ScottishPower Renewables

MachairWind Offshore Windfarm

Appendix 16.1: Seascape, Landscape and Visual Impact Assessment and Visualisation Methodology

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Registered number 2549296
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250 Waterloo Road
London SE1 8RD

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SLVIA Methodology

Introduction

1.1 This Chapter sets out the detailed methodology used for **Chapter 16 Seascape, Landscape and Visual Impact Assessment (SLVIA)** including consideration of cumulative effects.

1.2 Seascape, landscape and visual impact assessments are separate, although linked, processes. SLVIA therefore considers the likely effects of the Project on:

- Seascape/ landscape as a resource in its own right (caused by changes to the constituent elements of the seascape/ landscape, its specific aesthetic or perceptual qualities and the character of the seascape/ landscape); and
- Views and visual amenity as experienced by people (caused by changes in the appearance of the seascape/ landscape).

1.3 SLVIA deals with seascape/ landscape and visual effects separately, followed by an assessment of cumulative seascape/ landscape and visual effects where relevant.

1.4 Where the term 'landscape' is used in this Chapter, it should also be taken to include 'seascape'.

Guidance

1.5 This methodology was developed by Chartered Landscape Architects (Chartered Members of the Landscape Institute (CMLI)) at LUC (Land Use Consultants Ltd), who have extensive experience in the assessment of seascape/ landscape and visual effects arising from wind energy developments and associated onshore infrastructure.

1.6 The methodology was developed primarily in accordance with the principles contained within the Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (GLVIA3)[1]. NatureScot cumulative guidance[2] also informed the approach to the assessment of cumulative seascape/ landscape and visual effects. A full list of legislation, policy and guidance of reference to the SLVIA is contained within **Chapter 16 SLVIA,** Table 16.1.

Scope of Assessment

1.7 All potentially significant seascape/ landscape and visual effects (including cumulative effects) were examined, including those relating to construction, operation and, where relevant, decommissioning.

1.8 Where it is judged that significant effects are unlikely to occur, the assessment of likely effects on some receptors may be 'scoped out'. This was agreed at scoping stage as set out in the Environmental Impact Assessment (EIA) Scoping Report and EIA Scoping Opinion. The effects scoped in and scoped out are presented in **Chapter 16 SLVIA**.

Assessment Methodology

Study Area

1.9 The Study Area for an SLVIA is determined by the nature and scale of the development proposed and the nature of the SLVIA Study Area. The extent of the Study Area was agreed through consultation with statutory consultees (Argyll and Bute Council and NatureScot). The SLVIA Study Area is a 60 km radius from the Windfarm Development Area (WDA). For effects on landscape receptors the Study Area is 40 km. The

[1] The Landscape Institute and Institute of Environmental Management and Assessment (2013) Guidelines for Landscape and Visual Impact Assessment, 3rd Edition, Routledge
[2] NatureScot (2021) Guidance: assessing the cumulative landscape and visual impact of onshore wind energy developments

SLVIA Study Area was agreed through the EIA Scoping Report and EIA Scoping Opinion, meetings held at pre-scoping stage and Expert Topic Group (ETG) meetings, as set out in **Chapter 16 SLVIA,** Table 16.2.

Methodological Overview

1.10 The key steps in the methodology for assessing seascape/ landscape and visual effects are as follows:

- The seascape/ landscape of the SLVIA Study Area is analysed, and seascape/ landscape receptors identified, informed by desk and field-survey;
- The area over which the Project would potentially be visible is established through the creation of an initial zone of theoretical visibility (ZTV) plan[3];
- The visual baseline is recorded in terms of the different receptors (groups of people) who may experience views of the Project (informed by the initial ZTV) and the nature of their existing views and visual amenity;
- Potential assessment viewpoints are selected, as advocated by GLVIA3 to represent a range of different receptors and views, in consultation with statutory consultees:
  - "*Representative viewpoints, selected to represent the experience of different types of visual receptor, where larger numbers of viewpoints cannot all be included individually and where the significant effects are unlikely to differ – for example, certain points may be chosen to represent the views of users of particular public footpaths and bridleways;*
  - *Specific viewpoints, chosen because they are key and sometimes promoted viewpoints within the landscape, including for example specific local visitor attractions, viewpoints in areas of particularly noteworthy visual and/or recreational amenity such as landscapes with statutory landscape designations, or viewpoints with particular cultural landscape associations; and*
  - *Illustrative viewpoints, chosen specifically to demonstrate a particular effect or specific issues, which might, for example, be the restricted visibility at certain locations.*" (GLVIA3, Para 6.19, Page 109).
- Likely significant effects on both the seascape/ landscape as a resource and visual receptors are identified; and
- The level (and significance) of seascape/ landscape and visual effects are judged with reference to the sensitivity of the receptor, which considers both susceptibility and value, and the magnitude of change, which considers a combination of judgements including scale, geographical extent, duration and reversibility.

Direction of Effects

1.11 As required by The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 ('the EIA Regulations') the assessment must identify the direction of effect as either being beneficial, adverse (also referred to as positive or negative) or neutral.

1.12 The direction of seascape/ landscape, visual effects (including cumulative effects) is determined in relation to the degree to which the proposal fits with the existing seascape/ landscape character or views, and the contribution to the seascape/ landscape or views that the Project makes, even if it is in contrast to the existing character of the seascape/ landscape or views.

1.13 With regard to wind energy development and its associated onshore infrastructure, whilst there is a broad spectrum of response from the strongly positive to the strongly negative, an assessment is required to take an objective approach. Therefore, on a precautionary basis, likely seascape/ landscape and visual effects (including cumulative effects) are generally assumed to be adverse (negative) unless stated otherwise.

[3] A bare ground ZTV indicates areas from where a development is theoretically visible, but does not account for screening from vegetation and/or buildings.

Method for Assessing Seascape/ Landscape Effects

1.14 As outlined in GLVIA3 "*An assessment of landscape effects deals with the effects of change and development on landscape as a resource*" (GLVIA3, Para 5.1, Page 70). Changes may affect the elements that make up the seascape/ landscape, the aesthetic and perceptual aspects of the seascape/ landscape and its distinctive character.

1.15 An assessment of seascape/ landscape effects requires consideration of the nature of seascape/ landscape receptors (sensitivity of the receptor) and the magnitude of impact (or magnitude of change). GLVIA3 states that the nature of seascape/ landscape receptors, commonly referred to as their sensitivity, should be assessed in terms of the susceptibility of the receptor to the type of change proposed, and the value attached to the receptor. The nature of the effect on each seascape/ landscape receptor, referred to as the magnitude of impact, should be assessed in terms of scale, geographical extent, duration and reversibility.

1.16 Sensitivity and magnitude of impact are considered together, to form a judgement regarding the overall significance of seascape/ landscape effects (GLVIA3, Figure 5.1 Page 71). The following sections set out the methodology used to evaluate sensitivity and magnitude.

Sensitivity of Seascape/ Landscape Receptors

1.17 The sensitivity of a landscape receptor to change is assessed in terms of the susceptibility of the receptor to the type of change proposed, and the value attached to the receptor. Criteria for making these judgements are set out below.

1.18 Landscape and seascape receptors examined in this SLVIA are:

- Landscape Character Types (LCT) defined by NatureScot, as described in **Chapter 16 SLVIA**; and
- Coastal Character Areas (CCA) defined for the purposes of this SLVIA, which are described in **Appendix 16.3 Coastal Character Baseline Assessment**.

1.19 Effects on National Scenic Area designations are considered separately in **Appendix 16.2 Assessment of Effects on Special Landscape Qualities**.

