Viewpoint 01D (looking west) - Existing View

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Viewpoint 01D (looking west) (TGN 06/19 Type 3 Image (Option 1, A1 Width, Enlargement (to FFS/50mm) 96%), Level 3 (AVR3))
See Photomontage Technical Report for Location Data

Note: This is a composite image made up of 50mm photographs joined together horizontally (by means of cylindrical projection) to form an overall field of view which is wider than that seen in detail by the human eye. For correct perspective viewing, this page should be viewed at comfortable arm's length when printed at full size (297mm x 841mm).

Date:	15 November 2024
Drawing Number:	D6783/01a
Drawn by:	AP
Checked by:	MP

Project title:	**Fillongley Solar Farm**
Client:	
Drawing Title:	**Viewpoint 01D (looking west) - Existing**

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Drawn by:	AP
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Project title:	Fillongley Solar Farm
Client:	
Drawing Title:	Viewpoint 01D (looking west) - Proposed at Year 01

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Drawn by:	AP
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Project title:	**Fillongley Solar Farm**
Client:	
Drawing Title:	**Viewpoint 01D (looking west) - Proposed at Year 15**

Viewpoint 02 (looking east) - Existing View

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Viewpoint 02 (looking east) (TGN 06/19 Type 3 Image (Option 1, A1 Width, Enlargement (to FFS/50mm) 96%), Level 3 (AVR3))
See Photomontage Technical Report for Location Data
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Date:	15 November 2024
Drawing Number:	D6783/01a
Drawn by:	AP
Checked by:	MP

Project title:	Fillongley Solar Farm
Client:	
Drawing Title:	Viewpoint 02 (looking east) - Existing

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Viewpoint 02 (looking east) (TGN 06/19 Type 3 Image (Option 1, A1 Width, Enlargement (to FFS/50mm) 96%), Level 3 (AVR3))
See Photomontage Technical Report for Location Data

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Date:	15 November 2024
Drawing Number:	D6783/01a
Drawn by:	AP
Checked by:	MP

Project title:	**Fillongley Solar Farm**
Client:	
Drawing Title:	**Viewpoint 02 (looking east) - Proposed at Year 01**

Viewpoint 02 (looking east) - Proposed at Year 15

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Checked by:	MP
Project title:	**Fillongley Solar Farm**
Client:	
Drawing Title:	**Viewpoint 02 (looking east) - Proposed at Year 15**

Fillongley Solar Farm

Accurate Visual Representations Technical Report

November 2024

troopers hill

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Overview
The process of generating verified views (also referred to as accurate visual representations (AVR)) for a proposed development at Fillongley Solar Farm was carried out by Andy Maw Design Limited (AMD) and Troopers Hill Limited (THL).

High quality/resolution photographs were taken from the agreed locations by Troopers Hill. An adequate number of visible features were subsequently surveyed, including the precise location and bearing of the camera. A geo-referenced development model was constructed to OSGB36 coordinates. With a known camera position and orientation, photographic and surveyed existing visible features, the development model was accurately aligned to the photograph.

The AVRs produced have an estimated accuracy tolerance of +/-10cm.

The pages in this document should be printed at their intended size and not be scaled to fit smaller page sizes. Technical Methodology pages should be printed on A3 landscape paper (297mmx420mm), and the existing / proposed panoramic visualisations should be printed on 297mmx841mm paper.

The panoramic visualisations presented are cylindrically projected and for correct perspective viewing should be viewed at comfortable arm's length.

Site visit
AMD visited the site on the 12th November 2024 to obtain viewpoint photography. The view positions were marked with paint and documented using photography of the exact positions. A survey was also performed on the same visit to record the precise co-ordinates of camera and control points.

Technical Methodology
This section explains the processes involved in the preparation of Accurate Visual Representations (AVR).

Standards
The visualisations produced comply with relevant sections of the following guidance:

1. The Landscape Institute/IEMA Guidelines for Landscape and Visual Impact Assessment (3rd edition 2013);
2. The Landscape Institute TGN 06/19 Visual representation of development proposals
3. The SPG London View Management Framework (LVMF) (March 2012).

Preparation
Following a formal instruction from the client, the scope of the project was agreed. The client identified a number of viewpoints and supplied a map of required view locations.

Focal length, image format, required content and context and AVR level was agreed prior to the site visit. The photographer was familiar with the scope of the project and read any relevant information that was made available by the client.

