Appendix 13-1

Briskalagh Renewable Energy Development EIAR

LVIA Methodology

DOCUMENT DETAILS

Client:	**Enerco**
Project Title:	**Briskalagh Renewable Energy Development EIAR**
Project Number:	**230502**
Document Title:	**Appendix 13-1**
Document File Name:	**Appendix 13-1 LVIA Methodology - F - 2024.10.04 - 23050210.04 - 230502**
Prepared By:	**MKO** **Tuam Road** **Galway** **Ireland** **H91 VW84**

Planning and Environmental Consultants

Rev	Status	Date	Author(s)	Approved By
01	Draft	15/05/2024	AR	JS
02	Draft	09/08/2024	DM	JW
F	Final	04.10.2024	DM	JW

Contents

1. LVIA METHODOLOGY

1.1 Scope and Definition of Landscape and Visual Impact Assessment (LVIA) Study Area

Chapter 13 follows the naming conventions and definitions detailed in Section 1.1.1. of Chapter 1 of this EIAR. For the purposes of this chapter, where the 'the Site' is referred to, this relates to the primary study area for the Proposed Project, as shown delineated in green on the LVIA Baseline map (Appendix 13-4).

Landscape and visual baseline mapping and viewpoint selection are based on wider study areas referred to as the 'LVIA Study Area'. The geographical parameters for this LVIA was determined by desktop study, survey work undertaken, the professional judgement of the assessment team, experience from other relevant projects and policy guidance or standards, such as:

- *Appendix 3* of the 'Wind Energy Development Guidelines for Planning Authorities' (DoEHLG, 2006), hereafter referred to as the Guidelines.
- The Guidelines for Landscape and Visual Impact Assessment 3rd Edition–Landscape Institute & IEMA, 2013 , (GLVIA3).

GLVIA3 refers to the identification of the area of landscape that is to be covered while assessing landscape and visual effects:

> *"The study areas should include the site itself and the full extent of the wider landscape around it which the proposed project may influence in a significant manner."*

The distance at which a ZTV is set from a proposed wind farm development usually defines the parameters of the LVIA Study Area. The LVIA Study Area was chosen as 20 kilometres from the Proposed Wind Farm turbines for landscape and visual effects as recommended by the Guidelines:

> *'For blade tips in excess of 100m, a Zone of Theoretical Visibility radius of 20km would be adequate'*

Through extensive experience conducting LVIA for other wind energy development projects, the assessment team determined that no significant effects on landscape character are likely to arise beyond distances of 15km from the proposed turbines. The turbines of a wind farm are unlikely to significantly impact the key characteristics of an LCA beyond a distance of 15km, even for the most sensitive designated LCAs. Therefore, a study area of 15km, hereafter referred to as the 'LCA Study Area', is deemed appropriate for effects on landscape character in relation to the assessment of effects upon designated Landscape Character Areas.

Essential Aspects of the Proposed Project from an LVIA Perspective

GLVIA3 states that:

> *"It is important to make sure that the project description provides all the information needed to identify its effect on particular aspects of the environment. For LVIA, it is important to understand, from the project description, the essential aspects of the scheme that will potentially give rise to its effect on the landscape and visual amenity."*

The tall, vertical nature of the Proposed Wind Farm turbines make them the most prominent elements of the Proposed Project from a landscape and visual perspective and have the most potential to give rise to significant landscape and visual effects. In this regard, the Proposed Wind Farm turbines are deemed

to be the 'essential aspect' of the Proposed Project which will give rise to effects on the landscape and visual amenity and therefore a primary focus of the LVIA conducted in Chapter 13.

1.1.2 Topics Scoped out of Assessment

On the basis of desk studies and survey work undertaken, the professional judgement of the assessment team, experience from other relevant projects and policy guidance or standards, the following topic areas have been scoped out of the assessment:

- Effects on landscape and visual receptors that have minimal or no theoretical visibility (as predicted by ZTV mapping) and are therefore unlikely to be subject to 'Significant' effects;
- Effects on sensitive landscape receptors beyond a 20 km radius (LVIA Study Area) from the proposed turbines, from where it is judged that potential 'Significant' effects on key characteristics and/or special qualities, or views are unlikely to occur;
- Effects on landscape character and designated LCAs beyond a 15km radius (LCA Study Area) from the proposed turbines, where it is judged that potential 'Significant' effects on landscape character are unlikely to occur;
- Effects on visual receptors beyond a 20km radius (LVIA Study Area) from the proposed turbines, where it is judged that potential 'Significant' effects are unlikely to occur;
- Cumulative landscape and visual effects beyond a 20km radius (LVIA Study Area) from the proposed turbines, where it is judged that potential 'Significant' cumulative effects are unlikely to occur.
- There are several singular turbines located within the LVIA Study Area. Whilst it is acknowledged these singular turbines exist, due to the distance beyond 5km and the height of the singular turbines below 50m, these turbines have been scoped out from assessment.

1.2 Guidelines

Whilst the legislation and the general guidance on Environmental Impact Assessment is set out in Chapter 1 of this EIAR, only guidance specifically pertaining to the Landscape and Visual Impact are outlined below.

Ireland signed and ratified the European Landscape Convention (ELC) in 2002, which introduces a pan-European concept which centres on the quality of landscape protection, management, and planning. The Department of Arts, Heritage and the Gaeltacht has published a National Landscape Strategy for Ireland in 2015. The Strategy aims to ensure compliance with the ELC and contains six main objectives, which include developing national landscape Character Assessment and Developing Landscape Policies.

In 2000, the Department of the Environment and Local Government published 'Landscape and Landscape Assessment: Consultation Draft of Guidelines for Planning Authorities', which recommended that all Local Authorities adopt a standardised approach to landscape assessment for incorporation into Development Plans and consideration as part of the planning process. However, the Guidance remains in draft form.

The LVIA is primarily based on GLVIA3 and also informed by the following:

- 'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' (Environmental Protection Agency of Ireland [EPA], 2022);
- 'Guidance: Assessing the Cumulative Impact of Onshore Wind Energy Developments' (Nature Scot, 2021; includes methodology published in 2012);
- 'Wind Energy Development Guidelines (The Guidelines) for Planning Authorities' (DoEHLG, 2006) and the 'Draft Revised Wind Energy Development Guidelines (Draft

Guidelines)' (Department of Housing, Local Government and Heritage [DoHPLG], 2019);
- 'Visual Representation of Development Proposals' (Landscape Institute Technical Guidance Note 06/19, 2019) (hereafter, LI TGN 06/19);
- 'Siting and Designing Wind Farms in the Landscape, Version 3a' (Scottish Natural Heritage [SNH], 2017) (hereafter, SNH Guidance v.3a);
- 'Visual Representation of Wind Farms, Version 2.2' (SNH, 2017) (hereafter, SNH Guidance v.2.2);
- 'Spatial Planning for Onshore Wind Turbines: Natural Heritage Considerations' (SNH, 2015);
- 'Visual Representation of Wind Farms, Version 2' (SNH, 2014) (hereafter, SNH Guidance v.2)
- 'Visual Assessment of Wind Farms: Best Practice' (SNH, 2002).

