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Volume 7B Proposed Development (Offshore) Appendices

Appendix 12-5 Seascape, Landscape and Visual Impact Assessment
Methodology

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Volume 7B Appendix 12-5 Seascape, Landscape and Visual Impact Assessment Methodology

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Acronyms and Abbreviations

CAA	Civil Aviation Authority
cd	Candela
CIA	Cumulative Impact Assessment
CLVIA	Cumulative Landscape and Visual Impact Assessment
DTM	Digital Terrain Model
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
GIS	Geographical Information System
GLVIA3	Guidelines for Landscape and Visual Impact Assessment: Third Edition
HfoV	Horizontal Field of View
IEMA	Institute of Environmental Management and Assessment
ICAO	International Civil Aviation Organisation
LCT	Landscape Character Type
LVIA	Landscape and Visual Impact Assessment
MHWS	Mean High Water Springs
OECC	Offshore Export Cable Corridor
OS	Ordnance Survey
OSP	Offshore Substation Platform
OWF	Offshore Wind Farm
RCCA	Regional Coastal Character Area
SLVIA	Seascape, Landscape and Visual Impact Assessment
VFoV	Vertical Field of View

WTG	Wind Turbine Generator
ZTV	Zone of Theoretical Visibility

1 Introduction

1.1.1.1 This appendix of the Environmental Impact Assessment Report (EIAR) describes the methodology used in the Seascape, Landscape and Visual Impact Assessment (SLVIA) of the Proposed Development (Offshore), set out in the following EIAR chapters:

- Volume 2, Proposed Development (Offshore), Chapter 12: Seascape, Landscape and Visual Impact Assessment;
- Volume 3, Caledonia North, Chapter 12: Seascape, Landscape and Visual Impact Assessment;
- Volume 4, Caledonia South, Chapter 12: Seascape, Landscape and Visual Impact Assessment;

1.1.1.2 This appendix also describes the methodology set out in the following technical appendices related to the SLVIA:

- Volume 7B, Proposed Development (Offshore):
 - Appendix 12-1: Night Time Assessment (Caledonia OWF);
 - Appendix 12-2: Seascape, Landscape and Visual Impact Assessment Figures;
 - Appendix 12-3: Seascape, Landscape and Visual Impact Assessment Visualisations;
 - Appendix 12-4: Seascape, Landscape and Visual Impact Assessment Visualisations (The Highland Council);
 - Appendix 12-6: Visibility Frequency and Range;
- Volume 7C, Caledonia North:
 - Appendix 12-1: Night Time Assessment (Caledonia North);
 - Appendix 12-2: Seascape, Landscape and Visual Impact Assessment Figures;
 - Appendix 12-3: Seascape, Landscape and Visual Impact Assessment Visualisations; and
 - Appendix 12-4: Seascape, Landscape and Visual Impact Assessment Visualisations (The Highland Council);
- Volume 7D, Caledonia South:
 - Appendix 12-1: Night Time Assessment (Caledonia South);
 - Appendix 12-2: Seascape, Landscape and Visual Impact Assessment Figures;
 - Appendix 12-3: Seascape, Landscape and Visual Impact Assessment Visualisations; and
 - Appendix 12-4: Seascape, Landscape and Visual Impact Assessment Visualisations (The Highland Council);

- 1.1.1.3 Baseline information included in Figures 12-1 to 12-5 contained in Volume 7B, Appendix 12-2: Seascape, Landscape and Visual Impact Assessment Figures should be referred to for Caledonia North and Caledonia South as this is not repeated in Volumes 7C and 7D, Appendix 12-2: Seascape, Landscape and Visual Impact Assessment Figures.
- 1.1.1.4 The SLVIA chapters (Volumes 2, 3 and 4, Chapter 12) and appendices assess and illustrate the seascape, landscape and visual effects of relevance to the Proposed Development (Offshore), Caledonia North and Caledonia South which each comprise Wind Turbine Generators (WTGs), inter-array and interconnector cables, Offshore Substation Platforms (OSPs) located within the Caledonia Offshore Wind Farm (OWF) (i.e., Array Area, which includes the Caledonia North Site and Caledonia South Site), Caledonia Offshore Export Cable Corridor (OECC) and Landfall Site up to Mean High Water Springs (MHWS).

2 Approach to Assessment

2.1 Guidance on Methodology

2.1.1.1 This assessment has been carried out in accordance with the principles contained within the following documents:

- Guidelines for Landscape and Visual Impact Assessment: Third Edition (GLVIA3) Landscape Institute and Institute of Environmental Management and Assessment (IEMA) (2013¹);
- Visual Representation of Development Proposals, Landscape Institute (2019²);
- Assessing landscape value outside national designations, Technical Guidance Note 02/21 Landscape Institute (2021³);
- Offshore Renewables – Guidance on Assessing the Impact on Coastal Landscape and Seascape. Guidance for Scoping an Environmental Statement, Scottish Natural Heritage (2012⁴);
- Visual Representation of Wind farms, Guidance (Version 2.2), Scottish Natural Heritage (2017⁵);
- Guidance Note. Coastal Character Assessment (Version 1a), Scottish Natural Heritage (2018⁶);
- Guidance - Assessing the cumulative landscape and visual impact of onshore wind energy developments, NatureScot (2021⁷);
- Guidance for applicants on using the design envelope for applications under section 36 of the Electricity Act 1989, Scottish Government (2022⁸); and
- Visualisation Standards for Wind Energy Developments, The Highland Council (2016⁹).

2.1.1.2 This methodology accords with Landscape Institute and IEMA (2013¹), 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.

2.1.1.3 The Landscape Institute and IEMA (2013¹) guidelines 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. It is considered 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, a

¹ In 2020, Scottish Natural Heritage was re-branded as NatureScot; however, its legal persona and statutory functions has remained unchanged.

high magnitude of change, based on size or scale, may be reduced to a lower rating if it occurred in a localised geographical area and for a short duration. This might mean that a potentially significant effect will be overlooked if effects are diluted due to their limited geographical extents and/or duration or reversibility.

- 2.1.1.4 GLVIA3 (Landscape Institute and IEMA, 2013¹) is guidance and not prescriptive in setting out a methodology and it is acknowledged that professional judgement is a key factor in the assessment of landscape and visual effects. In order to present a precautionary assessment of potentially significant effects, the methodology presented and utilised throughout the assessment bases the assessment of the level of magnitude of change on size or scale to determine the significance of the effects, 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 non-significant in accordance with the requirements of the Environmental Impact Assessment (EIA) Regulations.
- 2.1.1.5 GLVIA3 (Landscape Institute and IEMA, 2013¹) makes it clear at paragraph 3.33 that:
- "It is not essential to establish a series of thresholds for different levels of significance of landscape and visual effects, provided that it is made clear whether or not they are considered significant"*.
- 2.1.1.6 The methodology for the EIAR introduces the definition of levels of effect under five different categories with the higher levels being assessed as significant.
- 2.1.1.7 The assessment methodology uses six scales of magnitude of change – high, medium-high, medium, medium-low, low and negligible/none; which are preferred to the 'maximum of five categories' suggested in GLVIA3 (Landscape Institute and IEMA, 2013¹) as a means of clearly defining and summarising magnitude of change judgements.
- 2.1.1.8 These are not new diversions and follow practice established on other large-scale OWF projects such as Moray East, Moray West, East Anglia ONE North and TWO, Berwick Bank and Awel y Môr OWFs.
- 2.1.1.9 The SLVIA is based on a Design Envelope based on the Scottish Government (2022⁸) Guidance for applicants on using the design envelope for applications under section 36 of the Electricity Act 1989 (Parliament of the United Kingdom, 1989¹⁰). In compliance with EIA Regulations, the potential significant effects of a realistic 'worst-case' scenario are assessed and illustrated in the SLVIA with the worst case assumptions for SLVIA set

out in Section 12.6 of Volumes 2, 3 and 4, Chapter 12: Seascape, Landscape and Visual Impact Assessment.

2.2 Appropriate Level of Assessment

- 2.2.1.1 The SLVIA methodology provides for an approach to identifying receptors that could be significantly affected by the Proposed Development (Offshore) that need to be 'scoped in' for further assessment in the SLVIA and receptors that could not be significantly affected and that can be 'scoped out' of the assessment.
- 2.2.1.2 The general principle is that receptors that could be significantly affected will be identified based on their sensitivity/importance/value and the spatial and temporal scope of the assessment. Consultation has also informed the selection of potential receptors that could be significantly affected by the Proposed Development (Offshore).
- 2.2.1.3 The assessment of whether an effect has the potential to be significant has been based upon review of the existing evidence base, consideration of commitments made (embedded environmental measures), professional judgement and where relevant, recommended aspect specific methodologies and established practice. In applying this judgement, use has been made of a simple test that to be significant an effect must be of sufficient importance that it should be taken into consideration when making a development consent decision.
- 2.2.1.4 For those matters 'scoped in' for assessment, the approach to the level of assessment is tiered. A 'preliminary' or 'detailed' assessment has been undertaken as follows:
- A 'preliminary assessment' approach for an environmental aspect/effect which has included secondary baseline data collection (e.g., desk-based information) and qualitative assessment methodologies. A preliminary assessment of all seascape, landscape and visual receptors within the Zone of Theoretical Visibility (ZTV) has been undertaken in Volumes 2, 3 and 4, Chapter 12: Seascape, Landscape and Visual Impact Assessment, using desk-based information and ZTV analysis. The preliminary assessment identifies which seascape, landscape and visual receptors are unlikely to be significantly affected, which are subject to a preliminary assessment, and those receptors that are more likely to be significantly affected by the Proposed Development (Offshore), which require a 'detailed assessment'; and
 - A 'detailed assessment' approach is undertaken for seascape, landscape and visual receptors/effects that are identified in the preliminary assessment as requiring detailed assessment. This detailed assessment has included primary baseline data collection (e.g., through site surveys), quantitative and qualitative assessment methodologies, and

modelling such as ZTV analysis and wireline/photomontage visualisations.

- 2.2.1.5 To ensure the provision of a proportionate EIA and an SLVIA that is focused on potential significant effects, the assessment takes into account the considerable levels of existing environmental information available, extensive local geographical knowledge and understanding of the Proposed Development (Offshore) and surroundings gained from ongoing site selection analysis and environmental surveys. The spatial and temporal scope of the assessment enables the identification of receptors which may experience a change as a result of the Proposed Development (Offshore).

2.3 Desk-based and Site Survey Work

- 2.3.1.1 The SLVIA has been informed by desk-based studies, stakeholder consultations and field survey work undertaken within the SLVIA study area associated with the Caledonia OWF (Array Area), which is the combination of Caledonia North Site and Caledonia South Site (see Figure 12-1 in Volume 7B, Appendix 12-2: Seascape, Landscape and Visual Impact Assessment Figures). This study area encompasses the smaller study areas associated with the Caledonia North Site and Caledonia South Site with baseline information on Figures 12-1 to 12-5 contained in Volume 7B, Appendix 12-2: Seascape, Landscape and Visual Impact Assessment Figures also being applicable to those sites and the related SLVIAs. The specific SLVIA study area for Caledonia North is illustrated in Figures contained in Volume 7C, Appendix 12-2: Seascape, Landscape and Visual Impact Assessment Figures and for Caledonia South in Volume 7D, Appendix 12-2: Seascape, Landscape and Visual Impact Assessment Figures.
- 2.3.1.2 The landscape, seascape and visual baseline has been informed by desk-based review of landscape and seascape character assessments, and the ZTV, to identify receptors that may be affected by the WTGs and produce written descriptions of their key characteristics and value.
- 2.3.1.3 Interactions have been identified between the Proposed Development (Offshore) and seascape, landscape and visual receptors, to predict potentially significant effects arising and measures are proposed to mitigate effects.
- 2.3.1.4 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 terrestrial Landscape Character Areas, micro-siting of viewpoint locations, panoramic baseline photography and visual assessment survey from all representative viewpoints. These surveys were undertaken during Autumn 2023 and Spring 2024.

