind farms] and*

*The wind farms appear as a dominant characteristic of the area, seeming to define the character type as a 'wind farm landscape character type.'*"

1.7.6 Wind farm development that results in the creation of a *'wind farm landscape'* as opposed to a *'landscape with wind farms'* or *'landscape with occasional wind farms'* is likely to be assessed as significant. Equally the 'additional effect' of wind farm development, adding to a scenario where there are already a number of other existing or consented wind farms, may be less than the effect of the proposed development either on a 'solus' or primary basis or in an area where there are few or no wind farms existing. This is because wind farm development has already been established as a characterising influence and the additional effect of further development may or may not alter this.

1.7.7 Whilst the CLVIA considers other wind farm development, it should not be considered as a substitute for individual LVIA assessment in respect of each of the other cumulative developments included in the CLVIA.

## Defining the Cumulative Study Area

1.7.8 The cumulative study area is the same as the LVIA Study Area as illustrated in **SI 2021 Figure 7.1**. The cumulative assessment considers the effects of other existing, under-construction, consented and application wind energy sites on the landscape and visual receptors within the LVIA Study Area. In determining which wind energy developments should be included in the CLVIA the assessors may draw on the advice from consultees and other wind energy development within a wider search area (up to 45km radius from the proposed turbines).

1.7.9 Those developments at pre-planning or scoping stage are excluded in accordance with NatureScot guidance unless there is a justified / exceptional circumstance for their inclusion in the assessment. However, scoping stage wind farms have been included in the wirelines.

## Predicting Cumulative Landscape Effects

1.7.10 The assessment considers the extent to which the proposed development, in combination with others, may change landscape character through either an 'additional' or 'in combination' effect on characteristic elements, landscape characteristics and quality of the baseline landscape character. Identified cumulative landscape effects are described in relation to each individual Landscape Character Type/Area and for any designated landscape areas assessed within the LVIA Study Area.

## Predicting Cumulative Visual Effects

- 1.7.11 The assessment of cumulative visual effects involves reference to the cumulative visibility ZTV maps and the cumulative viewpoint analysis. The cumulative visibility of other existing and consented wind energy developments and applications is established in the first instance using the computer programme (Resoft Wind Farm© software) to identify areas where wind energy developments are theoretically visible. Cumulative visibility maps are analysed to identify the visual receptor locations and routes where cumulative visual effects on the landscape and people may occur as a result of the proposed development.
- 1.7.12 With potential receptor locations identified, cumulative effects on individual receptor groups are then explored through viewpoint analysis, which involves site visits informed by wireline illustrations that include other wind energy developments. The computer programme itself can also be used to 'drive' particular routes to assess the visibility of different wind energy developments and inform the assessment of sequential cumulative effects that may occur along a route or journey and compared to actual visibility experienced along a route on Site.

## Evaluation of Cumulative Landscape and Visual Effects

- 1.7.13 The evaluation of cumulative effects is assisted by the matrix illustrated in **Table 7.1.5**, which is used to guide the assessment.
- 1.7.14 The cumulative assessment has been prepared to ensure that, as well as the 'solus' or primary effect of the proposed development (LVIA) the 'additional' cumulative effects and the 'combined' cumulative effect (CLVIA) is also reported to account for two cumulative Scenarios as follows:
- **proposed development:** Assessed on an individual basis (the LVIA). This part of the assessment may take account of other existing forms of wind farm development that may be present in the landscape, whilst recognising that their influence on landscape character is likely to be time limited. It does not consider the additional or combined cumulative effects and only reports of the effect of the proposed development alone;
  - **Scenario 1: Existing + Consented + the proposed development:** The additional and combined cumulative effects of the existing and consented wind energy developments with the proposed development are assessed; and
  - **Scenario 2: Existing + Consented + Applications + the proposed development:** The additional and combined cumulative effects of the existing and consented wind energy developments and applications, with the proposed development are assessed.
- 1.7.15 In addition, the cumulative assessment takes account of the timescales, as far as practicable, for the operation of the existing and consented developments.
- 1.7.16 Due to the numbers of other development involved, the overall cumulative effects may be greater than for the primary effect or additional effect for the proposed development assessed in the main LVIA. The resulting level of cumulative effect may remain at the same level of effect or increase to a higher level of effect. The point at which these effects become significant or not significant in landscape and visual terms is still a matter for professional judgement, although four scenarios or combinations of cumulative effect, taking account of other wind energy development can occur as follows:
- A significant effect from the proposed development is predicted in addition or combination with another significant effect attributed to other development(s). The effect is still termed significant and cumulative, but is a greater level of effect than for either development individually;

- A significant effect from the proposed development is predicted in addition or combination with another non-significant effect attributed to other development(s). The effect is still termed significant and cumulative, but is attributed to the proposed development and is a greater level of effect than for either development individually;
- A non-significant effect from the proposed development is predicted in addition or combination with another significant effect attributed to other development(s). The effect is still termed significant and cumulative, but is attributed to the other wind energy development(s) and is a greater level of effect than for either development individually; and
- A non-significant effect from the proposed development is predicted in addition or combination with another non-significant effect attributed to other development(s). The effect is still termed cumulative and is a greater level of effect than for either development individually; the combined effect however, may or may not be significant.

1.7.17 The nature of a cumulative effect may also be described as direct / indirect, temporary / permanent, or beneficial / adverse. The probability of a cumulative effect occurring may also be described (certain, likely or uncertain / unknown) according to whether the developments in question are existing / under construction, consented or at the application stage.