1.3 Zone of Theoretical Visibility Mapping

The Zone of Theoretical Visibility (ZTV) represents the area over which a development can theoretically be seen and is based on a Digital Terrain Model (DTM), overlaid on a map base. A DTM refers to the way in which a computer represents a piece of topography in three dimensions as a digital model. ZTV maps provide the following information:

- Indicates broad areas where visibility of a wind energy development is most likely to occur;
- How much of the wind energy development is likely to be visible (using different coloured bands for different numbers of turbines);
- The extent and pattern of visibility.

Production of ZTV maps is usually one of the first steps of Visual Impact Assessment, helping to inform the selection of the study area in which impacts will be considered in more detail and the identification of sensitive vantage points. (Visual Representation of Wind Farms, Scottish Natural Heritage, 2017).

1.3.1 Limitations of ZTV Mapping

The SNH guidelines referred to above acknowledge the following limitations inherent to the use of theoretical visibility mapping:

- The ZTV presents a 'bare ground' scenario, i.e. visibility of the proposed turbines in a landscape without screening structures or vegetation. This includes trees, hedgerows, buildings and small-scale landform or ground surface features. The ZTV also does not take into account the effects of weather and atmospheric conditions, and therefore can be said to represent a 'worst-case' scenario, that is where the wind turbines could potentially be seen given no intervening obstructions and favourable weather conditions.
- The ZTV indicates areas from where a wind farm may be visible, but cannot show how it will look, nor indicate the nature or magnitude of visual impacts. The visibility of the turbines will decrease with the distance from which they are viewed, but this is not accounted for in the ZTV. Figure 1-1 below provides an illustration of the differences in view relative to the distance from a turbine.

Figure 1-1 The effect of distance on visibility of wind turbines (Illustrative Purposes Only)

- A ZTV is only as accurate as the data on which it is based. It is not easy to test the accuracy of a ZTV in the field, although some verification will occur during the assessment of viewpoints.

In order to handle large areas of terrain, the DTM data is based on information that does not allow detail to be distinguished below a certain level. There are also differences in the way that the software package 'interpolates' between heights in the calculations made.

1.3.2 ZTV Methodology

The ZTV maps presented in the EIAR show visibility of the proposed turbines using the half blade height of the wind turbines as points of reference. A ZTV map also shows the theoretical visibility of the Proposed Wind Farm in addition to visibility of other existing, permitted and proposed wind farms in the LVIA Study Area. The area covered by the ZTV maps in Chapter 13 (Figure 13-1) has a radius of 20km from the outer-most Proposed Wind Farm turbines.

The Guidelines require that:

> *'in areas where landscapes of national or international renown are located within 25 km of a proposed wind energy development, the Zone of Theoretical Visibility should be extended as far (and in the direction of) that landscape'.*

A mapping investigation determined that no landscapes of National or International renown are located within 25 km from the Proposed Wind Farm turbines and the extension of the ZTV beyond 20 km from the outer-most proposed turbine is not warranted. Therefore, 20 km was deemed a sufficient and appropriate boundary for the location and scale of the Proposed Project and any assessment of landscape and visual effects, as is determined in the Guidelines:

> *"For blade tips in excess of 100m, a Zone of Theoretical Visibility radius of 20km would be adequate" (the Guidelines Page 94; the draft Guidelines Page 152).*

ZTV maps assume a worst-case or 'bare ground' scenario, i.e. no land-cover. They represent visibility of a proposed wind farm in the absence of all natural and manmade features from the landscape, including vegetation, houses and other buildings. In reality, such features will restrict or limit visibility of the wind turbines, due to the screening effects of vegetation, for example forestry and road-side hedgerows and trees, and buildings, particularly within towns and villages.

Separate colour bands are used on each ZTV map to indicate the number of turbines which will potentially be visible to half blade i.e. only half a blade might be visible over the topography as opposed to seeing a full turbine. The legend on each map shows the number of visible turbines for each corresponding colour, which are as follows:

- Orange: 1-2 proposed turbines theoretically visible
- Yellow: 3-4 proposed turbines theoretically visible
- Teal: 5-6 proposed turbines theoretically visible
- Navy: 7 proposed turbines theoretically visible

1.3.3 Route Screening Methodology – Roads

In order to comprehensively demonstrate the varying characteristics of visual screening existent on roads, proximate to the Proposed Wind Farm and to record the actual visibility in comparison to the theoretical visibility, a methodology was developed by MKO. This is termed 'Route Screening Analysis' and it was undertaken from all public roads within 3 km of the Proposed Wind Farm turbines. Where roads continued beyond 3 km from the proposed turbines, the Route Screening Analysis survey continued to

record the visual screening until an appropriate termination point or junction. Visual screening along R695 regional road was recorded to a distance of 5 km from the proposed turbines as these are a relatively prominent and well trafficked transport routes surrounding the Site.

Route Screening Analysis as its name suggests considers the actual visibility of the proposed wind turbines from surrounding roads. The landscape surrounding the Wind Farm site comprises rolling agricultural land, a network of trees and hedgerows, and settlements. In order to get a clearer understanding of visibility and visual screening, and to bridge the gap for the assessor between the computer-generated ZTV maps and the actual nature of visibility in the study area, Route Screening Analysis was undertaken.

Every public road was driven within 3 km radius of the Proposed Wind Farm turbines. The extent of roadside screening was recorded digitally on a tablet/GPS device as the route is driven. In addition, dashcam video footage was recorded along the routes to allow later confirmation of mapping, and to methodically record the views along the route. All routes were driven slowly. Using the tablet device, visual screening was logged as one of three categories:

- **'Little/No'** visual screening: areas of the road that are mainly open with open views in the direction of the proposed turbines;
- **'Intermittent/Partial'** visual screening: areas of the road where there are intermittent or partial views in the direction of the proposed turbines;
- **'Dense/Full'** visual screening: areas of the road with dense visual screening, sufficient to block views in the direction of the proposed turbines;

Visual screening between the Proposed Wind Farm site and the relevant side of the road was recorded. In cases where the road travels directly in the direction of the Proposed Project, visual screening of the lowest classification was recorded (least amount of visual screening). The Route Screening Analysis surveys were conducted in January 2024. The screening data was then mapped and validated against the georeferenced dashcam footage.

