

# Appendix V9.A

## Methodology and Glossary

### 1.1 Introduction

- 1.1.1 The Landscape and Visual Impact Assessment (LVIA) and cumulative landscape and visual impact assessment (CLVIA) identifies, predicts, and evaluates potential landscape and visual effects likely to result from the Development (referred to as the 'Variation Development'). This assessment assesses the effects of the Variation Development described in **Chapter 3: Project Description** and is not a partial assessment of the proposed change or difference between the Variation Development and the Consented Development.
- 1.1.2 Essentially, the landscape and visual effect (and whether it is significant) is assessed by considering the landscape or visual sensitivity to the Variation Development, with reference to the susceptibility and value of the receptor, against the magnitude of change in order to identify a level of effect that would be brought about by the Variation Development, were it to be implemented. The level of effect is also described in terms of its scale, geographical extent and duration, and subsequently whether the effect would be significant.
- 1.1.3 The type of effect is also considered and may be direct or indirect; temporary or permanent (reversible); cumulative; and positive, neutral or negative. The assessment has also considered the cumulative effects resulting from the Variation Development in combination with other existing and consented wind farms, and wind farms at the planning application stage.
- 1.1.4 The time period for the assessment covers phases of development related to the construction of the Variation Development and associated infrastructure, its operation for a period of 30 years, and decommissioning.
- 1.1.5 The landscape and visual assessment 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.
- 1.1.6 **Appendix V9.A** has been structured as follows:
- General Methodology;
  - Landscape Assessment;
  - Visual Assessment;
  - Cumulative Landscape and Visual Assessment (CLVIA);
  - Evaluating Cumulative Landscape and Visual Effects;
  - Visual Assessment of Views of Residential Properties;
  - Production of ZTVs and Visualisations; and
  - Glossary of Terms and Abbreviations.

## 1.2 General Methodology

- 1.2.1 The methodology for the LVIA and CLVIA has been undertaken in accordance with best practice guidance including, but not limited to, the following:
- *Guidelines for Landscape and Visual Impact Assessment*, 3rd Edition, Landscape Institute and IEMA (May 2013);
  - *Siting and Designing Windfarms in the Landscape*, Version 3a, SNH (August 2017);
  - *Guidance: Assessing the Cumulative Impact of Onshore Wind Energy Developments*, SNH (2012); and
  - *Visual Representation of Windfarms*, Version 2.2, SNH (February 2017).
- 1.2.2 A full list of the references is provided at the back of **Chapter 9: Landscape and Visual Impact**.
- 1.2.3 The landscape and visual effects of wind turbines can be directly experienced through the observation of existing wind farms within this area. Noticeably, wind farm development can co-exist with other features of the landscape, rather than replacing or removing them, as in the case of more conventional built development, although they can alter the landscape character of an area. Wind farm development is also visually permeable and although views may be interrupted, they are not blocked or prevented. Generally, wind farms have a 'small' development footprint that preserves much of the physical elements of the landscape, but entails the addition of tall structures, which are unavoidably visible over longer distances, leading to greater visual effects. A further, important difference is the reversibility of almost all of the landscape and visual effects as a result of the decommissioning stage.
- 1.2.4 Wind farms give rise to a wide range of opinions, from strongly negative to strongly positive. 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 negative or neutral unless otherwise stated.

### Defining the Study Area

- 1.2.5 The SNH guidance<sup>1</sup> advises that the LVIA Study Area for wind turbines of this height should be based on an area 40km distance from each of the proposed turbine locations. However, in reference to the 2017 FEI for the Consented Development, it has been agreed through scoping to reduce this area to 35km distance from each of the proposed turbine locations. The Landscape and Visual Study Area is illustrated in **Figure V9.1** and covers a circular area of 36,259m radius from the application site centre (based on a minimum 35km distance from each of the proposed turbines).
- 1.2.6 It is important to note that the boundary of the Study Area is not the limit of potential visibility. Rather, it is an area defined by SNH in their guidance, on the basis of research, to determine a suitable Study Area for the assessment of wind farms, likely to contain all potential significant landscape and visual effects.

---

<sup>1</sup> *Siting and Design Wind Farms in the Landscape*, Version 3a, Scottish Natural Heritage (2017).

## 1.3 Landscape Assessment

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."*

1.3.2 The potential landscape effects, occurring during the construction, operation and decommissioning period may therefore include, but are not restricted to the following:

- Changes to landscape elements: the addition of new elements (wind turbines) or the removal of existing elements such as trees, vegetation and buildings and other characteristic elements of the landscape character type;
- Changes to landscape qualities: degradation or erosion of landscape elements and patterns and perceptual characteristics, particularly those that form key characteristic elements of landscape character types/areas 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; and
- Cumulative landscape effects: where more than one wind farm may lead to a potential landscape effect.

1.3.3 Development may have a direct (physical) effect on the landscape as well as an indirect effect which would be perceived from the wider landscape, or other areas of landscape, outside the host landscape character type/area.

### Evaluating Landscape Sensitivity to Change

1.3.4 The sensitivity of the landscape to a particular development considers the susceptibility of the landscape and its value. The overall sensitivity is described as High, Medium, Low, or Negligible. Landscape sensitivity often varies in response to both the type of development proposed and the particular site location, such that landscape sensitivity needs to be considered on a case by case basis. This 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 Scenic Area (NSA) may be described as inherently of high sensitivity on account of its designation, although it may prove to be less sensitive to particular development and/or of variable sensitivity across the geographical area of the NSA. Alternatively, an undesignated landscape may be of high sensitivity to a particular development regardless of the lack of local or national designation.

