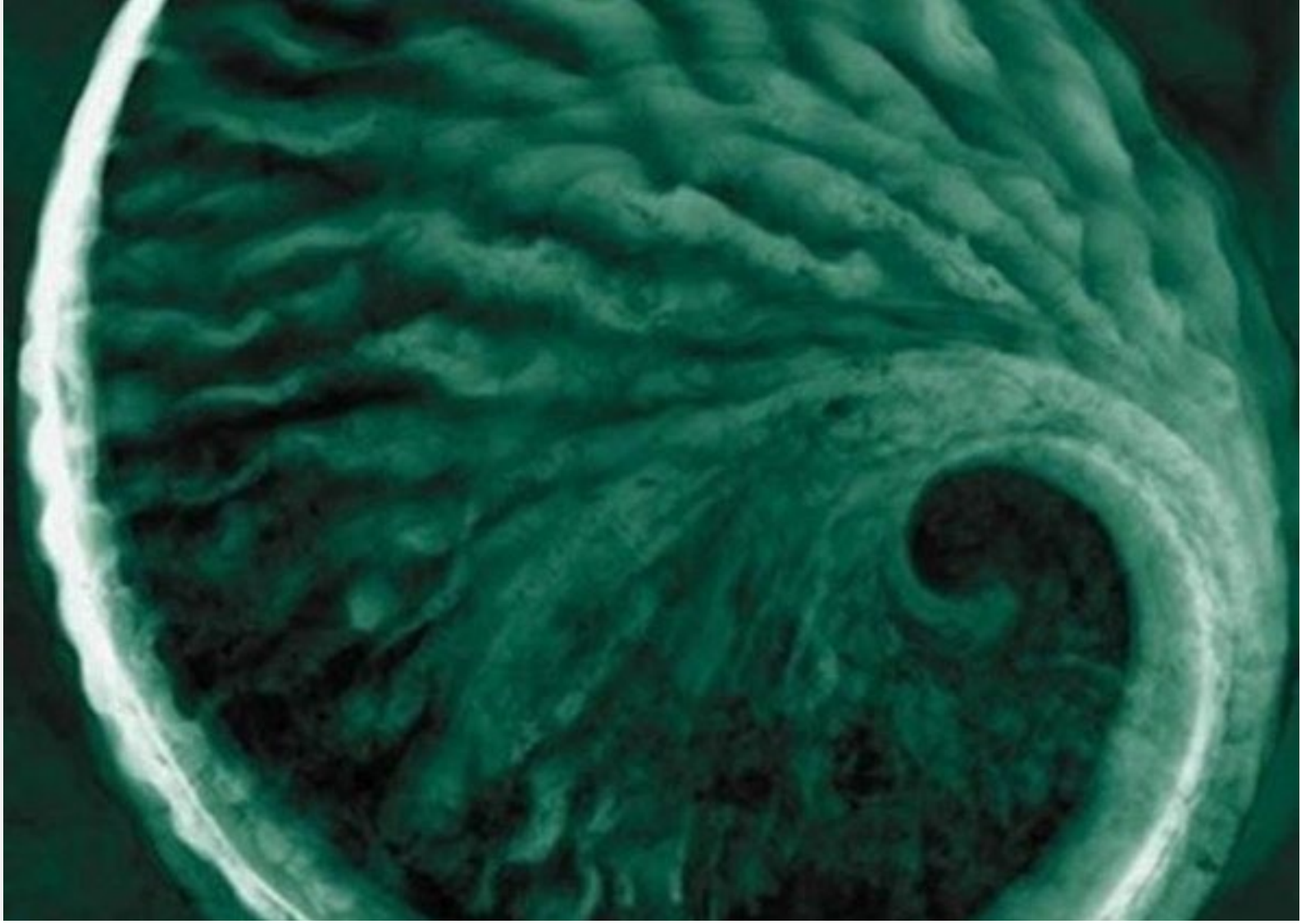

Ørsted Onshore Ireland Midco Limited

Owenreagh/Craignagapple Wind Farm

Environmental Statement – Technical Appendix A6.1: Landscape and Visual Impact Assessment Methodology

06 September 2023

Project No.: 0696177

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06 September 2023

Owenreagh/Craignagapple Wind Farm

Environmental Statement – Technical Appendix A6.1: Landscape and Visual Impact Assessment Methodology

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Acronyms and Abbreviations

Name	Description
AOD	Above Ordnance Datum
CAA	Civil Aviation Authority
CLVIA	Cumulative Landscape and Visual Impact Assessment
CMO	Complementary Metal Oxide
CZTV	Cumulative Zone of Theoretical Visibility

DTM	Digital Terrain Model
ES	Environmental Statement
EIA	Environmental Impact Assessment
FoV	Field of View
GIS	Geographic Information System
GLVIA3	Guidelines for Landscape and Visual Impact Assessment Third Edition
HFoV	High Field of View
ICAO	International Civil Aviation Organisation
IEMA	Institute of Environmental Management and Assessment
LCT	Landscape Character Type
LCA	Landscape Character Area
LDP	Local Development Plan
LI	Landscape Institute
LVIA	Landscape and Visual Impact Assessment
OPEN	Optimised Environments
OS	Operation System
OSNI	Ordnance Survey Northern Ireland
PTGUI	Panorama Photo Stitching Program
RVAA	Residential Visual Amenity Assessment
SLVIA	Seascape Landscape Visual Impact Assessment
TNG	Technical Guidance Note
SLA	Special Landscape Area
ZTV	Zone of Theoretical Visibility

1. INTRODUCTION

This technical appendix describes in detail the methodology that has been used to carry out the Landscape and Visual Impact Assessment (LVIA) for the proposed Owenreagh / Craignagapple Wind Farm, the 'Development'. The LVIA identifies and assesses the effects that the Development would have on the landscape and visual resource of the 30 km radius Study Area as set out in **Chapter 6** of this Environmental Statement (ES).

The LVIA identifies and assesses the likely significant effects resulting from the Development on both the landscape as an environmental resource and on people's views and visual amenity.

The LVIA methodology presented in this appendix is structured as follows:

- Introduction;
- Guidance, data sources and surveys;
- Overview of LVIA methodology;
- Types of landscape and visual effects;
- Evaluation of significance;
- Assessment of physical effects;
- Assessment of effects on landscape character;
- Assessment of visual effects;
- Assessing night-time visual effects;
- Assessing cumulative landscape and visual effects;
- Nature of effects; and,
- Visual representations.

2. GUIDANCE, DATA SOURCES AND SURVEYS

2.1 Guidance

The following sources have been used in the formulation of the LVIA methodology applied in the written assessment and in the preparation of visual representations:

- Landscape Institute with the Institute of Environmental Management and Assessment (2013). Guidelines for Landscape and Visual Impact Assessment, Third Edition (GLVIA3)[1];
- Carys Swanwick Department of Landscape University of Sheffield and Land Use Consultants for The Countryside Agency and NatureScot (2002). Landscape Character Assessment Guidance for England and Scotland[2];
- NatureScot (2021) Assessing the Cumulative Impact of Onshore Wind Energy Developments[3];
- NatureScot (2020). Assessing impacts on Wild Land Areas - Technical Guidance[4];
- NatureScot (2017) Siting and Designing Wind Farms in the Landscape Version 3a[5];
- NatureScot (2017). Visual Representation of Wind Farms, Version 2.2[6];
- Landscape Institute (2019) Technical Guidance Note 2/19 Residential Visual Amenity Assessment[7]; and,

[1] Landscape Institute with the Institute of Environmental Management and Assessment (2013). Guidelines for Landscape and Visual Impact Assessment, Third Edition (GLVIA3).
[2] Carys Swanwick Department of Landscape University of Sheffield and Land Use Consultants for The Countryside Agency and NatureScot (2002). Landscape Character Assessment Guidance for England and Scotland.
[3] NatureScot (2021). Assessing the Cumulative Impact of Onshore Wind Energy Developments.
[4] Scottish Natural Heritage (2021) Assessing the Cumulative Impact of Onshore Wind Energy Developments.
[5] Scottish Natural Heritage (SNH) (2017) Siting and Designing Wind Farms in the Landscape, version 3a.
[6] Scottish Natural Heritage (2017) Visual Representation of Wind Farms: Version 2.2.
[7] Landscape Institute (2019). Technical Guidance Note 2/19 Residential Visual Amenity Assessment.

- Landscape Institute (2019). Visual representation of Development Proposals: Landscape Institute Technical Guidance Note 06/19[8].

2.1.1 GLVIA3

The LVIA has been undertaken in accordance with the Landscape Institute and IEMA (2013) Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (GLVIA3). OPEN's LVIA methodology generally follows the guidance set out in GLVIA3. Where it diverges from specific aspects of the guidance, in a small number of areas, reasoned professional justification for this is provided as follows.

GLVIA3 sets out an approach to the assessment of magnitude of change in which three separate considerations are combined within the magnitude of change rating. These are the size or scale of the effect, its geographical extent and its duration and reversibility. This approach is to be applied in respect of both landscape and visual receptors. OPEN considers that the process of combining all three considerations in one rating can distort the aim of identifying significant effects of wind farm development. For example, an increased magnitude of change, based on size or scale, may be reduced to a lower rating if it occurred in a localised area and for a short duration. This might mean that a potentially significant effect would be overlooked if effects are diluted down due to their geographical extents and/or duration or reversibility.

OPEN has chosen to keep the consideration of the size or scale of the effect, its geographical extent and its duration and reversibility separate, by basing the magnitude of change on size or scale to determine where significant and not significant effects occur, and then describing the geographical extents of these effects and their duration and reversibility separately. Duration and reversibility are stated separately in relation to the assessed effects (i.e. as short/medium/long-term and temporary/permanent) and are considered as part of drawing conclusions about significance, combining with other judgements on sensitivity and magnitude, to allow a final judgement to be made on whether each effect is significant or not significant.

OPEN's assessment methodology utilises six word scales of magnitude of change – high, medium-high, medium, medium-low, low and negligible; which are preferred to the 'maximum of five categories' suggested in GLVIA3 (Paragraph 3.27), as a means of clearly defining and summarising magnitude of change judgements.

These are not new divergences and this approach follow practice established on other large scale onshore wind farm projects.

2.2 Information and Data Sources

The assessment is initiated through a desk study of the 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 related planning designations, landscape character typology, wild land areas, operational and potential cumulative wind farms, 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 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 following sources:

- The Northern Ireland Landscape Character Assessment[9]; and,
- Landscape Character Assessment of County Donegal[10].

[8] Landscape Institute (2019) Technical Guidance Note 06/19: Visual representation of development proposals.

[9] Department of Agriculture, Environment and Rural Affairs (2000) The Northern Ireland Landscape Character Assessment [Online] Available at: Landscape Character of Northern Ireland | Department of Agriculture, Environment and Rural Affairs (daera-ni.gov.uk) (Accessed 08/09/2023)

[10] Donegal County Council (May 2016) Landscape Character Assessment of County Donegal [Online] Available at: Donegal County Council (Accessed 08/09/2023)

2.3 Desk Based and Site Survey Work

The assessment is initiated through a desk study of the Development boundary and LVIA study area. ZTV analysis of the Development has been carried out, as has mapping of landscape character, landscape related designations and principal visual receptors.

The LVIA undertaken as part of the ES has been informed by desk-based studies, stakeholder consultations and field survey work undertaken within the LVIA Study Area. The landscape and visual baseline has been informed by desk-based review of landscape character assessments, publications describing the special qualities of designated landscapes, visual receptor mapping and the ZTV, to identify receptors that may be affected by the Development and produce written descriptions of their key characteristics and value.

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 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 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 Development. Views from a variety of distances, aspects, elevations and extents were included. Receptor types include individual properties and settlements; main transport routes; main visitor locations; areas of cultural significance; the range of landscape character types within the Study Area; and the cumulative effects of the Development in combination with other existing or proposed wind farms in the Study Area.

Interactions have been identified between the Development and landscape and visual receptors, to predict potentially significant effects arising. For those receptors where a detailed assessment is required, primary data acquisition has been undertaken through a series of surveys. These surveys include field survey verification of the ZTV from landscape character types (LCTs), micro-siting of viewpoint locations, panoramic baseline viewpoint photography and visual assessment surveys from representative viewpoints and principal visual receptors. Site surveys allow the assessors to judge the likely scale, distance, extent and prominence of the Development directly. These surveys were undertaken between July 2021 and January 2023.

3. OVERVIEW OF LVIA METHODOLOGY

3.1 Introduction

The LVIA is based on the project description in **Chapter 3: Development Description**.

The LVIA assesses the likely effects that the construction and operation of the Development on the landscape and visual resource, encompassing physical landscape, effects on landscape character and designated landscapes, visual effects, and cumulative effects.

The assessment is undertaken through an evaluation of sensitivity of landscape and visual resource, taking account of the value and susceptibility of the receptor to the Development. This is combined with an assessment of the magnitude of change resulting from the Development, which takes account of the size and scale of the proposed change. By combining assessments of sensitivity and magnitude of change, a level of landscape or visual effect can be evaluated and determined. The resulting level of effect is described in terms of whether it is significant or not significant, and the geographical extent, duration and the type of effect is described as either direct or indirect; temporary or permanent (reversible); cumulative; and beneficial, neutral, or adverse.

3.2 Defining the LVIA Study Area

The definition of a Study Area for the LVIA is an important and established part of LVIA, which is recommended in LVIA guidance from the Landscape Institute[11] and NatureScot[12]. The LVIA study area covers a radius of 30 km from the Development, as illustrated in Figure 6.1 as agreed in the EIA Scoping Opinion and stakeholder consultations.

The LVIA Study Area is defined based on guidance, relevant legislation, consultation feedback, the ZTV for the Development and the emerging findings of the LVIA to ensure that is an appropriate Study Area based on the threshold of significance, defining an outer limit within which significant effects could occur using professional judgement.

Institute of Environmental Management and Assessment Guidance (2015 and 2017) recommends a proportionate EIA focused on the significant effects. An overly large LVIA study area may be considered disproportionate if it makes the understanding of the key impacts of the Development more difficult.

This is supported by Landscape and Visual Impact Assessment (LVIA) Guidance produced by the Landscape Institute (GLVIA3) (para 3.16). This guidance recommends that *'The level of detail provided should be that which is reasonably required to assess the likely significant effects'*. Para 5.2 and p70 also states that '*The study area should include the site itself and the full extent of the wider landscape around it which the Development may influence in a significant manner'.*

The LVIA focuses on locations from where it may be possible to see the Development, as defined by the blade tip ZTV, which is presented in Figure 6.5. Consideration of the blade tip ZTV indicates that theoretical visibility of the Development mainly occurs within 30 km and that beyond this distance, the geographic extent of visibility will become very restricted.

At distances over 30 km, the horizontal spread of the Development will also occupy a small portion of available views and the apparent height (or 'vertical angle') of the wind turbines would also appear very small, therefore significant visual effects are unlikely to arise at greater than this distance, even if the wind turbines are theoretically visible.

Landscape and visual effects as a result of the Development are scoped out beyond 30 km as agreed in the EIA Scoping Opinion and stakeholder consultations.

Visual receptors have been considered within a 30 km Study Area, with a more detailed focus for those receptors found closer to the site i.e. Public Rights of Way and local recreational routes within 10 km. For individual properties, a Residential Visual Amenity Assessment (RVAA) has been carried out within a 2 km Study Area, in accordance with Landscape Institute (LI) guidance. See **Technical Appendix 6.2: Residential Visual Amenity Assessment** for further description of the RVAA Study Area.

4. TYPES OF LANDSCAPE AND VISUAL EFFECTS

The LVIA is intended to determine the effects that the 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.

4.1 Landscape Effects

The LVIA considers the effects of the 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:

[11] Landscape Institute with the Institute of Environmental Management and Assessment (2013). Guidelines for Landscape and Visual Impact Assessment, Third Edition (GLVIA3).

[12] Scottish Natural Heritage (SNH) (2017) Siting and Designing Wind Farms in the Landscape, version 3a [Online] Available at: Appendix 1 (nature.scot) (Accessed 08/09/2023)

- 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 Development.
- 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 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.

4.2 Visual Effects

The LVIA considers the effect of the 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:

- An assessment of the effects of the 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,
- An assessment of the effects of the 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.

4.3 Cumulative Effects

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 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 Development is seen in isolation. The main assessment of the effects of the Development takes into account its addition to a baseline landscape that contains the operational/under construction wind farms.

5. EVALUATION

The objective in assessing the effects of the Development is to predict the significant effects of the Development on the landscape and visual resource. In accordance with The Planning (Environmental Impact Assessment) Regulations (Northern Ireland) 2017[13] the LVIA effects are assessed to be either significant or not significant.

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 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 A6.1.1 below 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, moderate-major and major. In those instances where the magnitude has been assessed as 'no change' and the level of effect is recorded as 'no effect'.

For the purposes of this assessment, any effects with a significance level of major and moderate-major have been deemed significant in EIA terms (dark grey shaded boxes in Table A6.1.1). '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

[13] Department for Infrastructure (2017) The Planning (Environmental Impact Assessment) Regulations (Northern Ireland) 2017

factors evaluated (light grey shaded boxes in Table A6.1.1). These assessments are explained as part of the assessment, where they occur. Significance can therefore occur at a range of levels depending on the magnitude and sensitivity, however in all cases, a significant effect is considered more likely to occur where a combination of the variables results in the 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 assessed as not significant (white boxes in Table A6.1.1).

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 A6.1.1. Matrix used to guide determination of effect significance

Magnitude of Change	Sensitivity of Resource or Receptor				
	High	**Medium-high**	**Medium**	**Medium-low**	**Low**
High	**Major (significant)**	**Major (significant)**	**Major-moderate (significant)**	Moderate (Significant or Not Significant)	Moderate (Significant or Not Significant)
Medium-high	**Major (significant)**	**Major-moderate (significant)**	Moderate (Significant or Not Significant)	Moderate (Significant or Not Significant)	Moderate-minor (Not significant)
Medium	**Major-moderate (significant)**	Moderate (Significant or Not Significant)	Moderate (Significant or Not Significant)	Moderate-minor (Not significant)	Minor (Not significant)
Medium-low	Moderate (Significant or Not Significant)	Moderate (Significant or Not Significant)	Moderate-minor (Not significant)	Minor (Not significant)	Minor (Not significant)
Low	Moderate-minor (Not significant)	Moderate-minor (Not significant)	Minor (Not significant)	Minor (Not significant)	Negligible (Not significant)
Negligible	Minor (Not significant)	Minor (Not significant)	Minor (Not significant)	Negligible (Not significant)	Negligible (Not significant)

Significant effects occur where the Development would provide a defining influence 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 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.

Significant cumulative effects occur where the addition of the Development to the baseline under consideration (which may include other wind energy developments), leads to wind farms becoming a prevailing landscape and visual characteristic or where the Development adversely contrasts with the scale or design of an existing or proposed development.

6. ASSESSMENT OF PHYSICAL EFFECTS

6.1 Introduction

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 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).

The physical effects of the Development are restricted to the area of the site where existing landscape elements may be changed. Physical effects are the direct effects as a result of the Development on the fabric of the site, 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 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 Development would have on them are described as follows.

6.2 Sensitivity of Landscape Elements

The sensitivity of a landscape element is an expression of its value and quality, and the potential to mitigate the effect.

- 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, its value is likely to be increased; and,
- The susceptibility of a landscape element is a reflection of the degree to which the element can be restored, replaced or substituted. For example, it may be possible to restore ground cover following the excavation required for the building of turbine foundations, and this would reduce the sensitivity of this element.

The evaluation of sensitivity is described for each receptor in the assessment. Levels of sensitivity: high, medium-high, medium, medium-low and low, are applied. The sensitivity of each receptor is a product of the specific combination of value, quality and potential for mitigation as evaluated by professional judgement.

6.3 Magnitude of Change on Landscape Elements

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

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

6.4 Significance of Effects on Landscape Elements

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

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 Development. If the landscape element is of lower sensitivity, it may undergo a higher level of removal or alteration yet remain as a not significant effect.

7. ASSESSMENT OF EFFECTS ON LANDSCAPE CHARACTER

7.1 Introduction

The objective of the assessment of effects on landscape character is to determine what the likely effects of the Development would be, 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.

7.2 Landscape Baseline and Preliminary Assessment

The landscape baseline provides an understanding of the landscape in the area that may be affected - its constituent elements, its character, distinctiveness, condition and value, and the way this varies spatially. The landscape baseline describes aspects of the landscape that may be significantly affected, as defined in Schedule 4 of the EIA Regulations. Establishing the landscape baseline will, when reviewed alongside the description of the Development, form the basis for the identification and description of the landscape effects of the Development. The baseline description of the landscape that may be affected is primarily determined by the physical footprint of the Development components and their ZTV.

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, allowing the full baseline to be described for landscape receptors that may be significantly affected. Those receptors which are identified as not having the potential to undergo significant effects and significant cumulative effects are not included in the subsequent detailed assessment but are noted with reasons given for their exclusion.

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 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;
- The visual and sensory experience of the landscape and how it associates with other landscapes including, in particular, the landscape character receptor where the Development is located; and,
- 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.

The landscape baseline also describes current pressures that may cause change in the landscape 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 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 Development are assessed within this context in the assessment of landscape and visual effects.

7.3 Sensitivity of Landscape Character Receptors

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 specific type of change or the development proposed, and the value related to that receptor.

7.3.1 Value of the Landscape Receptor

The value of a landscape character receptor is a reflection of the value which society attaches to that landscape. The assessment of the landscape value is classified as high, medium-high, 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, 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 elements has detracted from its inherent attributes; and,
- **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.

7.3.2 Susceptibility to Change

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 addition of the Development. The assessment of the susceptibility of the landscape receptor to change is classified as high, medium-high, 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 specific nature of the Development: The susceptibility of landscape receptors is assessed in relation to change arising from the specific development proposed, including the specific components and features of the Development proposed, its size, scale, location, context and characteristics.

- **Landscape character**: The key characteristics of the existing landscape character of the receptor is considered in the evaluation of susceptibility as they determine the degree to which the receptor may accommodate the influence of the Development. For example, a landscape that is of a particularly wild and remote character may have a higher susceptibility to the influence of the Development 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 Development; and,

- **Landscape association**: The extent to which the Development would influence the character of the landscape receptors across the Study Area, relates to the associations that exist between the landscape receptor where the Development is located and the landscape receptor from which the Development 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 Development is set along the skyline, and in other situations weak where the landscape association is less important; for example, where the Development lies inland of a coastal landscape that has its main focus outwards over the sea.

7.3.3 Sensitivity Rating

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, medium-high, 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 A6.1.2**.**

Table A6.1.2 Landscape Sensitivity to Change Criteria

Sensitivity factor	Higher	Lower
Value	Designation: Designated landscapes with national policy level protection or defined for their natural beauty.	Landscapes without formal designation. Despoiled or degraded landscape with little or no evidence of being valued by the community.
	Quality: Higher quality landscapes with consistent, intact and well-defined, distinctive attributes.	Lower quality landscapes with indistinct elements or features that detract from its inherent attributes.
	Rarity: Rare or unique landscape character types, features or elements.	Widespread or ‘common’ landscape character types, features or elements.
	Aesthetic / scenic: Valued perceptual aspects, or designated wildlife, ecological or cultural heritage features that contribute to landscape character.	Limited aesthetic / perceptual aspects, wildlife, ecological or cultural heritage features, or limited contribution to landscape character.
	Perceptual qualities: Landscape with perceptual qualities of wildness, remoteness or tranquillity.	Landscape where potential qualities of wildness, remoteness or tranquillity are no longer present or experienced, often as a result of existing development influences.
Susceptibility	Strength and robustness: Fragile landscape vulnerable and lacking the ability to accommodate change.	Robust landscape that is capable of reasonably accommodating change without undue adverse effects.
	Landscape scale: A smaller scale landscape, with complex, distinctive or small-scale coastal landforms.	A landscape of a suitably large enough scale to accommodate the development, with simple, broad and homogenous coastal landforms.
	Openness / enclosure: Openness may increase susceptibility if there is wider visibility, however open landscape may also be larger scale and simple which would decrease susceptibility.	Enclosed landscapes can offer more screening potential, limiting visibility to a smaller area, however they may also be smaller scale and more complex which would increase susceptibility
	Skyline: Distinctive undeveloped skylines with landmark features.	Developed, non-distinctive skylines without landmark features.

Sensitivity factor	Higher	Lower
	Relationship with other development: Little association with other contemporary development, or strong associations occur with smaller scale or historic development.	Strong or direct association with other similar contemporary developments and landscape character influenced by development.
	Perceptual qualities: Perceptual qualities associated with particular scenic qualities, wildness or tranquillity.	Contemporary, cultivated / settled or developed landscapes with fewer perceptual qualities are likely to have a lower susceptibility.
	Landscape association: Adjacent landscape character context connected by associated character and views.	Host landscape character is separate from surrounding / adjacent landscape character with weak association.
Sensitivity to change	High ⟷ Medium ⟷ Low	

7.4 Magnitude of Change on Landscape Character

The magnitude of change on views is an expression of the scale of the change that would result from the 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.

7.4.1 Size or Scale of Change

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

- **Landscape elements**: the degree to which the pattern of elements that makes up the landscape character would be altered by the 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;
- **Landscape characteristics**: the extent to which the Development would change, physically or perceptually, the characteristics 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 Development with these key characteristics;
- **Landscape designation**: In the case of designated landscapes, the degree of change is considered in light of the effects on the special landscape qualities which underpin the designation and the effect on the integrity of the designation. All landscapes change over time and much of that change is managed or planned. Often landscapes will have management objectives for ‘protection’ or ‘accommodation’ of development. The scale of change may be localised, or occurring over parts of an area, or more widespread affecting whole landscape receptors and their overall integrity;
- **Distance**: The size and scale of change is also strongly influenced by the proximity of the Development to the receptor and the extent to which the development can be seen as a characterising influence on the landscape. Consequently, the scale or magnitude of change is likely to be lower in respect of landscape receptors that are distant from the Development and / or screened by intervening landform, vegetation and built form to the extent that the scale of their influence on landscape receptors is small or limited. Conversely, landscapes closest to the development are likely to be most affected. Host landscapes (where the development is located within a ‘host’ landscape character unit) will be directly affected whilst adjacent areas of landscape character will be indirectly affected.; and,

- **Amount and nature of change**: The amount of the Development that will be seen. Visibility of the Development may range from one wind turbine blade tip to all of the wind turbines; generally, the greater the amount of the Development that can be seen, the higher the scale of change. The degree to which the Development is perceived to be on the horizon or 'within' the landscape. Generally, the magnitude of change is likely to be lower if the Development is largely perceived to be on the horizon at distance, rather than 'within' the landscape.

7.4.2 Geographical Extent

The geographical extent over which the landscape effects would be experienced is also assessed, which is distinct from the size or scale of effect. This evaluation is not combined in the assessment of the level of magnitude, but instead expresses the extent of the receptor that would experience a particular magnitude of change and can therefore affect the geographical extents of the significant and non-significant effects.

The extent of the effects would vary depending on the specific nature of the Development and is principally assessed through analysis of the extent of visibility of physical change to the landscape or the extent to which the landscape character would change through visibility of the Development.

7.4.3 Duration and Reversibility

The duration and reversibility of landscape effects has been based on the period over which Development are likely to exist (during construction and operation) and the extent to which these elements has been removed (during decommissioning) and its effects reversed at the end of that period. Long-term, medium-term and short-term landscape effects are defined as follows:

- long-term – more than 10 years (may be defined as permanent and / or reversible);
- medium-term – 6 to 10 years; and
- short-term – 1 to 5 years.

7.4.4 Magnitude of Change Rating

The magnitude, or degree of change resulting from the Development is described as high, high-medium, medium, medium-low, low or negligible. In assessing magnitude of change, the assessment focuses on the size or scale of change. The geographic extent, duration and reversibility are stated separately in relation to the assessed effects (i.e., as short/medium / long-term and temporary/permanent). The basis for the assessment of magnitude for each receptor has been made clear using evidence and professional judgement. The levels of magnitude of change that can occur are defined in Table A6.1.3.

Table A6.1.3. Landscape Magnitude of Change Definitions

Magnitude of change	Definition
High	The Development will result in a high level of alteration to the baseline characteristics or special qualities of the landscape, forming the prevailing influence and/or introducing elements that are uncharacteristic in the baseline landscape. The addition of the Development will result in a large-scale change, loss or addition to the baseline landscape.
Medium-high	Intermediate rating with combination of criteria from high magnitude (described above) and medium magnitude (described below).
Medium	The Development will result in a medium level of alteration to the baseline characteristics or special qualities of the landscape, forming a readily apparent influence and/or introducing elements that are potentially uncharacteristic in the baseline landscape. The addition of the Development will result in a medium-scale change, loss or addition to the baseline landscape.

Medium-low	Intermediate rating with combination of criteria from medium magnitude (described above) and low magnitude (described below).
Low	The Development will result in a low level of alteration to the baseline characteristics or special qualities of the landscape, providing a slightly apparent influence and/or introducing elements that are characteristic in the baseline landscape. The addition of the Development will result in a small-scale change, loss or addition to the baseline landscape.
Negligible	The Development will result in a negligible alteration to the baseline characteristics or special qualities of the landscape, providing a barely discernible influence and/or introducing elements that are substantially characteristic in the baseline landscape. The addition of the Development will result in negligible change, loss or addition to the baseline landscape.

7.5 Significance of Effects on Landscape Character Receptors

The significance of 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 Development. These judgements on sensitivity and magnitude are combined to arrive at an overall assessment as to whether the 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 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 A6.1.1 helps to inform the threshold of significance when combining sensitivity and magnitude to assess significance.

A significant effect would occur where the combination of the variables results in the 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 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.

OPEN has chosen to keep the consideration of the size or scale of the effect, its geographical extent and its duration and reversibility separate, by basing the magnitude of change on size or scale to determine where significant and not significant effects occur, and then describing the geographical extents of these effects and their duration and reversibility separately. Duration and reversibility are therefore stated separately in relation to the assessed effects (i.e. as short/medium/long-term and temporary/permanent) and are considered as part of drawing conclusions about significance, combining with other judgements on sensitivity and magnitude, to allow a final judgement to be made on whether each effect is significant or not significant.

8. ASSESSMENT OF VISUAL EFFECTS

8.1 Introduction

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

Visual effects are identified for different receptors (people) who will experience the view at their place of residence, within their community, during recreational activities, at work, or when travelling through

the area. Visual effects may include changes to an existing static view, sequential views, or wider visual amenity as a result of development or the loss of particular landscape elements or features already present in the view.

The level of visual effect (and whether this is significant) is determined through consideration of the sensitivity of each visual receptor (or range of sensitivities for receptor groups) and the magnitude of change that will be brought about by the construction, operation and decommissioning of the Development.

The assessment of visual effects is carried out in two parts:

- an assessment of the effects that the 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; and,
- an assessment of the effects that the 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.

The LVIA therefore includes viewpoint analysis prepared for a series of representative viewpoints and presented as supporting assessment in the LVIA. The viewpoint analysis assists in defining the direction, elevation, geographical spread and nature of the potential visual effects and identify areas where significant effects are likely to occur. This approach seeks to provide clarity and confidence to consultees and decision makers by allowing the detailed judgements on the magnitude of visual change to be more readily scrutinised and understood. The viewpoint analysis is used to assist the visual assessment of visual receptors reported in the LVIA.

8.2 Visual Baseline and Preliminary Assessment

The visual baseline establishes the area in which the Development may be visible, the different groups of people who may experience views of the Development, the viewpoints where they would be affected and the nature of the views at those points. The visual baseline describes aspects of the visual amenity that may be significantly affected, as defined in Schedule 4 of the EIA Regulations. 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.

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

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, allowing the full baseline to be described for visual receptors that may be significantly affected. Those receptors which are identified as not having the potential to undergo significant effects are not included in the subsequent detailed assessment but are noted with reasons given for their exclusion.

The baseline study establishes the visual baseline, including the area from which the Development may be visible, the different groups of people who may experience views of the Development (visual receptors), the viewpoints where they would be affected and nature of views at these points. The baseline study establishes the visual baseline in relation to the following matters:

- The area from which the Development may be visible, that is land from which it may potentially be seen, is established and mapped using an initial ZTV of the Development;
- The location, type and number of visual receptors experiencing visibility of the 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 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; and,
- 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.

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 Development are assessed within this context in the assessment of landscape and visual effects.

8.3 Sensitivity of Visual Receptors

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 Development would have on the view.

8.3.1 Value of the View

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 value of a view is classified as high, medium-high, 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 or lies within or overlooks a designated area such as a National Scenic Area, which implies a greater value to the visible landscape; and,
- **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.

8.3.2 Susceptibility to Change

Susceptibility relates to the nature of the viewer experiencing the view and how susceptible they are to the potential effects of the Development. A judgement to determine the level of susceptibility therefore relates to the nature of the viewer and their experience from that particular viewpoint or series of viewpoints, as follows:

- **Nature of the viewer**: The nature of the viewer is described by the occupation or activity which they are engaged in at the viewpoint or series of viewpoints. The most common groups of viewers considered in the visual assessment include residents, road-users, workers and walkers. Viewers whose attention is focused on the landscape, walkers, for example are likely to have a higher sensitivity, as would residents of properties that gain constant views of the Development. Viewers

travelling in cars or on trains would tend to have a lower sensitivity as their view is transient and moving. The least sensitive viewers are usually people at their place of work as they are less sensitive to changes in the view; however, this also depends on the nature of their work and the work place which they occupy; and,

- **Experience of the viewer**: The experience of the visual receptor relates to the extent to which the viewer's attention or interest may be focused on the view and the visual amenity they experience at a particular location. The susceptibility of the viewer to change arising from the Development may be influenced by the viewer's attention or interest in the view, which may be focused in a particular direction, from a static or transitory position, over a long or short duration, and with high or low clarity. For example, if the principal outlook from a route is aligned directly towards the Development, the experience of the visual receptor would be altered more notably than if the experience related to a glimpsed view seen at an oblique angle from a car travelling at high speed. The visual amenity experienced by the viewer varies depending on the presence and relationship of visible elements, features or patterns experienced in the view and the degree to which the landscape in the view may accommodate the influence of the Development.

8.3.3 Sensitivity Rating

An overall level of sensitivity is applied for each visual receptor or view: high, medium-high, medium, medium-low, low; by combining individual assessments of the value of the receptor and its susceptibility to change. Each visual receptor, meaning the particular person or group of people likely to be affected at a specific viewpoint, is assessed in terms of their sensitivity. The basis for the assessments is made clear using evidence and professional judgement in the evaluation of each receptor. Criteria that tend towards higher or lower sensitivity are set out in Table A6.1.4.

Table A6.1.4. Sensitivity to Change Criteria

Sensitivity factor	Higher	Lower
Value	Specific viewpoint identified in OS maps and / or tourist information and signage.	Viewpoint not identified in OS maps or tourist information and signage.
	Facilities provided at viewpoint to aid the enjoyment of the view.	No facilities provided at viewpoint to aid enjoyment of the view.
	View afforded protection in planning policy.	View is not afforded protection in planning policy.
	View is within or overlooks a designated landscape, which implies a higher value to the visible landscape.	View is not within, nor does it overlook, a designated landscape.
	View has informal recognition and well-known at a local level, as having particular scenic qualities.	View has no informal recognition and is not known as having particular scenic qualities.
	View or viewpoint is recognised through references in art or literature.	View or viewpoint is not recognised in references in art or literature.
	View has high scenic qualities relating to the content and composition of the visible landscape.	View has low scenic qualities relating to the content and composition of the visible landscape.
Susceptibility	Viewer who is likely or liable to be influenced by the Development.	Viewer who is unlikely or not liable to be influenced by the Development.
	Viewers such as walkers, or tourists, whose main attention and interest are on their surroundings.	Viewers whose main attention is not focused on their surroundings, such as people at work, or specific forms of recreation.

	Residents that gain static, long-term views of the Development in their principal outlook.	Viewers who are transient and dynamic, such as those travelling in cars or on trains, where the view is of short duration.
	Viewpoint is visited or used by a large number of people.	View is visited or gained by very few people.
	A view that is focused in a specific directional vista, with notable features of interest in a particular part of the view.	Open views with no specific point of interest, or specific directional vista away from direction of the Development.
	Viewers are focused on the experience of a high level of visual amenity at the location due to its overall pleasantness as an attractive visual setting or backdrop to activities.	The visual amenity experienced at the location by viewers is less pleasant or attractive than might otherwise be the case. Presence of existing built element features influence visual amenity experienced.
Sensitivity to change	High ◄——————► Medium ◄——————► Low	

8.4 Visual Magnitude of Change

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

8.4.1 Size or Scale

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 Development, based on the following criteria:

- **Distance**: the distance between the visual receptor or viewpoint and the Development. Generally, the greater the distance, the lower the magnitude of change, as the Development would constitute a smaller scale component of the view;
- **Size**: the amount and size of the Development that would be seen. Visibility may range from one blade tip to all of the turbines. Generally, the larger the Development appears in the view, and the more of the Development that can be seen, the higher the magnitude of change;
- **Scale**: 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 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;
- **Field of view**: the vertical / horizontal field of view available and the proportion of the view that is affected by the Development. Generally, the more of the proportion of view that is affected, the higher the magnitude of change would be. If the 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 Development covers just a part of an open, expansive and wide view, the magnitude of change is likely to be reduced as the Development would not affect the whole open part of the outlook;
- **Contrast**: the scale and character of the context within which the 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 Development;
- **Consistency of image**: the consistency of image of the Development in relation to other developments. The magnitude of change of the 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;

- **Skyline/background**: whether the Development will be viewed against the skyline or a background landscape may affect the level of contrast and magnitude. If the Development add to an already developed skyline the magnitude of change will tend to be lower;
- **Number**: generally, the greater the number of separate Development seen simultaneously or sequentially, the higher the magnitude of change. Further effects will occur in the case of separate developments and their spatial relationship to each other will affect the magnitude of change. For example, development that appears as an extension to an existing development will tend to result in a lower magnitude of change than a separate, new development; and,
- **Nature of visibility**: the nature of visibility is a further factor for consideration. The Development may be subject to various phases of development change and the way the Development may be viewed could be intermittent or continuous and / or seasonally, due to periodic management or leaf fall.

8.4.2 Geographical Extent

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

The geographical extent can be described as an area measurement or proportion of the total area of the receptor affected. For example, effects on people within a particular area such as a country park or area of common land can be illustrated via a 'representative viewpoint' that represents a similar visual effect, likely to be experienced by larger numbers of people within that area. The geographical extent of that visual effect can be expressed as approximately '5 hectares' or '10%' of an area of land or defined recreational area.

The geographical extent can be described as a linear measurement (m or km) according to the length of route affected. For example, effects on people travelling on a route through the landscape such as a road or footpath can be illustrated via a 'representative viewpoint' that represents a similar visual effect, likely to be experienced by larger numbers of people along that route. The geographical extent of that visual effect can be expressed as approximately '2 km' or '10%' of the total length of the route.

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

8.4.3 Duration and Reversibility

The duration and reversibility of visual effects are based on the period over which the Development are likely to exist (during construction and operation) and the extent to which the Development will be removed (during decommissioning), with effects reversed at the end of that period.

Long-term, medium-term and short-term visual effects are defined as follows:

- Long-term – more than 10 years (may be defined as permanent and / or reversible);
- Medium-term – 6 to 10 years; and,
- Short-term – 1 to 5 years.

8.4.4 Visual Magnitude of Change Rating

The magnitude, or degree of change, resulting from the Development is described as high, high-medium, medium, medium-low, low and negligible as defined in Table A6.1.5.The basis for the assessment of magnitude for each receptor has been made clear using evidence and professional judgement.

Table A6.1.5. Visual Magnitude to Change Definitions

Magnitude of change	Definition
High	The Development will result in a high level of alteration to the existing view, forming the prevailing influence and/or introducing elements that are uncharacteristic in the baseline view. The addition of the Development will result in a large-scale change, loss or addition to the baseline view.
Medium-high	Intermediate rating with combination of criteria from high magnitude (described above) and medium magnitude (described below).
Medium	The Development will result in a medium level of alteration to the existing view, forming a readily apparent influence and/or introducing elements that are potentially uncharacteristic in the baseline view. The addition of the Development will result in a medium-scale change, loss or addition to the baseline view.
Medium-low	Intermediate rating with combination of criteria from medium magnitude (described above) and low magnitude (described below).
Low	The Development will result in a low level of alteration to the existing view, providing a slightly apparent influence and/or introducing elements that are characteristic in the baseline view. The addition of the Development will result in a small-scale change, loss or addition to the baseline view.
Negligible	The Development will result in a negligible alteration to the existing view, providing a barely discernible influence and/or introducing elements that are substantially characteristic in the baseline view. The addition of the Development will result in negligible change, loss or addition to the baseline view.

