FEHILY TIMONEY
30 YEARS

CONSULTANTS IN ENGINEERING, ENVIRONMENTAL SCIENCE & PLANNING

ENVIRONMENTAL IMPACT ASSESSMENT REPORT (EIAR) FOR THE PROPOSED CROAGHAUN WIND FARM, CO. CARLOW

VOLUME 2 – MAIN EIAR

CHAPTER 15 – LANDSCAPE AND VISUAL

Prepared for: Coillte

COILLTE
GROW · TRANSFORM · SUSTAIN

Date: December 2020

Core House, Pouladuff Road, Cork
T12 D773, Ireland

T: +353 21 496 4133 E: info@ftco.ie

CORK | DUBLIN | CARLOW

www.fehilytimoney.ie

TABLE OF CONTENTS

15. LANDSCAPE AND VISUAL 1

15.1 Introduction 1

15.1.1 Statement of Authority 1

15.1.2 Description of the Proposed Project 2

15.1.3 Definition of Study Area 3

15.2 Assessment Methodology 4

15.2.1 Desktop Study 4

15.2.2 Fieldwork 4

15.2.3 Appraisal 4

15.2.4 Assessment Criteria for Landscape Impact 5

15.2.5 Assessment Criteria For Visual Impact 7

15.2.6 Visual Impact Significance 11

15.3 Existing Environment 11

15.3.1 Landscape Baseline 11

15.3.2 Landscape Policy Context and Designations 16

15.4 Visual Baseline 29

15.4.1 Zone of Theoretical Visibility (ZTV) 29

15.4.2 Route Screening Analysis 31

15.4.3 Visual Receptors 36

15.4.4 Identification of Viewshed Reference Points as a Basis for Assessment 44

15.5 Potential Impacts 49

15.6 Mitigation Measures 49

15.6.1 Mitigation by Avoidance and Design 50

15.6.2 Buffering of Residential Receptors 51

15.7 Residual Landscape Effects 52

15.7.1 Landscape, Character, Value and Sensitivity 52

15.7.2 Magnitude of Landscape Impacts 55

15.7.3 Significance of Potential Landscape Impacts 58

15.8 Residual Visual Effects 58

15.8.1 Summary of Visual Impacts 60

15.9 Do Nothing Scenario 62

15.10 Cumulative Impacts 62

15.10.1 Cumulative Baseline 64

15.10.2 Cumulative Impacts 64

LIST OF APPENDICES

15.1: Viewpoint Assessments

15.2: A1 Mapping

LIST OF FIGURES

Page

Figure 15.1: Aerial photograph showing the landscape context of the site and its immediate surrounds. ..12
Figure 15.2: Terrain shadow map illustrating the nature of the landform contained within the study area. ... .14
Figure 15.3: Aerial photography showing the landscape context of the wider study area.....15
Figure 15.4: Excerpt from Carlow County Landscape Character Assessment, figure 5 showing approximate location of proposed development in relation to principal landscape character areas. 20
Figure 15.5: Excerpt from Carlow County Landscape Character Assessment, figure 6 showing approximate location of proposed site in relation to principal landscape types.....20
Figure 15.6: Excerpt from Carlow County Landscape Character Assessment, fig. 4 showing approximate location of proposed site in relation to landscape sensitivities. 21
Figure 15.7: Excerpt from Map No: 13 of the current Wexford County Development Plan 2013-2019 showing landscape units in County Wexford in relation to the proposed development. 22
Figure 15.8: Excerpt from the current Wicklow CDP identifying the generally 'low' landscape sensitivity designations adjacent to the Wicklow – Carlow county bounds.....23
Figure 15.9: Excerpt from the current Wicklow CDP identifying landscape sensitivities adjacent to the Kilkenny – Carlow county bounds.....25
Figure 15.10: Excerpt from page 41 of the current Carlow Wind Energy Strategy identifying wind energy development 'preferred locations' and areas 'open for consideration' in relation to the proposed wind farm development. 27
Figure 15.11: Map 11 of the current Carlow Wind Energy Strategy showing Areas open for consideration in relation to the proposed wind farm development. 28
Figure 15.12: ZTV Map (Tip Height) for Croaghaun Wind Farm (See Appendix 15.2 for full scale annotated ZTV maps) 30
Figure 15.13: Route Screening Analysis (RSA) Map 32
Figure 15.14: Graph illustrating results of Route Screening Analysis 33
Figure 15.15: Map of Route Screening Analysis for 'Open Views' 35
Figure 15.16: Graph illustrating RSA results for 'Open Views' 36
Figure 15.17: Map showing designated views in Carlow, Wicklow and Kilkenny overlaid on ZTV pattern 39
Figure 15.18: Map of Viewpoint Locations 48
Figure 15.19: Reverse ZTV from the settlement of Myshall for early stage design. Note turbines outside of the ZTV pattern will not be visible from the selected receptor 51
Figure 15.20: Turbine 'scale in relation to distance' relationship 52

LIST OF TABLES

Page

Table 15.1: Landscape Value and Sensitivity 5
Table 15.2: Magnitude of Visual Impacts 6
Table 15.3: Impact Significance Matrix 7
Table 15.4: Magnitude of Visual Impact 10
Table 15.5: Rationale for selection of scenic designations within the Carlow County Development Plan 40
Table 15.6: Rational for selection of scenic designations within the Wicklow County Development Plan 43
Table 15.7: Rationale for selection of scenic designations within the Kilkenny County Development Plan 44
Table 15.8: Description of selected Viewshed Reference Points (VRPs) 46
Table 15.9: Summary of Visual Effects at Viewshed Reference Points (VRP's) 58
Table 15.10: Outline Magnitude of cumulative impact 63
Table 15.11: Cumulative Wind Farms within the Study Area 64
Table 15.12: Nature of Cumulative Visibility 65

15. LANDSCAPE AND VISUAL

15.1 Introduction

This chapter describes the landscape context of the proposed Croaghaun Wind Farm and assesses the likely landscape and visual impacts of the scheme on the receiving environment. Although closely linked, landscape and visual impacts are assessed separately.

Landscape Impact Assessment (LIA) relates to changes in the physical landscape brought about by the proposed development which may alter its character, and how this is experienced. This requires a detailed analysis of the individual elements and characteristics of a landscape that go together to make up the overall landscape character of that area. By understanding the aspects that contribute to landscape character, it is possible to make judgements in relation to its quality (integrity) and to identify key sensitivities. This, in turn, provides a measure of the ability of the landscape in question to accommodate the type and scale of change associated with the proposed development without causing unacceptable adverse changes to its character.

Visual Impact Assessment (VIA) relates to assessing effects on specific views and on the general visual amenity experienced by people. This deals with how the surroundings of individuals or groups of people may be specifically affected by changes in the content and character of views as a result of the change or loss of existing elements of the landscape and/or introduction of new elements. Visual impacts may occur from; Visual Obstruction (blocking of a view, be it full, partial or intermittent) or; Visual Intrusion (interruption of a view without blocking).

Cumulative landscape and visual impact assessment is concerned with additional changes to the landscape or visual amenity caused by the proposed development in conjunction with other developments (associated or separate to it), or actions that occurred in the past, present or are likely to occur in the foreseeable future.

This LVIA uses methodology as prescribed in the following guidance documents:

- Environmental Protection Agency (EPA) publication 'Guidelines on the Information to be contained in Environmental Impact Statements (Draft 2017) and the accompanying Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (Draft 2015).
- Landscape Institute and the Institute of Environmental Management and Assessment publication entitled Guidelines for Landscape and Visual Impact Assessment – Third Addition (2013).
- Scottish Natural Heritage (SNH) Guidance Note: Cumulative Effect of Wind Farms (2012).
- Department of the Environment, Heritage and Local Government Wind Energy Development Guidelines (2006).
- Scottish Natural Heritage (SNH) Visual representation of wind farms: Best Practice Guidelines (version 2.2 - 2017).

15.1.1 Statement of Authority

This Landscape and Visual Assessment (LVIA) report was prepared by Richard Barker (MLA MILI) and Cian Doughan (BSLA MILI) of Macro Works Ltd Macro Works Ltd, is a specialist LVIA company with over 20 years of experience in the appraisal of effects from a variety of energy, infrastructure and commercial developments.

Relevant experience includes LVIA work on over 140 on-shore wind farm proposals throughout Ireland, including six Strategic Infrastructure Development (SID) wind farms. Macro Works and its senior staff members are affiliated with the Irish landscape Institute.

15.1.2 Description of the Proposed Project

A detailed description of the project assessed in this EIAR is provided in Chapter 3 and is comprised of three main elements:

- The wind farm (hereinafter referred to as the **'the site'**);
- Turbine delivery route (hereinafter referred to as the **'turbine delivery route'** or **'TDR'**);
- Grid connection (hereinafter referred to as the **'grid connection'**.

The main wind farm site includes the wind turbines, internal access tracks, hard standings, the permanent meteorological mast, recreational amenity trail and associated signage, onsite substation, internal electrical and communications cabling, temporary construction compound, drainage infrastructure and all associated works related to the construction of the wind farm. The grid connection includes the buried grid connection cable route from the on-site substation to the existing grid substation at Kellistown, Co. Carlow and the proposed off-site substation, also at Kellistown. The turbine delivery route includes all aspects of the route from the M11/N30 junction to the site entrance including proposed temporary accommodation works to facilitate the delivery of wind turbine components. Replanting lands at Sroove Co. Sligo and Crag Co. Limerick have also been assessed for cumulative impacts. Reports detailing environmental assessments carried out on these sites are contained in Appendix 3.3 and 4.4 of this EIAR.

In summary the proposed project will consist of the following:

- Erection of up to 7 no. wind turbines with a tip height of up to 178m;
- Construction of turbine foundations and crane pad hardstanding areas;
- Construction of new site tracks and associated drainage infrastructure;
- Upgrading of existing tracks and associated drainage infrastructure where necessary;
- All associated drainage and sediment control;
- Installation of new watercourse or drain crossings;
- Re-use or upgrading of existing internal watercourse and drain crossings;
- Construction of 1 no. onsite 38kV electrical substation to ESBN specifications and associated compounds including:
    - Welfare facilities;
    - Electrical infrastructure;
    - Parking;
    - Wastewater holding tank;
    - Rainwater harvesting;
    - Security fencing;
    - All associated infrastructure, services and site works including landscaping;

- Construction of 1 no. off-site electrical substation to ESBN specifications and associated compounds at Kellistown substation including:
    - Control building with welfare facilities;
    - Electrical infrastructure;
    - Parking;
    - Wastewater holding tank;
    - Rainwater harvesting;
    - Security fencing.;
    - All associated infrastructure, services and site works including landscaping.
- Temporary accommodation works associated with the Turbine Delivery Route to facilitate the delivery of turbine components including a temporary bridge crossing at Kilbranish;
- 1 no. Temporary construction site compound and associated ancillary infrastructure including parking;
- 1 no. on site borrow pit (the borrow pit shall be accessed via wind farm access tracks);
- Tree felling and associated replanting to facilitate construction and operation of the proposed development;
- Installation of medium voltage (20/33kV) and communication underground cabling between the proposed turbines and the proposed on-site substation and associated ancillary works;
- Installation of 38kV underground cabling and ducting between the proposed on-site substation and the existing Kellistown substation and associated ancillary works. The proposed grid connection cable works will include 9 no. existing watercourse and drain crossings and the installation of up to 42 no. pre-cast joint bays;
- Erection of 1 no. permanent meteorological mast to a maximum height of 100m above ground level;
- Upgrade of existing forest tracks and paths that shall be re-purposed as recreational amenity trails for community use.

15.1.3 Definition of Study Area

The Wind Energy Development Guidelines (current 2006 – Draft Revised 2019) published by the Department of the Environment, Heritage and Local Government specify different radii for examining the zone of theoretical visibility of proposed wind farm projects (ZTV). The extent of this search area is influenced by turbine height, as follows:

- 15 km radius for blade tips up to 100m;
- 20 km radius for blade tips greater than 100m and;
- 25 km radius where landscapes of national and international importance exist.

In the case of this project, the blade tips are up to 178m high and, thus, the minimum ZTV radius recommended is 20 km from the outermost turbines of the scheme. However, Vinegar Hill is located just over c.22km southeast of the site, and consequently as per the 2006 guidance, it is recommended to include that receptor within the study even though it falls outside of the principle study area.

Notwithstanding the full 20km extent of the LVIA study area, there will be a particular focus on receptors and effects within the central study area where there is higher potential for significant impacts to occur. When referenced within this assessment, the 'central study area' is the landscape within 5km of the site.

15.2 Assessment Methodology

Production of this Landscape and Visual Impact Assessment involved baseline work in the form of desktop studies and fieldwork comprising professional evaluation by qualified and experienced Landscape Architects as detailed in the preceding Statement of Authority. This entailed the following:

15.2.1 Desktop Study

- Establishing an appropriate Study Area from which to study the landscape and visual impacts of the proposed wind farm;
- Review of a Zone of Theoretical Visibility (ZTV) map, which indicates areas from which the project is potentially visible in relation to terrain within the Study Area;
- Review of relevant County Development Plans, particularly with regard to sensitive landscape and scenic view/route designations;
- Selection of potential Viewshed Reference Points (VRPs) from key visual receptors to be investigated during fieldwork for actual visibility and sensitivity;

15.2.2 Fieldwork

- Recording of a description of the landscape elements and characteristics within the Study Area.
- Selection of a refined set of VRP's for assessment. This includes the capture of reference images and grid reference coordinates for each VRP location for the visualisation specialist to prepare photomontages.

15.2.3 Appraisal

- Consideration of the receiving landscape with regard to overall landscape character as well as the salient features of the study area including landform, drainage, vegetation, land use and landscape designations.
- Consideration of the visual environment including receptor locations such as centres of population and houses; transport routes; public amenities, facilities and heritage features and; designated and recognised views of scenic value.
- Consideration of design guidance and planning policies.
- Consideration of potentially significant effects and the mitigation measures that could be employed to reduce such effects.
- Estimation of the significance of residual landscape impacts.

- Estimation of the significance of residual visual impacts aided by photomontages prepared at all of the selected VRP locations.
- Estimation of cumulative landscape and visual effects in combination with other surrounding developments that are either existing or permitted.

15.2.4 Assessment Criteria for Landscape Impact

The classification system used by Macro Works to determine the significance of landscape and visual impacts is based on the IEMA Guidelines for Landscape and Visual Impact Assessment (2013). When assessing the potential impacts on the landscape resulting from a wind farm development, the following criteria are considered:

- Landscape character, value and sensitivity
- Magnitude of likely impacts; and
- Significance of landscape effects

The sensitivity of the landscape to change is the degree to which a particular landscape receptor (Landscape Character Area (LCA) or feature) can accommodate changes or new features without unacceptable detrimental effects to its essential characteristics. Landscape Value and Sensitivity is classified using the following criteria outlined **Table 15.1** below:

Table 15.1: Landscape Value and Sensitivity

Sensitivity	Description
Very High	Areas where the landscape character exhibits a very low capacity for change in the form of development. Examples of which are high value landscapes, protected at an international or national level (World Heritage Site/National Park), where the principal management objectives are likely to be protection of the existing character.
High	Areas where the landscape character exhibits a low capacity for change in the form of development. Examples of which are high value landscapes, protected at a national or regional level (Area of Outstanding Natural Beauty), where the principal management objectives are likely to be considered conservation of the existing character.
Medium	Areas where the landscape character exhibits some capacity and scope for development. Examples of which are landscapes, which have a designation of protection at a county level or at non-designated local level where there is evidence of local value and use.
Low	Areas where the landscape character exhibits a higher capacity for change from development. Typically this would include lower value, non-designated landscapes that may also have some elements or features of recognisable quality, where landscape management objectives include, enhancement, repair and restoration.
Negligible	Areas of landscape character that include derelict, mining, industrial land or are part of the urban fringe where there would be a reasonable capacity to embrace change or the capacity to include the development proposals. Management objectives in such areas could be focused on change, creation of landscape improvements and/or restoration to realise a higher landscape value.

The magnitude of a predicted landscape impact is a product of the scale, extent or degree of change that is likely to be experienced as a result of the proposed development. The magnitude takes into account whether there is a direct physical impact resulting from the loss of landscape components and/or a change that extends beyond the proposal site boundary that may have an effect on the landscape character of the area. **Table 15.2** refers:

Table 15.2: Magnitude of Visual Impacts

Magnitude of Impact	Description
Very High	Change that would be large in extent and scale with the loss of critically important landscape elements and features, that may also involve the introduction of new uncharacteristic elements or features that contribute to an overall change of the landscape in terms of character, value and quality.
High	Change that would be more limited in extent and scale with the loss of important landscape elements and features, that may also involve the introduction of new uncharacteristic elements or features that contribute to an overall change of the landscape in terms of character, value and quality.
Medium	Changes that are modest in extent and scale involving the loss of landscape characteristics or elements that may also involve the introduction of new uncharacteristic elements or features that would lead to changes in landscape character, and quality.
Low	Changes affecting small areas of landscape character and quality, together with the loss of some less characteristic landscape elements or the addition of new features or elements.
Negligible	Changes affecting small or very restricted areas of landscape character. This may include the limited loss of some elements or the addition of some new features or elements that are characteristic of the existing landscape or are hardly perceivable.

The significance of a landscape impact is based on a balance between the sensitivity of the landscape receptor and the magnitude of the impact. The significance of landscape impacts is arrived at using the following matrix set out in Table 15.3.

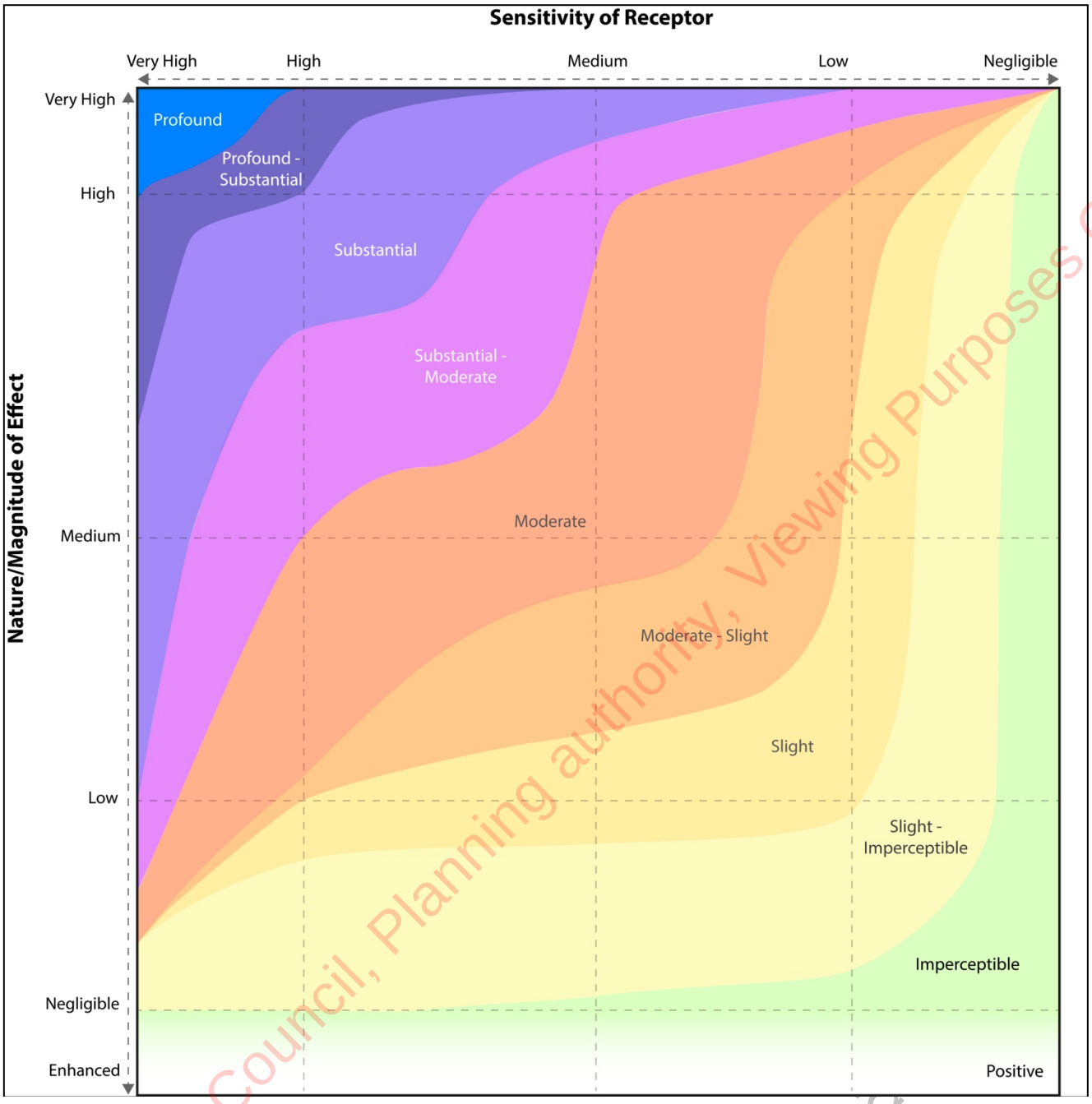


Table 15.3: Impact Significance Matrix

** Note: Judgements deemed 'substantial' and above are considered to be 'significant impacts' in EIA terms.*

15.2.5 Assessment Criteria For Visual Impact

As with the landscape impact, the visual impact of the proposed wind farm will be assessed as a function of receptor sensitivity versus magnitude. In this instance, the sensitivity of visual receptors, weighed against the magnitude of visual effects.

15.2.5.1 Visual sensitivity

Unlike landscape sensitivity, visual sensitivity has an anthropocentric basis. Visual sensitivity is a two-sided analysis of receptor susceptibility (people or groups of people) versus the value of the view on offer at a particular location.

To assess the susceptibility of viewers and the amenity value of views, the assessors use a range of criteria and provide a four point weighting scale to indicate how strongly the viewer/view is associated with each of the criterion. Susceptibility criteria is extracted directly from the IEMA Guidelines for Landscape and Visual Assessment (2013), whilst the value criteria relate to various aspects of a view that might typically be related to high amenity including, but not limited to, scenic designations. These are set out below:

- **Susceptibility of receptor group to changes in view**. This is one of the most important criteria to consider in determining overall visual sensitivity because it is the single category dealing with viewer susceptibility. In accordance with the IEMA Guidelines for Landscape and Visual Assessment (3rd edition 2013) visual receptors most susceptible to changes in views and visual amenity are;
- *Residents at home;*
- *People, whether residents or visitors, who are engaged in outdoor recreation, including use of public rights of way, whose attention or interest is likely to be focused on the landscape and on particular views;*
- *Visitors to heritage assets, or to other attractions, where views of the surroundings are an important contributor to the experience;*
- *Communities where views contribute to the landscape setting enjoyed by residents in the area; and*
- *Travelers on road rail or other transport routes where such travel involves recognised scenic routes and awareness of views is likely to be heightened.*

Visual receptors that are less susceptible to changes in views and visual amenity include;

- *People engaged in outdoor sport or recreation, which does not involve or depend upon appreciation of views of the landscape; and*
- *People at their place of work whose attention may be focused on their work or activity, not their surroundings and where the setting is not important to the quality of working life.*
- **Recognised scenic value of the view** (County Development Plan designations, guidebooks, touring maps, postcards etc.). These represent a consensus in terms of which scenic views and routes within an area are strongly valued by the population because in the case of County Development Plans, at least, a public consultation process is required;
- **Views from within highly sensitive landscape areas**. Again, highly sensitive landscape designations are usually part of a county's Landscape Character Assessment, which is then incorporated with the County Development Plan and is therefore subject to the public consultation process. Viewers within such areas are likely to be highly attuned to the landscape around them;
- **Intensity of use, popularity**. Whilst not reflective of the amenity value of a view, this criterion relates to the number of viewers likely to experience a view on a regular basis and whether this is significant at county or regional scale;

- **Connection with the landscape**. This considers whether or not receptors are likely to be highly attuned to views of the landscape i.e. commuters hurriedly driving on busy national route versus hill walkers directly engaged with the landscape enjoying changing sequential views over it;
- **Provision of elevated panoramic views**. This relates to the extent of the view on offer and the tendency for receptors to become more attuned to the surrounding landscape at locations that afford broad vistas.
- **Sense of remoteness and/or tranquility**. Remote and tranquil viewing locations are more likely to heighten the amenity value of a view and have a lower intensity of development in comparison to dynamic viewing locations such as a busy street scene, for example;
- **Degree of perceived naturalness**. Where a view is valued for the sense of naturalness of the surrounding landscape it is likely to be highly sensitive to visual intrusion by obvious human interventions;
- **Presence of striking or noteworthy features**. A view might be strongly valued because it contains a distinctive and memorable landscape feature such as a promontory headland, lough or castle;
- **Historical, cultural or spiritual value**. Such attributes may be evident or sensed at certain viewing locations that attract visitors for the purposes of contemplation or reflection heightening the sense of their surroundings;
- **Rarity or uniqueness of the view**. This might include the noteworthy representativeness of a certain landscape type and considers whether other similar views might be afforded in the local or the national context;
- **Integrity of the landscape character in view**. This criterion considers the condition and intactness of the landscape in view and whether the landscape pattern is a regular one of few strongly related components or an irregular one containing a variety of disparate components;
- **Sense of place**. This criterion considers whether there is special sense of wholeness and harmony at the viewing location; and
- **Sense of awe**. This criterion considers whether the view inspires an overwhelming sense of scale or the power of nature.