1.3.5 The main factors considered are discussed as follows:

#### Landscape Susceptibility

1.3.6 Landscape susceptibility according to GLVIA3 means *"the ability of the landscape to accommodate the development without undue consequences for maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies"*. In the case of wind farm development

there may be local or regional spatial strategies and/or landscape studies that can assist in broad scale judgements about the overall landscape capacity or sensitivity to wind farm development. Attention, however, must be paid to the purpose, scope and methodology of these documents, as whilst providing assistance for strategic planning, they are not usually suitable for the assessment of specific wind farm proposals and should not be directly applied to individual applications. Rather, they provide broad information that should be considered as part of the more detailed landscape assessment.

1.3.7 Judgements on landscape susceptibility include references to both the physical and aesthetic landscape characteristics, and the potential scope for mitigation. Landscape susceptibility varies according to different areas of landscape character and whilst accepting that wind farm development is likely to lead to high levels of landscape change in most circumstances, factors that commonly indicate lower landscape susceptibility to wind farm development include landscape characteristics of larger scale, uniformity of land cover, simple landform and skylines with limited landscape features. Generally speaking, lower landscape susceptibility together with lower landscape value tends to indicate lower landscape sensitivity to development. Conversely, higher landscape susceptibility and value tend to indicate higher landscape sensitivity to development.

1.3.8 Common indicators of landscape susceptibility<sup>2</sup> to wind farm development are as follows:

- Landscape Scale:

A large-scale landscape is generally considered to be less susceptible to wind farm development in comparison to a small-scale landscape.

- Landform and Topography:

A simple landform with smooth, regular, rolling, undulating, or flowing landforms that might include plains, undulating or rolling lowlands, and plateaus that are generally considered to be less susceptible to wind farm development in comparison to more complex landforms which might include narrow glens, valleys, dramatic rugged and/or distinct landform features or pronounced undulations.

- Openness and Enclosure:

Open landscapes are generally considered to be less susceptible to wind farm development, but could entail wider visibility, conversely enclosed landscapes could offer more screening potential, limiting visibility to a smaller area, but are also likely to be of smaller scale.

- Land Cover Pattern:

Simple, regular landscapes with extensive areas of uniform ground cover (moorland / grassland, unenclosed land, forestry, large regular field patterns, parliamentary enclosures) are generally considered to be less susceptible to wind farm development in comparison to landscapes with more complex or irregular land cover (smaller fields, medieval enclosures, smaller scale 'patchwork' landscapes of mixed fields with small woodland copses).

- Presence of Development:

Areas where there are existing large-scale developments (industry, mineral extraction, masts pylons, other turbines, urban fringe / large settlement, major transport routes) are generally considered to be less susceptible to wind farm development in comparison to areas characterised by smaller scale development (smaller, generally historic villages with dense settlement patterns and smaller scale associated buildings such as churches).

<sup>2</sup> Scottish Natural Heritage, A Guide to Commissioning a Landscape Capacity Study, 2015.

- Landmarks:

Landscapes that contain large scale landmarks which may include other wind farms and infrastructure and large-scale developments are generally less susceptible to wind farm development although development needs to be carefully sited to manage landscape foci and avoid 'visual clutter' or cumulative impacts. Historic landmarks such as important views to distinctive church spires and towers, particular 'landmark' landforms (prominent hills or peaks) or 'land art' generally increase susceptibility.

- Settlement:

Landscapes which are un-settled or with lower levels of population (away from receptors) are generally considered to be less susceptible to wind farm development in comparison to more densely populated areas.

- Skyline:

Prominent and distinctive skylines, horizons (including indented ridges / peaks, key views and or vistas) or skylines 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 turbines / tall infrastructure features.

- Windiness and Rational:

Areas that appear to be windy / windswept which may also be elevated or exposed are generally considered to be less susceptible to wind farm development in comparison to more sheltered areas.

- Change and Movement:

Landscapes which contain movement (traffic, wind turbines, other moving infrastructure and waves / tides) or are subject to high levels of change (large scale forestry operations, mineral extraction, man-made change and development) are generally considered to be less susceptible to wind farm development in comparison to landscapes that are still or appear to be unchanging and/or notably historic with notable 'time depth'.

- Remoteness, Naturalness, Wildness / Tranquillity:

Notably wild or tranquil landscapes are generally considered to be more susceptible to wind farm development in comparison to cultivated or farmed / developed landscapes where perceptions of 'wildness' and tranquillity are less tangible. Landscapes which are either remote or natural may vary in their susceptibility to wind farm development.

- Landscape Context and Adjacent Landscapes:

The location and visual connection to adjacent landscapes may also have a bearing on the overall susceptibility of the landscape to wind farm development.

## Landscape Value

- 1.3.9 This includes the consideration of a range of features which may include the presence or absence of landscape designation, landscape and scenic qualities, rarity / representativeness, conservation interests, recreational value, perceptual qualities such as tranquillity and historical or cultural associations, as set out in GLVIA 3, page 84, Box 5.1. The importance attached to a landscape, often as a basis for designation or recognition, which expresses national or local consensus, because of its quality including cultural associations, scenic or aesthetic qualities. Landscape value may be

indicated by the presence or absence of a landscape planning designation such as a NSA or Special Landscape Area (SLA) (higher value) indicating a landscape of national or local value accordingly or an undesignated landscape (lower value).

