Highfield Farm Wind Turbine Repowering

Landscape and Visual Appraisal

Prepared for

CONSTANTINE WIND ENERGY

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1.0 INTRODUCTION

1.1 Introduction

1.1.1 Axis has been appointed to undertake a Landscape and Visual Appraisal (LVA) for the proposed repowering of an existing wind turbine ('the Proposed Development').

1.1.2 The Proposed Development is located in West Cumbria, within the borough of Copeland. It is located approximately 2.4km south-east from the settlement edge of Whitehaven.

1.1.3 This standalone LVA report appraises the effects of the Proposed Development upon landscape character and visual amenity.

1.2 The Proposed Development

1.2.1 The existing turbine and Proposed Development are described in detail in the Planning Statement and illustrated on the Planning Drawings. For context, the existing turbine was consented in 2013 (application ref: 4/13/2157/OF1).

1.2.2 In summary, the Proposed Development would comprise the replacement of an existing wind turbine, which has a hub height of 30 metres and a blade tip height of 45.4m, with a new turbine that has a hub height of 50m and a blade tip height of up to 76m, subject to turbine availability. Paragraph 3.14 of the Planning Statement explains how there are three potential candidate turbines for the Proposed Development, the final selection of which would depend on market availability during implementation. As such, the Landscape and Visual Appraisal only considers the installation of the Vestas V52 model, as this comprises the tallest turbine, which would typically have the greatest landscape and visual effects.

2.0 LEGISLATION AND POLICY CONTEXT

2.1 Legislation, Policy and Guidance

2.1.1 Details of the planning and policy background for the proposal, including an appraisal of effects on relevant landscape-related policies, as set out in the adopted Statutory Development Plan, are included in the Planning Statement. Key legislation and policies relevant to the LVA are summarised below.

2.2 European Landscape Convention

2.2.1 The UK Government is a signatory of the European Landscape Convention (ELC), which became binding in March 2007. The Convention is aimed at the protection, management and planning of all landscapes and raising awareness of the value of a living landscape. It relates chiefly to public bodies and to the policies, plans and programmes produced by these.

2.2.2 This LVIA is a development specific process which accords with Article 6C of the ELC. This LVIA is informed by extant Landscape Character Assessment studies (described in Section 3.0 below), which more directly relate to the provisions of Article 6C.

2.3 National Planning Policy

2.3.1 National planning policy relevant to the potential landscape and visual effects of the proposed scheme is found within the National Planning Policy Framework (NPPF) (Department for Levelling Up, Housing and Communities, revised December 2023).

2.3.2 The NPPF sets out the Government's planning objectives to contribute to and enhance the natural and local environment by "*protecting and enhancing valued landscapes*" (Para.180 (a) Page 52). It also states the importance of *"recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services"* (Para. 180 (b) Page 52) Additionally, in planning decisions, "*Great weight should be given to conserving and enhancing landscape and scenic beauty in National Parks, the Broads and Areas of Outstanding Natural Beauty which have the highest status of protection in relation to these issues*" (Para. 182, Page 52).

2.4 Local Planning Policies and Supplementary Planning Guidance

2.4.1 The Local Planning Authority is Copeland Borough Council. As such the relevant plan is the Copeland Local Plan (Copeland Borough Council, 2013).

2.4.2 The following policies of relevance are:

Policy ENV5 – Protecting and Enhancing the Borough's Landscapes

7.6.2: *"The issue of landscape protection in the Borough is complex. Much of Copeland is, of course, within the Lake District National Park. There were a number of areas designated in the Copeland Local Plan 2001-16 as Landscapes of County Importance and the only other heritage landscape designation is the St Bees Heritage Coast (a national designation). The approach to landscapes outside nationally protected areas is changing. The emphasis is now on Landscape Character Assessment and protecting landscapes through sensitive development management based on the Assessment, rather than rigid designations*.

7.6.3: *Cumbria County Council undertook a Historic Landscape Characterisation Programme (published in 2009) and also published a Landscape Character Assessment Guidance and Toolkit in 2011 to help planners and developers protect the intrinsic qualities of the county's landscape assets. Pending a more detailed Assessment, to be undertaken for the Copeland plan area, the Council will continue to use the Landscapes of County Importance designation in development management decisions. It is expected that this work will be completed in time for the characterisation to be depicted on the Proposals Map when the map is revised following adoption of the Site Allocation and Policies Plan.*

Policy CC2PU: Wind Energy Developments

2.4.3 Copeland Borough Council have published the *Copeland Wind Energy Technical Document, 2022* which is referred to in Policy CC2PU of the Copeland Borough Council Local Plan (2021-2038). The following is relevant to the Proposed Development:

"Wind turbines 50m in height or over must be located in an Area Suitable for Wind Energy as shown on the Local Plan Proposals Map, unless the proposal is for the repowering of existing turbines or windfarms or is for a proposal to extend the life of an existing turbine."

2.4.4 The consideration of landscape sensitivity to wind turbine development within the study area is considered further as part of the appraisal of landscape effects, with particular focus on the host Landscape Character Types: 4: Coastal Sandstone, which is identified in the Copeland Wind Energy Technical Document as having Low/Moderate capacity for wind energy developments; and 5: Lowland, which is identified as having Moderate capacity for wind developments.

3.0 METHODOLOGY AND GUIDANCE

3.1 Guidance

3.1.1 The method of appraisal is based on the principles established in the best practice guidance, the Guidelines for Landscape and Visual Impact Assessment, Third Edition (GLVIA3). GLVIA3 states that any assessment of effects should be tailored to the specific nature and likely potential effects of the development proposed.

3.1.2 This LVA has followed a methodology which has been developed using the published good practice guidelines set out in the GLVIA3. A detailed methodology followed in undertaking this LVA is set out in **Appendix A**.

3.1.3 This LVA also follows the Landscape Institute's guidance regarding the production of visualisations TGN 06/19. A methodology describing how visualisations have been produced is set out in **Appendix B**.

3.2 Scope of the Appraisal

3.2.1 This appraisal considers the likely landscape and visual effects of the Proposed Development. The appraisal focuses on landscape character (the effect on the landscape resource) and visual amenity (the visual effect on people's views). Given the rural nature of the site, townscape effects are scoped out of this appraisal.

3.2.2 The appraisal focuses on the operational phase effects of the Proposed Development with only brief consideration of effects during construction. The appraisal focuses on effects of the Proposed Development immediately after completion of construction and the medium to long term effects of the Proposed Development when fully operational.

3.2.3 The appraisal acknowledges the contribution of heritage features to the landscape and visual baseline but excludes specific appraisal of any effect on the setting of the cultural heritage assets, which are properly dealt with by cultural heritage specialists.

3.3 Study Area

3.3.1 The Study Area for the LVIA has been determined by the computer-generated Zone of Theoretical Visibility (ZTV) for the Proposed Development, as presented on **Figures 2.1** and **2.2**. The ZTV extends for a 25km distance from the Proposed

Development. Reference was made to relevant NatureScot guidance[1], the most widely referenced guidance in the UK on the visual representation of wind farms, which recommends a 25km initial ZTV radius for turbines with a blade tip height of between 71m and 85m. The Proposed Development consists of a 76m high turbine, and will therefore an initial Study Area of 25km will be considered.

3.3.2 The 25km Study Area captures most areas that fall within the ZTV of the proposed scheme as shown on **Figure 2.1**. Outside of this Study Area, whilst visibility is theoretically possible over longer distances, the level of visual effect will diminish with distance and is unlikely to be considered material to the decision maker.

3.3.3 Referring to **Figure 2.1**, the inland ZTV coverage is largely confined to an approximate 10km radius from the Site. Given that the Proposed Development comprises a single turbine and it would form the replacement of an operational turbine at the Site, a maximum 10km Study Area will be used as a basis for assessing landscape and visual effects. This has been verified in site and desk studies. However, this focus has not precluded consideration of locations outside 10km and, for example, a viewpoint has been included from elevated ground within the Lake District National Park, 14km north-east of the Site. The focused 10km study area is shown on **Figure 2.2**.

3.3.4 Operational wind turbines within the study area form part of the LVIA baseline and their presence is taken into account in any conclusions made. A cumulative assessment is concerned with a scenario where these, along with other consented and proposed schemes are present alongside the Proposed Development. From a review of current planning applications within Copeland, there are no additional consented (and unbuilt) wind turbines or current wind turbine applications within the Study Area. Therefore, there are no cumulative schemes considered relevant to the Proposed Development, and hence an assessment of cumulative landscape and visual effects has not been carried out.

3.4 Appraisal Criteria

[1] *NatureScot (formerly Scottish Natural Heritage) (2017) Visual Representation of Wind Farms: Guidance*

3.4.1 Having applied professional judgement to assess the sensitivity of the baseline landscape and visual environment and to consider the magnitude of potential change that the Proposed Development would cause. These are then combined using further professional judgement to consider the level of effect.

3.4.2 An LVA is not typically produced as part of an Environmental Impact Assessment (EIA) process and therefore it is not necessary to identify 'significant effects.' It is however still appropriate to draw attention to any changes to landscape character or visual amenity which may be of particular note to the determining authority when considering the acceptability of a proposal. This approach is supported by GLVIA3 and subsequent clarifications provided by the Landscape Institute.

3.4.3 The level of effect can only be defined in relation to each particular development and its specific location. It is for each LVA to determine how judgements about receptor sensitivity and the magnitude of effect should be combined to derive the level of effect and to clearly explain how this appraisal has been made.

3.4.4 Refer to **Appendix A** which provides further explanation as to how sensitivity and magnitude are combined to identify the level of effect upon a receptor.

3.5 Limitations

3.5.1 There were no notable limitations to the production of this LVA.

3.5.2 The photography was undertaken at the end of winter when weather and light conditions are less favourable than summer months. This is sometimes evident in photography at viewpoints. However, the advantage of surveying during winter months is that trees have shed their leaves and this results in greater visibility across the landscape and a reasonable 'worst-case' appraisal of effects can be undertaken.

3.6 Data Collection

3.6.1 Baseline data for this LVA has been gathered by both desk- and field-based surveys. These have included reviews of extant landscape character assessment studies (see below) and field visits in February and March 2024 to gain an understanding of the landscape and visual context of the Site and to take photographs.

3.7 Zone of Theoretical Visibility (ZTV)

3.7.1 ZTV mapping has been used to help identify the extent of expected visibility of the Proposed Development.

3.7.2 The ZTV was produced using a Digital Terrain Model (DTM), OS Terrain 50 which is supplied by DEFRA. This is derived from terrain information and excludes surface screening features such as buildings and vegetation.

3.7.3 This data source gives a theoretical worst case analysis of visibility of the Proposed Development as it is based on landform alone and not surface screening features. However, it should be noted that any ZTV analysis should be seen as a tool which aids desk and site studies rather than being an absolute indicator of visibility and the assessor has verified the ZTV on site.

3.7.4 The ZTV shown on **Figure 2.1 and 2.2** reflects the theoretical visibility of the Proposed Development using the maximum tip height of the proposed turbine, which is 76m and a maximum hub height of 50m. The ZTV on **Figure 2.3** illustrates a comparison between the theoretical visibility of the operational turbine, based on a 45.4m tip height, compared to the tip height of the proposed turbine, 76m.

3.8 Visualisations

3.8.1 The methodology for the production of visualisations in presented in **Appendix B**.

3.9 Site Visit

3.9.1 Site visits were carried out in February and March 2024.

3.9.2 During the site visits, viewpoint photography was captured and the assessor gained familiarity with the wider Study Area by walking along public footpaths, across open access land, and by walking and driving along lanes and roads.

3.9.3 Viewpoint locations were refined during the site visit to avoid localised screening and to select camera positions to illustrate the most representative views.

