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MONA OFFSHORE WIND PROJECT

Preliminary Environmental Information Report

Volume 8, annex 26.4: Seascape, landscape and visual impact assessment methodology technical report

Image of an offshore wind farm

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Glossary

Term	Meaning
Access Land	Land designated as open access as defined in the Countryside and Rights of Way Act 2000 (the CRoW Act)
Characteristics	Elements, or combinations of elements, which make a contribution to distinctive landscape character.
Designated landscapes	Areas of landscape identified as being of importance at international, national or local levels, either defined by statute or identified in development plans or other documents.
Elements	Individual parts which make up the landscape, such as, for example, trees, hedges and buildings.
Feature	Prominent elements in the landscape, such as tree clumps, church towers or wooded skylines.
Green infrastructure	Networks of green spaces and watercourses and water bodies that connect rural areas, villages, towns and cities.
Heritage	The historic environment and especially valued assets and qualities, such as historic buildings and cultural traditions.
Key characteristics	Elements which are particularly important to the current character of the landscape and help to give an area its particularly distinctive sense of place.
Landform	The shape and form of the land surface which has resulted from combinations of geology, geomorphology, slope, elevation and physical processes.
Landscape	An area, as perceived by people, the character of which is a result of the action and interaction of natural and/or human factors.
Landscape character	A distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse.
Landscape Character Areas	These are single unique areas which are the discrete geographical areas of a particular landscape type.
Landscape Character Assessment	The process of identifying and describing variation in the character of the landscape and using this information to assist in managing change in the landscape. It seeks to identify and explain the unique combination of elements and features that make landscape distinctive. The process results in the production of a Landscape Character Assessment.
Landscape Character Type	These are distinct types of landscape that are relatively homogeneous in character. They are generic in nature in that they may occur in different areas in different parts of the country, but wherever they occur they share broadly similar combinations of geology, topography, drainage patterns, vegetation, historical land use, and settlement pattern.
Landscape effects	Effects on the landscape as a resource in its own right.
Landscape quality (condition)	A measure of physical state of the landscape. It may include the extent to which typical character is represented in individual areas, the intactness of the landscape and the condition of individual elements.
Landscape receptors	Defined aspects of the landscape resource that have the potential to be affected by the proposal.
Landscape value	The relative value that is attached to different landscapes by society. A landscape may be valued by different stakeholders for a whole variety of reasons
Magnitude (of impact)	A term that combines judgements about the size and scale of the impact or change, the extent of the area over which it occurs, whether it is reversible or irreversible and whether it is short or long term in duration.
Photomontage	A visualisation which superimposes an image of a proposed development upon a photograph or series of photographs of the existing landscape.
Seascape	The visual and physical conjunction of land and sea which combines maritime, coast and hinterland character.
Sensitivity	A term applied to specific receptors, combining judgements of the susceptibility of the receptor to the specific type of change or development proposed and the value related to that receptor.
Significance (of effect)	A judgement of the environmental effect resulting from a combination of the sensitivity of the receptor and the magnitude of the impact of a proposed development.
Special Qualities	A term usually used in relation to National Parks or Areas of Outstanding Natural Beauty. It is given to those qualities for which the area is designated.
Susceptibility	The ability of a defined landscape or visual receptor to accommodate the specific proposed development without undue negative consequences.
Tranquillity	A state of calm and quietude associated with peace, considered to be a significant feature in the landscape.
Visual amenity	The overall pleasantness of the views people enjoy in their surroundings, which provides an attractive visual setting or backdrop for the enjoyment of activities of the people living, working, recreating, visiting or travelling through an area.
Visual effects	Effects on specific views and on general visual amenity experienced by people.
Visual receptors	Individuals and/or defined groups of people who have the potential to be affected by a proposal.
Visualisation	A computer simulation, photomontage or other technique illustrating the predicted appearance of a proposed development.
Zone of Theoretical Visibility	A map, usually digitally produced, showing areas of land within which, a development is theoretically visible.

Acronyms

Acronym	Description
AOD	Above Ordnance Datum
AONB	Area of Outstanding Natural Beauty
CEA	Cumulative Effect Assessment
EIA	Environmental Impact Assessment
ES	Environmental Statement
FoV	Field of View
GLVIA	Guidelines for Landscape and Visual Impact Assessment
IEMA	Institute of Environmental Management and Assessment
LANDMAP	LANDMAP, All Wales database
LAT	Lowest Astronomical Tide
LCA	Landscape Character Area
LCT	Landscape Character Type
MLWS	Mean Low Water Springs
MCA	Marine Character Area
NCA	National Character Area
NE	Natural England
NRW	Natural Resources Wales
OS	Ordnance Survey
PEIR	Preliminary Environmental Impact Report
PRoW	Public Right of Way
SCA	Seascape Character Area
SLA	Special Landscape Area
SLVIA	Seascape, Landscape and Visual Impact Assessment
SPD	Supplementary Planning Document
SPG	Supplementary Planning Guidance
SSZ	Seascape Sensitivity Zone
WHS	World Heritage Site
WTG	Wind Turbine Generator
ZTV	Zone of Theoretical Visibility

Units

Unit	Description
m	Metres
km	Kilometres

1 SEASCAPE, LANDSCAPE AND VISUAL IMPACT ASSESSMENT METHODOLGY

1.1 Introduction

1.1.1.1 This technical report annex describes the methodology used to undertake the seascape, landscape and visual impact assessment (SLVIA), including the collection of baseline information and the assessment of likely significant effects, contained in volume 4, chapter 26: Seascape, landscape and visual resources of the Mona Offshore Wind Project Preliminary Environmental Impact Report (PEIR).

1.2 Study area

1.2.1.1 The SLVIA study area for the generation and transmission assets of the Mona Offshore Wind project, hereafter referred to as 'the SLVIA study area' is illustrated in Figure 1.1. It has been based on the findings of an analysis of the Zone of Theoretical Visibility (ZTV) and is described below:

- The area of land to be temporarily and permanently occupied during construction, operations and maintenance and decommissioning of the Mona Offshore Wind Project together with:
  - 50km buffer from the Mona Array Area (Figure 26.1). This study area incorporates the Mona Offshore Cable Corridor. This distance threshold aligns with recommendations in the White Consultants report for Natural Resources Wales (NRW) 'Seascape and Visual Buffer Study for Offshore Wind Farms' (2020).
  - 1km buffer from the Mona Proposed Onshore Development Area (i.e. the area landward of Mean Low Water Springs (MLWS)) to be temporarily or permanently occupied during the construction, operations and maintenance and decommissioning of the Mona Offshore Wind Project
  - 10km from the Mona Onshore Substation.

1.2.1.2 The SLVIA Cumulative Effects Assessment (CEA) study areas extend to 85km from the outer edges of the Mona Array Area to capture existing and proposed onshore windfarms, and 100km from the outer edges of the Mona Array Area to capture existing and proposed offshore windfarms, 35km from the Mona Onshore Substations to capture other existing and proposed onshore windfarms and 10km from the Mona Onshore Substations to capture other plans/projects. The CEA study areas identified above are illustrated on Figure 1.2 below.

1.2.1.3 The buffers used to define the seascape, landscape and visual resources study area are based on the Maximum Design Scenario (MDS) set out in volume 4, chapter 26: Seascape, landscape and visual resources of the PEIR.

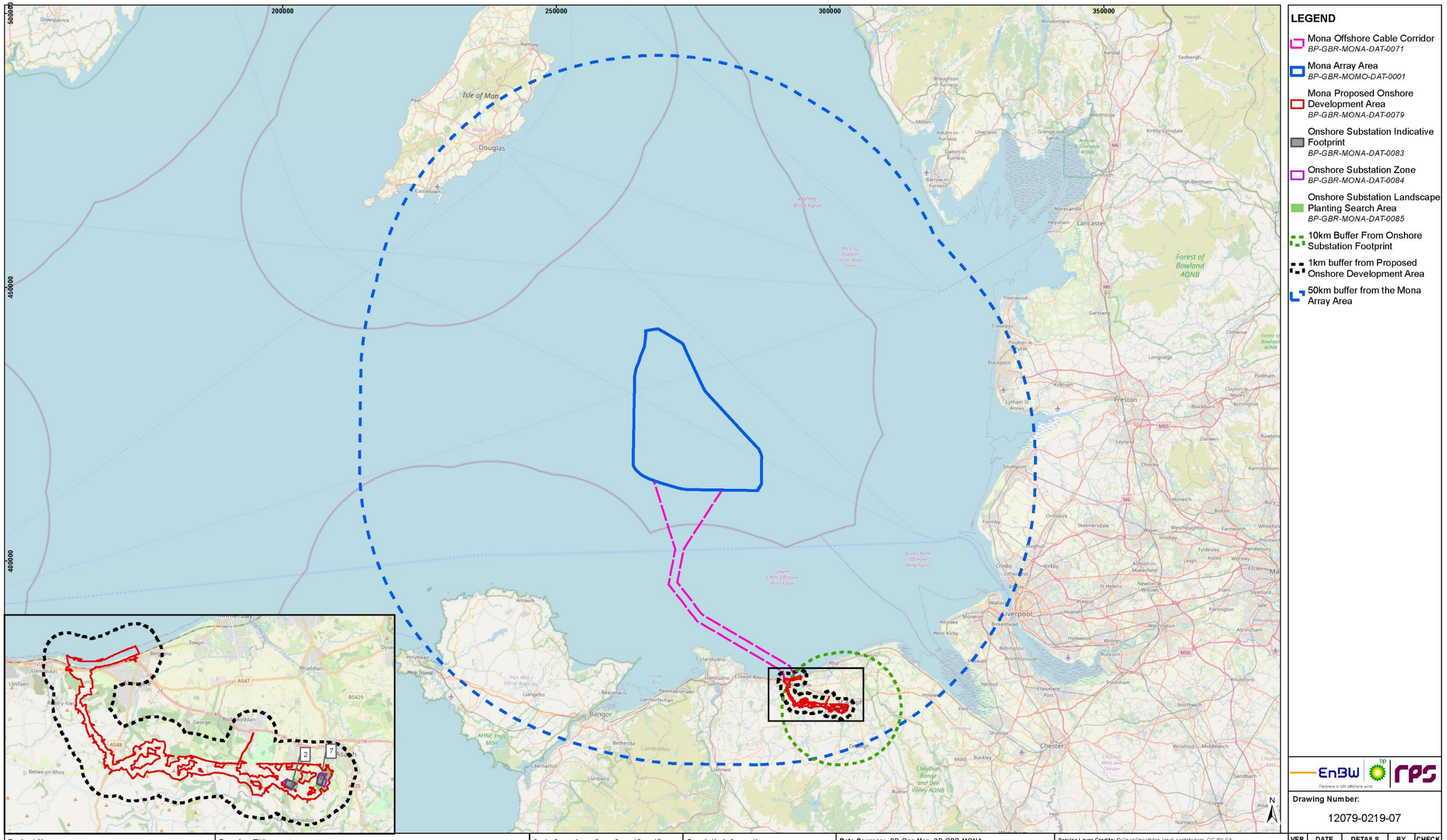

Figure 1.1: SLVIA study area.

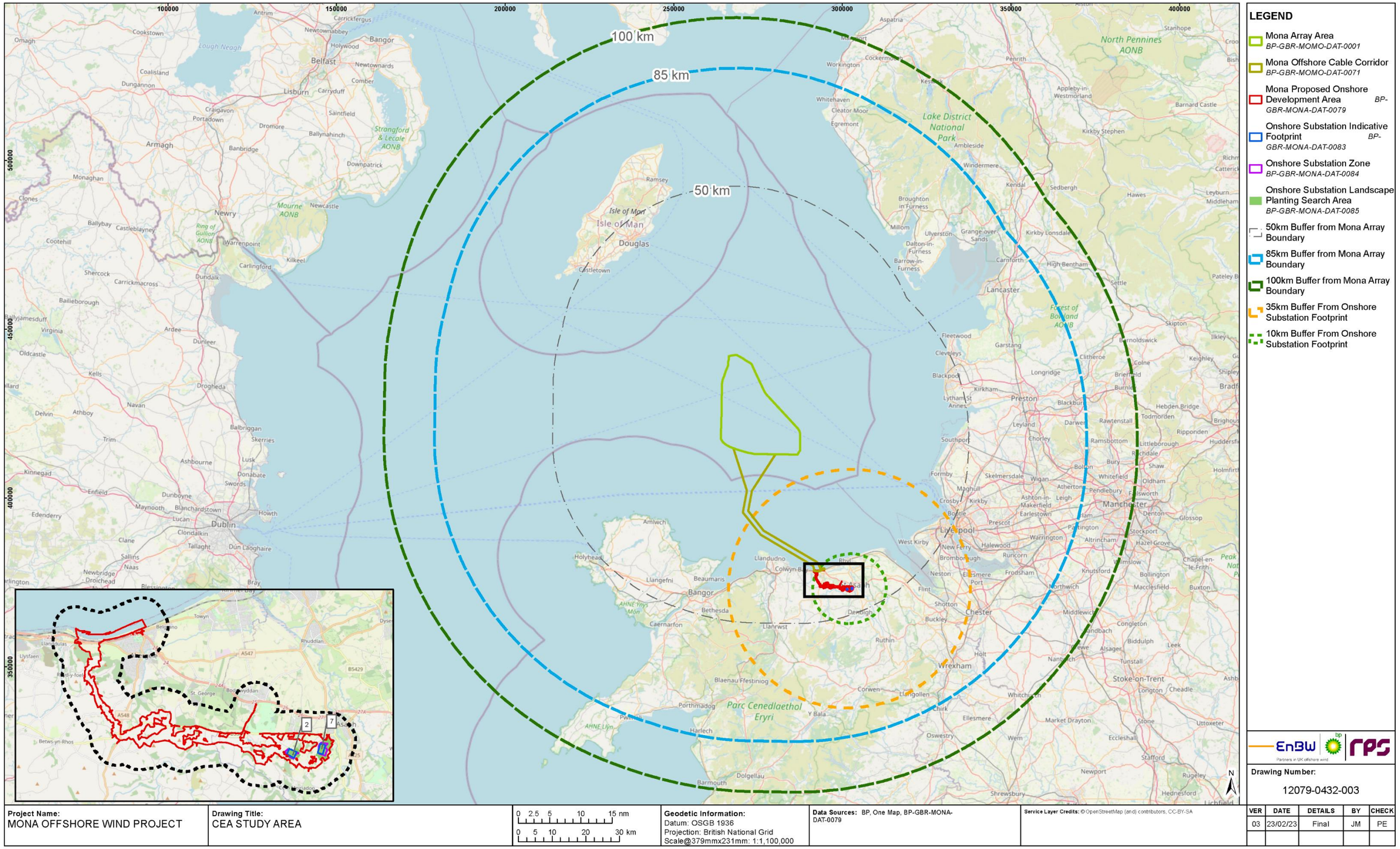

Figure 1.2: SLVIA CEA study areas.