2.4 Types of Effect

- 2.4.1.1 The SLVIA predicts, describes and assesses the likely significant effects that the Proposed Development (Offshore), will have on the seascape, landscape and visual resource, and covers the following types of effect which may arise during construction, decommissioning or operation.
- Seascape/Coastal character effects – arising from the introduction of new offshore elements which may alter the coastal character through visibility of these changes out at sea.
 - Landscape character effects – arising from the introduction of new offshore elements which may be visible from the land and may therefore affect the perceived character of the landscape. This may also include effects on the special landscape qualities and integrity of designated landscapes.
 - Visual effects – arising from the introduction of new offshore elements in views and the resultant effects on visual amenity experienced by people from principal visual receptors (i.e., groups of people, such as within settlements, using transport routes or recreational trails) and representative viewpoints throughout the day and into the night.
- 2.4.1.2 In addition to the above, cumulative effects may arise where the study areas for two or more projects overlap so that they are experienced at a proximity where they may have a greater incremental effect, or where projects may combine to have a sequential effect. The SLVIA assesses the cumulative effect that would arise through the introduction of the Proposed Development (Offshore).

2.5 Assessing Visual Effects

2.5.1 Overview

- 2.5.1.1 Visual effects are concerned wholly with the effect of the Proposed Development (Offshore) on views and the general visual amenity and are defined in GLVIA3 (Landscape Institute and IEMA, 2013¹), paragraph 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”.*
- 2.5.1.2 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.

- 2.5.1.3 The level of visual effect (and whether this is significant) is determined through consideration of the sensitivity of each visual receptor (or range of sensitivities for receptor groups) and the magnitude of change that will be brought about by the Construction, Operation and Maintenance and Decommissioning of the Proposed Development (Offshore).

2.5.2 Zone of Theoretical Visibility

- 2.5.2.1 Plans mapping the ZTV are used to analyse the extent of theoretical visibility of the Proposed Development (Offshore), across the SLVIA study area and to assist with viewpoint selection. The ZTVs do not, however, take account of the screening effects of buildings, localised landform and vegetation. 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 realistic 'worst-case' scenario of the theoretical visibility.

2.5.3 Viewpoint Analysis

- 2.5.3.1 Viewpoints have been agreed with key consultees. Viewpoint analysis has been used to assist the assessment and has been conducted from selected representative viewpoints within the SLVIA study area. The purpose of this is to assess both the level of visual effect for particular receptors and to help focus the assessment. A range of viewpoints have been examined in detail and analysed to determine whether a significant visual effect will occur. The viewpoints have been renumbered since the scoping stage and are ordered from Orkney through Highland in the north-west and from Moray to Aberdeenshire in the south-east of the SLVIA study area.
- 2.5.3.2 The assessment has involved visiting the viewpoint location to review wirelines and photomontages prepared for each viewpoint. The fieldwork was conducted in periods of fine weather with generally very good to excellent visibility and the assessment considers seasonal changes.
- 2.5.3.3 The SLVIA therefore includes viewpoint analysis prepared for each viewpoint and presented as supporting assessment in the SLVIA. The viewpoint analysis assists in defining the direction, elevation, geographical spread and nature of the potential visual effects and identifies areas where significant effects are likely to occur. This approach seeks to provide clarity and confidence to consultees and decision makers by allowing the detailed judgements on the magnitude of visual change to be more readily

scrutinised and understood. The viewpoint analysis has been used to assist the visual assessment of visual receptors reported in the SLVIA.

2.5.4 Evaluating Visual Sensitivity to Change

2.5.4.1 In accordance with GLVIA3 (Landscape Institute and IEMA, 2013¹; paragraphs 6.31-6.37), the sensitivity of visual receptors has been determined by a combination of the value of the view and susceptibility of the visual receptors to the change likely to result from the Project Development (Offshore) on the view and visual amenity.

Value of the View

2.5.4.2 The value of a view or series of views reflects 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 has been classified as high, medium-high, medium, medium-low or low and the basis for this assessment has been made clear using evidence and professional judgement, based on the following factors:

- Formal recognition: The value of views can be formally recognised through their identification on Ordnance Survey (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 has been increased if it presents an important vista from a designed landscape or lies within or overlooks a designated landscape area, which implies a greater value to the visible landscape.
- Informal recognition: Views that are well-known at a local level and/or have particular scenic qualities can have an increased value, even if there is no formal recognition or designation. Views or viewpoints are sometimes informally recognised through references in art or literature and this can also add to their value. A viewpoint that is visited or appreciated by a large number of people will generally have greater importance than one gained by few people.

Susceptibility to Change

2.5.4.3 Susceptibility relates to the nature of the viewer experiencing the view and how susceptible they are to the change arising from the specific development proposal (i.e., the Proposed Development (Offshore)); Landscape Institute and IEMA, 2013¹; paragraphs 3.26 and 6.30, Figure 3.5 and 6.1). A judgement to determine the level of susceptibility therefore relates to the type of change arising from the Proposed Development



(Offshore), and the nature of the viewer and their experience from that particular viewpoint. Susceptibility to change is classified as high, medium-high, medium, medium-low or low and based on the following factors:

- **Nature of the viewer:** The nature of the viewer is defined by the occupation or activity of the viewer at the viewpoint or series of viewpoints. The most common groups of viewers considered in the visual assessment include people within settlements, motorists, and people taking part in recreational activity or working. Viewers, whose attention is focused on the landscape, or with static long-term views, are likely to have a higher susceptibility. Viewers travelling in cars or on trains will tend to have a lower susceptibility as their view is transient and moving. The least susceptible viewers are usually people at their place of work whose attention is generally focused on their work or activity, not on their surroundings, and where the setting is not important to the quality of working life.
- **Experience of the viewer:** The experience of the visual receptor relates to the extent to which the viewer's attention or interest may be focused on the view and the visual amenity they experience at a particular location. The susceptibility of the viewer to change arising from the Proposed Development (Offshore) 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 settlement is aligned directly towards the Proposed Development (Offshore), the experience of the visual receptor will be altered more notably than if the experience relates to a glimpsed view seen at an oblique angle from a car travelling at 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 Proposed Development (Offshore).

Visual Sensitivity Rating

2.5.4.4 An overall level of sensitivity has been applied for each visual receptor or view – high, medium-high, medium, medium-low or low – by combining individual assessments of the value of the view and the susceptibility of the visual receptor to change. The basis for the assessments has been 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 2-1.

Table 2-1: Visual sensitivity to change criteria.

Sensitivity Factor	Higher	Lower	
Value	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.	
	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 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.	
Susceptibility	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 Proposed Development (Offshore) 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 Proposed Development (Offshore).	
	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	High 	Medium 	Low

2.5.5 Evaluating Visual Magnitude of Change

2.5.5.1 The magnitude of change on views is an expression of the scale of the change that will result from the Proposed Development (Offshore) and is dependent on a number of variables regarding the size or scale of the change. The consideration of the size or scale of the effect, its geographical extent and its duration and reversibility are kept separate, by basing the magnitude of change solely on size or scale to determine where significant and non-significant effects occur, and then describing the geographical extents of the effects and their duration and reversibility separately.

Size or Scale of Change

2.5.5.2 An assessment has been made about the size or scale of change in the view that is likely to be experienced as a result of the Proposed Development (Offshore), based on the following factors:

- **Distance:** the distance between the visual receptor/viewpoint and the Proposed Development (Offshore). Generally, the greater the distance, the lower the magnitude of change, as the Proposed Development (Offshore) will constitute a smaller scale component of the view.
- **Size:** the amount and size of the Proposed Development (Offshore) that will be seen. Visibility may range from small or partial visibility to full visibility of the Proposed Development (Offshore). Generally, the more of the Proposed Development (Offshore) that appears in the view, the higher the magnitude of change. This is also related to the degree to which the Proposed Development (Offshore) may be wholly or partly screened by landform, vegetation (seasonal) and/or built form. Conversely open views are likely to reveal more of the Proposed Development (Offshore), particularly where this is a key characteristic of the landscape or seascape.
- **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 scale of the Proposed Development (Offshore) may appear larger or smaller relative to the scale of the receiving seascape landscape.
- **Field of view:** the Vertical Field of View (VFoV)/Horizontal Field of View (HfoV) and the proportion of the view that is affected by the Proposed Development (Offshore). Generally, the more of the proportion of a view that is affected, the higher the magnitude of change will be. If the Proposed Development (Offshore) extends across the whole of the open part of the outlook, the magnitude of change will generally be higher as the full view will be affected. Conversely, if the Proposed Development (Offshore) covers just a narrow part of an open, expansive and wide view, the magnitude of change is likely to be reduced as they will not affect the whole open part of the outlook. This can in part be described objectively by reference to the VfoV or HfoV affected, relative to the extent and proportion of the available view.

- **Contrast:** the character and context within which the Proposed Development (Offshore) will 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, luminance and motion. Contrasts and changes may arise particularly as a result of the rotation movement of the WTG blades, as a characteristic that gives rise to effects. Developments which contrast or appear incongruous in terms of colour, scale and form are likely to be more visible and have a higher magnitude of change whilst the counter is likely to have a lower magnitude of change, where the Proposed Development (Offshore) is seen within a context of existing OWF development.
- **Consistency of image:** the consistency of image of the Proposed Development (Offshore) in relation to other developments. The magnitude of change of Proposed Development (Offshore) is likely to be lower if its WTG height, arrangement, and layout design are broadly similar to other developments in the seascape, in terms of its scale, form and general appearance. Where there is a consistency of image new development is more likely to appear as a logical component of the landscape/seascape with a strong rationale for its location.
- **Skyline/background:** Whether the Proposed Development (Offshore) will be viewed against the skyline or a background seascape may affect the level of contrast and magnitude. If the Proposed Development (Offshore) adds to an already developed skyline the magnitude of change will tend to be lower.
- **Number:** generally, the greater the number of separate components of the Proposed Development (Offshore) 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.
- **Nature of visibility:** the nature of visibility is a further factor for consideration. The Proposed Development (Offshore) will be subject to various phases of development change and the way the Proposed Development (Offshore) will be viewed could be intermittent or continuous depending on a number of factors such as seasonal changes, weather conditions, time of day and wind direction.

Visual Magnitude of Change Rating

- 2.5.5.3 The 'magnitude' or 'degree of change' resulting from the Proposed Development (Offshore) is described as 'High', 'High-medium', 'Medium', 'Medium-low' 'Low' and 'Negligible' as defined in Table 2-2. The basis for the assessment of magnitude for each receptor has been made clear using evidence and professional judgement.

Table 2-2: Levels of visual magnitude of change.

