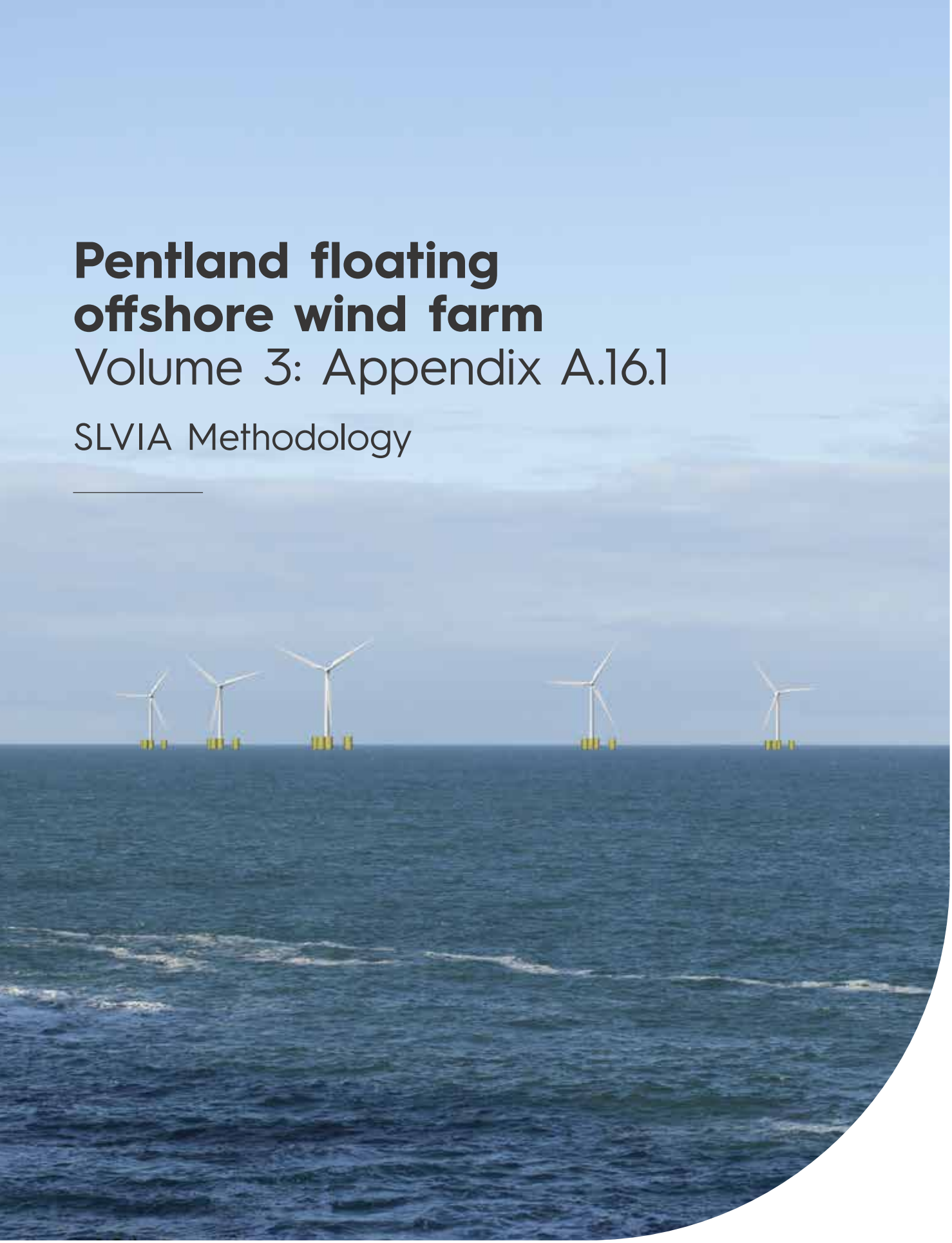
Pentland floating offshore wind farm

Volume 3: Appendix A.16.1

SLVIA Methodology



PENTLAND FLOATING OFFSHORE WIND FARM

OFFSHORE EIAR (VOLUME 3): TECHNICAL APPENDICES

APPENDIX 16.1: SLVIA METHODOLOGY

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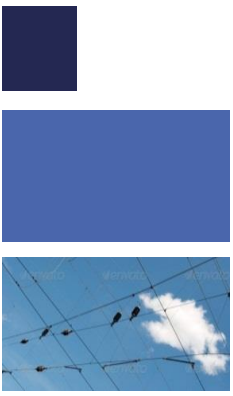

APPENDIX 16.1 SEASCAPE LANDSCAPE AND VISUAL IMPACT ASSESSMENT METHODOLOGY

1.1 Introduction

The project-wide approach to the Environmental Impact Assessment (EIA) methodology is set out in Offshore EIAR (Volume 2): Chapter 6: EIA Methodology. This appendix describes the methodology to be used within the Seascape, Landscape and Visual Impact Assessment (SLVIA) of the Environmental Impact Assessment Report (EIAR) for the Pentland Floating Offshore Wind Farm (PFOWF) Array (the Offshore Development).

This SLVIA methodology appendix has been structured as follows:

- Overview of SLVIA Methodology;
- Iterative Assessment and Design;
- Guidance, Data Sources and Site Surveys;
- Assessing Seascape and Landscape Effects;
- Assessing Visual Effects;
- Assessing Cumulative Seascape, Landscape and Visual Effects;
- Evaluation of Significance;
- Nature of Effects; and
- Visual Representations.

The SLVIA is supported by a set of GIS plans and visualisations, which are presented in Appendix 16.9: SLVIA Figures.

1.2 Overview of the SLVIA Methodology

The assessment will be undertaken in accordance with the Landscape Institute and IEMA (2013) Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (GLVIA3), and other best practice guidance including visualisation standards produced by The Highland Council (THC) and NatureScot. The SLVIA will assess the likely effects that the construction, operation and decommissioning of the Offshore Development will have on the seascape, landscape and visual resource, encompassing effects on seascape and landscape character, designated landscapes, visual effects and cumulative effects.

The SLVIA is based on the 'Design Envelope' approach as described in Chapter 5: Project Description. The potential significant effects of a realistic 'worst case' scenario are assessed and illustrated in the SLVIA. This approach is as set out in Scottish Government (2022) 'Guidance for Applicants on using the design envelope for applications under Section 36 of the Electricity Act 1989' and Planning Inspectorate (2018) 'Advice Note Nine: Rochdale Envelope'. This worst case scenario is described in Chapter 16: Seascape, Landscape and Visual Impact Assessment at Section 16.5.4 and was discussed with NatureScot and THC.

The significance of seascape, landscape and visual effects is determined by an assessment of the 'sensitivity' of each receptor or group of receptors and the 'magnitude of change' that would result from the Offshore Development. The evaluation of sensitivity takes account of the value and susceptibility of the receptor to the Offshore Development. This is combined with an assessment of the magnitude of change which takes account of the size and scale of the proposed change. By combining assessments of sensitivity and magnitude of change, a level of seascape, landscape or visual effect can be evaluated and determined. The resulting level of effect is described in terms of whether it is significant or not significant and the level of effect in terms of major, moderate or minor. The type of effect is described as either direct or indirect; temporary or permanent (reversible); cumulative; and beneficial, neutral or adverse.

The assessment also considers the cumulative effects likely to result from additional changes to the seascape, landscape and visual amenity caused by the Offshore Development in addition to other developments that occurred in the past, present or are likely to occur in the foreseeable future.

In each case an appropriate and proportionate level of assessment has been undertaken and agreed through consultation at the scoping stage. The level of assessment may be 'simple', requiring desk-based data analysis, or 'detailed', requiring site surveys and investigations in addition to desk-based analysis.

The SLVIA involves a combination of quantitative and qualitative assessment and, wherever possible, a consensus of professional opinion has been sought through consultation, internal peer review, and the adoption of a systematic, impartial, and professional approach.

1.2.1 Interface between SLVIA and LVIA

The Onshore Development associated with the Offshore Development will be covered either by a Landscape and Visual Impact Assessment (LVIA) that will form part of the EIAR and be submitted as a consent application separately for the Onshore Development or by a variation to the existing Dounreay Tri consent. The SLVIA and the LVIA will consider potential whole project effects of the Pentland Floating Offshore Wind Farm (the Offshore Development). The offshore infrastructure of the Offshore Development, including the offshore wind turbine generators (WTGs) including substructures, and offshore export cable corridor, are assessed in the SLVIA and the onshore infrastructure of the Onshore Development, including the landfall, onshore cable corridor and onshore substation, are covered by the LVIA. Both the SLVIA and the LVIA follow a broadly similar assessment methodology based on GLVIA3 (Landscape Institute and IEMA, 2013).

In Section 16.9 of Offshore EIAR (Volume 2): Chapter 16: Seascape, Landscape and Visual Impact Assessment, an overview of the potential whole project effects is presented. This considers the potential interrelated effects of the Offshore Development and Onshore Development on landscape and visual receptors within the SLVIA Study Area. An example could include effects on views where both offshore and onshore infrastructure would be visible, potentially resulting in whole project landscape and visual effects as a result of the Offshore Development and Onshore Development. An overview of these potential effects on specific receptors with potential to be affected is presented in Section 16.9 of Offshore EIAR (Volume 2): Chapter 16: Seascape, Landscape and Visual Impact Assessment.

1.2.2 Assessment of the Foreshore

NatureScot in their 'Guidance Note on Coastal Character' (Scottish Natural Heritage (SNH), 2017) supports the concept of considering seascape as a combination of sea, coast and hinterland, setting out their definition as follows;

'Seascape' refers to an area, as perceived by people, from land, sea or air, where the sea is a key element of the physical environment. Defining the character of the coast and its relationship with both its hinterland and the sea is an important aspect of character assessment.'

The proposed approach to the SLVIA means that the 'foreshore', which includes beaches, inter-tidal areas and coastlines between MHWS and MLWS, will be considered in both the SLVIA and LVIA. This ensures adequate consideration will be given to assessing the relationship between land and sea, and the interactions across the interface between them.

1.2.3 Defining the SLVIA Study Area

The SLVIA Study Area covers a radius of 50 km around the PFOWF Array Area, as illustrated in Figure 16.1. The SLVIA Study Area broadly comprises a southern terrestrial area, including Caithness to the south and south-east, and Sutherland to the south-west, and a northern offshore area, including the Pentland Firth to the north and north-east and the Atlantic Ocean to the north-west. The SLVIA Study Area extends far enough to include all receptors which could be significantly affected and presents an outer limit to where significant effects could occur. The extent of the SLVIA Study Area has been established by applying guidance, as well as professional judgement and experience and agreed with THC and NatureScot through the scoping process.

