Chapter 6: Landscape and Visual Impact Assessment
6 LANDSCAPE AND VISUAL IMPACT ASSESSMENT

6.1 Introduction

This chapter of the ES is based on the findings of a Landscape and Visual Impact Assessment (LVIA) carried out by Stephenson Halliday. The purpose of this chapter is to identify, and where possible quantify, the likely significant effects of the Lancaster University Wind Development on the existing landscape and visual amenity within 30 km of the development site.

A full description of the development is provided in Chapter 2 of this document. The main elements of the development considered by this section of the ES are as follows:

- A single 2 MW wind turbine which will comprise a three bladed, horizontal axis machine with a hub height of approximately 59 m, a blade length of approximately 41 m and a rotor diameter of approximately 82 m, giving a ground to tip height of 100 m;
- 1.05 km of access tracks (see Figure 2.4 a-c);
- Underground cable route; and
- A temporary construction compound and topsoil storage compound.

Landscape impacts and visual impacts are separate, but related. Landscape impacts are changes in the fabric, character and quality of the landscape. Visual impacts relate solely to changes in available views of the landscape, and the effects that those changes have on people. Landscape and visual impacts do not necessarily coincide. Impacts can be beneficial as well as adverse.

There are three main objectives to the Landscape and Visual Impact Assessment. Firstly, to identify the effects of the development on the visual amenity of the area. This includes views from nearby properties and settlements and any areas of public access. This process requires the identification of the intrinsic visual characteristics of the existing landscape, its quality, and value. An impact of the development on views relates to the changes that arise in the composition of views as a result of changes to the landscape, to people’s responses to the changes, and to the overall effects with respect to visual amenity.

The second objective is to identify the effects of the development on the landscape character of the area. This will involve the identification of the landscape characteristics of the site and its surrounds at a national, regional and local level, and an assessment of how the development will change the fabric, character and quality of the landscape.

Thirdly, this assessment will identify any cumulative effects the development will have on visual amenity. A cumulative appraisal has been undertaken to take account of any wind farm developments within a 10 km radius which are either in operation, under construction, have planning permission, or which are due to be submitted to local planning authorities for planning permission in the near future. This includes the existing wind farm development at Caton Moor, and its possible extension. This wind farm is located 10 km from the development site and currently comprises eight 2 MW turbines.

Guidance provided in The Companion Guide to PPS22 ‘Planning for Renewable Energy’ identifies cumulative effects as “the degree to which renewable energy development becomes a feature in particular views (or sequence of views), and the effect this has upon the people who experience those views”. The Guidance for Landscape and Visual Impact Assessment defines cumulative effects as additional changes to visual amenity caused by the proposed development in conjunction with other developments, or actions that occurred in the past, present or are likely to occur in the foreseeable future. Cumulative effects consist of combined visibility and sequential visibility. Combined visibility occurs where the observer is able to see two or more developments from one viewpoint. Sequential effects occur when the observer has to move to another viewpoint to see a different development.

6.1.1 Chapter Structure

The potential landscape and visual effects of the proposed development are regarded as a key issue. The appraisal and consideration of these effects is set out in the following sections:

- Consultation - summary of consultation and responses received.

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Guidance and Legislation – Summary of guidance and legislation followed during the assessment.

Assessment Methodology – an outline of general methodology, with reference to established guidance;

Baseline description – to identify/confirm the fabric, character and quality of the landscape which would be affected by the proposal, including a review of the extent, purposes and special characteristics of landscape planning designations within the study area;

Landscape Capacity – summary of relevant guidance contained within the Landscape Sensitivity to Wind Energy Development in Lancashire’ report.

Information Gaps - Summary of any gaps in information identified during the assessment

Project Description and Mitigation – a description of the aspects of the proposed wind turbine development which have the potential to cause a landscape and/or visual effect, and the measures which have been incorporated into the project design to mitigate these potential effects;

Visual Analysis – comprising an assessment of the visual effects of the proposed development with reference to computer generated Visibility Maps to ascertain from where the development could be visible and those potential receptors that could be affected by changes in views, together with a viewpoint analysis to determine the magnitude and significance of the changes in the view from a selection of viewpoint locations that represent the main landscape and visual receptors in the study area;

Assessment of Landscape Effects – an assessment of the significance of effects arising from the proposed wind turbine on the landscape fabric, landscape character and quality of the landscape types and designated areas within the study area;

Assessment of Visual Effects – an assessment of the significance of effects arising from the proposed wind turbine on the visual amenity, receptors and viewpoints in the study area; and

Residual Effects and Statement of Significance– a summary of the assessment results and concluding discussion on the acceptability of the proposed turbine in landscape and visual terms.

Following consultation with the Local Planning Authority for the initial 2 turbine proposal, the landscape assessment is based on a 10 km radius (see Figure 6.01 - 6.03 and Figure 6.06) and the visual assessment is based on a 15 km radius study area (see Figure 6.04-6.09). The assessment of landscape and visual effects is illustrated with reference to existing photographs, wireframes and photomontages (Visualisations 1-12 on Figures 6.10 - 6.31).

6.2 Consultation

Consultation forms an important part of the assessment process. As described in Chapter 1 of this document, during the scoping stage of this development, consultation with relevant stakeholders and interested parties was carried out. The aim of this consultation was to provide them with information on the development proposal and what technically appear to be the key issues and to find out what their key concerns are regarding the location and the development itself. Consultation responses as follows:

6.2.1 Forest of Bowland AONB and Lancashire County Council

Following an initial consultation request on the original two turbine proposal, the AONB Office deferred comments on Landscape and Visual Impacts to Lancashire County Council who expressed some reservations on the following aspects of the development:

- The site as identified within Lancashire’s Landscape Sensitivity to Wind Energy Development document is within an area of moderate- high sensitivity;
- Location;
- The turbines would be situated on a narrow ridge that has quite a complex and relatively small scale landscape pattern. This would increase the likelihood that the turbines would be out of scale with the surroundings;
- Impacts on landscape value - the wind turbines would be visible from within much of the Forest of Bowland AONB;
- The presence of features nearby which would act as scale comparators emphasising the height of the turbines;
- The overall proposed height of the turbines which at 123.7 m would be inappropriate for the areas topography [this discussion was based on turbine specifications greater than the current proposal];
The relative scale of the proposed turbines in relation to the average height of the ridge that they would be located on. The turbines at 123.7 m high would exceed the average height of the ridge which has a maximum height of only 144 m, by a considerable margin [this discussion was based on turbine specifications greater than the current proposal];

- Likely significant adverse visual impacts on nearby residences and the M6 corridor; and
- Cumulative impacts with the Caton Moor wind farm.

As previously stated, the comments above relate to the original two turbine proposal. The turbines were subsequently reduced to 100m in height to address the Council’s concerns and the current proposal is for a single turbine at 100m to tip.

6.2.2 Lancaster Council
Detailed consultation regarding landscape and visual impact has been undertaken with Lancaster City Council who has been supportive of the principle of the development. The scope of the assessment criteria including the radius (km) of the Landscape and Visual Assessment studies, the scope of the cumulative assessment and the general locations of the visualisations have been agreed prior to commencement of the study.

6.2.3 English Heritage
English Heritage have been consulted at pre application and scoping stages.

6.2.4 Natural England
In response to initial pre application consultation and a Scoping Opinion Request on the original two turbine proposal, Natural England replied:

“The proposed wind farm site is not within a designated landscape. The Forest of Bowland Area of Outstanding Natural Beauty (AONB) is less than 2Km to the East of the proposed development site. However Natural England is of the opinion that the adverse effects on the special qualities of this part of the AONB, including the sense of wildness and remoteness, will not be of sufficient significance for an objection to be made on landscape grounds given that the proposed development will be within the M6 motorway corridor and against a background of the Lancaster university buildings.

The landscape and visual impact assessment should follow the standard methodology as set out in the Landscape Institute/IEMA Guidelines for Landscape and Visual Impact Assessment 2nd edition 2002. As the wind turbines may be seen from coastal locations and from viewpoints across Morecambe Bay, the methodology for seascape assessment (CCW/Brady Martin Shipman ‘Guide to Best Practice in Seascape Assessment 2001) is also relevant, as are offshore wind energy developments in assessing cumulative effects.”

In addition to the national Character Areas (also known as Joint Character Areas), there are strategies and Supplementary Planning Documents which are relevant, including landscape sensitivity in relation to wind energy studies. Information on these and on Historic Landscape Character assessments can be obtained from the local authorities affected.”

6.3 Guidance and Legislation
The assessment has been prepared after referencing a number of different sources and materials, including the following:

6.3.1 Guidance and Legislation
The assessment has been based on the following best practice guidance:

- Guidelines for Landscape and Visual Assessment (Landscape Institute and Institute of Environmental Management and Assessment 2002); and

It also takes account of advice within the following documents:

- Environmental Impact Assessment Regulations 1999;
- Guidelines on the Environmental Impact of Windfarms and Small Scale Hydro Electric Schemes (SNH 2001);
- Visual Representation of Windfarms: Good Practice Guidance (SNH 2006);
- Cumulative Effect of Windfarms (SNH 2005);
- ‘A Landscape Strategy for Lancashire’ (2000); and

6.3.2 Policy Framework
A number of national planning policy statements consider landscape character as set out below:

6.3.2.1 PPS1 - Delivering Sustainable Development
PPS1 sets out the Government’s overarching planning policies on the delivery of sustainable development through the planning system. It states that one of the Government’s objectives for the planning system is that planning should facilitate and promote sustainable urban and rural development by protecting and enhancing the natural and historic environment and the quality and character of the countryside (Para 5).

In its key principles, PPS1 states that “a spatial planning approach should be at the heart of planning for sustainable development” (Para 13.iii) and “design which fails to take the opportunities for improving the character and quality of an area should not be accepted” (Para 13.iv). When preparing development plans, “planning authorities should seek to enhance as well as protect biodiversity, natural habitats, the historic environment and landscape and townscape character” (Para 27).

6.3.2.2 PPS7 - Sustainable Development in Rural Areas
Landscape Character Assessment, along with Village or Town Design Statements and Village or Parish Plans, is recommended as a tool to assist Local Authorities in the preparation of policies and guidance that encourage good quality design throughout rural areas (Para 13).

Landscape Character Assessment is recommended as a tool for creating carefully drafted, criteria-based policies in Local Development Documents to protect valued landscapes outside nationally designated areas without the need for rigid local designations, which may restrict sustainable development and the economic vitality of rural areas. Local landscape designations should only be maintained or, exceptionally, extended where it can be clearly shown that criteria-based policies cannot provide the necessary protection (Paras 24 and 25).

6.3.2.3 PPS22 – Renewable Energy
The Companion Guide to PPS22 makes clear endorsements of the landscape character approach when planning for renewable energy at the regional level. It states that the “intrinsic qualities of each landscape character area”, as expressed in either the Character of England Countryside Character volumes or more recent Landscape Character Assessments, should be considered when addressing broader landscape issues at the regional planning level: these ‘intrinsic qualities’ should be set down in writing, and all parties involved or interested in development for renewable energy should be encouraged to consult this supporting information before making reference to a particular landscape character area (Para 3.29).

It also states that regional planning authorities should identify the sensitivity of any landscape character areas referred to in plans for renewable energy development to particular types of change/development at a broad scale, and that “landscape character areas may be described in relation to their suitability as a location for particular types and scales of renewable energy development” (Para 3.29). It goes on to state that “applying LCA at the regional level is recommended to inform strategic planning for renewables” (Para 3.33).