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

2.5.6 Evaluating Visual Effects and Significance

2.5.6.1 The level of visual effect is evaluated through the combination of visual sensitivity and magnitude of change. Once the level of effect has been assessed, a judgement is then made as to whether the level of effect is 'significant' or 'not significant' as required by The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (Scottish Government, 2017¹¹). This process is assisted by a matrix which is used to guide the assessment. Geographical extent and duration and reversibility 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 non-significant. The factors considered in the evaluation of the sensitivity and the magnitude of the change resulting from the Proposed Development (Offshore) and their conclusion, have been presented in a comprehensive,

clear and transparent manner. Where professional judgement has been used to determine the significance of effects at the threshold of significance, the rationale for this assessment is set out.

- 2.5.6.2 When defining impact significance further information is also provided about the nature of the effects (whether these will be direct/indirect; temporary/permanent/reversible; beneficial/neutral/adverse or cumulative).
- 2.5.6.3 A significant effect is more likely to occur where a combination of the variables results in the Proposed Development (Offshore) having a defining effect on the view or visual amenity or where changes affect a visual receptor that is of high sensitivity.
- 2.5.6.4 A not significant effect is more likely to occur where a combination of the variables results in the Proposed Development (Offshore) having a non-defining effect on the view or visual amenity or where changes affect a visual receptor that is of low sensitivity.

2.5.7 Visibility of the Proposed Development (Offshore)

- 2.5.7.1 The varied clarity or otherwise of the atmosphere will reduce the number of days (the 'frequency') upon which views of the Proposed Development (Offshore) will be available from the coastline and hinterland, and is likely to inhibit clear views, rendering the WTGs located at long distance offshore, as visually recessive within the wider seascape. The effects of the construction, operation and maintenance and decommissioning of the Proposed Development (Offshore) will vary according to the weather and prevailing visibility. This means that effects that may be significant in the SLVIA under 'very good' or 'excellent' (i.e., worst-case/optimum) visibility conditions, may be not significant under moderate, poor or very poor visibility conditions. Further detail on this matter is included in Volume 7B, Appendix 12-6: Visibility Frequency and Range of Visibility.
- 2.5.7.2 Assessments are based on a worst-case position of optimum ('very good' or 'excellent') visibility, in line with current guidance (Landscape Institute and IEMA, 2013¹); however, within the visual assessment there is an assessment of the frequency or 'likelihood' of effect' for each viewpoint, based on the distance of the Proposed Development (Offshore), Met Office visibility data and professional judgement from experience of viewing offshore wind farms in different conditions and distances. Likely visibility frequency can therefore be taken into consideration, with visibility range from viewpoints located at very long distances over 40km (where 'excellent' visibility is required) occurring less frequently than viewpoints at closer range.
- 2.5.7.3 Whilst optimal weather conditions are assessed as the worst-case scenario, in reality, the degree and extent of visual effects arising from the construction and operation of the Proposed Development (Offshore) is a

combination of several different factors, including the prevailing weather conditions. The prevailing weather can determine changes in character and visibility, with varied wind, light and tidal movements and the clarity or otherwise of the atmosphere. Collectively, these will combine to reduce the number of days upon which views of the Proposed Development (Offshore) are available from the coastline and hinterland, or to inhibit views, rendering them more visually recessive within the wider seascape. Viewing conditions and visibility has been found to vary in the study area, and the effects of the wind farm will vary greatly according to the weather.

- 2.5.7.4 The photographs used in the photomontages included in Volumes 7B, 7C and 7D, Appendix 12-3: Seascape, Landscape and Visual Impact Assessment Visualisations were captured between October 2023 and May 2024 in generally very good to excellent visibility conditions and show this maximum potential visibility of the Proposed Development (Offshore). There are two viewpoints where the visibility conditions are not as clear over a long distance. These are Figure 12-1: Viewpoint 1: Burwick Ferry Landing on Orkney and Figure 12-11: Morven. These are relatively remote and distant viewpoints. The assessments made take account of the visibility that would occur were the conditions to be excellent based on professional experience and judgement with reference to other viewpoints. In reality the degree and extent of visual effects arising from the Proposed Development (Offshore) will be influenced by the prevailing weather and visibility conditions and such excellent visibility occurs relatively infrequently.

2.6 Assessing Night-time Visual Effects

2.6.1 Introduction

- 2.6.1.1 The assessment of night-time visual effects is based on the description of proposed WTG lighting set out in Section 12.6 (Key Parameters for Assessment), as set out in Volumes 2, 3 and 4, Chapter 12: Seascape, Landscape and Visual Impact Assessment, and the relevant International Civil Aviation Organisation (ICAO) or Civil Aviation Authority (CAA) regulations and standards, including CAA Policy and Guidelines on Wind Turbines CAP764 (CAA, 2016a¹²) and Air Navigation Order 2016: Civil Aviation (CAA, 2016b¹³).
- 2.6.1.2 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 The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 the potential significant effects of a 'worst-case' scenario for WTG lighting are assessed and illustrated in this visual assessment.

- 2.6.1.3 In this instance Caledonia Offshore Wind Farm Ltd (the Applicant) has committed to install sensors so that when visibility of the WTGs lights from all sensors is greater than 5km in the hours of darkness the aviation lighting is reduced from 2000cd to 200cd. Therefore, since the 2000cd lights would only be on during periods of reduced visibility they are unlikely to be seen to their full intensity by the receptors on the land. Therefore, the worst case scenario for assessment is 200cd.
- 2.6.1.4 In accordance with NatureScot’s advice received by email on 29 May 2024: *“(As agreed with Scottish Government and the working group for the draft aviation lighting assessment guidance) photomontage visualisations should illustrate the maximum case lighting intensity scenario. For example, 200 cd where dimming of aviation lights is proposed as embedded mitigation, and 2000 cd only where this mitigation is not proposed”*.
- 2.6.1.5 Whilst it may also be possible to see other lights installed on the WTGs and OSPs such as the marine navigation lights and those required infrequently for access and search and rescue these are not shown in the photomontages as they will be of lesser impact.
- 2.6.1.6 It should be noted that the WTGs would also include infra-red lighting on the WTG hubs, which would not be visible to the human eye. Details of the lighting would be agreed with the Ministry of Defence. The focus of the night-time visual assessment in this assessment is on the visible lighting requirements of the Proposed Development (Offshore).
- 2.6.1.7 The study area for the visual assessment of WTG lighting is coincident with the 60km SLVIA study area; however, it is particularly focused on the closest areas of the coastline.
- 2.6.1.8 The assessment of the lighting of the Proposed Development (Offshore) is primarily intended to determine the potential significant 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 matter of visible aviation and marine navigation lighting assessment is primarily a visual matter and the assessment presented focusses on that premise.
- 2.6.1.9 ICAO indicates a requirement for no lighting to be switched on until ‘Night’ has been reached, as measured at 50cd/m² or darker. It does not require 2,000cd medium intensity or 200cd low 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 the 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.

- 2.6.1.10 The Scottish Government’s Aviation Lighting Working Group is working on guidance to streamline the process for night-time lighting assessments. While this guidance has yet to be published, there is some consensus that the perception of landform/skylines at night is a relevant consideration (with perception being a component of visual effects), however there is also widespread agreement that it is not possible to undertake landscape/coastal character assessment after the end of civil twilight, when it is technically ‘dark’ and wind turbine aviation lighting is switched on.
- 2.6.1.11 To date the only formal recognition of this approach to assessment is the Scottish Ministers’ 2021 Decision for the Crystal Rig IV Public Local Inquiry¹⁴. The Reporters concluded in their report at paragraph 4.141:
“It can be seen from the summaries of evidence above that the parties differ as to whether the proposed aviation lighting would be a visual impact alone. We consider that without being able to see and fully appreciate the features of the landscape and the composition of views it is not possible to carry out a meaningful landscape character assessment. On this matter, we find that the proposed lighting is indeed a visual concern, as the applicant asserts”.
- 2.6.1.12 In the absence of guidance being available, it is considered reasonable to adopt the findings of Scottish Ministers, following a detailed Public Inquiry, as this represents precedence for focusing on the assessment of effects of turbine lighting as a visual matter.
- 2.6.1.13 Assessment of proposed wind turbine lighting on coastal character at night is therefore focused on particular areas where the landform of the foreshore, coastal landforms and inshore islands, etc. may be perceived at night with lights in the background on the sea skyline (i.e., where a perceived character effect may occur as a component of visual effects and for particular designations where dark skies are a specific ‘special quality’ defined in their citation).

2.6.2 Significance Criteria for Night-time Effects

- 2.6.2.1 The nature of the daytime and night-time effects from visible aviation and marine navigation lighting are clearly very different, in that during daylight hours visibility of moving WTG rotors gives rise to effects that are very different to the pinpoint effects of flashing aviation 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.
- 2.6.2.2 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 change likely to result from the Proposed Development (Offshore).

- 2.6.2.3 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.
- 2.6.2.4 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 are considered appropriate for the purposes of establishing receptor sensitivity at night-time.
- 2.6.2.5 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 2-3. Intermediate levels of high to medium and medium to low may also occur where the magnitude of change sits between two defined levels.
- 2.6.2.6 The significance of the 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 in Table 2-3, and informed by the matrix in Table 2-6, which gives an understanding of the threshold at which significant effects may arise.
- 2.6.2.7 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 and marine navigation lighting may have an influence, but this influence would not be definitive.
- 2.6.2.8 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 (Institute of Lighting Professionals, 2021¹⁵) in a prominent, incongruous or intrusive way.

Table 2-3: Levels of visual magnitude of change for visible lighting.

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.

2.7 Assessing Seascape/Landscape Effects

2.7.1 Interface Between SLVIA and Onshore LVIA

2.7.1.1 Together, the SLVIA and the onshore Landscape and Visual Impact Assessment (LVIA) provide a whole project assessment of the effects of the Proposed Development. The effects of the Proposed Development (Offshore) (above sea surface elements of the Proposed Development seaward of MHWS) are assessed in the SLVIA; and the effects of the Proposed Development (Onshore) (the onshore substation, onshore cable corridor, and landfall location) are assessed in the LVIA. Both the SLVIA and the LVIA follow a broadly similar assessment methodology that generally uses the same glossary and terminology.

2.7.1.2 The SLVIA study area includes the intertidal area and this area is also considered as part of the onshore LVIA study area. As trenchless

technology (e.g., horizontal directional drilling) will be employed to bring the offshore export cable ashore, no physical disturbance of the beach or intertidal area is predicted.

2.7.2 Approach to Assessment of Seascape and Landscape Effects

2.7.2.1 The UK Marine Policy Statement (UK Government, 2011¹⁶) states:

"References to seascape should be taken as meaning landscapes with views of the coast or seas, and coasts and the adjacent marine environment with cultural, historical and archaeological links with each other".

2.7.2.2 In England, seascape characterisation includes both the sea surface and what lies below the waterline, however in Scotland:

"The focus is on the coast and its interaction with the sea and hinterland, relationships that are quite distinctive in the Scottish context" (Scottish Natural Heritage, 2018⁶).

2.7.2.3 Given the definition in the UK Marine Policy Statement (UK Government, 2011¹⁶) and the Scottish Natural Heritage (NatureScot) coastal character assessment guidance⁶, the assessment of seascape character effects in this SLVIA focuses on areas of onshore landscape with views of the coast or seas/marine environment, in other words the 'coastal character', on the premise that the most important effect of OWFs is on the perception of the character of the coast.

2.7.2.4 Coastal character, made up of the margin of the coastal edge, its immediate hinterland and areas of sea, is described by Scottish Natural Heritage (2018⁶) as the:

"Distinct, recognisable and consistent pattern of elements on the coast, land and sea that makes one part of the coast different from another".