1.4 Photomontage Visualisations

Photomontages are visualisations that superimpose an image of a proposed development upon a photograph or series of photographs from a specific location termed 'viewpoint'. They are intended as graphical representations of how a proposed development will appear in the existing landscape and are used as a tool in the LVIA process. A series of photomontages have been prepared as part of this assessment and are presented in a separate volume: EIAR Volume 2: *Photomontage Booklet* (hereafter, *Photomontage Booklet*), submitted as part of this EIAR.

The following two guidance documents are considered the industry benchmark for producing photomontages specifically for wind energy developments and were the standards adhered to during the production of photomontages for the *Photomontage Booklet*:

- LI TGN 06/19 (2019);
- SNH Guidance v.2.2 (2017).

The verified photomontages produced for this EIAR are classified as 'Type 4 Visualisations' in the LI TGN 06/19 (2019), meaning that the visualisations maintain the following qualities. The proposed turbines modelled in the photomontages are proportionately scaled within a topographic model from the specific locations where the photographic imagery is captured, i.e. the 'viewpoints'. The turbines and topographic model are then carefully positioned and scaled within the landscape view presented in each photomontage (to 90° and 53.5° horizontal fields of view, as prescribed by the SNH Guidance v.2.2 (2017) and LI TGN 06/19 (2019). The modelling of turbines in the topographical model (wireline) is generated by software using input co-ordinates of the turbine locations, viewpoint locations and the specific turbine specifications of the turbines presented.

The views presented in the *Photomontage Booklet* include a range of distances and geographic perspectives, and the images used for photomontages represent differing atmospheric conditions. Although it is not reasonable to control the weather, all images were captured when weather was sufficient to enable clear and long-ranging visibility in the direction of the proposed turbines from selected viewpoints.

The proposed turbines appear differently in the landscape depending on factors such as time of day, weather conditions and the location of the observer. The photomontages produced aim to realistically represent the proposed turbines while considering their contrast against the backdrop of the sky and landscape. The turbines presented in the photomontages have been coloured in such a way that ensures sufficient contrast for purposes of visual impact assessment, whilst at the same time balancing the intention to present the photomontages as life-like visualisations.

1.4.1 Photomontage Viewpoint Selection

The viewpoints or photo locations were selected following the Guidelines , GLVIA3 and SNH Guidance v.2.2 (2017). The selection of photo locations is designed to provide a representative range of views of the Proposed Wind Farm turbines.

Viewpoints, the photo locations from which the photomontages are produced, were chosen after compiling the Visual Baseline (Section 13.5 of Chapter 13). The main purpose of establishing the visual baseline was to identify the key visual receptors that should be considered for viewpoint selection. To this end the following were identified:

- Designated Scenic Routes and Views;
- Viewing Points (e.g. marked on OSi Maps);
- Settlements;
- Recreational Routes:
  - Waymarked Walking Routes;
  - Cycle Routes;
  - Scenic Drives;
  - Tourist Routes;
- Recreational, Cultural Heritage and Tourist Destinations;
- Transport Routes;
- Residential Receptors.

These visual receptors are listed in tables under the sections identified above along with theoretical visibility at those locations indicated by the ZTV maps. After all key visual receptors were identified, a Visual Receptor Preliminary Analysis was carried out to eliminate selected visual receptors from further assessment due to the following reasons:

- Having no or very limited theoretical visibility according to ZTV mapping;
- Designated views and scenic routes, as well as OSi Viewing Points, that are not directed towards the Proposed Wind Farm;
- Visual receptors visited on-site where views towards the Proposed Wind Farm turbines were either entirely or substantially screened from view, and those for which the distance from the proposed turbines would mitigate any visual effects.

All other key visual receptors were selected as viewpoint locations. Viewpoints were chosen having regard to the SNH Guidance v.2.2 (2017) which advises that a range of views should be shown at a range of distances, aspects and varying elevations, and that images should illustrate instances where the proposed turbines will be completely visible as well as partially visible. Consideration was also given to ensure that photomontages captured other wind farm developments in the LVIA Study Area in order to assess cumulative landscape and visual effects.

1.4.2 Limitations of Photomontage Visualisation

Photographs, and therefore photomontages, are subject to a range of limitations, as stated in the SNH Guidance v.2 (2014):

- Visualisations provide a tool for assessment that can be compared with an actual view in the field; they should never be considered as a substitute to visiting a viewpoint in the field;
- Neither photographs nor visualisations can replicate a view as seen in reality by the human eye;
- Visualisations are only as accurate as the data used to construct them;
- Visualisations can only represent the view from a single location at a particular time and in particular weather conditions;
- Static visualisations cannot convey the effect of turbine blade movement.

Although the scale, siting and geometry of photomontages are based on technical data, the other qualities of the image are open to judgement. The guidance also notes that interpretation of visualisations must be taken into account as well as additional information including variable lighting, the movement of turbine blades, seasonal differences and the movement of the viewer through the landscape. However, accepting these limitations, the SNH Guidance v.2 (2014) and v.2.2 (2017) state that photomontages are useful tools in the visual impact assessment of wind turbines.

Furthermore, with regard to the representation of cumulative visual effects, the photomontages were produced to also show existing, permitted and proposed turbines. The representation of existing turbines relies on the existing turbines as seen within the photographic imagery captured on-site, while permitted and proposed turbines are images of turbines that have been modelled and rendered into the image. As such, there can be a discrepancy in the lighting and sharpness between these two different representations.

Photomontages ('Type 4 Visualisations' of Development Proposals according to the LI TGN 06/19, 2019) are 2D representations of 3D views and thus cannot convey the actual perspective or depth of view when seeing the objects with the naked eye. One of the ways in which this limitation affects the assessment of cumulative visual effects is where turbines have been proposed to be cited in front or behind existing or permitted turbines. In the field, this physical separation may be obvious, while in the photomontage, the turbines may appear as one collective wind farm.

1.4.3 Photomontage Presentation

The photomontage visuals contained in the *Photomontage Booklet* are devised to be viewed at arm's length. The existing views, photomontages and wireline views are panoramas presented on banner sheets of paper of size 'A1'. More specifically, the horizontal field of view presented in the visualisations are spread across 84.1cm, the equivalent of the maximum horizontal field of an A1 sheet of paper. In line with best practice guidance for the production of photomontages for wind energy development (SNH Guidance v.2.2, 2017 and LI TGN 06/19, 2019) the A1 banners present the proposed turbines enlarged to fit within a 53.5° horizontal field of view.