Photography
The site visit was done on 12th November 2024 and consideration was made to:
1. Forecast weather conditions
2. Shot itinerary based on sun position/time of day
3. Access / distance to site / duration of journey to site and required time on site
4. Suitable parking

Equipment used:
1. Camera, in working order with charged batteries (Canon EOS 5D mkiv)
2. Empty CF cards, at least 3x32Gb cards and 128Gb across additional cards in various capacities in case of failure
3. Battery charger
4. 50mm lens (Canon EF 50mm f/1.2L)
5. Lens cloth
6. Remote cabled shutter release
7. Tripod with indexed/panoramic head (Manfrotto 303)
8. Tripod head levelling base (Manfrotto 438)
9. Small magnetic spirit level
10. Plumb bob
11. Spray paint (upside down street marking paint)
12. Hilti nails / pegs and hammer
13. Tape measure

Lens Selection Criteria
In order to capture the whole site and appropriate and relevant context, it was agreed that a 50mm lens should be used in combination with a panoramic tripod head. A series of shots were taken (with the camera in portrait orientation) to form panoramic photographs for each view location.

With reference to the Landscape Institute TGN 06/19, the views have been prepared to conform to Type 3, Option 1, Panoramic Images (intended to be presented at A1 width)

On site procedure
1. Based on the order of viewpoints on the itinerary, each view location was visited. The tripod was erected and camera attached, along with the 50mm lens, shutter release, spirit level and plumb bob. The bob was hung from the bottom of central tripod assembly after a nodal point adjustment had been made.
2. The height of the lens' central axis above ground level was measured and set to 1.6m using the tape measure.
3. A spray paint mark was used directly below the plumb bob to mark the location for the surveyor to measure.
4. Using a camera phone 4 shots (n,e,s,w) were taken of the assembled tripod, camera and bob in situ over the marker. A shot of the marker was also captured.
5. The following camera settings were used:

- Manual 'M' mode
- Bracket set to +/- 0.75 stops
- Aperture at f8 to ensure wide depth of field and minimal diffraction.
- ISO <100
- Auto White Balance (AWB)
- Evaluative metering
- RAW capture only to avoid loss of dynamic range and image quality degradation associated with 8bit jpeg format
- Enabled highlight warning
- Check that TS-E lens is not 'tilted' or shifted if in use
- Used 'Live View' and zoom function to fix and verifiy focus on the site, This also enables 'mirror lockup' and therefore less camera shake.
- Evaluative metering.

Panoramic Shots:
1. A sufficient horizontal field of view was determined to include the site and sufficient relevant context, vertical field of view was also considered based on height of the proposals and proximity to the site - the views were very close to the site, so the camera was set in portrait orientation.
2. The tripod was levelled using the tripod mounted level. Following this the panoramic tripod head was levelled using the levelling base. The levelling base was microadjusted by partially engaging the clamp. Using the digital level built in to the camera, pitch and yaw angles were adjusted to achieve level. Levels were checked at the mid point and each end of the panorama. A trial sweep of the panorama was performed while checking the digital level to ensure a perfectly level set of shots.
3. A minimum of 50% shot overlap must was achieved with the camera in portrait orientation. The panoramic tripod head assembly was adjusted to rotate incrementally at approximately 50% of the total horizontal field of view of the selected lens with the camera is in portrait orientation.
4. The panoramic tripod head was adjusted to centre the lens nodal point to the rotational axis of the tripod. It was important to ensure this is set to the correct measurement in order to avoid parallax.
5. With the camera centred on the site, 'live view' and x10 magnification was enabled and an appropriate point was identified to focus on.
6. Once focused, and accounting for conditions, the correct exposure was achieved by adjusting the shutter speed.
7. The panorama was shot from left to right, taking three bracketed shots per rotational increment, through the panorama attempting where possible to avoid cars and any other moving objects.
8. Shots were previewed to check the quality, focus, highlight warning and histogram for the shots to ensure that a well exposed usable set of photographs had been captured.
9. ETR (expose to the right) method was used to achieve noise free shots - using the histogram and bracketing the shutter speed was adjusted to achieve an over exposed (but not clipped) +0.75 bracket shot.

Photography Post Processing
RAW files were processed in Adobe Camera Raw after shot approval in Adobe Bridge. The processed RAW files were then taken into Adobe Photoshop to be stitched and saved as full resolution TIF files. The process was as follows:
Downloading and Reviewing:
1. Downloaded *.CR2 RAW files from CF card using a CF card reader. The files were saved to the appropriate project folder on the network.
2. The tripod and marker shots were downloaded to the same location and deposited in a 'documentation' folder.
3. Shots were reviewed with Adobe Bridge, and selections were made based on sharpness, composition, suitability for stitching and exposure.