IEMA Guidance (IEMA, 2015 and 2017) recommends a proportionate EIAR focused on the significant effects and a proportionate EIAR topic chapter. This is supported by LVIA Guidance produced by the Landscape

Institute (GLVIA3) (para 3.16). This guidance recommends that *"The level of detail provided should be that which is reasonably required to assess the likely significant effects".* Para 5.2 at p70 also states that "*The study area should include the site itself and the full extent of the wider landscape around it which the proposed development may influence in a significant manner".*

Other wind farm specific guidance, such as NatureScot's Visual Representation of Wind Farms Guidance (SNH, 2017) recommends that ZTV distances are used for defining study areas based on WTG height. This guidance recommends a 45 km radius for WTGs greater than 150 m to blade tip (para 48, p12), however it does not go beyond WTGs above 150 m in height. The height of current offshore WTGs has now exceeded the heights covered in this guidance. The NatureScot guidance recognises that greater distances may need to be considered for larger WTGs used offshore, as is the case for the SLVIA Study Area for the Offshore Development.

The ZTVs shown in Figures 16.6a. 16.6b, 16.7a and 16.7b are based on WTGs of 300 m to tip (above Highest Astronomical Tide (HAT)). The WTGs are located as close as is practical to the southern boundary of the PFOWF Array Area, which in turn is closest to the northern coastal edge of the Mainland of Scotland. This represents the worst case scenario considered in the SLVIA. Consideration of the blade tip ZTV (Figure 16.6a) indicates that theoretical visibility of the Offshore Development mainly occurs within 50 km and that beyond this distance the geographic extent of visibility will become very restricted. At distances over 50 km, the horizontal spread of the Offshore Development would also occupy a small portion of available views and the apparent height of the WTGs would also appear very small, therefore, significant visual effects would be unlikely to arise at greater than this distance, even if the WTGs would be visible. Assessments carried out for Offshore Wind Farms with WTGs of a similar scale have assessed significant effects as occurring only within a much closer range than 50 km.

The influence of the earth's curvature begins to limit the apparent height and visual influence of the WTGs visible at long distance, such as over 50 km, as the lower parts of the WTGs would be partially hidden behind the apparent horizon, leaving only the upper parts visible above the skyline. The influence of climatic conditions also has a bearing with variable visibility having an effect on the actual visibility of the Offshore Development, especially from long distances over 50 km. Based on a review of Met Office visibility data presented in Appendix 16.8, visibility frequency drops sharply at longer distances, such that 'excellent' visibility over 50 km is recorded to occur for only 7% of the time over a 10-year period. Views of the Offshore Development at distances over 50 km are, therefore, experienced infrequently.

In considering the SLVIA Study Area, the sensitivity of the receiving seascape, landscape and visual receptors has also been reviewed, taking particular account of the landscape designations shown in Figure 16.11, and principal visual receptors shown in Figure 16.12. It is clear that the principal issue for the SLVIA is the location of the Offshore Development off the Caithness, Sutherland and Orkney coasts and its visibility from settlements and routes along these coastlines, as well as from the East Halladale Flows Wild Land Areas (WLA), Hoy WLA, Kyle of Tongue National Scenic Area (NSA) and Hoy and West Mainland NSA, all of which are primarily within 8 to 40 km of the Offshore Development.

Potential cumulative interactions with other large-scale energy developments have also influenced the definition of the SLVIA Study Area. Other large-scale energy developments within the SLVIA Study Area are shown in Figure 16.16.

1.3 Iterative Assessment and Design

The SLVIA is part of an iterative EIA process which aims to 'design out' significant effects. Design is an integrated part of the SLVIA process and environmental measures relating to landscape design and management can be an important tool to mitigate significant effects. The EIA process can also call on a range of environmental and technical specialists that contribute other forms of mitigation that may also bring a range of benefits. Potentially significant seascape, landscape and visual effects and the constraints and opportunities connected with their resolution are identified through the SLVIA process.

The likely visual effects of different layout scenarios have been investigated in the absence of mitigation measures as part of the review of the worst case scenario layout for the Offshore Development.

As can be seen in Offshore EIAR (Volume 2): Chapter 3: Site Selection and Alternatives, significant changes have been made to the development footprint during the EIA. This includes a reduction in the Offshore Development Area by 50% and a reduction in the maximum number of turbines from ten to seven.

The design and layout will be finalised following project consent and prior to the commencement of construction. This will be required to take into account other stakeholder requirements such as navigation, commercial fisheries and search and rescue (SAR); and other technical and environmental factors within the PFOWF Array Area.

1.3.1 Potential effects during construction and decommissioning

As described in Section 16.5.2 of Offshore EIAR (Volume 2): Chapter 16: Seascape, Landscape and Visual Impact Assessment, effects on landscape character and visual amenity will occur as a result of the construction activities, including laying new offshore export cables to shore and the installation of WTGs; using wind farm service vessels. Temporary effects may also arise as a result of the WTG fabrication in the locality of the installation port (to be determined) and temporarily during the tow out from the port facility. Temporary effects resulting from WTG fabrication will be associated with port operations in a location which is likely to have a baseline industrial character, and these effects are unlikely to be significant and so are not considered further in the assessment.

The residual effects arising as a result of the construction and decommissioning of the Offshore Development are assessed as being of the same magnitude and significance on all coastal, landscape and visual receptors as those arising due to their operation and maintenance, as assessed in Section 16.7 of Offshore EIAR (Volume 2): Chapter 16: Seascape, Landscape and Visual Impact Assessment, with the residual effects being short-term and temporary, occurring during the length of the construction and decommissioning phases and differing in nature from the operational effects mainly due the influence of the various construction vessels in the seascape, including cable laying vessels closer to shore within the export cable array area corridor, during the construction and decommissioning phase that will not be present or result in effects during the operational phase. The effects during the construction and decommissioning phase are, therefore, not assessed in detail and for effects on all coastal, landscape and visual receptors during the construction and decommissioning phases, reference should be made to the detailed assessment during the operational and maintenance phase for the assessment of significance.

1.3.2 Potential effects during operation and maintenance

Potential effects on the seascape, landscape and visual resource are likely during the operation of the Offshore Development over its operational lifetime, including:

Seascape effects: Effects on perceived seascape character (Regional Coastal Character Areas (RCCAs) and Local Coastal Character Areas (LCAAs)), arising as a result of the offshore WTGs located within the PFOWF Array Area as well as maintenance activities, which will occur both within and outwith the PFOWF Array Area, and which may alter the seascape character of the PFOWF Array Area itself and the perceived character of the wider seascape.

Landscape effects: Effects on perceived landscape character (Landscape Character Types (LCTs) and Designations), arising as a result of the offshore WTGs and maintenance activities, which will be visible from the coast and may therefore affect the perceived character of the landscape. Effects on defined special qualities of designated landscapes.

Visual effects: Effects on views and visual amenity experienced by people as principal visual receptors and representative viewpoints, arising as a result of the operational WTGs, substations and maintenance activities, marine navigation and aviation lighting.

Cumulative effects: Effects of the operation of the Offshore Development that have the potential to contribute to cumulative seascape, landscape and visual effects including effects on seascape, landscape and visual amenity due to combined or sequential visibility with other existing and planned large-scale energy developments.

1.4 Guidance, Data Sources and Site Surveys

1.4.1 Guidance on methodology

The following relevant legislation, policy and guidance relating to SLVIA was used in the preparation of this chapter:

Legislation

- *Town and County Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended) (the 'EIA Regulations') – the relevant regulations for carrying out EIA.*

Policy

- *Scottish Government (2020). Scottish Planning Policy - relevant national planning policy*
- *The Highland Council (2012). Highland wide Development Plan – relevant regional planning policy*

Guidance

- *Landscape Institute and the Institute of Environmental Management and Assessment (2013). Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (GLVIA3) – best practice guidance in respect of LVIA production.*
- *Countryside Agency and Scottish Natural Heritage (2002). 'Guidelines for Landscape Character Assessment.'*
- *NatureScot (2021). Guidance – Assessing the cumulative landscape and visual impact of onshore wind energy development.*
- *Scottish Natural Heritage (2020). Assessing the Impacts on Wild Land: Technical Guidance – best practice guidance in respect of wild land assessment.*
- *Scottish Natural Heritage (2017). Visual Representation of Wind Farms Guidance – Version 2.2.*
- *The Highland Council (2016). Visualisation Standards for Wind Energy Developments.*
- *Landscape Institute (September 2019). Visual Representation of Development Proposals Technical Guidance Note 06/19 – best practice guidance in respect of the production of LVIA visualisations.*
- *Landscape Institute (2021). Technical Guidance Note 02/21 Assessing landscape value outside national designations.*

This methodology accords with GLVIA3 (Landscape Institute and IEMA, 2013). Where it diverges from specific aspects of the guidance, in a small number of areas, reasoned professional justification for this is provided as follows.

GLVIA3 sets out an approach to the assessment of magnitude of change in which three separate considerations are combined within the magnitude of change rating. These are the size or scale of the effect, its geographical extent and its duration and reversibility. This approach is to be applied in respect of both landscape and visual receptors. 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 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 down due to their limited geographical extents and/ or duration or reversibility.

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 primarily on size or scale to determine where significant and non-significant effects occur, and then describing the geographical extents of these effects and their duration and reversibility separately. Duration and reversibility are stated separately in relation to the assessed effects as short, medium or long-term, and temporary or permanent, and are considered as part of drawing together conclusions about significance and combining with other judgements on sensitivity and magnitude,

to allow a final judgement to be made on the level of significance and whether each effect is significant or not significant.

OPEN's assessment methodology utilises six word scales of magnitude of change; high, medium-high, medium, medium-low, low and negligible; which are preferred to the 'maximum of five categories' suggested in GLVIA3 (3.27), as a means of clearly defining and summarising magnitude of change judgements. These are not new diversions and follow practice established on other offshore wind farms such as East Anglia THREE, Norfolk Vanguard, Norfolk Boreas and Thanet Extension.

1.4.2 Data sources

The data sources that have been collected and used to inform this SLVIA are summarised in Table 1.4-1.