Susceptibility of Seascape/ Landscape Receptors

1.20 Susceptibility is defined by GLVIA3 as "*the ability of the landscape receptor (whether it be the overall character or quality/condition of a particular type or area, or an individual element and/or feature, or a particular aesthetic and perceptual aspect) to accommodate the proposed development without undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies*" (GLVIA3 paragraph 5.40).

1.21 A series of criteria are used to evaluate the susceptibility of landscape receptors. These are derived from NatureScot guidance and have been developed based on LUC's experience of undertaking LVIAs for wind energy developments.

Table 1.1 Seascape/ Landscape Susceptibility Criteria

	Aspects Indicating Reduced Susceptibility	↔	Aspects Indicating Greater Susceptibility
Scale	Larger scale	↔	Smaller scale
Landscape terrain	Absence of strong topographical variety, featureless, convex or flat	↔	Presence of strong topographical variety or distinctive landform features

	Aspects Indicating Reduced Susceptibility	↔	Aspects Indicating Greater Susceptibility
Seascape/ landscape pattern and complexity	Simple Regular or uniform	↔	Complex Rugged and irregular
Settlement and man-made influence	Presence of extensive settlement and/or contemporary structures e.g. utility, infrastructure or industrial elements	↔	Absence of modern development; presence of small scale, historic or vernacular settlement
Skylines	Non-prominent/ screened skylines; presence of existing modern man-made features	↔	Distinctive, undeveloped skylines; skylines that are highly visible over large areas; skylines with important historic landmarks
Inter-visibility with adjacent seascape/ landscapes	Little inter-visibility with adjacent sensitive landscape or viewpoints	↔	Strong inter-visibility with sensitive landscape; forms an important part of view from sensitive viewpoints
Perceptual aspects	Close to visible or audible signs of human activity and development; weak sense of place or local distinctiveness	↔	Remote from visible or audible signs of human activity and development; strong sense of place or local distinctiveness

1.22 Published seascape/ landscape capacity or sensitivity studies (where they exist) may be reviewed to inform the evaluation of susceptibility, in addition to fieldwork undertaken across the SLVIA Study Area. This review includes an evaluation as to the relevance of the publication to the assessment being undertaken (e.g. consideration of the purpose and scope of the published studies and whether they have become out of date).

1.23 Seascape/ landscape susceptibility is described as being **high**, **medium** or **low**.

Value of Seascape/ Landscape Receptors

1.24 The European Landscape Convention advocates that all landscape is of value, whether it is the subject of defined landscape designation or not: "*The landscape is important as a component of the environment and of people's surroundings in both town and country and whether it is ordinary landscape or outstanding landscape*" (Explanatory Report to the European Landscape Convention, Page 6). The value of a seascape/ landscape receptor to society is recognised as being a key contributing factor to the sensitivity of seascape/ landscape receptors.

1.25 The value of seascape/ landscape receptors is determined with reference to:

- Review of relevant designations and the level of policy importance that they signify (such as landscapes designated at international, national or local level); and/or
- Application of criteria that indicate value (such as scenic quality, rarity, recreational value, representativeness, conservation interests, perceptual aspects and artistic associations) as described in GLVIA3, paragraphs 5.44-5.47.

1.26 Internationally and nationally designated landscapes would generally indicate landscape of higher value whereas those without formal designation, and which may be a widespread or common landscape type without high scenic quality, are likely to be of lower value, bearing in mind that all seascape/ landscapes are valued at some level. There is variation across both designated and undesignated areas, and so judgements regarding value are also informed by fieldwork.

1.27 Seascape/ landscape value is described as being **high**, **medium** or **low**.

Combining Susceptibility and Value

1.28 The sensitivity of a seascape/ landscape receptor to change is based on weighing up professional judgements regarding susceptibility and value, as set out in the table below.

Table 1.2 Sensitivity of Seascape/ Landscape Receptors

	Higher		Lower
Susceptibility	Attributes that make up the character of the seascape/ landscape offer very limited opportunities for the accommodation of change without key characteristics being fundamentally altered by development of the type proposed, leading to a different seascape/ landscape character.	↔	Attributes that make up the character of the seascape/ landscape are resilient to being changed by development of the type proposed.
Value	Landscapes with high scenic quality, high conservation interest, recreational value, important cultural associations or a high degree of rarity. Areas or features designated at a national level e.g. National Parks or National Scenic Areas or key features of these with national policy level protection.	↔	Landscape of poor condition and intactness, limited aesthetic qualities, or of character that is widespread. Areas or features that are not formally designated.

1.29 There may be a complex relationship between the value attached to a seascape/ landscape and the susceptibility of the seascape/ landscape to a specific change. Therefore, the rationale for judgements on the sensitivity of seascape/ landscape receptors needs to be clearly set out for each receptor. Further information on the criteria is provided below. It should be noted that whilst landscape designations at an international or national level are likely to be accorded the highest value, it does not necessarily follow that such landscapes all have a high susceptibility to all types of change, and conversely, undesignated landscapes may also have high value and susceptibility to change (GLVIA3, Page 90).

1.30 The sensitivity of a seascape/ landscape receptor to change is defined as **high**, **medium** or **low** as set out in the table below.

Table 1.3 Sensitivity of Seascape/ Landscape Receptors: Definitions

Sensitivity	Definition
High	Landscapes which by nature of their character would be less able to accommodate development without change in character, due to their relatively higher susceptibility to the type of change proposed, and/or the higher value placed upon them by society.
Medium	Landscapes which by nature of their character would be able to accommodate development, subject to careful siting and design, due to their more moderate susceptibility to the type of change proposed, and/or relatively moderate value placed upon them by society.
Low	Landscapes which by nature of their character would be more able to accommodate development without substantive change in character, due to their

Sensitivity	Definition
	relatively lower susceptibility to the type of change proposed, and/or lower value placed upon them by society.

Magnitude of Seascape/ Landscape Impact

1.31 The judgement of magnitude of seascape/ landscape impact is based on combining professional judgements on scale, geographical extent, duration and reversibility. Further information on the criteria used to make these judgements is provided below.

Scale of Change

1.32 For seascape/ landscape elements/features this depends on the extent of existing seascape/ landscape elements that would be lost or changed, the proportion of the total extent that this represents, and the contribution of that element to the character of the seascape/ landscape.

1.33 In terms of seascape/ landscape character, this reflects the degree to which the character of the seascape/ landscape would change because of removal or addition of seascape/ landscape components, and how the changes would affect key characteristics.

1.34 The scale of the change is described as being **large**, **medium**, **small**, or **imperceptible**.

Geographical Extent

1.35 The geographical extent over which the seascape/ landscape effect would arise is described as being **large** (scale of the seascape/ landscape character type, or widespread), **medium** (more immediate surroundings) or **small** (localised or site level).

Duration

1.36 GLVIA3 states that "*Duration can usually be simply judged on a scale such as short term, medium term or long term*" (GLVIA3, Page 91). For the purposes of the assessment, duration is often determined in relation to the phases of the Project, as follows:

- **Short-term** effects are those that occur during construction, and may extend into the early part of the operational phase, e.g. construction activities, generally lasting 0-5 years;
- **Medium-term** effects are those that occur during part of the operational phase, generally lasting 5-10 years; and
- **Long-term** effects are those which occur throughout the operational phase (in this instance 35 years), e.g. presence of turbines/ onshore infrastructure, or are permanent effects which continue after the operational phase, generally lasting over 10 years.