Processing:
4. Using Adobe Camera Raw, simple and standard digital photo processing techniques were applied ie sharpening, noise reduction and chromatic aberration correction. Settings were adjusted as necessary to achieve the best exposure, shadow detail and clarity.
5. Using Adobe Bridge, the processed RAW files were stitched to form a panorama of cylindrical projection.
6. The completed panorama was saved as a DNG file and subsequently exported to PSB.

AVR Control (Survey)
A full photo control survey was not considered necessary for the AVRs. A survey grade RTK GPS was used to record the x,y,z position of the camera, and Environment Agency LiDAR DSM and DTM (1m resolution) was used as photo control to verify the alignment of the AVRs. See Appendix A for details.

AVR Production
Modelling of the Proposals

The proposed parameters were modelled from drawings provided by the project architect. See Appendix A for details

Autodesk 3DS MAX 2024 was used to bring together the proposed PV Array model, and survey data to generate a master 3D environment.

Autodesk 3DS Max has poor floating point performance and requires that OSGB36 coordinate based drawings and models need to be reprojected nearer to scene origin (0,0).

A project global shift value (x and y axis) was designated when modelling was started. This value was a coordinate for the centre of the site. All drawings were corrected by the global shift value.

Importing of AVR Control Data
The point data provided by the surveyor for control points and camera location was in e,n,z format and delivered as a *.csv. The LiDAR DSM data was translated from GEOTIFF to ASC using QGIS. The CSV and ASC data was imported in to 3DS Max using a script and was also corrected to the global shift value. When imported virtual cameras were created where specified in the CSV data.

Aligning the 3D Scene to the Baseline Photography
3DS MAX was used to generate high resolution *renders from the virtual cameras set up in the 3D environment

**Rendering is the process of generating an image from a model (or models in what collectively could be called the 3D environment), by means of computer programs - specifically, in this case Chaos Group V-Ray Next for Autodesk 3Ds Max 2024.*

The virtual camera was configured to match the same field of view to that of the panoramic baseline photograph.

The render from each virtual camera shows the LiDAR DSM Mesh. In order for the render to match the cylindrical projection of the photograph it was necessary to render the LiDAR DSM Mesh to a cylindrical projection (using the spherical camera type in VRay 6 by specifying exact horizontal and vertical field of view parameters)

This render of the LiDAR Mesh was taken into Adobe Photoshop converted to a smart object and overlayed on to the baseline photograph. The smart object was scaled (uniformly) so that the LiDAR mesh aligned with the same features visible in the photography. The position of the smart object was locked so that it could not be moved accidentally.

The baseline photography was then effectively aligned to the 3D environment, and when the proposed model was rendered (in cylindrical projection) from this environment and placed in to the smart object it was therefore automatically correctly positioned in the photograph.

Output of the finished AVR
The style of AVR was discussed with the client and it was agreed that fully rendered AVRs were required to show the development parameters effectively (TGN06/19 Type 3, Level 3).

For each view, a render was created from the virtual camera that simulated the same time of day and lighting conditions of the baseline photograph. The render was placed in to the aligned smart object. A mask was applied to the smart object to hide aspects of the proposed scheme that would be hidden by intervening (existing) built form and vegetation. Adjustment layers were applied to the proposals to adjust the colour balance, reflectivity and general realism/appearance of the proposals.

Using the smart object, the field of view of the baseline photography was calculated, measured and subsequently cropped (non destructively) to a fixed field of view of 90 degrees in the horizontal axis for all views.

Using Adobe InDesign, each completed AVR was presented in a document that conforms with the relevant guidance.