## 1.8 Evaluation of Significance and Nature of Effect

- 1.8.1 The matrix presented in **Table 7.1.5** is used as a guide to illustrate the LVIA process. In line with the emphasis placed in GLVIA3 upon the application of professional judgement, an overly mechanistic reliance upon a matrix is avoided through the provision of clear and accessible narrative explanations of the rationale underlying the assessment made for each landscape and visual receptor. Such narrative assessments provide a level of detail over and above the outline assessment provided by use of the matrix alone.
- 1.8.2 The landscape and visual assessment unavoidably, involves a combination of quantitative and qualitative assessment and wherever possible cross references will be made to objective evidence, baseline figures and / or to photomontage visualisations to support the assessment conclusions. Often a consensus of professional opinion has been sought through consultation, internal peer review, and the adoption of a systematic, impartial, and professional approach. Importantly each effect results from its own unique set of circumstances and have been assessed on a case by case basis. The matrix should therefore be considered as a guide and any deviation from this guide will be clearly explained in the assessment.
- 1.8.3 In accordance with the relevant EIA Regulations it is important to determine whether the effects, assessed as a result of the proposed development, are likely to be significant. Significant landscape and visual effects will be highlighted in bold in the text and in most cases, relate to all those effects that result in a '**Major**' or a '**Major / Moderate**' effect as indicated in **Table 7.1.5**.
- 1.8.4 In some circumstances, '**Moderate**' levels of effect also have the potential, subject to the assessor's professional opinion, to be considered as either significant or not significant and these exceptions are also highlighted in bold and explained as part of the assessment, where they occur.
- 1.8.5 White or un-shaded boxes in **Table 7.1.5** indicate a non-significant effect. In those instances where there would be no effect, the magnitude has been recorded as 'Zero' and the level of effect as 'None' or 'No View'.

Table 7.1.5 Evaluation of Landscape and Visual Effects

		Landscape and Visual Sensitivity			
		High	Medium	Low	Negligible
Magnitude of Change	Substantial	Major	Major / Moderate	Moderate	Not used
	Moderate	Major / Moderate	Moderate	Moderate / Minor	
	Slight	Moderate	Moderate / Minor	Minor	
	Negligible	Moderate / Minor	Minor	Minor / None	
	Zero	None / No View			

### Type or Nature of Effect

- 1.8.6 In accordance with the EIA Regulations the type or nature of effect is also described in terms of whether it is direct or indirect; its duration (temporary / permanent or reversible) cumulative; and whether the effect is positive, neutral or negative. Transboundary effects are not relevant to this assessment.

### Direct and indirect effects

- 1.8.7 Direct landscape effects relate to the host landscape and concern both physical and perceptual effects on the receptor.
- 1.8.8 Indirect landscape effects relate to those landscapes and receptors which are separated by distance or remote from the development and therefore are only affected in terms of perceptual effects, for example landscape character types and areas that do not contain the proposed development. The Landscape Institute also defines indirect effects as those which are not a direct result of the development but are often produced away from it or as a result of a complex pathway.
- 1.8.9 Visual effects are generally all considered as direct effects. An indirect visual effect may however be used to define a visual effect on a view that is not in the direction of the main view of the viewer as described by the following examples:
- Road users generally face the road directly ahead in the direction of travel and visual effects affecting those views may be described as direct effects. Where the visual effect is experienced in views oblique to the direction of travel they may be described as indirect; and
  - Designed landscapes and vistas / viewpoints may be orientated in a particular direction and visual effects affecting those views may be described as direct effects. Where the visual effect is experienced in views oblique to the direction of the designed or main / primary view they may be described as indirect.
- 1.8.10 Secondary effects (or effects subsequent to an initial effect) are covered in this assessment by indirect effects.

### Beneficial and adverse effects

- 1.8.11 Wind farms give rise to a wide range of opinions, from strongly adverse to strongly beneficial. However, LVIA is not an assessment of public opinion, although a precautionary approach has been taken, which assumes that the nature of the effects would be adverse or neutral unless otherwise stated.

- 1.8.12 Guidance provided by the in GLVIA 3 on the nature of effect (i.e. beneficial or adverse) states that 'in the LVIA, thought must be given to whether the likely significant landscape and visual effects are judged to be positive (beneficial) or negative (adverse) in their consequences for landscape or for views and visual amenity', but it does not provide guidance as to how that may be established in practice. The nature of effect is therefore one that requires interpretation and, where applied, this involves reasoned professional opinion.
- 1.8.13 In relation to many forms of development, the LVIA will identify 'beneficial' and 'adverse' effects by assessing these under the term 'Nature of Effect'. The landscape and visual effects of large-scale infrastructure are difficult to categorise in either of these brackets as, unlike other disciplines, there are no definitive criteria by which the effects can be measured as being categorically 'beneficial' or 'adverse'. In some disciplines, such as noise or ecology, it is possible to quantify the effect in numeric terms, by objectively identifying or quantifying the proportion of a receptor that is affected and assessing the nature of that effect in justifiable terms. However, this is not the case in relation to landscape and visual effects where the approach combines quantitative and qualitative assessment.
- 1.8.14 As a starting point, unless stated otherwise, the effects considered in the assessment will be considered to be adverse. Beneficial or neutral effects may, however, arise in certain situations and are stated in the assessment where relevant, based on the following definitions:
- Beneficial effects contribute to the landscape and visual resource through the enhancement of desirable characteristics or the introduction of new, beneficial attributes. The development contributes to the landscape by virtue of good design or the introduction of new landscape planting. The removal of undesirable existing elements or characteristics can also be beneficial, as can their replacement with more appropriate components;
  - Neutral effects occur where the development fits with the existing landscape character or visual amenity. The development neither contributes to or detracts from the landscape and visual resource and can be accommodated with neither beneficial or adverse effects, or where the effects are so limited that the change is hardly noticeable (negligible magnitude). A change to the landscape and visual resource is not considered to be adverse simply because it constitutes an alteration to the existing situation; and
  - Adverse effects are those that detract from the landscape character or quality of visual attributes experienced, through the introduction of elements that contrast, in a detrimental way, with the existing characteristics of the landscape and visual resource, or through the removal of elements that are key in its characterisation.

### Probability of Effect

- 1.8.15 The probability of cumulative effects is variable. Those effects related to existing wind energy development and those under construction are considered as certain; effects related to development with planning consent are considered as likely. Wind energy development sites for which there is a submitted planning application are considered as uncertain with an even greater level of uncertainty attached to pre-planning application sites.

## 1.9 Residential Visual Amenity Assessment

- 1.9.1 Further methodology is provided here to support the **SI Chapter 7**.
- 1.9.2 Residential amenity is a planning matter that involves a wide number of effects (such as noise and shadow flicker) and benefits, of which residential visual amenity is just one component. The Residential Visual Amenity Assessment (RVAA) is limited to the consideration of visual effects on

residential amenity and the methodology accords with the advice in GLVIA 3, the Landscape Institute's *Residential Visual Amenity Assessment: Technical Guidance Note*, 2019.