1.3 Consultation

1.3.1.1 In line with best practice guidance in Guidelines for Landscape and Visual Impact Assessment: Third edition (GLVIA3) (Landscape Institute and IEMA, 2013) (engaging with stakeholders and the public, page 43, paragraphs 3.40-3.45), the scope and methodology of the SLVIA has been the subject of engagement and consultations with the relevant planning authorities, statutory bodies and other parties, and the public.

1.3.1.2 Details of the consultees and others engaged, and consultations undertaken to date, together with a summary of the key issues raised by the parties pertinent to SLVIA, are set out in the PEIR as follows:

- Volume 4, chapter 26: Seascape, landscape and visual resources of the PEIR (section 26.3)
- Volume 8, annex 26.3: Visual baseline of the PEIR (section 26.3).

1.4 Overview of SLVIA methodology

1.4.1 Introduction

1.4.1.1 The SLVIA has been undertaken based on the guidance on landscape and visual impact assessment within the Guidelines for Landscape and Visual Impact Assessment: Third edition (GLVIA3) (Landscape Institute, 2013). In addition, the SLVIA has been informed by relevant best practice guidance including:

- Using LANDMAP in Landscape and Visual Impact Assessments, LANDMAP Guidance Note 46 (GN46) (NRW, 2020)
- Technical Guidance Note 02/21: Assessing landscape value outside national designations (Landscape Institute, May 2021)
- Technical Guidance Note 06/19: Visual Representation of Development Proposals (Landscape Institute, September 2019).

1.4.1.2 Using LANDMAP in Landscape and Visual Impact Assessments (GN46) (NRW, 2020) advises that the LANDMAP database provides survey information which, in association with other baseline sources and planning guidance, will provide context for a development proposal. However, when it comes to assessing the specific effects of a development proposal, GN46 directs the user to GLVIA3 as below:

"LANDMAP does not provide a specific judgement about the effects of a specific development proposal. Evidence based, reasoned judgements, with reference to the landscape and visual effects must be made, following good practice as set out in GLVIA3."

1.4.1.3 An overview of the SLVIA process set out in GLVIA3 is described in the following sections of this report and illustrated in Figure 1.3. The SLVIA assesses the likely significant effects of the construction, operations and maintenance and decommissioning of the Mona Offshore Wind Project on the seascape, landscape and visual receptors, within the SLVIA study area.

1.4.1.4 GLVIA3 sets out the need to assess landscape and visual aspects separately, notwithstanding that they are related topics. The SLVIA follows the guidance recommendation in treating seascape/landscape and visual matters separately throughout the assessment.

1.4.1.5 GLVIA3 sets out broad guidelines rather than detailed prescriptive methodologies. The methodologies tailored for the assessment of the Mona Offshore Wind Project is based on GLVIA3 guidance, which recommends that an LVIA *"concentrates on principles and process"* and *"does not provide a detailed or formulaic recipe"* to assess effects, it being the *"responsibility of the professional to ensure that the approach and methodology are appropriate to the task in hand"* (preface to GLVIA3).

1.4.1.6 Potential seascape, landscape and visual effects (the impact of the Mona Offshore Wind Project) are assessed by considering the amount or 'magnitude' of change/impact, compared with the baseline conditions, likely to be experienced by seascape and landscape character areas and visual receptors (people) as a result of implementing the Mona Offshore Wind Project. Magnitude is then weighed against the sensitivity (to the Mona Offshore Wind Project) of the seascape, landscape or visual receptor in question to arrive at a judgement on the level of effect. The sensitivity of a given receptor is assessed by considering both its inherent value and its susceptibility to the type of development proposed. Finally, a judgement is made on whether the predicted seascape, landscape or visual effect is likely to be significant or not significant.

1.4.1.7 Regarding establishing the SLVIA baseline, in accordance with GLVIA3 (paragraph 7.13) and Planning Inspectorate Advice Note 17: Cumulative Effects Assessment (The Planning Inspectorate, 2015) existing active/in operation development is considered as part of the baseline conditions. As such, this SLVIA is an assessment of the likely seascape, landscape and visual effects of the Mona Offshore Wind Project set within its existing seascape, landscape and visual context, one which already contains operational wind farms, other infrastructure, and associated activities.

1.4.1.8 The assessment methodology is summarised in Figure 1.3 below. These factors are determined through a combination of quantitative (objective) and qualitative (subjective) assessment using professional judgement.

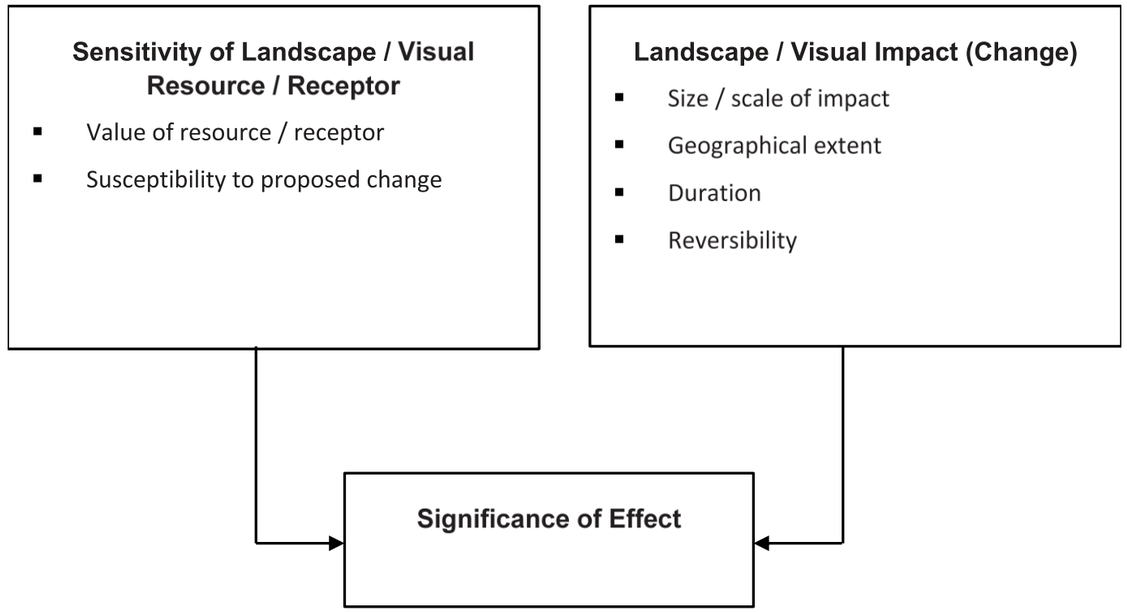

Figure 1.3: Assessment method summary.

1.4.1.9 The guidance emphasises the need for all assessments to be clear and transparent. It encourages the use of a simplified matrix of significance and warns against the use of other topics' significance criteria. The guidance also warns against reliance on significance tables alone, the emphasis should be on well-argued narrative text, for clarity and transparency.

1.4.2 Note on significance and proportionality

1.4.2.1 The purpose of carrying out this SLVIA is to identify and assess the significant effects likely to arise from the implementing the proposed development in question. Chapter 1 Introduction of GLVIA3 best practice guidance states:

"Identifying significant effects stresses the need for an approach that is in proportion to the scale of the project that is being assessed and the nature of its likely effects. Judgement needs to be exercised at all stages in terms of the scale of investigation that is appropriate and proportional. This does not mean that effects should be ignored or their importance minimised but that the assessment should be tailored to the particular circumstances in each case" (paragraph 1.17).

1.4.2.2 This SLVIA and its findings and conclusions are steered by the proportionality principle expressed in the paragraph quoted above.

1.4.2.3 When judging the overall significance of effect, GLVIA3 reiterates the need to clearly distinguish between effects which are significant and those which are not. It explains that there are no hard or fast rules about what effects should be deemed to be significant.

1.4.3 Assumptions and limitations

1.4.3.1 The SLVIA is subject to the following assumptions and limitations:

- The visual assessment is based on analysis of Ordnance Survey (OS) mapping of the Mona Offshore Wind Project and surrounding area, and on field survey and analysis of views from publicly accessible viewpoints in the surrounding landscape and ferry routes. Although every effort has been made to include viewpoints in sensitive locations and locations from which the Mona Offshore Wind Project would be most visible, not all public viewpoints from which the Mona Offshore Wind Project would potentially be seen have necessarily been included in the assessment.
- The fieldwork and visual assessment were undertaken during early spring when deciduous trees were not in leaf and late summer 2022 when deciduous trees were in leaf. The early spring photography has allowed an accurate projection of the MDS (i.e. the most visible conditions). However, visibility in some months can be more limited due to weather conditions (see Appendix B: Meteorological Office visibility data to this annex). Judgements have necessarily been made regarding the summer situation when vegetation is in full leaf for some of the locations.
- The term 'host' landscape/seascape is understood to mean the seascape/landscape character unit in which the Mona Offshore Wind Project is located. In other words, seascape/landscape character unit that is 'hosting' the proposed development.
- The Mona Offshore Wind Project is treated as a permanent form of development with the potential of being reversed at some point in the future, although not necessarily at the end its design life.
- A 'defining' change is understood to mean one that substantially and/or materially alters the existing situation. In this SLVIA, a 'defining' change to the existing seascape/landscape or visual resource will typically lead to a significant effect being recorded, whereas a 'non-defining' change will not.
- Assumptions and limitations relating the visualisations and graphics production generally are set out in Appendix A1: Visual representations of this annex.

1.5 Iterative assessment and design

1.5.1.1 As described in volume 1, chapter 5: Environmental impact assessment methodology of the PEIR, section 5.3.5, the SLVIA is part of an ongoing iterative design process which aims to *"avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment"*. This iterative approach involves a feedback loop whereby if the initial assessment of a potential seascape/landscape and/or visual effect is deemed likely to result in a significant adverse effect in EIA terms, changes to the design of the Mona Offshore Wind Project MDS are made (where reasonably practical) to avoid, reduce or offset this. The assessment is then repeated, and the process continues until the effect has been reduced to a level that is judged to be not significant in EIA terms or, having regard to other constraints, no further changes may be made to the Mona Offshore Wind Project MDS in order to reduce the magnitude of impact (and hence its potential seascape, landscape and visual significance of

effect). In such cases an overall effect that is still significant may be presented in the SLVIA section of the PEIR.

1.5.1.2 This iterative design process has been used to inform the design of the Mona Offshore Wind Project through the identification of likely significant seascape/landscape and/or visual effects, and (where possible within operation constraints) the development of mitigation measures to address these. Where practical, these measures have been incorporated into the design of the Mona Offshore Wind Project MDS. They are referred to throughout the PEIR as 'measures adopted as part of the Mona Offshore Wind Project'.

1.5.2 Potential effects during construction and decommissioning

1.5.2.1 Potential effects on seascape character, landscape character and views/visual amenity that may occur during the construction and decommissioning phases of the Mona Offshore Wind Project include the following:

- Seascape effects:
  - Potential direct and indirect effects on seascape character, which may arise during the construction and decommissioning phase of the Mona Offshore Wind Project. For example, laying new Offshore Export Cables to shore, landfall and structures located within the Mona Array Area, which may alter the seascape character of within Mona Array Area and Mona Offshore Cable Corridor and/or the perceived character of the wider seascape, through the ability of people to see these changes within views.
- Landscape effects:
  - Potential direct and indirect effects on landscape character, which may arise during the construction and decommissioning phase of the Mona Offshore Wind Project. For example, laying new Offshore Export Cables to shore, Onshore Cable Corridor, Mona Onshore Substation, and the 400kv Grid Connection Cable Corridor to Bodelwyddan National Grid substation.
  - Potential indirect effects on the special landscape qualities and integrity of designated landscapes during the construction and decommissioning phase of the Mona Offshore Wind Project. For example, construction and decommissioning of the offshore and onshore infrastructure may alter the landscape qualities and integrity of Eryri National Park, The Isle of Anglesey Area of Outstanding Natural Beauty (AONB), the Clwydian Range and Dee Valley AONB, in addition to themes and criteria for The Castles and Town Walls of King Edward 1st World Heritage Sites (WHS) and The Slate Landscape of Northwest Wales WHS.
- Visual effects:
  - Potential direct effects on views and visual amenity experienced by people, which may arise during the construction and decommissioning phase of the Mona Offshore Wind Project. For example, laying new Offshore Export Cables to shore, landfall, Onshore Cable Corridor, Mona Onshore Substation, and the 400kv Grid Connection Cable Corridor to Bodelwyddan National Grid substation.