Those locations where highly susceptible receptors or receptor groups are present and which are deemed to satisfy many of the view value criteria above are likely to be judged to have a high visual sensitivity and vice versa.

15.2.5.2 Visual Impacts Magnitude

The magnitude of visual effects is determined on the basis of two factors; the visual presence of the proposal and its effect on visual amenity.

Visual presence is a somewhat quantitative measure relating to how noticeable or visually dominant the proposal is within a particular view. This is based on a number of aspects beyond simply scale in relation to distance. Some of these include the extent of the view as well as its complexity and the degree of existing contextual movement experienced such as might occur where turbines are viewed as part of / beyond a busy street scene. The backdrop against which the project is presented and its relationship with other focal points or prominent features within the view is also considered.

Visual presence is essentially a measure of the relative visual dominance of the proposal within the available vista and is expressed as such i.e. minimal, sub-dominant, co-dominant, dominant, highly dominant.

For wind energy developments, a strong visual presence is not necessarily synonymous with adverse impact. Instead, the 2012 Fáilte Ireland survey entitled 'Visitor Attitudes On The Environment – Wind Farms' found that *"Compared with other types of development in the Irish landscape, wind farms elicited a positive response when compared to telecommunication masts and steel electricity pylons"*…. and that *"most* (tourists) *felt that their presence did not detract from the quality of their sightseeing, with the largest proportion (45%) saying that the presence of the wind farm had a positive impact on their enjoyment of sightseeing…*". The purpose here is not to suggest that turbines are either inherently liked or disliked, but rather to highlight that the assessment of visual impact magnitude for wind turbines is more complex than just the degree to which turbines occupy a view. Furthermore, a clear and comprehensive view of a wind farm might be preferable in many instances to a partial, cluttered view of turbine components that are not so noticeable within a view. On the basis of these reasons, the visual amenity aspect of assessing impact magnitude is qualitative and considers such factors as the spatial arrangement of turbines both within the scheme and in relation to surrounding terrain and land cover. It also examines whether the project contributes positively to the existing qualities of the vista or results in distracting visual effects and disharmony.

It should be noted that as a result of this two-sided analysis, a high order visual presence can be moderated by a low level of effect on visual amenity and vice versa. Given that wind turbines do not represent significant bulk, visual impacts result almost entirely from visual 'intrusion' rather than visual 'obstruction' (the blocking of a view). The magnitude of visual impacts is classified in the following table:

Table 15.4: Magnitude of Visual Impact

Criteria	Description
Very High	The proposal intrudes into a large proportion or critical part of the available vista and is without question the most noticeable element. A high degree of visual clutter or disharmony is also generated, strongly reducing the visual amenity of the scene
High	The proposal intrudes into a significant proportion or important part of the available vista and is one of the most noticeable elements. A considerable degree of visual clutter or disharmony is also likely to be generated, appreciably reducing the visual amenity of the scene
Medium	The proposal represents a moderate intrusion into the available vista, is a readily noticeable element and/or it may generate a degree of visual clutter or disharmony, thereby reducing the visual amenity of the scene. Alternatively, it may represent a balance of higher and lower order estimates in relation to visual presence and visual amenity
Low	The proposal intrudes to a minor extent into the available vista and may not be noticed by a casual observer and/or the proposal would not have a marked effect on the visual amenity of the scene
Negligible	The proposal would be barely discernible within the available vista and/or it would not detract from, and may even enhance, the visual amenity of the scene

15.2.6 Visual Impact Significance

As stated above, the significance of visual impacts is a function of visual receptor sensitivity and visual impact magnitude. This relationship is expressed in the same significance matrix included for Landscape Impact Significance at
Table 15.3.

15.3 Existing Environment

15.3.1 Landscape Baseline

The landscape baseline represents the existing landscape context and is the scenario against which any changes to the landscape brought about by the proposal will be assessed. This also includes reference to any relevant landscape character appraisals and the current landscape policy context (both are generally contained within County Development Plans).

A description of the landscape context of the proposed wind farm site and wider study area is provided below under the headings of landform and drainage and vegetation and land use. Centres of population, transport routes and tourism, recreation and heritage features form part of the visual baseline and are dealt with in Section 15.4 below.

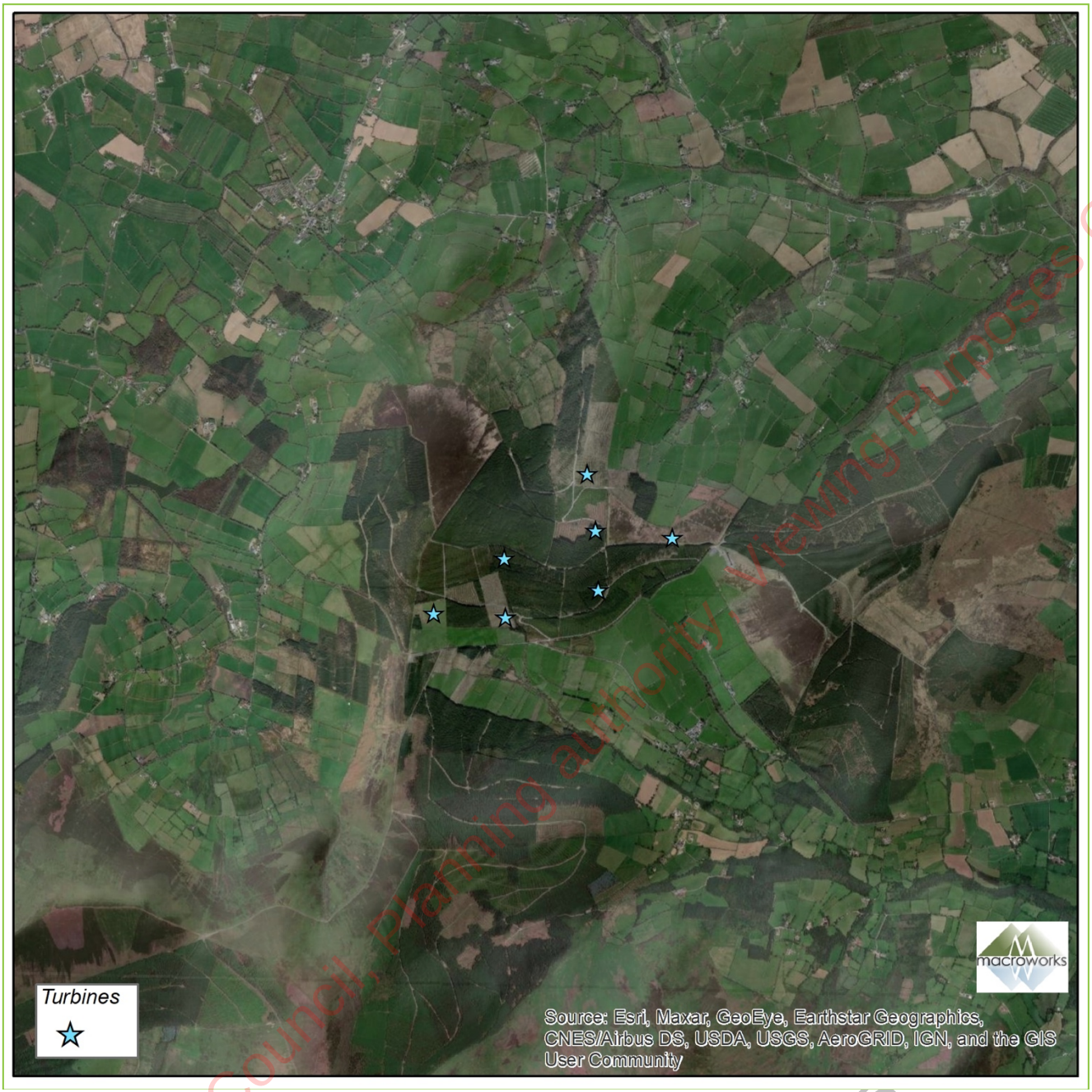


Figure 15.1: Aerial photograph showing the landscape context of the site and its immediate surrounds.

15.3.1.1 Landform and Drainage

Situated in the northern foothills of the Blackstairs Mountains, the proposed wind farm development extends across Croaghaun Hill, which rises to a max elevation of 455m AOD. North and west of site the terrain swiftly descends towards the lowland context of County Carlow, whilst a collection of rolling hills at similar elevations occur immediately east of the main wind farm site and includes Kilbranish Hill, Greenoge and Johns Hill. Immediately south of the site the terrain transitions to the principal ridgeline associated with the Blackstairs Mountains which is oriented in a general north-south direction and denotes the county boundary between Carlow and Wexford. Mount Leinster is the highest peak in the Blackstairs rising to a height of 794m AOD and begins to ascend from its foothills c.2km south of the proposal site.

Other notable peaks and hills in the immediate surrounds of Mount Leinster include Blackrock Mountain (599m AOD), Slievebawn (524m AOD), and Knockroe (540m AOD).

Emerging from the northern slopes of Mount Leinster, the Burren river and several of its tributaries flow immediately south and west of Croaghaun Hill whilst the River Clody and its tributaries flow to the east of Mount Leinster and its surrounding hills, before merging with the River Slaney at the settlement of Bunclody. The River Clashavey also emerges immediately north of the site and empties into the River Slaney in the eastern half of the study area. The River Slaney is the most notable watercourse within the central study area and is situated just under 5km east of the site at its nearest point. Other notable watercourses within the study area include the River Barrow which flows through the wider western half of the study area and forms the county boundary between Kilkenny and Carlow. The river Barrow is situated c.13.5km west of the site at its nearest point.

Away from the rolling hills and upland context of the central study area, much of the wider study area in County Carlow constitutes a relatively flat landscape punctuated by small streams, river valleys, and isolated rolling hills. To the east and northeast of Bunclody within the wider study area, the terrain begins to transition to a rolling landscape comprising of low hills and ridgelines including Gibbet Hill, Slieveboy, and Aghowle. Similarly across the county border with Kilkenny in the south-western quadrant of the study area, the terrain rises from the Barrow river valley and is contained in low rolling hills and ridgelines.

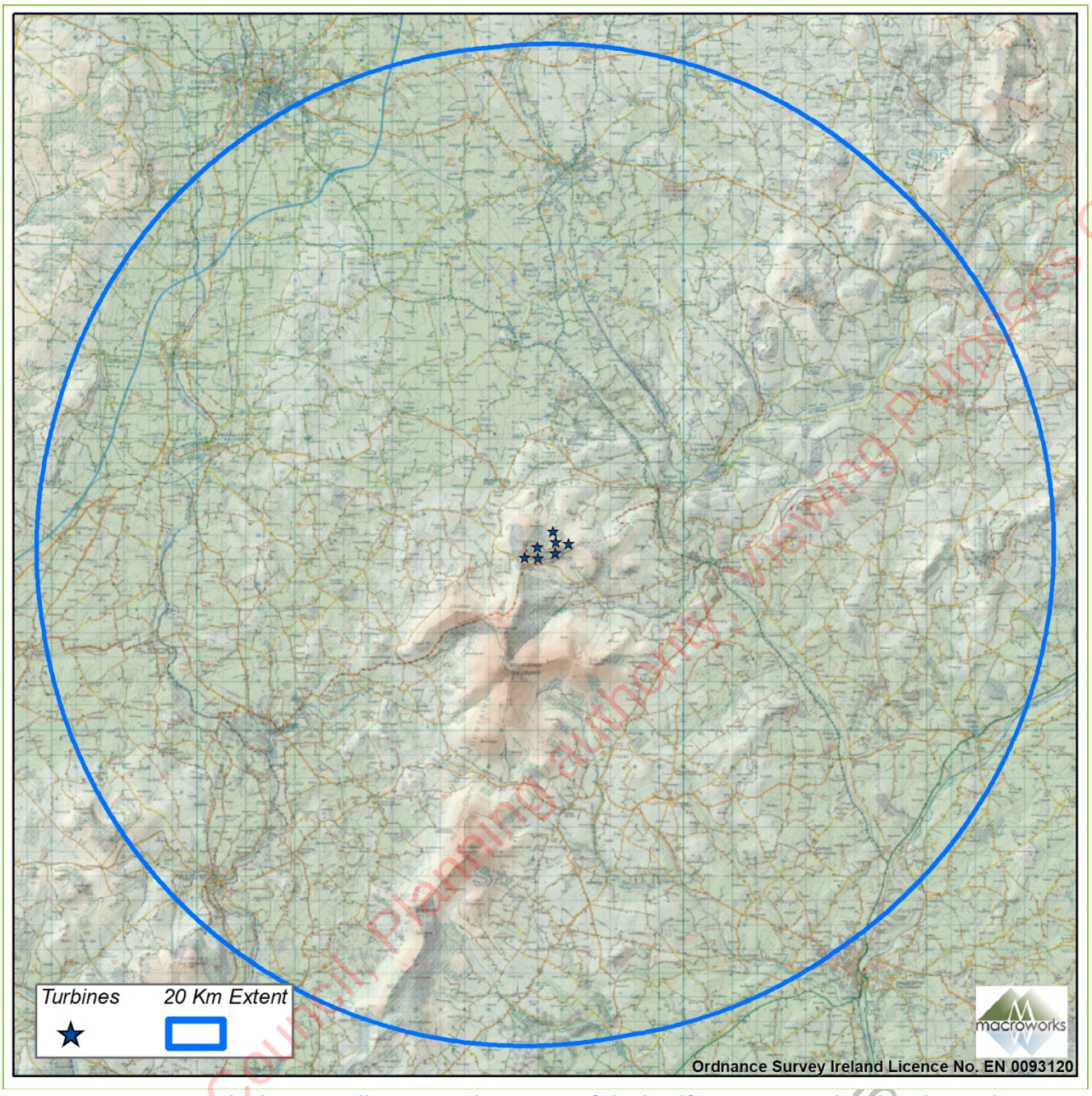


Figure 15.2: Terrain shadow map illustrating the nature of the landform contained within the study area.

15.3.1.2 Vegetation and Land Use

The proposed wind farm site is located across an area of commercial conifer forest that cloaks the upper slopes of Croaghaun Hill, some of which have been recently harvested. The surrounding hillsides transition between naturalistic moorland and blocks of commercial forestry, with the lower slopes contained in areas of pastoral farmland. Whilst large blocks of conifer forest and mountain moorland exist to the south of the site and cloak upland areas of Mount Leinster and the surrounding Blackstairs, the primary land use within the study area is that of pastoral farmland. This patchwork of agricultural fields typically cloaks the low-lying well-drained areas of terrain in addition to some rolling hills within the wider study area. Field patterns within the central study area and in the surrounds of the uplands tend to be small, however, they begin to increase as the terrain begins to level out further to the north and west. Isolated blocks of commercial conifer plantations are also dotted throughout the wider study area and often occur along the summit of low rolling hills and ridgelines.

Notable linear corridors of riparian woodland also flank many of the watercourses within the study area. A number of urban settlements are also situated within the central and wider study the nearest of which are Myshal and Bunclody situated north and east of the site respectively, but these do not contribute significant urban land cover in the context of the study area. Wind energy developments are also an established land use within the central and wider study area. An existing wind farm development at Greenoge is situated immediately east of the site whilst several existing wind energy developments perch along the upper slopes of rolling hills and ridgelines in the eastern half of the study area in both Wicklow and Wexford.

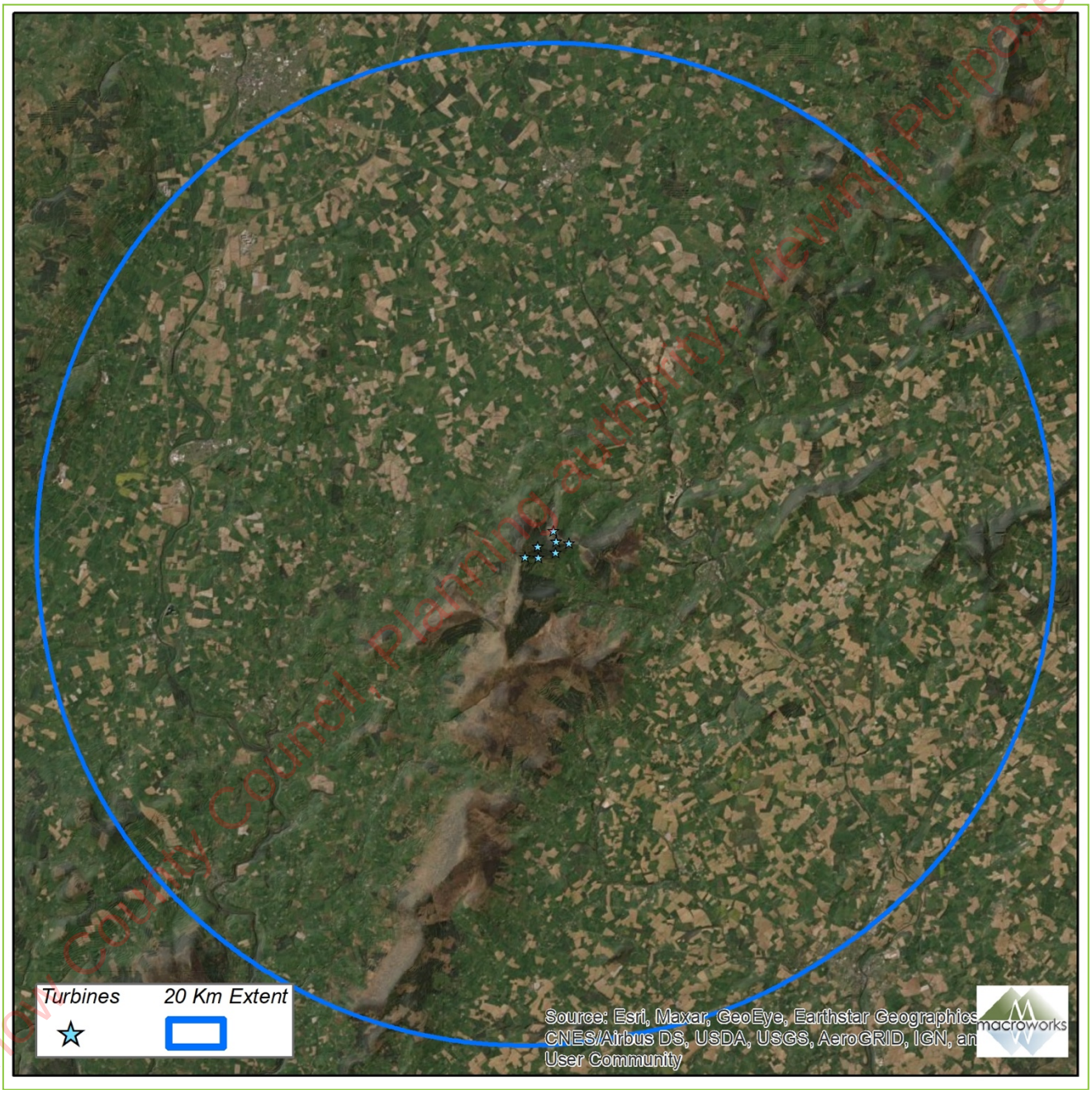


Figure 15.3: Aerial photography showing the landscape context of the wider study area.

15.3.2 Landscape Policy Context and Designations

15.3.2.1 The Department of Environment, Heritage and Local Government Wind Energy Development Guidelines 2006

The 2006 Wind Energy Development Guidelines provide guidance on wind farm siting and design criteria for a number of different landscapes types. The main wind farm site is considered to be located within a landscape that is consistent with the 'Transitional Marginal Landscapes'. In such instances the Guidelines recommend consideration of the advice for each landscape type. Siting and design recommendations for these landscape types include the following:

Transitional Marginal Landscapes:

Location – *"As wind energy developments, for reasons of commercial viability, will typically be located on ridges and peaks, a clear visual separation will be achieved from the complexity of lower ground."*

"wind energy developments might also be located at lower levels in extensive areas of this landscape type, where they will be perceived against a relatively complex backdrop. In these situations it is important to minimise visual confusion such as the crossing by blade sets of skylines, buildings, utility lines and varied landcover."

Spatial extent - *"Wind energy developments in these landscapes should be relatively small in terms of spatial extent. It is important that they do not dominate but achieve a balance with their surrounds, especially considering that small fields and houses are prevalent."*

"Wind energy development with irregular spacing and random layout -is more appropriate given the relative undulation of the setting."

"Large wind energy development straddling two landscape character types within the same visual unit -this creates a visual ambivalence and, thus, negative tension between the two character types involved."

Spacing - *"All options are possible, depending on the actual landscape characteristics. However, irregular spacing is likely to be most appropriate."*

Layout - *"The likely location of wind energy developments on ridges suggests a linear or staggered linear layout whereas on broader hilltops they could be linear or clustered."*

Height - *"…where the upper ground is relatively open and visually extensive, taller turbines may be more appropriate."*

"…the profile can be even or uneven, depending on the profile and visual complexity of the terrain involved. The more rugged and undulating, the greater the acceptability of an uneven profile provided it does not result in significant visual confusion and conflict."

Cumulative - *"This would have to be evaluated on a case-by-case basis, but great caution should be exercised. The spatial enclosure often found in transitional marginal landscapes is likely to preclude the possibility of seeing another wind energy development.*

However, should two or more wind energy developments be visible within a confined setting a critically adverse effect might result, depending on turbine height and wind energy development extent and proximity."

In instances where two or more landscape types are potentially applicable, the Guidelines recommend consideration of the advice for each landscape type rather than just the one which is considered to be most applicable. The 2006 Guidance specifically states (p40):

"It is, however, common that a wind energy development is located in one landscape character type but is visible from another, for example, where the site comprises an unenclosed moorland ridge standing above a broad flat farmland. In such an instance, the entire visual unit should be taken into consideration …".

In combination with the recommendations for 'Transitional Marginal Landscapes', the siting and design recommendations for the *'Mountain Moorland'* and *'Hilly and Flat Farmland'* landscape types have also been considered when designing the turbine layout for the proposed Croaghaun Wind Farm as a result of the varied nature of the landscape within the wider study area. In general, the proposed development is relatively consistent with the guidance notes for all three landscape types but it is especially consistent with the guidance for the landscape type 'Transitional Marginal Landscapes' in which the proposed project is situated. A key consideration in this instance was the locational guidance to maintain "a clear visual separation … from the complexity of lower ground" and to avoid a situation where the "wind energy development straddles two landscape character types within the same visual unit" thereby generating "negative tension between two character types". The other key consideration relates to turbine height and the guidance that "where upper ground is relatively open and visually extensive, taller turbines may be more appropriate".

Siting in Relation to Individual Properties ('Setback')

Section 6.18 of the Draft Revised Wind Energy Development Guidelines (December 2019) refers to appropriate setback distances for visual amenity purposes. The guidelines outline a mandatory minimum setback distance of *"500 meters"* or the distance of *"4 times the tip height"* of the proposed turbines *"between the nearest point of the curtilage of any residential property".* This is set out in SPPR2 which is included below:

SPPR 2: With the exception of applications where reduced setback requirements have been agreed with relevant owner(s) as outlined at 6.18.2 below, planning authorities and An Bord Pleanála (where relevant), shall, in undertaking their development planning and development management functions, ensure that a setback distance for visual amenity purposes of 4 times the tip height of the relevant wind turbine shall apply between each wind turbine and the nearest point of the curtilage of any residential property in the vicinity of the proposed development, subject to a mandatory minimum setback of 500 metres from that residential property. Some discretion applies to planning authorities when agreeing separation distances for small scale wind energy developments generating energy primarily for onsite usage. The planning authority or An Bord Pleanála (where relevant), shall not apply a setback distance that exceeds these requirements for visual amenity purposes.

The nearest residential dwelling to any of the proposed turbines is 984m which exceeds and fully complies with the setback distance outlined in the both the current 2006 Guidelines and the Draft Revised Guidelines (2019).

One of the most notable changes in the Draft Revised Wind Energy Development Guidelines (2019) from its predecessor, is the introduction of a residential amenity setback from the curtilage of neighbouring dwellings, which is based on 4 X tip height buffer distance. The current Wind Energy Guidelines (2006) provide for a 500m setback from residential dwellings. As no neighbouring dwellings fall within 750m of nearest turbines for the proposed development the setback is significantly greater than the requirement for the current Guidelines. Furthermore, the residential amenity setback for the Draft Revised Guidelines is also complied with (minimum setback 712m from 178m tip height turbines), which also gives a considerable buffer to account for 'curtilage' of dwellings, as specified by the Draft Revised Guidelines.