The viewpoints presented in the *Volume 2 EIAR Photomontage Booklet* show several views from each viewpoint location. These include:

1. **Overview Sheet and Key Image at 120°–** Viewpoint details include location description, grid reference, distance from nearest turbine and technical data in relation to photography. Three maps at various scales show the viewpoint location. A 120-degree existing-view image without any proposed and permitted turbine is called the 'Key Image'. Existing turbines visible in the landscape may appear within this image, and the horizontal extent of the 90-degree and 53.5-degree image to be presented in subsequent images is also framed;

2. **Existing View at 90° –** A 90-degree visual baseline image without any proposed or permitted turbines and a matching wireline image of the same view which includes any existing turbines visible in the landscape. If turbines are already existing in the landscape, these will be visible on the photograph and are illustrated in the wireline view;
3. **Proposed Photomontage with Cumulative at 90°** – A 90-degree photomontage image with the Proposed Wind Farm turbine and all other existing, permitted and proposed wind farms within the view, and a matching wireline image shows the turbines of all proposed, permitted and existing wind farms individually coloured and labelled for ease of identification;
4. **Proposed Photomontage with Cumulative at 53.5°** –A photomontage image of the Proposed Wind Farm turbines and any existing, permitted and proposed turbines in a 53.5-degree horizontal field of view;
5. **Proposed Wireline with Cumulative at 53.5°** - A matching wireline image showing the turbines of all proposed, permitted and existing wind farms individually coloured and labelled for ease of identification in a 53.5-degree horizontal field of view.

Blue-Sky Photomontage Booklet (Volume 3)

At a pre-planning consultation meeting that took place on 29th February 2024, a representative from Kilkenny County Council requested that photomontages be shown on a blue-sky background. Therefore, a separate, **Proposed Photomontage Booklet with Blue Sky Background at 90°** was prepared which contains an existing view at 90°, followed by a Proposed Photomontage at 90°.

1.4.4 Presentation of Wireline Views

The SNH Guidance v.2.2 (2017) suggests that all turbine blades should be presented in the same orientation when presented within a wireline view with one blade completely vertical. The rationale for this method proposes that the singular vertical blade will show the greatest turbine tip height for all turbines. Using this method, the orientation of the turbine blades does not match what is presented in the corresponding photomontage. Conversely, guidance in the Guidelines (p. 97) and draft Guidelines (p. 97) state the following in relation to wirelines (they refer to wireframes – equivalent of a wireline):

> *"Related to the above, the photomontage should be accompanied by a wire frame computer generated perspective view of the landscape, or shaded-relief model, illustrating all theoretically visible turbines. These wire frame diagrams may also be used to indicate turbines that are not visible in whole or in part due to screening, simply to prove that point.* ***Wire frames and photomontages should be at the same scale and presented in unison so that direct comparison/correlation can be made****".*

This LVIA has been cognisant of the guidance from both sources (the Guidelines and the draft Guidelines ; and SNH v.2.2 (2017). However, it is considered that that the guidance in the Guidelines and draft Guidelines is a preferable option. Wireline views showing the turbines in irregular orientation with each other, but in unison with the corresponding photomontage is an optimal method of presentation for the following reasons:

- Enables direct correlation and comparison with the photomontages;
- If all turbines are oriented the same way this is an unnatural and unrealistic representation, it is unlikely this would ever occur in reality;
- Although the single vertical blade shows greatest tip height, it doesn't necessarily show the greatest visual exposure of turbines in the landscape, as there could potentially be two blades (instead of one) seen above a feature of the landform when using a non-regular orientation;

For the reasons outlined above, the turbines in the wireline views within the *Photomontage Booklet* are presented in unison with the orientation of the turbines in the photomontages, in line with the Guidelines and draft Guidelines.

1.4.5 Photowires (Early-Stage Draft Photomontages): Alternative Viewpoints

All imagery captured from viewpoints for the LVIA (a total of 36 No. VPs) were progressed to a draft stage called - 'Photowires'. Photowires are early-stage photomontage visualisations (classified as 'Type 3 Visualisations' in the LI TGN 06/19, 2019). Photowires are a combination of photographic images and a 'wireline'. A wireline is the model of the proposed turbines accurately scaled and positioned within a digital elevation model (topography) as seen from a viewpoint. Photowires are produced by positioning and overlaying the wireline on top of the stitched photographic imagery captured from a viewpoint location.

16 No. viewpoints were selected for inclusion in the *Photomontage Booklet*. The other 21 viewpoints for this LVIA are presented as Photowires in Appendix 13-5. Photowires are used as tools both to pick the best viewpoints for the *Photomontage Booklet*, and also to demonstrate as part of discussion in the LVIA chapter the locations where very limited visibility might occur. A photowire might not have been selected for the *Photomontage Booklet* as another nearby viewpoint provided a better representation of views from receptors in a particular area or represented a greater number of sensitive receptors.

The photowire imagery in Appendix 13-5 are Type 3 Visualisations, therefore:

- No rendering is applied to the imagery to make the turbines photorealistic – hence the orange colour and monochrome photographic imagery;
- Photowires do not include cumulative – modelling and rendering of other permitted and proposed wind farms;
- The wireline element of the Photowire only accounts for screening from topography in the elevation model;
- The wireline overlaid the photograph is shown in front of above ground elements of the landscape e.g. vegetation screening and the built environment. Therefore, the photowire shows where the turbines are located relative to the viewpoint but are seen in front of above ground features which would visually screen them in reality on the ground.

The 21 No. photowires are presented within Appendix 13-5 and are useful visual aids for the discussion of visual effects included in Section 13.7 of Chapter 13: *Likely Significant Landscape and Visual Effects*. The location of photowire viewpoints in Appendix 13-5 are marked as orange icons in Figure 13-23 and Figure 13-24, labelled as 'PW' (e.g., PW-A, PW-B etc.).

It should be emphasised that photowires are useful visual aids to inform the impact assessment; however, they do not include modelling of other existing, permitted, or proposed wind energy developments and are therefore not used for the assessment of cumulative effects.

1.5 Landscape and Visual Impact Assessment Methodology

1.5.1 Identification of Landscape Receptors

The following landscape receptors are identified in the landscape baseline:

- **Landscape Designations** based on:

- Kilkenny City and County Development Plan 2021 – 2027
- Tipperary County Development Plan 2022 – 2028
- Laois County Development Plan 2021 – 2027

- **Landscape Character of the Proposed Wind Farm site and its immediate environment** based on:
  - Site Surveys undertaken throughout 2023
  - The Guidelines, Landscape Character Types identified in *Landscape Character Types as a basis for Guidelines*

- **Landscape Character of the LCA Study Area** based on:
  - Landscape Character Assessment of County Kilkenny
  - Landscape Character Assessment of County Tipperary
  - Landscape Character Assessment of County Laois
  - Site Surveys undertaken throughout 2023.

After all landscape receptors are identified, a Landscape Receptor Preliminary Assessment is carried out to eliminate the landscape receptors, where no or very limited theoretical visibility has been indicated on the ZTV map. All other landscape receptors were selected for further assessment of landscape effects.

