# **Jacobs**

# **Cottam Parkway**

Appendix 5.2 Landscape and Visual Impact Assessment Methodology

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Lancashire County Council



# **Cottam Parkway**

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# 1. Landscape and visual impact assessment methodology

# 1.1 Introduction

- 1) This appendix provides an outline of the methodology used to assess the landscape and visual effects of the proposed development. The methodology used will be agreed through consultations with the Landscape Officer at Lancashire County Council (LCC) and is derived in accordance with the following guidance documents:
  - Highways England et al., 2020, DMRB, Volume 11, Section 3, Part 5, LA107 Landscape and visual<sup>1</sup>; and,
  - Landscape Institute and Institute of Environmental Management and Assessment, 2013, Guidelines for Landscape and Visual Impact Assessment 3rd Edition (GLVIA3)<sup>2</sup>.
- 2) Guidance is provided by GLVIA3<sup>2</sup> on the area of landscape that should be covered in assessing landscape and visual effects i.e. the 'Assessment area' (para. 5.2 page 70). "The assessment area should include the site itself and the full extent of the wider landscape around it which the proposed development may influence in a significant manner. This will usually be based on the extent of Landscape Character Areas likely to be significantly affected either directly or indirectly. However, it may also be based on the extent of the area from which the development is potentially visible, defined as the Zone of Theoretical Visibility (ZTV), or a combination of the two."
- 3) The following activities will be undertaken in the assessment:
  - Review and take account of relevant guidance and policy, and the landscape chapter of the Preston Western Distributor (PWD) and East-West Link Road Environmental Statement;
  - Define the study areas and identify viewpoint locations and receptors;
  - Establish the environmental baseline conditions within the study area for receptors;
  - Determine susceptibility / value / sensitivity of landscape and visual receptors, the magnitude of change and significance of effect;
  - Carry out assessment of the significance of effects on landscape receptors;
  - Carry out assessment of the significance of effects on the visual amenity of receptors;
  - Identify mitigation measures (including reinstatement measures) in order to reduce and minimise
    potential impacts on both landscape and visual receptors; and,
  - Design and development of appropriate landscape mitigation proposals and contributions to a projectwide Environmental Masterplan (EMP).

# 1.2 Planning policy and guidance

4) The assessment, design proposals and mitigation measures will be guided by relevant National Planning Policy Framework and local planning policy. Planning policies and designations of relevance to the proposed development will be taken into consideration, for example in terms of assessing the value of receptors and identifying mitigation measures.

# 1.3 Identification of study area

- 5) The study area for definition of the baseline landscape and visual conditions will be determined by the extent to which the proposed development is likely to be visible from the surrounding landscape at all assessment stages. This extent will be determined with the aid of ZTV mapping and a site appraisal, in order to indicate the maximum extent to which there is the potential for landscape and visual effects to occur.
- 6) It is important to note that all ZTVs are theoretical and illustrate the worst-case scenario in that they are based upon a 'bare earth' ground model. Physical features which may potentially provide screening have not been

<sup>&</sup>lt;sup>1</sup> Highways England, Transport Scotland, Welsh Government and Department for Infrastructure, 2020, DMRB, Volume 11, Section 3, Part 5, LA107 Landscape and visual effects, Version 2. (formerly DMRB Volume 11 Section 3 Part 5 Landscape Effects and IAN 135/10

<sup>&</sup>lt;sup>2</sup> Landscape Institute and Institute of Environmental Management and Assessment, 2013, Guidelines for Landscape and Visual Impact Assessment 3rd Edition (GLVIA3).

included in the computer modelling, such as existing hedgerows or buildings, unless otherwise stated. Therefore, the ZTVs are an indication only of the areas within which visual effects may be expected to occur. For this reason, the views recorded on site will not reflect the full extent of the topographical ZTV.

7) GLVIA3<sup>2</sup> advocates a proportionate approach to Landscape and visual impact assessment (LVIA), with emphasis placed on the need to focus on the potential for significant effects. The likelihood of significant landscape and visual effects diminishes with increasing distance from a proposed development. This will be taken into consideration when defining the study area. The extent of the study area will be agreed with the client.

# 1.4 Identification of receptors

- 8) The key receptors viewpoints on which to base the LVIA will be identified following baseline studies and review of the effects likely to arise from the proposed development. The location of viewpoints and photomontage viewpoints (up to five photomontage viewpoints) will be identified and agreed with the Landscape Officer at LCC.
- 9) ZTV mapping will be used to inform the selection of a range of representative viewpoints. A ZTV is theoretical, therefore the extent of actual visibility will be assessed in the field from publicly accessible locations. The aim is not to identify every possible view available, but to identify a representative range of viewpoints that typify the views experienced by people, living, working or visiting the area. The range of viewpoints selected is proportionate to the size of the proposed development.
- 10) Photography and visualisations will be prepared in accordance with the requirements of the Highland Council Guidelines<sup>3</sup>.
- 11) The methodology for the production of the photomontages is provided at the end of this document.

# 1.5 Identification of the baseline conditions

- 12) The collection of landscape and visual baseline information includes a desk study of published sources of information on the landscape and the potential visual assessment viewpoints backed up by a site visit. It will be informed by aerial photographs and OS data, collating information on topography, landform, land-use, vegetation and landscape pattern.
- 13) Landscape character assessments will be based on published information from local landscape character assessments and Natural England's National Character Assessments (NCA)<sup>4</sup>.
- 14) The landscape and visual context of the study area, including ecology, landscape tranquillity, local geodiversity sites, cultural heritage features and landscape / heritage designations will also be considered to inform the landscape character assessment of the study area.
- 15) A site visit will be undertaken in order to gain a better understanding of the landscape context and views within the study area. The site visits will inform the project-level studies of local landscape character to supplement published sources of landscape character assessment.