Reversibility

1.37 In accordance with the principles contained within GLVIA3, reversibility is reported as **reversible**, **partially reversible** or **irreversible** (i.e. permanent), and is related to whether the change could be reversed at the end of the phase of development under consideration (i.e. at the end of construction or at the end of the operational lifespan of the Project). The effects associated with the WDA are considered reversible as the turbines and offshore substation platforms would be removed at the end of the operational phase.

Combining the Judgements

1.38 Overall judgements on the magnitude of landscape impact are guided by the table below. Scale of change is generally the dominant factor in assessing magnitude of impact, though other factors may have more or less influence depending on the situation.

Table 1.4 Magnitude of Seascape/ Landscape Impact

Factor	Higher magnitude		Lower magnitude
Scale	Extensive loss of seascape/ landscape features and/or elements, and/or change in, or loss of key seascape/ landscape characteristics, and/or creation of new key seascape/ landscape characteristics	↔	Limited loss of seascape/ landscape features and/or elements, and/or change in or loss of some secondary seascape/ landscape characteristics
Geographical Extent	Change in seascape/ landscape features and/or character extending considerably beyond the immediate WDA and widespread across the seascape/ landscape character type/area	↔	Change in seascape/ landscape features and/or character contained within or local to the immediate WDA and affecting only a small part of the seascape/ landscape character type/area
Duration	Changes experienced for a period of around 10 years or more	↔	Changes experienced for a shorter period of up to 5 years
Reversibility	Change to features, elements or character which cannot be undone or are only partly reversible after a long period	↔	A temporary seascape/ landscape change which is largely reversible following the completion of construction, or decommissioning of the Project

1.39 Judgements on the magnitude of seascape/ landscape impact are recorded as **high**, **medium**, **low** or **negligible** as defined in the table below.

Table 1.5 Magnitude of Seascape/ Landscape Impact: Definitions

Magnitude	Definition
High	A clearly evident and frequent/continuous change in landscape features and characteristics affecting an extensive area (relative to the SLVIA Study Area), or the characteristics, and/or notable widespread alteration to the special or key qualities of designated areas.
Medium	A moderate change in landscape features and character, frequent or continuous, and over a wide area, or a clearly evident change either over a restricted area, and/or with some alteration to the special or key qualities of designated areas.
Low	A small change in landscape features and character over a wide area or a moderate change over a more restricted area, and/or barely altering the special or key qualities of designated areas.
Negligible	An imperceptible, barely or rarely perceptible change in landscape features and character, and/or not altering the special or key qualities of designated areas.

Judging Levels of Seascape/ Landscape Effect and Significance

1.40 The final step in the assessment requires the judgements of sensitivity and magnitude of impact to be combined to make an informed professional assessment on the significance of each seascape/ landscape effect (GLVIA3, Figure 5.1, Page 71).

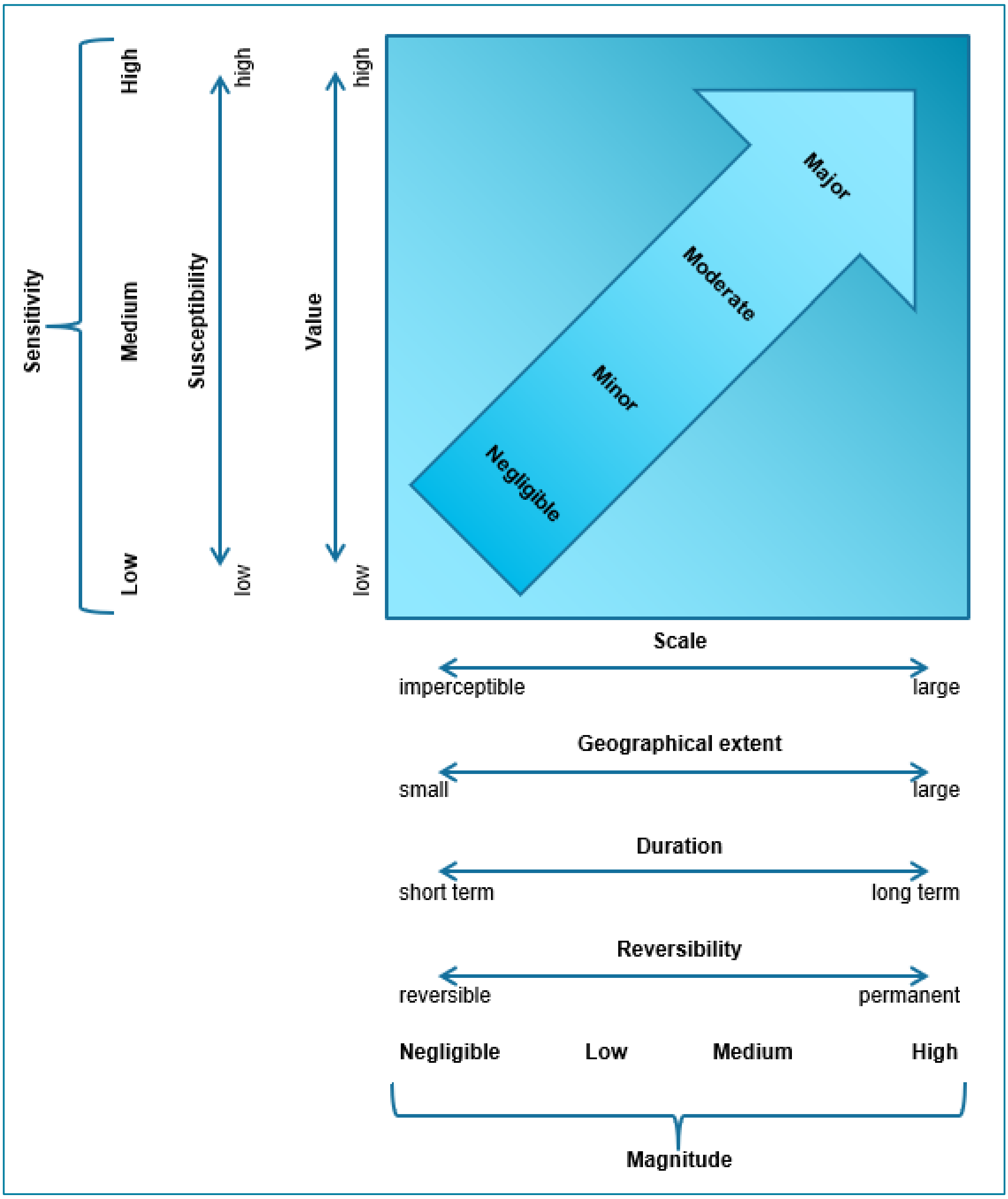
1.41 Although a numerical or formal weighting system is not applied, consideration of the relative importance of each aspect is made to feed into the overall decision. This determination requires the application of professional judgement and experience to take on board the many different variables which need to be considered, and which are given different weight according to site-specific and location-specific considerations in every instance. Judgements are made on a case-by-case basis, guided by the principles set out in **Plate 1.1** below. A rigid matrix-type approach, which does not take on board professional judgement and experience, and where the level of effect is defined simply based on the level of sensitivity (nature of receptor) combined with the magnitude of impact (magnitude of change), is not used. As such, the conclusion on the level of effect is not always the same.

1.42 Levels of effect are identified as **negligible**, **minor**, **moderate** or **major**. As noted in paragraph 1.13, effects are assumed to be adverse unless stated otherwise. Moderate and major effects are considered significant in the context of the EIA Regulations. Effects which are below moderate, i.e. minor or negligible, are considered not significant. Definitions of significance levels are provided in the table below.