1.5.2 Assessing Landscape Effects

The methodology uses qualitative methods in order to arrive at an assessment, which is based on the DoEHLG, 2000 as well as GLVIA3, and the Guidelines were also taken into account.

Landscape effects can be described as changes which affect the landscape as a resource. This includes how the proposal will affect the elements that make up the landscape, the aesthetic and perceptual aspects and its landscape character. Landscape effects also relate to changes in the structure of the landscape. Under GLVIA3, the assessment of likely significant effects on landscape receptors includes a judgement on both the sensitivity of the receptor as well as magnitude of the change.

1.5.2.1 Assessing Landscape Sensitivity

Landscape Sensitivity is described in GLVIA3 as a combination of the landscape's susceptibility to change as well as the value attached to the landscape.

Susceptibility to change can be descried as the ability of the landscape receptor (either the overall character, quality of the landscape or a particular landscape feature) to accommodate the proposed turbines without undue consequences for the maintenance of the baseline (existing) landscape and/or the aims of landscape planning policies and strategies.

Determination of landscape value considers scenic amenity designations, sensitivity and value designations found in local landscape policy, as well as other indicators of landscape value attached to undesignated landscapes (page 84, GLVIA3).

Section 13.4 – Landscape Baseline of this EIAR describes and determines the Landscape Values for the Proposed Wind Farm site and its wider landscape setting in order to establish the capacity of the immediate landscape in which the Proposed Wind Farm turbines will be built, as it is prescribed by best practice guidance: *"as part of the baseline description the value of the potentially affected landscape should be established"* (Page 80, GLVIA). Comprehension of Landscape Value and its susceptibility to change enables determination of the sensitivity of the landscape at a micro level.

Determination of Sensitivity of Designated Landscape Character Areas

Designated Landscape Character Areas (LCAs) are comprehensively assessed in Appendix 13-2. Ireland does not currently have a standardised nationwide Landscape Character Assessment. The LCAs scoped in for assessment in Chapter 13 are located in differing counties and each county uses a differing method and scale to represent sensitivity of its individual LCAs (e.g., Co. Tipperary LCAs – Five classes from class Zero *("Could be improved by Change")* to Class Five *("Unique")). For* the purposes of this LVIA and to provide consistency across the assessment of LCAs (Appendix 13-2), a rating of sensitivity was assigned to each LCA within the following classification scale:

- Very High
- High
- Medium
- Low

The sensitivity classification assigned to each LCA takes into account key characteristic and sensitivity descriptions (and where applicable sensitivity ratings) in the respective county development plans, as well as any relevant wind energy capacity designations and policy. A rationale for the sensitivity classification of each LCA is provided in the assessment tables included in Appendix 13-2. LCAs at the 'Very High' end of the scale would include very sensitive landscapes of national importance, whilst LCAs at the 'Low' end of the scale might be locally important landscapes, but which do not comprise receptors or characteristics of unique or national value.

1.5.2.2 Assessing Magnitude of Change in the Landscape

The magnitude of change in each LCA is a combination of the visual presence - size and scale - of the change, the extent of the area to be affected, and the duration and reversibility of the effect. The magnitude of change for each LCA was assessed using the definitions outlined in Table 1-1 below.

Table 1-1 Magnitude of Landscape Change Criteria

Magnitude of Change	Description
Substantial	Where a landscape will experience the loss of key landscape features or the introduction of uncharacteristic additions over a large area. The changes to the landscape are prominent and large in scale. The level of change has an effect on the overall landscape character. The effects are likely long term and may be irreversible.
Moderate	A more limited loss of or change to landscape features over a medium extent which will result in some change to landscape features and aesthetics. Could include the addition of some new uncharacteristic features or elements that would lead to the potential for change in landscape character in a localised area or part of a landscape character area. Would include moderate effects on the overall landscape character that do not affect key characteristics. The effects could be long to medium term and/or partially reversible.
Slight	The loss of or change to landscape features of limited extent, or changes to landscape character in smaller areas. Changes would not affect key characteristics. The addition of any new features or elements to the landscape would only result in low-level changes to the overall aesthetics of the landscapes. Changes to the landscape are more evident at a local level and not over a wide geographical area. The effects could potentially be medium to short term and/or reversible.

Magnitude of Change	Description
Negligible	A change affecting smaller areas of landscape character including the loss of some landscape elements or the addition of features or elements which are either of low value or hardly noticeable. The effects could be short term and/or reversible.

1.5.2.3 Landscape Effects Assessment Matrix

Table 1-2 below shows the significance of landscape effects, arrived at by combining the landscape receptor sensitivity and the magnitude of change classifications. Landscape receptor sensitivity is shown in the left-hand first column and magnitude of landscape change is shown in the first row at the top of the table. This table is used as an indicative tool to assist in determining the significance of landscape effects. In different circumstances differing levels of mitigating factors may ultimately result in a different determination of the level of significance. The significance of a landscape effect is based on a balance between the sensitivity of the receptor and the magnitude of effect. The significance of landscape effect is arrived at using a combination of the matrix shown in Table 1-2 and Table 1-3 below.

Table 1-2 Landscape Effects Significance Matrix

	Substantial	Moderate	Slight	Negligible
Very High	Major	Major/Moderate	Moderate	Moderate/Minor
High	Major/Moderate	Moderate	Moderate/Minor	Minor
Medium	Moderate	Moderate/Minor	Minor	Minor/Negligible
Low	Moderate/Minor	Minor	Minor/Negligible	Negligible

The determination of significance uses a seven-point scale, ranging from Major to Negligible. This seven-point scale is translated to the EPA, 2022 impact assessment classifications of significance, as outlined in Table 1-3 below.

Table 1-3 EPA,2022 Impact Assessment Significance Classification for Landscape Effects

Matrix Classification Significance	EPA, 2022 Significance Classification	EPA, 2022 Definition of Significance
Major	Profound	An effect which obliterates sensitive characteristics
Major/Moderate	Very significant	An effect, which by its character, magnitude, duration or intensity alters most of a sensitive aspect of the environment
Moderate	Significant	An effect, which by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Moderate/Minor	Moderate	An effect that alters the character of the environment in a manner consistent with existing and emerging baseline trends
Minor	Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
Minor/Negligible	Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Negligible	Imperceptible	An effect capable of measurement but without significant consequences

1.5.3 Assessing Visual Effects

Visual effects relate to changes in views and visual amenity of the surroundings of individuals or groups of people. These may result from changes in content and character of views as a result in changes to the landscape. The assessment of visual effects is based on views shown in photomontages and the potential visibility indicated by the ZTV maps as well as actual visibility on the ground.

It should be noted that in assessing visual effects, there are different types of visual effects:

- **Visual obstruction:** This occurs when there is an impact on a view which blocks the view.
- **Visual intrusion:** This occurs when there is an impact on a view, but which does not block the view.