Table 1.4-1 Data sources

Title	Source	Year	Author
Ordnance Survey (OS) 1:50,000 Raster from Highland Wind Limited	Xodus, via emapsite: emapsite.com	2020/2021	Ordnance Survey
OS 1:250,000 Raster from OS OPEN data	OS OpenData	2021	Ordnance Survey
OS Terrain 5 Digital Terrain Model (DTM)	Emapsite: emapsite.com	2021	Ordnance Survey
Met Office Visibility Data	Mettoffice.gov.uk	2021 / 2022	Met Office
NatureScot Landscape Character Assessment	https://www.nature.scot/professional-advice/landscape/landscape-character-assessment/scottish-landscape-character-types-map-and-descriptions	2021	NatureScot
Coastal Character Assessment: Orkney and North Caithness	https://www.nature.scot/coastal-character-assessment-orkney-and-north-caithness	2016	Scottish Natural Heritage
Scottish Natural Heritage Commissioned Report No. 374 The special qualities of the National Scenic Areas	https://www.nature.scot/doc/naturescot-commissioned-report-374-special-qualities-national-scenic-areas	2010	Scottish Natural Heritage
Assessment of Highland Special Landscape Areas	https://www.highland.gov.uk/downloads/file/2937/assessment_of_highland_special_landscape_areas	2011	The Highland Council
Wild Land Description - East Halladale Flows	https://www.nature.scot/sites/default/files/2021-06/Wild%20land%20Description%20East-Halladale-Flows-July-2016-39.pdf	2017	Scottish Natural Heritage
Wild Land Description - Hoy	https://www.nature.scot/sites/default/files/2021-06/Wild%20land%20Description%20Hoy-July-2016-41.pdf	2017	Scottish Natural Heritage
Highland wide Local Development Plan	https://www.highland.gov.uk/info/178/local_and_statutory_development_plans/199/highland-wide_local_development_plan	2012	The Highland Council
Caithness and Sutherland Local Development Plan	https://www.highland.gov.uk/downloads/file/19712/casplan_adopted	2018	The Highland Council

Title	Source	Year	Author
Orkney Local Development Plan 2017	https://www.orkney.gov.uk/Service-Directory/O/Orkney-Local-Development-Plan.htm	2017	Orkney Islands Council
National Cycle Network	https://www.sustrans.org.uk/national-cycle-network/	2022	Sustrans
Guidelines for Landscape and Visual Impact Assessment Third Edition	Routledge, 2 Park Square, Mitlon Park, Abingdon, Oxon, OX14 4RN	2013	The Landscape Institute

1.4.3 Desk-based and Site Survey Work

The SLVIA undertaken as part of the EIAR has been informed by desk-based studies and field survey work undertaken within the SLVIA Study Area. This has included reference to the work previously undertaken for the consented Dounreay Tri offshore wind farm, including the submitted EIAR and associated consultation responses. A preliminary desk-based assessment of seascape, landscape and visual receptors using ZTV analysis, has been undertaken to identify which are likely to be significantly affected by the Offshore Development, and, therefore, require a detailed assessment. Those that are identified as unlikely to be significantly affected have been discounted from the detailed assessment.

For many of the receptors where a detailed assessment is required, site surveys have been undertaken. These surveys have included field survey verification of the ZTV from terrestrial coastal character areas and landscape character areas, micro-siting of viewpoint locations, panoramic baseline photography and visual assessment survey from all representative viewpoints. Photography has been taken in line with guidance set out in NatureScot's Visual Representation of Wind Farms, Guidance - Version 2.2 (2017) and The Highland Council's (THCs) Visualisation Standards for Wind Energy Developments (2016). These surveys have been undertaken in Autumn and Winter 2021 / 2022. Sea-based offshore surveys have not been undertaken as part of the SLVIA, with the exception of the survey undertaken from the Scrabster to Stromness Ferry.

1.5 Assessing Seascape and Landscape Effects

Landscape Effects are defined by the Landscape Institute in GLVIA 3, paragraphs 5.1 and 5.2 as follows:

"An assessment of landscape effects deals with the effects of change and development on landscape as a resource. The concern ... is with how the proposal will affect the elements that make up the landscape, the aesthetic and perceptual aspects of the landscape and its distinctive character."

In accordance with GLVIA 3 the term 'landscape' encompasses areas of 'townscape' and coastal areas of 'seascape'. Areas of landscape and seascape are relevant to this assessment, and they are described as follows.

1.5.1 Seascape character

GLVIA 3 paragraph 5.6, advises that where LVIA is carried out in coastal or marine locations baseline studies must take account of seascape. Seascape is defined in the UK Marine Policy Statement, (UK Government, 2011) as *"landscapes with views of the coast or seas, and coasts and the adjacent marine environment with cultural, historical and archaeological links with each other."*

GLVIA 3 paragraph 5.6, identifies the following different factors which together determine seascape character:

- *"coastal features;*
- *views to and from the sea;*
- *particular qualities of the open sea;*
- *the importance of dynamic changes due to weather and tides;*

- *changes in seascapes due to coastal processes;*
- *cultural associations; and*
- *contributions of coastal features to orientation and navigation at sea."*

In Scotland, it is the coastal areas that form the basis of NatureScot's coastal characterisation assessments and not the seascape, as presented in 'Guidance on Coastal Character Assessment' (SNH, 2017) and 'Coastal Character Assessment: Orkney and North Caithness' (SNH, 2016). The SLVIA, therefore, uses the coastal characterisations instead of seascape characterisations, as the basis of the assessment and despite SLVIA standing for Seascape, Landscape and Visual, Impact Assessment, reference in this methodology is made to coastal character instead of seascape character and it is the effects on coastal character and not seascape character that is assessed.

1.5.2 Landscape character

GLVIA 3, paragraph 5.4, advises that Landscape Character Assessment should be regarded as the main source for baseline studies and identifies the following factors which combine to create areas of distinct landscape character:

"the elements that make up the landscape in the study area including:

- *physical influences – geology, soils, landform, drainage and water bodies;*
- *landcover, including different types of vegetation and patterns and types of tree cover;*
- *the influence of human activity, including landuse and management, the character of settlements and buildings, and pattern and type of fields and enclosure;*
- *The aesthetic and perceptual aspects of the landscape – such as, for example, its scale, complexity, openness, tranquillity or wildness; and*
- *The overall character of the landscape in the study area, including any distinctive Landscape Character Types or Areas that can be identified, and the particular combinations of elements and aesthetic and perceptual aspects that make each distinctive, usually by identification as key characteristics of the landscape."*

1.5.3 Coastal and Landscape Effects

In respect of the Offshore Development, the potential effects on coastal and landscape receptors, occurring during the construction, operation and decommissioning periods of the Offshore Development may include, but are not restricted to, the following:

- Changes to coastal or landscape character and qualities which may be affected through the incremental effect on characteristic elements, landscape patterns and qualities (including perceptual characteristics) and the addition of new features, the magnitude of which is sufficient to alter the overall seascape or landscape character within a particular area;
- Changes to the perceived character that would affect the special landscape qualities or wildness qualities underpinning the following designated landscapes or mapped interests; Farr Bay, Strathy and Port Skerra Special Landscape Area (SLA); the Kyle of Tongue National Scenic Area (NSA); Hoy and West Mainland NSA; East Halladale Flows Wild Land Area (WLA); and Hoy WLA; and
- Cumulative coastal and landscape effects, where more than one development of a similar type may lead to a cumulative effect.

Development may have a direct effect on the seascape, however all landscape effects arising from the Offshore Development on landscape character will be indirect effects, which would be perceived from the wider landscape, outside the Offshore Site and its surrounding seascape.

1.5.4 Evaluating Coastal and Landscape Sensitivity to Change

The assessment of sensitivity takes account of the value of the seascape or landscape receptor and its susceptibility to the Offshore Development.

Seascape and landscape sensitivity often varies in response to the type of the development proposed, the phase in its lifecycle 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 Scenic Area 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, less sensitive, to a particular development. The susceptibility of seascape and landscape receptors is assessed in relation to change arising from the specific offshore infrastructure of the Offshore Development.

The sensitivity of a seascape or landscape character receptor is determined through 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.

1.5.4.1 Value of the coastal or landscape receptor

The value of a coastal or landscape character receptor is a reflection of the value that society attaches to that seascape or landscape. The assessment of the seascape or landscape value will be classified as high, medium-high, medium, medium-low or low and the basis for this assessment will be made clear using evidence and professional judgement, based on the following range of factors.

- **Seascape and 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 and landscape quality** - The quality of a seascape or 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 or 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; and
- **Seascape and 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 or landscape in its own right, the recreational value of the seascape or landscape, and the contribution of other values relating to the nature conservation or archaeology of the area.

1.5.4.2 Seascape or landscape susceptibility to change

The susceptibility of a seascape or 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 Offshore Development without undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies. Some seascape and landscape receptors are better able to accommodate development than others due to certain characteristics that are indicative of capacity to accommodate change. These characteristics may or not also be special landscape qualities that underpin designated landscapes.

The assessment of the susceptibility of the seascape or landscape receptor to change will be classified as high, medium-high, medium, medium-low or low and the basis for this assessment will be made clear using evidence and professional judgement. Indicators of landscape susceptibility to the construction, operation and decommissioning of the Offshore Development are based on the following criteria.

- **Overall strength and robustness:** Collectively the overall characteristics and qualities of a particular seascape, coastal or landscape receptor result in a strong and robust receptor that is capable of reasonably accommodating the influence of the Offshore Development without undue adverse effects on the special landscape qualities of a designated landscape or the key characteristics of a coastal or landscape character receptor;

- **Landscape scale and topography:** The scale and topography of the seascape, landscape or coast are large enough to physically accommodate the influence of the Offshore Development. 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, coast or landscape may increase susceptibility to change because it can result in wider visibility, however open seascapes, coasts or landscapes may also be larger scale and simple, which would decrease susceptibility. Conversely, enclosed seascapes, coasts or 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. In general, large scale, simple and open coastal landscapes are likely to be less susceptible to the Offshore Development than more enclosed, complex coastal landscapes, such as indented bays and headlands;
- **Skyline:** Prominent and distinctive skylines and horizons with important landmark features that are identified in the landscape or coastal 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 developments and landmarks:** Contemporary coast or landscapes where there are existing similar large-scale energy developments or other forms of development (industry, mineral extraction, masts, urban development, 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 coast or landscapes that are acknowledged to be particularly scenic, wild or tranquil are generally considered to be more susceptible to development in comparison to settled, farmed, afforested or developed landscapes where perceptions of ‘wildness’ and tranquillity are less tangible. Coasts or landscapes which are either remote or appear natural may vary in their susceptibility to development; and
- **Landscape and coastal context and association:** The extent to which the Offshore Development will influence the character of coastal or landscape receptors across the SLVIA Study Area relates to the associations that exist between the coastal or landscape receptor within which the Offshore Development is located and the coastal or landscape receptor from which the Offshore Development is being experienced. In some situations, this association will be strong, where the seascapes, coasts or landscapes are directly related, and in other situations weak where the association is weak. The context and visual connection to areas of adjacent seascape, coast or landscape character or designations has a bearing on the susceptibility to development.

1.5.4.3 Coastal or landscape sensitivity rating

An overall sensitivity assessment of the coastal or landscape receptor will be made by combining the assessment of the value of the coastal or landscape character receptor and its susceptibility to the proposed change that will arise as a result of the Offshore Development. The evaluation of coastal or landscape sensitivity will be applied for each coastal or landscape receptor; high, medium-high, medium, medium-low and low, by combining individual assessments of the value of the receptor and its susceptibility to the proposed change. The basis for the assessments will be 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 1.5-1 below.