15.3.2.2 Carlow County Development Plan 2015-2021

Carlow County Landscape Character Assessment

A landscape Character Assessment has been incorporated in the Carlow County Development Plan. This separates the county into four specific landscape character types (LCTs) (**Figure 15.4** and **Figure 15.5** refer). The proposed wind farm is situated in the 'Blackstairs and Mount Leinster Uplands' principal landscape character area which is further subdivided into 'generic landscape types', of which, the proposed wind farm is situated in the 'Uplands'. The LCA 'Blackstairs and Mount Leinster Uplands' "*is dominated by the uplands of the Blackstairs Mountains and Mount Leinster, which extend as a distinct ridgeline for c. 25km northwards from the border with Wexford. Mount Leinster is largely located in Wexford. The western slopes are however in County Carlow. The slopes of the mountain descend westwards to an undulating landscape, which converges with the landscape of the Central Lowlands landscape character area…..The higher slopes of the Blackstairs are essentially unproductive lands with a thin covering of soil and blanket bog, and heather type vegetation cover. The lower slopes at c. 80m to 200m OD are in rough grazing merging into arable lands and grasslands. The fields are small and bounded by a mixture of hedges and stone walls with occasional trees.*"

With regard to tourism, this LCA has been designated as the 'Blackstairs Wilderness/Nature Sub Zone'. This area *"is seen as having the best natural tourism assets of the County (in addition to the Barrow Valley): 'a peaceful, relaxing, rural retreat...very attractive villages, a strong heritage and wide range of outdoor activities for tourists'".* Furthermore the Wicklow Way terminates at the settlement of Clonegal whilst the 'Mount Leinster Heritage Drive' also passes through the study area.

The LCA 'Mount Leinster Uplands' is described as *"the most important in the County and is as such highly sensitive to change. This particularly applies to the uplands / mountains whereas the farmed ridges and rolling rough grazing types would be moderately sensitive."* The entire 'Uplands' landscape type is similarly categorised with a high sensitivity rating (**Figure 15.6** refers). The landscape character assessment also identified this LCA as having a *"low capacity to absorb wind turbines, overhead cables and masts, particularly in the upland areas where they would detract from the scenery and visitors' experience of 'wilderness'".* In terms of capacity to accommodate other forms of development, the landscape character assessment designates this LCA with a "moderate capacity to absorb forest and biomass development" and a 'high' capacity to accommodate 'tourism related activity'. All other identified development types have been classified with a 'low' capacity to accommodate development.

A list of key issues and recommendations relating to all of the identified landscape character areas are also listed within the landscape character assessment.

Those deemed to be relevant to the proposed development are included below:

- *"Careful site selection and detailed mitigation to minimise impacts is a fundamental prerequisite to integrating developments into the landscape.*
- *Careful planning of infrastructure networks is necessary to avoid damage to the landscape and to landscape elements and in particular to avoid the cumulative impacts that can arise when infrastructural clustering of structures occurs.*
- *In general, wind turbines should be sited away from higher scenic or otherwise valued landscapes, and positioned where their impacts will be considered acceptable. Criteria for the development of wind energy are subject to a separate study.*
- *Native or indigenous trees and shrubs should be used in development works and for mitigation large scale schemes."*

Within the landscape character assessment of County Carlow a number of general recommendations are outlined with regard to the LCA 'Mount Leinster / Blackstairs Landscape Character Area'. Some of these are relevant to the proposed development and are included below:

- *"It is the most important area in the County for scenery and 'wilderness'. Conserve character of land pattern and landform typified by small fields defined by hedges and occasional stone walls. Discourage their replacement with wire fences.*
- *Encourage the use of native and indigenous planting in new developments to integrate buildings into the surrounding landscape.*
- *Protect views and vistas by ensuring that new developments are not inappropriately located."*

The landscape character assessment also outlines general policy objectives relating to the 'Mount Leinster/Blackstairs Uplands' LCA and are included below:

- *"Balance conservation with enhancement of the existing landscape character.*
- *New developments to maintain integrity of landscape character area though careful location, siting and design."*

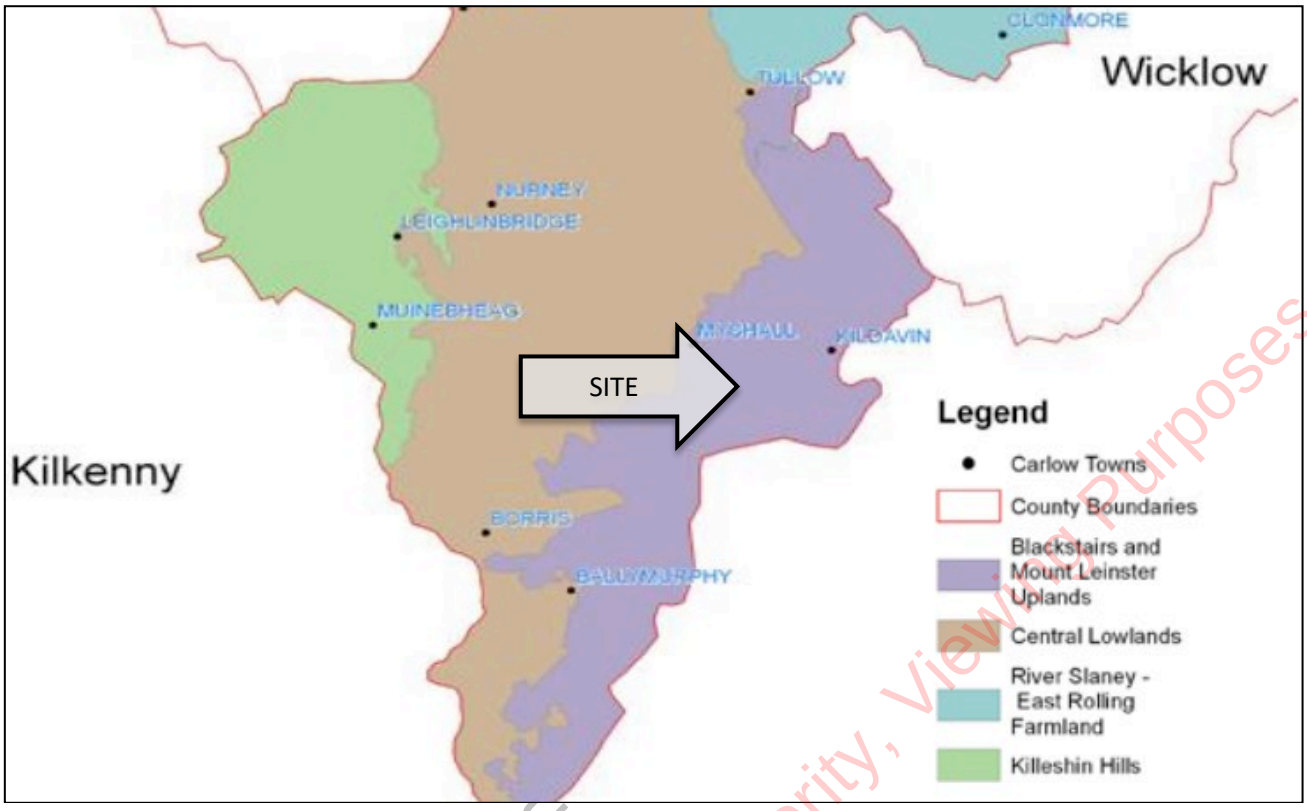


Figure 15.4: Excerpt from Carlow County Landscape Character Assessment, figure 5 showing approximate location of proposed development in relation to principal landscape character areas.

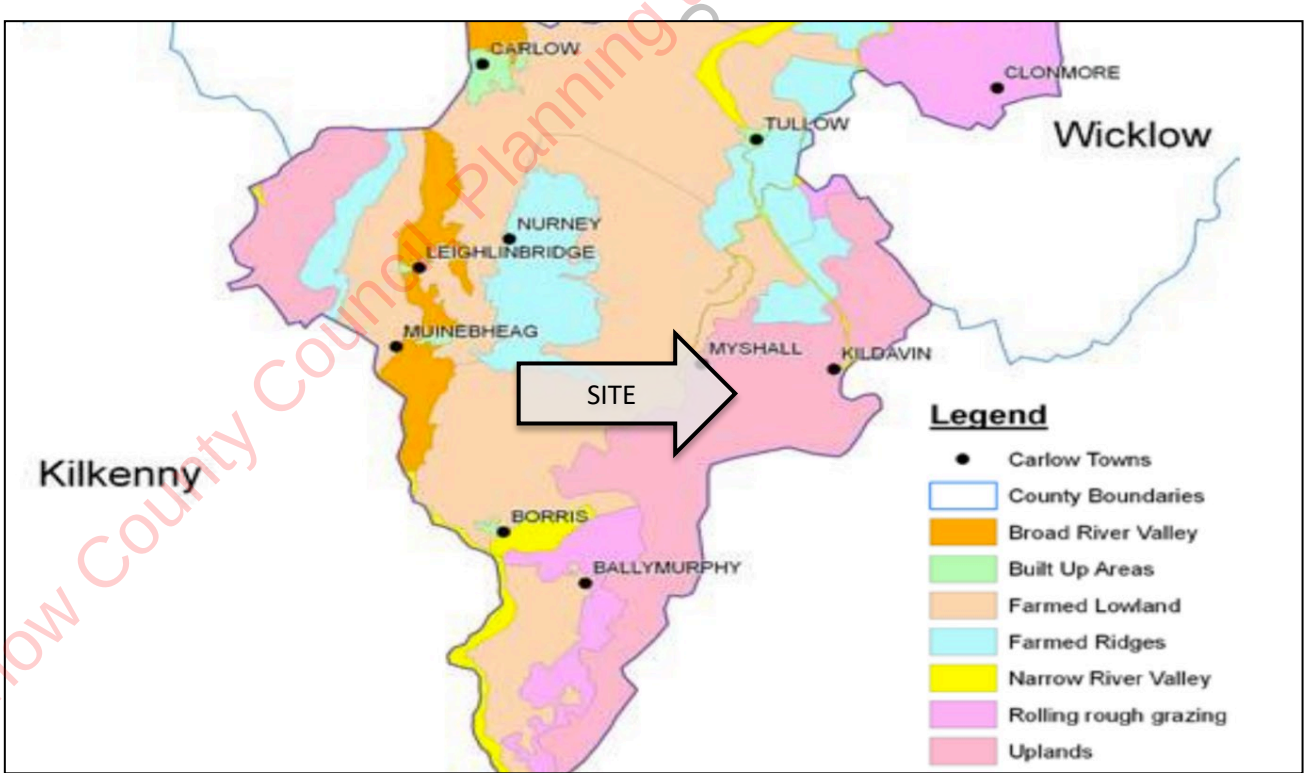


Figure 15.5: Excerpt from Carlow County Landscape Character Assessment, figure 6 showing approximate location of proposed site in relation to principal landscape types.

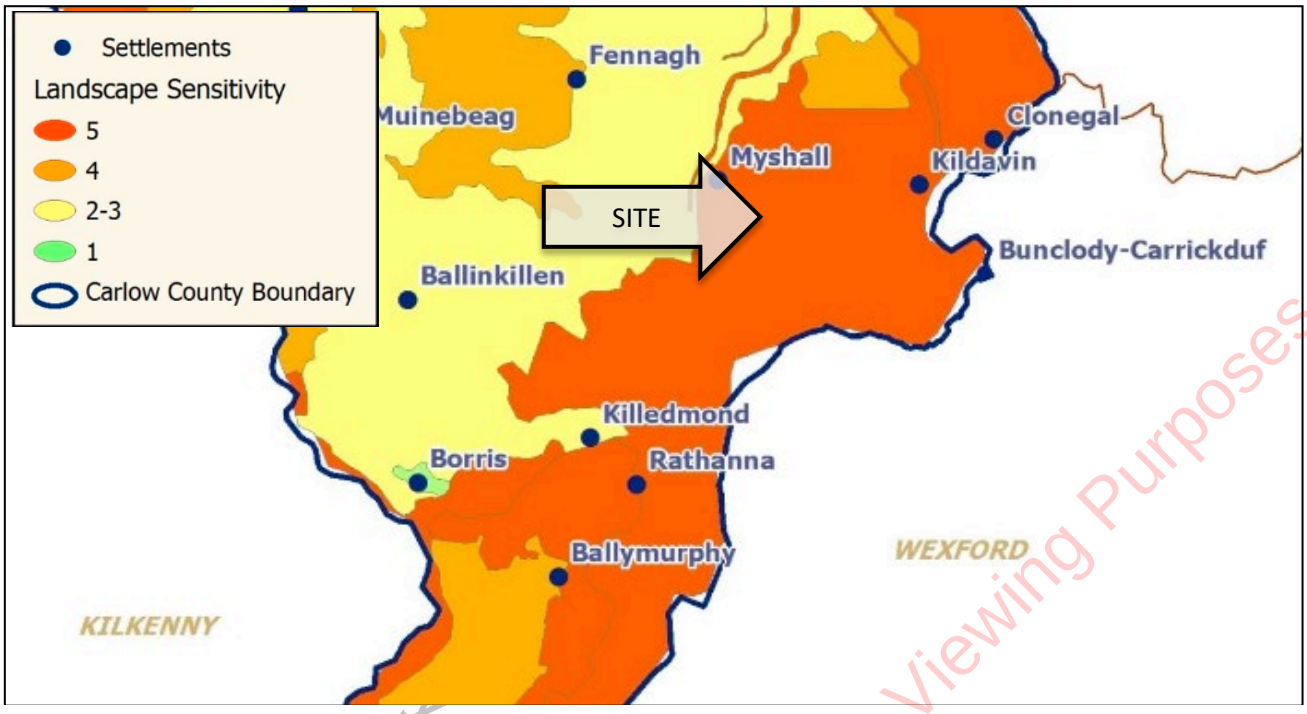


Figure 15.6: Excerpt from Carlow County Landscape Character Assessment, fig. 4 showing approximate location of proposed site in relation to landscape sensitivities.

15.3.2.3 Wexford County Development Plan 2013-2019

Whilst the proposed development is entirely located within County Carlow, the Carlow – Wexford county border is situated just over 2km southeast of the site at its nearest point. Thus, it is important to consider landscape policy within County Wexford. A Landscape Character Assessment has been prepared for County Wexford and this is incorporated into the current Wexford County Development Plan 2013-2019. In the CDP, the landscape of County Wexford is divided into four different landscape units: Uplands, Lowlands, River Valleys and Coastal. The nearest and most relevant of these landscape units is the 'uplands' which traverses almost the entire Carlow – Wexford border. This landscape unit is described as containing *"concentrations of more elevated and steeper land, ridges and skylines, which are very prominent in the overall landscape of the county and are generally more sensitive to development. Whilst having lower population densities than the Lowland landscape, the Uplands do accommodate significant living and working populations. Low intensity agriculture is the predominant economic activity in this landscape. However, commercial wind farms have become a recent addition in recent years."*

The landscape unit 'River Valley also occurs south of Bunclody and relates to the corridor of the River Slaney corridor whilst the 'Uplands' landscape unit transitions to the 'lowlands' unit in the wider south-eastern quadrant of the study area. No outline sensitivity designations are identified for any of these landscape units, however, the CDP does recognise 'landscapes of greater sensitivity' within County Wexford. None of these landscapes of greater sensitivity occur within the study area.

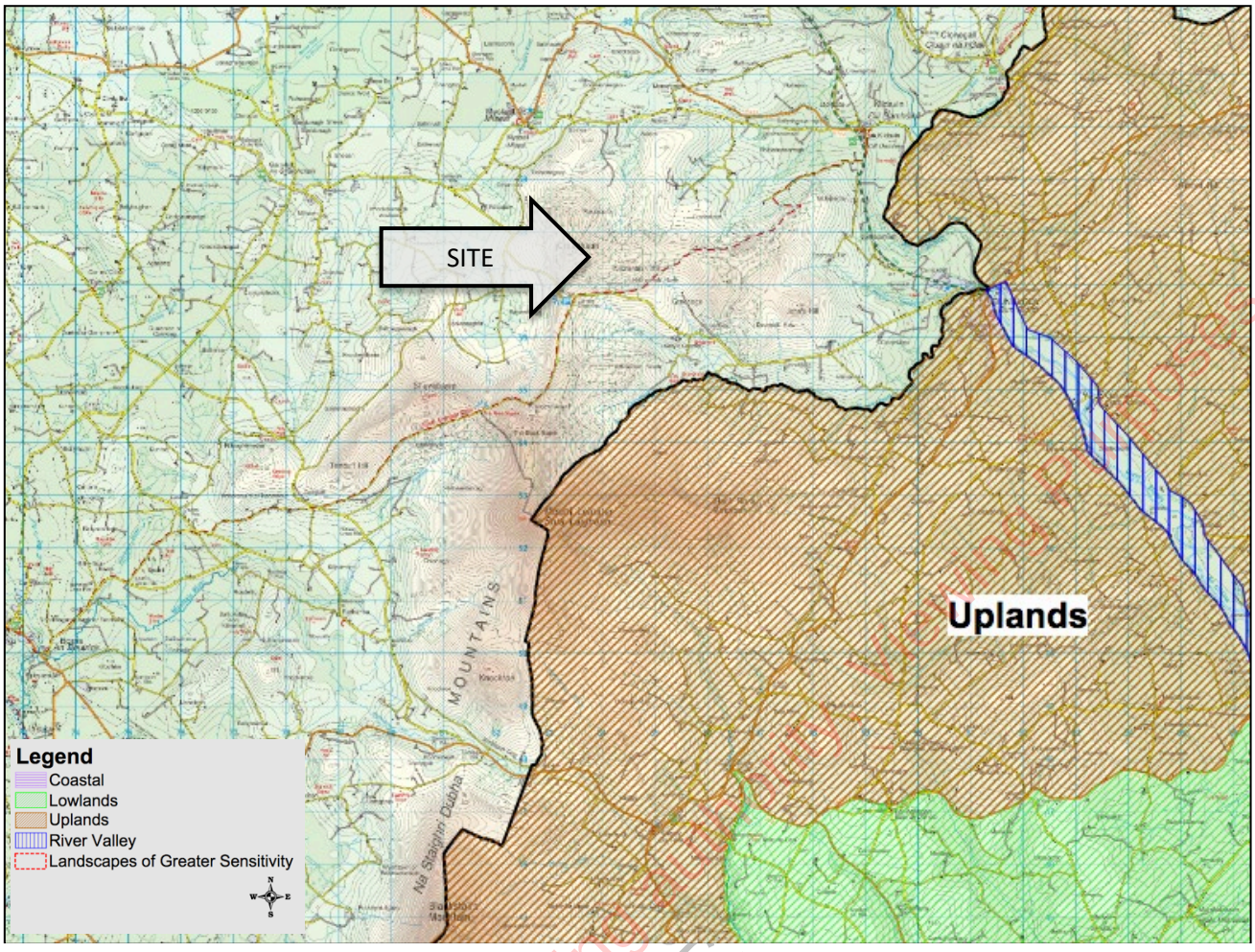


Figure 15.7: Excerpt from Map No: 13 of the current Wexford County Development Plan 2013-2019 showing landscape units in County Wexford in relation to the proposed development.

15.3.2.4 Wicklow County Development Plan 2016-2022

The Wicklow – Carlow border is situated just over 10km northeast of the proposed wind farm and therefore it is important to consider landscape policy in County Wicklow. A landscape character assessment is incorporated within Appendix 5 of the current Wicklow County Development Plan, which divides the county into 6 no. landscape character units and a further 14 geographically specific landscape character areas. The nearest and most relevant landscape character areas in County Wicklow include the 'Rolling Lowlands' which then merge with the 'Southern Hills – Area of High Amenity'. Landscape sensitivity in County Wicklow is addressed at a much finer scale than that of landscape units and Landscape Character Areas and is based more on specific landscape features, topography and land cover.

Figure 2.1 (Figure 15.8 below) of the current landscape assessment outlines landscape sensitivity in Wicklow and identifies that much of the landscape along the Wicklow – Carlow border is designated with a 'Low' sensitivity designation. Nevertheless, some small corridors of 'medium' to 'high' sensitivity also occur here, although these generally relate to streams and river corridors or locally elevated areas of terrain.

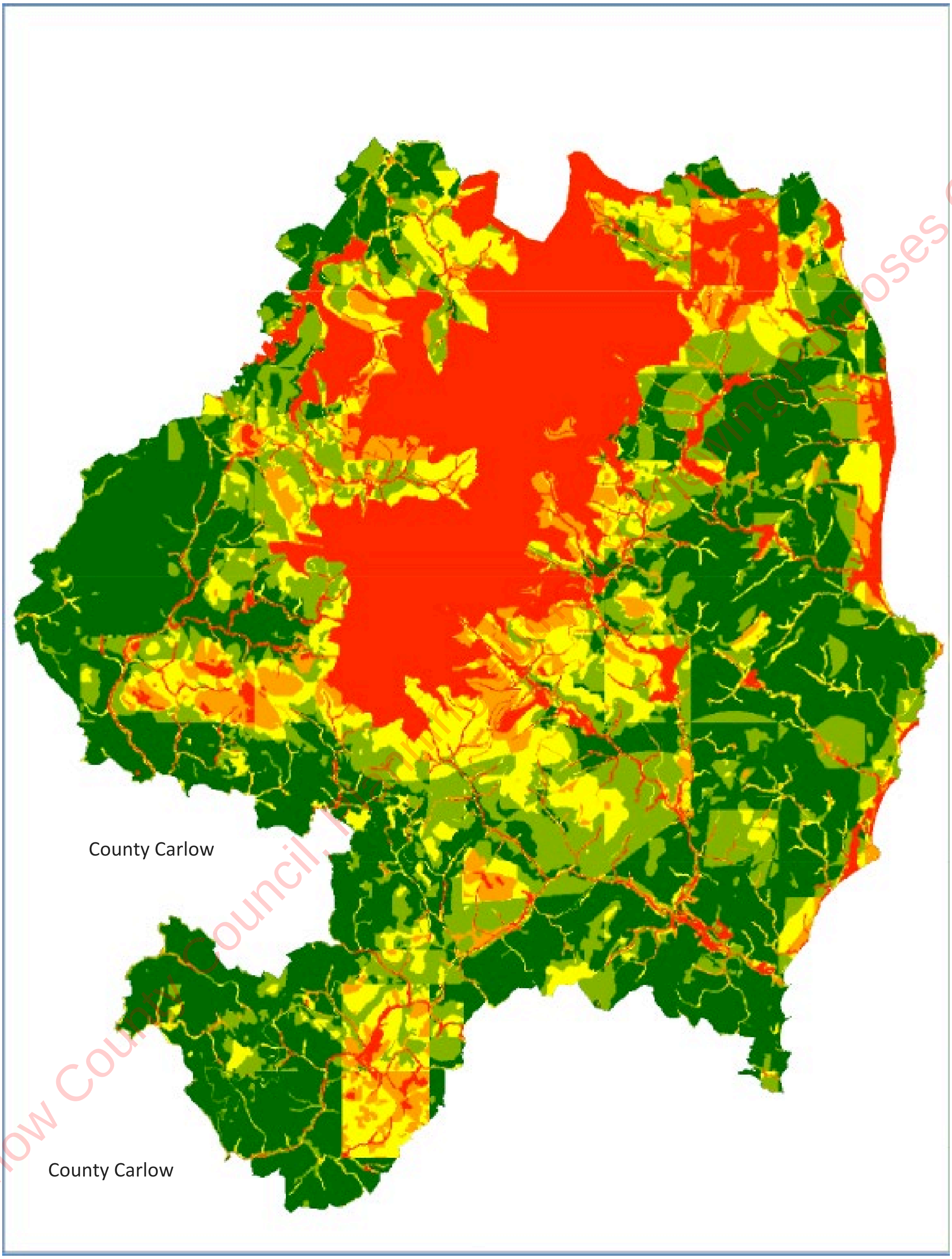


Figure 15.8: Excerpt from the current Wicklow CDP identifying the generally 'low' landscape sensitivity designations adjacent to the Wicklow – Carlow county bounds

15.3.2.5 Kilkenny County Development Plan 2014-2020

The Kilkenny county border is situated just under 14km southwest of the site at its nearest point, and consequently, landscape policy's and designations within County Kilkenny are also considered to be of some relevance. The current Kilkenny County Development Plan incorporates a Landscape Character Assessment for the County. This divides the landscapes of Country Kilkenny into four generic landscape types and, subsequently, into 21 geographically specific landscape character areas (LCAs). According to figure 8.2 of the County Development Plan a number of contrasting LCAs occur along the Kilkenny – Carlow border and include 'LCA I – Barrow Valley', 'LCA D – Brandon Hill', 'LCA D1 – Brandon Hill Transition Zone', 'LCA F3 – Kilkenny Eastern Basin' and 'LCA B1 – Castlecomer Southern Transition Zone'. It should be noted that 'LCA D – Brandon Hill' is designated as 'highly scenic/visually pleasing'.