## 1.6 Timescales

- 16) The timescale over which impacts of the scheme would be experienced varies according to the nature of the impact and the time taken for mitigation to become fully effective. The varying nature of landscape and visual impacts throughout the timeline of the proposed development will be taken into account in this assessment. The timescales applied within this assessment are as follows:
  - Construction period: considers construction activities, temporary works and construction traffic during the construction period. Assessments for each landscape and visual receptor during the construction period will be made on a working day in winter where impacts are most significant for the individual receptor;

<sup>&</sup>lt;sup>3</sup> The Highland Council. 2016., Visualisation Standards for Wind Energy Developments

<sup>&</sup>lt;sup>4</sup>Natural England. 2014. Corporate report: National Character Area profiles. [online] Available at:

https://www.gov.uk/government/publications/national-character-area-profiles-data-for-local-decision-making/national-character-area-profiles [Accessed 2019]

- Opening year: considers the operation of the scheme on a winter's day in the opening year before
  mitigation planting has begun to take effect; and,
- Future year: considers the impacts once mitigation planting has established on a summer's day in the fifteenth year after opening. Mitigation planting is assumed to be substantially effective.

## 1.7 Assessment criteria

#### 1.7.1 Landscape character assessment

- 17) Landscape character areas are areas with distinguishing characteristics formed by natural and man influenced landscape elements, such as topography, vegetation and landscape pattern. Existing landscape character assessments for the study area and surrounding landscape are available at a national, county and designated area level. These character assessments, supplemented by information collated during a site visit will be used to inform the creation of Local Landscape Character Areas (LLCAs), which are described within the LVIA. These areas will be assessed in terms of quality as explained below.
- 18) Landscape quality is defined by GLVIA3<sup>2</sup> as follows: "A measure of the physical state of the landscape. It may include the extent to which typical character is represented in individual areas, the intactness of the landscape and the condition of individual elements." Landscape quality will be described using the following criteria:
  - High quality extensive and intact landscape elements and features make a positive contribution to character and sense of place.
  - Medium quality compromised or commonplace landscape elements and features with some contribution to character and sense of place.
  - Low quality compromised landscape elements and features that are discordant, derelict or in decline, resulting in indistinct character with little or no sense of place.

#### 1.7.2 Landscape sensitivity evaluation

- 19) In accordance with GLVIA3<sup>2</sup> the assessment of sensitivity for both landscape and visual assessments combines judgements on the value attributed to that receptor and the susceptibility of the receptor to the specific type of development proposed. Sensitivity will be assessed on a three-points scale of High, Medium or Low.
- 20) Susceptibility to change has been defined, in keeping with GLVIA3<sup>2</sup>, as the ability of a landscape receptor to accommodate the proposed development without undue, adverse consequences.
- 21) The key criteria for value and susceptibility to change used to inform the assessment of sensitivity is summarised in Table 1. The application of these criteria is not a formulaic process and the tables only indicate general categories of sensitivity.

#### Table 1: Landscape Susceptibility Criteria

Susceptibility	Criteria
High	The landscape is highly susceptible to the nature of the proposed development because the relevant characteristics or elements of the landscape have no or very limited ability to accommodate the development without undue effects. For example, because the proposals would result in the loss of a key characteristic or characteristics including pattern, grain, use, scale and mass that are important components of the landscape.
Medium	The landscape is moderately susceptible to the nature of the proposed development because the relevant characteristics or elements of the landscape including scale, pattern, grain, land use of the prevailing character have some ability to accommodate the development without undue effects.

Low	The landscape has a low susceptibility to the nature of the proposed development		
	because the character of the local area, including pattern, grain, use, scale and mass		
	are generally able to accommodate the development without undue effects		

- 22) GLVIA3<sup>2</sup> defines landscape value as '*The relative value that is attached to different landscapes by society.*' A review of existing designations (e.g. National Park, Areas of Outstanding Natural Beauty (AONB), etc.) is usually the starting point in understanding value. A value is given to each landscape character area on a three-points scale high, medium or low, Table 2 outlines these three-points of value and their respective criteria. This overall judgement is determined by professional judgement following an assessment of the relative value attached to the criterial set out in GLVIA3 and, following desktop studies, local consultations and site survey. These include geology, landform, hydrology and soils, landcover, fauna and flora, cultural, social and heritage, aesthetic and perceptual qualities. The description of landscape value for each character area takes account of:
  - International, national and local landscape designations;
  - Policies in local planning documents;
  - Areas of local community interest such as local green spaces, village greens or allotments;
  - Status of cultural heritage or ecological features;
  - Recreational value; and
  - Scenic quality and perceptual aspects.
  - Cultural associations such as viewpoints that formed the basis for great artworks or areas that were the focus of great works of fiction

High	Likely to be of national, regional or county importance: Characteristics intact and/or in good condition; patterns and elements make a significant contribution to sense of place; uncommon features and qualities; rich cultural and/or nature conservation content; fors a strong contribution to recreational experience; wild, tranquil or unspoilt landscape without noticeable detractors; and rich or high valued cultural associations.
Medium	Likely to be of local importance: Intact features more fragmented or partly spoilt; some distinctive characteristics contributing to a local sense of place; widely distributed features of local interest; some cultural and/or nature conservation content; some contribution to recreational experience; some detractors but also retains some perpetual values; some and/or moderately valued cultural associations.
Low	Very limited aesthetically pleasing scenes; intact features are highly fragmented or spoilt;. little local character and a weak sense of place; common features widely distributed; no or limited cultural and/or nature conservation content; no or limited contribution to recreation experience; prominent detractors probably part of key characteristics; and without recorded cultural associations.