Table 1.6 Levels of Effect Significance

Level	Definition
Major	The Project would result in an obvious change in baseline characteristics, likely affecting a receptor with a medium or high susceptibility to that type of change, and/or which is highly valued at a national level. The effect is likely to be long term and affect a relatively large area.
Moderate	The Project would result in a noticeable change in baseline characteristics, likely affecting a receptor with a medium sensitivity to that type of change. This level of effect may also occur when a smaller scale of effect acts on a higher-sensitivity receptor, or when a large scale of effect occurs over a relatively short period or over a small area.
Minor	The Project would result in a small change in baseline characteristics over a long term, or a larger scale of effect of short duration or confined to the WDA.
Negligible	The Project would not result in a noticeable change in baseline characteristics.

Plate 1.1 Judging Levels of Effect – Seascape/ Landscape or Visual (including cumulative)



Method for Assessing Visual Effects

1.43 As outlined in GLVIA3 "*An assessment of visual effects deals with the effects of change and development on views available to people and their visual amenity*" (GLVIA3, Para 6.1, Page 98). Changes in views may be experienced by people at different locations across the SLVIA Study Area including from static locations (normally assessed using representative viewpoints) and whilst moving through the landscape (normally referred to as sequential views, e.g. from roads and walking routes or offshore on boats).

1.44 Visual receptors are individuals or groups of people who may be affected by changes in views and visual amenity. They are usually grouped by their occupation or activity (e.g. residents, motorists, recreational users) and the extent to which their attention is focused on the view (GLVIA3, Paras. 6.31-6.32, Page 113).

1.45 GLVIA3 states that the sensitivity of visual receptors should be assessed in terms of the susceptibility of the receptor to change in views and/or visual amenity and the value attached to particular views. The magnitude of impact should be assessed in terms of the scale, geographical extent, duration and reversibility of the effect.

1.46 Sensitivity and magnitude of impact are considered together, to form a judgement regarding the overall significance of visual effect (GLVIA3, Figure 6.1, Page 99). The following sections set out the methodology used to evaluate sensitivity and magnitude.

Sensitivity of Visual Receptors

1.47 The sensitivity of a visual receptor to change is assessed in terms of the susceptibility of the receptor to the type of change proposed, and the value attached to the view. Criteria for making these judgements are set out below.

Susceptibility of Visual Receptors

1.48 The susceptibility of visual receptors to changes in views/visual amenity is a function of the occupation or activity of people experiencing the view and the extent to which their attention is focused on views (GLVIA 3, para 6.32). This is recorded as **high**, **medium** or **low** informed by the table below.

Table 1.7 Susceptibility of Visual Receptors

High	Medium	Low
Viewers whose attention or interest is focussed on their surroundings, including: ■ Communities where views contribute to the landscape setting enjoyed by residents. ■ Visitors to heritage assets or other attractions/ landscape features where views of surrounding are a very important contributor to experience. ■ Visitors to formal or promoted stopping places, or on recognised scenic recreational routes.	■ People engaged in outdoor recreation (for example users of rights of way and trails whose interest is likely to be focused on the landscape). ■ People travelling on scenic routes and tourist routes, where attention is focused on the surrounding landscape.	■ People travelling more rapidly on major road, rail or transport routes (not recognised as scenic routes). ■ People travelling on local road routes, where attention may be focused on the surrounding landscape, but is transitory. ■ People engaged in outdoor sport or recreation which does not involve or depend upon appreciation of views of the landscape. ■ People at their place of work whose attention is not on their surroundings (and where setting is not important to the quality of working life).

Value of View or Visual Amenity

1.49 GLVIA3 also requires evaluation of the value attached by society to the view or visual amenity and relates this to planning designations and cultural associations (GLVIA3, Para. 6.37, Page 114).

1.50 Recognition of the value of a view is determined with reference to:

- Planning designations specific to views;
- Whether it is recorded as important in relation to designated landscapes (such as views specifically mentioned in the special qualities of a National Park or National Scenic Area);

- Whether it is recorded as important in relation to heritage assets (such as designed views recorded in citations of Gardens and Designed Landscapes (GDL) or views recorded as of importance in Conservation Area Appraisals); and
- The value attached to views by visitors, for example through appearances in guidebooks or on tourist maps, provision of facilities for their enjoyment and references to them in literature and art.

1.51 A designated viewpoint or scenic route advertised on maps and in tourist information, or which is a significant destination in its own right, is likely to indicate a view of higher value. High value views may also be recognised in relation to the special qualities of a designated landscape or heritage asset, or it may be a view familiar from photographs or paintings.

1.52 Views experienced from viewpoints or routes not recognised formally or advertised in tourist information, or which are not provided with interpretation, or, in some cases, formal access are likely to be of lower value.

1.53 Judgements on the value of views or visual amenity are recorded as **high**, **medium** or **low**.

Combining Susceptibility and Value

1.54 The sensitivity of a visual receptor to change is based on weighing up professional judgements regarding susceptibility and value, and each of their component considerations, as set out in the table below.

Table 1.8 Sensitivity of Visual Receptors

	Higher		Lower
Susceptibility	Viewers whose attention or interest is focused on their surroundings, including communities/individual residential receptors/people engaged in outdoor recreation/ visitors to heritage assets or other attractions where views of surrounding area are an important contributor.	↔	People whose attention is not on their surroundings (and where setting is not important to the quality of working life) such as commuters/people engaged in outdoor sports/people at their place of work.
Value	Views may be recorded in management plans, guidebooks, and/or which are likely to be experienced by large numbers of people.	↔	Views which are not documented or protected.

1.55 The sensitivity of visual receptors may involve a complex relationship between a visual receptor's (e.g. person's) susceptibility to change, and the value attached to a view. Therefore, the rationale for judgements of sensitivity is clearly set out for each receptor in relation to both its susceptibility (to the type of change proposed) and its value. Further information on the criteria is provided below.

1.56 The sensitivity of a visual receptor to change is defined as **high**, **medium** or **low** as set out in the table below.

Table 1.9 Sensitivity of Visual Receptors: Definitions

Sensitivity	Definition
High	Larger numbers of viewers and/or those with proprietary interest and prolonged viewing opportunities such as residents and users of attractive and well-used

Sensitivity	Definition
	recreational facilities. The quality of the existing view, as likely to be perceived by the viewer, is considered to be high.
Medium	Small numbers of residents or moderate numbers of recreational viewers, with an interest in their environment. Larger numbers of recreational road users. The quality of the existing view, as likely to be perceived by the viewer, is considered to be medium.
Low	Small numbers of recreational viewers with interest in their surroundings. Viewers with a passing interest not specifically focussed on the landscape e.g. workers, commuters. The quality of the existing view, as likely to be perceived by the viewer, is considered to be low.

Magnitude of Visual Impact

1.57 The overall judgement of magnitude of visual change is based on weighing up professional judgements on scale, geographical extent, duration and reversibility. Further information on the criteria is provided below.

Scale of Change

1.58 The scale of a visual change depends on:

- 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, including the proportion of the view occupied by the Project;
- The degree of contrast or integration of any new features or changes in the landscape with the existing or remaining landscape elements and characteristics in terms of form, scale and mass, line, height, colour and texture; and
- The nature of the view of the Project, in terms of the relative amount of time over which it would be experienced and whether views would be full, partial or glimpses.

1.59 Note that wireframes and ZTVs prepared to illustrate potential visual effects are calculated on the basis of bare ground and therefore demonstrate the maximum extent of visibility possible, in the absence of buildings or vegetation. Where woodland is present, consideration is given to seasonal changes and if levels of screening are likely to change notably.