Examples of criteria that tend towards higher or lower magnitude of change that can occur on views and visual receptors are set out in Table A6.1.6.

Table A6.1.6. Visual Magnitude to Change Criteria

Magnitude of change	Definition
High	The Development will be the prevailing feature, forming the major focus of visual attention due to its large vertical scale and lateral spread, filling a large proportion of the field of view, with contrasts in form, line, colour, texture, luminance or motion contributing to the prevailing influence. ■ Size and Scale: A large scale and prevailing change to the view. ■ Number: Involving the loss/addition of a large number of features / elements. ■ Distance: Typically appearing closer to the viewer in the fore to middle ground. ■ FoV: Affecting a large vertical angle and wide horizontal FoV. ■ Nature of Visibility: Multiple phase development, continuously and sequentially visible. ■ Contrast: Strong degree of contrast with surroundings with little or no screening. ■ Skyline: Visible on the skyline as a new feature. ■ Consistency of Image: Contrasting with other developments, lacking in visual rationale. Typically experienced from representative viewpoints illustrating a visual effect likely to be experienced by larger numbers of people, relative to the activity, and may also be experienced from a specific viewpoint.
Medium	The Development will be plainly visible, so will not be missed by casual observers, but will not strongly attract visual attention or dominate the view because of its apparent size. The

	Development is obvious and will have sufficient size to contrast with other seascape/landscape elements, but with insufficient visual contrast to strongly attract visual attention and insufficient size to occupy most of an observer's field of view. ■ Size and Scale: A medium scale and readily apparent change to the view. ■ Number: Involving the loss/addition of a number of features / elements. ■ Distance: Typically appearing in the middle ground. ■ FoV: Affecting a medium vertical angle and moderate horizontal FoV. ■ Nature of Visibility: Multiple phase development, intermittently and sequentially visible. ■ Contrast: Contrast with surroundings and may benefit from some screening. ■ Skyline: Visible on the skyline along with other features. ■ Consistency of Image: Different from other developments, some visual rationale. Typically experienced from representative viewpoints illustrating a visual effect likely to be experienced by a medium number of people, relative to the activity, and may also be experienced from a specific viewpoint.
Low	The Development will be visible when scanning in its general direction; otherwise it may be missed by casual observers. Small and/or faint, but when the observer is scanning the horizon or looking more closely at an area, can be detected and sometimes noticed by casual observers; however, most people would not notice it without some active looking. • Size and Scale: A small scale and slightly apparent change, could being missed by the casual observer. ■ Number: Involving the loss/addition of a small number of features / elements. ■ Distance: Typically appearing in the background. ■ FoV: Affecting a small vertical angle and narrow horizontal FoV. ■ Nature of Visibility: Simple, single development, intermittently and infrequently visible. ■ Contrast: Some parity / 'fits' with surroundings and may benefit from screening. ■ Skyline: Partly visible on a developed skyline or not visible on the skyline. ■ Consistency of Image: Similar from other developments with visual rationale, appearing reasonably well accommodated within its surroundings. Typically experienced from illustrative viewpoints likely to be experienced by low numbers of people, relative to the activity and may also be experienced from a specific viewpoint.
Negligible	The Development will be visible only after extended viewing and is near the limit of visibility or is barely visible, such that it would not be seen by a person who was unaware of it in advance and therefore looking for it. Even under those circumstances, it may be seen only after looking at it closely for an extended period. ■ Size and Scale: A very small scale or barely negligible change, need to 'look for it'. ■ Number: Involving the loss/addition of a small number of features / elements. ■ Distance: Typically appearing in the far distance. ■ FoV: Affecting a very small vertical and narrowest horizontal FoV. ■ Nature of Visibility: Simple, single development, intermittently and infrequently visible. ■ Contrast: Blends with surroundings and / or is well screened. ■ Skyline: Partly visible on a developed skyline or not visible on the skyline. ■ Consistency of Image: Similar from other developments with strong visual rationale, appearing well accommodated within its surroundings.

	Typically experienced from illustrative viewpoints likely to be experienced by low numbers of people, relative to the activity and may also be experienced from a specific viewpoint.

8.5 Significance of Effects on Views

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 Development. These judgements on sensitivity and magnitude are combined to arrive at an overall assessment as to whether the Development would have an effect that is significant or not significant on the visual receptor.

Table A6.1.1 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 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 Development is not definitive, and the view continues to be defined 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. 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. 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.

OPEN has chosen to keep the consideration of the size or scale of the effect, its geographical extent and its duration and reversibility separate, by basing the magnitude of change on size or scale to determine where significant and not significant effects occur, and then describing the geographical extents of these effects and their duration and reversibility separately. Duration and reversibility are therefore stated separately in relation to the assessed effects (i.e. as short/medium/long-term and temporary/permanent) and are considered as part of drawing conclusions about significance, combining with other judgements on sensitivity and magnitude, to allow a final judgement to be made on whether each effect is significant or not significant.

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 Development would vary greatly dependent according to the prevailing viewing conditions.

9. ASSESSING NIGHT-TIME VISUAL EFFECTS

9.1 Introduction

The assessment of night-time visual effects is based on the description of proposed wind turbine lighting set out in **Chapter 3: Development Description** and the relevant ICAO/CAA regulations and standards, including Air Navigation Order 2016: Civil Aviation (CAA, 2016)[14].

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[15]. As such, there is potential that parts of the Development may be visible at night. The effect of the Development at night would result from visible lighting located on the nacelles, and on the towers, of all turbines[16]. The LVIA assesses the visual effects of visible aviation lighting in **Technical Appendix A6.3: Assessment of Aviation Lighting** which includes specific lighting ZTVs and nighttime visualisations.

[14] Civil Aviation Authority (2016). CAP393: The Air Navigation Order 2016 (SI 2016 No.765).

[15] Civil Aviation Authority, Safety & Airspace Regulation Group (2017). Policy Statement: Lighting of Onshore Wind Turbine Generators in the United Kingdom with a maximum blade tip height at or in excess of 150m Above Ground Level.

[16] Civil Aviation Authority (2016) CAP 764: Policy and Guidelines on Wind Turbines.

Specific requirements for aviation and navigational lighting would be agreed with the relevant stakeholders post-consent and prior to construction. 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. There is an additional requirement for lights to be provided at an intermediate level of half the nacelle height. These would need to be fitted around the towers to allow for 360-degree horizontal visibility.

A description of the turbine lighting requirements and a proposed turbine lighting is found within **Chapter 15: Other Issue** of the ES report. Based on this, the worst case Aviation Lighting Scheme is assessed, which assumes visible aviation lighting would be located on all turbine hubs and intermediate lighting on all towers.

Technical Appendix A6.3: Assessment of Aviation Lighting describes the lighting parameters and approach to assessing nighttime effects in more detail in relation to the Development.

9.2 Night-time Visual Effects

The effect of the visible lights will be dependent on a range of factors, including the intensity of lights used, the clarity of atmospheric visibility and the degree of negative/positive vertical angle of view from the light to the receptor. In compliance with EIA regulations, the likely significant effects of a 'worst-case' scenario for turbine lighting are assessed and illustrated in this visual assessment.

A worst-case approach is applied to the assessment that considers the potential effects of medium-intensity 2,000 cd lights in clear visibility. It should be noted however, that medium intensity lights are only likely to be operated at their maximum 2,000 cd during periods of poor visibility. A further assessment of the likely residual effects is therefore made factoring in embedded mitigation, i.e. that the 2,000cd aviation lights will be dimmed to 10% of their value (200 cd) if meteorological conditions permit – which means when visibility is greater than 5 km. This scenario also covers the effects that may arise for receptors that view the turbine aviation lights from locations that are 1.5 degrees below the horizontal, where the Air Navigation Order 2016 allows aviation lights to be reduced to 10% peak intensity (200 cd). Photomontages showing both 2,000 cd and 200 cd are provided from representative viewpoints to support these assessments.

It should be noted that the turbines would also 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 MoD. The focus of the night-time visual assessment in this assessment is on the visible lighting requirements of the Development. The study area for the visual assessment of turbine lighting is shown in Figure 6.24 and is coincident with the 30 km LVIA Study Area however, is particularly focused on the closest areas around the Development where significant effects are most likely to arise.

The assessment of the lighting of the Development is intended to determine the likely effects on the visual resource i.e. it is an assessment of the visual effects of aviation lighting on views experienced by people at night. The assessment of turbine lighting does not consider effects of aviation lighting on landscape character or landscape designations.

ICAO indicates a requirement for no lighting to be switched on until 'Night' has been reached, as measured at 50 cd/m^2 or darker[17]. It does not require 2,000 candela medium intensity to be on during 'twilight', when landscape character may be discerned. The aviation and marine navigational lights may be seen for a short time during the twilight period when some recognition of landscape features, profiles, shapes and patterns may be possible. It is considered however, that level of recognition does not amount to an ability to appreciate in any detail landscape character differences and subtleties, nor does it provide sufficient natural light conditions to undertake a landscape character assessment.

The proposed aviation lighting will not have significant effects on the perception of landscape character, which is not readily perceived at night in darkness, particularly in rural areas. The matter of visible aviation lighting assessment is wholly a visual concern and the assessment presented focusses on that premise.

[17] ICAO (2018). Annex 14 to the Convention on International Civil Aviation - Volume I Aerodrome Design and Operations (ICAO, Eighth Edition).

9.3 Significance criteria for night-time visual effects

The nature of the daytime and night-time effects from visible aviation lighting are clearly very different, in that during day light hours visibility of moving turbine rotors gives rise to effects that are very different to the pinpoint effects of lighting at night. It is considered therefore, that the same criteria should not be used to assess these differences in daytime and night-time effect.

In relation to the sensitivity of visual receptors, this is defined through the application of professional judgement in relation to the interaction between the 'value' of the view experienced by the visual receptor and the 'susceptibility' of the visual receptor (or 'viewer', not the view) to the particular form of change likely to result from the Development.

The factors weighed in reaching a decision on 'value' of the view are not all applicable at night-time, in the same way they may be during the day. It is not appropriate, for example, to attribute value to views at night when the detail of the view, or of elements that add value to it within a landscape, cannot readily be discerned. Furthermore, the popularity of a viewpoint during the day may be completely different to its use at night. Value factors assessed for day-time viewpoints may therefore be of less relevance to the value judgement for night-time viewpoints, which is factored into the following assessments.

In reaching a view on the significance of the likely visual effects from the visible aviation lighting, it is relevant to consider what parts of the landscape - where darkness qualities are well displayed - are likely to be affected by visibility of the aviation lights and, in turn, to understand what people might be doing in these areas at night to be susceptible to visibility of aviation lights. Descriptions of 'susceptibility' provided for daytime viewpoints and receptors in Section 7.3.2 are considered appropriate for the purposes of establishing receptor sensitivity at night-time, however the susceptibility of people experiencing night-time views will depend on the degree to which their perception is affected by existing baseline lighting. In brightly lit areas, or when travelling on roads from where sequential experience of lighting may be experienced, the susceptibility of receptors is likely to be lower than from within areas where the baseline contains no or limited existing lighting.

In relation to the other key component in determining significance of effect, the magnitude of change, reference to 'loss of important features' and 'composition of the view' are not readily discernible or relevant at night and, on this basis, a distinct set of criteria to explain the magnitude of change at night, as a consequence of the appearance of aviation lights, is set out in Table A6.1.7 below.

Table A6.1.7. Magnitude of Change Definitions for Night-time Visual Effects

Magnitude of change	Definition
High	Addition of aviation and marine navigation lighting results in large scale of change/large intrusion to the existing night-time baseline conditions/darkness in the view, due to a full and/ or close range view of visible aviation lighting and/ or a high degree of contrast/ low degree of integration with level of baseline lighting in the view. Results in obtrusive light which compromises or diminishes the view of the night sky.
Medium	Addition of aviation lighting results in moderate scale of change/moderate intrusion to the existing night-time baseline conditions/ darkness in the view, due to partial and/ or middle distance view of visible aviation lighting and/ or moderate level of contrast/ integration with level of baseline lighting in the view. Results in light that may partially compromise or diminish the view of the night sky, but which is not considered obtrusive.
Low	Addition of aviation and marine navigation lighting results in small scale of change/minor intrusion to the existing night-time baseline conditions/ darkness in the view, due to limited and/ or distant view of aviation lighting and/ or low degree of contrast/ high degree of integration with level of baseline lighting in the view. Results in light that does not compromise or diminish the view of the night sky, nor is it considered obtrusive.
Negligible	Addition of aviation and marine navigation lighting results in a largely indiscernible change/negligible intrusion to the existing night-time baseline conditions/ darkness in the view, due to glimpsed view of lighting and/ or slight degree of contrast/ very high degree of

	integration with level of baseline lighting in the view. Results in light that does not compromise or diminish the view of the night sky, nor is it considered obtrusive.

The significance of effects of aviation and marine navigation lighting is assessed through a combination of the sensitivity of the visual receptor and the magnitude of change that would result from the visible aviation lighting, taking into account the considerations described above, and informed by the matrix in Table A6.1.1, which gives an understanding of the threshold at which significant effects may arise.

A significant effect occurs where the aviation and marine navigation lighting would provide a defining influence on a view or visual receptor. A not significant effect would occur where the effect of the aviation and marine navigation lighting is not material, and the baseline characteristics of the view or visual receptor continue to provide the definitive influence. In this instance the aviation lighting may have an influence, but this influence would not be definitive.

In determining significance, particular attention is paid to the potential for 'Obtrusive Light' i.e. whether the lighting impedes a particular view of the night sky; creates sky glow, glare or light intrusion (ILP, 2011[18]) in a prominent, incongruous or intrusive way.

10. ASSESSING CUMULATIVE LANDSCAPE AND VISUAL EFFECTS

10.1 Introduction

Assessment of cumulative effects is required by the EIA Regulations. Cumulative effects have been defined in a broad generic sense as *"impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project…"*[19].

In GLVIA3 the guidelines define cumulative landscape and visual effects as those that "*result from additional changes to the landscape and visual amenity caused by the 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*."[20]

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.

NatureScot's guidance, Assessing the Cumulative Impact of Onshore Wind Energy Developments[21] is widely used across the UK to inform the specific assessment of the cumulative effects of windfarms. Both GLVIA3 and NatureScot's guidance provide the basis for the methodology for the cumulative LVIA undertaken. NatureScot presents the following guidance:

"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."

"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."

In line with guidance from NatureScot, the SLVIA focuses on the key cumulative impacts which are likely to influence decision making, rather than assessing every potential cumulative effect.

[18] Institute of Lighting Professionals (2011). Guidance Notes for the Reduction of Obtrusive Light (GN01:2011).

[19] Hyder (1999) Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions, p. 7.

[20] Landscape Institute with the Institute of Environmental Management and Assessment (2013). Guidelines for Landscape and Visual Impact Assessment, Third Edition (GLVIA3), p.120

[21] NatureScot (2021). Assessing the Cumulative Impact of Onshore Wind Energy Developments.

The degree to which cumulative effects occur, or may occur, as a result of more than one wind farm development being constructed or 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; and,
- The way in which the landscape is experienced.

10.2 Scope of the Cumulative Assessment

GLVIA3, p.120, 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)'*.

In accordance with this guidance, the cumulative assessment focuses on the addition of the 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. The cumulative assessment includes 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 Development.

The cumulative Study Area covers a radius of 30 km. The extent of the detailed cumulative assessment within this area is then defined relative to key landscape and visual receptors and anticipated effects, focussing on potential significant cumulative effects, and refining to a list of projects to those within 'influencing distance'.

Based on surrounding topography and the locations of wind farm developments within this 30 km Study Area it is considered that there is no likelihood of significant cumulative effects between the Development and any of the cumulative sites that lie beyond 20 km of the Development. For this reason, the detailed assessment within the LVIA has focussed on the cumulative sites within 20 km of the Development. Cumulative ZTVs have been produced for existing and under construction wind farms plus consented and undetermined wind farm applications within 20 km. Where wind farms are in close proximity to each other they have been grouped for ZTV production to help illustrate the theoretical visibility of the existing baseline.

Cumulative wirelines are prepared for all 25 viewpoints, with all developments within the 30 km search area shown in the wirelines to illustrate the Development in the wider context of other wind energy developments and support the approach to cumulative assessment.

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 and agree on a cut-off date when the sites and layouts to be included are fixed. The cumulative assessment includes operational, consented and application stage wind energy developments as of January 2023. Any changes in the cumulative situation after this date are not incorporated in the assessment.

Cumulative wind farms within the 30 km Study Area are shown on Figure 6.12. Diagrams showing Cumulative Zone of Theoretical Visibility (CZTV) for those relevant developments within 20 km of the Development are shown on Figures 6.13 to 6.22.

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 Development should encompass the effects of the proposal in combination with existing, under construction, consented and application stage wind farms awaiting determination.

Schemes that are at the pre-planning or scoping stage are not generally considered in the assessment of cumulative effects because firm information on which to base the assessment is not

available. Scoping stage sites are mapped on Figure 6.12 for reference but are not considered further due to layout and design uncertainties at the pre-application stages.

10.3 Cumulative Development Scenarios

GLVIA3 advises in relation to the baseline, taking 'the 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 Development into a context that includes existing or under construction wind farms are assessed, with the effects considered against the landscape and visual baseline.

The likely significant cumulative effects of the Development are assessed in relation to two relevant scenarios within the cumulative assessment:

- The consented scenario: the cumulative assessment assesses the effect of the 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'). This scenario assumes that all consented wind energy developments have become operational and are part of a theoretical baseline situation. The cumulative assessment in the consented scenario identifies the magnitude of change that would arise due to the contribution of the 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 often the case that consented wind farms are not ultimately built, which reduces the likelihood of consented scenario effects arising; and,
- 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 underdetermined) planning applications ('the application stage scenario'). The application stage scenario assumes that all application stage wind energy developments have become operational and are part of a theoretical baseline situation. The cumulative assessment in the application stage scenario identifies the magnitude of additional cumulative change that would arise due to the contribution of the 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.

10.4 Types of Cumulative Effect

The aim of the cumulative assessment is to identify the additional changes which would be brought about by the Development when considered in conjunction with other wind farms. In accordance with NatureScot's guidance (2021), the LVIA for each receptor considered assesses the effect arising from the addition of the 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.

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 Section 6.9.19 of **Chapter 6: LVIA.**

10.4.1 Cumulative Landscape Effects

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 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.

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

- The 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 Development is unlikely to be significant;
- The addition of the 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 Development may be significant or not significant, depending on the sensitivity of the receptor, magnitude of the change and specific effects arising from the Development; and,
- The addition of the 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 Development is likely to be significant.

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.

10.4.2 Cumulative Visual Effects

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 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; and,
- 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 Development is more likely to be significant when frequently sequential.

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.

10.4.3 Cumulative Sensitivity of Landscape and Visual Receptors

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 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.

10.4.4 Cumulative Magnitude of Change

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 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 Development in relation to other wind farm developments. If the 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 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 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 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 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 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 Development in relation to other developments. The cumulative magnitude of change of the 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; and,
- The magnitude of change of the 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 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 Development would equate to the 'no change' situation.

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

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

10.4.5 Significance of Cumulative Effects

The objective of the cumulative assessment is to determine whether any effects that the 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 wind farms 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 wind farm 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 wind farm development, wind farms 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 wind farm, or the overlapping of several wind farms was not too dense; the 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; and,
- The next stage would be to consider larger commercial wind farms/developments and/or an increase in the number of wind farms/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 wind farm 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 wind farm development may already exist as part of the baseline landscape context.

Less extensive, but nevertheless significant cumulative landscape and visual effects may also arise as a result of the addition of the 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 Development contrasts with the scale or design of an existing or Development. Higher levels of significance may arise from cumulative landscape and visual effects related to the Development being in close proximity to other wind farms when they are clearly visible together in views, however provided that the 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 overall capacity of the landscape is not exceeded.

The capacity of the landscape or view may be assessed as being exceeded where the landscape or visual receptor becomes defined by wind farm development, or if the 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.

In accordance with NatureScot's guidance (2021), the LVIA for each receptor considered assesses the effect arising from the addition of the Development to the cumulative situation, and not the overall effect of multiple wind farms. 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 Section 6.9.19 of **Chapter 6: LVIA.**

11. NATURE OF EFFECTS

11.1 Overview

The nature of effects refers to whether the landscape and/or visual effect of the Development is positive or negative (herein referred to as 'beneficial' and 'adverse').

The EIA Regulations 2017[22] state that the ES should define *'the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the development'*.

Cumulative effects have been described in Section 10, and *'short-term, medium-term and long-term, permanent and temporary'* effects are described in Section 7.4.3 and 8.4.3 under the heading 'Duration and Reversibility'.

Transboundary effects will arise owing to the spread of the 30 km LVIA Study Area extending across the Northern Ireland Border and into the Republic of Ireland, which is an EU member state. The detailed assessment of landscape, visual and cumulative effects, has, however, found that there will be no significant effects on any landscape or visual receptors as a result of the Development.

11.2 Direct and Indirect Effects

Direct landscape effects relate to the host landscape and concern both physical and perceptual effects on the receptor.

Indirect landscape effects relate to those landscapes and receptors which separated by distance or remote from the development and therefore are only affected in terms of perceptual effects. The Landscape Institute also defines indirect effects as those which are not a direct result of the development but are often produced away from it or as a result of a complex pathway.

Visual effects are considered as direct effects, as the view itself may be directly altered by the Development

11.3 Positive and Negative Effects

The nature of effects refers to whether the landscape and/or visual effect of the 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 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 by OPEN, 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:

[22] Department of Communities and Local Government (UK Government) (2017) The Town and Country Planning (Environmental Impact Assessment) Regulations 2017, UK Statutory Instruments No.571.

- Beneficial effects contribute to the landscape and visual resource through the enhancement of desirable characteristics or the introduction of new, beneficial attributes. The Development contributes to the landscape by virtue of good design, 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;
- Neutral effects occur where the Development fits with the existing landscape character or visual amenity. The 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; and,
- Adverse effects are those that detract from the landscape character or quality of visual attributes experienced, through the introduction of elements that contrast, in a detrimental way, with the existing characteristics of the landscape and visual resource, or through the removal of elements that are key in its characterisation.

11.4 Duration and Reversibility

The EIA Regulations (2017) 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*'.

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 (permanent and / or reversible);
- Medium-term – 5 to 10 years; and,
- Short-term – 1 to 4 years.

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.

The effect of the Development is considered to be long term and reversible as the application is for a 40 year duration. The effects have also to be considered reversible, in that the wind turbines and infrastructure can be removed, and their effects largely reversed on final decommissioning.

The effect of the construction of the 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 Development and are assessed as short-term and reversible effects.

GLVIA3 sets out an approach to the assessment of magnitude of change in which three separate considerations are combined within the magnitude of change rating. These are the size or scale of the effect, its geographical extent and its duration and reversibility. OPEN considers that the process of combining all three considerations in one magnitude of change rating can distort the aim of identifying significant effects of wind farm development. For example, an increased magnitude of change, based on size or scale, may be reduced to a lower rating if it occurred over a localised geographic extent and for a short duration. This might mean that a potentially significant effect would be overlooked if effects are diluted down due to their geographical extents and/or duration or reversibility.

OPEN has chosen to keep these the consideration of the size or scale of the effect, its geographical extent and its duration and reversibility separate, by basing the magnitude of change on size or scale to determine where significant and not significant effects occur, and then describing the geographical extents of these effects and their duration and reversibility separately. Duration and reversibility are therefore stated separately in relation to the assessed effects (i.e. as short/medium/long-term and temporary/permanent) and are considered as part of drawing conclusions about significance, combining with other judgements on sensitivity and magnitude, to allow a final judgement to be made on whether each effect is significant or not significant.

Should decommissioning of any part of the Development be required e.g. failure of a wind turbine beyond economic repair, it is considered that any effects would be similar to, but less than those resulting from the initial decommissioning and construction phase of the Development.

12. VISUAL REPRESENTATIONS

12.1 Overview

Zones of Theoretical Visibility (ZTVs) and visualisations (wirelines or wirelines and photomontages) are graphical images produced to assist and illustrate the LVIA and the cumulative assessment. The methodology used for viewpoint photography and photomontages has been produced in accordance with the NatureScot guidance on Visual Representation of Wind Farms[23], GLVIA 3 and the Landscape Institute Technical Guidance Note on Visual Representation of Development Proposals (2019)[24].

12.2 ZTV

The ZTVs in Figures 6.5 to 6.11 and 6.13 to 6.22 have been calculated using GIS software to generate a ZTV of the Development to demonstrate the theoretical extent of visibility from any point in the study area.

The ZTVs are based on Ordnance Survey Northern Ireland (OSNI) 10m digital terrain model (DTM) data, and Copernicus 30m DTM data to produce detailed ZTV plots to assess particular effects, such as along the coastline. The computer model will include the entire study area and takes account of atmospheric refraction and the Earth's curvature. The resulting ZTV plots have been overlaid on Ordnance Survey mapping at an appropriate scale and presented as figures using desktop publishing or graphic design software.

Cumulative ZTV plots based on the intervisibility of the Development and other relevant developments within the study area have also been produced.

There are limitations which should be considered in the interpretation and use of the ZTV as follows:

- Where the ZTV has been calculated using OSNI 10 DTM and Copernicus 30m DTM, this will not account for the screening effects of vegetation or built form unless added in the form of OS Vectormap data or digitally added and stated on the figure;
- The ZTVs are based on theoretical visibility from 2 m above ground level;
- The Blade Tip ZTV does not indicate the decrease in visibility that occurs with increased distance from the array area. The nature of what is visible from 3 km away will differ markedly from what is visible from 10 km away, although both are indicated on the Blade Tip ZTV as having the same level of visibility; and,
- 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 seven turbines may gain views of the smallest extremity of blade tips, or of seven full turbines. This can make a considerable difference in the effects of the Development on that area.

These limitations mean that while the ZTV is used as a starting point in the assessment, providing an indication of where the Development will be theoretically visible and tending to present a worst-case or over-estimate the actual visibility. The information drawn from the ZTV is checked by field survey observation.

The LVIA includes a Horizontal Angle ZTV to show the horizontal field of view (in degrees) that may be affected by views of the wind turbines.

[23] Scottish Natural Heritage (2017) Visual Representation of Wind Farms: Version 2.2.

[24] Landscape Institute (2019) Technical Guidance Note 06/19: Visual representation of development proposals.

12.3 Baseline Photography

12.3.1 Overview

Once a view has been selected, the location is visited, confirmed, and assessed with the aid of a wireline or similar visualisation in the field. A photographic record is taken to record the view and the details of the viewpoint location and associated data are recorded to assist in the production of visualisations and to validate their accuracy.

The following photographic information is recorded:

- Date, time, weather conditions and visual range;
- GPS recorded 12 figure grid reference accurate to approximately 5 to 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); and
- Bearing to the Development.

The photographs used to produce the photomontages were taken at the times of day and locations agreed with the consultees 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 were taken on a tripod with a pano-head at a height of approximately 1.5 m above ground.

Whilst no two-dimensional image can fully represent the real viewing experience, the visualisation aims to provide a realistic representation of the offshore elements, based on current information and photomontage methodology.

Guidelines for LVIA (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'.*

In preparing photomontages for the LVIA, photographs have been taken in favourable weather conditions during periods of 'very good' or 'excellent' visibility conditions - seeking to represent a maximum visibility scenario when the Development may be most visible.

12.4 Visualisations

Photomontages have been produced in accordance with NatureScot Visual Representation of Windfarms Guidance (NatureScot, 2017) and Landscape Institute (2019) Technical Guidance Note (TGN) 06/19 Visual Representation of Development Proposals.

A photomontage is a visualisation which superimposes an image of a 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.

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 will 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 view 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.

The baseline photographs and cumulative wireline visualisations shown for each viewpoint cover a 90-degree field of view (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. 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 photomontages.

Wireline representations that illustrate the Development set within a computer-generated image of the landform, are used in the assessment to predict theoretical appearance of the turbines. These are produced with Resoft WindFarm software and are based on OSNI 10m DTM and Copernicus 30m DTM .There are limitations in the accuracy of digital terrain model (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 OSNI 10m DTM and Copernicus 30m DTM 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.

Daytime visualisations and wirelines show a wind turbine model which represents the maximum development scenario of the Development and allow the potential proportions of the wind turbines to be appreciated from the visualisations.

Fully rendered photomontages have been produced for the agreed viewpoints using Resoft WindFarm software, to provide a photorealistic image of the appearance of the Development. In the daytime photomontages modelled representations are combined with the baseline view photographs to create a photorealistic rendered photomontage image of the development.

'Panoramic photomontages' are produced in the SLVIA with a 53.5° HFoV, based on relevant guidance (NatureScot, 2017) and due to their suitability to encompass the horizontal spread of the Development and show the turbines at a representative scale and distance. In some views, two adjacent 53.5° photomontages will be required to capture the horizontal spread of the Development.

The 53.5 degree field of view wirelines and photomontages are prepared using a planar projected image and should also be viewed flat at a comfortable arm's length. These images are each printed on paper 841 x 297mm (half A1) which provides for a relatively large-scale image.

In the wirelines, the wind 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 wind turbines facing the viewer directly.

Rendering of the wind turbines in the photomontages is as photorealistic as possible to the conditions shown in each viewpoint photograph. There may be some variation in the appearance and visibility of the wind turbines between the viewpoints, as they are rendered to suit the conditions shown in each of the different viewpoint photographs, which have some unavoidable degree of variation in terms of lighting and weather conditions. The key requirement is that the wind turbines need to be rendered with sufficient contrast against the skyline backdrop to illustrate their maximum visibility scenario in each image. Photomontages have been prepared to depict how the Development will appear to illustrate the worst-case. The full suite of viewpoint photomontages should be viewed to gain an impression of the likely visual effects of the Development.

12.5 Night-time Visualisations

The visual effect of the Development at night has been assessed in **Technical Appendix A6.3: Assessment of Aviation Lighting**, informed by the night-time photomontage visualisations produced from representative viewpoints, to visually represent aviation lighting at night. Photomontages showing aviation lighting at both 2,000 cd and 200 cd aviation are provided to support the assessment.

Night-time visualisations have been produced using a combination of 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/atmospheric conditions from the baseline photographs and professional judgement using photoshop.

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 much more defined as point sources. However, the proposed lighting has been shown in this way for consistency with the lights in the baseline photographs.

12.6 Information on Limitations of Visualisations

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 has been 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. Limitations of photomontages are set out further below.

The photomontage visualisations of the Development (and any wind farm proposal) have a number of limitations when using them to form a judgement on visual impact. These include the following:

- A visualisation can never show exactly what the Development will look like in reality due to factors such as: different lighting, weather and seasonal conditions which vary through time and the resolution of the image;
- The images provided give a reasonable impression of the scale 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 Development proposal these images are best viewed at the viewpoint location shown;
- The images must be printed and viewed at the correct size (260 mm by 820 mm);
- Images should be held flat at a comfortable arm's length. If viewing these images on a wall or board at an exhibition, stand at arm's length from the image presented to gain the best impression;
- It is preferable to view printed images rather than view images on screen. Images on screen should be viewed using a normal PC screen with the image enlarged to the full screen height to give a realistic impression; and,
- There are practical limitations to shooting viewpoint photographs only in very good or excellent visibility and at particular times of day. The photographs shown in the visualisations show the most favourable weather conditions available during photographic survey work.

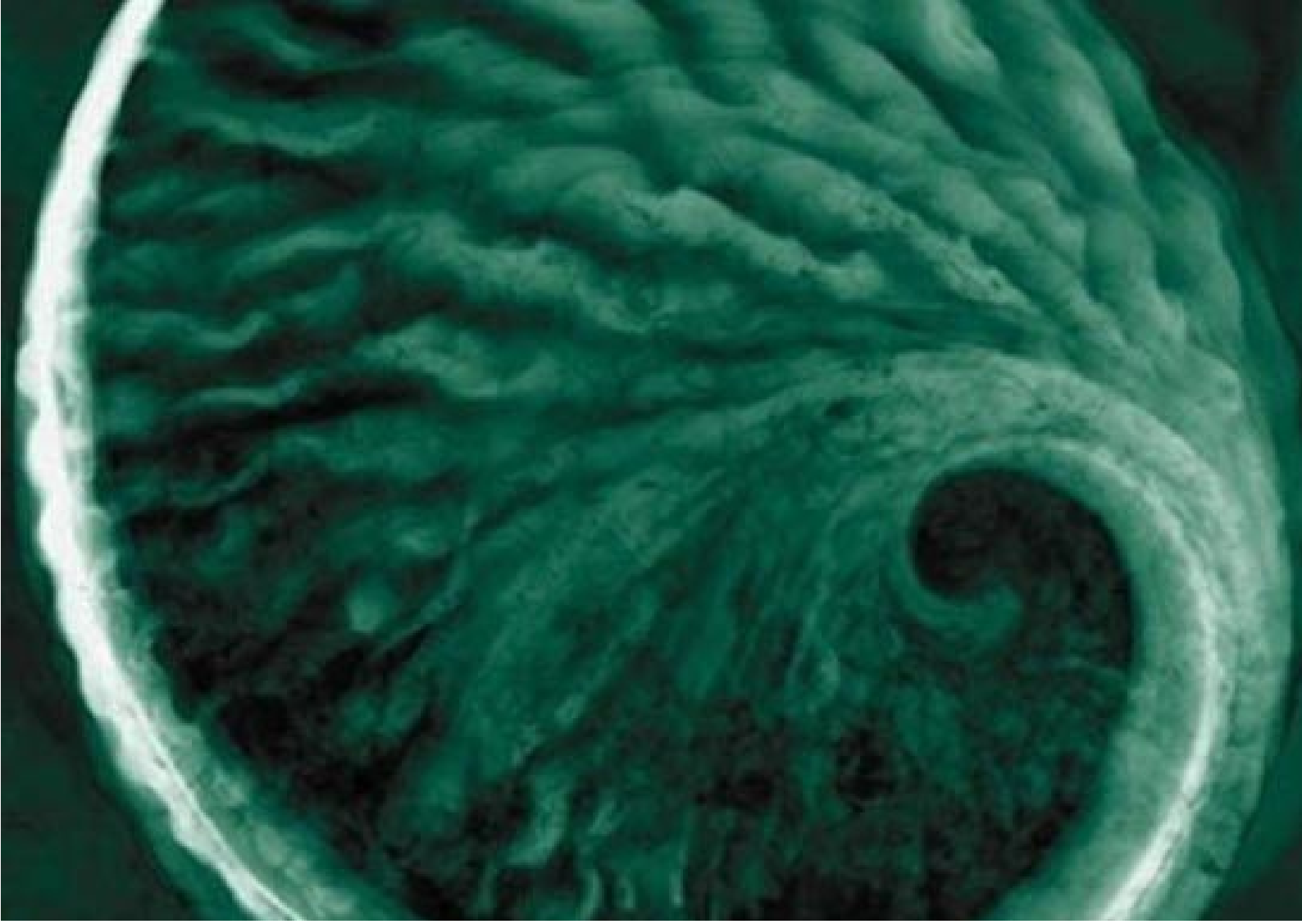
12.7 Technical Methodology - Visualisations

In accordance with the requirements of Landscape Institute (2019) Technical Guidance Note 06/19 Table A6.1.8 sets out the technical information for the preparation of the visualisations contained in ES **Volume 3b: Visualisations and 3c: Wirelines.**

Table A6.1.8. Technical Methodology - Visualisations

Category	Details
Photography	
Visualisation type	Type 4 – where survey of viewpoint locations is not required
Camera location	Established via hand-held Garmin GPS
Level of accuracy of location	1-3m (depending on satellites)
Camera	Canon EOS 5D Mark II and Canon EOS 6D Digital SLR. Full-frame (35mm negative size) CMOS sensor.
Lens	50mm fixed f1.4 lens
Tripod	Set to approximately 1.5m. Nodal Ninja panoramic head with Adjust Leveller. Nodal Ninja panoramic head set to take photographs at 20 degree increments
Photography process	Camera used on fully manual settings. Photographs taken in RAW image format. Bracketed exposures are taken for each view and those depicting the clearest images are selected to prepare the panoramic image

Category	Details
Preparation of panoramic photographs	PTGUI v12.8 is used to join and cylindrically project the images. Adobe Photoshop 2021 used to correct tonal alterations and create an even range of exposure across the photographs so that the individual photographs are not apparent. Planar panoramic images are prepared using Resoft Windfarm software or Hugin Panorama Stitcher
3D Model/Visualisations	
Topographic height data	OSNI 10m DTM and Copernicus 30m DTM.
Use of coordinates in software	Coordinates are brought in from the surveyed GPS coordinates. Positions checked using aerial photography.
Markers for horizontal alignment	Existing onshore turbines and their known coordinates.
Markers for vertical alignment	Existing onshore turbines and their known coordinates.
Rendering software	Resoft Windfarm v.5.2.5.3 (Wind turbines in wirelines and photomontages). Sketchup or AutoCAD Map 3D 2018. Autodesk 3ds Max 2018. Visual Nature Studio V 3.10.
Limitations	
Terrain data	There may therefore be local, small-scale landform that is not reflected in the data and subsequently the visualisation but may alter the real visibility of the Development, either by screening theoretical visibility or revealing parts of the Development that are not theoretically visible.
Movement	Static images are unable to capture the movement within the view or of the turbines



Owenreagh/Craignagapple Wind Farm

Environmental Statement – Technical Appendix A6.2 Residential Visual Amenity Assessment

Ørsted Onshore Ireland Midco Limited

06 September 2023

Project No.: 0696177

The business of sustainability

ERM

Signature Page

06 September 2023

Owenreagh/Craignagapple Wind Farm

Environmental Statement – Technical Appendix A6.2 Residential Visual Amenity Assessment

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Acronyms and Abbreviations

Name	Description
ANO	Air Navigation Order
AOD	Above Ordnance Datum
CAA	Civil Aviation Authority
CLVIA	Cumulative Landscape and Visual Impact Assessment
CMO	Complementary Metal Oxide
CZTV	Cumulative Zone of Theoretical Visibility
DfI	Department for Infrastructure
DTM	Digital Terrain Model
EASA	European Union Aviation Safety Agency
ES	Environmental Statement
EIA	Environmental Impact Assessment
FoV	Field of View
GIS	Geographic Information System
GLVIA3	Guidelines for Landscape and Visual Impact Assessment Third Edition
GN01	Guidance Notes for the Reduction of Obtrusive Light
HFoV	High Field of View
ICAO	International Civil Aviation Organisation
IEMA	Institute of Environmental Management and Assessment
ILP	Institute of Lighting Professionals
LCT	Landscape Character Type

LCA	Landscape Character Area
LDP	Local Development Plan
LI	Landscape Institute
LVIA	Landscape and Visual Impact Assessment
OPEN	Optimised Environments
OS	Operation System
OSNI	Ordnance Survey Northern Ireland
PTGUI	Panorama Photo Stitching Program
RVAA	Residential Visual Amenity Assessment
SLVIA	Seascape Landscape Visual Impact Assessment
TNG	Technical Guidance Note
SLA	Special Landscape Area
ULR	Upward Light Ratio
ZTV	Zone of Theoretical Visibility

1. INTRODUCTION

This Technical Appendix has been prepared to accompany Chapter 6: LVIA in Volume 1 of the Owenreagh / Craignagapple Wind Farm (hereafter the Development) Environmental Statement (ES). In accordance with the third edition of 'Guidelines for Landscape and Visual Impact Assessment' (GLVIA3), the LVIA assesses the visual impact of the Development on public views and public visual amenity. This Appendix was authored, and the assessment undertaken, by Optimised Environments Ltd (OPEN).

This Residential Visual Amenity Assessment (RVAA) goes a stage beyond the LVIA by assessing the impact on the visual component of the amenity and enjoyment of dwellings and their gardens which may reasonably be expected. The threshold of reasonable expectation adopted in this, and all such cases, is that impacts should not be overwhelming or overbearing. It has been prepared in accordance with the Landscape Institute's Technical Guidance Note 2/19 'Residential Visual Amenity Assessment' (the Technical Guidance). This guidance sets out the 'Steps' to be followed when undertaking a RVAA and highlights how it should be informed by the principles and processes of GLVIA3. The purpose of the RVAA is to identify those properties where the effect of the Development leads to the 'Residential Visual Amenity Threshold' being reached or, in other words, where the effect could be described as overwhelming or overbearing.