Table 1.5-1 Coastal or landscape sensitivity rating

Higher Criteria	Lower Criteria
Value	
Designated coasts/landscapes with national policy level protection or defined for their natural beauty.	Coasts/landscapes without formal designation. Despoiled or degraded coasts/landscape with little or no evidence of being valued by the community.

Higher Criteria	Lower Criteria
Higher quality coasts/landscapes with consistent, intact and well-defined, distinctive attributes.	Lower quality coasts/landscapes with indistinct elements or features that detract from its inherent attributes.
Rare or unique coastal/landscape character types, features or elements	Widespread or 'common' coastal/landscape character types features or elements.
Aesthetic / scenic or perceptual aspects of designated wildlife, ecological or cultural heritage features that contribute to coastal/landscape character.	Limited wildlife, ecological or cultural heritage features, or limited contribution to coastal/landscape character.
Coasts/landscapes with perceptual qualities of wildness, remoteness or tranquility.	Limited or no evidence that the coasts/landscape is used for recreational activity.
Coasts/landscapes with strong cultural associations that contributes to scenic quality.	Coasts/landscapes with few cultural associations.
Susceptibility to change	
Fragile coasts/landscapes vulnerable and lacking the ability to accommodate change.	Robust coasts/landscapes that are capable of reasonably accommodating change without undue adverse effects
A coast/landscape of a suitably large enough scale to accommodate the development, with simple, broad and homogenous coastal landforms.	A smaller scale coast/landscape, with complex, distinctive or small-scale coastal landforms.
Enclosed coasts/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.	Openness may increase susceptibility if there is wider visibility, however open coasts/landscape may also be larger scale and simple which would decrease susceptibility.
Distinctive undeveloped skylines with landmark features.	Developed, non-distinctive skylines without landmark features.
Little association with other contemporary development, or strong associations occur with smaller scale or historic development.	Strong or direct association with other similar contemporary developments and coastal/landscape character influenced by development.
Perceptual qualities associated with particular scenic qualities, wildness or tranquility.	Contemporary, cultivated, settled or developed coasts/landscapes with fewer perceptual qualities are likely to have a lower susceptibility.
Adjacent coastal/landscape character context connected by associated character and views.	Host landscape character is separate from surrounding / adjacent coastal/landscape character with weak association.
Strong association with seascape where Offshore Development will be located.	Weak association with seascape where Offshore Development will be located.

1.5.5 Coastal or Landscape Magnitude of Change

The magnitude of change affecting coastal or landscape receptors is an expression of the scale of the change that will result from the Offshore Development and is dependent on a number of variables regarding the size or scale of the change and the geographical extent over which the change would be experienced.

1.5.5.1 Size or scale of change

This criterion relates to the size or scale of change to the coastal or landscape receptor that will arise as a result of the Offshore Development, based on the following factors.

- **Coastal or landscape characteristics:** The extent to which the effect of the Offshore Development changes, physically or perceptually, those key characteristics of the coastal or landscape receptor that may be important to its distinctive character. This may include, for example, the scale of the landform, its relative simplicity or irregularity, the nature of the coastal and landscape context, the grain or orientation of the coast and landscape, the degree to which the receptor is influenced by external features and the juxtaposition of the Offshore Development in relation to these key characteristics. If the Offshore Development is located in a seascape, coastal or landscape receptor that is already affected by other similar development, this may reduce the magnitude of change, especially if there is a high level of integration and the developments form a unified and cohesive feature in the seascape, coast or landscape;
- **Coast or landscape designation:** In the case of designated landscapes, the degree of change is considered in light of the effects on the special landscape qualities which underpin the designation and the effect on the integrity of the designation. All landscapes change over time and much of that change is managed or planned. Often landscapes will have management objectives for 'protection' or 'accommodation' of development. The scale of change may be localised, or occurring over parts of an area, or more widespread affecting whole landscape designations and their overall integrity;
- **Distance:** The size and scale of change is also strongly influenced by the proximity of the Offshore Development to the receptor and the extent to which the Offshore Development can be seen as a characterising influence on the coast or landscape. Consequently, the scale or magnitude of change is likely to be lower in respect of coastal or landscape receptors that are distant from the Offshore Development and / or screened by intervening landform, vegetation and built form to the extent that the scale of their influence on coastal and landscape receptors is small or limited. Conversely, coasts or landscapes closest to the development are likely to be most affected; and
- **Amount and nature of change:** The amount of the Offshore Development that will be seen. Visibility of the Offshore Development may range from one WTG blade tip to all of the WTGs. Generally, the greater the extent to which the Offshore Development can be seen, the higher the scale of change. The degree to which the Offshore Development is perceived to be on the horizon or 'within' the seascape also has a bearing, with the magnitude of change likely to be lower if the Offshore Development is largely perceived to be on the horizon at distance, rather than 'within' the seascape.

1.5.5.2 Geographical extent

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

The extent of the effects will vary depending on the specific nature of the Offshore Development and is principally assessed through analysis of the extent of perceived changes to the coastal or landscape character arising through visibility of the Offshore Development.

Coastal and landscape effects are described in terms of the geographical extent or physical area that would be affected (described as a linear or area measurement). This should not be confused with the scale of the development or its physical footprint. The manner in which the geographical extent of the coastal or landscape effect is described for different seascape and landscape receptors, is explained as follows:

- **Coastal or landscape character:** The extent of the effects on coastal or landscape character will vary depending on the specific nature of the Offshore Development. This is not simply an expression of visibility or the extent of the ZTV, but also includes a specific assessment of the extent to which the seascape or landscape character would be changed by the Offshore Development in terms of its character, key characteristics and elements; and
- **Landscape Designations**: In the case of a designated landscape, this refers to the extent to which 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 (with the support of an expert topic group and / or peer review) and whether the integrity of the designation is affected.

1.5.5.3 Duration and reversibility

The duration and reversibility of coastal or landscape effects will be based on the period over which Offshore Development is likely to exist during construction and operation, the extent to which these elements will be removed during decommissioning, and its effects reversed at the end of that period. Long-term, medium-term and short-term coastal or landscape 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.

1.5.5.4 Coastal and landscape magnitude of change rating

The 'magnitude' or 'degree of change' resulting from the Offshore Development is described as 'high', 'medium-high', 'medium', 'medium-low' 'low' or 'negligible'. In assessing magnitude of change, the assessment will focus on the size or scale of change and it geographical extent. The duration and reversibility are stated separately in relation to the assessed effects as short, medium or long-term and temporary or permanent. The basis for the assessment of magnitude for each receptor will be made clear using evidence and professional judgement. The levels of magnitude of change that can occur are defined in Table 1.5-2.

Table 1.5-2 Seascape or landscape magnitude of change rating

Magnitude of change	Description / reason
High	**Size / Scale:** A large-scale change and major loss of key landscape elements / characteristics or the addition of large scale or numerous new and uncharacteristic features or elements that would affect the coastal/landscape character and the special landscape qualities / integrity of a landscape designation.
Medium-high	Intermediate rating with combination of criteria from high or medium magnitude.
Medium	**Size / Scale:** A medium scale change and moderate loss of some key landscape elements / characteristics or the addition of some new medium scale uncharacteristic features or elements that could partially affect the coastal/landscape character and the special landscape qualities / integrity of a landscape designation.
Medium-low	Intermediate rating with combination of criteria from medium or low magnitude.
Low	**Size / Scale:** A small-scale change and minor loss of a few landscape elements / non key characteristics, or the addition of some new small-scale features or elements of limited characterising influence on coastal/landscape character and designations.
Negligible	**Size / Scale:** A very small-scale change that may include the loss or addition of some landscape elements of limited characterising influence. The coastal/landscape characteristics and character would be unaffected.

1.5.6 Evaluating coastal and landscape effects and significance

The level of coastal or landscape effect is evaluated through the combination of coastal or 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 relevant EIA Regulations. This process is assisted by the matrix in Table 1.7-1 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 Offshore Development and their conclusion, will be presented in a comprehensive, clear and transparent manner.

Further information is also provided about the nature of the effects, whether these would be direct or indirect; temporary, permanent or reversible; beneficial, neutral or adverse, or cumulative.

1.5.6.1 Significant coastal and landscape effects

A significant effect would occur where the combination of the variables results in the Offshore Development having a defining effect on the coastal or landscape receptor, or where changes of a lower magnitude affect a coastal or landscape receptor that is of particularly high sensitivity. A major loss or irreversible effect over an extensive area or coastal or landscape character, affecting landscape elements, characteristics and / or perceptual aspects that are key to a nationally valued landscape are likely to be significant.

1.5.6.2 Not Significant Landscape Effects

A not significant effect would occur where the effect of the Offshore Development is not defining, and the coastal or 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 coastal or landscape quality or integrity of a designation. Reversible effects, on elements, characteristics and character that are of small-scale or affecting lower value receptors are unlikely to be significant.

1.6 Assessing visual effects

Visual effects are concerned wholly with the effect of the Offshore Development on views, and the general visual amenity and are defined by the Landscape Institute in GLVIA 3, paragraphs 6.1 as follows:

"An assessment of visual effects deals with the effects of change and development on views available to people and their visual amenity. The concern ... is with assessing how the surroundings of individuals or groups of people may be specifically affected by changes in the context and character of views."

Visual effects are identified for different visual receptors who would experience the views from residential areas of settlements, within their community, during recreational and tourist activities, at work, or when travelling through the area. The visual effects may include the following:

- Visual effect: a change to an existing static view, sequential views, or wider visual amenity as a result of development or the loss of particular landscape elements or features already present in the view; and
- Cumulative visual effects: the cumulative or incremental visibility of similar types of development may combine to have a cumulative visual effect.

The level and significance of the visual effect is determined through consideration of the sensitivity of each visual receptor, or range of sensitivities for receptor groups, and the magnitude of change that would be brought about by the construction, operation and decommissioning of the Offshore Development.

1.6.1 Zone of Theoretical Visibility (ZTV)

Plans mapping the Zone of Theoretical Visibility (ZTV) are used to analyse the extent of theoretical visibility of the Offshore Development, across the SLVIA Study Area and to assist with viewpoint selection. The ZTV does not, however, take account of the screening effects of buildings, localised landform and vegetation, unless specifically noted (see individual figures). As a result, there may be roads, tracks and footpaths within the SLVIA Study Area which, although shown as falling within the ZTV, are fully or partly screened by buildings or vegetation.

The ZTVs provide a starting point in the assessment process and typically present a 'worst case scenario' in which theoretical visibility is more extensive than actual visibility.