- 1.3.10 The absence of a landscape planning designation should not assume an area of 'low' landscape value and undesignated areas of landscape are often of some local value. Indications of this are likely to be present in the form of documented, locally valued, cultural / natural heritage and scenic or aesthetic qualities such as 'wildness' or the presence of viewing platforms or benches. It should be noted that a landscape of high value may not always equate to areas of high landscape quality and that areas of low landscape value may contain areas of higher landscape quality. The state of repair or condition of the elements of a particular landscape, its integrity and intactness and the extent to which its distinctive character is apparent are also relevant. The quality of a landscape element or characteristic may also be influenced by the degree to which it may contribute to the overall landscape character type/area, its rarity, fragility, and potential for replacement or mitigation. Landscapes of lower quality tend to include those under intensive agriculture, forestry or urban fringe situations where the landscape elements and patterns have been eroded, landscapes with man-made development such as infrastructure or other wind farms and areas of derelict or vacant land, areas of mineral extraction and / or land fill.

### Evaluating the Magnitude of Landscape Change

- 1.3.11 The 'magnitude' or 'degree of change' resulting from a particular development is described as High, Medium, Low, Negligible or None. This is assessed by considering the scale, geographical extent and duration of the proposed change, which may include the loss or addition of particular features, changes to landscape quality and changes to landscape character. As such this needs to be considered on a case by case basis. It may be possible for some mitigation measures to reduce the magnitude of change and consequently the residual landscape effects, and for these reasons the landscape design of the wind farm should form an iterative part of the assessment process. The main factors to be considered are discussed as follows.

- Loss, Alteration, or Addition to Landscape Elements:

Development may result in the loss, alteration, or addition of landscape elements such as trees, hedgerows, or development components such as wind turbines and new access tracks. These can be quantified objectively;

- Loss, Alteration, or Addition to Landscape Characteristics / Quality:

Development may result in the loss, alteration, or addition of physical landscape characteristics, such as wooded areas, landscape patterns, or development components such as wind turbines, which can be quantified objectively. Perceptual characteristics and effects on scenic quality or wildness also need to be considered, albeit subjectively, with reference made to objective and documented opinion; and

- Change to Landscape Character:

All landscapes change over time and much of that change is managed or planned. Often landscapes will have management objectives for 'protection' or 'accommodation', meaning that they may accommodate wind farm development and 'change'<sup>3</sup> whereby the landscape character could be altered to create new landscapes for the accommodation of windfarm development and / or forestry or to provide areas or development resulting in townscape or

<sup>3</sup> Landscape management objectives of 'protection', 'accommodation' or 'change' as described in SNH's 'Spatial Planning for Onshore Wind Turbines – natural heritage considerations, Guidance', Annex 1, June 2015.

peri-urban 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.

- 1.3.12 In addition to the scale or magnitude of the effect, GLVIA 3 advises that consideration should also be given to the following aspects of a landscape effect:

### Geographical Extent

- 1.3.13 Landscape effects should be 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. Landscape effects occurring over a larger geographical extent are more likely to be regarded as significant.

### Duration and Reversibility

- 1.3.14 Landscape effects should also be described in terms of the duration of the effect and whether this would be permanent, temporary or reversible. Duration can be considered as ranging between temporary (short to long term and time limited) or permanent. Although 'long term' some development such as housing should be regarded as permanent, whilst mineral extraction works usually entail several phases of development, followed by restoration to a 'new' landscape character. Wind farm development usually operates for a long term, time limited operational period, in this case 30 years followed by a decommissioning period that would allow the landscape effects to be reversed. Reversibility is only assessed as part of the decommissioning stage and cannot factor into the assessment of the time limited operational effects.
- 1.3.15 Further guidance on the evaluation of landscape sensitivity and magnitude are provided in **Table V9.A.1**.
- 1.3.16 The level of landscape effect is evaluated through the combination of landscape sensitivity and magnitude of change, a process assisted by the matrix in **Table V9.A.3**, which is used to guide the assessment. In those instances where there would be no change to the landscape, the magnitude has been recorded as 'Zero' and the level of effect as 'None'.
- 1.3.17 Once the level of effect has been assessed, a judgement is then made as to whether the level of effect is 'significant' as required by the relevant EIA Regulations. Further information is also provided about the nature of the effects (whether these would be direct / indirect, temporary / permanent / reversible, cumulative, or positive, neutral or negative).

Table V9.A.1 Landscape Sensitivity and Magnitude

#### Examples of Landscape Sensitivity

High	Landscape character, characteristics, and elements with no or limited landscape capacity or scope for landscape change and higher landscape value and susceptibility to the Variation Development. Often includes landscapes which are nationally, internationally or regionally designated and have a high landscape value. In relation to landscape designations and wild land, the documented Special Landscape Qualities and wild land qualities are such that there would be no or limited landscape capacity or scope for landscape change of the type posed by the Variation Development.
Medium	Landscape character, characteristics, and elements with some landscape capacity or some scope for landscape change. Often includes landscapes of medium landscape value and quality which may be locally designated or undesignated and have a medium landscape value. In relation to landscape designations and wild land, the documented Special Landscape Qualities and wild land qualities are such that there would be some landscape capacity or scope for change or accommodation.