1.60 In this assessment scale of visual change is described as being **large**, **medium**, **small** or **barely perceptible**.

Geographical Extent

1.61 The geographical extent of a visual change records the extent of the area over which the changes would be visible e.g. whether this is a unique viewpoint from where the Project could be glimpsed, or whether it represents a large area from which similar views are gained. Geographical extent is described as being **large**, **medium** or **small**.

Duration

1.62 The duration of visual effects is reported as **short-term**, **medium-term** or **long-term**, as defined for the duration of landscape effects (see paragraph 1.36 above).

Reversibility

1.63 Reversibility is reported as **irreversible** (i.e. permanent), **partially reversible** or **reversible**, and is related to whether the visual change could be reversed at the end of the phase of development under consideration (i.e. at the end of construction or at the end of the operational lifespan of the Project). The operational visual effects of the WDA are considered to be reversible as the decommissioning phase would remove turbines and offshore substation platforms at the end of the operational phase.

Combining the judgements

1.64 The judgement of magnitude of visual impact is based on weighing up professional judgements on scale, geographical extent, duration and reversibility, as set out in the table below. Scale of change is generally the dominant factor in assessing magnitude of impact, though other factors may have more or less influence depending on the situation.

Table 1.10 Magnitude of Visual Impacts

Factor	Higher magnitude		Lower magnitude
Scale	A large visual change resulting from the Project is the most notable aspect of the view, perhaps because of the Project being in close proximity, or because a substantial part of the view is affected, or because the Project introduces a new focal point and/or provides contrast with the existing view and/or changes the scenic qualities of the view.	↔	A small or some visual change resulting from the Project as a minor or generally unnoticed aspect of the view, perhaps because of the Project being in the distance, or because only a small part of the view is affected, and/or because the Project does not introduce a new focal point or is in contrast with the existing view and/ does not change the scenic qualities of the view.
Geographical Extent	The assessment location is clearly representative of similar visual effects over an extensive geographic area.	↔	The assessment location clearly represents a small geographic area.
Duration	Visual change experienced over around 10 years or more.	↔	Visual change experienced over a short period of up to 5 years.
Reversibility	A permanent visual change which is not reversible or only partially reversible following decommissioning of the Project.	↔	A temporary visual change which is largely reversible following the completion of construction, or decommissioning, of the Project.

1.65 Judgements on the magnitude of visual impact are recorded as **high**, **medium**, **low** or **negligible** as defined in the table below.

Table 1.11 Magnitude of Visual Impact: Definitions

Sensitivity	Definition
High	Large change in view, perhaps where the Project is in close proximity in a direct line of vision, or affecting a substantial part of the view, or providing contrast with the existing view.
Medium	Clearly perceptible change in view, perhaps where the Project is relatively close but at an oblique angle or further away in the direct line of vision, creating a distinct new element in the view.

Sensitivity	Definition
Low	Small change in view, perhaps where the Project is at a distance or oblique angle, or where the scale of the landscape absorbs the Project well.
Negligible	Change in view which is barely perceptible.

Judging the Level of Visual Effect and Significance

1.66 As for landscape effects, the final step in the assessment requires the judgements of sensitivity of visual receptor and magnitude of visual impact to be combined to make an informed professional assessment on the significance of each visual effect.

1.67 Although a numerical or formal weighting system is not applied, consideration of the relative importance of each aspect is made to feed into the overall decision. This determination requires the application of professional judgement and experience to take on board the many different variables which need to be considered, and which are given different weight according to site-specific and location-specific considerations in every instance. As such, the conclusion on the level of effect is not always the same. Judgements are made on a case-by-case basis, guided by the same principles as set out in **Plate 1.1** above.

1.68 Levels of effect are identified as **negligible**, **minor**, **moderate** or **major**. As noted in paragraph 1.13, effects are assumed to be adverse unless stated otherwise. Moderate and major effects are considered significant in the context of the EIA Regulations. Effects which are below moderate, i.e. minor or negligible, are considered not significant. Definitions of significance levels are provided in **Table 1.6** above.

Assessment of Cumulative Effects

1.69 The purpose of cumulative assessment 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.*"[4]

1.70 The cumulative assessment therefore focuses on the additional cumulative change which may result from the introduction of the Project (i.e. in addition to other development which may or may not be present).

1.71 GLVIA3 also makes reference to 'combined cumulative effects', i.e. an assessment which considers the effects if all current, past and future proposals are deemed present, including the Project. These are sometimes referred to as 'total' cumulative effects. GLVIA3 (paragraph 7.13) acknowledges that "*assessing combined effects involving a range of different proposals at different stages in the planning process can be very complex*". Therefore, this type of cumulative effect is only described where it is considered likely to be a relevant consideration in the determination of the Project. GLVIA3 Clarifications[5] further notes that "*Typically, a 'combined' cumulative assessment would consider the addition of all unbuilt schemes, including the proposed development, to the existing baseline (rather than the combined effect of all past, present, and future schemes against a 'bare landscape').*"

Cumulative Baseline and Scope

1.72 Cumulative assessment for windfarm proposals focuses on potential interactions with other existing and proposed windfarms. It may also consider the potential interactions between different types of development (e.g. transmission infrastructure, other energy generation stations or other built development) if these are likely to result in significant cumulative landscape and visual impacts.

[4] NatureScot (2021) Guidance: assessing the cumulative landscape and visual impact of onshore wind energy developments
[5] Landscape Institute (2024) Notes and Clarifications on aspects of the 3rd Edition Guidelines on Landscape and Visual Impact Assessment (GLVIA3). LITGN-2024-01.

1.73 The baseline for the SLVIA is the current landscape at the time of writing the assessment. This is referred to as the 'primary assessment'. At the time of undertaking the assessment, no relevant operational or under construction developments were identified within the SLVIA Study Area.

1.74 To consider potential future cumulative effects, it is also necessary to assess the effects of the addition of the Project into a speculative future landscape / seascape baseline. This includes windfarm proposals that are consented but not yet built, and/or undetermined planning applications.

1.75 Windfarms at scoping stage have less certainty attached, and limited information may be available about these proposals. They are not generally included unless there is a high likelihood of significant cumulative effects, or at the specific request of statutory consultees.

1.76 For the purposes of this project, three tiers of project certainty have been identified. These are described in **Appendix 5.1 Cumulative Effects Assessment Methodology** and set out in the table below.

Table 1.12 Cumulative Development Status

Tier	Definition
Tier 1	Projects which are operational (but not part of the baseline), under construction, those with consent and submitted but not yet determined
Tier 2	All plans/projects assessed under Tier 1, plus those projects with a Scoping Report and/or Scoping Opinion
Tier 3	All plans/projects assessed under Tier 1 and Tier 2, plus those projects likely to come forward where a Crown Estate Scotland (CES) Option to Lease Agreement or equivalent has been granted (i.e. ScotWind and INTOG projects)

1.77 No relevant Tier 1 or Tier 2 developments have been identified, and only a small number of relevant Tier 3 developments (see Section 16.8.2 in **Chapter 16 SLVIA**). Therefore, all future developments are considered together as a single cumulative scenario. These projects are considered in the cumulative assessment insofar as there is sufficient published information to allow an informed assessment.

1.78 A cut-off date of six months prior to application submission was applied for the inclusion of developments within the cumulative assessment.