The Companion Guide to PPS22 also makes specific endorsements of the Countryside Character Network, the former name of the Landscape Character Network, as “the main forum for ongoing discussion on landscape issues”, and LCA Topic Paper 6: Techniques and Criteria for Judging Capacity and Sensitivity (Further Information, p41).

6.4 Assessment Methodology

6.4.1 General Approach
The assessment has utilised information in the Countryside Character publication for the North West in addition to the county landscape character assessment: “A Landscape Strategy for Lancashire” (2000) and the ‘Landscape Sensitivity to Wind Energy Development in Lancashire’ SPD (2005). It has been assisted by consultations with Lancaster City Council, Lancashire County Council and Natural England.
6.4.2 Significance Criteria

The aim of the landscape and visual assessment is to identify, predict and evaluate potential key effects arising from the proposed development. Wherever possible identified effects are quantified, but the nature of landscape and visual assessment requires interpretation by professional judgement. In order to provide a level of consistency to the assessment, the prediction of magnitude and assessment of significance of the residual landscape and visual effects have been based on pre-defined criteria.

6.4.3 Landscape Sensitivity

The sensitivity of the landscape to change is not absolute and varies according to the existing landscape, the nature of the proposed development and the type of change being proposed. Accordingly, the concept of ‘sensitivity to change’ is not part of the baseline description of the landscape of the study area, but is considered in relation to the assessment of the effects of the proposed development. In general terms, areas of high landscape quality and value are more sensitive to change than areas of lesser quality and value, and general guidance on the evaluation of sensitivity is provided in Table 6.1. However, the actual sensitivity would depend on the attributes of the landscape receiving the proposals, and the nature of those proposals.

The assessment of sensitivity is based on consideration of the following parameters, together with the nature of the proposals, during the course of the assessment:

- Landscape value: the importance attached to a landscape, often as a basis for designation or recognition which expresses national or regional consensus, because of its quality, cultural associations, scenic or aesthetic qualities;
- Landscape quality: the state of repair or condition of elements of a particular landscape, its integrity and intactness and the extent to which its distinctive character is apparent;
- Landscape capacity: the capacity of a particular type of landscape to accommodate change brought about by wind farm development without unacceptable negative effects on its character, reflecting key aspects of landscape character including scale and complexity of the landscape and degree of ‘wildness’ or ‘remoteness’.

Table 6.1 Landscape Sensitivity

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Sensitivity of Landscape</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High</td>
</tr>
<tr>
<td><strong>Landscape value</strong></td>
<td>National (e.g. National Parks and AONBs)</td>
</tr>
<tr>
<td><strong>(designations)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Landscape quality</strong></td>
<td>A landscape in good condition, predominantly intact and with a clearly apparent distinctive character</td>
</tr>
<tr>
<td><strong>Landscape capacity</strong></td>
<td>Landscapes of distinctive character susceptible to relatively small changes</td>
</tr>
</tbody>
</table>

The sensitivity of potential visual receptors will vary depending on the location and context of the viewpoint, the activity of the receptor and importance of the view. Visual receptor sensitivity is defined as high, medium, or low in accordance with the criteria in Table 6.2.
Table 6.2 Visual sensitivity criteria

<table>
<thead>
<tr>
<th>Sensitivity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>High sensitivity</td>
<td>Residents experiencing principal views from dwellings, users of outdoor recreational facilities including strategic recreational footpaths and cycle ways, people experiencing views from important landscape features of physical, cultural or historic interest, beauty spots and picnic areas.</td>
</tr>
<tr>
<td>Medium sensitivity</td>
<td>Road users and travellers on trains experiencing views from transport routes. In addition, residents experiencing secondary views from dwellings, users of secondary footpaths experiencing views, and people engaged in outdoor sport (other than appreciation of the landscape) or recreation i.e. hunting, shooting, golf and water based activities.</td>
</tr>
<tr>
<td>Low sensitivity</td>
<td>Workers, users of facilities and commercial buildings (indoors) experiencing views from buildings.</td>
</tr>
</tbody>
</table>

Those receptors living within view of the scheme are usually regarded as the highest sensitivity group along with those engaged in outdoor pursuits for whom landscape experience is the primary objective. The threshold for significance of visual effects relies to a great extent on professional judgement. Criteria and local circumstances require close study and careful consideration to decide if the effect on a single property will warrant classification as a highly significant issue. Generally it will be rare for the impact on a single dwelling to be categorised as of high significance for the development overall. However it may combine with similar impacts on many properties to give rise to a more general impact of high significance.

The magnitude of change arising from the proposed development at any particular viewpoint is described as substantial, moderate, slight or negligible based on the interpretation of a combination of largely quantifiable parameters, as follows:

- Distance of the viewpoint from the development;
- Duration of effect;
- Extent of the development in the view;
- Angle of view in relation to main receptor activity;
- Proportion of the field of view occupied by the development;
- Background to the development; and
- Extent of other built development visible, particularly vertical elements.

In order to differentiate between different levels of magnitude the following definitions are provided:

- Substantial - total loss or major alteration to key landscape elements/features/characteristics such that post development the baseline landscape character or composition of the view will be fundamentally changed;
- Moderate - partial loss or alteration to one or more key landscape elements/features or characteristics such that post development the baseline landscape character or composition of the view will be partially changed;
- Slight - minor loss or alteration to one or more key landscape elements/features or characteristics such that post development the change/loss will be discernible but the underlying landscape character or composition of the view will be similar to the baseline; and
- Negligible - very minor loss or alteration to one or more key landscape elements/features or characteristics of the baseline conditions. Change will be barely distinguishable approximating to no change.

The significance of any identified landscape or visual effect has been assessed in terms of major, moderate, minor or none. These categories are based on the juxtaposition of viewpoint or landscape sensitivity with the predicted magnitude of change. This matrix should not be used as a prescriptive tool but must allow for the exercise of professional judgement. These categories have been based on combining viewpoint or landscape sensitivity and predicted magnitude of change, to determine significance of effects.
Table 6.3 Significance of landscape and visual impact

<table>
<thead>
<tr>
<th>Landscape and Visual Sensitivity</th>
<th>Magnitude of Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Substantial</td>
</tr>
<tr>
<td>High</td>
<td>Major</td>
</tr>
<tr>
<td>Medium</td>
<td>Major/Moderate</td>
</tr>
<tr>
<td>Low</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

Where the landscape or visual effect has been classified as Major or Major/Moderate this is considered to be equivalent to likely significant effects referred to in the Town and Country Planning (Environmental Impact Assessment) Regulations 1999. Effects described as Major/Moderate to Moderate or less are generally not considered significant; however a level of professional judgement is applied to the assessment.

The measure of significance of effects must not be taken to imply that they are necessarily adverse or should warrant refusal. As with many aspects of landscape and visual assessment, significance of effect also needs to be qualified with respect to the scale over which it is felt. An effect may be locally significant, or significant with respect to a small number of receptors, but not significant when judged in a wider context.

Any effect may be described as temporary or permanent, direct or indirect, positive or negative and these various types of effect have a bearing on the acceptability or otherwise of the type of effect. The various types of effect are described as follows:

6.4.4 Temporary/Permanent Effects

If a proposal would result in an alteration to an environment whose attributes can be quickly recovered then judgements concerning the significance of effects should be tempered in that light. The wind energy application is for a 25 year operational period, and while this is not permanent it can properly be described as long term. Landscape and visual effects can be reversed and following decommissioning there would be no residual landscape and visual effects. A wind turbine should therefore be regarded as a long term reversible addition to the landscape preserving the choice for future generations whether or not to retain what might be regarded as the landscape fabric of today.

6.4.5 Direct and Indirect Effects

Direct and Indirect landscape and visual effects are defined in Guidelines for Landscape and Visual Impact Assessment (GLVIA 2002). Direct effects may be defined “…as an effect that is directly attributable to a defined element or characteristic of the proposed development, for example the loss or removal of an element or feature such as a hedgerow or a prominent group of trees…”’. ‘An indirect (or secondary) effect is an effect that is not a direct result of the proposed development but is often produced away from the site of the proposed development or as a result of a complex pathway or secondary association’. The direct or physical effects are generally limited to an area around the base of the proposed turbine and cable trenches to an existing substation building on the Lancaster University Campus. The main effects are often concerned with the visual effects (occasionally referred to as indirect effects) and relate to effects associated with the introduction of the wind turbine as seen in the context of the existing landscape and visual character of the view.

6.4.6 Positive/Negative (Beneficial and Adverse)

Positive effects upon landscape receptors may result from changes to a view involving positive enhancement measures or through the addition of well-designed elements, which add to the landscape experience or sense of place in a complementary manner. In the case of wind turbine development it is not a clear cut matter to determine whether or not a change in the view should necessarily be regarded as an adverse or positive effect, because of the widely varying responses of individuals to this form of development. The perception of the viewer influences whether a significant visual effect would constitute acceptable change to the landscape. As described in Chapter 4 of the ES a public attitude surveys in the vicinity of existing operational wind farms in England, Scotland and Wales have consistently found that more people view wind farms positively than negatively and it appears to be the case that this proportion tends to increase post construction compared to pre-construction. The most recent study is the ‘Public Attitude to Wind farms’
survey carried out for the Scottish Executive by MORI (August 2003). The factors influencing acceptability are considered in the conclusions of this chapter.

The assessment has been carried out in a systematic manner based on a neutral perspective in relation to the beneficial or adverse nature of effects.

6.4.7 Illustrative Tools

6.4.7.1 Visibility Maps

Computer generated Zone of Theoretical Visibility (ZTV) Maps have been prepared to assist in viewpoint selection and to indicate the potential influence of the development in the wider landscape. They have been prepared to indicate the extent of potential visibility on the basis of ‘bare ground’ only not taking the screening effects of the built form of settlements and main areas of woodland into account.

Visibility Maps to turbine blade tip and hub height have been prepared to a radius of 15 km from the proposed turbine. Visibility Maps illustrate potential visibility on the basis of ‘bare ground’.

The Visibility Maps indicate areas from which it might be possible to secure views of part, or parts, of the proposed turbine. However, use of the Visibility Maps needs to be qualified on the following basis:

- there are a number of areas within the Visibility Maps from which there is potential to view parts of the proposal, but which comprise open agricultural, or other land where the general public do not appear to exercise regular access;
- the Visibility Maps can indicate visibility in areas of significant tree and woodland cover where the landcover obscures the majority of views out with the vegetated area;
- the Visibility Maps do not account for the effects of screening and filtering of views as a result of intervening features, such as buildings, dense settlement, trees and hedgerows;
- the Visibility Maps do not account for the likely orientation of a viewer – for example when travelling in a vehicle.

6.4.7.2 Viewpoint Assessment and Visualisations

The combined effect of these limitations means that the Visibility Maps tend to over-estimate the extent of visibility – both in terms of the land area from which the turbine is visible and also possibly the extent of visibility of the turbine from a particular viewpoint.

In addition, the accuracy of the Visibility Maps has to be considered. In particular, the Visibility Maps are generated from Ordnance Survey (OS) Landform Panorama digital data based on a gridded terrain model with 50 m cell sizes. The resolution of this model cannot accurately represent small-scale terrain features, which can therefore give rise to inaccuracy in the predicted visibility. This can lead to either underestimation of visibility – e.g. a raised area of ground permitting views over an intervening obstruction – or can lead to overestimation of visibility – such as where a roadside embankment obscures a view. These effects are said to be ‘random’ and over the extents of the Visibility Maps are unlikely to present a significant error.

The use of this type of Visibility Map is considered good practice and should be considered as a tool to assist in assessing the visibility of the project. The Visibility Maps do not present an absolute measure of visibility and do not represent the ‘visual impact’ of the proposed wind turbine.