---

#### Examples of Landscape Sensitivity

---

Low	Landscape character, characteristics and elements which display greater landscape capacity or scope for landscape change to accommodate the Variation Development as part of spatial strategy for example. Usually applies to landscapes which are undesignated with indicators of lower landscape susceptibility to development. May also apply to landscapes that may have been subject to intensive agriculture, blanket forestry or other man-made development and have a low landscape value.
Negligible	Landscape character, characteristics and elements where there is a high landscape capacity or a planned desire for landscape change of the type proposed as part of spatial strategy for example. Usually applies to landscapes with a lower landscape susceptibility to development. May also apply to derelict landscapes, or vacant land, areas of mineral extraction and / or land fill for example.

---

#### Examples of Landscape Magnitude

---

High	A total or large-scale change and / or extent that may include the loss of key landscape characteristics / special qualities or the addition of new uncharacteristic features or elements, that would become the dominant characteristics of the landscape, and change the overall landscape quality, and character over a large area.
Medium	A medium-scale change of limited scale and extent including the loss of some key landscape characteristics / special qualities or elements, or the addition of some new uncharacteristic features or elements that would potentially change the landscape quality and character of a localised area or part of a landscape character type/area.
Low	A low-scale change affecting small areas of landscape character / special qualities, including the loss of lower value landscape elements, or the addition of new features or elements of limited characterising influence.
Negligible	A negligible change affecting smaller areas of landscape character and quality, including the loss of some landscape elements or the addition of features or elements, which are either of low value or hardly noticeable in terms of their contribution to the landscape character.
None	There would be no change to the receptor.

---

## 1.4 Visual Assessment

1.4.1 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.”*

1.4.2 Visual effects are identified for different receptors (people) who will experience the view(s) at their places of residence, 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(s); and
- Cumulative visual effects: the cumulative or incremental visibility of similar types of development may combine to have a cumulative visual effect.



## Zone of Theoretical Visibility (ZTV)

- 1.4.3 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 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.
- 1.4.4 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

- 1.4.5 Viewpoint analysis is used to assist the assessment and is conducted from selected viewpoints within the Study Area. The purpose of this is to assess both the level of visual impact 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 arranging the viewpoints in order of distance it is possible to define a threshold or outer geographical limit, beyond which there would be no further significant effects.
- 1.4.6 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.
- 1.4.7 The assessors have also viewed the electronic photomontages in animated form as part of the office-based software used for their production so the effects of blade rotation can be assessed. The turbines are always viewed as though facing towards the viewer to provide maximum potential visibility, although during operation, the turbines would face into the wind. The prevailing wind direction, likely to occur during the operational period is therefore also informative to the assessment, particularly if this tends to be variable or directional.

## Evaluating Visual Sensitivity to Change

- 1.4.8 Visual effects are also assessed by considering the sensitivity of the visual receptor (people or groups of people) and the proposed magnitude of change. The sensitivity takes account of the susceptibility of the receptor and the value attached to the view. Sensitivity is assessed as High, Medium, Low, or Negligible, although in practice 'negligible' sensitivity is not used.

### Visual Assessment: Susceptibility

- 1.4.9 The main factors to consider are the activity or occupation of the receptor at the viewpoint or receptor location and the extent to which their attention or interest may be focused on the view and visual amenity of the surrounding landscape. Whilst it is accepted that people will undertake a range of different activities, their visual experience of a development will change according to where they are, and what they are doing, and susceptibility is assessed as follows:
- People at nationally recognised viewpoints (for example the Queen's View or Scott's View) people at views/vistas attached to heritage features (such as Gardens and Designed Landscapes) or other locations recognised nationally in art or literature, are assessed as of high susceptibility. Residents and people engaged in out-door recreation, where the focus of the

activity is on enjoyment of the landscape and there is a high frequency of use, are also considered to be of high susceptibility;

- People on local footpaths routed through undesignated, landscapes that may be of lower scenic quality, and people engaged in sport, or travelling / commuting are considered to be of less susceptibility (medium); and
- People at work as the least (low) susceptibility.

### Visual Assessment: Value

1.4.10 In relation to value, consideration is given to the value of the view(s) through reference to local or national scenic landscape designation. Other factors to consider include the importance or popularity of the view(s) and/or the likely numbers of viewers and the location and context of the viewpoint (in terms of the main primary or secondary views from a receptor location). The visual experience from a tourist destination, for example, could involve either the key views to, or from the main attraction, or those from the car-park / service area, and this context will affect the sensitivity and value of the views. Whilst views from car-parks / service areas may still be experienced by receptors of inherently higher sensitivity, these types of views should not be considered of higher value or sensitivity.

1.4.11 Landmarks / tourist attractions and national trails visited and used by large numbers of people are likely to be of higher value and more sensitive than those which are less visited. Occasionally there may be exceptions such as motorways where, although there are higher numbers of receptors these are generally considered to be of lower value. Conversely some less well visited footpaths within Wild Land Areas for example, may be of higher value precisely because of the lower visitor numbers.

### Evaluating the Magnitude of Change to the View

1.4.12 The magnitude of change is described as High, Medium, Low, Negligible or Zero, and is assessed by taking into account possible changes caused by the Variation Development, which may affect the view. In those instances where the Variation Development would not be visible and there would be no change to the view, the magnitude has been recorded as 'zero' and the level of effect as 'no view'.

1.4.13 The magnitude of visual change is described by reference to the following:

- Scale of Change:

The scale of change in the view (including horizontal and vertical FoV<sup>4</sup> affected), is determined by the loss or addition of features in the view and changes in the composition and extent of view affected. This can in part be described objectively by reference to numbers of new objects visible and the horizontal / vertical FoV affected.