Types of Cumulative Effects

1.79 The NatureScot cumulative guidance[6] states that "*Cumulative landscape impacts can change either the physical fabric or character of the landscape, or any special values attached to it. For example:*

- *Cumulative impacts on the physical fabric of the landscape arise when two or more developments affect landscape components such as woodland, dykes, rural roads or hedgerows. Although this may not significantly affect the landscape character, the cumulative effect on these components may be significant – for example, where the last remnants of former shelterbelts are completely removed by two or more developments.*
- *Cumulative impacts on landscape character arise when two or more developments introduce new features into the landscape. In this way, they can change the landscape character to such an extent that they create a different landscape character type*."

1.80 Three types of cumulative effects on visual amenity are considered in the assessment: combined, successive and sequential:

- **Combined effects** occur where a static viewer is able to view two or more windfarms from a viewpoint within the viewers' same arc of vision (assumed to be about 90 degrees for the purpose of the assessment);

[6] NatureScot (2021) Guidance: assessing the cumulative landscape and visual impact of onshore wind energy developments

- **Successive effects** occur where a static viewer is able to view two or more windfarms from a viewpoint, but needs to turn to see them; and
- **Sequential effects** occur when a viewer is moving through the landscape from one area to another, for instance when a person is travelling along a road or footpath and is able to see two or more windfarms at the same, or at different times as they pass along the route. Frequently, sequential effects occur where windfarms appear regularly, with short time lapses between points of visibility. Occasionally sequential effects occur where long periods of time lapse between views of windfarms, depending on speed of travel and distance between viewpoints.

Assessment of Cumulative Effects

1.81 For each of the baseline scenarios (primary assessment and cumulative assessment) a separate assessment of effects is made. The approach does not assess the 'difference' between scenarios but treats each as a separate potential situation. It is important to note that in practice only one situation would arise at any one time, so effects as set out should be interpreted as an either/or situation and should not be double counted. In each case the assessment reports on the additional effects of the Project against the cumulative baseline scenario.

1.82 Cumulative effects are assessed in accordance with the methodology presented in the preceding sections and guided by the principles set out in **Plate 1.1**. Where the potential for cumulative effects needs to be determined, the following additional factors are considered as part of the scale of effect:

- The pattern and arrangement of windfarms in the landscape / seascape or view, e.g. developments seen in one direction or part of the view (combined views), or seen in different directions (successive views in which the viewer must turn) or developments seen sequentially along a route;
- The relationship between the scale of the windfarms, including turbine size and number, and if windfarms appear balanced in views in terms of their composition, or at odds with one another;
- The position of the windfarms in the landscape, e.g. in similar landscape or topographical context;
- The position of the windfarms in the view, e.g. on the skyline or against the backdrop of land; or how the Project would be seen in association with another development (separate, together, behind etc.); and
- The distances between windfarms, and their distances from the viewer.

1.83 More significant cumulative landscape effects are likely where:

- The Project extends or intensifies a landscape / seascape effect;
- The Project 'fills' an area such that it alters the landscape / seascape resource; and / or
- The interaction between the Project and other windfarms means that the total effect on the landscape is greater than the sum of its parts.

1.84 GLVIA 3 states "*The most significant cumulative landscape effects are likely to be those that would give rise to changes in the landscape character of the study area of such an extent as to have major effects on its key characteristics and even, in some cases, to transform it into a different landscape type. This may be the case where the project being considered itself tips the balance through its additional effects. The emphasis must always remain on the main project being assessed and how or whether it adds to or combines with the others being considered to create a significant cumulative effect*" (GLVIA 3, Para 7.28). More significant cumulative visual effects are likely where:

- The Project extends or intensifies a visual effect;
- The Project 'fills' an area such that it alters the view/ visual amenity;
- The interaction between the Project and other developments means that the total visual effect is greater than the sum of its parts; and/or
- The Project would lengthen the time over which effects are experienced (sequential effects).

Chapter 2
ZTV and Visualisation Methodology

Introduction

2.1 This Chapter sets out the approach to the production of the ZTV and visualisations which accompany **Chapter 16 SLVIA**. Figures are included in **Chapter 16 SLVIA** and **Appendix 16.4 SLVIA Visualisations**.

2.2 The methodology for the production of visualisations was based on current good practice guidance from NatureScot[7] and the Landscape Institute[8]. Further information about the approach is provided below.

Data Sources

2.3 Data used for generating maps and visualisations:

- OS Terrain 50 Digital Terrain Model (DTM);
- OS Terrain 5 DTM; and
- Ordnance Survey 1:25,000 and 1:50,000 raster data.

Zone of Theoretical Visibility (ZTV) Mapping

Turbine Blade Tip Height and Hub Height ZTVs

2.4 Evaluation of the theoretical extent to which the Project would be visible was informed by establishing a ZTV, using specific computer software designed to calculate the theoretical visibility of the Project within its surroundings. ZTVs were generated for two design scenarios, as set out in Section 16.7 in **Chapter 16 SLVIA**.

2.5 ESRI's ArcPro 3.4.0 software was used to generate ZTVs. The Visibility tool does not use mathematically approximate methods. This program calculates areas from which the turbine hubs and maximum blade tip height are potentially visible. This was performed on a 'bare ground' computer generated terrain model, which does not take account of potential screening by buildings or vegetation. It should be noted that the software uses raster height data, but while it is displayed as continuous data (with each grid square referred to as a 'cell'), it assumes a single height value from the centre of that cell for the whole cell. Therefore, any height variations between centre points of cells are not recognised.

2.6 The DTM used for the ZTV analysis was OS Terrain® 50 height data, obtained from Ordnance Survey in January 2025. The DTM data has not been altered (i.e. by the addition of local surface screening features) for the production of the ZTV. LUC has not identified any significant discrepancies between the DTM used and the actual topography around the SLVIA Study Area. The effect of earth curvature and light refraction was included in the ZTV analysis. A viewer height of 2 m above ground level was used. As the ZTV uses a 'bare ground' model, it is considered to over-emphasise the extent of visibility of the Project and therefore represents a 'maximum potential visibility' scenario. The ZTV was used as a starting point in the assessment to provide an indication of theoretical visibility. This information was verified in the field so that the assessment conclusions represent the actual visibility of the proposals reasonably accurately.

2.7 The ZTV was calculated to show the potential number of turbines visible to maximum blade tip height and maximum hub height above Lowest Astronomical Tide (LAT).

2.8 To construct cumulative ZTVs (CZTVs) to illustrate the cumulative visibility of the Project in conjunction with other windfarms, the ZTV to tip height of each windfarm was generated (based on the tip height of each turbine to an applicable maximum radius in accordance with the current guidance (SNH, 2017)) and then combined with the Project ZTV (60 km radius). The CZTVs are colour coded to distinguish between areas

[7] Scottish Natural Heritage (2017) Visual Representation of Wind Farms Guidance, Version 2.2
[8] Landscape Institute (2019) Technical Guidance Note 06/19 Visual Representation of Development Proposals

where the Project is predicted to be visible (either on its own, or in conjunction with other windfarms), and areas where other windfarms would be visible, but the Project would not.

Aviation Lighting ZTVs

Visible Lighting

2.9 The SLVIA considers the potential seascape, landscape and visual effects arising from the introduction of visible aviation and marine navigation lighting. The aviation and marine navigation lighting scheme for the Project is detailed in **Appendix 12 Outline Lighting and Marking Plan**. It consists of medium intensity (2,000 candela (cd)) aviation warning lights positioned on the nacelles of 36 of the 91 proposed turbines in the illustrated worst-case scenario (see **Chapter 16 SLVIA**, Table 16.5). The aviation warning lights operate at 10% of their maximum luminance intensity (i.e. 200 cd) in times of clear meteorological conditions, where visibility exceeds 5 km at the point of measurement (i.e. sensors on the turbine nacelles). Marine navigation lighting will be installed on significant peripheral structures and intermediate peripheral structures. Aviation and marine navigation lighting is shown on dusk visualisations presented within **Chapter 16 SLVIA**, and these were prepared in line with the approach set out in Chapter 2 of this Appendix. ZTVs illustrating the predicted extents of theoretical visibility of aviation lighting have been generated as set out below. ZTVs showing the marine navigation lighting have not been produced, as these lower intensity lights are not anticipated to be widely visible, based on the nominal range of 5 nautical miles (9.3 km).