The assessment of landscape and visual effects is carried out from an agreed representative selection of viewpoints. Following consultation with Lancaster City Council a total of 12 viewpoints were chosen at a range of locations throughout the 15 km study area for the original 2 turbine application (which we consider to remain valid as the proposed turbine is lower than initial elevations). The selected viewpoints are representative of the views experienced at different distances and directions from the site, as well as from the various landscape character types identified in the study area from which the proposed wind turbine would be visible. Detailed analysis of the viewpoints includes description of the existing and predicted view, analysis of magnitude of change and the effects on landscape character and visual amenity.

The viewpoint analysis is illustrated with reference illustrative material, comprising photographs and photomontages, both of which have been undertaken in line with guidance provided in the SNH document ‘Visual Representation of Windfarms’ which recommends a “minimum viewing distance of 300 mm and the use of a 50 mm equivalent camera
Photography was undertaken with a digital SLR camera with full size (35 mm) sensor, using a 50 mm focal length lens, mounted on a level panoramic head tripod.

All of the photographs and photomontages have been produced to record a 65.5 degree angle of view, illustrating the view experienced at the viewpoint, and provides an indication of the visual context of the development. In this assessment the visualisations have been presented with a comfortable viewing distance of 350 mm when printed at A3 size.

6.5 Baseline Description
The aim of the baseline analysis is to document, classify and appraise the existing landscape features in the vicinity of the development site. It also establishes the extent of the visibility of the site. Through this process, a better understanding of the key components or characteristics of the study area is gained, which is critical in identifying valued and potentially sensitive landscape and visual receptors against which the predicted landscape and visual impacts of the development can be assessed.

6.5.1 Landscape Context
The site is located adjacent to the M6 motorway corridor south of Lancaster within the rolling lowland landscape of the Bowland Fringe and Pendle Hill character areas. The proposed turbine would be located within agricultural land and the immediate character close to the site includes the predominantly developed M6 corridor to the west, with more rural character to the east including narrow lanes, hedgerows and scattered dwellings. It was agreed with the Local Planning Authority that the Study of Landscape Character should be limited to a 10 km radius of the proposed development site.

6.5.2 Landscape Character – National Character Areas
A description of the wider landscape surrounding the development is given here to provide context to the visual qualities of the landscape within which the development would be located. The description is based on Natural England’s ‘National Character Areas’, (NCA) of which there are 159 in England. The descriptions given for each character area highlight the influences which determine the character of the landscape, for example land cover, buildings and settlements. Figure 6.01 – Landscape Character, illustrates the location of the NCA’s and also the Local Landscape Character types within a 10km radius of the development, as agreed with the Local Planning Authority.

The NCA in which the development site falls is No.33 – Bowland Fringe and Pendle Hill, close to the boundary with No. 31 - Morecambe Coast and Lune Estuary. The Bowland Fringe and Pendle Hill is a transitional landscape which wraps around the dramatic upland core of the Bowland Fells. It extends from the Lune Valley in the north around the slopes of the Bowland massif before merging imperceptibly eastward into the landscape of the Ribble Valley. The eastern boundary links with the Yorkshire Dales while to the south lie the Lancashire Valleys.

Bowland Fringe and Pendle Hill (NCA 33)
This is a diverse landscape of undulating pasture, broadleaved woodland, parkland and water bodies. Fields are small to medium-sized and are enclosed by well maintained hedgerows with large mature hedgerow trees. The Sycamore of the Lancashire and Amounderness Plain is replaced by Oak, Ash and Alder. This is a relatively wellwooded landscape, predominantly associated with the myriad of streams and valleys which cascade off the Bowland Fells and support large areas of semi-natural riparian woodland. This includes several areas of ancient woodland along the Brock and Calder and between Dolphinston and Abbeystead.

To the south of Bowland the moorland outliers of Pendle Hill, Beacon Fell and Longridge Fell enclose the Ribble Valley and reinforce its affinity with the Forest of Bowland. The combination of topography, tree cover and field enclosure creates a sense of intimacy in contrast to the expanse of the coastal plain and exposed moorland heights. To the north of Bowland is the Lune Valley which separates the Fringe from Morecambe Bay. It has a pastoral character with fields enclosed by well-maintained hedgerows containing mature hedgerow trees. Due to soil conditions and a favourable microclimate, vegetation is generally larger and more vigorous than in other areas. Deciduous woodland, including some areas of ancient woodland, is concentrated on valley sides and is most prominent in the Roeburn, Wenning, Greta and Hindburn valleys.

The key characteristic of the Bowland Fringe and Pendle Hill landscape area are as follows:

- Undulating rolling landscape with local variation created by both the numerous river valleys and outlying upland features of Beacon Fell, Longridge Fell and Pendle Hill;
- Strong outcrops of ‘reef knolls’ and limestone form distinct landscape features to the Ribble and Hodder Valleys;
- Meandering, commonly tree-fringed rivers with oxbow lakes form prominent features within the predominantly pastoral landscape;
- Predominantly Grade 3 agricultural land supporting permanent pasture, mostly improved, for dairy and livestock farming;
- Intensively managed landscape, with lush hay meadows in small- to medium-scale fields defined by well maintained hedgerows with mature hedgerow trees. Some rough grazing at higher elevations;
- Extensive semi-natural woodland, much of which is ancient, on both main valley bottoms, side valleys and ridges;
- Dense north - south communication corridor, comprising the M6, the railway line and the Lancaster Canal, defining the western boundary and providing a physical and psychological barrier;
- Numerous water courses and bodies including the rivers Ribble, Hodder, Calder, Wyre, a number of reservoirs, and field ponds north of Preston;
- Small villages, hamlets and scattered farmsteads mostly in local stone are well integrated into the landscape and connected by a network of winding hedge-lined country lanes; and
- Bowland Fells provide a dramatic backdrop to the east and north with extensive views possible from high ground across the Lancashire and Amounderness Plain and across open valley bottoms.

The key characteristics of the other National Character Areas within the Study Area are set out at Appendix 6.0.

6.5.3 Lancashire Landscape Character Assessment

All of the NCA’s, including the Bowland Fringe and Pendle Hill area have been subdivided further by the Lancashire County Council’s Landscape Character Assessment ‘A Landscape Strategy for Lancashire’ (2000).

The development site predominantly falls within the 7c – Langthwaite Ridge, landscape character type (LCT) which is within the Farmed Ridges Landscape Character Area (LCA). The southern tip of the site is located in 12a – Carnforth- Galgate-Cockerham LCT within the Low Coastal Drumlins LCA. Both landscape character types are described in more detail below.

In the area around the development site, in addition to type 7c – Langthwaite Ridge, the following landscape character types also fall within the 10km study area (see Appendix 6.0 for full descriptions):
- 1b – High Bowland Plateau;
- 2b – Central Bowland Fells;
- 4d – Bowland Gritstone Fringes;
- 5i – West Bowland Fringes;
- 10a – Wyre Valley;
- 10b – North Bowland Valleys;
- 11d – Lune Valley;
- 12c – Heysham – Overton;
- 13c – Docker-Kellet-Lancaster;
- 15e – Forton-Garstang-Catterall;
- 16a – North Flyde Mosses;
- 16f – Heysham Moss;
- 17b – Cockerham Coast;
- 18d – Lune Marshes; and
- 18e – Pilling and Cockerham Marshes.

7c Langthwaite Ridge
The development site falls within the landscape character area of Langthwaite Ridge as shown on the map below and is part of a group of ‘Farmed Ridges’ which includes 7a – Mellor Ridge and 7B - Upholland Ridge. These gritstone outcrops are relatively low in comparison to the Bowland Fells and outliers, their distinctive ridge profiles set them apart from the adjacent lowland agricultural landscapes. Wooded sides, which rise sometimes dramatically from the farmed plains, are visible for miles around and provide a sense of orientation when in the lowlands. The ridges themselves support a mosaic of mixed farmland and woodland which provides a textural backdrop to the surrounding lowlands. The landscape character one side of the ridge may be totally different from the character on the other, despite their proximity to each other.

The local vernacular is clustered stone built villages with scattered outlying cottages and farmsteads strung out along local roads, but more recent ribbon development and new houses display an incongruous mix of materials. There is a good network of footpaths, parking and picnic spots with views over the surrounding lowlands. The ridges also support some forestry and provide ideal sites for reservoirs and communication masts.

The ridges are formed from high areas of Millstone Grit which rise dramatically from the surrounding landscape to elevations of between 140 and 230 m. The Millstone Grit outcrops in places, but is largely overlain by Boulder clay. The Langthwaite Ridge is orientated north south and is separated from the Bowland Hills by low lying land of glacial sands and boulder clay drift. To the west lie low drumlins.

The relative height and views from the ridges have more recently attracted communication masts, housing developments and recreational activities. The ridges continue to be resources for agriculture, stone and water to supply nearby urban populations. Intensive farming in recent history threatens to remove traces of early enclosure, although the early origin of field patterns is still discernible in the landscape.

Relating to the Langthwaite Ridge in particular, this gritstone outcrop forms a prominent rounded ridge which forms a southern extension to the Docker-Kellet-Lancaster Drumlin Field. It separates the city of Lancaster and developed coastal drumlin landscape from the rural landscapes of the Bowland Fells.

It is distinguished from the adjacent drumlin field by its smooth rounded form. It is typical of a farmed ridge with a rich mosaic of pasture, woodland and parkland. It forms a setting for the city of Lancaster and scattered built development takes advantage of views from the ridge. It provides suitable location for reservoirs and communication masts which stand out against the skyline. Mixed woodlands are a feature of this area, associated with the Quernmore estate and the reservoirs. The largest block is Knots Wood, managed by Forest Enterprise.

12a – Carnforth-Galgate-Cockerham

The Low Coastal Drumlins, on or near which Lancaster and Morecambe are built, extend along the coast behind Morecambe Bay from Cockerham in the south to Carnforth in the north. This landscape supports an extremely high proportion of built development including the large settlements of Lancaster and Morecambe and recent built development along the A6. The Low Coastal Drumlins provide a convenient transport corridor; the Lancaster Canal, M6, A6 and mainline railway run side-by-side in a north-south orientation. The canal, which weaves through the drumlins, is an important reminder of the area’s industrial heritage; a branch emerges into the Lune at Glasson Dock.

To the west of Cockerham settlement is sparse and dominated by scattered large scale farmsteads in contrast to the towns and large villages further north. Fields are largely of post medieval pattern, however there are areas of older enclosure and settlement, notably at Cockersand Abbey. The drumlins provide elevated points from which there are views over the salt marshes to Morecambe Bay. Near Thurnham there is a significant area of mossland lying between the drumlins, allowing long distant views towards the coast. Traditional farmsteads and older settlement cores are built of stone but the modern development is often built using red brick. Buildings on top of the drumlin hills are particularly visible. Woodland is limited to small plantations, woods associated with former estates and rarely, fragments of ancient woodland in unusual hilltop or hillside settings.

6.5.4 Greenbelts

Approximately 25% of the total area of Lancashire is designated as Greenbelt. The purposes of the Greenbelt designation are as follows:

- To check the unrestricted sprawl of large built-up areas;
- To prevent neighbouring towns from merging into one another;
- To assist in safeguarding the countryside from encroachment;
- To preserve the setting and special character of historic towns; and
- To assist in urban regeneration by encouraging the recycling of derelict and other urban land.

The extent of the Greenbelt designation in Lancashire is shown in Figure 6.02 Landscape Designations. Greenbelt policy in England is guided by PPS2: Greenbelts. This planning policy statement is detailed in Chapter 3 of this ES.

The closest Greenbelt designation to the development site is to the north of Lancaster, located approximately 6 km from the proposals. The designation separates the city of Lancaster from the settlements of Slyne, Hest Bank, Bolton le Sands and Carnforth to the north (see Figure 6.02 – Landscape Designations).