4.0 BASELINE

4.1 Data Collection

4.1.1 Baseline data for the LVA has been gathered by both desk and field based surveys. This includes a review of landscape character assessment studies (see below), and field visits to gain an understanding of the landscape and visual context of the Sites.

4.2 The Site and its Surroundings

4.2.1 The Site is located close to the Cumbrian coastline, 1.1km west of the village of Bigrigg and 1.7km north-east of the settlement edge of St. Bees. The Site is situated at the top of a plateau at 120m AOD, just above the Pow Beck Valley which is located directly to the west. It comprises a small to medium sized field with hedgerows to the south, south-west and east. To the west, the field is bound by a small access track. The Site includes an access track leading to a single operational turbine with a hub height of 30m and a 45.4m tip height. The operational turbine is situated on a small foundation pad and hardstanding. The Site is not crossed by any Public Rights of Way (PRoW).

4.2.2 The wider landscape consists of open farmland plateau with scattered farmsteads and woodland along the valley sides, particularly a large block of ancient woodland to the north. The Cumbria Coast Rail Line runs through the Pow Beck Valley to the west, connecting St.Bees to Whitehaven. The coastline is located 3km south-west at its nearest point to the site.

4.3 Landscape Designations

Statutory Landscape Designations.

4.3.1 The Site is not covered by any landscape designations.

4.3.2 The Study Area includes the western extent of the Lake District National Park, the boundary of which is approximately 5km east of the site and will therefore be considered further in this appraisal.

4.4 Landscape Character

National

4.4.1 At a national level, 159 National Character Areas (NCA) have been identified by the former Countryside Commission (now Natural England). Details of each NCA are available via the Natural England website[2].

4.4.2 NCAs provide background and context to more detailed landscape character assessments produced at county and district levels. Their broad geographic reach means that the key characteristics identified as typical of a particular NCA may not necessarily apply to a specific location within that NCA.

4.4.3 The Proposed Development is located within **NCA7: West Cumbria Coastal Plain**, the key characteristics of which are:

"The NCA consists of an undulating coastal landscape of varying width with open views to the Cumbria High Fells NCA and across the Irish Sea to Galloway and the Isle of Man.

The area has a diverse, open coastline ranging from depositional sand, shingle and pebble beaches and sand dunes, through low soft cliffs of glacial or industrial origin, to high sandstone cliffs with a rich and varied flora and fauna, including dune grasslands, seabird colonies and the natterjack toad.

There are lowland river valleys with limited ancient semi-natural woodland, and expansive estuarine landscapes with lowland raised mires, salt marshes, mudflats and intertidal habitats with large numbers of wintering waders and wildfowl.

Important areas of brownfield biodiversity, often in urban-fringe locations, are characterised by rare plants, reptiles and invertebrates including the small blue butterfly.

The area includes open pastoral farmland with occasional woodlands, basin and valley fens, remnant semi-natural grasslands/meadows associated with streamsides, low-lying land, and localised pockets of arable land supporting species such as curlew and wintering hen harrier.

[2] Natural England, 2014. *National Character Area profiles.* [online] <https://www.gov.uk/government/publications/national-character-area-profiles-data-for-local-decision-making/national-character-area-profiles> [accessed 18 Oct 2023]

There are areas of ancient enclosure with medium to large rectilinear fields and few hedgerow trees. They are bounded by hedges (often gappy and augmented by wire fences), stonewalls on higher ground, and stone-faced earthbanks locally known as 'kests' along the coast.

There is limited tree cover, with most woodland to be found on steeper slopes and along river corridors. There are some plantation woodlands and shelterbelts associated with the upland margins of the area and former open cast mining sites.

There is a dispersed rural settlement pattern of hamlets and isolated farmsteads with some villages.

Distinctive building materials are a combination of locally quarried red sandstone, red brick and render augmented by coastal pebbles along the southern coast.

Larger urban settlements and coastal towns are closely linked with the growth and location of the area's strong industrial history of coal and iron ore mining, processing ore, smelting and ship-building.

Extensive urban-fringe influence is linked to highly visible industrial past and present, including quarrying, open cast mining, restoration and reclamation initiatives, manufacturing and processing plants and the nuclear energy industry.

A rich history is evident in the pattern of land use and heritage features dating from the Neolithic period onwards, including earthworks, forts and castles and all the Roman coastal forts that form part of the Hadrian's Wall World Heritage Site."

Local

4.4.4 This appraisal will consider the following landscape character studies:

i) Copeland Landscape Character Assessment, 2021.
ii) Lake District National Park Landscape Character Assessment and Guidelines, Revised 2021.
iii) Cumbria Landscape Character Guidance and Toolkit, 2011.

4.4.5 The landscape appraisal focuses on the Copeland and Lake District Landscape Character Assessments. The Copeland Landscape Character Assessment is the most recent, and therefore relevant, landscape study, however it frequently

references the Cumbria Landscape Character Guidance as a data source, hence its inclusion as a relevant source of data for this appraisal.

4.4.6 The Site is situated close to the boundary of **LCT4: Coastal Sandstone** and **LCT 5b: Lowland – Low Farmland** and these 'host' character types form the focus of the landscape appraisal. In addition to these LCT's, the Study Area consists of the following areas most likely to be subject to change due to the Proposed Development, in particular where there is extensive ZTV coverage, as demonstrated on **Figures 1a and 1b**:

i) 1a: Bay and Estuary – Intertidal flats (Copeland).
ii) 5a: Lowland ridge and valley (Copeland).
iii) 5d: Lowland – Urban Fringe (Copeland).
iv) 9a: Intermediate moorland and plateau – Open moorlands (Copeland).
v) 9d: Intermediate moorland and plateau – Ridges (Copeland).
vi) 11a: Upland Fringe – Foothills (Copeland), which directly connects to (Lake District) G: Rugged / Angular Slate High Fell.

4.4.7 These Copeland and Lake District National Park LCT's will be reviewed as part of the appraisal of effects in **Section 5**.

4.5 Visual Baseline

ZTV and General Visual Context

4.5.1 Two ZTVs have been produced to determine the overall extent of theoretical visibility of the Proposed Development:

i) A ZTV of the proposed turbine hub and blade tip ZTV (**Figures 2.1 and 2.2**).
ii) A comparative blade tip ZTV of the operational turbine on the site and the proposed turbine (**Figure 2.3**).

4.5.2 The ZTVs illustrate the following with regards theoretical visibility coverage of the proposed turbine:

i) The majority of visibility would mostly be contained within a 10km radius from the site.
ii) While there is reasonably extensive ZTV coverage within close proximity to the site, there are areas of lower ground that would be screened, notably to

the west and south-west in the lower valley directly adjacent to St Bees, and 2km to the east and south-east, on the edge of Egremont and in the vicinity of the A5096 road.

iii) Much of the coastline is excluded from the ZTV, likely due to its low position and there would be at most glimpsed views of the proposed turbine from the English Coastal Path. Visibility would be constrained to a small section of St.Bees Beachfront.

iv) There is theoretical visibility from nearby settlements of Whitehaven, Egremont, Cleator Moor and St Bees. However, ground truthing of the ZTV on site has demonstrated that visibility of the proposed turbine would be limited to isolated locations within the settlements as buildings and intermittent tree cover screen most views out. Some views may be possible from upper storey windows of properties on the periphery of settlements which face the site.

v) The ZTV coverage extends into the very western extent of the Lake District National Park, which is 14km away at its nearest point. However, coverage is sporadic and relatively limited, indicating negligible visual effects overall on receptors within the National Park.

4.5.3 The comparative ZTV illustrated on **Figure 2.3** demonstrates that the potential additional visibility of the proposed turbine would be relatively limited in relation to that of the operational turbine, indicating that visual effects are likely to be contained to areas where the turbine is already a feature of existing views and therefore the assessment of landscape and visual effects primarily relates to the increase in size of turbine in existing views and on the same landscape character areas.

Viewpoints

4.5.4 The LVA includes an appraisal of visual effects from seven representative viewpoints. The locations of the viewpoints are shown on **Figures 2.1** and **2.2**. Wireframes and photomontages from each Viewpoint are presented on **Figures 4.1 to 4.7.** The Viewpoints illustrate the view towards the Site from different directions within the Study Area, and in some instances the degree to which views of the Site are screened by existing features. The precise location of each Viewpoint was determined in the field, following a review of the relevant published studies and ZTVs.

4.5.5 In accordance with the guidance set out in GLVIA 3, each viewpoint falls into one (or more) of three broad categories, as follows:

i) Representative viewpoints (which represent the experience of different types of receptors in the vicinity of the viewpoint).
ii) Specific viewpoints (a particular view, for example a designed view, or from a well-known beauty spot).
iii) Illustrative viewpoints (which illustrate a particular effect/issue, which may include limited or no visibility).

4.5.6 It is important to recognise that the absence of a viewpoint from a particular location does not imply that there would be no view of a development proposal. NatureScot's visualisation guidance document states that:

"It is important to stress that viewpoint assessment forms just one part of LVIA. Because of the powerful nature of viewpoint images and the widespread recognition of some of the locations from where these are taken, there is often over-emphasis on their role…"

4.5.7 **Table 1** sets out the viewpoint type and the representative visual receptors covered by each Viewpoint.

Table 1: Representative Viewpoints

Viewpoint	British National Grid Coordinates & Elevation (AOD)	Viewpoint Type / Visual Receptor
1 – Whitehaven	2298317, 515204 19m AOD	Representative Viewpoint - Residential area, located 2.5km to the north, north-west of the Site
2 – Egremont	299917, 511134 80m AOD	Representative Viewpoint - Residential area, located 1.9km to the south, south-east of the Site
3 – Bigrigg	300047, 513184 99m AOD	Representative Viewpoint - Residential area, located 1.2km to the east, north-east of the Site
4 – St. Bees	296961, 512093 10m AOD	Representative Viewpoint – Residential area, located 2.1km to the west, south-west of the Site
5 – Cleator Moor	301639, 514591 77m AOD	Representative Viewpoint - Residential area, located 3.2km to the north east of the Site
6 – Coastal path, St.Bees Beachfront	295922, 511874 10m AOD	Representative Viewpoint - Footpath users, located 3.2km to the west, south-west of the Site
7 – Lake District National Park (Blake Fell)	311036, 519681 572m AOD	Specific Viewpoint - Footpath users, located 13.9km to the north-east of the Site

Viewpoint	British National Grid Coordinates & Elevation (AOD)	Viewpoint Type / Visual Receptor

5.0 APPRAISAL OF EFFECTS

5.1 Construction Stage

5.1.1 Refer to the Planning Statement for a description of the construction stage of the Proposed Development.

5.1.2 The construction process is described in the Planning Statement and would comprise the decommissioning and removal of the existing turbine, and the subsequent installation of the proposed turbine.

5.1.3 The existing access track to the Site would be used during the construction process, along with the existing hard standing to accommodate the mobile crane units required to remove the existing turbine and erect the proposed turbine. It is anticipated that decommissioning of the existing turbine, and installation and commissioning of the replacement turbine would last for approximately 6 weeks.

5.1.4 Central to the construction would be the use of cranes, which by virtue of their height would potentially be visible for some distance, but their permeable structure would reduce their perceived mass. Cranes would be present for a limited duration only, a proportion of the timescales stated above. Whilst visual effects would result from the presence of cranes and the construction activity, these would be short-term and temporary in nature, and would occur in a context where wind turbines, telecommunication masts and pylons are already locally prominent vertical structures.

5.1.5 Artificial lighting may be required on a temporary basis during the construction period, in order to ensure the health, safety and welfare of those on the Site. In some instances lighting may be required for work on elevated structures, including crane mounted lighting. Lighting would be minimised as far as reasonably practicable. The Construction Environmental Management Plan (CEMP) will include measures to monitor and control lighting levels and light spillage throughout the construction process. As such the main construction lighting would be limited to hours of poor daylight during this period. Some low level lighting may also be required throughout the night for security reasons.