1.5.3 Potential effects during operations and maintenance

1.5.3.1 Potential effects on the seascape, landscape and views/visual amenity that may occur during the operations and maintenance phases of the Mona Offshore Wind Project, include the following:

- Seascape effects:
  - Potential direct and indirect effects on seascape character, which may arise as a result of the operation of the wind turbines, operations and maintenance activities located within the Mona Array Area and landfall, which may alter the seascape character of the Mona Array Area itself and/or the perceived character of the wider seascape through the ability of people to see these changes within views.
- Landscape effects:
  - Potential direct and indirect effects on seascape and landscape character (including designated landscapes), arising as a result of the operation of the wind turbines, substations (onshore and offshore) and maintenance activities.
  - Potential indirect effects on the special landscape qualities and integrity of designated landscapes. For example, operations and maintenance of the offshore and onshore infrastructure may alter the landscape qualities and integrity of Eryri National Park, The Isle of Anglesey Area of Outstanding Natural Beauty (AONB), the Clwydian Range and Dee Valley AONB, in addition to themes and criteria for The Castles and Town Walls of King Edward 1st World Heritage Sites (WHS) and The Slate Landscape of Northwest Wales WHS.
- Visual effects:
  - Potential direct effects on views and visual amenity experienced by people, which may arise as a result of the operation of the wind turbines, substations (onshore and offshore) and maintenance phase, including marine navigation and aviation lighting.
- Cumulative effects:
  - The assessment also considers the potential direct and indirect cumulative effects between the Mona Offshore Wind Project and other plans/projects, which are likely to result in additional changes to seascape character, landscape character and views/visual.

1.6 Guidance, data sources and site surveys

1.6.1 Guidance

1.6.1.1 As well as relevant planning policy and guidance detailed in volume 4, chapter 26: Seascape, landscape and visual resources of the PEIR, the methodology used for the SLVIA has regard to relevant guidance and requirements contained in published documents, including in the following:

- Council of Europe, The European Landscape Convention (2000, ratified 2006) ETS No. 176

- Countryside Agency and Scottish Natural Heritage (2004), Topic Paper 6: Techniques and Criteria for judging Capacity and Sensitivity
- Department of Energy and Climate Change (2011), National Policy Statement for Electricity Networks Infrastructure (EN-5)
- Department of Energy and Climate Change (2011), National Policy Statement for Renewable Energy (EN-3)
- Department of Energy and Climate Change (2011), Overarching National Policy Statement for Energy (EN-1)
- Department of Energy and Climate Change, (2016), Offshore Energy Strategic Environment Assessment 3
- Department of Trade and Industry, (2005), Guidance on the Assessment of the Impact of Offshore Wind Farms: Seascape and Visual Impact Report
- Department of Trade and Industry, BMT Cordah (2003), Offshore Wind Energy Generation: Phase 1 Proposals and Environment Report
- Hill M., Briggs J., Minto P., Bagnall D., Foley K., Williams A., (2001), INTERREG Report No. 5: Guide to Best Practice in Seascape Assessment
- Landscape Institute (2019). Visual Representation of Development Proposals
- Natural England, (2012), An Approach to Seascape Character Assessment (NE, 2012)
- Natural England (2014), An Approach to Landscape Character Assessment (NE, 2014)
- NatureScot (2022). Assessing the Cumulative Landscape and Visual Impacts of Onshore Wind Energy Developments
- NatureScot (2017). Visual Representation of Wind farms, Guidance (Version 2.2)
- Various, (2021), Offshore Wind Marine Environmental Assessments: Best Practice Advice for Evidence and Data Standards – Phase III: Expectations for Data Analysis and Presentation at Examination for Offshore Wind Applications – Draft Report
- White Consultants with Northumbria University, (2020), Offshore Energy Strategic Environmental Assessment: Review and Update of Seascape and Visual Buffer Study for Offshore Wind Farms – Final Report
- White S., Michaels S., King H., (2019), Seascape and Visual Sensitivity to Offshore Wind Farms in Wales: Strategic Assessment and Guidance – Stage 1. Ready Reckoner of Visual Effects Related to Turbine Size (NRW Report No. 315)
- White S., Michaels S., King H., (2019), Seascape and Visual Sensitivity to Offshore Wind Farms in Wales: Strategic Assessment and Guidance – Stage 2. Guidance on Siting Offshore Wind Farms (NRW Report No. 330)
- White S., Michaels S., King H., (2019), Seascape and Visual Sensitivity to Offshore Wind Farms in Wales: Strategic Assessment and Guidance – Stage 3. Strategic Assessment and Guidance (NRW Report No. 331).
- Parker, J., Banks, A., Fawcett, A., Axelsson, M., Rowell, H., Allen, S., Ludgate, C., Humphrey, O., Baker, A. & Copley, V. (2022a). Offshore Wind Marine Environmental Assessments: Best Practice Advice for Evidence and Data Standards.
- Phase I: Expectations for pre-application baseline data for designated nature conservation and landscape receptors to support offshore wind applications. Natural England. Version 1.1. 79 pp. (NE, 2022).

1.6.2 Data sources

1.6.2.1 The data sources that have been collected and used to inform this SLVIA are summarised in Table 1.1 below.

Table 1.1: Data sources used to inform the SLVIA.

Title	Source	Year	Author
A Landscape Strategy for Lancashire	Lancashire County Council	2000	Lancashire County Council
Supplementary Planning Guidance: Landscape Character Assessment of Sefton	Sefton Council	2003	Sefton Council
LANDMAP – the Welsh Landscape Baseline	Natural Resources Wales	Various (2007)	Natural Resources Wales
Isle of Man Landscape Character Assessment	Isle of Man Government	2008	Chris Blandford Associates
National Character Area Profile	Natural England http://publications.naturalengland.org.uk/	Various (2012 to 2014)	Natural England
National Landscape Character	Natural Resources Wales https://cdn.cyfoethnaturiol.cymru/	Various (2013)	Natural Resources Wales
Anglesey Seascape Character Assessment	Isle of Anglesey Council	2013	Fiona Fyfe Associates
Anglesey Seascape Character Assessment	Isle of Anglesey Council	2013	Fiona Fyfe Associates
Conwy and Denbighshire Landscape Sensitivity and Capacity Assessment for Wind Energy Development	Conwy County Borough Council and Denbighshire County Council	2013	Conwy County Borough Council and Denbighshire County Council
Clwydian Range and Dee Valley Management Plan 2014 - 2019	Clwydian Range and Dee Valley AONB	2014	Clwydian Range and Dee Valley AONB Partnership
LDP11: Landscape Sensitivity and Capacity Assessment for Onshore Wind Turbine Development	Conwy Local Development Plan 2007 – 2022 SPD	2014	Conwy County Borough Council

Title	Source	Year	Author
Marine Plan Areas in England	Marine Management Organisation	2014	Marine Management Organisation
Supplementary Planning Guidance: Landscapes and Seascapes of Eryri	Snowdonia National Park Authority	2014	Snowdonia National Park Authority
The Isle of Anglesey Area of Outstanding Natural Beauty (AONB) Management Plan Review 2015 to 2020	Isle of Anglesey AONB/Isle of Anglesey County Council	2015	Isle of Anglesey AONB/Isle of Anglesey County Council
National Seascape Assessment for Wales	Natural Resources Wales	2015	Land Use Consultants
Seascape Character Assessment for the North West Inshore and Offshore Marine Plan Areas	Marine Management Organisation	2018	Land Use Consultants
Seascape and visual sensitivity to offshore wind farms in Wales: Strategic assessment and guidance – Stage 3, Report No. 331	Natural Resources Wales	2019	White, S. Michaels, S. King, H.
Welsh National Marine Plan	Welsh Government	2019	Welsh Government
Wirral Landscape Character Assessment	Wirral Metropolitan Borough Council	2019	Land Use Consultants

1.6.3 Desk-based studies and site survey work

1.6.3.1 The SLVIA has been informed by desk-based studies, stakeholder consultations and field survey work undertaken as set out annex 26.3: Visual baseline technical report of the PEIR.

1.7 Assessment of visual effects

1.7.1 Introduction

1.7.1.1 Visual effects are concerned with effects on views and visual amenity, defined as '*the overall pleasantness of the views people enjoy of their surroundings…'* (GLVIA3, page 158). They relate to the effects on views experienced by visual receptors (e.g. footpath users, road users, people in their places of work).

1.7.1.2 Visual receptors are always people *"An assessment of visual effects deals with the effects of change and development on the views available to people and their visual amenity"* (GLVIA3, paragraph 6.1). The assessment of visual effects is thus concerned with the potential visual change experienced by people as a result of implementing the Mona Offshore Wind Project and may include changes to existing static and sequential views, or the wider visual amenity.

1.7.1.3 The level of visual effect (and whether this is significant or not) is determined through consideration of the sensitivity of each visual receptor (or group) and the magnitude of impact that will potentially be brought about by the construction, operations and maintenance and decommissioning of the Mona Offshore Wind Project.

1.7.2 Zone of Theoretical Visibility (ZTV)

1.7.2.1 Plans mapping the Zone of Theoretical Visibility (ZTV) for both the turbine array and the substations are used to establish the extent of theoretical visibility of the Mona Offshore Wind Project throughout the SLVIA study area and to assist with representative viewpoint selection. The ZTVs take account the screening effects of buildings, landform and significant vegetation, as shown on the 1:25,000 OS mapping. They do not reflect local topographical variations, hedgerows, individual trees or smaller built structures, such as walls. A ZTV is only an indication of where a proposed structure might be seen from. It does not indicate how much of the Mona Offshore Wind Project can be seen or reflect the effects of perspective. It simply shows that part of the Mona Offshore Wind Project is visible, however small or distant. As such it is a MDS, a tool to be followed up by fieldwork, which verifies what of the Mona Offshore Wind Project, might actually be visible.

1.7.3 Representative Viewpoints

1.7.3.1 Representative Viewpoints are used to assist the assessment and cover a range of viewpoints within the SLVIA study area at differing distances and orientations relative to the Mona Offshore Wind Project. The purpose of these is to help assess both the level of visual effect for visual receptors and guide the design process, and generally focus the assessment.

1.7.3.2 The representative viewpoints used in the SLVIA have been agreed with the relevant consultees as part of the Mona Offshore Windfarm Project consultation process, as referred to previously in section 25.3 above.

1.7.3.3 The assessment process involved visiting the representative viewpoint location and viewing wireline visualisations of the Mona Offshore Wind Project prepared for each. The fieldwork was conducted in periods of favourable visibility, during both the summer and winter months to take account of the seasonal variation in vegetation cover. The changes in visibility over the year are set out in Appendix B: Meteorological Office visibility data, to this annex.

1.7.4 Evaluating visual sensitivity to change

1.7.4.1 The sensitivity of each visual receptor (the particular person or group of people likely to be affected at a specific viewpoint) *"should be assessed in terms of both their susceptibility to change in views and visual amenity and also the value attached to particular views"* (GLVIA3, paragraph 6.31). In this SLVIA, susceptibility and value of visual receptors are defined as follows:

- Visual Susceptibility: "*The susceptibility of different visual receptors to changes in views and visual amenity is mainly a function of:*
  - *the occupation or activity of people experiencing views at the particular locations; and,*

– *the extent to which their attention or interest may therefore be focused on the views and the visual amenity they experience at particular locations*" (GLVIA3, paragraph 6.32).

- Value of views: Judgements made about the value of views should take account of: "*recognition of the value attached to particular views, for example in relation to heritage assets, or through planning designations; and, indicators of value attached to views by visitors, for example through appearances in guidebooks or on tourist maps, provision of facilities for their enjoyment (such as parking places, sign boards or interpretive material) and references to them in literature or art…*" (GLVIA3, paragraph 6.37).

1.7.5 Visual sensitivity criteria

1.7.5.1 Sensitivity is not readily graded in bands and GLVIA notes, with regards to visual sensitivity, that the division of who may or may not be sensitive to a particular change *"is not black and white and in reality, there will be a gradation in susceptibility to change"* (GLVIA, paragraph 6.35). To provide both consistency and transparency to the assessment process, Table 1.2 below defines the criteria which have guided the judgement as to the intrinsic susceptibility and value of the visual receptor and their subsequent sensitivity to changes to views brought about by the Mona Offshore Wind Project.

Table 1.2: Visual sensitivity to change.

Sensitivity	Typical Descriptors	
	Visual Receptor Susceptibility	**Value of View**
Very High	Observers, drawn to a particular view, including those who have travelled from around Britain and overseas to experience the views.	See paragraph 25.7.4.1 above
High	Observers on the public rights of way network in the countryside are more sensitive to visual change.	See paragraph 25.7.4.1 above
Medium	Observers enjoying the countryside from vehicles on quiet/promoted routes or pedestrians on less scenic/urban rights of way are moderately sensitive to visual change.	See paragraph 25.7.4.1 above
Low	Observers in vehicles or people involved in outdoor activities where attention is not focused on landscape are less sensitive to visual change.	See paragraph 25.7.4.1 above
Negligible	Observers in vehicles or people involved in frequent or frequently repeated activities are less sensitive to visual change.	See paragraph 25.7.4.1 above

1.7.6 Evaluating visual magnitude of impact

1.7.6.1 The magnitude of impact affecting visual receptors depends on the size or scale of the development, the geographical extent of the area influenced and its duration and reversibility. These factors are described below.

Size or scale

1.7.6.2 An assessment is made about the size or scale of change in the view that is likely to be experienced because of the Mona Offshore Wind Project, based on the following criteria:

- **Distance**: the distance between the visual receptor/viewpoint and the Mona Offshore Wind Project. Generally, the greater the distance, the lower the magnitude of impact, as the Mona Offshore Wind Project will constitute a smaller scale component of the view. Distance can be quantified and described objectively.
- **Size**: the amount and size of the Mona Offshore Wind Project that will be seen. Visibility may range from small or partial visibility of the Mona Offshore Wind Project to all the offshore or onshore elements being visible. Generally, the closer and greater the number of elements within the Mona Offshore Wind Project appearing in the view, the higher the magnitude of impact. This is also related to the degree to which the Mona Offshore Wind Project may be wholly or partly screened by landform, vegetation (seasonal) and/or built form. Conversely open views are likely to reveal more of the Mona Offshore Wind Project, particularly where this is a key characteristic of the seascape/landscape. The amount of development visible can be described objectively in part by reference to the proportion of the whole in view.
- **Scale**: the scale of 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 Mona Offshore Wind Project may appear larger or smaller relative to the existing view composition.
- **Field of view (FoV)**: the extent or proportion of the view that is affected by the Mona Offshore Wind Project. Generally, the greater the extent or proportion impacted, the higher the impact magnitude will be. If the Mona Offshore Wind Project extends across the whole of the view, the magnitude of impact will generally be higher. Conversely, if the Mona Offshore Wind Project occupies just a narrow portion of the view, the magnitude of impact is likely to be reduced. This can in part be described objectively by reference to the horizontal and vertical FoVs affected relative to the extent available view.
- **Contrast**: the character and context within which the Mona Offshore Wind Project will be seen and the degree of contrast or integration of any new features with existing seascape or landscape elements, in terms of scale, form, mass, line, height, colour, luminance and (e.g. in the case of the wind turbines) motion. Contrasts and changes may arise because of the rotation movement of the wind turbine blades, as a particular 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 impact. Conversely, congruity with existing surroundings is likely to be less impactful.