6.5.5 Development Site Designation

The development site falls within an area designated as countryside by the Lancaster District Local Plan, covered by policy E4. This designation is described in more detail in Chapter 3 of this Environmental Statement.

6.6 Landscape Capacity

6.6.1 Lancashire Landscape Capacity Guidance

In 2004 ‘Landscape Sensitivity to Wind Energy Development in Lancashire’ was produced to provide strategic guidance on the sensitivity of Lancashire’s landscapes to wind energy developments. The study addresses landscape parameters only and excludes the consideration of other others, such as potential impacts on ecology, hydrology and soils.

The document looks at the landscape character areas as defined in the Lancashire Landscape Character Assessment. A desk top review was undertaken referring to the written LCA descriptions and each LCA was considered in respect of the selected sensitivity criteria.

These criteria included scale, openness, landform, landcover, complexity and patterns, built environment, sense of remoteness/wildness, perception of change, views, landscape form/setting/backdrop/local points, rarity of landscape, designation, cultural associations and amenity and recreation.

The output in respect of each LCA is expressed as High, Moderate-High, Moderate, Moderate-Low and Low sensitivity to wind energy development. The assessment process integrated the different components of sensitivity and the findings were tested on a sample of LCAs in the field.

In general it was found that Lancashire as a whole has a generally High and Moderate-High sensitivity to wind energy development as shown in the Figure 6.06. This sensitivity includes the areas of both AONBs.

6.6.2 Sensitivity of Langthwaite Ridge

The development site is located in 7c – Langthwaite Ridge, which was found to have a Moderate-High level of sensitivity to wind energy development. It is stated that this particular landscape rises above the surrounding lowland, forming a prominent ridge, although in close proximity to the more elevated landscape of the Forest of Bowland. There are no attributes of scale or landform that lead to particular sensitivity.

The area has a long established settlement pattern, including designated landscapes and country houses with a distinctive architecture, all of which tend to elevate the sensitivity. In addition there is an extensive footpath network and the area is used for recreation. There are however some detractors within this area that reduce the sensitivity.

Whilst not forming elevated backdrops to adjacent areas this area is an important component of local and some wider views and this tends to elevate the sensitivity, with these areas perceived as part of the setting of adjacent areas. This is particularly the case with this area forming the setting of the western edge of Lancaster.

The document points out that since this is a broad scale study carried out at County level to provide strategic guidance, an identification of high sensitivity to wind energy development does not necessarily rule out all wind development in the denoted area. It is possible that in limited parts of these LCAs, exceptional circumstances of characteristics, or the absence of them, may lead to opportunities for wind energy development.

A further consideration of the study was undertaken in order to identify the appropriate scale of wind energy developments that may be appropriate within each LCA, notwithstanding the findings of sensitivity. In this context the following typology for scales of wind energy development was prepared to address four scales of development:

- Small scale clusters (2-5 1.3MW+ turbines);
- Medium scale clusters (6-10 1.3MW+ turbines);
- Large scale clusters (11-25 1.3MW+ turbines); and
- Very large scale clusters (26+ 1.3MW+ turbines).

Langthwaite Ridge is identified as being appropriate for small and possibly medium scale clusters. This is shown on the map in Appendix 6.06.

6.7 Information Gaps
Details of any gaps in information are documented and discussed in the relevant assessment sections of this chapter.

6.8 Project Description and Mitigation
6.8.1 The Proposed Development
The proposed development would comprise three distinct phases; a temporary construction phase, an operational phase and a temporary decommissioning phase. A description of these phases of development is contained in Chapter 2 of the ES. Those elements of the development with the potential to cause an effect on landscape character and visual amenity are described in the paragraphs below.

The construction phase is expected to last for approximately 5 months. The activities and temporary features with the potential to cause an effect on the landscape and visual amenity include:

- Construction of crane hard-standing;
- Excavations and construction of turbine base foundation;
- Excavations for underground cables;
- Temporary site compound;
- HGV deliveries to site and movement of vehicles on site;
- Erection of turbine;
- Reinstatement works, including mitigation measures and the removal of the temporary accommodation.

These works will be confined to the immediate surroundings of the site within agricultural land and include delivery movements as well as construction machinery in the immediate vicinity. The visual effects of the construction phase are considered below.

The proposed wind turbine is the only element of this development with the potential to affect the landscape and visual amenity of the study area during the operational phase.

The precise turbine make and model have not been finalised as this is dependent upon the technology available at the time of install and statutory requirements for tendering. However the turbine will have a nominal hub height of 59 m and 41 m rotor length, giving a maximum blade tip height of 100 m in the vertical position. The turbine would be three bladed with a tubular tower as illustrated in Figure 2.1 a-f. An electrical transformer would be accommodated within the tower. The colour of this structure would be pale grey, with a semi-matt surface that minimizes surface reflectance, subject to agreement with the local planning authority.

6.8.2 Potential Effects of Operational and Decommissioning Phase
The access tracks and underground grid connection are not anticipated to have any significant residual effects on the landscape and visual amenity of the area, as a result of appropriate siting and design, and thus has not been considered in any further detail in this assessment. The assessment which follows has therefore been based on the potential residual effect of the wind turbine.

The expected operational life of the turbine is approximately 25 years from the date of commissioning. When the wind turbine is decommissioned the turbine components would be removed. It is envisaged that conditions attached to any planning consent for the turbine would stipulate the work required for the reinstatement of the site. The turbine can be decommissioned easily, rapidly dismantled and the land restored.

There would be a short term temporary impact associated with the removal of structures during the decommissioning stage of the project; however this would have a minimal effect on the locality and has not been considered further as part of this assessment.
In the circumstances that a development would result in an alteration to an environment whose attributes can be quickly recovered, then judgements concerning the significance of effects should be tempered in that light. Landscape and visual effects, whether regarded as positive or adverse, can be reversed and following decommissioning there would be no residual effects.

6.8.3 Mitigation Measures
By its nature, the proposed turbine would result in significant visual effects which it would not be feasible to mitigate by adjusting the siting, or providing screening. The design of the turbine comprises a simple tubular tower with nacelle and three blades which provides a smoother sense of movement and more efficient power generation than two blades. The proposed colour of the upper parts of the turbine has been selected to blend with the predominant colour of the sky and have a semi matte finish to minimise reflectance.

6.8.4 Landscape Proposals
The landscape proposals are illustrated on the Landscape Master Plan at Appendix 6.1. The new woodland would comprise planted areas of native species in a 10m wide belt along the western perimeter of the site to reinforce the structural planting framework and provide stronger linkages between existing areas of structural vegetation. The southern end of the access track is specified as reinforced grass to assist in blending the track into the surrounding pasture. The regarding of the landform to the west of the road with excess soil material generated from the construction process will also assist in subtly enclosing the route, reinforcing the pattern of the local ridge that already exists in this area.

New species rich native hedgerows are proposed to replace those lost as part of the construction process. A short section of hedgerow along the Lane adjacent to the southern boundary would be removed to accommodate the new access road visibility splay, whilst the hedgerow in the vicinity of the turbine would be removed for ecological reasons (see Chapter 5 of the ES). A further length of hedgerow would need to be lost to accommodate the relocated research area. In total the removal of 690 m of existing hedgerow would be replaced by 737 m of new species rich native hedgerow incorporating standard trees. In addition, the structure of existing hedgerows would be improved by the planting of native standard trees in the locations illustrated on the Landscape Master Plan.

No woodland is proposed to be removed as a result of the development proposals; however a single tree in the hedgerow to the south of the turbine would be removed as advised by Natural England to minimise effects upon bats. A total of 0.42 ha of woodland would be planted, reinforcing the planting along the Motorway embankment to the western boundary of the Site and connecting to the new hedgerow that is proposed along the northern boundary. The proposals would maintain 14.3 ha of pasture across the site, which would allow the tenant farmer to continuing utilising the majority of the land for sheep grazing.

6.9 Visual Analysis
This section comprises the assessment of visual effects arising from the proposed wind turbine during the operational period. The potential landscape and visual effects arising during the operational phase of the turbine have been assessed in two ways:

- Analysis of the zone of theoretical visibility (ZTV) maps to provide a general overview of the visibility of the turbine from different distances within the study area;
- Assessment of the potential landscape and visual effects at the 12 representative LVIA viewpoints illustrated in the visualisations.

6.9.1 Visibility Map Analysis
Visibility Mapping to turbine blade tip and hub height has been prepared to a radius of 15 km from the proposed turbines, as illustrated in Zone of Theoretical Visibility (ZTV) plan shown Figure 6.04 ZTV. This ZTV analysis has been prepared on the basis of ‘bare ground’; not taking into account the screening effects of the built form of settlements or vegetation.

The Visibility Mapping (Figure 6.04 ZTV) illustrates the maximum overall visibility of the proposed turbine to the upper blade tip height of 100 m.

Hub Height Visibility
The theoretical visibility would be widespread within 5 km with only small pockets of land in the north and south east not experiencing any visibility. Beyond 5 km the theoretical visibility would be predominantly concentrated in the west, south
west and south east with more dispersed visibility in the east and north. The wider views out to 15 km would also be predominantly in the south west with limited visibility in the east (Bowland Fringe and Bowland Fells).

Blade Visibility

The blade visibility is broadly similar to hub height visibility with reduced visibility in the north beyond 5 km and in the south east between 5 km and 10 km.

6.9.2 Receptors

Settlement

Potential visibility may be experienced by residents of settlements at the following locations:

- Scattered isolated dwellings and settlement within 5 km of the proposed turbine, including Bailrigg, Galgate, Ellel, parts of Lancaster, Quernmore, Dolphinholme, Conder Green, Lower Green Bank and Brow Top;
- Parts of towns and villages within 5 -10 km radius of the site including Lancaster, Crossgill, Caton, Brookhouse, Heysham, Middleton, Overton, Cockerham, Forlon and Thurnham; and
- There would be limited theoretical opportunity for visibility from settlement at 15 -30 km radius from the site, given the screening effect of intervening topography.

Road Users

Potential visibility may be experienced by motorists on A, B and minor roads including:

- M6 Motorway;
- A6 Lancaster to Garstang;
- A588 Lancaster to Cockerham;
- A683 Morecambe to Hornby; and
- B5272.

Railways

The London to Glasgow west coast line runs parallel with the A6 road to the west of the site (approx 1.5 km at the closest point).

6.9.3 Recreational Receptors Tourist Destinations

It is considered that all the main road routes through the study area are likely to have tourist, visitor and recreational usage and the above analysis of visibility for the road network would apply to these receptors. Recreation and visitor interest focuses on the natural and historic environment with walking, cycling and bird watching representing the key activities.

The study area contains national and regional footpaths that may be subject to views of the proposed development, including:

- Lancashire Coastal Way – 137 mile footpath following the coastline between Mersey side and Cumbria. At the closest location to the turbine is approximately 3 km distance to west near Ashton on the River Lune;
- Wyre Way – Connects Fleetwood on Lancashire coast to Tarnbrook in Forest of Bowland. At the closest location the turbine is approximately 4.5 km distance at Dolphinholme to south east;
- Lune Valley Ramble – Extends north east from the centre of Lancaster along River Lune to Kirby Lonsdale. At the closest location to the turbine is approximately 5 km distance within the centre of Lancaster; and
- Forest of Bowland – Series of local walks located within approx 10 km to the north east including Caton and Littledale Walks.

In addition to these long range footpaths, pedestrian, cycle and horse riding access within the study area is provided by an extensive network of local footpaths, tracks and minor roads.