In terms of landscape sensitivity, the Kilkenny CDP identifies areas throughout the county that are highly sensitive to development and have a low capacity to accommodate change. These areas are identified on Figure 15.9 below of the landscape character assessment and take account of areas of higher altitude and contrasting land cover. A number of these occur on the immediate Carlow – Kilkenny border and include 'Broad-leaved forests', 'Agri. with natural veg' and 'Transitional woodland scrub'.

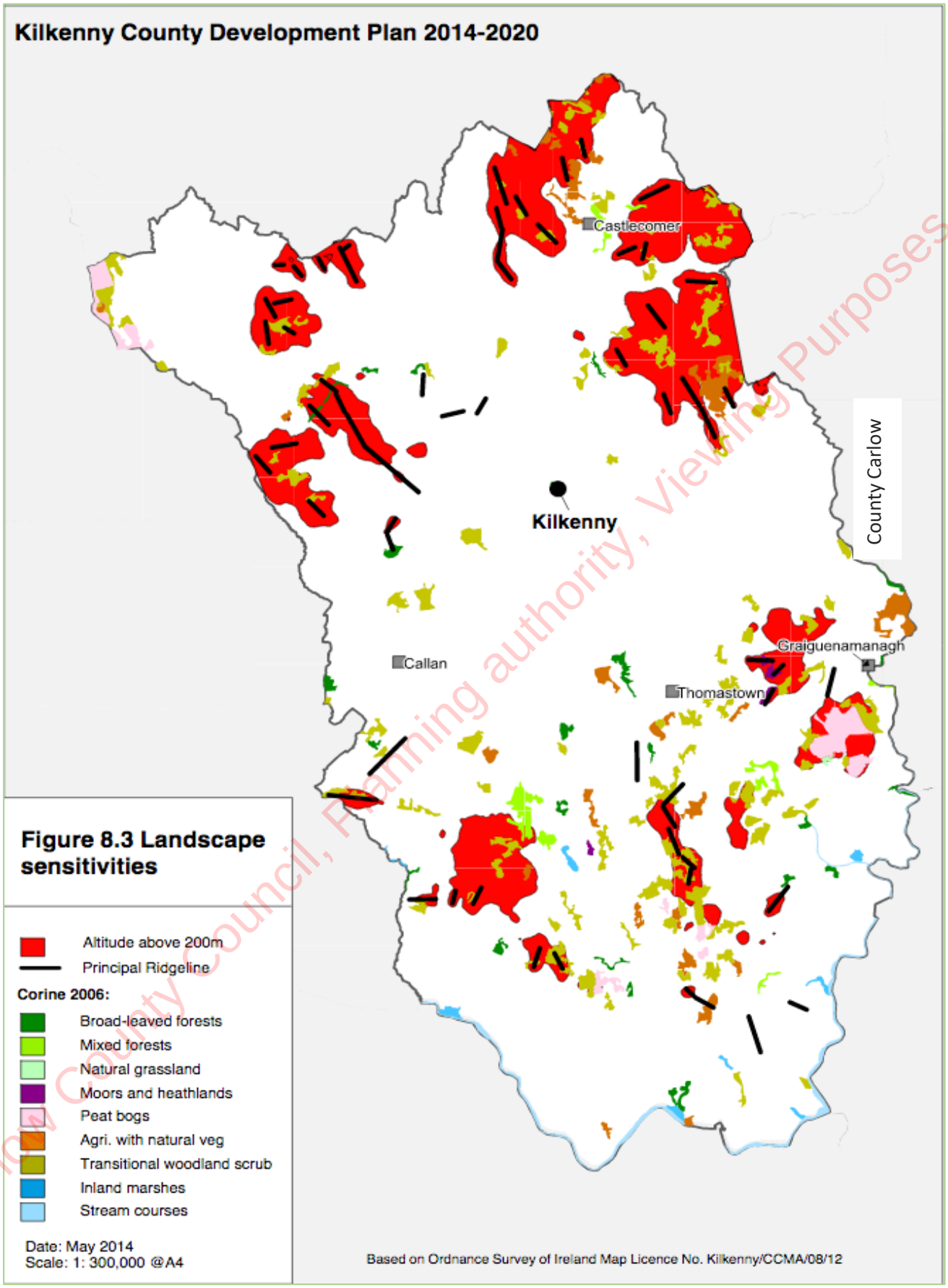


Figure 15.9: Excerpt from the current Wicklow CDP identifying landscape sensitivities adjacent to the Kilkenny – Carlow county bounds

Subsection 6.3.1 of the current county development plan relates to wind energy and identifies the Wind Energy Strategy that forms part of the plan. Policy relating to wind energy within the current CDP is included below:

Energy – Policy 5

"It is the policy of Carlow County Council to:

- *Promote and facilitate wind energy development in accordance with current Wind Energy Development Guidelines by the DoECLG and best international practices and standards and subject to compliance with normal planning and environmental criteria and the development management standards"*

Appendix 5 of the current Carlow CDP includes a wind energy strategy for the County which identifies areas deemed suitable or unsuitable for wind energy development. These areas are subdivided into four categories; strategic areas, preferred areas, areas open for consideration and 'no-go' areas. The wind energy strategy also list a number of key points to reduce visual impacts on wind farm developments which are included below:

- *"Ensuring all turbines look alike, have a clean sleek appearance and that the blades rotate in the same direction*
- *Minimising the number of turbines by using the largest possible model (subject to the visual absorption capabilities and environmental considerations of the site) rather than numerous small ones*
- *Siting the wind farm, ancillary structures, access roads and transmission infrastructure to complement the natural landform, contours and landform backdrop including ridgelines.*
- *Ensuring the choice of materials and colour (e.g. off white and grey for turbines, low contrast for roads) for the development complements the skyline and the backdrop of the viewsheds.*
- *Minimising the stripping of vegetation and using advanced tree planting where feasible as visual buffers.*
- *Ensuring good quality trees and landform rehabilitation on-site and off-site.*
- *Locating turbines to reflect landscape and topographical features (e.g. random pattern may suit a rolling varied landform and a linear pattern may suit ridgelines)."*

With regard to the capacity of landscape character areas to accommodate wind farm developments, the 'Mount Leinster/Blackstairs' LCA has been identified with a 'low' capacity whilst the remaining three landscape character areas within County Carlow as shown on Figure 15.5 are all classified with a 'moderate' capacity to accommodate wind farms. Nevertheless, the wind energy strategy states that as the 'Mount Leinster/Blackstairs' LCA is *"an extensive area"* and *"its capacity to assimilate wind farms would be very much influenced by the conditions obtaining in specific locations and the degree to which mitigation measures could minimise visual and environmental intrusion."* Furthermore, a map of County Carlow is also included on page 41 of the wind energy strategy which outlined 'preferred locations' for wind farms and area 'open for consideration' (Figure 15.10 refers). A number of areas identified as 'open for consideration' are situated within the site boundary and include 'Kilbranish Hill', 'Tinnamogney' and 'Cranemore'. These larger areas 'open for consideration' are further broken down on Map 11 (**Figure 15.11** refers) of the current wind energy strategy and identify additional small geometric areas classified as 'open for consideration' within the site boundary. Areas designated as 'open for consideration' within the wind energy strategy are described as areas where *"applications for planning permission will be treated on their merits. It is likely that such instances may arise only in the Mount Leinster/Blackstairs area, given the requirement for adequate wind speeds."*

It is considered that the small and sporadic areas of 'Open to Consideration' for wind turbines across the site (Map 11) are not an appropriate scale within which to consider wind energy development and could in fact lead to a disjointed layout if strictly adhered to. Consequently, the siting of the proposed Croaghaun Wind Farm has taken account of the general prevalence of 'Open to Consideration' areas across the site, but while their general prevalence influenced the overall proposed location these discrete pockets have not influenced its design. Refer to Chapter 4 for more information in relation to this issue.

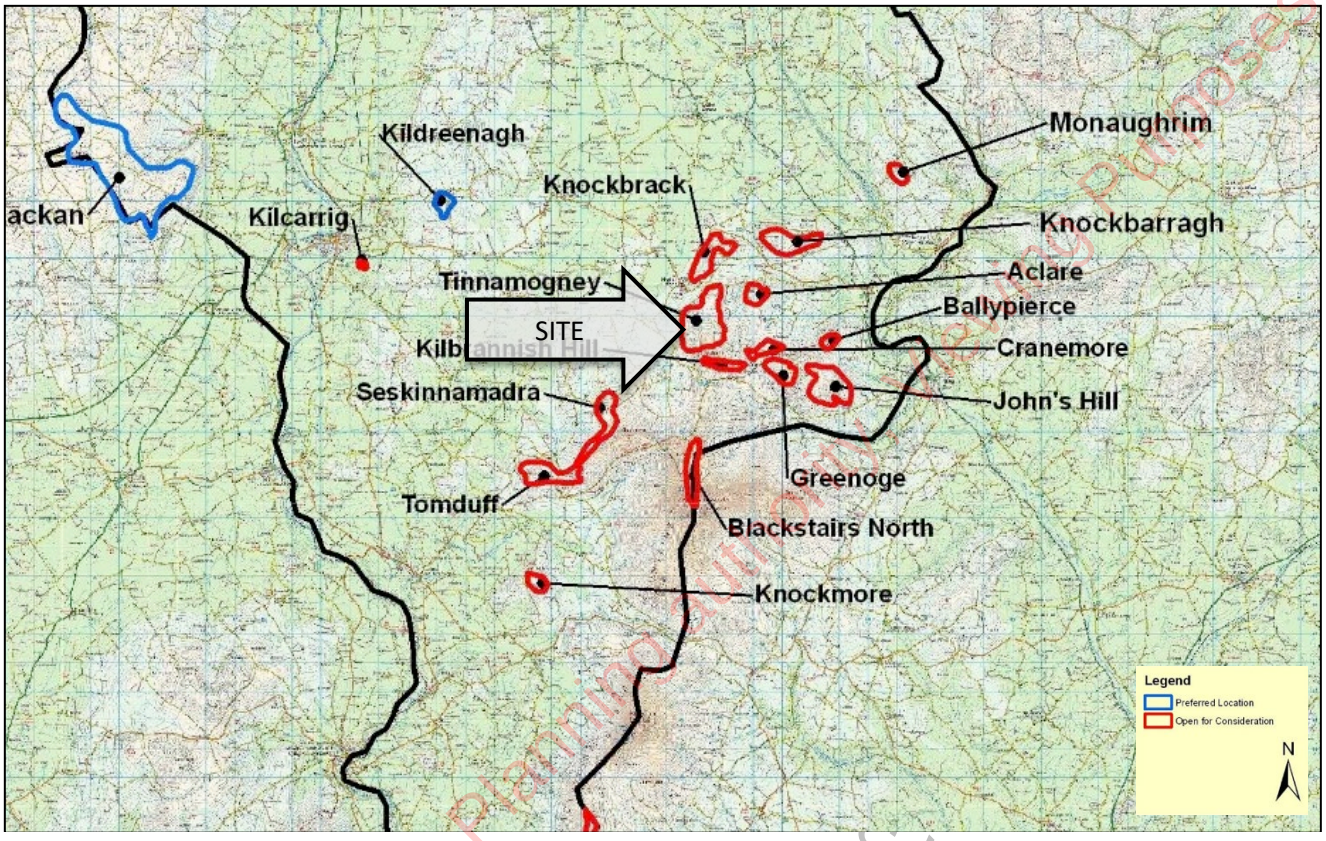


Figure 15.10: **Excerpt from page 41 of the current Carlow Wind Energy Strategy identifying wind energy development 'preferred locations' and areas 'open for consideration' in relation to the proposed wind farm development.**

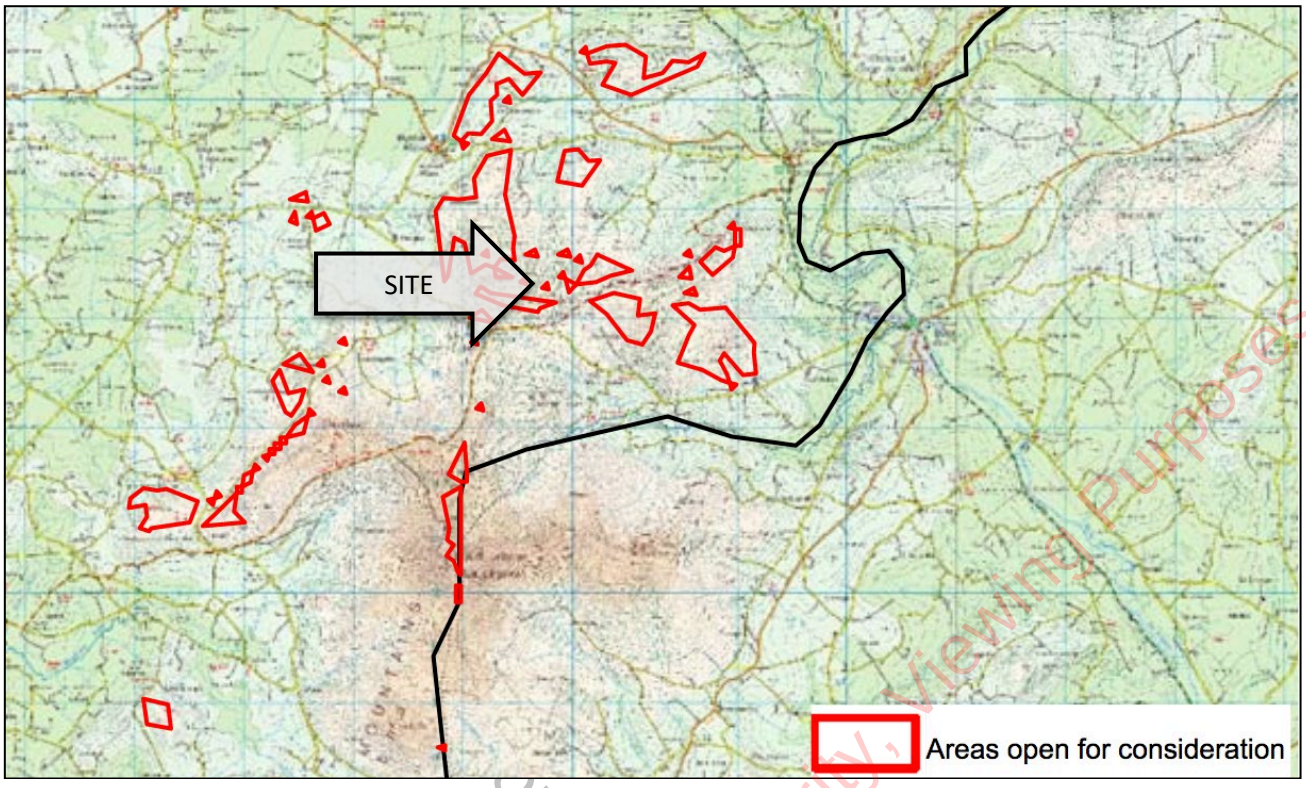


Figure 15.11: Map 11 of the current Carlow Wind Energy Strategy showing Areas open for consideration in relation to the proposed wind farm development.

15.3.2.7 Wexford County Development Plan 2013-2019 – Wind Energy Strategy

Whilst the site is wholly situated in County Carlow, the Wexford county border is situated just over 2km southeast of the site at its nearest point, and as a result, the proposed wind farm has the potential to have a notable influence on the landscape here. Consequently, it is important to consider wind energy designations in County Wexford. Volume 5 of the current CDP includes a Wind Energy Strategy for Wexford which identifies areas 'not normally permissible', 'acceptable in principal' and 'open for consideration'. The entire north-western border of County Wexford is identified as a 'not normally permissible' area, however it is important to the note that a number of constructed and permitted wind farms already exist here. The wind energy strategy describes the 'uplands' landscape character unit as having *"limited capacity to absorb development".*

It further notes that the northern portions of Wexford have a number of existing and permitted wind farms and that "*having regard to the areas open for consideration for wind energy development in adjoining counties, it is considered that the north-west of the county will reach capacity in terms of wind farm development (assuming that all permitted wind farms will be built). Further wind farm development in this area may have potential adverse cumulative impacts."*

Note: *As both the Wicklow and Kilkenny county bounds are some c.10km and c.15km away from the proposal site respectively, it is not considered necessary to include the wind energy strategy from either county development plan.*

15.4 Visual Baseline

Only those parts of the study area that potentially afford views of the proposed development are of interest to this part of the assessment. Therefore, the first part of the visual baseline is establishing a 'Zone of Theoretical Visibility' and subsequently, identifying important visual receptors from which to base the visual impact assessment.

15.4.1 Zone of Theoretical Visibility (ZTV)

A computer generated Zone of Theoretical Visibility (ZTV) map has been prepared to illustrate where the proposed turbines are potentially visible from. The ZTV map is based solely on terrain data (bare ground visibility), and ignores features such as trees, hedges or buildings, which may screen views. Given the complex vegetation patterns within this landscape, the main value of this form of ZTV mapping is to determine those parts of the landscape from which the proposed development will definitely not be visible, due to terrain screening within the 20km study area. The ZTV below is based on the max tip height of the proposed turbines as a worst-case scenario.

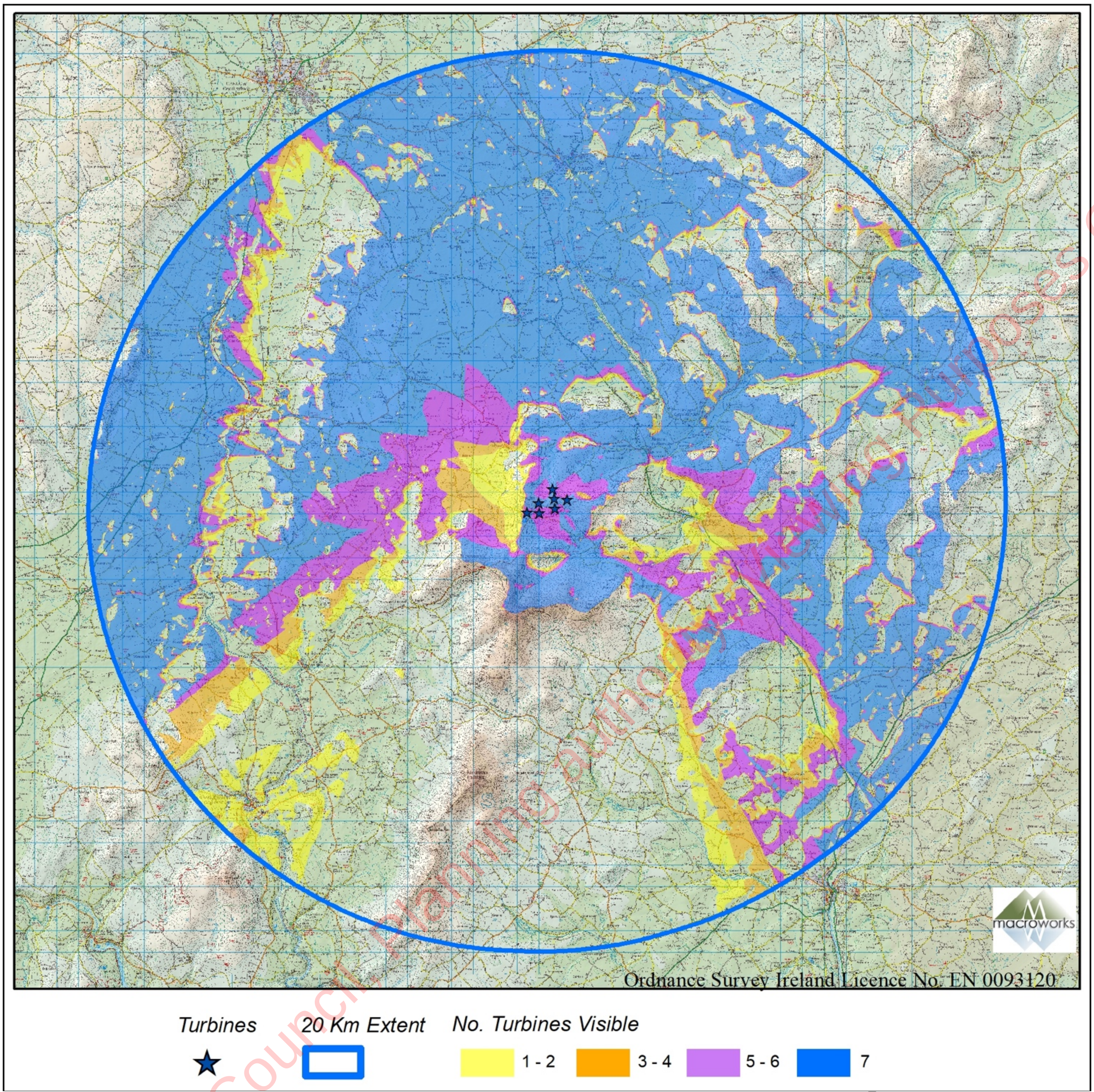


Figure 15.12: ZTV Map (Tip Height) for Croaghaun Wind Farm (See Appendix 15.2 for full scale annotated ZTV maps)

The following key points are illustrated by the 'bare-ground' ZTV map (**Figure 15.12** refers);

- The most notable areas of comprehensive visibility (blue pattern – all turbines theoretically visible) occur in the immediate surrounds of the site on the adjacent hills and ridges to the north and south, and in the wider northern and western half of the study area where the terrain is typically flat to low-rolling. Immediately west and northwest of the site, visibility fluctuates between low-moderate (orange/yellow/purple ZTV pattern) with areas of no visibility occurring in the surrounds of Myshall. In similar circumstances to this, visibility fluctuates between low-moderate at the eastern extents of the settlement of Bunclody, whilst the central and western half of the settlement will afford no turbine visibility.

- One of the most notable aspects noted from this ZTV is that there will be no potential for visibility of the proposed turbines for up to half of the wider southern extents of the study area where some of the more visually sensitive upland features occur. This is as a consequence of the neighbouring ridges and hills situated to the immediate south of the site which screen the main wind farm site throughout a large proportion of the southern half of the study area.

- In County Wexford and along the Wicklow Mountains foothills in the wider eastern half of the study area, the ZTV pattern fluctuates between large blocks of no visibility and areas of comprehensive visibility as a result of the rolling terrain here.

- A corridor of no visibility also occurs along the River Barrow valley in the western half of the study area, whilst notable blocks of no visibility occur along some of the more elevated sections of terrain in the western periphery of the study area in County Kilkenny.

- The wider northern half of the study area accounts for the largest area of comprehensive visibility within the study area as a result of the flat/low-lying terrain here. Comprehensive visibility has the potentially to occur at the settlements of Ballon, Tullow and Carlow Town.

15.4.2 Route Screening Analysis

Whilst the standard ZTV map outlines baseline theoretical visibility within the study area, it grossly overestimates the actual degree of visibility and does not take existing hedgerows, woodland and large areas of forestry into account, which, in this case will offer a notable degree of screening in the direction of the proposed development.

Route Screening Analysis, as its name suggests, considers actual visibility of the proposed wind farm from surrounding roads using current imagery captured in the field, then subsequently reviewed in the context of a digital model of the project. Route Screening Analysis bridges the gap for the assessor between the computer generated, theoretical visibility modelling (e.g. ZTV maps) and the actual nature of visibility in a given area. In order to get a clearer understanding of visibility within the central study area, Route Screening Analysis (RSA) was undertaken for every road within a 5km radius of the proposed turbines using a Digital Surface Model (DSM) and sample points every 25m along each road/waymarked route.

The RSA consists of three visibility scenarios: open visibility; partial visibility; and fully screened. In this instance, 'open visibility' is conservatively judged to occur if the view of a full blade rotation of any one single turbine is afforded. 'Partial visibility' occurs when there is view of less than a full blade rotation of any particular turbine/s occurs.