- 1.6.1 Planning law contains a widely understood principle that the outlook or view from a private property is a private interest and not therefore protected by the UK planning system. However, the planning system also recognises situations where the effects on residential visual amenity are considered as a matter of public interest. This matter has been examined at a number of public inquiries in both Scotland and England where the key determining issue was not the identification of significant effects on views, but whether the proposed turbines would have an effect on the residential visual amenity through an overbearing effect and/or result in unsatisfactory living conditions, leading to a property being regarded, objectively, as an unattractive (as opposed to a less attractive) place in which to live.
- 1.6.2 As a consequence, the visual assessment methodology provides for a much more detailed assessment of the closest residential properties. This allows the assessor and consequently the determining authority to make a judgement as to whether the residents at these properties would be likely to sustain unsatisfactory living conditions which it would not be in the public interest to create. Reviews of decisions demonstrate that significant visual effects or changes to the views available from a residential property and its curtilage are not the decisive consideration, rather it is the residential amenity and in this case residential *visual* amenity that is determinate.
- 1.6.3 The methodology for assessing the visual effects on views from residential properties is therefore slightly different from the assessment of other visual receptors and allows for two stages of assessment as follows:
- Stage 1: Undertake a visual assessment to identify any significant effects; and
  - Stage 2: Undertake a Residential Visual Amenity Assessment (RVAA).
- 1.6.4 A residential property, for the purposes of environmental impact assessment, should be one that was designed and built/converted for that purpose and currently (at the time of the assessment) remains in a habitable condition (is of a safe construction, wind and watertight with appropriate vehicle access, and services such as drinking water, sanitation, and power supply). Other buildings such as barns/outbuildings, garages, huts and derelict properties should generally be excluded from the assessment, unless they form part of the curtilage of an existing residence.
- 1.6.5 The assessment of residential properties or clusters of residential properties has been limited to those which appear on the Ordnance Survey 1:25,000 scale map and any known recent 'new-builds'. Planning permissions and conversions have not been included. Whilst most of the properties can be viewed at close range from public roads and footpaths, or have otherwise been visited, some of these properties are accessed via private or gated roads and due to these access limitations, they have been assessed from the nearest public road or footpath which may be at greater distance from the property. Where this is the case, the assessment should be regarded as a 'best estimate' of the likely visual effects.

### Stage 1: Visual Assessment

- 1.6.6 A visual assessment is undertaken to identify those properties where a significant visual effect on a view from the property is likely to occur. The methodology for this is set out previously under visual assessment and combines an assessment of 'sensitivity' with an assessment of 'magnitude'.
- 1.6.7 The sensitivity of individual residential receptors has been assessed as 'High' in each case due to the high susceptibility of residents in accordance with GLVIA 3, paragraph 6.33. The value of the view is also likely to be regarded as high by the residents themselves, but the views in this area are not nationally or locally designated for their scenic value and accord a medium value in this respect.

- 1.6.8 The assessment also takes account of cumulative effects likely to result from the visibility of other wind energy development. In order to identify the likely significant effects, and noting that the RVAA study area is usually 2km, the baseline of other wind energy development considered in this assessment with those wind farms within 10km of the proposed development likely to be most relevant.
- 1.6.9 Although other wind energy development may be visible within the wider area, it is considered unlikely that it would contribute to an effect on the RVAA.

## Stage 2: Residential Visual Amenity Assessment

- 1.9.3 The second stage is to consider the residential visual amenity and whether, in terms of the wider public interest, the visual effects would result in unsatisfactory living conditions, leading to a property being regarded, objectively, as an unattractive (as opposed to a less attractive) place in which to live. Relevant information considered as part of the assessment may include, but is not limited to the following:
- Scale of Wind Farm:
    - ▶ Number and height of visible turbines;
    - ▶ The horizontal extent or Angle of View (AOV) of the visible turbine array; and
    - ▶ Separation distance (closest and furthest visible turbines).
  - Description of Property, as far as this can be ascertained:
    - ▶ Orientation and size of property and whether views from the property towards the wind farm would be direct or oblique;
    - ▶ Location of principal rooms and main living areas such as living/dining rooms, kitchens and conservatories, as opposed to upstairs rooms (bedrooms / bathrooms), working areas such as farm buildings and utility areas;
    - ▶ Location of principal garden areas which may include patios and seating areas as opposed to less well used areas such as paddocks or garages; and
    - ▶ The effects of any screening by landform, vegetation or nearby built development.
  - Location and Context:
    - ▶ The aspect of the property in terms of the overall use and relationship to the garden areas and surrounding landscape;
    - ▶ The principal direction of main views and visual amenity;
    - ▶ The context and nature of any intervening structures e.g. other existing wind farm development, farm buildings or forestry.
- 1.6.10 The assessment has been further supported by aerial and ground level photography as well as map-based data, the production of ZTV plots and visualisations such as wirelines. The assessment takes account of the likely views from the ground floors of properties and main garden areas but excludes upper floors and other non-residential land that may be connected with the property. These areas cannot usually be assessed from public areas, unless they have been subject to further on-site assessment with the resident's permission.
- 1.6.11 Other factors affecting residential amenity such as noise and shadow flicker are not considered as part of this assessment.

## 1.10 Night-time Assessment

- 1.10.1 The night-time assessment follows a similar methodology used for the assessment of landscape, visual and cumulative effects. It is conducted during periods of dawn to dusk and assesses the baseline night-time environment against the proposed additional, artificial lighting, in this case aviation warning lights, fitted to the proposed turbines.
- 1.10.2 The study area for the night-time assessment is also the same as the LVIA Study Area used for the landscape, visual and cumulative assessment.
- 1.10.3 As with the landscape and visual assessment, the sensitivity of the receptor to the proposed development (aviation warning lights) and the magnitude of change are combined to determine the level of effect likely to result from the aviation warning lights. It should not be assumed that the sensitivity of a receptor during the daytime is the same during the night-time nor that the magnitude of the proposed development is similar, and each have to be assessed on a case by case basis. The evaluation of significance and the nature of these effects is also described following the methodology used for the assessment of landscape, visual and cumulative effects.
- 1.10.4 Importantly, the night-time assessment is not a technical lighting impact assessment based on quantitative measurement of light levels, rather the assessment relies on professional judgement of what the human eye can reasonably perceive at the viewpoints / receptor locations.
- 1.10.5 The night-time assessment is supported by a baseline night-time environment or darkness survey and ZTV plots, baseline photography, wirelines and photomontages from selected viewpoints. These visualisations help to assess both the level of night-time visual impact for particular receptors and focus the assessment.

