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Glen Earrach Pumped Storage Hydro

Environmental Impact Assessment Report

Volume 5: Appendices
Appendix 6.1: Landscape and Visual Methodology

Glen Earrach Energy Ltd

Glen Earrach AECOM

Quality information

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Issue History

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1. Introduction

1.1.1 This section sets out the detailed methodology for the landscape and visual impact assessment (LVIA) contained in **Chapter 6: Landscape and Visual (Volume 2: Main Report).** It takes into account best practice guidance and builds on the general assessment methodology presented in **Chapter 4: Approach to EIA (Volume 2: Main Report)** and develops this to take account of the range of likely significant effects on the landscape character and visual amenity arising from the Pre-Construction and Enabling Works, and Construction and Operational phases of the Proposed Development.

1.1.2 It should be noted that the methodology for the LVIA does not use the standard significance matrix set out within **Chapter 4: Approach to EIA (Volume 2: Main Report)**, as the approach to determining significance is based on professional judgement with narrative descriptions provided.

2. Sensitivity of Landscape Receptors

2.1.1 Landscape receptors are described as components of the landscape that are likely to be affected by the Proposed Development. These can include overall character and key characteristics, individual elements or features, and specific aesthetic or perceptual aspects. It is the interaction between the different components of the Proposed Development and these landscape receptors which has potential to result in landscape effects (both adverse and beneficial).

2.1.2 The sensitivity of the landscape receptor has been derived by combining the value of the landscape (undertaken as part of the baseline study) and the susceptibility to change of the receptor to the specific type of development being assessed.

2.1.3 Landscape value is frequently addressed by reference to international, national, regional, and local designations. Absence of such a designation does not necessarily imply a lack of quality or value. Factors such as accessibility and local scarcity can render areas of nationally unremarkable quality, highly valuable as a local resource. The evaluation of landscape value considers the following factors, as outlined in the Landscape Institute's Technical Guidance Note 02/211, and classified as **very high, high, medium, low** and **very low** with evidence provided as to the basis of the evaluation:

- *"Natural heritage - Landscape with clear evidence of ecological, geological, geomorphological or physiographic interest which contribute positively to the landscape;*
- *Cultural heritage - Landscape with clear evidence of archaeological, historical or cultural interest which contribute positively to the landscape;*
- *Landscape condition - Landscape which is in a good physical state both with regard to individual elements and overall landscape structure;*
- *Associations - Landscape which is connected with notable people, events and the arts;*
- *Distinctiveness - Landscape that has a strong sense of identity;*
- *Recreational - Landscape offering recreational opportunities where experience of landscape is important;*
- *Perceptual (scenic) - Landscape that appeals to the senses, primarily the visual sense;*
- *Perceptual (wildness and tranquillity) - Landscape with a strong perceptual value notably wildness, tranquillity and/or dark skies; and*
- *Functional - Landscape which performs a clearly identifiable and valuable function, particularly in the healthy functioning of the landscape."*

[1] *Landscape Institute.* (2021). *Assessing landscape value outside national designations Technical Guidance Note 02/21* [Online]. Available: https://www.landscapeinstitute.org/publication/tgn-02-21-assessing-landscape-value-outside-national-designations/ (Accessed: 16/09/2024).

2.1.4 Landscape susceptibility relates to the ability of a particular landscape to accommodate the Proposed Development. It is assessed through consideration of the baseline characteristics of the landscape, and in particular, the scale or complexity of a given landscape. The baseline characteristic considerations include the following:

- Scale – a measure of how well a proposed development would relate to the overall scale of the landscape, landform and/or landscape features.
- Landform – the extent to which a proposed development would relate to and/or integrate with the existing landform and topographic features.
- Pattern – the extent to which a proposed development would relate to the existing landscape pattern.
- Landcover – a measure of how well the proposed development would relate to existing landcover.
- Openness/enclosure – the level of which the openness or enclosure of a landscape would influence the ability of a landscape to accommodate a proposed development.
- Landmarks – a measure of how well the proposed development would relate to existing landmark features.
- Development context – the level to which existing similar development within a landscape influences the ability to accommodate a proposed development.
- Perceptual qualities (remoteness, tranquillity, dark skies etc.) – extent to which existing perceptual qualities would influence the ability of the landscape to accommodate the proposed development.

2.1.5 The evaluation of landscape susceptibility is defined as **very high, high, medium, low** and **very low** and is supported by a clear explanation based upon the analysis of the landscape receptor and the extent to which it is able to accommodate the changes that would result from the Proposed Development.