- **Consistency of image**: the consistency of image of the Mona Offshore Wind Project in relation to other developments. The magnitude of impact is likely to be lower if its wind turbine height, arrangement, and layout design are broadly similar to other developments in the seascape, in terms of its scale, form and general appearance. The same applies to the size of the substation(s) in the landscape relative to other buildings or structures.
- **Skyline/background**: whether the Mona Offshore Wind Project will be viewed against the skyline or a landform or seascape backdrop may affect the level of contrast and magnitude. If it adds to an already developed backdrop or skyline the magnitude of impact will tend to be lower.
- **Number**: generally, the greater the number of separate elements within a proposed development seen simultaneously or sequentially, the higher the magnitude of impact. This can usually be quantified and described objectively.
- **Nature of visibility**: the nature of visibility is a further factor for consideration. The Mona Offshore Wind Project may be subject to various phases of development and the way it is viewed will vary throughout the year due to differing weather and atmospheric conditions/visibility and seasonal variations, including vegetation cover (see Appendix B: Meteorological Office visibility data).

Geographical extent

1.7.6.3 The geographic extent over which the visual effect will be experienced is distinct from the size or scale of effect and is described in terms of the physical area or location over which it will be experienced (quantifiable as a linear or area measurement). The extent of effects will vary according to the specific nature of the Mona Offshore Wind Project and is principally assessed through consideration of the ZTV, field survey and analysis of the extent of visibility likely to be experienced by visual receptors on the ground at the representative viewpoints.

Duration and reversibility

1.7.6.4 The duration and reversibility of visual effects are based on the period over which the Mona Offshore Wind Project is likely to exist (i.e. during construction, operations and maintenance and decommissioning phase), with effects being reversed at the end of that period.

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

- long-term: more than 10 years (may be permanent or reversible)
- medium-term: six to 10 years (reversible)
- short-term: one to five years (reversible).

Visual magnitude of impact rating

1.7.6.6 The magnitude of impact resulting from the Mona Offshore Wind Project is described as large, medium, small, negligible and no change as defined in Table 1.3 below.

Table 1.3: Visual Magnitude of Impact Criteria.

Magnitude of Impact	Definition
Large	Complete or very substantial visual change involving complete or very substantial obstruction of existing view or complete change in character and composition of visual baseline (i.e. pre- development view) e.g. through removal of key elements.
Medium	Moderate visual change, which may involve partial obstruction of existing view or partial change in character and composition of visual baseline (i.e. pre- development view) through the introduction of new elements or removal of existing elements. Change may be prominent but would not substantially alter the scale and character of the surroundings and the wider setting. Composition of views would alter. View character may be partially changed through the introduction of features which, although uncharacteristic, may not necessarily be visually discordant.
Small	Minor change to the visual baseline (i.e. pre-development view) – change would be distinguishable from the surroundings whilst view composition and character would be similar to the pre- change circumstances.
Negligible	Very slight change in visual baseline (i.e. pre- development view) – change barely distinguishable from the surroundings. Composition and character of view substantially unaltered.
No Change	No alteration to the existing view.

1.7.7 Evaluating significance of visual effect

1.7.7.1 The significance of a visual effect is evaluated through the combination of visual sensitivity and magnitude of impact. Once the level of effect has been established, a judgement is then made as to whether the effect is 'significant' as required by the relevant EIA Regulations. This process is assisted by the matrix in Table 1.7 below, which is used to guide the assessment.

1.7.7.2 A significant effect is more likely to occur where a combination of the variables results in the Mona Offshore Wind Project having a defining effect on the view or visual amenity, or where changes materially affect a visual receptor of high sensitivity. An effect is more likely to be assessed as not significant when the combination of variables results in the Mona Offshore Wind Project having a non-defining effect on the view or visual amenity, or where predicted changes affect a low sensitivity visual receptor.

1.8 Assessment of seascape/landscape effects

1.8.1 Introduction

1.8.1.1 The Marine Policy Statement (UK Government, 2011) states *"references to seascape should be taken as meaning landscapes with views of the coast or seas, and coasts and the adjacent marine environment with cultural, historical and archaeological links with each other."* In England, seascape characterisation includes both the sea surface and what lies below the waterline.

1.8.1.2 Regarding Wales, INTERREG 2001 defines seascape to include: "*views from land to sea; views from sea to land; views along coastline; the effect om landscape of the conjunction of sea and land."*

1.8.1.3 National Character Areas (NCAs) and Marine Character Areas (MCAs) are considered to be appropriate for the assessment of effects on seascape character. Where there is a gap in these and other published assessments, this SLVIA has identified and described its own seascape character areas using available information.

1.8.1.4 For the onshore elements of the Mona Offshore Wind Project, located wholly in Wales, landscape character areas have been determined through the LANDMAP database with a focus on Visual and Sensory Aspect Area data.

1.8.1.5 Other sources of seascape and landscape character information which have informed this assessment are listed above in Table 25.1 Data sources used to inform the SLVIA.

1.8.2 Evaluating seascape/landscape sensitivity to change

1.8.2.1 The sensitivity of a seascape/landscape receptor is a combination of *"judgements of their susceptibility to the type of change or development proposed and the value attached to the landscape"* (GLVIA3, paragraph 5.39). In this SLVIA, susceptibility and value of seascape/landscape receptors are defined as follows:

- Landscape susceptibility: "*the ability of the landscape receptor (whether it be the overall character or quality/condition of a particular landscape type or area, or an individual element and/or feature, or a particular aesthetic and perceptual aspect) to accommodate the proposed change without undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies*" (GLVIA3, paragraph 5.40).
- Value of the landscape receptor: "*The value of the Landscape Character Types or Areas that may be affected, based on review of designations at both national and local levels, and, where there are no designations, judgements based on criteria that can be used to establish landscape value; and, the value of individual contributors to landscape character, especially the key characteristics, which may include individual elements of the landscape, particularly landscape features, notable aesthetic, perceptual or experiential qualities, and combinations of these contributors*" (GLVIA3, paragraph 5.44).

1.8.2.2 The assessment of seascape/landscape sensitivity has regard to published landscape and seascape sensitivity studies including NRW Report No. 331.

Value of the seascape/landscape receptor

1.8.2.3 The value of a seascape/landscape has been classified as very high, high, medium, low or negligible. The assessment has been made using evidence and professional judgement based on the following criteria.

- **Seascape or landscape designations**: a receptor that lies within the boundary of a recognised landscape related planning designation will be of increased value, depend on the proportion of the receptor that is so influenced and the level of importance of the designation (i.e. 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. Technical Guidance Note 02/21: Assessing landscape value outside national designations (Landscape Institute, May 2021) is helpful when considering the value of landscape receptors. LANDMAP visual and sensory evaluation is also a consideration in relation to landscape value.
- **Seascape or landscape quality**: the quality of a seascape/landscape character receptor is a reflection of its attributes, such as scenic quality, sense of place, rarity and representativeness, and the extent to which its valued attributes have remained intact. A seascape or landscape with consistent, intact, well-defined and distinctive attributes is considered to be of higher quality and, in turn, higher value, than a less intact landscape containing elements that detract from its character.
- **Seascape or landscape experience**: the experiential qualities evoked by a landscape receptor can add to its value. This relates to several factors, including the perceptual responses it evokes, the cultural associations that may exist in literature or history, or the iconic status of the seascape/landscape in its own right. Other factors include the recreational value of the seascape/landscape and those relating to the nature conservation and/or archaeology value of the area.

1.8.2.4 Due to the distance from land, the assessment of the effects of the Mona Offshore Wind Project array and offshore substations, volume 4, chapter 26: Seascape landscape and visual resources of the PEIR, has considered nationally and internationally designated landscapes and areas only. For the Onshore Substations the effects on locally designated landscapes within 5km have also been assessed. Undesignated land within the Mona Proposed Onshore Development Area (including the Onshore Cable Corridor and the Onshore Substations) has also be assessed as to whether it is a valued landscape.

Seascape and landscape susceptibility to change

1.8.2.5 The susceptibility of a seascape/landscape character receptor to change is a reflection of its ability to accommodate the changes that would result from the introduction of the Mona Offshore Wind Project without detrimental consequences for the maintenance of the baseline situation and/or fulfilment of landscape planning policies and strategies. Some seascape and landscape receptors are better able to accommodate development than others due to certain characteristics indicative of their capacity to accommodate change.

1.8.2.6 The susceptibility of a seascape or landscape receptor to change has been classified as very high, high, medium, low or negligible. The assessment has been made using evidence and professional judgement based on the following criteria:

- **Overall strength and robustness**: collectively the overall characteristics and qualities of a particular seascape/landscape result in a strong and robust character that is capable of reasonably accommodating the influence of the Mona Offshore Wind Project without undue adverse effects on the special qualities (in the case of a designated landscape), or the key characteristics for which an area of seascape or landscape character is valued.
- **Seascape and landscape scale and topography**: the scale and topography are large enough to physically accommodate the influence of the Mona Offshore Wind Project. Topographical features such as more complex,

distinctive or small-scale landforms are likely to be more susceptible than larger scale, simple, expansive and homogenous landforms.

- **Openness and enclosure**: openness in the seascape or landscape may increase susceptibility to change because it can result in wider visibility. However, an open seascape/landscape may also be larger scale and simple which will decrease its susceptibility. Conversely, enclosed seascape/landscapes can offer more screening potential, limiting visibility to a smaller area. However, they may also be smaller scale and more complex which will increase susceptibility. In general, broad and open seascapes/landscapes are likely to be less susceptible to the Mona Offshore Wind Project than more enclosed, complex seascapes and landscapes (such as indented bays, headlands, small-scale and varied coastal landscapes).
- **Skyline**: prominent and distinctive skylines and horizons with important landmark features identified in seascape/landscape character assessments are generally considered to be more susceptible to development compared with broad, simple skylines/horizons which lack landmark features or contain built features and human activities.
- **Relationship with other development and landmarks**: contemporary landscapes where there are existing similar developments (e.g. windfarms) or other forms of development and related activities (industry, mineral extraction, masts, urban fringe/large settlement, major transport/shipping routes) that already have a characterising influence result in a lower susceptibility to development as opposed to areas characterised by smaller scale, historic development and landmarks.
- **Perceptual qualities**: notable landscapes acknowledged to be particularly scenic, wild or tranquil are generally considered to be more susceptible to development in comparison to ordinary, cultivated, farmed or developed landscapes where perceptions of 'wildness' and tranquillity are less tangible or more diluted. However, landscapes which are either remote or appear natural may vary in their susceptibility to development. Dynamic landscapes/seascapes (i.e. supporting human generated activity/movement) are considered less susceptible than the converse described above.
- **Seascape/landscape context and association**: the extent to which the Mona Offshore Wind Project will influence the character of the seascape, landscape and visual resource study area relates to existing associations between the host seascape or landscape receptor and the receptor from which it is being experienced. In some situations, this association will be strong (i.e. where the seascapes/landscapes are directly related) whereas in others it will be less marked (i.e. where the seascape or landscape association is weak). The seascape/landscape context and visual connections with areas of adjacent seascape or landscape character or designations has a bearing on the susceptibility to development.

Seascape and landscape sensitivity rating

1.8.2.7 As with visual sensitivity described above (Table 1.2) seascape and landscape sensitivity is not readily graded into bands. In order to provide both consistency and transparency to the assessment process, descriptions of landscape susceptibility and value are based on the same sliding scale as visual receptors (i.e. negligible, low, medium, high and very high) as set out in Table 1.4 Table 1.4 below.

Table 1.4: Sensitivity of seascape and landscape receptors.

Sensitivity	Typical Descriptors	
	Seascape/Landscape Resource/Receptor Susceptibility	**Seascape/Landscape Resource/Receptor Value**
Very High	Exceptional seascape/landscape quality; absence of seascape/landscape detractors; no or limited potential for substitution. Key elements/features well known to the wider public	Nationally/internationally designated seascape/landscape, or key elements or features of nationally/internationally designated seascape/landscape
High	Strong/distinctive seascape/landscape character; relatively free of seascape/landscape detractors	Regionally/nationally designated seascape/landscape areas or features
Medium	Some distinctive seascape/landscape characteristics; presence of seascape/landscape detractors	Locally/regionally designated/valued seascape/landscape and features
Low	Absence of distinctive seascape/landscape characteristics; unavoidable presence of seascape/landscape detractors	Undesignated seascape/landscape and features
Negligible	Absence of positive seascape/landscape characteristics. Significant presence of seascape/landscape detractors	Undesignated seascape/landscape and features

1.8.3 Seascape and landscape magnitude of impact

1.8.3.1 As with the magnitude of visual impacts, the magnitude of impact or change affecting the seascape or landscape resource depends on the size or scale, geographical extent of the area influenced and its duration and reversibility. These factors are described below.

Size or scale of change

1.8.3.2 This criterion relates to the size or scale of change to the seascape/ landscape that will arise as a result of a proposed development, based on the following factors:

- **Seascape/landscape elements**: the degree to which the pattern of elements that makes up the seascape/landscape character will be altered by the Mona Offshore Wind Project, by removal or addition of elements compared with the baseline situation. The magnitude of impact will generally be higher if the seascape/landscape features are extensively removed or altered, and/or if many new elements are added to the seascape/landscape.
- **Seascape and landscape characteristics**: this relates to the extent to which the effect of the Mona Offshore Wind Project changes, physically or perceptually, the key characteristics of the seascape/landscape that may be important to its distinctive character. This may include, for example, the scale of the seascape or landform, its relative simplicity or irregularity, and the

seascape/landscape context. Also relevant are: the grain or orientation of the seascape landscape; the degree to which the receptor is influenced by external features; and the juxtaposition of the Mona Offshore Wind Project in relation to these and other baseline characteristics. If the Mona Offshore Wind Project is located in a seascape or landscape receptor that is already affected by other similar development, this may reduce the magnitude of impact.