1.6.2 Viewpoint Analysis

Viewpoint analysis is used to assist the assessment and is conducted from selected viewpoints within the SLVIA Study Area. The purpose of this is to assess both the level of visual effect for particular receptors and help guide the design process. A range of viewpoints are examined in detail through viewing wirelines and

photomontages prepared for that location and analysed to determine whether a significant visual effect would occur.

The assessment involves visiting the viewpoint location and viewing wirelines and photomontages prepared for each viewpoint location. The fieldwork is conducted in periods of fine weather with good visibility and considers seasonal changes such as reduced leaf cover or hedgerow maintenance. The SLVIA, therefore, includes viewpoint analysis prepared for each viewpoint and is presented as an integral part of the assessment in the SLVIA. A summary table of the findings will also be provided in order of distance from the Offshore Development.

1.6.3 Evaluating visual sensitivity to change

In accordance with paragraphs 6.31 to 6.37 of GLVIA3, the sensitivity of visual receptors will be determined by a combination of the value of the view and the susceptibility of the visual receptors to the change likely to result from the Offshore Development on the view and visual amenity.

1.6.3.1 Value of the view

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 will be classified as high, medium-high, medium, medium-low or low and the basis for this assessment will be made clear using evidence and professional judgement, based on the following criteria.

- **Formal recognition** - The value of views can be formally recognised through their identification on OS or tourist maps as formal viewpoints, sign-posted and with facilities provided to add to the enjoyment of the viewpoint such as parking, seating and interpretation boards. Specific views may be afforded protection in local planning policy and recognised as valued views. Specific views can also be cited as being of importance in relation to landscape or heritage planning designations, for example the value of a view will be increased if it presents an important vista from a designed landscape or lies within, or overlooks, a designated area, which implies a greater value to the visible landscape; and
- **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 very few people.

1.6.3.2 Susceptibility to change

Susceptibility relates to the nature of the viewer experiencing the view and how susceptible they are to the potential effects of the Offshore Development. A judgement to determine the level of susceptibility, therefore, relates to the nature of the viewer and their experience from that particular viewpoint or series of viewpoints, classified as high, medium-high, medium, medium-low or low and based on the following criteria:

- **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 residents, 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 sensitivity. Viewers travelling in cars or on trains will tend to have a lower sensitivity as their view is transient and moving. The least sensitive viewers are usually people at their place of work as they are generally less sensitive to changes in views; and
- **Experience of the viewer** - The experience of the visual receptor relates to the extent to which the viewer's attention or interest may be focused on the view and the visual amenity they experience at a particular location. The susceptibility of the viewer to change arising from the Offshore Development may be influenced by the viewer's attention or interest in the view, which may be focused in a particular direction, from a static or transitory position, over a long or short duration, and with high or low clarity. For example, if the principal outlook from a settlement is aligned directly towards the Offshore Development, 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 high speed. The visual amenity experienced by the viewer varies depending on the presence and relationship of visible elements, features or patterns experienced in the view and the degree to which the landscape in the view may accommodate the influence of the Offshore Development.

1.6.3.3 Visual sensitivity rating

An overall level of sensitivity will be 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. Each visual receptor, meaning the particular person or group of people likely to be affected at a specific viewpoint, is assessed in terms of their sensitivity. The basis for the assessments will be 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 1.6-1 below.

Table 1.6-1 Visual sensitivity rating

Higher Criteria	Lower Criteria
Value	
Specific viewpoint identified in OS maps and / or tourist information and signage.	Viewpoint not identified in OS maps or tourist information and signage.
Facilities provided at viewpoint to aid the enjoyment of the view.	No facilities provided at viewpoint to aid enjoyment of the view.
View afforded protection in planning policy.	View is not afforded protection in planning policy.
View is within or overlooks a designated landscape, which implies a higher value to the visible landscape.	View is not within, nor does it overlook, a designated landscape.
View has informal recognition and well- known at a local level, as having particular scenic qualities.	View has no informal recognition and is not known as having particular scenic qualities.
View or viewpoint is recognised through references in art or literature.	View or viewpoint is not recognised in references in art or literature.
View has high scenic qualities relating to the content and composition of the visible landscape.	View has low scenic qualities relating to the content and composition of the visible landscape.
Susceptibility to change	
Viewer who is likely or liable to be influenced by the Offshore Development.	Viewer who is unlikely or not liable to be influenced by the Offshore Development.
Viewers such as walkers, or tourists, whose main attention and interest are on their surroundings.	Viewers whose main attention is not focused on their surroundings, such as people at work, or specific forms of recreation.
Residents that gain static, long-term views of the Offshore Development in their principal outlook.	Viewers who are transient and dynamic, such as those travelling in cars or on trains, where the view is of short duration.
Viewpoint is visited or used by a large number of people.	View is visited or gained by very few people.
A view that is focused in a specific directional vista, with notable features of interest in a particular part of the view.	Open views with no specific point of interest.
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.

Higher Criteria	Lower Criteria
Close proximity to, strong visual association with, and/or clear visibility of the host seascape where the Offshore Development will be located.	Distant location from, weak visual association with, and/or limited visibility of the host seascape where the Offshore Development will be located.

1.6.4 Visual magnitude of change

The visual magnitude of change is an expression of the scale of the change that will result from the Offshore Development and is dependent on a number of variables regarding the size or scale of the change and the geographical extent over which the change would be experienced. A separate assessment will also be made of the duration and reversibility of visual effects.

1.6.4.1 Size or scale of change

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

- **Distance:** the distance between the visual receptor or viewpoint and the Offshore Development. Generally, the greater the distance, the lower the magnitude of change, as the Offshore Development will constitute a smaller scale component of the view;
- **Size:** the amount and size of the Offshore Development that will be seen. Visibility may range from a small extent or partial visibility of the Offshore Development to all of the Offshore Development being visible. Generally, the greater the extent to which the Offshore Development will be visible, the higher the magnitude of change. This consideration relates to the extent to which the Offshore Development is screened by landform, vegetation and / or buildings. Conversely open views are likely to reveal more of the Offshore Development, particularly where this is a key characteristic of the seascape or landscape;
- **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 Offshore Development may appear larger or smaller relative to the scale of the receiving seascape or landscape;
- **Field of view:** the vertical / horizontal field of view (FoV) and the proportion of the view that is affected by the Offshore Development. Generally, the more of the proportion of a view that is affected, the higher the magnitude of change will be. If the Offshore Development 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 Offshore Development covers just a narrow part of an open, expansive and wide view, the magnitude of change is likely to be reduced as it will not affect the whole open part of the outlook. This can be described objectively by reference to the horizontal / vertical FoV affected, relative to the extent and proportion of the available view;
- **Contrast:** the character and context within which the Offshore Development 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;
- **Consistency of image:** the consistency of image of the Offshore Development in relation to other developments. The magnitude of change of the Offshore Development 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. New development is more likely to appear as logical components of the landscape with a strong rationale for their location;
- **Skyline / background:** Whether the Offshore Development would be viewed against the skyline or a background seascape may affect the level of contrast and magnitude. If the Offshore Development would add to an already developed skyline the magnitude of change would tend to be lower;

- **Number:** generally, the greater the number of separate components of the Offshore Development seen simultaneously or sequentially, the higher the magnitude of change. Further effects would occur in the case of separate developments and their spatial relationship to each other would affect the magnitude of change. For example, development that appears as an extension to an existing development would tend to result in a lower magnitude of change than a separate, new development; and
- **Nature of visibility:** the nature of visibility is a further factor for consideration. The Offshore Development may be subject to various phases of development change and the manner in which the Offshore Development may be viewed could be intermittent or continuous and / or seasonally, due to periodic management or leaf fall.

1.6.4.2 Geographical extent

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

- The geographical extent can be described as an area measurement or proportion of the total area of the receptor affected. For example, effects on people within a particular area such as a golf course or area of common land can be illustrated via a 'representative viewpoint' that represents a similar visual effect, likely to be experienced by larger numbers of people within that area. The geographical extent of that visual effect can be expressed as approximately '5 hectares' or '10%' of an area of common land or defined recreational area;
- The geographical extent can be described as a linear measurement (m or km) according to the length of route affected. For example, effects on people travelling on a route through the landscape such as a road or footpath can be illustrated via a 'representative viewpoint' that represents a similar visual effect, likely to be experienced by larger numbers of people along that route. The geographical extent of that visual effect can be expressed as approximately '2 km' or '10%' of the total length of the route; and
- The geographical extent of a visual effect experienced from a specific viewpoint may be limited to that location alone. An example of a 'specific viewpoint' is a public viewpoint recommended in tourist literature such as a well visited hill summit. An example of an 'illustrative viewpoint' is a particular location within a built up or well vegetated area where an uncharacteristically open or restricted view exists.

1.6.4.3 Duration and reversibility

The duration and reversibility of visual effects are based on the period over which the Offshore Development is likely to exist (during construction and operation) and the extent to which the Offshore Development will be removed (during decommissioning) and the 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.

1.6.4.4 Visual magnitude of change rating

The 'magnitude' or 'degree of change' resulting from the Offshore Development is described as 'high', 'medium-high', 'medium', 'medium-low' 'low' and 'negligible' as defined in Table 1.6-2 In assessing the magnitude of change the assessment has focused on the size or scale of change. The geographical extent and duration/reversibility are stated separately in relation to the assessed effects as short, medium or long-term and temporary or permanent. The basis for the assessment of magnitude for each receptor will be made clear using evidence and professional judgement. Examples of criteria that tend towards higher or lower magnitude of change that can occur on views and visual receptors are set out in Table 1.6-2.