5.1.6 All construction effects would be limited in scale and duration. Whilst there would be some localised adverse change, the effects of this upon landscape character and upon the visual receptors would not be significant.

5.2 Operational Stage Landscape Effects

Landscape Character

5.2.1 An appraisal of effects upon the character of the two host landscape character types: **5b. Low Farmland** and **4. Coastal Sandstone** is presented subsequently. For the other character areas which were identified in the baseline section as having the potential to be subject to landscape effects due to the proposed development, a more focused narrative approach has been adopted given that they would be subject to indirect influence, i.e. the proposed turbine does not fall directly within their boundaries.

5b Low Farmland

5.2.2 This LCT is described in the Cumbria Landscape Character Guidance and Toolkit as follows: "*Much of this type is intensively farmed agricultural land. The predominant land cover is pasture. This is interspersed with arable land. Fields tend to be fairly large and bounded by hedges with hedgerow trees, or replacement fences. The hedges form an interlocking matrix across the undulating land... The rolling topography is dissected by small and larger meandering river valleys, with the latter being found through the lower plain around Carlisle*.."

5.2.3 The key characteristics of the Low Farmland LCT include:

"Undulating and rolling topography.

Intensely farmed agricultural pasture dominates.

Patchy areas of woodland provide contrast to the pasture.

Woodland is uncommon west towards the coast.

Fields are large and rectangular.

Hedges, hedgerow trees and fences bound fields and criss cross up and over the rolling landscape."

Landscape Sensitivity

5.2.4 The following points summarise the key considerations of this LCT in relation to the sensitivities of the landscape:

"The matrix of interlocking hedges, woodlands, trees along rivers and fields and wind sculpted trees in hedges in coastal areas are sensitive to changes in land management.

The ecological value associated with grazing marsh, wetlands and floodplains are also sensitive to changes in land management. Frontiers of the Roman Empire: Hadrian's Wall and associated Romano British settlements are sensitive to infrastructure and other development.

The traditional feel of villages and farms can provide a sense of stepping back in time in places and is sensitive to unsympathetic village expansion.

The open and uninterrupted views to the Solway Firth and Lakeland Fells are sensitive to tall infrastructure development."

5.2.5 The defining characteristics of this LCT which indicate its susceptibility to the type of changes associated with the Proposed Development are:

i) It is a relatively large-scale landscape, reducing the perceived scale of individual elements such as buildings and structures, indicating a lower level of susceptibility to the type of change proposed.

ii) It is a generally open and intensively farmed landscape, with a low level of woodland cover, however it is also a gently rolling landscape which limits visibility in lower valley locations in particular. Of note are some uninterrupted views to the east and the Lakeland Fells. This indicates a medium level of susceptibility to the type of change proposed.

iii) An observation from site surveys is that there are many tall elements in the vicinity of the site, including the operational turbine on the site, pylons, other turbines and telecommunications masts. This indicates a lower level of susceptibility to change.

5.2.6 Taking these characteristics into account, the susceptibility of this LCT is considered to be **Medium.**

5.2.7 This part of the LCT doesn't associate with any overarching landscape designations and it is of **Low** landscape value. Considering the level of susceptibility to change and value attributed to this LCT, its overall sensitivity is considered to be **Medium**.

5.2.8 With regards potential change to 5b Low Farmland due to the proposed development, the following is noted:

i) There is an operational turbine on the site and therefore the change primarily relates to the introduction of a taller wind turbine which will be 86.5m to blade tip.

ii) The site is located at the northern extent of the LCT and within it, there are occasional tall structures which would limit the change that the proposed turbine would incur.

iii) **Figure 3.2** indicates that visibility of the proposed turbine within LCT 5b would be limited primarily to its northern extent and ground-truthing of the ZTV on site indicated that the actual visibility would be much reduced than is shown, due to the screening effect of vegetation and buildings, particularly those on the western extent of Egremont. Influence of the proposed turbine on the LCT would therefore be relatively limited, avoiding extensive change to its key characteristics.

iv) The turbine is set away from villages and settlements within LCT 5b, limiting change to the characteristics of relatively small scale villages and towns.

5.2.9 In summary, the Proposed Development would only incur a **Small** scale of landscape effect to LCT 5b landscape through the replacement of an existing wind turbine at an increased height. As there are various other tall features in the vicinity which are present features of this LCT, including a smaller wind turbine on the site, the effect due to the Proposed Development would be relatively limited. The proposed turbine would give rise to a relatively limited increase in the number of tall structures in the vicinity of the site and its influence on LCT 5b would be contained to its northern extent.

5.2.10 The Proposed Development would alter a relatively small geographical area in the context of this landscape and therefore the effect is considered to be **Localised**. The duration of operation would be **Long-term**. The landscape effect would be **Reversible** given the avoidance of loss of any trees for construction and as it could

be theoretically removed and the site and character area could be returned to their original condition.

5.2.11 Combining all these criteria, it is considered that there would be a **Minor Adverse** level of landscape effect on LCT 5b: Low Farmland due to the increase in size of the proposed turbine.

4. Coastal Sandstone

5.2.12 This LCT is described as comprising: "*distinctive sandstone cliff scenery around St Bees, undulating plateau and the rolling coastal hills that move inland and south towards Sellafield. The open plateau north of St Bees is covered in a patchwork of large open regular pastoral fields. These are largely divided by hawthorn hedges. Between St Bees and Sellafield the patchwork of fields continues and gently rolling pastoral fields with prominent hedge (kest) banks of gorse, hawthorn and sometimes bracken. Small blocks of mixed woodland and scrub occur on the valley sides and inland throughout this type. The valley of Pow Beck which cuts through the higher ground is often open and bare, but higher up is more wooded with well maintained hedges*."

5.2.13 The key characteristics of the Coastal Sandstone LCT include:

"Sandstone plateau and cliffs, 80m - 130m elevation.

Mainly unsettled farmland, coastal heath at clifftops.

Access Land and coastal path registered common land at Rottington.

Existing and historic quarries on coast.

Arable and pasture.

Fragmented woodland in sheltered valley.

Large fields on plateau, smaller fields, based on strip fields, closer to Sandwith.

Straight boundaries, hedges and fences.

Small woodland blocks at lower level on Pow Beck valley rim. Shelter planting around farm buildings, otherwise open and with little tree cover.

Isolated farmsteads, Sandwith village in valley. St Bees Head Lighthouse is a prominent landmark."

Landscape Sensitivity

5.2.14 The following points summarise the key considerations of this LCT in relation to the sensitivities of the landscape:

"The dramatic cliffs of St Bees Heritage Coast, their colonies of breeding sea birds that provide a strong link with the open sea and sense of 'naturalness,' and the discrete siting of the railway line along the lower coastal edge are all sensitive to the dynamic forces of the sea.

The networks of native hedges are sensitive to changes in land management and farm diversification."

5.2.15 The defining characteristics of this LCT which indicate its susceptibility to the type of changes associated with the Proposed Development are:

i) It is an elevated and open coastal landscape, indicating higher susceptibility to change, however this is reduced by the position of the site at its eastern extent of the LCT which is the furthest point from the coastline.
ii) It is a relatively large-scale landscape, reducing the perceived scale of individual elements such as buildings and structures, indicating a lower level of susceptibility to the type of change proposed.
iii) An observation from site surveys is that there are many tall elements in the vicinity of the site, including the operational turbine on the site, pylons, other turbines and telecommunications masts. This indicates a lower level of susceptibility to change.

5.2.16 Taking these characteristics into account, the susceptibility of the LCT is considered to be **Medium.**

5.2.17 This part of the LCT doesn't associate with any overarching landscape designations and it is of **Low** landscape value. Considering the level of susceptibility to change and value attributed to this LCT, its overall sensitivity is considered to be **Medium**.

5.2.18 With regards potential change to 4. Coastal Sandstone due to the proposed development, the following is noted:

i) There is an operational turbine on the site and therefore the change primarily relates to the introduction of a taller wind turbine which will be 86.5m to blade tip.

ii) The site is located at the eastern extent of the LCT and within it, there are occasional tall structures which would limit the change that the proposed turbine would incur.

iii) **Figure 3.2** indicates that visibility of the proposed turbine within LCT 4 would be limited primarily to areas within its eastern extent on higher ground. The extent of the LCT which is closer to the coastline, in the western extent, is located in a lower position and visibility of the Proposed Development would be more limited. Ground-truthing of the ZTV on site indicated that the actual visibility would be further reduced by vegetation and buildings, particularly those is located on the western extent of St Bees. Influence of the proposed turbine on the LCT would therefore be relatively limited, avoiding extensive change to its key characteristics.

iv) The turbine is set away from villages and settlements within LCT 4, limiting change to the characteristics of relatively small scale villages and towns.

5.2.19 In summary, the Proposed Development would only incur a **Small** scale of landscape effect to LCT 5b landscape through the replacement of an existing wind turbine at an increased height. As there are various other tall features in the vicinity which are present features of this LCT, including a smaller wind turbine on the site, the effect due to the Proposed Development would be relatively limited. Influence on the western extent of the LCT, along the coastline would be limited and overall the proposed turbine would give rise to a relatively limited increase in the number of tall structures in the vicinity of the site.

5.2.20 The Proposed Development would alter a relatively small geographical area in the context of this landscape and therefore the effect is considered to be **Localised**. The duration of operation would be **Long-term**. The landscape effect would be **Reversible** given the avoidance of loss of any trees for construction and as it could be theoretically removed and the site and character area could be returned to their original condition.

5.2.21 Combining all these criteria, it is considered that there would be a **Minor Adverse** level of landscape effect on LCT 4. Coastal Sandstone due to the increase in size of the proposed turbine.

Effects on Other Landscape Character Types Within the Study Area

5.2.22 The following comprises consideration of the indirect landscape effects on LCTs which fall within the study area and which were identified in Section 4.4. as having the potential to be subject to some change due to the Proposed Development.

1a. Bay and Estuary

5.2.1 The characteristics of LCT 1a is summarised as:

"The largely undeveloped horizons, naturalness and tranquillity of the wide open seas and mudflats contribute to its sensitivity. Daily inundation provides a feeling of wildness and remoteness which is sensitive to man made development. Nature conservation and birds reinforce the naturalness of area and is sensitive to significant changes in management and use. The large and expansive backdrop of the Lakeland and Scottish fells add to the drama of the area.

Development pressures include major infrastructure and energy infrastructure proposals, which can be highly intrusive particularly as the waters-edge naturally attracts attention and is a focal point. The need to develop renewable energy sources to help mitigate climate change could include tidal energy schemes and on and off shore large scale wind energy developments. These could have significant effects on natural coastal processes, habitats and the open seascape character."

5.2.2 **Figure 3.2** illustrates that ZTV coverage would be relatively limited from the coastline, contained to occasional glimpses, and site surveys have verified this. The landscape effect due to the increased height turbine on LCT 1a is therefore considered to be **Negligible**.

5a. Lowland – Ridge and Valley

5.2.3 This LCT is located approximately 3km north-east of the Site at its nearest point. Its key characteristics are:

"Undeveloped areas of ridge tops and valley rims are sensitive to large scale ridge line development where significant contrast could arise between small scale settlements and large scale features such as large scale wind turbines and pylons. Open and uninterrupted views from ridge tops to the Solway Firth and Lakeland Fells are sensitive to large scale infrastructure development."

"Large scale wind energy schemes have already changed the character of the sub type, particularly around Workington. Without careful control parts of this sub type could become defined by wind energy development. This could have knock on effects on the character of adjacent landscape types due to the far reaching visual effects of such development."