- **Seascape or landscape designation**: in the case of designated seascapes/landscapes, the degree of change is considered in light of potential effects on the special qualities for which the area is designated which in turn underpin the integrity of the designation. All seascapes and landscapes change over time and much of that change is managed or planned. Designated seascapes and landscapes often have management objectives for 'protection' from or 'accommodation' of development'. The scale of change may be localised, occurring over limited parts of a designated area, or more widespread affecting a large part of designation, in which latter case the overall integrity of the designated area may potentially be affected.
- **Distance**: the size and scale of change is also strongly influenced by the proximity of the Mona Offshore Wind Project to the receptor and the extent to which the development has a characterising influence on the seascape/landscape. Consequently, the scale or magnitude of impact is likely to be lower in respect of receptors that are distant from the Mona Offshore Wind Project and/or screened by intervening landform, vegetation and built form. This is because the scale of its influence on such seascape or landscape receptors is small or limited. Conversely, those seascapes and landscapes closest to the development are likely to be most affected. Host seascapes and landscapes will be directly affected whilst adjacent areas of seascape or landscape character will be indirectly affected.
- **Amount and nature of change**: the amount of development components and context in which the Mona Offshore Wind Project will be seen has a bearing on impact magnitude. Visibility of it may range from one wind turbine blade tip to all of the wind turbines, or part of the Onshore Cable Corridor, Onshore Substation and the 400kv Grid Connection Cable Corridor or landfall. Broadly speaking, the greater the amount of development that can be seen, the higher the scale of change. The degree to which the Mona Offshore Wind Project is perceived to be on the horizon or 'within' the seascape/landscape also has a bearing on the amount and nature of change. In general, the magnitude of impact is likely to be lower when the Mona Offshore Wind Project Array Area is perceived to be on the horizon, or beyond it, at distance, rather than 'within' the seascape or landscape.

Geographical extent

1.8.3.3 The geographic extent over which the seascape or landscape effects would be experienced is distinct from the size or scale of effect. This evaluation is an expression of the geographic extent of the receptor that will experience a particular magnitude of impact and the corresponding extents of potential significant and non-significant effect. This will vary depending on the specific nature of the Mona Offshore Wind Project and is principally assessed through analysis of the extent of its visibility and the likely geographic extent of perceived changes to seascape/landscape character.

Duration and reversibility

1.8.3.4 The duration and reversibility of seascape and landscape effects has been based on the period over which the Mona Offshore Wind Project is likely to exist (i.e. during construction, operations and maintenance and decommissioning phase) the extent to which it will be removed and its effects reversed at the end of that period (during decommissioning). Long-term, medium-term and short-term seascape/landscape effects are defined as follows:

- long-term: more than 10 years (may be defined as permanent or reversible)
- medium-term: six to 10 years (reversible)
- short-term: one to five years (reversible).

Seascape/landscape magnitude of impact rating

1.8.3.5 The magnitude of impact resulting from the Mona Offshore Wind Project is described as large, medium, small, negligible or no change. In assessing magnitude of impact, the assessment focuses on the size or scale of change. The geographic extent, duration and reversibility are stated separately in relation to the assessed effects (i.e. as short, medium, or long-term and temporary or permanent in the case of the last option). The assessment of magnitude for each receptor is based on evidence and professional judgement. The levels of magnitude of impact that can occur are defined in Table 1.5 below.

Table 1.5: Definition of terms relating to the magnitude of impact upon seascape and landscape receptors.

Magnitude of Impact	Definition
Large	Total loss, or/very substantial loss or addition of, key elements/features/patterns of the baseline (i.e. pre-development seascape/landscape) and/or introduction of dominant, uncharacteristic elements compared to the attributes of the receiving seascape/landscape.
Medium	Partial loss or addition of, or moderate alteration to, one or more key elements/features/patterns of the baseline (i.e. pre-development seascape/landscape) and/or introduction of elements that may be prominent, but would not be substantially uncharacteristic in comparison to the attributes of the receiving seascape/landscape.
Small	Minor loss or addition of, or alteration to, one or more key elements/features/patterns of the baseline, i.e. pre-development seascape/landscape and/or introduction of elements that may not be uncharacteristic compared to the surrounding seascape/landscape.
Negligible	Very minor loss or addition of, or alteration to, one or more key elements/features /patterns of the baseline (i.e. pre-development seascape/landscape) and/or introduction of elements that are not

Magnitude of Impact	Definition
	uncharacteristic in comparison to the surrounding seascape/landscape; approximating to a 'no-change' situation.
No Change	No loss, alteration or addition to the receiving seascape/landscape resource.

1.8.4 Evaluating seascape/landscape significance of effect

1.8.4.1 The level of seascape/landscape effect is evaluated through the combination of receptor sensitivity and magnitude of impact. 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 1.6 which is used to guide the assessment.

1.8.4.2 A significant effect would occur where the combination of the variables results in the Mona Offshore Wind Project having a defining effect on the seascape or landscape receptor, or where changes of a lower magnitude clearly and demonstrably affect a seascape or /landscape receptor of particularly high sensitivity. A major loss or irreversible effect over an extensive area of seascape or /landscape character, affecting nationally or internationally valued elements, characteristics and/or perceptual aspects is likely to be significant.

25.8.4.3 An effect that is not significant would occur where the effect of the Mona Offshore Wind Project is not defining, and the seascape or landscape receptor continues to be characterised principally by its baseline character. Equally, a small-scale change experienced by a receptor of high sensitivity may not significantly affect the integrity of a designation. Reversible seascape and landscape effects that are of small-scale or affecting lower value receptors are unlikely to be significant.

1.8.5 Evaluation of significance of effect

1.8.5.1 The significance of an effect upon seascape, landscape and visual receptors is determined by correlating the magnitude of the impact and the sensitivity of the receptor, as presented in Table 1.6.

1.8.5.2 For the purposes of this assessment, any effects with a significance level of substantial or major have been deemed significant in EIA terms. An accumulation of individual moderate effects, for instance experienced during a journey undertaken by the same visual receptor, may also be judged as significant in some circumstances.

1.8.5.3 Effects are assessed as being adverse, neutral or positive. The judgements regarding the significance of effect and that relating to whether an effect is beneficial or adverse are entirely separate. The assessment of whether an effect is positive, neutral or adverse is based on professional judgement having regard to the relevant objective factors.

Table 1.6: Assessment of significance of effect matrix.

Sensitivity of Receptor	Magnitude of impact				
	No Change	**Negligible**	**Small**	**Medium**	**Large**
Negligible	No change	Negligible	Negligible to Minor	Negligible to Minor	Negligible to Minor
Low	No change	Negligible to Minor	Negligible to Minor	Minor	Minor to Moderate
Medium	No change	Negligible to Minor	Minor	Moderate	Moderate tor Major
High	No change	Negligible to Minor	Minor to Moderate	Moderate to Major	Major
Very High	No change	Minor	Moderate to Major	Major	Substantial

1.8.5.4 A description of the terms used to describe the level of significance of effect is provided in Table 1.7 below.

Table 1.7: Definitions of Significance Criteria.

Level of Significance	Typical Descriptors	
	Seascape/Landscape Resource	**Visual Resource**
Substantial	Where proposed changes would be uncharacteristic and/or would significantly alter a landscape of exceptional landscape quality (e.g. internationally designated landscapes), or key elements known to the wider public of nationally designated seascape/landscapes (where there is no or limited potential for substitution nationally).	Where proposed changes would be uncharacteristic and/or would significantly alter a view of remarkable scenic quality, within internationally designated landscapes or key features or elements of nationally designated seascapes/landscapes that are well known to the wider public.
Major	Where proposed changes would be uncharacteristic and/or would significantly alter a valued aspect of (or a high quality) seascape/landscape.	Where proposed changes would be uncharacteristic and/or would significantly alter a valued view or a view of high scenic quality.
Moderate	Where proposed changes would be demonstrably out of scale or at variance with the character of an area.	Where proposed changes to views would be demonstrably out of scale or at variance with the existing view.
Minor	Where proposed changes would be at slight variance with the character of an area.	Where proposed changes to views, although discernible, would only be at slight variance with the existing view.
Negligible	Where proposed changes would have an indiscernible effect on the character of an area.	Where proposed changes would have a barely noticeable effect on views/visual amenity.
No Change	No discernible loss or alteration to seascape/landscape character, features or elements.	No part of the Mona Offshore Wind Project is discernible.

1.9 Assessment of night-time effects

1.9.1 Introduction

1.9.1.1 The assessment of night-time effects is based on the description of lighting for the Mona Offshore Wind Project, as set out in volume 1, chapter 3: Project description of the PEIR.

1.9.1.2 The SLVIA study area for the assessment of night-time effects is the same as that for daytime, informed by the likely patterns of human use or activities at night-time. The assessment of night-time effects considers the potential effects upon night-time views, seascape and landscape for both the onshore and offshore elements of the Mona Offshore Wind Project during its construction, operations and maintenance, and de-commissioning phases. Having regard to the proportionality principle, the focus of the night-time assessment is on areas/locations where potential seascape, landscape and visual effects are likely to be experienced by the greatest number of people.

1.9.2 Evaluating night-time effects and significance of effect

1.9.2.1 Whilst the nature of daytime and night-time effects of the Mona Offshore Wind Project are very different, in that during daylight hours the visibility of moving rotors gives rise to effects that are very different to the pinpoint effects of lighting at night, the same criteria are considered appropriate for assessment of its potential night-time effects.

1.9.2.2 As with the assessment of daytime effects, the significance of the potential night-time effects of the Mona Offshore Wind Project are assessed through a correlation of the seascape, landscape or visual receptor sensitivity and the magnitude of impact that would result from lighting of the Mona Offshore Wind Project.

1.9.2.3 A significant night-time effect is likely where implementation of the Mona Offshore Wind Project would have a defining influence on a landscape, seascape or visual receptor at night. In contrast, a not significant night-time effect is likely to occur when the effect of lighting is non-defining, and the existing baseline characteristics of the night-time view, area of seascape or landscape continue to provide the defining influence.

1.9.3 Cumulative seascape, landscape and visual effects

Introduction

1.9.3.1 This section should be read in association with section 5.4 cumulative effects assessment (CEA) of volume 1, chapter 5: Environmental impact assessment methodology of the PEIR. The CEA is concerned with the potential cumulative effects that may result from incremental changes caused by other reasonably foreseeable proposed projects, plans and activities, that were not present at the time of data collection or survey, considered alongside the project in question. It also considers the ‘in combination’ and ‘sequential’ effects of adding the same type of development to the existing situation, e.g. would adding a windfarm to an area of seascape that already contains windfarms, change the defining characteristic of the seascape area.

1.9.3.2 GLVIA3 (page 120) 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."

1.9.3.3 The approach to cumulative assessment adopted in this SLVIA and outlined below accords with the recommendations set out in GLVIA3. Both the likely daytime and night-time cumulative effects of the Mona Offshore Wind Project are considered in the cumulative SLVIA.

1.9.4 Tiered approach to the CEA

1.9.4.1 As stated in paragraph 5.4.3.13 of volume 1, chapter 5: environmental impact assessment methodology of the PEIR, a tiered approach to the CEA has been adopted by identifying a set of appropriate 'cumulative development scenarios'. This approach takes into account the different stages that other planned projects are at in the planning/consenting process and the varying potential of each for proceeding to an operational stage, and hence their differing potential to ultimately contribute to a cumulative impact in conjunction with the Mona Offshore Wind Project.

1.9.4.2 The tiered CEA approach, set out in The Planning Inspectorate Advice Note 17: Cumulative Effects Assessment (2015) has been adopted to assess the complexity of cumulative development scenarios, keeping in mind the principle of proportionality, is summarised as follows:

- Tier 1
  - Under construction
  - Permitted application
  - Submitted application
  - Those currently operational that were not operational when baseline data were collected, and/or those that are operational but have an on-going impact
- Tier 2
  - Scoping report has been submitted
- Tier 3
  - Scoping report has not been submitted
  - Identified in a relevant development plan
  - Identified in other plans and programmes.

1.9.4.3 Advice Note 17 adds a note to the Tier 1 'under construction' category – *"Where other projects are expected to be completed before construction of the proposed NSIP and the effects of those projects are fully determined, effects arising from them should be considered as part of the baseline and may be considered as part of both the construction and operational assessment"* (page 6).

1.9.4.4 The development projects selected as relevant to the CEA and included in the SLVIA are based upon the results of a screening exercise and informed by consultations with the relevant authorities (see volume 5, annex 5.1: Cumulative effects screening matrix of the PEIR).

1.9.5 Assessing cumulative seascape/landscape and visual effects

1.9.5.1 The same conclusions as to the assessment of sensitivity of the various seascape/landscape and visual receptors are carried forward from the SLVIA and applied in the cumulative SLVIA. The same method as in the SLVIA is used to assess the magnitude and significance of cumulative effect of the Mona Offshore Wind Project, considered in conjunction with each of the cumulative development scenarios, using the tiered approach set out above.

1.10 References

Council of Europe, The European Landscape Convention (2000, ratified 2006) ETS No. 176.

Countryside Agency and Scottish Natural Heritage (2004) Topic Paper 6: Techniques and Criteria for judging Capacity and Sensitivity.

UK Government (2011) Marine Policy Statement.

Natural Resources Wales (2023) LANDMAP database.

Landscape Institute and IEMA (2013). Guidelines for Landscape and Visual Impact Assessment: Third Edition.

Landscape Institute (2019) Technical Guidance Note 2/19 Residential Visual Amenity Assessment.

Landscape Institute (2019) Technical Guidance Note 06/19 Visual Representation of Development Proposals.