This RVAA assesses the likely effects of the Development on the visual component of residential amenity relating to individual properties within a localised study area. The effect of the proposed new turbines only is considered, and not the current effect of the existing turbines, which will be removed as part of the initial decommissioning and construction phase of the Development. The term 'residential amenity' refers to the living conditions at a house, including its gardens and domestic curtilage, which are commonly interpreted to include visual amenity, noise amenity and other factors such as shadow flicker. In a RVAA, such as this, OPEN deals only with the visual amenity aspect of residential amenity, as this is its area of expertise. The effect on noise and shadow flicker are assessed in **Volume 2** of the ES in **Chapters 12: Noise** and **15: Other Issues** respectively.

The purpose of the RVAA is to inform the planning process. It is in this context that the Technical Guidance makes the following statement: 'It is not uncommon for significant adverse effects on views and visual amenity to be experienced by people at their place of residence as a result of introducing a new development into the landscape. In itself this does not necessarily cause particular planning concern. However, there are situations where the effect on the outlook / visual amenity of a residential property is so great that it is not generally considered to be in the public interest to permit such conditions to occur where they did not exist before.'

2. APPROACH

The approach set out in the Technical Guidance is based on the four following Steps:

- Step 1: Definition of the study area and scope of the assessment, informed by the description of the Development, defining the study area extent and scope of the assessment with respect to the properties to be included;
- Step 2: Evaluation of baseline visual amenity at properties to be included having regard to the landscape and visual context and the Development proposed;
- Step 3: Assessment of likely change to visual amenity of included properties in accordance with GLVIA3 principles and processes; and,
- Step 4: Further assessment of predicted change to visual amenity of properties to be included forming a judgement with respect to the Residential Visual Amenity Threshold.

2.1 Step 1

Step 1 involves defining the extent of the RVAA Study Area and establishing the scope of the assessment. In respect of defining the extent of the RVAA Study Area, Landscape Institute Technical Guidance Note presents the following advice, 'When assessing relatively conspicuous structures such as wind turbines, and depending on local landscape characteristics, a preliminary study area of approximately 1.5 to 2 km radius may initially be appropriate in order to begin identifying properties to include in a RVAA.'

In line with this guidance, the RVAA Study Area for the Development has been drawn out to the larger 2 km radius recommended. Whilst it is recognised that there are further residential properties beyond 2 km that may also experience a significant visual effect, the Technical Guidance Note explains that the 'exceptionally large' study areas of up to 3 km are disproportionate further stating that 'The logic for these (exceptionally) large study areas was based on certain findings of LVIAs which identified significant visual effects from 'settlements' or from clusters of residential properties within this range. This fails to recognise that RVAA is a stage beyond LVIA. Consequently, many RVAAs, including those of windfarms with large turbines (150 m and taller), have included disproportionately extensive study areas incorporating too many properties. This appears to be based on the misconception that if a significant effect has been identified in the LVIA adjacent to a property at 2.5 km it will also potentially lead to reaching the Residential Visual Amenity Threshold.'

Within the 2 km RVAA Study Area, a total of 79 residential properties have been identified. Of these, 68 residential properties which experience theoretical visibility of the Development have been identified using Ordnance Survey Northern Ireland (OSNI) Address Point data and then verified in the field. These are individually numbered in Figure A6.2.1 and listed in Figure A6.2.2 and in Table A6.2.1 below.

The RVAA has been undertaken for both residential properties that appear to be occupied and in use as dwelling houses, as well as those that are currently under construction and that have been consented, and are shown in the ZTV to experience visibility (Figure A6.2.1). Properties which have been confirmed as uninhabitable have not been included in the assessment.

The ZTV within this 2 km area shows theoretical visibility is almost continuous across the entire RVAA Study Area, with at least one turbine visible from practically all areas. Small areas which do not experience visibility of the Development are focussed along the courses of the Ballykeery Burn to the east and the Glenmornan River to the north. Several properties lie outwith the area covered by the ZTV, as seen in Figure A6.2.1. Properties lying outwith the ZTV are not considered further in the assessment.

Table A6.2.1. Properties within 2 km of the Development Turbines

VP	Property numbers	Property	Grid Ref		Dist. to Nearest Turbine (km)	Scoped in / out
1	**1 & 2**	129 & 125 Curlyhill Road	239859	396600	1.84	In
2	**3**	40 Glenmornan Road	240803	398699	1.85	In
3	**4, 5 & 6**	93 and 91 Holyhill Road & unnamed property LA11/2018/0744RM	241015	398504	1.58	In
4	**7 & 8**	44 Koram Road & unnamed property LA11/2020/1008/RM	240673	398256	1.57	In
5	**9 & 10**	38 & 40 Koram Road	240492	398077	1.59	In

VP	Property numbers	Property	Grid Ref		Dist. to Nearest Turbine (km)	Scoped in / out
6	**11**	47 Koram Road	240784	398089	1.38	In
7	**12**	34 Koram Road	240754	397896	1.27	In
8	**13, 14 & 15**	33 & 35 Koram Road, & unnamed property	240867	397471	0.95	In
9	**16**	7 Crockan Road	241524	398983	1.89	In
10	**17 & 18**	12 & 15 Crockan Road	241899	399016	1.92	In
11	**20 & 19**	14 & 16 Crockan Road	241983	398959	1.87	In
12	**21, 22, 23 & 24**	18, 18A, 20 & 22A Crockan Road	242049	398941	1.86	In
13	**25**	21A Crockan Road	242072	398844	1.77	In
14	**26 & 27**	22, 23, 24 & 25 Crockan Road	242185	398919	1.86	Out 23 and 25 – no ZTV / In 22 and 24
15	**28**	30 Crockan Road	242331	398827	1.79	In
N/A	**N/A**	38 & 39 Crockan Road, & unnamed property	242739	398514	1.45	Out – no ZTV
16	**29 & 30**	44 & 46 Crockan Road	242739	398514	1.45	In
17	**31**	131 Moorlough Road	242966	398618	1.47	In
18	**32 & 33**	Unnamed property LA11/2019/0065/RM and 106 Holyhill Road	242692	398319	1.29	In
19	**34**	101 Holyhill Road	242635	398227	1.24	In
20	**35**	100 Holyhill Road	242513	398503	1.48	In
21	**36**	105 Holyhill Road	242776	398246	1.18	In
22	**37, 38 & 39**	109, 111 & 113 Holyhill Road	243037	398390	1.23	In
23	**40 & 41**	150 Moorlough Road & planning application LA11/2021/0359/O	243776	399010	1.87	In
24	**42 & 43**	141 & 143 Moorlough Road	243532	398952	1.77	In
25	**45, 44, 46 & 47**	135, 136 & 137 Moorlough Road & planning application LA11/2021/0712/F	243228	398953	1.76	In
26	**50, 48 and 49**	130, 132 & 134 Moorlough Road	243105	399058	1.88	In

VP	Property numbers	Property	Grid Ref		Dist. to Nearest Turbine (km)	Scoped in / out
27	**51**	123 Moorlough Road	242812	398992	1.87	In
28	**52 and 53**	119 & 126 Moorlough Road	242744	399169	2.06	In
29	**54**	166 Moorlough Road	245228	398595	1.99	In
30	**55**	171 Moorlough Road	245325	398156	1.77	In
31	**56**	64 Meendamph Road	245628	397422	1.56	In
32	**57**	9 Balbane Road	245451	396366	1.29	In
33	**58**	51 Napple Road	245122	396215	1.05	In
34	**59**	0 Napple Road	245393	396054	1.37	In
N/A	**N/A**	30 Ballykeery Road	245140	395970	1.21	Out – no ZTV
N/A	**N/A**	21 Ballykeery Road & Planning Application LA11/2022/1200/O	245007	395703	1.32	Out – no ZTV
N/A	**N/A**	20 Ballykeery Road & two unnamed properties	244898	395648	1.30	Out – no ZTV
35	**60,61 & 62**	10, 10A & 12 Ballykeery Road	242750	394595	1.46	In
36	**63 & 64**	13 Ballykeery Road & unnamed property	243773	394141	1.83	In
37	**65 & 66**	15 & 21 Koram Road	241158	395213	1.41	In
38	**67**	11 Koram Road	241133	394878	1.73	In
39	**68**	8 Koram Road	241093	394610	1.99	In

2.2 Step 2

Step 2 involves carrying out an evaluation of the baseline visual amenity at the properties to be included, through a combination of desk study and field work. The key considerations of this evaluation are set out in the Technical Guidance as follows:

- 'The nature and extent of all potentially available existing views from the property and its garden / domestic curtilage, including the proximity and relationship of the property to surrounding landform / landcover and visual foci. This may include primary / main views from the property or domestic curtilage as well as secondary / peripheral views; and,
- Views as experienced when arriving or leaving the property, for example from private driveways / access tracks.'

In the course of carrying out the baseline evaluation, OPEN has surveyed the visual amenity of the residential properties from adjacent public roads, open land or footpaths. The locations of the

residential properties within the 2 km RVAA Study Area are shown on RVAA Overview Plan which includes the blade tip height ZTV (Figure A6.2.1).

RVAA sheets have been prepared for all properties within the RVAA Study Area that are considered to require assessment in the RVAA following Step 1. These assessments contain an OSNI map and aerial photograph of the property, the orientation of the principal facade of each property, the direction of the view/horizontal field of view which will be affected by the Development and the theoretical visibility of the Development. The RVAA sheets record details of the baseline residential amenity and the likely visual effects resulting from the Development. In respect of some of the properties where close range inspection was not possible, assumptions have been made regarding the principal façade and where the front and rear of the property occurs. Operational wind farms are included in the baseline evaluation, with these existing windfarms considered in the assessment of effects on residential visual amenity. A 53.5 degree wireline is also presented to illustrate the theoretical visibility of the Development, in Figures 6.2.3 to 6.2.4 included as a separate document.

2.3 Step 3

Step 3 involves carrying out an assessment of the likely change to the visual amenity of properties by applying the process of assessment advocated by GLVIA3, in which the sensitivity of the receptor is combined with the magnitude of change which will arise as a result of the Development, to determine whether the effect will be significant or not. The aim of Step 3 is to identify those properties with potential to reach the Residential Visual Amenity Threshold and therefore require further assessment in Step 4. This will only occur where a high magnitude of change is assessed as the threshold describes those effects that are at the extreme where they may become overwhelming or over-bearing.

OPEN's methodology assumes that all occupiers of local residential property within this RVAA typically have a higher sensitivity than other visual receptors. OPEN attaches less weight to views from upper floor rooms in houses compared with ground floor principal rooms, an approach which is reflected in GLVIA3 (paragraph 6.36). The assessment of magnitude of change which will arise from the Development is determined by the factors influencing magnitude of change on views, the potential change to the outlook from each property, as well as other factors, such as areas of garden ground or property access drives immediately surrounding a property, that will be likely to be affected. The key considerations of this assessment are set out in the Technical Guidance as follows:

- Distance of property from the proposed development having regard to its size / scale and location relative to the property (e.g. on higher or lower ground);
- Type and nature of the available views (e.g. panoramic, open, framed, enclosed, focused etc.) and how they may be affected, having regard to seasonal and diurnal variations;
  - Direction of view / aspect of property affected, having regard to both the main / primary and peripheral / secondary views from the property;
  - Extent to which development / landscape changes will be visible from the property (or parts of) having regard to views from principal rooms, the domestic curtilage (i.e. garden) and the private access route, taking into account seasonal and diurnal variations;
  - Scale of change in views having regard to such factors as the loss or addition of features and compositional changes including the proportion of view occupied by the development, taking account of seasonal and diurnal variations;
  - Degree of contrast or integration of new features or changes in the landscape compared to the existing situation in terms of form, scale and mass, line, height, colour and texture, having regard to seasonal and diurnal variations;
  - Duration and nature of the changes, whether temporary or permanent, intermittent or continuous, reversible or irreversible etc.; and,

- Mitigation opportunities – consider implications of both embedded and potential further mitigation.'

Technical Appendix A6.1: LVIA Methodology of the ES provides a description of the criteria that contribute to magnitude of change on views and a description of the magnitude ratings used in this assessment. **Technical Appendix A6.1: LVIA Methodology** also presents Table A6.1.1 which is a matrix used to guide determination of effect significance setting out sensitivity ratings and magnitude of change rates and illustrating how their combination leads to significant or not significant effects. This matrix has been applied in the assessment of effects in respect of each of the RVAA properties.

The magnitude of change assessed in respect of the RVAA differs slightly in that the focus is specifically on visual amenity and the potential for reaching the Residential Visual Amenity Threshold which sets a higher bar than the visual assessment in the LVIA. This means that there needs to be more of an impact to reach a high magnitude of change in the RVAA than in the LVIA.

The significance of the effect on residential visual amenity experienced at each property is dependent on all of the factors considered in the sensitivity and the magnitude of change resulting from the Development. These judgements on sensitivity and magnitude are combined to arrive at an overall assessment as to whether the Development will have an effect that is significant or not significant on residential visual amenity.

2.4 Step 4

Recognition of the difference between significant visual effects and what might be considered to be an unacceptable or overbearing effect on residential visual amenity has evolved through Public Local Inquiry (PLI) decisions over at least the past decade. The factors considered in such an assessment are widely recognised by professional Landscape Architects and decision makers and are often referred to as 'the Lavender test' after the Inspector who first developed the concept. The factors considered in the so called 'Lavender test' require a level of visual effect to arise which is greater than a significant visual effect in EIA terms, for the impact to be unacceptable in planning terms. In the Technical Guidance this is referred to as the Residential Visual Amenity Threshold.

The magnitude of effect must be to such a degree that a property will become widely regarded as an unattractive place in which to live. This public interest test therefore has a higher threshold than 'significant' in EIA terms. This approach is commonly applied to the assessment of visual effects on residential amenity. The approach has been refined through decisions for Inquiries and Appeals into wind farm applications across the United Kingdom and recognises that, given no person is entitled to a view in law, it is not sufficient for a property to simply sustain a significant visual effect for its residential amenity to be unacceptably harmed. For residential visual amenity to be harmed a higher threshold requires to be triggered, whereby the turbine(s) are at such proximity to a house, or in such number, that they lead to an overwhelming or overbearing effect on the property to the extent that it becomes an unattractive place in which to live. Where this occurs, the matter affects the public interest as such an outcome will be considered to harm the provision of good housing stock.

The Step 4 Assessment differs from the Step 3 Assessment in that it considers whether the visual effects likely to be experienced at the Development will lead to 'Residential Visual Amenity Threshold' being reached, that is to say, that the effects have the potential to be overbearing in respect of the visual amenity of residents at the property.

In the RVAA, while there is no specific definition of Residential Visual Amenity Threshold to base an assessment upon, there are a number of suggested criteria that may be applicable, including 'blocking the only available view from a property', or 'overwhelming views in all directions'; and 'unpleasantly encroaching' or being 'inescapably dominant from the property'. The Step 4 Assessment is triggered when the Development is found to give rise to a high magnitude of change in the Step 3 Assessment and is reported in the RVAA sheets for applicable properties. Those properties that are assessed in the Step 3 Assessment to undergo a medium-high or lower magnitude

of change are not taken forward to the Step 4 Assessment as at a medium-high or lower rating, there is not the potential for the effects to breach the RVAA threshold.

3. SUMMARY OF RVAA RESULTS

The RVAA identifies 68 residential properties which have potential views of the Development, out of a total of 79 properties located within 2 km of the Development. All properties which have theoretical visibility of the Development are located between 1 and 2 km of the Development. Detailed assessment sheets (provided in Section 6 of this Appendix) have been prepared for these properties, which include properties currently under construction and properties which have been consented that occur within the ZTV. Properties located in close proximity to each other, and which will experience similar views towards the Development, have been grouped and assessed together. Wirelines (provided at the back of this Appendix) have been produced to illustrate the view from each property, or - where properties are grouped together - the view from one representative property within the group.

The effect of the Development on 54 of the properties will be significant, while 14 properties will experience not significant effects. The magnitude of change will be high at 15 properties, medium-high at 22 properties, medium at 14 properties, medium-low at eight properties, and low at nine properties. The high magnitude of change experienced at 15 properties has meant that these 15 properties require also to be considered for a Step 4 Residential Visual Amenity Threshold Assessment. The conclusion of this Step 4 assessment is that whilst a high magnitude of change and major **significant** effect is predicted, the nature of the visual impact at all 15 properties is not sufficiently adverse to be characterised as an overwhelming or overbearing effect on visual amenity.

In conclusion, the RVAA has assessed 54 of the 79 properties within the RVAA Study Area to experience significant visual effects. However, the Development is not considered to lead to the 'Residential Visual Amenity Threshold' being reached in respect of any of these properties. That is to say, **the Development does not have the potential to give rise to overbearing or over whelming effects on any of the properties in respect of the visual amenity of residents at the property**.

4. REFERENCES

- Landscape Institute with the Institute of Environmental Management and Assessment (2013). Guidelines for Landscape and Visual Impact Assessment, Third Edition (GLVIA3).
- Landscape Institute (2019). Technical Guidance Note 2/19 Residential Visual Amenity Assessment.
- Landscape Institute (2019). Visual representation of Development Proposals: Landscape Institute Technical Guidance Note 06/19

5. RVAA ASSESSMENT SHEETS

RVAA Assessment sheets have been prepared for each of the 39 viewpoints used to represent the 68 properties with potential visibility of the Development. Each RVAA Assessment sheet presents a map and an aerial image showing the location of the properties and the direction of the view towards the Development and the angle of that view within which proposed turbines would be visible.

The assessment is set out following the Step 2, 3 and 4 approach recommended in the LI Guidance. Assessments have been carried out in the field and it must be noted that the assessment of private properties from only publicly accessible land gives rise to certain limitations in respect of the accuracy of the information. Where there is any degree of uncertainty, this is noted in the assessment.

Where properties are in close proximity it is not necessary to produce a RVAA wireline for each property as each wireline would essentially show the same extent of visibility. Where this occurs, properties have been grouped and a logical single viewpoint location chosen that represents the group of properties. The grid reference for the viewpoint is cited at the top right column of each RVAA Sheet in Section 6 and the associated distance between this viewpoint and the nearest turbine also cited. In the assessment text, reference may be made to a different distance which is the average distance between the properties and the closest turbine.

Residential Properties

1. 129. CURLYHILL ROAD (Viewpoint 1)
2. 125. CURLYHILL ROAD (Viewpoint 1)
3. 40. GLENMORNAN ROAD (Viewpoint 2)
4. 93. HOLLYHILL ROAD (Viewpoint 3)
5. 91. HOLLYHILL ROAD (Viewpoint 3)
6. 0. Unnamed property (Viewpoint 4)
7. 44. KORAM ROAD (Viewpoint 4)
8. 0. Unnamed property
9. 40. KORAM ROAD (Viewpoint 5)
10. 38. KORAM ROAD (Viewpoint 5)
11. 47. KORAM ROAD (Viewpoint 6)
12. 34. KORAM ROAD (Viewpoint 7)
13. 33. KORAM ROAD (Viewpoint 8)
14. 35. KORAM ROAD (Viewpoint 8)
15. 0. Unnamed property (Viewpoint 8)
16. 7. CROCKAN ROAD (Viewpoint 9)
17. 12. CROCKAN ROAD (Viewpoint 10)
18. 15. CROCKAN ROAD (Viewpoint 10)
19. 16. CROCKAN ROAD (Viewpoint 11)
20. 14. CROCKAN ROAD (Viewpoint 11)
21. 18. CROCKAN ROAD (Viewpoint 12)
22. 18a. CROCKAN ROAD (Viewpoint 12)
23. 20. CROCKAN ROAD (Viewpoint 12)
24. 22a. CROCKAN ROAD (Viewpoint 12)
25. 21a. CROCKAN ROAD (Viewpoint 13)
26. 22. CROCKAN ROAD (Viewpoint 14)
27. 24. CROCKAN ROAD (Viewpoint 14)
28. 30. CROCKAN ROAD (Viewpoint 15)
29. 44. CROCKAN ROAD (Viewpoint 16)
30. 46. CROCKAN ROAD (Viewpoint 16)
31. 131. MOORLOUGH ROAD (Viewpoint 17)
32. 0. Unnamed property (Viewpoint 18)
33. 106. HOLLYHILL ROAD (Viewpoint 18)
34. 101. HOLLYHILL ROAD (Viewpoint 19)
35. 100. HOLLYHILL ROAD (Viewpoint 20)
36. 105. HOLLYHILL ROAD (Viewpoint 21)
37. 109. HOLLYHILL ROAD (Viewpoint 22)
38. 111. HOLLYHILL ROAD (Viewpoint 22)
39. 113. HOLLYHILL ROAD (Viewpoint 22)
40. 150. MOORLOUGH ROAD (Viewpoint 23)
41. 0. Outline permission dwelling on a farm holding, adjacent to 150 Moorlough Road. (Viewpoint 23)
42. 141. MOORLOUGH ROAD (Viewpoint 24)
43. 143. MOORLOUGH ROAD (Viewpoint 24)
44. 136. MOORLOUGH ROAD (Viewpoint 25)
45. 135. MOORLOUGH ROAD (Viewpoint 25)
46. 137. MOORLOUGH ROAD (Viewpoint 25)
47. 0. Planning application for proposed dwelling and garage @ Site directly to East of 135 Moorlough Road (Viewpoint 25)
48. 132. MOORLOUGH ROAD (Viewpoint 26)
49. 134. MOORLOUGH ROAD (Viewpoint 26)
50. 130. MOORLOUGH ROAD (Viewpoint 26)
51. 123. MOORLOUGH ROAD (Viewpoint 27)
52. 119. MOORLOUGH ROAD (Viewpoint 28)
53. 126. MOORLOUGH ROAD (Viewpoint 28)
54. 166. MOORLOUGH ROAD (Viewpoint 29)
55. 171. MOORLOUGH ROAD (Viewpoint 30)
56. 64. MEENDAMPH ROAD (Viewpoint 31)
57. 9. BALBANE ROAD (Viewpoint 32)
58. 51. NAPPLE ROAD (Viewpoint 33)
59. 0. NAPPLE ROAD (Viewpoint 34)
60. 10. BALLYKEERY ROAD (Viewpoint 35)
61. 10a. BALLYKEERY ROAD (Viewpoint 35)
62. 12. BALLYKEERY ROAD (Viewpoint 35)
63. 13. BALLYKEERY ROAD (Viewpoint 36)
64. 0. Unnamed property (Viewpoint 36)
65. 15. KORAM ROAD (Viewpoint 37)
66. 21. KORAM ROAD (Viewpoint 37)
67. 11. KORAM ROAD (Viewpoint 38)
68. 8. KORAM ROAD (Viewpoint 39)

open optimised environments
Ørsted
ERM

1:10,000 Scale @ A3
0 0.15 0.3 km
NORTH

Produced By: TH	Ref:
Checked By: JP	Date: 30/03/2023

Figure 6.2.2
Blade Tip ZTV with Residential Properties Legend

Owenreagh/Craignagapple Wind Farm Environmental Statement RVAA

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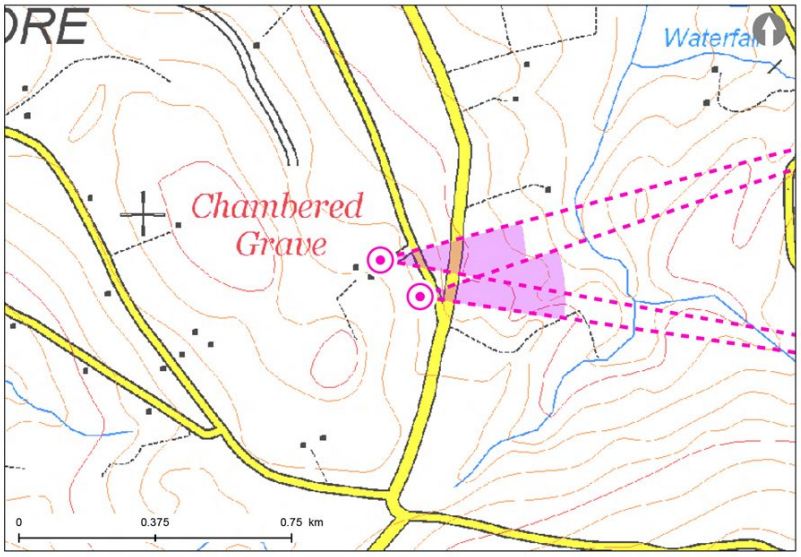
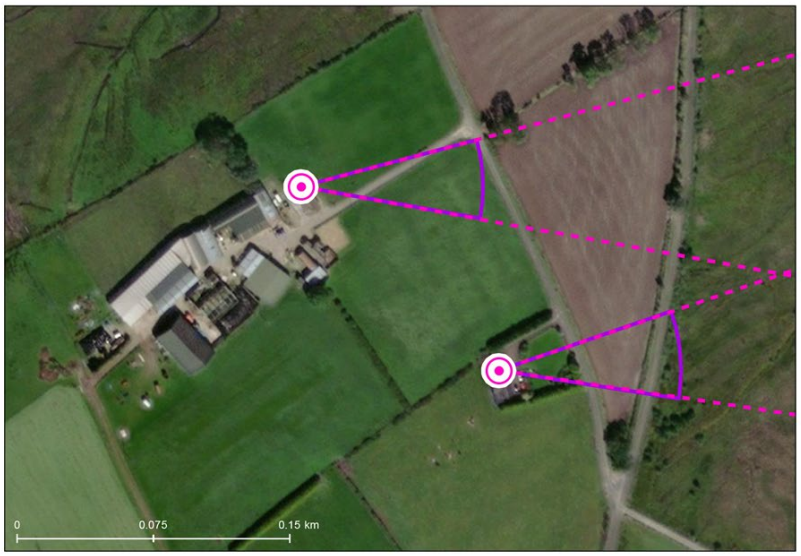
6. RESIDENTIAL VISUAL AMENTIY ASSESSMENT SHEETS

6.1 Viewpoint 1: 129 and 125 Curlyhill Road (Properties 1 and 2) (Figure 6.2.3)





Data Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

6.1.1 Property Description

OS Grid Ref: 239859 E 396600 N Distance to Nearest Turbine: 1784 m Elevation: 224.9 m AOD

6.1.2 Step 2: Existing Residential (Visual) Amenity

Two modern one-storey bungalows located to the west of Curlyhill Road. Both properties are set short distances above the road and accessed by driveways. Number 125 is orientated north-east to south-west and principal views are to the north-east towards Curlyhill Road. There are several large outbuildings to the rear and a small garden to the front. Number 129 is orientated east to west, with principal views to the east and a small garden to the front contained by large hedges to the north and south. To the north-east there are long-distance views over agricultural land from both properties, while to the east the horizon is formed by partially forested moorland hills. Outward views to the west

and south from number 125 are contained by the farm buildings adjacent to the property. Vegetation within the garden of number 129 limits views to the north and south. Turbines within the operational Owenreagh I and II Wind Farms are visible above the horizon to the east from both properties, partially filtered by vegetation within the garden from 129, and at an oblique angle from 125.

6.1.3 Step 3: Residential (Visual) Amenity Effects

Mean Affected Field of View:	26.5°	No of Blade Tips Theoretically Visible:	9 – 10	No of Turbine Hubs Theoretically Visible:	6

The wireline shows that up to 10 of the 14 turbines will be theoretically visible in views to the east. Five of the turbines will be seen to practically their full extents, with the hub of one further turbine visible above the horizon and the blades of the remaining turbines intermittently visible. The Development will be visible from the interior and exterior of the properties, including from gardens and driveways. From number 125, interior views will be oblique to the east from the north-eastern principal façade. From number 129, direct views will be available from the principal façade, albeit partially filtered by vegetation within the garden. The 156.5 m turbines will present large and dynamic structures that will appear at variance with the relatively small scale and rural character of this local landscape. The Development will bring wind farm development into closer proximity to these properties than the existing operational Owenreagh I and II Wind Farms, and the turbines of the Development will be appreciably larger than the existing turbines.

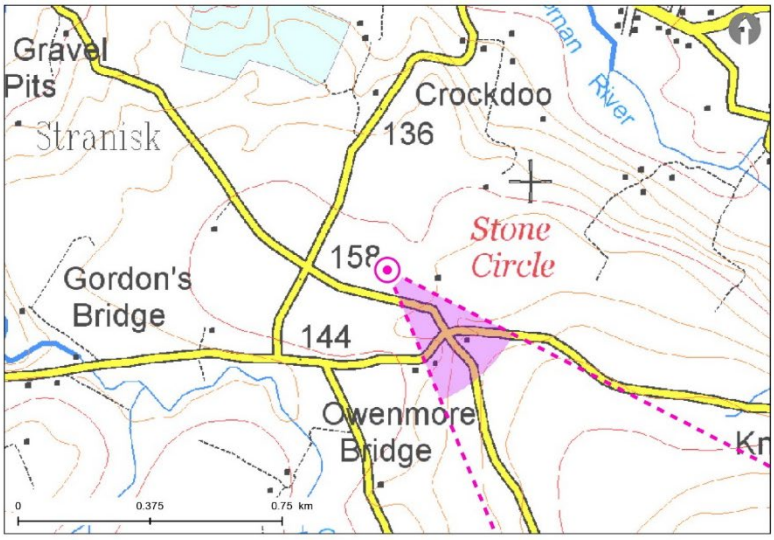
The magnitude of change is predicted to be high, which when combined with the high sensitivity will result in a major and significant effect.

6.1.4 Step 4: Residential Visual Amenity Threshold

Step 4 involves making a judgement as to whether the predicted effects on visual amenity and views at a property assessed to have a high magnitude of change are such that it has reached the Residential Visual Amenity Threshold, as described in the introduction. These properties are considered not to have reached the Residential Visual Amenity Threshold, for the following reasons:

- Although turbines may be visible to the east from the interior of properties, these views will be oblique from number 125 and filtered by vegetation from number 129; and
- The Development will be seen within the same sector of the view in which the turbines of the operational Owenreagh Wind Farm are visible, and which have established a baseline influence of wind farm development; and,
- The turbines will be contained within a relatively small horizontal field of view (26.5 degrees), visible in the eastern aspect with the wider view unaffected, and their containment within this sector preventsreduces the likelihood of effects becoming overbearing or overwhelming.

6.2 Viewpoint 2: 40 Glenmornan Road (Property 3) (Figure 6.2.4)



Data Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

6.2.1 Property Description

OS Grid Ref:	240803 398699	Distance to Nearest Turbine:	1854 m	Elevation:	153.7 m AOD

6.2.2 Step 2: Existing Residential (Visual) Amenity

A modern one-storey detached property located to the north of Glenmornan Road. The property is orientated north to south, with principal views to the south. It is set a short distance from the road and is accessed by a driveway and surrounded by a small garden on all sides, with a small outbuilding to the north-east. Outward views from the property are open in all directions over relatively flat agricultural land. There are longer-distance views to the south towards moorland and forested hills, while to the north views are slightly more contained. To the south-east, turbines within the operational Owenreagh I and II Wind Farms can be seen above the horizon. Views also include several other residential properties and farms.

6.2.3 Step 3: Residential (Visual) Amenity Effects

Affected Field of View:	41º	No of Blade Tips Theoretically Visible:	11	No of Turbine Hubs Theoretically Visible:	7

The wireline shows that 11 of the 14 turbines will be theoretically visible in views to the south-east. Five turbines to the north of the Development will be seen to almost their full extents, although two of these turbines will be partially backclothed by the higher ground towards the south of the Site. The hubs of seven turbines will be visible, with the remaining five seen as blade tips only. The Development will be seen in principal views from the interior and exterior of the property, including from the garden and driveway. The 156.5 m turbines will present large and dynamic structures that will appear at variance with the relatively small scale and rural character of this local landscape. The Development will bring wind farm development into closer proximity than the existing operational Owenreagh I and II Wind Farms, and the turbines of the Development will be appreciably larger than the existing turbines. However, the turbines will be contained within the south-eastern sector of the view and will only slightly extend the field of view occupied by turbines. The location of the nearest turbines to the fore of the ridge will increase their prominence and make them the defining feature in the views from the property.

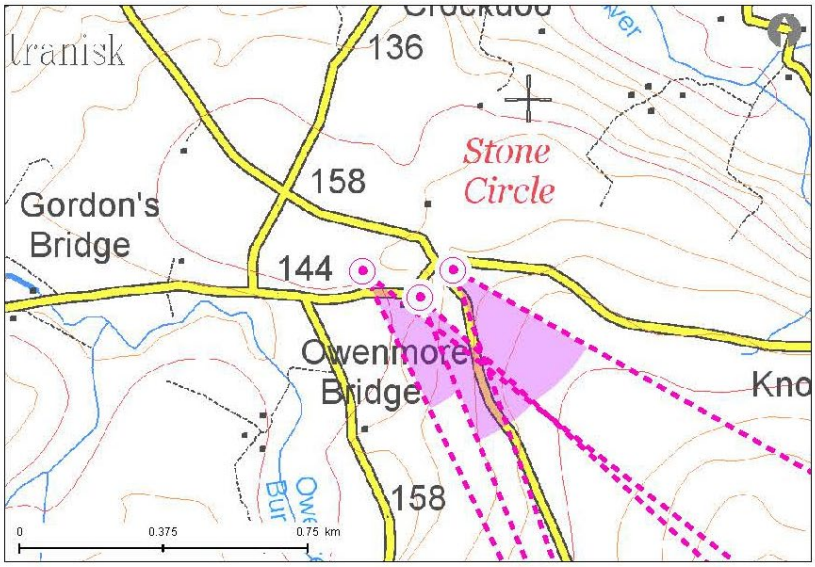
The magnitude of change is predicted to be **high**, which when combined with the **high** sensitivity will result in a **major** and **significant** effect.

6.2.4 Step 4: Residential Visual Amenity Threshold

Step 4 involves making a judgement as to whether the predicted effects on visual amenity and views at a property assessed to have a high magnitude of change are such that it has reached the Residential Visual Amenity Threshold, as described in the introduction. This property is considered not to have reached the Residential Visual Amenity Threshold, for the following reasons:

- Although turbines will be visible to the south-east from the interior of the property and its surroundings, they will be contained within a horizontal field of view of 41° and will not affect the wider view; and,
- The turbines will be seen at a minimum range of 1.9 km, such that they will not appear especially close range.

6.3 Viewpoint 3: 93 and 91 Hollyhill Road and unnamed property LA11/2020/1008/RM (Properties 4, 5 and 6) (Figure 6.4.5)



Data Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

6.3.1 Property Description

OS Grid Ref:	241015 39 8504	Distance to Nearest Turbine:	1595 m	Elevation:	172.8 m AOD

6.3.2 Step 2: Existing Residential (Visual) Amenity

This group consists of two modern properties and one property which is currently under construction. The two modern properties are located to the south of Hollyhill Road. Number 91 is a one-storey building, orientated north to south, while number 93 is a one-and-a-half storey property orientated

east to west. Principal views from number 91 are to the north towards Hollyhill Road, and views to the south are contained at close proximity by farm outbuildings adjacent to the property. Principal views from number 93 are to the west towards the junction between Hollyhill Road and Glenmornan Road, and the property can be accessed by short driveways from each road. There is a large barn to the south-east of number 93. Number 93 is set on higher ground and has more open outward views; views from number 91 are very limited, although there are longer-distance glimpsed views to the south between farm buildings towards distant hills. From number 91, outward views are open and long-distance to the north, west and south. Views to the east from the rear of the property are more contained by the rising landform. The property under construction (planning reference LA11/2020/1008/RM) is located to the north of Holyhill Road. It has an H-shaped form, with large windows on all facades. The operational Owenreagh I and II Wind Farms are visible from the surroundings of all three properties in views to the south-east, and in interior views from the property under construction.

6.3.3 Step 3: Residential (Visual) Amenity Effects

Affected Field of View:	41°	No of Blade Tips Theoretically Visible:	11	No of Turbine Hubs Theoretically Visible:	7

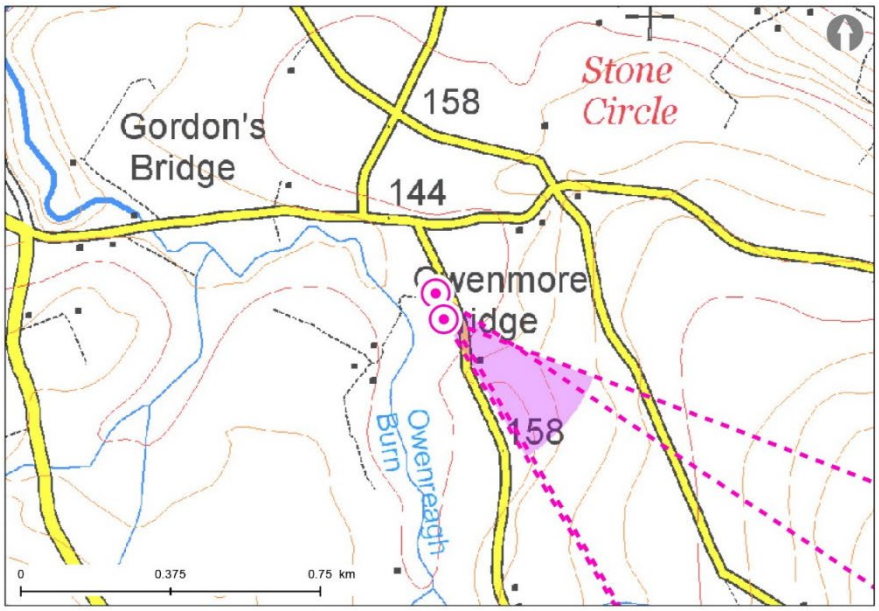
The wireline shows that up to eight of the 14 turbines will be theoretically visible in views to the south-east. The hubs of six turbines and the blades of a further two will be visible, with some partial backclothing of several turbines in views from number 93 and the property under construction. From number 91, the landform provides some screening, reducing the theoretical visibility. The Development will be visible only in glimpsed views from the surroundings of number 91. It will likely only be visible in exterior views from the garden and surroundings of number 93, although there may be oblique interior views from the southern façade, partially filtered by vegetation along Glenmornan Road. Most open views will be available from the property under construction, with views towards the Development available in slightly oblique views from the principal southern façade of the property. The 156.5 m turbines will present large and dynamic structures that will appear at variance with the relatively small scale and rural character of this local landscape. The Development will bring wind farm development into closer proximity than the existing operational Owenreagh I and II Wind Farms, and the turbines of the Development will be appreciably larger than the existing turbines. The largely glimpsed, oblique nature of views from number 91 and 93 will reduce the magnitude of change, although from the property under construction the magnitude of change will be higher. The distance of no less than 1580 m between the property and the turbines, and the containment within the south-eastern sector of the view, will reduce the magnitude of change resulting from the Development. The magnitude of change is predicted to be high, which when combined with the high sensitivity will result in a major and significant effect.

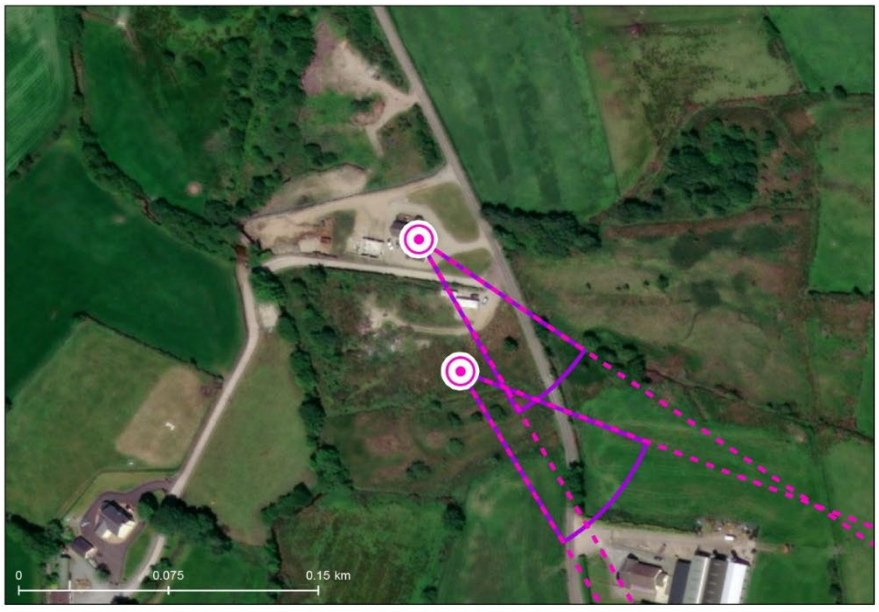
6.3.4 Step 4: Residential Visual Amenity Threshold

Step 4 involves making a judgement as to whether the predicted effects on visual amenity and views at a property assessed to have a high magnitude of change are such that it has reached the Residential Visual Amenity Threshold, as described in the introduction. These properties are considered not to have reached the Residential Visual Amenity Threshold, for the following reasons:

- Although turbines may be visible to the south from the interior of the property under construction (planning reference LA11/2020/1008/RM) and 93 Holyhill Road, the turbines will be contained in the south-eastern aspect with the wider view unaffected, and their containment within this sector prevents the effects becoming overbearing or overwhelming; and,
- The turbines will occupy a field of view of approximately 31° and will be seen at a minimum range of 1.6 km, such that they will appear contained and not especially close in range.