### Night-time Viewpoint Analysis

- 1.10.6 A range of viewpoints are examined in detail and analysed to determine whether a significant visual effect would occur. By arranging the viewpoints in order of distance it is possible to define a threshold or outer limit, beyond which there would be no further significant effects.
- 1.10.7 The night-time viewpoint analysis involves visiting the viewpoint locations during periods between dusk and dawn and viewing wirelines and photomontages prepared for each viewpoint location. The fieldwork is conducted in periods of fine weather with clear skies and considers seasonal changes such as reduced leaf cover or hedgerow maintenance.

### Baseline Night-time Environment or Darkness Survey

- 1.10.8 During site visits a baseline night-time environment survey or 'darkness survey' is carried out at each viewpoint location. The purpose of the darkness survey is to establish the existing light levels perceived by the landscape architects at the viewpoints and determine their sensitivity to change. The following observations are recorded:
- Areas of darkness with no artificial light;
  - Direct artificial lighting (where the light source is directly visible from the viewpoint);
  - Indirect artificial lighting (where the light source is not visible but the light emanating from the light source is visible as in the case of 'sky glow');
  - Static lighting, for example emanating from a residential property or street light; and
  - Mobile or transient lighting, for example associated with moving vehicles, trains or aircraft.

- 1.10.9 Baseline photographs at each of the night-time assessment viewpoints are recorded.

### Assessment of Night-time Sensitivity

- 1.10.10 In terms of landscape effects, a key determinant of the value and susceptibility of a landscape is the degree to which the landscape character can be discerned at night and the quality of the baseline 'darkness' – essentially is the area unlit or lit? There is a limited period of the night, during the twilight periods just after sunset or just before dawn when the landscape character maybe partially perceived and during periods when there are clear skies and under conditions such as a full moon. During these limited periods it may be possible to discern sufficient number of the key landscape characteristics, in particular, topography / skyline and some of the perceptual qualities, although other features such as colour, pattern, texture will be muted or not discernible. As darkness progresses these features cease to be visible. The susceptibility of the landscape at night is therefore variable and reduces from its highest or most susceptible during the day, through the twilight period, until the night when susceptibility would be at its lowest, during periods of greatest darkness.
- 1.10.11 The value of the landscape at night is recognised in designations that include National Parks and dark sky parks and more rarely in relation to local landscape designations and particular landscape character types, although the landscape value of non-designated landscapes is usually lower.
- 1.10.12 In terms of visual effects, the susceptibility of the receptor is primarily influenced by the activity of the viewer and residents are generally considered to be of higher sensitivity. A number of tourist locations are likely to be closed to the public during the hours of darkness, residents are most likely to be indoors, and hill walkers and people viewing the landscape from recognised viewpoints are less likely or unlikely to be present at those locations during the night. Again, the susceptibility of the receptor at night is most likely to reduce from its highest or most susceptible during the day, through the twilight period, until the night under conditions of greatest darkness when it would be at its lowest, although exceptions include may locations such as dark sky park viewpoints.
- 1.10.13 The value of the specific views and visual amenity at night is also recognised in designations that include National Parks and dark sky parks but more rarely in association with OS viewpoints, and scenic qualities associated with local landscape designations or tourist routes which tend to be focused on an appreciation of the landscape during the day with consequentially a less or a lower value ascribed during the night.
- 1.10.14 Factors affecting the susceptibility and value of landscape and visual receptors are combined to determine the sensitivity of the receptor and afforded a rating of High, Moderate, Slight or Negligible in a similar manner to that set out in **Tables 7.1.1** and **7.1.3**. For all of the above reasons it is likely that in most cases the overall sensitivity of the landscape and visual receptors will tend to be reduced under night-time conditions in comparison to the day-time receptors.

### Assessment of Night-time Magnitude

- 1.10.15 In terms of landscape and visual effects the size / scale, geographical extent, and the nature of the effect in terms of its duration or whether it is cumulative is considered in order to assess the magnitude of the effect on the landscape or visual receptor.
- 1.10.16 The number of lights likely to be visible as well as their intensity can be described in objective terms and ZTVs indicating the theoretical visibility of numbers of lights and their intensity is mapped in order to assist the assessment process. Other objective factors include the FoV and the distance over which the lights may be seen. More subjectively the proposed development is considered against the baseline or darkness survey in terms of whether the proposed lighting would contrast with an unlit area or assimilate with other lights in a landscape or view that may already have

multiple light sources. In this manner the assessment has to consider the degree to which the proposed development would affect the landscape character or designation, as far as that can be perceived at night.

- 1.10.17 In visual terms, a further consideration is the numbers of viewers which are likely to experience the views and visual amenity at night. It is reasonable to assume that the numbers of tourists and hill walkers, viewing the landscape at night for example, will tend to be few in number or rare, with most tourist destinations closed during the hours of darkness for example. Exceptions may include specific viewpoints within a dark sky park. Walkers and road users out at night, will also themselves tend to be sources of light from torches and vehicle headlights and thus affect the baseline or darkness survey.
- 1.10.18 The 'magnitude' or 'degree of change' resulting from the proposed development is described as 'Substantial', 'Moderate', 'Slight', 'Negligible' or 'Zero' in similar terms to the descriptions set out in **Tables 7.1.2** and **7.1.4**.

### Evaluation of Night-time Level of Effects and Significance

- 1.10.19 The level effect is evaluated through the combination of sensitivity and magnitude of change. Once the level of effect has been assessed, and the nature of the effect is determined (whether this is direct / indirect; its duration, temporary / permanent; and whether it is beneficial / neutral / adverse or cumulative) a judgement is then made as to whether the level of effect is 'significant' or 'not significant' as required by the relevant EIA Regulations. This process is assisted by the matrix illustrated in **Table 7.1.5** which is used to guide the assessment. The factors considered in the evaluation of the sensitivity and the magnitude of the change resulting from the proposed development and their conclusion, is presented in a comprehensive, clear and transparent manner.