2.10 The ZTV illustrating the theoretical visibility of the proposed visible aviation lighting across the 60 km radius SLVIA Study Area is shown on Figure 16.16 of **Chapter 16 SLVIA**.

Aviation Lighting Intensity ZTVs

2.11 To supplement the hub height ZTVs, directional lighting intensity ZTV figures were produced (see Figures 16.17 and Figure 16.18 of **Chapter 16 SLVIA**). The ZTVs were prepared to illustrate the maximum and minimum predicted luminous intensity (cd) emitted from the nacelle mounted aviation lights relative to viewing angle/elevation.

2.12 The specific luminous intensity (cd) of medium intensity aviation obstruction lights, which meet the minimum regulatory requirements, result in light being emitted most strongly at 0˚ (horizontal) to +1˚ angle. This could be reduced outside a 3° band from horizontal, and many modern aviation lights are capable of substantially reducing the level of light emitted at vertical angles outside this range. The reduction in emitted light intensity is especially evident at negative angles (below -1˚) which is important in terms of how receptors positioned at lower elevations than turbine nacelles may perceive the lights. This is referred to as vertical directional intensity mitigation and is inbuilt into the specific type of light proposed.

2.13 Variation in the elevation angle between the light and the viewpoint (observer/receptor) could result in a considerable increase or decrease in the luminous intensity experienced at each representative viewpoint location. The intensity of light emitted at different angles is shown in the form of lighting intensity ZTV mapping (as detailed above in relation to Figure 16.17 and Figure 16.18 of **Chapter 16 SLVIA**).

2.14 The DTM data and methodology used for the calculation of the lighting intensity ZTVs were identical to the ZTV (hub height) as defined above, except that vertical limits were set for the output. The maximum and minimum predicted luminous intensity values (cd) emitted are based on a CEL-WT-MIC light, which meets the minimum requirements of ICAO/CAP393 medium-intensity nacelle mounted aviation light – including ICAO Minimum 2,000 cd. average intensity required between 0˚ (horizontal) and +3˚. These specific maximum and minimum luminous intensity values are derived from the manufacturer's technical specification and performance statistics for the CEL-WT-MIC light, as detailed in **Table 2.1** below. The ZTV was run twelve times (to represent each vertical angle band) with different upper and lower angle elevation limits (where 0° represents the horizontal plane), to represent the minimum average intensities required at different elevation angles.

Table 2.1 Maximum and minimum luminous intensity relative to viewing angle - CEL-WT-MIC light

Vertical Angle of Lighting from Nacelle	Approximate Maximum and Minimum Emitted Intensity (cd) at 100%	Approximate Maximum and Minimum Emitted Intensity (cd) at 10% (clear weather conditions)
Above 5°	147 to 34	15 to 3
4° to 5°	247 to 134	25 to 13
3° to 4°	481 to 237	48 to 24
2° to 3°	1160 to 481	116 to 48
1° to 2°	2119 to 1170	212 to 117
0° to 1°	2206 to 1968	221 to 197
-1° to 0°	2036 to 987	204 to 99
-2° to -1°	996 to 383	100 to 38
-3° to -2°	394 to 197	39 to 20
-4° to -3°	199 to 131	20 to 13
-5° to -4°	131 to 92	13 to 9
Below -5°	94 to 38	9 to 4

2.15 There is an overlap between each of the layers which represents the visibility of each of the 36 lit turbines. Figure 16.17 and Figure 16.18 in **Chapter 16 SLVIA** show the layer with the greater intensity on top (i.e. the individual turbine nacelle mounted light with the brightest emitted light), so as to represent the 'maximum effect' or 'worst-case' scenario.

2.16 The ZTVs do not take account of the effect that distance has in reducing the amount of light falling on a particular area, and therefore perceived brightness of light experienced on the ground, or the potential screening provided by vegetation or buildings.

Viewpoint Photography

2.17 The methodology for photography is in accordance with guidance from NatureScot[9] and the Landscape Institute[10] (LI). The focal lengths used are in accordance with recommendations contained in guidance and are stated on the figures. Photography was undertaken by LUC between August 2024 and September 2025. A Nikon D750 and a D700 full frame sensor digital single lens reflex (SLR) camera, with a fixed 50 mm focal length lens, was used to undertake photography from all viewpoint locations.

2.18 A tripod with vertical and horizontal spirit levels was used to provide stability and to ensure a level set of adjoining images. A panoramic head was used to ensure the camera rotated about the no-parallax point of the lens to eliminate parallax errors[11] between the successive images and enable accurate stitching of the images. The camera was rotated through a full 360˚ at each viewpoint.

2.19 The location of each viewpoint and information about the conditions was recorded in the field in accordance with NatureScot (SNH, 2017) and LI guidance (LI, 2019).

[9] Scottish Natural Heritage (2017) Visual Representation of Wind Farms Guidance, Version 2.2
[10] Landscape Institute (2019) Technical Guidance Note 06/19 Visual Representation of Development Proposals
[11] Parallax is the difference in the position of objects when viewed along two different lines of sight. In the case of a camera this would occur if the rotation point of the lens was not constant and would result in stitching errors in the panorama.

2.20 Weather conditions and visibility were considered an important aspect of the field visits for the photography. Where possible, visits were planned around clear days with very good visibility. Viewpoint locations were visited at times of day to ensure, as far as possible, that the sun lit the scene from behind, or to one side of the photographer. South facing viewpoints could present problems particularly in winter when the sun is low in the sky. Photography opportunities facing into the sun were avoided where possible.

Visualisations

2.21 Wirelines are computer generated line drawings which show outlines of the proposed turbines and the bare earth topography. Photomontages are computer generated images of the Project modelled into the actual baseline photography. Wirelines and photomontages are assessment tools and are not a substitute for site visits. They do not convey turbine movement and are representative of particular views but cannot represent visibility at all locations.

Photographic Stitching, Wirelines and Photomontages

2.22 Photographic stitching software PTGui© 12.27 was used to stitch together the adjoining frames to create panoramic baseline photography. A selection of identical control points was created within each of the adjoining frames to increase the level of accuracy when stitching the 360° panoramic photography.

2.23 The software package ReSoft© WindFarm version 5.1.1.4 was used to view the Project from selected viewpoints in wireline format. A combination of OS Terrain® 5 and OS Terrain® 50 data was used to create a DTM which provided a detailed and reliable representation of the topography for the wireline view. Turbine locations, type and size, and viewpoint location coordinates were entered. The software applies default turbine geometry in wireline views, so turbines are shown with the specified blade tip heights, hub heights and rotor diameters, but other dimensions such as tower diameter, hub and nacelle proportions, are generic and not exact to manufacturer specifications. This means that the turbine towers, hub and nacelle may appear larger in scale in the wireline images than in rendered models where additional turbine geometry may be set. The turbines shown within the wireline images are considered schematic and illustrative, and the software graphically displays these in a way which allows their visibility to be clearly discerned in all visualisations, regardless of viewpoint distance. Viewer height was set to 1.5 m above ground level. In some instances, the viewer height was increased by a small increment to achieve a closer match between the terrain data and photographic landform content.