5.2.4 **Figure 3.2** illustrates that there would be relatively extensive theoretical visibility of the Proposed Development from LCT 5a. However, site truthing of the ZTV has indicated that the screening effect of Cleator Moor and intermittent tree cover within the area would limit visibility of the Proposed Development. The landscape effect due to the increased height turbine on LCT 5a is therefore considered to be **Negligible**.

5d. Lowland - Urban Fringe

5.2.5 This LCT is located approximately 1km east of the Site at its nearest point. Its key characteristics are:

"Wooded valleys, restored woodland, some semi urbanised woodland, and the intact field patterns of farmland reinforced by hedges and hedgerow trees are sensitive to changes in land management and settlement expansion. Open green spaces and fields close to settlement edges are sensitive to unsympathetic development."

5.2.6 **Figure 3.2** illustrates that there would be relatively extensive theoretical visibility of the Proposed Development from LCT 5d, albeit with some lower valley areas which are excluded from the ZTV coverage. However, site truthing of the ZTV has indicated that the screening effect of settlements and tree cover at the western extent of the LCT limit views out to the west. This includes, Bigrigg, Moor Row and the Westlakes Science Park, which is surrounded by tree cover. When views would be possible, tall structures in and around the site, including pylons, would also be visible, which would limit the change further. However, the influence of the Proposed Development on the LCT would be slightly elevated given its position on the skyline, looking west, from this LCT. The landscape effect due to the increased height turbine on LCT 5d is therefore considered to be **Minor Adverse**.

9a. Intermediate Moorland and Plateau - Open Moorlands

5.2.7 This LCT is located approximately 6km north-east of the Site at its nearest point. Its key characteristics are:

"The open character and expansive views across moorland and higher farmed areas are sensitive to large scale infrastructure development that could obscure or significantly interrupt the views. Large scale wind energy infrastructure developments and other vertical structures such as, communication masts, pylons or overhead transmission lines could erode the open and remote character of the landscape and reduce the nature conservation interest."

5.2.8 **Figure 3.2** illustrates that there would be some theoretical visibility of the Proposed Development from the southern extent of LCT 9a and there is a large area of woodland at its southern extent which would limit views further. This is an elevated landscape and views would be occasionally possible from a small extent of the LCT. However, the Proposed Development, and specifically its increase in height from the operational turbine on the site, would likely be barely perceptible from this LCT. Given the open and expansive views that are possible, the Proposed Development would form a very small element and the presence of existing tall structures in the vicinity of the site would further reduce its influence. In summary, the landscape effect due to the increased height turbine on LCT 9a is considered to be **Negligible**.

9d. Intermediate Moorland and Plateau - Ridges

5.2.9 This LCT is located approximately 6.5km north-east of the Site at its nearest point. Its key characteristics are:

"The open and distinct ridges and heather moorland and wide and expansive uninterrupted views to sea and the Lakeland Fells provide a sense of wildness that are sensitive to changes in land management and significant infrastructure development.

The Government's commitment to an increase in renewable energy could see increased interest in large scale wind energy schemes. The cumulative effects of schemes could have a significant adverse effect on the character of the area."

5.2.10 Similar to LCT 9a, which is adjacent, **Figure 3.2** illustrates that there would be some theoretical visibility of the Proposed Development from the southern extent of LCT 9d. This is also an elevated landscape and views would be occasionally possible

from a small extent of the LCT. However, the Proposed Turbine, and specifically its increase in height from the operational turbine, would likely be barely perceptible from this LCT. Given the open and expansive views that are possible, the Proposed Development would form a very small element and the presence of existing tall structures in the vicinity of the site would further reduce its influence. In summary, the landscape effect due to the increased height turbine on LCT 9a is considered to be **Negligible**.

11a. Upland Fringe – Foothills and G. Rugged / Angular Slate High Fell

5.2.11 These comprise two LCTs which adjoin across the border between Copeland and Lake District Landscape Character Assessments. The characteristics of LCT 11a are summarised as:

"The contrast in scale with Pennine Scarps and Lakeland Fells and more intimate farms and woodland are sensitive to large scale infrastructure development.

Upgrading the national grid and the development of more large scale wind energy schemes could erode the open and generally undeveloped character, particularly close to national landscape designations."

5.2.12 The characteristics of LCT G are summarised as:

"Considered to have very high visual sensitivity, as a result of the very open character, uncluttered skylines and associated long distance views.

Areas that may appear to be hidden within one viewpoint are likely to be highly visible and exposed from another. There is strong intervisibility with the Upland Valley, and Rugged/Craggy Volcanic High Fell Landscape Character Types towards the edges of the Fells, and with surrounding landscape types outside the National Park. In higher locations, views are limited by the elevated topography. The area also forms a striking backdrop in views from surrounding areas outside the park…"

5.2.13 While these are higher sensitivity landscape, which partly include the National Park designation, **Figure 3.2** illustrates that there would be some theoretical visibility of the Proposed Development from them. However, from the western extent of the areas the slopes face broadly to the north and north-west, not towards the site in the west, limiting the influence of the Proposed Development. Overall, visibility of the

Proposed Development would be relatively limited and there would at most a **Negligible** effect on this LCT.

5.3 Operational Visual Effects

Viewpoint Appraisal

Table 2: Visual Effects on Representative Viewpoints

Criteria	Description of visual effect
Viewpoint 1 – Whitehaven	
Approximate distance & direction from the Site	2.5km to the north, north-west of the Site
Receptors	Residential properties
Baseline view	The view is from a gap in the hedgerow beside Mirehouse Road, which defines the very southern extent of Whitehaven. Views are generally restricted from ground level by hedgerow, however there would be views from upper storey windows of properties here. The view is across flat, pasture which is bounded by some hedgerow and tree cover. The land rises sharply up towards the site in the far distance and the existing turbine is visible on the skyline. There are other vertical structures evident in and around the site such as pylons and a telecommunications mast.
Sensitivity	This viewpoint is representative of a small number of residential receptors at the southern extent of Whitehaven and they are of High susceptibility to change. There is no notable value attributed to the view, such as a designated landscape, therefore the value is Low. The overall sensitivity is considered to be **High**.
Magnitude and overall level of effect	The Proposed Development would be evident on the ridge line in the far distance from the site. There are existing tall structures on the hillside in the vicinity of the site, including pylons and a telecommunications mast. The existing turbine on the site is visible and its blades create movement in the view, however it is broadly in proportion with the nearby tall structures. The Proposed Development would appear taller than the nearby structures, and while it would comprise one relatively small part of the wider view to the south, it would introduce a relatively tall feature when compared to existing tall elements in the view. Overall, the Proposed Development would give rise to a **Small to Medium** magnitude of effect on the view. Considering the high sensitivity of the receptors in the vicinity of the viewpoint and the small to medium magnitude of effect on the view, the Proposed Development would give rise to a **Moderate Adverse** level of visual effect on this representative viewpoint.
Viewpoint 2 – Egremont	
Approximate distance & direction from the Site	1.9km to the south, south-east of the Site
Receptors	Residential properties
Baseline view	This view is from the western extent of Egremont on a path which leads north from the housing. The view is relatively simple and comprises a large, open

	grassed field which rises very gently up to the vicinity of the site, at which it falls away such that the ridge upon which the site is located forms the skyline. The skyline includes the operational turbine on the site, a telecommunications mast and pylons. There is some intervening hedge and tree cover, however this is limited.
Sensitivity	This viewpoint is located on a footpath, however it is representative of upper storey views from a small number of residential receptors at the north-western extent of Egremont and they are of High susceptibility to change. There is no notable value attributed to the view, such as a designated landscape, therefore the value is Low. The overall sensitivity is considered to be **High**.
Magnitude and overall level of effect	The Proposed Development would be visible on the ridge line in the far distance from the site. There are existing tall structures on the skyline in the vicinity of the site, including pylons and a telecommunications mast. The existing turbine on the site is glimpsed and its blades create movement in the view, however it appears smaller than most of the nearby tall structures. While it would be taller than the existing turbine on the site, the Proposed Development would appear to be in scale proportion with adjacent structures, and it would comprise a relatively small part of the wider view to the north. Overall, the Proposed Development would give rise to a **Small** magnitude of effect on the view. Considering the high sensitivity of the receptors in the vicinity of the viewpoint and the small magnitude of effect on the view, the Proposed Development would give rise to a **Minor Adverse** level of visual effect on this representative viewpoint.
Viewpoint 3 – Bigrigg Village	
Approximate distance & direction from the Site	1.2km to the east, north-east of the Site
Receptors	Residential properties
Baseline view	Views are of pastoral fields bounded by trees and hedgerows which lead to a ridge upon which the site is located. Along the ridge, electricity pylons are evident, as is the existing wind turbine nested between them. Slightly further south than the site is a telecommunications mast. The hillside screened beyond the site and it forms the skyline to the west of Bigrigg. The view is relatively fragmented as the east facing slopes of the hillside comprise a patchwork of trees, occasional properties, tall structures and fields.
Sensitivity	This viewpoint is located on a path within Bigrigg, and it is representative of ground level views from a small number of residential receptors at the western extent of Bigrigg and they are of High susceptibility to change. There is no notable value attributed to the view, such as a designated landscape, therefore the value is Low. The overall sensitivity is considered to be **High**.
Magnitude and overall level of effect	The Proposed Development would be visible on the ridge line to the west of Bigrigg. There are existing tall structures on the skyline in the vicinity of the site, including pylons and a telecommunications mast. The existing turbine on the site is glimpsed and its blades create movement in the view, however it appears smaller than most of the nearby tall structures. The Proposed Development would be taller than most of the nearby structures, aside from the telecommunications mast, and while it would comprise one part of the wider view to the west, it would introduce a tall feature at a slightly taller scale to other tall elements in the view. Overall, the Proposed Development would give rise to a **Small to Medium** magnitude of effect on the view. Considering the high sensitivity of the receptors in the vicinity of the viewpoint and the small to medium magnitude of effect on the view, the

	Proposed Development would give rise to a **Moderate Adverse** level of visual effect on this representative viewpoint.
Viewpoint 4 – St.Bees	
Approximate distance & direction from the Site	2.1km to the west, south-west of the Site
Receptors	Residential properties
Baseline view	St Bees is set slightly below the site in a valley and most views out to the site are screened. However, the viewpoint is from a position on the B5435 which illustrates the long range glimpsed views of the operational turbine on the site which are possible from certain peripheral locations around St Bees. The immediate foreground comprises the boundary wall beside the B5345, lined with trees on its adjacent side. In the medium to far distance, views are channelled along the valley to the north-east and the valley is framed by the gradually rising hillside to the east upon which the site is located. The existing turbine on the site is glimpsed as a relatively small feature, recessed behind the hill to a partial extent.
Sensitivity	This viewpoint is located on a path within St Bees, and it is representative of ground level views from a small number of residential receptors at the north-eastern extent of St Bees and they are of High susceptibility to change. There is no notable value attributed to the view, such as a designated landscape, therefore the value is Low. The overall sensitivity is considered to be **High**.
Magnitude and overall level of effect	The proposed turbine would be visible from this viewpoint, particularly during winter months. However, views are channelled along the valley to the north-east and the Proposed Development would form an evident feature on the side slope of the hill and this peripheral position within the view reduces its visual prominence. While it would be visible as a moving feature on the hillside, it would comprise a relatively small part of the wider view and it's likely that during summer views would be more restricted out from St Bees. Overall, the Proposed Development would give rise to a **Small** magnitude of effect on the view. Considering the high sensitivity of the receptors in the vicinity of the viewpoint and the small to medium magnitude of effect on the view, the Proposed Development would give rise to a **Minor Adverse** level of visual effect on this representative viewpoint.
Viewpoint 5 – Cleator Moor	
Approximate distance & direction from the Site	3.2km to the north east of the Site
Receptors	Residential properties
Baseline view	The view is from the western extent of Cleator Moor and is from slightly elevated ground. The view is across the valley to the west before which the land rises up in the vicinity of Bigrigg and then up to the site which is located in the vicinity of the ridgeline which forms the visible horizon to the west of Cleator Moor. The valley to the west is well wooded, however the hillside upon which the site is located is more open and includes visible tall structures such as pylons, a telecommunications mast and the operational turbine on the site.
Sensitivity	This viewpoint is located on a path within Cleator Moor, and it is representative of upper storey views from a small number of residential receptors at the south-western extent of Cleator Moor and they are of High susceptibility to change. There is no notable value attributed to the view, such as a designated landscape, therefore the value is Low. The overall sensitivity is considered to be **High**.

