Glentarken Wind Farm

LVIA Technical Appendix 5.1 - Methodology

CONTENTS

1 INTRODUCTION

1.1.1 This Technical Appendix (TA) has been prepared to accompany **Chapter 5: Landscape and Visual Impact Assessment** in Volume 1 of the Glentarken Wind Farm (Proposed Development) Environmental Impact Assessment Report (EIA Report). This methodology has been prepared by chartered landscape architects at OPEN, part of SLR Consulting Limited and describes in detail the methodology that has been used to carry out the Landscape and Visual Impact Assessment (LVIA). The LVIA identifies and assesses the significance of changes resulting from the Proposed Development on both the landscape as an environmental resource and on people's views and visual amenity.

1.2 Key Guidance Documents

1.2.1 The LVIA methodology is devised specifically for the assessment of wind farm developments which is in line with GLVIA3, the key source of guidance for LVIA (including the clarifications set out by the LI in 2024[1]). Other sources of guidance used and referenced in the LVIA include the following:

- Landscape Institute and Institute for Environmental Management and Assessment (2013) 'Guidelines for Landscape and Visual Impact Assessment: Third Edition' ('GLVIA3').
- SNH and The Countryside Agency (TCA) (2002). Landscape Character Assessment Guidance for England and Scotland.
- SNH (2017). Visual Representation of Wind Farms Version 2.2.
- NatureScot (2021). Assessing the Cumulative Impact of Onshore Wind Energy Developments.
- Landscape Institute (2019). Visual Representation of Development Proposals: Landscape Institute Technical Guidance Note 06/19.
- NatureScot (2020). Assessing Impacts on Wild Land Areas Technical Guidance.
- Landscape Institute (2019). Technical Guidance Note 2/19 Residential Visual Amenity Assessment.
- NatureScot (2024 Consultation Draft). Guidance for Assessing the Effects on Special Landscape Qualities.
- SNH (2017). Siting and Designing of Windfarms in the Landscape: Version 3a.
- NatureScot (2024). NatureScot pre-application guidance for onshore wind farms.

1.3 Information and Data Sources

1.3.1 The assessment is initiated through a desk study of the Proposed Development and the LVIA study area. This desk study identifies aspects of the landscape and visual resource that are considered in the LVIA, including landscape character typology, landscape related planning designations, wild land areas, operational and potential cumulative windfarms, and views from routes and settlements. The desk study utilises Geographic Information System (GIS) and ReSoft WindFarm software to explore the potential visibility of the Proposed Development. The resultant Zone of Theoretically (ZTV) diagrams and wirelines provide an indication of which landscape and visual receptors are likely to be key in the assessment. Landscape characterisation information and data has been obtained from the NatureScot

[1] Landscape Institute, Technical Guidance Note LITGN – 2024-01, Published August 2024.

(2019). Landscape Character Assessment in Scotland online database.

1.4 Study Area

1.4.1 The initial step in the LVIA is the establishment of the Study Area for the assessment. Guidance developed by NatureScot (Visual Representation of Windfarms Version 2.2, February 2017) indicates that an area with a radius of 45 km from the nearest turbine is appropriate for the turbines of the size proposed in the Proposed Development. Based on the Proposed Development scoping layout Perth and Kinross Council and NatureScot agreed through scoping consultation that the LVIA should focus on a more detailed Study Area of 20 km. The LVIA has therefore adopted a 20 km Study Area for the assessment of potential effects of the Proposed Development. For reference, ZTVs and a cumulative context plan have been prepared out to 45 km from the Proposed Development. Also note that several of the agreed viewpoints are beyond 20 km, these are retained in the LVIA to illustrate the wider visual context and to support the agreed Study Area extents.

1.5 Field Survey

1.5.1 To inform the LVIA and layout design process, field survey was undertaken between August 2022 and October 2024. Viewpoint photography was captured during field survey visits in periods of good visibility. Field surveys were carried out throughout the 20 km detailed Study Area, although surveys were concentrated within the areas shown on the ZTV to gain theoretical visibility of the Proposed Development.

1.5.2 Field survey included visits to viewpoints (including several viewpoints beyond the detailed 20km Study Area) as well as travel around the Study Area to consider potential effects (including cumulative) on landscape character and on the experience of views seen from travel routes through the landscape. These visits have allowed the landscape character and the visual amenity of the Study Area to be experienced in a range of different conditions and seasonal variation. The field survey allows the assessors to judge the likely scale, distance, extent and prominence of the Proposed Development directly.

1.5.3 The landscape of the site was assessed for any particular features that contribute to the landscape character of the site or are important to the wider landscape setting. In particular, the form and pattern of the land was assessed from the site and surrounding area to better understand its character and to take these qualities into account in the siting and design of the Proposed Development. The landscape character types for the Study Area were reviewed and the key characteristics of the landscape were identified. The field surveys provided an experience of the character types of the Study Area and verification of how these areas might be affected by the Proposed Development. Visual amenity was surveyed including both static and sequential views, from receptors representative of the range of views and viewer types likely to experience the Proposed Development. Views from a variety of distances, aspects, elevations and extents were included. Receptor types include settlement; transport routes; visitor locations; areas of cultural significance; the range of landscape character types within the Study Area; and the cumulative effects of the Proposed Development in combination with other existing or proposed wind farms in the Study Area.

2 TYPES OF LANDSCAPE AND VISUAL EFFECTS

2.1 Categories of Effect

2.1.1 The LVIA is intended to determine the effects that the Proposed Development would have on the landscape and visual resource. For the purpose of assessment, the potential effects on the landscape and visual resource are grouped into three categories: landscape effects, visual effects and cumulative landscape and visual effects, each of which is briefly described as follows.

Landscape Effects

2.1.2 The LVIA considers the effects of the Proposed Development on the landscape as a resource. Landscape effects are either direct effects on the physical fabric of the site, or effects on landscape character. The assessment of landscape effects is carried out as follows:

2.1.3 Assessment of physical effects: physical effects are direct effects on the physical fabric of the site, such as the removal of trees and alteration to ground cover. This category of effects is made up of landscape elements, which are the components of the landscape such as hedgerows or woodland that may be physically affected by the Proposed Development.

2.1.4 Assessment of effects on landscape character: landscape character is the distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape, and the way that this pattern is perceived. Effects on landscape character arise either through the introduction of new elements that alter this pattern of elements, or through visibility of the Proposed Development, which may alter the way in which the pattern of elements is perceived. This category of effects is considered in terms of landscape character receptors, which fall into two groups; landscape character types/areas and landscape designations.

Visual Effects

2.1.5 The LVIA considers the effect of the Proposed Development on views and visual amenity. Visual effects include effects on visual receptors, i.e. groups of people that may experience an effect, and views (viewpoints). The visual assessment is carried out as follows:

2.1.6 An assessment of the effects of the Proposed Development on views from principal visual receptors, including residents of settlements, motorists using roads, people using recreational routes, features and attractions throughout the Study Area (as ascertained through the baseline study); and

2.1.7 An assessment of the effects of the Proposed Development on representative viewpoints that have been selected to assess the effect on locations relevant to these visual receptors and from specific viewpoints, chosen because they are key or promoted viewpoints in the landscape.

Cumulative Effects

2.1.8 Cumulative landscape and visual effects arise where the study areas for two or more wind farms overlap so that both are experienced at proximity where they may have a greater incremental effect, or where wind energy developments may combine to have a sequential effect, irrespective of any overlap in study areas. This means that the addition of the Proposed Development to a situation where other wind farms are apparent in the baseline, or a potential future baseline landscape and visual context may result in a greater effect than where the Proposed Development is seen in isolation. The main assessment of the

effects of the Proposed Development takes into account its addition to a baseline landscape that contains the operational/under construction wind farms.

2.2 Significance of effects

2.2.1 The objective in assessing the effects of the Proposed Development is to predict the significant effects on the landscape and visual resource. The EIA Regulations require that the direct and indirect significant effects of the Proposed Development are identified, described and assessed, and therefore the LVIA effects are assessed to be either significant or not significant. The LVIA does not define intermediate levels of significance as the EIA Regulations do not provide for these. GLVIA3 also provides guidance on this, noting that (paragraphs 3.32 and 3.33): '*LVIAs should always distinguish clearly between what are considered to be the significant and non-significant effects…it is not essential to establish a series of thresholds for different levels of significance of landscape and visual effects, provided that it is made clear whether or not they are considered significant.'*

2.2.2 The significance of effects is assessed through a combination of the sensitivity of the landscape receptor or view and the magnitude of change that would result from the addition of the Proposed Development. While this methodology is not reliant on the use of a matrix to determine the conclusion of a significant or not significant effect, a matrix is included in Table 5.1.1 to illustrate how combinations of sensitivity and magnitude of change ratings can give rise to significant effects. On this basis potential impacts are assessed as of Negligible, Minor, Moderate-Minor, Moderate, Major-Moderate and Major. In those instances where the magnitude has been assessed as 'no change', the level of effect is recorded as 'no effect'.

2.2.3 For the purposes of this assessment, any effects with a significance level of Major and Major-Moderate have been deemed significant (dark grey shaded boxes in Table 5.1.1). Moderate levels of effect have the potential, subject to the assessor's professional judgement, to be considered as significant or not significant, depending on the sensitivity and magnitude of change factors evaluated (light grey shaded boxes in Table 5.1.1). GLVIA3 clarification note 3(5) supports this approach and states that '*moderate effects may or may not be significant and justification would be needed in the methodology or receptor assessment as to whether a moderate effect is significant or not.'* The assessments of significance for Moderate levels of effect are therefore explained as part of the assessment, where they occur.

2.2.4 Significance thresholds can therefore vary depending on the sensitivity and magnitude, however in all cases, a significant effect is considered more likely to occur where a combination of the variables results in the Proposed Development having a defining effect on the landscape character or view. Definitions are not provided for the individual categories of significance shown in the matrix and the reader should refer to the detailed definitions provided for the factors that combine to inform sensitivity and magnitude. Effects assessed as being either Moderate-Minor, Minor or Negligible level are deemed as not significant (white boxes in Table 5.1.1).

2.2.5 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.

Table 5.1.1: Matrix used to guide determination of effect significance.