Table 1.6-2 Visual magnitude of change

Magnitude of change	Magnitude of change definitions	Examples of visual magnitude of change
High	The Offshore Development will result in a high level of alteration to the existing view, forming the prevailing influence and/or introducing elements that are substantially uncharacteristic in the baseline view. The addition of the Offshore Development will result in a major incremental change, loss or addition to the baseline view.	**Size and Scale** A very large and dominant change to the view. **Number:** Involving the loss/addition of a large number of features / elements. **Distance:** Typically appearing closer to the viewer in the fore to middle ground. **FoV:** Affecting a large vertical angle and wide horizontal FoV. **Nature of Visibility:** Multiple phase development, continuously and sequentially visible. **Contrast:** Strong degree of contrast with surroundings with little or no screening. **Skyline:** Visible on the skyline as a new feature. **Consistency of Image:** Contrasting with other developments, lacking in visual rationale. Typically experienced from representative viewpoints illustrating a visual effect likely to be experienced by larger numbers of people, relative to the activity, affecting a large area or length / proportion of route. May also be experienced from a specific viewpoint.
Medium-high	Intermediate rating with combination of criteria from high or medium magnitude of change category.	
Medium	The Offshore Development 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 receiving view. The addition of the Offshore Development will result in a moderate incremental change, loss or addition to the baseline view.	**Size and Scale** A medium and prominent change to the view. **Number:** Involving the loss/addition of a number of features / elements. **Distance:** Typically appearing in the middle ground. **FoV:** Affecting a medium vertical angle and moderate horizontal FoV. **Nature of Visibility:** Multiple phase development, intermittently and sequentially visible. **Contrast:** Contrast with surroundings and may benefit from some screening. **Skyline:** Visible on the skyline along with other features. **Consistency of Image**: Different from other developments, some visual rationale. Typically experienced from representative viewpoints illustrating a visual effect likely to be experienced by a medium number of people, relative to the activity, affecting a medium area or length / proportion of route. May also be experienced from a specific viewpoint.
Medium-low	Intermediate rating with combination of criteria from medium or low magnitude of change category.	
Low	The Offshore Development will result in a low level of alteration to the baseline view, providing a slightly apparent influence and/or introducing	**Size and Scale** A small and noticeable change, could being missed by the casual observer. **Number:** Involving the loss/addition of a small number of features / elements. **Distance:** Typically appearing in the background. **FoV:** Affecting a small vertical angle and narrow horizontal FoV.

Magnitude of change	Magnitude of change definitions	Examples of visual magnitude of change
	elements that are characteristic in the receiving view. The addition of the Offshore Development will result in a low incremental change, loss or addition to the baseline view.	**Nature of Visibility:** Simple, single development, intermittently and infrequently visible. **Contrast:** Some parity / 'fits' with surroundings and may benefit from screening. **Skyline:** Partly visible on a developed skyline or not visible on the skyline. **Consistency of Image:** Similar from other developments with visual rationale, appearing reasonably well accommodated within its surroundings. Typically experienced from illustrative viewpoints likely to be experienced by low numbers of people, relative to the activity, affecting a smaller area or length / proportion of route. May also be experienced from a specific viewpoint.
Negligible	The Offshore Development will result in a negligible alteration to the existing view. If visible it may, form a barely discernible influence and/or introduce elements that are substantially characteristic in the baseline view. The addition of the Offshore Development will result in negligible incremental change, loss or addition to the baseline view.	**Size and Scale:** A small or negligible change, need to 'look for it'. **Number:** Involving the loss/addition of a small number of features / elements. **Distance:** Typically appearing in the far distance. **FoV:** Affecting a very small vertical and narrowest horizontal FoV. **Nature of Visibility:** Simple, single development, intermittently and infrequently visible. **Contrast:** Blends with surroundings and / or is well screened. **Skyline:** Partly visible on a developed skyline or not visible on the skyline. **Consistency of Image:** Similar from other developments with strong visual rationale, appearing well accommodated within its surroundings. Typically experienced from illustrative viewpoints likely to be experienced by low numbers of people, relative to the activity, affecting a smaller area or length / proportion of route. May also be experienced from a specific viewpoint.

1.6.5 Evaluating visual effects and significance

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 relevant EIA Regulations. This process is assisted by the matrix in Table 1.7-1 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 Offshore Development and their conclusion, will be presented in a comprehensive, clear and transparent manner.

Further information is also provided about the nature of the effects, whether these would be direct / indirect; temporary / permanent / reversible; beneficial / neutral / adverse or cumulative.

1.6.5.1 Significant Visual Effects

A significant effect is more likely to occur where a combination of the variables results in the Offshore Development having a defining effect on the view or visual amenity or where changes affect a visual receptor that is of high sensitivity.

1.6.5.2 Not Significant Visual Effects

A not significant effect is more likely to occur where a combination of the variables results in the Offshore Development having a non-defining effect on the view or visual amenity or where changes affect a visual receptor that is of low sensitivity.

1.6.5.3 Weather conditions

The assessment of visual effects is undertaken in clear weather with good to excellent visibility. This means that the viewpoint assessment represents a maximum effect assessment of the likely visual effects. The same viewpoint may be experienced under less optimal viewing conditions resulting in a significant effect appearing as not significant, due to the change in the variable weather conditions. Due to the conditions of the assessment the reverse is unlikely to occur, with a not significant effect appearing as a significant effect.

Met Office records regarding humidity in this area have been analysed to determine the likely frequency at which the Offshore Development will be visible from the various viewpoints. This information is presented in respect of the assessment of visual effects on the 16 representative viewpoints in Section 16.7.4 of Offshore EIAR (Volume 2): Chapter 16: Seascape, Landscape and Visual Impact Assessment, and in respect of the assessment of lighting effects in Offshore EIAR (Volume 3): Appendix 16.6.

1.7 Evaluation of significance

The matrix presented in Table 1.7-1 is used as a guide to illustrate the SLVIA process. In line with the emphasis placed in GLVIA3 upon the application of professional judgement, an overly mechanistic reliance upon a matrix is avoided through the provision of clear and accessible narrative explanations of the rationale underlying the assessment made for each landscape and visual receptor. Such narrative assessments provide a level of detail over and above the outline assessment provided by use of the matrix alone.

The landscape and visual assessment unavoidably, involves a combination of quantitative and qualitative assessment and wherever possible cross references will be made to objective evidence, baseline figures and photomontage visualisations to support the assessment conclusions. Often a consensus of professional opinion has been sought through consultation, internal peer review, and the adoption of a systematic, impartial, and professional approach. Importantly each effect results from its own unique set of circumstances and have been assessed on a case-by-case basis. The matrix, as presented in Table 1.7-1, should therefore be considered as a guide and any deviation from this guide will be clearly explained in the assessment.

Significant landscape and visual effects are highlighted in bold and shaded dark grey in Table 1.7-1. They relate to all those effects that result in a ‘major’ or a ‘major / moderate’ level of effect. In some circumstances, ‘moderate’ levels of effect, shaded light grey in the table, also have the potential, subject to the assessor’s opinion, to be considered as significant and these exceptions are also highlighted in bold in the text and will be explained as part of the assessment, where they occur. White or un-shaded boxes in Table 1.7-1 indicate a not significant effect, which are moderate/minor or minor levels of effect.

In those instances where there would be no effect, the magnitude will be recorded as ‘no change’ and the level of effect as ‘no effect’.

Table 1.7-1 Illustrative matrix of significant SLVIA effects

>Magnitude of change Sensitivity	High	Medium-high	Medium	Medium-low	Low	Negligible
High	Significant (Major)	Significant (Major)	Significant (Major-moderate)	Significant or not significant (Moderate)	Not significant (Moderate-minor)	Not significant (Minor)
Medium-high	Significant (Major)	Significant (Major-moderate)	Significant or not significant (Moderate)	Significant or not significant (Moderate)	Not significant (Moderate-minor)	Not significant (Minor)
Medium	Significant (Major-moderate)	Significant or not significant (Moderate)	Significant or not significant (Moderate)	Not significant (Moderate-minor)	Not significant (Minor)	Not significant (Minor)
Medium-low	Significant or not significant (Moderate)	Significant or not significant (Moderate)	Not significant (Moderate-minor)	Not significant (Minor)	Not significant (Minor)	Not significant (Negligible)
Low	Not significant (Moderate-minor)	Not significant (Moderate-minor)	Not significant (Minor)	Not significant (Minor)	Not significant (Negligible)	Not significant (Negligible)

1.8 Nature of effects

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

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

Cumulative effects have been described in Section 1.10, and 'short-term, medium-term and long-term, permanent and temporary' effects are described in Section 1.5.5.3 and Section 1.6.4.3 under the heading 'Duration of Effect'.

1.8.1 Direct and indirect effects

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

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

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

1.8.2 Beneficial, Adverse and Neutral Effects

Guidance provided by the in GLVIA3 on the nature of effect states that 'in the LVIA, thought must be given to whether the likely significant landscape and visual effects are judged to be positive (beneficial), negative (adverse) or neutral in their consequences for landscape or for views and visual amenity', but it does not provide guidance as to how that may be established in practice. The nature of effect is therefore one that requires interpretation and, where applied, this involves reasoned professional opinion.

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

In relation to many forms of development, the LVIA will identify 'beneficial' and 'adverse' effects by assessing these under the term 'Nature of Effect'. The landscape and visual effects of wind farms are difficult to categorise in either of these brackets as, unlike other disciplines, there are no definitive criteria by which the effects of wind farms can be measured as being categorically 'beneficial' or 'adverse'. In some disciplines, such as noise or ecology, it is possible to quantify the effect of a wind farm in numeric terms, by objectively identifying or quantifying the proportion of a receptor that is affected and assessing the nature of that effect in justifiable terms. However, this is not the case in relation to landscape and visual effects where the approach combines quantitative and qualitative assessment.

Generally, in the development of 'new' wind farms, a precautionary approach is adopted by OPEN, which assumes that significant landscape and visual effects will be weighed on the adverse side of the planning balance. Unless it is stated otherwise, the effects considered in the assessment will be considered to be adverse. Beneficial or neutral effects may, however, arise in certain situations and are stated in the assessment where relevant, based on the following definitions.

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 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.

1.9 Assessing night-time visual effects

The assessment of night-time visual effects is based on current standard specification for aviation and navigational lighting for offshore WTGs, and complies with the ICAO/CAA regulations and standards as set out in Section 5.12.3 of Offshore EIAR (Volume 2): Chapter 5: Project Description.

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 or positive vertical angle of view from the light to the receptor. In compliance with EIA regulations, the potential significant effects of a 'worst case' scenario for WTG lighting are assessed and illustrated in this visual assessment.

The aviation lighting will comprise red flashing lights, one attached to each of the hubs of the WTGs. They will be medium intensity in the order of 2,000 candela (cd). Mitigation detection systems associated with these lights will ensure that they are dimmed to 10% of their full intensity during periods when visibility is greater than 5 km, such that their intensity will be reduced to 200 cd.

The marine navigational lighting will comprise yellow flashing lights, attached to the top of the four corners od WTG substructures at a maximum height of 30 m. They will have a 5 Nautical Mile (NM) nominal range and they will be positioned at the peripheral points around the array.

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 MoD. The focus of the night-time visual assessment in this assessment is on the visible lighting requirements of the Offshore Development.

The assessment considers the effects of the aviation lights at an intensity of 200 cd. This is because in clear visibility (>5 km) the lights will be dimmed from 2,000 cd to 200 cd. In poor visibility (<5 km) the high humidity

will reduce the intensity of the aviation lights, such that from closest coast at a minimum of approximately 7 km south of the Offshore Development, the intensity of the aviation lights will be reduced to a similar degree.

The SLVIA Study Area for the visual assessment of WTG lighting is coincident with the 50 km SLVIA Study Area. The assessment is, however, particularly focused on the closest sections of the Caithness and Sutherland coastline within approximately 7 to 10 km.