#### Table 2: Criteria for Assessing Value of Landscape Designations and Landscape Areas

23) In particular, a receptor may be considered to be of high value, but it does not necessarily follow that the receptor is automatically of high susceptibility to the nature of the proposed change and therefore of high sensitivity. For example, an AONB, though of high value, may be able to accommodate appropriate forms of development without undue effects and may therefore not necessarily be considered to be of high sensitivity to all changes. Conversely, landscapes considered to be of lower landscape value may be highly susceptible to the nature of the proposed change. Judgements are therefore made about each receptor, with the criteria

below serving as a guide and balanced accordingly. For instance, a receptor of high value and low susceptibility (or vice versa) may be considered to be of overall medium sensitivity.

24) Sensitivity will be assessed on a three-points scale of high, medium, low. Table 3 outlines the criteria incorporating the above assessment of 'value' along with professional judgement that will be used in the evaluation of overall landscape sensitivity.

#### Table 3: Landscape Sensitivity Criteria

Sensitivity	Criteria
High	Landscapes which by nature of their character would be unable to accommodate change of the type proposed. Typically these would be:
	• Of high quality with distinctive elements and features making a positive contribution to character and sense of place.
	• Likely to be designated, but the aspects which underpin such value may also be present outside designated areas, especially at the local scale.
	• Areas of special recognised value through use, perception or historic and cultural associations.
	• Likely to contain features and elements that are rare and could not be replaced.
Medium	Landscapes which by nature of their character would be able to partly accommodate change of the type proposed. Typically these would be:
	Comprised of commonplace elements and features with some sense of place.
	• Locally designated, or their value may be expressed through non-statutory local publications.
	• Containing some features of value through use, perception or historic and cultural associations.
	Likely to contain some features and elements that could not be replaced.
Low	Landscapes which by nature of their character would be able to accommodate change of the type proposed. Typically these would be:
	• Comprised of some features and elements that are discordant, derelict or in decline, resulting in indistinct character with little or no sense of place.
	Not designated.
	• Containing few, if any, features of value through use, perception or historic and cultural associations.
	Likely to contain few, if any, features and elements that could not be replaced.

#### 1.7.3 Visual sensitivity evaluation

25) The susceptibility of different visual receptors to changes in views and visual amenity is mainly a function of:

- The occupation or activity of people experiencing the view at particular locations; and,
- The extent to which their attention or interest may be focused on the views and the visual amenity they experience at particular locations.
- 26) Table 4 (based on generic guidance in GLVIA3<sup>2</sup>) will be used to help evaluate the susceptibility of different types of receptors.



#### Table 4: Visual Receptor Susceptibility to Change

Susceptibility	Receptor Type
High	Residents;
	People engaged in outdoor recreation, including users of public rights of way, whose attention is likely to be focused on the landscape and on particular views;
	Visitors to heritage assets or other attractions where views of the surroundings are an important part of the experience;
	Communities where views contribute to the landscape setting and are enjoyed by residents; and,
	Transient users of scenic routes where awareness of views is likely to be particularly high.
Medium	Transient users of road, rail or other transport routes where the appreciation of visual amenity is not the primary concern; and,
	Outdoor workers where the viewer's attention or interest is related to views and the landscape.
Low	People engaged in outdoor sport or recreation, which does not involve appreciation of views;
	People at their place of work, education and worship whose attention may be focused on their activities and where the setting is not important; and,
	Transient users of routes where the view is incidental to the journey.

27) The criteria in Table 5 will be used, along with professional judgement, to help determine the value of the views in relation to designations and helps to equate sensitivity to other factors, for example, residential views.

#### Table 5: Value of Views

Value	Views From
High	Viewpoints of international or national importance, or highly popular visitor attractions where the view forms an important part of the experience, or with important cultural associations. A view that may be identified in character area appraisals.
Medium	Viewpoints of regional / district importance or moderately popular visitor attractions where the view forms part of the experience, or with local cultural associations. A typical / representative view where neither highly discordant nor highly attractive components form a key part of the view composition.
Low	Viewpoints with no designations and with minimal or no cultural associations. Views where discordant or unattractive features are prevalent.

28) The sensitivity of visual receptors to changes in their views will be evaluated in accordance with the criteria provided in Table 6, based on the receptor susceptibility to change and the value of views.

#### Table 6: Visual Sensitivity Criteria

Sensitivity	Criteria
High	Receptors where the changed view is of high value and importance and / or where the receptor will notice any change to visual amenity by reason of the nature of use and their expectations. Receptors where the view is important to users will be considered to be of high sensitivity such as residential, public rights of way or other recreational trails (e.g.