Sensitivity \ Magnitude	High	High-Medium	Medium	Medium-Low	Low	Negligible
High	Major (Significant)	Major (Significant)	Major-Moderate (Significant)	Moderate (Significant / Not Significant)	Moderate - Minor (Not significant)	Minor (Not significant)
High-Medium	Major (Significant)	Major-Moderate (Significant)	Moderate (Significant / Not Significant)	Moderate (Significant / Not Significant)	Moderate - Minor (Not significant)	Minor (Not significant)
Medium	Major-Moderate (Significant)	Moderate (Significant / Not Significant)	Moderate (Significant / Not Significant)	Moderate - Minor (Not significant)	Minor (Not significant)	Minor (Not significant)
Medium-Low	Moderate (Significant / Not Significant)	Moderate (Significant / Not Significant)	Moderate - Minor (Not significant)	Minor (Not significant)	Minor (Not significant)	Negligible (Not significant)
Low	Moderate (Significant / Not Significant)	Moderate - Minor (Not significant)	Minor (Not significant)	Minor (Not significant)	Negligible (Not significant)	Negligible (Not significant)

2.2.6 A significant effect occurs where the Proposed Development would provide one of the defining influences on a landscape element, landscape character receptor or view; or where changes of a lower magnitude occur on a landscape element, landscape character receptor or view that is of particularly high sensitivity. A not significant effect occurs where the effect of the Proposed Development is not material, whereby the baseline characteristics of the landscape element, landscape character receptor or view continue to provide the definitive influence, or where the small scale of change experienced by a high sensitivity receptor is such as to be considered not significant.

2.2.7 Significant cumulative effects occur where the addition of the Proposed Development to various scenarios of other relevant existing and proposed wind farms would lead to wind farm development becoming one of the prevailing characteristics of a view or landscape or where the Proposed Development adversely contrasts with the scale or design of an existing or Proposed Development.

3 LANDSCAPE ASSESSMENT

3.1.1 Landscape character is the distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape, and the way that this pattern is perceived. Effects on landscape character arise either through the introduction of new elements that physically alter this pattern of elements, or through visibility of the Proposed Development, which may alter the way in which the pattern of elements

is perceived. This category of effects is made up of physical effects and effects on landscape character (landscape character types and designated areas).

3.2 Assessment of Physical Landscape Effects

3.2.1 The physical effects of the Proposed Development are restricted to the area within the site boundary where existing landscape elements may be changed. Physical effects are the direct effects as a result of the Proposed Development on the fabric of the area within the site boundary, such as the removal of trees and alteration to ground cover. The objective of the assessment of physical effects is to determine what the likely physical effects of the Proposed Development would be, which landscape elements would be affected, and whether these effects would be significant or not significant. The variables considered in the sensitivity of landscape elements and the magnitude of change that the Proposed Development would have on them, are described as follows.

Sensitivity of Landscape Elements

3.2.2 The sensitivity of a landscape element is an expression of its value and quality, and susceptibility to change.

- The value of a landscape element is a reflection of its importance in the pattern of elements which constitute the landscape character of the area. For example, the value of woodland is likely to be increased if it provides an important component of the local landscape character. If a landscape element is particularly rare, as a remnant of an historic landscape layout for example, or a particular combination of landscape elements in a locale presents particular qualities, its value is likely to be increased.
- The susceptibility of a landscape element to change is a reflection of the degree to which landscape elements are vulnerable to change and the extent to which they can be restored, replaced or substituted.

3.2.3 The evaluation of sensitivity is described for each receptor in the assessment. Levels of sensitivity: high, high-medium, medium, medium-low and low, are applied.

Magnitude of Change on Landscape Elements

3.2.4 The magnitude of change on landscape elements is quantifiable and is expressed in terms of the degree to which a landscape element would be removed or altered by the Proposed Development, the extent of existing landscape elements that would be lost and the contribution of that element to the character of the landscape. Definitions of magnitude of change are applied in order that the process of assessment is made clear. These are:

- High: where the Proposed Development would result in the complete removal or substantial alteration of a key landscape element.
- Medium: where the Proposed Development would result in the removal of a notable part of a landscape element or a notable alteration to a key landscape element.
- Low: where the Proposed Development would result in the removal of a minor part of a landscape element or a minor alteration to a key landscape element.
- Negligible: where the Proposed Development would result in the removal of a negligible amount of a landscape element or is barely discernible.
- None: where the Proposed Development would result in no change to the landscape element.

3.2.5 There may also be intermediate levels of magnitude of change, such as high-medium or medium-low, where the change falls between definitions.

Significance of Effects on Landscape Elements

3.2.6 The assessment of effect on landscape elements, is dependent on all of the factors considered for the sensitivity of the receptor and the magnitude of change upon it, and by applying professional judgement to assess whether or not the Proposed Development would have an effect that is significant or not significant.

3.2.7 A significant effect would occur where the degree of removal or alteration of the landscape element is such that the landscape element would be redefined (although the landscape character may not necessarily be redefined). If the landscape element is of a high sensitivity, a significant effect can occur with a limited degree of removal or alteration. A not significant effect would occur where the form of the landscape element is not redefined, as a result of the particular characteristics of the Proposed Development. If the landscape element is of lower sensitivity, it could undergo a higher level of removal or alteration yet remain as a not significant effect.

3.3 Assessment of Effects on Landscape Character

3.3.1 The objective of the assessment of effects on landscape character is to determine what the likely effects of the Proposed Development could introduce, which landscape character receptors would be affected, and whether these effects would be significant or not significant. The methodology for the assessment of effects on landscape character involves the undertaking of a baseline study, evaluation of sensitivity, magnitude of change and an assessment of significance.

Landscape Baseline and Scope of Assessment

3.3.2 The landscape baseline provides an understanding of the landscape in the area that may be affected - its constituent elements, its character, distinctiveness, condition, value and qualities, and the way this varies spatially. The landscape baseline describes aspects of the landscape that may be significantly affected. Establishing the landscape baseline will, when reviewed alongside the description of the Proposed Development, form the basis for the identification and description of the effects of the Proposed Development on that baseline. The baseline description of the landscape that may be affected is primarily determined by the physical footprint of the Proposed Development components and their ZTV.

3.3.3 An overview of the landscape baseline is described, and a preliminary assessment identifies landscape receptors that may experience significant effects, which require to be assessed in full. A detailed description of the baseline is provided for each landscape receptor that may experience significant effects. Those receptors for which significant effects and significant cumulative effects are not predicted are scoped out of the subsequent detailed assessment but are noted with reasons given for their exclusion.

3.3.4 The baseline study of each landscape character receptor collates and presents information relevant to the assessment drawn from a combination of desk study and fieldwork. The baseline study covers the following issues:

- the description of the landscape character receptor drawn from the relevant documentation such as the Landscape Character Assessment or citations in respect of landscape designations.

- a description of the landscape character receptor based on field work to determine the strength of character displayed and how typical or not the landscape character receptor is in relation to documented descriptions.
- those features and patterns of the landform, land-cover and land use which make the landscape character receptor distinctive, or individually or in combination can be judged to have particular qualities worth considering further.
- the visual and sensory experience of the landscape and how it associates with other landscapes including, in particular, the landscape character receptor where the Proposed Development is located.
- how change in this landscape character receptor, either through natural or human processes, is presently affecting character and how they are predicted to affect character in the future. This may include operational wind farms where they are a feature of the baseline landscape context.

3.3.5 The landscape baseline also describes current pressures that may cause change in the landscape in the future, for example with respect to renewable energy, drawing on information for wind energy developments that are not yet present in the landscape but are at other stages in the Proposed Development and consenting process. Operational and under construction wind energy developments are regarded as part of the baseline landscape character of the area. Any changes resulting from the Proposed Development are assessed within this context in the assessment of landscape and visual effects.

Sensitivity of Landscape Character Receptors

3.3.6 The sensitivity of a landscape character receptor is an expression of the combination of the judgements made about the susceptibility of the receptor to the type or nature of change proposed and the value related to that receptor.

Value of the Landscape Receptor

3.3.7 The value of a landscape character receptor is classified as high, high-medium, medium, medium-low 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 covered and the level of importance of the designation; international, national, regional or local. It is important to note that the absence of designations does not preclude local resource value, as an undesignated landscape character receptor may be important as a resource in the local or immediate environment, particularly when experienced in comparison with other nearby landscapes.
- Landscape quality: The quality of a landscape character receptor is a reflection of its attributes, such as scenic quality, sense of place and distinctiveness, rarity and representativeness and the extent to which these attributes have remained intact. A landscape with consistent, intact and well-defined, distinctive attributes is generally considered to be of higher quality and in turn, higher value than a landscape where the introduction of inappropriate (uncharacteristic?) elements has detracted from its inherent attributes.
- Landscape experience: The experience of the landscape character receptor can add to its value and relates to a number of factors including the perceptual responses it evokes, the cultural associations that may exist in literature or history, or the iconic status of the landscape in its own right, the

recreational value of the landscape for outdoor pursuits, and the contribution of other values relating to the nature conservation or archaeology of the area.

Susceptibility to Change

3.3.8 The susceptibility of a landscape character receptor to change is a reflection of its ability to accommodate the changes that would occur as a result of the type or nature of change proposed. The assessment of the susceptibility of the landscape receptor to change is classified as high, high-medium, medium, medium-low or low and the basis for this assessment is made clear using evidence and professional judgement, based on the following criteria:

- The type or nature of change proposed: The susceptibility of landscape receptors is assessed in relation to change arising from the specific type and nature of development proposed.
- Landscape character: The key characteristics of the existing landscape is considered in the evaluation of susceptibility as the degree to which the receptor may accommodate the influence of the type or nature of change proposed is determined. For example, a landscape that is of a particularly wild and remote character may have a higher susceptibility to the influence of the type or nature of change proposed due to the contrast that it would have with the landscape, whereas a developed, industrial landscape, where built elements and structures are already part of the landscape character, may have a lower susceptibility. However, there are instances when the quality of a landscape may have been degraded to an extent whereby it is considered to be in a fragile state and therefore a degraded landscape may have a higher susceptibility to the type or nature of change proposed.
- Landscape association: The extent to which the type or nature of change proposed would influence the character of the landscape receptors across the study area, relates to the associations that exist between the landscape receptor where the Proposed Development is located and the landscape receptor from which the type or nature of change is being experienced. In some situations, this association would be strong where the landscapes are directly related, for example the influence on a valley landscape by an enclosing upland landscape where the Proposed Development is set along the skyline, and in other situations weak where the landscape association is less important; for example, where the Proposed Development lies inland of a coastal landscape that has its main focus outwards over the sea.