2.24 Windfarm layouts included within the cumulative assessment were added to the ReSoft© WindFarm model.

2.25 The panoramic baseline daytime photographic images were imported into ReSoft© WindFarm software. From each viewpoint the wireline views of the landform model with the proposed turbines were carefully adjusted to obtain a match. Fixed features on the ground, such as buildings and roads, were located in the model and used as markers to help with the alignment process where necessary. Each view was rendered taking account of the sunlight and the position of the sun in the sky at the time the photograph was taken. Blade angle and orientation adjustments were also made to represent a realistic situation.

2.26 The exported renders were imported into Adobe Photoshop© where they were aligned and composited with the baseline photography. Turbines or sections of turbines which were located behind foreground elements in the photograph were masked out (removed) to create the photomontage.

2.27 Finally, where applicable, the images were converted from Cylindrical Projection to Planar Projection using PTGui© 12.27 software.

Dusk/Night-time Visualisations

2.28 Guidance on the approach to aviation lighting impact assessment, developed by the Scottish Government and NatureScot, was published in November 2024.[12] This guidance advocates that where

[12] Scottish Government and NatureScot (2024) Guidance on Aviation Lighting Impact Assessment

automatic dimming mitigation is adopted, photomontage visualisations showing lights illuminated only to the 200 cd scenario (e.g. not less than 10% of the minimum peak intensity) need be presented.

2.29 Photomontage visualisations have been prepared for five representative dusk/night-time assessment viewpoints, as agreed with stakeholders as part of consultation on the list of viewpoints (refer to Table 16.12 in **Chapter 16 SLVIA**). Photomontages illustrate the dimmed aviation lights to 10% of their maximum luminance intensity (i.e. 200 cd) in times of clear meteorological conditions, where visibility exceeds 5 km at the point of measurement (i.e. sensors on the turbine nacelles). The viewpoints are:

- Viewpoint 3: Kilchoman, Islay;
- Viewpoint 5: Minor Rd near Portnahaven, Islay;
- Viewpoint 14: B8086 south of Lower Kilchattan, Colonsay;
- Viewpoint 16: Beinn nan Guidairean, Colonsay; and
- Viewpoint 21: Mull - Iona Ferry (Fionnphort Pier).

2.30 Baseline photographs from the dusk/night-time assessment viewpoints were taken between March and July 2025, using the same camera equipment and similar procedure as the daytime views. Baseline photography, including the presence of existing sources of artificial lights where applicable, was taken in clear atmospheric conditions. 360˚ ranges of photography were taken at regular intervals starting shortly before sunset with subsequent ranges taken as natural light faded and existing manmade light sources became visible.

2.31 In accordance with good practice guidance, baseline photography was carried out in appropriate conditions close to dusk. NatureScot guidance[13] 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"* (paragraphs 174-177, pages 35 and 36). The baseline photography selected for the visualisations was captured at approximately 30 minutes after civil twilight on the date of the photography, with reference to guidance from NatureScot.

2.32 All dusk photography was processed identically to the daytime photography, as detailed above.

2.33 The lighting visualisations were created using Autodesk 3DS Max©/Vray© modelling and rendering software, which allows modelling of any light source in cd or micro lumen units (also known as lux). In accordance with the latest NatureScot guidance, a single photomontage was created for each dusk viewpoint showing the 'reduced lighting intensity scenario' (200 cd) for all visible hub lights across the scheme. If the photomontages are being viewed on a screen, it is recommended this is done in a darkened environment with low levels of lighting, avoiding any screen glare (i.e. no reflections or light shining directly onto the surface of the screen which would alter the perceived light being cast out from the screen, as this has the effect of making things appear lighter or darker than they actually are to the human eye). The turbines in the night views were orientated with the hub facing the viewer (and not obscured by turbine blades). This ensures that the images show the maximum visibility of the lighting proposed to be installed on the hubs of the turbines.

2.34 Additionally, mid-point yellow aviation navigational lighting was also modelled at 140cd, with full 360 degree visibility. These lights would flash in sequence (5 seconds on significant peripheral structures and 2.5 seconds on intermediate peripheral structures). The intermediate peripheral structure lighting may not be required but was included as a worst-case scenario.

2.35 The exported renders were imported into Adobe Photoshop© where they were aligned and combined with the baseline photography. Turbines or sections of turbines which were located behind foreground elements in the photograph were removed to create the photomontage.

[13] Scottish Natural Heritage (2017) Visual Representation of Wind Farms Guidance, Version 2.2

2.36 As with the daytime images the exported renders were then composited with the baseline photographic view using Adobe Photoshop© software and converted from Cylindrical Projection to Planar Projection using PTGui© software.

2.37 Finally, Adobe InDesign© software was used to present the 53.5˚ horizontal included angle photomontages.

2.38 The dusk visualisations aim to be representative of the visual appearance of the proposed aviation lighting at dusk in clear viewing conditions. They are prepared to demonstrate the worst-case scenario. However, it should be noted that due to limitations in software, distance to the lights and atmospheric conditions cannot be modelled in the 3D environment.

2.39 The photomontages do not seek to replicate the additional variable influence which distance (between the light and the viewpoint/observer) or atmospheric attenuation by moisture (cloud/rain/fog) or by dust or other particulates can have on the observed brightness of the lights. However, it is understood that the additional influence of these factors could lead to a further decrease in the brightness as it is perceived.

2.40 The photomontages prepared and presented in the Environmental Impact Assessment Report (EIAR) illustrate a likely 'maximum case effect' in clear conditions for each representative viewpoint, providing an indicative tool, which is referred to when visiting the viewpoint in the field. As with any visualisation, limitations are recognised, including issues relating to print quality and paper surface if printed, or size, screen brightness and output resolution if viewed on screen. Judgements on levels of effect were informed by research and the aviation lighting intensity ZTVs (Figures 16.11 and 16.12 of **Chapter 16 SLVIA**), observations made during the field work for this Project, and experience from other projects.

Figure Layout

2.41 The printed figures for the viewpoints produced in accordance with NatureScot requirements are presented in **Appendix 16.4 SLVIA Visualisations**. Adobe InDesign© software was used to present the figures. The dimensions for each image (printed height and field of view) are in accordance with NatureScot requirements. Photography information and viewing instructions are provided on each page where relevant.

2.42 The elongated A3/A1 width format pages for each viewpoint are set out as follows. This follows NatureScot visualisation standards:

- The first A3 page contains two maps:
  - An OS 1:50,000 scale map showing the viewpoint location, direction of the 90˚ baseline photography, wireline views and 53.5˚ photomontage view. Turbine locations for the Project are also shown when visible in the map view;
  - An OS 1:250,000 scale map showing the Project and other existing or proposed windfarms.
- The following page contains 90˚ baseline photography and wireline to illustrate the wider landscape and visual context. These are shown in cylindrical projection and presented on an A1 width page. Additional pages in the same format are provided where relevant to illustrate wider cumulative visibility up to 360˚; and
- The subsequent two pages contain a 53.5˚ wireline and photomontage. These images are both shown in planar projection and presented on an A1 width page;

2.43 For viewpoints 18 and 24 wireline only views are presented (as agreed with NatureScot and Argyll and Bute Council). For these viewpoints, a single 90˚ horizontal included angle wirelines to illustrate wider cumulative visibility, and a single 53.5˚ horizontal included angle wireline, are presented.

2.44 For viewpoints 3, 5, 14, 16 and 21 the baseline dusk and photomontage views are presented as 53.5˚ planar horizontal included angle images.