	National Trails, footpaths, bridleways), users of recreational facilities where the purpose of that recreation is enjoyment of the countryside e.g. Country Parks and views from heritage assets or views featured in art and literature.
Medium	Receptors where the changed view is incidental, but not critical to amenity and / or the nature of the view, is not a primary consideration of the users (receptors where users are likely to spend time outside or participation in an activity looking at the view and industrial receptors that have offices with windows that take advantage of views). Public rights of way or other recreational trails with lower value views, outdoor workers, users of scenic roads, low speed passenger railways or waterways or users of designated tourist routes, schools or other institutional buildings and their outdoor areas.
Low	Receptors where the changed view is less important and / or users are not sensitive to change (outdoor receptors where users are unlikely to consider the views an important element of their usage of the site will generally be assessed to be of low sensitivity). Indoor workers, users of main roads or passengers on public transport on main arterial routes, users of high speed passenger trains, users of recreational facilities where the purpose of the recreation is not related to the view.

#### 1.7.4 Evaluation of magnitude of effects

29) The magnitude of impact is the degree of change that would occur during the construction and operation of the proposed development.

#### Magnitude of Landscape Effects

- 30) The magnitude of landscape effect will be assessed in terms of its relative scale of change, the geographical extent of the area that would be influenced and its duration and reversibility.
- 31) This judgement on magnitude of change in the landscape takes into consideration the following factors:
  - The extent / proportion of landscape elements lost or added;
  - The contribution of that element to landscape character and the degree to which aesthetic / perceptual aspects are altered; and,
  - Whether the change is likely to alter the key characteristics of the landscape, which are critical to its distinctive character.
- 32) The criteria used to assess the size, scale and geographic extents of landscape effects will be based upon the amount of change that would occur as a result of the proposed development, as described in the Table 7.

#### Table 7: Magnitude of Landscape Effects

Magnitude	Criteria
Major	Total loss or large scale damage to existing character or distinctive features and elements, and / or the addition of new but uncharacteristic conspicuous features and elements.
	Large scale improvement of character by the restoration of features and elements, and / or the removal of uncharacteristic and conspicuous features and elements, or by the addition of new distinctive features.
Moderate	Partial loss or noticeable damage to existing character or distinctive features and elements, and / or the addition of new but uncharacteristic noticeable features and elements.
	Partial or noticeable improvement of character by the restoration of existing features and elements, and / or the removal of uncharacteristic and noticeable features and elements, or by the addition of new characteristic features.

Minor	Slight loss or damage to existing character or features and elements, and / or the addition of new but uncharacteristic features and elements.
	Slight improvement of character by the restoration of existing features and elements, and / or the removal of uncharacteristic features and elements, or by the addition of new characteristic elements.
Negligible	Barely noticeable loss or damage to existing character or features and elements, and / or the addition of new but uncharacteristic features and elements.
	Barely noticeable improvement of character by the restoration of existing features and elements, and / or the removal of uncharacteristic features and elements, or by the addition of new characteristic elements.
No Change	No noticeable loss, damage or alteration to character or features or elements.

- 33) In accordance with GLVIA3<sup>2</sup>, consideration has also been given to the duration and reversibility of landscape effects in the evaluation of magnitude. The duration of the change is based on guidance in GLIVIA3, and will be categorised as:
  - Short term up to 1 year or during construction;
  - Medium term 1 to 15 years when new planting will not be fully effective; and,
  - Long term over 15 years when planting will be effective mitigation.

#### Magnitude of Visual Effects

- 34) Evaluation of the magnitude of visual change affecting receptors will be carried out by considering the following:
  - The scale of the change in the view with respect to the loss or addition of features and changes in its composition, including the proportion of the receptor's available view affected by the development;
  - The degree of contrast or integration of any new features or changes in the landscape with the existing landscape elements and characteristics;
  - The nature of the view of the proposed development, in terms of the relative amount of time over which it will be experienced and whether views will be full, partial or glimpsed;
  - The angle of view relative to the main activity of the receptor;
  - The distance of the viewpoint from the proposed development;
  - The extent of the area over which changes would be visible; and,
  - The duration and reversibility of changes.

35) The criteria used to help determine the magnitude of visual effects are shown in Table 8.

#### Table 8: Magnitude of Visual Effects

Magnitude	Criteria
Major	The project, or a part of it, would become the dominant feature or focal point of the view.
	Total loss or substantial alteration to key characteristics of the view e.g. the proposals dominate the view and fundamentally change its character and components. Introduction of uncharacteristic features across a large proportion of the view.
Moderate	The project, or a part of it, would form a noticeable feature or element of the view which is readily apparent to the receptor e.g. the proposals are noticeable in the view, affecting its character and altering some of its components and features.

	Partial loss or noticeable alteration to key characteristics of the view. Introduction of uncharacteristic features across part of the view.		
Minor	The project, or a part of it, would be perceptible but not alter the overall balance of features and elements that comprise the existing view.		
	Slight loss or alteration to key characteristics of the view Introduction of uncharacteristic features across a small part of the view.		
Negligible	Only a very small part of the project would be discernible, or it is at such a distance that it would form a barely noticeable feature or element of the view e.g. the changes are only a minor element of the overall view that are likely to be missed by the casual observer. Introduction of features largely characteristic of the view.		
No change	No part of the project or activity associated with is discernible.		

- 36) Mitigation measures and standard construction and operational management practices will be incorporated into the design and will be considered in the determination of the magnitude of change.
- 37) In accordance with GLVIA3<sup>2</sup>, consideration has also been given to the duration and reversibility of visual effects in the evaluation of magnitude. The duration of the change is based on guidance in GLIVIA3, and will be categorised as:
  - Short term up to 1 year or during construction;
  - Medium term 1 to 15 years when new planting will not be fully effective; and,
  - Long term over 15 years when planting will be effective mitigation.