Landscape Institute (2021) Technical Guidance Note 02/21: Assessing landscape value outside national designations.

Natural England (2014) An Approach to Landscape Character Assessment.

NatureScot (March 2021). Assessing the Cumulative Landscape and Visual Impact of Onshore Wind Energy Developments.

NatureScot (2017) Visual Representation of Windfarms. Version 2.2.

Renewable UK (2013) Cumulative Impact Assessment Guidelines.

RPS (2022), Mona Scoping Report, Part 3.The Planning Inspectorate (2015) Advice Note 17: Cumulative Effects Assessment.

Appendix A: Visual Representations

A.1 Visual representations

A.1.1 Overview

1.10.1.1 Zones of Theoretical Visibility (ZTVs) and visualisations (wirelines or wirelines and photomontages) are graphical images produced to assist and illustrate the SLVIA and the cumulative assessment. The methodology used for viewpoint photography and photomontages has been produced in accordance with the NatureScot guidance on Visual Representation of Wind Farms, Version 2.2 (2017), the Guidelines for Landscape and Visual Impact Assessment, Third Edition (GLVIA 3) (Landscape Institute and IEMA, 2013) and the Landscape Institute Technical Guidance Note on Visual Representation of Development Proposals (2019).

1.10.1.2 ZTVs are produced on the assumption that the Mona Offshore Wind Project wind turbines are modelled relative to Lowest Astronomical Tide (LAT) sea level at their maximum blade tip height (324 m). The closest tidal stations show LAT as between 4.9m and 3.85m Below Ordnance Datum (BOD). As per the MDS, the turbines were modelled at 324m Above Ordnance Datum (AOD).

A.1.2 Zone of Theoretical Visibility (ZTV)

1.10.1.3 The ZTVs have been calculated using GIS software to generate a ZTV of Mona Offshore Wind Project to demonstrate the theoretical extent of visibility from any point in the study area.

1.10.1.4 Within England and Wales the Ordnance Survey Terrain 50 Digital Terrain Model (DTM) was used.

1.10.1.5 The Isle of Man Government 20m DTM product was used to provide coverage of the Isle of Man. An issue was identified with data quality in the Snaefell Mountain area and NASA Shuttle Radar Topography Mission data at 1 arcsecond resolution was used to replace this area.

1.10.1.6 Each source DTM was reprojected to the UTM Zone 30N coordinate system at a 50m sampling using bilinear interpolation.

1.10.1.7 The computer model includes the entire study area and takes account of atmospheric refraction and the Earth's curvature. The resulting ZTV plots have been overlaid on mapping at an appropriate scale and presented as figures using desktop publishing or graphic design software.

1.10.1.8 Cumulative ZTV plots based on the intervisibility of the Mona Offshore Wind Project and other relevant developments within the SLVIA study area have also been produced.

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

- The ZTV does not account for the screening effects of existing vegetation or built form.
- The ZTVs are based on theoretical visibility from 2m above ground level.
- The Blade Tip ZTV does not indicate the decrease in visibility that occurs with increased distance from the Mona Array Area. The nature of what is visible from 3km away will differ markedly from what is visible from 10km or greater distances 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 seven wind turbine generators (WTG) may gain views of the smallest extremity of blade tips, or alternatively of seven full WTGs. This can make a significant difference in the effects of the Mona Offshore Wind Project on that area.

1.10.1.10 These limitations mean that, while the ZTV is useful as a starting point and aid to assessment, providing an indication of where the Mona Offshore Wind Project will be theoretically visible, it will tend to present a worst-case or over-estimate the actual visibility. The information drawn from the ZTV is checked by field survey observation and interpreted using professional judgement.

1.10.1.11 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.

A.1.3 Baseline Photography

A.1.3.1 Overview

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

The following photographic information is recorded:

- date, time, weather conditions and visual range
- GPS recorded 12 figure grid reference accurate to ~5-10 m
- GPS recorded AOD height data
- use of a fixed 50 millimetre (mm) focal length lens is confirmed
- horizontal field of view (in degrees)
- bearing to Mona Offshore Wind Project.

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

1.10.1.14 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.

1.10.1.15 This includes GLVIA 3, paragraph 8.22 which states the following with respect to photomontages:

"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".

1.10.1.16 In preparing photomontages for the SLVIA, as far as possible in order to represent when the Mona Offshore Wind Project may be most visible (a maximum visibility scenario), photographs have been taken in favourable weather conditions during periods of good or better visibility. The time of day that the views were taken was mainly governed by the position of the sun relative to the viewpoint location, and that part of the Mona Offshore Windfarm Project for which an existing view photograph was being taken.

1.10.1.17 Various weather forecasts were checked in advance of field survey to ensure favourable weather conditions. These included the Met Office (https://www.metoffice.gov.uk/). However, Appendix B below provides visibility data from Meteorological Office weather stations at Mona, Rhyl No. 2 and Ronaldsway (Isle of Man), which are located in, or close to the SLVIA study area.

A.1.4 Visualisations

1.10.1.18 Wirelines of the Mona Offshore Wind Project array have been produced in accordance with NatureScot Visual Representation of Windfarms Guidance (NatureScot, 2017) and Landscape Institute (2019) Technical Guidance Note (TGN) 06/19 Visual Representation of Development Proposals (Landscape Institute, September 2019).

1.10.1.19 Wirelines for the Mona Array Area have been produced to inform volume chapter. Wirelines have not been generated for the offshore or onshore substations, as the exact location and appearance/dimensions of these elements is not currently known. Photomontages of the Mona Offshore Wind Project will be produced at the final ES stage.

1.10.1.20 A photomontage is a visualisation which superimposes an image of a proposed development upon a photograph or series of photographs. Photomontage is a widespread and popular visualisation technique, which allows changes in views and visual amenity to be illustrated and assessed, as well as being compared and tested with existing views.

1.10.1.21 To create the baseline panorama, individual frames are cylindrically projected and then digitally joined to create a fully cylindrically projected panorama using Adobe Photoshop or PTGui software. This process avoids the wide-angle effect that will result should these frames be arranged in a perspective projection, namely one where the image is not faceted to allow for the cylindrical nature of the full 360°Horizontal Field of View (HFoV) but appears essentially as a flat plane.

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

1.10.1.23 The baseline photographs and cumulative wireline visualisations shown for each selected viewpoint cover a 90 degree (°) HFoV (or in some cases, up to 360°), which accords with Visual Representation of Windfarms Guidance (NatureScot, 2017). These are cylindrically projected images and should be viewed flat at a comfortable arm's length.

1.10.1.24 The photographs are also joined to create planar projection panoramas using PTGui software. These are used in the creation of the 53.5° HFoV photomontages.

1.10.1.25 Wireline representations illustrating the Mona Array Area are set within a computer-generated image of the landform. These are used in the SLVIA to predict the appearance of the WTGs and assess the likely visual effect arising. The wirelines are produced with Resoft WindFarm software and are based on OS Terrain 5 DTM. There are limitations in the accuracy of digital terrain model (DTM) data so that landform may not be picked up precisely and may result in 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, these refer to the illustrations generated (as described above) and therefore the reality on the ground may differ to a minor degree from these impressions.

1.10.1.26 Daytime visualisations and wirelines show a WTG model which represents the maximum development scenario of the Mona Offshore Wind Project in the Mona Array Area. The visualisations and allows the potential proportions of the WTGs to be assessed.

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

1.10.1.28 'Panoramic photomontages' presented in the SLVIA are produced with a 53.5° HFoV. This format is based on relevant guidance (NatureScot, 2017) due to its suitability to encompass the horizontal spread of the Mona Array Area and show the turbines at a representative scale and distance. In some views, two adjacent 53.5° photomontages will be required to capture the full horizontal spread of the Mona Offshore Wind Project Mona Array Area.

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

1.10.1.30 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 position with the central WTGs facing the viewer directly.

1.10.1.31 Rendering of the WTGs in the photomontages is as photorealistic as possible to the conditions shown in each viewpoint photograph. There may be some variation in the appearance and visibility of the WTGs between the viewpoints, as they are rendered to suit the conditions shown in each of the different viewpoint photographs, which unavoidably have some degree of variation in terms of lighting and weather conditions. The key requirement is that the WTGs need to be rendered with sufficient contrast against the skyline backdrop to illustrate the maximum visibility scenario in each image. Photomontages have been prepared to depict the MDS (i.e. most visible) of how the Mona Array Area will appear. The full suite of viewpoint photomontages should be viewed to gain an impression of the likely visual effects of the Mona Offshore Wind Project, in the round.

A.1.5 Night-time visualisations

1.10.1.32 The visual effects of the Mona Offshore Wind Project at night has also been assessed. This has been informed by the night-time photomontage visualisations produced from several representative viewpoints, to visually represent aviation and marine navigation lighting at night.

A.1.6 Information on limitations of visualisations

1.10.1.33 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 is now, or will be in the future, 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.

1.10.1.34 The photomontage visualisations of the Mona Offshore Wind Project (and any wind farm proposal) have several limitations when using them to form a judgement on visual impact. These include the following:

- A visualisation can never show exactly what the Mona Offshore Wind Project will look like in reality due to factors such as: different lighting, weather and seasonal conditions which vary through time and the resolution of the image.
- The images provided give a reasonable impression of the scale of the WTGs and the distance to the WTGs but can never be 100% accurate.
- A static image cannot convey turbine movement, or flicker or reflection from the sun on the turbine blades as they move.
- 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 Mona Offshore Wind Project proposal these images are best viewed at the viewpoint location shown.
- The images must be printed and viewed at the correct size (e.g. 260mm by 820mm).
- The 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.

A.1.7 Technical Methodology – Visualisations

Table A.1.1: Technical Methodology – Visualisations.

Category	Details
Photography	
Visualisation Type	Type 4 – where survey of viewpoint locations is not required
Camera location	Established via hand-held Garmin GPS
Level of accuracy of location	1-3m (depending on satellites)
Camera	Canon EOS 5D Mark II and Canon EOS 6D Digital SLR. Full-frame (35mm negative size) CMOS sensor
Lens	50mm fixed f1.4 lens
Tripod	Set to approximately 1.5m. Nodal Ninja panoramic head with Adjust Leveller. Nodal Ninja panoramic head set to take photographs at 20 degree increments
Photography process	Camera used on fully manual settings. Photographs taken in RAW image format. Bracketed exposures are taken for each view and those depicting the clearest images are selected to prepare the panoramic image
Preparation of panoramic photographs	PTGUI v12.8 is used to join and cylindrically project the images. Adobe Photoshop 2021 used to correct tonal alterations and create an even range of exposure across the photographs so that the individual photographs are not apparent. Planar panoramic images are prepared using Resoft Windfarm software or Hugin Panorma Stitcher
3D Model/Visualisation	
Topographic height data	Ordnance Survey Terrain 5 (5m resolution). Ordnance Survey Terrain 50 (50m resolution)
Use of coordinates in software	Coordinates are brought in from the surveyed GPS coordinates. Positions checked using aerial photography
Markers for horizontal alignment	Existing offshore windfarms and their known coordinates (for the offshore elements of the Mona Offshore Windfarm and tall structures in the landscape, e.g. pylons and church spires for the onshore elements of the Mona Offshore Windfarm Project
Markers for vertical alignment	Existing offshore windfarms and their known heicoordinates (for the offshore elements of the Mona Offshore Windfarm and tall structures in the landscape, e.g. pylons and church spires for the onshore elements of the Mona Offshore Windfarm Project.
Rendering software	Resoft Windfarm v.5.2.5.3 (Wind turbines in wirelines and photomontages). Sketchup or AutoCAD Map 3D 2018 (OSPs, Met Mast and jacket foundations). Autodesk 3ds Max 2018. Visual Nature Studio V 3.10.
Limitations	
Terrain data	There may therefore be local, small-scale landform that is not reflected in the data and subsequently the visualisation but may alter the real visibility of the Mona Offshore Wind Project, either by screening theoretical visibility or revealing parts of the Mona Offshore Wind Project that are not theoretically visible
Movement	Static images are unable to capture the movement within the view or of the WTGs

Appendix B: Meteorological Office Data

B.1 Meteorological Office Visibility Data

B.1.1 Introduction

1.10.1.35 Visibility analysis reports were requested from four Meteorological Office weather stations:

- Mona, Anglesey (grid reference: 53.26051, -437599)
- Rhyl No.2 (grid reference: 53.2593, -3.50882)
- Ronaldsway, IOM (grid reference: 54.08507, -4.6307)
- Walney Island (grid reference: 54.124387, -3.2577383).

1.10.1.36 The analysis reports use ten years of historical data (2012 to 2021). The data is given both as metres (m) (broken as follows: 0-999m, 1000 to 1999m, 2000 to 2999m, to 70000m or more) and percentages. The data extends beyond 50km from the Mona Array Area (i.e. the SLVIA study area).

1.10.1.37 The data allows analysis of the different visibility conditions for each month of the year. This allows an estimation of the potential visibility during the holiday seasons.

1.10.1.38 The visibility data from the Mona, Rhyl No. 2 and Ronaldsway weather stations are applicable to the Mona Array Area, as they lie within or close to the SLVIA study area. The data for each of these three weather stations is set out in Tables B.1 to B.6 of this appendix below.

B.1.2 Meteorological Office Explanatory Notes

1.10.1.39 Visibility is defined as the greatest distance at which an object can be seen and recognized in daylight, or at night if the general illumination were raised to daylight levels. It is typically measured using visiometer at automatic sites. However, this used to be undertaken by observers at manual stations, except for some Weather Centres and Climate Data Logger stations, where observations are made from a non-standard roof top exposure. The following notes apply:

- Visibility is measured horizontally
- Values are noted in metres (m)
- A dash indicates where data is not available
- A value of 0.0 indicates less than 0.05%.

B.1.3 High Level Analysis of Visibility Data

1.10.1.40 The closest part of the Mona Array Area lies:

- Approximately 28km from the closest point in Wales
- Approximately 40km from the closest point in England
- Approximately 43km from the closest point on the Isle of Man.