The Study Area contains several national cycle and regional routes including:
- National Cycle Route 6 – Is routed through the 15 km study area from Catteral in the south to Carnforth in northwest, broadly following the route of the Lancashire Coastal Way;
- Regional Route 90 – The Northern loop of this cycle routes is routed through the 15 km study area near Fleetwood on Lancashire coast to Carnforth in northwest via western parts of the Forest of Bowland. At the closest location the turbine would be located approximately 1 km to the east; and
- National Cycle Route 69 – Is routed through the study area between Morecambe and Caton.

6.9.4 Viewpoint Analysis

A viewpoint assessment has been carried out on a selection of key viewpoint locations to assess the likely magnitude and significance of landscape and visual effects arising as a result of the proposed turbine. A total of 12 were selected following consultation with Lancaster City Council. The viewpoints are considered representative of the main landscape and visual receptors in the study area. These 12 viewpoints are listed in Table 6.4 below and their locations are shown in Figures 6.10 to 6.31.

Table 6.4 Viewpoints included in this assessment

<table>
<thead>
<tr>
<th>Vp Ref</th>
<th>Viewpoint Name</th>
<th>Distance from turbine</th>
<th>Grid reference</th>
<th>Sensitive receptors</th>
<th>Landscape Character types</th>
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<tbody>
<tr>
<td>1</td>
<td>Bailrigg</td>
<td>0.8 km</td>
<td>348492 458243</td>
<td>Residents</td>
<td>Low Coastal Drumlins</td>
</tr>
<tr>
<td>2</td>
<td>Galgate</td>
<td>2.2 km</td>
<td>348361 455694</td>
<td>Residents, Road users</td>
<td>Low Coastal Drumlins</td>
</tr>
<tr>
<td>3</td>
<td>Bay Horse Road</td>
<td>2.6 km</td>
<td>351095 457047</td>
<td>Residents, Road users in AONB</td>
<td>Moorland Fringe</td>
</tr>
<tr>
<td>4</td>
<td>Quernmore</td>
<td>3.1 km</td>
<td>352047 459026</td>
<td>Residents, Road users in AONB</td>
<td>Moorland Fringe</td>
</tr>
<tr>
<td>5</td>
<td>Greyhound Bridge</td>
<td>4.6 km</td>
<td>347716 462102</td>
<td>Road users</td>
<td>Urban</td>
</tr>
<tr>
<td>6</td>
<td>M6 South</td>
<td>5.0 km</td>
<td>349827 452739</td>
<td>Road users</td>
<td>Moorland Fringe</td>
</tr>
<tr>
<td>7</td>
<td>Jubilee Tower</td>
<td>5.1 km</td>
<td>354215 457316</td>
<td>Leisure users</td>
<td>Moorland Plateaux</td>
</tr>
<tr>
<td>8</td>
<td>M6 North</td>
<td>6.4 km</td>
<td>349645 465167</td>
<td>Road users</td>
<td>Drumlin Field</td>
</tr>
<tr>
<td>9</td>
<td>Sunderland Point</td>
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<td>342640 455886</td>
<td>Footpath users, Leisure users</td>
<td>Open Coastal Marsh</td>
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<tr>
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<td>345975 464243</td>
<td>Leisure users</td>
<td>Low Coastal Drumlins</td>
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<tr>
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<td>343597 449790</td>
<td>Bridleway users</td>
<td>Mosslands</td>
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<td>336484 473996</td>
<td>Strategic, Footpath users</td>
<td>Open Farmland and Pavements</td>
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<td>Viewpoint</td>
<td>Distance from turbine</td>
<td>Turbine theoretically visible</td>
<td>Landscape Effects</td>
<td>Visual Effects</td>
</tr>
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<td>-----------------------</td>
<td>-----------------------</td>
<td>------------------------------</td>
<td>-------------------</td>
<td>---------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Landscape Sensitivity*</td>
<td>Magnitude of change</td>
</tr>
<tr>
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<td>Medium/High</td>
<td>Substantial</td>
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<tr>
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<td>Medium/High</td>
<td>Substantial to Moderate</td>
</tr>
<tr>
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<td>Bay Horse Road</td>
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<td>Yes</td>
<td>High</td>
<td>Substantial to Moderate</td>
</tr>
<tr>
<td>4</td>
<td>Quernmore</td>
<td>3.1 km</td>
<td>Yes</td>
<td>High</td>
<td>Moderate</td>
</tr>
<tr>
<td>5</td>
<td>Greyhound Bridge</td>
<td>4.6 km</td>
<td>No</td>
<td>Low</td>
<td>None</td>
</tr>
<tr>
<td>6</td>
<td>M6 South</td>
<td>5.0 km</td>
<td>Yes</td>
<td>High</td>
<td>Moderate to Slight</td>
</tr>
<tr>
<td>7</td>
<td>Jubilee Tower</td>
<td>5.1 km</td>
<td>Yes</td>
<td>High</td>
<td>Moderate to Slight</td>
</tr>
<tr>
<td>8</td>
<td>M6 North</td>
<td>6.4 km</td>
<td>Yes</td>
<td>Medium/High</td>
<td>Slight/ Negligible</td>
</tr>
<tr>
<td>9</td>
<td>Sunderland Point</td>
<td>6.8 km</td>
<td>Yes</td>
<td>Medium/High</td>
<td>Slight</td>
</tr>
<tr>
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<td>Torrisholme</td>
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<td>Medium/High</td>
<td>Slight</td>
</tr>
<tr>
<td>11</td>
<td>Cockerham</td>
<td>9.7 km</td>
<td>Yes</td>
<td>Low</td>
<td>Slight</td>
</tr>
<tr>
<td>12</td>
<td>South west of Grange Over Sands</td>
<td>19.4 km</td>
<td>Yes</td>
<td>High</td>
<td>Negligible</td>
</tr>
</tbody>
</table>

*Landscape Sensitivity – values derived from the 2004 publication by Lancashire County Council ‘Landscape Sensitivity to Wind Energy Development in Lancashire’
6.10 Assessment of Landscape Effects

6.10.1 Introduction
Landscape Effects defined by the Landscape Institute “Change in the elements, characteristics, character, and qualities of the landscape as a result of development.” These effects are assessed by considering the landscape sensitivity against the magnitude of change. The type of effect may also be described as temporary or permanent, direct or indirect, cumulative and positive, neutral, or negative.

6.10.2 Landscape Effect during Construction
Whilst it is the operational stage of the wind turbine which would give rise to prolonged landscape and visual effects, temporary effects at the construction stage would occur and these are considered below. Construction of the wind turbine would involve the following operations:

- Construction of crane hard-standing;
- Excavation and construction of turbine base foundation;
- Excavations for underground cables;
- Temporary site compound;
- HGV deliveries to site and movement of vehicles on site;
- Erection of turbine;
- Reinstatement works, including the removal of the temporary accommodation.

The works detailed above would give rise to some landscape and visual effects. These effects would however be temporary and would mainly arise through the erection of the turbine. The effects arising from other operations, including the vehicle movement, excavation of turbine foundation, cable runs and the construction compound would be localised, and would not be unduly prominent in views from the surrounding areas. Construction operations would take place over a period of approximately 5 months. These effects would be limited in extent and duration and are not considered to be significant.

During the construction period many of the potential construction mitigation measures would involve small-scale site management issues regarding the detailed location of construction activities. Individually these may have only minor effects, but cumulatively these could have an influence upon the intrusiveness of the construction activities. The key measures that can be implemented in order to avoid or reduce potential construction effects include:

- The selective and sensitive location of temporary storage of materials and plant and security fencing;
- Using designated routes around the site for construction vehicles and operation of construction plant such as cranes;
- Implementation and monitoring of site management procedures including regular litter sweeps of immediate environs for litter arising from the construction site; and
- The protection of key landscape resources such as existing boundary vegetation and on-site hedgerows that are to be retained. Contractors will be required to prepare methodologies for working close to such features.

6.10.2.1 Potential Construction Effects on Landscape (Fabric and Character)
The construction of the turbine would take place on a limited part of the existing agricultural land adjacent to the M6. The wind turbine is located within the Langthwaite Ridge landscape character area with the southern end of the access track located within the adjacent Carnforth-Galgate-Cockerham landscape character area. Direct landscape effects on these landscapes would be localised and indirect effects are assessed in the Landscape Effects Section below.

The main site access would be taken from Hazelrigg Lane as shown in Figure 2.2. An estimated 1.05km of site access tracks would be required for the wind turbine. The tracks would have a nominal width of 5 m and may have temporary passing places as required in order to facilitate traffic movement.

Any disturbance of existing grassland areas to be retained on completion of construction would be reinstated accordingly. The effects of the construction phase of the turbine development on the fabric of the landscape are considered to be minor and not significant.
6.10.2.2 Potential Construction Effects on Visual Amenity

The visual effects of the activities during the construction phase would be temporary and intermittent and slight in magnitude. The visual effects of the limited number of turbine delivery vehicle movements would be of minor significance.

Having regard to the assessment set out above and the temporary nature of the construction effects, it is considered that the proposal would result in landscape and visual effects of minor significance during the construction stage, not considered to be significant.

6.10.3 Landscape Effects during Operation

Post construction the wind turbine site would gain a ‘cleaner’ and more ‘settled’ appearance as the construction areas would be restored and the wind turbine operational stage would have commenced.

The wind turbine would be visible over a wider area and potentially capable of indirect effects on the surrounding landscape resource. These effects have been assessed under the operational effects as they would occur incrementally over the construction period, but would not exceed the final operational magnitude of effect.

Direct Effects upon Landscape Fabric of the Site

In total the removal of 690 m of existing hedgerow would be replaced by 737 m of new species rich native hedgerow. In addition, the structure of existing hedgerows would be improved by the planting of over 40 native standard trees in the locations illustrated on the Landscape Master Plan (see Appendix 6.1).

The proposals would maintain 14.3 ha of pasture across the site, which would allow the tenant farmer to continuing utilising the majority of the land for sheep grazing.

It is assessed that the sensitivity of landscape fabric in the local context is medium to high and the magnitude of change in the local context is slight resulting in Moderate to Moderate/Minor effects that would not be significant and would be mitigated over time by the establishment of new hedgerows and tree planting.

Effects on Bowland Fringe and Pendle Hill National Landscape Character Area (NCA 33)

A large proportion of this landscape is designated within the Forest of Bowland Area of Outstanding Natural Beauty and contains large areas natural woodland and distinct limestone features within the Ribble and Hodder Valleys. Overall the landscape sensitivity is considered to be high, reducing to medium in outer fringe areas. Whilst the proposals would have significant effects upon landscape character, localised within approximately 3 km of the turbine; the proposals would not have a significant effect on the wider regional character area. A loss of distinction would however occur with the adjacent Morecambe Coast and Lune Coast Estuary (NCA 31) resulting in a localised blurring of landscape character area boundaries.