2.7.2.5 The extent of the coast is principally influenced by the dominance of the sea in terms of physical characteristics, views and experience. The landward extent of the coast can be narrow where edged by cliffs or settlement; or broad where it includes raised beaches, dunes or more open coastal pasture or machair. The major determinant in defining the landward and seaward components of the coast is the sea – the key characteristic.

2.7.2.6 Regional Coastal Character Areas (RCCAs) have been defined within 40km of the Proposed Development (Offshore) for the assessment of effects on coastal character. As agreed through the scoping process the RCCAs that were defined and mapped for the Moray West OWF SLVIA form the basis of the baseline coastal character description.

- 2.7.2.7 Where there are gaps in the RCCA dataset to the east of Banff and west of Duncansby Head, the characterisation will be completed using the layers of desk information available on terrestrial Landscape Character Types (LCTs), together with detailed site survey information and in accordance with Guidance on Coastal Character Assessment (Scottish Natural Heritage, 2018⁶).
- 2.7.2.8 The SLVIA considers RCCAs within the SLVIA study area.
- 2.7.2.9 Due to its scale, distance from shore and extent of visibility, it is necessary to consider the effects of the Proposed Development (Offshore) on both coastal character and landscape character.
- 2.7.2.10 The effect of the Proposed Development (Offshore) on coastal (seascape) character is considered for the defined RCCAs and the immediately adjacent LCT or types covering their hinterland, as defined in Volumes 7B, 7C and 7D, Appendix 12-2: Seascape, Landscape and Visual Impact Assessment Figures, Figures 12-13 and 12-14, where there is a strong visual relationship with the sea/tidal waters and coastal landscapes such as dunes or cliffs.
- 2.7.2.11 The effect of the Proposed Development (Offshore) on landscape character is considered in relation to LCTs inland of these RCCAs and coastal LCTs, where there may be some intervisibility of the Proposed Development (Offshore), but where the land is less likely to have a strong visual relationship with the sea/tidal waters. These LCTs are identified in Figures 12-13 and 12-14 contained in Volumes 7B, 7C and 7D, Appendix 12-2: Seascape, Landscape and Visual Impact Assessment Figures. In general, they are considered unlikely to experience significant character effects as a result of the Proposed Development (Offshore) because it is located in the sea, and these landscapes do not have a strong visual relationship with the sea and their character is fundamentally defined by other characteristics.
- 2.7.2.12 Where detailed assessment of RCCAs is required, effects are assessed on the discrete aspects of coastal character as defined in the coastal character assessment guidance (Scottish Natural Heritage, 2018⁶) as follows:
- Maritime influences and experience from the sea;
 - Character of the coastal edge and its immediate hinterland;
 - Extent of human activity; and
 - Views and visibility (visual assessment).
- 2.7.2.13 The assessment of effects on coastal character focuses upon the experiential characteristics that may be affected by the Proposed Development (Offshore), rather than physical characteristics, which will not be affected by Proposed Development (Offshore).

2.7.3 Seascape and Landscape Character Effects

2.7.3.1 In respect of the Proposed Development (Offshore), the potential seascape/landscape effects, occurring during the Construction, Operation and Maintenance, and Decommissioning periods of the Proposed Development (Offshore) may therefore include, but are not restricted to the following:

- Changes to coastal character/landscape character and qualities: coastal/landscape character may be affected through the incremental effect on the perception of characteristic elements, landscape patterns and qualities (including experiential characteristics) and the addition of new features, the magnitude of which is sufficient to alter the perceived coastal character/landscape character within a particular area.
- Changes to the perceived character of designated landscapes: changes that will affect the perceived special landscape qualities underpinning the designation and potentially its integrity.
- Cumulative effects on coastal character/landscape character: where more than one development of a similar type may lead to a cumulative effect on the perception of coastal character or landscape character.

2.7.3.2 Effects on coastal character and landscape character arising from the Proposed Development (Offshore) will be indirect effects, which will be perceived from the wider landscape, outside the Proposed Development (Offshore) Area.

Evaluating Seascape/Landscape Sensitivity to Change

2.7.3.3 The assessment of sensitivity takes account of the seascape/landscape value and the susceptibility of the receptor to the Proposed Development (Offshore).

2.7.3.4 Seascape/landscape sensitivity often varies in response to both the type and phase of the development proposed and its location, such that sensitivity needs to be considered on a case-by-case basis. It should not be confused with 'inherent sensitivity' where areas of the landscape may be referred to as inherently of 'high' or 'low' sensitivity. For example, a National Park may be described as inherently of high sensitivity on account of its designation and value, although it may prove to be less susceptible (and therefore sensitive) to a particular development. The susceptibility of seascape/landscape receptors has been assessed in relation to change arising from the specific development proposed.

2.7.3.5 The sensitivity of a seascape/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.

Value of the Seascape/Landscape Receptor

2.7.3.6 The value of a seascape/landscape character receptor is a reflection of the value that society attaches to that seascape/landscape. The assessment takes into account the considerations set out in Landscape Institute (2021³) guidance.

2.7.3.7 The assessment of the seascape/landscape value has been classified as high, medium-high, medium, medium-low or low and the basis for this assessment has been made clear using evidence and professional judgement, based on the following range of factors.

- Seascape/landscape designations – A receptor that lies within the boundary of a recognised landscape related planning designation will be of increased value, depending on the proportion of the receptor that is affected and the level of importance of the designation which may be international, national, regional or local. The absence of designations does not however preclude value, as an undesignated landscape character receptor may be valued as a resource in the local or immediate environment.
- Seascape/landscape quality – The quality of a seascape/landscape character receptor is a reflection of its attributes, such as scenic quality, sense of place, rarity and representativeness and the extent to which its valued attributes have remained intact. A seascape/landscape with consistent, intact, well-defined and distinctive attributes is considered to be of higher quality and, in turn, higher value, than a landscape where the introduction of elements has detracted from its character.
- Seascape/landscape experience – The experiential qualities that can be evoked by a landscape 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 seascape/landscape in its own right, the recreational value of the seascape/landscape, and the contribution of other values relating to the nature conservation or archaeology of the area.

Seascape/Landscape Susceptibility to Change

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

2.7.3.9 Landscape susceptibility is particular to both the specific seascape/landscape in question and the change arising from the specific proposal. The assessment of susceptibility of seascape/landscape receptors is

assessed in relation to change arising from the specific development proposal (Landscape Institute and IEMA, 2013¹; paragraphs 3.26, 5.40, 5.41, 5.42 and 5.46).

2.7.3.10

The assessment of the susceptibility of the seascape/landscape receptor to change has been classified as high, medium-high, medium, medium-low or low and the basis for this assessment has been made clear using evidence and professional judgement. Indicators of landscape susceptibility to the type of development proposed (Construction, Operation and Maintenance and Decommissioning of the Proposed Development (Offshore)) are based on the following factors:

- Overall strength and robustness: Collectively, the overall characteristics and qualities of a particular seascape/landscape result in a strong and robust landscape that is capable of reasonably accommodating the influence of the Proposed Development (Offshore) without undue adverse effects on the special landscape qualities (in the case of a designated landscape) or the key characteristics for which an area of seascape/landscape character or a particular element is valued.
- Landscape scale and topography: The scale and topography are large enough to physically accommodate the influence of the Proposed Development (Offshore). Topographical features such as more complex, distinctive or small-scale coastal landforms are likely to be more susceptible than simple, broad and homogenous coastal landforms.
- Openness and enclosure: Openness in the seascape/landscape may increase susceptibility to change because it can result in wider visibility, however open seascape/landscape may also be larger scale and simple, which will decrease susceptibility. Conversely, enclosed seascape/landscapes can offer more screening potential, limiting visibility to a smaller area, however they may also be smaller scale and more complex which will increase susceptibility. In general, large-scale, simple and open seascapes/coastlines are likely to be less susceptible to the Proposed Development (Offshore) than more enclosed, complex seascapes/coasts (such as indented bays, headlands, etc.).
- Skyline: Prominent and distinctive skylines and horizons with important landmark features that are identified in the landscape character assessment, are generally considered to be more susceptible to development in comparison to broad, simple skylines which lack landmark features or contain other infrastructure features.
- Relationship with other development and landmarks: Contemporary landscapes where there are existing similar developments (WTGs or energy developments) or other forms of development (industry, mineral extraction, masts, urban fringe/large settlement, major transport routes) that already have a characterising influence result in a lower susceptibility to development in comparison to areas characterised by smaller scale, historic development and landmarks.

- **Perceptual qualities:** Notable landscapes that are acknowledged to be particularly scenic, wild or tranquil are generally considered to be more susceptible to development in comparison to ordinary, cultivated or farmed/developed landscapes where perceptions of 'wildness' and tranquillity are less tangible. Landscapes which are either remote or appear natural may vary in their susceptibility to development.
- **Landscape context and association:** the extent to which the Proposed Development (Offshore) will influence the character of seascape/landscape receptors across the SLVIA study area relates to the associations that exist between the seascape/landscape receptor within which the Proposed Development (Offshore) are located and the seascape/landscape receptor from which the Proposed Development (Offshore) is being experienced. In some situations, this association will be strong (where the seascapes/landscapes are directly related), and in other situations weak (where the landscape association is weak). The context and visual connection to areas of adjacent seascape/landscape character or designations has a bearing on the susceptibility to development.

Seascape/Landscape Sensitivity Rating

2.7.3.11

An overall sensitivity assessment of the seascape/landscape receptor has been made by combining the assessment of the value of the seascape/landscape character receptor and its susceptibility to change. The evaluation of seascape/landscape sensitivity has been applied for each seascape/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 has been 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 2-4.

Table 2-4: Seascape/landscape sensitivity to change.

Sensitivity Factor	Higher	Lower
Value	Designation: Designated seascape/landscapes with national policy level protection or defined for their natural beauty.	Seascape/landscapes without formal designation. Despoiled or degraded seascape/landscape with little or no evidence of being valued by the community.
	Quality: Higher quality seascape/landscapes with consistent, intact and well-defined, distinctive attributes.	Lower quality seascape/landscapes with indistinct elements or features that detract from its inherent attributes.
	Rarity: Rare or unique seascape/landscape character types, features or elements.	Widespread or 'common' seascape/landscape character types, features or elements.
	Aesthetic/scenic: Aesthetic/scenic or perceptual aspects of designated wildlife, ecological or cultural heritage features that contribute to seascape/landscape character.	Limited wildlife, ecological or cultural heritage features, or limited contribution to seascape/landscape character.
	Perceptual qualities: Seascape/landscape with perceptual qualities of wildness, remoteness or tranquillity.	Seascape/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 seascape/landscape vulnerable and lacking the ability to accommodate change.	Robust seascape/landscape with strong inherent characteristics that is capable of reasonably accommodating change without undue adverse effects.
	Landscape scale: A smaller scale seascape/landscape, with complex, distinctive or small-scale coastal landforms.	A seascape/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 seascape/landscape may also be larger scale and simple which would decrease susceptibility.	Enclosed seascape/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.
	Relationship with other development: Little association with other contemporary development, or	Strong or direct association with other similar contemporary developments and

Sensitivity Factor	Higher	Lower
	strong associations occur with smaller scale or historic development.	seascape/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.
	Seascape/landscape association: Adjacent seascape/landscape character context connected by associated character and views.	Host landscape character is separate from surrounding/adjacent seascape/landscape character with weak association.
Sensitivity	High ←————→	Medium ←————→ Low

Seascape/Landscape Magnitude of Change

2.7.3.12 The magnitude of change on seascape/landscape receptors is an expression of the scale of the change that will result from the Proposed Development (Offshore) and is dependent on a number of variables regarding the size or scale of the change. The consideration of the size or scale of the effect, its geographical extent and its duration and reversibility are kept separate, by basing the magnitude of change solely 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.