Due to the nature of the development and the appearance of wind turbines, visual intrusion occurs more frequently than obstruction.

The likely significant effects of the proposed turbines in terms of visual and landscape effects are informed by the ZTV and photomontages. Visual effects relate to changes in views and visual amenity of the surroundings of individuals or groups of people. These may result from changes in content and character of views because of changes to the landscape. The significance of the effect on visual receptors is a combination of the sensitivity of the receptor as well as the magnitude of the change.

1.5.3.1 Visual Receptor Sensitivity

Visual Receptor Sensitivity depends on the occupation or activity of the people, as well the extent to which the attention is focused on views and visual amenity, according to GLVIA3 . Visual receptor sensitivity is assessed as either being Very High, High, Medium, or Low, based on the definition of descriptions and examples set out in Table 1-4 below.

Table 1-4 Visual Receptor Sensitivity Assessment Criteria

Sensitivity of Visual Receptor(s)	Description
Very High	Included in this category are viewers that are primarily focused on views from this particular location, such as visitors to popular destinations identified for their outstanding views. Residents in close proximity who have primary views of a scenic quality in the direction of the proposed turbines.
High	Includes viewers at designated views or landscapes. Viewers such as residents in close proximity to the viewpoint who have primary views that will be in the direction of the proposed turbines that may not necessarily be of a particularly scenic quality; viewers at well-known heritage or popular tourist or recreational areas, viewers along scenic or tourist routes.
Medium	Includes viewers who may have some susceptibility to a change in view. Viewers such as residents in medium proximity but who do not have views focused on the direction of the proposed turbines or whose views are not of a particularly scenic quality; those from views which are not designated but may have local recreational uses or those travelling along routes or at views which are considered moderately scenic.
Low	Includes viewers engaged in activities where the focus is not on the landscape or view. These including those travelling along a busy route, viewers at work or engaged in sport not related to views or experience of the landscape.

Photomontage viewpoints are specific locations which are representative of key visual receptors. The viewpoint assessment tables in Appendix 13-3 consider all receptors represented in the determination of the visual receptor sensitivity rating for each viewpoint. This determination takes a balanced approach considering the types, sensitivities, and quantities of visual receptors represented. The sensitivity rating given to each photomontage viewpoint in Appendix 13-3 considers both the susceptibility of the visual receptors represented as well as the value attached to the available views at that particular location.

1.5.3.2 Magnitude of Visual Change

The magnitude of the visual change resulting at each viewpoint is a combination of scale of the change, the extent of the area to be affected and the duration and reversibility of the effect, determined by reviewing the photomontage and wireframe images for each viewpoint. The magnitude of change is determined in accordance with the definitions and descriptions included in Table 1-5 below.

Table 1-5 Magnitude of Visual Change Criteria

Magnitude of Change	Description
Substantial	Substantial change, where the proposals would result in large-scale, prominent or very prominent change, leading to substantial obstruction of existing view or complete change in character and composition of the baseline though removal of key elements or addition of uncharacteristic elements which may or may not be visually discordant. This includes viewpoints where the proposed turbines are fully or almost fully visible over a wide extent, at close proximity to the viewer. This change could be long term or of a long duration.
Moderate	The change in the view may involve partial obstruction of existing view or partial change in character and composition of the baseline through the introduction of new elements or removal of existing elements. Likely to occur at locations where the proposed turbines are partially visible over a moderate or medium extent, and which are not in close proximity to the Proposed Project. Change may be readily noticeable but not substantially different in scale and character from the surroundings and wider setting.
Slight	The proposals would be partially visible or visible at sufficient distance to be perceptible and result in a low level of change in the view and its composition and a low degree of contrast. The character of the view may be altered but will remain similar to the baseline existing situation. This change could be short term or of a short duration.
Negligible	Any change would only be barely distinguishable from the status quo "do-nothing scenario" in the surroundings. The composition and character of the view would be substantially unaltered, approximating to little or no change.

1.5.3.3 Visual Effects Assessment Matrix

Table 1-6 below shows the significance of visual effects, arrived at by combining the visual receptor sensitivity and the magnitude of change classifications. Visual receptor sensitivity is shown in the left-hand first column and magnitude of visual change is shown in the first row at the top of the table. This table is used as an indicative tool to assist in determining the significance of visual effects. In different circumstances differing levels of mitigating factors may ultimately result in a different determination of the level of significance (see below). The significance of a visual effect is based on a balance between the sensitivity of the receptor and the magnitude of effect. The significance of visual effect is arrived at using a combination of the matrix shown in Table 1-6 and Figure 1-2 below.

Table 1-6 Visual Effects Significance Assessment Matrix

	Substantial	Moderate	Slight	Negligible
Very High	Major	Major/Moderate	Moderate	Moderate/Minor
High	Major/Moderate	Moderate	Moderate/Minor	Minor
Medium	Moderate	Moderate/Minor	Minor	Minor/Negligible
Low	Moderate/Minor	Minor	Minor/Negligible	Negligible

The determination of significance uses a seven-point scale, ranging from Major to Negligible. This seven-point scale is translated to the EPA, 2022 impact assessment classifications of significance, as outlined Table 1-7 below.

Table 1-7 EPA, 2022 Impact Assessment Significance Classification for Visual Effects

Matrix Classification Significance	EPA, 2022 Significance Classification	EPA, 2022 Definition of Significance
Major	Profound	An effect which obliterates sensitive characteristics
Major/Moderate	Very significant	An effect, which by its character, magnitude, duration or intensity alters most of a sensitive aspect of the environment
Moderate	Significant	An effect, which by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Moderate/Minor	Moderate	An effect that alters the character of the environment in a manner consistent with existing and emerging baseline trends
Minor	Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
Minor/Negligible	Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Negligible	Imperceptible	An effect capable of measurement but without significant consequences

1.5.3.4 Residual Visual Effect

After determining the significance of the visual effect using the above visual effects assessment matrix and significance graph, mitigating factors are taken into consideration to arrive at the final residual effect. In some cases, mitigating factors merit a reduction in classification.

1.5.4 Determination of Residual Landscape and Visual Effects

The matrices and tables above are excellent tools to aid professional judgement in the determination of the significance of an effect. They are useful in that they provide a transparent, objective, structure to the process of balancing sensitivity and magnitude of change. In the context of the determination of visual effects, the formulaic process created by the use of the matrix above provides an indicative initial assessment, which can be seen clearly in the photomontage assessment tables in Appendix 13-3.