2.1.6 The overall sensitivity assessment of the landscape receptor has been made by applying professional judgement to combine and analyse the identified value and susceptibility ratings. Overall sensitivity has been rated as **very high, high, medium, low** and **very low.**

2.1.7 **Table 2-1 Sensitivity of landscape receptors** below outlines indicators that inform landscape value, susceptibility and sensitivity. The basis of the assessment is made clear in the evaluation of each landscape receptor.

Table 2-1 Sensitivity of landscape receptors

	Higher Sensitivity Indicators	Lower Sensitivity Indicators
Value	A designated landscape (National Park, National Scenic Area, World Heritage Site) or a landscape in very good condition, exceptional scenic quality and high recreational opportunities or a high degree of rarity.	Landscapes containing few if any notable elements/ features, of poor condition or containing several detracting features and limited aesthetic qualities. Landscapes which are not formally designated.
Susceptibility	Attributes that make up the character of the landscape which offer very limited opportunities to accommodate change of the type proposed without fundamentally altering key characteristics.	Attributes that make up the character of the landscape which are tolerant of a large degree of the type of change proposed without fundamentally altering the key characteristics.

3. Sensitivity of Visual Receptors

3.1.1 Sensitivity of visual receptors has been defined through an appraisal of the viewing expectation, or value placed on the view as identified in the baseline study, and its susceptibility to change.

3.1.2 Value of the view is an appraisal of the value attached to views and is often informed by the appearance on Ordnance Survey or tourist maps and in guidebooks, literature and art, or identified in policy. Value can also be indicated by the provision of parking or services and signage and interpretation. The nature and composition of the view and its scenic quality is also an indicator. It is important to note that the absence of view recognition does not preclude local value, as a view may be important as a resource in the local or immediate environment due to

its relative rarity or local importance. The value of the view has been classified as **very high, high, medium, low** and **very low** and is supported by evidenced, professional judgements.

3.1.3 The susceptibility of visual receptors to change has been established as a function of the occupation or activity of people experiencing the view, and the extent to which their attention or interest is focussed on the view and the visual amenity they experience. For example, walkers whose interest may tend to be focused on the landscape or a particular view, or visitors at an attraction where views are an important part of the experience, indicate a higher level of susceptibility. Conversely receptors engaged in outdoor sport where views are not important or receptors at their place of work are considered less susceptible to change. The susceptibility of visual receptors is not dependent on the specific change being proposed.

3.1.4 Judgements about the susceptibility of visual receptors have been ascribed using **very high, high, medium, low** and **very low** ratings using consistent and reasoned judgements.

3.1.5 The overall sensitivity assessment of the visual receptor has been determined by applying professional judgement to combine and analyse the identified value and susceptibility ratings. Overall visual sensitivity has been rated as **very high, high, medium, low** and **very low**. **Table 3-1 Sensitivity of visual receptors** below outlines indicators that inform value of the view, susceptibility and sensitivity of visual receptors. The basis of the assessment is made clear in the evaluation of each visual receptor.

Table 3-1 Sensitivity of visual receptors

	Higher Sensitivity Indicators	Lower Sensitivity Indicators
Value	Views protected by designation, or nationally recognised, or recorded on maps/ guidebooks or with cultural associations. Views that have high scenic qualities relating to the content and composition of the view.	Views which are not documented or protected with minimal or no cultural associations. Views that exhibit low scenic qualities relating to the content and composition of the view.
Susceptibility	Viewers whose attention or interest is focused on their surroundings; Residential properties and settlements where views contribute to the landscape setting enjoyed by residents; and People engaged in outdoor recreation including users of cycle routes, recreational routes, core paths and visitors to heritage assets where views of the surroundings are an important contributor to experience.	People whose attention or interest is not focused on their surroundings and where the view is incidental to their enjoyment; People travelling more rapidly on major roads, rail or transport routes not recognised as scenic routes; People engaged in outdoor recreation which does not involve or depend upon appreciation of views of the landscape; and People at their place of work whose attention is not on their surroundings.