The assessment of the lighting of the Offshore Development is intended to determine the likely effects on the visual resource, such that it is an assessment of the visual effects of aviation lighting on views experienced by people at night. The assessment of WTG lighting does not consider effects of aviation lighting on landscape or seascape character.

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

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

1.9.1 Significance criteria for night-time effects

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 lighting at night. It is considered, therefore, that the same criteria should not be used to assess these differences in daytime and night-time effect.

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

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

In reaching a view on the significance of the likely visual effects from the visible aviation lighting, it is relevant to consider what parts of the landscape - where darkness qualities are well displayed - are likely to be affected by visibility of the aviation lights and, in turn, to understand what people might be doing in these areas at night to be susceptible to visibility of aviation lights. Descriptions of 'susceptibility' provided for daytime viewpoints and receptors in Section 1.6.3.2 are considered appropriate for the purposes of establishing receptor sensitivity at night-time, however the susceptibility of people experiencing night-time views will depend on the degree to which their perception is affected by existing baseline lighting. In brightly lit areas, or when travelling on roads from where sequential experience of lighting may be experienced, the susceptibility of receptors is likely to be lower than from within areas where the baseline contains no or limited existing lighting.

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

- **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; and
- **Negligible:** Addition of aviation and marine navigation lighting results in a largely indiscernible change/ negligible intrusion to the existing night-time baseline conditions/ darkness in the view, due to glimpsed view of lighting and/ or slight degree of contrast/ very high degree of integration with level of baseline lighting in the view. Results in light that does not compromise or diminish the view of the night sky, nor is it considered obtrusive.

The significance of effects of aviation and marine navigation lighting is assessed through a combination of the sensitivity of the visual receptor and the magnitude of change that would result from the visible aviation lighting, taking into account the considerations described above, and informed by the matrix in Table 1.7-1, which gives an understanding of the threshold at which significant effects may arise. In determining significance, particular attention is paid to the potential for 'Obtrusive Light', for example, whether the lighting impedes a particular view of the night sky; creates sky glow, glare or light intrusion (ILP, 2011) in a prominent, incongruous or intrusive way.

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

1.10 Assessing cumulative seascape, landscape and visual effects

1.10.1 Overview

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

NatureScot's guidance, Assessing the Cumulative Impact of Onshore Wind Energy Developments (NatureScot 2021) is widely used across the UK to inform the specific assessment of the cumulative effects of windfarms. Both GLVIA3 and NatureScot's guidance provide the basis for the methodology for the cumulative SLVIA undertaken in the SLVIA. The NatureScot (2021) presents the following guidance:

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

"The assessment should be proportionate to the likely impacts and all CLVIA should accord with the guidelines within GLVIA3. The emphasis should be on the production of relevant and useful information, highlighting why

the proposals assessed have been included and why others have been excluded, rather than the provision of a large volume of information."

In line with guidance (NatureScot 2021), the SLVIA focuses on the key cumulative impacts which are likely to influence decision making, rather than assessing every potential cumulative effect.

1.10.2 Scope of the Cumulative Assessment

The main assessment in Offshore EIAR (Volume 2): Chapter 16: Seascape, Landscape and Visual Impact Assessment, Section 16.6, considers effects of the construction and operation of the Offshore Development with a baseline of operational and under construction large-scale energy developments.

The cumulative assessment in Offshore EIAR (Volume 2): Chapter 16: Seascape, Landscape and Visual Impact Assessment, Section 16.8 considers effects of the operation of the Offshore Development cumulatively with other consented and application stage, as listed in Table 16-4 of Chapter 16 and shown in the plan of cumulative developments in Figure 16.16 (Offshore EIAR (Volume 3): Appendix 16.9: Visualisations).

A comprehensive 'long list' of projects has been compiled with potential for cumulative impact interactions, with the short-list relevant to the SLVIA presented in Table 16.4 of Chapter 16 (Offshore EIAR (Volume 2): Chapter 16: Seascape, Landscape and Visual Impact Assessment). All operational, consented and application stage projects that have potential to interact cumulatively with the Offshore Development are included in this table. A cumulative assessment of the likely significant cumulative effects of the Offshore Development is undertaken in in relation to each of the following scenarios.

1.10.2.1 Scenario 1

Scenario 1 assesses the additional effects of the Offshore Development in addition to the consented projects that may soon be present in the seascape or landscape. This scenario assumes that the consented projects have become part of a theoretical baseline situation in addition to those that are operational or under construction. The assessment seeks to establish whether the addition of the Offshore Development with these consented projects results in new, different or additional effects, over and above those that were assessed in Offshore EIAR (Volume 2): Chapter 16: Seascape, Landscape and Visual Impact Assessment, Section 16.7. The effects identified under Scenario 1 are considered as being likely to arise, on the assumption that the Projects receive planning consent and are likely to be built and become operational.

1.10.2.2 Scenario 2

Scenario 2 assesses the additional effects of the Offshore Development in addition to the application stage projects, that may become present in the seascape or landscape. This scenario assumes that the application stage projects become part of a theoretical baseline situation in addition to those that are operational, under construction or consented. It also seeks to establish whether the addition of the Offshore Development with the application stage projects results in new, different or additional effects. The effects identified under Scenario 2 are considered as being less likely to arise than the consented scenario, as it is possible that application stage projects will not gain consent or become operational.

1.10.2.3 Scenario 3

Scenario 3 assesses the additional effects of the Offshore Development in addition to the future proposed West Orkney Offshore Wind Farm that may become present in the North Atlantic. This scenario assumes that this specific future proposed offshore wind farm becomes part of a theoretical baseline situation in addition to those that are operational, under construction, consented or at application stage and also seeks to establish whether the addition of the Offshore Development with the West Orkney Offshore Wind Farm results in new, different or additional effects. The effects identified under Scenario 3 are considered as being less likely to arise than the consented scenario, as it is possible that this future proposed project will not gain consent or become operational.

1.10.3 Types of Cumulative Effect

1.10.3.1 Cumulative Visual Effects

Cumulative visual effects consist of combined and sequential effects:

- Combined visibility - occurs where the observer is able to see two or more developments from one viewpoint. Combined visibility may either be 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 Offshore Development may be significant, or not significant, depending on factors influencing the cumulative magnitude of change, such as the degree of integration and consistency of image with other developments in combined views; and its position relative to other developments and the landscape context in successive views; and
- Sequential visibility - occurs when the observer has to move to another viewpoint to see different developments. Sequential effects are assessed along regularly used routes such as major roads, railway lines and footpaths. The occurrence of sequential effects range from 'frequently sequential' (the features appear regularly and with short time lapses between, depending on speed of travel and distance between the viewpoints) to 'occasionally sequential' (long time lapses between appearances, because the observer is moving slowly and/or there are large distances between the viewpoints). The cumulative visual effect is more likely to be significant when frequently sequential.

1.10.3.2 Cumulative Seascape/ Landscape Effects

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

- If the Offshore Development forms a separate isolated feature from other developments within the seascape or landscape, too infrequent and of insufficient significance to be perceived as a characteristic of the area, then the cumulative seascape or landscape effect of the Offshore Development is unlikely to be significant;
- If the addition of the Offshore Development results in large-scale energy developments or any other large-scale development forming a key characteristic of the seascape or landscape, exerting sufficient presence as to establish or increase the extent of a 'seascape or landscape with windfarms'; then the cumulative seascape or landscape effect of the proposal may be significant or not significant, depending on the sensitivity of the receptor and magnitude of the change; and
- If the addition of the Offshore Development results in offshore windfarms forming the prevailing characteristic of the seascape or landscape, seeming to define the seascape or landscape as a 'windfarm seascape or landscape character type' then the cumulative seascape or landscape effect of the Offshore Development is likely to be significant.

1.10.4 Assessing Cumulative Landscape and Visual Effects

1.10.4.1 Cumulative Sensitivity of Landscape and Visual Receptors

The assessment ratings for the sensitivity of landscape and visual receptors is the same in the main assessment, presented in Offshore EIAR (Volume 2): Chapter 16: Seascape, Landscape and Visual Impact Assessment, Section 16.7 and the cumulative assessment, presented in Offshore EIAR (Volume 2): Chapter 16: Seascape, Landscape and Visual Impact Assessment, Section16.8.

1.10.4.2 Cumulative Magnitude of Change

The cumulative magnitude of change is an expression of the extent to which seascape, landscape and visual receptors will be altered by the addition of the Offshore Development within the cumulative context. The cumulative magnitude of change is assessed according to a number of criteria, described below.

- **The location, position and visual relationship of the Offshore Development:** Depending on the viewpoint/viewing angle from the coast, the Offshore Development 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 Offshore Development in relation to other developments:** If the Offshore Development is seen in a part of the view or setting to a 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 Offshore Development 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 Offshore Development and other projects on the horizon. If the lateral spread/horizontal angle of the Offshore Development 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 Offshore Development 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 Offshore Development 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 Offshore Developments is likely to be lower if its WTG height, arrangement, layout design and visual appearance 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 or 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 Offshore Development as assessed in the project alone assessment:** Where the Offshore Development 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.

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 Offshore Development 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 Offshore Development 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 Offshore Development 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 Offshore Development will result in a negligible incremental change, loss or addition to the seascape/landscape receptor or view.

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.

1.10.5 Significance of Cumulative Effects

The objective of the cumulative assessment is to determine whether any effects that the construction and operation of the Offshore Development will have on seascape, landscape and visual receptors, when seen or perceived cumulatively with the construction and operation of the other projects, will be significant or not significant. Significant cumulative seascape, landscape and visual effects arise where the addition of the Offshore Development, leads to large-scale energy developments becoming a prevailing seascape, landscape or visual characteristic of a receptor that is sensitive to such change. Cumulative seascape and 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 or seascape;
- With the addition of further development, it can become a characteristic element of the landscape or seascape, as they appear as elements or components that are repeated. Providing there was sufficient 'space' or undeveloped landscape or 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;
- 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 or seascape. The result would be to materially change the existing seascape/ landscape character and resulting in a significant cumulative effect. A landscape or seascape characterised by offshore windfarm or energy developments may already exist as part of the baseline seascape context;
- Less extensive, but nevertheless significant cumulative seascape, landscape and visual effects may also arise as a result of the addition of the Offshore Development where it results in a seascape, landscape or view becoming defined by the presence of more than one offshore windfarm 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;
- 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;
- The capacity of the seascape, landscape or view may be assessed as being exceeded where the seascape, landscape and visual receptor becomes defined by a particular type of development, or if the Offshore Development extends across seascape or landscape character areas, or clear visual or topographic thresholds in a view; and
- 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 offshore windfarm defined seascape or landscapes.