1.10.1.41 The Mona and Rhyl datasets have been used for North Wales and the Ronaldsway dataset have been used for visibility from the Isle of Man.

Table B.1 Mona – visibility frequency.

STATION: MONA (NGR: 2416E 3763N, ALT: 60m A.M.S.L)

PERIOD: Jan 2012 to Dec 2021

Month													
Visibility (km)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ALL OBS
< 1	130	76	118	77	81	76	102	133	157	64	78	142	**1234**
1 to 1.9	86	82	95	70	35	51	75	54	81	44	46	61	**780**
2 to 2.9	147	131	200	100	76	97	109	103	123	95	107	117	**1405**
3 to 3.9	160	144	212	133	109	98	117	109	153	119	112	142	**1608**
4 to 4.9	154	155	227	172	118	136	127	102	121	116	132	167	**1727**
5 to 5.9	151	155	230	156	126	141	154	99	153	116	141	161	**1783**
6 to 6.9	204	180	223	176	148	171	144	133	124	115	148	132	**1898**
7 to 7.9	182	196	204	182	166	187	176	155	144	132	157	159	**2040**
8 to 8.9	164	175	253	200	203	178	223	180	176	138	153	193	**2236**
9 to 9.9	223	187	236	211	218	215	229	160	166	135	153	210	**2343**
10 to 10.9	236	259	291	216	234	207	263	185	178	176	145	199	**2589**
11 to 11.9	227	224	248	239	224	236	263	203	207	175	166	195	**2607**
12 to 12.9	264	255	312	212	294	301	286	242	205	207	180	249	**3007**
13 to 13.9	249	276	314	231	277	349	306	290	230	255	182	214	**3173**
14 to 14.9	317	257	342	254	355	354	358	266	225	236	205	294	**3463**
15 to 15.9	306	285	359	267	388	336	269	317	233	286	212	304	**3562**
16 to 16.9	316	293	352	252	403	338	292	291	263	320	254	319	**3693**
17 to 17.9	309	334	346	252	366	358	296	338	237	302	247	321	**3706**
18 to 18.9	262	292	290	257	350	337	287	345	239	311	285	277	**3532**
19 to 19.9	288	261	234	279	340	345	301	300	251	319	251	282	**3451**
20 to 20.9	268	240	209	220	322	323	322	317	243	317	293	265	**3339**
21 to 21.9	217	187	216	234	291	320	293	313	238	339	280	276	**3204**
22 to 22.9	184	200	206	244	301	257	252	284	247	288	258	223	**2944**
23 to 23.9	173	175	166	227	260	252	264	264	250	300	232	201	**2764**
24 to 24.9	160	150	145	227	216	234	231	232	223	260	226	200	**2504**
25 to 25.9	141	152	128	223	218	182	222	256	253	266	213	204	**2458**
26 to 26.9	139	160	132	184	207	162	200	199	226	236	205	159	**2209**
27 to 27.9	132	132	107	176	189	162	200	232	222	237	186	154	**2129**
28 to 28.9	116	137	112	200	152	151	196	175	202	215	178	120	**1954**

Month Visibility (km)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ALL OBS
29 to 29.9	95	136	100	180	141	124	146	169	175	183	154	122	**1725**
30 to 34.9	488	419	401	543	446	357	520	511	731	712	585	461	**6174**
35 to 39.9	313	240	194	289	127	120	155	260	326	281	383	320	**3008**
40 to 44.9	213	129	108	126	27	32	40	114	122	81	186	217	**1395**
45 to 49.9	152	73	60	49	9	3	13	34	21	27	154	136	**731**
50 to 59.9	184	33	49	40	7	3	2	10	6	16	191	142	**683**
60 to 69.9	64	8	12	20	4	0	0	1	1	4	67	66	**247**
>= 70	11	0	0	0	0	0	0	0	0	0	21	8	40
ALL OBS	**7425**	**6788**	**7431**	**7118**	**7428**	**7193**	**7433**	**7376**	**7152**	**7423**	**7166**	**7412**	**87345**

Table B.2 Mona – percentage visibility.

STATION: RHYL NO.2 (NGR: 2994e 3746n, ALT: 77m A.M.S.L)

PERIOD: Jan 2012 to Dec 2021

Month Visibility (km)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ALL OBS
< 1	1.75	1.12	1.59	1.08	1.09	1.06	1.37	1.80	2.20	0.86	1.09	1.92	**1.41**
1 to 1.9	1.16	1.21	1.28	0.98	0.47	0.71	1.01	0.73	1.13	0.59	0.64	0.82	**0.89**
2 to 2.9	1.98	1.93	2.69	1.40	1.02	1.35	1.47	1.40	1.72	1.28	1.49	1.58	**1.61**
3 to 3.9	2.15	2.12	2.85	1.87	1.47	1.36	1.57	1.48	2.14	1.60	1.56	1.92	**1.84**
4 to 4.9	2.07	2.28	3.05	2.42	1.59	1.89	1.71	1.38	1.69	1.56	1.84	2.25	**1.98**
5 to 5.9	2.03	2.28	3.10	2.19	1.70	1.96	2.07	1.34	2.14	1.56	1.97	2.17	**2.04**
6 to 6.9	2.75	2.65	3.00	2.47	1.99	2.38	1.94	1.80	1.73	1.55	2.07	1.78	**2.17**
7 to 7.9	2.45	2.89	2.75	2.56	2.23	2.60	2.37	2.10	2.01	1.78	2.19	2.15	**2.34**
8 to 8.9	2.21	2.58	3.40	2.81	2.73	2.47	3.00	2.44	2.46	1.86	2.14	2.60	**2.56**
9 to 9.9	3.00	2.75	3.18	2.96	2.93	2.99	3.08	2.17	2.32	1.82	2.14	2.83	**2.68**
10 to 10.9	3.18	3.82	3.92	3.03	3.15	2.88	3.54	2.51	2.49	2.37	2.02	2.68	**2.96**
11 to 11.9	3.06	3.30	3.34	3.36	3.02	3.28	3.54	2.75	2.89	2.36	2.32	2.63	**2.98**
12 to 12.9	3.56	3.76	4.20	2.98	3.96	4.18	3.85	3.28	2.87	2.79	2.51	3.36	**3.44**
13 to 13.9	3.35	4.07	4.23	3.25	3.73	4.85	4.12	3.93	3.22	3.44	2.54	2.89	**3.63**
14 to 14.9	4.27	3.79	4.60	3.57	4.78	4.92	4.82	3.61	3.15	3.18	2.86	3.97	**3.96**
15 to 15.9	4.12	4.20	4.83	3.75	5.22	4.67	3.62	4.30	3.26	3.85	2.96	4.10	**4.08**
16 to 16.9	4.26	4.32	4.74	3.54	5.43	4.70	3.93	3.95	3.68	4.31	3.54	4.30	**4.23**
17 to 17.9	4.16	4.92	4.66	3.54	4.93	4.98	3.98	4.58	3.31	4.07	3.45	4.33	**4.24**

Month Visibility (km)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ALL OBS
18 to 18.9	3.53	4.30	3.90	3.61	4.71	4.69	3.86	4.68	3.34	4.19	3.98	3.74	**4.04**
19 to 19.9	3.88	3.85	3.15	3.92	4.58	4.80	4.05	4.07	3.51	4.30	3.50	3.80	**3.95**
20 to 20.9	3.61	3.54	2.81	3.09	4.33	4.49	4.33	4.30	3.40	4.27	4.09	3.58	**3.82**
21 to 21.9	2.92	2.75	2.91	3.29	3.92	4.45	3.94	4.24	3.33	4.57	3.91	3.72	**3.67**
22 to 22.9	2.48	2.95	2.77	3.43	4.05	3.57	3.39	3.85	3.45	3.88	3.60	3.01	**3.37**
23 to 23.9	2.33	2.58	2.23	3.19	3.50	3.50	3.55	3.58	3.50	4.04	3.24	2.71	**3.16**
24 to 24.9	2.15	2.21	1.95	3.19	2.91	3.25	3.11	3.15	3.12	3.50	3.15	2.70	**2.87**
25 to 25.9	1.90	2.24	1.72	3.13	2.93	2.53	2.99	3.47	3.54	3.58	2.97	2.75	**2.81**
26 to 26.9	1.87	2.36	1.78	2.58	2.79	2.25	2.69	2.70	3.16	3.18	2.86	2.15	**2.53**
27 to 27.9	1.78	1.94	1.44	2.47	2.54	2.25	2.69	3.15	3.10	3.19	2.60	2.08	**2.44**
28 to 28.9	1.56	2.02	1.51	2.81	2.05	2.10	2.64	2.37	2.82	2.90	2.48	1.62	**2.24**
29 to 29.9	1.28	2.00	1.35	2.53	1.90	1.72	1.96	2.29	2.45	2.47	2.15	1.65	**1.97**
30 to 3 49	6.57	6.17	5.40	7.63	6.00	4.96	7.00	6.93	10.22	9.59	8.16	6.22	**7.07**
35 to 39.9	4.22	3.54	2.61	4.06	1.71	1.67	2.09	3.52	4.56	3.79	5.34	4.32	**3.44**
40 to 44.9	2.87	1.90	1.45	1.77	0.36	0.44	0.54	1.55	1.71	1.09	2.60	2.93	**1.60**
45 to 49.9	2.05	1.08	0.81	0.69	0.12	0.04	0.17	0.46	0.29	0.36	2.15	1.83	**0.84**
50 to 59.9	2.48	0.49	0.66	0.56	0.09	0.04	0.03	0.14	0.08	0.22	2.67	1.92	**0.78**
60000 to 69999	0.86	0.12	0.16	0.28	0.05	0.00	0.00	0.01	0.01	0.05	0.93	0.89	**0.28**
>= 70	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.29	0.11	**0.05**
ALL OBS	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Table B.3 Rhyl No.2 – frequency of visibility.

STATION: RHYL NO.2 (NGR: 2994e 3746n, ALT: 77m A.M.S.L)

PERIOD: Jan 2012 to Dec 2021

Month Visibility (km)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ALL OBS
< 1	13	29	29	28	12	13	18	11	30	9	8	34	**234**
1 to 1.9	34	36	45	29	16	47	44	46	39	29	29	33	**427**
2 to 2.9	60	51	83	47	36	75	63	54	77	63	48	60	**717**
3 to 3.9	79	71	141	72	55	81	62	71	83	63	64	60	**902**
4 to 4.9	75	69	155	91	72	101	62	76	101	71	84	75	**1032**
5 to 5.9	103	86	155	96	70	85	67	78	138	71	114	72	**1135**
6 to 6.9	118	106	130	121	86	106	65	63	125	96	116	91	**1223**
7 to 7.9	99	71	129	122	100	81	75	99	147	106	134	94	**1257**

Month Visibility (km)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ALL OBS
8 to 8.9	115	130	185	142	91	87	94	93	164	167	146	85	**1499**
9 to 9.9	140	128	160	113	115	86	82	100	152	111	108	90	**1385**
10 to 10.9	104	101	140	103	95	83	74	85	119	137	109	97	**1247**
11 to 11.9	137	102	152	85	110	85	100	101	137	127	107	83	**1326**
12 to 12.9	104	117	148	105	106	114	106	116	149	125	117	105	**1412**
13 to 13.9	140	120	126	120	114	83	111	99	117	138	113	73	**1354**
14 to 14.9	127	115	114	115	104	112	103	99	134	141	117	106	**1387**
15 to 15.9	139	126	134	133	102	130	120	108	165	133	105	115	**1510**
16 to 16.9	128	150	126	129	106	166	148	130	183	163	103	139	**1671**
17 to 17.9	170	146	125	134	139	210	151	189	185	158	126	166	**1899**
18 to 18.9	171	149	175	131	151	236	164	156	160	159	122	122	**1896**
19 to 19.9	172	142	138	127	122	212	171	154	175	167	123	115	**1818**
20 to 20.9	161	122	157	146	153	210	142	146	154	201	121	117	**1830**
21 to 21.9	155	145	149	133	130	183	150	142	146	161	118	166	**1778**
22 to 22.9	138	120	144	132	129	206	128	141	156	166	101	119	**1680**
23 to 23.9	140	114	153	122	145	192	145	144	135	156	108	149	**1703**
24 to 24.9	167	141	171	119	136	171	149	118	141	162	112	138	**1725**
25 to 25.9	167	168	143	122	142	182	128	128	117	173	129	143	**1742**
26 to 26.9	171	163	137	156	138	153	137	140	126	165	109	149	**1744**
27 to 27.9	175	163	129	124	142	140	129	121	127	166	120	144	**1680**
28 to 28.9	173	170	138	130	132	138	171	145	127	156	133	184	**1797**
29 to 29.9	173	154	117	136	153	156	142	138	130	170	113	176	**1758**
30 to 34.9	871	735	715	665	791	741	740	772	562	730	675	895	**8892**
35 to 39.9	711	668	662	676	791	625	703	752	548	683	730	902	**8451**
40 to 44.9	523	534	580	652	788	466	570	636	438	606	706	797	**7296**
45 to 49.9	398	363	449	520	597	338	432	397	323	394	532	459	**5202**
50 to 59.9	660	638	751	961	953	695	1104	1099	794	771	827	905	**10158**
60 to 69.9	124	112	132	141	193	78	166	98	59	117	139	92	**1451**
>= 70	143	119	119	94	104	78	144	122	67	125	187	87	**1389**
ALL OBS	**7278**	**6674**	**7436**	**7072**	**7419**	**6945**	**7160**	**7167**	**6730**	**7336**	**6953**	**7437**	**85607**

Table B.4: Rhyl No. 2 - percentage visibility.