## 1.11 Production of ZTVs and Visualisations

- 1.8.1 Zones of Theoretical Visibility (ZTVs) and visualisations (wirelines / wirelines and photomontages) are graphical images produced to assist and illustrate the LVIA and the cumulative assessment. The methodology used for viewpoint photography, ZTVs and photomontages accords with the NatureScot guidance *Visual Representation of Wind Farms*, Version 2.2, February 2017. Further, additional guidance is provided by the Landscape Institute Technical Guidance Note: *Visual Representation of Development Proposals*, 17 September 2019.

### Methodology for Production of ZTVs

- 1.8.2 The ZTVs are calculated using Resoft Wind Farm© software to generate the zone of theoretical visibility of the proposed development. This software creates a 3D computer model of the existing landscape and the proposed development using digital terrain data as follows:
- Ordnance Survey Terrain 50: Used to produce the main or standard ZTV plot and wirelines, these tiles provide a digital record of the existing landform of Great Britain, or Digital Terrain Model (DTM) at 10m elevation intervals based on 50m grid squares and models representing the specified geometry and position of the proposed turbines. The computer model includes the entire LVIA Study Area and takes account of the effects caused by atmospheric refraction and the Earth's curvature; and
  - Ordnance Survey Terrain 5: Used to produce a more detailed ZTV plot or wireline for limited areas, often used where there are small undulations or crags within the landscape. These tiles provide a digital record of the existing landform of Great Britain based on 5m grid squares and models representing the specified geometry and position of the proposed turbines. The

computer model includes the central LVIA Study Area and takes account of atmospheric refraction and the Earth's curvature.

- 1.11.1 The resulting ZTV plots are overlaid on Ordnance Survey mapping at an appropriate scale and presented as figures using desktop publishing/graphic design software.
- 1.11.2 The same computer software is also used to calculate cumulative ZTV plots based on the intervisibility of the proposed development with other existing, consented and application wind farms included in the CLVIA. In addition to the methods as described above, the layouts and geometries of the surrounding existing, consented and application wind farms are loaded into the same computer programme.

### Methodology for Baseline Photography

- 1.8.3 Once a view has been selected, the location is visited, confirmed, and assessed with the aid of a wireline or similar visualisation in the field. The viewpoint location is micro-sited to avoid as far as reasonable foreground clutter and photographed during fair weather and light conditions. A photographic record is taken to record the view and the details of the viewpoint location and associated data are recorded to assist in the production of visualisations and to validate their accuracy.
- 1.8.4 The following photographic information is recorded:
- Date, time, weather conditions and visual range;
  - GPS recorded 12 figure grid reference accurate to ~5-10 m;
  - GPS recorded Above Ordnance Datum (AOD) height data;
  - The focal length of lens is confirmed;
  - Horizontal field of view (in degrees); and
  - Bearing to Target Site (proposed development).
- 1.8.5 All photographs included in this assessment were recorded with a digital SLR camera set to produce photographs equivalent to that of a manual 35 mm SLR camera with a fixed 50mm or 75mm focal length lens as required.
- 1.8.6 All the resulting visualisations have been prepared to show other cumulative wind energy development in order that they may assist the cumulative assessment as well as the LVIA.
- 1.8.7 Whilst no two-dimensional image can fully represent the real viewing experience, the visualisation aims to provide a realistic representation of the proposed development, based on current information and photomontage methodology.

### Weather Conditions

- 1.11.3 GLVIA 3 para 8.22 states:

*"In preparing photomontages, weather conditions shown in the photographs should (with justification provided for the choice) be either:*

- *representative of those generally prevailing in the area; or*
- *taken in good visibility, seeking to represent a maximum visibility scenario when the development may be highly visible".*

- 1.11.4 In preparing photomontages for the LVIA, photographs will be taken in favourable weather conditions that are representative of the weather conditions generally and where possible, will be taken during periods of 'good' or 'excellent' visibility conditions.

### Methodology for Production of Visualisations

- 1.11.5 Each view has been illustrated with a photograph, a wireline and / or a photomontage indicating the proposed development. Definitions of each of these are described as follows:
- Baseline photograph: A photograph of the existing view recorded in fair weather conditions and usually presented as a panorama that represents a 90° or 53.5° FoV.
  - Wireline or Wireframe: A computer generated model of the landscape and the proposed development.
  - Photomontage is a visualisation which superimposes an image of a proposed development (in this case the wireline or wireframe) upon the baseline photograph, which is then rendered by computer software to produce an image of how the proposed development would appear from that viewpoint. Photomontage is a widespread and popular visualisation technique, which allows changes in views and visual amenity to be illustrated and assessed.

### Baseline Photograph Production

- 1.11.6 Photographs are then taken using a digital SLR camera in combination with a panoramic head equipped tripod. Detailed information is then recorded on site to enable the accurate alignment of the photographs with the wireline model (data such as: GPS grid co-ordinates; ground level information; compass bearings; and any other known references and viewpoint information).
- 1.11.7 To create the baseline panorama, the photographs from the viewpoint are then digitally joined using Adobe Photoshop or PTGui software to form a planar or cylindrical projection image or panorama using computer software to remove 'barrel distortion' caused by the camera lens. There are practical limitations to shooting viewpoint photographs only in very good or excellent visibility and at particular times of day or from location that avoid foreground clutter or other vertical features such as telegraph poles, particularly where this is a true representation of the view from that viewpoint area.

### Wireline or Wireframe Production

- 1.11.8 The wirelines and photomontages are produced using Resoft Wind Farm© software to generate a perspective view of the wind farm. This software creates a 3D computer model of the existing landscape and the proposed development using digital terrain data and models representing the specified geometry and position of the proposed turbines. The computer model includes the entire LVIA Study Area and all visualisations take account of the effects caused by atmospheric refraction and the Earth's curvature. The computer model does not take account of the screening effects of any intervening objects and forestry, unless specified (see individual figures).
- 1.11.9 A wireline of the proposed development and the existing landform is generated for each viewpoint within the LVIA Study Area. These wirelines are used to assist the assessment on location at each viewpoint, the position of which, if required, is adjusted on site to achieve the most visible vantage-point of the proposed development (e.g. to avoid buildings, forestry, other features, potentially interfering with the view).