Size or Scale of Change

2.7.3.13 This criterion relates to the size or scale of the change to the seascape/landscape that will arise as a result of the Proposed Development (Offshore), based on the following factors:

- Seascape/landscape elements: The degree to which the pattern of elements that makes up the seascape/landscape character will be altered by the Proposed Development (Offshore), by removal or addition of elements in the seascape/landscape. The magnitude of change will generally be higher if the features that make up the seascape/landscape character are extensively removed or altered, and/or if many new offshore elements are added to the seascape/landscape.
- Seascape/landscape characteristics: This relates to the extent to which the effect of the Proposed Development (Offshore) changes perceptually the key characteristics of the seascape/landscape that may be important to its distinctive character. This may include, for example, the scale of the landform, its relative simplicity or complexity, the nature of the seascape/landscape context, the grain or orientation of the seascape/

landscape, the degree to which the receptor is influenced by external features and the juxtaposition of the Proposed Development (Offshore) in relation to these key characteristics. If the Proposed Development (Offshore) is located in a seascape/landscape receptor that is already affected by other similar development, this may reduce the magnitude of change if there is a high level of integration and the developments form a unified and cohesive feature in the seascape/landscape.

- Seascape/landscape designation: In the case of designated landscapes, the degree of change is considered in light of the impacts on the special landscape qualities, which underpin the designation and the impact on the integrity of the designation. All landscapes change over time and much of that change is managed or planned. Often landscapes will have management objectives for 'protection' or 'accommodation' of development. The scale of change may be localised, or occurring over parts of an area, or more widespread affecting whole landscape receptors and their overall integrity.
- Distance: The size and scale of change is also strongly influenced by the proximity of the Proposed Development (Offshore) to the receptor and the extent to which the development can be seen as a characterising influence on the landscape. Consequently, the scale or magnitude of change is likely to be lower in respect of landscape receptors that are distant from the Proposed Development (Offshore) 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.
- Amount and nature of change: The amount of the Proposed Development (Offshore) that will be seen - Visibility of the Proposed Development (Offshore) may range from one WTG blade tip to all of the WTGs; generally, the greater the amount of the Proposed Development (Offshore) that can be seen, the higher the scale of change. The perceived prominence of the Proposed Development (Offshore) within the seascape/landscape - Generally, the magnitude of change is likely to be lower if the Proposed Development (Offshore) is largely perceived to be on the horizon at distance, rather than 'within' the seascape/landscape.

Seascape/Landscape Magnitude of Change Rating

2.7.3.14 The 'magnitude' or 'degree of change' resulting from the Proposed Development (Offshore) is described as 'High', 'High-medium', 'Medium', 'Medium-low', 'Low' or 'Negligible'. The geographic extent, duration and reversibility are described 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 2-5.

Table 2-5: Levels of seascape/landscape magnitude of change.

Magnitude of Change	Definition
High	The Proposed Development (Offshore) will result in a high level of alteration to the baseline characteristics or special qualities of the seascape/landscape, forming the prevailing influence and/or introducing elements that are uncharacteristic in the baseline landscape/seascape. The addition of the Proposed Development (Offshore) will result in a large-scale change, loss or addition to the baseline seascape/landscape.
Medium to high	Intermediate rating with combination of criteria from high magnitude (described above) and medium magnitude (described below).
Medium	The Proposed Development (Offshore) will result in a medium level of alteration to the baseline characteristics or special qualities of the seascape/landscape, forming a readily apparent influence and/or introducing elements that are potentially uncharacteristic in the baseline seascape/landscape. The addition of the Proposed Development (Offshore) will result in a medium-scale change, loss or addition to the baseline seascape/landscape.
Medium to low	Intermediate rating with combination of criteria from medium magnitude (described above) and low magnitude (described below).
Low	The Proposed Development (Offshore) will result in a low level of alteration to the baseline characteristics or special qualities of the seascape/landscape, providing a slightly apparent influence and/or introducing elements that are characteristic in the baseline seascape/landscape. The addition of the Proposed Development (Offshore) will result in a small-scale change, loss or addition to the baseline seascape/landscape.
Negligible or no change	The Proposed Development (Offshore) will result in a negligible alteration or no change to the baseline characteristics or special qualities of the seascape/landscape, providing a barely discernible influence, by introducing elements that are substantially characteristic in the baseline seascape/landscape or by not changing the baseline characteristics. The addition of the Proposed Development (Offshore) will result in negligible change, loss or addition to the baseline seascape/landscape or no change to it.

Evaluating Seascape/Landscape Effects and Significance

- 2.7.3.15 The level of seascape/landscape effect is evaluated through the combination of seascape/landscape sensitivity and magnitude of change. Once the level of effect has been assessed, a judgement is then made as to whether the level of effect is 'significant' or 'not significant' as required by The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017. This process is assisted by the matrix in Table 2-6 which is used to guide the assessment. The factors considered in the evaluation of the sensitivity and the magnitude of the change resulting from the Proposed Development (Offshore) and their conclusion, has been presented in a comprehensive, clear and transparent manner.
- 2.7.3.16 Further information is also provided about the nature of the effects (whether these will be direct/indirect; temporary/permanent/reversible; beneficial/neutral/adverse or cumulative).
- 2.7.3.17 A significant effect will occur where the combination of the variables results in the Proposed Development (Offshore) having a defining effect on the seascape/landscape receptor, or where changes of a lower magnitude affect a seascape/landscape receptor that is of particularly high sensitivity. A major loss or irreversible effect over an extensive area or seascape/landscape character, affecting landscape elements, characteristics and/or perceptual aspects that are key to a nationally valued landscape are likely to be significant.
- 2.7.3.18 A not-significant effect will occur where the effect of the Proposed Development (Offshore) is not defining, and the landscape character of the receptor continues to be characterised principally by its baseline characteristics. Equally a small-scale change experienced by a receptor of high sensitivity may not significantly affect the special landscape quality or integrity of a designation.

2.8 Evaluation of Significance

2.8.1 Overview

- 2.8.1.1 The significance of the effect upon seascape, landscape and visual receptors is determined by correlating the magnitude of the impact and the sensitivity of the receptor, as presented in Table 2-6.
- 2.8.1.2 The significance of the effect on each seascape/landscape character and visual receptor is dependent on all of the factors considered in the sensitivity of the receptor and the magnitude of change resulting from the Proposed Development (Offshore). Judgements on sensitivity and magnitude of change are combined to arrive at an overall assessment as to whether the Proposed Development (Offshore) will have an effect that is

significant or not significant on each seascape/landscape and visual receptor.

- 2.8.1.3 The matrix in Table 2-6 is used as a guide to help inform the threshold of significance when combining sensitivity and magnitude to assess significance. On this basis potential effects are assessed as either negligible, minor, moderate or major. In those instances where there would be no effect, the magnitude has been recorded as 'no change' and the level of effect as 'none'.
- 2.8.1.4 For the purposes of this assessment, any effects with a significance level of 'major' or 'major - moderate' have been deemed significant. 'Moderate' levels of effect have the potential, subject to the assessor's professional judgement, to be considered as significant or not significant, depending on the sensitivity and magnitude of change factors evaluated. These assessments are explained as part of the assessment, where they occur.
- 2.8.1.5 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 Proposed Development (Offshore) having a defining effect on the landscape/seascape 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.
- 2.8.1.6 In line with the emphasis placed in GLVIA3 (Landscape Institute and IEMA, 2013¹) 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. The matrix as well as other aspects of the SLVIA methodology differs from that presented in Volume 1, Chapter 7: EIA Methodology. This deviation from the standard methodology and matrix which allows for topic specific variation whilst allowing a degree of professional judgement.

Table 2-6: Matrix used to guide determination of the level of effect and its significance.

Sensitivity	Magnitude					
	High	Medium-high	Medium	Medium-low	Low	Negligible/No change
High	Major (Significant)	Major (Significant)	Major - Moderate (Significant)	Moderate (Significant or Not Significant)	Moderate - Minor (Not Significant)	Minor (Not Significant)
Medium-high	Major (Significant)	Major - Moderate (Significant)	Moderate (Significant or Not Significant)	Moderate (Significant or Not Significant)	Moderate - Minor (Not Significant)	Minor (Not Significant)
Medium	Major - moderate (Significant)	Moderate (Significant or Not Significant)	Moderate (Significant or Not Significant)	Moderate - Minor (Not Significant)	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)	Negligible (Not Significant)
Low	Moderate (Significant or Not Significant)	Moderate - Minor (Not Significant)	Minor (Not Significant)	Minor (Not Significant)	Negligible (Not Significant)	Negligible (Not Significant)

2.8.2 Geographical Extent of Effects

2.8.2.1 The geographic extent over which the seascape, landscape and visual effects will be experienced is also assessed. This is distinct from the size or scale of impacts 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 Proposed Development (Offshore) and is principally assessed through ZTV, field survey and viewpoint analysis of the extent of visibility likely to be experienced by visual receptors and the perception of character changes in relation to seascape/landscape character. The geographical extent of visual effects is described as per the following examples.

2.8.2.2 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 proportionally, approximately '5 hectares' or '10%' of an area of land or defined recreational area.

- 2.8.2.3 The geographical extent can be described as a linear measurement (m or km) according to the length of route affected. For example, effects on people travelling on a route through the landscape such as a road or footpath can be illustrated via a 'representative viewpoint' that represents a similar visual effect, likely to be experienced by larger numbers of people along that route. The geographical extent of that visual effect can be expressed as approximately '2km' or '10%' of the total length of the route.
- 2.8.2.4 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.
- 2.8.2.5 The extent of the effects on seascape/landscape character will vary depending on the specific nature of the Proposed Development (Offshore). This is not simply an expression of visibility or the extent of the ZTV, but also includes a specific assessment of the extent of seascape/landscape character that will be changed by the Proposed Development (Offshore) in terms of its character.
- 2.8.2.6 In the case of a designated landscape, this refers to the extent the special landscape qualities of the designation are affected and whether this can be defined in terms of area or linear measurements, or subjectively through professional judgement and whether the integrity of the designation is affected.

2.8.3 Duration and Reversibility of Effects

- 2.8.3.1 The duration and reversibility of visual effects are based on the period over which the Proposed Development (Offshore) is likely to exist (during Construction and Operation and Maintenance) and the extent to which the Proposed Development (Offshore) 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 or reversible);
 - Medium-term – 6 to 10 years; and
 - Short-term – 1 to 5 years.

2.8.4 Direct and Indirect Effects

- 2.8.4.1 Direct seascape/landscape effects relate to the host landscape and concern both physical and perceptual effects on the receptor. In Scotland it is considered (in accordance with Scottish Natural Heritage, 2012⁴; 2018⁶) guidance) that there are generally no direct seascape effects as a

consequence of OWF development. This is with the possible exception of the landfall.

- 2.8.4.2 Indirect seascape/landscape effects relate to those landscapes and receptors which are separated by distance or remote from the Proposed Development (Offshore) 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.
- 2.8.4.3 Visual effects are considered as direct effects, as the view itself may be directly altered by the Proposed Development (Offshore).

