MSENVIRONMENTAL

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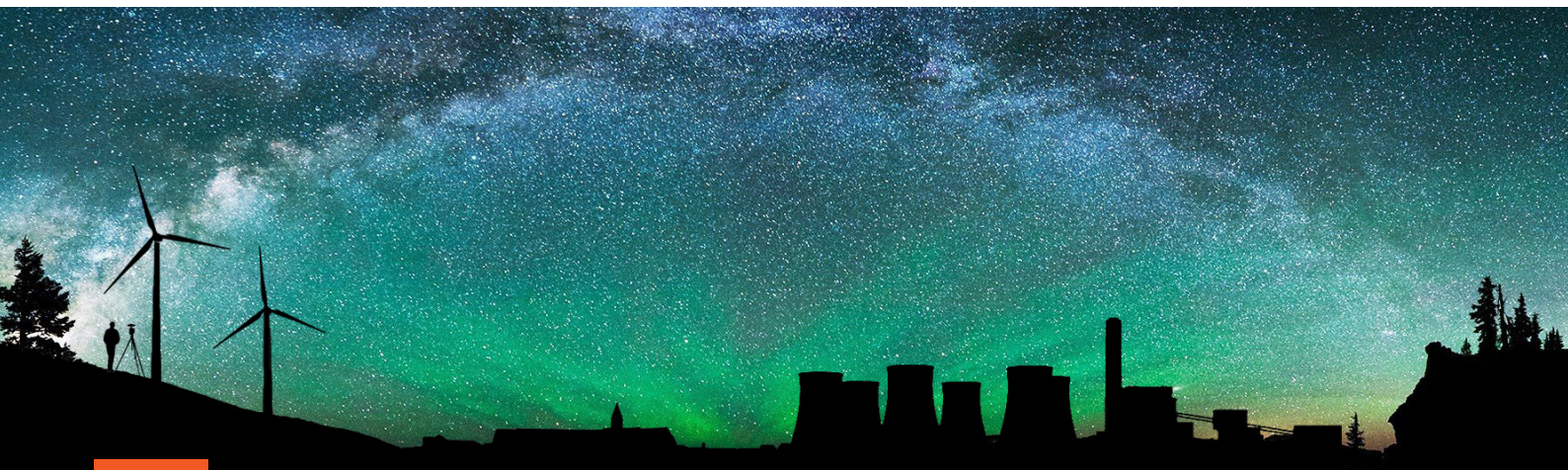
Technical Photography,
3D Modelling and Visualisations

Technical Methodology

Wandy Law Wind Farm
Ros Castle Viewpoint

December 2017



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Landscape Institute Registered Practice

IEMA

Introduction

Mike Spence BA (Hons), MLD, CMLI, REIA, FRGS is one of the UK's leading independant exponents of technical photography and visualisations. Since 2013 Mike has been a technical advisor to the Landscape Institute on 'photography and photomontage in landscape and visual impact assessment', and has been undertaking this work for over 20 years. He is one of the main authors of the forthcoming update to Advice Note 01/11 and provided technical support to Scottish Natural Heritage on their windfarm visualisation guidance. His background as a Chartered Landscape Architect, Registered EIA Practitioner and Fellow of the Royal Geographic Society working on strategic infrastructure projects such as Crossrail, multiple power station schemes (biomass and CCGT), SNH's windfarm visualisation guidance and major housing development, has meant that the accuracy of the visualisation work is paramount, and technical photography, together with extensive surveying experience and detailed 3D modelling using real world co-ordinates ensures that the visualisations produced follow a clear and transparent methodology to ensure they are as accurate as possible.

Recent projects include the White Rose Carbon Capture project for Capture Power, Drax and ERM, Oxford University Science Park at Harwell for Exterior Architecture and Scarp Landscape, small scale windfarm development visualisations for Scottish Natural Heritage, multiple Public Inquiry reviews for Capita as well as hydro-electric projects for Dulas/RWE. Mike's work and objective technical checks have been used at numerous Public Inquiries and Planning Hearings, on behalf of both local authorities and developers.

In November 2017 Mike undertook some photography and visualisation research to inform developing understanding of viewpoint photography and the preparation of visualisations.