Magnitude and overall level of effect	The Proposed Development would be visible on the ridge line in the far distance from the site. There are existing tall structures on the skyline in the vicinity of the site, including pylons and a telecommunications mast. The existing turbine on the site is glimpsed and its blades create movement in the view, however it appears smaller than most of the nearby tall structures. While it would be taller than the existing turbine on the site, the Proposed Development would be broadly in proportion with adjacent structures, and it would comprise a relatively small part of the wider view to the south-west, with the intervening valley creating depth in the view that would reduce the prominence of the turbine. Overall, the Proposed Development would give rise to a **Small** magnitude of effect on the view. Considering the high sensitivity of the receptors in the vicinity of the viewpoint and the small to medium magnitude of effect on the view, the Proposed Development would give rise to a **Minor Adverse** level of visual effect on this representative viewpoint.
Viewpoint 6 – England Coastal Path, St. Bees Beachfront	
Approximate distance & direction from the Site	3.2km to the west, south-west of the Site
Receptors	Footpath users
Baseline view	This viewpoint is from beside a small footbridge which crosses the stream leading towards the beach and this is a rare view back out from the coastline towards the site as the coastal path is largely screened from views of the site. The landform to the east rises to form an embankment with rows of caravans situated along its ridge. Glimpsed views of the hilltops to the east can be seen above and between the caravans.
Sensitivity	Footpath users on the Coastal Path take a particular interest in views of the landscape around them and are of a **High** level of susceptibility to change. There is no notable value attributed to the view, such as a designated landscape, therefore the value is Low. The overall sensitivity is considered to be **High**.
Magnitude and overall level of effect	Glimpsed views of the blade tips of the proposed turbine can be seen from this viewpoint between the caravans. However, it would form a barely perceptible element of the view as the intervening caravans and boundary fencing obscures the general visibility of the turbine. Overall, the Proposed Development would give rise to a **Negligible** magnitude of effect on the view. The level of effect would therefore also be **Negligible.**
Viewpoint 7 – Lake District National Park, Blake Fell	
Approximate distance & direction from the Site	13.9km to the north-east of the Site
Receptors	Footpath users
Baseline view	This is a location on an elevated hillside at the western extent of the Lake District National Park and it comprises panoramic views towards the coast and Irish Sea. Long distance views of the lowland valley are available, with woodlands and settlements of varying sizes scattered across the plain. Glimpsed views of tall structures, including the operational turbine on the site, are possible scattered along the coastline, including: other turbines, pylons and telecommunications masts.
Sensitivity	Footpath users take a particular interest in views of the landscape around them and are of a **High** level of susceptibility to change. This view is a recognised viewpoint within the Lake District National Park and is therefore of **High** value. The overall sensitivity is considered to be **High**.

Magnitude and overall level of effect	Views of the proposed turbine would be possible from this viewpoint, although it would form a barely perceptible element within the panoramic views of the coastal landscape and Irish Sea. The Proposed Development would be visible on a low ridgeline in the far distance, with the sea as a partial backdrop, however other tall structures are evident and it would not disrupt the views from this location. While it would form a barely perceptible element within the wider panorama from this location, its position with a backdrop of sea would increase its prominence slightly and therefore it would give rise to a **Small** rather than Negligible change in the view. Taking into account the **High** sensitivity of the receptor and the **Small** magnitude of change, the level of effect would be **Minor Adverse.**

Summary of visual effects

5.3.1 The detailed appraisal of the seven selected representative viewpoints and associated desk and site studies, including analysis of the ZTV shown in **Figures 2.1 and 2.2,** has established that the following are key observations with regards the potential visual effects of the proposed turbine:

i) Overall, site studies demonstrated that views towards the site from within the study are generally screened by: intervening vegetation, which mainly comprises low level hedgerow and occasional small woodland blocks; gentle undulations in the landform; and buildings within the settlements.

ii) The main receptors of the Proposed Development would comprise: users of footpaths located within a maximum of 10km from the site and occasional residential properties (mainly upper storey windows) located on the edges of settlements which face towards the site.

iii) Views of the Proposed Development from the Lake District National Park would be relatively limited and comprise occasional views from high points, such as Blake Fell which is represented by Viewpoint 7, located at the very western extent of the National Park. Where visible, the Proposed Development would be set close to the coastline, with a backdrop of the sea, however it would form a very small element and other tall structures, such as pylons, telecommunications masts and other turbines are visible in views.

iv) Fleeting, glimpsed views of the proposed turbine blades would be possible in an easterly direction from the England Coastal Path, as represented by Viewpoint 6. However, the Proposed Development would be barely

perceptible due to the low topographical position of the coastline which would screen most views.

v) Views from the largest settlement in the study area, Whitehaven, would be almost entirely screened and views of the Proposed Development would be limited to a small number of residential properties located at its southern extent, and mainly from upper storey windows which face towards the site. However, a Moderate Adverse level of effect has been identified on Viewpoint 1 which represents a small number of properties located on Mirehouse Road. These properties comprise a small group which are at the very southern extent of Whitehaven and are therefore not representative of the entire settlement.

vi) Similarly, a Moderate Adverse level of effect has been identified on a Viewpoint 3 in Bigrigg. However, this represents a small number of residential properties on the western edge of the settlement with most views from Bigrigg screened.

vii) The similarity with the effects identified on Viewpoints 1 and 3, is that, while views generally take in a large-scale landscape which includes pylons, telecommunications masts and operational turbines, at Viewpoints 1 and 3.the turbine would be located on a ridgeline and would appear slightly taller and more prominent than the nearby existing structures, elevating the level of effect when compared to some other views. However, each of these views are not representative of the majority of views from Whitehaven and Bigrigg, in which the Proposed Development would be mostly screened from view.

viii) Views from other settlements within the study area would also be limited, due mainly to the screening effect of properties within the settlements. Specific observations from site work are: that St Bees is located within a relatively shallow valley which partially limits views out towards the site; views from Bigrigg are possible from west facing windows in properties and occasional ground floor glimpses; from Cleator Moor, there would be possible views form the south-western extent; and from Egremont the sloping topography would restrict views our from footpaths on its north-western extent.

ix) While there would be some longer range views of the Proposed Development within the study area, where adjacent hedgerow, occasional

woodland blocks or small settlements don't screen the view out, locations from which clear views out are likely to be infrequent. Where long-range views are possible, the Proposed Development would appear as a relatively small-scale feature within a large-scale landscape and often in close proximity to other tall structures.

6.0 SUMMARY AND CONCLUSION

6.1.1 The appraisal has concluded that the level of operational landscape effects of the Proposed Development would generally be Minor Adverse or Negligible and the operational visual effects would also generally be Minor Adverse or Negligible, with a small number of Moderate levels of effects identified on views from properties and footpaths located on the edge of nearby settlements, in relatively proximity to the site. Effects are limited due to the following key factors:

i) The limited footprint of the Proposed Development, i.e. that it comprises a single turbine development, which is located on the site of an operational, albeit smaller, wind turbine.

ii) The large-scale of the surrounding landscape which would reduce the perceived scale of the Proposed Development and can comfortably accept developments of this scale.

iii) While the landscape and visual amenity is locally valued, there are no landscape designations on or around the site. Views from the Lake District National Park, which is located 5km east of the site at its nearest point, would be sporadic and where possible, visual change would be limited.

iv) While it is a landscape with a relatively low level of tree cover, hedgerow and occasional tree belts on field boundaries are effective in screening the Proposed Development due to the generally flat surrounding landscape.

v) The existing presence of large-scale vertical features, i.e. and rows of pylons, a telecommunications mast and wind turbines located in close proximity to the site which would remain a focus in views, limiting change due to the Proposed Development.

6.1.2 Landscape character change associated with the Proposed Development would be limited to a localised increase in tall structures as the influence of the development on surrounding character areas would be limited to occasional views. This is in part due to the relatively flat landform in which minor undulations and the presence of occasional hedgerow and buildings within settlements provide an effective screen to views. The Proposed Development would be set back from the coastline and would generally not disrupt views west towards the sea. Landscape effects on the host character types, LCT4: Coastal Sandstone and LCT 5b: Lowland – Low Farmland, would be no greater than Minor Adverse.

6.1.3 The delivery of the turbine would necessitate the removal of a minor number of hedges as a result of the introduction of the development. However, it is not anticipated that there would be major direct landscape change, i.e. the removal of landscape features, would be negligible. Whilst the introduction of the larger wind turbine would alter the appearance of the Site, the surrounding pasture would remain in situ which would create a degree of continuity in the character of the Site.

6.1.4 Overall, visual effects would be very limited due to the same key factors. The main views of the Proposed Development would be from within approximately 3km from the site and would be from a small number of residential properties and footpaths which connect farms and local roads together. The highest level of effects identified on representative viewpoints are Moderate Adverse at Viewpoint 1, which is located at the southern extent of Whitehaven, 2.5km to the north, north-west of the Site, and from Viewpoint 3, which is located on the western extent of Bigrigg, 1.2km to the east, north-east of the Site. While evident on the skyline due to its position on a nearby hill, in each of these views the larger wind turbine would remain would comprise a relatively narrow feature within a wider panorama. Overall, a relatively small number of visual receptors would experience any visual change due to the Proposed Development and, while this is a landscape which largely comprises large-scale open farmland and has a low level of built form, it would be visible in and amongst other tall structures such as pylons which are located within close proximity to the site.

6.1.5 The Proposed Development would not alter any of the physical features of the National Park. Views of the Proposed Development would occur at a long distance and will form only a minor element of much wider views of the landscape. The Proposed Development would not alter any of the special qualities of this designated landscape and its setting.

6.1.6 The Proposed Development would accord with the landscape objectives identified by Copeland Borough Council in the *Wind Energy Technical Document, 2020*. The area within which the turbine is located is assessed as having moderate capacity for wind energy development of this scale. This capacity assessment considers sensitivity to development, landscape values and national designations. The presence of wind turbines at the Site is a well-established influence on the local landscape, and this would not change as a result of the Proposed Development.

Therefore, the capacity of the landscape to accommodate wind energy development would not be exceeded.

Appendix A – Appraisal Methodology

1.0 METHODOLOGY

1.1.1 Landscape and Visual Appraisal (LVA) is a tool used to systematically identify and assess the nature of the effects of a proposed development upon the landscape and upon views and visual amenity. The purpose of the LVA is to identify the level and nature of effect arising from a proposed development and if necessary, through an iterative design process, to inform changes to the development and evolution of mitigation strategies which minimise effects wherever possible.

1.1.2 The methodology for this LVA is informed by guidance contained within the Guidelines for Landscape and Visual Impact Assessment (The Landscape Institute and Institute of Environmental Assessment, 3rd Edition, 2013), often referred to as 'the GLVIA'. The LVA aims to establish the following:

i) A clear understanding of the development site and its context, in respect of the physical and perceived landscape and of views and visual amenity.
ii) An understanding of the proposed development in terms of how this would relate to the existing landscape and views.
iii) An identification of likely effects of the proposed development upon the landscape and upon views, throughout the life cycle of the development.
iv) Those mitigation measures necessary to reduce or eliminate any potential adverse effect on the landscape or views arising as a result of the proposed development.
v) A conclusion as to the residual likely effects of the proposed development.