- Contrast:

The degree of contrast or integration of any new features or changes in the landscape with the existing or remaining landscape elements and characteristics in terms of mass, scale, colour, movement, form and texture. Developments which contrast or appear incongruous in terms of colour, scale and form are likely to be more visible and have a higher magnitude of change.

- Distance:

---

<sup>4</sup> Field of View.

The proximity or distance from the development can be described objectively and often provides a strong indicator of magnitude, subject to any intervening screening by landform, vegetation, or buildings.

- Speed of Travel:

The speed at which a development may be viewed will affect how long the view is experienced and the likelihood of a development being particularly noticed by people travelling in cars compared to those who may be walking and able to stop and 'take in' a view.

- Angle of View (AoV):

The AoV from the main viewing direction may be considered in terms of whether a development is experienced directly or at an oblique angle from the main viewing direction. Road users are generally more aware of the views in the direction of travel, whilst train passengers are more aware of views perpendicular to their direction of travel. Elevated views are likely to reveal more of the development, whereas low level views are more likely to be screened by intervening built form and vegetation.

- Screening:

A development may be wholly or partly screened by landform, vegetation (seasonal) and or built form. Conversely open views, particularly from landscapes where this is a characteristic, are likely to reveal more of a development.

- Skyline / Background:

Whether a 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 uninterrupted horizons. Conversely, wind turbines may also appear more noticeable when viewed against a darker background landscape, such as forestry.

- Nature of Visibility:

The nature of visibility, whether this is subject to various phases of development change and the manner in which the development may be viewed such as intermittently or continuously, and / or seasonally, due to periodic management or leaf fall, is a further factor for consideration.

1.4.14 In addition, to the scale or magnitude of the effect, GLVIA 3 advises that consideration should also be given to the following aspects of a visual effect:

### Geographical Extent

1.4.15 A visual effect is also considered in terms of the geographical extent, physical area or location over which it would be experienced (described as a linear or area measurement). Visual effects affecting a large geographical area are more likely to be regarded as significant.

### Duration and Reversibility

1.4.16 A visual effect is also considered in terms of the duration over which the effect would be experienced and whether this would be permanent, temporary or reversible. Duration can be considered as ranging between temporary (short to long term and time limited) or permanent. Although 'long term' some development such as housing should be regarded as permanent, whilst mineral extraction works usually entail several phases of development, followed by restoration. Wind farm development usually operates for a long term, time limited period, in this case 30 years

followed by a decommissioning period that would allow the visual effects to be reversed. Reversibility is only assessed as part of the decommissioning stage and cannot factor into the assessment of the time limited operational effects. Permanent visual effects (not time limited) are more likely to be regarded as significant.

1.4.17 Further guidance on the evaluation of visual sensitivity and magnitude is provided in **Table V9.A.2**.

**Table V9.A.2 Visual Receptor Sensitivity and Magnitude**

Examples of Visual Sensitivity	
High	People in residential properties or settlements and on long distance, strategic footpaths or popular footpaths and tourist destinations, viewing important landscape features, beauty spots and picnic areas, where the activities are focused on the landscape. Receptors include groups of high susceptibility to change such as residents, tourists / visitors, and walkers travelling through the landscape, viewing and experiencing landscapes of high value and quality.
Medium	People within outdoor sports based recreational spaces such as and golf courses, using local or less well used recreational routes of viewing landscapes of high or medium value. Receptors include groups of medium susceptibility to change such as some walkers, cyclists, road users, and other recreational receptors travelling through the landscape / seascape. Viewing and experiencing landscapes of medium value and quality.
Low	People working on the land or sea, at their place of work, or taking part in activities such as team sports that do not involving an appreciation of the landscape, including drivers on motorways and other busy trunk roads. Often viewing and experiencing landscapes of medium to low value and quality.
Negligible	Not used.
Examples of Visual Magnitude	
High	A major change or obstruction of a view that may be directly visible, appearing as the dominant and contrasting feature appearing in the fore or middle ground.
Medium	A prominent change or partial view of a new element within the view that may be readily noticeable, directly or obliquely visible including glimpsed, partly screened or intermittent views, appearing as a prominent feature in the middle ground or background landscape.
Low	A noticeable or small level of change, affecting a small part of the view that may be obliquely viewed or partly screened and/or appearing in the background landscape although noticeable. May include views experienced whilst travelling at speed.
Negligible	A small or intermittent change to the view that may be obliquely viewed and mostly screened and/or appearing in the distant background or viewed at high speed over short periods and capable of being missed by the casual observer.
None	There would be no change to the view.

1.4.18 The level of visual effect is evaluated through the combination of visual sensitivity and magnitude of change, a process assisted by the matrix in **Table V9.A.3**, which is used to guide the assessment. In those instances where there would be no change or no visibility or view of the Variation Development, the magnitude has been recorded as 'Zero' and the level of effect as 'No View'.

1.4.19 Once the level of effect has been assessed, a judgement is then made as to whether the level of effect is 'significant' as required by the relevant EIA Regulations. Further information is also provided about the nature of the effects (whether these would be direct / indirect, temporary / permanent / reversible, cumulative, or positive, neutral or negative).