Sensitivity Rating

3.3.9 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. An overall level of sensitivity is applied for each landscape receptor: high, high-medium, medium, medium-low and low; by combining individual assessments of the value of the receptor and its susceptibility to change. The basis for the assessments is made clear using evidence and professional judgement in the evaluation of sensitivity for each receptor. Criteria that tend towards higher or lower sensitivity are set out in Table 5.1.2.

Table 5.1.2: Sensitivity to change – landscape receptors.

Criteria tending towards higher or lower sensitivity						
Value	High	→	Medium	→	Low	

	Designated landscapes with national policy level protection or defined for their natural beauty. Higher quality landscapes with consistent, intact and well-defined, distinctive attributes. Rare or unique landscape character types or features. Aesthetic or perceptual aspects of designated wildlife, ecological, geological or cultural heritage features that contribute to landscape character and local / regional identity. Evidence that the landscape is valued or used substantially for recreational activity. Landscape with perceptual qualities of wildness, remoteness or tranquillity. Landscape with strong cultural associations that contribute to perceptions of scenic quality.	Landscapes without formal designation. Despoiled or degraded landscape with little or no evidence of being valued by the community. Lower quality landscapes with indistinct elements or features that detract from its inherent attributes. Widespread or 'common' landscape character types or features. Limited or no wildlife, ecological, geological or cultural heritage features, or limited contribution to landscape character and identity. No evidence that the landscape is used for recreational activity. Landscape with inherent character has been changed by human activity. Landscape with few cultural associations.
Susceptibility to Change	High → Medium → Low	
	Landscape key characteristics which are likely or liable to be influenced by the type or nature of change proposed. Landscape vulnerable or fragile to change through the loss or addition of features that would alter key landscape characteristics. Landscape which lacks the ability to resist/accommodate the change that is likely to occur as a result of the type or nature of change proposed. Landscape of high quality/in good condition. Aesthetic or perceptual aspects of landscape are susceptible to changes associated with the type or nature of change proposed. Strong or direct association between Proposed Development and the landscape receptor. Landscape which is directly exposed to the type or nature of change proposed and has highest degree of exposure.	Landscape characteristics which are unlikely or not liable to be influenced by the type or nature of change proposed. Robust landscape, able to accommodate change or loss of features without altering key characteristics. Landscape which has the ability to resist/accommodate the change that is likely to occur as a result of the type or nature of change proposed. Landscape of low quality/in poor condition. Aesthetic or perceptual aspects of landscape may accommodate changes associated with features of type or nature of change proposed. Weak and indirect association between the landscape receptor and the type or nature of change proposed. Landscape which is not directly exposed to the type or nature of change proposed and has degree of concealment/screening.
Sensitivity to Change	High → Medium → Low	

Magnitude of Change on Landscape Character Receptors

3.3.10 The magnitude of change on views is primarily an expression of the scale of the change that would result from the Proposed Development and is dependent on a number of variables regarding the size or scale of the change. An assessment is also made of the geographical extent of the area over which this

would occur and the duration and reversibility of such changes. The basis for this assessment is made clear using evidence and professional judgement, based on the following criteria.

Size or Scale of Change

3.3.11 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:

- The degree to which the pattern of elements that makes up the landscape character would be altered by the Proposed Development, through removal or addition of elements in the landscape, in this instance. The magnitude of change would generally be higher if key features that make up the landscape character are extensively removed or altered, and if many new components are added to the landscape.
- The extent to which the Proposed Development would change, physically or perceptually, the characteristics and any qualities identified that may be important in the creation of the distinctive character of the landscape. This may include the scale of the landform, its relative simplicity 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 with these key characteristics.
- The degree to which landscape character receptors would be changed by the addition of the Proposed Development, in place of or in addition to, baseline wind energy developments that are already present in the landscape. If the Proposed Development is located in a landscape receptor that is already affected by wind energy development, this may reduce the magnitude of change, particularly if there is a high level of integration and the developments form a unified and cohesive feature in the landscape. The converse could also be applicable.
- The landscape context in which the Proposed Development and other wind energy development are located. If the Proposed Development is located in a similar landscape context, the magnitude of change is likely to be lower as they relate consistently to key landscape characteristics. If developments are located in different landscape settings, this can lead to a perception that wind energy development is unplanned and uncoordinated, affecting a wide range of landscape characters and blurring the distinction between them.
- In relation to designated landscapes, the degree of change is considered against the special landscape qualities, which underpin the designation and the impact 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 receptors and their overall integrity.
- The scale of the landscape, landform and patterns of the landscape. A large-scale landscape can provide a more appropriate receiving environment than a more intimate, small-scale setting where development may result in uncomfortable scale comparisons and increase the magnitude of change.
- The distance between the landscape character receptor and the Proposed Development. Generally, the greater the distance, the lower the scale of change as the Proposed Development would constitute a less apparent influence on the landscape character.
- The extent of the Proposed Development that would be seen from the landscape receptor. Visibility of the Proposed Development may range from one turbine blade tip to all of the turbines, and generally the greater the extent of the Proposed Development that can be seen, the greater the change.

Geographical Extent

3.3.12 The geographical extent over which the landscape effects would be experienced is also assessed, which is distinct from the size or scale of effect. The extent of the effects varies depending on the specific nature of the Proposed Development and is principally assessed through analysis of the extent of visibility of physical change to the landscape or the extent to which the experience of that landscape character would change through visibility of the Proposed Development. This evaluation expresses the extent of the receptor that would experience a particular magnitude of change and can affect the geographical extents of the significant and non-significant effects.

Duration and Reversibility

3.3.13 The duration and reversibility of landscape effects are based on the period over which the Proposed Development is likely to exist and the extent to which the Proposed Development would be removed, and its effects reversed at the end of that period. Where relevant, duration and reversibility are stated separately in relation to the assessed effects.

Magnitude of Change Rating

3.3.14 An overall assessment of the magnitude of change resulting from the Proposed Development on the landscape receptor is made by combining the assessments of size or scale of change and geographical extent. The basis for the assessment of magnitude for each receptor is made clear using evidence and professional judgement. The levels of magnitude of change that can occur are defined as follows:

- High: the Proposed Development would result in a major alteration to the baseline characteristics of the landscape, providing the prevailing influence and/or introducing elements that are uncharacteristic in the receiving landscape.
- Medium: the Proposed Development would result in a moderate alteration to the baseline characteristics of the landscape, providing a readily apparent influence and/or introducing elements potentially uncharacteristic in the receiving landscape.
- Low: the Proposed Development would result in a minor alteration to the baseline characteristics of the landscape, providing a slightly apparent influence and/or introducing elements that are characteristic in the receiving landscape.
- Negligible: the Proposed Development would result in a negligible alteration to the baseline characteristics of the landscape, providing a barely discernible influence and/or introducing elements that are substantially characteristic in the receiving landscape.
- None: the Proposed Development would result in no change to the baseline characteristics of the landscape.

3.3.15 There may also be intermediate levels of magnitude of change, such as high-medium and medium-low, where the change falls between definitions. Criteria that tend towards higher or lower magnitude of change are set out in Table 5.1.3.

Table 5.1.3: Magnitude to Change Criteria – Landscape Receptors

Criteria tending towards higher or lower magnitude				
	High →	Medium →	Low →	Negligible

Size or scale of change	Major loss of existing landscape elements which contribute to the landscape character. Major alteration to pattern of elements, or perception of landscape pattern, through removal or addition of landscape elements. Major change to key characteristics which define the distinctive character of the landscape. Proposed Development located within or close to landscape receptor and results in large scale change to its landscape character. Large amount of Proposed Development visible resulting in higher scale of change. Proposed Development contrasts with other existing windfarms in pattern, scale and relationship to key characteristics, creating a confusing or inconsistent image or relationship to key characteristics.	Minor or negligible loss of existing landscape elements. Minor alteration to pattern of elements, or perception of landscape pattern. Minor change to key characteristics, or changes to characteristics which are not part of inherent distinctiveness. Proposed Development located at long distance outside landscape receptor and result in small scale change to its landscape character. Small amount of Proposed Development visible resulting in lower scale of change. Proposed Development consolidates existing windfarms, relates consistently to a key characteristic of the landscape and/or has a high level of integration forming a unified and cohesive feature in the landscape.
Magnitude of Change	High → Medium → Low → Negligible	

Significance of Effects on Landscape Character Receptors

3.3.16 The effect on each landscape character receptor is dependent on all of the factors considered in the sensitivity of the receptor, and the magnitude of change resulting from the Proposed Development. These judgements on sensitivity and magnitude are then combined to arrive at an overall assessment as to whether the Proposed Development would have an effect that is significant or not significant on the landscape character receptor. An assessment of the factors considered in the evaluation of the sensitivity of each landscape character receptor and the magnitude of the change resulting from the Proposed Development are presented in the assessment in order that the relevant considerations which have informed the significance can be considered transparently. The matrix shown in Table 5.1.1 helps to inform the threshold of significance when combining sensitivity and magnitude to assess significance.

3.3.17 A significant effect would occur where the combination of the variables results in the Proposed Development having a defining effect on the landscape character receptor, or where changes of a lower magnitude occur on a landscape character receptor that is of particularly high sensitivity. A not significant effect would occur where the effect of the Proposed Development is not definitive, and the landscape character of the receptor continues to be characterised principally by its baseline characteristics, or where the small scale of change experienced by a high sensitivity receptor is such as to be considered not significant. A major loss or irreversible effect over an extensive area, on elements and/or perceptual aspects that are key to the character of nationally valued landscapes are likely to be of greatest significance. Reversible effects, over a restricted area, on elements and/or perceptual aspects that contribute to but are not key characteristics of the character of landscapes that are of lower value, are likely to be of least significance.

4 VISUAL ASSESSMENT

4.1.1 The assessment of visual effects is an assessment of how the introduction of the Proposed Development would affect the views available to people and their visual amenity. The assessment of visual effects is carried out in two parts:

- an assessment of the effects that the Proposed Development would have on a series of viewpoints that have been selected to represent the views available to people from representative or specific locations within the study area.
- an assessment of the effects that the Proposed Development would have from principal visual receptors, including residents of settlements, motorists using roads and people using recreational routes, features and attractions throughout the study area.