Effects on the Langthwaite Ridge 7c (Farmed Ridges) Local Landscape Character Area

This landscape extends 7km north east from the wind turbine site and is made of ridge profiles of mixed farmland and woodland. The landscape is located out with the AONB and would be of medium to high sensitivity to the development proposed. ZTV coverage within the landscape would be concentrated on areas up to 4 km, after which visibility becomes more dispersed. The wind turbine would result in a Substantial to Moderate magnitude of change and the overall level of landscape effect on the Langthwaite Ridge would be Major to Major/Moderate and significant up to approximately 3 km from the turbine. In addition a localised loss of distinction would occur with the adjacent landscape character areas of Carn

Effects on the Galgate - Cockerham - Carnforth 12a (Low Coast Drumlins) Local Landscape Character Area

This landscape extends approx 8 km from the M6 corridor to west and south west of the site to the River Lune and Cockerham Sands. The landscape supports a high proportion of built development including the large settlements of Lancaster and Morecambe and recent built development along the A6. Woodland is limited to small plantations, woods associated with former estates and rarely, fragments of ancient woodland in unusual hilltop or hillside settings. The overall sensitivity of this landscape is Medium to High. The magnitude of change out to approximately 3 km of the turbine would range from Substantial to Moderate leading to Major to Major / Moderate and significant effects upon landscape character within approximately 3 km of the turbine.
### 6.10.3.1 Indirect Effects on Adjacent Areas of Landscape Character

Moving beyond the Langthwaite Ridge and Galgate/Cockerham/Carnforth local landscapes, the wind turbine would have an indirect effect on the visual and perceptual characteristics of nearby landscape character areas. None of these landscapes would be directly affected by operation of the proposed development, as there would be no direct effects on their key physical characteristics. However, the wind turbine may be visible from these areas and as such could indirectly affect the landscape character where particular views or scenic qualities are noted as key characteristics of the landscape. Figure 6.05 illustrates the ZTV in relation to the landscape character areas.

**Effects on the West Bowland 5i (Undulating Lowland Farmland)**

This landscape runs parallel to the Langthwaite Ridge to the west at distances of between approximately 0.5 km and 15 km (north east and south) from the Site. This is a transitional landscape between the Bowland Fells and coastal plain with some unique landscape features including wooded ridges, valleys and drumlin fields. The landscape is partially located within the Forest of Bowland AONB and sensitivity of this landscape is high. The visibility of the wind turbine would be predominantly concentrated to areas within 5 km of the proposals. Viewpoint 3 is representative of close range views from within this landscape and the magnitude would be substantial to moderate with Major to Major/Moderate and significant effects predicted near the edge of the landscape character area with a slight loss of distinction with the adjacent landscape character area of Langthwaite Ridge. Effects would be localised to within approximately 3 km of the turbine and from the remainder of the area the magnitude of change would be predominantly slight and the level of effect Moderate and not significant.

**Effects on Bowland Gritstone Fringes 4d (Moorland Fringe)**

There are four pockets of this landscape type within the study area and are located at distances of between 3 km and 15 km from the wind turbine site. They are transitional landscapes between the uplands of the Bowland Fells and lower wooded fringes. The landscapes are predominantly located within the AONB and are of High sensitivity. The visibility of the wind turbine would predominantly occur up to 5 km east of the site, with some smaller patches of visibility in relation to areas in the south east at distances between 6 km and 12 km. Viewpoint 4 is representative of locations within this landscape up to approximately 3 km distance and the magnitude would be moderate leading to a Major / Moderate level of indirect effect that would be significant.

**Central Bowland Fells 2b (Moorland Hills)**

This landscape is located between 4 km and 15 km to the east of wind turbine site, and extends beyond this distance to include a large proportion of the fells. It encompasses the smooth heather clad profiles of the escarpment slopes on the western limit of the fells, the wide undulating areas of open craggy moorland, and the deep upland valleys within the core of the Fells. The majority of the landscape is designated within the Forest of Bowland AONB and is of High sensitivity. The visibility of the wind turbine would apply to areas to the north east (between 4 km and 6 km) at Hare Appletree Fell and at further distance to the south east (between 7 km and 12 km) at Catshaw Fell and Blaze Moss. A large proportion of these landscapes in the north east and south east would not experience any visibility. Viewpoint 7 is representative of views from within this landscape up to 5 km distance and the magnitude would be Moderate to Slight leading to a Major / Moderate to Moderate level of indirect effect that is not significant.

**Wyre Valley 10a (Wooded Rural Valleys)**

This landscape is located between 3.5 km and 12 km to the south and east of wind turbine site at the western edge of the Bowland Fells. The landscape follows the River Wyre from the M6 corridor to Abbeystead and is partially located within the AONB designation. The landscape contains some unique features particularly in the east including mosaics of open water and woodland, generally the landscape is of High Sensitivity. Visibility would be predominantly restricted to areas beyond 5 km in the south east and the magnitude of change would be Slight with a Moderate level of effect that is not significant.

**Docker-Kellet-Lancaster 13c (Drumlin Field)**

This landscape is located between 1 km and 15 km from the wind turbine and extends as a thin strip from the university to the north and north east of the study area towards Cumbria forming a large expanse of undulating ground north of the River Lune. The landscape is of Medium to High sensitivity and visibility would include close range views around the Lancaster University area to views out to 5 km in area to east of Lancaster. At longer distances visibility would be intermittent and concentrated on areas to north and north east of Halton at distances of between 7 km and 14 km.
Viewpoint 8 is located within in this landscape and the overall effects have been adjudged to be Moderate / Minor. The magnitude of change would be predominantly Slight and level of effect Moderate and not significant.

High Bowland Plateau 1b (Moorland Plateau)

These landscapes are located between 5 km and 15 km to east and south east of the wind turbine site. These are large scale landscapes reaching 561 m AOD are located within the Forest of Bowland AONB and are of High sensitivity. Visibility would be intermittent and range between 5.5 km at Clougha Scar to 12 km in south east at Bleasdale Moor with turbine viewed in the context of expansive panoramic views over Lowland areas. Viewpoint 7 from the adjacent landscape character area is assessed to be similar to views from Clougha and the magnitude would be Moderate to Slight leading to a Major / Moderate to Moderate level of indirect effect that would not be significant.

Lune Marshes 18d (Open Coastal Marsh)

This landscape is located between 4 km and 7 km to west, north west and south west of the wind turbine site following the River Lune between Lancaster and the coast. The landscape is of Medium to High sensitivity with a high accessibility to the public including the Lancashire Coastal Way. The visibility would be relatively widespread with views consisting of upper turbine against the background landscape. The magnitude of change would be predominantly Slight and level of effect Moderate and not significant.

Heysham – Overton 12c (Low Coast Drumlins)

This landscape is located between 5 km and 9 km to the west of the wind turbine between the River Lune and the coast. The landscape is of Medium to High with visibility being relatively widespread. The magnitude of change would be predominantly Slight and level of effect Moderate and not significant.

Forton – Garstang – Catteral 15e (Coastal Plain)

This landscape is located between 4km and 15km to the south and south west of the wind turbine site. This is a transitional landscape between the Bowland Fells and raised bog at Winnmarleigh and is a gently undulating landscape with areas of improved pasture and scattered woodland. In addition there are large areas of urban development and the sensitivity of this landscape is Medium. The magnitude of change would be Moderate at peripheral areas closest to the site and the level of effect would be Moderate and not significant.

North Fyde Mosses 16a (Mosslands)

This landscape is located between 7 km and 15 km to the south west of the wind turbine site and includes large areas of moss including Winnmarleigh and Stalmine. Vertical elements such as telegraph poles and pylons are prominent in this landscape and there are distant views to Blackpool Tower, the Pleasure Beach rides and industrial development on the outskirts of Blackpool. The overall landscape sensitivity is Low. The magnitude of change would be Slight and level of effect Minor and not significant.

Heysham Moss 16 f (Mosslands)

This landscape is located between 6 km and 9 km to the north west of the site between the Lune Valley and Morecambe. The proximity of the city of Lancaster influences the character of the mossland in the north of the character area where trading estates, residential estates and caravan parks spill out onto the mosslands, obscuring the landscape pattern and eroding the rural nature of the landscape. The overall landscape sensitivity is Low, the overall magnitude of change would be Slight and level of effect Minor and not significant.

Cockerham Coast 17b (Enclosed Coastal Marsh)

This landscape is located between 7 km and 14 km to the south west at Cockerham Sands are flat expansive areas coastal land and marsh which have been reclaimed by drainage. Improved pasture predominates and is used for cattle or sheep grazing, although arable crops grow in well drained areas and the landscape is of Medium sensitivity. The overall magnitude of change would be Slight and level of effect Minor and not significant.

Lune Valley 11d (Valley Floodplains)

This landscape is located between 8 km and 15 km to the north east following the River Lune and includes areas of pasture and flood plain surrounded drumlins and hills. There are remnant features of previous industry and the overall sensitivity of this landscape is Medium. Visibility of the wind turbine would be confined to areas around Aughton.
(between 10 km and 13 km) and the magnitude of change would be negligible leading to Minor visual effect that is not significant.

6.10.3.2 Effects on Landscape Designations

The proposals are not located within any landscape designations and therefore landscape effects would therefore be limited to indirect effects, such as those on the views and visual character experienced from within designation in the wider landscape. The assessment below considers the indirect effect on the integrity of landscape planning designations within the study area with particular emphasis on the potential effects on valued features and characteristics for which these areas are designated. The assessment of potential effects upon landscape planning designations only includes those designated areas within the blade tip ZTV.

Forest of Bowland Area of Outstanding Natural Beauty

The Forest of Bowland Area of Outstanding Natural Beauty is an extensive designation located to the east of the wind turbine, approximately 1.3 km at the closest point, extending approximately 25 km to the east and north east (North Yorkshire) and approx 25 km to south east towards Clitheroe. This designation relates to scenic quality with many parts of the landscape offering expansive views over the fells and valleys. It is also a popular destination for various recreational activities including walking, cycling, fishing and bird watching. The overall sensitivity of the landscape is high.

Areas of potential visibility within the AONB are predominantly concentrated within western and southern parts of the designation, predominantly within 10 km with some dispersed visibility between 10 km and 15 km. Visibility within 10 km includes parts of Hare Appletree Fell, Littedale, Caton Moor, Calshaw Fell and Hawthornthwaite Fell. Viewpoints 3, 4 and 7 are located within the AONB (within 5 km) and magnitude of change would range from Moderate to Substantial. Whilst locally significant visual effects may be experienced near the edge of the designation, the magnitude in relation to the composite designation would be Slight leading to a Moderate indirect effect which would not be significant.

6.10.3.3 Effects on Registered Parks and Gardens

Registered Parks and Gardens are designated due to their historical, horticultural, architectural and scenic qualities. Registered Parks and Gardens are assessed below and their sensitivity is considered to be high.

Ashton Memorial Gardens and Williamson Park

These gardens are located approximately 3.5 km to the north of the proposals at the eastern edge of Lancaster and include a memorial feature, Public Park, woodland garden, butterfly house and lakes. Views would be intermittent and subject to screening by mature woodland features within the park and intervening buildings within Lancaster. The magnitude of change would be slight, resulting in a moderate level of effect that would not be significant.

6.10.4 Decommissioning Effects

The details regarding the decommissioning are provided in Chapter 4. Decommissioning would entail the removal of all above-ground structures including the wind turbine, crane hard standing, substation and grid connection. The wind turbine foundation, site tracks, and underground cables would be left in situ, but in the case of wind turbine foundation and cables, no visible part of these components would remain above ground.

There would be a short term temporary impact associated with the removal of structures during the decommissioning stage of the project, however this would have a minimal landscape and visual effect on the locality and has not been considered further as part of this assessment.

6.11 Assessment of Visual Effects

6.11.1 Introduction

Visual effects are recognised by the Landscape Institute as a subset of landscape effects and are concerned with the effect of the development on views, and the general visual amenity as experienced by people.

Visual effects are assessed by considering the sensitivity of the receptor (people) against the proposed magnitude of change to determine a level of visual effect. In professional landscape terms, the acceptability of this effect largely relates to the activity and the experience of the viewer and the visual composition, character, context, and the overall ability of the landscape in that view to accommodate the development in design terms. Visual effects are assessed in relation to the agreed viewpoints, properties and settlements, tourist and recreational destinations and transport routes.
This section draws on the results of the landscape context, review of the development proposal, viewpoint assessment and field work observations. It considers the potential effects of the proposal on the visual amenity of the following groups of potential receptors:

- Residents and workers - in towns, villages and isolated dwellings;
- Motorists and other road users on A class, B class and minor roads;
- Recreational Receptors and tourist destinations.