6.4 Viewpoint 4: 44 Koram Road and unnamed property LA11/2018/0744RM (Properties 7 and 8) (Figure 6.2.6)





Data Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

6.4.1 Property Description

OS Grid Ref:	240673 398256	Distance to Nearest Turbine:	1610 m	Elevation:	148.3 m AOD

6.4.2 Step 2: Existing Residential (Visual) Amenity

This group consists of one modern property and one property which is currently under construction (planning application LA11/2018/0744RM). Both properties are located to the west of Koram Road.

Both properties are orientated east to west with principal views to the east and are surrounded by large gardens and accessed by short driveways. Number 44 is a one-and-a-half storey property, while the property under construction has one storey. Views to the east from the properties are over rising agricultural land. Views to the west are more open over rolling agricultural land. Turbines within the operational Owenreagh I and II Wind Farms are visible to the south-east from the surroundings of the properties.

6.4.3 Step 3: Residential (Visual) Amenity Effects

Affected Field of View:	25º	No of Blade Tips Theoretically Visible:	9	No of Turbine Hubs Theoretically Visible:	7

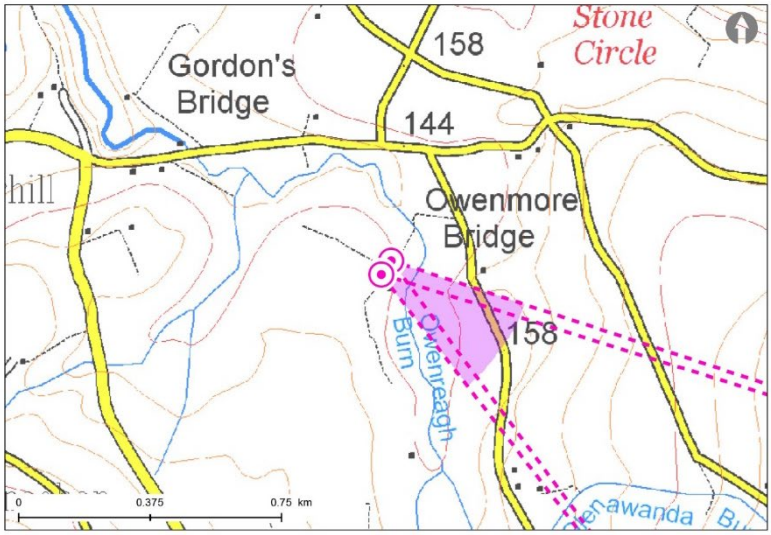
The wireline shows that nine of the 14 turbines will be theoretically visible in views to the south-east. The hubs of seven turbines and the blades of a further two will be visible, one occurring as only a tip. One turbine will be partially backclothed against the landform beyond. From both properties, there are likely to be oblique internal views to the south-east from the eastern principal façade. However, these are likely to be filtered by vegetation along the east of Koram Road. The turbines will be seen beyond farm buildings at 47 Koram Road. The 156.5 m turbines will present large and dynamic structures that will appear at variance with the relatively small scale and rural character of this local landscape. The Development will bring wind farm development into closer proximity than the existing operational Owenreagh I and II Wind Farms, and the turbines of the Development will be appreciably larger than the existing turbines. The oblique nature of views from the two properties, the minimum distance of 1,514 m between the property and the turbines, and the containment within the south-eastern sector of the view, will moderate the magnitude of change resulting from the Development.

The magnitude of change is predicted to be **medium-high**, which when combined with the **high** sensitivity will result in a **major** and **significant** effect.

6.4.4 Step 4: Residential Visual Amenity Threshold

N/A

6.5 Viewpoint 5: 40 & 38 Koram Road (Properties 9 and 10) (Figure 6.2.7)



Data Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

6.5.1 Property Description

OS Grid Ref:	240492 398077	Distance to Nearest Turbine:	1722 m	Elevation:	152.6 m AOD

6.5.2 Step 2: Existing Residential (Visual) Amenity

Number 40 is a large two-storey property, and number 38 is a single-storey property, located along a private road to the west of Koram Road. The two-storey property is orientated north-east to south-west, with principal views to the north-east. The single-storey property is orientated east to west with principal views to the east. There are several large farm buildings to the south of the two properties, as well as smaller outbuildings around the two properties. There is vegetation to the east of the properties which filters views towards Koram Road and beyond in this direction. The farm buildings to the south are likely to screen views in this direction. To the north and west views are more open, over rolling agricultural land. To the west, the horizon is formed by forested moorland hills.

6.5.3 Step 3: Residential (Visual) Amenity Effects

Affected Field of View:	38	No of Blade Tips Theoretically Visible:	9 – 10	No of Turbine Hubs Theoretically Visible:	7

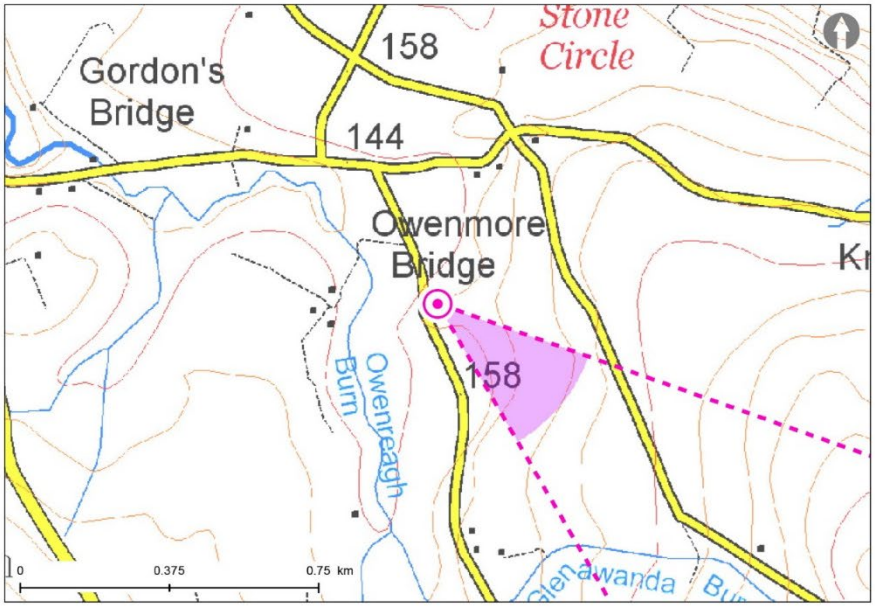
The wireline shows that 10 of the 14 turbines will be theoretically visible in views to the south-east. The hubs of seven turbines and the blades of up to three will be visible. One turbine will be partially backclothed against the landform beyond. It is possible there will be oblique interior views to the south-east from the principal eastern façade of number 38, as well as in direct views from the south-eastern secondary façade of number 40. Due to the location of the properties along a private road, it is not possible to confirm this visibility from publicly accessible locations. Vegetation to the east of the properties, and farm buildings to the south, may provide some screening and filtering of the Development in interior and exterior views. There is likely to be open views towards the Development from the access road. The 156.5 m turbines will present large and dynamic structures that will appear at variance with the relatively small scale and rural character of this local landscape. The Development will bring wind farm development into closer proximity than the existing operational Owenreagh I and II Wind Farms, and the turbines of the Development will be appreciably larger than the existing turbines. The oblique nature of views from number 38 and the view from the secondary façade of number 40; the distance of no less than 1722 m between the property and the turbines; and the containment within the south-eastern sector of the view, will moderate the magnitude of change resulting from the Development.

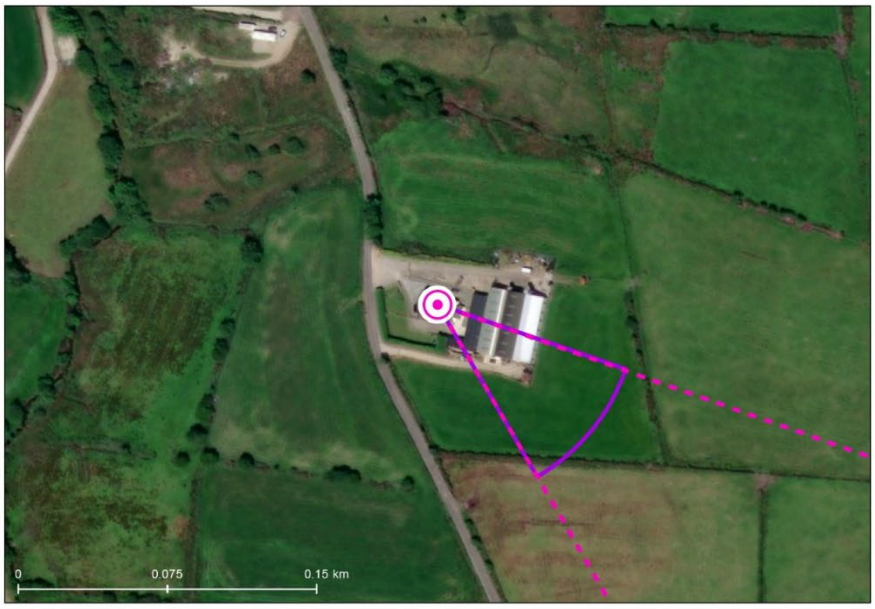
The magnitude of change is predicted to be **medium-high**, which when combined with the **high** sensitivity will result in a **major** and **significant** effect.

6.5.4 Step 4: Residential Visual Amenity Threshold

N/A

6.6 Viewpoint 6: 47 Koram Road (Property 11) (Figure 6.2.8)





Data Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

6.6.1 Property Description

OS Grid Ref:	240784 398089	Distance to Nearest Turbine:	1379 m	Elevation:	158.3 m AOD

6.6.2 Step 2: Existing Residential (Visual) Amenity

A modern two-storey detached property located to the east of Koram Road. The property is orientated east to west, with principal views to the west. It has a small garden at the front to the west, a farmyard to the north, and several large farm buildings to the east. A tall hedge surrounds the garden to the north, west and south, and there is a short driveway to the north. From the driveway and surroundings of the property there are open views to the west. There are also views to the south and south-east

from parts of the front garden to the west of the property, towards partially forested moorland hills. Turbines within the operational Owenreagh I and II Wind Farms are visible on the horizon in this direction. The tall hedge largely restricts outward views to the south and west from the property and from most of the garden.

6.6.3 Step 3: Residential (Visual) Amenity Effects

Affected Field of View:	40º	No of Blade Tips Theoretically Visible:	9	No of Turbine Hubs Theoretically Visible:	7

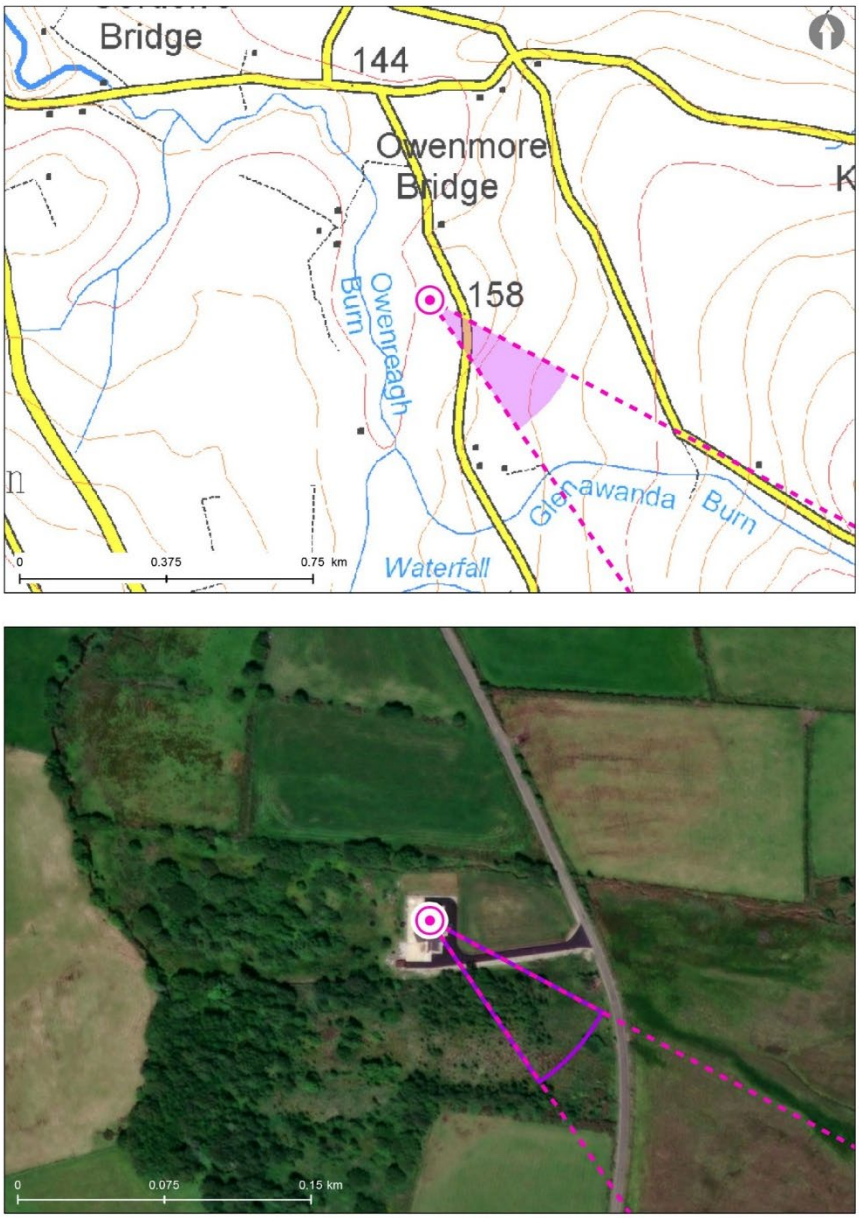
The wireline shows that nine of the 14 turbines will be theoretically visible in the south-eastern sector of the view. Five turbines to the north of the Development will be seen to their full extents, with the turbine towers of the two closest turbines partially backclothed against the higher ground to the south of the Site. A further four turbines towards the south and west of the Development will be seen beyond. The farm sheds to the east and vegetation within the garden to the south is likely to screen views of the Development from the ground floor interior rooms and from parts of the exterior of the property, although there may be second-storey views and views from parts of the garden. With the minimum distance of 1,378 m between the property and the closest turbine, the Development will be seen as a close-range feature, with the 156.5 m turbines presenting large and dynamic structures that will appear at variance with the relatively small scale and rural character of this local landscape. Where the Development is visible from the interior of the property, this will be in oblique second-storey views from the south-facing secondary façade.

The magnitude of change is predicted to be **medium**, which when combined with the **high** sensitivity will result in a **moderate** and **significant** effect.

6.6.4 Step 4: Residential Visual Amenity Threshold

N/A

6.7 Viewpoint 7: 34 Koram Road (Property 12) (Figure 6.2.9)



Data Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

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6.7.1 Property Description

OS Grid Ref:	240754 E 397896 N	Distance to Nearest Turbine:	1271 m	Elevation:	153.3 m AOD

6.7.2 Step 2: Existing Residential (Visual) Amenity

A modern one-storey detached property located to the west of Koram Road. The property is orientated east to west, with principal views to the east. It has a garden at the front to the east and is accessed by a driveway from Koram Road. Due to the landform, the property is set slightly below Koram Road. There is vegetation to the south of the property which largely limits views in this direction. Views to the east are more open, towards agricultural land and moorland beyond Koram

Road. To the north and west, views are less contained by the landform, and comprise agricultural land seen beyond sparse woodland. Turbines within the operational Owenreagh I and II Wind Farms are visible on the horizon to the south-east from the driveway and parts of the garden and may also be visible from the interior of the property, although it is not possible to confirm this from publicly accessible locations and vegetation to the south of the property could create a screen to views.

6.7.3 Step 3: Residential (Visual) Amenity Effects

Affected Field of View:	28º	No of Blade Tips Theoretically Visible:	8	No of Turbine Hubs Theoretically Visible:	6

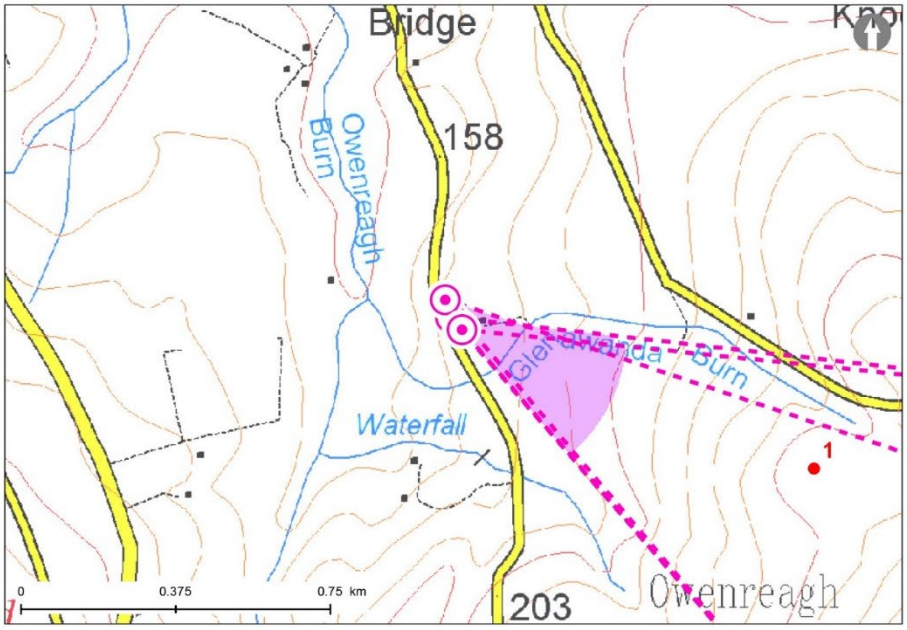
The wireline shows that eight of the 14 turbines will be theoretically visible in the south-eastern sector of the view. The hubs and tips of a total of six turbines will be seen, as well as the blade tips of an additional two turbines. The tower of one turbine will be partially backclothed against higher ground to the south of the site. Vegetation to the south of the property is likely to filter views towards the Development from the interior of the property. Where views are available, they will be oblique to the south-east from the principal eastern façade. The Development will be seen from the driveway and parts of the front garden. With the minimum distance of 1,271 m between the property and the closest turbine, the Development will be seen as a close-range feature, with the 156.5 m turbines presenting large and dynamic structures that will appear at variance with the relatively small scale and rural character of this local landscape. Turbines within the Development will be contained within the south-eastern sector of the view and will only slightly extend the horizontal field of view occupied by turbines within the existing operational Owenreagh I and II Wind Farms.

The magnitude of change is predicted to be **medium-high**, which when combined with the **high** sensitivity will result in a **major** and **significant** effect.

6.7.4 Step 4: Residential Visual Amenity Threshold

N/A

6.8 Viewpoint 8: 33 & 35 Koram Road, and unnamed property (Properties 13, 14 and 15) (Figure 6.2.10)



Data Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

6.8.1 Property Description

OS Grid Ref:	240867 397471	Distance to Nearest Turbine:	1194 m	Elevation:	174.9 m AOD

6.8.2 Step 2: Existing Residential (Visual) Amenity

Three properties to the east of Koram Road. Numbers 33 and 35 are orientated east to west, with principal views to the west, while the unnamed property is orientated north to south with principal

views to the south. Number 33 has a small outbuilding to the north-east, and there are several large outbuildings to the east of number 35 and north-east of the unnamed property. Numbers 33 and 35 are one-storey buildings, while the unnamed property has two storeys. All properties have gardens on several sides. Views to the west are open and long-distance. Views to the east are contained at close range by rising landform. From number 33 and 35 views to the south are partially screened by vegetation and the adjacent buildings. From the unnamed property views to the south are more open, although partially filtered by vegetation. Turbines within the operational Owenreagh I and II Wind Farms are visible from the surroundings of the unnamed property, although screened from interior views by vegetation. They are also visible in glimpsed views from the surroundings of number 33. From number 35, number 33 largely screens views in this direction.

6.8.3 Step 3: Residential (Visual) Amenity Effects

Affected Field of View:	25 – 32°	No of Blade Tips Theoretically Visible:	8 – 9	No of Turbine Hubs Theoretically Visible:	7

The wireline shows that nine of the 14 turbines will be theoretically visible in the south-east sector of the view. Five turbines will be seen to almost their full extents, with a further two turbines with towers screened and two with only very small tips showing. Some of these turbines may be visible in oblique interior views to the south-east from the principal southern façade of unnamed property, although there will be screening by vegetation to the south-east. The Development may also be seen from the surroundings of number 33 and 35, although it is likely these views will be filtered or partially screened by surrounding vegetation. With the minimum distance of 1950 m as an average between the two properties and the closest turbine, the Development will be seen as a close-range feature, with the 156.5 m turbines presenting large and dynamic structures that will appear at variance with the relatively small scale and rural character of this local landscape. The turbines will bring wind farm development closer to the properties than the turbines within the operational Owenreagh I and II Wind Farms, and the scale of the turbines within the Development will be appreciably larger than the existing 60 and 66 m turbines.

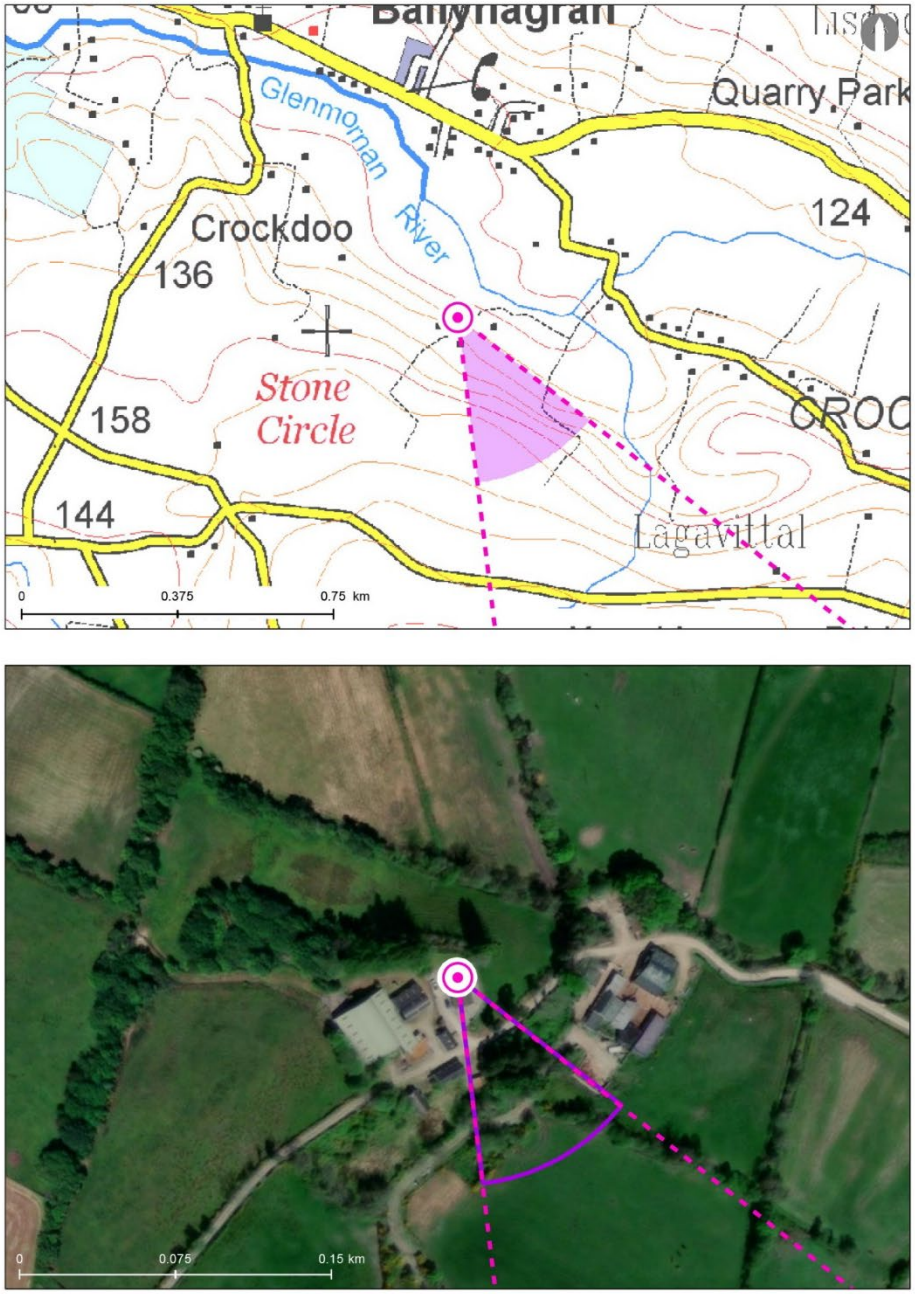
The magnitude of change is predicted to be **high**, which when combined with the **high** sensitivity will result in a **major** and **significant** effect.

6.8.4 Step 4: Residential Visual Amenity Threshold

Step 4 involves making a judgement as to whether the predicted effects on visual amenity and views at a property assessed to have a high magnitude of change are such that it has reached the Residential Visual Amenity Threshold, as described in the introduction. This property is considered not to have reached the Residential Visual Amenity Threshold, for the following reasons:

- Although turbines may be visible to the south-east from the interior of the unnamed property, these views will be oblique and filtered by vegetation to the south of the property;
- While the Development may be visible from the surroundings of number 33 and 35, principal interior views from these properties will remain unaffected; and
- The turbines will be contained in the south-eastern aspect with the wider view unaffected, and their containment within this sector prevents the effects becoming overbearing or overwhelming.

6.9 Viewpoint 9: 7 Crockan Road (Property 16) (Figure 6.2.11)



Data Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

6.9.1 Property Description

OS Grid Ref:	241524 398983	Distance to Nearest Turbine:	1892 m	Elevation:	117.35 m AOD

6.9.2 Step 2: Existing Residential (Visual) Amenity

This property is located along a private track to the south-west of Crockan Road and is not visible from publicly accessible locations. As such, assessment is based on aerial photography. The property appears to be orientated east to west. Principal views are assumed to be to the east, due to the

presence of farm outbuildings in close proximity to the west. There is also a further group of outbuildings along the access track to the east of the property. There appears to be a small garden at the front of the property to the east, and there are areas of woodland to the north and south. Farm buildings and vegetation to the west and south respectively likely screen or filter views in these directions, and views are assumed to be more open to the east.

6.9.3 Step 3: Residential (Visual) Amenity Effects

Affected Field of View:	45º	No of Blade Tips Theoretically Visible:	9	No of Turbine Hubs Theoretically Visible:	3

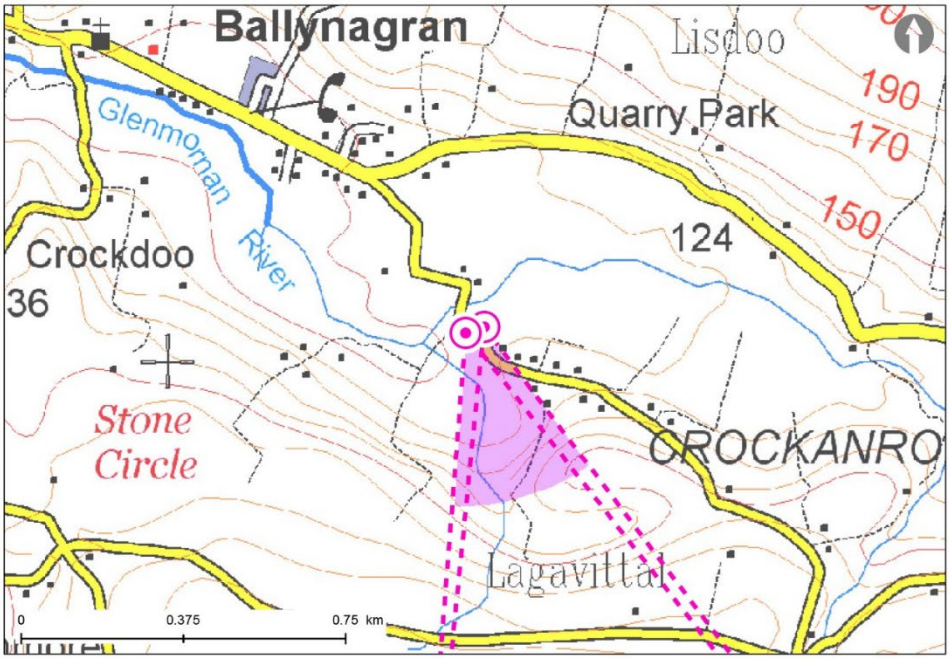
The wireline shows that the hubs and blades of three turbines and the blade tips of a further six turbines within the Development will be theoretically visible to the south-east. It is likely that vegetation to the south of the property will at least partially filter views in this direction. If views are available from the interior of the property, these will be from the south-facing gable end, and principal views to the east will remain unaffected. Views of the Development are likely to be experienced from more open parts of the access track to the east of the property. Turbines within the operational Owenreagh I and II Wind Farms are not visible from this location, so the Development will introduce wind farm development into views from this property. While the turbines will introduce large and dynamic structures into this relatively small-scale landscape, they will be seen at a distance of 1,892 m and contained within the south-eastern sector of the view. Views of the Development will likely be filtered by vegetation.

The magnitude of change is predicted to be **medium**, which when combined with the **high** sensitivity will result in a **major / moderate** and **significant** effect.

6.9.4 Step 4: Residential Visual Amenity Threshold

N/A

6.10 Viewpoint 10: 12 and 15 Crockan Road (Properties 17 and 18) (Figure 6.2.12)



Data Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

6.10.1 Property Description

OS Grid Ref:	241899 399016	Distance to Nearest Turbine:	1926 m	Elevation:	104.9 m AOD

6.10.2 Step 2: Existing Residential (Visual) Amenity

Two properties located to the north and south of Crockan Road, both orientated north-west to south-east. Number 12 is a modern one-and-a-half storey property, while number 15 is a modern two-storey property. Both properties have principal views to the north-west, gardens at the front and outbuildings at the rear to the south-east. Number 15 has a large farmyard at the rear as well as several outbuildings. Outward views from the properties are limited by vegetation along Crockan Road to the north-west and outbuildings to the south-east. Views from number 12 are more open to the north towards pastoral land on rolling hills in the middle distance. Turbines within the existing operational Owenreagh I and II Wind Farms are screened from view from number 12 by vegetation along Crockan Road and buildings at number 15. From number 15, there may be filtered views towards operational Owenreagh I and II Wind Farms from upper storey windows, although these are also likely to be filtered by vegetation if available.

6.10.3 Step 3: Residential (Visual) Amenity Effects

Affected Field of View:	42.5°	No of Blade Tips Theoretically Visible:	8 – 9	No of Turbine Hubs Theoretically Visible:	5

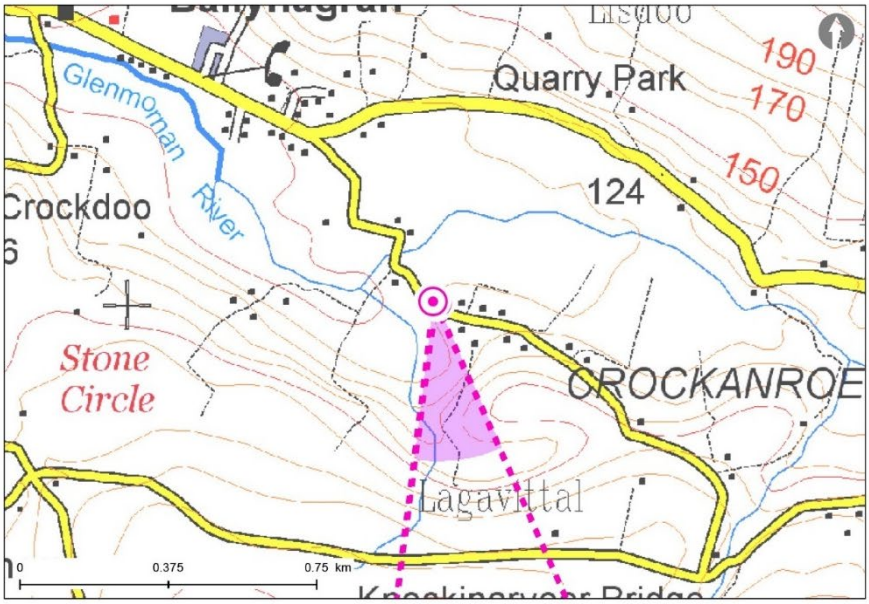
The wireline shows that the hubs and blades of five turbines and the blade tips of four further turbines will be theoretically visible in views to the south. From number 12, actual views of the turbines will be screened by buildings at number 15 and vegetation along Crockan Road. There may be internal views from the upper-storey rear windows of number 15 towards the turbines of the Development, although if available these are likely to be filtered by vegetation to the rear of the property. There may also be views towards the Development from the yard to the rear of this property. If visible, the turbines will be seen as a close-range feature, at a minimum distance of 1917 m, and the 156.5 m turbines will present large and dynamic structures. The turbines will be appreciably larger than the turbines within the existing operational Owenreagh I and II Wind Farms and will bring wind farm development closer to the property than the existing turbines. The magnitude of change will be moderated by the non-principal nature of interior views, and the likely filtering by vegetation to the rear.

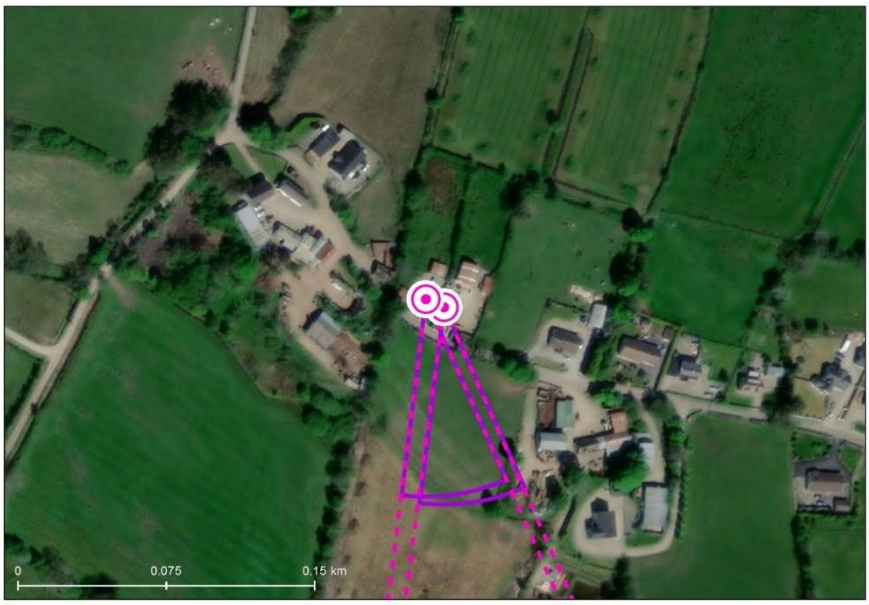
The magnitude of change is predicted to be **medium-high**, which when combined with the **high** sensitivity will result in a **major** and **significant** effect.

6.10.4 Step 4: Residential Visual Amenity Threshold

N/A

6.11 Viewpoint 11: 16 and 14 Crockan Road (Properties 19 and 20) (Figure 6.2.13)





Data Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

6.11.1 Property Description

OS Grid Ref:	241983 398959	Distance to Nearest Turbine:	1868 m	Elevation:	110.6 m AOD

6.11.2 Step 2: Existing Residential (Visual) Amenity

Two adjoined modern two-storey semi-detached properties located to the north of Crockan Road. The properties are orientated north to south, with principal views to the south. Both properties have gardens on three sides, including large rear gardens with outbuildings, and are accessed by very short driveways from Crockan Road. To the south, principal views are directed towards the rolling hills in the middle distance beyond Crockan Road. A hedgerow along Crockan Road may partially screen

views in this direction. Views to the east and west are more restricted, owing to the topography and vegetation along Crockan Road. Longer distance views are available to the north, again contained by rolling hills. A small number of turbines within the existing operational Owenreagh I and II Wind Farms are visible above the horizon to the south.

6.11.3 Step 3: Residential (Visual) Amenity Effects

Affected Field of View:	30 – 31º	No of Blade Tips Theoretically Visible:	8	No of Turbine Hubs Theoretically Visible:	4

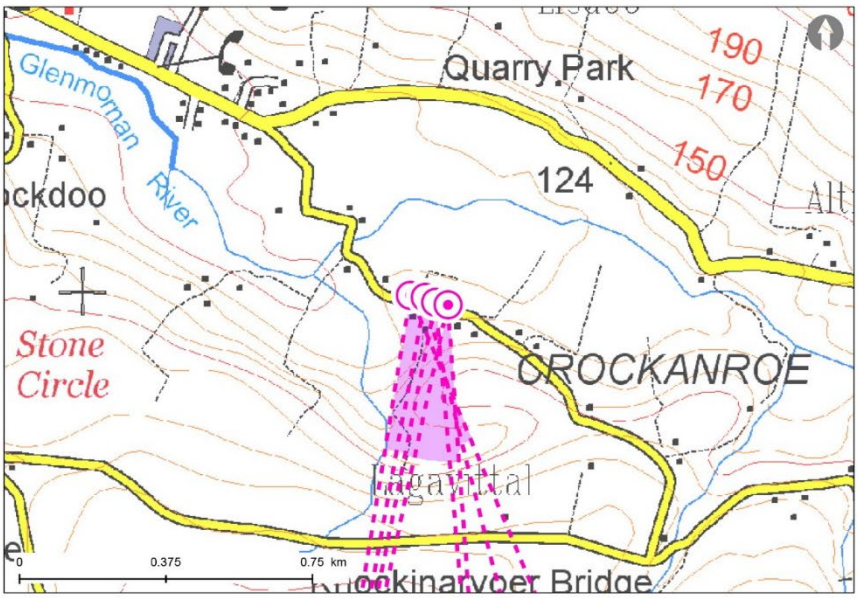
The wireline shows that the hubs and blades of four turbines, and the blade tips of a further four turbines, will be theoretically visible to the south. The Development will be seen in internal and external views from both properties. Internal views are likely to comprise direct principal views from second-storey windows; views from ground floor rooms are likely to be screened by hedgerows along Crockan Road. There may also be views from the surroundings of the properties, including parts of the front gardens, although these will be heavily filtered by vegetation along Crockan Road. Woodland upon the hills to the south may also provide some low-level screening of the lower parts of the turbines. With the minimum distance of 1866 m between the properties and the closest turbine, the Development will be seen as a close-range feature, with the 156.5 m turbines presenting large and dynamic structures that will appear at variance with the relatively small scale and rural character of this local landscape. The turbines will bring wind farm development closer to the properties than the existing turbines within the operational Owenreagh I and II Wind Farms, and the scale of the turbines will appreciably larger than the existing 60 to 66 m turbines. The second-storey nature of views will slightly reduce the magnitude of change, as will the screening of the majority of turbines within the Development by the landform.

The magnitude of change is predicted to be **medium-high**, which when combined with the **high** sensitivity will result in a **major** and **significant** effect.