## Photomontage Production

- 1.11.10 Visualisations will be produced for the agreed viewpoints identified in the LVIA and photomontages will aim to provide a photorealistic image of the appearance of the proposed development. 3D model representations are combined with the baseline view photographs to create a photorealistic rendered photomontage image of the development.
- 1.11.11 Visualisations that illustrate the proposed development are produced using a range of computer software, most commonly in this case Resoft WindFarm©. Others such as True View and 3D AutoCAD or Studio Max are also used for example.
- 1.11.12 The photomontage is produced by digitally combining or superimposing the wireline / wireframe or computer generation 3D model of the landscape and the proposed development onto the baseline photograph and rendering this in order to add colour, texture and lighting effects.
- 1.11.13 To produce the photomontage, the wireline turbines are rendered to appear 'life-like' taking into account the time of the photography and weather conditions occurring on the day.
- 1.11.14 The completed panoramas, wirelines, photomontages and accompanying data are then presented as figures using desktop publishing/graphic design software.

## Limitations of Visualisations

- 1.8.8 The photomontage visualisations used in the LVIA are for illustrative purposes only and, whilst useful tools in the assessment, are not considered to be completely representative of what will be apparent to the human eye. The assessments are carried out from observations in the field and therefore may include elements that are not visible in the photographs. NatureScot guidance advises that beyond 20km the visibility of turbines in the printed photomontages is difficult to see or reproduce realistically.
- 1.11.15 The photomontage visualisations of the proposed development have a number of limitations when using them to form a judgement on visual effect. These include:
- A visualisation can never show exactly what a development will look like in reality due to factors such as: different lighting, weather and seasonal conditions which vary through time and the resolution of the image;
  - The images provided give a reasonable impression of the scale and the distance to the proposed development but can never be 100% accurate to the as constructed effect;
  - A static image cannot convey movement such as turbine blade rotation or other features such as the movement of water or the reflection from the sun. The assessment however will take account of turbine movement by examining animated versions of the photomontages on screen and / or other examples of existing wind farm development on site;
  - The viewpoints illustrated are representative of views in the area but cannot represent visibility at all locations;
  - To form the best impression of the effects, these images are best viewed at the viewpoint location shown;
  - The visualisations must be printed and viewed at the correct size as indicated on the figures;
  - Images should be held flat at a comfortable arm's length. If viewing these images on a wall or board at an exhibition, stand at arm's length from the image presented to gain the best impression; and

- It is preferable to view printed images rather than view images on screen. Images on screen should be viewed using a normal PC screen with the image enlarged to the full screen height to give a realistic impression.

### Printing of Maps and Visualisations

- 1.11.16 All electronic visualisations and maps should be printed out and viewed at the correct scale as noted on the document.

## Glossary of Terms and Abbreviations

Note: Descriptions marked with an asterisk are as per the terminology provided in the GLVIA 3 glossary.

Term/abbreviation	Definition
AOD	Above Ordnance Datum
AoV / FoV	Angle of View / Field of View
Artificial light	Light produced by electrical means.
BT	Blade Tip
Candela	A unit of measure of luminous intensity, in a given direction.
CLVIA	Cumulative Landscape and Visual Impact Assessment
Constant light	Uninterrupted light source over a given time period.
Cumulative effects	Additional changes caused by a proposed development in conjunction with other similar developments or as a combined effect of a set of developments, taken together' (Scottish Natural Heritage, 2012)
Cumulative landscape effects	Effects that 'can impact on either the physical fabric or character of the landscape, or any special values attached to it' (Scottish Natural Heritage, 2012)
Cumulative visual effects: In combination In succession Sequentially	<p>Effects that can be caused by combined visibility, which 'occurs where the observer is able to see two or more developments from one viewpoint' and/or sequential effects which 'occur when the observer has to move to another viewpoint to see different developments' (Scottish Natural Heritage 2012)</p> <ul style="list-style-type: none"> <li>• In combination: Where two or more developments are or would be within the observer's arc of vision at the same time without moving his/her head (GLVIA 3, 2013 Table 7.1).</li> <li>• In succession: Where the observer has to turn his/her head to see the various developments – actual and visualised (GLVIA 3, 2013 Table 7.1).</li> <li>• Sequential cumulative effect. Occurs where the observer has to move to another viewpoint to see the same or different developments. Sequential effects may be assessed for travel along regularly used routes such as major roads or popular paths (GLVIA 3, 2013 Table 7.1).</li> </ul>
Darkness survey	Visual survey the night-time environment and the identification of artificial light sources.
Development*	Any proposal that results in change to the landscape and/or visual environment.
Degree of change	A combination of the scale, extent and duration of an effect also defined as 'magnitude'.
Designated Landscape*	Areas of landscape identified as being of importance at international, national or local levels, either defined by statute or identified in development plans or other documents.
Direct light	The artificial light source is visible. Note that light emanating from the window of a building is considered to be a 'direct' light source.
EIA	Environmental Impact Assessment