6.11.2 Residents – Settlements

The following section of the assessment considers changes and consequent visual effects upon the views available to the residents residing in settlements. In accordance with the GLVIA residential receptors in settlements are all considered to be of high visual sensitivity.

For residents of urban areas and scattered villages, the most likely places for visibility would be from the edges of the settlements nearest the proposed turbine. Within these settlements, many potential views of the proposals would be fully or partially restricted by adjacent dwellings and intervening buildings and filtered by field boundary trees and woodland cover. It is important to note that the magnitude of visual effects arising from the presence of the turbine in views from within the built up areas would be greatly reduced in comparison with those experienced in open views from the edges of settlements, as illustrated in the visualisations.

6.11.2.1 Settlements within 5 km

Views of the proposed development would be experienced from individual dwellings and farmsteads in the surrounding area (refer to Figures 6.10 - 6.31 and Appendix 6.5). It has been observed that the orientation of dwellings, local topography and intervening vegetation/structures combine to reduce the potential visibility of the wind turbine. Furthermore, initial field survey observations have confirmed that the total number of individual properties where a significant visual effect may be experienced is small compared to the overall population in the surrounding area. Whilst acknowledging that significant effects may arise in the private context, it is considered that the overall change in visual amenity would not be unacceptable, given the separation distance from the proposed turbine and the restricted nature of views from many dwellings.

Lancaster is located approximately 1.2 km from the proposed wind turbine at the closest point and extends some 5 km further to the north west. There would be views of the wind turbine at distances of between 1.2 km and 4.0 km subject to screening by intervening buildings and woodland within the settlement. Visibility would predominantly be concentrated on the southern and eastern edges of the settlement with the turbine visible against the background landscape and sky. Viewpoint 5 selected following consultation with the Local Planning Authority is located at Greyhound Bridge within the centre of Lancaster where there would be no visibility. There would be a Moderate to Substantial magnitude of change resulting in Major to Major/Moderate and significant effects from parts of the southern and eastern edges of the City; however the majority of residents would not have any views of the turbine.

Bailrigg is a small hamlet, located approximately 800 m north west of the proposals and separated from it by the M6 corridor. There would be views of the proposed turbine from the majority of dwellings in the hamlet, particularly from properties on the northern edge of the settlement in elevated locations (see Viewpoint 1). The magnitude of change would be Substantial and level of effect would be Major and significant.

Ellel is located approximately 1.3 km south of the turbine at the closest point and views of turbine from the village would be predominantly confined to the northern edge of the settlement where unrestricted views would be available from a limited number of dwellings. The magnitude of change for a limited number of dwellings at the northern end of the settlement would be Substantial to Moderate and the level of effect Major/Moderate and significant.

Galgate is located approximately 2.2 km to the south west of the turbine and the village is centred on the A6, extending west towards the Lancaster Canal. There would be views of the wind turbine seen against the sky in the context of the university buildings and pylons. Viewpoint 2 is located at the eastern edge of the settlement and the magnitude change is predicted to be Substantial to Moderate and the level of effect Major/Moderate and significant. The majority of dwellings in the settlement are predicted to have no views of the proposed turbine due to the surrounding built form with significant effects predominantly restricted to the northern and eastern edges of the village.

Glasson is located approx. 4.5 km to the south west at the end of Lancaster Canal on the Lune estuary. Viewpoint 9 is located at Sunderland Point to the west of the settlement where the magnitude of change has been predicted to be
Slight. The magnitude of change for the settlement would be predominantly Slight and level of effect would be Moderate and not significant.

Overton is located approx 5 km to the west of the Site near the Lune estuary. The magnitude of change for the settlement would be Slight and level of effect Moderate and not significant.

6.11.2.2 Settlements between 5 km-10 km

Morecambe is situated between 6 km and 9 km to the north west of the wind turbine between the River Lune and the Lancashire coast. Views would be subject to screening by buildings and vegetation within the settlement and mainly concentrated on southern and eastern edges. The magnitude of change for the settlement would be predominantly Slight and level of effect would be Moderate and not significant.

Heysham is a coastal town located approx 8 km to the north west adjoining Morecambe. Views would be restricted to eastern and southern edges and the magnitude of change for the settlement would be predominantly Slight and level of effect would be Moderate and not significant.

Middleton is located approx 7 km to west of the wind turbine and is located between Overton and Heysham. Views would be subject to intervening screening within farmland and the magnitude of change for the settlement would be predominantly Slight and level of effect would be Moderate and not significant.

Halton is located to the north east of Lancaster adjacent to the River Lune and there would be views of the wind turbine at approximately 8 km distance. Views would be subject to screening by buildings and vegetation within the settlement and mainly concentrated on southern edges. The magnitude of change for the settlement would be predominantly Negligible and level of effect would be Moderate / Minor and not significant.

6.11.2.3 Settlements between 10 km – 15 km

The visual effects in relation settlements between 10 km and 15 km would be limited to settlements in the south and south west of the study area including Garstang and Stake Pool. The effects in relation these settlements would be predominantly Moderate / Minor to none and not significant.

6.11.3 Motorists and other road users

The potential significance of visual effects experienced by those travelling on the road network has been considered with reference to the viewpoint analysis and visual survey of key routes. The views from these routes would be experienced transiently by road users and the sensitivity of all of these receptors is considered to be medium. All visibility from roads would be subject to variable levels of filtering along routes and within intervening farmland by woodland and tree planting.

6.11.3.1 M6

The M6 is routed through the study area between Catterall in the south and Wharton in the north. Visibility would be predominantly concentrated on the section of motorway between Catterall in the south to Lancaster, with visibility becoming more dispersed between Lancaster and the northern edge of study area. There would be close range views as the motorway runs adjacent to the wind turbine and visibility within 5 km would predominantly apply to the section of motorway near the River Wyre in the south and junction 34 near Lancaster. Viewpoint 6 and Viewpoint 8 are located on this route and the magnitude of change at these locations has been assessed to range between Moderate and Slight/Negligible with Moderate to Slight/Negligible effects that are not significant. Closer to the proposals a Substantial to Moderate magnitude of change and Major/Moderate to Moderate and significant visual effects would be experienced travelling north from Junction 33. Travelling south from junction 34, the ZTV indicates that the hub and blades of the proposed turbine would be potentially visible above the wooded embankment passing Scotforth resulting in significant localised visual effects.

6.11.3.2 A6

The A6 is routed through the study area between Catterall in the south to Bolton Le Sands in the north west. There would be close range views as the route passes the university and widespread visibility within 5 km between Brook in the south and southern edge of Lancaster (see Viewpoint 2). The visual effects would be broadly contiguous with views from the M6 with the magnitude of change ranging between substantial and negligible with significant effects potentially experienced within 5 km of the turbine. Further than 5 km from the turbine the magnitude would be predominantly Slight and the level of effect Moderate/Minor and not significant.
6.11.3.3 A588
The A588 is routed through the study area between Knott End on Sea in the south west and Lancaster. Visibility of the wind turbine would predominantly apply to entire section of the route with greatest visibility applying to the section of the route between Lancaster and Cockerham within 5 km. The magnitude of change within the study area would vary between substantial and negligible with significant effects potentially experienced within 5 km and the magnitude of change from the remainder of the route would be predominantly Slight resulting in Moderate/Minor effects that would not be significant.

6.11.3.4 A683
The A683 is routed through the study area between Morecambe in the north west and Hornby in the north east. Visibility would be extremely limited and potentially available from a section of the route within the settlement Morecambe. The magnitude of change would be Negligible and level of effect would be Minor and not significant.

6.11.3.5 B5272
The B5272 is route through the study area between Cockerham and Garstang to the south west of the wind turbine site. Visibility of the wind turbine would be at distances of between 6 km and 11 km and the magnitude of change would be predominantly Slight and the level of effect would be Moderate and not significant.

6.11.4 Recreational Receptors Tourist Destinations
There are several long distance footpaths and Sustrans cycle routes within the study area. The visual changes and their consequent effects that would be experienced by the walkers, riders. The assessment of the potential effects on these routes has been assisted by the use of ZTV maps, study of aerial photography and field verification.

6.11.4.1 Lancashire Coastal Way
This nationally designated route is a coast to coast long distance footpath between Merseyside and Cumbria which is routed through the study area between Pilling in south west to Carnforth in the north west. The sensitivity of receptors using this route would be high.

Visibility of the wind turbine from this route would be concentrated on the section of the route between Pilling and Ashton Hall at distances between 3 km and 15 km. The visibility between Aston Hall and Lancaster would be intermittent and subject to potential screening by built features. To north west of Lancaster and Morecambe the visibility would be extremely limited and confined to a small section of the route between Hest Bank and Morecambe at 9 km distance. Although there could be significant effects from parts of the route within 5km the magnitude of change would be predominantly slight leading to a Moderate level of effect that would not be significant.

6.11.4.2 The Wyre Way
This long distance footpath is routed through the study area between Knott End and Abbeystead Reservoir in the south east. The sensitivity of receptors using this route would be high.

Visibility would be concentrated on the section of route between Knott End and Garstang at distances of between 15 km and Garstang 12 km. There would also be visibility on the section of route between Garstang and Scorton (8 km). The magnitude of change would be predominantly Slight and the level of effect Moderate and not significant.

6.11.4.3 Lune Valley Ramble
This extends north east from the centre of Lancaster along River Lune to Kirby Lonsdale. At the closest location to the turbines are approximately 5 km distance within the centre of Lancaster and the overall sensitivity of receptors using this route would be Medium. Visibility would be extremely limited within the study area and the magnitude of change would generally be Negligible with a Minor effect that would not be significant.

6.11.4.4 National Cycle Route 6
Cycle Route 6 is routed through the 15km study area from Catterall in the south to Carnforth in north west, broadly following the route of the Lancashire Coastal Way and the sensitivity of receptors using the route is High. The visibility would be consistent with views from the Lancashire Coastal Way and although there could be significant effects from parts of the route within 5 km the magnitude of change would be predominantly Slight leading to a Moderate visual effect that would not be significant.

6.11.4.5 Regional Route 90
The Northern loop of this cycle route is routed through the 15 km study area near Fleetwood on Lancashire coast to Carnforth in north west via western parts of the Forest of Bowland. At the closest location the turbines are turbine is approximately 1 km distance to the east. The sensitivity of the receptors would predominantly be Medium except within
the section of route within the Forest of Bowland AONB where receptor sensitivity would be high. Visibility would be generally concentrated on section route between Pilling and Quernmore to the north east of the site. Although there could be significant effects from parts of the route within 5 km the magnitude of change from the route would be predominantly slight leading to a Moderate visual effect that would not be significant.

6.11.4.6 National Cycle Route 69

This cycle route passes through the study area between Morecambe in the north west to Caton in the north east. Visibility would be concentrated on the section of route within Morecambe where views would predominantly screened by built features, the remainder of route would have no visibility coverage. The magnitude of change would be predominantly Negligible leading to a Moderate / Minor visual effect that would not be significant.

6.12 Cumulative Landscape and Visual Effects

6.12.1 Introduction

The cumulative assessment has considered existing, consented and proposed projects where planning applications have been submitted within 20 km of the proposed turbine at Lancaster (See Table 6.6 below and Figure 6.07). The Study Area and schemes assessed were agreed in advance with the Local Planning Authority.