4.1.2 The objective of the assessment of effects on visual receptors is to determine what the likely effects of the Proposed Development would be on the people experiencing views across the study area, and whether these effects would be significant or not significant. The methodology for the assessment of visual effects involves the undertaking of a baseline study, evaluation of sensitivity, magnitude of change and an assessment of significance.

4.2 Visual Baseline and Preliminary Assessment

4.2.1 The visual baseline establishes the area in which the Proposed Development may be visible, the different groups of people who may experience views of the Proposed Development, the viewpoints where they would be affected and the nature of the views at those points. The baseline description of the groups of people (referred to as visual receptors) and viewpoints that may be affected is primarily determined by the ZTV. An overview of the visual baseline is described, and a preliminary assessment identifies visual receptors that may experience significant effects, which require to be assessed in full. A full description of the baseline is provided for each visual receptor that may experience significant effects. Those receptors for which likely significant effects which are not predicted are scoped out of further detailed assessment but are noted with reasons given for their exclusion. The baseline study establishes the visual baseline in relation to the following matters:

- the area from which the Proposed Development may be visible, that is land from which it may potentially be seen, is established and mapped using an initial ZTV of the Proposed Development.
- the location, type and number of visual receptors experiencing visibility of the Proposed Development, the likely views experienced and the activity / occupation they are engaged in.
- selection of viewpoints from within the ZTV, including representative viewpoints selected to represent the experience of different types of visual receptor and specific viewpoints selected because they are key/promoted viewpoints in the landscape.
- the location, character and type of each viewpoint with an indication of the type of visual receptor likely to be experiencing the view from each viewpoint.
- the nature of the view in terms of both the direction of view towards the Proposed Development as well as the wider available view, making reference to the principal orientation, focal features, and visible extents in terms of both horizontal degrees and distance.
- the character of the view in terms of its content and composition, its horizontal and vertical scale as well as depth and sense of perspective, important attributes such as prominent skylines and focal points and ultimately identifying the defining patterns and features which characterise the view.

- scenic qualities of the view in terms of an individual or combination of characteristics, in the view that contribute to distinctiveness and identify.
- the influence of human intervention and how the addition of artefacts and modification through land use affect the baseline situation. This may include operational wind farms where they are a feature of the baseline visual context.

4.2.2 The visual baseline also describes current pressures that may cause change to the visual amenity of the area in the future, in particular drawing on information for wind energy developments that are not yet present in the landscape but are at other stages in the project and consenting process. Operational and under construction wind energy developments are regarded as part of the baseline visual context. Any changes resulting from the Proposed Development are assessed within this context in the assessment of landscape and visual effects.

4.3 Assessment of Visual Effects

Sensitivity of Visual Receptors

4.3.1 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 that the Proposed Development would have on the view.

Value of the View

4.3.2 The value of a view or series of views is a reflection of the recognition and the 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 high strength of which is assessed and verified through field work. The value of a view is classified as high, high-medium, medium, medium-low or low and 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, lies within or overlooks a designated landscape area such as a National Scenic Area, or an area of scenic quality which implies a greater value to the visible landscape.
- Informal recognition: Views that are well-known at a local level 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 or used by a large number of people would tend to have greater importance than one gained by very few people, although this is not always the case. Specific or sequential views that from a particular combination of key landscape characteristics, have a defined scenic quality or qualities can also add to the value assessed.

Susceptibility to Change

4.3.3 Visual susceptibility is a function of:

- The occupation or activity of people (visual receptors) experiencing the view. The occupation or activity which receptors are engaged in is described for viewpoints and principal visual receptors. The most common groups of receptors considered in the visual assessment include residents, road-users, workers and walkers.
- The extent to which their attention or interest may be focused on views. Viewers whose attention is focused on the surrounding landscape, walkers, for example are likely to have a higher sensitivity, as would residents of properties who have a heightened appreciation of surrounding views. Viewers travelling in cars or on trains would tend to have a lower sensitivity as their view is transient and moving. The least susceptible receptors are usually people at their place of work as they are less susceptible to changes in the view.
- The visual amenity they experience. 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 to change of the viewer 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 outlook from a route is open and unobstructed the experience of the visual receptor would be altered more notably than if the experience related to a glimpsed view from a car travelling at high speed. The visual amenity experienced by the viewer also varies depending on the presence and relationship of visible elements, features or patterns experienced in the view.

4.3.4 In line with the LI GLVIA3 clarifications, visual susceptibility is not influenced by the type of development proposed, which is assessed as part of magnitude of change.

Sensitivity Rating

4.3.5 An overall level of sensitivity is applied for each visual receptor or view: high, high-medium, medium, medium-low, low; by combining individual assessments of the value of the receptor and its susceptibility to change. Each visual receptor, meaning the person or group of people likely to be affected 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 6.4.

Table 5.1.4: Sensitivity to change – visual receptors.

Criteria tending towards higher or lower sensitivity		
	High → Medium → Low	
Value	Specific viewpoint identified in OS maps and/or tourist information and signage. Facilities provided at viewpoint to aid the enjoyment of the view. View afforded protection in planning policy. View is within or overlooks a designated landscape or has high scenic quality, which implies a higher value to the visible landscape.	Viewpoint not identified in OS maps or tourist information and signage. No facilities provided at viewpoint to aid enjoyment of the view. View is not afforded protection in planning policy. View is not within, nor does it or overlook, a designated landscape or have high scenic quality. View has no informal recognition.

	View has informal recognition and well-known at a local level. View or viewpoint is recognised through references in art or literature.	View or viewpoint is not characteristic through references in art or literature.
Susceptibility to Change	High → Medium → Low	
	Viewers such as walkers, or tourists, whose main attention and interest is on their surroundings. Residents that gain static, long-term views of the surrounding landscape in their principal outlook. A view that is focused in a specific directional vista, with notable features of interest in a particular part of the view. A view of an undeveloped landscape with little or no built development and/or human influence.	Viewers whose main attention is not focused on their surroundings, such as people at work, or specific forms of recreation. Viewers whom are transient and dynamic, such as those travelling in cars or on trains, where the view is of short duration. Open views with no specific point of interest. A view of a developed, industrial landscape where built elements and structures are present.
Sensitivity to Change	High → Medium → Low	

Magnitude of Change on Views

4.3.6 The magnitude of change on views is primarily an expression of the scale of the change that would result from the Proposed Development and is dependent on a number of variables regarding the size or scale of the change. An assessment is also made of the geographical extent of the area over which this would occur and the duration and reversibility of such changes.

Size or Scale

4.3.7 An assessment is made about the size or scale of change in the view that is likely to be experienced as a result of the Proposed Development, based on the following criteria:

- The distance between the visual receptor or viewpoint and the Proposed Development. Generally, the greater the distance, the lower the magnitude of change, as the Proposed Development would constitute a smaller scale component of the view.
- The amount and size of the Proposed Development that would be seen. Visibility may range from one blade tip to all of the turbines. Generally, the larger the Proposed Development appears in the view, and the more of the Proposed Development that can be seen, the higher the magnitude of change.
- The scale of the change in the view, with respect to the loss or addition of features in the view and changes in its composition. The Proposed Development may appear in a similar part of the view to that which includes an operational wind farm, or it may appear close to or as an extension to an existing wind farm and its scale of change is assessed in the context of these existing views.
- The field of view available and the proportion of the view that is affected by the Proposed Development. Generally, the more of a view that is affected, the higher the magnitude of change would be. If the Proposed Development extends across the whole of the open part of the outlook, the magnitude of change would generally be higher as the full view would be affected; Conversely,

if the Proposed Development covers just a part of an open, expansive and wide view, the magnitude of change is likely to be reduced as the Proposed Development would not affect the whole open part of the outlook.

- The scale and character of the context within which the Proposed Development would be seen and the degree of contrast or integration of any new features with existing landscape elements, in terms of scale, form, mass, line, height, colour and motion. Contrasts and changes may arise particularly as a result of the more notable rotation movement of the wind turbine blades, as a characteristic that gives rise to effects of the Proposed Development.
- The consistency of image of the Proposed Development in relation to other developments. The magnitude of change of the Proposed Development is likely to be lower if its wind turbine height, arrangement and layout design are broadly similar to other wind farm developments in the views, as they are more likely to appear as relatively simple and logical components of the landscape.
- The uniformity of appearance of the Proposed Development in different views. If the Proposed Development appears relatively uniform and consistent in appearance from different viewpoints and viewing angles, in a similar setting and familiar form, this tends to reduce the magnitude of change. If, on the other hand, it appears inconsistent in image, scale and appearance, or from a variety of different angles, and is seen in a different form and setting, the magnitude of change is likely to be higher as it would be a variable and less familiar component of views.
- The extent of the wind energy developed skyline. If the Proposed Development would add notably to the wind energy developed skyline in a view, extending the lateral spread of development or increasing the perceived connection between other wind farms, the magnitude of change would tend to be higher.
- Where a particular scenic quality or combined scenic qualities are strongly expressed, the extent to which the Proposed Development would erode or detract from the appreciation of those qualities.
- The number and scale of developments seen simultaneously or sequentially. Generally, the greater the number of clearly separate developments that are visible, the higher the magnitude of change would be, whereas an extension to an existing wind farm would tend to result in a lower magnitude of change than a separate, new wind farm.
- The scale and form comparison between developments. If the Proposed Development is of a similar scale and form to other visible developments, particularly those seen in closest proximity to it, the magnitude of change would generally be lower as it would have more integration with the other wind farm projects and would be less apparent as an addition.

Geographical Extent

4.3.8 The geographic area over which the visual effects would be experienced is also assessed, which is distinct from the size or scale of effect. The extent of the effects would vary depending on the specific nature of the Proposed Development and is principally assessed through analysis of the extent of visibility of the Proposed Development from visual receptors. For example - the extent of the visual receptor (a road, footpath or settlement for example) that would experience changes through visibility of the Proposed Development; and / or the extent to which the change would affect views, whether this is unique to a particular viewpoint or if similar visual changes occur over a wider area represented by the viewpoint. If the Proposed Development is visible from extensive areas, the overall change is likely to be higher than if it is visible from a limited part of a receptor.

