Verified Views and Methodology

Oakley Farm, Cheltenham

26th January 2021

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Overview

A verified photomontage is a visual representation of a proposed development that is as accurate as it is possible to be within the limits of the technology used and the available data. Although it is not possible to achieve 100% perfect accuracy due to minor errors in survey work, environmental variables and photographic distortion, the careful implementation of a best practise method will result in only a negligible error.

The photomontage images represent how the proposed development would be perceived from a number of locations surrounding the site. These locations were chosen as the result of a detailed consideration of sensitive viewpoints.

The methods described in this document are based on current best practise and follow recommendations from 'Guidelines for Landscape and Visual Impact Assessment 3rd edition' (GLVIA3), Landscape Institute and IEMA (2013), alongside the Landscape Institute technical guidance note, 'Visual Representation of Development Proposals, (LI 06/19)

The entities responsible for the preparation of the views that are set out in the following pages comprise:

Photography, production and checking of photomontages & Surveying
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Methodology

Photography

During the field study, a photographic record was made to represent the full range of potential views towards the site from available viewpoints within the study area. These locations are mapped, the visual receptor types recorded and viewpoint context described. All photographs have been taken from publicly accessible locations; no private access was needed. The methodology ensures that the combination of camera and lens recreates as close as possible what can be seen by the human eye.

Equipment:
The aim of a verified photomontage is to illustrate what a proposed development may look like to a person standing at a specified photographic viewpoint. In order to create this effect, all photographs are taken with a camera and lens combination, resulting in a 'standard' focal length (equivalent to the cone of human vision). A standard focal length is usually considered to be in the range 45mm to 55mm on a traditional 35mm film camera. On digital cameras, where the image sensor is often smaller than the recorded image on traditional film cameras, the focal length of the lens used must compensate for the effective magnification resulting from the smaller sensor.

A Canon 5D Mark II full frame sensor camera was used for all viewpoints in conjunction with a Sigma 50mm prime lens (35mm format equivalent), which is within the 'standard' focal length range. The full frame sensor in the Canon 5D therefore, results in no magnification. To eliminate the parallax error that occurs when taking panoramic images, a sliding plate on the tripod head was employed allowing the camera to be moved back along the line of sight so that the nodal point of the lens was positioned directly over the axis of rotation.

Image capture: The camera was mounted on a tripod using a Nodal Ninja Panoramic tripod head at 1.5m above ground level to simulate the view at eye level.

The orientation of the camera was adjusted so that the optical axis and the horizontal axis were aligned with the horizon. This is the 'astronomical' horizon as set by a gravity governed bubble level.

Images were captured in the camera's maximum quality jpeg mode, with a RAW image processed as a backup. Camera settings were chosen carefully for each viewpoint; the camera was set to aperture priority mode, a small aperture of f/11 was used and the focus distance selected specifically to render all parts of the scene in focus whilst retaining image quality.

Panoramas were deemed essential to show the maximum extent of the proposed development and so frames were taken at 20-degree intervals to allow for overlap (discussed below).

Post Production: The panoramas were stitched together using PT Gui Pro specialist panorama creation software, with each photograph being cropped to take only the central portion of each image. These precautions minimise the small amount of optical distortion effect caused by the camera lens. Images were imported as jpeg files and minor tonal and colour adjustments were made which aim to replicate the scene as honestly as possible as it was perceived by the photographer at the time of capture. The stitched cylindrical panorama was then cropped to 90˚ for use as a baseline 'existing' view.

Survey
Precise surveying was essential to gain accurate information of the camera and control point positions. GPS readings were taken from the central tripod position that the camera was placed using a Spectra Precision SP60 GNSS Receiver, which achieved a 25mm degree of tolerance.

Control Points:
Control points are surveyed points/objects that can clearly be identified on the photograph. Since they are included in the 3D model, they can be visually matched with the corresponding points on the photograph.