## 1.5 Cumulative Landscape and Visual Assessment

- 1.5.1 The assessment of cumulative effects is essentially the same as for the 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 developments.
- 1.5.2 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 landuse 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 negative 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.
- 1.5.3 Detailed guidance on the cumulative assessment of wind farm development is provided in the SNH 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 Variation Development to other cumulative wind farm development and 'combined' cumulative effects that assess the total cumulative effect of the Variation Development and other cumulative wind farm development. In the latter case a significant cumulative effect may result from the Variation 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.
- 1.5.4 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>5</sup>;
    - ▶ 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°;
    - ▶ 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 Study Area.
- 1.5.5 The SNH 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, such as where:
- "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;*

<sup>5</sup> Note: A person's field of view is variable but is approximately 90° when facing in one direction.

*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.'*

- 1.5.6 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 Variation 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.
- 1.5.7 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

- 1.5.8 The Cumulative Search Area and Study Area is the same as the Landscape and Visual Study Area (35km distance from each of the proposed turbine locations) as illustrated in **Figure V9.1**. Other existing, under-construction, consented and application wind energy sites included within this area are noted and considered in terms of their likely relevance to the CLVIA. Sites within the Cumulative Search Area which are considered likely to contribute to a significant cumulative effect in 'addition' or in 'combination' with the Variation Development are included in the CLVIA.
- 1.5.9 Those developments at pre-planning or scoping stage are excluded in accordance with SNH guidance, unless there is a justified / exceptional circumstance for their inclusion in the assessment.

### Predicting Cumulative Landscape Effects

- 1.5.10 The assessment considers the extent to which the Variation 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 Study Area.

### Predicting Cumulative Visual Effects

- 1.5.11 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 Variation Development.
- 1.5.12 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

- 1.5.13 The evaluation of cumulative effects is assisted by the matrix in **Table V9.A.3**, which is used to guide the assessment.
- 1.5.14 The cumulative assessment has been prepared to ensure that, as well as the 'solus' or primary effect of the Variation Development (LVIA) the 'additional' cumulative effects and the 'combined' cumulative effect (CLVIA) is also reported to account for two cumulative Scenarios as follows:
- Variation Development the 'solus' or primary effect;
  - Scenario 1: Existing + Consented + the Variation Development;  
The additional and combined cumulative effects of the existing and consented wind energy developments with the Variation Development are assessed.
  - Scenario 2: Existing + Consented + Applications + the Variation Development;  
The additional and combined cumulative effects of the existing and consented wind energy developments and applications, with the Variation Development are assessed.
- 1.5.15 In addition, the cumulative assessment takes account of the timescales, as far as practicable, for the operation of the existing and consented developments within 10km of the Variation Development.
- 1.5.16 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 Variation 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 Variation Development is predicted in addition or in 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 Variation Development is predicted in addition or in combination with another non-significant effect attributed to other development(s). The effect is still termed significant and cumulative, but is attributed to the Variation Development and is a greater level of effect than for either development individually;
  - A non-significant effect from the Variation 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 Variation Development is predicted in addition or in 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.

- 1.5.17 The nature of a cumulative effect may also be described as direct / indirect, temporary / permanent, or positive/ negative. The probability of a cumulative effect occurring may also be described (certain, likely or uncertain / unknown).

## 1.6 Evaluating Landscape and Visual Effects

- 1.5.18 The level of effect relating to landscape and visual effects and/or cumulative landscape and visual effects is determined by the combination of sensitivity (ranging from High to Negligible) and magnitude of change (ranging from High to Zero), which is assisted by the matrix illustrated in **Table V9.A.3**. In addition to the scale or magnitude of the effect, the GLVIA 3 advises that consideration should also be given to the geographical extent and duration or reversibility of the effect as described earlier.

### Types of Landscape and Visual Effect

- 1.5.19 The relevant EIA Regulations also require that the level of effect is described in terms of its 'type' or 'nature' of effect (whether the effect is permanent / temporary, direct / indirect, positive/neutral/negative and or cumulative) as well as the scale over which the effect would occur. For example, an effect may be locally significant, or significant with respect to a small number of receptors, but not significant when judged in a wider context. These terms are defined below:

- Temporary or Short Term / Long term / Permanent:

The time period over which an effect may occur is referred to as temporary / short term, long term, or permanent. Wind farm development is considered 'in perpetuity' due to the long-term periods of operation typically occurring over 30 years. However, the Variation Development is time-limited and the effects would also be reversible when decommissioned.

- Direct / 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.

- Positive / Neutral / Negative:

The landscape and visual effects may be positive, neutral, or negative. The assessment tends to assume that the nature of the effects would be 'negative' unless otherwise stated and in the case of wind farm development, the most noticeable effects and changes are likely to be visual. However the landscape and visual assessment guidelines caution against the automatic assumption that all change would result in a negative effect.

