Scottish & Southern Electricity Networks

TRANSMISSION

Spittal to Loch Buidhe to Beauly 400 kV OHL Connection

Environmental Impact Assessment

Volume 5 | Technical Appendix

Appendix 7.3 | Technical Methodologies for Visual Representation

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Scottish & Southern Electricity Networks
TRANSMISSION

VOLUME 5: APPENDIX 7.3 TECHNICAL METHODOLOGIES FOR VISUAL REPRESENTATION

1. TECHNICAL METHODOLOGIES FOR VISUAL REPRESENTATION

1.1 Introduction

1.1.1 This appendix provides details of the methodologies adopted in the production of the Zone of Theoretical Visibility (ZTV) mapping and the visualisations supporting the Landscape and Visual Impact Assessment (LVIA).

1.1.2 In preparing the visualisations, two formats have been applied in response to the Scoping Response provided by The Highland Council (THC). THC requested that visualisations be prepared to both The Highland Council's Standards and to NatureScot's guidance i.e.:

- The Highland Council, (2016), Visualisation Standards for Wind Energy Developments[1]; and
- NatureScot (2017), Visual Representation of Wind Farms (Version 2.2)[2].

1.1.3 While both documents primarily relate to the visual representation of wind energy developments, the key principles provided within the Standards and the guidance relating to the representation of the Proposed Development and the presentation of the visualisations have been applied. The approach to the production of the visualisations has also drawn from the guidance provided in the Landscape Institute's Technical Guidance Note TGN 06/19 Visual Representation of Development Proposals[3]. The Technical Note acknowledges the limitations of two-dimensional visualisations and asserts that:

"Two-dimensional visualisations, however detailed and sophisticated, can never fully substitute what people would see in reality. They should, therefore, be considered an approximation of the three-dimensional visual experiences that an observer might receive in the field."

1.1.4 Limitations in the use of visualisations are also acknowledged by NatureScot's guidance, and the Visual Representation of Wind Farms notes that:

"*visualisations, whether they are hand drawn sketches, photographs or photomontages, can never exactly match what is experienced in reality. They should, however, provide a representation of the proposal that is accurate enough for the potential impacts to be fully understood."*

1.1.5 and that:

"*visualisations in themselves can never provide the full picture in term of potential impacts; they only inform the appraisal process by which judgements are made."*

1.1.6 In this regard, while every effort has been made to provide a reasonable representation of the Proposed Development in the visualisations such that assessors, consultees and members of the public can understand the likely landscape and visual change associated with the Proposed Development, and can assist with decision making, the visuals are only an approximation of what people may experience in the field.

1.1.7 Details of how the visualisations have been prepared in addition to the ZTV mapping are provided in the following sections.

[1] The Highland Council (2016), Visualisation Standards for Wind Energy Developments
[2] NatureScot (2017), Visual Representation of Wind Farms (Version 2.2)
[3] Landscape Institute (2019), TGN 06/19 Visual Representation of Development Proposals

1.2 Zone of Theoretical Visibility Mapping

1.2.1 ZTV mapping has been prepared using Esri's ArcGIS software and Ordnance Survey's (OS) Terrain 5 Digital Terrain Model (DTM) to illustrate the potential/theoretical visibility of the proposed towers.

1.2.2 The Terrain 5 DTM is a grid of heightened points with regular five metre spacing. The GIS software has used this information to create a virtual, three-dimensional, bare-ground model which is representative of the earth's surface surrounding the Proposed Development. The DTM does not however take into account elements above the ground such as buildings, walls, trees or minor variations in landform which may influence visibility. Therefore, while the ZTV indicates areas of potential visibility of the Proposed Development, in reality, not all locations within the ZTV would necessarily experience views of the Proposed Development. Nevertheless, the ZTV is a valuable tool in both landscape character and visual impact assessment.

1.2.3 The ZTVs have been run using the designed heights for each tower, as identified in the Tower Schedules (refer to **Volume 5, Appendix 3.1: Indicative Tower Schedule**). The ZTVs have also been prepared based on a viewer height of 2 m above ground level in line with the NatureScot 2017 Guidance (which results in greater potential visibility in comparison to a 1.5 m viewer height typically used for visualisations), and account for earth curvature and atmospheric light refraction. The ZTVs are provided in **Volume 3, Figure 7.1**.

1.3 Photography

1.3.1 The photography has been captured through the use of a modern, full frame sensor (equivalent to a 35mm film frame), digital single lens reflex (DSLR) camera. The details of the camera and lens used for each viewpoint location are included on the relevant photograph or photomontage figure.