6.11.4 Step 4: Residential Visual Amenity Threshold

N/A

6.12 Viewpoint 12: 18, 18A, 20 and 22A Crockan Road (Properties 21, 22, 23 and 24) (Figure 6.2.14)



Data Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

6.12.1 Property Description

OS Grid Ref:	242049 398941	Distance to Nearest Turbine:	1751 m	Elevation:	115.4 m AOD

6.12.2 Step 2: Existing Residential (Visual) Amenity

Four properties to the north of Crockan Road, orientated north to south with principal views to the south over the road. Number 18 is one-storey, while the remaining properties are one-and-a-half storeys. All properties have gardens on all sides, and are accessed by very short driveways from Crockan Road. Principal views to the south are most open from numbers 18, where there are views towards rolling pastoral land in the middle distance, beyond farm outbuildings on the opposite side of

Crockan Road in the foreground. From the other three properties outward views to the south are contained at closer proximity by outbuildings and steeply rising topography. Views to the north are more open, towards rolling pastoral land, although filtered from some properties by garden vegetation.

6.12.3 Step 3: Residential (Visual) Amenity Effects

Affected Field of View:	24 – 25º	No of Blade Tips Theoretically Visible:	1 – 6	No of Turbine Hubs Theoretically Visible:	0 – 5

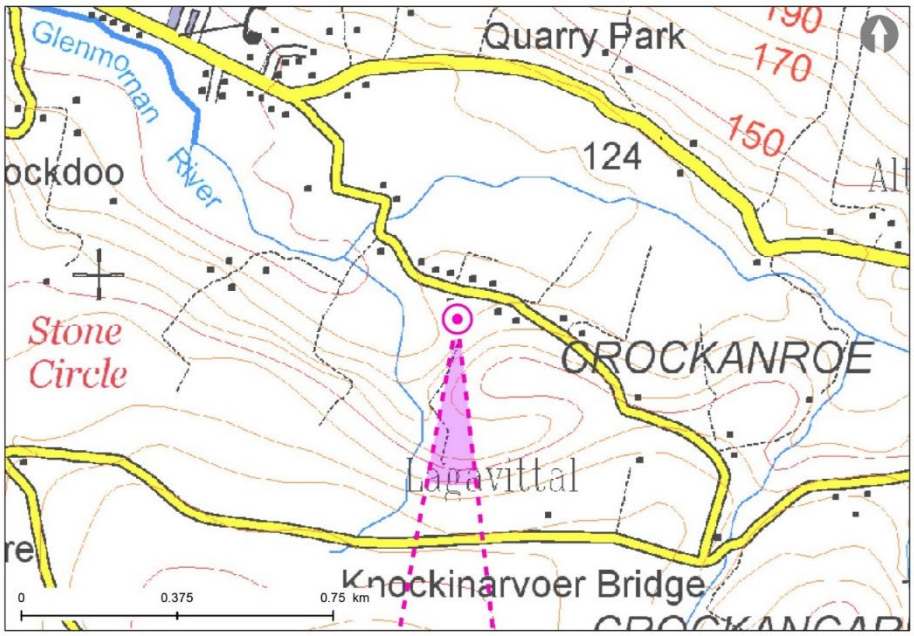
The wireline shows that the hubs and blades of five turbines, and the blades tips of one further turbine will be theoretically visible from the group of properties. The turbines will be visible above the steep ground to the south, with the towers of the turbines largely screened by the landform. The Development may be seen in principal interior views to the south from number 18, partially filtered by vegetation surrounding the farmyard to the south. In these views six turbines will be seen, with the majority of the Development being screened by the landform. Views are also likely to be available from the garden to the front of this property. From the other properties in this group, vegetation to the south of Crockan Road and farm outbuildings associated with number 21A to the south are likely to screen views of the Development. Where they are available, these views will be heavily filtered and more limited in nature than from number 18, due to screening by the landform. With the minimum distance of 1751 m between the property and the closest turbine, the Development will be seen as a close-range feature, with the 156.5 m turbines presenting large and dynamic structures that will appear at variance with the relatively small scale and rural character of this local landscape. The turbines will be seen beyond close-proximity farm buildings and associated infrastructure. The magnitude of change will be reduced by the screening of the majority of the Development by the landform and the filtered nature of views.

The magnitude of change is predicted to be **medium-high**, which when combined with the **high** sensitivity will result in a **major** and **significant** effect.

6.12.4 Step 4: Residential Visual Amenity Threshold

N/A

6.13 Viewpoint 13: 21A Crockan Road (Property 25) (Figure 6.2.15)



Data Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

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6.13.1 Property Description

OS Grid Ref:	242072 398844	Distance to Nearest Turbine:	1644 m	Elevation:	117.4 m AOD

6.13.2 Step 2: Existing Residential (Visual) Amenity

A large modern two-storey property orientated east to west to the south of Crockan Road. The property is accessed by a track from Crockan Road and has a number of outbuildings and associated infrastructure within a farmyard to the north. A number of mature trees surround the property. Principal views are to the west over rolling pastoral land. Views are most open to the south, although

it is not possible to ascertain whether there are windows on this aspect from publicly accessible locations. In this direction, steeply rising agricultural land forms the horizon in close proximity, partially filtered in views from the property by surrounding woodland.

6.13.3 Step 3: Residential (Visual) Amenity Effects

Affected Field of View:	25°	No of Blade Tips Theoretically Visible:	4	No of Turbine Hubs Theoretically Visible:	1

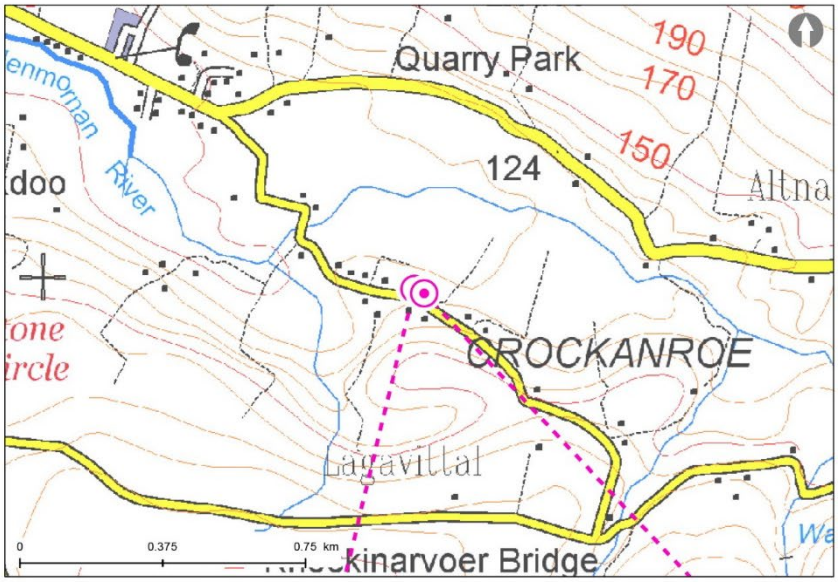
The wireline shows that the hubs and blades of one turbine, and the blades tips of a further three turbines will be theoretically visible from this property. The turbines will be visible above the steep ground to the south, with the towers of the turbines largely screened by the landform. The Development will be visible from the exterior of the property, including the access track and farmyard. It is not possible to confirm from publicly accessible locations whether there will be interior views from the property, although if there are windows on the southern aspect it is likely that interior views will be experienced. With the minimum distance of 1644 m between the property and the closest turbine, the Development will be seen as a close-range feature, with the 156.5 m turbines presenting large and dynamic structures that will appear at variance with the relatively small scale and rural character of this local landscape. The existing operational Owenreagh I and II Wind Farms are not visible from this property, so the Development will introduce wind farm development into the view. The magnitude of change will be reduced by the non-principal nature of views and the screening of the majority of the Development by the landform.

The magnitude of change is predicted to be **medium**, which when combined with the **high** sensitivity will result in a **major / moderate** and **significant** effect.

6.13.4 Step 4: Residential Visual Amenity Threshold

N/A

6.14 Viewpoint 14: 22 and 24 Crockan Road (Property 26 and 27) (Figure 6.2.16)



Data Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

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6.14.1 Property Description

OS Grid Ref:	242185 398919	Distance to Nearest Turbine:	1864 m	Elevation:	116.5 m AOD

6.14.2 Step 2: Existing Residential (Visual) Amenity

Two modern properties situated to the north of Crockan Road. Number 22 is a one-and-a-half storey property, orientated north to south with principal views to the south. Number 24 is a one-storey property aligned in the same direction. Both properties are accessed by a short driveway from Crockan Road and have gardens on each side. Outward views are generally more open to the north over rolling pastoral land, while views to the south are constrained in the middle distance by steeply rising landform and buildings to the south of Crockan Road. Views to the east and west along

Crockan Road are largely filtered by vegetation along the road and the topography. Two properties to the south of these, numbers 23 and 25 Crockan Road, have been scoped out of the assessment due to a lack of theoretical visibility of the Development.

6.14.3 Step 3: Residential (Visual) Amenity Effects

Affected Field of View:	0°	No of Blade Tips Theoretically Visible:	1	No of Turbine Hubs Theoretically Visible:	0

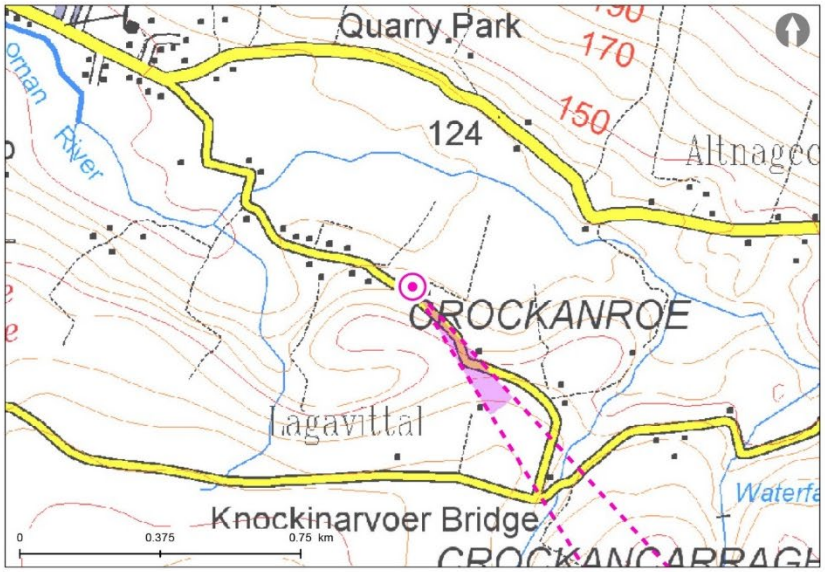
The wireline shows that one turbine blade will be theoretically visible from each property in views to the south. Actual visibility is likely to be further reduced as a result of screening by buildings and vegetation along Crockan Road to the south. The Development may be visible in glimpsed views to the south from both properties, although the nature of these view will be very limited.

The magnitude of change is predicted to be **low**, which when combined with the **high** sensitivity will result in a **moderate / minor** and **not significant** effect.

6.14.4 Step 4: Residential Visual Amenity Threshold

N/A

6.15 Viewpoint 15: 30 Crockan Road (Property 28) (Figure 6.2.17)



Data Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

6.15.1 Property Description

OS Grid Ref:	242331 398827	Distance to Nearest Turbine:	1789 m	Elevation:	122.9 m AOD

6.15.2 Step 2: Existing Residential (Visual) Amenity

A modern one-storey property situated to the north of Crockan Road and orientated north to south, with principal views to the south over the road. It is accessed by a short driveway directly from Crockan Road and surrounded by a garden on all sides, including hedges to the east and west which limit outward views in these directions. There are several outbuildings to the north and north-east. Views to the north from the rear of the property are open over rolling pastoral land. Hills form the horizon in the middle distance. To the south, principal views are contained in close proximity by steeply rising landform to the south of Crockan Road. A hedgerow and line of trees along the road edge also filter views in this direction.

6.15.3 Step 3: Residential (Visual) Amenity Effects

Affected Field of View:	11º	No of Blade Tips Theoretically Visible:	1	No of Turbine Hubs Theoretically Visible:	0

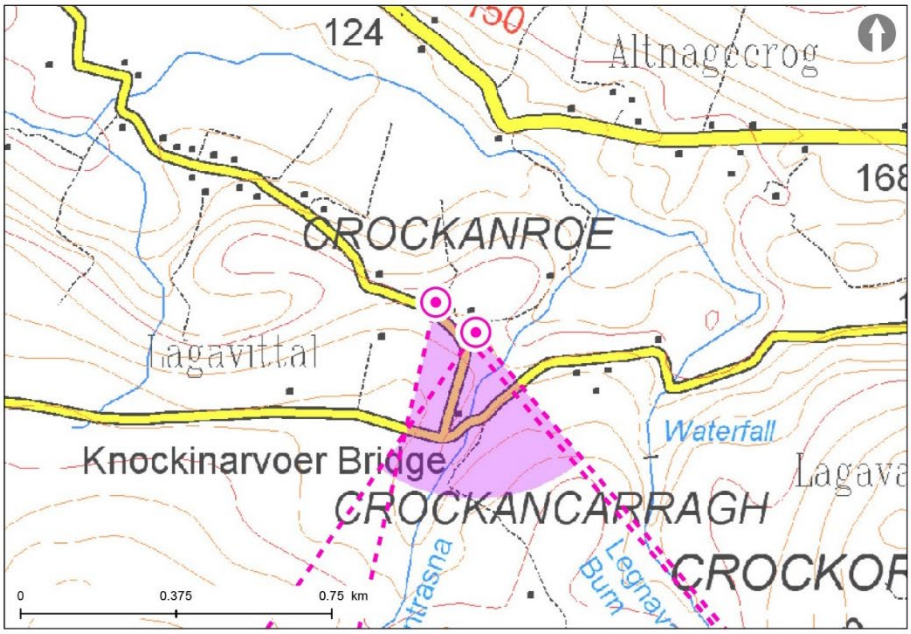
The wireline shows that the blade tips of one turbine will be theoretically visible from this property, above steep ground to the south. The turbine tower will be screened by the landform. Vegetation within the garden of the property and the hedgerow along Crockan Road to the south are likely to screen actual views of the Development from this property. There may be filtered views towards the Development from the surroundings of the property, although these will be very limited in nature.

The magnitude of change is predicted to be **low**, which when combined with the **high** sensitivity will result in a **moderate / minor** and **not significant** effect.

6.15.4 Step 4: Residential Visual Amenity Threshold

N/A

6.16 Viewpoint 16: 44 and 46 Crockan Road (Property 29 and 30) (Figure 6.2.18)



Data Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

6.16.1 Property Description

OS Grid Ref:	242739 398514	Distance to Nearest Turbine:	1511 m	Elevation:	156.9 m AOD

6.16.2 Step 2: Existing Residential (Visual) Amenity

Two modern properties located to the north-east of Crockan Road, both orientated north-west to south-east. Number 44 is a one-and-a-half storey property, with a conservatory on the north-eastern aspect and windows on all facades. It is surrounded by a large garden and has a large outbuilding to

the north-east. Number 46 is a one-storey property, with principal views to the north-west. It is accessed by a short track which then continues as the access track for 131 Moorlough Road. It is surrounded by a garden and has an outbuilding to the south-west. There are also several large farm buildings beyond the property boundary directly to the north-west. Number 44 has largely open views to the north, east and west over rolling pastoral land. Number 46 has similar open views to the north-west, north-east and south-west, although views from this property are longer distance towards moorland hills to the south. Views to the south from number 44 and south-west from number 46 are contained in close proximity by the steeply rising landform to the south-west of Crockan Road.

6.16.3 Step 3: Residential (Visual) Amenity Effects

Affected Field of View:	25 – 76°	No of Blade Tips Theoretically Visible:	10 – 13	No of Turbine Hubs Theoretically Visible:	2 – 6

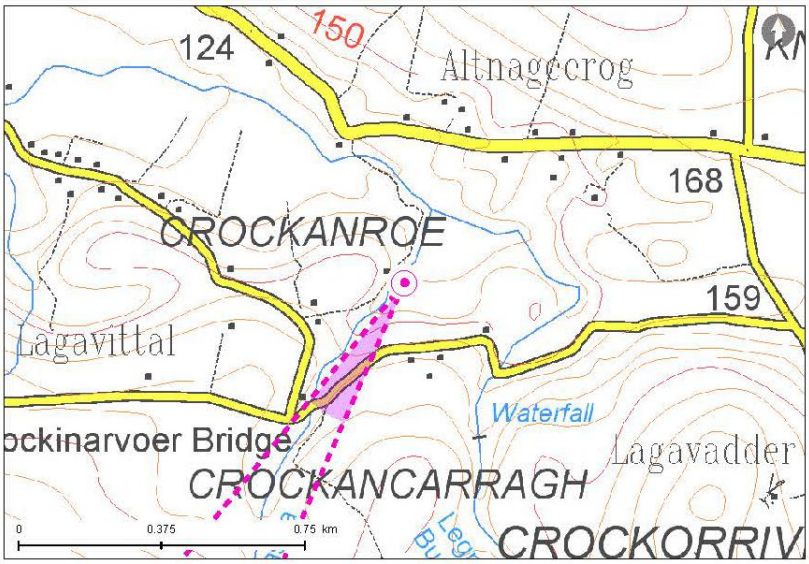
The wireline shows that the hubs and blades of six turbines, and the blade tips of a further seven turbines, will be visible from number 46, while from number 44 the theoretical visibility is slightly lower due to increased screening by the landform. The Development will likely be visible from the interior and exterior of both properties, including in direct interior views from the rear of number 46. With the minimum distance of 1446 m as an average between the two properties and the closest turbine, the Development will be seen as a close-range feature, with the 156.5 Viewpoint 17: m turbines presenting large and dynamic structures that will appear at variance with the relatively small scale and rural character of this local landscape. Turbines within the existing operational Owenreagh I and II Wind Farms are not visible from these properties, so the Development will introduce wind farm development into views from these properties. However, the turbines will be seen in non-principal views from both properties, and wider, more open views to the north will remain unaffected.

The magnitude of change is predicted to be **medium-high**, which when combined with the **high** sensitivity will result in a **major** and **significant** effect.

6.16.4 Step 4: Residential Visual Amenity Threshold

N/A

6.17 Viewpoint 17: 131 Moorlough Road (Property 31) (Figure 6.2.19)



Data Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

6.17.1 Property Description

OS Grid Ref:	242966 398618	Distance to Nearest Turbine:	1470 m	Elevation:	129.7 m AOD

6.17.2 Step 2: Existing Residential (Visual) Amenity

This property is located along a private track to the east of Moorlough Road and is not visible from publicly accessible locations. As such, assessment is based on aerial photography. The property appears to be orientated north-west to south-east. It is not possible to determine in which direction principal views are experienced, although the location of the property to the south-east of the access track, with the driveway to the north-west, indicates that the north-western façade may be the principal aspect. There are several large outbuildings to the north of the property and there appears to be a small garden to the rear at the south-east. There are areas of woodland to the north-west and east. Views are assumed to be most open to the south, due to the absence of outbuildings and vegetation which are likely to screen or filter outward views in other directions.

6.17.3 Step 3: Residential (Visual) Amenity Effects

Affected Field of View:	70°	No of Blade Tips Theoretically Visible:	2	No of Turbine Hubs Theoretically Visible:	0

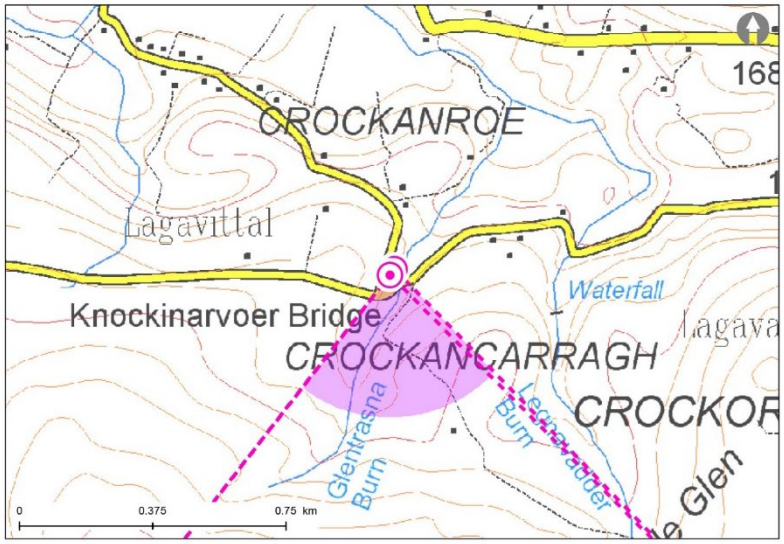
The wireline shows that the blade tips of two turbines within the Development will be theoretically visible to the south. Oblique interior views may be experienced from the south-eastern façade, and there are likely to be views towards the Development from the garden to the rear of the property. Buildings along Holyhill Road to the south may partially screen these views. While the Development may introduce wind farm development into views from this property, views towards the turbines will be at a distance of 1470 m, contained within the southern sector of the view, and will be very limited in nature. Principal views to the north-west will remain unaffected.

The magnitude of change is predicted to be **negligible**, which when combined with the **high** sensitivity will result in a **negligible** and **not significant** effect.

6.17.4 Step 4: Residential Visual Amenity Threshold

N/A

6.18 Viewpoint 18: 106 Hollyhill Road and unnamed property LA11/2019/0065/RM (Properties 32 and 33) (Figure 6.2.20)



Data Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

6.18.1 Property Description

OS Grid Ref:	242692 398319	Distance to Nearest Turbine:	1297 m	Elevation:	172.6 m AOD

6.18.2 Step 2: Existing Residential (Visual) Amenity

Two modern properties located to the east of Crockan Road. The unnamed property (planning reference LA11/2019/0065/RM) is currently under construction. Number 106 is a large two-storey property. It has a large one-and-a-half storey garage to the north-east and is surrounded by a small garden on all sides. The property under construction is a large one-and-a-half storey property. Both are orientated north-west to south-east with principal views to the north-west. Views to the west are open over the surrounding agricultural land, although contained in the middle distance by the landform. Views to the east are limited by woodland along the Legnahone Burn, which passes on

lower ground to the rear of the properties. Turbines within the operational Owenreagh I and II Wind Farms are visible to the south above the moorland hills which form the horizon in this direction.

6.18.3 Step 3: Residential (Visual) Amenity Effects

Affected Field of View:	25 – 81º	No of Blade Tips Theoretically Visible:	14	No of Turbine Hubs Theoretically Visible:	12

The wireline shows that the hubs and blades of 12 turbines, and the blades tips of a further two turbines will be theoretically visible from these properties. The turbines will be visible above the moorland hills to the south. The Development is likely to be visible in exterior views from the surroundings of both properties, as well as in direct interior views from the secondary south-facing façade of number 106. Interior views from the unnamed property are likely to be screened by number 106 and a large hedge to the south of the property. With the minimum distance of 1293 m as an average between the two properties and the closest turbine, the Development will be seen as a close-range feature and will introduce large-scale dynamic structures into the view. The turbines will occupy a wide field of view, and the scale of the 156.5 turbines will be at variance with the small scale and rural character of this landscape. The Development will extend the influence of wind farm development across a greater extent of the view than the existing operational Owenreagh I and II Wind Farms, and the scale of the turbines will be appreciably larger than the existing 60 to 66m turbines.

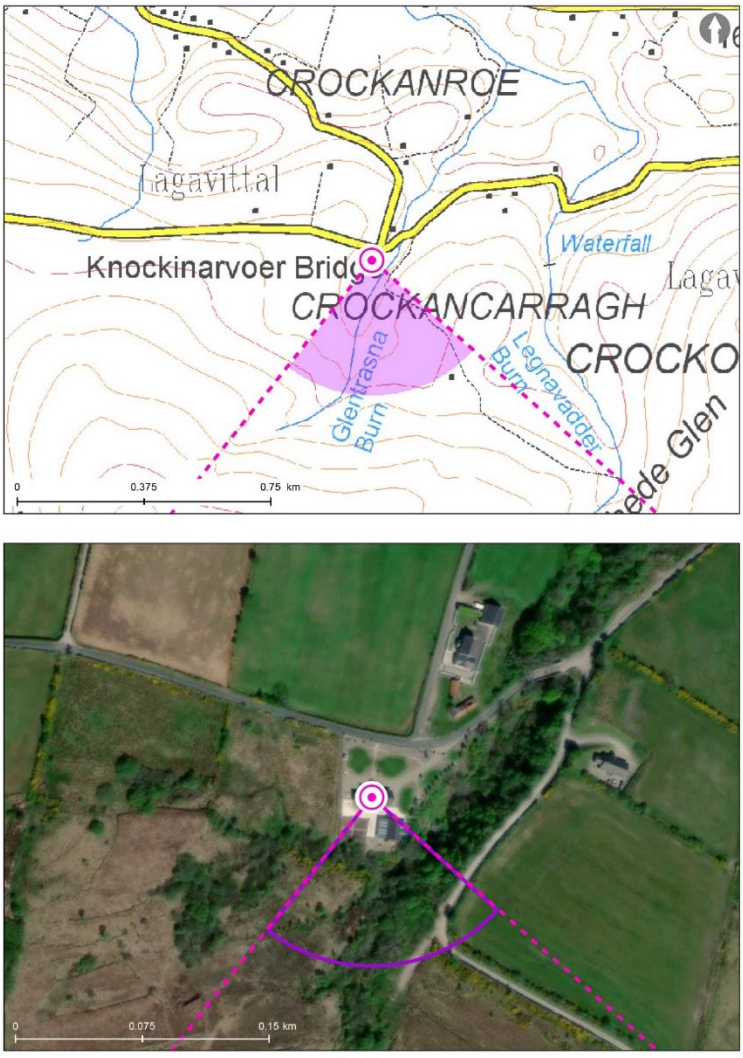
The magnitude of change is predicted to be **high**, which when combined with the **high** sensitivity will result in a **major** and **significant** effect.

6.18.4 Step 4: Residential Visual Amenity Threshold

Step 4 involves making a judgement as to whether the predicted effects on visual amenity and views at a property assessed to have a high magnitude of change are such that it has reached the Residential Visual Amenity Threshold, as described in the introduction. These properties are considered not to have reached the Residential Visual Amenity Threshold, for the following reasons:

- Although turbines may be visible to the south from the interior of 106 Holyhill Road, these views will be from a secondary façade of the property, and principal views to the west will remain unaffected; and,
- The turbines will be contained in the southern aspect with the wider view unaffected, and their containment within this sector prevents the effects becoming overbearing or overwhelming.

6.19 Viewpoint 19: 101 Hollyhill Road (Properties 34) (Figure 6.2.21)



Data Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

6.19.1 Property Description

OS Grid Ref:	242635 398227	Distance to Nearest Turbine:	1241m	Elevation:	174.7 m AOD

6.19.2 Step 2: Existing Residential (Visual) Amenity

A large modern one-storey property, orientated north to south with principal views to the north towards Hollyhill Road. The property is surrounded by a garden and accessed by a short driveway from Hollyhill Road. There is a large outbuilding to the south. Views are open in all directions, with principal views to the north over pastoral land enclosed by rolling hills. Properties along Crockan Road are visible in the middle distance. Views to the east, south and west contain woodland and shrub at lower elevation, with plateau moorland hills visible beyond. Turbines within the existing operational Owenreagh I and II Wind Farms are visible above the horizon in direct views to the south from the interior and exterior of the property.

6.19.3 Step 3: Residential (Visual) Amenity Effects

Affected Field of View:	85º	No of Blade Tips Theoretically Visible:	14	No of Turbine Hubs Theoretically Visible:	12

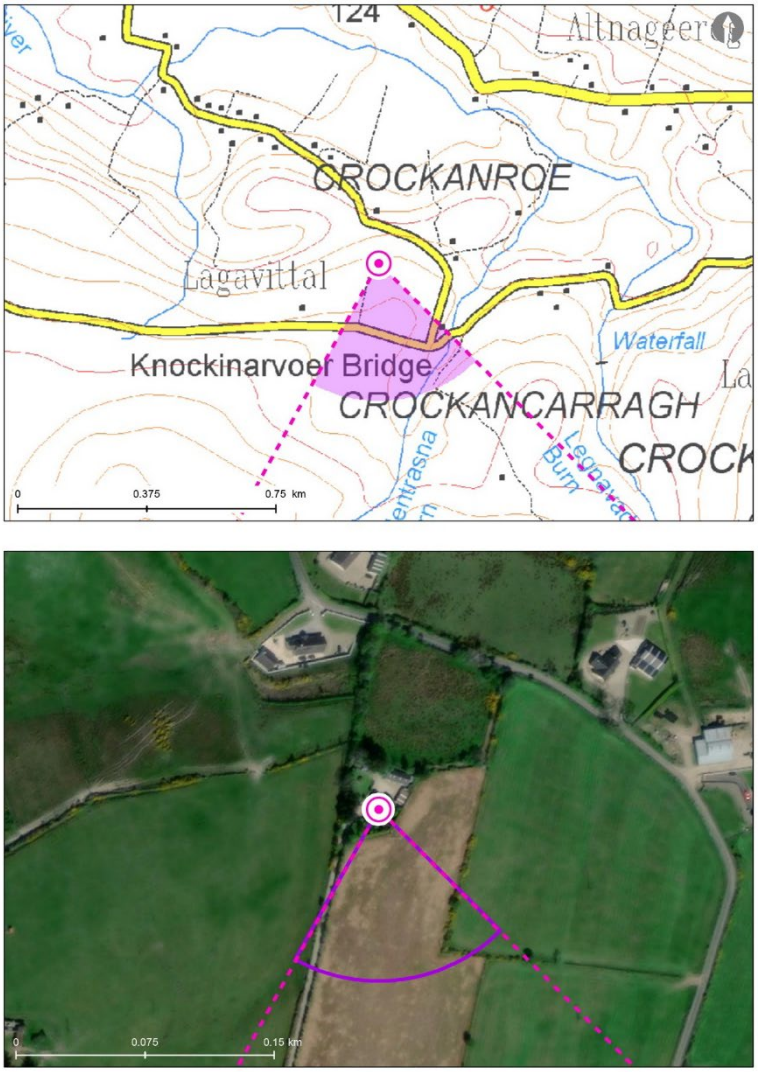
The wireline shows that the hubs and blades of 12 turbines, and the blades tips of a further two turbines, will be theoretically visible from this property. The turbines will be visible above the moorland hills to the south. The Development will be visible from the interior and exterior of the property, including in interior views from the rear, as well as views from the front and rear gardens. With the minimum distance of 1241 m between the property and the closest turbine, the Development will be seen as a close-range feature and will introduce large-scale dynamic structures into the view. The turbines will occupy a wide field of view, and the scale of the 156.5 m turbines will be at variance with the small scale and rural character of this landscape. The Development will extend the influence of wind farm development across a greater extent of the view than the existing operational Owenreagh I and II Wind Farms, and the scale of the turbines will be appreciably larger than the existing 60 and 66 m turbines. The turbines will be contained within the southern aspect, occupying a field of view of 85°. Open views to the north from the principal façade of the property will not be affected. The magnitude of change is predicted to be **high**, which when combined with the **high** sensitivity will result in a **major** and **significant** effect.

6.19.4 Step 4: Residential Visual Amenity Threshold

Step 4 involves making a judgement as to whether the predicted effects on visual amenity and views at a property assessed to have a high magnitude of change are such that it has reached the Residential Visual Amenity Threshold, as described in the introduction. This property is considered not to have reached the Residential Visual Amenity Threshold, for the following reasons:

- Although turbines will be visible in rear views to the south from the interior of the property, principal views to the north will remain unaffected; and,
- The turbines will be contained in the southern aspect with the wider view unaffected, and their containment within this sector will prevent the effects becoming overbearing or overwhelming.

6.20 Viewpoint 20: 100 Hollyhill Road (Property 35) (Figure 6.2.22)



Data Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

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6.20.1 Property Description

OS Grid Ref:	242513 398503	Distance to Nearest Turbine:	1483 m	Elevation:	171.2 m AOD

6.20.2 Step 2: Existing Residential (Visual) Amenity

A modern one-storey property orientated north-east to south-west to the north of Hollyhill Road, and accessed along a private road from Hollyhill Road. It is difficult to ascertain from publicly accessible locations which direction principal views are in, but these are assumed to be to the south-west from aerial photography. The property appears to have a small garden to the north, east and south. From aerial photography there appears to be a small outbuilding to the north-east. The driveway is flanked by tall vegetation along parts and there are a number of trees within the garden to the north, south and west of the property. Views from the property are relatively open and long-distance to the north and south towards hills beyond the Glenmornan River valley and Owenreagh Hill respectively, while to the east and west views are more contained by the landform. Turbines within the existing operational Owenreagh I and II Wind Farms are likely to be visible in views to the south from the garden and driveway, as well as possibly in interior views.

6.20.3 Step 3: Residential (Visual) Amenity Effects

Affected Field of View:	73°	No of Blade Tips Theoretically Visible:	14	No of Turbine Hubs Theoretically Visible:	14

The wireline shows that the hubs and blades of all 14 turbines will be theoretically visible from this property. The turbines will be visible parts vegetation within the surroundings of the property will filter such views. The Development may also be visible in oblique interior views to the south from the principal south-western façade. With the minimum distance of 1483 m between the property and the closest turbine, the Development will be seen as a close-range feature and will introduce large-scale dynamic structures into the view. The turbines will occupy a wide field of view, and the scale of the 156.5 m turbines will be at variance with the small scale and rural character of this landscape. The Development will extend the influence of wind farm development across a greater extent of the view than the existing operational Owenreagh I and II Wind Farms, and the scale of the turbines will be appreciably larger than the existing 60 to 66 m turbines.

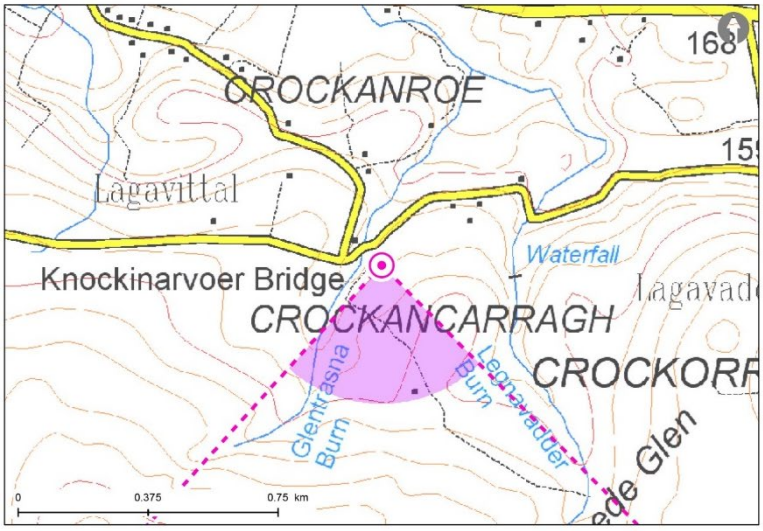
The magnitude of change is predicted to be **high**, which when combined with the **high** sensitivity will result in a **major** and **significant** effect.

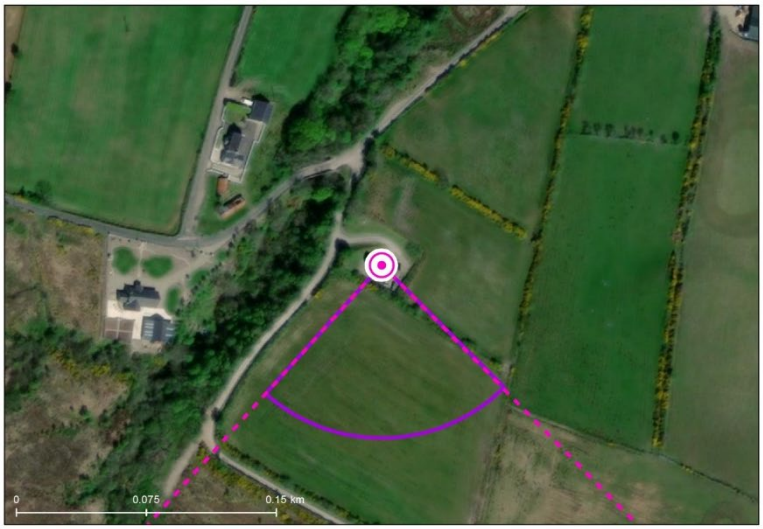
6.20.4 Step 4: Residential Visual Amenity Threshold

Step 4 involves making a judgement as to whether the predicted effects on visual amenity and views at a property assessed to have a high magnitude of change are such that it has reached the Residential Visual Amenity Threshold, as described in the introduction. This property is considered not to have reached the Residential Visual Amenity Threshold, for the following reasons:

- The Development will introduce turbines into a sector of the view already influenced by wind farm development, albeit of a larger scale and closer proximity than the existing; and,
- The turbines will be contained in the southern aspect with the wider view unaffected, and their containment within this sector will prevent the effects becoming overbearing or overwhelming.

6.21 Viewpoint 21: 105 Hollyhill Road (Property 36) (Figure 6.2.23)





Data Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

6.21.1 Property Description

OS Grid Ref:	242776 398246	Distance to Nearest Turbine:	1189 m	Elevation:	179.1 m AOD

6.21.2 Step 2: Existing Residential (Visual) Amenity

A modern one-storey property orientated north-east to south-west to the south of Hollyhill Road and accessed along a private road from Hollyhill Road. Principal views are to the north-east. The property appears to be surrounded by a small garden. The property is set higher up above the road, which drops down at this point as it crosses the Legnahone Burn. Woodland along the Legnahone Burn to the west of the property filters outward views in this direction, while a row of trees along a field boundary to the south of the property also provides some filtering of views. It is not possible to ascertain from publicly accessible locations the nature of views to the north and east, although these are assumed to be more open, over the surrounding agricultural land. Turbines within the existing operational Owenreagh I and II Wind Farms are likely to be visible in views to the south from the garden to the rear of the property, as well as possibly in interior views, although these are likely to be filtered by surrounding vegetation.

6.21.3 Step 3: Residential (Visual) Amenity Effects

Affected Field of View:	86°	No of Blade Tips Theoretically Visible:	13	No of Turbine Hubs Theoretically Visible:	11

The wireline shows that the hubs and blades of 11 turbines, and the blades tips of a further two turbines, will be theoretically visible from this property. The turbines will be visible above the moorland hills to the south. The Development is likely to be visible in exterior views from the garden and direct interior views from the secondary south-western façade, although vegetation to the south may partially filter such views. With the minimum distance of 1189 m between the property and the closest turbine, the Development will be seen as a close-range feature and will introduce large-scale dynamic structures into the view. The turbines will occupy a wide field of view, and the scale of the 156.5 m turbines will be at variance with the small scale and rural character of this landscape. The Development will extend the influence of wind farm development across a greater extent of the view than the existing operational Owenreagh I and II Wind Farms, and the scale of the turbines will be appreciably larger than the existing 60 to 66 m turbines.

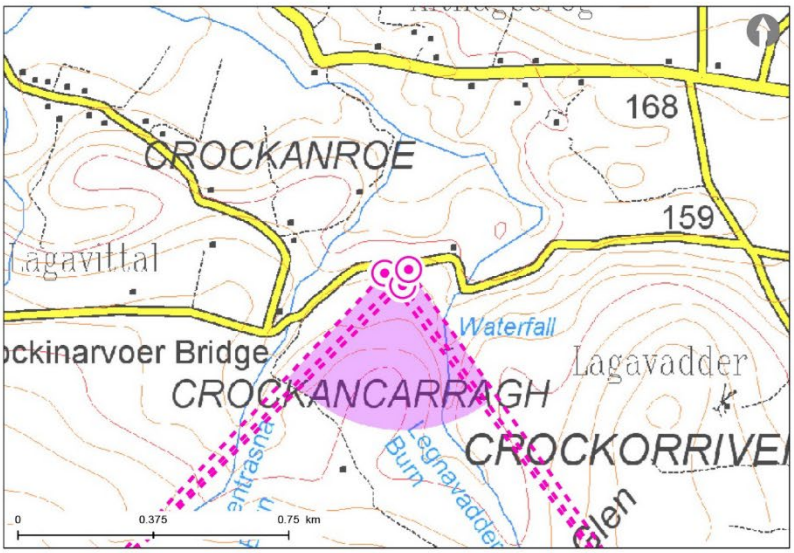
The magnitude of change is predicted to be **high**, which when combined with the **high** sensitivity will result in a **major** and **significant** effect.