Magnitude of Change Rating

4.3.9 An overall assessment of the magnitude of change resulting from the Proposed Development on each visual receptor is made by combining the assessment of size or scale and geographical extent. The basis of the assessment is made clear using evidence and professional judgement. The levels of magnitude of change that can occur on views are defined as follows:

- High: the Proposed Development would result in a high level of alteration to the baseline view, providing the prevailing influence and/or introducing elements that are substantially uncharacteristic in the receiving view.
- Medium: the Proposed Development would result in a moderate alteration to the baseline view, providing a readily apparent influence and/or introducing elements potentially uncharacteristic in the receiving view.
- Low: the Proposed Development would result in a minor alteration to the baseline view, providing a slightly apparent influence and/or introducing elements that are characteristic in the receiving view.
- Negligible: the Proposed Development would result in a negligible alteration to the baseline view, providing a barely discernible influence and/or introducing elements that are substantially characteristic in the receiving view.
- None: the Proposed Development would in no way change to the baseline characteristics of the view.

4.3.10 There may also be intermediate levels of magnitude of change, such as high-medium or medium-low, which is an intermediate rating with a combination of criteria from high or medium magnitude of change category. Criteria that tend towards higher or lower magnitude of change are set out in Table 5.1.5.

Table 5.1.5: Magnitude to Change Criteria – Visual Receptors

Criteria tending towards higher or lower magnitude		
	High → Medium	Low → Negligible
Size or scale of change	Large scale change in the view resulting from loss and/or addition of features and changes in its composition. Proposed Development located in close proximity to the viewpoint and would form large scale component of the view. All or majority of the Proposed Development would be visible in the view e.g. full towers and rotor sweep. Proposed Development effects large proportion of available field of view. Proposed Development has high degree of contrast/low degree of integration with existing landscape elements, in terms of scale, form, mass, line, height, colour and texture. Proposed Development appears inconsistently, in a different setting and/or form each time it is visible.	Small scale change in the view resulting from loss and/or addition of features and changes in its composition. Proposed Development located at long distance from the viewpoint and would form small scale component of the view. Limited amount of the Proposed Development would be visible in the view e.g. extremity of blade tips. Proposed Development effects small proportion of available field of view. Proposed Development has low degree of contrast/high degree of integration with existing landscape elements, in terms of scale, form, mass, line, height, colour and texture. Proposed Development appears consistent, in a similar setting and/or form each time it is visible.

	Proposed Development contrasts with other existing windfarms in pattern, scale and relationship to key characteristics, creating a confusing or inconsistent image or relationship to key characteristics.	Proposed Development consolidates existing windfarms, relates consistently to a key characteristic of the landscape and/or has a high level of integration forming a unified and cohesive feature in the landscape.
Geographical Extent	Extensive / long distance → Scattered / mid-range → Limited / short distance	
	Proposed Development is visible over long distances. Proposed Development is visible from widespread areas/extensive parts of visual receptor. Visibility/views of Proposed Development occur over a wider area represented by multiple viewpoints.	Proposed Development is visible only at short range. Proposed Development is visible from restricted areas/limited parts of visual receptor. Visibility/view of Proposed Development is unique to a particular location or viewpoint.
Magnitude of Change	High → Medium → Low → Negligible	

Significance of Effects on Views

4.3.11 The significance of the effect on each view is dependent on all of the factors considered in the sensitivity of the view, and the magnitude of change resulting from the Proposed Development. These judgements on sensitivity and magnitude are combined to arrive at an overall assessment as to whether the Proposed Development would have an effect that is significant or not significant on the visual receptor.

4.3.12 Table 5.1.1 helps to inform the threshold of significance when combining sensitivity and magnitude to assess the significance of effect. A significant effect would occur where the combination of the variables results in the Proposed Development having a defining effect on the view or where changes of a lower magnitude occur on a view or visual receptor that is of particularly high sensitivity. A not significant effect would occur where the appearance of the Proposed Development is not definitive, and the view continues to be defined principally by its baseline characteristics; or where the small scale of change is experienced by a high sensitivity receptor. Irreversible, long-term effects on people who are particularly sensitive to changes in views and visual amenity are more likely to be significant, as are effects on people at recognised viewpoints or views judged to have high scenic quality. Large-scale changes which introduce new, non-characteristic or discordant elements into the view are also more likely to be significant than small changes or changes involving features already present within the view.

4.3.13 The assessment of visual effects assumes clear weather and optimum viewing conditions. This means that effects that are assessed to be significant may be not significant under different, less clear conditions. Viewing conditions and visibility tend to vary considerably and therefore the likelihood of effects resulting from the Proposed Development would vary greatly dependent according to the prevailing viewing conditions.

5 NATURE OF EFFECTS

5.1.1 The nature of effects refers to whether the landscape and/or visual effect of the Proposed Development

is positive or negative (herein referred to as 'beneficial' and 'adverse'). Guidance provided by the Landscape Institute on the nature of effect in GLVIA3 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. 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 wind farms are difficult to categorise in either of these brackets as, unlike other disciplines, there are no definitive criteria by which the effects of wind farms can be measured as being categorically 'beneficial' or 'adverse'. In some disciplines, such as noise or ecology, it is possible to quantify the effect of a wind farm in numeric terms, by objectively identifying or quantifying the proportion of a receptor that is affected by the Proposed Development 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. Generally, in the development of 'new' wind farms, a precautionary approach is adopted, which assumes that significant landscape and visual effects will be weighed on the adverse side of the planning balance. Unless it is stated otherwise, the effects considered in this assessment are 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:

5.1.2 Beneficial effects contribute to the landscape and visual resource through the enhancement of desirable characteristics or the introduction of new, beneficial attributes. The Proposed Development contributes to the landscape by virtue of good design, even if it contrasts with the existing character. The removal of undesirable existing elements or characteristics can also be beneficial, as can their replacement with more appropriate components.

5.1.3 Neutral effects occur where the Proposed Development fits with the existing landscape character or visual amenity. The Proposed Development neither contributes to nor 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. A change to the landscape and visual resource is not considered to be adverse simply because it constitutes an alteration to the existing situation.

5.1.4 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.

6 DURATION AND REVERSIBILITY

6.1.1 The EIA Regulations require a description of the likely significant effects on factors including (among other things) 'short-term, medium-term and long-term, permanent and temporary effects'.

6.1.2 Duration (short, medium or long-term) and reversibility (permanent or temporary) are separate but linked considerations. Duration of effects are judged on a scale as long-term, medium-term and short-term effects, defined in this methodology as follows:

- Long-term – more than 10 years;

- Medium-term – 5 to 10 years.
- Short-term – 1 to 4 years.

6.1.3 Reversibility is a judgement about the degree of permanence or temporary nature of an effect, determined by the prospects and the practicality of the particular effect being reversed and the time period over which this may occur. Some forms of development can be considered permanent, while others can be considered temporary or reversible since they have a limited operational life and would be removed and/or the land reinstated.

6.1.4 The effect of the Proposed Development is considered to be long term and reversible, in that the wind turbines and infrastructure can be removed and their effects largely reversed at the end of the 50 year operational period. The effect of the construction of the Proposed Development is assessed as temporary and short-term in this LVIA. Other infrastructure and operations such as the construction processes and plant (including tall cranes and heavy machinery for turbine erection) and construction and storage compounds would be apparent only during the initial construction period of the Proposed Development and are assessed as short-term and reversible effects. Should decommissioning of any part of the Proposed Development be required e.g. failure of a wind turbine beyond economic repair, it is considered that any effects would be less than those resulting from construction of the Proposed Development, and as such this potential for decommissioning has been scoped out of further assessment.

7 ASSESSMENT OF CUMULATIVE EFFECTS

7.1 Introduction

7.1.1 The Cumulative Impact Assessment (CIA) takes into account the impact associated with the Proposed Development together with other relevant plans, projects and activities. Cumulative effects are therefore the additional or combined effect of the Proposed Development in combination with the effects from a number of different projects, on the same receptor or resource.

7.1.2 In GLVIA3 (Landscape Institute and IEMA, 2013, p120) the guidelines define cumulative landscape and visual effects as those that *'result from additional changes to the landscape and visual amenity caused by the Proposed Development in conjunction with other developments (associated with or separate to it), or actions that occurred in the past, present or are likely to occur in the foreseeable future.'*

7.1.3 NatureScot's guidance, 'Assessing the Cumulative Impact of Onshore Wind Energy Developments' (2021) is widely used across the UK to inform the specific assessment of the cumulative effects of wind farms. This guidance provides the basis for the methodology for the cumulative assessment.

7.1.4 The guidance defines the following types of cumulative effects:

- '*The purpose of a Cumulative Landscape and Visual Impact Assessment (CLVIA) is to describe, visually represent and assess the ways in which a proposed wind farm would have additional impacts when considered with other consented or proposed wind farms.'* (NatureScot 2021, p8).
- '*Cumulative impacts can change either the physical fabric of character of the landscape, or any special values attached to it'* (NatureScot 2021, p7).
- '*Cumulative impacts on visual amenity can be caused by 'combined visibility' and/or 'sequential impacts'*. (NatureScot 2021, p7).

7.1.5 The degree to which cumulative effects occur, or may occur, as a result of more than one wind farm/development being constructed/becoming operational are a result of:

- The distance between individual wind farms/relevant developments.
- The interrelationship between their ZTVs.
- The overall character of the landscape and its sensitivity to wind farms/other relevant development.
- The siting, scale and design of the wind farms/developments themselves.
- The way in which the landscape is experienced.

7.2 Scope of the Cumulative Assessment

7.2.1 NatureScot's guidance highlights that '*The purpose of a Cumulative Landscape and Visual Impact Assessment (CLVIA) is to describe, visually represent and assess the ways in which a proposed wind farm would have additional impacts when considered with other consented or proposed wind farms. It should identify the significant cumulative impacts arising from the proposed wind farm'* GLVIA3, p120 also highlights that 'the focus of the cumulative assessment will be on the additional effect of the project in conjunction with other developments of the same type (as for example, in the case of wind farms)'

7.2.2 In accordance with the aforementioned guidance, the cumulative assessment focuses on the addition of the Proposed Development to other wind farm development. Wind energy development data was sourced directly from relevant local authorities, a range of wind energy developer web sites and local authority online planning application portals.