#### 1.7.5 Significance of effects

38) The resulting determinations of sensitivity and magnitude will be applied together to assess the significance of effects through use of the matrix set out in Table 9 and Table 10. Effects will be qualified as 'adverse' or 'beneficial'. The significance of landscape and visual effects will be assessed on a four-points scale of major, moderate, slight and negligible as set out in Table 9, based on professional judgement and informed by GLVIA3<sup>2</sup>.

Table 9: Criteria to Assess the Sig	ificance of Effect for	Landscape and Visua	l Resources
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Category	Landscape	Visual		
Major Beneficial Effect - Significant	The project would fit well with the scale, landform and pattern and enhance the character (including quality and value) of the landscape; enable the restoration of characteristic features and elements lost; enable a sense of place to be enhanced.	The project would create a new feature that would greatly enhance the view.		
Moderate Beneficial Effect - Significant	The project would improve the character (including quality and value) of the landscape; enable the restoration of characteristic features and elements partially lost or; enable a sense of place to be restored.	The proposals would cause obvious improvement to a view from a receptor of medium sensitivity or a perceptible improvement to a view from a more sensitive receptor.		
Slight Beneficial Effect	The project would complement the character (including quality and value) of the landscape; maintain or enhance characteristic features and elements; enable some sense of place to be restored.	The project would cause limited improvement to a view from a receptor of medium sensitivity or would cause greater improvement to a view from a receptor of low sensitivity.		

Negligible Effect	The project would be compatible with the existing character (including quality and value) of the landscape; blend in with characteristic features and elements; enable a sense of place to be retained.	No perceptible deterioration or improvement in the existing view
Slight Adverse Effect	The project would not quite fit the character (including quality and value) of the landscape; be at variance with characteristic features and elements; detract from a sense of place.	The project would cause limited deterioration to a view from a receptor of medium sensitivity or cause greater deterioration to a view from a receptor of low sensitivity.
Moderate Adverse Effect - Significant	The project would conflict with the character (including quality and value) of the landscape; have an adverse impact on characteristic features or elements; diminish a sense of place	The project would cause obvious deterioration to a view from a receptor of medium sensitivity or perceptible damage to a view from a more sensitive receptor.
Major Adverse Effect – Significant	The project would be at complete variance with the character (including quality and value) of the landscape; cause the integrity of characteristic features, elements and sense of place to be lost.	The project would cause major deterioration or loss of a view from a highly sensitive receptor, and would constitute a major discordant element in the view.

#### Table 10: Significance matrix

		Magnitude of impact				
		No change	Negligible	Minor	Moderate	Major
Sensitivity	High	Neutral	Slight	Slight or Moderate	Moderate or Large	Large or Very Large
	Medium	Neutral	Neutral or Slight	Slight	Moderate	Moderate or Large
	Low	Neutral	Neutral or Slight	Neutral or Slight	Slight	Slight or Moderate
	Negligible	Neutral	Neutral	Neutral or slight	Neutral or Slight	Slight

#### 1.7.6 Mitigation measures

- 39) Mitigation measures will be developed in response to the identification of impacts from the proposed development on landscape character areas and visual receptors. The mitigation measures aim to reduce the magnitude or degree of change and therefore reduce the significance of the effects from the proposed development.
- 40) Mitigation measures will be incorporated into the design of the scheme as part of an iterative process to avoid, reduce or offset adverse landscape and visual effects. Mitigation will be identified by individual specialists, as is the case for this topic, and fed into an EMP, which is contained within Chapter 5 of this Environmental Statement (ES). A description of proposed mitigation measures of relevance to the visual assessment Chapter 5 are contained in Section 5.8 of the main text. The beneficial effect of these measures will be taken into account in the assessment of significant effects.

# 1.8 Photomontage methodology

- 41) This section provides a description of the methodology for the production of the photomontages in Appendix 5.3. This methodology has been produced to provide transparency of the process undertaken to produce photomontages for illustrative purposes only, in line with the key guidance document: *The Highland Council, July 2016: Visualisation Standards for Wind Energy Developments*; as supported where appropriate by other industry guidelines<sup>5</sup> and as approved for use by LCC. These images will be used to inform the LVIA following full site survey and desktop assessments.
- 42) The final figure for each viewpoint comprises a series of eight sheets to reflect the existing views along with photomontages to reflect the first year of opening (Year 1) in winter and the scheme 15 years on in summer once mitigation proposals have established (Year 15).
- 43) The full list of sheet sets per viewpoint are listed in Section 1.8.12 and are as prescribed within the Highland Council Guidelines to enable both desktop and site-based viewing, as described in more detail below.

#### 1.8.1 Viewpoint location consultation

- 44) Viewpoints were chosen to reflect the worst-case changes in views from what were considered the most sensitive receptors. The locations of viewpoints have been selected through email and telephone correspondence with Steven Brereton of LCC between March and August 2020. The final list of viewpoints were accepted on 18th August 2020 and it was agreed that the following extents were acceptable:
- <u>Viewpoints 5, 6, 7A and 8</u>: 65.5° panoramic for landscape context, plus 50 mm and 75 mm (recalibrated) extracts for visual assessment.
- <u>Viewpoints 7B, 12 and 14</u>: 39.6° single 50 mm frame image for baseline and photomontage, plus 75 mm (recalibrated) extracts for visual assessment.