- ▶ In Landscape Terms: a positive effect would require development to add to the landscape quality and character of an area. Neutral landscape effects would include changes that neither add nor detract from the quality and character of an area including development that may be reasonably accommodated within the scale and capacity of the landscape in the context of landscape management and change, and negligible magnitudes of change. A negative effect may include the loss of landscape elements such as mature trees and hedgerows as part of construction or development that exceeds landscape capacity, leading to a reduction in landscape quality and character of an area;



- ▶ In Visual Terms: positive or negative effects are less easy to define or quantify and require subjective consideration of a number of aesthetic factors affecting the view, which may be positive, neutral, or negative. Not all change, including high levels of change, is necessarily a negative experience. Public opinions as to the visual effects of wind farms vary widely, however this assessment is not an assessment of public opinion. Rather, this assessment considers architectural and aesthetic factors such as the visual composition of the landscape in the view together with the wind farm design, which may or may not be reasonably accommodated within the scale and character of the landscape as perceived from the receptor location. Neutral visual effects would include changes that are not dominating, overbearing, or oppressive. They include development that appears reasonably well accommodated within the scale and landscape setting or context and also includes negligible magnitudes of change. A negative effect may include poor visual design quality such as overlapping turbines, inappropriate scale of development relative to the underlying landscape, or other visual factors that may reduce scenic quality, such that the wind farm would appear dominating, overbearing, or oppressive for example.
- Cumulative Effects:
 

Landscape and visual effects may also be cumulative with other existing, consented, or application wind energy development.

### Probability of Effect

- 1.5.20 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.

### Determining the Significance of Effects

- 1.5.21 In accordance with the relevant EIA Regulations it is important to determine whether the predicted effects, resulting from the proposed wind farm, are likely to be significant. Significant landscape and visual effects are highlighted in **bold** in the text and in most cases, relate to all those effects that result in a '**Substantial**' or a '**Substantial / Moderate**' effect as indicated in **Table V9.A.3**. In some circumstances, '**Moderate**' levels of effect also have the potential, subject to the assessor's opinion, to be considered as significant and these exceptions are also highlighted in bold and explained as part of the assessment, where they occur.
- 1.5.22 Wind turbines are tall, visible structures and the existence of what would inevitably be a significant effect does not mean that the proposal should be considered 'unacceptable' and consent refused.

Table V9.A.3 Evaluation of Landscape and Visual Effects

		Landscape and Visual Sensitivity			
		High	Medium	Low	Negligible
Magnitude of Change	High	Substantial	Substantial / Moderate	Moderate	Slight
	Medium	Substantial / Moderate	Moderate	Slight	Slight / Negligible
	Low	Moderate	Slight	Slight / Negligible	Negligible
	Negligible	Slight	Slight / Negligible	Negligible	Negligible
	Zero	None / No View			

## 1.7 Visual Assessment of Residential Properties

- 1.7.1 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 and East Ayrshire Council's (EAC) Supplementary Guidance: *Planning for Wind Energy*, December 2017, which refers to residential amenity (visual dominance) in Section 3.2.1: *Effect on communities and individual dwellings*.
- 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 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 in the round and in this context 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, of a safe construction, wind and water tight with appropriate

vehicle access, and services (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 expectations such as 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 above 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 2km, the baseline of other wind energy development considered in this assessment has been limited to those wind farms within 10km of the Variation Development. This includes the following:
- Existing Wind Farms:
    - ▶ Windy Standard + Extension
    - ▶ Afton;
    - ▶ High Park Farm;
    - ▶ Hare Hill + Extension; and
    - ▶ Mansfield Mains.
  - Consented Wind Farms:
    - ▶ South Kyle;
    - ▶ Pencloe;
    - ▶ Benbrack;
    - ▶ Over Hill;
    - ▶ Windy Rig; and
    - ▶ Taiglim Farm.
  - Application Wind Farms:
    - ▶ Windy Standard Phase III;

- ▶ North Kyle; and
- ▶ Sanquhar II.

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

1.6.10 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 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.

1.6.11 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.

1.6.12 Other factors affecting residential amenity such as noise and shadow flicker are not considered as part of this assessment and can be found in **Chapters 7** and **8** respectively.

## 1.8 Production of ZTV's 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 landscape and visual assessment as well as the cumulative assessment. The methodology used for viewpoint photography and photomontage accords with the SNH guidance *The 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 ZTV's

1.8.2 The ZTVs are calculated using Resoft Wind Farm© software to generate the zone of theoretical visibility of the Variation Development. This software creates a 3D computer model of the existing landscape and the 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 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 Study Area and takes account of atmospheric refraction and the Earth's curvature.

1.8.3 The resulting ZTV plots are overlaid on Ordnance Survey mapping at an appropriate scale and presented as figures using desktop publishing/graphic design software.

1.8.4 The same computer software is also used to calculate cumulative ZTV plots based on the intervisibility of the Variation 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

1.8.5 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. 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.

1.8.6 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;
- Use of a fixed 50 mm focal length lens is confirmed;
- Horizontal field of view (in degrees);

- Bearing to Target Site (Variation Development).
- 1.8.7 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 50 mm focal length lens.
- 1.8.8 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. Additional cumulative 360° photographs have been aligned with 360° wirelines from some viewpoints or hill top locations to provide an indication of the 'all round' cumulative effects.
- 1.8.9 Whilst no two-dimensional image can fully represent the real viewing experience, the visualisation aims to provide a realistic representation of the Variation Development, based on current information and photomontage methodology.
- 1.8.10 Since the 2017 FEI, viewpoint photography has been re-taken for viewpoints 1, 2, 4, 5, 6, 8, 11, 12, 15 and B as a result of changes to the baseline view (for example, cumulative wind farms been built and / or changes in forestry).