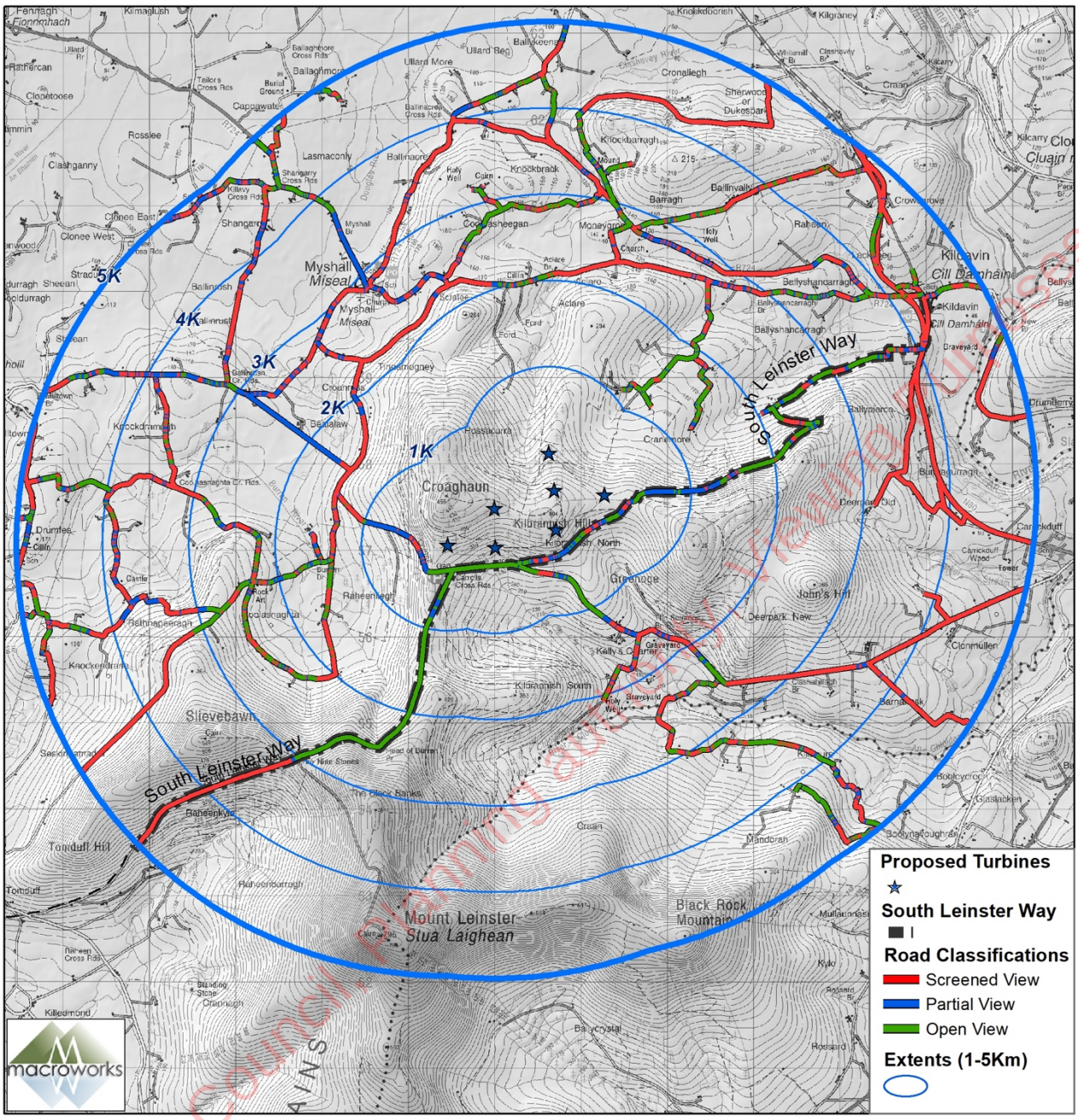


Figure 15.13: Route Screening Analysis (RSA) Map

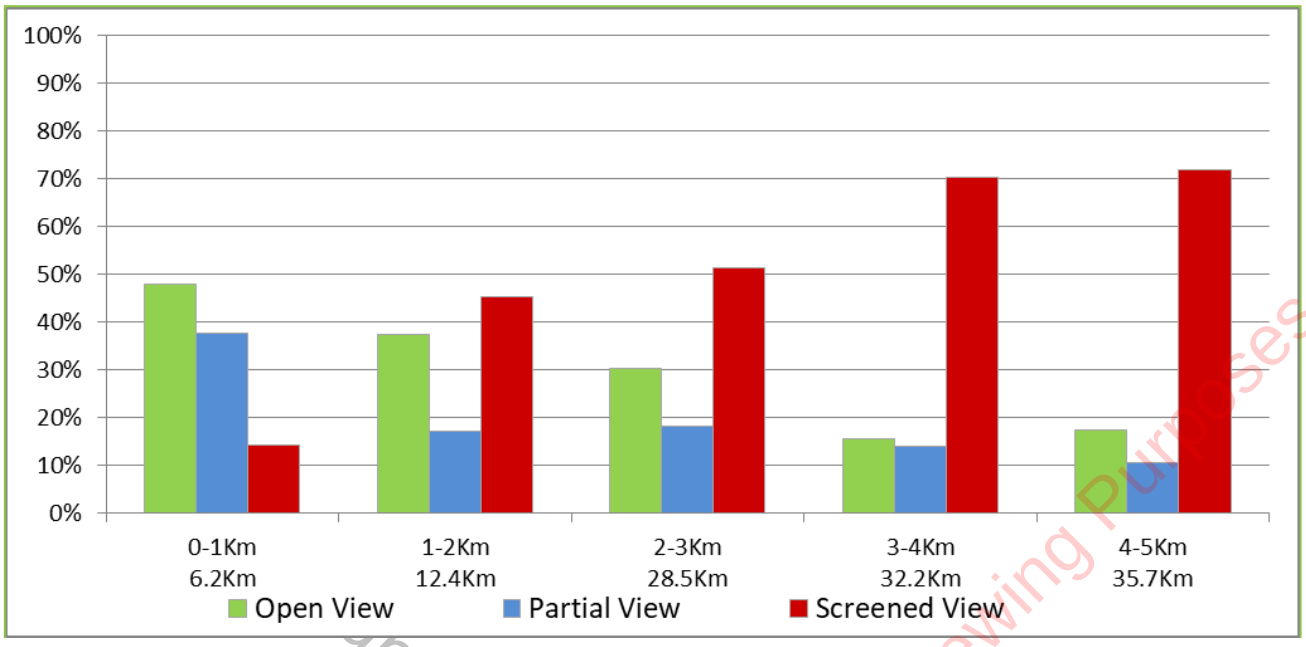


Figure 15.14: Graph illustrating results of Route Screening Analysis

The RSA map (Figure 15.13) and associated graph (Figure 15.14) illustrates a moderate to strong degree of wind farm screening from the local road and waymarked trail network within 5km of the proposed development. 'Fully Screened' views dominate from beyond the 1-2km band in an inverse relationship to 'Open Views'. This indicates that beyond 2km intervening vegetation (predominantly hedgerows and treelines) serve to restrict views and fully screened of the proposed turbines are notably more common than open views or partial views.

15.4.2.1 Screened Views

In terms of screened views, these fluctuate from 14% to 72% across the distance bands with a consistent increase from <1km to 3-4km bands and then only a minor increase of 2% in the 4-5km band. Screened views are most prevalent in the mid to outer reaches of the 5km radius RSA study area, as would be expected. Most notably, the eastern section of the RSA study area, which includes the settlement of Kildavin and roads stemming out from the western areas of Bunclody. This also includes the N80 national secondary route which will have limited visibility within the 5km radius aside from some areas northwest of Kildavin. Similarly, there is limited visibility indicated from within and around the settlement of Myshall in the northwest portion of the RSA study area. Typically screened views begin to appear in the outer bands (e.g. 3-4km and 4-5km), however in this instance, due to the rolling nature of the terrain and high degree of conifer forests and dense hedgerows in the immediate surrounds of the site, screened views surpass both 'open views' and 'partial views' from the 1-2km band . Even within the immediate surrounds of the turbines screened views are evident, most notably along sections of the South Leinster Way that pass immediately southeast of the site. This is reflective of the conifer forestry that cloaks much of the upland parts of the terrain here.

15.4.2.2 Partial Views

Overall, partial views range from 38% to 10%, with the outer four distance bands out to 5km registering similar figures between 10-18%. Partial visibility is at its highest in the first band and equates to 38%. This again reflects the rolling terrain of much of the wider RSA study area where the foothills of the Blackstairs Mountains begin to transition to the central Carlow lowlands.

Partial views only surpass 'screened views' in the first band (1-2km) which again relates to screening of the proposed turbines by a combination of the terrain and surrounding vegetation.

15.4.2.3 Open Views

As stated above, 'open views' have an inverse relationship to screened views, but with slightly less dramatic fluctuation. This ranges from just under 50% of road viewing scenarios within 1km, and steadily decreases to 15% at the 3-4km band. A minor increase to about 18% occurs at the 4-5km band. It is only within the 1-2km-distance band that open visibility is first usurped by fully screened views. In all instances within the RSA study area 'open views' are greater than 'partial views' which is likely a reflection of the landscape context of the study area, where the main wind farm site is located at a more elevated location than the majority of the study area. The most notable section of 'open views' is located immediately south of the site along the L3005 local road. This reflects the elevated nature of this route and the fact that the proposed turbines are primarily located on a south facing slope.

As the methodology used for the RSA requires only a view of the full blade set of one turbine to record an 'open view' of the project, it is useful to analyse the 'open view' set in more detail to establish how many turbines are actually visible in each instance (see **Figure 15.15** and accompanying graph at **Figure 15.16**)

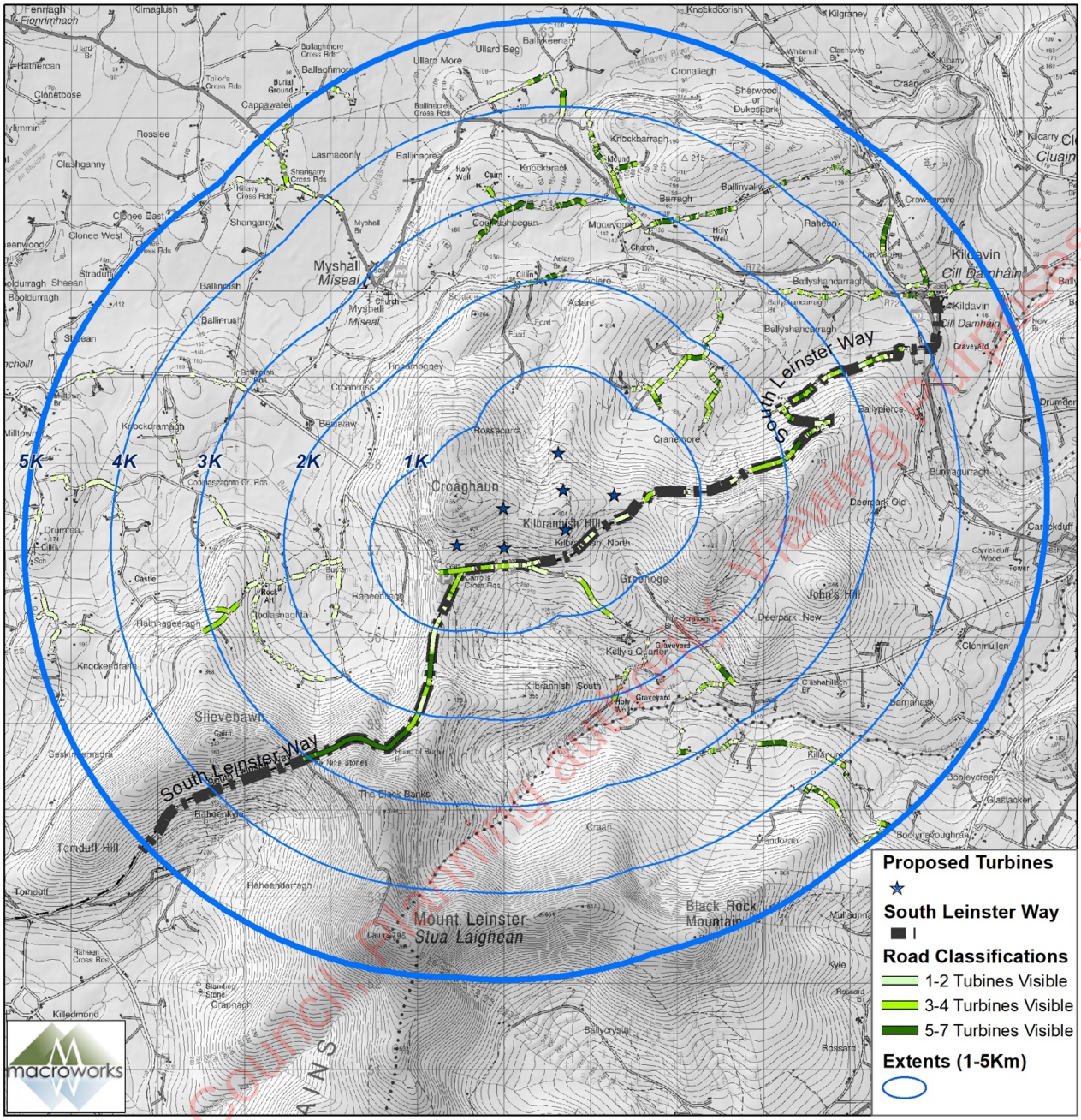


Figure 15.15: Map of Route Screening Analysis for 'Open Views'

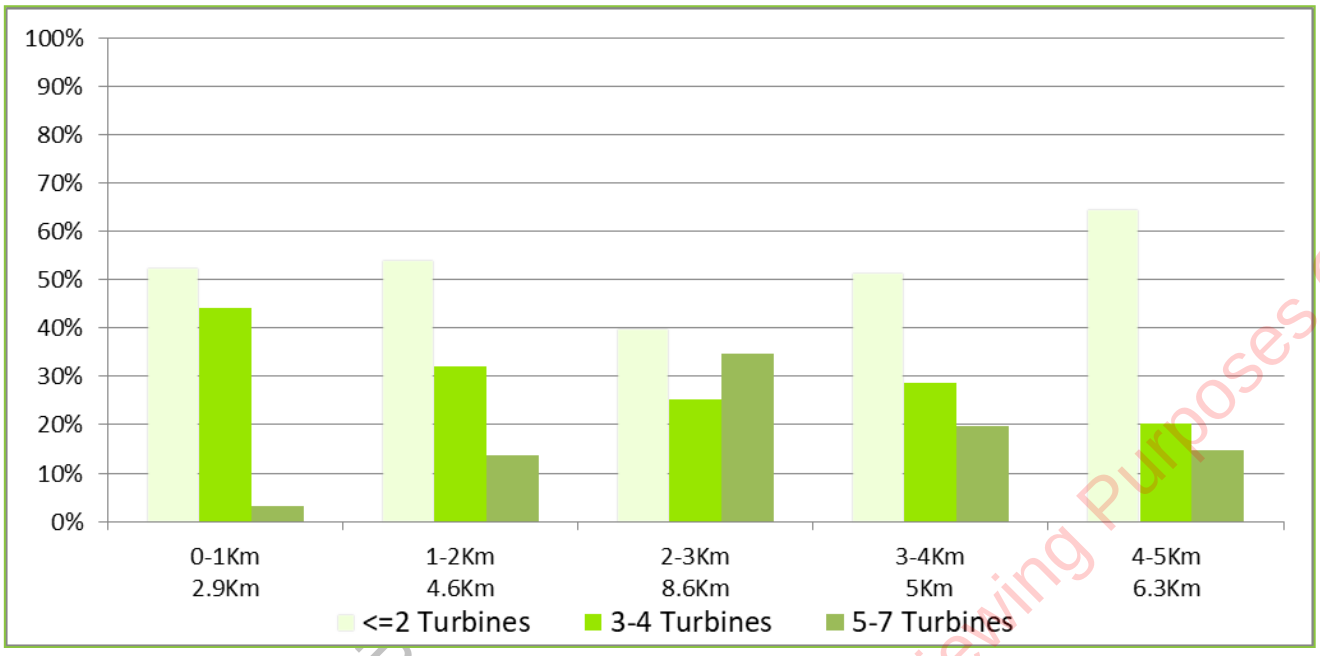


Figure 15.16: Graph illustrating RSA results for 'Open Views'

The results shown in **Figure 15.15** and **Figure 15.16** indicate that most commonly when an 'open view' of the project is afforded, it relates to the blade sets of less than 2 turbines. Indeed, this is the case between 40% and 64% of the time, with the view of 3-4 turbines occurring between c. 20% and 44% of the time. 'Open views' of 5-7 turbines only occurs between 3% and 34% of the time. The most notable aspect of this analysis is that the highest potential for 'open views' of up to 5-7 of the proposed turbines peaks at the 2-3km band and relates to the clear elevated views that will likely be afforded from the surrounds of the Nine Stones viewing point, which avails of little in the way of vegetative screening.

15.4.3 Visual Receptors

15.4.3.1 Centre's of Population and Houses

Situated just over 2km northwest of its nearest turbine, the small settlement of Myshall is the nearest centre of population to the proposed wind farm development. Located along the Mount Leinster Heritage Drive the settlement has a long religious history and includes the notable Adelaide Memorial Church. Situated just over 4km west of the Croaghaun Hill is the small village of Drumphea. The small settlement of Kildavin is located just over 4km northeast of the site whilst the modest-sized settlement of Bunclody is situated along the meandering corridor of the River Slaney and is just over 5km east of the proposed wind farm.

Within the wider study area in County Carlow are the settlements of Borris, Bagnelstown, Fenagh, Ballon, Leighlinbridge, and Tullow. Tullow is one of the larger settlements within the wider study area and is situated just under c.15km north of the site. Carlow town is situated just outside of the north-western periphery of the 20km study radius.

Within Wicklow in the eastern half of the study area are the settlements of Shillelagh, Carnew, and Clonegal, whilst within the southeast quadrant of the study area in County Wexford are the settlements of Ballycarney, Ballindaggan, Kiltealy and Ferns. The notable settlement of Enniscorthy is situated just outside the south-eastern periphery of the 20km study radius.

In county Kilkenny in the southwest quadrant of the study area is the picturesque town of Graiguenamanagh which is situated along the River Barrow, whilst further north along the River Barrow is the small town of Goresbridge.

15.4.3.2 Transport Routes

Oriented in a northeast by southwest direction the most notable major route within the study area is the M9 motorway which occurs on the outer northwest quadrant of the study area and is situated over c.17km from the site at its nearest point. Within the central study area, the most notable major route in relation to the main wind farm site is the N80 national secondary route which passes just over 3.5km east of the proposed development where it connects the towns of Enniscorthy, Bunclody, and Tullow. Other notable major routes within the central study area include the R724 regional road which links the settlements of Kildavin, Myshall, Fenagh, and Bagenalstown and is situated just over 2km north of the site.

Just over 6km southeast of the main wind farm site the R746 regional road links the settlements of Bunclody and Kiltealy before merging into the R730 and R702. The R702 regional road extends out in a westerly direction from Kiltealy passing through a valley in the Blackstairs Mountains and links with the settlement of Borris in the southwest quadrant of the study area. North of Borris the R705 extends out in a northerly direction and links with the settlements of Bagenalstown and Leighlinbridge before merging with the R448 and the M9.

In terms of local roads the nearest and most relevant to the main wind farm site L2026 and L3005 local roads which both occur immediately south of the main wind farm site and host sections of the Mount Leinster Heritage drive. A large number of local roads also criss-cross the wider study area, most notably to the north and west of the proposed development in the surrounds of the low-lying settled areas of the landscape.

15.4.3.3 Tourism, Recreational and Heritage Features

Mount Leinster and the Blackstairs Mountains are noted in the current CDP as “one of the most important natural attractions in the county” and provide ample opportunity for outdoor recreation and tourism. This area includes numerous walking routes, the most notable of which is the South Leinster Way, which commences at the settlement of Kildavin and passes across Croaghaun Hill and through the proposal site. The route carries on in a general southerly direction passing through the Blackstairs Mountains before existing the study area southwest of Graiguenamanagh. Two looped walks also occur in the immediate vicinity of the main wind farm site in Coillte owned lands, and include the ‘Kilbranish Loop’ and the ‘Wind Farm Loop’. Heritage features also play a notable role within the Blackstairs Mountains and their surrounds, many of which are included along the Mount Leinster Heritage Drive. The Blackstairs Mountains are also a popular launch location for hang gliders in Ireland.

The Mount Leinster Heritage Drive is a 75km looped scenic drive that includes heritage features, scenic walks, stately homes, and viewing points. Some of the more notable features along this route include; Adelaide Memorial Church located at Myshall, Huntington Gardens situated at the settlement of Clonegal, the Nine Stones Viewing Point, and Ballymoon Castle to name but a few.

A number of notable walking trails and cycling routes also occur within the wider surrounds of the study area. The 129km Wicklow Way concludes at the settlement of Clonegal in the eastern half of the study area. In County Wexford, a number of National Looped Walks occur in the surrounds of Slieveboy Mountain, whilst several looped walks also occur in the surrounds of Gibbet Hill east of Bunclody.

The Barrow Way occurs in the wider western half of the study area and follows the course of The River Barrow where it intersects with the South Leinster Way west of Borris. An on-road cycling route known as the 'Kilkenny East Cycle Route' also occurs in the wider south-western quadrant of the study area and passes through the settlements of Goresbridge and Graiguenamanagh.

Vinegar Hill is situated just over 22km southeast of the site east of Enniscorthy and is the site where the Battle of Vinegar Hill took place during the Irish Rebellion of 1798. The hill now contains a short looped walk to its summit where panoramic views are afforded across the surrounding countryside and beyond.

A number of other areas of outdoor recreation and sporting facilities are also located within the surrounds of the Croaghaun Hill. The Southern County Fishing Resort is located c. 4.5km west of the proposal site and comprises of 3 fishing lakes and a small café. Other notable local sporting facilities include Naomh Eoin GAA Club at Myshall and Halfway House GAA club at Bunclody. Kildavin Clonegal GAA pitches are located east of Kildavin, whilst the Bunclody Golf and Fishing Club are located along the banks of the River Slaney, north of Bunclody town centre.

15.4.3.4 Views of Recognised Scenic Value

Views of recognised scenic value are primarily indicated within County Development Plans in the context of scenic views/routes designations, but they might also be indicated on touring maps, guide books, road side rest stops or on post cards that represent the area.

All of the scenic routes and views that fall inside the ZTV pattern (see **Figure 15.12**) were investigated during fieldwork to determine whether actual views of the proposed wind farm might be afforded. Where visibility may occur, a viewpoint has been selected for use in the visual impact appraisal later in this chapter. In some instances, a single viewpoint is selected to represent a stretch of designated scenic route or a cluster of designated scenic views, particularly distant ones.

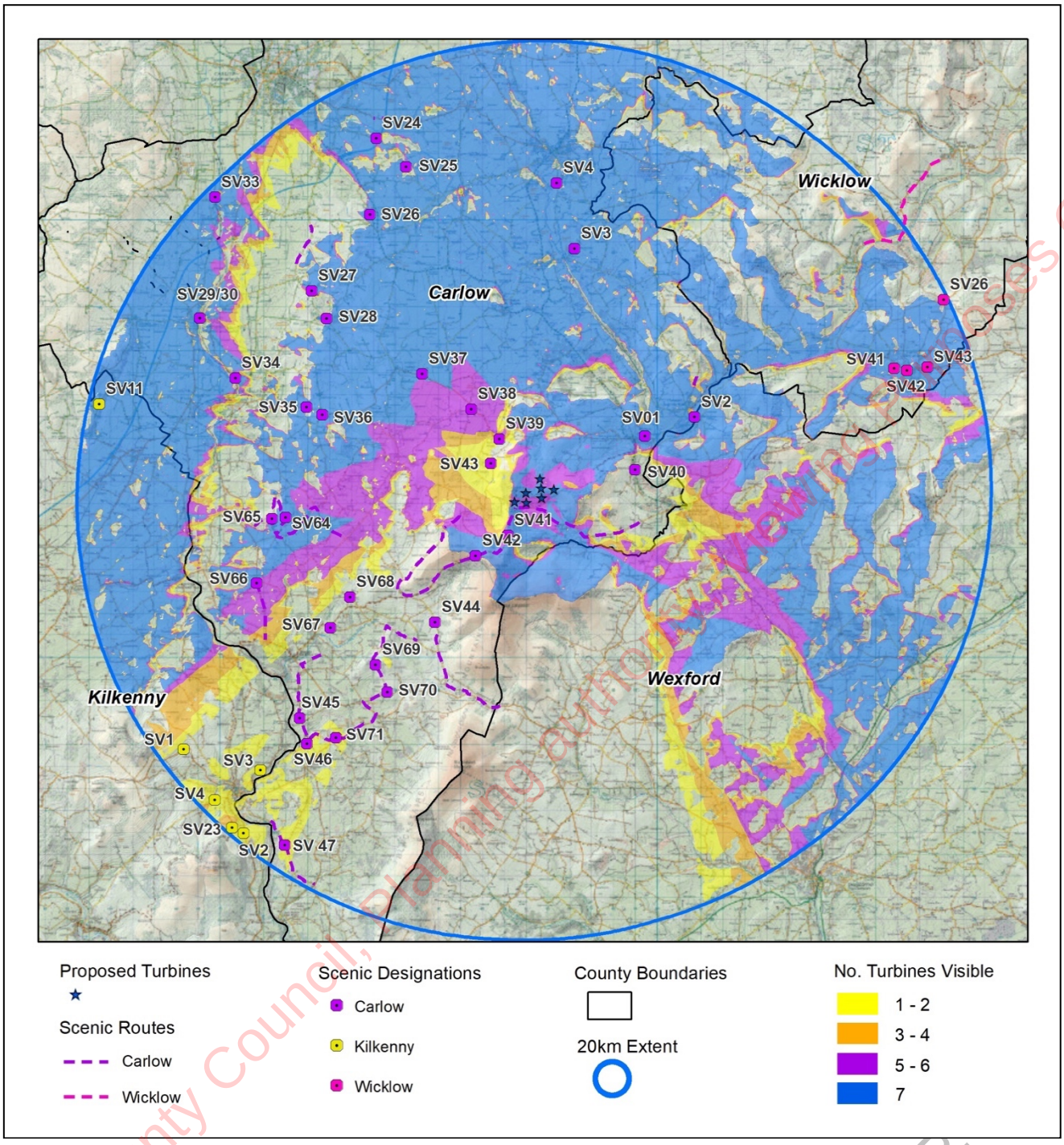


Figure 15.17: Map showing designated views in Carlow, Wicklow and Kilkenny overlaid on ZTV pattern

15.4.3.5 Carlow County Development Plan 2015-2021 – Views and Prospects

Part 6 of the current Carlow Landscape Assessment, which forms part of the current Carlow CDP includes a schedule of views prospects and scenic routes. All identified views situated within the 20km study radius are included in **Table 15.5** below in addition to their rational for selection/rejection as a viewpoint for this assessment.