6.21.4 Step 4: Residential Visual Amenity Threshold

Step 4 involves making a judgement as to whether the predicted effects on visual amenity and views at a property assessed to have a high magnitude of change are such that it has reached the Residential Visual Amenity Threshold, as described in the introduction. This property is considered not to have reached the Residential Visual Amenity Threshold, for the following reasons:

- Although turbines are likely to be visible in rear views to the south from the interior of the property, principal views to the north-east will remain unaffected;
- The Development will introduce turbines into a sector of the view already influenced by wind farm development, albeit of a larger scale and closer proximity than the existing; and,
- The turbines will be contained in the southern aspect with the wider view unaffected, and their containment within this sector will prevent the effects becoming overbearing or overwhelming.

6.22 Viewpoint 22: 109, 111 and 113 Hollyhill Road (Properties 37, 38 and 39) (Figure 6.2.24)



Data Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

6.22.1 Property Description

OS Grid Ref:	243037 398390	Distance to Nearest Turbine:	1260 m	Elevation:	171 m AOD

6.22.2 Step 2: Existing Residential (Visual) Amenity

Three modern properties located to the south of Holyhill Road, orientated north to south and with principal views to the north. Number 109 is a two-storey property with a front garden to the north and west, and a yard and outbuildings to the east and south. Number 111 is a one-storey property accessed along a short track to the east of number 109. It is set within a small yard and has an outbuilding to the east. Number 113 is a one-storey property surrounded by a garden on each side and accessed via a short driveway directly from Hollyhill Road. It has an outbuilding to the south. Long distance views are available from the group of properties to the north over rolling pastoral land featuring other residential properties and evidence of farming infrastructure. Views in other directions are more contained, both by the rising landform to the south and by surrounding vegetation. Number

111 is likely to have the most open views to the south, due to its higher elevation, although it is not possible to confirm this from publicly accessible locations due to the property's orientation and position on higher ground above Hollyhill Road. There are no views towards the existing operational Owenreagh I and II Wind Farms from numbers 109 and 113, but number 111 may have views of the existing turbines from the rear of the property to the south.

6.22.3 Step 3: Residential (Visual) Amenity Effects

Affected Field of View:	78 - 80°	No of Blade Tips Theoretically Visible:	14	No of Turbine Hubs Theoretically Visible:	10 - 12

The wireline shows that turbines within the Development will be visible to the south from all three properties. Theoretical visibility is most pronounced from number 111, with the hubs and blades of 12 turbines, and the blades of a further two turbines, visible on the horizon. Numbers 109 and 113 experience slightly reduced theoretical visibility due to their lower elevation and will also experience more screening by surrounding vegetation. From number 111, direct interior and exterior views of the Development are likely to be experienced from the rear of the property. With the minimum distance of 1232 m as an average between the three properties and the closest turbine, the Development will be seen as a close-range feature, with the 156.5 m turbines presenting large and dynamic structures that will appear at variance with the relatively small scale and rural character of this local landscape. The turbines will bring wind farm development closer to the properties than the existing turbines within the operational Owenreagh I and II Wind Farms, and the scale of the turbines will appreciably larger than the existing 60 to 66 m turbines.

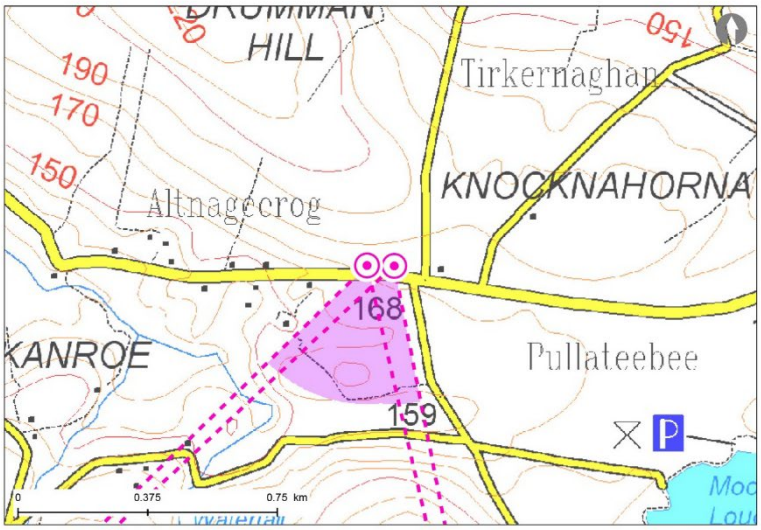
The magnitude of change is predicted to be **high**, which when combined with the **high** sensitivity will result in a **major** and **significant** effect.

6.22.4 Step 4: Residential Visual Amenity Threshold

Step 4 involves making a judgement as to whether the predicted effects on visual amenity and views at a property assessed to have a high magnitude of change are such that it has reached the Residential Visual Amenity Threshold, as described in the introduction. This property is considered not to have reached the Residential Visual Amenity Threshold, for the following reasons:

- Although turbines are likely to be visible in rear views to the south from the interior of number 111, principal views to the north will remain unaffected;
- The Development will introduce turbines into a sector of the view already influenced by wind farm development, albeit of a larger scale and closer proximity than the existing; and,
- The turbines will be contained in the southern aspect with the wider view unaffected, and their containment within this sector will prevent the effects becoming overbearing or overwhelming.

6.23 Viewpoint 23: 150 Moorlough Road and planning application LA11/2021/0359/O (Properties 40 and 41) (Figure 6.2.25)



Data Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

6.23.1 Property Description

OS Grid Ref:	243776 399010	Mean Distance to Nearest Turbine:	1863 m	Elevation:	172.5 AOD

6.23.2 Step 2: Existing Residential (Visual) Amenity

A modern one-storey property located to the north of Moorlough Road. It is orientated north to south and experiences principal views to the south over pastoral land with woodland cover in some areas towards rolling hills in the longer distance. The existing operational Owenreagh I and II Wind Farms are visible in direct views to the south. The property has a large garden and is accessed by a short driveway directly from Moorlough Road. There is an outbuilding to the north-east. Outward views in other directions are limited by vegetation within the garden. There is an approved planning application (planning reference LA11/2021/0359/O) for a dwelling adjacent to 150 Moorlough Road, however documents relating to this application are not available. The effects arising from the Development on amenity at this proposed dwelling are not considered likely to exceed those experienced at 150 Moorlough Road.

6.23.3 Step 3: Residential (Visual) Amenity Effects

Affected Field of Vie–:	25 - 57º	No of Blade Tips Theoretically Visible:	14	No of Turbine Hubs Theoretically Visible:	13

The wireline shows that all 14 turbines within the Development will be theoretically visible to the south. With the principal orientation of the property to the south, it is likely that the Development will be visible from the front interior spaces and seen set in the open views of the landscape in this direction, although vegetation in the garden is likely to provide some filtering of such views. The turbines will also be visible from the garden grounds to the front of the property. With the minimum distance of 1855 m as an average between the two properties and the closest turbine, the Development will be seen as a close-range feature, with the 156.5 m turbines presenting large and dynamic structures that will appear at variance with the relatively small scale and rural character of this local landscape. The Development will occupy a larger horizontal field of view than the existing operational Owenreagh I and II Wind Farms, and the scale of the turbines will be appreciably larger than the existing 60 to 66 m turbines.

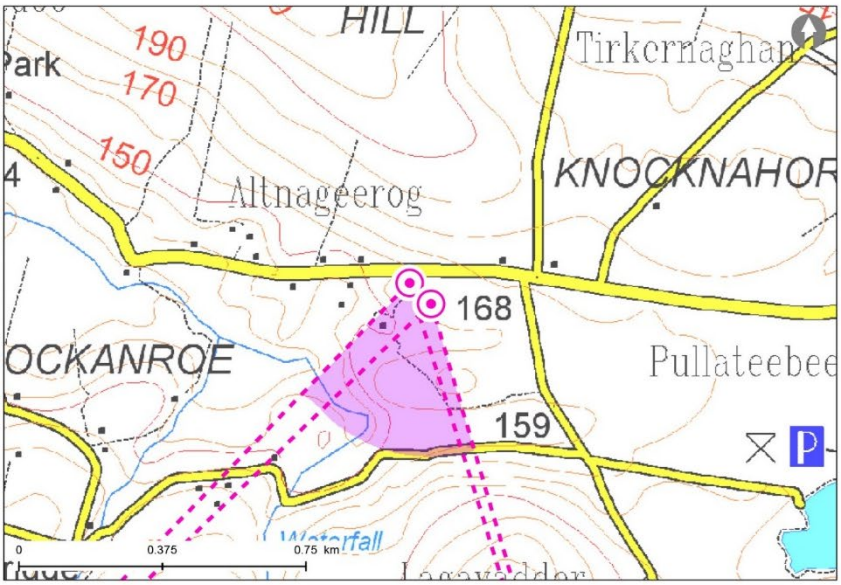
The magnitude of change is predicted to be **high**, which when combined with the **high** sensitivity will result in a **major** and **significant** effect.

6.23.4 Step 4: Residential Visual Amenity Threshold

Step 4 involves making a judgement as to whether the predicted effects on visual amenity and views at a property assessed to have a high magnitude of change are such that it has reached the Residential Visual Amenity Threshold, as described in the introduction. These properties are considered not to have reached the Residential Visual Amenity Threshold, for the following reasons:

- The Development will introduce turbines into a sector of the view already influenced by wind farm development, albeit of a larger scale and closer proximity than the existing; and,
- The turbines will be contained within a 41 degree field of view, with the wider view to the south unaffected, and their containment within this sector will prevent the effects becoming overbearing or overwhelming.

6.24 Viewpoint 24: 141 and 143 Moorlough Road (Property 42 and 43) (Figure 6.2.26)



Data Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

6.24.1 Property Description

OS Grid Ref:	243532 398952	Distance to Nearest Turbine:	1749 m	Elevation:	159.7 m AOD

6.24.2 Step 2: Existing Residential (Visual) Amenity

Two large modern two-storey detached properties located to the south of Moorlough Road. Number 141 is orientated north-east to south-west, with principal views to the north-east. Number 143 is orientated north to south, with principal views to the north. Both properties are accessed via driveways from Moorlough Road and set within gardens with outbuildings. From 141 views are open to the south over pastoral land in the foreground, with woodland along the valley of the Glenmornan River. The horizon is formed by rolling moorland hills. The operational Owenreagh I and II Wind Farms are visible on these hills in direct views from the rear of this property. From number 141, views to the rear are

slightly more contained by vegetation within the garden to the south. From both properties, views to the north are limited by the rising landform and vegetation to the north of Moorlough Road.

6.24.3 Step 3: Residential (Visual) Amenity Effects

Affected Field of View:	61 - 62º	No of Blade Tips Theoretically Visible:	14	No of Turbine Hubs Theoretically Visible:	11

The wireline shows that turbines within the Development will be visible to the south-west from both properties. The hubs and blades of 11 turbines and the blade tips of a further three turbines will be seen above the horizon. To the east of the Development, the turbine towers will largely be screened by the landform, whereas in the centre and to the west the towers will be visible above the horizon. Direct interior views will be available from the rear of number 143. From number 141, interior views are likely to be limited by the orientation of the property, outbuildings to the south-east and vegetation to the south, although there may be oblique interior views from the rear of the property. Both properties will experience exterior views towards the Development from the surroundings, including the driveways and gardens. With the minimum distance of 1726 m as an average between the two properties and the closest turbine, the Development will be seen as a close-range feature, with the 156.5 m turbines presenting large and dynamic structures that will appear at variance with the relatively small scale and rural character of this local landscape. The turbines will bring wind farm development closer to the properties than the existing turbines within the operational Owenreagh I and II Wind Farms and will occupy a larger horizontal field of view. The scale of the turbines will be appreciably larger than the existing 60 and 66 m turbines. The magnitude of change will be greater from number 143, which is more likely to experience direct interior views of the Development.

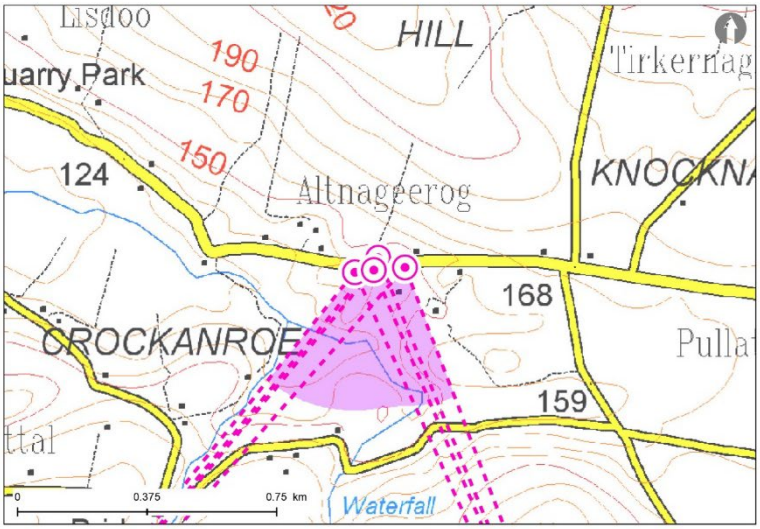
The magnitude of change is predicted to be **high**, which when combined with the **high** sensitivity will result in a **major** and **significant** effect.

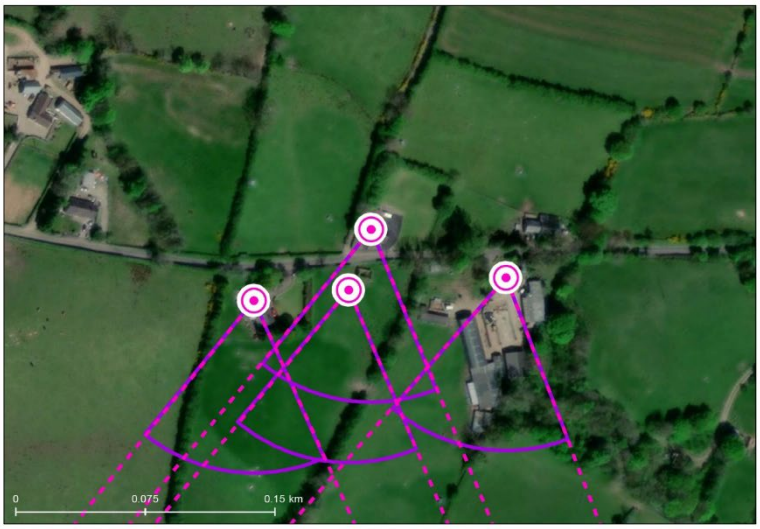
6.24.4 Step 4: Residential Visual Amenity Threshold

Step 4 involves making a judgement as to whether the predicted effects on visual amenity and views at a property assessed to have a high magnitude of change are such that it has reached the Residential Visual Amenity Threshold, as described in the introduction. These properties are considered not to have reached the Residential Visual Amenity Threshold, for the following reasons:

- Although turbines will be visible in rear views to the south from the interior of number 143, and may be visible in rear views from the interior of 141, principal views from both properties will remain unaffected;
- The Development will introduce turbines into a sector of the view already influenced by wind farm development, albeit of a larger scale and closer proximity than the existing; and,
- The turbines will be contained in the southern aspect with the wider view unaffected, and their containment within this sector will prevent the effects becoming overbearing or overwhelming.

6.25 Viewpoint 25: 135, 136 and 137 Moorlough Road and planning application LA11/2021/0712/F (Properties 45, 44, 46 and 47) (Figure 6.2.27)





Data Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

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6.25.1 Property Description

OS Grid Ref:	243228 398953	Distance to Nearest Turbine:	1746 m	Elevation:	140.6 m AOD

6.25.2 Step 2: Existing Residential (Visual) Amenity

Three detached properties located along Moorlough Road. Number 135 is a one-storey detached property located to the south of Moorlough Road and orientated east to west, with principal views to the east. Number 136 is a one-storey detached property located to the north of Moorlough Road and orientated north to south, with principal views to the south and a conservatory to the east. Number 137 is a two-storey detached property located to the south of Moorlough Road and orientated north to south with principal views to the north. Numbers 135 and 136 are set within gardens while 137 has a large farmyard to the south, with a number of associated outbuildings. From all properties, views to the north are contained by the rising landform at close proximity. From number 135, vegetation to the south limits views in this direction from the garden and surroundings. It is not possible to ascertain

from publicly accessible locations whether there are interior views to the south from this property, although if there is a window on this façade the property may experience open views to the south. From number 136, there are views to the south over pastoral farmland with areas of woodland in the foreground towards rolling hills beyond. Outward views from number 137 are partially screened by the surrounding outbuildings and vegetation, although there are filtered views towards the rolling hills that form the horizon. From number 136, and potentially from the other two properties, the operational Owenreagh I and II Wind Farms is visible on the horizon to the south-west. There is also an approved planning application for a two-storey dwelling located adjacent to number 135. Application documents show this property orientated north to south, with principal views to the north towards Moorlough Road. The effects arising from the Development on this property are not considered likely to exceed the effects experienced at the existing properties.

6.25.3 Step 3: Residential (Visual) Amenity Effects

Affected Field of View:	25 - 62º	No of Blade Tips Theoretically Visible:	14	No of Turbine Hubs Theoretically Visible:	12 - 13

The wireline shows that there will be theoretical visibility of all 14 turbines within the Development to the south-west from all three properties. Actual visibility will be most available from number 136, due to the relative lack of screening and filtering in views to the south. From number 135, vegetation within the garden is likely to screen views from the principal façade and the garden, although there may be views from the southern façade if this has a window. From number 137, views will be filtered by vegetation to the south, and likely partially screened by farm buildings. From number 136, there will be direct interior views from the principal façade of the property, as well as from the garden and surroundings of the property. With the minimum distance of 1763 m as an average between the four properties and the closest turbine, the Development will be seen as a close-range feature, with the 156.5 m turbines presenting large and dynamic structures that will appear at variance with the relatively small scale and rural character of this local landscape. The turbines will bring wind farm development closer to the properties than the existing turbines within the operational Owenreagh I and II Wind Farms and will occupy a larger horizontal field of view. The scale of the turbines will be appreciably larger than the existing 60 to 66 m turbines. The magnitude of change will be greatest from number 136, which is more likely to experience direct interior views of the Development.

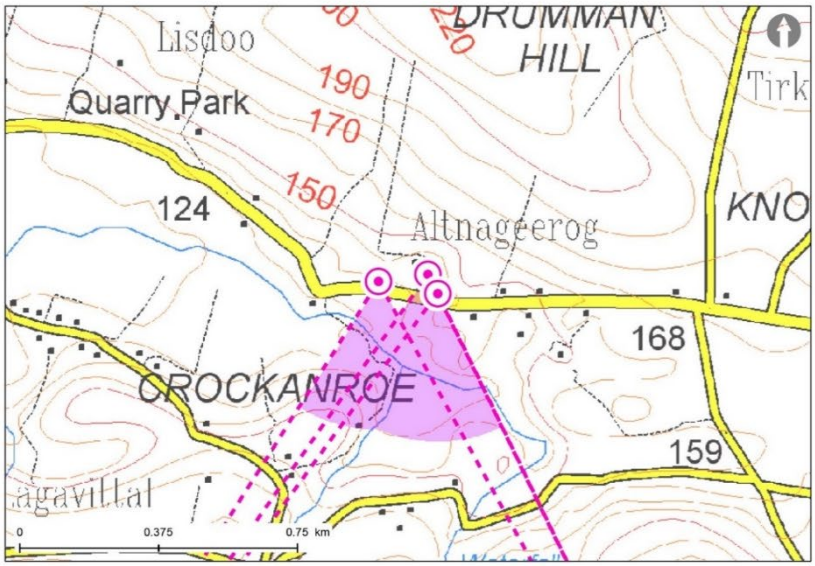
The magnitude of change is predicted to be **high**, which when combined with the **high** sensitivity will result in a **major** and **significant** effect.

6.25.4 Step 4: Residential Visual Amenity Threshold

Step 4 involves making a judgement as to whether the predicted effects on visual amenity and views at a property assessed to have a high magnitude of change are such that it has reached the Residential Visual Amenity Threshold, as described in the introduction. These properties are considered not to have reached the Residential Visual Amenity Threshold, for the following reasons:

- Although turbines may be visible in principal views from number 136, secondary views from number 135, and rear views from number 137 and the consented property, these will be seen in a sector of the view already influenced by wind farm development, albeit of a larger scale and closer proximity than the existing; and,
- The turbines will be contained in the southern aspect with the wider view unaffected, and their containment within this sector will prevent the effects becoming overbearing or overwhelming.

6.26 Viewpoint 26: 130, 132 and 134 Moorlough Road (Properties 50, 48 and 49) (Figure 6.2.28)



Data Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

6.26.1 Property Description

OS Grid Ref:	243105 399058	Mean Distance to Nearest Turbine:	1861 m	Elevation:	133.9 m AOD

6.26.2 Step 2: Existing Residential (Visual) Amenity

Three modern one-storey properties, located to the north of Moorlough Road and orientated north to south with principal views to the south towards the road. Numbers 130 and 134 are both accessed by short driveways directly from Moorlough Road and set within small gardens, while number 132 is accessed via a longer access track and set within a farmyard with a number of outbuildings to the north and west. Outward views from all three properties are largely contained to the north by the landform and vegetation, with more open views to the south over pastoral land towards rolling hills in the distance. The operational Owenreagh I and II Wind Farms are visible in longer-distance views to the south.

6.26.3 Step 3: Residential (Visual) Amenity Effects

Affected Field of View:	61°	No of Blade Tips Theoretically Visible:	14	No of Turbine Hubs Theoretically Visible:	12 – 14

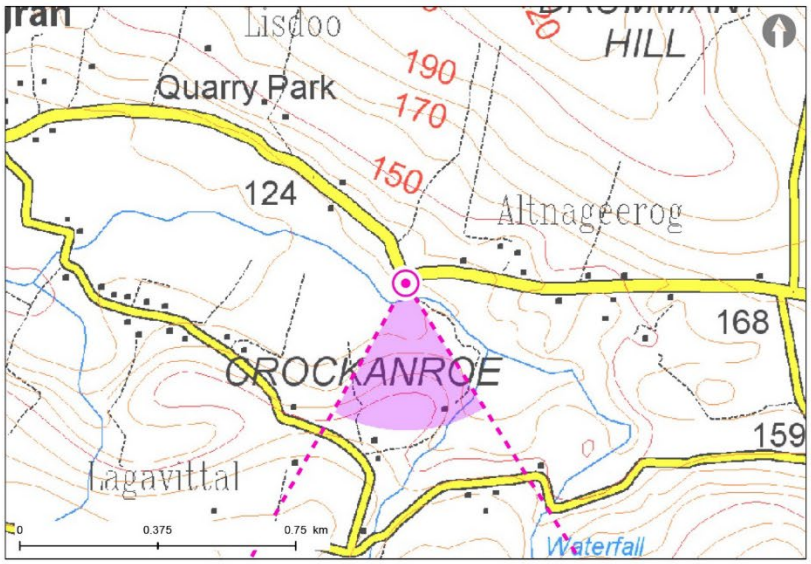
The wireline shows that there will be theoretical visibility of all 14 turbines within the Development to the south from all three properties. The turbines will be seen above the horizon in direct principal views from the interior and exterior of each property. The turbines will be seen above a hedgerow along the south of Moorlough Road. Most open views will be experienced from number 132, due to a gap in the hedgerow adjacent to this property, as well as the presence of vegetation within the front gardens of the other two properties, which will provide some filtering of views. With the minimum distance of 1825 m as an average between the three properties and the closest turbine, the Development will be seen as a close-range feature, with the 156.5 m turbines presenting large and dynamic structures that will appear at variance with the relatively small scale and rural character of this local landscape. The turbines will bring wind farm development closer to the properties than the existing turbines within the operational Owenreagh I and II Wind Farms and will occupy a larger horizontal field of view. The scale of the turbines will be appreciably larger than the existing 60 to 66 m turbines.

The magnitude of change is predicted to be **high**, which when combined with the **high** sensitivity will result in a **major** and **significant** effect.

6.26.4 Step 4: Residential Visual Amenity Threshold

- Step 4 involves making a judgement as to whether the predicted effects on visual amenity and views at a property assessed to have a high magnitude of change are such that it has reached the Residential Visual Amenity Threshold, as described in the introduction. These properties are considered not to have reached the Residential Visual Amenity Threshold, for the following reasons:
- Although turbines may be visible in principal views from the interior and exterior of the three properties, these will be seen in a sector of the view already influenced by wind farm development, albeit of a larger scale and closer proximity than the existing;
- Vegetation to the south of Moorlough Road and within the gardens of two of the properties will provide some limited filtering of views towards the Development from number 130 and 134; and,
- The turbines will be contained in the southern aspect with the wider view unaffected, and their containment within this sector will prevent the effects becoming overbearing or overwhelming.

6.27 Viewpoint 27: 123 Moorlough Road (Property 51) (Figure 6.2.29)



Data Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

6.27.1 Property Description

OS Grid Ref:	242812 398992	Distance to Nearest Turbine:	1872 m	Elevation:	123.4 m AOD

6.27.2 Step 2: Existing Residential (Visual) Amenity

A modern two-storey detached property located to the south of Moorlough Road and orientated north to south with principal views to the north. It has a small garden to the front, side and rear and a farmyard to the west with a number of outbuildings. Trees within the garden to the south and east limit outward views in these directions. The outbuildings to the west also limit views, although there are some glimpsed longer-distance views to the west of rolling pastoral land. Principal views are to the north over rising land on the northern side of Moorlough Road, which limits longer-distance views in this direction.

6.27.3 Step 3: Residential (Visual) Amenity Effects

Affected Field of View:	61°	No of Blade Tips Theoretically Visible:	14	No of Turbine Hubs Theoretically Visible:	9

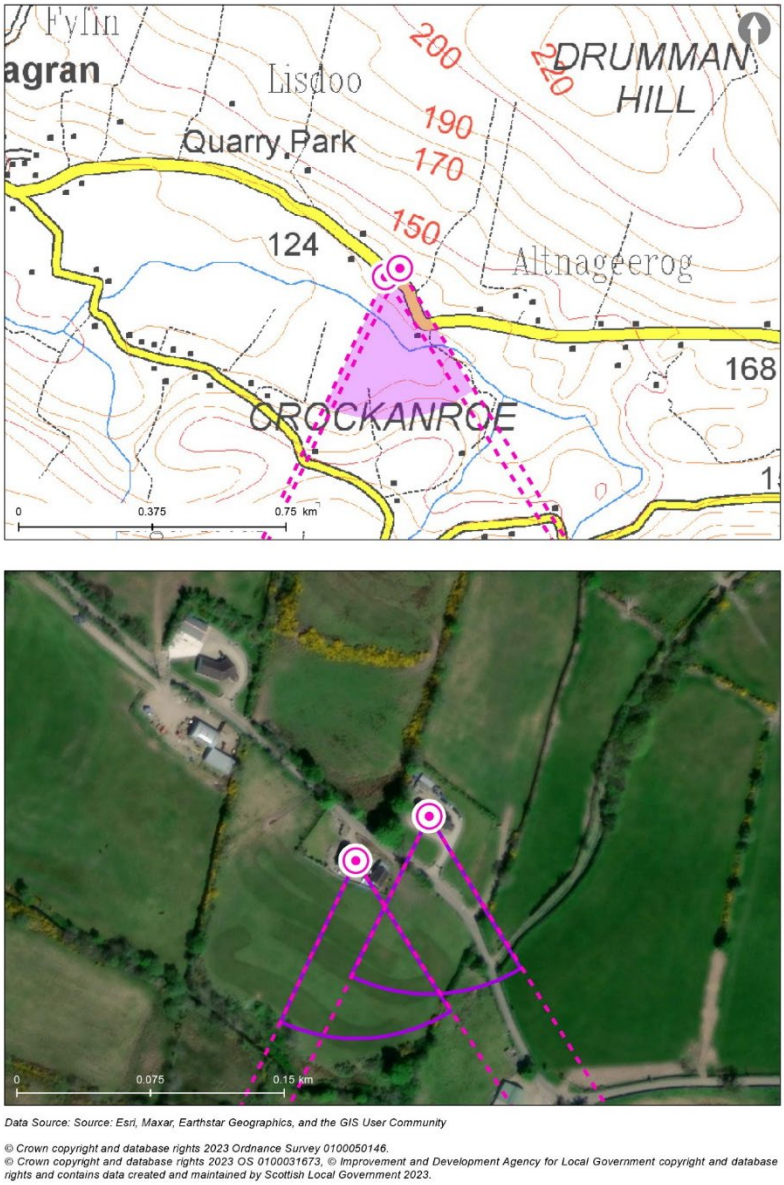
The wireline shows that all 14 turbines within the Development will be theoretically visible to the south. The actual visibility of the Development will be limited by the dense vegetation to the south, and it is considered likely that this will fully screen the turbines from the property and its surroundings. There is the possibility that views may sometimes be available, for example during the winter months when foliage on the trees will be reduced, although due to the glimpsed and filtered nature of these views, and the distance of approximately 1872 m to the Development, the overall magnitude of change will still be reduced.

The magnitude of change is predicted to be **medium-low**, which when combined with the **high** sensitivity will result in a **moderate** and **not significant** effect.

6.27.4 Step 4: Residential Visual Amenity Threshold

N/A

6.28 Viewpoint 28: 119 and 126 Moorlough Road (Property 52 and 53) (Figure 6.2.30)



Data Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

6.28.1 Property Description

OS Grid Ref:	242744 399169	Distance to Nearest Turbine:	2055 m	Elevation:	128.5 m AOD

6.28.2 Step 2: Existing Residential (Visual) Amenity

Two large detached properties orientated north-east to south-west. Number 119 is a large two-storey property to the south of Moorlough Road, accessed via a driveway directly from Moorlough Road and set within a small garden on all sides. There is a large outbuilding to the west. Principal views are to the north, although views to the south are more open. Number 126 is a large one-storey detached property to the north of Moorlough Road. It is also accessed via a driveway from Moorlough Road and surrounded by garden, particularly to the east. Principal views from this property are south towards Moorlough Road. From both properties, views to the north are limited by the rising landform and views

to the south and south-west are more open over the rolling pastoral landscape in this direction. From number 126, trees to the south of Moorlough Road largely screen outward views, although from the garden to the east of the property there are open views over the surrounding landscape. The operational Owenreagh I and II Wind Farms can be seen on the horizon to the south.

6.28.3 Step 3: Residential (Visual) Amenity Effects

Affected Field of View:	56 - 57°	No of Blade Tips Theoretically Visible:	14	No of Turbine Hubs Theoretically Visible:	14

The wireline shows that there will be theoretical visibility of turbines within the Development to the south from both properties. The hubs and blades of all 14 turbines will be seen above the horizon in views from the garden and surroundings of both properties, as well as in direct interior views from the rear of number 119. The 156.5 m turbines will present large and dynamic structures that will appear at variance with the relatively small scale and rural character of this local landscape. The turbines will bring wind farm development closer to the properties than the existing turbines within the operational Owenreagh I and II Wind Farms and will occupy a larger horizontal field of view. The scale of the turbines will be appreciably larger than the existing 60 to 66 m turbines. The minimum distance of approximately 2049 m as an average between the two properties and the closest turbine will somewhat reduce the magnitude of change.

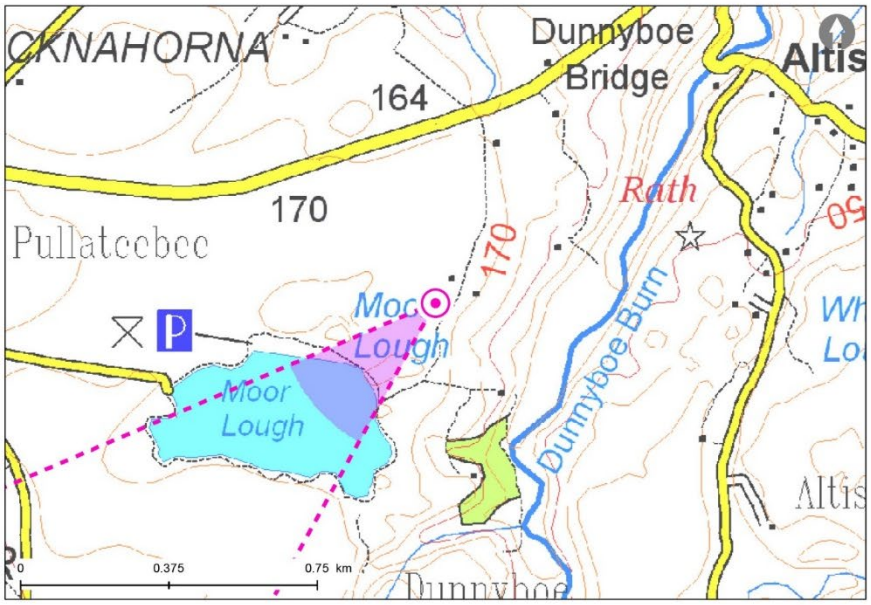
The magnitude of change is predicted to be **high**, which when combined with the **high** sensitivity will result in a **major** and **significant** effect.

6.28.4 Step 4: Residential Visual Amenity Threshold

Step 4 involves making a judgement as to whether the predicted effects on visual amenity and views at a property assessed to have a high magnitude of change are such that it has reached the Residential Visual Amenity Threshold, as described in the introduction. These properties are considered not to have reached the Residential Visual Amenity Threshold, for the following reasons:

- Although turbines may be visible in rear views from number 119 and in exterior views from the surroundings of both properties, these will be seen in a sector of the view already influenced by wind farm development, albeit of a larger scale and closer proximity than the existing; and,
- The turbines will be contained in the southern aspect with the wider view unaffected, and their containment within this sector will prevent the effects becoming overbearing or overwhelming.

6.29 Viewpoint 29: 166 Moorlough Road (Property 54) (Figure 6.2.31)



Data Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

6.29.1 Property Description

OS Grid Ref:	245228 398595	Distance to Nearest Turbine:	1997 m	Elevation:	176.6 m AOD

6.29.2 Step 2: Existing Residential (Visual) Amenity

This property is located along a private track to the south of Moorlough Road and is not visible from publicly accessible locations. As such, assessment is based on aerial photography. The property appears to be orientated south-east to north-west. It is not possible to determine in which direction principal views are experienced, nor what existing views comprise. It is surrounded by a small garden,

and there are trees along the access track. Vegetation appears to surround the boundary of the property to the north-east, north-west and south-east.

6.29.3 Step 3: Residential (Visual) Amenity Effects

Affected Field of View:	39º	No of Blade Tips Theoretically Visible:	14	No of Turbine Hubs Theoretically Visible:	14

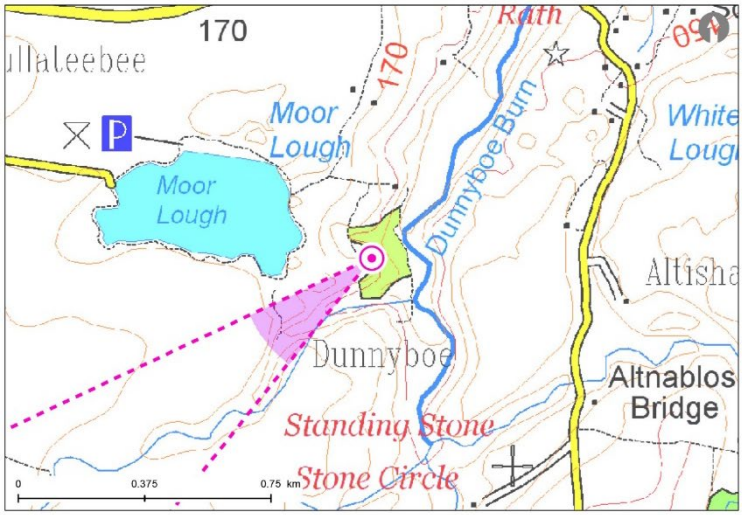
The wireline shows that the hubs and blades of 14 turbines within the Development will be theoretically visible to the south-west. It is likely that vegetation along the property boundary will at least partially filter views towards the Development. The property may experience direct interior views from the south-western gable end. While the turbines will introduce large and dynamic structures into this relatively small-scale landscape, they will be seen at a distance of 1997 m and contained within the south-western sector of the view. Views of the Development will likely be filtered by vegetation.

The magnitude of change is predicted to be **medium-high**, which when combined with the **high** sensitivity will result in a **major** and **significant** effect.

6.29.4 Step 4: Residential Visual Amenity Threshold

N/A

6.30 Viewpoint 30: 171 Moorlough Road (Property 55) (Figure 6.2.32)



Data Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

6.30.1 Property Description

OS Grid Ref:	245325 398156	Distance to Nearest Turbine:	1773 m	Elevation:	157.4 m AOD

6.30.2 Step 2: Existing Residential (Visual) Amenity

This property is located along a private track to the south of Moorlough Road and is not visible from publicly accessible locations. As such, assessment is based on aerial photography. The property has a T-shaped form, and the orientation is not clear. It is surrounded by a small yard, with outbuildings to the south and west. It is not possible to determine the nature of existing views, although woodland to the north, east and south is likely to limit views in these directions.

6.30.3 Step 3: Residential (Visual) Amenity Effects

Affected Field of View:	27º	No of Blade Tips Theoretically Visible:	7	No of Turbine Hubs Theoretically Visible:	1

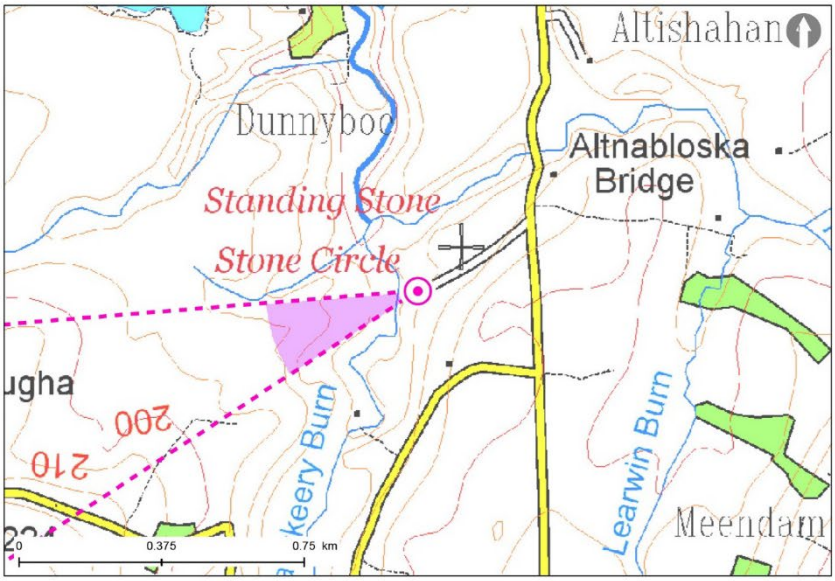
The wireline indicates that the hub of one turbine and the blade tips of a further six turbines will be theoretically visible in views to the south-west. Actual visibility is likely to be somewhat reduced due to screening by outbuildings to the south and west.

The magnitude of change is predicted to be **medium-high**, which when combined with the **high** sensitivity will result in a **major** and **significant** effect.

6.30.4 Step 4: Residential Visual Amenity Threshold

N/A

6.31 Viewpoint 31: 64 Meendamph Road (Property 56) (Figure 6.2.33)



Data Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

6.31.1 Property Description

OS Grid Ref:	245628 397422	Distance to Nearest Turbine:	1559 m	Elevation:	165.4 m AOD

6.31.2 Step 2: Existing Residential (Visual) Amenity

A small L-shaped detached property located to the west of Meendamph Road. The property is accessed via a track from Meendamph Road and is surrounded by a small garden with an outbuilding to the south-east. It is set low within the surrounding landscape and is accessed by a track from Meendamph Road. Views to the west are over gently rising moorland hills. Turbines within the operational Owenreagh I and II Wind Farms are visible above the horizon in this direction. Views to the north and east are contained by the rising landform, while to the south vegetation appears to filter views from the property. It is not clear from publicly accessible locations which direction principal views are in. Views are likely most open to the west, although it is not possible to confirm whether there are windows on this aspect from publicly accessible locations.

6.31.3 Step 3: Residential (Visual) Amenity Effects

Affected Field of View:	29º	No of Blade Tips Theoretically Visible:	14	No of Turbine Hubs Theoretically Visible:	13

The wireline shows that the Development will be theoretically visible to the south-west. The hubs and blades of 13 turbines and the blade tips of one further turbine will be visible upon the moorland hills in this direction. Interior views of the turbines may be experienced from the western façade, although it is not clear whether there are windows on this aspect. Vegetation to the west of the property may filter views towards the Development from this façade. There will be views towards the Development from the garden and access track. The Development will introduce large and dynamic structures into this relatively small-scale landscape. Development will bring turbines into closer proximity to the property than the existing turbines, and at 156.5 m their scale will be appreciably larger than the existing 60 and 66 m turbines. They will be contained within a 29 degree field of view, and will slightly extend the field of view occupied by turbines.