#### 1.8.2 Key assumptions and limitations

- 45) Whilst every effort has been made to ensure a suitable level of accuracy is maintained throughout the production of photomontages, no final image is 100% accurate. Therefore, the following assumptions and limitations have been identified:
  - The baseline photographs that form the basis of the photomontage are a flattened 2D representation of what the eye would see (planar projection);
  - Accuracy tolerances for survey and data have been determined based on key data used to provide references for fixing camera perspectives and are as follows:
    - 3D Toposurvey data is sub cm accuracy;
    - Light Detection and Ranging (LiDAR) data was sourced from Department of Food and Rural Affairs open source datasets and was Digital Terrain Mapping (DTM) files at +/- 1m accuracy;
    - Satmap Active12: +/- 1 m;
  - Photographs have been taken at 1.6m above ground which is acknowledged as a departure from the prescribed 1.5m within the Highland Council Guidelines, but still represents the viewing height of a person and is as set out in GLVIA3<sup>2</sup> paragraph 6.11;
  - Photomontages reflect the worst-case impacts of the proposed development in winter of the Opening Year (Yr1) and the function of the mitigation in the Future Year (Yr15). For the Year 15 photomontages,

<sup>5</sup> Key Guidance document: The Highland Council Guidelines (The Highland Council, Visualisation Standards for Wind Energy Developments) – July 2016;

Scottish Natural Heritage Guidelines (Scottish Natural Heritage, 2014, Visual Representation of Windfarms)

Landscape Institute Guidelines (Landscape Institute, Technical Guidance Note TGN06/19: Visual Representation of Development Proposals – September 2019)

Guidelines for Landscape and Visual Impact Assessment 3rd Edition – Landscape Institute & IEMA - April. 2013;

plant growth will be assumed to reflect a total height of proposed mitigation planting as described in Section 1.8.6 paragraph 59 ; and,

- All 3D and 2D highway design, lighting, signage, structural and environmental mitigation design information required for 3D modelling were supplied by the LCC Engineer teams in June 2022 (Design Fix).
- The scheme will include some elements of planting undertaken as part of the Preston Western Distributor Road (PWDR) which is due to open early 2023 with planting undertaken this winter season. (November 2022). The Cottam Parkway Scheme is due to be constructed 2023 and will take approximately 24 months. Therefore it is assumed that planting in the PWDR areas on the scheme would be completed in November 2022 and the Year 1 planting for the scheme complete in November 2025. This would mean that the Winter Year 1 scenario will theoretically show an additional 3 years growth of PWDR planting compared to the Scheme planting complete for Year 1. Refer to Section 1.8.6 for more details on heights assumed.

#### 1.8.3 Site survey, photography and baseline information

- 46) Viewpoints were chosen to reflect the worst case changes in views from what were considered the most sensitive receptors. The locations of viewpoints have been selected through consultation and verified on site to maximize views of the scheme and, where possible, avoid any obstructions that limit views. The selected viewpoints are shown on Figure 5.4 Representative Viewpoints. The photographs were taken in August 2020 and February 2021 in clear conditions where even light levels prevailed. At each viewpoint location, the following survey data was collected where possible:
- 47) Global Positioning System (GPS) reference noting the location of the camera in National Grid Coordinates as well as the ground elevation;
  - The height of the camera above ground level (approximately 1.6m);
  - Direction of view (compass bearing);
  - Date and time photograph was taken; and,
  - Weather conditions at the time of photograph.
- 48) The baseline photographs were taken using a Canon EOS 5D digital SLR camera with a fixed 50 mm lens. All photographs have been taken on a tripod mounted and levelled to the vertical and horizontal axes as well as using the maximum resolution of the camera and including the metadata. Viewpoints 7B, 12 and 14 were photographed as a single shot.
- 49) For viewpoints 5, 6, 7A and 8, panoramic photography was undertaken using a series of photographs taken with a minimum of 60% (15° increments) overlap between frames to reduce barrel distortion. These photographs were then manually stitched together in Adobe Photoshop software to produce a single panoramic image. During this process only minor improvements have been made to the photographs to balance brightness, contrast etc. where necessary. None of the photographs have been distorted. All survey information as well as other important information has been provided on the first two sheets for each viewpoint set (see below).
- 50) Final images were then cropped to 65.5° field of view to ensure a suitable image size for a comfortable viewing distance (385 mm x 144 mm tall images to be viewed at approx. 300 mm from eye). These images were used as the basis for the photomontages for Year 1 and Year 15 (sheet 2).
- 51) Additional 50 mm single frame as well as 75mm equivalent zoomed images have been provided. These were derived from a single 50 mm image cut out from the panoramic (centred on the middle of the panoramic). The single frame (216 mm x 144 mm) was then resized to 390 mm x 260 mm in accordance with the verification template in Appendix 5.3. From this a 75 mm equivalent crop of 260 mm x 174 mm was trimmed out. Finally, this image was resized to 390 mm x 260 mm and added to the photomontage sheet set (Sheet 3).