7.2.3 NatureScot guidance highlights that '*The assessment should be proportionate to the likely impacts and all CLVIA should accord with the guidelines within GLVIA3. The emphasis should be on the production of relevant and useful information, highlighting why the proposals assessed have been included and why others have been excluded, rather than the provision of a large volume of information.'* (NatureScot 2021, p8).

7.2.4 The cumulative assessment therefore focuses on identifying cumulative effects which are likely to be a key consideration in determining the application, rather than an assessment of every potential cumulative effect. The outcome of the cumulative assessment is the identification of any significant cumulative effects that may arise from the addition of the Proposed Development to the cumulative situation, in accordance with NatureScot guidance, which states that cumulative assessment should *'focus on the likely significant impacts and those which are likely to influence the outcome of the consenting process'.*

7.2.5 A review of the broad wind farm context within 45 km radius has been undertaken including all wind turbine developments that are operational, under construction, consented or at planning application stage and are over 50 m to tip in height. It is considered that turbines below 50 m in height are unlikely to result in significant cumulative effects with the Proposed Development. The cumulative situation changes frequently as applications are made or withdrawn, and the layouts of submitted application wind farms are changed. It is therefore necessary to decide on a cut-off date when the sites and layouts to be included are fixed, which for the LVIA is August 2024. Any changes in the cumulative wind farm situation after this date are not incorporated in the assessment. Scoping stage sites are also included on the cumulative baseline map for reference. Based on surrounding topography, the extent of theoretical visibility of the Proposed Development and the locations of groups of wind farm developments within the wider 45 km Study Area it is considered that there is no potential for significant

cumulative effects between the Proposed Development and any of the cumulative sites located beyond 20 km and as such the cumulative assessment is focussed on this detailed study area.

7.3 Cumulative Development Scenarios

7.3.1 GLVIA3 (Landscape Institute and IEMA, 2013, p120) advises in relation to the baseline, taking 'the Proposed Development' to mean the main proposal that is being assessed, ‘it is considered that existing schemes and those which are under construction should be included in the baseline for both landscape and visual effects assessments (the LVIA baseline). The baseline for assessing cumulative landscape and visual effects should then include those schemes considered in the LVIA and in addition potential schemes that are not yet present in the landscape but are at various stages in the development and consenting process’. The LVIA follows this approach and the cumulative effects that would potentially arise from the addition of the Proposed Development into a context that includes existing or under construction wind farms are assessed, with the effects considered against the landscape and visual baseline.

7.3.2 In terms of the timescale of proposals for inclusion, both NatureScot guidance and GLVIA3 advise in their guidance that the assessment of the cumulative impacts associated with the Proposed Development should encompass the effects of the proposal in combination with existing, under construction, consented and application stage wind farms awaiting determination.

7.3.3 The likely significant cumulative effects of the Proposed Development are typically assessed in relation to a ‘consented’ and ‘application’ scenario.

- The consented scenario: the cumulative assessment assesses the effect of the Proposed Development in addition to wind farms already present in the landscape (operational/under construction wind farms) and wind farms that are likely to soon be present (consented wind farms) ('the consented scenario'). The cumulative assessment in the consented scenario identifies the magnitude of change that would arise due to the contribution of the Proposed Development, when considered with operational, under construction and consented wind energy developments in the landscape. The effects identified are considered as having some likelihood to arise, on the assumption that consented wind farms will be built and become operational, however, it is sometimes the case that consented wind farms are not ultimately built, which reduces the likelihood of consented scenario effects arising.
- The application stage scenario: a further hypothetical scenario is also assessed, that not only takes into the account the operational, under construction and consented wind farms, but also those that have valid (but as yet undetermined) planning applications ('the application stage scenario'). The cumulative assessment in the application stage scenario identifies the magnitude of additional cumulative change that would arise due to the contribution of the Proposed Development, when considered with operational, consented and application stage wind energy developments in the landscape. The effects identified are considered as being less likely to arise, as it is unlikely that all application stage wind farms will gain consent.

7.3.4 In line with GLVIA3 and NS cumulative guidance, scoping stage sites are generally not considered in detailed assessment due to layout and design uncertainties at the pre-application stages. In relation to the Proposed Development, the exception to this is the Glen Lednock Wind Farm which has been included in the cumulative assessment in the LVIA as a result of its close proximity to the Proposed Development site. It should be noted however that a large degree of uncertainty applies to this assessment scenario.

7.4 Types of Cumulative Effect

7.4.1 The aim of the cumulative assessment is to identify the additional changes which would be brought about by the Proposed Development when considered in conjunction with other wind farms. In accordance with guidance (NatureScot, 2021), the LVIA for each receptor considered assesses the effect arising from the addition of the Proposed Development to the cumulative situation, and not the overall effect of multiple wind farms. Adjacent developments may complement one another, or may be discordant with one another, and it is the increased or reduced level of significance of effects which arises as a result of this change that is assessed in the cumulative assessment.

7.4.2 However, in considering the detailed cumulative effects described within the LVIA, a broad statement relating to the combined cumulative effect of multiple wind farms in the area has also been provided in the LVIA summary.

Cumulative Landscape Effects

7.4.3 The cumulative development of wind farms within a particular area may build up to create different types of landscape. Significant cumulative landscape effects may arise where a 'Landscape with wind farms' is created, as a result of the addition of the Proposed Development to other existing or proposed wind farms, which results in wind turbines becoming sufficiently prolific that they become a prevailing or key landscape and visual characteristic.

7.4.4 The significance of the cumulative landscape effect from the addition of the Proposed Development reflects the intensification of wind farms within the landscape, which is assessed as follows:

- The Proposed Development forms a separate isolated feature from other wind farms within the landscape, too infrequent and of insufficient influence to be perceived as a characteristic of the area. The cumulative landscape effect of the Proposed Development is unlikely to be significant.
- The addition of the Proposed Development results in wind farms forming a key characteristic of the landscape, exerting sufficient presence as to establish or increase the extent of a 'landscape with wind farms', but not of sufficient dominance to be a defining characteristic of the area. The cumulative landscape effect of the Proposed Development may be significant or not significant, depending on the sensitivity of the receptor, magnitude of the change and specific effects arising from the Proposed Development.
- The addition of the Proposed Development results in wind farms forming the prevailing characteristic of the landscape, seeming to define the landscape as a 'wind farm landscape' character type. The cumulative landscape effect of the Proposed Development is likely to be significant.

7.4.5 These effects can occur at varying scales, for example, effecting a local character type, or at a regional level, which is assessed as part of the geographic extent assessment in the LVIA.

7.5 Cumulative Visual Effects

7.5.1 Cumulative visual effects consist of combined and sequential effects:

- Combined visibility occurs where the observer is able to see two or more developments from one viewpoint. Combined visibility may either be 'in combination', where several wind farms are within the observer's main angle of view at the same time, or 'in succession', where the observer has to turn to see the various wind farms. The cumulative visual effect of the Proposed Development may

be significant or not significant depending on factors influencing the cumulative magnitude of change, such as the degree of integration and consistency of image with other wind farms in combined views; and the position of the development relative to other wind farms and the landscape context in successive views.

- Sequential visibility occurs when the observer has to move to another viewpoint to see different developments. Sequential effects are assessed along regularly used routes such as major roads, railway lines and footpaths. The occurrence of sequential effects range from 'frequently sequential' (the features appear regularly and with short time lapses between, depending on speed of travel and distance between the viewpoints) to 'occasionally sequential' (long time lapses between appearances, because the observer is moving slowly and/or there are large distances between the viewpoints). The cumulative visual effect of the Proposed Development is more likely to be significant when frequently sequential.

7.5.2 The methodology for the assessment of cumulative landscape and visual effects involves the undertaking of a baseline study of the existing and potential future wind farm/other relevant development influence, an evaluation of sensitivity, magnitude of change and the resulting significance of cumulative effects.

Cumulative Sensitivity of Landscape and Visual Receptors

7.5.3 In evaluating cumulative sensitivity, the value component of the assessments of sensitivity would not change, however, in an evolving wind farm/other relevant development context, the susceptibility of a landscape and visual receptor to the introduction of the Proposed Development may increase or decrease. This is therefore re-evaluated based on the criteria contained in the landscape and visual susceptibility criteria sections of this methodology.

Cumulative Magnitude of Change

7.5.4 The cumulative magnitude of change is an expression of the degree to which landscape character receptors and visual receptors/views would be changed by the addition of the Proposed Development to wind farms/other relevant developments that are already operational, consented or at application stage. Where required, scoping stage wind farms and other early stage developments may exceptionally be included. The cumulative magnitude of change is assessed according to a number of criteria, described as follows:

- The location of the Proposed Development in relation to other wind farm developments. If the Proposed Development is seen in a part of the view or setting to a landscape receptor that is not affected by other development, this would generally increase the cumulative magnitude of change as it would extend influence into an area that is currently unaffected by development. Conversely, if the Proposed Development is seen in the context of other sites, the cumulative magnitude of change may be lower as development is not being extended to otherwise undeveloped parts of the outlook or setting. This is particularly true where the scale and layout of the Proposed Development is similar to that of the other sites as where there is a high level of integration and cohesion with an existing site, the various developments may appear as a single site.
- The extent of the developed skyline. If the Proposed Development would add notably to the developed skyline in a view, the cumulative magnitude of change would tend to be higher as skyline development can have a particular influence on both views and landscape receptors.
- The number and scale of developments seen simultaneously or sequentially. Generally, the greater the number of clearly separate developments that are visible, the higher the cumulative magnitude

of change would be. The addition of the Proposed Development to a view or landscape where a number of smaller developments are apparent would usually have a higher cumulative magnitude of change than one or two large developments as this can lead to the impression of a less co-ordinated or strategic approach.