Verified Photography and 3D Modelling

The photographs were taken with a full frame camera (Canon EOS 5D Mark III) and 50mm lens combination consistent with Landscape Institute's Advice Note 01/11, GLVIA3 and the emerging understanding of the requirement for technical photography for visualisation work.

As part of the work a single view from South Road was identified. The viewpoint was visited on 11November 2017. The weather was excellent with clear visibility.

Technical Photography

The camera was mounted on a Manfrotto 303 SPH panoramic tripod head, levelled using a Manfrotto Leveller, supported on a Manfrotto Tripod. The tripod head was levelled using a spirit level, to avoid pitch and roll. The camera was set with the centre of the lens 1.65m above ground level, which is equivalent to the eye level of an average person standing 5' 9". Photographs were taken in Manual mode with an aperture of f8 a and a fixed focal length throughout. The panoramic tripod head was set with increments of 20 degrees between photographs, to give approximately 50% overlap. Photographs were taken in landscape format. From each photograph location a full 360 degree field of view was taken centred around a nodal point. The nodal point was set to avoid any problems of foreground parallax. A Sigma 50mm f1,4 lens was used for all viewpoint photographs.

From the viewpoint a 360 degree panorama using 18 images (in landscape orientation) were cylindrically corrected and stitched together. This allowed an accurate cylindrical view to be extracted from the full panorama.

Technical information for the camera location is provided in Appendix 1. The full results can be viewed with the on-line viewer at: **www.msenvironmental.co.uk/wandylaw.html**

Surveying

The position of each camera location was surveyed using Spectra Precision GNSS/RTK equipment which gves an accuracy down to 1cm in eastings, northings and height (metres Above Ordnance Datum). The equipment used was Spectra Precision SP80 GNSS smart antennae with Mobile Mapper 20 data recorder. Real Time Kinematic corrections were carried out which allowed cm accuracy for the camera location. Points were saved using DigiTerra software. A photograph of the camera location was taken, and shown in Appendix 1.

3D Modelling

MSEnvironmental constructed a geo-referenced 3D site model using Ordnance Survey Terrain 5 DTM data. The 3D model was constructed using information contained with the Wand Law Environmental Statement. The turbine models were inserted into the detailed site landform model using geo-referenced aerial photography.

Target points were taken from the existing features in the view, together with Ordnance Suvey DTM and DSM data, and built into the 3D model. This allowed the horizontal and vertical alignment of the photograph and 3D model to be checked and cross-referenced.

Cylindrical renders were exported from the 3D modelling software and used to overlay the cylindrical panorama. Target points from both the photograph and the model view were aligned to ensure a precise fit between the two images.

The results are presented as a sequence of visualisations as follows:

1. *Existing View single frame image (A3 acetate)*
2. *Baseline Photograph and wireline (3D Model) 90 degree view (A1 wide x A4 high on paper)*
3. *Wireline (3D model View) 53.5 degree view (A1 wide x A4 high on paper)*
4. *Wireline (3D model View) - Photograph Overlay 53.5 degree view (A1 wide x A4 high on paper)*
5. *Photomontage 53.5 degree view cylindrical (A1 wide x A4 high on paper)*
6. *Photomontage 65mm focal length single frame image planar (A3 on paper)*
7. *Photomontage 65mm focal length single frame image cylindrical (A3 on paper)*

Viewing Printed Images

The visualisations have been prepared to be printed at either A3 or A1 wide by A4 high. The visualisations have been produced both in planar (A3) and cylindrical projection(A1 wide). This means that to view these correctly the A3 prints should be held flat and viewed through one eye. For the A1 wide prints these should be held in an arc, As a result, when viewed on site with one eye all visual elements in the view will correctly align with the printed visualisations.

Summary

This work has been undertaken partly in accordance with best practice (Scottish Natural Heritage Visual Representation of Wind Farms Good Practice Guidance v2.1), but also following developing understanding how the human eyes perceive images. An A3 acetate is included with a 50mm effective focal length.

The photography and surveying has been undertaken in a robust manner, using professional full frame sensor DSLR and 50mm lens with panoramic head and tripod. The camera position has been surveyed using highly accurate GNSS/RTK equipment. The resultant visualisations are therefore highly accurate

The photography, surveying and 3D modelling have followed a transparent methodology, and the resultant visualisations are considered robust and fit for purpose to illustrate the likely positioning, scale and massing of the proposed development.