Mitchell Peacock

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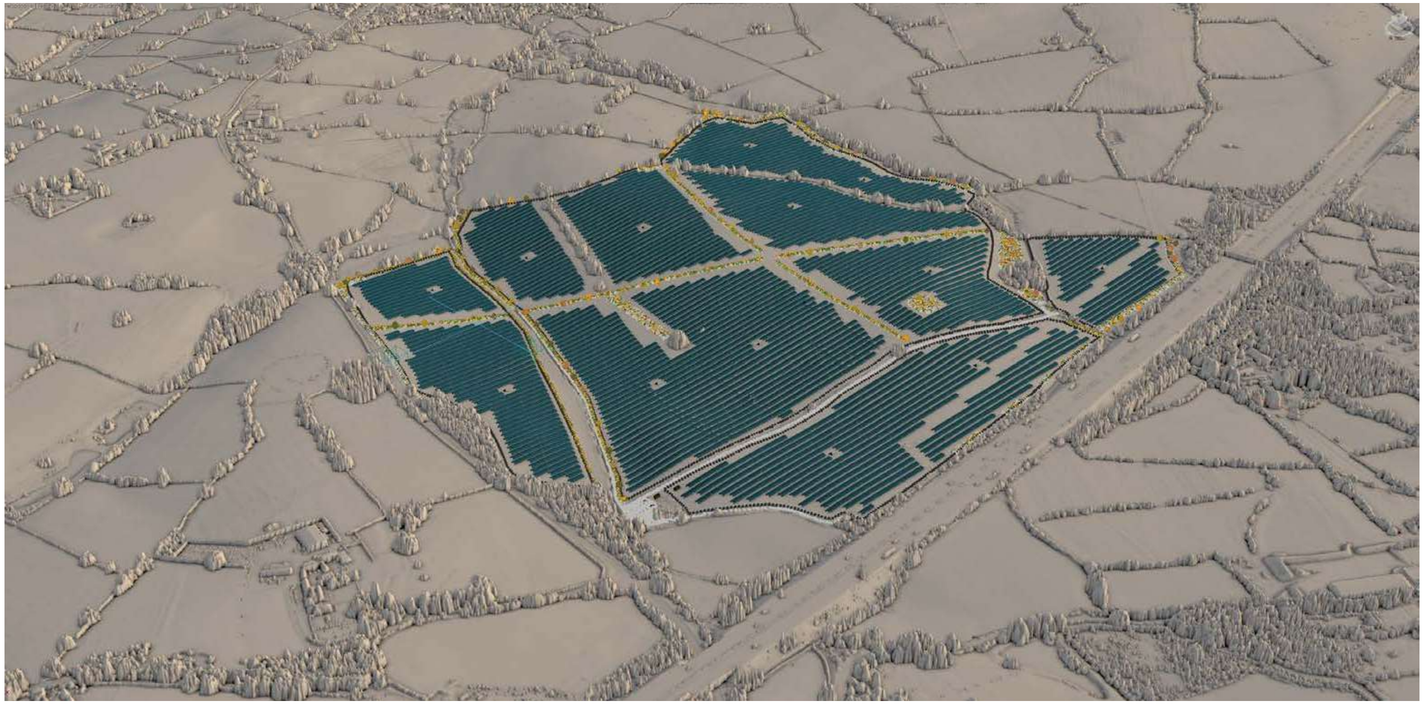

Appendix A: AVR Data.
Data Sources

Supplied Data

Asset	Description	Supplier	Reference	Date Received	Comment
Verification Data	LiDAR DSM and DTM Data	Environment Agency	lidar_composite_first_return_dsm-2022 lidar_composite_dtm-2022	13.11.24	GeoTiff converted to ASC Origin Shift -427342E -286085N
Development Plans	Adobe PDF	Planning Portal (Environmena)	P.NailcoteFarm_09_PlanningLayout_RevD.pdf	13.11.24	Proposed Development Layout
Landscape Strategy	Adobe PDF	Planning Portal (Pegasus)	11370_FPCR_ZZ_XX_DR_L_0001_P17_ Landscape_Strategy_Plan.pdf	13.11.24	Landscape Strategy

Generated Data (by Troopers Hill)

Asset	Description	Reference	Date	Comment
3D Model	Scene file generated in Autodesk 3Ds Max 2024 to combine supplied survey and model data.	THL6783	14.11.24	Proposed Development plans translated to scheme model representing proposed scheme using Autodesk 3DsMax.

Photography Data

VP	Description	(AVR)Type	(AVR)Level	Easting	Northing	Height (AOD)	Tripod Height	Camera	Lens	Focal Length	Orientation	HFOV	Date	Time	Format
Viewpoint 01		3 (panorama)	3	427342.711	286085.039	128.24	1.6m	Canon 5D MK iv	Canon 50mm f/1.2L	50mm	Portrait	90°	12/11/2024	13:23	RAW
Viewpoint 02		3 (panorama)	3	427199.775	286176.687	136.55	1.6m	Canon 5D MK iv	Canon 50mm f/1.2L	50mm	Portrait	90°	12/11/2024	13:48	RAW