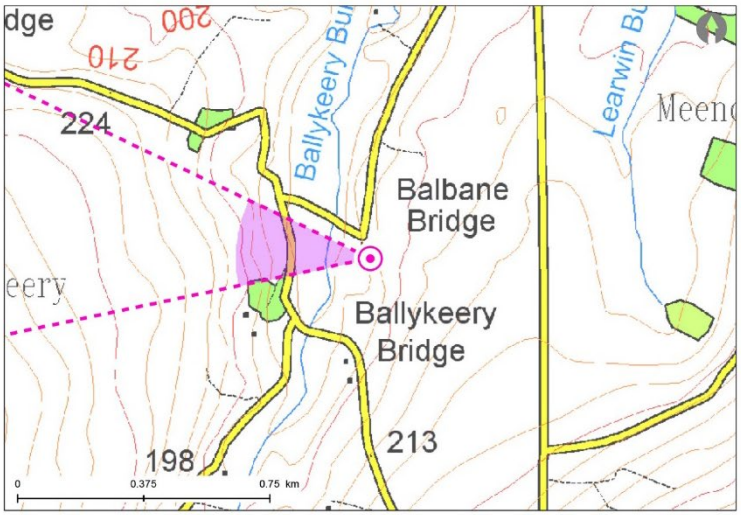
The magnitude of change is predicted to be **high**, which when combined with the **high** sensitivity will result in a **major** and **significant** effect.

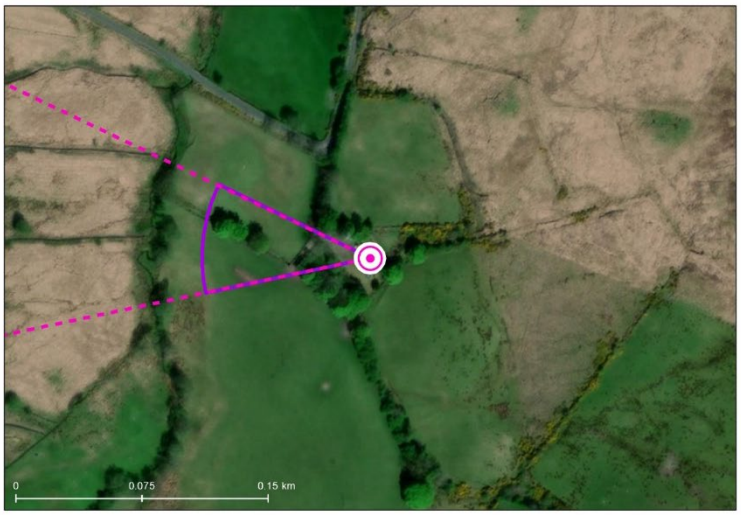
6.31.4 Step 4: Residential Visual Amenity Threshold

Step 4 involves making a judgement as to whether the predicted effects on visual amenity and views at a property assessed to have a high magnitude of change are such that it has reached the Residential Visual Amenity Threshold, as described in the introduction. This property is considered not to have reached the Residential Visual Amenity Threshold, for the following reasons:

- Although turbines may be visible to the south-west from the interior of the property, these views will be slightly oblique from the western façade where there is potential for screening from vegetation; and,
- The turbines will be contained in the south-western aspect with the wider view unaffected, and their containment within this sector prevent the effects becoming overbearing or overwhelming.

6.32 Viewpoint 32: 9 Balbane Road (Property 57) (Figure 6.2.34)





Data Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

6.32.1 Property Description

OS Grid Ref:	245451 396366	Distance to Nearest Turbine:	1293 m	Elevation:	174.8 m AOD

6.32.2 Step 2: Existing Residential (Visual) Amenity

This property is located along a private track to the south of Balbane Road. Vegetation to the north and west of the property largely screen it from view from publicly accessible locations, so assessment is based on aerial photography. The property is situated within a block of woodland. The property appears to be orientated east to west, with principal views to the west. Outward views are largely screened by the surrounding vegetation.

6.32.3 Step 3: Residential (Visual) Amenity Effects

Affected Field of View:	37°	No of Blade Tips Theoretically Visible:	12	No of Turbine Hubs Theoretically Visible:	2

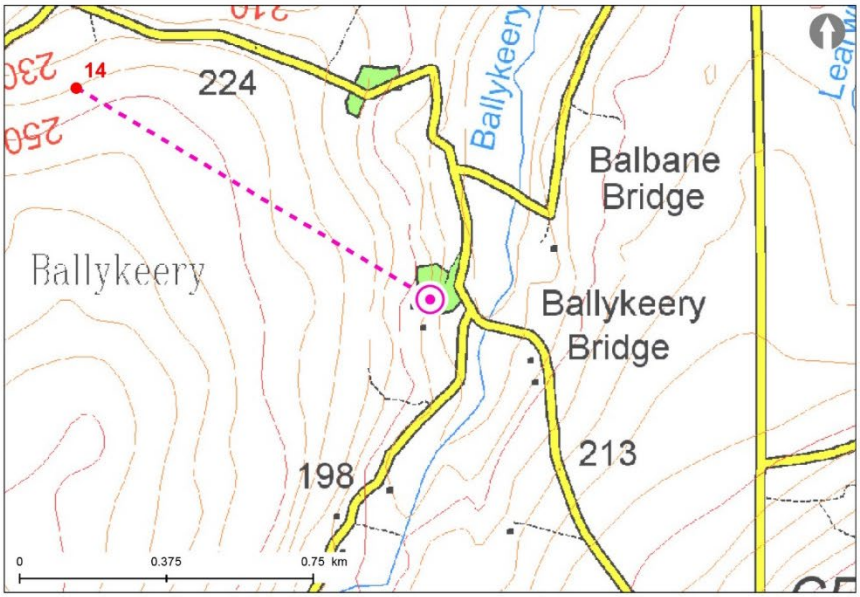
The wireline indicates that the hubs and blades of two turbines, and the blade tips of a further ten turbines, will be theoretically visible above the moorland hills to the west. Actual views are likely to be heavily filtered by vegetation surrounding the property to the west, although in winter there may be glimpsed views towards the Development. Forestry along the horizon may also partially screen the turbines.

The magnitude of change is predicted to be **medium**, which when combined with the **high** sensitivity will result in a **moderate** and **significant** effect.

6.32.4 Step 4: Residential Visual Amenity Threshold

N/A

6.33 Viewpoint 33: 51 Napple Road (Property 58) (Figure 6.2.35)



Data Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

6.33.1 Property Description

OS Grid Ref:	245122 396215	Distance to Nearest Turbine:	1053 m	Elevation:	195.7 m AOD

6.33.2 Step 2: Existing Residential (Visual) Amenity

This property is located along a private track to the west of Napple Road. Vegetation to the north and east of the property largely screens it from view from publicly accessible locations, so assessment is based on aerial photography. The property is situated within a block of coniferous woodland, and there are several farm buildings to the south. The property appears to be orientated south-east to north-west, with principal views to the south-east. Outward views are largely screened by the surrounding vegetation.

6.33.3 Step 3: Residential (Visual) Amenity Effects

Affected Field of View:	0º	No of Blade Tips Theoretically Visible:	1	No of Turbine Hubs Theoretically Visible:	0

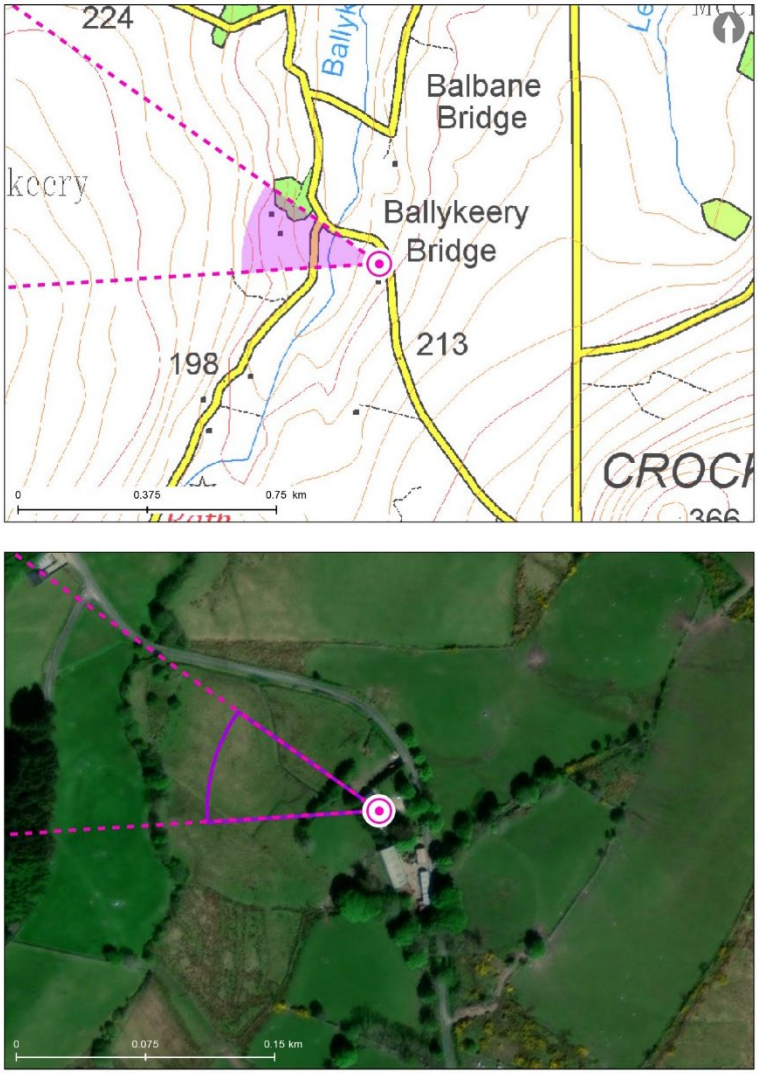
The wireline shows that the blade tips of one turbine within the Development will be theoretically visible to the west. It is likely that woodland to the west of the property will screen or filter views towards the Development from this property. If views are available, these will be seen to the west in slightly oblique views from the rear of the property. Turbines within the existing operational Owenreagh I and II Wind Farms are not visible from this property, and as such the Development will introduce wind farm development into views in which it is not currently experienced. While the turbines will introduce large and dynamic structures into this relatively small-scale landscape, they will be contained within a narrow field of view and will be filtered by vegetation.

The magnitude of change is predicted to be **low**, which when combined with the **high** sensitivity will result in a **moderate** and **not significant** effect.

6.33.4 Step 4: Residential Visual Amenity Threshold

N/A

6.34 Viewpoint 34: 47 Napple Road (Property 59) (Figure 6.2.36)



Data Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

6.34.1 Property Description

OS Grid Ref:	245393 396054	Distance to Nearest Turbine:	1368 m	Elevation:	184.5 m AOD

6.34.2 Step 2: Existing Residential (Visual) Amenity

A one-storey property located to the west of Napple Road. The property is orientated north-east to south-west and principal views are to the north-east. It is accessed by a driveway from Napple Road and has a garden to the front at the north-east. There are several large farm buildings to the south which screen views in this direction. A row of trees to the west of the property and vegetation to the north and east filter views in these directions.

6.34.3 Step 3: Residential (Visual) Amenity Effects

Affected Field of View:	25º	No of Blade Tips Theoretically Visible:	11	No of Turbine Hubs Theoretically Visible:	1

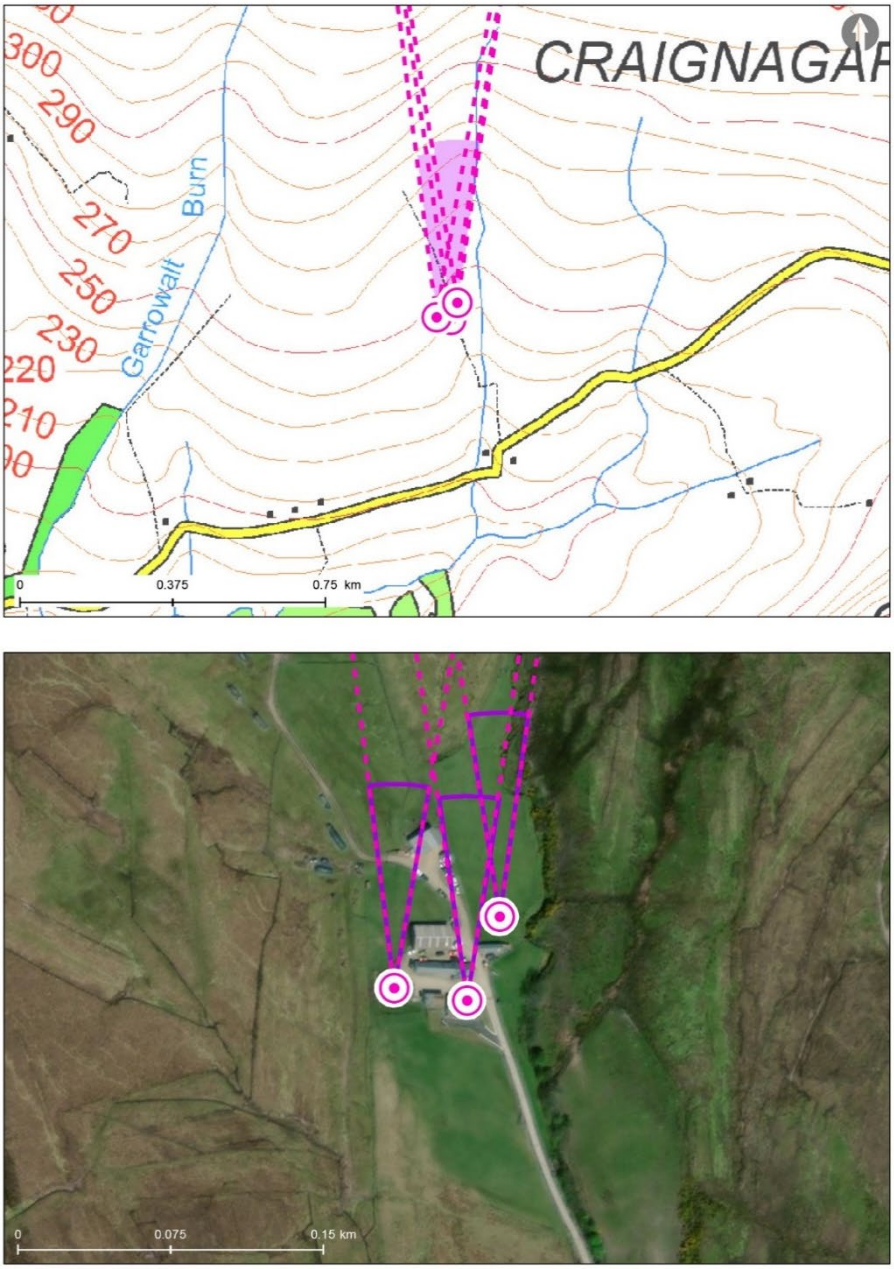
The wireline shows that the Development will be theoretically visible to the west. The hub and blades of one turbine and the blade tips of a further ten turbines will be visible above the moorland hills in this direction. Slightly oblique interior views of the turbines may be experienced, although it is considered likely that the row of trees to the west will heavily filter these views from the interior and exterior of the property. Turbines within the existing operational Owenreagh I and II Wind Farms are not visible from this property, and as such the Development will introduce wind farm development into views in which it is not currently experienced. While the turbines will introduce large and dynamic structures into this relatively small-scale landscape, they will be contained within a narrow field of view and will be filtered by vegetation. Where visible from the interior of the property, this will be in slightly oblique views from the south-western non-principal façade.

The magnitude of change is predicted to be **medium**, which when combined with the **high** sensitivity will result in a **major / moderate** and **significant** effect.

6.34.4 Step 4: Residential Visual Amenity Threshold

N/A

6.35 Viewpoint 35: 10, 10A and 12 Ballykeery Road (Properties 60,61 and 62) (Figure 6.2.37)



Data Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

6.35.1 Property Description

OS Grid Ref:	242750 394595	Mean Distance to Nearest Turbine:	1443 m	Elevation:	241.7 m AOD

6.35.2 Step 2: Existing Residential (Visual) Amenity

Three properties are located to the north of Ballykeery Road, along a private access track. Two of these properties are visible from publicly accessible locations, while the third is screened from view from Ballykeery Road by the landform. Number 10 is a single-storey property, orientated north to

south with principal views to the south. Number 12 has one-and-a-half storeys and is orientated north-west to south-east, with principal views to the south-east. There are several large farm buildings located among the dwellings, most prominently to the north of 10 and 10A and north-west of 12. Principal views from each property are to the south over the valley of the Douglas Burn towards forested and moorland hills on the southern side of the valley. A block of forestry to the south of the properties is likely to partially screen views in this direction. To the north views are more contained by the rising landform towards moorland hills which form the horizon nearby. Turbines within the existing operational Owenreagh I and II Wind Farms are visible above the horizon in this direction.

6.35.3 Step 3: Residential (Visual) Amenity Effects

Affected Field of View:	25 - 42°	No of Blade Tips Theoretically Visible:	4	No of Turbine Hubs Theoretically Visible:	2

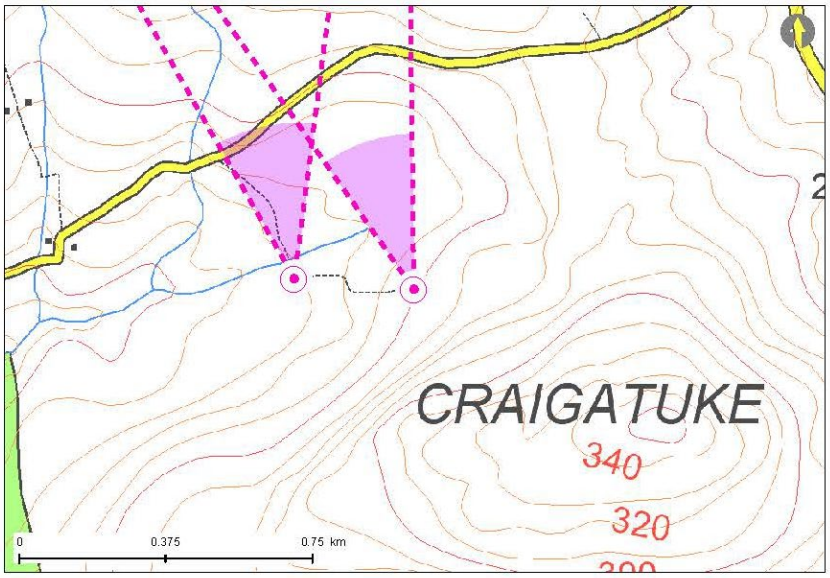
The wireline shows that the Development will be theoretically visible to the north from each property. The hubs of two turbines and the blade tips of a further two turbines will be visible above the moorland hills to the rear of the properties. These are likely to be visible in direct interior views from the rear of each property, although it is not possible to confirm whether there are windows on the northern aspect of each property from publicly accessible locations. The Development will also be visible from the surroundings of the properties, including the access track. While the turbines will introduce large and dynamic structures into this relatively small-scale landscape in views from these properties, and while the scale of the turbines will be appreciably larger than the existing 60 and 66 m turbines, they will be contained within the narrow field of view currently occupied by turbines and will be visible only slightly higher above the horizon. The majority of the Development will be screened by the landform.

The magnitude of change is predicted to be **medium**, which when combined with the **high** sensitivity will result in a **major / moderate** and **not significant** effect.

6.35.4 Step 4: Residential Visual Amenity Threshold

N/A

6.36 Viewpoint 36: 13 Ballykeery Road and unnamed property (Properties 63 and 64) (Figure 6.2.38)



Data Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

6.36.1 Property Description

OS Grid Ref:	243773 394141	Distance to Nearest Turbine:	1832 m	Elevation:	245.2 m AOD

6.36.2 Step 2: Existing Residential (Visual) Amenity

Two properties located to the south of Ballykeery Road and accessed along a private track. The unnamed property is orientated east to west, and number 13 is orientated north to south. Both properties have several adjacent outbuildings, located to the south and east of the unnamed property, and to the north-west and east of number 13. The unnamed property also has a small garden to the west. Principal views from the unnamed property are long-distance to the west along the valley floor of the Douglas Burn. Views to the south and east are screened by the outbuildings, while views to the north are contained by rising landform. Turbines within the operational Owenreagh I and II Wind

Farms are likely to be visible from the surroundings of the property, and potentially from a window on the northern gable end, although it is not possible to confirm this from publicly accessible locations. Principal views from number 13 are to the north towards Owenreagh Hill, and again turbines within the wind farm are likely to be visible. Views to the north-west and east are screened by outbuildings.

6.36.3 Step 3: Residential (Visual) Amenity Effects

Affected Field of View:	25 - 35º	No of Blade Tips Theoretically Visible:	8	No of Turbine Hubs Theoretically Visible:	4

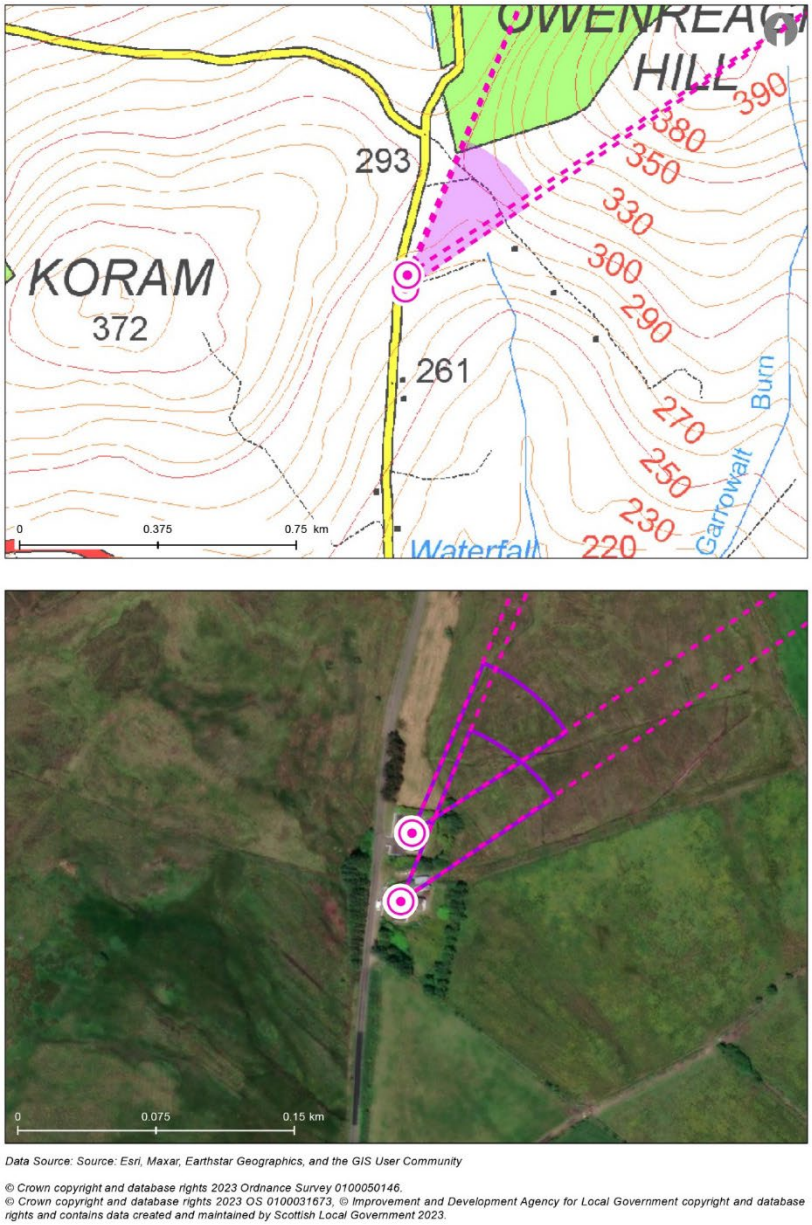
The wireline shows that the Development will be theoretically visible to the north from each property, with the hubs and blades of four turbines, and a further four blade tips visible above the horizon. It is likely that number 13 will experience interior views from the principal north-facing façade towards the Development, although there may be some screening of turbines to the west of the Development by farm outbuildings to the north-west of the property. The unnamed property is likely to experience slightly oblique interior views of turbines within the Development from the principal western façade, and there may also be direct interior views from a small window on the northern façade. The Development will be visible from the surroundings of both properties, including the access track. The turbines will introduce large and dynamic structures into this relatively small-scale landscape in views from these properties, and while the scale of the turbines will be appreciably larger than the existing 60 to 66 m turbines, they will be contained within a similar narrow field of view to that currently occupied by turbines, and will be visible only slightly higher above the horizon. The majority of the Development will be screened by the landform.

The magnitude of change is predicted to be **medium-high**, which when combined with the **high** sensitivity will result in a **major** and **significant** effect.

6.36.4 Step 4: Residential Visual Amenity Threshold

N/A

6.37 Viewpoint 37: 15 and 21 Koram Road (Properties 65 and 66) (Figure 6.2.39)



Data Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

6.37.1 Property Description

OS Grid Ref:	241158 395213	Distance to Nearest Turbine:	1424 m	Elevation:	287.1 m AOD

6.37.2 Step 2: Existing Residential (Visual) Amenity

Two single-storey detached properties, located to the east of Koram Road. Both properties are orientated east to west, with principal views towards Koram Road to the west. Both properties have gardens to the front and rear and are accessed by short driveways from Koram Road. From number 21, these views are contained at fairly close proximity by rising landform beyond the road. From number 15, trees on the western side of Koram Road limit outward views at close proximity. Outward views are more open from both properties to the east. Views in this direction are over agricultural land in the foreground, with higher ground beyond. To the north-east, Owenreagh Hill forms the horizon,

while to the south-east, views are longer distance towards higher peaks in the Sperrins range. Vegetation within the property boundaries largely limits views to the north and south from both properties. The blade tips of turbines within the existing operational Owenreagh I and II Wind Farms may be visible above Owenreagh Hill to the north-east in interior views from both properties, although vegetation to the north-east of each property is likely to filter these views at least partially.

6.37.3 Step 3: Residential (Visual) Amenity Effects

Affected Field of View:	33 - 43°	No of Blade Tips Theoretically Visible:	4 - 5	No of Turbine Hubs Theoretically Visible:	1

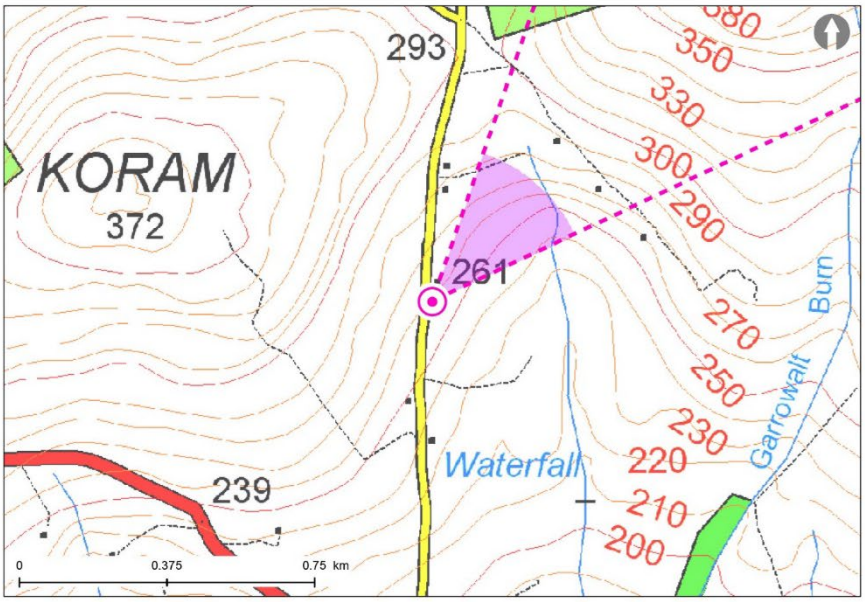
The wireline shows that the Development will be theoretically visible from both properties to the north-east. From number 21, there will be theoretical visibility of the hub of one turbine and the blade tips of a further four. Oblique interior views towards these turbines may be experienced from the rear of the property. The Development will also be visible from the front garden of the property. From number 15, there will be theoretical visibility of the hub of one turbine and the blade tips of a further three. Vegetation to the north of the property, and the adjacent number 21, are likely to screen views towards the Development, although some turbines are likely to be visible in views from the front garden. There is the possibility that turbines within the Development will be visible in interior views from a window on the northern façade, although this view is likely to be at least partially filtered by vegetation to the north. While the turbines will introduce large and dynamic structures into this relatively small-scale landscape, and while the scale of the turbines will be appreciably larger than the existing 60 to 66 m turbines, they will be contained within a narrow field of view and will only marginally extend the field of view occupied by existing turbines within the operational Owenreagh I and II Wind Farms (which they will replace). The majority of the Development will be screened by the landform, and interior views are considered likely to be limited in nature.

The magnitude of change is predicted to be **medium**, which when combined with the **high** sensitivity will result in a **major / moderate** and **not significant** effect.

6.37.4 Step 4: Residential Visual Amenity Threshold

N/A

6.38 Viewpoint 38: 11 Koram Road (Property 67) (Figure 6.2.40)



Data Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

6.38.1 Property Description

OS Grid Ref:	241133 394878	Distance to Nearest Turbine:	1728 m	Elevation:	258.3 m AOD

6.38.2 Step 2: Existing Residential (Visual) Amenity

A single-storey detached property, located to the east of Koram Road. The property is orientated east to west, with principal views towards Koram Road to the west. There is a garden at the front, side and rear, to the west, south and east respectively. To the north, there is a farmyard, with a number of large outbuildings. Principal views to the west are limited by trees on the western side of Koram Road. Outward views to the east and south are contained by vegetation along the property boundary. To the north, there are glimpsed views from the surroundings of the property towards Owenreagh Hill beyond

farm outbuildings in close proximity. The blade tips of turbines within the existing operational Owenreagh I and II Wind Farms are visible upon the hill.

6.38.3 Step 3: Residential (Visual) Amenity Effects

Affected Field of View:	44º	No of Blade Tips Theoretically Visible:	5	No of Turbine Hubs Theoretically Visible:	0

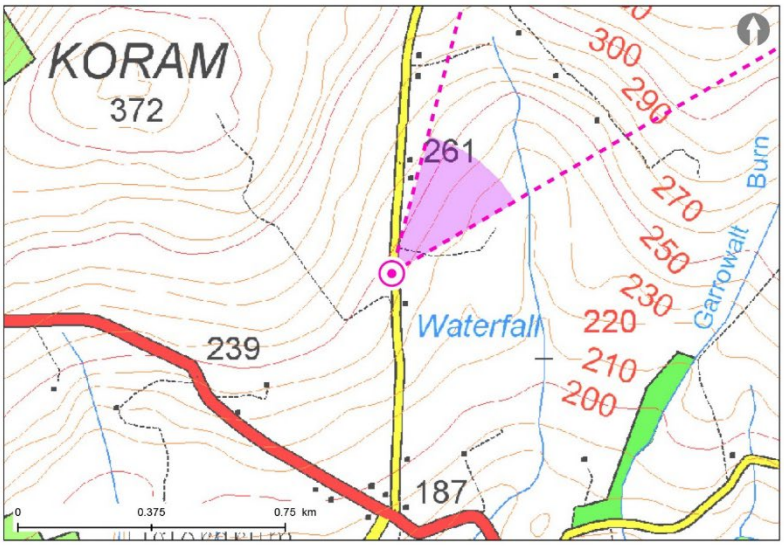
The wireline shows that the Development will be theoretically visible in views to the north-east. There will be theoretical visibility of the blade tips of five turbines; the majority of the turbines will be screened by the landform. It is likely that oblique interior views towards the turbines from the eastern aspect will be screened by surrounding vegetation, while from the northern aspect farm buildings will likely screen potential visibility. There may be glimpsed views of some of the turbines from the surroundings of the property, beyond farm outbuildings to the north. While the turbines will introduce large and dynamic structures into this relatively small-scale landscape, the screening of the majority of the turbines; their containment within a narrow field of view; the glimpsed nature of views towards them; and the existing influence of turbines within the operational Owenreagh I and II Wind Farms will reduce the magnitude of change experienced at this property.

The magnitude of change is predicted to be **medium-low**, which when combined with the **high** sensitivity will result in a **moderate** and **not significant** effect.

6.38.4 Step 4: Residential Visual Amenity Threshold

N/A

6.39 Viewpoint 39: 8 Koram Road (Property 68) (Figure 6.2.41)



Data Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

6.39.1 Property Description

OS Grid Ref:	241093 394610	Distance to Nearest Turbine:	1995 m	Elevation:	243.7 m AOD

6.39.2 Step 2: Existing Residential (Visual) Amenity

A one-and-a-half storey detached property located to the west of Koram Road. The property is orientated east to west and has principal views to the east. It has gardens to the front and rear, and a large outbuilding to the south. Principal views to the east are long-distance, over agricultural land in the foreground towards longer-distance rolling hills. Trees to the east of Koram Road partially filter views. To the north-east, Owenreagh Hill forms the horizon, with operational turbines within the operational Owenreagh I and II Wind Farms visible above the skyline. Views to the west are contained in closer proximity by rising landform to the rear of the property.

6.39.3 Step 3: Residential (Visual) Amenity Effects

Affected Field of View:	41º	No of Blade Tips Theoretically Visible:	6	No of Turbine Hubs Theoretically Visible:	0

The wireline shows that the Development will be theoretically visible in views to the north-east. There will be theoretical visibility of the blade tips of six turbines; the full extents of the turbines will be screened by the landform and one tip will be barely discernible. The Development will be visible in direct interior views from the northern aspect, and oblique interior views from the principal eastern aspect. Views will also be available from the surroundings of the property, including the garden to the front at the east. While the turbines will introduce large and dynamic structures into this relatively small-scale landscape, the screening of the majority of the turbines by the intervening landform; their containment within a narrow field of view; and the existing influence of turbines within the operational Owenreagh I and II Wind Farms (which they will replace) will limit the magnitude of change experienced at this property.

The magnitude of change is predicted to be **medium**, which when combined with the **high** sensitivity will result in a **major / moderate** and **not significant** effect.

6.39.4 Step 4: Residential Visual Amenity Threshold

N/A

The Netherlands
New Zealand
Norway
Panama
Peru
Poland
Portugal
Puerto Rico
Romania
Singapore
South Africa
South Korea
Spain
Sweden
Switzerland
Taiwan
Tanzania
Thailand
UK
US
Vietnam

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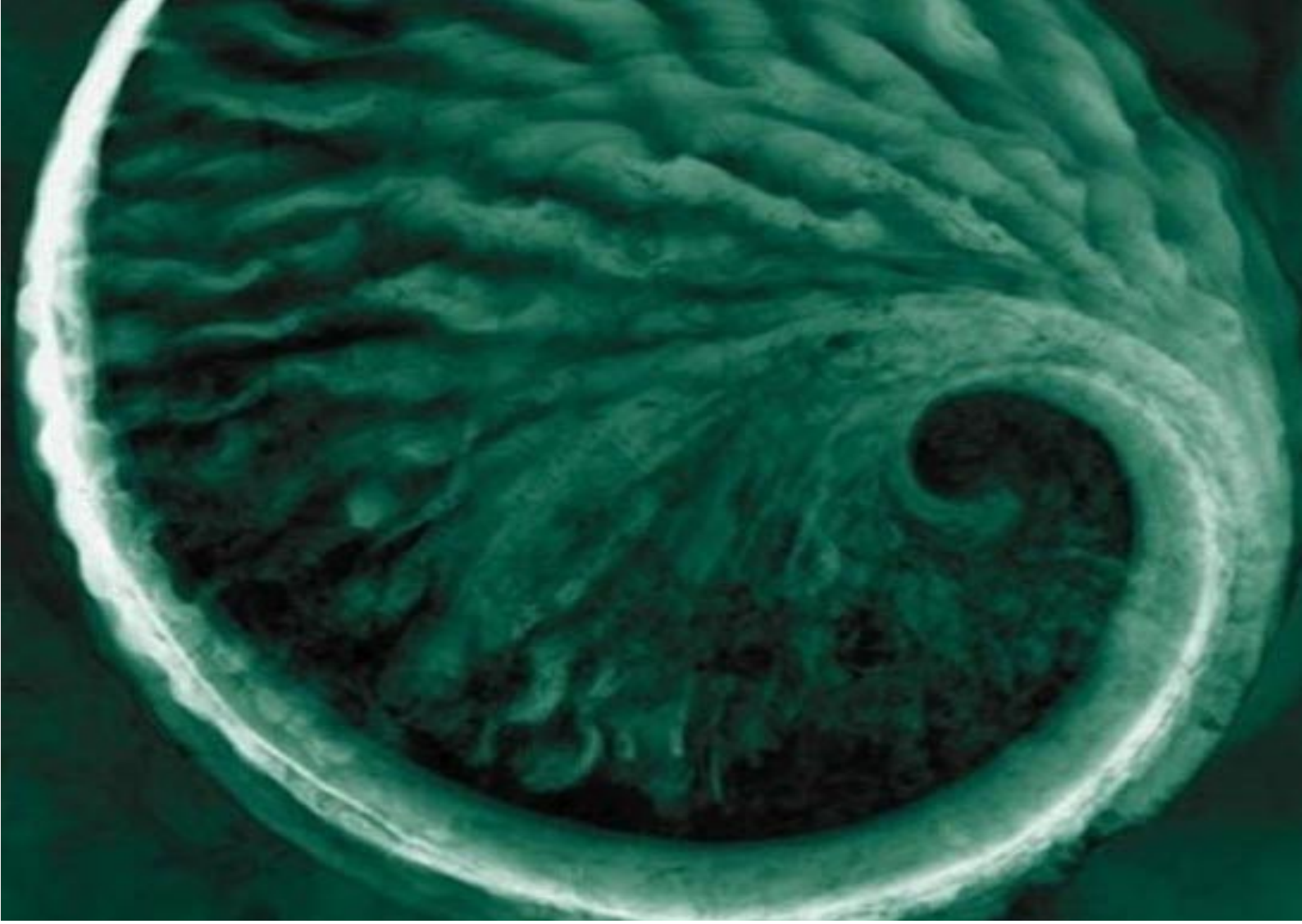

Ørsted Onshore Ireland Midco Limited

Owenreagh/Craignagapple Wind Farm

Environmental Statement – Technical Appendix A6.3 Assessment of Aviation Lighting

06 September 2023

Project No.: 0696177

The business of sustainability

ERM

Signature Page

06 September 2023

Owenreagh/Craignagapple Wind Farm

Environmental Statement – Technical Appendix A6.3 Assessment of Aviation Lighting

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CONTENTS

List of Tables

Acronyms and Abbreviations

Name	Description
ANO	Air Navigation Order
AOD	Above Ordnance Datum
CAA	Civil Aviation Authority
CLVIA	Cumulative Landscape and Visual Impact Assessment

CMO	Complementary Metal Oxide
CZTV	Cumulative Zone of Theoretical Visibility
DfI	Department for Infrastructure
DTM	Digital Terrain Model
EASA	European Union Aviation Safety Agency
ES	Environmental Statement
EIA	Environmental Impact Assessment
FoV	Field of View
GIS	Geographic Information System
GLVIA3	Guidelines for Landscape and Visual Impact Assessment Third Edition
GN01	Guidance Notes for the Reduction of Obtrusive Light
HFoV	High Field of View
ICAO	International Civil Aviation Organisation
IEMA	Institute of Environmental Management and Assessment
ILP	Institute of Lighting Professionals
LCT	Landscape Character Type
LCA	Landscape Character Area
LDP	Local Development Plan
LI	Landscape Institute
LVIA	Landscape and Visual Impact Assessment
OPEN	Optimised Environments
OS	Operation System
OSNI	Ordnance Survey Northern Ireland
PTGUI	Panorama Photo Stitching Program
RVAA	Residential Visual Amenity Assessment
SLVIA	Seascape Landscape Visual Impact Assessment
TNG	Technical Guidance Note
SLA	Special Landscape Area
ULR	Upward Light Ratio
ZTV	Zone of Theoretical Visibility

1. INTRODUCTION

This Technical Appendix has been prepared to accompany **Chapter 6: Landscape and Visual Impact Assessment (LVIA)** of this Environmental Statement (ES). 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 the Development may need to display visible red lights at night. The effect of the Development at night would result from visible medium intensity (2,000 candela) red coloured light fittings located on the hubs and 32 candela red coloured light fittings located on the towers of all proposed turbines. It should be noted that all turbines would also include infra-red lighting on the turbine hubs which would not be visible to the human eye. The focus of this Technical Appendix is on the visual assessment of the visible aviation lighting requirements of the Development. For the assessment of lighting effects, the visual sensitivity and magnitude criteria described in **Technical Appendix A6.1: LVIA Methodology** have been applied.