1.1.3 Professional judgement is a very important part of the LVA process at every stage of the assessment. This judgement is exercised within an assessment framework that transparently sets out the steps in the assessment process which have led to the overall conclusions. This is emphasised in Box 3.1 (page 37) of the GLVIA, which advocates a structured approach that considers the sensitivity of the receptor and magnitude of the effect.

1.1.4 To ensure the transparency of the assessment and professional judgements made, the LVA follows a standard approach, namely:

i) The establishment of the baseline conditions, against which the effects of the proposed development will be assessed.
ii) The determination of the nature of the receptor likely to be affected, i.e. its sensitivity.

iii) The prediction of the nature of the effect likely to occur, i.e. the magnitude of effect.

iv) An appraisal of the level of which effect would occur upon any receptor, by considering the predicted magnitude of effect together with the sensitivity of the receptor, taking into account any proposed mitigation measure.

1.1.5 The GLVIA clarifies that the guidance concentrates on:

"…principles while also seeking to steer specific approaches where there is a general consensus on methods and techniques. It is not intended to be prescriptive, in that it does not provide a detailed 'recipe' that can be followed in every situation. It is always the primary responsibility of any landscape professional carrying out an assessment to ensure that the approach and methodology adopted are appropriate to the particular circumstance."

1.1.6 As set out above, use of professional judgement within a structured assessment framework is a very important element of the assessment of landscape and visual effects. As discussed in the GLVIA:

[2.23] "…Whilst there is some scope for quantitative measurement of some relatively objective matters, …much of the assessment must rely on qualitative judgement, for example about what effect the introduction of a new development or land use change may have on visual amenity, or about the significance of change in the character of the landscape and whether it is positive or negative."

[2.24] "…In all cases there is a need for the judgements that are made to be reasonable and based on clear and transparent methods so that the reasoning applied at different stages can be traced and examined by others…"

[2.26] "…In carrying out an LVIA the landscape professional must always take an independent stance, and fully and transparently address both the negative and positive effects of a scheme in a way that is accessible and reliable for all parties concerned."

1.1.7 Landscape and visual matters are separate issues, although closely related and interlinked, are dealt with as such throughout the LVA. The methodologies for assessing both are outlined separately below.

2.0 LANDSCAPE ASSESSMENT

2.1.1 The landscape assessment considers the potential effects of the proposed development on the components of the landscape as an environmental resource. Landscape receptors which could be affected by a proposed development may include:

i) Individual constituent elements and features of the landscape (sometimes referred to as landscape fabric).
ii) Specific aesthetic and perceptual qualities of the landscape.
iii) The overall character and key characteristics of the landscape as experienced in different areas (e.g. landscape character areas or types).

2.2 Sensitivity

2.2.1 The nature of a landscape receptor likely to be affected, i.e. its sensitivity is determined by considering two factors, namely:

a) Susceptibility to change.
b) Value.

Susceptibility to Change

2.2.2 Susceptibility to change is defined in the GLVIA as follows:

[5.40] "This means the ability of the landscape receptor (whether it be the overall character or quality/condition of a particular landscape type or area, or an individual element and/or feature, or a particular aesthetic and perceptual aspect) to accommodate the proposed development without undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning polices and strategies."

[5.41] "The assessment may take place in situations where there are existing landscape sensitivity and capacity studies, which have become increasingly common. They may deal with the general type of development that is proposed, in which case they may provide useful preliminary background information for assessment. But they cannot provide a substitute for the individual assessment of the susceptibility of the receptors in relation to change arising from the specific development proposal."

2.2.3 To understand susceptibility to change, the various characteristics/factors that make up a particular landscape must be identified and consideration given as to how these will be affected by **the specific characteristics of the proposed development**. A landscape may have different levels of susceptibility to different scales and types of development (e.g. new houses; wind turbines; power lines). Consideration is given to physical and perceptual factors which are considered together to derive an overall susceptibility to the specific type of change. Factors influencing the susceptibility of a landscape to change are set out below, **with specific reference made to vertical structures, such as wind turbines,** where applicable:

i) Scale: A larger scale landscape (relative to the development proposed) will typically be less susceptible than a smaller scale landscape.

ii) Pattern/Complexity: The susceptibility of a receiving landscape to change will be influenced by the specific pattern of features and elements present and by the complexity of this pattern. A simpler landscape pattern will typically be more susceptible than a complex one. With specific reference to tall structures, the nature of the pattern relative to the structure may be a factor e.g. whether the predominant pattern is horizontal or vertical

iii) Development/Human Influence: A landscape that includes obvious alterations to natural ground levels, includes many contemporary development elements or structures, or that is clearly functional/utilitarian in its land use will typically be less susceptible to change that introduces contemporary structures than one where development is either absent or more traditional in style, or where natural influences and natural or long-established landforms are predominant.

iv) Connections with adjacent areas: A landscape which has a clear relationship with other surrounding landscapes, for example in relation to views in and out, will typically be more susceptible than one that is more enclosed where such intervisibility not present.

v) Visual Interruption: A landscape where views are frequently interrupted by screening features, for example vegetation cover or variations in landform, will typically be less susceptible than one where there are few / no screening features.

vi) A particular landscape may have different characteristics that are more or less susceptible to change. As such, the overall susceptibility to change is allocated using professional judgement based upon consideration of the various factors outlined above and the relative weight attached to these (which will vary from landscape to landscape). The assessment of susceptibility is expressed using a

three point verbal scale of high, medium or low. Where appropriate, intermediate levels such as medium/high or low/medium are used to refine the assessment. The rationale in support of the assessment of susceptibility is set out for each receptor in the assessment, so that it is clear how each judgement has been made.

Value

2.2.4 The value of the landscape receptor is independent of any development proposal. The absence of a formal landscape designation does not necessarily imply that a landscape is of lower value. Value is defined in the GLVIA as:

[5.19] "…the relative value that is attached to different landscapes by society, bearing in mind that a landscape may be valued by different stakeholders for a whole variety of reasons…Landscapes or their component parts may be valued at the community, local, national or international levels…"

2.2.5 Factors that can help in identifying valued landscapes include:

a) Presence/absence of statutory landscape designations.
b) Presence/absence of local landscape designations and associated policies.
c) Landscape quality/condition.
d) Scenic quality.
e) Rarity of particular elements/features.
f) Representativeness.
g) Conservation interest.
h) Recreation value.
i) Perceptual aspects.
j) Cultural associations.

2.2.6 The assessment of value is expressed on a similar basis to that described for susceptibility of change above. Table 2.1 indicates how the above factors have been used to determine landscape value.

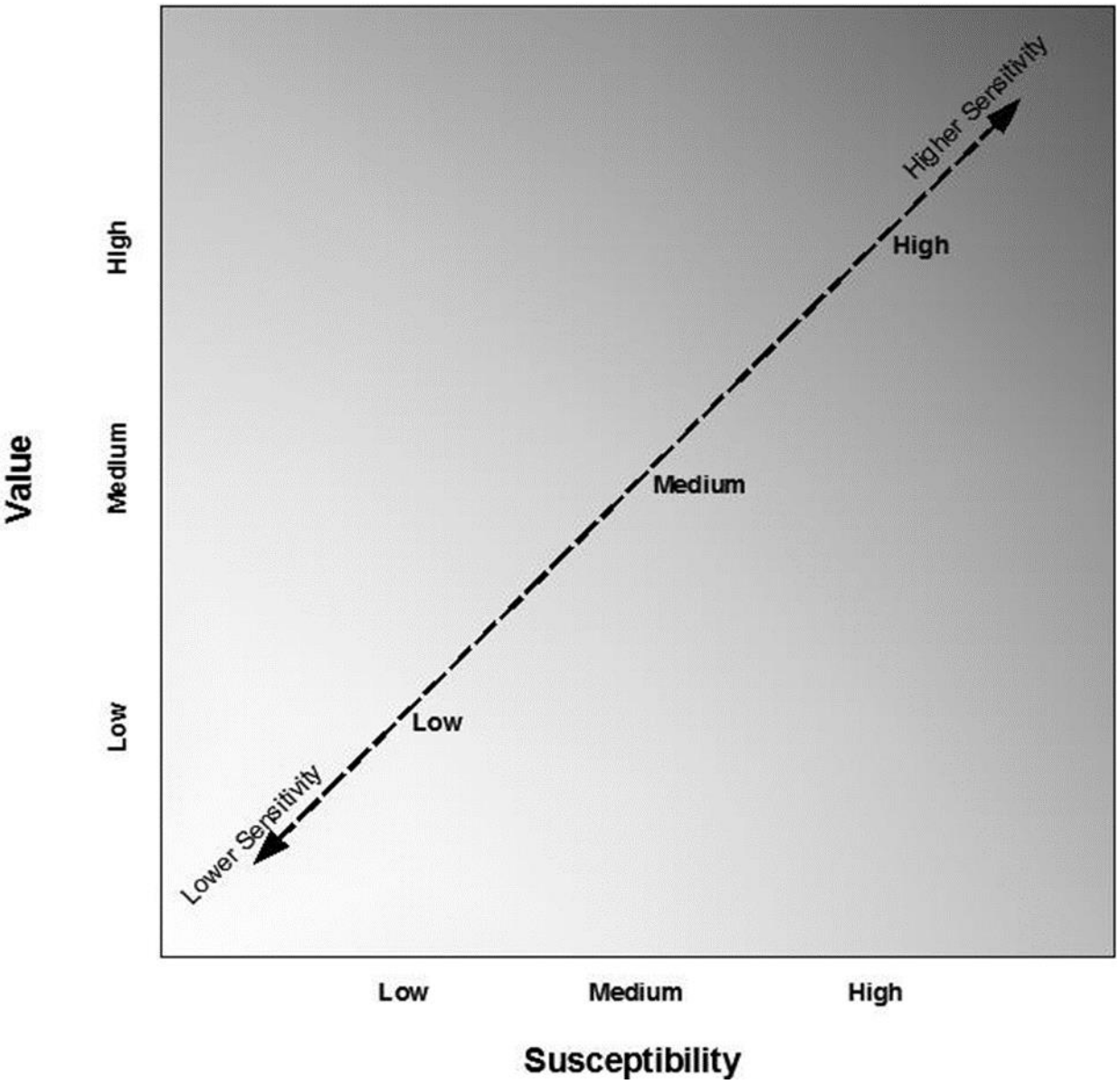
Table 2.1: Landscape Value Criteria

	Criteria tending towards higher or lower value	
	Higher	Lower
Value	Unique, and/or strongly positive landscape character, often with strong associations or (non-landscape) environmental designations. Nationally designated landscape (protected by statute).	Widespread or common landscape character. Negative character Lack of other environmental qualities Landscape without formal designation and with limited positive contribution to the locality.

Sensitivity

2.2.7 Susceptibility to change and value are considered together to determine the sensitivity of the receptor. It should be noted that the relationship between susceptibility to change and value can be complex and is not linear. For example, a highly valued landscape (such as a National Park or Area of Outstanding Natural Beauty) may have a low susceptibility to change, due both to the characteristics of the landscape and the nature of the change proposed. Figure 2.1 provides a guide as to how susceptibility and value can be combined to assess sensitivity (with the grey shading indicative of the increasing sensitivity of receptors with increasing susceptibility and / or value). However, it must be emphasised that this is only a guide and that the final assessment of sensitivity is one of professional judgement.

Figure 2:1 Indicative Sensitivity Assessment



2.3 Magnitude

2.3.1 The magnitude of change is determined by considering four separate factors, namely:

i) Size/scale of the effect.
ii) Geographical extent of the effect.
iii) Duration of the effect.
iv) Reversibility of the effect.