Table 15.5: Rationale for selection of scenic designations within the Carlow County Development Plan

Carlow CDP ref:	Relevance to visual impact appraisal?	VP ref no.
Scenic Views and Prospects		
1	**Yes Relevant** – Views oriented in the direction of the site	VP17
2*	**Not Relevant** – High degree of mature vegetation in the direction of the project. View of turbines unlikely.	-
3	**Not Relevant** - High degree of dense mature vegetation in the direction of the site. View of turbines unlikely	-
4	**Yes Relevant** – Views oriented in the direction of the site	VP2
24	**Yes Relevant** – Views oriented in the direction of the site	VP1
25	**Not Relevant** – Localised view of church and near ridgeline. View of turbines unlikely.	-
26	**Yes Relevant** – Views oriented in the direction of the site (One illustrative view has been chosen to represent multiple views from this portion of the study area)	VP1
27	**Not Relevant** – Views oriented in the opposite direction to the proposed development.	-
28	**Not Relevant** – Views oriented in the opposite direction to the proposed development.	-
29/30*	**Not Relevant** – River corridor enclosed by dense mature vegetation. View of turbines unlikely.	-
33*	**Not Relevant** – Heavily enclosed view of River Barrow.	-
34	**Not Relevant** – View located outside of ZTV	-
35*	**Yes Relevant** – Views oriented in the direction of the site	VP8
36	**Yes Relevant** – Views oriented in the direction of the site (One illustrative view has been chosen to represent scenic views 35 and 36)	VP8
37	**Yes Relevant** – Views oriented in the direction of the site	VP9
38	**Yes Relevant** – Views oriented in the direction of the site (One illustrative view has been chosen to represent scenic views 37 and 38)	VP9
39*	**Yes Relevant** – Views oriented in the direction of the site	VP12
40	**Not Relevant** – View located outside of ZTV	-

Carlow CDP ref:	Relevance to visual impact appraisal?	VP ref no.
41	**Yes Relevant** – Views oriented in the direction of the site (One illustrative view has been chosen to represent scenic views 41 and 42)	VP29
42*	**Yes Relevant** – Views oriented in the direction of the site (One illustrative view has been chosen to represent scenic views 41 and 42)	VP29
43	**Not Relevant** – View oriented in the opposite direction of the proposed development	-
44	**Not Relevant** – View located outside of ZTV	-
45*	**Not Relevant** – View located outside of ZTV	-
46*	**Not Relevant** – View located outside of ZTV	-
47	**Not Relevant** – Low potential for site visibility as per ZTV. High degree of mature vegetative screening in the direction of the proposed development. Views of turbines unlikely.	-
64	**Yes Relevant** – Views oriented in the direction of the site	VP21
65	**Not Relevant** – View oriented in the opposite direction to the proposed development.	-
66	**Yes Relevant** – Views oriented in the direction of the site (One illustrative view has been chosen to represent scenic views 64 and 66)	VP21
67	**Not Relevant** – View located outside of ZTV	-
68	**Not Relevant** – View located outside of ZTV	-
69	**Not Relevant** – View located outside of ZTV	-
70	**Not Relevant** – View located outside of ZTV	-
71	**Not Relevant** – ZTV identifies a low potential for turbine visibility	-
Scenic Routes		
1	**Not Relevant** – Majority of scenic route located outsides of ZTV and views oriented in the opposite direction to the proposed development.	-
4	**Yes Relevant** – Views oriented in the direction of the site (One illustrative view has been chosen to represent multiple views from this portion of the study area)	VP1
5	**Not Relevant** – Scenic route located outside of ZTV	-

Carlow CDP ref:	Relevance to visual impact appraisal?	VP ref no.
10	**Yes Relevant** – Views oriented in the direction of the site	VP25
11	**Not Relevant** – Scenic route located outside of ZTV	-
12	**Yes Relevant** – Views oriented in the direction of the site	VP23
13	**Not Relevant** – Scenic route located outside of ZTV	-
14	**Not Relevant** – ZTV identifies very low potential for site visibility	-
15	**Not Relevant** – ZTV identifies very low/no potential for site visibility	-
16	**Yes Relevant** – Views oriented in the direction of the site	VP29
22	**Not Relevant** – ZTV identifies very low/no potential for site visibility	-
23	**Yes Relevant** – Views oriented in the direction of the site (One illustrative view has been chosen to represent multiple views from this portion of the study area)	VP21
24	**Yes Relevant** – Views oriented in the direction of the site	VP21

**Views which are identified of 'high importance' within the Wind Energy Strategy in the Current Carlow CDP 2015-2021*

15.4.3.6 Wicklow County Development Plan 2016-2022 – Views and Prospects

Views and prospects in County Wicklow are set out in Schedules 10.14 and 10.15 and Maps 10.14 and 10.15 of the current Wicklow CDP 2016-2022. All identified views situated in County Wicklow within the 20km study radius are included in Table 15.6 below in addition to their rational for selection as a viewpoint for this assessment. Objectives relating to views and prospects are also included within the current development plan and are listed below:

- ***NH52 –*** *To protect listed views and prospects from development that would either obstruct the view / prospect from the identified vantage point or form an obtrusive or incongruous feature in that view / prospect. Due regard will be paid in assessing development applications to the span and scope of the view / prospect and the location of the development within that view / prospect.*

Table 15.6: Rational for selection of scenic designations within the Wicklow County Development Plan

Wicklow CDP ref:	Relevance to visual impact appraisal?	Preliminary VP ref no.
Scenic Views and Prospects		
41	**Not Relevant** – View oriented in the opposite direction to the proposed development.	-
42	**Not Relevant** – View oriented in the opposite direction to the proposed development.	-
43	**Yes Relevant** – Views oriented in the direction of the site	VP10
Scenic Routes		
51	**Not Relevant** – Prospect located outside of ZTV	-

15.4.3.7 Kilkenny County Development Plan 2014-2020 – Views and Prospects

Views and prospects to be protected in Kilkenny are contained in Appendix H of the CDP and are shown on Figure 8.2. All identified views situated in County Wicklow within the 20km study radius are included in **Table 15.7** below in addition to their rational for selection as a viewpoint for this assessment. Objectives relating to views and prospects are also included within the current development plan and are listed below:

- ***8H –*** *To preserve and improve places or areas from which views or prospects of special amenity value exist, as identified in Appendix H and on Figure 8.2.*

Table 15.7: Rationale for selection of scenic designations within the Kilkenny County Development Plan

Kilkenny CDP ref:	Relevance to visual impact appraisal?	Preliminary VP ref no.
Scenic Views and Prospects		
1	**Not Relevant** – View located outside of ZTV	-
2	**Yes Relevant** – Views oriented in the direction of the site (One illustrative view has been chosen to represent multiple views from this portion of the study area)	VP36
3	**Not Relevant** – View located outside of ZTV	-
4	**Not Relevant** – View located outside of ZTV	-
11	**Yes Relevant** – Views oriented in the direction of the site	VP6
23	**Yes Relevant** – Views oriented in the direction of the site (One illustrative view has been chosen to represent multiple views from this portion of the study area)	VP36

15.4.3.8 Wexford County Development Plan 2013-2019

There are no designated scenic views identified within the current Wexford County Development Plan.

15.4.4 Identification of Viewshed Reference Points as a Basis for Assessment

The results of the ZTV analysis provide a basis for the selection of Viewshed Reference Points (VRP's), which are the locations used to study the landscape and visual impact of the proposed wind farm in detail. It is not warranted to include each and every location that provides a view of this development as this would result in an unwieldy report and make it extremely difficult to draw out the key impacts arising from the project. Instead, a variety of receptor locations was selected that are likely to provide views of the proposed wind farm from different distances, different angles and different contexts.

The visual impact of a proposed development is assessed using up to 6 categories of receptor type as listed below:

- Key Views (from features of national or international importance);
- Designated Scenic Routes and Views;
- Local Community views;
- Centres of Population;
- Major Routes; and
- Amenity and heritage features.

Where a VRP might have been initially selected for more than one reason it will be assessed according to the primary criterion for which it was chosen. The characteristics of each receptor type vary as does the way in which the view is experienced. These are described below.

Key Views

These VRPs are at features or locations that are significant at the national or even international level, typically in terms of heritage, recreation or tourism. They are locations that attract a significant number of viewers who are likely to be in a reflective or recreational frame of mind, possibly increasing their appreciation of the landscape around them. The location of this receptor type is usually quite specific.

Designated Scenic Routes and Views

Due to their identification in the County Development Plan this type of VRP location represents a general policy consensus on locations of high scenic value within the Study Area. These are commonly elevated, long distance, panoramic views and may or may not be mapped from precise locations. They are more likely to be experienced by static viewers who seek out or stop to take in such vistas.

Local Community Views

This type of VRP represents those people who live and/or work in the locality of the proposed EIA Development, usually within a 5 km radius of the site. Although the VRPs are generally located on local level roads, they also represent similar views that may be available from adjacent houses. The precise location of this VRP type is not critical; however, clear elevated views are preferred, particularly when closely associated with a cluster of houses and representing their primary views. Coverage of a range of viewing angles using several VRPs is necessary in order to sample the spectrum of views that would be available from surrounding dwellings.

Centres of Population

VRPs are selected at centres of population primarily due to the number of viewers that are likely to experience that view. The relevance of the settlement is based on the significance of its size in terms of the Study Area or its proximity to the site. The VRP may be selected from any location within the public domain that provides a clear view either within the settlement or in close proximity to it.

Major Routes

These include national and regional level roads and rail lines and are relevant VRP locations due to the number of viewers potentially impacted by the proposed development. The precise location of this category of VRP is not critical and might be chosen anywhere along the route that provides clear views towards the proposal site, but with a preference towards close and/or elevated views. Major routes typically provide views experienced whilst in motion and these may be fleeting and intermittent depending on screening by intervening vegetation or buildings.

Tourism, Recreational and Heritage Features

These views are often one and the same given that heritage locations can be important tourist and visitor destinations and amenity areas or walking routes are commonly designed to incorporate heritage features. Such locations or routes tend to be sensitive to development within the landscape as viewers are likely to be in a receptive frame of mind with respect to the landscape around them. The sensitivity of this type of visual receptor is strongly related to the number of visitors they might attract and, in the case of heritage features, whether these are discerning experts or lay tourists. Sensitivity is also heavily influenced by the experience of the viewer at a heritage site as distinct from simply the view of it. This is a complex phenomenon that is likely to be different for every site. Experiential considerations might relate to the sequential approach to a castle from the car park or the view from a hilltop monument reached after a demanding climb. It might also relate to the influence of contemporary features within a key view and whether these detract from a sense of past times.

It must also be noted that the sensitivity rating attributed to a heritage feature for the purposes of a landscape and visual assessment is not synonymous with its importance to the Archaeological or Architectural Heritage record.

The Viewshed Reference Points selected in this instance are set out in the Table 15.8 and **Figure 15-18** below:

Table 15.8: Description of selected Viewshed Reference Points (VRPs)

VRP No.	Location	Distance to nearest turbine	Direction of view
VP1	L3053 overbridge of M9 at Moyle Big	17.13km (T1)	SE
VP2	L20201 south of Tullow	13.54km (T1)	S
VP3	River Barrow at Leighlinbridge	16.68km (T3)	SE
VP4	L2035 at Ballon	7.67km (T1)	S
VP5	Wicklow Way at Aghowle	13.33km (T6)	SW
VP6	Local road at Shankill, west of M9	19.42km (T3)	E
VP7	L3049 at Fenagh	8.27km (T3)	SE
VP8	Ballymoon Castle	10.50km (T3)	SE
VP9	R724 north of Shangarry Crossroads	4.57km (T1)	SE
VP10	R725 at Carnew	16.75km (T6)	SW
VP11	R724 at Myshall	2.88km (T1)	SE
VP12	Adelaide Memoral Chruch, Myshall	2.73km (T1)	SE
VP13	L7109 east of Myshall	1.98km (T1)	S
VP14	N80 northwest of Kildavin	4.26km (T6)	SW
VP15	Huntington Castle	6.48km (T6)	SW
VP16	Watch House Village, Clonegal	7.57km (T6)	SW
VP17	L2027 at Kildavin GAA	4.92km (T6)	SW
VP18	L7005 southeast of Ballinrush Crossroads	2.98km (T3)	SE
VP19	L60665 at Cranemore	1.85km (T6)	SW
VP20	L20281 at Ballypierce	2.56km (T6)	SW
VP21	L70221 at Sliguff	10.56km (T3)	E

VRP No.	Location	Distance to nearest turbine	Direction of view
VP22	St Lazerian's Church, Drumphea	4.83km (T3)	E
VP23	L30011 at Coolasnaghta	2.43km (T3)	NE
VP24	Carpark west of Carroll's Crossroads	0.39km (T3)	NE
VP25	L2026 Local road at Kilbranish	0.71km (T7)	N/NW
VP26	Bunclody Football Club	5.57km (T6)	W
VP27	Local road at Gorteen south of Brady's Cross Roads	7.15km (T6)	W
VP28	Slieveboy Loop Walk	17.01km (T6)	W
VP29	Nine Stones viewpoint	2.99km (T3)	NE
VP30	Local road at Kilbranish south	2.01km (T7)	NW
VP31	L2006 at Clohamon	8.55km (T6)	NW
VP32	Local road at Ballinavocran	5.74km (T6)	NW
VP33	Mount Leinster	4.48km (T3)	N
VP34	Woodlawn Park, Borris	12.84km (T3)	NE
VP35	R745 west of Ferns	16.97km (T6)	NW
VP36	L8245 at Ballynakill south of Graiguenamanagh	19.53km (T3)	NE
VP37	Vinegar Hill, Enniscorthy	22.01km (T6)	NW

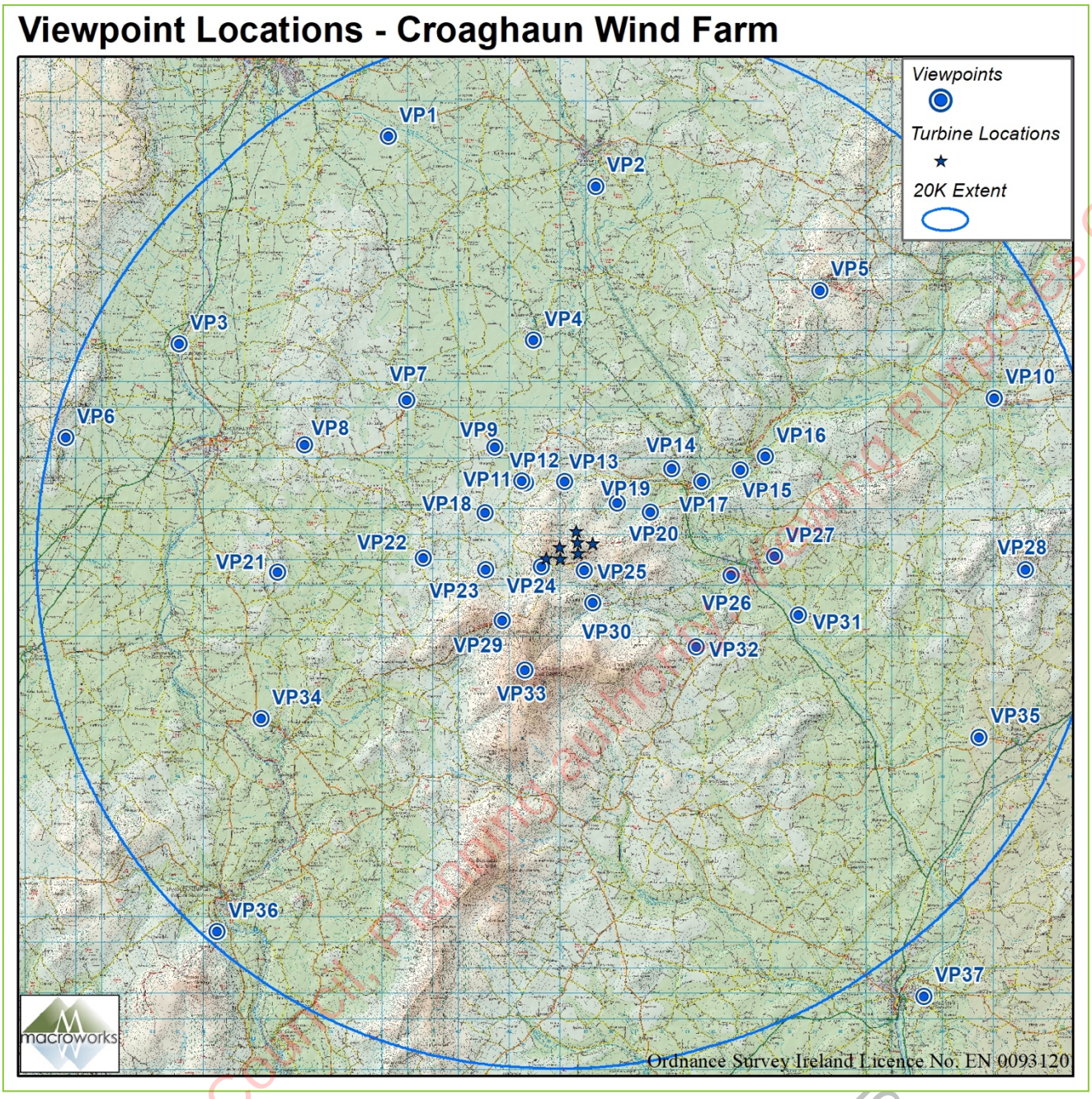


Figure 15.18: Map of Viewpoint Locations

15.5 Potential Impacts

Based on the assessment criteria employed herein, potential significant impacts are considered most likely to occur in instances where highly sensitive landscape and visual receptors coincide with high order landscape and visual effects (see descriptions in Table 15.1, Table 15.2 and **Error! Reference source not found.**). From Macro Works previous experience of this type of proposed development in a rural setting, it is considered that potentially significant landscape and visual impacts have the potential to occur in the following ways.

Landscape Impacts

a) Irreversible physical effects on sensitive landscape features

b) Disruption of existing land use patterns

c) Incongruous change to areas of sensitive landscape character.

Visual Impacts

a) A combination of visual and spatial dominance as seen from highly sensitive receptor locations. This is most likely to occur within 1-3km of the proposed development.

b) Visual clutter and ambiguity as seen from highly sensitive receptor locations. This can occur at any distance, but tends to occur beyond 2-3km as turbines can become stacked in perspective and a more two dimensional layout is perceived.

c) A combination of both of the above effects.

The above potential landscape and visual impacts are relevant for construction, operation and decommissioning of the project.

From baseline studies and early stage assessment specific to the proposed development, the most highly sensitive physical landscape receptor is considered to be Mount Leinster and the Blackstairs Mountains and their associated scenic and naturalistic values.

The most sensitive visual receptors are likely to be the designated scenic views and routes identified in the Carlow County Development Plan, which are sensitive receptor locations on the basis that they represent a consensus on scenic amenity. The Nine Stones viewing point is considered to be the most sensitive visual receptor within in the central study area, whilst Vinegar Hill in the wider study area is also considered to be a highly sensitive visual receptor.

15.6 Mitigation Measures

Given the highly visible nature of commercial wind energy developments it is not generally feasible to screen them from view using on-site measures as would be the primary form of mitigation for many other types of development. Instead, landscape and visual mitigation for wind farms must be incorporated into the early stage site selection and design phases.

In this instance, the two main forms of landscape and visual mitigation employed were:

- Mitigation by avoidance and design - using Reverse ZTV technology
- Buffering of Residential Receptors.

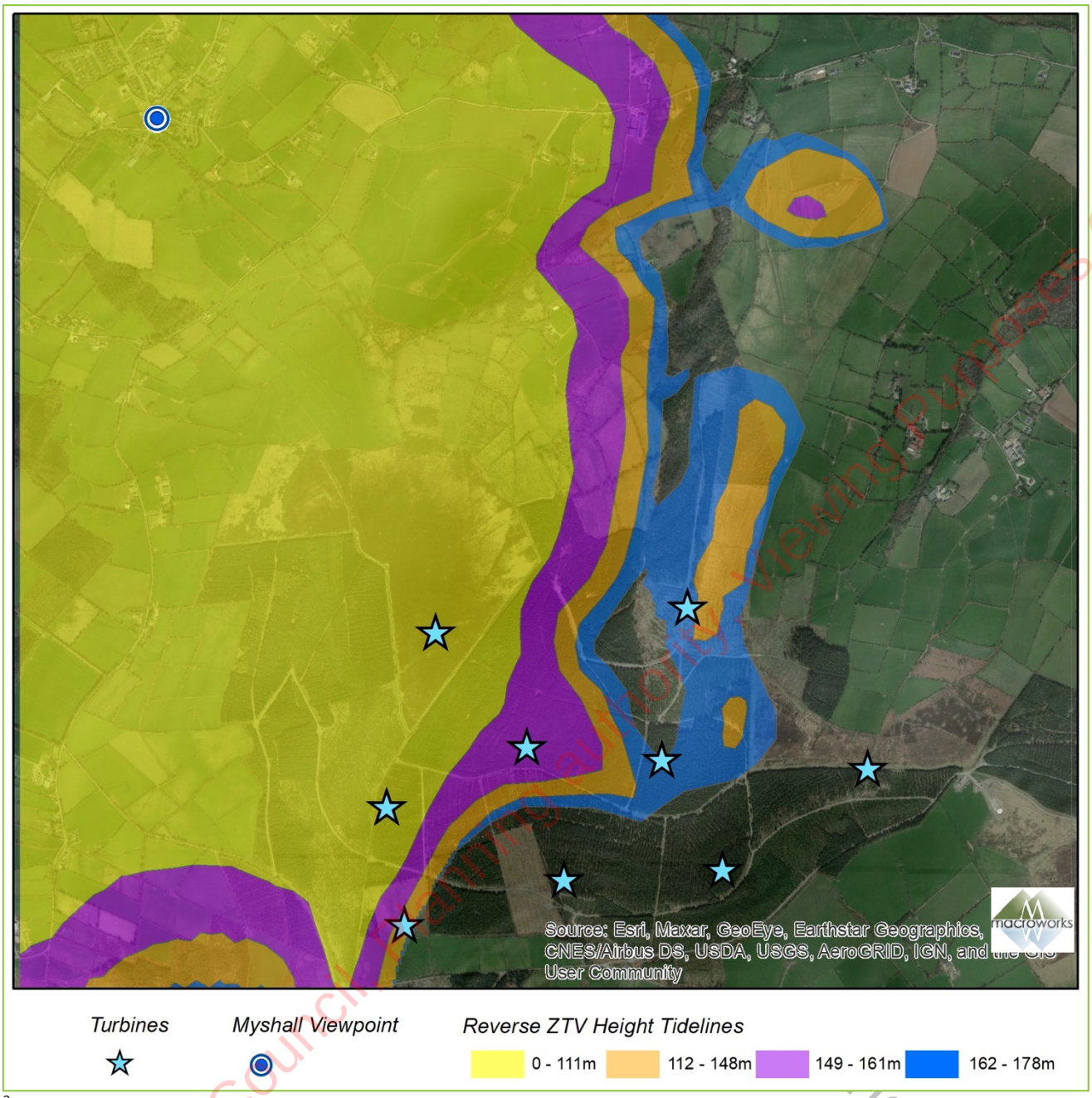
15.6.1 Mitigation by Avoidance and Design

During the early stages of the proposed Croaghaun Wind Farm it was identified that the central and wider study area was relatively constrained in terms of landscape and visual receptors. The Blackstairs Mountains and Mount Leinster Uplands were deemed the most sensitive landscape receptor within the study area, whilst the nearby settlement of Myshall was also deemed a sensitive visual receptor as a result of its heritage value and near distance to the proposed wind farm.