This visual assessment of turbine lighting is supported by a baseline light pollution map (Figure 6.23), Hub Lighting ZTV (Figures 6.24), a Lighting Intensity ZTV (Figure 6.25) and night-time photomontage visualisations from three viewpoints (See visualisations on Figures 6.29, 6.30 and 6.47)regulations and guidance

1.1 ICAO/ Civil Aviation Authority (CAA) Regulations

ICAO (a UN body) sets international Standards; Recommendations and 'Notes' for aviation lighting in its publication 'Annex 14 to the Convention on International Civil Aviation' - Volume I Aerodrome Design and Operations (ICAO, Eighth Edition, July 2018).

ICAO Table 6.1 (page 6-4) identifies the international definitions of daylight; twilight and night based on measured background illuminance as follows:

- Daylight: Above 500 cd/m2;
- Twilight: 50-500 cd/m2; and,
- Night: Below 50 cd/m2.

For 2,000 candela medium intensity steady or fixed red lights, ICAO indicates a requirement for no lighting to be switched on until 'Night' has been reached, as measured at 50 cd/m2 or darker.

ICAO Table 6.3 (page 6-5) identifies minimum requirements and recommendations for 2,000 cd aviation lights on wind turbines at 150 m and above. In summary these are:

Minimum requirements:

- 0 to +3° from horizontal: 2,000 cd minimum average intensity (or 1,500 cd minimum intensity); and,
- -1 degree from horizontal: 750 cd minimum intensity.

The European Aviation Safety Agency (EASA) implements ICAO in European airspace. In pursuit of international standards for use around the globe, a project team has been established to provide clearer direction to lighting manufacturers, as there is scope for interpretation of ICAO in different ways by manufacturers.

Within the UK, the ICAO/ EASA requirements for lighting wind turbines are implemented through CAA publication 'CAP 764: Policy and Guidelines on Wind Turbines', and 'CAP393: Air Navigation Order 2016'. The CAA have confirmed that UK policy broadly aligns with the International standards, including insofar as the point at which lights must be switched on at 'Night' rather than 'Twilight'.

The proposed turbines, at 156.5 m to blade tip, would require lighting under Article 222 of the Air Navigation Order (ANO, 2016). This requires a single, medium intensity, 'steady' red aviation light (emitting 2,000 candela) to be fitted at hub level to each turbine. In addition, the CAA requires 3 low

intensity lights to be fitted at the intermediate level on the turbine tower (CAA, 2017), to provide 360 degree visibility around the tower. The intermediate 'tower' lights will be 32 candela.

Air Navigation Order 2016 (CAP393) Article 223 (8) states that 'If visibility in all directions from every wind turbine generator in a group is more than 5km the light intensity for any light required by this article to be fitted to any generator in the group and displayed may be reduced to not less than 10% of the minimum peak intensity specified for a light of this type.' This reduction affords valuable mitigation of light intensity and allows the minimum intensities identified above to be dimmed to 10 % of their values if meteorological conditions permit (i.e. the 2,000 cd minimum intensity may be dimmed to 10 %, or 200 cd, if visibility is greater than 5 km, i.e. in moderate to excellent or 'clear' visibility).

1.2 Guidelines for Landscape and Visual Impact Assessment (GLVIA3)

GLVIA3 (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.’

GLVIA3 (page 60) also provides the following guidance with regards to mitigation of obtrusive light: ‘lighting for safety or security purposes may be unavoidable and may give rise to significant adverse effects; in such cases, consideration should be given to different ways of minimising light pollution and reference should be made to appropriate guidance, such as that provided by the Institution of Lighting Professionals (ILP, 2011)’.

1.3 Institute of Lighting Professional Guidance

Guidance produced by the Institute of Lighting Professionals (ILP) (2011) (GN01:2011) is useful in setting out some key lighting terminology that relates to potential visual effects.

'Obtrusive Light, whether it keeps you awake through a bedroom window or impedes your view of the night sky, is a form of pollution, which may also be a nuisance in law and which can be substantially reduced without detriment to the lighting task. Skyglow - the brightening of the night sky; Glare - the uncomfortable brightness of a light source when viewed against a darker background; and Light Intrusion - the spilling of light beyond the boundary of the property or area being lit, are all forms of obtrusive light which may cause nuisance to others.'

The following key guidance within the ILP GN01:2011 is noted as follows:

- 'The most sensitive/critical zones for minimising sky glow are those between 90° and 100° (note that this equates to 0-10° above the horizontal);
- Keep glare to a minimum by ensuring that the main beam angle of all lights directed towards any potential observer is not more than 70°;
- In rural areas the use of full horizontal cut off luminaires installed at 0° uplift will, in addition to reducing sky glow, also help to minimise visual intrusion within the open landscape; and,
- Upward Light Ratio (ULR) of the Installation is the maximum permitted percentage of luminaire flux that goes directly into the sky. A ULR of 0 (zero) Candela (cd) is suggested for Dark Sky Parks.'

CPRE also identifies these same broad terms as the three types of light pollution:

- Skyglow - the pink or orange glow we see for miles around towns and cities, spreading deep into the countryside, caused by a scattering of artificial light by airborne dust and water droplets;

- Glare - the uncomfortable brightness of a light source; and,
- Light intrusion - light spilling beyond the boundary of the property on which a light is located, sometimes shining through windows and curtains'.

1.4 NatureScot Guidance

1.4.1 Visual Representation Guidance

In the absence of UK wide or Northern Ireland guidance on the visual representation of wind farms, NatureScot's guidance is used in the production of LVIA and night-time visualisations. NatureScot is an executive non-departmental public body of the Scottish Government responsible for the country's natural heritage NatureScot advises on all aspects of nature, wildlife management and landscape across Scotland, and has been at the forefront of preparing policy and guidance on the development of wind farms. NatureScot's guidance is the industry standard and is used widely across the UK and Republic of Ireland.

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 wind farm lighting would look compared to the existing baseline at night.

Existing lights shown in the photographs appear larger and more blurred than those seen to the naked eye in the field when the photographs were captured. 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 Development have been added to the night time views this effect has been emulated.

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 impression. 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.

1.4.2 Evolving NatureScot Approaches to Turbine Lighting

Recent NatureScot workshops, which draw together the knowledge and expertise of the public and private sectors, indicate that a proportionate and pragmatic approach is required, both in terms of the need to assess likely significant effects under the EIA regulations (complying with current civil aviation standards) and also in providing mitigation (on a project and site-specific basis).

Mitigation options to eliminate or reduce the need for, and effects of, visible lighting are evolving quickly and developers are exploring these with consultees and the CAA in relation to specific sites. NatureScot has offered a perspectiveprovided guidance on the efficacy of different mitigation options, noting that the most effective appears to be radar activated, albeit accepting the considerable cost implications inherent in this potential option.

Ministers and planning authorities are using planning conditions to manage effects across the UK. It is recognised that the EIA should not necessarily specify one mitigation option, as these are evolving rapidly, and developers need flexibility to utilise the most appropriate mitigation once they are ready to start discharging conditions. Conditions provide some flexibility for developers to identify the most appropriate mitigation option(s) post consent and prior to construction, and to agree these with the relevant decision maker.

In terms of visual effects, NatureScot's view (as expressed at a seminar in November 2019) is that lengthy debate about the exact brightness of lights (including in visualisations) is potentially not helpful and that it is better to focus on where they will be visible, how many lights will be visible and the level of change from the baseline situation. This is recognised in the visual assessment in this Appendix. NatureScot has also taken a pragmatic view with night-time visualisations, requesting that decision makers, consultees and communities require visualisations from a small number of relevant viewpoints to understand these effects. NatureScot also recognises the challenges of capturing night time photography and accept that some post photographic manipulation of images to provide a good representation is acceptable.

2. ASSESSMENT PARAMETERS

2.1 Overview

A description of the proposed turbine lighting is found within **Chapter 3: Development Description** and **Chapter 15: Other Uses**, based on this, the following assumptions have been made with regards to visible lighting of the Development for the LVIA:

- The CAA requires that all obstacles at or above 150 m above ground level are fitted with visible medium intensity lighting (2,000 cd) located on the turbine hub;
- The CAA requires that a secondary light is fitted to the hub for use only when the primary light fails and would not be lit concurrently;
- There is an additional requirement for three lights to be provided at an intermediate level of half the hub height. These would need to be fitted around the towers to allow for 360degrees horizontal visibility; and,
- The 2,000 cd medium intensity lights may be dimmed to 10 %, or 200 cd, if visibility is greater than 5 km, i.e. in moderate to excellent or 'clear' visibility.

2.2 Worst case Aviation Lighting Scheme

In relation to the Development, the worst-case scenario for night time effects includes the following parameters:

- Turbines T1, T2, T7, T10, T12, T13 and T14 would have red, medium intensity visible lights mounted on the hub (90 m based on the worst case hub height candidate turbine described in **Chapter 4: Site Selection and Design**);
- 2,000 cd and 200 cd intensity hub lights have been assessed representing two differing worst case situations. 2,000 cd represents the maximum intensity possible. 200 cd represents the maximum intensity that would be used when visibility extending from the wind farm exceeds 5 km;
- All turbines would also have low-intensity lights (32 candela) to be provided on the turbine towers at an intermediate level of half the hub height (45 m); and,
- The steady red lighting fixed to the top of the hubs and to the turbine towers may appear to flicker on and off with the blade movement. This would occur when the turbine blades pass between the lights and the observers.

On the basis of the CAA requirements, it is evident that the effect of the visible lights of the Development will be dependent on a range of factors, including the intensity of lights used, the clarity of atmospheric visibility and the degree of negative/ positive vertical angle of view from the light to the receptor.

In compliance with EIA regulations, the likely significant effects of a 'worst-case' scenario for turbine lighting are assessed and illustrated in this visual assessment. A worst-case approach is applied which considers the effects of 2,000 cd and 200 cd scenarios during periods of clear visibility. It should be noted however, that as the required medium intensity lights are only likely to be operated at their maximum 2,000 cd during periods of poor visibility, that 2,000 cd intensity actually represents an unrealistic worst-case position, as it is unlikely to ever be experienced at that maximum illumination level.

2.3 Light Intensity

Visible aviation obstruction warning lights are designed to emit light horizontally in 360 degrees and offer a reduced light intensity above and below the horizontal. This in line with ICAO Annex 14 which requires the intensity of emitted light to be most intense at 0° (horizontal) and lower below the horizontal. Whilst aviation lighting manufacturers must meet the minimum requirements, their products may vary in relation to recommended limits set out in ICAO standards and the lighting characteristics of different light fittings may therefore vary outside the minimum requirements stipulated by ICAO.

For this assessment data from the testing of a Quantec medium intensity obstruction light has been used to provide an example of the reduction in lighting intensity above and below the horizontal. Whilst the precise model of light to be used for the Development is not known at this time it is considered that such an example provides a useful understanding of the potential visual mitigation of the intensity of the lights for receptors viewing them from areas of the Study Area that are below the horizontal. The Quantec data has therefore been used to define the amount of light emitted at particular angles above and below the horizontal for use in the assessment, see Table A6.3.1 below.

Table A6.3.1. Intensity of Turbine Light based on the Quantec medium Intensity Obstruction Light

Vertical Angle	Turbine Lighting Intensity (Intensity of Turbine Light shown in Candelas (cd))	
	2000cd intensity	**200cd intensity**
Above 6°	<100cd	<10cd
2° to 6°	775 to 100cd	77.5 to 10cd
0° to 2°	2100 to 775cd	210 to 77.5cd
0° to -1	2100 to 750cd	210 to 75cd
-1° to -2°	750 to 75cd	75 to 7.5cd
-2° to -3°	75 to 32cd	7.5 to 3.2cd
-3° to -4°	32 to 13cd	3.2 to 1.3cd
Below -4°	<13cd	<1.3cd

On the basis of the CAA requirements, therefore, it is evident that the intensity of the visible lights of the Development will be dependent on the clarity of atmospheric visibility and the degree of negative/ positive vertical angle of view from the light to the receptor. It should also be noted that the definitions in Table A6.3.1 do not take account of the potential for some of the emitted light spilling onto the passing blades which would be visible at all negative angles, albeit as a less intense and diffuse reflected glow. Figure 6.25 shows the intensity of visible aviation lights across the extent of visibility for the hub lights for the 'Worst Case Aviation Lighting Scheme' in which all the turbines would be lit.

2.4 Representative Night Time Viewpoints

A hub height ZTV was used to identify where there could be direct line of sight from the surrounding area to the proposed turbine lights mounted on the turbine hub (Figure 6.24). This ZTV does not take account of any intervening screening that may arise as a result of forestry or woodland cover.

Night-time visualisations have been produced for the following three representative viewpoints. These were selected from the LVIA viewpoints and agreed with the Department for Infrastructure (DfI) during the Pre-Application Discussion process. and are as follows:

- Viewpoint 4: Moor Lough;
- Viewpoint 5: Holy Hill; and,
- Viewpoint 22: Aghafad Road.

The precise locations of the viewpoints differ slightly from the daytime locations as they were captured on separate and specific visits.

Whilst aviation lighting manufacturers must meet the minimum requirements, their products may vary in relation to recommended limits set out in ICAO standards, which makes it difficult producing accurate visualisations as the lighting characteristics of different light fittings, of the same intensity, may vary outside the minimum requirements stipulated by ICAO. The night-time photomontages have been produced to show both 2,000 cd and 200 cd reduced intensity lighting, to inform the assessment of worst-case effects assessed. However, it should be noted that the night-time photography has been captured in periods of good visibility that is greater than 5 km. As a result, the night-time photomontage representations of the 2,000 cd lights are therefore an unrealistic over-representation of the likely visibility of visible aviation lighting. This is because visibility on the site where the Development would be (and likely at the viewpoint itself) is very likely to be much poorer (<5 km) when they operate at that intensity.

3. ASSESSMENT OF EFFECTS

3.1 Types of Effect

The visual assessment of turbine lighting is intended to determine the likely effects that the Development would have on the visual resource i.e. it is an assessment of the effects of visible aviation lighting on views experienced by people at night.

The assessment of turbine lighting in this Appendix does not consider effects of aviation lighting on landscape character (i.e. landscape effects). For visible medium intensity steady or fixed red aviation warning lights, ICAO indicates a requirement for no lighting to be switched on until 'night' has been reached, as measured at 50 cd/m2 or darker. This is helpful as it does not require them to be on during 'twilight', when landscape character may be clearly discerned. It is considered that visible aviation lighting would therefore not affect the perception of landscape character, which is not readily perceived at night in darkness, particularly in rural areas. The assessment of visible lighting is solely a visual effect. While aviation lighting would be visible and result in visual effects, as assessed in this Appendix, the effects of aviation lighting on the perception of landscape character are scoped out of this assessment. This decision to scope out landscape effects reflects the Scottish Ministers' recent

finding in the Crystal Rig IV Wind Farm Public Inquiry. The Ministers' Decision Notice and Reporter's Report can be accessed on the Department of Planning and Environmental Appeals website available at https://www.dpea.scotland.gov.uk/CaseDetails.aspx?id=120491 (case reference WIN-140-8).

3.2 Baseline Lighting

The existing baseline lighting levels have been mapped for the surrounding landscape (see Figure 6.23 based on Open Source data of Light Pollution across the UK). This Open Source data has been used to help understand and illustrate the existing baseline lighting levels of the Study Area. Each pixel in the mapping shows the level of radiance (night lights) shining up into the night sky, which have been categorised into nine colour bands to distinguish between different light levels, from low level light pollution colour band one (darkest) to high level light pollution nine (brightest).

Figure 6.23 shows that the extent of baseline lighting across the Study Area is largely concentrated where settlements occur, while the majority of the rural parts of the Study Area remains unaffected by baseline lighting. The highest levels of baseline lighting occur in the north to the north and west of the Development, coinciding with the settlements of Derry and Strabane respectively. The Development sits in an area which is shown on Figure 6.23 to be largely unaffected by baseline lighting, extending eastwards across the uninhabited uplands of the Sperrin Mountains. As the Development is located in the lower hills at the western extremity of this hill range, it is surrounded to the north, west and south by settled farmland in which dispersed farmsteads and properties across this rural area add a low level of baseline lighting.

The greater concentration of settlement to the west of the Development is registered as increasing levels of lighting intensity with the highest levels shown across the town of Strabane, at a range of 6 to 10 km from the Development. A similar pattern occurs to the north of the Development at a range of 15 to 27 km where lighting levels build to the highest level which covers the citytown of Londonderry/ Derry and its developed outskirts.

4. DETAILED ASSESSMENT

4.1 Visibility of turbine lighting from viewpoints

Table A6.3.2 below provides a summary of the potential visibility of hub lights for each of the LVIA viewpoints, this is based on the hub light ZTV, and details how many lit turbines would be theoretically visible from each of the viewpoints included in the LVIA. It should be noted that actual visibility of the aviation lighting may be reduced by the screening effect of intervening features, such as tree cover, although it is likely that the lights will be visible through less dense tree cover. Table A6.3.2 also sets out the reductions in lighting intensity that would occur if directional lighting were used, as illustrated on the Lighting Intensity ZTV on Figure 6.25. While there are notable benefits of using directional lighting, these are not considered in the assessment as, at this application stage, the Applicant is unable to commit to the particular lamp that these calculations are based on.

Table A6.3.2. Viewpoint Lighting Intensity Summary

Viewpoint	Distance to nearest turbine (km)	Number of hub aviation lights visible	Light intensity at each viewpoint relative to vertical angle (cd)		
			Vertical Angle	2,000 cd	200 cd
1 Koram Road, Ligfordrum.	2.0	1 to 2	-2 to -3	75 to 32	7.5 to 3.2
2 Koram Road, north	1.7	1 to 2	-2 to -3	75 to 32	7.5 to 3.2

Viewpoint	Distance to nearest turbine (km)	Number of hub aviation lights visible	Light intensity at each viewpoint relative to vertical angle (cd)		
			Vertical Angle	2,000 cd	200 cd
of Ligfordrum.					
3 Napple Road, Ballykeery Bridge.	1.6	3 to 4	-2 to -3	75 to 32	7.5 to 3.2
4 Moor Lough picnic area.	1.4	5 to 6	-4	<13	<1.3
5 Holyhill Road, Holly Hill	3.8	5 to 6	-1 to -2	750 to 75cd	75 to 7.5
6 President Wilson's House	4.7	1 to 2	-2 to -3	75 to 32	7.5 to 3.2
7 Strathmourne Road, Strabane	7.8	3 to 4	-2 to -3	75 to 32	7.5 to 3.2
8 Victoria Bridge	9.0	1 to 2	-1 to -2	750 to 75cd	-2 to -3
9 Harry Avery's Castle, Newtownstewart	11.4	1 to 2	-1 to -2	750 to 75cd	-2 to -3
10 Slievebeg Road, Slievebeg	8.6	1 to 2	-1 to -2	750 to 75cd	-2 to -3
11 B48 Ballynamallaght	4.9	7	-1 to -2	750 to 75cd	-2 to -3
12 B48 Dunnamanagh	5.5	5 to 6	-2 to -3	75 to 32	7.5 to 3.2
13 Lenamore picnic site, above Gortin	13.9	5 to 6	0 to -1	2100 to 750	210 to 75
14 Ulster Way at Bolaght Mountain above Castlederg	23.6	1 to 2	0 to -1	2100 to 750	210 to 75
15 Foreglen Road, Killaloo	14.9	1 to 2	-1 to -2	750 to 75	-2 to -3
16 A5, Strule River Valley	14.2	1 to 2	-1 to -2	750 to 75	-2 to -3
17 Bells Park Road, Glebe	10.0	3 to 4	-1 to -2	750 to 75	-2 to -3
18 Mullaghclogha, Sperrin Mountains	11.5	5 to 6	0 to 2	2100 to 775	210 to 77.5
19 Ballindrait	11.5	0	-	-	-
20 Meendamph Road, Crockrour Hill	2.3	5 to 6	0 to -1	2100 to 750	210 to 75
21 Glenmornan	2.7	7	-3 to -4	32 to 13	3.2 to 1.3

Viewpoint	Distance to nearest turbine (km)	Number of hub aviation lights visible	Light intensity at each viewpoint relative to vertical angle (cd)		
			Vertical Angle	2,000 cd	200 cd
22 Aghafad Road	5.8	7	-1 to -2	750 to 75	-2 to -3
23 Bessy Bell	14.5	5 to 6	0 to 2	2100 to 775	210 to 77.5
24 Silverhill Road	1.8	3 to 4	-2 to -3	75 to 32	7.5 to 3.2
25 Raphoe	16.3	5 to 6	0 to -1	2100 to 750	210 to 75

4.2 Viewpoint Lighting Intensity

The Lighting Intensity ZTV in Figure 6.25 illustrates where the different intensities, relative to the different vertical angles from the hub mounted aviation lighting on turbines T1, T2, T7, T10, T12, T13 and T14, would be visible within the surrounding landscape. Figure 6.25 also illustrates the corresponding intensity in respect of 2,000 cd lighting and when this is reduced to 200 cd. It is clear from Figure 6.25 that the full intensity of the hub lights would only theoretically be experienced from a very small proportion of the Study Area where the elevation is similar to the height of the hub lights. Many of the representative viewpoints across the Study Area, occupy a lower elevation and, therefore, would have reduced intensity as a result of the negative vertical angle in which the hub lights would be viewed. Table 6.3.2 provides a summary of the reduced intensity for the hub lights based on the ZTVs in Figure 6.24 and 6.25.

As described in the LVIA baseline, the ZTV of the Development is largely contained within the local landscape by the Sperrin Mountains which enclose the eastern side of the Study Area and lower uplands which enclose the northern and southern extents. This landform pattern ensures that continuous areas of visibility is largely contained within the first 10 km of the Development with visibility between 10 and 20 km following a patchier pattern. The lower lying landform to the west means that larger patches of visibility extend out to approximately 20 km in this direction. There is a concentration of theoretical visibility across the local landscape around the Development between a range of approximately 4 to 6 km. Gaps in theoretical visibility then coincide with enclosed valleys or opposite facing hill sides, where landform creates a screen. Theoretical visibility then typically resumes where there is more openness in the landform, or it is orientated back towards the Development

The Lighting Intensity ZTV in Figure 6.25 shows lighting intensity relative to those areas in the Study Area from where the seven hub lights would be visible, as shown on Figure 6.24. Generally, lighting intensity would be relatively low, especially across the local area around the Development, which occupies a lower elevation than the hub aviation lights. The exception occurs across the south-western part of the area where the Development would be located, where higher intensity occurs. This is as a result of the comparatively higher elevation of this part of the hill relative to the height of the hub lights on the proposed turbines to the north-east.

In the area around the Development, roughly extending across 3 to 4 km to the north, south and west, 6 km to the south-west and with patches out to 1 to 2 km to the east, lighting intensity is shown to be typically low. Where the vertical angle of the turbine lights is shown to be > -4 degrees, then the intensity of the lighting would be as low as <13 cd for the 2,000 cd lighting and 1.3 cd for the 200 cd lighting. Where the vertical angle of the turbine lights is shown to be -3 to -4 degrees, then the intensity of the lighting would be 32 to 13 cd for the 2,000 cd lighting and 3.2 to 1.3 cd for the 200 cd lighting. These lower levels present a notable reduction from the maximum intensities and their

occurrence relates to the lower elevation of these close range parts of the Study Area relative to the height of the hub lights.

Beyond these close range parts, while the extent to which the hub lighting would generally become more patchy, lighting intensity would generally increase. This is owing to the combination of the landform becoming more elevated, especially to the east, and the greater separation distance from the Development, which contributes to a reduction in the negative angle of the hub lighting. Small patches of the highest level of intensity (2,100 to 775 cd at 2,000 cd and 210 to 77.5 cd at 200 cd) can be seen on Figure 6.25 to occur across the upper slopes and summits of the Sperrin Mountains, at locations mostly beyond 7 km but also with a closer patch across Balix Hill (403 m AOD) at approximately 3 km.

In reality, it is extremely unlikely that 2,000 cd would ever be experienced at its full intensity as it would only operate when visibility is reduced by climatic conditions. Reduced visibility would also affect someone's perception of the intensity of the light fitting. Ten of the viewpoints lie within 5 km of the Development, with the remaining 15 located beyond 5 km. Therefore, the worst-case intensity experienced at the majority of the viewpoints would likely be represented by the 200 cd scenario. This is because the 2000 cd intensity lights would only be in operation when visibility is less than 5 km and, in this situation, they would appear far less intense due to the poor visibility surrounding the Development. In distant views, over 10 km, the aviation lights are still likely to be visible, based on experience of other operational wind farm aviation lights viewed in the field, however the distance and reduced intensity are mitigating factors with increasing distance.

Whilst it is noted that the actual intensity of light perceived at the majority of assessment viewpoints (and within the Study Area) is likely to be less intense than the maximum intensity of the light (2,000 cd in visibility <5 km and 200 cd in visibility >5 km), this Technical Appendix assesses the maximum possible intensity of light observed at each of the viewpoints considered and represents this maximum intensity in corresponding visualisations.

5. REPRESENTATIVE VIEWPOINTS

5.1 Viewpoint 4: Moor Lough picnic area

Nearest Visible Turbine Light: 1.4 km

5.1.1 Night-Time Baseline Condition and Sensitivity

The viewpoint is located a minimum of 1.4 km to the north-east of the Development, thus representing a close range view. The viewpoint is representative of the recreational users who visit Moor Lough.

A rough track encircles the loch, providing access to walkers and cyclists. Tree cover surrounding the loch ensures that views of the development from most of this track are screened. There are, however, sections where open views occur, including from the western end where this viewpoint is located, approximately 500 m south of the car park, albeit beyond intervening landform such that a more open view is experienced. While there is no particular attraction at night-time and it appears that the majority of people visit during the daytime, there does also appear to be some activity around the loch in the evening and into the night. During two night-time site visits, late walkers were seen out as well as groups hanging out. It is assumed that people may also visit the loch for early morning walks or runs that may coincide with the hours of dawn.

In terms of baseline light levels in this area, there are no residential properties around the loch and few in the immediate surrounding area. There are also no roads with street lighting readily visible from this location. Moor Lough lies in a shallow bowl, with enclosure from landform and trees around it, such that views out to rural settlement are largely screened. This means that baseline lighting is low and that the landscape is typically seen to be dark and devoid of artificial lighting. The exception

occurs in respect of the Moor Lough car park and the intermittent arrival and departure of vehicles as well as lights from torches or bonfires around the loch shore.

During the day, the view to the south-west from the viewpoint adds to the scenic setting of the loch. In the fore to middlegound the landform rises to a low upland ridge with landcover of improved and semi-improved pasture and clumps of tree cover around the loch and into the rural farmland. Blocks of coniferous forestry are evident along this ridgeline and beyond this, the background is marked by a more distant and higher upland ridge, although only a thin band of this is visible. The existing turbines of Owenregah I and II Wind Farms are also readily visible along this ridgeline.

At night, however, individual landscape elements that create different landscape patterns in the view are difficult to discern, and these are reduced to form a dark outline set against the slightly lighter sky. The baseline night photography is captured at a time where the shape of the closer intervening ridgeline and associated forestry is evident but the more distant ridgeline is not.

The value and visual susceptibility of receptors at night differs when compared to the assessment carried out for daytime conditions. During the night the landscape has a diminished scenic quality and receptors would not have the same appreciation of the landscape which is dark and muted compared to what is evident during the day. Taking these factors into account, the night-time sensitivity of recreational receptors is considered to be medium-high.

5.1.2 Night-Time Assessment

2,000 cd Light Intensity

Seven of the 14 turbines would be lit with hub aviation lighting and of these, five would be visible from this location. In other open sections around the loch, all seven hub aviation lights might be visible, albeit potentially from a greater range. The location of the viewpoint relative to the prevailing south-westerly wind would mean that the lights on the hubs would at most times be seen behind the rotors and would therefore be intermittently obscured by intervening blades. On this basis they would appear to flicker as the turbine blades pass the hub and tower lights. The intensity of the hub lights in the 2,000cd scenario, allowing for the vertical angle between this viewpoint and the closest hub is calculated to be below 13 cd.

The hub aviation lighting would be seen as an introduction of lights into night-time views where the baseline is characterised by dark skies with very little influence from fixed sources of lighting, as shown in the night-time photomontages on Figures 6.29h and 6.29i. The lighting would be seen above the south-western horizon where there are no other lights visible below or on the horizon. The close proximity of the Development would tend to increase the visual impression that the turbine lights would have on receptors at this location and the effect would detract from the dark skies of this rural location. However, the vertical angle in which the lights are experienced greatly reduces their potential intensity and therefore potential effect.

Taking this into account, it is considered that these lights would form a relatively moderatenotable addition to the existing baseline view and the magnitude of change is assessed as medium-high. The effect on recreational receptors at this viewpoint would, however, be major / moderate and significant, owing to the medium-high sensitivity.

200 cd Light Intensity

The description of lights visible for 2,000cd also applies to the 200cd reduced intensity scenario. The intensity of the hub lights in the 200cd scenario, allowing for the vertical angle between this viewpoint and the closest hub is calculated to be below 1.3 cd. The effect however differs with a reduced intensity of light experienced that would be a tenth of the maximum 2,000 cd intensity, as shown in the night-time photomontage on Figures 6.29f and 6.29g therefore, reducing the intensity of light experienced. Taking this into account the magnitude of change is assessed as medium-low resulting in a moderate and not significant effect. Despite the reduced intensity, the close proximity of the

turbine lights and the contrast they would present relative to the baseline night sky would mean they would still have a notable effect.

5.2 Viewpoint 5: Holy Hill

Nearest Visible Turbine Light: 3.8 km

5.2.1 Night-Time Baseline Condition and Sensitivity

This viewpoint represents the views of road-users on Holy Hill Road and residents in the dispersed rural settlement across this area. The viewpoint is located a minimum of 3.8 km to the west-north-west of the Development, with the views of east-bound road-users on Holy Hill Road, largely aligned towards the Development. Despite being a narrow rural road, it forms an important east-west link and experiences some busy spells, especially at the beginning and end of the working day. During the winter months, these busy spells fall within the hours of darkness. The orientation of residential properties in this area is variable with few directly aligned towards the Development.

In terms of baseline light levels, the location of this viewpoint in the heart of the rural area means that it is surrounded by dispersed properties and farmsteads. The indoor and occasionally outdoor lighting associated with these rural properties sets a dispersed pattern of low level sources of lighting across the lowland parts of this landscape. In contrast, there is currently no lighting associated with the upland landscape, with the exception of the red light on the tip of the Koram Hill mast that is readily visible across the wider landscape. The other source of lighting evident from this viewpoint, comes from the passing vehicles, which although intermittent, do appear bright and close range from this location.

During the day, views to the east are across a foreground of residential properties dispersed along Holy Hill Road, with a middleground of rolling landform and landcover comprising fields of improved pasture enclosed by trees and hedgerows, and with a background of upland hills and landcover comprising a mix of moorland and commercial forestry. The broader western flank of Owenreagh Hill is exposed in these views from the west and the operational Owenreagh I and II Wind Farms are currently readily visible.

At night, however, individual landscape elements that create different landscape patterns in the view are difficult to discern. The baseline night photography is captured at a time where the distant ridgeline of Owenreagh Hill is just discernible against the skyline, however, the intervening landscape is not readily visible. The lighter colour of the closer range houses and makes them apparent, along with the vertical form of the wooden transmission pole.

During the night the landscape has a diminished scenic quality and receptors would not have the same appreciation of the landscape which is dark and muted compared with the landscape scenery evident during the day and particularly in muted contrast to the closer context of lighting within the settlement itself. Taking these factors into account, the night-time sensitivity of this location is considered to be medium.

5.2.2 Night-Time Assessment

2,000 cd Light Intensity

Seven of the 14 turbines would be lit with hub aviation lighting and of these, six would be visible from this location. The intensity of the hub lights in the 2,000cd scenario, allowing for the vertical angle between this viewpoint and the closest hub is calculated to be between 750 and 75 cd.

The hub aviation lights would be seen close to the upland horizon with lights set either on or just above the ridgeline as shown in the night-time photomontage on Figures 6.30g. This would reduce their prominence as they would be seen more closely associated with the land rather than extending into the wider night sky. While they would introduce lighting into an upland area where there is currently little evidence of lighting other than the mast lights, they would also be seen in the same

sector of the view where low level lighting associated with residential properties is evident and, in a location, where intermittent light sources associated with passing cars is also evident. The vertical angle in which the lights are experienced would reduce their potential intensity and therefore potential effect. Taking this into account, it is considered that these lights would form a relatively moderate addition to the existing baseline view and the magnitude of change is assessed as medium-low. The effect on road-users and residential receptors represented by this viewpoint is considered to be moderate and not significant.

200 cd Light Intensity

The description of lights visible for 2,000cd also applies to the 200cd reduced intensity scenario. The intensity of the hub lights in the 200cd scenario, allowing for the vertical angle between this viewpoint and the closest hub is calculated to be between 75 and 7.5 cd. The effect however differs therefore, with a reduced intensity of light experienced that would be a tenth of the maximum 2,000 cd intensity, as shown in the night-time photomontage on Figure 6.30f reducing the intensity of light experienced. Taking this into account the magnitude of change is assessed as medium-low resulting in a moderate / minor and not significant effect.

5.3 Viewpoint 22: Aghafad Road

Nearest Visible Turbine Light: 5.8km

5.3.1 Night-Time Baseline Condition and Sensitivity

This viewpoint represents views from Aghafad Road which extends north-east from the B48 at Ballynamallaght. The road ascends the hillside from the valley into the upland area and while there is a cluster of residential properties at Ballynamallaght, there are very few properties along the more elevated section of this Aghafad Road. This viewpoint is therefore largely representative of the views of south-west bound road-users who are largely aligned towards the Development, as well as the few residential receptors in this rural area.

There is very little baseline lighting in this rural area owing to the absence of streetlights and limited number of rural properties. There is also no readily visible artificial lighting in the surrounding upland landscape. This results in a predominantly dark landscape with very few sources of lighting, other than those associated with passing cars on Aghafad Road.

Views during the day are channelled by south-west by the valley landform, towards the upland landscape which forms the background to the view. The valley is characterised by green fields of improved pasture enclosed by shelterbelts of trees and hedgerows. These fields cover the sloping sides and are enclosed by the surrounding ridgelines. The upland landscape appears distinct owing to the more muted brown colour of the moorland land cover. There is very little development in this valley landscape other than dispersed rural properties, evident on account of their light coloured render, and the Owenreagh I and II Wind Farms readily apparent in the upland landscape.

At night, however, individual landscape elements that create these distinctions in the landscape are difficult to discern. The contrast between land and sky on this south-western skyline can be seen beyond dusk as the setting sun maintains a low glow against the skyline for a sustained period. The effect of this is more prolonged in summer months. The overall impression of the immediate night-time context at this location is of a dark upland landscape, and although there are intermittent lights from passing cars and fixed lights from some distant properties, these do not overly diminish the immediate sense of darkness experienced at this location.

The value and visual susceptibility of road-users at this location differs at night when compared to the assessment carried out for daytime conditions. During the night the landscape has a diminished scenic quality and road-users would not have the same appreciation of the landscape which is dark and muted compared with the landscape scenery evident during the day. Taking these factors into account, the night-time sensitivity of this location is considered to be medium.

5.3.2 Night-Time Assessment

2,000 cd Light Intensity

Seven of the 14 turbines would be lit with hub aviation lighting and all seven of these would be visible from this location. The intensity of the hub lights in the 2,000cd scenario, allowing for the vertical angle between this viewpoint and the closest hub is calculated to be between 750 and 75 cd.

The seven turbine lights would form an apparent feature in the night-time views of south-west bound road-users. They would be seen to introduce lighting into a view and an upland landscape where there is currently very little influence from other artificial light sources. The effect of the hub aviation lighting would, however, be moderated by the fact that they would be seen close to the upland horizon with lights set either on, just above or just below the ridgeline. This would reduce their prominence as they would be seen more closely associated with the land rather than extending into the wider night sky. The vertical angle in which the lights are experienced would reduce their potential intensity and, therefore, potential effect.Furthermore, only seven turbine lights would be visible and they would be seen within a contained sector of the wider view. Taking these factors into account, it is considered that these lights would form a relatively moderate addition to the existing baseline view and the magnitude of change is assessed as medium. The effect on road-users and residential receptors represented by this viewpoint is considered to be moderate and not significant.

200 cd Light Intensity

The description of lights visible for 2,000 cd also applies to the 200 cd reduced intensity scenario. The effect however differs with a reduced intensity of light experienced that would be a tenth of the maximum 2,000 cd intensity, as shown in the night-time photomontage on Figure 6.47f. The intensity of the hub lights in the 200 cd scenario, allowing for the vertical angle between this viewpoint and the closest hub is calculated to be between 75 and 7.5 cd. The effect differs therefore, reducing the intensity of light experienced. Taking this into account the magnitude of change is assessed as medium-low resulting in a moderate / minor and not significant effect.

6. CONCLUSION

At night the turbines would not in themselves be conspicuous during times of darkness. Nevertheless, the assessment of night-time effects for the Development has predicted a significant effect for one of the three representative night-time viewpoints, namely at Viewpoint 4: Moor Lough as a result of the 2000 cd and 200 cd scenarios. For the other representative viewpoints, the effect is assessed as not significant.

In considering the effects of the aviation lighting across the wider study area the following factors should be considered. Firstly, the fact that only seven of the 14 turbines will be lit. Secondly, all seven turbine lights would be visible from only three of the 25 viewpoints, while one to two turbine lights would be visible from nine of the 25 viewpoints. This shows that the screening effect of landform would considerably reduce the number of turbine lights visible. Thirdly, that the viewpoints that represent night-time receptors such as residents and road-users, typically have some level of baseline lighting, albeit relatively low owing to the rural location. Als, that the masts in the area already introduce night-time lighting into the upland context. Fourthly, the viewpoints located in the more remote areas where baseline lighting is especially low, such as in the Sperrin AONB, there are very few night-time receptors.

The assessment does, however, indicate that there would be significant night-time effects on close range receptors in more rural parts where baseline lighting is low, for example at Moor Lough. For the same reasons, there would also potentially be significant effects on residents and road-users associated with Napple Road and Ballykeery Road to the east and Silverhill Road to the west. From Koram Road to the south, the screening effect of the landform would ensure only one or two turbine lights would be visible, while from Glenmornan Road to the north, significant effects would arise in the

more open sections not enclosed by tree cover and not influenced by the baseline lighting of settlement.

It should be noted that this assessment has been based on a lighting intensity of 2,000 cd, which would not be experienced owing to the reduction to 200cd that would be implemented during good visibility and the reduction that would occur naturally during poor visibility. It also does not take into account the notable reductions that would occur were directional hub lights implemented, as demonstrated in Table A6.3.2. This assessment, therefore, represents a pronounced worst case scenario.

The duration of the effect of the lights on receptors is likely to be over a relatively short period, more commonly experienced during evening and morning hours of darkness, around dusk and sunrise. The ICAO standard requires the lights to be switched on 30 minutes after sunset, and 30 minutes before sunrise, removing the likelihood of visible lighting during twilight. The visual effects of the Development at night would also be limited by the activity of receptors at night. Receptors that experience views at night are generally limited to residents on the closest edge or elevated parts of settlements, residents of rural properties and road-users. Views from within properties are likely to be restricted by the use of window coverings, particularly in winter. Views from remote uplands and hills, rural farmland and footpaths etc. are visited infrequently at night therefore numbers of receptors affected would be low.

The assessment of night-time effects is also based on clear night time viewing conditions. At dusk and sunrise, it may be possible to identify the formation of the turbines with the lighting switched on, but only in conditions of good and excellent visibility. At sunrise it may also be possible, in views from the west, to see the turbines with lights switched on whilst backlit by the rising sun.

7. REFERENCES

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