Term/abbreviation	Definition
Elements*	Individual parts which make up the landscape, such as, for example, trees, hedges and buildings.
Enhancement*	Proposals that seek to improve the landscape resource of the site and its wider setting beyond its baseline condition.
Environmental fit	The relationship of a development to identified environmental opportunities and constraints in its setting.
Feature*	Particularly prominent or eye-catching elements in the landscape such as tree clumps, church towers or wooded skylines OR a particular aspect of the project proposal.
FoV	Field of View – the horizontal angle of the view illustrated in a visualisation.
Geographical Information System (GIS)	A system that captures, stores, analyses, manages and presents data linked to location. It links spatial information to a digital database.
GLVIA 3	Guidelines for Landscape and Visual Impact Assessment, Third Edition, published jointly by the Landscape Institute and Institute of Environmental Management and Assessment, 2013.
Heritage	The historic environment and especially valued assets and qualities such as historic buildings and cultural traditions.
HH	Hub Height
Historic Landscape Characterisation (HLC) and Historic Land-use Assessment (HLA)	Historic characterisation is the identification and interpretation of the historic dimension of the present-day landscape or townscape within a given area. HLC is the term used in England and Wales, HLA is the term used in Scotland.
Indirect effects*	Direct effects relate to the host landscape and concern both physical and perceptual effects on the receptor. Indirect effects relate to those landscapes and receptors which separated by distance or remote from the development and therefore are only affected in terms of visual or perceptual effects. The Landscape Institute also defines indirect effects as those which are not a direct result of the development but are often produced away from it or as a result of a complex pathway.
Indirect light	The light source is not visible but the light emanating from the source is apparent.
Infrared light	A type of light not visible to the human eye.
Iterative design process	The process by which project design is amended and improved by successive stages of refinement which respond to growing understanding of environmental issues.
Key characteristics	Those combinations of elements which are particularly important to the current character of the landscape and help to give an area its particularly distinctive sense of place.
Land cover	The surface cover of the land, usually expressed in terms of vegetation cover or lack of it. Related to but not the same as land use.
Landscape and Visual Impact Assessment (LVIA)	A tool used to identify and assess the likely significance of the effects of change resulting from development both on the landscape as an environmental resource in its own right and on people's views and visual amenity.
Landscape Character Area (LCA)*	These are single unique areas which are the discrete geographical areas of a particular landscape type.

Term/abbreviation	Definition
Landscape Character Assessment	The process of identifying and describing variation in the character of the landscape, and using this information to assist in managing change in the landscape. It seeks to identify and explain the unique combination of elements and features that make landscapes distinctive. The process results in the production of a Landscape Character Assessment.
Landscape Character Types (LCTs)*	Distinct types of landscape which are relatively homogenous in character. They are generic in nature in that they may occur in different areas in different parts of the country, but wherever they occur they share broadly similar combinations of geology, topography, drainage patterns, vegetation and historical land use and settlement patterns, and perceptual and aesthetic attributes.
Landscape capacity	The amount of specified development or change which a particular landscape and the associated visual resource is able to accommodate without undue negative effects on its character and qualities. (NE 2019)
Landscape character*	A distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse.
Landscape classification	A process of sorting the landscape into different types using selected criteria but without attaching relative values to different sorts of landscape.
Landscape constraints	Components of the landscape resource such as views or mature trees recognised as constraints to development. Often associated with landscape opportunities.
Landscape effects*	Effects on the landscape as a resource in its own right.  An assessment of landscape effects deals with the effects of change and development on landscape as a resource. The concern here is with how the proposal will affect the elements that make up the landscape, the aesthetic and perceptual aspects of the landscape and its distinctive character. (GLVIA 3 2013, Para 5.1).
Landscape fit	The relationship of a development to identified landscape opportunities and constraints in its setting.
Landscape patterns	Spatial distributions of landscape elements combining to form patterns, which may be distinctive, recognisable and describable e.g. hedgerows and stream patterns.
Landscape quality (condition)*	A measure of the physical state of the landscape. It may include the extent to which typical character is represented in individual areas, the intactness of the landscape and the condition of individual elements.
Landscape qualities	A term used to describe the aesthetic or perceptual and intangible characteristics of the landscape such as scenic quality, tranquillity, sense of wildness or remoteness. Cultural and artistic references may also be described here.
Landscape receptors *	Defined aspects of the landscape resource that have the potential to be affected by a proposal
Landscape resource	The combination of elements that contribute to landscape context, character, and value.
Landscape sensitivity	The sensitivity of the landscape to a particular development considers the susceptibility of the landscape and its value.
Landscape strategy	The overall vision and objectives for what the landscape should be like in the future, and what is thought to be desirable for a particular landscape type or area as a whole, usually expressed in formally adopted plans and programmes or related documents.

Term/abbreviation	Definition
Landscape value*	<p>The relative value that is attached to different landscapes by society. A landscape may be valued by different stakeholders for a whole variety of reasons.</p> <p>The value of the Landscape Character Types or Areas that may be affected, based on review of any designations at both national and local levels, and, where there are no designations, judgements based on criteria that can be used to establish landscape value.</p>
Level of effect	Determined through the combination of sensitivity of the receptor and the proposed magnitude of change brought about by the development.
Lux	A unit of illumination, the amount of light on a surface per unit area.
Magnitude (of effect)*	A term that combines judgements about the size and scale of the effect, the extent of the area over which it occurs, whether it is reversible or irreversible and whether it is short term or long term in duration.
Mitigation	Measures which are proposed to prevent, reduce and where possible offset any significant adverse effects (or to avoid, reduce and if possible remedy identified effects. (GLVIA 3, 2013 Para 3.37).
Natural light	Light supplied by the sun, directly or indirectly, the moon and stars.
NSA	National Scenic Area
Perception	Combines the sensory (that we receive through our senses) with the cognitive (our knowledge and understanding gained from many sources and experiences).
Perceptual Aspects	A landscape may be valued for its perceptual qualities, notably wildness and/or tranquillity. (GLVIA 3, 2013 Box 5.1)
Photomontage*	A visualisation which superimposes an image of the proposed development upon a photograph or series of photographs.
Beneficial or Adverse Types of Landscape Effect	<p>The landscape effects may be beneficial, neutral, or adverse.</p> <p>In landscape terms – a beneficial effect would require development to add to the landscape quality and character of an area. Neutral landscape effects would include low or negligible changes that may be considered as part of the ‘normal’ landscape processes such as maintenance or harvesting activities. An adverse effect may include the loss of landscape elements such as mature trees and hedgerows as part of construction leading to a reduction in the landscape quality and character of an area.</p>
Beneficial or Adverse Types of Visual Effect	<p>The visual effects may be beneficial, neutral, or adverse.</p> <p>In visual terms – beneficial or adverse effects are less easy to define or quantify and require a subjective consideration of a number of factors affecting the view, which may be beneficial, neutral, or adverse. Opinions as to the visual effects of wind energy developments vary widely, however it is not the assumption of this assessment that all change, including substantial levels of change is an adverse experience. Rather this assessment has considered factors such as the visual composition of the landscape in the view together with the design and composition, which may or may not be reasonably, accommodated within the scale and character of the landscape as perceived from the receptor location.</p>
Probability of Effect	<p>The probability of a landscape and visual effect occurring as a result of this Development should be regarded as certain, subject to the stated project design and the continuance of the existing, baseline landscape resource, including known changes such as other permitted wind farm development.</p> <p>The probability of cumulative effects however is variable. Whereas those effects related to existing wind energy development and those under construction are considered as certain, effects related to development with planning consent are only considered as likely. Wind energy development</p>