2.3.2 The **size and scale** of an effect is determined by considering the amount of change experienced by a receptor, including:

a) The extent of existing landscape elements that would be lost, the proportion of the total extent that this represents and the contribution of that element to the wider character
b) The degree to which aesthetic or perceptual aspects of the landscapes are altered by the removal, or introduction of new landscape components.
c) Whether the change affects the key characteristics of a landscape.

2.3.3 The **geographical extent** of an effect is the area over which effects will be experienced. It is not the same as size / scale, as a small-scale change may be experienced over a wider area, or vice-versa.

2.3.4 The **duration** of an effect simply relates to the length of time for which it would be experienced. There is no fixed definition of how these are categorised, but the following are quoted as an example in GLVIA (para 5.51):

i) Short term: zero to 5 years.
ii) Medium-term: 5-10 years.
iii) Long-term: 10 years or beyond.

2.3.5 Wind turbines will typically be long term infrastructure that would be in place for 25 years subject to the details of the planning consent.

2.3.6 The **reversibility** of an effect relates to whether or not when the Proposed Development reaches the end of its operational life and is demolished or removed, there will be a lasting effect on the landscape. If it can be taken away and the land restored, it is reversible. If removal is impractical or unlikely it isn't reversible. In some cases, partial removal will mean that there is partial reversibility.

2.3.7 The four factors contributing to magnitude are considered together to derive an overall magnitude of effect in relation to each receptor, determined by use of professional judgement. The assessment of the magnitude of effect is expressed using a four point verbal scale of large, medium, small or negligible. Where appropriate, intermediate levels such as medium / large or small / medium are used to refine the assessment.

2.3.8 Table 2.2 provides some descriptors for each of the four points on the scale which indicate how the above factors can be used to inform magnitude of effect. These are very much examples rather than definitive – in reality the factors combine in multiple different ways and every case will be different. As such the circumstances of each

specific case are reflected in a reasoned narrative within the LVA in order to explain the particular magnitude of change allocated to each receptor.

Table 2.2: Magnitude of Landscape Change Criteria (indicative)

Magnitude	Description
Large	A substantial change or loss in landscape characteristics and/or introduction of a very incongruous feature influencing an extensive geographical area and/or which may result in a permanent and perhaps irreversible landscape impact.
Medium	A moderate change or loss in landscape characteristics and/or introduction of an incongruous feature influencing a large geographical area, and/or which may be reversible in the long term.
Small	A small change or loss in landscape characteristics and/or introduction of a feature which would influence a relatively localised geographical area, and/or which may be reversible over a short duration of time.
Negligible	A barely perceptible change or loss in landscape characteristics and/or the perception of change would be focused on a small geographical area, and/or which is almost or completely reversible.

3.0 VISUAL ASSESSMENT

3.1.1 The visual assessment is concerned with the potential effects upon the population likely to be affected (i.e. the views experienced by people). As is the case for landscape effects (Section 2.0), the sensitivity of the receptor affected is identified, as is the magnitude of the effect that would occur which are then considered together to determine the level of effect.

3.1.2 A key part of the visual assessment is the assessment of effects from a number of predetermined viewpoints, which reflect views available to different groups of people. The viewpoint itself is not the receptor; rather it is the people that would be experiencing the view. These people will generally have different responses to a change in view depending upon their location, their activity and other factors, including the weather and time of day or year. Viewpoints fall into three categories (as set out in the GLVIA):

i) Representative viewpoints (which represent the experience of different types of receptors in the vicinity).
ii) Specific viewpoints (a particular view, for example a well-known beauty spot).
iii) Illustrative viewpoints (which illustrate a particular effect or issue, which may include limited or lack of visibility).

3.1.3 Private viewpoints, such as from specific residential properties are not typically included in the LVA. It is impractical to visit all affected properties and access to private land may not be granted. Representative or specific viewpoints from nearby publicly accessible locations can typically be used to provide a suitable proxy.

3.2 Sensitivity

3.2.1 The nature of a visual receptor likely to be affected, i.e. its sensitivity is determined by considering two factors, namely:

i) Susceptibility to change.
ii) Value.

Susceptibility to Change

3.2.2 Paragraph 6.32 of GLVIA identifies susceptibility to change in view/visual amenity as:

"...mainly a function of:

The occupation or activity of people experiencing the view at particular locations.

The extent to which their attention or interest may therefore be focused on the views and the visual amenity they experience at particular locations."

3.2.3 Susceptibility to change is, in part, classified based upon the indicative criteria, provided in GLVIA, as set out in Table 3.1.

Table 3.1: Typical Visual Susceptibility to Change Criteria (indicative)

Criteria Level	Description
Susceptibility to Change	
High	Residents at home. People engaged in outdoor recreation, whose attention/interest is likely to be focused on the landscape or particular views, including from public rights of way. Visitors to heritage assets or other attractions, where views of the surrounding are an important contributor to the experience. Communities where views contribute to the landscape setting enjoyed by residents. Travellers on scenic routes.
Medium	Travellers on road, rail, or other scenic routes.
Low	People engaged in outdoor sport or recreation which does not involve or depend upon appreciation of views of the landscape. People at their place of work whose attention may be focused on their work / activity and not their surroundings.

3.2.4 It is important to note that the examples set out in GLVIA and Table 3.1 above only address the first bullet point and part of the second bullet point in paragraph 3.2.2 above (which are focused on the occupation or activity of the people and the extent to which their attention is focussed on the view).

3.2.5 As such, the assessment of susceptibility in Table 3.1 and GLVIA (pages 113 &114) needs to be adjusted to reflect the requirements of the final part of the second bullet point, namely the visual amenity that people currently experience. GLVIA identifies clearly that the division between categories of susceptibility to change:

[6.35] "…is not black and white and in reality, there will be a gradation in susceptibility to change. Each project needs to consider the nature of the groups of people who will be affected and the extent to which their attention is likely to be focused on views and visual amenity…"

3.2.6 For example, the presence of existing detracting features in any given view may reduce the visual amenity of those experiencing the view. This may therefore reduce their susceptibility to certain types of change and ultimately their sensitivity.

3.2.7 The assessment of susceptibility to change is made on the same basis as for landscape effects (Section 2.0 above). A three-point scale (with intermediate levels where appropriate) is used, supported by a reasoned narrative that explains the judgement made.

Value

3.2.8 In accordance with paragraph 6.37 of the GLVIA when considering the value of a view experienced, this should take account of:

a) Recognition of the value attached to particular views, for example in relation to heritage assets or through planning designations.
b) Indicators of the value attached to views by visitors, for example through appearances in guidebooks or on tourist maps, provision of facilities for their enjoyment and references to them in literature or art.

3.2.9 Whilst not specifically referenced in the current edition of GLVIA, the number of people likely to be affected can influence the value assigned to a particular view.

3.2.10 The assessment of value is made on the same basis as the assessment of susceptibility to change.

Sensitivity

3.2.11 Susceptibility to change and value are considered together as was illustrated in Figure 2.1. Professional judgement determines the final judgement of sensitivity, due to the non-linear and complex relationship between susceptibility and value. A reasoned narrative is set out in the LVA in order to justify the particular sensitivity assessed for each receptor, so that it is clear how each judgement has been made.

3.3 Magnitude

3.3.1 The magnitude of effect that is likely to occur is determined by considering four separate factors, namely:

i) Size/scale of the effect.
ii) Geographical extent of the effect.

iii) Duration of the effect.
iv) Reversibility of the effect.

3.3.2 The **size and scale** of an effect is determined by considering a variety of factors including:

a) the loss of or addition of features, and change in composition, and the proportion of the existing view that would be occupied by the change.
b) The degree of contrast or integration of new features or other changes with relation to the existing or remaining elements in the view (form, scale, mass, line, height, colour, texture etc.).
c) The nature of the view, namely the relative amount of time it would be experienced for and whether the views would be full, partial or glimpsed.

3.3.3 The **geographical extent** of an effect will vary from viewpoint to viewpoint and will reflect the following:

a) The angle of view in relation to the main activity of the receptor.
b) The distance from the proposed development.
c) The extent over which the change in view would be visible.

3.3.4 The **duration** of an effect simply relates to the length of time for which it would be experienced, i.e. short, medium or long term in a similar manner as was set out for landscape effects.

3.3.5 The **reversibility** of an effect relates to the prospects and practicality of an effect being able to be wholly or partially reversed, or whether the change cannot realistically be reversed, i.e. it is permanent.

3.3.6 These four factors are then considered together to derive an overall magnitude of effect for each receptor, which is determined by use of professional judgement. The assessment of the magnitude of effect is expressed using a four point verbal scale of large, medium, small or negligible. Where appropriate, intermediate levels such as medium/large or small/medium are used to refine the assessment.

3.3.7 Table 3.2 indicates with some descriptive text how the above factors could be used to inform magnitude of effect. As the circumstances of each specific receptor will vary, a reasoned narrative is set out in the LVA for each view in order to explain the particular magnitude of effect allocated to each receptor.

Table 3.2: Magnitude of Visual Effect Criteria (indicative)

Magnitude	Description
Large	A change which introduces a prominent new feature, and/or something of a larger scale to existing elements in the view, which may be seen across an extensive area or experienced from a long section of a route, and/or a longer-term effect, and/or significant contrast with the existing view.
Medium	A change which introduces an obvious new feature, and/or something at a slightly bigger scale to existing elements in the view, which may be seen across a wider area or experienced from a section of a route, and/or a medium-term effect, and/or broadly compatible with the existing view.
Small	A change affecting a smaller proportion of a view, which may be seen from a limited area or experienced from a short section of a route, and/or a shorter-term effect, and/or compatible with the existing view.
Negligible	A change which is barely perceptible in the view, and/or which is only glimpsed from a route.

4.0 LEVEL OF EFFECT

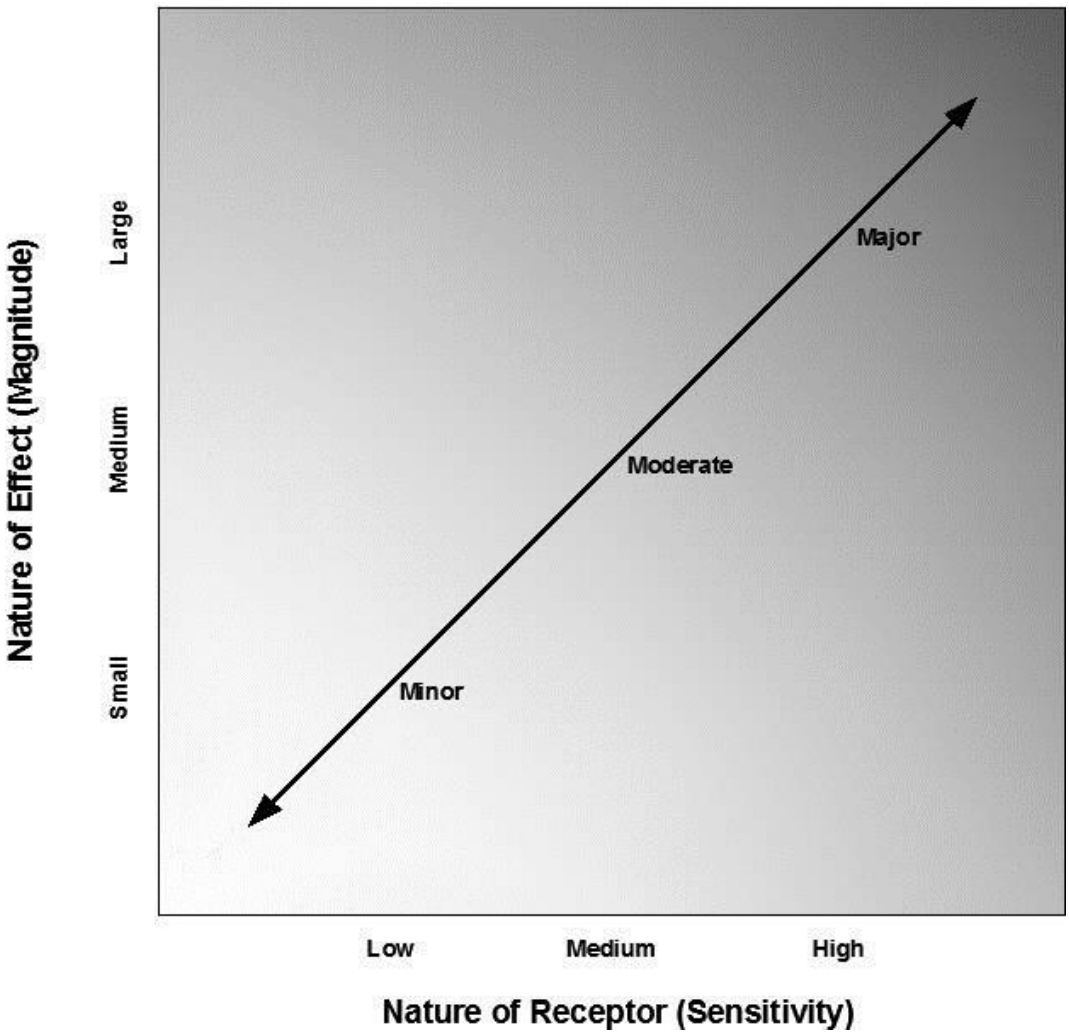
4.1.1 Having applied professional judgement to assess the sensitivity of the baseline landscape and visual environment and to consider the magnitude of potential change that the Proposed Development would cause. These are then combined using further professional judgement to consider the level of effect.