2.8.5 Positive and Negative Effects

- 2.8.5.1 Guidance provided in GLVIA3 (Landscape Institute and IEMA, 2013¹) on the nature of effect (i.e., beneficial or adverse) states that:

“In the LVIA, thought must be given to whether the likely significant landscape and visual effects are judged to be positive (beneficial) or negative (adverse) in their consequences for landscape or for views and visual amenity’.
- 2.8.5.2 However, 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.
- 2.8.5.3 In the SLVIA the nature of effects refers to whether the seascape/landscape and/or visual effect of the Proposed Development (Offshore) is positive or negative (herein referred to as ‘beneficial/neutral’ or ‘adverse’).
- 2.8.5.4 In relation to many forms of development, SLVIA will identify ‘beneficial’ and ‘adverse’ effects by assessing these under the term ‘Nature of Effect’. The seascape, 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 and assessing the nature of that effect in justifiable terms. However, this is not the case in relation to seascape/landscape and visual effects where the approach combines quantitative and qualitative assessment.
- 2.8.5.5 Generally, in the development of ‘new’ wind farms, a precautionary approach has been adopted, which assumes that significant landscape and visual effects are weighed on the adverse side of the planning balance. Unless it is stated otherwise, the effects considered in the assessment have been considered to be adverse. Beneficial or neutral effects may, however,

arise in certain situations and are stated in the assessment where relevant. The following definitions have been used.

- Beneficial effects - contribute to the seascape, landscape and visual resource through the enhancement of desirable characteristics or the introduction of new, beneficial attributes. The development contributes to the landscape by virtue of good design or the introduction of new landscape planting. The removal of undesirable existing elements or characteristics can also be beneficial, as can their replacement with more appropriate components.
- Neutral effects - occur where the Proposed Development fits with the existing seascape/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, nor where the effects are so limited that the change is hardly noticeable. A change to the seascape, landscape and visual resource is not considered to be adverse simply because it constitutes an alteration to the existing situation.
- Adverse effects - are those that detract from the seascape/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 seascape, landscape and visual resource, or through the removal of elements that are key in its characterisation.

2.8.6 Frequency of Effects

2.8.6.1 Although the SLVIA is based on 'very good' to 'excellent' visibility conditions, a description of visibility frequency is provided using Meteorological Aerodrome Report visibility data from the nearest Met Office station that records visibility, to highlight potential trends in the visibility conditions of the study area. For viewpoints in Highland visibility frequency data is provided based on information from the Wick Met Office station and for Aberdeenshire and Moray from Lossiemouth. Both GLVIA3 (Landscape Institute and IEMA, 2013¹) and NatureScot guidance (Scottish Natural Heritage, 2017⁵; paragraph 39) refer to use of Met Office visibility data to assess typical visibility conditions within an area.

2.8.6.2 Most synoptic observing stations have sensors that provide a measurement of visibility. Visibility sensors measure the meteorological optical range which is defined as the length of atmosphere over which a beam of light travels before its luminous flux is reduced to 5% of its original value. The use of light within the visible spectrum allows the sensor to most accurately simulate human perception of visibility. Reasonably accurate measurements are possible over a range of visibility extending from a few tens of metres to a few tens of kilometres.

- 2.8.6.3 Although there are limitations to how this data can be applied to judgements about offshore wind farm visibility, the visibility data provides some understanding and evidence basis for evaluating the visibility of the WTGs against their background.
- 2.8.6.4 Visibility is categorised into distance ranges, such as <1km, 1 to 2km, 2 to 3km, etc. and a frequency table has been compiled showing the total number of observations within each distance category at hourly intervals for each month. This information is contained in Volume 7B, Appendix 12-6: Visibility Frequency and Range. The data has been summarised and mapped along with the ZTV in Volumes 7B, 7C and 7D, Appendix 12-2: Seascape, Landscape and Visual Impact Assessment Figures, Figure 12-12 to highlight trends in the visibility conditions of the study area, such as the distance range band which has the most visibility observations recorded, and approximate number of viewing days lost to low visibility weather conditions. Visibility data is then assessed to set out the frequency of visibility (over a 10-year period) at different distance ranges, based on Met Office (2024¹⁷) banded visibility definitions:
- Very Poor: <1km;
 - Poor: 1–4km;
 - Medium: 4–10km;
 - Good: 10–20km;
 - Very Good: 20–40km; and
 - Excellent: >40km.
- 2.8.6.5 The Met Office visibility data is then interpreted to allow more specific quantification of the likely frequency of visibility of the Proposed Development (Offshore) from the viewpoints (as a % and average number of days per year), based on the distance of each viewpoint location from the Caledonia OWF. The Met Office visibility frequency data is used to inform an assessment of the 'likelihood of effect' from each viewpoint, in order to qualify any significant effects assessed in optimum visibility conditions with how likely they are to actually occur given the prevailing weather/visibility conditions.

2.9 Assessing Cumulative Seascape, Landscape and Visual Effects

2.9.1 Approach to Additional or Combined Cumulative Effects

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

2.9.1.2 The Landscape Institute and IEMA (2013¹; p120) defines cumulative landscape and visual effects as those that:

"May result from an individual project that is being assessed interacting with the effects of other proposed developments in the area".

2.9.1.3 NatureScot's guidance, Assessing the Cumulative Impact of Onshore Wind Energy Developments (NatureScot, 2021⁷) is widely used across the UK to inform the specific assessment of the cumulative effects of windfarms. Both GLVIA3 (Landscape Institute and IEMA, 2013¹) and NatureScot's guidance (Scottish Natural Heritage, 2017⁵) provide the basis for the methodology for the cumulative SLVIA undertaken in the SLVIA. The NatureScot (2021⁷) guidance states that:

"The purpose of a Cumulative Landscape and Visual Impact Assessment (CLVIA) is to describe, visually represent and assess the ways in which a proposed wind farm would have additional impacts when considered with other consented or proposed wind farms".

2.9.1.4 It defines cumulative landscape effects as those effects that (NatureScot, 2021⁷):

"Can impact on either the physical fabric or character of the landscape, or any special values attached to it".

2.9.1.5 It also explains that cumulative visual effects can be caused by combined visibility (NatureScot, 2021⁷):

"Where the observer is able to see two or more developments from one viewpoint" and/or sequential effects which occur "when the observer has to move to another viewpoint to see different developments".

2.9.1.6 In line with NatureScot (2021⁷) guidance and GLVIA3 (Landscape Institute and IEMA, 2013¹), cumulative effects are assessed in this SLVIA as the additional changes caused by the Proposed Development (Offshore) in conjunction with other similar developments (not the totality of the cumulative effect).

2.9.1.7 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 CIA, such as through design discordance or proliferation of multiple developments affecting characteristics or new geographic areas, and ultimately if character changes occur because of multiple developments becoming a prevailing characteristic of the seascape or view.

2.9.2 CIA of Projects at Different Development Stages

2.9.2.1 In accordance with NatureScot guidance (Scottish Natural Heritage, 2017⁵) and GLVIA3 (Landscape Institute and IEMA, 2013¹; paragraph 7.13), existing projects and those which are under construction have been included in the SLVIA baseline and described as part of the baseline conditions, including the extent to which these have altered character and views, and affected sensitivity to windfarm development. An assessment of the additional effect of the Proposed Development (Offshore) has been undertaken in conjunction with a baseline that includes operational and under-construction projects as part of the main assessment in Volumes 2, 3 and 4, Chapter 12: Seascape, Landscape and Visual Impact Assessment (see Section 12.7). This includes assessment of the Proposed Development (Offshore) against magnitude factors such as its size, scale, spread and landscape context, as well as cumulative effect factors relating to the operational and under-construction wind farms, such as its increase in spread, aesthetic relationship, and contrasts of size and spacing of WTGs of the projects.

2.9.2.2 A further assessment of the additional cumulative seascape, landscape and visual effects of the Proposed Development (Offshore) with other potential future projects at different development stages is undertaken in the CIA based on a tiered approach. As agreed through consultation the CIA includes offshore and onshore wind farms that are operational, under construction and consented.

2.9.2.3 In undertaking the CIA for the Proposed Development (Offshore), other projects and plans under consideration will have differing potential for proceeding to an operational stage and hence a differing potential to ultimately contribute to a cumulative impact alongside the Proposed Development (Offshore). As the availability of information necessary to conduct the CIA will depend on the current status of the other plans or projects, the status of these other plans or projects are recorded as set out as follows:

- Plans or projects that are operational or in construction – The impacts from the Proposed Development (Offshore) have been assessed alongside impacts from all relevant projects which are operational or in construction as part of the baseline in the main assessment contained within the SLVIA.

- Plans or projects which have been granted a consent – The impacts from the Proposed Development (Offshore) have been assessed alongside impacts from all relevant projects which have been granted consent at least six months before the Proposed Development (Offshore)'s application submission.

- 2.9.2.4 A long-list of cumulative projects has been undertaken and presented in Volume 7A, Appendix 7-1: Cumulative Impact Assessment Methodology. This has been compiled in accordance with The Planning Inspectorate (2019¹⁸) Advice Note 17 Cumulative Effects Assessment. This has been reviewed to ascertain the OWFs that are or may be located in the SLVIA study area, including those at scoping or early concept stage. In addition, a search of onshore wind farm development that is operational, under construction and consented has been undertaken. These projects are mapped on Figure 12-6 of Volumes 7B, 7C and 7D, Appendix 12-2: Seascape, Landscape and Visual Impact Assessment Figures.
- 2.9.2.5 Those included in the overall short list for the CIA have then been subject to a screening exercise specific to potential cumulative impacts on seascape, landscape and visual receptors and in accordance with the approach agreed with consultees which determined that only onshore and offshore wind farms that are operational, under construction or consented should be included in the SLVIA. Also of relevance to the CIA is the decommissioning of the Beatrice facilities (Repsol, 2024¹⁹) including the associated platforms and two demonstrator WTGs.
- 2.9.2.6 The specific projects scoped into the CIA for seascape, landscape and visual receptors, are set out in Section 12.8.2 of Volumes 2, 3 and 4, Chapter 12: Seascape, Landscape and Visual Impact Assessment.
- 2.9.2.7 The range of potential cumulative effects that are identified and included in the CIA, is a subset of those considered for the Proposed Development (Offshore) alone assessment. This is because some of the potential impacts identified and assessed for the Proposed Development (Offshore) alone, are localised and temporary in nature. It is considered therefore, that these potential impacts have limited or no potential to interact with similar changes associated with other plans or projects. These have therefore been scoped out of the CIA.
- 2.9.2.8 Similarly, some of the potential impacts considered within the Proposed Development (Offshore) alone assessment are specific to a particular phase of development (e.g., Construction, Operation and Maintenance or Decommissioning). Where the potential for cumulative effects with other plans or projects only have potential to occur where there is spatial or temporal overlap with the Proposed Development (Offshore) during certain phases of development, impacts associated with a certain phase may be omitted from further consideration where no plans or projects have been identified that have the potential for cumulative effects during this period.