3.2 Landscape Magnitude of Effect

3.2.1 Landscape magnitude of effect refers to the extent to which the Proposed Development would alter the existing characteristics of the landscape. It is an expression of the size or scale of change to the landscape, the geographical extent of the area influenced, and its duration and reversibility. Notes and Clarifications on Aspects of GLVIA3 Technical Guidance Note LITGN-2024-01[2] sets out that the size/scale of effect is likely to be the most important factor with geographical extent and duration/reversibility considered as 'modifiers'. The variables involved are:

- The extent of existing landscape elements that would be lost, the proportion of the total extent that this represents and the contribution of that element to the character of the landscape;
- The extent to which aesthetic or perceptual aspects of the landscape are altered either by removal of existing components of the landscape or by the addition of new components;
- Whether the change alters the key characteristics of the landscape that are integral to its distinctive character;

[2] *Landscape Institute* (2024) *Notes and Clarifications on Aspects of Guidelines for Landscape and Visual Impact Assessment Third edition (GLVIA3) Technical Guidance Note - 2024-01.* Available at: https://www.landscapeinstitute.org/wp-content/uploads/2024/08/LITGN-2024-01-GLVIA3-NC_Aug-2024.pdf (Accessed: 16/10/2024).

- The geographic area over which the change will be experienced (for example within the application boundary, the immediate setting around that boundary, at the local landscape character area scale, or on a larger scale influencing broader areas of landscape character);
- The duration of the change (i.e., short term, medium term, or long term) and its reversibility (i.e., whether it is permanent, temporary, or partially reversible); and
- Landscape change can be both direct, through alteration of physical components, or indirect, resulting from changes to perceptual aspects of character and how it is experienced.

3.2.2 An overall assessment of the magnitude of landscape change resulting from the Proposed Development on landscape receptors has been made by combining the above judgements using evidence and professional judgement. The levels of landscape magnitude of effect are described as being **very high, high, medium, low, very low** and **none** as defined in **Table 3-2 Landscape magnitude of effect** below.

Table 3-2 Landscape magnitude of effect

Magnitude	Criteria
Very High	Substantial alteration to the landscape receptor or may impact an extensive area or unique characteristics at a local level. May be longer term, permanent or reversible.
High	Large alteration to the landscape receptor or may impact an extensive area or unique characteristics at a local level. May be longer term, permanent or reversible.
Medium	Partial alteration to the landscape receptor or may impact a wide area or characteristics at a local level. May be medium term, permanent or reversible.
Low	Slight alteration to the landscape receptor or may impact a restricted area and few key characteristics. May be short to medium term, permanent or reversible.
Very Low	Very slight alteration to the landscape receptor or may impact a limited area or no key characteristics. May be short-term, permanent or reversible.
None	No change to the landscape receptor.

3.3 Visual Magnitude of Effect

3.3.1 Visual magnitude of effect relates to the extent to which the Proposed Development would alter the existing view and is an expression of the size or scale of change in the view, the geographical extent of the area influenced and its duration and reversibility. Notes and Clarifications on Aspects of GLVIA3 Technical Guidance Note LITGN-2024-01[2] sets out that not all components of magnitude of effect are equally weighted. It is considered that the scale of change and degree of contrast are likely to be the most important factors with the nature of view, angle of the view and duration/reversibility considered as 'modifiers'. The variables involved are described below:

- The scale of the change in the view with respect to the loss or addition of features in the view and changes in its composition, including the proportion of the view occupied by the Proposed Development;
- The degree of contrast or integration of any new features or changes in the form, scale, composition and focal points of the view;
- The nature of the view of the Proposed Development in relation to the amount of time over which it will be experienced, and whether views of this will be visible fully, partially or glimpsed;
- The angle of view in relation to the main activity of the receptor, distance of the viewpoint from the Proposed Development and the extent of the area over which the changes would be visible; and
- The duration of the change (i.e., short-term, medium term, or long term), as defined in **Chapter 4: Approach to Environmental Impact Assessment (Volume 2: Main Report)**, and its reversibility (i.e., whether it is permanent, temporary, or partially reversible).

3.3.2 An overall assessment of the magnitude of visual change resulting from the Proposed Development on the visual receptor has been made combining the above judgements using evidence and professional judgement. The levels of visual magnitude of effect are described as being **very high, high, medium, low, very low** and **none** as defined in **Table 3-3 Visual magnitude of effect** below.

Table 3-3 Visual magnitude of effect

Magnitude	Criteria
Very High	A substantial change to the composition of the view or change that may be viewed in the foreground or directly. May be longer term, permanent or reversible.
High	A pronounced change to the composition of the view or change that may be viewed in the foreground or directly. May be longer term, permanent or reversible.
Medium	A noticeable change to the composition of the view or change that may be viewed in the middle ground or indirectly. May be medium term, permanent or reversible.
Low	An unobtrusive change in the composition of the view or change that may be viewed in the background or obliquely. May be short to medium term, permanent or reversible.
Very Low	A barely perceptible change in the composition of the view or change that may be viewed in the background and/or very obliquely. May be short-term, permanent or reversible.
None	No change to the view.