STATION: RONALDSWAY (NGR: 2279E 4686N, ALT: 16m A.M.S.L)

PERIOD: Jan 2012 to Dec 2021

Month Visibility (km)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ALL OBS
< 1	0.18	0.43	0.39	0.40	0.16	0.19	0.25	0.15	0.45	0.12	0.12	0.46	**0.27**
1 to 1.9	0.47	0.54	0.61	0.41	0.22	0.68	0.61	0.64	0.58	0.40	0.42	0.44	**0.50**
2 to 2.9	0.82	0.76	1.12	0.66	0.49	1.08	0.88	0.75	1.14	0.86	0.69	0.81	**0.84**
3 to 3.9	1.09	1.06	1.90	1.02	0.74	1.17	0.87	0.99	1.23	0.86	0.92	0.81	**1.05**
4 to 4.9	1.03	1.03	2.08	1.29	0.97	1.45	0.87	1.06	1.50	0.97	1.21	1.01	**1.21**
5 to 5.9	1.42	1.29	2.08	1.36	0.94	1.22	0.94	1.09	2.05	0.97	1.64	0.97	**1.33**
6 to 6.9	1.62	1.59	1.75	1.71	1.16	1.53	0.91	0.88	1.86	1.31	1.67	1.22	**1.43**
7 to 7.9	1.36	1.06	1.73	1.73	1.35	1.17	1.05	1.38	2.18	1.44	1.93	1.26	**1.47**
8 to 8.9	1.58	1.95	2.49	2.01	1.23	1.25	1.31	1.30	2.44	2.28	2.10	1.14	**1.75**
9 to 9.9	1.92	1.92	2.15	1.60	1.55	1.24	1.15	1.40	2.26	1.51	1.55	1.21	**1.62**
10 to 10.9	1.43	1.51	1.88	1.46	1.28	1.20	1.03	1.19	1.77	1.87	1.57	1.30	**1.46**
11 to 11.9	1.88	1.53	2.04	1.20	1.48	1.22	1.40	1.41	2.04	1.73	1.54	1.12	**1.55**
12 to 12.9	1.43	1.75	1.99	1.48	1.43	1.64	1.48	1.62	2.21	1.70	1.68	1.41	**1.65**
13 to 13.9	1.92	1.80	1.69	1.70	1.54	1.20	1.55	1.38	1.74	1.88	1.63	0.98	**1.58**
14 to 14.9	1.74	1.72	1.53	1.63	1.40	1.61	1.44	1.38	1.99	1.92	1.68	1.43	**1.62**
15 to 15.9	1.91	1.89	1.80	1.88	1.37	1.87	1.68	1.51	2.45	1.81	1.51	1.55	**1.76**
16 to 16.9	1.76	2.25	1.69	1.82	1.43	2.39	2.07	1.81	2.72	2.22	1.48	1.87	**1.95**
17 to 17.9	2.34	2.19	1.68	1.89	1.87	3.02	2.11	2.64	2.75	2.15	1.81	2.23	**2.22**
18 to 18.9	2.35	2.23	2.35	1.85	2.04	3.40	2.29	2.18	2.38	2.17	1.75	1.64	**2.21**
19 to 19.9	2.36	2.13	1.86	1.80	1.64	3.05	2.39	2.15	2.60	2.28	1.77	1.55	**2.12**
20 to 20.9	2.21	1.83	2.11	2.06	2.06	3.02	1.98	2.04	2.29	2.74	1.74	1.57	**2.14**
21 to 21.9	2.13	2.17	2.00	1.88	1.75	2.63	2.09	1.98	2.17	2.19	1.70	2.23	**2.08**
22 to 22.9	1.90	1.80	1.94	1.87	1.74	2.97	1.79	1.97	2.32	2.26	1.45	1.60	**1.96**
23 to 23.9	1.92	1.71	2.06	1.73	1.95	2.76	2.03	2.01	2.01	2.13	1.55	2.00	**1.99**
24 to 24.9	2.29	2.11	2.30	1.68	1.83	2.46	2.08	1.65	2.10	2.21	1.61	1.86	**2.02**
25 to 25.9	2.29	2.52	1.92	1.73	1.91	2.62	1.79	1.79	1.74	2.36	1.86	1.92	**2.03**
26 to 26.9	2.35	2.44	1.84	2.21	1.86	2.20	1.91	1.95	1.87	2.25	1.57	2.00	**2.04**
27 to 27.9	2.40	2.44	1.73	1.75	1.91	2.02	1.80	1.69	1.89	2.26	1.73	1.94	**1.96**
28 to 28.9	2.38	2.55	1.86	1.84	1.78	1.99	2.39	2.02	1.89	2.13	1.91	2.47	**2.10**
29 to 29.9	2.38	2.31	1.57	1.92	2.06	2.25	1.98	1.93	1.93	2.32	1.63	2.37	**2.05**
30 to 34.9	11.97	11.01	9.62	9.40	10.66	10.67	10.34	10.77	8.35	9.95	9.71	12.03	**10.39**

Month Visibility (km)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ALL OBS
35 to 39.9	9.77	10.01	8.90	9.56	10.66	9.00	9.82	10.49	8.14	9.31	10.50	12.13	**9.87**
40 to 44.9	7.19	8.00	7.80	9.22	10.62	6.71	7.96	8.87	6.51	8.26	10.15	10.72	**8.52**
45 to 49.9	5.47	5.44	6.04	7.35	8.05	4.87	6.03	5.54	4.80	5.37	7.65	6.17	**6.08**
50 to 59.9	9.07	9.56	10.10	13.59	12.85	10.01	15.42	15.33	11.80	10.51	11.89	12.17	**11.87**
60 to 69.9	1.70	1.68	1.78	1.99	2.60	1.12	2.32	1.37	0.88	1.59	2.00	1.24	**1.69**
>= 70	1.96	1.78	1.60	1.33	1.40	1.12	2.01	1.70	1.00	1.70	2.69	1.17	**1.62**
ALL OBS	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Table B.5: Ronaldsway – frequency of visibility.

STATION: RONALDSWAY (NGR: 2279E 4686N, ALT: 16m A.M.S.L)

PERIOD: Jan 2012 to Dec 2021

Month Visibility (km)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ALL OBS
< 1	24	28	81	80	71	94	109	96	71	23	21	18	**716**
1 to 1.9	8	13	26	24	35	31	46	42	23	4	7	9	**268**
2 to 2.9	38	57	54	41	35	62	78	52	43	31	39	53	**583**
3 to 3.9	112	113	146	114	89	105	136	110	111	112	101	135	**1384**
4 to 4.9	144	160	177	108	106	124	108	85	109	112	99	157	**1489**
5 to 5.9	169	164	239	128	91	159	114	108	123	136	154	227	**1812**
6 to 6.9	130	150	206	97	97	118	116	92	110	97	117	173	**1503**
7 to 7.9	119	115	159	88	75	104	94	81	99	96	111	128	**1269**
8 to 8.9	233	297	269	191	146	171	165	138	184	253	217	263	**2527**
9 to 9.9	96	106	118	109	86	94	89	74	93	93	114	114	**1186**
10 to 10.9	318	278	260	230	215	189	232	192	278	224	221	250	**2887**
11 to 11.9	3	3	6	12	4	6	5	6	1	4	4	4	**58**
12 to 12.9	327	313	302	311	245	281	256	270	256	261	259	294	**3375**
13 to 13.9	20	21	19	36	21	19	9	22	39	15	9	25	**255**
14 to 14.9	21	29	25	12	25	25	10	14	15	14	10	9	**209**
15 to 15.9	650	677	615	516	512	515	532	540	489	555	489	591	**6681**
16 to 16.9	3	0	0	1	0	2	5	0	3	0	0	9	**23**
17 to 17.9	14	16	19	14	13	11	7	13	4	6	6	4	**127**
18 to 18.9	121	129	136	110	140	141	118	134	130	79	94	88	**1420**
19 to 19.9	0	0	0	0	0	0	0	0	0	0	0	0	**0**
20 to 20.9	1051	1010	800	708	848	841	748	1002	791	743	702	966	**10210**

Month Visibility (km)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ALL OBS
21 to 21.9	0	0	0	0	0	0	0	0	0	0	0	0	**0**
22 to 22.9	12	13	10	14	11	23	16	12	17	19	12	12	**171**
23 to 23.9	0	0	0	0	0	1	0	0	0	0	0	0	**1**
24 to 24.9	2	0	1	1	0	0	0	0	2	0	0	1	**7**
25 to 25.9	975	773	837	695	821	828	713	881	704	803	748	870	**9648**
26 to 26.9	0	0	0	0	0	0	0	0	0	0	0	0	**0**
27 to 27.9	0	0	0	0	0	0	0	0	0	0	0	0	**0**
28 to 28.9	0	0	0	0	1	0	1	0	0	0	0	1	**3**
29 to 29.9	0	0	0	0	0	0	0	0	1	0	0	0	**1**
30 to 34.9	1298	1046	1354	1252	1485	1256	1316	1366	1438	1324	1305	1419	**15859**
35 to 39.9	50	20	33	41	33	25	22	15	33	31	59	66	**428**
40 to 44.9	1013	797	1016	1324	1285	1238	1527	1315	1324	1451	1425	972	**14687**
45 to 49.9	2	7	11	9	9	1	1	1	1	4	7	6	**59**
50 to 59.9	366	327	354	603	653	546	680	571	501	623	623	400	**6247**
60 to 69.9	65	80	86	214	106	100	91	130	116	147	122	82	**1339**
>= 70	4	9	15	28	10	22	23	11	31	45	42	11	**251**
ALL OBS	**7388**	**6751**	**7374**	**7111**	**7268**	**7132**	**7367**	**7373**	**7140**	**7305**	**7117**	**7357**	**86683**

Table B.6: Ronaldsway – percentage visibility.

Month Visibility (km)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ALL OBS
< 1	0.32	0.41	1.10	1.13	0.98	1.32	1.48	1.30	0.99	0.31	0.30	0.24	**0.83**
1 to 1.9	0.11	0.19	0.35	0.34	0.48	0.43	0.62	0.57	0.32	0.05	0.10	0.12	**0.31**
2 to 2.9	0.51	0.84	0.73	0.58	0.48	0.87	1.06	0.71	0.60	0.42	0.55	0.72	**0.67**
3 to 3.9	1.52	1.67	1.98	1.60	1.22	1.47	1.85	1.49	1.55	1.53	1.42	1.83	**1.60**
4 to 4.9	1.95	2.37	2.40	1.52	1.46	1.74	1.47	1.15	1.53	1.53	1.39	2.13	**1.72**
5 to 5.9	2.29	2.43	3.24	1.80	1.25	2.23	1.55	1.46	1.72	1.86	2.16	3.09	**2.09**
6 to 6.9	1.76	2.22	2.79	1.36	1.33	1.65	1.57	1.25	1.54	1.33	1.64	2.35	**1.73**
7 to 7.9	1.61	1.70	2.16	1.24	1.03	1.46	1.28	1.10	1.39	1.31	1.56	1.74	**1.46**
8 to 8.9	3.15	4.40	3.65	2.69	2.01	2.40	2.24	1.87	2.58	3.46	3.05	3.57	**2.92**
9 to 9.9	1.30	1.57	1.60	1.53	1.18	1.32	1.21	1.00	1.30	1.27	1.60	1.55	**1.37**
10 to 10.9	4.30	4.12	3.53	3.23	2.96	2.65	3.15	2.60	3.89	3.07	3.11	3.40	**3.33**
11 to 11.9	0.04	0.04	0.08	0.17	0.06	0.08	0.07	0.08	0.01	0.05	0.06	0.05	**0.07**

Month Visibility (km)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ALL OBS
12 to 12.9	4.43	4.64	4.10	4.37	3.37	3.94	3.47	3.66	3.59	3.57	3.64	4.00	**3.89**
13 to 13.9	0.27	0.31	0.26	0.51	0.29	0.27	0.12	0.30	0.55	0.21	0.13	0.34	**0.29**
14 to 14.9	0.28	0.43	0.34	0.17	0.34	0.35	0.14	0.19	0.21	0.19	0.14	0.12	**0.24**
15 to 15.9	8.80	10.03	8.34	7.26	7.04	7.22	7.22	7.32	6.85	7.60	6.87	8.03	**7.71**
16 to 16.9	0.04	0.00	0.00	0.01	0.00	0.03	0.07	0.00	0.04	0.00	0.00	0.12	**0.03**
17 to 17.9	0.19	0.24	0.26	0.20	0.18	0.15	0.10	0.18	0.06	0.08	0.08	0.05	**0.15**
18 to 18.9	1.64	1.91	1.84	1.55	1.93	1.98	1.60	1.82	1.82	1.08	1.32	1.20	**1.64**
19 to 19.9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
20 to 20.9	14.23	14.96	10.85	9.96	11.67	11.79	10.15	13.59	11.08	10.17	9.86	13.13	**11.78**
21 to 21.9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
22 to 22.9	0.16	0.19	0.14	0.20	0.15	0.32	0.22	0.16	0.24	0.26	0.17	0.16	**0.20**
23 to 23.9	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
24 to 24.9	0.03	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.01	**0.01**
25 to 25.9	13.20	11.45	11.35	9.77	11.30	11.61	9.68	11.95	9.86	10.99	10.51	11.83	**11.13**
26 to 26.9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
27 to 27.9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
28 to 28.9	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.01	**0.00**
29 to 29.9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	**0.00**
30 to 34.9	17.57	15.49	18.36	17.61	20.43	17.61	17.86	18.53	20.14	18.12	18.34	19.29	**18.30**
35 to 39.9	0.68	0.30	0.45	0.58	0.45	0.35	0.30	0.20	0.46	0.42	0.83	0.90	**0.49**
40 to 44.9	13.71	11.81	13.78	18.62	17.68	17.36	20.73	17.84	18.54	19.86	20.02	13.21	**16.94**
45 to 49.9	0.03	0.10	0.15	0.13	0.12	0.01	0.01	0.01	0.01	0.05	0.10	0.08	**0.07**
50 to 59.9	4.95	4.84	4.80	8.48	8.98	7.66	9.23	7.74	7.02	8.53	8.75	5.44	**7.21**
60 to 69.9	0.88	1.19	1.17	3.01	1.46	1.40	1.24	1.76	1.62	2.01	1.71	1.11	**1.54**
>= 70	0.05	0.13	0.20	0.39	0.14	0.31	0.31	0.15	0.43	0.62	0.59	0.15	**0.29**
ALL OBS	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**