1.10.6 Weather Conditions - frequency and likelihood of visual effects

The judgements made in the SLVIA are based on optimum 'very good' to 'excellent' visibility of the Offshore Development. This assumption is assessed as the worst case scenario, but in reality, the degree and extent of visual effects arising from the construction and operation of the offshore infrastructure 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 Offshore Development will be available from the coastline and hinterland, or to inhibit views, rendering them more visually recessive within the wider seascape. Viewing conditions and visibility will be found to vary in the SLVIA Study Area, and the effects of the wind farm will vary greatly according to the weather. This means that effects that are assessed to be significant may be not significant under different, less clear conditions.

Although the SLVIA is based on 'very good' to 'excellent' visibility conditions, a description of visibility frequency is provided using METAR visibility data from the nearest Met Office stations that record visibility (Strathy East), to highlight potential trends in the visibility conditions of the SLVIA Study Area. Both GLVIA3 (8.15) and NatureScot guidance (SNH 2017, para 39) refer to use of Met Office visibility data to assess typical visibility conditions within an area. Most synoptic observing stations have sensors which 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.

Although there are limitations to how this data can be applied to judgements about wind farm visibility, the visibility data provides some understanding and evidence basis for evaluating the visibility of the WTGs against their background.

Met Office visibility data will be assessed from the nearest weather station that records visibility, at Strathy East. Visibility is categorised into distance ranges, such as <1km, 1 to 2km, 2 to 3km etc and a frequency table will be compiled revealing the total number of observations within each distance category at hourly intervals for each month. The data will be summarised and mapped to highlight trends in the visibility conditions of the SLVIA Study Area, such as the distance category 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 visibility definitions: < 1km Very Poor; 1 - 4km Poor; 4 -10km Moderate; 10 - 20km Good; 20 - 40km Very Good; 40km > Excellent.

The Met Office visibility data is then interpreted to allow more specific quantification of the likely frequency of visibility of the Offshore Development from the coastal viewpoints (as a % and average number of days per year), based on the distance of each viewpoint location from the Array Area. 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. This data is presented in Appendix 16.8.

1.11 Visual representations

Zones of Theoretical Visibility (ZTVs) and visualisations, including wirelines and photomontages, are graphical images produced to assist and illustrate the SLVIA and the cumulative assessment. Viewpoint photography and photomontages have been produced in accordance with the NatureScot guidance on 'Visual Representation of Wind Farms - Version 2.2' (SNH, 2017), THC's 'Visualisation Standards for Wind Energy Developments' (THC, 2016), GLVIA 3 (Landscape Institute and IEMA, 2013) and the Landscape Institute Technical Guidance Note on Visual Representation of Development Proposals (Landscape Institute, 2019).

1.11.1 Zone of Theoretical Visibility (ZTV)

The ZTVs will be calculated using computer software to generate a ZTV of the Offshore Development, to demonstrate the theoretical extent of visibility from any point in the SLVIA Study Area.

A 3D computer model has been developed of the existing landscape using digital terrain data as follows:

- Ordnance Survey Terrain 50: Used to produce the main or standard ZTV plot and wirelines, these tiles provide a digital record of the existing landform of Great Britain, or Digital Terrain Model (DTM) at 10 m elevation intervals based on 50 m grid squares and models representing the specified geometry and position of the offshore elements. The computer model will include the entire SLVIA Study Area and takes account of the effects caused by atmospheric refraction and the Earth's curvature; and
- Ordnance Survey Terrain 5: Used to produce more detailed ZTV plots where required to assess particular effects, such as along the coastline, or within a detailed part of the SLVIA Study Area. The computer model will include the entire SLVIA Study Area and takes account of atmospheric refraction and the Earth's curvature.

The resulting ZTV plots are overlaid on Ordnance Survey mapping at an appropriate scale and presented as figures using desktop publishing or graphic design software. Cumulative ZTV plots based on the intervisibility of the Offshore Development and other relevant developments within the SLVIA Study Area will also be produced.

There are limitations in this theoretical production, and these should be considered in the interpretation and use of the ZTV as follows.

- Where the ZTV has been calculated using Ordnance Survey Terrain 50 or Terrain 5 digital terrain data, this will not account for the screening effects of vegetation or built form unless added in the form of OS Vectormap data or digitally added and stated on the figure.
- The 50 km radius ZTVs are based on a 50 m data grid OS Digital Terrain Model (DTM). Several ZTVs will also be produced at an enlarged A1 scale utilising 5 m data grid (OS Terrain 5).
- The ZTVs are based on theoretical visibility from 2 m above ground level.
- The Blade Tip ZTV does not indicate the decrease in visibility that occurs with increased distance from the Array Area. The nature of what is visible from 3 km away will differ markedly from what is visible from 10 km away, although both are indicated on the Blade Tip ZTV as having the same level of visibility.
- 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 5 WTGs may gain views of the smallest extremity of blade tips, or of 5 full WTGs. This can make a considerable difference in the effects of the Offshore Development on that area. The hub height ZTV will be used in conjunction with the blade tip ZTV to provide an indication of the degree to which the WTGs are visible.

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

The SLVIA includes a Horizontal Angle ZTV to show the horizontal field of view in degrees that may be affected by views of the WTGs.

1.11.2 Methodology for baseline photography

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

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

- Date, time, weather conditions and visual range;
- GPS recorded 12 figure grid reference accurate to ~5-10 m;
- GPS recorded Above Ordnance Datum (AOD) height data;

- Use of a fixed 50 mm focal length lens is confirmed;
- Horizontal field of view (in degrees); and
- Bearing to Target Site.

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

All the resulting visualisations will be prepared to indicate other cumulative development in order that they may assist the cumulative assessment as well as the LVIA.

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.

1.11.3 Weather conditions

GLVIA3 para 8.22 state – 'In preparing photomontages, weather conditions shown in the photographs should (with justification provided for the choice) be either:

- representative of those generally prevailing in the area; or
- taken in good visibility, seeking to represent a maximum visibility scenario when the development may be highly visible'.

In preparing photomontages for the SLVIA, photographs have been taken in favourable weather conditions. Weather conditions shown in the photographs for all viewpoints have, where possible, been taken during periods of 'very good' or 'excellent' visibility conditions, during summer and in the afternoon or evening - seeking to represent a maximum visibility scenario when the developments may be highly visible. In the three viewpoints taken from Hoy, namely, Viewpoint 9: Path to Old Man of Hoy, Viewpoint 15: Ward Hill and Viewpoint 16: Tor Ness, visibility of the mainland of Scotland is limited due to medium to high levels of humidity combined with the separation distances of over 40 km between Hoy and the Caithness / Sutherland coast set behind the Offshore Development.

1.11.4 Methodology for production of visualisations

Photomontages will be produced in accordance with NatureScot's 'Visual Representation of Windfarms Guidance' (SNH, 2017) and THC's 'Visualisation Standards for Wind Energy Developments'.

A photomontage is a visualisation which superimposes an image of the Offshore Development upon a photograph or series of photographs. Photomontage is a widespread and popular visualisation technique, which allows changes in views and visual amenity to be illustrated and assessed, within known views of the 'real' landscape.

To create the baseline panorama, the frames are individually cylindrically projected and then digitally joined to create a fully cylindrically projected panorama using Adobe Photoshop or PTGui software. This process avoids the wide-angle effect that would result should these frames be arranged in a perspective projection, whereby the image is not faceted to allow for the cylindrical nature of the full 360-degree view but appears essentially as a flat plane.

Tonal alterations are made using Adobe software to create an even range of tones across the photographs once joined. The 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.

Daytime visualisations and wirelines show a WTG model which represents the maximum development scenario of the Offshore Development in the Array Area and allow the potential proportions of the WTGs to be appreciated from the visualisations.

Wireline representations that illustrate the Offshore Development 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 a terrain model with a 50 m data grid (OS Panorama) with a more detailed area of terrain modelling (OS terrain 5) used for the coastal parts of the SLVIA Study Area, which includes the majority of viewpoints used in the SLVIA. There are limitations in the accuracy of digital terrain model (DTM) data so that landform may not be picked up precisely and may result in 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.

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

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's guidance. These are cylindrically projected images and should be viewed flat at a comfortable arm's length.

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. For field work review and assessment, the photomontages should, where possible, be printed and viewed at the correct size (260mm by 820mm). Images viewed on screen should be viewed with the image enlarged to the 260mm height by 'zooming' to 'actual size' to give a realistic impression when viewed at approximately arm's length. Images should be held flat at a comfortable arm's length. If viewing these images on a wall or board at an exhibition, viewers should stand at arm's length from the image presented to gain the best impression.

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.

Rendering of the WTGs in the photomontages is as photorealistic as possible to the conditions shown in each viewpoint photograph. There is 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 will be rendered with sufficient contrast against the skyline backdrop to illustrate their maximum visibility scenario in each image. Photomontages will be prepared to depict how the Offshore Development would appear in excellent visibility conditions 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 Offshore Development.

Where THC requests planar panoramas for use in its single frame panoramic viewer, these have a vertical field of view of a focal length of 75 mm (18 degrees field of view), based on a recalibration of the 50mm single frame.

1.11.5 Night-time visualisations

Night-time visualisations will be produced from four key agreed viewpoints, to visually represent aviation and marine navigation lighting at night. The lighting intensity shown will be both at 2,000 and 200 candela for the aviation lighting, with the intensity presented in the visualisations based on comparison with photography of existing aviation lighting taken from similar ranges.

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

The appearance of the lights in the night-time photomontages emulates how lights appear in the other parts of the baseline photographs. A light shown in a photograph tends to have a slight 'halo' (or bokeh) around it due to the way a camera lens renders out-of-focus points of light. This is not the way lights are seen in reality,

as they tend to be much more defined as point sources. However, the proposed lighting will be shown in this way for consistency with the lights in the baseline photographs.

1.11.6 Information on limitations of visualisations

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

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

- A visualisation can never show exactly what the Offshore Development will look like in reality due to factors such as: different lighting, weather and seasonal conditions which vary through time and the resolution of the image;
- The images provided give a reasonable impression of the scale of the WTGs and the distance to the WTGs but can never be 100% accurate;
- A static image cannot convey WTG movement, or flicker or reflection from the sun on the WTG blades as they move; and
- 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 Offshore Development proposal these images are best viewed at the viewpoint location shown. The images must be printed and viewed at the correct size (260mm by 820mm). Images should be held flat at a comfortable arm's length. If viewing these images on a wall or board at an exhibition, stand at arm's length from the image presented to gain the best impression. It is preferable to view printed images rather than view images on screen. Images on screen should be viewed using a normal PC screen with the image enlarged to the full screen height to give a realistic impression.

There are practical limitations to shooting viewpoint photographs only in very good or excellent visibility and at particular times of day. The photographs shown in the visualisations show the most favourable weather conditions available during photographic survey work.

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