2.9.3 Types of Cumulative Effect

Cumulative Visual Effects

16.10.2.1 Cumulative visual effects consist of combined and sequential effects:

- Combined visibility – occurs where the observer is able to see two or more developments from one viewpoint. Combined visibility may either be where several developments are within the observer’s main angle of view at the same time, or, where the observer has to turn to see the various developments. The cumulative visual effect of the Proposed Development (Offshore) 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 developments in combined views; and its position relative to other developments and the landscape context in successive views.
- Sequential visibility – occurs when the observer has to move to another viewpoint to see different developments. Sequential effects are assessed along regularly used routes such as major roads, railway lines and footpaths. The occurrence of sequential effects range from ‘frequently sequential’ (the features appear regularly and with short time lapses between, depending on speed of travel and distance between the viewpoints) to ‘occasionally sequential’ (long time lapses between appearances, because the observer is moving slowly and/or there are large distances between the viewpoints). The cumulative visual effect is more likely to be significant when frequently sequential.

Cumulative Seascape/Landscape Effects

2.9.3.1 Cumulative development within a particular area may build up to create different types of seascape/landscape effect. The significance of the cumulative seascape/landscape effects of the addition of the Proposed Development (Offshore) will be assessed as follows:

- If the Proposed Development (Offshore) forms a separate isolated feature from other developments within the seascape/landscape, too infrequent and of insufficient significance to be perceived as a characteristic of the area, then the contribution of the Proposed Development (Offshore) to the cumulative seascape/landscape effect is unlikely to be significant.
- If the addition of the Proposed Development (Offshore) results in wind farms forming a key characteristic of the seascape/landscape, exerting sufficient presence as to establish or increase the extent of a ‘seascape/landscape with windfarms’; then the contribution of the Proposed Development (Offshore) to the cumulative seascape/landscape effect may be significant or not significant, depending on the sensitivity of the receptor and magnitude of the change.

- If the addition of the Proposed Development (Offshore) results in wind farms forming the prevailing characteristic of the seascape/landscape, seeming to define the seascape/landscape as a 'windfarm seascape/landscape character type' then the contribution of the Proposed Development (Offshore) to the cumulative seascape/landscape effect is likely to be significant.

2.9.4 Assessing Cumulative Seascape, Landscape and Visual Effects

Cumulative Sensitivity of Seascape, Landscape and Visual Receptors

2.9.4.1 In evaluating cumulative sensitivity in the CIA the sensitivity to change of seascape, landscape and visual receptors are retained from the main assessment in Section 12.7 of Volumes 2, 3 and 4, Chapter 12: Seascape, Landscape and Visual Impact Assessment.

Cumulative Magnitude of Change

2.9.4.2 The cumulative magnitude of change is an expression of the degree to which seascape, landscape and visual receptors will be changed by the addition of the Proposed Development (Offshore) cumulatively. The cumulative magnitude of change is assessed according to a number of criteria, described below.

- The location, position and visual relationship of the Caledonia OWF: Depending on the viewpoint/viewing angle from the coast, the Caledonia OWF may be viewed adjacent to other developments on the skyline, covering a wider lateral spread; they may form one grouping or could be viewed separately on the skyline (separated by space on the skyline); or could be viewed with one project being 'behind' the other project. The overall magnitude of change will vary depending on this visual relationship at different viewpoints and is likely to be higher when two projects are viewed adjacent to each other over a wider lateral spread; and lower when one project is viewed behind the other project;
- The location of the Caledonia OWF in relation to other developments: If the Caledonia OWF is seen in a part of the view or setting to a seascape/landscape receptor that is not affected by other development, this will generally increase the cumulative magnitude of change as it will extend influence into an area that is currently unaffected by development. Conversely, if the Caledonia OWF is seen in the context of other developments, 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 proposal is similar to that of the other developments 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: The proportion (or horizontal angle) of the view that is affected by the combined lateral spread of the Caledonia OWF and other projects on the horizon. If the lateral spread/horizontal angle of the Caledonia OWF will add notably to the developed horizon in a view, the cumulative magnitude of change will tend to be higher;
- 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 will be. The addition of the Caledonia OWF to a view or seascape/ landscape where a number of smaller developments are apparent will 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 Caledonia OWF is of a similar scale to other visible developments, particularly those seen in closest proximity to it, the cumulative magnitude of change will generally be lower as it will have more integration with the other sites and will be less apparent as an addition to the cumulative situation;
- The consistency of image of the proposal in relation to other developments: The cumulative magnitude of change of the Caledonia OWF is likely to be lower if its turbine height, arrangement, layout design and visual appearance/aesthetics are broadly similar to other developments in the seascape, as they are more likely to appear as relatively simple and logical components of the seascape;
- The context in which the developments are seen: If projects are seen in a similar seascape/landscape context, the cumulative magnitude of change is likely to be lower due to visual integration and cohesion between the sites. If projects are seen in a variety of different settings, this can lead to a perception that development is unplanned and uncoordinated, affecting a wide range of landscape character and blurring the distinction between them; and
- The magnitude of change of the Caledonia OWF as assessed in the project alone assessment: Where the Caledonia OWF is assessed to have a negligible or low magnitude of change on a view or seascape/landscape receptor, there is more likely to be a low cumulative effect.

2.9.4.3

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

- High – where the magnitude of change arising from the Caledonia OWF will result in a high cumulative change, loss or addition to the seascape/ landscape receptor or view;

- Medium – where the magnitude of change arising from the Caledonia OWF will result in a medium change, loss or addition to the seascape/landscape receptor or view;
- Low – where the magnitude of change arising from the Caledonia OWF will result in a low change, loss or addition to the seascape/landscape receptor or view; and
- Negligible – where the magnitude of change arising from the Caledonia OWF will result in a negligible incremental change, loss or addition to the seascape/landscape receptor or view.

2.9.4.4 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.

Significance of Cumulative Effects

2.9.4.5 The objective of the cumulative assessment is to determine whether the effects of the Proposed Development (Offshore) on seascape, landscape and visual receptors, when seen or perceived cumulatively with the construction and operation and maintenance of the other projects, will be significant or not significant. Significant cumulative seascape, landscape and visual effects arise where the addition of the Proposed Development (Offshore), leads to wind farms becoming a prevailing seascape, landscape or visual characteristic of a receptor that is sensitive to such change. Cumulative seascape/landscape effects may evolve as follows:

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

windfarm or energy generation/transmission development may already exist as part of the baseline seascape context.

- 2.9.4.6 Less extensive, but nevertheless potentially significant cumulative seascape, landscape and visual effects may also arise as a result of the addition of the Caledonia OWF where it results in a seascape, landscape or view becoming defined by the presence of more than one OWF or similar/large scale development, so that other patterns and components are no longer definitive, or where the proposal contrasts with the scale or design of an existing or development.
- 2.9.4.7 Higher levels of cumulative effect may arise when projects are clearly visible together in views, however provided that the projects are designed to achieve a high level of visual integration, with few notable visual differences between developments, these effects may not necessarily be significant. In particular, the effects of an extension to an existing development are often less likely to be significant, where the effect is concentrated, providing that the design of the developments are compatible and that the overall capacity of the seascape is not exceeded.
- 2.9.4.8 Higher levels of cumulative effect may arise where the seascape, landscape and visual receptor becomes defined by a particular type of development, or if the Caledonia OWF extends across seascape/landscape character areas or clear visual/topographic thresholds in a view.
- 2.9.4.9 More substantial cumulative effects may result from developments that have some geographical separation, but remain highly inter-visible, potentially resulting in extending effects into new areas, such as an increased presence of development on a skyline, or the creation of multiple, separate OWF defined seascape/landscapes.

2.10 Visual Representations

2.10.1 Overview

- 2.10.1.1 ZTVs and visualisations (wirelines or wirelines and photomontages) are graphical images produced to assist and illustrate the SLVIA and the CIA. The methodology used for viewpoint photography and photomontages has been produced in accordance with NatureScot and other guidance Scottish Natural Heritage, (2017⁵), Landscape Institute and IEMA (2013¹), Landscape Institute (2019²) and The Highland Council (2016⁹).
- 2.10.1.2 ZTVs and visual representations are produced on the assumption that the WTGs are modelled at a maximum blade tip height of 355m above Mean Sea Level for bottom-fixed WTGs and 327.19m above Mean Sea Level for floating WTGs in order to take into account their increased tip or hub height relative to the land at the Highest Astronomical Tide level.

2.10.2 Zone of Theoretical Visibility

- 2.10.2.1 The ZTVs in Volumes 7B, 7C and 7D, Appendix 12-2; Seascape, Landscape and Visual Impact Assessment Figures (Figure 12-8 onwards) have been calculated using Geographical Information System (GIS) software to generate a ZTV of the WTGs located within the Caledonia OWF to demonstrate the theoretical extent of visibility from any point in the study area.
- 2.10.2.2 The A3 scale ZTVs are based on OS Terrain 50 Digital Terrain Model (DTM) whilst the more detailed ZTVs are based on OS Terrain 5 DTM data across the majority of the SLVIA study area with Terrain 50 used in more distant locations within the wider study area beyond the environs of any viewpoints. The computer model has included the entire SLVIA study area and taken account of atmospheric refraction and the Earth's curvature. The resulting ZTV plots have been overlaid on OS mapping at an appropriate scale and presented as figures using desktop publishing or graphic design software.
- 2.10.2.3 Cumulative ZTV plots based on the intervisibility of the WTGs within the Caledonia OWF and other relevant developments within the study area have also been produced.
- 2.10.2.4 There are limitations which should be considered in the interpretation and use of the ZTV as follows:
- The ZTVs do not account for the screening effects of vegetation or built form or small-scale landform changes;
 - The ZTVs are based on theoretical visibility from 2m Above Ground Level. This height is used in production of the ZTVs to compensate for potential inaccuracies in digital terrain data and to ensure that the realistic 'worst-case' scenario is represented (Scottish Natural Heritage, 2017⁵);
 - The Blade Tip ZTV does not indicate the decrease in visibility that occurs with increased distance from the Caledonia OWF; 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 WTGs may gain views of the smallest extremity of blade tips, or of seven full WTGs. This can make a considerable difference in the effects of the Proposed Development (Offshore) on that area.
- 2.10.2.5 These limitations mean that, while the ZTV is used as a starting point in the assessment by providing an indication of where the WTGs of the Proposed Development (Offshore) will be theoretically visible, it tends to present a worst-case or over-estimate the actual visibility. The information drawn from the ZTV is checked by field survey observation.
- 2.10.2.6 The SLVIA includes a Horizontal Angle ZTV to show the horizontal field of view (in degrees) that may be affected by views of the WTGs.

2.10.3 Baseline Photography

- 2.10.3.1 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.
- 2.10.3.2 The photographs used to produce the photomontages were taken as part of a 360 degree panorama at the times of day and locations agreed with the consultees using Canon EOS 5D and 6D Digital Single Lens Reflex (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 1.5m AGL.
- 2.10.3.3 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. GLVIA3 (Landscape Institute and IEMA, 2013¹; paragraph 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".*
- 2.10.3.4 In preparing photomontages for the SLVIA, 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 WTGs within the Caledonia OWF may be most visible.

2.10.4 Visualisations

- 2.10.4.1 Photomontages have been produced in accordance with current guidance provided by Scottish Natural Heritage (2017⁵), The Highland Council (2016⁹), the Landscape Institute and IEMA (2013¹) and the Landscape Institute (2019²).
- 2.10.4.2 A photomontage is a visualisation which superimposes an image of a proposed development upon a photograph or series of photographs. Photomontage is a widespread and popular visualisation technique, which allows changes in views and visual amenity to be illustrated and assessed, within known views of the 'real' landscape.
- 2.10.4.3 To create the baseline panorama, the frames are individually cylindrically projected and then digitally joined to create a fully cylindrically projected panorama using Adobe Photoshop or PTGui software. This process avoids

the wide-angle effect that 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.