- The scale comparison between developments. If the Proposed Development is of a similar scale to other visible developments, particularly those seen in closest proximity to it, the cumulative magnitude of change would generally be lower as it would have more integration with the other sites and would be less apparent as an addition to the cumulative situation.
- The consistency of image of the Proposed Development in relation to other developments. The cumulative magnitude of change of the Proposed Development is likely to be lower if its turbine height, arrangement and layout design are broadly similar to other developments in the landscape, as they are more likely to appear as relatively simple and logical components of the landscape.
- The context in which the developments are seen. If developments are seen in a similar landscape context, the cumulative magnitude of change is likely to be lower due to visual integration and cohesion between the sites. If developments are seen in a variety of different landscape settings, this can lead to a perception that wind farm development is unplanned and uncoordinated, affecting a wide range of landscape characters and blurring the distinction between them.
- The magnitude of change of the Proposed Development as assessed in the main assessment. The lower this is assessed to be, the lower the cumulative magnitude of change is likely to be. Where the Proposed Development itself is assessed to have a negligible magnitude of change on a view or receptor there would not be a cumulative effect as the contribution of the Proposed Development would equate to the 'no change' situation.

7.5.5 Definitions of cumulative magnitude of change are applied in order that the process of assessment is made clear. These are:

- High: where the addition of the Proposed Development to the landscape or view would result in a major incremental change, loss or addition to the cumulative situation.
- Medium: where the addition of the Proposed Development would result in a moderate incremental change, loss or addition to the cumulative situation.
- Low: where the addition of the Proposed Development would result in a minor incremental change, loss or addition to the cumulative situation.
- Negligible: where the addition of the Proposed Development to other wind energy developments in the landscape or view would result in a negligible incremental change, loss or addition to the cumulative situation.
- None: where the addition of the Proposed Development to other wind energy developments in the landscape or view would have no change to the cumulative windfarm situation and its addition equates to a 'no change' situation.

7.5.6 There may also be intermediate levels of cumulative magnitude of change: high-medium and medium-low; where the change falls between two of the definitions.

7.6 Significance of Cumulative Effects

7.6.1 The objective of the cumulative assessment is to determine whether any effects that the Proposed Development would have on landscape receptors and visual receptors, when seen or perceived in combination with other existing and proposed sites, would be significant or not significant. Significant cumulative landscape and visual effects arise where the addition of the proposed wind turbines or other

similar/large scale development to a specific baseline, leads to windfarms becoming a prevailing landscape and visual characteristic of a receptor that is sensitive to such change. Cumulative effects may evolve as follows:

- A small scale, single windfarm would often be perceived as a new or 'one-off' landscape feature or landmark within the landscape. Except at a local site level, it usually cannot change the overall existing landscape character, or become a new characteristic element of a landscape.
- With the addition of further windfarm development, windfarms can become a characteristic element of the landscape, as they appear as landscape elements or components that are repeated. Providing there was sufficient 'space' or undeveloped landscape/skyline between each windfarm, or the overlapping of several windfarms was not too dense; the Proposed Developments or other similar/large scale developments would appear as a series of developments within the landscape and would not necessarily become the dominant or defining characteristic of the landscape nor have significant cumulative effects.
- The next stage would be to consider larger commercial windfarms/developments and/or an increase in the number of windfarms/developments within an area that either overlap or coalesce and/or 'join-up' along the skyline. The effect is to create a landscape where the windfarm element is a prevailing characteristic of the landscape. The result would be to materially change the existing landscape character of a landscape type, or the landscape in a view and resulting in a significant cumulative effect. A landscape characterised by windfarm development may already exist as part of the baseline landscape context.

7.6.2 In relation to the significance of cumulative landscape effects, GLVIA3 notes (paragraph 7.28) that *'the most significant cumulative landscape effects are likely to be those that would give rise to changes in the landscape character of the study area of such an extent as to have major effects on its key characteristics and even, in some cases, to transform it into a different landscape type. This may be the case where the project being considered itself tips the balance through its additional effects.'*

7.6.3 GLVIA3 (paragraph 7.38) goes on to state the following in relation to the significance of cumulative visual effects:

7.6.4 'Higher levels of significance may arise from cumulative visual effects related to:

- *developments that are in closer proximity to the main project and are clearly visible together in views from the elected viewpoints.*
- *developments that are highly inter-visible, with overlapping ZTVs – even though the individual developments may be at some distance from the main project and from individual viewpoints, and when viewed individually not particularly significant, the overall combined cumulative effect on a viewer at a particular viewpoint may be more significant.'*

7.6.5 It should be noted that if the Proposed Development itself is assessed to have a significant effect, it does not necessarily follow that the cumulative effect would also be significant.

7.6.6 Less extensive, but nevertheless significant cumulative landscape and visual effects may also arise as a result of the addition of the Proposed Development where it results in a landscape or view becoming defined by the presence of more than one wind farm or similar/large scale development, so that other patterns and components are no longer definitive, or where the Proposed Development contrasts with the scale or design of an existing or Proposed Development. Higher levels of significance may arise from cumulative landscape and visual effects related to the Proposed Development being in close proximity to other wind farms when they are clearly visible together in views, however provided that the

Proposed Development is designed to achieve a high level of visual integration, with few notable visual differences between wind farms, these effects may not necessarily be significant. In particular, the effects of a wind farm extension are often less likely to be significant, where the effect is concentrated, providing that the design of the wind farms are compatible, and that the capability of the landscape to accommodate the change is not exceeded.

7.6.7 The capability of the landscape or view to accommodate the change proposed may be assessed as being exceeded where the landscape or visual receptor becomes defined by wind farm development, or if the Proposed Development extends across landscape character types or clear visual/topographic thresholds in a view. More substantial cumulative effects may result from wind farms that have some geographical separation, but remain highly inter-visible, potentially resulting in extending effects into new areas, such as an increased presence of wind farm development on a skyline, or the creation of multiple, separate wind farm defined landscapes.

7.6.8 In accordance with guidance (NatureScot, 2021), the LVIA for each receptor considered assesses the effect arising from the addition of the Proposed Development to the cumulative situation, and not the overall effect of multiple windfarms. However, in considering the detailed cumulative effects described within the LVIA, a broad statement relating to the combined cumulative effect of multiple windfarms in the area has also been provided in the LVIA summary.

8 ASSESSMENT OF LIGHTING EFFECTS

8.1.1 The Civil Aviation Authority (CAA) requires that 'en-route obstacles' at or above 150 m above ground level are lit with visible lighting to assist their detection by aircraft. As such, there is potential that parts of the Proposed Development may be visible at night. The CAA requires that all obstacles at or above 150 m above ground level are fitted with visible lighting and in the case of wind turbines these should be located on the nacelle and at an intermediate level of half the nacelle height. It should be noted that some turbines would include infra-red lighting on the turbine hubs, which would not be visible to the human eye. Details of the lighting would be agreed with the Ministry of Defence (MoD).

8.1.2 GLVIA 3 (page 103) provides the following guidance on the assessment of lighting effects: '*For some types of development the visual effects of lighting may be an issue. In these cases, it may be important to carry out night-time 'darkness' surveys of the existing conditions in order to assess the potential effects of lighting and these effects need to be taken into account in generating the 3D model of the scheme. Quantitative assessment of illumination levels, and incorporation into models relevant to visual effects assessment, will require input from lighting engineers, but the visual effects assessment will also need to include qualitative assessments of the effects of the predicted light levels on night-time visibility.'*

8.1.3 In terms of how lighting is captured in visualisations, the main change in the latest version of the NatureScot guidance 'Visual Representation of Wind Farms' (Version 2.2, February 2017) is in paragraphs 174-177, which states: '*The visualisation should use photographs taken in low light conditions, preferably when other artificial lighting (such as street lights and lights on buildings) are on, to show how the wind farm lighting will look compared to the existing baseline at night. We have found that approximately 30 minutes after sunset provides a reasonable balance between visibility of the landform and the apparent brightness of artificial lights, as both should be visible in the image.'* The night-time photography has therefore been captured in low light conditions, when other artificial lighting (such as street lights and lights on buildings) is on, to show how the windfarm lighting would look

compared to the existing baseline at night (including situations where no existing lighting is visible in the view).

8.1.4 Existing lights shown in the night-time baseline photographs can appear larger and more blurred than those seen to the naked eye in the field when the photographs were captured. The lights that encircle communication masts can also appear blurred together creating a series of combined but brighter lights when viewed at distance. The term used in photography to describe this effect is 'Bokeh' which has been defined as *'the way the lens renders out-of-focus points of light'*. This has proved difficult to avoid when taking photographs of light at varied distances across a view. The blurred nature of the lights is also exacerbated by their movement, particularly on vehicle headlights. Where the lights of the Proposed Development have been added to the night-time views this effect has been emulated.

8.1.5 The turbine blades, when they intermittently pass in front of the aviation lights, would cause randomised flickering when the lights are switched 'on'. The turbines used in the night-time visualisations have been positioned so that their blades face away from the viewpoint so that all the lights are visible and on within the visualisations, representing a worst-case scenario. The flickering effect caused by the blades interacting with the lights would be most usually apparent from a south westerly direction due to the prevailing south westerly wind.

8.1.6 The lighting represented in the viewpoint visualisations has been calibrated using examples of existing, equivalent, turbine lighting observed in the field in other parts of the UK, during similar periods of dusk / darkness. For the assessment of lighting effects, the visual sensitivity and magnitude criteria described earlier in this methodology appendix has been applied.

9 VISUAL REPRESENTATIONS

9.1.1 Zones of Theoretical Visibility (ZTVs) and visualisations, including wirelines and photomontages, are graphical images produced to assist and illustrate the LVIA and the cumulative assessment. Viewpoint photography and photomontages have been produced in accordance with the NatureScot guidance on 'Visual Representation of Wind Farms - Version 2.2' (SNH, 2017), GLVIA 3 (Landscape Institute and IEMA, 2013) and the Landscape Institute Technical Guidance Note on Visual Representation of Development Proposals (Landscape Institute, 2019).

9.2 Zone of Theoretical Visibility (ZTV)

9.2.1 The ZTVs have been generated using Geographic Information System (GIS) software to demonstrate the number of turbines that may theoretically be seen from any point in the study area. The ZTVs, show the number of turbines (blade tips) that are theoretically visible around the study area. The Hub Height ZTVs, show the number of turbine hubs theoretically visible in the study area. When used in conjunction with the Blade Tip ZTV, the Hub Height ZTV provides an indication of the degree to which the wind turbines may be visible.

9.2.2 There are limitations in this theoretical production, and these should be considered in the interpretation and use of the ZTVs:

- the ZTVs illustrate the 'bare ground' situation, and do not take into account the screening effects of vegetation, buildings, or other local features that may prevent or reduce visibility.
- the ZTVs are based on theoretical visibility from 2 m above ground level.