Table 6.6 Schemes included in the Cumulative Assessment

<table>
<thead>
<tr>
<th>Ref</th>
<th>Wind Farm</th>
<th>No. of turbines</th>
<th>Blade tip height (m)</th>
<th>Approx distance from Lancaster Wind Turbine</th>
<th>Landscape Character Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Caton Moor</td>
<td>8</td>
<td>100</td>
<td>9 km</td>
<td>Central Bowland Fells (2b)</td>
</tr>
<tr>
<td>B</td>
<td>Dewlay Cheese</td>
<td>1</td>
<td>126</td>
<td>13 km</td>
<td>Forton-Garstang-Catterall (15e)</td>
</tr>
<tr>
<td>C</td>
<td>Eagland Hill (At Appeal)</td>
<td>2</td>
<td>125</td>
<td>12.5 km</td>
<td>North Fyde Mosses (16a)</td>
</tr>
<tr>
<td>D</td>
<td>Claughton Moor (Refused scheme – appeal to be confirmed)</td>
<td>20</td>
<td>126</td>
<td>9 km</td>
<td>Central Bowland Fells (2b)</td>
</tr>
<tr>
<td>E</td>
<td>Heysham South</td>
<td>5</td>
<td>145</td>
<td>5.9 km</td>
<td>Heysham Moss (16f)</td>
</tr>
<tr>
<td>F</td>
<td>Port of Heysham</td>
<td>3</td>
<td>125</td>
<td>9.0km</td>
<td>Heysham Overton (12c)</td>
</tr>
<tr>
<td>G</td>
<td>BT Heysham</td>
<td>1</td>
<td>100</td>
<td>7.1km</td>
<td>Heysham Moss (16f)</td>
</tr>
</tbody>
</table>

The potential composite cumulative effects arising from the construction of Lancaster against a baseline situation consisting of all operational and consented projects. In addition, potential cumulative effects arising from Lancaster are considered assuming that the all the projects where applications have been submitted are constructed.

6.12.2 Potential Cumulative Landscape Character Effects

The baseline situation comprises the existing turbines at Caton Moor which are located some 9 km north east of the Lancaster site within the Central Bowland Fells LCA and the operational Dewlay Cheese turbine which lies 13 km south of the Lancaster Site within the Forton-Garstang-Catterall LCA. Excluding the Lancaster scheme from consideration it is assessed that there is sufficient distance between Caton Moor and Dewlay Cheese sites for there to be no conjoining of wind farm landscapes and also no conjoining of sub-types. Bringing the Lancaster proposal into the equation would not change the overall judgement just expressed and it is considered there is the potential for all sites to co-exist without transformation of landscape type and coalescence of character whether this be at the local or regional scale.

Assuming the prior presence of the other proposals of Eagland Hill, Claughton Moor and the three schemes near Heysham, which are located within different landscape character types, it is assessed that each wind farm would create a wind farm landscape within approximately 600 m to 800 m of the turbines and a wind farm sub-type of each character area extending several kilometres from the turbine. It is considered that Lancaster is sufficiently distant from the other proposed schemes and would not give rise to coalescence of sub-types into broader unified sub-types or lead to the establishment of new landscape types over an extensive area so as to cumulatively transform local and regional
landscape character. A threshold of change would not be crossed with the addition of the one Lancaster turbines that would transform perceptions to those of a wind farm landscape across the area of the Langthwaite Ridge (7c) and Carnforth-Galgate-Cockerham (12a) LCT’s that cover the proposed site and immediate surroundings.

6.12.3 Potential Cumulative Visual Effects

6.12.3.1 Residents

Given the separation distance between Lancaster and Caton Moor and the distribution of settlement it is considered that there is limited potential for significant cumulative effects upon residential amenity. Reference to the combined baseline cumulative ZTV (Figure 6.07 Cumulative Location Plan) indicates that potential combined visibility may be available from the western edge of Quernmore on Wyresdale Road and scattered dwellings between the village and Littledale Road to the north east which may give rise to significant cumulative effects from the front and rear of the same dwelling.

Assuming the prior presence of the other proposals at Eagland Hill and Claughton Moor and the three schemes in scoping/screening near Heysham, potentially significant cumulative effects on residents would not occur due to the distances between the schemes, however the introduction of the Lancaster turbine would potentially result in cumulative effects with the Heysham schemes from scattered dwellings to the south of Stodday, however the effects would be restricted by the presence of intervening vegetation. Dwellings at Condor Green, Glasson and Overton may also experience views of the Heysham schemes or Lancaster, however due to the orientation of dwellings within these settlements views of both proposals are unlikely to be available from the same dwelling.

6.12.3.2 Road Users

Visibility of the baseline schemes of Caton Moor and Dewlay Cheese are experienced from the M6 travelling north and south, however field verification indicates the principal stretch of visibility of the Caton Moor scheme is restricted to a short section of the route in the vicinity of Junction 34. The Dewlay Cheese turbine is potentially visible for longer stretches of the M6 travelling in both directions, particularly in winter when leaf cover is reduced; however the principal cumulative effect with Caton would be sequential. The addition of the Lancaster turbine would reinforce the sequential cumulative effect experienced from the M6 and would increase the magnitude of turbine presence resulting in a significant cumulative effect. It should be noted that combined visibility of Lancaster and the baseline schemes is not predicted apart from the stretch of the M6 within approximately 1km of the site, where the visual effect resulting from the Lancaster turbine would already be significant.

Assuming the prior presence of all other proposals the magnitude of turbine presence would be increased slightly from the M6 with Eagland Hill being seen in combined views with Dewlay Cheese and Claughton Moor seen with the nearby Caton Moor. As described for the baseline situation the addition of the Lancaster turbine would reinforce the sequential cumulative effect experienced from the M6 and would increase the magnitude of turbine presence, resulting in a significant cumulative effect.

Cumulative baseline visual effects from the A6 would be restricted in extent, as whilst the Dewlay Cheese scheme would be visible from parts of the route, visibility of Caton Moor is extremely limited due to intervening landform, vegetation and buildings. Due to the separation distance between Dewlay Cheese and the proposals it is predicted that the addition of the Lancaster turbine, over 13 km to the north would not result in any significant sequential cumulative effects and it is predicted that drivers passing Dewlay Cheese would generally not be aware of the Lancaster scheme until the approach to Junction 33, due to intervening vegetation and buildings alongside the route.

Assuming the prior presence of all other proposals the addition of one or more of the three Heysham schemes may result in a slight increase in turbine magnitude in oblique views from the road corridor between Galgate and Lancaster, however the significant visual effects from the route between Junction 33 and the southern edge of Lancaster would primarily arise from the presence of the Lancaster scheme alone and no significant cumulative effects are predicted.

Intermittent visibility of the Heysham schemes and the Lancaster turbine are predicted to be available from the A588 travelling between Upper Thurnham and Lancaster. Assuming prior presence of all proposals, the primary effect would be potential oblique views of the Heysham schemes (c.3.5 to 7.0 km W) with the addition of the Lancaster turbine (c.2 km E at the closest point) raising the magnitude of turbine presence to a level where significant cumulative effects would potentially occur. These effects would be limited to sections of the route where views to both proposals would not be screened by local woodland cover and it should be noted that due to the orientation of the schemes, combined visibility is not likely to be perceived by motorists or their passengers.
6.12.3.3 Tourism and Recreation
Visibility of the baseline schemes from the Lune Valley Ramble, National Cycle Route 6, National Cycle Route 69, The Wyre Way and The Lancashire Coastal Way would be not be significant from a cumulative perspective due to intervening landform, vegetation and the location of the routes relative to these schemes. The addition of the Lancaster turbine would not significantly increase the magnitude of turbine presence from these routes and therefore no significant cumulative effects are predicted. Assuming the prior presence of all schemes, cumulative effects are predicted to occur from a limited section of the Lancashire Coastal Way/National Cycle Route 6 in the vicinity of Stodday where the addition of the Lancaster proposals in combination with the Heysham schemes could potentially result in significant cumulative effects for a limited section of the route. Further north on the edge of Lancaster, more extensive views of the Heysham schemes would be available that are predicted to be significant, regardless of the Lancaster proposals. Visibility of the Caton Moor Windfarm and Dewlay Cheese turbine from Regional Cycle Route 90 within 5km of the Lancaster Proposals is extremely limited. The addition of the Lancaster turbine whilst resulting in significant visual effects from the route within a radius of approximately 5 km, would not result in a significant combined cumulative effect. It is predicted however that sequential cumulative effects would occur between Caton village and the crossing over the M6 to the south. Assuming the prior presence of all proposals, the addition of the Lancaster scheme would reinforce the sequential cumulative effect between Caton and the M6, where the overall magnitude of turbine presence would be increased by the addition of Claughton Moor.

6.13 Residual Effects
In the circumstances that a development would result in an alteration to an environment whose attributes can be quickly recovered, then judgements concerning the significance of effects should be tempered in that light. Landscape and visual effects whether regarded as positive or adverse can be reversed, and following decommissioning there would be no residual effects. A wind turbine proposal should therefore be regarded as a long term reversible addition to the landscape, preserving the choice for future generations as to whether or not to recover what might be regarded as the landscape fabric of today, or continue with clean renewable energy generation.

6.14 Statement of Significance
6.14.1 Introduction
The proposed wind turbine proposal at Lancaster has been designed following the design objectives and principles set out within Chapter 5: The Proposed Development. The design has been optimised, taking account of the technical, economic and environmental constraints, and has achieved a turbine design which relates to the scale and landform of the site and its surroundings. The effects on landscape and visual amenity within the surrounding area have been minimised as a result.

6.14.2 Landscape Effects
The turbine is located within the Langthwaite Ridge (7c) Landscape Character Area and the southern end of the access track is located within the Cockerham-Galgate-Carnforth (12a) landscape area. There would be no significant direct effects on the landscape fabric as a result of the wind turbine development; however significant effects upon landscape character would occur within the Langthwaite Ridge (7c) Landscape Character Area and Cockerham-Galgate-Carnforth (12a) Landscape Character Area.

In respect of other neighbouring landscape character areas, significant but localised effects would apply to areas within approx 5km of the turbine affecting West Bowland (5i), Bowland Gritstone Fringes (4d), Central Bowland Fells (2b), and High Bowland Plateau (1b); however it the composite effects for each of these would not be significant.

The indirect landscape effects in relation to the Forest of Bowland AONB would be similar to effects on some of the landscapes with significant effects associated to areas within approximately 3 km and with overall composite effects being Moderate.

6.14.3 Visual Effects
Significant effects would apply to some receptors within settlement at Bailrigg and Galgate subject to intervening screening levels. In terms of roads significant visual effects would apply to short sections of the M6 and A6 routes where the wind turbine could be viewed at close range, although the overall visual effects in relation to these routes and others within the study area would not be significant.
In terms of recreational routes and footpaths significant effects would apply to parts of Lancashire Coastal Way, National Cycle Route 6 and Regional Route 90 at locations within 5 km, although the overall effects on these routes would not be significant.

6.14.4 Cumulative Landscape and Visual Effects

Significant cumulative effects would potentially apply to residents on the western edge of Quernmore on Wyresdale Road and scattered dwellings between the village and Littledale Road to the north east as a result of the addition of the Lancaster turbine. The Lancaster scheme would reinforce the sequential cumulative effects already experienced from the M6 resulting in significant effects.

Assuming the prior presence of all schemes, cumulative effects are predicted to occur from a limited section of the Lancashire Coastal Way/National Cycle Route 6 in the vicinity of Stodday where the addition of the Lancaster proposals in combination with the Heysham schemes could potentially result in significant cumulative effects for a limited section of the route. Sequential cumulative effects would also occur as a result of the Lancaster turbine from the Regional Cycle Route 90 between Caton village and the M6.