With regard to the Blackstairs Mountains and Mount Leinster, the Nine Stones Viewing point was deemed the most sensitive visual receptor, as a result of its highly scenic nature where up to eight surrounding counties are said to be visible on a clear day. The nine stones view is also a designated view within the Carlow CDP and is located along the South Leinster Way and Mount Leinster Heritage Drive. Several turbine layout options were presented to Macro Works at the early stages of the project, and ranged from 6 to 9 turbines with alternating tip heights and rotor diameters. A set of preliminary visuals was generated from key viewpoints within the central study area (including the nine stones viewing point) and each view was assessed on the basis of; the visual presence of the proposed turbines, the aesthetics of the proposed development, and the visual relationship of the proposed wind farm with the existing Greenoge Wind Farm. Each layout was rated in LVIA terms and the results were also combined with preliminary assessments from other EIA disciplines including noise, ecology, etc. From this early stage assessment, a final layout was generated which consisted of 7 turbines with a maximum tip height of 178m. An additional layer of assessment then took place to fine tune the visual aesthetics of the main wind farm site from the Nine Stones viewpoint. The main considerations here were to create a highly legible layout with as little turbine overlap as possible, whilst also maintaining a seamless visual relationship without undue scale conflict with the existing, smaller Greenoge turbines.

Reverse ZTV[1] maps were also prepared from Myshall, as the settlement and its associated heritage value were noted as potential constraints to the proposed project at an early stage (**Figure 15.19** refers). It was proposed to screen the proposed turbines insofar as possible from here to reduce the potential for visual impacts. Macro Works undertook a 'Reverse ZTV' exercise which identified areas within the site in which turbines could be placed whilst not being visible from particular locations, or only partially visible (i.e. partial views of blade tips). This exercise resulted in a layout that shifted further to the east away from the most elevated sections of Croaghaun Hill. As a consequence of this, theoretical visibility of the proposed turbines within the central areas of Myshall resulted in only partial views of blade tips of up to two turbines and the visual presence of the overall scheme was considerably reduced from this nearest settlement.

[1] Reverse Zone of Theoretical Visibility (ZTV) map generated from receptor location rather than the object (proposed turbines)



[2]

Figure 15.19: Reverse ZTV from the settlement of Myshall for early stage design. Note turbines outside of the ZTV pattern will not be visible from the selected receptor

15.6.2 Buffering of Residential Receptors

For the proposed Croaghaun Wind Farm, the minimum distance of any turbine from the nearest residential receptor is 984m, which is in excess of the draft Wind Energy Development Guidelines (2019) mandatory minimum set back of 500m and the setback distance of 4 times the tip height of the proposed turbines. In this instance the setback for visual amenity purposes would be 712m from residential receptors on the basis of the 178m high turbines.

[2] Height tideline – A height threshold represented in plan view indicating relative visibility of turbines from a given receptor.

Variation in residential buffer distances within the nearest kilometre has a much more noticeable effect on perceived turbine scale than when it occurs in the context of more distant views. This is due to the law of perspective – that doubling the distance to an object halves its perceived height. The reduction factor is even more pronounced when considered in the context of the 'swept area' of turbine blades and not just their tip height. This exponential 'scale in relation to distance' scenario is illustrated in Figure 15.20 below.

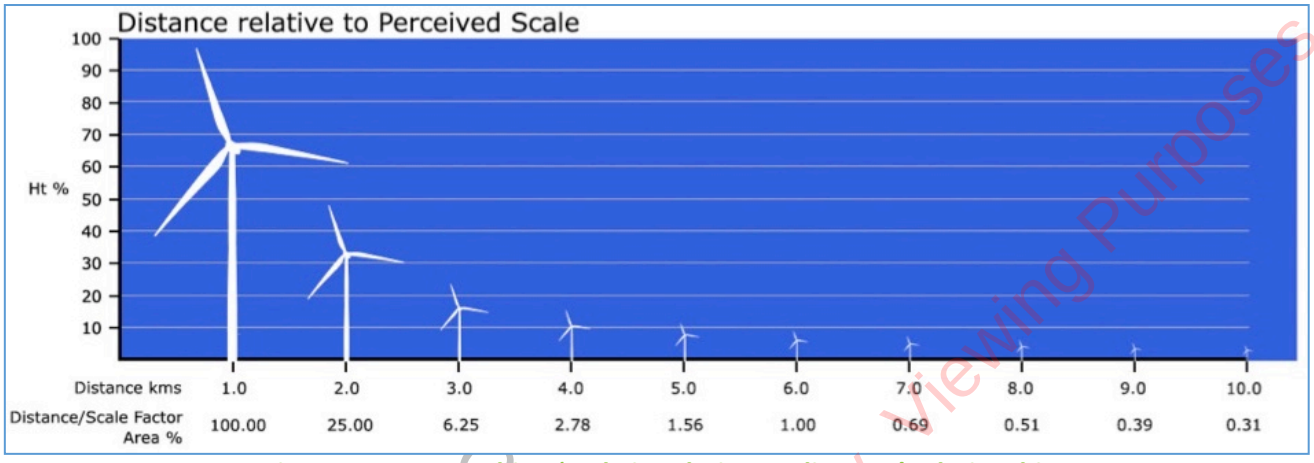


Figure 15.20: Turbine 'scale in relation to distance' relationship

15.7 Residual Landscape Effects

15.7.1 Landscape, Character, Value and Sensitivity

Effects on landscape character will be considered at both the localized scale of the site and its immediately surrounding landscape as well as the broader scale of the Study Area.

Central Study Area (<c. 5km from the nearest turbines)

The central study area comprises a complex mix of landforms and land uses with the site and its immediate surrounds located in an area of transitional landscape where the farmed Carlow lowlands transition to the distinct upland peaks and ridges of the Blackstairs Mountains. The site itself is located across Croaghaun Hill which accounts for the most northerly foothill in the Blackstairs Mountain range and rises to a max elevation of 455m AOD. Immediately east of Croaghaun Hill is a crest of similar-sized ridges and hills that eventually descend towards the settlement of Bunclody. A low ridge connects Croaghaun and its surrounding hills to the most prominent feature in the Blackstairs Mountains, Mount Leinster. Rising to a maximum height of 794m AOD, Mount Leinster is the highest peak in the Blackstairs Mountains and is viewed as a distinct landscape feature throughout Carlow and its neighbouring counties. This part of the study area is highly scenic, with panoramic elevated views often afforded across the lowlands of Carlow, Wexford and beyond. The principal ridgeline of the Blackstairs and Mount Leinster also denotes the county boundary between Carlow and Wexford. North and west of Croaghaun Hill the landscape is more homogenous in nature and principally comprises of flat to low rolling terrain. In comparison to the uplands, this is a settled area where landscape values typically relate to rural productivity as opposed to the more scenic and naturalistic values attributed to the Blackstairs Mountains.

In terms of the local population, much of this is contained to the north and west of the main wind farm site within the lowland context. Myshall is the only notable settlement within the central study area and has a notable degree of heritage value associated with it.

The small settlement has a long religious history and encompasses the Adelaide Memorial Church which is said to be a miniature version of Salisbury Cathedral and has been described as an "architectural gem". As a consequence of its heritage value, Myshall is also identified as a noteworthy stop along the Mount Leinster Heritage Drive route and as an attraction along 'Irelands Ancient East' . In general, the central study area has strong heritage, naturalistic, scenic, and recreational landscape values. The Blackstairs Mountains and its surrounding foothills host numerous scenic walking trails, the most prominent of which is the South Leinster Way and passes directly east and south of the site as it continues towards the settlement of Borris. Nevertheless, walking and hiking are not the sole outdoor recreational activities on offer here, as this area of the Blackstairs is also one of the best launch locations in the county for the Hang Gliding and Paragliding community. In terms of scenic amenity, the Nine Stones Viewing Point is one of the most prominent views within the Carlow where up to 8 surrounding counties can be viewed on a clear day. The view also has a historical relationship, with the alignment of the nine stones that abut the local road said to commemorate nine rebels killed in the area in 1798.

Much of the land use along the foothills and uplands of Mount Leinster is contained in commercial conifer plantations and mountain Moorland. A large portion of the Blackstairs is also under commonage, with agriculture mainly consisting of grazing by sheep. As the terrain descends towards the lowlands, pastoral farmland becomes the most prominent land-use comprising of a patchwork of small geometric fields often bound by dense mature hedgerow vegetation. A sense of the naturalistic is also evident in the surrounds of the River Slaney and its tributaries, where dense linear swathes of riparian woodland often flank the river corridor. However, any strong sense of the naturalistic within the immediate study area is typically diminished as a consequence of the existing Greenoge wind farm development situated immediate east of the proposal site and other typical utilitarian features such as the telecommunications masts perched at the summit of Mount Leinster and large blocks of commercial conifer forest plantations. Whilst the central study area possesses some sense of the naturalistic, this is a diverse and complex landscape setting which also encompasses a range of other anthropogenic land uses.

With regard to landscape designations within the relevant county development plans, the proposed site is located in the 'LCA – Mount Leinster Uplands' and the 'Uplands' landscape character type within the current landscape assessment for County Carlow. The majority of both the 'Mount Leinster Uplands' LCA and the 'Uplands' landscape type have been designated with a 'Level 5 – Most' sensitivity rating, the highest rating within the current landscape character assessment. This high sensitivity rating relates to the scenic, naturalistic and touristic values of the Blackstairs Mountains landscape which has also been designated as the 'Blackstairs Wilderness/Nature Sub Zone'. The sensitivity of the landscape also relates to the capacity the landscape has to accommodate new and different forms of development. The current CDP identifies that the 'Uplands' landscape type has a "low capacity to absorb wind turbines, overhead cables and masts, particularly in the upland areas where they would detract from the scenery and visitors' experience of 'wilderness'. Possible exceptions to this may include limited plantation forestry….". This is somewhat at odds with the Wind Energy Strategy for County Carlow where the majority of the areas designated 'open to consideration' in terms of wind farm development, are located within the 'Uplands' landscape type. The statement is also further at odds with the current baseline scenario of site which is comprises of large plantation forestry. It is important to note here that that proposed site is located in the northernmost aspect of the 'Uplands' landscape character type, which borders the 'Farmed Lowlands' immediately west and north of the site, and therefore possesses transitionary characteristics of both landscape types. As such, it is considered that the sensitivity of the immediate site surrounds is less sensitive than those areas of the landscape further south of Croaghaun Hill in the vicinity of Mount Leinster. Instead the immediate site surrounds, albeit a sensitive landscape, has more characteristics of a typical working landscape of coniferous forest plantations, rolling pastoral farmland and existing wind energy development, in comparison to the more naturalistic mountain moorland that cloaks Mount Leinster and its associated ridgelines further south.

On balance for the reasons outlined above, it is considered that the central study area is a complex transitional landscape that encompasses a range of contrasting values and sensitivities. Whilst there are strong scenic and naturalistic elements to the central study area, it is also heavily characterised by typical rural features such as agriculture and forestry. There are also some distinctly anthropogenic land uses that also have a strong influence on the central study area, such as the existing Greenoge wind farm, the large telecommunications poles at the summit of Mount Leinster, and large commercial conifer plantations. Consequently, the site and the central study area are deemed to have a collective **Medium** landscape sensitivity, albeit areas to the south of the site in the surrounds of Mount Leinster would increase to **High** sensitivity.

Wider Study Area (c. 5-25km)

The wider study area similarly comprises varied landforms and land uses. Much of the northern and western half of the study area is contained within the Carlow central lowlands where the terrain is typically flat to low rolling with some small locally elevated hills. The River Barrow also flows through the wider western half of the study area and has scenic, recreational and touristic values associated with it. Parts of the River Barrow corridor also delineate the county boundary between Carlow and Kilkenny in the southwest quadrant of the study area. West of the River Barrow and west of the picturesque settlement of Graiguenamanagh in county Kilkenny, the terrain begins to ascend towards a crest of rolling hills and ridges located on the south-eastern? periphery of the study area. Within the eastern half of the study area the meandering corridor of the River Slaney is one of the more prominent and sensitive landscape features. The Slaney enters the study area at its northern periphery before flowing south through Tullow and further south again to Bunclody before entering county Wexford. The terrain to the east of the River Slaney begins to transition to the rolling hills and ridges that characterise much of the southern portions of Wicklow and north-eastern portions of Wexford within the study area.

The southern half of the study area is the most distinctive in terms of land form. Much of this half of the study area is heavily influenced by the upland peaks and ridges within the Blackstairs Mountains. The Blackstairs Mountains divides the southern portions of the study area in two; areas to the southeast within Wexford and areas to the southwest in Carlow. Despite their separation by the Blackstairs, both the southeast and southwest quadrants are very similar in character and typically comprise of low rolling hills emanating from the upland areas of the Blackstairs that transition towards the settled lowlands which encompass meandering river corridors. The Blackstairs Mountains are the most prominent and sensitive designated landscape features within the study area as identified in the Carlow landscape assessment, and have typical scenic, naturalistic, and recreational values associated with them. They have been identified with a highly sensitive designation within the Carlow CDP, with much of the designated scenic amenity in county associated with views too or from their upland context.

Other distinctive landscape features include both the River Slaney and River Barrow which have similar scenic and naturalistic landscape values. The River Barrow hosts the Barrow Way and sections of the South Leinster Way whilst several golf courses, fishing clubs and heritage features are located along the River Slaney corridor. The study area has also been extended at its southeast quadrant to include for Vinegar Hill which is located immediately east of the River Slaney and the settlement of Enniscorthy, and is the site where the Battle of Vinegar Hill took place during the Irish Rebellion of 1978. Other sensitive landscape receptors within the wider study area include the several looped hilltop walks in the wider eastern half of the study area in the surrounds of Gibbet Hill and Slieveboy. The Wicklow Way also enters the study area in its northeast quadrant before terminating at the settlement of Clonegal just north of the 17th Century Huntington Castle and Gardens. The wider study area also has strong heritage values with a large proportion of these heritage features situated along the Mount Leinster Heritage Drive which passes through the settlements of Borris, Bagenalstown, Fenagh, Myshall, Kildavin, Clonegal, and concludes at Bunclody.

Notwithstanding these strong scenic, recreational, and heritage values, much of the wider study area relates to that of a typical rural Irish context where landscape values often relate to rural productivity, as opposed to the more susceptible scenic and naturalistic values associated with certain parts of the study area. The wider study area has notable anthropogenic landscape values which include busy major routes such as M9, M11 and N80, in addition to modest sized urban centres of Bunclody, Borris, and Tullow. In terms of industry there are large scale quarries located along the River Slaney just north of Bunclody, whilst several existing wind energy developments cloak the rolling hills in the wider eastern half of the study area in both Wicklow and Wexford.

For the reasons outlined above, the wider study area is generally considered to that of a typical settled working landscape of a **Medium-low** landscape sensitivity, but with occasional landscape features and areas of higher landscape sensitivity.

15.7.2 Magnitude of Landscape Impacts

The physical landscape as well as the character of the proposed development and its central study area (<5km) is affected by the proposed wind turbines as well as ancillary development such as access and circulation roads, areas of hard standing for the turbines, borrow pits, grid connection and the substation compounds. By contrast, for the wider landscape of the study area, landscape impacts relate almost exclusively to the influence of the proposed turbines on landscape character. The aspects of the proposed development that are likely to have an impact on the physical landscape and landscape character are described in Chapter 3 (Description of Proposed Development) with construction processes described in the Construction and Environmental Management Plan (CEMP) at Appendix 3.1.

15.7.2.1 Construction Stage Effects on the Physical Landscape

It is considered that the proposed wind farm development will have a modest physical impact on the landscape within the site as none of the proposed development features have a large 'footprint' and land disturbance/vegetation clearing will be relatively limited. The topography and land cover of the proposed site will remain largely unaltered with construction being limited to tracks, areas of hard standing for the turbines, the on-site substation compound, temporary site construction compound and borrow pits. Excavations will tie into existing ground levels and will be the minimum required for efficient working. Any temporary excavations or stockpiles of material will be re-graded to marry into existing site levels and reseeded appropriately in conjunction with advice from the project ecologist.

The finalised internal road layout has been designed to avoid environmental constraints, and every effort has been made to minimise the length of necessary roadway by utilising and upgrading existing forestry tracks. Furthermore, the road layout has been designed to follow the natural contours of the land wherever possible reducing potential for areas of excessive 'cut and fill'. There will be an intensity of construction stage activity associated with the access tracks and turbine hardstands consisting of the movement of heavy machinery and materials, but this will be temporary/short term in duration and transient in location. The construction stage effects on landscape character from these familiar and dispersed surface activities will be minor.

There will be one 38kV on-site substation compound constructed to collect the generated power from the proposed development before distributing it to the existing Kellistown substation. The 38kV on-site substation compound will be located in an area of conifer forest and will have dimensions of 50m x 25m. The sub-station building is single storey with a pitched roof and will have a concrete render finish of up to 6m in height.

The proposed substation compound, which will be enclosed by a 2.5 metre high steel palisade fence, will be heavily screened by the surrounding conifer forest and will be barely visible from surrounding road and residential receptors. The most notable construction stage landscape impacts resulting from the proposed on-site substation relate to the construction of concrete foundations to facilitate that substation building. Overall, these construction stage effects a relatively minor and compare to the construction of a small outbuilding/farm shed.

As part of the proposed development, works will also be required in proximity to the existing Kellistown substation. Two potential compound locations have been assessed as part of the proposed project and will measure approximately 61m x 50m and will both be located in an area of arable farmland immediately adjacent to the existing Kellistown site. The substation compound will include a substation control building of up to 6m in height and electrical components, and will appear in the immediate context of the existing substation. In similar circumstances to the on-site substation, construction stage landscape effects will arise from the preparation of the ground for the incoming control building foundations, in addition to the construction of access tracks and foundations for the surrounding site security fencing.

All internal site cabling will be underground and will follow site access tracks without the need for trenching through open ground. Indeed, the land cover of the site will only be interrupted as necessary to build the structures of the proposed wind farm and to provide access. Impacts from land disturbance and vegetation loss at the site are considered to be modest in the context of this landscape setting. Some forest felling will be necessary to accommodate the construction of some turbines, hardstands, crane pads, access tracks and the proposed onsite substation. All forestry that is removed (24.4ha) will be subject to forest replanting provisions, which are likely to be provided on sites at Sroove, Co. Sligo and Treanmanagh, Co. Clare.

One permanent meteorological (Met) mast shall be erected on site and will comprise of a 100m high lattice steel mast with a shallow concrete foundation, fixed to ground by anchors by 3 no. guy-wires. The most notable construction stage effects here relate to the minor amount of ground excavation require to facilitate the shallow foundations for the steel mast structure. The proposed project also includes the upgrade of 3.15km of existing forest tracks and paths that shall be re-purposed as recreational amenity trails for community use.

The grid connection cabling will run from the onsite substation across a combination of private lands and public roads generating land disturbance and associated movement of machinery and stockpiling of materials. The proposed grid connection route will include for directional drilling at up to 11 no. locations to cross existing watercourses and the N80 National Road. No overhead lines are required for this connection. Connection works will involve the installation of ducting, joint bays, drainage and ancillary infrastructure and the subsequent running of cables along the existing road network. This will require delivery of plant and construction materials, followed by ground excavation, laying of cables and subsequent reinstatement of trenches, and will result in minor and very localised construction stage landscape effects.

Site activity will be at its greatest during the construction phase due to the operation of machinery on site and movement of heavy vehicles to and from site. This phase will have a more significant impact on the character of the site than the operational phase, but it is a 'short-term' impact that will cease as soon as the proposed development is constructed and becomes operational (approximately 12-18 months from the commencement of construction).

There will be some long term/permanent construction stage effects on the physical landscape in the form of turbine foundations and hardstands, access tracks and a substation, but only the on-site and offsite substation and are likely to remain in perpetuity as part of the national grid network.

It is likely that with the exception of some residually useful access tracks, all other development features will be removed from the project site and it will be reinstated to agricultural or forestry use upon decommissioning. Thus, the construction stage landscape effects of the proposed development are largely reversible.

There will be some construction stage effects on landscape character generated by the intensity of construction activities (workers and heavy machinery) as well as areas of bare-ground and stockpiling of materials as identified in the Construction and Environmental Management Plan (CEMP). Such effects will be temporary/short term in duration and, therefore, not considered to be significant.

15.7.2.2 Operational and Decommissioning Stage Effects on Landscape Character

For most commercial wind energy developments, the greatest potential for landscape impacts to occur is as a result of the change in character of the immediate area due to the introduction of tall structures with moving components. Thus, wind turbines that may not have been a characteristic feature of the area become a new defining element of that landscape character. In this instance, wind turbines are a characteristic feature of the immediate and wider study area, especially to the east of the proposal project where the existing Greenoge turbines are located on the same ridge. The effect, therefore, is one of intensification and extension of an established land use in this landscape and not the introduction of a new and unfamiliar feature.

In terms of scale and function, the proposed wind farm is well assimilated within the context of the central study area. This is due to the broad scale of the landform, landscape elements and land use patterns. These attributes prevent the height and extent of the proposed wind farm causing the type of scale conflict that can occur in more intricate landscape areas. The rolling hills and ridges in the immediate surrounds of the main wind farm site have a notable utilitarian character due to the presence of the existing Greenoge wind farm and a number of sizable commercial conifer plantations. Even aspects of the more remote uplands to the south at Mount Leinster have something of a utilitarian character as a result of the several communications mast situated at its summit. Although the proposed development represents a stronger human presence and level of built development than currently exists on the site, it will not detract significantly from its productive rural character, which wind turbines already contribute to.

It is important to note that in terms of duration, this development proposal represents a long term, but not permanent impact on the landscape and is reversible. The lifespan of the project is 35 years, after which time it will be dismantled and the landscape reinstated to prevailing conditions. Within 2-3 years of decommissioning there will be little evidence that a wind farm ever existed on the site, albeit the proposed on-site and offsite substations will remain in perpetuity as part of the national grid infrastructure, in addition to some residually useful access tracks .

The decommissioning phase will have similar temporary impacts as the construction phase with the movement of large turbine components away from the site. There may be a minor loss of roadside and trackside vegetation that has grown during the operation phase of the project, but this can be reinstated upon completion of decommissioning.

It is proposed that the internal site access tracks will be left in place with the exception of T3 and T6 hard standings which will be fully reinstated.

In summary, there will be physical impacts on the land cover of the site as result of the proposed development during the operational phase, but these will be relatively minor in the context of this productive rural landscape that comprises of existing wind energy developments and extensive areas of commercial conifer forest.

The scale of the proposed development will be well assimilated within its landscape context without undue conflicts of scale with underlying land form and land use patterns. For these reasons the magnitude of the landscape impact is deemed to be **Medium** with the Central Study Area, whereas, beyond 5km from the site, the magnitude of landscape impact is deemed to reduce to **Low** and **Negligible** at increasing distances as the wind farm becomes a proportionately smaller component of the overall landscape fabric.

15.7.3 Significance of Potential Landscape Impacts

The significance of landscape impacts is a function of landscape sensitivity weighed against the magnitude of landscape impact. This is derived from the significance matrix (
Table 15.3) used in combination with professional judgement. Based on the assessment described in Section 15.7.1 and Section 15.7.2, the significance of impact is considered to be **Moderate** within the central study area.

For the wider study area (beyond 5km from the site), landscape impact significance is not considered to exceed **Slight** and will reduce to Slight and Imperceptible at increasing distances as the project becomes a progressively smaller component of the wider landscape fabric even in the context of higher sensitivity landscape units / features.

15.8 Residual Visual Effects

Error! Reference source not found. below summarises the full textual assessment of visual effects for each Viewshed Reference Point (VRP) contained in Appendix 15.1. Whilst the 'receptor sensitivity analysis table' and full textual assessment for each VRP is normally contained within the landscape and visual chapter, in this instance, given the considerable number of VRPs, it is considered more prudent to place this material in a separate appendix and focus herein on the significance of the findings. The left hand side of the table incorporates statistical data associated with the view of turbines, whilst the right hand side contains professional judgements in respect of the view. It is important to note that the professional judgements are based on the effects experienced in relation to the view and are not directly influenced by the statistical data. These aspects are only combined within **Error! Reference source not found.** in order to identify patterns of effect to better inform the conclusions of this assessment.