- the ZTVs are based on a 5 m data grid (OS Terrain 5), therefore relatively small changes in elevation may not be accounted for.
- the Blade Tip ZTV does not indicate the decrease in visibility that occurs with increased distance from the Proposed Development. The nature of what is visible from 3 km away would differ markedly from what is visible from 10 km away, although both are indicated on the Blade Tip ZTV has having the same level of visibility.
- there is a wide range of variation within the visibility shown on the ZTV, for example, an area shown on the Blade Tip ZTV as having visibility of large numbers of turbines may gain views of the smallest extremity of blade tips, or of many full turbines. This can make a considerable difference in the effects of the Proposed Development on that area. The Hub Height ZTV should be used in conjunction with the Blade Tip ZTV to provide an indication of the degree to which the wind turbines are visible.

9.2.3 These limitations mean that while the ZTV is used as a starting point in the assessment, providing an indication of where the Proposed Development would theoretically be visible, the information drawn from the ZTV is checked in the field, to ensure that the assessment conclusions represent the visibility of the Proposed Development reasonably accurately. The Horizontal Angle ZTV shows the horizontal field of view (in degrees) that may be affected by views of the turbines.

9.3 Methodology for baseline photography

9.3.1 The following photographic information is recorded in line with NatureScot guidance:

- 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.

9.3.2 The photographs used to produce the photomontages are taken at the agreed locations using Canon EOS 5D and 6D Digital SLR cameras, with a fixed lens and a full-frame (35 mm negative size) complementary metal oxide semiconductor (CMOS) sensor. The photographs are taken on a tripod with a pano-head at a height of approximately 1.5 m above ground.

9.3.3 GLVIA3 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'.*

9.3.4 In preparing photomontages for the LVIA, photographs have been taken in favourable weather conditions. Weather conditions shown in the photographs for all viewpoints have, where possible, been taken during periods of '*very good'* or '*excellent'* visibility conditions seeking to represent a maximum visibility scenario when the developments may be highly visible.

9.3.5 The night-time photography has been captured in low light conditions, when other artificial lighting (such as street-lights and lights on buildings) is on, to show how the wind farm lighting would look compared to the existing baseline at night. In relation to Viewpoint 5 at the summit of Ben Vorlich, a manipulated daytime photo has been used as the baseline photo for the nighttime visualisation. We consider this to be the most appropriate and proportionate approach that avoids the serious health and safety concerns

of consultants safely accessing this steep sloping mountain during the hours of darkness. This is line with the NatureScot 2024 Pre-application Guidance which states in relation to manipulated daytime photography - '*there may be instances where the approach could be used for remote locations where no other sources of artificial light may be present in the baseline.'*

9.4 Visualisation Production

9.4.1 Photographs and other graphic material such as wirelines and photomontages used in the assessment are for illustrative purposes only and, whilst useful tools in the assessment, are not considered to be completely representative of what would be apparent to the human eye. A photomontage is a visualisation which superimposes an image of the Proposed Development upon a photograph or series of photographs. Photomontage is a widespread and popular visualisation technique, which allows changes in views and visual amenity to be illustrated and assessed, within known views of the 'real' landscape.

9.4.2 NatureScot provides the following information on the limitations of visualisations that are produced according to the NatureScot guidance 'Visual Representation of Windfarms' (February 2017): *'Visualisations of wind farms have a number of limitations which you should be aware of when using them to form a judgement on a wind farm proposal. These include:*

- *a visualisation can never show exactly what the wind farm 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 of the turbines and the distance to the turbines but can never be 100% accurate.*
- *a static image cannot convey turbine movement, or flicker or reflection from the sun on the turbine blades as they move.*
- *the viewpoints illustrated are representative of views in the area but cannot represent visibility at all locations.*
- *to form the best impression of the impacts of the wind farm proposal these images are best viewed at the viewpoint location shown.*
- *the images must be printed at the right size to be viewed properly (260mm by 820mm); and*
- *you should hold the images flat at a comfortable arm's length. If viewing these images on a wall or board at an exhibition, you should stand at arm's length from the image presented to gain the best impression.'*

9.4.3 To create the baseline panorama, the frames are individually cylindrically projected and then digitally joined to create a fully cylindrically projected panorama using Adobe Photoshop or PTGui software. This process avoids the wide-angle effect that would result should these frames be arranged in a perspective projection, whereby the image is not faceted to allow for the cylindrical nature of the full 360-degree Horizontal Field of View (HFOV) but appears essentially as a flat plane. Tonal alterations are made using Adobe software to create an even range of tones across the photographs once joined.

9.4.4 The photographs are also joined to create planar projection panoramas using PTGui software. These are used in the creation of the 53.5-degree field of view NatureScot photomontages.

9.4.5 Wireline representations that illustrate the Proposed Development model set within a computer-generated image of the landform are used in the assessment to predict the theoretical appearance of

the turbines. These are produced with Resoft WindFarm software and are based on OS terrain 5 terrain model. There are limitations in the accuracy of DTM data so that landform may not be picked up precisely and may result in turbines being more or less visible than is shown, however, the use of OS terrain 5 minimises these limitations. Where descriptions within the assessment identify the numbers of turbines visible this refers to the illustrations generated and therefore the reality may differ to a degree from these impressions.

9.4.6 Photomontages have been produced for the majority of views, again using ReSoft WindFarm software, to provide a more realistic image of the appearance of the Proposed Development. In most views these include the introduction of the turbines only as these are the elements that create the greatest change in views and are likely to be most visible from the surrounding area. Where there is notable visibility of site infrastructure (within 5km), this is shown in the photomontages and is generated using a combination of 3D software such as Topos, Visual Nature Studio, Sketchup and 3D Studio Max.

9.4.7 The baseline photographs and cumulative wireline visualisations shown for each viewpoint cover a 90-degree HFOV (or in some cases, up to 360-degree), which accords with NatureScot guidance. These are cylindrically projected images and should be viewed flat at a comfortable arm's length.

9.4.8 In the wirelines, the turbines are shown with the central turbines facing the viewer directly, with the full rotor diameter visible at its tallest extent. In the photomontages, the turbine rotors are shown with a random appearance with the central turbines facing the viewer directly. In the night-time photomontages, lights are shown as visible and without obstruction from turbine blades.

9.4.9 The photographs and other graphic material such as wirelines and photomontages used in this assessment are for illustrative purposes only and, whilst useful tools in the assessment, are not considered to be completely representative of what would 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.

9.4.10 The 53.5-degree field of view NatureScot photomontages are prepared using a planar projected image and should also be viewed flat at a comfortable arm's length. These planar photomontage views do not always include a view of key existing windfarms in the view, and it is important therefore that the NatureScot 90 degree baseline panoramas provided are reviewed alongside these visualisations so that these existing windfarms are properly taken into account.

Night-time visualisations

9.4.11 Night-time visualisations are produced from key viewpoints, to visually represent visible aviation lighting at night. The lighting intensity shown will be both at 2,000 and 200 candela for the aviation lighting.

9.4.12 Night-time visualisations are produced using a combination of using Resoft's WindFarm software's aviation module software for positioning of the lights, 3D modelling software that can simulate lighting conditions, referencing existing lighting imagery and atmospheric conditions from the baseline photographs and professional judgement using photoshop.

9.4.13 The appearance of the lights in the night-time photomontages emulates how lights appear in the other parts of the baseline photographs. A light shown in a photograph tends to have a slight 'halo' (or bokeh) around it due to the way a camera lens renders out-of-focus points of light. This is not the way lights are seen in reality, as they tend to be much more defined as point sources. However, the proposed lighting will be shown in this way for consistency with the lights in the baseline photographs.

9.4.14 In relation to Viewpoint 5 at the summit of Ben Vorlich, the manipulation of the daytime photo has been produced using photoshop software to replicate the low light conditions of night-time photography captured at other viewpoints in order to provide the baseline photograph for photomontage production (see also Section 9.3 above).

10 REFERENCES

- Guidelines for Landscape and Visual Impact Assessment: Third Edition ('GLVIA3'). Landscape Institute and Institute for Environmental Management and Assessment (2013)
- Landscape Character Assessment Guidance for England and Scotland. NatureScot and The Countryside Agency (2002). Available at: https://digital.nls.uk/pubs/e-monographs/2020/216649977.23.pdf
- Visual Representation of Wind Farms Version 2.2. NatureScot (2017) Available at: https://www.nature.scot/sites/default/files/2019-09/Guidance%20-%20Visual%20representation%20of%20wind%20farms%20-%20Feb%202017.pdf
- Assessing the Cumulative Impact of Onshore Wind Energy Developments. NatureScot (2021). Available at: https://www.nature.scot/doc/guidance-assessing-cumulative-landscape-and-visual-impact-onshore-wind-energy-developments
- Visual Representation of Development Proposals: Landscape Institute Technical Guidance Note 06/19. Landscape Institute (2019). Available at: https://www.landscapeinstitute.org/wp-content/uploads/2019/09/LI_TGN-06-19_Visual_Representation-1.pdf
- Assessing Impacts on Wild Land Areas Technical Guidance. NatureScot (2020). Available at: https://www.nature.scot/doc/assessing-impacts-wild-land-areas-technical-guidance
- Technical Guidance Note 2/19 Residential Visual Amenity Assessment. Landscape Institute (2019). Available at: https://www.landscapeinstitute.org/technical-resource/rvaa/
- The special qualities of the National Scenic Areas. Scottish Natural Heritage Commissioned Report No. 374.NatureScot (2010). Available at: https://www.nature.scot/doc/naturescot-commissioned-report-374-special-qualities-national-scenic-areas
- Guidance for Assessing the Effects on Special Landscape Qualities. NatureScot (2024 Consultation Draft). Available at: https://www.nature.scot/doc/guidance-assessment-effects-special-landscape-qualities-aeslq
- Siting and Designing of Windfarms in the Landscape: Version 3a. NatureScot (2017). Available at: https://www.nature.scot/doc/siting-and-designing-wind-farms-landscape-version-3a
- NatureScot pre-application guidance for onshore wind farms. NatureScot (2024). Available at: https://www.nature.scot/doc/naturescot-pre-application-guidance-onshore-wind-farms