3.4 Duration of Change

3.4.1 For the purposes of this LVIA, the duration of change associated with the landscape and visual magnitude of effect is considered to be as follows:

- Short-term: 0-4 years;
- Medium-term: 5-10 years; and
- Long-term: 11+ years.

3.5 Significance of Effects

3.5.1 Determination of the significance of landscape and visual effects has been undertaken by employing professional judgement and experience to combine and analyse the magnitude of effect against the identified sensitivity of landscape and visual receptors.

3.5.2 The landscape assessment has taken account of direct and indirect changes to existing landscape elements, features, key characteristics and evaluates the extent to which these would be lost or modified, in the context of their importance in determining the existing baseline character.

3.5.3 The visual assessment has taken account of the likely changes to the visual composition, including the extent to which new features would distract or screen existing elements in the view or disrupt the scale, structure, or focus of the existing view.

3.5.4 The significance of landscape and visual effects are described with reference to the criteria presented in **Table 3-4 Significance of effect** below. For the purposes of this assessment, effects rated as being of **moderate or major** significance are considered to be significant.

Table 3-4 Significance of effect

Significance of Effect	Landscape	Visual
Major	Highly noticeable change affecting key characteristics of a very highly sensitive landscape, resulting in a fundamental change to its character.	Considerable change affecting a large extent of a very highly sensitive view and becoming a dominant feature.
Moderate	Noticeable change affecting some key characteristics in a highly sensitive landscape or very noticeable change in a medium sensitivity landscape, resulting in a change to the overall impression of its character.	Noticeable change affecting an important part of a highly sensitive view or a wider extent of a medium sensitivity view, becoming prominent or detracting from the existing focus.
Minor	Small change affecting few characteristics in a medium to highly sensitive landscape or noticeable change to a less sensitive landscape, resulting in a limited or localised change to the impression of its character.	Small change affecting a limited and/or unimportant part of a medium to highly sensitive view or an important part of a less sensitive view, unlikely to distract from the existing focus.

Significance of Effect	Landscape	Visual
Negligible	Very little change from baseline conditions, resulting in a barely distinguishable or indistinguishable change.	Where there is no discernible improvement or deterioration in the existing view.
No change	No alteration to any of the components that contribute to the existing landscape resource.	No change to the existing view.

4. Photomontage Methodology

4.1 Introduction

4.1.1 This document details how the AECOM Digital Media Team in Belfast prepares photomontages.

4.2 Guidelines

4.2.1 The photomontages that we prepare are based on guidance from the following publications:

- Visualisation Standards for Wind Energy Development[3];
- Visual Representation of Wind Farms Version 2.2[4].
- Visual Representation of Development Proposals Technical Guidance Note 06/19[5];
- Photography and Photomontage in Landscape and Visual Impact Assessment Advice Note 01-11[6]; and
- Guidelines for Landscape & Visual Impact Assessment (Third Edition)[7].

4.3 Site Photography

4.3.1 Viewpoint photography was captured in November 2024, December 2024, January 2025 and February 2025. The procedure for taking photography on site is described below:

- Site visits are planned around time of day and taking the weather into consideration. The photos are best taken with the sun behind the camera. This means views facing west are best taken in the morning and views facing east in the afternoon.
- Photos are taken using a full-frame format camera with a fixed 50 mm focal length mounted to a panoramic head on a steady tripod.
- The camera is levelled in both pitch and roll referencing a bubble level or electronic ‘virtual horizon’ feature in the camera.
- Camera height was 1.5 m above the ground level.
- Manual camera settings used to ensure consistent exposure across all photos taken.
- A GPS device is used to record the camera location.
- Photos are taken using a remote shutter release to eliminate any camera shake.
- Photos are taken in landscape format.
- The panoramic head is rotated to the next interval using the built-in step rotator and another photo is taken using the remote shutter release. This is repeated until a full 360-degree sweep of photos is taken.

[3] The Highland Council. (2016). Visualisation Standards for Wind Energy Development [Online]. Available: https://www.highland.gov.uk/downloads/file/12880/visualisation_standards_for_wind_energy_developments. (Accessed: 02/01/2025).
[4] Scottish Natural Heritage. (2017). Visual Representation of Wind Farms Version 2.2 [Online] Available: https://www.nature.scot/doc/visual-representation-wind-farms-guidance (Accessed: 31/10/2024).
[5] Landscape Institute. (2019). Visual Representation of Development Proposals Technical Guidance Note 06/19 [Online] Available: https://www.landscapeinstitute.org/visualisation/ (Accessed: 31/10/2024)
[6] Landscape Institute. (2011). Photography and Photomontage in Landscape and Visual Impact Assessment Advice Note 01-11 [Online] Available: https://www.landscapeinstitute.org/visualisation/photography-and-photomontage/ (Accessed: 31/10/2024)
[7] Landscape Institute and IEMA. (2013). Guidelines for Landscape & Visual Impact Assessment (Third Edition). Routledge.