Term/abbreviation	Definition
	sites for which there is a submitted planning application are considered as uncertain and other wind energy development for which no planning application has been made are considered as uncertain / unknown, as the level of uncertainty would be greater.
Proximity activated lighting	Lighting which is turned on by the detection of moving objects, such as aircraft detected by radar.
Rarity	The presence of rare elements or features in the landscape or the presence of a rare Landscape Character Type. (GLVIA 3 2013, Box 5.1)
RD	Rotor Diameter
Receptor	Physical landscape resource, special interest, or viewer group that will experience an effect.
Recreation Value*	Evidence that the landscape is valued for recreational activity where experience of the landscape is important. (GLVIA 3 2013, Box 5.1)
Representativeness*	Whether the landscape contains a particular character and/or features or elements which are considered particularly important examples.
Residual effects	Likely environmental effects, remaining after mitigation.
Scale Indicators	Landscape elements and features of a known or recognisable scale such as houses, trees, and vehicles that may be compared to other objects, where the scale of height is less familiar, to indicate their true scale.
Scenic quality	Depends upon perception and reflects the particular combination and pattern of elements in the landscape, its aesthetic qualities, its more intangible sense of place or 'genius loci' and other more intangible qualities. (GLVIA 3 2013, Box 5.1)
Seascape	Landscapes with views of the coast or seas, and coasts and adjacent marine environments with cultural, historical and archaeological links with each other.
Sense of Place (genius loci)	The essential character and spirit of an area: 'genius loci' literally means 'spirit of the place'.
Sensitivity*	A term applied to specific receptors, combining judgements of the susceptibility of the receptor to the specific type of change or development proposed and the value associated to that receptor.
Significance	A measure of the importance or gravity of the environmental effect, defined by significance criteria specific to the environmental topic.
Significant Effects	<p>It is a requirement of the EIA Regulations to determine the likely significant effects of the development on the environment which should relate to the level of an effect and the type of effect.</p> <p>The significance of an effect gives an indication as to the degree of importance (based on the magnitude of the effect and the sensitivity of the receptor) that should be attached to the impact described.</p> <p>Whether or not an effect should be considered significant is not absolute and requires the application of professional judgement.</p> <p>Significant – 'noteworthy, of considerable amount or effect or importance, not insignificant or negligible'. The Concise Oxford Dictionary.</p> <p>Those levels and types of landscape and visual effect likely to have a major or important / noteworthy or special effect of which a decision maker should take particular note.</p>

Term/abbreviation	Definition
Sky glow	The brightness of the night sky in a built-up area as a result of light pollution, apparent as a diffuse artificial light in the sky above major towns and cities.
SNH / NatureScot	Scottish Natural Heritage Now known as NatureScot.
Susceptibility*	The ability of a defined landscape or visual receptor to accommodate the specific proposed development without undue negative consequences.
Sustainability*	The principle that the environment should be protected in such a condition and to such a degree that ensures new development meets the needs of the present without compromising the ability of future generations to meet their own needs.
Temporary or permanent effects	Effects may be considered as temporary or permanent. In the case of wind energy development the application is for a 35 year period after which the assessment assumes that decommissioning will occur and that the site will be restored. For these reasons the development is referred to as long term and reversible.
Time depth	Historical layering – the idea of landscape as a ‘palimpsest’, a much written-over asset of landscape.
Townscape	The character and composition of the built environment including the buildings and the relationships between them, the different types of urban open space, including green spaces, and the relationship between buildings and open spaces.
True View Visuals	A mobile 3D augmented reality (AR) tool used to aid with the assessment. The True View Visuals tool indicates visibility of the proposed development to assist in confirming viewpoint positions as well as indicating limited or no visibility of turbines in particular locations. Whilst the images are indicative only, the AR tool provides a comparable image to the accurate wirelines produced.
Type or Nature of effect	Whether an effect is direct or indirect, temporary or permanent, beneficial (positive), neutral or adverse (negative) solus or cumulative.
Viewpoints	<p>Selected for illustration of the visual effects fall broadly into three groups:</p> <p>Representative Viewpoints: selected to represent the experience of different types of visual receptor, where larger numbers of viewpoints cannot all be included individually and where the significant effects are unlikely to differ – for example certain points may be chosen to represent the view of users of particular public footpaths and bridleways;</p> <p>Specific Viewpoints: chosen because they are key and sometimes promoted viewpoints within the landscape, including for example specific local visitor attractions, such as landscapes with statutory landscape designations or viewpoints with particular cultural landscape associations.</p> <p>Illustrative Viewpoints: chosen specifically to demonstrate a particular effect or specific issues, which might, for example, be the restricted visibility at certain locations. (GLVIA 3 2013, Para 6.19)</p>
Visual amenity	The overall views and surroundings, which provide a visual setting or backdrop to the activities of people living, working, participating in recreational activities, visiting or travelling through an area.
Visual dominance	A visual effect often referred to in respect of residential properties that in relation to development would be subject to blocking of views, or reduction of light / shadowing, and high levels of visual intrusion.
Visual effect*	Effects on specific views and on the general visual amenity experienced by people.
Visual Receptors*	Individuals and/or defined groups of people who have the potential to be affected by a proposal.
Visual sensitivity	The sensitivity of visual receptors such as residents, relative to their location and context, to visual change proposed by development.

<b>Term/abbreviation</b>	<b>Definition</b>
Visualisation	Computer visualisation, photomontage, or other technique to illustrate the appearance of the development from a known location.
Wireline / Wireframe	A computer-generated line drawing of the DTM (digital terrain model) and the proposed development from a known location.
Zone of Theoretical Visibility (ZTV)*	A map, usually digitally produced, showing areas of land within which, a development is theoretical visible.