SHEIRDRIM RENEWABLE ENERGY DEVELOPMENT

Technical Appendix 7.2: LVIA Visualisation Methodology

Prepared for: ScottishPower Renewables UK Ltd

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BASIS OF REPORT

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1.0 INTRODUCTION

This Appendix sets out the methodologies used to prepare the figures which support the LVIA. The LVIA is contained in Chapter 7 of the Environmental Impact Assessment (EIA) report and the supporting figures are contained in Volume 3a Figures and Volume 3b, 3C and 3d LVIA Visualisations.

Zones of Theoretical Visibility (ZTV) and Photomontages for the project have been prepared in accordance with the accepted methodologies included in the following guidance documents:

- Landscape Institute Technical Guidance Note 06/19: Visual representation of development proposals issued September 2019;
- Scottish Natural Heritage (SNH): Visual Representation of Wind Farms, Version 2.2 issued February 2017; and
- Guidelines for Landscape and Visual Impact Assessment (Landscape Institute and Institute of Environmental Management and Assessment) 3rd Edition 2013.

2.0 ZTV METHODOLOGY

A ZTV, sometimes known as a Zone of Visual Influence (ZVI), is used to identify the theoretical visibility of a windfarm development. It is a computer-generated analysis which evaluates visibility using the height and extent of a proposed development against a Digital Terrain Model (DTM).

SLR use ESRI ArcGIS 10.5.1 to produce ZTVs as it is an industry recognised software package designed to perform this type of analysis.

Wind farm layouts are input to ArcGIS and the correct turbine dimensions assigned. The ZTVs are then run using a combination of OS Terrain 50 and Terrain 5 height data as a terrain base. The observer height is set to 2 m above ground level and the Earth's curvature (radius = 6370km) and atmospheric refraction (refraction coefficient = 0.075) is applied.

The completed ZTV is then presented in a title block in ArcGIS.

Software used to generate ZTVs:

- ArcGIS 10.5.1.

Data used to generate ZTVs:

- Ordnance Survey (OS) Terrain 50 and Terrain 5 height data; and
- Turbine co-ordinates and dimensions.

The ZTV analysis does not take into account the screening effects of vegetation, buildings or other surface features.

3.0 PHOTOGRAPHY AND STITCHING PANORAMAS

The following is a step by step guide on how SLR Consulting produces photomontages for Landscape and Visual Impact Assessments.

At each viewpoint location a series of high-resolution photographs are taken by a professional, experienced in viewpoint photography, and using a digital Single Lens Reflex (SLR) camera with a full frame sensor. A 50 mm fixed focal length lens is used to reduce inaccuracies and enable verification.

At each viewpoint location, the camera is mounted on a levelled tripod with a calibrated panoramic head which, in accordance to SNH 2017 guidance (Ref 7.1.1), is set to a height of 1.5 m (accommodating adjustments made to allow for uneven ground). Single frame photographs are then taken every 20 degrees to form a complete 360-degree view from the viewpoint. Photography is taken in landscape format, unless a vertical format is required. Each single frame photograph has a horizontal field of view of approximately 39.6 degrees. Taking photographs every 20 degrees provides enough overlap between the frames to achieve an accurately stitched panorama. When appropriate, two to three sets of 360-degree sweeps are taken in differing lighting conditions to ensure the photographs have the best possible clarity.

The location of the tripod is recorded via a hand-held GPS device and a photograph of the tripod in situ is taken. If necessary, this allows a viewpoint to be revisited at a later date with the required level of accuracy.

Upon receipt of the photographs by the SLR visualisation team, photograph metadata is checked to ensure that they are taken correctly and that they comply with accepted best practice.

Each set of viewpoint photographs is reviewed, and the best representative 360-degree sweep selected for stitching as a panorama. Individual frames are then manually aligned, and the stitching software is used to create a 360 degree cylindrically projected panorama. The stitching is completed using PT Gui Pro 11.18 which is an industry recognised photo stitching software package.

The stitched panoramas are reviewed for any anomalies generated in the stitching process and reworked where necessary. The suitability of lighting and clarity of view are then checked; any minimal enhancement to the exposure/sharpness of the panoramas is carried out to achieve the clearest possible view of the proposed Development.

The panoramas are resized to the correct dimensions as described in the SNH 2017 guidance (Ref 7.1.1).

4.0 PRODUCTION OF A COMPUTER MODEL

A 3D model is created within ReSoft WindFarm v4.2.5.2 by loading in OS Terrain 5 data, the positions of any turbines at their designated co-ordinates, viewpoint locations at their GPS co-ordinates and any points that have been surveyed to assist with the accurate positioning of the turbines within the photomontage.

An additional computer model is created within Autodesk InfraWorks from the same data used to create the ReSoft WindFarm model for modelling the Site infrastructure.

5.0 WIRELINES

Once the processes above are complete then wireline views are generated in the Photomontage module of ReSoft WindFarm using the GPS coordinates for the viewpoint.

The wirelines are then exported for insertion into the title blocks.

6.0 PHOTOMONTAGE

Once the processes above are complete then the panoramas can be taken into the Photomontage module in ReSoft WindFarm and aligned with the wireline using the associated viewpoint coordinates, view direction and pitch angle.

Once the photograph is aligned with the wireline, the turbines are lit according to the weather conditions and the time of day/year, rendered to the image and exported.

The draft photomontage is then taken into Photoshop and made to look as if the turbines were in the view.

To photomontage the Site infrastructure and tree felling, a 3D model of the development is created within Autodesk InfraWorks. The tracks, crane hardstandings, earthworks, areas of tree felling and other associated infrastructure are modelled in and rendered accordingly.

Raster outputs are then generated from each of the viewpoints where there is visibility and taken over to Photoshop for alignment and rendering onto the panorama.

If single frame views are required then these are extracted from the panoramic photomontage as described in the SNH 2017 guidance (Ref 7.1.1).

7.0 FIGURE PRODUCTION

Once all the outputs have been prepared, they are then aligned, positioned and cropped into the relevant title block in Adobe InDesign.

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EUROPEAN OFFICES

United Kingdom

AYLESBURY
T: +44 (0)1844 337380

BELFAST
T: +44 (0)28 9073 2493

BRADFORD-ON-AVON
T: +44 (0)1225 309400

BRISTOL
T: +44 (0)117 906 4280

CAMBRIDGE
T: + 44 (0)1223 813805

CARDIFF
T: +44 (0)29 2049 1010

CHELMSFORD
T: +44 (0)1245 392170

EDINBURGH
T: +44 (0)131 335 6830

EXETER
T: + 44 (0)1392 490152

GLASGOW
T: +44 (0)141 353 5037

GUILDFORD
T: +44 (0)1483 889800

LEEDS
T: +44 (0)113 258 0650

LONDON
T: +44 (0)203 805 6418

MAIDSTONE
T: +44 (0)1622 609242

MANCHESTER
T: +44 (0)161 872 7564

NEWCASTLE UPON TYNE
T: +44 (0)191 261 1966

NOTTINGHAM
T: +44 (0)115 964 7280

SHEFFIELD
T: +44 (0)114 245 5153

SHREWSBURY
T: +44 (0)1743 23 9250

STIRLING
T: +44 (0)1786 239900

WORCESTER
T: +44 (0)1905 751310

Ireland

DUBLIN
T: + 353 (0)1 296 4667

France

GRENOBLE
T: +33 (0)6 23 37 14 14

www.slrconsulting.com