1.3.2 All photography was captured with a lens fitted with a polarising filter and/or neutral gradient filter where appropriate to maximise the quality of light balance and photography at source and minimise the need for computer enhancement/post-processing.

1.3.3 The baseline photographs were taken in landscape and/or portrait format by a camera attached to a tripod and rotating panoramic head unit (set to 20° intervals) with a levelling base in order to maintain a stable platform for photography work, and to ensure an even overlap for successive panorama images. The camera was mounted at a height of 1.5 m above ground level.

1.3.4 For each viewpoint location a global positioning system (GPS) navigation device was used to ascertain the location of the camera and tripod The GPS device identified the location of the equipment, to the nearest metre. All GPS readings taken were to a maximum of ±5 m accuracy. The recorded location of where the photograph was taken was later corroborated through the use of online aerial imagery where this was possible.

1.3.5 While at the viewpoint location, the photographer recorded the grid reference, ground level and camera viewing height along with a brief description of the nature of view, weather conditions and visibility. The camera embeds details of the date, time, camera make and model, the lens focal length, shutter speed, f-number and ISO speed rating as metadata in each photograph file. A photograph of the tripod position was also taken.

1.3.6 Baseline photographs were then downloaded and combined to create 360° baseline panoramic images in cylindrical projection using PTGui software. Where applicable these were converted to planar projection using Hugin – Panorama Stitcher software (Hugin). All single frame images conform to the fields of view characteristic of the lenses they represent (50 mm or 75 mm).

1.4 Wireline Visualisations

1.4.1 Wirelines of the Proposed Development towers as required, were created for all VLs using 3ds Max with specific tower models provided by the client and Terrain 5 DTM. Where appropriate, wirelines were converted to planar projection using Hugin.

1.4.2 The extent of the wirelines is limited to that included within the 3d model. For this reason, where a very extensive view is obtained, the full backdrop and horizon line visible in photographs is not always represented in the wireline view. Wirelines should therefore always be viewed in combination with baseline photographs and/or photomontages.

1.4.3 Similar to the limitations of the ZTVs, the wireline visualisations provide an indication of the Proposed Development's potential appearance but do not take account of screening elements such as buildings, trees or minor variations in landform.

1.5 Photomontage Preparation

1.5.1 The photomontage visualisations have been created using the wirelines and baseline photography. The towers and ancillary infrastructure have been rendered in 3ds Max and exported to Adobe Photoshop, using the wireline to position these accurately into the photograph. Tracks and forestry felling were added where these would be visible using 3d georeferenced models which accurately places these features in the view relative to the camera position and manually rendered into the image using Photoshop. Final touch-up rendering to create a realistic image was applied in Photoshop.

1.6 Viewing

1.6.1 The visualisations supporting the LVIA are for illustrative purposes only and should not be considered completely representative of what the human eye will see. As indicated in Section 1.1, while visualisations can provide a reasonable impression of the scale and distance to the Proposed Development, they cannot show exactly what they will look like in reality. This is due to various factors, including the resolution of the image; and the static nature of visualisations which cannot convey movement of changing light/shadows, weather and seasonality etc. As such, visualisations should be viewed at the viewpoint location where the viewer can appreciate the wider context.

1.6.2 All visualisations, whether prepared in accordance with NatureScot guidance or THC standards should be printed at the specified size and viewed flat at a comfortable arm's length. Where the visualisations are viewed on a computer screen, rather than printed at the specified size, they should be enlarged to the full screen height in order to provide a more realistic impression of the scale of the Proposed Development. The use of devices with smaller screens, such as mobile phones and tablets for viewing the visualisations is not recommended.

1.6.3 It should be noted that, the THC Guidance 75 mm focal length photomontage and the NatureScot, Guidance 53.5° field of view images, when printed at the correct size, illustrate an image greater than actual size if held at a comfortable arm's length. This 'enlargement' is intended to counteract the effects of a loss of relative perspective when viewing a flat image.

1.6.4 It is important to note that these visualisations are provided for illustrative purposes to support the LVIA and are presented in a format to conform with the NatureScot guidance and THC's Standards. Whilst the visualisations provide a helpful tool for assessment purposes, the judgements of landscape and visual effects reported in the LVIA are not reached wholly on the basis of these images, but through the landscape architect's professional experience and understanding of how the Proposed Development would appear in the field.