However, over-reliance on the formulaic process, which is heavily influenced by the definitions of sensitivity and magnitude of change contained in Table 1-4 and Table 1-5 above, can lead to a failure to properly account for the full range of circumstances and factors at play in the determination of the

significance of a visual effect (see Section 3.35, GLVIA3). A wide range of factors, mitigating or otherwise, can factor into such a determination, and it is not possible to capture the complexity involved in balancing all considerations within the necessarily limited definitions contained in these tables. This then naturally results in circumstances whereby the process of the determination of significance using the formulaic method involved with the matrix shown in Table 1-6 can result in misrepresentations of the significance of visual effects. It is only with professional judgement, and narrative descriptions of effect, that such complexity can be integrated into the determination of significance. Therefore, the formulaic methods based upon the matrix presented above is combined with professional judgement in the determination of significance. This is illustrated in Figure 1-2 below where the professional judgment of the competent expert is used to properly determine the significance of an effect taking all considerations into account.

A focus is placed upon the narrative description of effects (see Section 3.36, GLVIA3) given the naturally subjective nature of the significance determination process, particularly in relation to visual effects, ensuring that the rationale for the overall judgement is clear (see Sections 3.28-3.29, GLVIA3). The comprehensive assessment of photomontages included in Appendix 13-3 aims to provide a transparent and robust determination of residual visual effects utilising the graph in Figure 1-2 in combination with a clear and logical narrative.

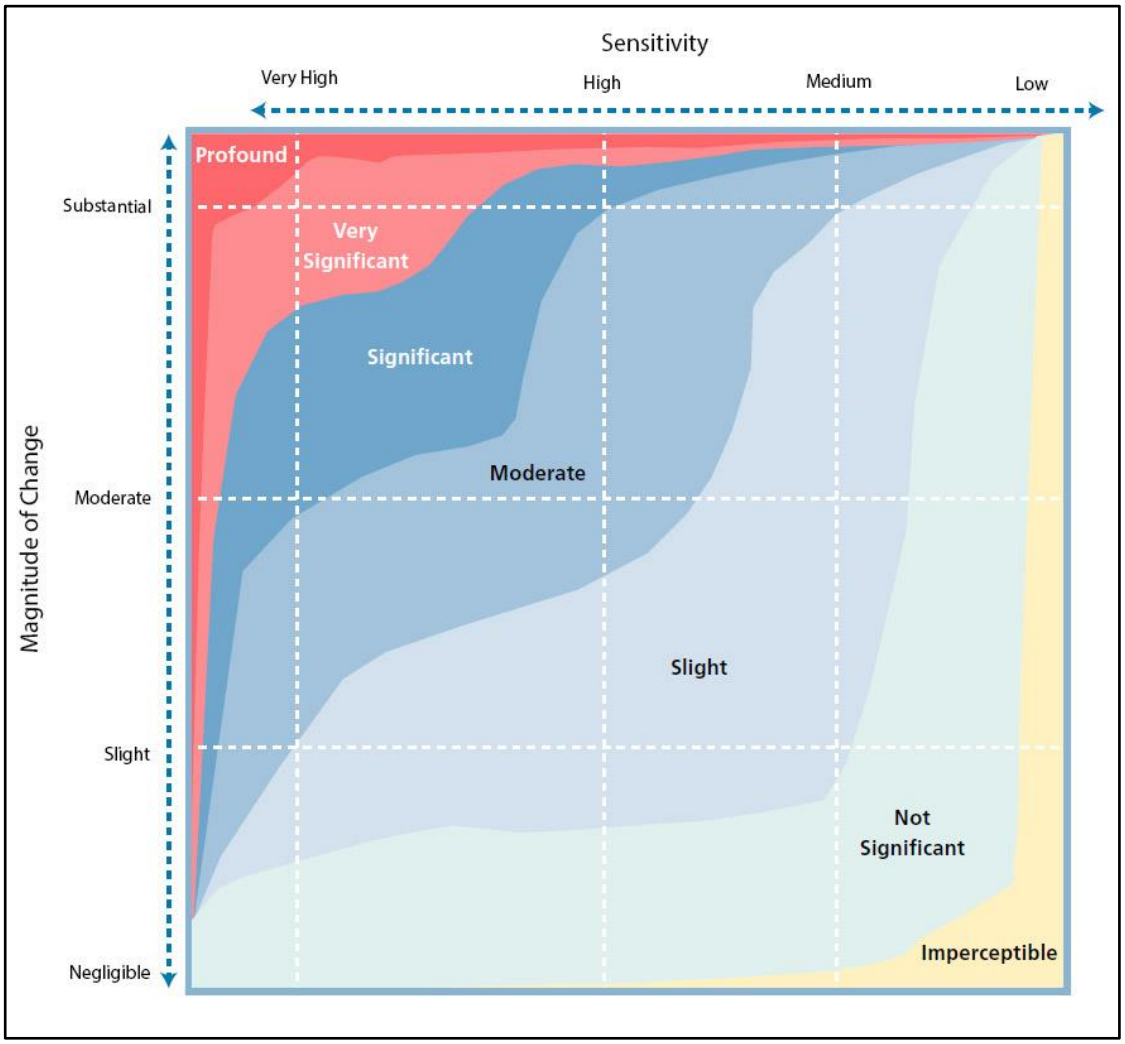

Figure 1-2 Visual Effect Significance Graph (adapted from EPA, 2022)

1.5.5 Assessing Cumulative Landscape and Visual Effects

1.5.5.1 Cumulative Landscape Effects

The Nature Scot 2021 publication *Assessing the Cumulative Landscape and Visual Impact of Onshore Wind Energy Developments* identifies two principal areas of cumulative landscape effects, on the physical fabric of the landscape and on the landscape character, which state:

- *"Cumulative effects on the **physical fabric** of the landscape arise when two or more developments affect landscape components such as woodland, dykes, rural roads or hedgerows. Although this may not significantly affect the landscape character, the cumulative effect on these components may be significant – for example, where the last remnants of former shelterbelts are completely removed by two or more developments.*
- *Cumulative effects on **landscape character** arise when two or more developments introduce new features into the landscape. In this way, they can change the landscape character to such an extent that they create a different landscape character type, in a similar way to large scale afforestation. That change need not be adverse; some derelict or degraded landscapes may be enhanced as a result of such a change in landscape character."*

Potential changes to the physical fabric outlined above are predominantly restricted to the Site and the LCA in which the Proposed Wind Farm turbines are located. Therefore, these landscape receptors will be assessed for cumulative landscape effects on the physical fabric of the landscape arising from the Proposed Wind Farm.

Cumulative effects on the landscape character will be assessed in the Landscape Character Areas (LCAs) that have theoretical visibility of the Proposed Wind Farm turbines with particular emphasis on the LCA in which the proposed turbines will be located.

Cumulative landscape effects are discussed in a separate row within the LCA Assessment Tables in Appendix 13-2 with any cumulative effects on landscape character arising incorporated within the magnitude of change determination made within those tables. Cumulative landscape effects are also discussed and summarised in the LVIA Chapter of the EIAR.