Table 15.9: Summary of Visual Effects at Viewshed Reference Points (VRP's)

VRP No.	Distance to nearest Visible turbine (km)	No. of turbine nacelles visible	Visual receptor Sensitivity (from Table 15.8)	Visual Impact Magnitude	Significance of Visual effect
VP1	17.13km (T1)	6	Low	Low-negligible	**Slight-imperceptible**
VP2	13.54km (T1)	7	Medium-low	Low-negligible	**Slight-imperceptible**
VP3	16.68km (T3)	0	Medium	Negligible	**Imperceptible**
VP4	7.67km (T1)	5	Medium-low	Low	**Slight**
VP5	13.33km (T6)	7	Medium	Low	**Slight**
VP6	19.42km (T3)	6	High-medium	Low-negligible	**Slight-imperceptible**

VRP No.	Distance to nearest Visible turbine (km)	No. of turbine nacelles visible	Visual receptor Sensitivity (from Table 15.8)	Visual Impact Magnitude	Significance of Visual effect
VP7	8.27km (T3)	7	Medium-low	Low	**Slight**
VP8	10.50km (T3)	3	Medium	Low-negligible	**Slight-imperceptible**
VP9	4.57km (T1)	6	Medium-low	Medium-low	**Moderate-slight**
VP10	16.75km (T6)	7	Medium-low	Low-negligible	**Slight-imperceptible**
VP11	2.88km (T1)	0	Medium	Low-negligible	**Slight-imperceptible**
VP12	2.73km (T1)	0	Medium	Low-negligible	**Slight-imperceptible**
VP13	1.98km (T1)	5	Medium-low	Medium	**Moderate**
VP14	4.26km (T6)	6	Medium-low	Medium-low	**Moderate-slight**
VP15	6.48km (T6)	7	Medium	Medium-low	**Moderate-slight**
VP16	7.57km (T6)	7	Medium-low	Low	**Slight**
VP17	4.92km (T6)	6	Medium	Medium-low	**Moderate-slight**
VP18	2.98km (T3)	2	Medium-low	Low	**Moderate-slight**
VP19	1.85km (T6)	5	Medium-low	Medium	**Moderate**
VP20	2.56km (T6)	5	Medium	Medium	**Moderate**
VP21	10.56km (T3)	4	Medium	Low	**Slight**
VP22	4.83km (T3)	4	Medium	Medium-low	**Moderate-slight**
VP23	2.43km (T3)	4	Medium	Medium-low	**Moderate-slight**
VP24	0.39km (T3)	6	High-medium	High-medium	**Substantial-moderate**
VP25	0.71km (T7)	6	High-medium	High-medium	**Substantial-moderate**
VP26	5.57km (T6)	0	Medium-low	Negligible	**Imperceptible**
VP27	7.15km (T6)	0	Medium	Low-negligible	**Slight-imperceptible**
VP28	17.01km (T6)	6	Medium	Low-negligible	**Slight-imperceptible**
VP29	2.99km (T3)	7	High	Medium	**Substantial-moderate**
VP30	2.01km (T7)	6	Medium	Medium	**Moderate**
VP31	8.55km (T6)	2	Medium-low	Low-negligible	**Slight-imperceptible**
VP32	5.74km (T6)	6	Medium-low	Medium-low	**Slight**
VP33	4.48km (T3)	7	High	Medium-low	**Moderate**
VP34	12.84km (T3)	1	Medium-low	Low-negligible	**Slight-imperceptible**
VP35	16.97km (T6)	5	Medium-low	Low-negligible	**Slight-imperceptible**
VP36	19.53km (T3)	0	Medium	Low-negligible	**Slight-imperceptible**
VP37	22.01km (T6)	5	High-medium	Low-negligible	**Slight-imperceptible**

15.8.1 Summary of Visual Impacts

The visual impacts of the proposed Croaghaun Wind Farm development were assessed across 37 different viewpoints that represent a wide range of angles, elevations, distances and receptor types within the study area. As noted in the summary table above (**Error! Reference source not found.**), the sensitivity of each visual receptor varied widely from Low to High which identifies the diverse and complex nature of the landscape within the study area. Those locations with the highest sensitivity tend to relate to outdoor recreationalists, such as hill walkers within the Blackstairs Mountains or sensitive heritage features within the wider surrounds of the study area. Alternatively, high to medium sensitivity receptors also relate to elevated parts of the study area that afford broad panoramic views across the surrounding landscape and/or are designated scenic views within the county development plans. Medium-low sensitivity receptors tend to relate to less remarkable and contained views from local and regional roads that are also influenced by a range of other anthropogenic land uses.

Of the 37 views assessed, 16 of these are deemed to have low range significance judgements (Slight-imperceptible/Imperceptible) and are typically associated with long distance views or views where the proposed turbines are heavily screened by a combination of terrain and dense areas of intervening vegetation. In some instances, clear views of the proposed wind farm are afforded from distant locally elevated areas of study area. In such instances, the turbines will appear as small scale background features and often present with a very low degree of contrast backed by the sky. In certain cases, most notably when viewing the proposed wind farm from the eastern and south-eastern parts of the study area, the turbines will be visible in combination with several other wind energy developments, and therefore, will appear as a characteristic feature of broad views. The turbines also present in combination with a range of other broad scale land-uses and landscape features, and as a result, they will not appear out of context or out of scale.

The highest impact significance typically relates to views from the Blackstairs Mountains within the central parts of the study area. The RSA also identified this area as the area most likely to afford clear views of up to 7 of the proposed turbines. Many of these views are representative of a mix of scenic designations and amenity and heritage features. The nearest viewpoint to the main wind farm site is VP24 (c.300m southwest of T1) and will afford a clear view of the proposed development at a near distance. The significance was deemed to be Substantial-moderate here as a result of the 'High-medium' sensitivity classification in combination with the 'High-medium' magnitude of visual impact judgement. Whilst the turbines present here at a sizable scale and have a highly dominant visual presence from this near distance, they will be viewed in a relatively clear and legible manner and will not have a notable bearing on the most sensitive aspect of this panorama which is to the west across the central Carlow lowlands.

In similar circumstances to VP24, VP29 is also judged to have a Substantial-moderate impact significance as a consequence of its 'high' sensitivity and 'medium' impact magnitude. This viewpoint is considered to represent the most highly sensitive visual receptor within the central and wider study area (the Nine Stones scenic view), as a result of its scenic, heritage and recreational value, and will afford a clear view of the main wind farm site from a distance of c.3km. All of the proposed turbines will be clearly visible from here and are viewed in a relatively unambiguous manner. Whilst the proposed wind farm will be a prominent feature of this view and will notably intensify the degree of built development visible from here, the turbines will not be viewed in the most sensitive aspect of this scenic designation which is to the west/northwest, as identified in the current landscape character assessment for Carlow. Instead they will contribute to a framing effect of this view at its eastern periphery.

The only other Substantial-moderate impact significance occurs along a local road scenic route in the townland of Kilbranish (VP25). The scale of the turbines will be slightly accentuated by the uphill nature of views afforded from here, however, only five of the proposed turbines will be visible to varying degrees.

There is a notable aesthetic merit to the proposed development from here as the turbines will typically be viewed in a clear and comprehensible manner with no apparent turbine overlap or sense of visual confusion. A strong sense of perspective is also generated from here as a result of the scale variation of the turbines from nearest to furthest. As is the case at both VP24 and VP29, the main wind farm site will have little impact on the visual amenity of the more sensitive aspects of this view, which are generally to the south towards Mount Leinster and the surrounding Blackstairs Mountains.

Other designated views within the wider Croaghaun Wind Farm study area can be broken down into two different categories; medium to long range views from the central Carlow lowlands, and elevated long distance views from the counties bordering Carlow. Impact significance for these medium to long range views generally ranges between Slight and Imperceptible.

Local community views represent those people who live, work and move around the area within approximately 5km of the site (the central study area). These are generally the people that are most likely to have their visual amenity affected by a wind energy proposal due to their proximity to the turbines. A range of viewpoints were selected to represent the views from within the local community and these include VP9, VP11, VP13, VP18, VP19, VP20, VP22 and VP30. In relation to impact significance judgements, VP13, VP19, VP20 and VP30 all received a 'Moderate' impact significance on the basis that they are they are the nearest local community views to the proposal site and will typically afford clear views of the proposed turbines. The clearest and most prominent views of the turbines to the north of the site occurs at VP19 where a slightly uphill view of the main wind farm site will be afforded. Although the turbines present in a dominant manner from here, this view represents a highly legible view of a wind energy development where the proposed turbines benefit from even spacing characteristics and there is no sense of visual clutter or confusion. Although not a local community view, VP33 also received a 'Moderate' impact significance. A clear and highly legible view of the proposed turbines is afforded from here, and in contrast to the four aforementioned viewpoints, the turbines do not present in a highly dominant manner from this viewpoint location. Instead, the 'moderate' impact significance relates more to the 'high' sensitivity of this receptor which in combination with a 'medium-low' visual impact magnitude results in a 'moderate' impact significance. Whilst the turbines will present as large scale features from some of these views, and will notably increase the intensity of built development, they do not appear incongruous in this landscape context where wind energy development is an established land use.

There are also several 'Moderate-slight' impact significance judgements which are typically middle to long range views within the study area. These views represent a combination of major routes, centres of population and amenity and heritage features. They range from clear distant views of the project to partial views of turbines substantially screened behind intervening landform and vegetation. In some instances a sense of visual ambiguity is generated by the degree of turbine overlap and/or turbine blade sets rotating against the ridgeline, however, this is often diluted by the clearer views of other turbines and the considerable viewing distances involved. VP14 is located on the outer periphery of the central study area and is a representative of views from the N80 national secondary route to the northeast of the site. Whilst there are some minor issues with turbine overlap here, overall, this is a relatively clear and comprehensible view of the main wind farm site from a locally elevated part of the study area.

In the majority of instances the proposed Croaghaun turbines will be viewed in the same context as the existing Greenoge turbines as a result of their near distance of less than 1km. As a result, this assessment is as much a cumulative assessment of both the proposed and existing developments as it is an assessment of the main wind farm site in its own right. Whilst there will be some VRP locations where both the proposed Croaghaun Wind Farm and existing Greenoge Wind Farm will appear with a minor degree of clutter and turbine overlap, for the most part, both developments appear together in a relatively clear and comprehensible manner with little apparent scale confusion, despite the fact that the existing turbines are considerably smaller in scale.

This is none more so evident than from VP29 where a strong sense of perspective is generated when viewing the proposed Croaghaun and existing Greenoge turbines in combination. Here, any sense of scale confusion is ameliorated by the newest of the Greenoge turbines which is notably larger than the remaining 4 Greenoge turbines and helps to soften the visual transition between both proposed and existing wind farm developments.

It is also important to note that a large part of some of the more sensitive areas within the 25km study radius will afford no visibility of the proposed development. Much of the Blackstairs Mountains south of Mount Leinster will afford no visibility of the proposed development along with considerable lengths of both the corridors of the River Barrow and River Slaney. Even where the proposed turbines are visible, significant visual impacts are not considered to occur in respect of the proposed Croaghaun Wind Farm. This is on the basis that the proposed turbines are considered to be well sited in a robust and transitional part of the study area that can accommodated a development of this scale and nature.

With regard to the proposed on-site substation, the residual visual impact is deemed to be negligible. This is on the basis that the proposed on-site substation will be heavily screened by the surrounding plantation forest and will be barely visible. The off-site substation is more likely to have a visual impact than on-site substation as it is proposed to be located in an area of lowland terrain typical characterised by pastoral farmland. Nevertheless, the off-site substation will be located in a neighbouring field to the existing Kellistown substation, and will appear as an extension to the existing development as opposed to a new and unfamiliar feature. The proposed substation compound will be located within the existing field pattern and will generate visual impacts that are typically in the lower order of magnitude.

15.9 Do Nothing Scenario

In a Do-Nothing scenario the existing conifer plantations that cloak the majority of the site would continue to be managed through rotations of commercial conifer planting and harvesting. The existing tracks would also remain and continue to be maintained for recreational uses.

15.10 Cumulative Impacts

The Scottish Natural Heritage (SNH) Guidelines relating to the Cumulative Effects of Wind Farms (2012) and the 3rd edition of the IEMA Visual impact Assessment Guidelines (2013) identify that cumulative impacts on visual amenity consist of combined visibility and sequential effects. The same categories have also been subsequently adopted in the Landscape Institute's 2013 revision of the Landscape and Visual Impact Assessment Guidelines:

> *"Combined visibility occurs where the observer is able to see two or more developments from one viewpoint. Combined visibility may either be in combination (where several wind farms are within the observer's arc of vision at the same time) or in succession (where the observer has to turn to see the various wind farms).*
>
> *Sequential effects occur when the observer has to move to another viewpoint to see different developments. The occurrence of sequential effects may range from frequently sequential (the features appear regularly and with short time lapses between, depending on speed of travel and distance between the viewpoints) to occasionally sequential (long time lapses between appearances, because the observer is moving very slowly and / or there are large distances between the viewpoints.)"*

Cumulative impacts of wind farms tend to be adverse rather than positive, as they relate to the addition of moving manmade structures into a landscape and viewing context that already contains such development. Based on guidance contained within the SNH Guidelines relating to the Cumulative Effects of Wind Farms (2005) and the DoEHLG Wind Energy Guidelines (2006), cumulative impacts can be experienced in a variety of ways.

In terms of landscape character, additional wind energy developments might contribute to an increasing sense of proliferation. A new wind farm might also contribute to a sense of being surrounded by turbines with little relief from the view of them.

In terms of visual amenity, there is a range of ways in which an additional wind farm might generate visual conflict and disharmony in relation to other wind energy developments. Some of the most common include visual tension caused by disparate extent, scale or layout of neighbouring developments. A sense of visual ambivalence might also be caused by adjacent developments traversing different landscape types. Turbines from a proposed wind farm that are seen stacked in perspective against the turbines of nearer or further developments tend to cause visual clutter and confusion. Such effects are exacerbated when, for example, the more distant turbines are larger than the nearer ones and the sense of distance is distorted. **Figure 15.10 below** provides criteria for assessing the magnitude of cumulative impacts.

Table 15.10: Outline Magnitude of cumulative impact

Magnitude of Impact	Description
Very High	• The proposed wind farm will strongly contribute to wind energy development being the defining element of the surrounding landscape. • It will strongly contribute to a sense of wind farm proliferation and being surrounded by wind energy development. • Strongly adverse visual effects will be generated by the proposed turbines in relation to other turbines.
High	• The proposed wind farm will contribute significantly to wind energy development being a defining element of the surrounding landscape. • It will significantly contribute to a sense of wind farm proliferation and being surrounded by wind energy development. • Significant adverse visual effects will be generated by the proposed turbines in relation to other turbines.
Medium	• The proposed wind farm will contribute to wind energy development being a characteristic element of the surrounding landscape. • It will contribute to a sense of wind farm accumulation and dissemination within the surrounding landscape. • Adverse visual effects might be generated by the proposed turbines in relation to other turbines.
Low	• The proposed wind farm will be one of only a few wind farms in the surrounding area and will be viewed in isolation from most receptors. • It might contribute to wind farm development becoming a familiar feature within the surrounding landscape. • The design characteristics of the proposed wind farm accord with other schemes within the surrounding landscape and adverse visual effects are not likely to occur in relation to these.

Magnitude of Impact	Description
Negligible	• The proposed wind farm will most often be viewed in isolation or occasionally in conjunction with other distant wind energy developments. • Wind energy development will remain an uncommon landscape feature in the surrounding landscape. • No adverse visual effects will be generated by the proposed turbines in relation to other turbines.

15.10.1 Cumulative Baseline

There are 13 operational wind farms and 1 permitted wind farm contained within the study area. These are set out in

below:

Table 15.11: Cumulative Wind Farms within the Study Area

Wind Farm Name	Number of Turbines	Distance and Direction from Proposed Development Site	Status
Greenogue Wind Farm	5	0.50km East of site	Existing
Ballon Turbine	1	6.79km Northwest of site	Existing
Monaughrim Turbine	1	7.87km Northeast of site	Permitted
Gibbet Hill Wind Farm	4	9.16km East of site	Existing
Ballindaggin Wind Farm	6	9.48km Southeast of site	Existing
Castledockrell Wind Farm	11	10.33km Southeast of site	Existing
Carranroe Wind Farm	1	10.62km Southeast of site	Existing
Knockalour Wind Farm	6	11.16km East of site	Existing
Ballaman Wind Farm	2	14.06km East of site	Existing
Ballycadden Wind Farm	9	14.20km East of site	Existing
Ballynancoran Wind Farm	2	14.75km East of site	Existing
Cronelea Wind Farm	9	17.35km Northeast of site	Existing
Shillelagh Wind Farm	1	18.44km Northeast of site	Existing
Tullow Mushroom Growers Turbine	1	19.87km Northeast of site	Existing

15.10.2 Cumulative Impacts

The appraisal of cumulative impacts with other wind energy developments is based on the cumulative ZTV maps and wireframes provided in **Appendix 15.2**. Given the absence of other tall structures within the study area, it is considered that there is no potential for in combination effects with other types of development.

15.10.2.1 Nature of Cumulative Visibility

The nature of cumulative visibility within the study area is analysed in **Table 15.12** below using the same viewpoints that are used for the main visual impact assessment:

Table 15.12: Nature of Cumulative Visibility

VRP Ref.	Number of other wind farms potentially visible	Nearer or further than the Proposed Development	Combined View (within a single viewing arc - 90°)	Succession View (within a series of viewing arcs from the same location)	Sequential View (view of different developments moving along a linear receptor)
VP1	5+	Nearer & further	Yes	Yes	Yes
VP2	5+	Nearer & further	Yes	Yes	-
VP3	0	-	-	-	-
VP4	5+	Nearer & further	Yes	Yes	-
VP5	5+	Nearer & further	Yes	Yes	Yes
VP6	5	Similar distance & further	Yes	Yes	-
VP7	5+	Similar distance & further	Yes	Yes	-
VP8	4	Similar distance & further	Yes	Yes	-
VP9	4	Similar distance & further	Yes	Yes	-
V10	5	Nearer & further	Yes	Yes	-
VP11	1	Further	No	Yes	Yes
VP12	1	Further	No	Yes	-
VP13	4	Similar distance & further	Yes	Yes	-
VP14	1	Similar distance	Yes	No	-
VP15	1	Similar distance	Yes	No	Yes
VP16	2	Nearer & similar distance	Yes	Yes	-
VP17	3	Similar distance & further	Yes	Yes	-
VP18	3	Further	No	Yes	-
VP19	5+	Similar distance & further	Yes	Yes	-
VP20	2	Similar distance & further	Yes	Yes	Yes

VRP Ref.	Number of other wind farms potentially visible	Nearer or further than the Proposed Development	Combined View (within a single viewing arc - 90°)	Succession View (within a series of viewing arcs from the same location)	Sequential View (view of different developments moving along a linear receptor)
VP21	3	Further	Yes	Yes	-
VP22	1	Further	No	Yes	-
VP23	2	Further	No	Yes	-
VP24	2	Further	Yes	-	-
VP25	2	Further	No	Yes	Yes
VP26	5	Nearer & further	Yes	Yes	-
VP27	3	Nearer & further	Yes	Yes	-
VP28	5+	Nearer & further	Yes	Yes	Yes
VP29	3	Further	Yes	Yes	Yes
VP30	3	Similar distance & further	Yes	Yes	-
VP31	5+	Nearer & similar distance	Yes	Yes	-
VP32	5+	Similar distance & further	Yes	Yes	-
VP33	5+	Further	Yes	Yes	-
VP34	1	Further	No	Yes	-
VP35	5+	Nearer & similar distance	Yes	Yes	-
VP36	1	Further	No	Yes	-
VP37	5+	Near & similar distance	Yes	Yes	-

15.10.2.2 Cumulative Impact Assessment

Although the anlaysis contained in table 15.12 and consideration of the Cumulative ZTV map in Appendix 15.2 relates principally to cumulative visual impacts (i.e. utililising the selected VP set), it also informs the closely related assessment of cumulative landscape impacts, particularly those relating to in-combination effects on the overall landscape character of the study area. The assessment below, therefore, relates to both cumulative visual effects and cumulative landscape effects.

The cumulative ZTV map (**Appendix 15.2**) shows the potential for cumulative visibility between the proposed turbines and all other existing wind farm developments within the 20km study area. At present there are 13 other operating wind farms within the study area in addition to 1 permitted singular turbine. For ease of cumulative assessment, they can be broken down into 3 clusters; the existing Greenoge turbines immediately east of the site, existing/permitted wind energy developments in the northern half of the study area, and existing windfarms to the east/southeast of the site.

The ZTV map (based on a bare ground scenario), identifies that the proposed Croaghaun Wind Farm has the potential to be viewed in isolation for only 4.6% of the study area whilst only 18.9% of the study will have no view of proposed, permitted or existing turbines. The most notable areas where the proposed turbines could theoretically be viewed in isolation occur immediately west of the site and in the wider western half of the study area. This is principally as a result of the lack of wind energy development in the western and northern half of the study area, and as a result of the high degree of terrain screening in the form of the Blackstairs Mountains, which typically screens the high number of wind energy developments in the eastern and south-eastern portions of the study area. Similarly, areas where no energy developments will be visible are predominately contained in the western and south-western portions of the study area which afford a high degree of screening from the Blackstairs Mountains. A channel of no turbine visibility also exists to the east of the River Barrow corridor as a result of a rolling ridge that is oriented in a general north-south direction.

Table 15.12 above gives an analysis of the nature of cumulative visibility within the study area based on the selected VRP's. In almost all case where the proposed Croaghaun Wind Farm will be clearly visible, it will also be theoretically visible in combination with at least one other existing/permitted development. Within the central study area and its wider surrounds the proposed development will most often be viewed in conjunction with the existing Greenogue turbines as they are situated less than 1km to the east of the site. In this respect, the visual assessment of the proposed windfarm is essentially a cumulative one as the existing Greenoge turbines are more often than not be viewed in conjunction with the proposed turbines and their cumulative relationship is examined in each case. In some instances a degree of visual ambiguity and scale conflict is apparent when viewing both the proposed Croaghaun turbines in combination with the smaller existing Greenogue turbines. Nevertheless, the apparent scale conflict is typically offset by the newest and larger of the existing Greenoge turbines which is the nearest adjacent existing turbine to the proposed Croaghaun development. The scale of this turbine is notably larger to that of its remaining four existing counterparts, and therefore, generates a much smoother visual transition to the considerably larger proposed Croaghaun turbines situated along the neighbouring ridgeline to the west.

Some of the most sensitive designated views occur to the south and southwest (Mount Leinster - VP33 and the Nine Stones view – VP29). In such cases, the smaller existing turbines are further from the viewer than the larger proposed turbines, which tends to accentuate the sense of perspective favourably giving an increased sense of space and distance rather than scale confusion.

The most notable cluster of existing wind farm developments occurs in the eastern half of the study area. A collection of five modest sized wind energy developments are located to the east of Bunclody and include Gibbet Hill, Knockalour, Ballynancoran, Ballycadden and Ballaman, whilst three wind energy developments are located to the south of Bunclody and include Ballindaggin, Carranroe and Castledockrell. In all instances where the proposed Croaghaun development is visible from the eastern and northern portions of the study area, it will be viewed in combination with the existing Greenoge development and/or the existing wind energy developments to the east/southeast of the proposed Croaghaun Wind Farm. As wind energy development is a notable established feature in the eastern and south-eastern portions of the study area, the proposed Croaghaun Wind Farm will only add marginally to the intensity of such development without materially contributing to a sense of proliferation.

A number of existing/permitted single turbine developments are also located in the wider northern half of the study area, whilst two modest sized wind energy developments are located on the north-eastern periphery of the study area in County Wicklow. These developments have the potential to be visible from many of the VRPs within the northern half of the study area albeit in the opposite direction to the proposed development. Furthermore, due to the relatively flat to low rolling terrain in much of this part of the study area, the single turbine developments will often be screened by intervening vegetation in combination with low rolling hills and ridges.

In terms of sequential cumulative views, the proposed development will theoretically be visible in combination with existing wind energy developments along a number of key linear receptors within the study area, most notably the N80 national secondary route, the South Leinster Way walking route and the Mount Leinster Heritage Drive. Furthermore, sequential cumulative views also have the potential to occur along the Wicklow Way and numerous regional roads within the wider study area. In general, sequential views are most likely to occur in the northern and eastern half of the study as this is where all of the existing wind energy developments occur within the study area. It is also important to note that some of the theoretical visibility will, in reality, be fully and intermittently obscured by vegetated rolling hills in combination with the high degree of existing roadside screening that border these linear receptors. Consequently, cumulative impacts along these linear receptors are not considered to be significant.

Overall, it is considered that the proposed Croaghaun turbines will often be viewed in combination with other wind energy developments, most notably the existing Greenoge turbines. However, rather than contributing to a sense of dispersal and proliferation they serve to consolidate and intensify the wind energy development already present on the Greenoge – Croaghaun ridgeline resulting in a combined development that still remains characteristic of medium-sized developments in this area (12 turbines). Overall, the proposed Croaghaun turbines will contribute an additional cumulative effect that is in the order of **Medium-Low** in respect of the impact classification in Table 15.10 above.

In respect of cumulative impacts with other forms of development, there are no other notable large scale developments within the vicinity of the wind farm site. A landscape and visual impact assessment was undertaken for the proposed replant lands in Sroove, County Sligo and Crag, County Limerick (Refer to Appendix 3.3 and 3.4). It is not considered that the replanting at either of these sites will result in any notable cumulative impacts, particularly given that they are in different counties.

FEHILY TIMONEY

30 YEARS

CONSULTANTS IN ENGINEERING, ENVIRONMENTAL SCIENCE & PLANNING

www.fehilytimoney.ie

CORK OFFICE
Core House
Pouladuff Road,
Cork, T12 D773,
Ireland
+353 21 496 4133

Dublin Office
J5 Plaza,
North Park Business Park,
North Road, Dublin 11, D11 PXT0,
Ireland
+353 1 658 3500

Carlow Office
Unit 6, Bagenalstown Industrial Park, Royal Oak Road,
Muine Bheag,
Co. Carlow, R21 XA00,
Ireland
+353 59 972 3800