- 2.10.4.4 Tonal alterations are made using Adobe software to create an even range of tones across the photographs once joined.
- 2.10.4.5 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 (Scottish Natural Heritage, 2017⁵). These are cylindrically projected images and should be viewed flat at a comfortable arm's length.
- 2.10.4.6 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.
- 2.10.4.7 Wireline representations that illustrate the WTGs located within the Caledonia OWF and set within a computer-generated image of the landform are used in the assessment to predict theoretical appearance of the WTGs. These are produced with Resoft WindFarm software and are based on OS Terrain 5 DTM. There are limitations in the accuracy of DTM data so that landform may not be picked up precisely and may result in WTGs being more or less visible than is shown, however, the use of OS Terrain 5 minimises these limitations. Where descriptions within the assessment identify the numbers of WTGs visible this refers to the illustrations generated and therefore the reality may differ to a degree from these impressions. It is important to note that wirelines overemphasise WTG visibility, particularly where they are located at substantial distances from the viewpoint. In some instances, the foremost and more distant WTGs represented in a wireline may be separated by distances of over 30km, resulting in a diversity of actual visibility across the Caledonia OWF.
- 2.10.4.8 Due to the separation distances between Highland and Aberdeenshire/Moray cumulative onshore wind farms located in Highland and Orkney are not shown in the cumulative wirelines prepared for the Aberdeenshire/Moray viewpoints and the Aberdeenshire/Moray onshore wind farms are not shown in the Orkney or Highland viewpoints.
- 2.10.4.9 Daytime visualisations and wirelines show a WTG model which represents the maximum development scenario within the Caledonia OWF and allow the potential proportions of the WTGs to be appreciated from the visualisations.
- 2.10.4.10 Fully rendered photomontages have been produced for the agreed viewpoints using Resoft WindFarm software, to provide a photorealistic image of the appearance of the WTGs within the Caledonia OWF. In the daytime photomontages modelled representations are combined with the

baseline (or future baseline) view photographs to create a photorealistic rendered photomontage image of the Proposed Development (Offshore).

- 2.10.4.11 'Panoramic photomontages' are produced in the SLVIA with a 53.5° HfoV, based on relevant guidance (Scottish Natural Heritage, 2017⁵) and due to their suitability to encompass the horizontal spread of the Caledonia OWF and show the turbines at a representative scale and distance.
- 2.10.4.12 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 should be printed on paper 841 x 297mm (half A1) which provides for a relatively large scale image (820 mm by 260mm).
- 2.10.4.13 In the wirelines, the WTGs are shown with the central WTGs facing the viewer directly, with the full rotor diameter visible at its tallest extent. In the photomontages, the WTG rotors are shown with a random appearance with the central WTGs facing the viewer directly.
- 2.10.4.14 In the 53.5 degree field of view wirelines the existing and under construction offshore wind farms have been added in grey to aid understanding of the context.
- 2.10.4.15 In the 53.5 degree field of view photomontages the existing and under construction offshore wind farms have been photomontaged in to the visualisations.
- 2.10.4.16 Single frame photomontages have been prepared for the Highland Council viewpoints in accordance with The Highland Council (2016⁹). The existing and under construction offshore wind farms have been photomontaged in to the visualisations. Notably the single frame photomontages do not show the full OWF cumulative context which is illustrated by the wider panoramic visualisations.
- 2.10.4.17 Section 4, page 11 of The Highland Council (2016⁹) visualisation guidance, Images for Visual Impact Assessment, requests the following statement be included:
"When viewed at a comfortable arm's length (approx. 500mm), this printed image is representative of our detailed central vision, but is not representative of scale and distance".
- 2.10.4.18 Rendering of the WTGs in the photomontages is as photorealistic as possible to the conditions shown in each viewpoint photograph. In many cases, due to the distances offshore the WTGs have been emphasised to make them visible in digital or printed formats. There may be some variation in the appearance and visibility of the WTGs 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 WTGs 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 Caledonia OWF 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 Proposed Development (Offshore).

2.10.5 Night-time Visualisations

2.10.5.1 The visual effect of the Caledonia OWF at night has been assessed in Volumes 7B, 7C and 7D, Appendix 12-1: Night Time Assessment, informed by the night-time photomontage visualisations produced from representative viewpoints, to visually represent aviation and marine navigation lighting at night. Photomontages showing aviation lighting at 200cd are provided in Volumes 7B, 7C and 7D, Appendix 12-2: Seascape, Landscape and Visual Impact Assessment Figures to support the assessment.

2.10.5.2 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.

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

2.10.5.4 As is the case with the existing OWFs the aviation lights will flash. This is not represented by the visualisation which shows all the Proposed Development (Offshore) aviation lights on. Each of the different OWF has a different flashing sequence/rhythm with each of the WTGs within one OWF flashing at the same time. The aviation lights of the under construction Moray West OWF have been added to the baseline views.

2.10.6 Information on Limitations of Visualisations

2.10.6.1 The photographs and other graphic material such as wirelines and photomontages used in this assessment are for illustrative purposes only and, whilst useful tools in the assessment, are not considered to be completely representative of what would be apparent to the human eye. The assessments are carried out from observations in the field and therefore may include elements that are not visible in the photographs. Limitations of photomontages are set out further below.

2.10.6.2 The photomontage visualisations showing the WTGs and OSPs within the Caledonia OWF (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 Proposed Development (Offshore) 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 WTGs and the distance to the WTGs 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 or the flashing of aviation lighting;
- 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 Proposed Development (Offshore) these images are best viewed at the viewpoint location shown with the images printed and viewed at the correct size (820mm by 260mm);
- 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 computer 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. However, limitations have been minimised through the timing of surveys during the most favourable periods of very good or excellent visibility. These limitations relating to viewpoint photography do not affect the assessments of likely significance assessed for relevant receptors, which assume optimum visibility and are informed by professional judgement of the effects of offshore WTGs at similar range gained from other projects that provide precedent for magnitude of change judgements.

2.10.7 Technical Methodology – Visualisations

2.10.7.1 In accordance with the requirements of Landscape Institute (2019²), Table 2-7 sets out the technical information for the preparation of the visualisations contained in Volumes 7B, 7C and 7D, Appendix 12-3: Seascape, Landscape and Visual Impact Assessment Visualisations.

Table 2-7: 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	3-10m (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.
Preparation of panoramic photographs	PTGui Pro 12.21 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/Visualisation	
Topographic height data	OS Terrain 5 and OS Terrain 50.
Use of coordinates in software	Coordinates are brought in from the surveyed GPS coordinates. Positions checked and adjusted using aerial photography.
Markers for horizontal alignment	Existing OWF WTGs and their known coordinates.
Markers for vertical alignment	Existing OWF WTGs and their known coordinates and heights.
Rendering software	Resoft Windfarm v.5.2.5.3 (Wind turbines in wirelines and photomontages). Sketchup or AutoCAD Map 3D 2018 (Offshore Substation Platforms, and jacket foundations). Autodesk 3ds Max 2018. Visual Nature Studio V 3.10.

Category	Details
Limitations	
Terrain data	Local, small-scale landform may not be reflected in the data and subsequently the visualisation but may alter the actual visibility of the Proposed Development (Offshore), either by screening actual visibility or revealing parts of the WTGs that are not actually visible.
Movement	Static images are unable to capture the movement within the view or of the WTGs.
Flashing of aviation lights	Static images are unable to capture the flashing nature of the aviation lights in the view.

3 References

- ¹ Landscape Institute and Institute of Environmental Management and Assessment (IEMA) (2013) 'Guidelines for Landscape and Visual Impact Assessment: Third Edition (GLVIA3)'
- ² Landscape Institute (2019) 'Visual Representation of Development Proposals'
- ³ Landscape Institute (2021) 'Assessing landscape value outside national designations, Technical Guidance Note 02/21'
- ⁴ Scottish Natural Heritage (2012) 'Offshore Renewables – Guidance on Assessing the Impact on Coastal Landscape and Seascape. Guidance for Scoping an Environmental Statement'
- ⁵ Scottish Natural Heritage (2017) 'Visual Representation of Wind farms, Guidance (Version 2.2)'. Available at: <https://www.nature.scot/doc/visual-representation-wind-farms-guidance> (Accessed 02/05/2024)
- ⁶ Scottish Natural Heritage (2018) 'Guidance Note. Coastal Character Assessment (Version 1a)'
- ⁷ NatureScot (2021) 'Guidance - Assessing the cumulative landscape and visual impact of onshore wind energy developments'. Available at: <https://www.nature.scot/doc/guidance-assessing-cumulative-landscape-and-visual-impact-onshore-wind-energy-developments> (Accessed 02/05/2024)
- ⁸ Scottish Government (2022) 'Guidance for applicants on using the design envelope for applications under section 36 of the Electricity Act 1989'. June 2022. Available at: <https://www.gov.scot/publications/guidance-applicants-using-design-envelope-applications-under-section-36-electricity-act-1989/> (Accessed 02/05/2024)
- ⁹ The Highland Council (2016) 'Visualisation Standards for Wind Energy Developments'. Available at: https://www.highland.gov.uk/downloads/file/12880/visualisation_standards_for_wind_energy_developments (Accessed 02/05/2024)
- ¹⁰ Parliament of the United Kingdom (1989) 'Electricity Act 1989'. Available at: <https://www.legislation.gov.uk/ukpga/1989/29/contents> (Accessed 15/10/2024)
- ¹¹ Scottish Government (2017) 'The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017'. Available at: <https://www.legislation.gov.uk/ssi/2017/101/contents> (Accessed 15/10/2024)
- ¹² Civil Aviation Authority (CAA) (2016a) 'CAP 764: Policy and Guidelines on Wind Turbines'. Available at: <https://www.caa.co.uk/our-work/publications/documents/content/cap-764/> (Accessed 02/05/2024)

¹³ Civil Aviation Authority (CAA) (2016b) 'Air Navigation Order 2016. Information regarding the Air Navigation Order (ANO) 2016 and updates'. Available at: <https://www.caa.co.uk/general-aviation/the-ga-unit/air-navigation-order-2016/> (Accessed 02/05/2024)

¹⁴ Planning and Environmental Appeals Division Report to the Scottish Ministers Section 36 Of The Electricity Act 1989 And Section 57 of Town and Country Planning (Scotland) Act 1997 (2021). Available at <https://www.dpea.scotland.gov.uk/CaseDetails.aspx?id=120491&T=20>

¹⁵ Institute of Lighting Professionals (2021) 'Guidance Note 1 for the reduction of obtrusive light 2021'

¹⁶ HM Government (2011) 'UK Marine Policy Statement'. HM Government, Northern Ireland Executive, Scottish Government, Welsh Assembly Government. Available at: <https://www.gov.scot/publications/uk-marine-policy-statement-march-2011> (Accessed 02/05/2024)

¹⁷ Met Office (2024) 'Definitions of codes'. Available at: <https://www.metoffice.gov.uk/services/data/datapoint/code-definitions> (Accessed 15/10/2024)

¹⁸ The Planning Inspectorate (2019) 'Advice Note 17 Cumulative Effects Assessment'

¹⁹ Repsol (2024) 'Beatrice'. Available at: <https://www.repsolresourcesuk.com/decommissioning/beatrice> (Accessed 15/10/2024)

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