4.4 Photo Stitching

4.4.1 When dealing with panoramic views the photos are loaded into specialist photo stitching software (PTGui Pro). The images are automatically corrected for lens distortion and stitched to create full 360-degree images. Adjustments can be made to manually correct the blend between images where appropriate. The resulting image is output as Spherical projection to correctly match the virtual camera to be used later in the 3D software. The software can remap images as cylindrical or planar projection in accordance with Landscape and Visual Impact Assessment (LVIA) requirements[5].

4.5 Camera Matching

4.5.1 A virtual camera is positioned in the 3D software (Autodesk 3ds Max) according to the same real-world position and height as per the GPS data. This camera is set-up with the stitched panorama photography. The stitched image loaded as the camera back plate.

4.5.2 The camera target is aligned to match existing elements visible in the photograph. For the Proposed Development, Ordnance Survey Terrain 5m data is used to match features in the photography.

4.6 3D Modelling

4.6.1 The daylight settings in the scene are matched to the time and location of the original photography.

4.6.2 We check that the CAD data provided by the design team is georeferenced and how the proposed model elements sit with the existing data. Once checked, a 3D computer model is developed using Autodesk 3ds Max. This includes model elements for the Headpond, Lower Control Works, access tracks and tunnel portals as well as accurate planting for Year 1 and Year 15 to achieve a realistic representation of the proposals. The 3D model for the Proposed Development has potential limitations. The design is at an early stage, hence (1) no design for cut/fill yet, so a flat level for each permanent compound was assumed from the middle contour of where it sits on; (2) no detailed design for the tunnel portals yet, so typical models with provided dimensions were used to illustrate them; (3) the GIS Switchyard has been represented by blocks, design effort is planned to improve the integration of these features into the landscape, external switchgear equipment within the GIS compound is not yet designed, and therefore not shown, but would be lower profile than the buildings..

4.7 Post-Production

4.7.1 The virtual camera views are rendered and composited into the background photography using Adobe Photoshop. The images are adjusted to mask the correct parts of the render behind existing elements in the photography. Proposed mitigation is added as per landscape design drawings and planting information. A wireline version can also be produced to illustrate how the scheme is sited in the bare-earth terrain.

4.8 Presentation

4.8.1 The photomontages and wireframes have been presented as two sets of layouts. One is using the Scottish Natural Heritage (now NatureScot) Visual Representation of Wind Farms Guidance. The other is using The Highland Council Guidelines (Visualisation Standards for Wind Energy Developments).

4.8.2 For the NatureScot page layouts, a 90 degree cylindrical image showing the original photography is presented alongside a wireline showing the extent of the Proposed Development within the context of the existing landscape. Subsequent pages show planar 53.5 degree images which are more closely focussed on the site. Photomontages are thus presented at this size showing both the Year 1 and Year 15 versions.

4.8.3 For The Highland Council page layouts, 65.5 degree planar photomontages showing both Year 1 and Year 15 are presented. The original photography is shown alongside a wireline illustrating the extent of the Proposed Development within the context of the existing landscape. Single frame images are also presented (both Year 1 and Year 15) for each viewpoint using a single 50mm frame, and the equivalent 75 mm crop of the 50mm single frame. A viewpoint map is also included, which illustrates the different fields of view used for the page layouts.

4.9 Planting Heights

4.9.1 At year 1 of operation, the proposed mitigation planting is assumed to be whips. The following heights have been used for the year 15 operational visualisations when the planting is assumed to have matured:

- Woodland: Between 5-10 m with some outliers at 3 m and 16.5 m;
- Wet Woodland: Majority at 5.5 m with occasional trees at 10 m;
- Dwarf Birch / Juniper / Scots Pine: Mix between 1-3 m in patches; and
- Montane Willow Scrub: Sparsely located up to 1 m.

4.9.2 It should be noted that these year 15 planting heights have been estimated using median values for UK forestry general yield class data from the Forestry Commission and informed qualitatively by existing tree species on the Development Site. This takes into account the stunted growth of some species, including the montane willow scrub, due to the proximity to the tree line.

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