### Methodology for Production of Visualisations

- 1.8.11 Each view has been illustrated with a photograph, a wireline and in some cases a photomontage indicating the Variation Development. It should be noted however, that the SNH guidance advises that beyond 20km the visibility of turbines in the printed photomontages is difficult to see or reproduce realistically.
- 1.8.12 An additional photomontage (cylindrical projection) has been provided for viewpoints 4-8, illustrating a 90° / 135° panorama in order to illustrate the Variation Development in its 'landscape setting'.
- 1.8.13 An additional photomontage (cylindrical projection) has also been provided for viewpoints 4-8, 11 and 12 in order to illustrate the close relationship of the Variation Development with the consented South Kyle Wind Farm.
- 1.8.14 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 development using digital terrain data and models representing the specified geometry and position of the proposed turbines. The computer model includes the entire 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).
- 1.8.15 A wireline of the Variation Development and the existing landform is generated for each viewpoint within the 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 Variation Development (e.g. to avoid buildings, forestry, other features, potentially interfering with the view). 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 as required by the SNH guidance).
- 1.8.16 The photographs from the viewpoint are then joined to form a planar or cylindrical projection image or panorama as required by the SNH guidance, using computer software to remove 'barrel distortion' caused by the camera lens. This panorama, combined in Resoft Wind Farm© with the data recorded on site, enables the wireline to be superimposed and aligned. 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.

- 1.8.17 The completed panoramas, wirelines, photomontages and accompanying data are then presented as figures using desktop publishing/graphic design software.
- 1.8.18 One 360° FoV visualisation is also produced from one nearby hilltop viewpoint as follows:
- Viewpoint 6: Blackcraig Hill (**Figure V9.55a-e**).

### Printing of Maps and Visualisations

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

## 1.9 Glossary of Terms and Abbreviations

- 1.9.1 Note: Those descriptions marked with an asterisk are as per the terminology provided in the GLVIA3 glossary.

Term/abbreviation	Definition
AOD	Above Ordnance Datum
AoV	Angle of View
BT	Blade Tip
CLVIA	Cumulative Landscape and Visual Impact Assessment
Cumulative effects	Additional changes caused by a Variation Development in conjunction with other similar developments or as a combined effect of a set of developments, taken together' (SNH, 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' (SNH, 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' (SNH 2012)</p> <ul style="list-style-type: none"> <li>● In combination: <ul style="list-style-type: none"> <li>● 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 (GLVIA3, 2013 Table 7.1).</li> </ul> </li> <li>● In succession: <ul style="list-style-type: none"> <li>● Where the observer has to turn his/her head to see the various developments – actual and visualised (GLVIA3, 2013 Table 7.1).</li> <li>● Sequential cumulative effect.</li> </ul> </li> </ul> <p>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 (GLVIA3, 2013 Table 7.1).</p>
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.
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*	Effects that result indirectly from the proposed project as a consequence of the direct effects, often occurring away from the Development Site, or as a result of a sequence of interrelationships or a complex pathway. They may be separated by distance or in time from the source of the effects. Also used to describe indirect landscape effects concerning perceptual characteristics and qualities of the landscape and indirect visual effects in relation to issues such as 'setting'.
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.
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)*	These are distinct types of landscapes that are usually 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 pattern, and perceptual and aesthetic attributes. (Topic Paper 6, Countryside Agency and SNH 2004)



Term/abbreviation	Definition
Landscape capacity	The ability of a landscape to accommodate different amounts of change or development of a specific type. Capacity reflects the landscape's sensitivity to the type of change, and the value attached to the landscape, and is therefore dependent on judgements about the desirability of retaining landscape characteristics and the acceptability of their loss. ( <a href="http://www.snh.gov.uk/protecting-scotlands-nature/looking-after-landscapes/landscape-resource-library/glossary-of-terms/">http://www.snh.gov.uk/protecting-scotlands-nature/looking-after-landscapes/landscape-resource-library/glossary-of-terms/</a> ).
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. (GLVIA3 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.
Landscape value*	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.
Level of effect	Determined through the combination of sensitivity of the receptor and the proposed magnitude of change brought about by the development.
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. (GLVIA3, 2013 Para 3.37).
NSA	National Scenic Area

Term/abbreviation	Definition
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. (GLVIA3, 2013 Box 5.1)
Photomontage*	A visualisation which superimposes an image of the Variation Development upon a photograph or series of photographs.
Positive or Negative Types of Landscape Effect	The landscape effects may be positive, neutral, or negative. In landscape terms – a positive 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. A negative 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.
Positive or Negative Types of Visual Effect	The visual effects may be positive, neutral, or negative. In visual terms – positive or negative effects are less easy to define or quantify and require a subjective consideration of a number of factors affecting the view, which may be positive, neutral, or negative. 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 a negative 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.
Probability of Effect	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. 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 is only considered as likely. Wind energy development 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.
Rarity	The presence of rare elements or features in the landscape or the presence of a rare Landscape Character Type. (GLVIA3 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. (GLVIA3 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	Potential 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. (GLVIA3 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.

Term/abbreviation	Definition
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. Where possible significant effects should be mitigated.</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>
SNH	Scottish Natural Heritage
Susceptibility*	The ability of a defined landscape or visual receptor to accommodate the specific Variation 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 30 year period after which the assessment assumes that decommissioning will occur and that the Development 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.
Type or Nature of effect	Whether an effect is direct or indirect, temporary or permanent, positive (beneficial), neutral or negative (adverse) 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. (GLVIA3 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, recreating, 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.

<b>Term/abbreviation</b>	<b>Definition</b>
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.
Visualisation	Computer visualisation, photomontage, or other technique to illustrate the appearance of the development from a known location.
Wireline	A computer-generated line drawing of the DTM (digital terrain model) and the Variation 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.