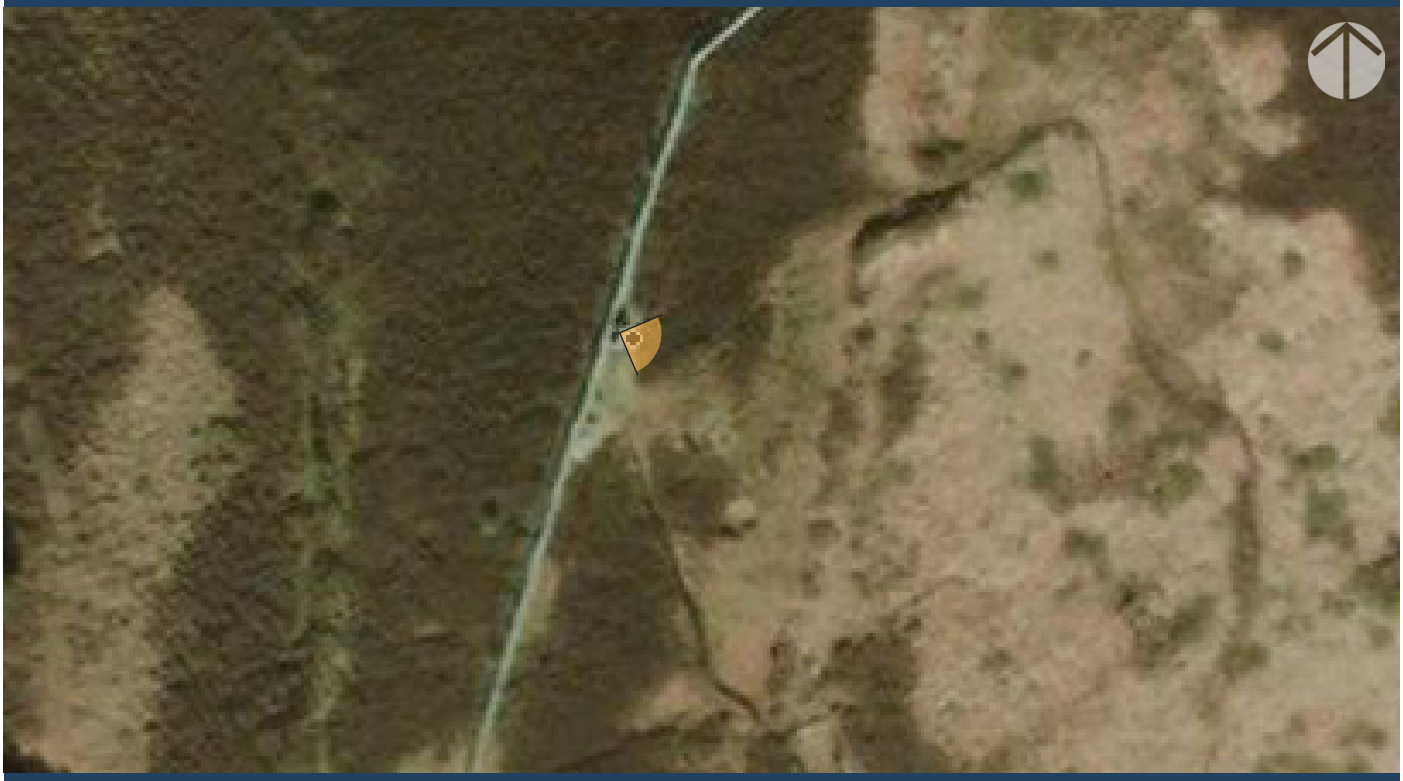
M.A.Spence BA(Hons), MLD, CMLI, REIA, FRGS 10 December 2017
Principal, MSEnvironmental

Appendix 1: Camera/Tripod Locations

The following photographs with accompanying maps and grid co-ordinates illustrate precisely where the phorographs were taken from. This would allow anyone to visit the camera location and gain the same view as that used for the visualisations:

Viewpoint Locations

Viewpoint 1



Panorama

Camera Location

GNSS/RTK Sensor Position:
408113.97E)
625337.21(N)

315.24AOD (Sensor Height)
Accuracy 5cm

Date/Time of Photography:
11 November 2017/15:05

Camera Equipment
Canon Eos 5D Mark III & 50mm Lens

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Appendix 2: Layout Information used for 3D Model