4.1.2 An LVA is not typically produced as part of an Environmental Impact Assessment (EIA) process and therefore it is not necessary to identify “significant effects.” It is however still appropriate to draw attention to any changes to landscape character or visual amenity which may be of particular note to the determining authority when determining the acceptability of a proposal. This approach is supported by GLVIA3 and subsequent clarifications provided by the Landscape Institute.

4.1.3 The level of effect can only be defined in relation to each particular development and its specific location. It is for each LVA to determine how judgements about receptor sensitivity and the magnitude of effect should be combined to derive the level of effect and to clearly explain how this assessment has been made.

4.1.4 Figure 4.1 (following page) provides a guide as to how sensitivity and magnitude can be combined to identify the level of effect upon a receptor (with the grey shading indicative of the increasing level of effect with increasing sensitivity and/or magnitude). Ultimately the final assessment of the level of effect is one of professional judgement and should be explained with narrative rather than simply relying on a matrix or diagram.

Figure 4.1: Level of Effect Matrix (indicative)



4.1.5 It should be noted that effects may be either adverse (negative) or beneficial (positive). If change occurs, with no obvious deterioration or improvement resulting, this can be said to be neutral.

Appendix B – Visualisation and ZTV Methodology

1.0 INTRODUCTION

1.1.1 This appendix provides the methodology for the production of visualisations.

1.1.2 Current good practice in the production of visualisations are set out within Landscape Institute TGN06/19 which has been referenced in the production of visualisations for the Proposed Development.

1.1.3 It should be recognised that production of visualisations is only one component of a Landscape and Visual Appraisal ('LVA'), which will consider a range of other factors when identifying and assessing changes to the landscape and to views. The use of visualisations is a useful aid when undertaking LVA, but the assessment process is not dependent on them. LVA may be undertaken without use of visualisations, but the inclusion of visualisations is accepted practice.

2.0 ZONE OF THEORETICAL VISIBILITY

2.1.1 The Zone of Theoretical Visibility of the Proposed Varied Development is computer-generated using topographical relief data, usually referred to as a Digital Terrain Model (DTM).

2.1.2 Ordnance Survey OS Terrain 50 data was used to generate the ZTV. This consists of a series of spot levels at 50m intervals. The root-mean-square error (RMSE) of the DTM is approximately 4m, i.e. the difference between the actual on-the-ground height of any particular location and the height as indicated by the DTM would be 4m or less.

2.1.3 The ZTV was calculated using QGIS open source software, taking account of the curvature of the earth's surface and light refraction. In order to offset any potential inaccuracies in the DTM data, the eye height of the viewer was set at 2m above ground level. The ZTV calculation did not use mathematically approximate methods.

2.1.4 The theoretical visibility of the turbine hub and the tip of the turbine blade was calculated and displayed graphically by using different colours according to how many turbine hubs or blade tips are visible.

2.1.5 The hub ZTV identifies areas from which any part of the main tower of the existing and proposed turbines could theoretically be seen. The blade tip ZTV identifies areas from which any part of the existing and proposed turbines from the base of the tower to the tip of an upright blade could theoretically be seen. A comparison of the

hub and blade tip ZTVs can be helpful in understanding the nature of visibility (i.e. whether full or partial views of turbines are available at any given location).

2.1.6 The ZTVs were produced based on the bare-earth DTM only and do not reflect the presence of screening features such as vegetation, buildings, walls/fences and other structures. As such, they represent a worst-case maximum of theoretical visibility only.

2.1.7 One limitation of this technique is that actual zones of visibility are not determined by topography alone. Other elements in the landscape act as screens, such as buildings, or filters such as hedgerows and woodlands. Screening and filtering of views by these elements can sometimes be very significant. In addition, a ZTV takes no account of the scale of the turbines in the view due to distance or truncation of views; it simply illustrates that a part of the structure would be visible.

2.1.8 The hub and blade tip ZTVs are presented on A1 paper using 1:50,000 scale Ordnance Survey mapping as a backdrop, to accord with the NatureScot guidance referenced above.

3.0 VIEWPOINT VISUALISATIONS

3.1 Photography

3.1.1 All photography for this assessment was taken using a digital single-reflex lens (DSLR) camera with a full-frame sensor, using a 50 mm lens. The camera is mounted on a tripod to ensure a stable support and minimise camera shake and a panoramic tripod head with built-in spirit level, which allows for the rotation of the camera at fixed intervals around a fixed point in vertical alignment with the camera lens, thereby eliminating parallax error. The camera is levelled using an auto-leveler device. Camera height was at a comfortable eye height being 1.5 to 1.6 m above the ground depending on the local ground conditions.

3.1.2 Photographs were taken over a full 360-degree sweep from each viewpoint location. The precise location of each photograph was recorded using a GNSS receiver GPS device.

3.2 Post-Photographic Processing

3.2.1 The individual photos taken on-site are stitched together using the software package PTGui. The output is a single panoramic image. The specifications of the camera

and camera lens used to take the photographs are inputted into the software to ensure the most accurate production of the final panoramic image.

3.3 Wireframes

3.3.1 Industry standard software (ReSoft WindFarm) is used for producing wireframes up to 360 degrees. Wireframes are constructed using a digital terrain model (DTM) of the bare earth surface (the Ordnance Survey Terrain 50 dataset) and the viewpoint data from the camera and photographs. The production of the wireframes makes allowance for the curvature of the earth and assumes a viewpoint height of 2m above the Ordnance Survey datum as a conservative worst case, which takes into account potential inaccuracies or discrepancies in the DTM data.

3.3.2 Wind turbine locations for a proposed development are defined to the nearest metre, using six-figure British National Grid co-ordinates. Hub heights, blade rotor diameter and other turbine dimensions are accurately modelled to correspond with the candidate turbine; or to a generic turbine model if precise details have not been finalised.

3.3.3 Based on the same input information as the wireframes and photomontages, a Google Earth file is used to double check that all viewpoint information corresponds with that which was recorded onsite. This also assists in confirming site position and extracting marker reference points used in the subsequent alignment process of wireframes and photographs.

3.3.4 Turbine models are set to face the viewer with a turbine tip pointing directly skywards to illustrate theoretical worst case visibility in terms of maximum width and height. Turbines are numbered and labelled to be consistent with references elsewhere on other documents and plans.

4.0 PHOTOMONTAGES

4.1.1 Photomontages are computer generated images; they depict a representation of the proposed wind turbines superimposed upon the existing photography, with the aim of producing a visualisation that should give a realistic impression of how the Proposed Development would appear within the landscape.

4.1.2 Using Adobe Photoshop, the wireframe and panoramic photograph are matched together to form an overlay of wireframe on top of photograph. Accuracy is ensured by using the same GPS location recorded on site, and by matching prominent

landforms and man-made objects (such as electricity pylons or telecommunication masts) as reference points where possible. This matching process will indicate turbine position upon the photograph and be used later as a reference point for positioning the rendered turbine models.

4.1.3 Turbine locations and dimensions correspond with the accompanying wireframe and are typically presented on the same page to allow direct comparison.

4.1.4 Wind turbines are rendered using ReSoft WindFarm software with a light source set to replicate as closely as possible the lighting conditions seen within the photographs that they are to be superimposed upon. Certain lighting conditions may require the turbines to be over-emphasised to enable the viewer to properly identify the location of the turbines.

4.1.5 Typically, for a greater sense of realism each turbine blade set is randomly rotated in the image. However, if this results in an image within which a blade would not be visible, or would be marginally visible when superimposed upon the photographs, then it is manually adjusted so as to be more visible. The turbines are set to directly face the view, again to present a worst case, as for the wireframes.

4.1.6 Using Adobe Photoshop, the rendered turbines are superimposed within the panoramic photograph, aligning with the previously generated wireframe. Where all or part of any turbine would be obscured by intervening features in the landscape, the non-visible sections of the turbine removed from the final image using a digital mask.

5.0 PRESENTATION

5.1.1 Once the final viewpoint images have been produced, these are then cropped to match a series of templates that accord with the output and display format required by NatureScot. Typically, the following output is produced:

1. *Baseline panorama and wireframe:* Displayed on one or more A1 width pages, with each page illustrating a 90° horizontal field of view (each image displayed at 820mm by 130mm). This shows the existing context of the viewpoint. The image is shown in cylindrical projection. The horizontal extent of the single frame 50mm lens photograph centred on the Proposed Development is indicated on the image, as is the extent of the extracted panorama used in relation to Item 3. Given the nature of the Proposed Development (repowering of an existing turbines located

in close proximity to a far larger wind farm, cumulative schemes are not shown on the baseline wireframe).

2. *Wireframe:* A wireframe produced in planar projection, using the same geometry and field of view as Item 3. The wireframe typically displays the proposed turbines only, with individual turbines numbered. The wireframe is displayed on an A1 width page.
3. *A1 panorama*: A photograph of the existing turbine, displayed on an A1 width page illustrating a 53.5° horizontal field of view and a 18.2° vertical field of view (image displayed at 260mm by 820mm). The image is shown in planar projection.
4. *A1 panorama:* A photomontage of the Proposed Development, displayed on an A1 width page illustrating a 53.5° horizontal field of view and a 18.2° vertical field of view (image displayed at 260mm by 820mm). The image is shown in planar projection.

1.1 These are presented as series of figures that accompany the LVIA (Figure 4.1.1 onwards).

6.0 VIEWING INSTRUCTIONS

6.1.1 Viewpoint visualisations can never provide an exact match to what is experienced in reality. Visualisations are tools in the assessment process but independent from it. They illustrate the likely change in view in the context of a specific date, time and weather conditions, that would be seen within a photograph and not as seen by the human eye. As such, visualisations need to be used in conjunction with site visits and should be considered in the context of the totality of views experienced from the viewpoint and not just focussed on the proposed wind turbine.

6.1.2 All visualisations are prepared to be technically correct at a specific viewing distance that recreates the correct perspective geometry of the view available from the viewpoint. To accurately recreate this using the printed page is difficult, particularly as the flat page does not conform easily to the biconvex lens of the human eye. As such, and in accordance with the TGN06/19 guidance referenced above, the visualisations displayed on the printed page should simply be viewed held at a comfortable arm’s length and with the page flat.