#### 1.8.4 Existing site 3D modelling, references and 3D camera matching

- 52) To assist the process of matching the baseline photograph with the 3D model of the proposals, reference points were identified at each viewpoint location. Reference points are features within a photograph that can be identified from 2&3D topographical survey drawings, Ordnance Survey (OS) and aerial photographical data. Examples include telegraph poles, field boundaries and pylons.
- 53) The existing site 3D model was produced at a local grid with a common global shift from OS National Grid [-349127,-431308]. This was produced using information from 3D toposurvey and LIDAR DTM contour information as converted using Autodesk Civil3D software and exported to Autodesk 3DS Max Design. This model has been used to vertically place reference objects as extracted from the same working Civil3D CAD model.
- 54) From the baseline panoramic images, single 50mm focal length images for use in the camera matching process were cropped to match the 4:3 ratio of a 50mm lens image. These frames were then be used as backdrops to the equivalent 50mm 3D camera within Autodesk 3DS Max Design software.
- 55) The surveyed locations of the viewpoints were added to the base 3D model (with the global shift applied) via export from Civil3D and used as a starting point for fixing the 3D camera. This was undertaken through matching terrain, reference points and other information in the model to the corresponding features in the background image (the 3D camera backdrop).

Following detailed camera matching of photography and reference points, minor adjustments to the location of the 3D camera location were required to accurately fix the 3D environment to the photo. Once the correct aspect, orientation and any camera roll was confirmed, checked and recorded above; the locations were locked for use in rendering.

#### 1.8.5 Construction of the base model and camera matching

- 56) 3D ground model information was imported into Autodesk 3DS Max Design to create a basic base terrain and provide topographical context to the site and surrounding area. Information from the topographical survey of the site was also imported into the basic base model to create a more detailed base model of the site and surrounding area.
- 57) In 3DS Max Design, locations of the baseline photographs were added to the base model using a 3D camera, created to match the specification of the camera and lens type and located to the GPS coordinates surveyed on site. The photographs were then matched to the 3D environment using information from OS, topographical survey and aerial data.

#### 1.8.6 Construction of the scheme model and rendering of final image

- 58) A 3D model of the scheme has been created using information supplied by the LCC and network Rail scheme engineers. This information has included data such as park and ride car park and associated earthworks and buildings, railway development buildings, road and pavement 3D lines, highway fencing lines, gantry locations and bridge structure. Additional information has been added from the Environmental Masterplan drawings to show proposed vegetation and ecological mitigation.
- 59) All proposed mitigation planting has been modelled to represent native woodland, trees, shrub and hedgerow and ornamental planting for both Year 1 and Year 15 as follows:

#### Year 1

- Woodland and tree and shrub planting: mix 1.2m and 600mm tall tree shelters (both 100mm diameter) modelled along with occasional feathered trees at approximately 2.5-3m tall x 1m wide;
- Individual native tree planting: 2.5-3m standard trees with single stake at each identified location;
- Individual native "bat hop over" tree planting: 3-4m heavy standard trees with double stake at each identified location;
- Individual formal / ornamental tree planting: 3-4m heavy standard trees with double stake at each identified location;

- Semi mature individual native tree planting (PWD only): 4-4.5m semi-mature trees no stake (underground guying) at each identified location;
- Native shrub / scrub planting: 600mm tall shrub shelters (160mm diameter);
- Hedge planting: A double staggered row of 450mm tall x 40mm diameter shelters at 300mm centres with 2m tall selected standard trees at each identified location;
- Ornamental shrub planting 30-40cm tall ornamental shrubs (no shelters); and,
- Ornamental shrub planting (ground cover) 15-20cm tall ornamental shrubs (no shelters).
- PWDR Semi Mature Individual Native tree planting: 4-4.5m semi-mature trees no stake (underground guying) at each identified location
- PWDR Individual Native "Bat Hop Over" tree planting: 4-5m Heavy Standard trees with double stake at each identified location
- PWDR Individual Native tree planting: 3.5-4m standard trees with single stake at each identified location
- PWDR Native shrub planting: 600mm tall shrub shelters (160mm diameter) with shrubs up to 800mm to 1m within

#### Year 15

- Woodland and tree and shrub planting: 8-10m tall;
- Individual tree planting (all including native, 'bat hop over and formal / ornamental trees): 8-10m tall;
- Hedgerow / native shrub / scrub planting: 3-4m tall;
- Ornamental shrubs 2-3m tall; and,
- Ornamental shrubs (groundcover) 1m tall.
- PWDR Individual tree planting (all including Native, Bat Hop Over, semi-mature): 10-12m tall
- PWDR native hedgerow / shrub planting: 4m tall
- 60) The final 3D model of the proposed scheme then incorporated materials and finishes (e.g. stone bridge walls, tarmac, grass etc.) and then merged into the existing scene. The environment lighting and atmospheric effects were also matched to the existing conditions as closely as possible using the RAW metadata.
- 61) The fixed 3D cameras were then used to render the proposed scheme over the baseline photograph as an image exported as jpeg and PNG formats for use in Adobe Photoshop for final image production.

#### 1.8.7 Compilation of images

62) The following set of images produced for the final output are as prescribed within the Highland Council Guidelines to enable both desktop and site-based viewing. Instructions and health warnings for each set and their use are further described in this section.

#### 1.8.8 Existing / baseline images for landscape context

#### Single 50 mm frame images

63) For Viewpoints 7B, 12 and 14 a single photo has been used to represent the context of the views. No adjustment to the images has been made apart from where images were resized to 235.70 mm x 157.26 mm for inserting to scale into AutoCAD to complete the figure sheets 1 and 2 for these viewpoints.