1.5.5.2 Cumulative Visual Effects

For this assessment, the Nature Scot (2021) definition of cumulative effects as *"additional changes caused by a proposed project in conjunction with other similar developments*", is used, however, this assessment also considers other types of developments. The definition in the Guidelines defines cumulative impacts in terms of wind farms, as the perceived effect on the landscape of two or more wind energy developments visible from any one place.

GLVIA3 and Nature Scot (2021) guidance also note that cumulative visual effects can be experienced **in combination**, where two or more developments are visible from one viewpoint, either **simultaneously** or **in succession** and these are considered in the assessment of visual effects from photomontage viewpoints in Appendix 13-3.

Another type of cumulative visual effect includes where two or more developments are seen **sequentially**, where a viewer moves to another viewpoint or along a transport or recreational route and sees the same or different developments. The photomontage viewpoints illustrate combined visibility and analysis of the photomontages, route screening, as well as site visits and field work undertaken allows sequential visibility to be assessed.

The guidance on cumulative effects in relation to the Proposed Wind Farm is as follows:

- *"Similarity in the siting and design approach is preferred where a number of wind energy developments are located in the same landscape character area, particularly within the same viewshed. However, an alternative approach where a particular aesthetic effect is sought may be acceptable.*
- *Different wind energy developments can appear as a single collective unit if located near each other.*
- *It is preferable to avoid locating turbines where they can be seen one behind another, when viewed from highly sensitive key viewpoints (for example, viewing points along walking or scenic routes, or from designated views or prospects), as this results in visual stacking and, thus, confusion. This may not be critical, however, where the wind energy development to the rear is in the distant background.*
- *Wind energy developments within relatively close proximity to one another, while in different landscape character contexts, may be so close as to be within the same visual unit and, therefore, should involve the same siting and design approach."*

The SNH 2017 publication *Siting and Designing Wind Farms in the Landscape* states that *'introducing turbines that are not similar in form, design, colour and scale may increase visual complexity and clutter'*.

Therefore, the cumulative assessment will concentrate on the following issues:

- Whether the Proposed Wind Farm turbines increase the spatial extent of turbines in the view
- Whether the different wind energy developments can appear as a single collective unit or there is separation
- Whether 'visual stacking' occurs
- Whether the contrast of different size and design between different wind developments creates visual clutter.

As cumulative visual effects depend on the aspect from which the turbines will be seen various viewpoints were selected to give a thorough overview of the how the Proposed Wind Farm turbines will appear in conjunction to turbines already present, permitted or proposed.

Cumulative visual effects are discussed in a separate row within the viewpoint assessment tables in Appendix 13-3 with any cumulative effects on landscape character arising incorporated within the magnitude of change determination made within those tables. Cumulative visual effects are also discussed and summarised in the LVIA Chapter of the EIAR.

There are several singular turbines located within the LVIA Study Area. Whilst it is acknowledged these singular turbines exist, due to the distance beyond 5km and the height of the singular turbines below 50m, these turbines have been scoped out from assessment. There is no potential for significant cumulative effects to arise between these singular turbines and the Proposed Project due to scale and set back distance. Other wind energy developments within 20 km of the Proposed Wind Farm turbines were identified by searching past planning applications lodged through the various planning authorities (Kilkenny County Council, Tipperary County Council and An Bord Pleanála) online planning portals. The information identified in the initial planning search was then used to verify, by means of a desk-based study and ground-truthing, whether the permitted wind energy developments had been constructed.

1.5.5.3 Reporting of Cumulative Effects in the LVIA: Chapter 13 and Impact Assessment Appendices

Discussion and assessment of cumulative landscape and visual effects are reported in the following locations of Chapter 13 in this EIAR:

- Section 13.6 of Chapter 13 – *Cumulative Context*:

- This section of Chapter 13 provides an overview of the other developments likely to contribute to cumulative effects in combination with the Proposed Wind Farm in the LVIA Study Area and the various cumulative scenarios which are likely to occur in existing and future receiving environments.
- This Section provides an overview of the assessment methodology and cumulative ZTV mapping;

- Appendix 13-2: *LCA Assessment Tables:*
  - This Appendix assesses the likely significant effects of the Proposed Wind Farm on designated LCAs, with a specific assessment table for each designated LCA scoped in for assessment.
  - One row in each table is dedicated to the likely cumulative landscape effects arising in each LCA in combination with the Proposed Wind Farm and is factored into the overall rating of significance of impacts on each LCA.
- Appendix 13-3: *Photomontage Assessment Tables:*
  - This Appendix assesses the likely significant visual effects of the Proposed Wind Farm from photomontage viewpoints, with a specific assessment table for each viewpoint.
  - The Cumulative Effects row is dedicated to the discussion and assessment of likely cumulative visual effects as seen in the photomontages from each viewpoint.
  - Potential for cumulative visual effects are factored into the 'Magnitude of Change' determination for each viewpoint which has the potential to alter the outcome of the visual impact assessment and the determination of likely significant effects for each viewpoint (See methodology criteria previously in Section 1.5.2 and 1.5.3).
- Section 13.7.3.2 of Chapter 13 – Cumulative Landscape Effects:
  - This section includes discussion of interactions of the Proposed Wind Farm with other wind energy developments within the landscape including an overview of relevant of the cumulative assessments on LCAs reported in Appendix 13-2.
- Section 13.7.3.4 of Chapter 13 – Cumulative Visual Effects:
  - This section includes discussion of visual interactions of the Proposed Wind Farm with other wind energy developments including an overview of relevant of the cumulative assessments as shown in the photomontages reported in Appendix 13-3.

The effects reported both in Chapter 13 and within the assessment appendices (Appendix 13-2: LCA Assessment Tables; Appendix 13-3: Photomontage Assessment Tables) uses appropriate and logical narrative to discuss cumulative interactions between the Proposed Wind Farm and all other wind energy developments irrespective of which category (Existing; Permitted; Proposed (and Proposed pre-planning)) they occur in. Discussion of cumulative interactions on specific landscape and visual receptors is relative to the effects on that receptor and proportionate to the likelihood of significant landscape and visual effects occurring. Discussion and the impact assessments also considers the probability of such cumulative effects arising in mind of the category of the other developments with which the Proposed Wind Farm interacts, meaning 'Existing', 'Permitted' or 'Proposed' (and Pre-Planning).

Assessment of cumulative landscape and visual effects need to be proportional. The focus is always on the extent to which the Proposed Wind Farm will contribute towards the cumulative effects on the particular receptors under assessment, these contributions are clearly explained in narrative in the cumulative impact assessments included in the Chapter (Sections 13.7.3.2 and 13.7.3.4), as well as the impact assessment Appendices (Appendix 13-2 and Appendix 13-3).