#### Stitched panoramic images

- 64) For Viewpoints 5, 6, 7A and 8, panoramic photographs are presented for the existing baseline view and photomontages for landscape context. These are not representative of scale and distance (see Section 1.8.11: 75 mm recalibrated photomontages).
- 65) The 50mm lens photographs have been manually stitched together in Adobe Photoshop software to produce a 65.5° wide panoramic image (390 mm x 157.26 mm) to a reflect a 65.5° horizontal x 27° vertical field of view. During this process only minor improvements have been made to the photographs to balance

brightness, contrast etc. where necessary. None of the photographs have been distorted to provide a planar stitched image.

66) Once all layering and final adjustment to brightness and contrast levels were complete, all panoramic images were resized to 390 mm x 157.26 mm for inserting to scale into AutoCAD to complete the figure sheets 1 and 2 for these viewpoints.

#### 1.8.9 Photomontage images for landscape context and visual assessment

- 67) For all photomontage images, Adobe Photoshop software has been used to remove features in the baseline photograph that would be removed by the scheme using additional photography undertaken at the same time as the viewpoint photograph. Furthermore, additional layers taken from the base photograph have been used as retained foreground elements which were layered over the top of the rendered layers.
- 68) The fixed 3D cameras have been used to render the proposed scheme from 3DS Max as an image file. This was then imported into Adobe Photoshop as a layer over the baseline images. Some additional textures from existing photography were also used to overlay rendered elements to create a photorealistic and scaled final image.
- 69) Once all layering and final adjustment to brightness and contrast levels were complete, the photomontage images were resized to either 235.70 mm (single 50 mm) or 390 mm (panoramic) x 157.26 mm for inserting to scale into AutoCAD to complete the figure sheets as described in section 1.8.10.

#### 1.8.10 Single 50 mm focal length images for visual impact assessment (Viewpoints 5, 6, 7A and 8)

- 70) The panoramic photomontage images were used as the basis for the single 50 mm focal length photomontages for visual impact assessment of viewpoints 5, 6, 7A and 8. These extracts were used to reflect the central section of the view, focused on the main impact of the scheme proposals. This process has been undertaken for both the Winter Year 1 and Summer Year 15 scenarios.
- 71) The 50 mm single frame extract has been cropped from the panoramic photomontage image (235.70 mm x 157.26 mm) and then resized to 390 mm x 260 mm for inserting to scale into AutoCAD to complete the figure sheets 5 and 6 for viewpoints 5, 6, 7A and 8.

#### 1.8.11 Single 75 mm focal length photomontages for visual impact assessment

- 72) The final 50 mm photomontage was imported into a recalibration template in Adobe Photoshop (see Illustration 1.1 below), whereby the "zone of permissible offset" has been used as a guide to crop out the 75 mm focal length equivalent image (260 mm x 174 mm). A verification template is provided (see Appendix A Verification Template) for verification of image sizes.
- 73) The recalibrated image has then been resized to 390 mm x 260 mm (300 ppc) for insertion into the A3 AutoCAD frames.

#### Illustration 1.1: 75 mm recalibration template illustration



#### 1.8.12 Final output summary

74) The following A3 figure set is provided for different types of viewpoint (based on what extent the baseline view is set to i.e. single 50 mm image or panoramic). All survey information as well as other important information is provided on figure sheets:

#### Viewpoints 5, 6, 7A and 8

- Sheet 1 = EXISTING VIEW WINTER 2021 BASELINE PANORAMIC;
- Sheet 2 = EXISTING VIEW SUMMER 2020 BASELINE PANORAMIC;
- Sheet 3 = WINTER YEAR 1 PHOTOMONTAGE LANDSCAPE CONTEXT PANORAMIC;
- Sheet 4 = SUMMER YEAR 15 PHOTOMONTAGE LANDSCAPE CONTEXT PANORAMIC;
- Sheet 5 = WINTER YEAR 1 50 mm PHOTOMONTAGE;
- Sheet 6 = SUMMER YEAR 15 50 mm PHOTOMONTAGE;
- Sheet 7 = WINTER YEAR1 75 mm PHOTOMONTAGE; and,
- Sheet 8 = SUMMER YEAR 15 75 mm PHOTOMONTAGE.

#### Viewpoints 7B, 12 and 14

- Sheet 1 = EXISTING VIEW WINTER 2021 BASELINE SINGLE 50 mm;
- Sheet 2 = EXISTING VIEW SUMMER 2020 BASELINE SINGLE 50 mm;
- Sheet 3 = WINTER YR 1 50 mm PHOTOMONTAGE;
- Sheet 4 = SUMMER YEAR 15 50 mm PHOTOMONTAGE;
- Sheet 5 = WINTER YR1 75 mm PHOTOMONTAGE; and,
- Sheet 6 = SUMMER YEAR 15 75 mm PHOTOMONTAGE.

- 75) Once each viewpoint sheet set was complete, all images were printed to a single pdf document set at high resolution and to 1:1 scale to ensure no loss of image size.
- 76) The final display of the finished photomontage figures should be printed at A3 at high resolution on a good quality printer. Custom margins of 3 mm to all edges of A3 paper (reduced from 5 mm) will be required on some printers to allow full print at a 1:1 ratio.
- 77) The recalibrated 75 mm photomontage sheets of the figure sheet set will be representative of scale and distance if viewed on site at a comfortable arm's length (approx. 500 mm) see Illustration 1.2 below.

Illustration 1.2: Illustration of site use of 75 mm recalibrated photomontage.