Control points were identified within each photograph and marked for the survey team to take measurements. A minimum of three control points were chosen, and five where possible of fixed

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features such as lamp-posts, fences and sign posts. Occasionally if available, control points taken from another viewpoint were also used for even more accurate positioning of the 3D model within the photograph. Due to the rural nature of many of the viewpoint locations, survey poles were used as temporary control points. These control points were then created within the 3D program in the precise positions.

Control points were taken using the aforementioned Spectra Precision GPS device.

All survey measurements were supplied in CAD format for use in the 3D model.

3D Model

3D models were created and supplied which were then aligned within 3DS Max using the site masterplan to determine the X and Y position. Finished floor levels were then used to accurately position the 3D model vertically AOD (above ordnance datum).

Camera Matching and Rendering

The process of camera matching (i.e. correctly assembling the perspective views within the 3D program to match those photographs taken on site) needs meticulous attention to detail. The details of the Ordnance Survey co-ordinates for each viewpoint, and the angle of each view were also checked as part of the verification process.

The survey information was added into the 3D model and aligned precisely with the OS coordinate system. '3D' Cameras (or perspective views) were then created within 3DS Max at each of the viewpoint locations and raised by 1.5m to match the position at eye-level that was achieved during photography.

3D control points were created to match those visible in each of the panoramas and positioned according to the survey data. Any atmospheric conditions experienced at the time of taking the photograph were added to the model. For example, haze or reflected sunlight.

Using the '3D' camera each 90˚ cylindrical panorama was used as a backdrop and rendered using a VRay camera option that mirrors the distortion exhibited in a cylindrical panorama. Adjustments were then made to the camera angle to align the 3D control points with the real-life equivalents shown in each panorama, thus creating a 'photo-matched' viewpoint with the model aligned at the correct scale and angle.

A daylight system was then created within 3DS Max using the geographic location and time zone, then setting the correct time that the viewpoint was captured. This allows for the accurate creation of shadows as at the time of taking the photograph. For viewpoints taken in full cloud, a High Dynamic Range Image (HDRI) was mapped as a 'dome light' within 3DS Max and used as the main light source. An HDRI is an image format that contains a large amount of shadow and highlight information and can be used to illuminate a 3D scene, providing a good representation of conditions on a cloudy day.

Post production

Care was taken in Adobe Photoshop to mask out elements of the 3D model that may be obscured by foreground objects to produce the final visualisations.

The final visualisations were then taken back into PT Gui Pro and converted to 53.5˚ rectilinear (or planar) panoramas. These panoramas were aligned according to the latest LI and SNH guidance and presented at A3 and A1 page width, which allows for a comfortable arm's length viewing distance.

Caveats

i. A photomontage can never be considered as a 100% accurate representation of what would be seen due to the large number of variables affecting the images from the photography to the limitations of the 3D programs. They should be used as an aid to the decision making process.
ii. Due to the proximity to the site it was decided that viewpoints 4 and 5 would not be magnified to 150% at A1 page width as a significant proportion of the context would be cropped. These have been presented at 90˚ at A1 as cylindrical panoramas to avoid the distortion that a planar projection at this angle of view would give.
iii. Viewpoints 4 and 5 had immediate intervening vegetation which would be removed in the proposal. A photograph was taken beyond the hedgelines and spliced into the photomontage to give a representation of what would be seen from the viewpoint, thus the accuracy of the photographic elements in the photomontages will not be as accurate as viewpoints 1-3.

References

All photomontages were created in accordance with recommendations given in the following publications:

Landscape Institute and IEMA (2013) Guidelines for Landscape and Visual Impact Assessment 3rd edition (GLVIA3).

Landscape Institute:
Note 06/19 - Visual Representation of Development Proposals

Note 07/19 - Visual Representation of Development Proposals: Glossary and Abbreviations

Note 08/19 - Visual Representation of Development Proposals: Camera Auto Settings

Scottish Natural Heritage (2017) Visual representation of windfarms: good practice guidance. ('SNH 2017')

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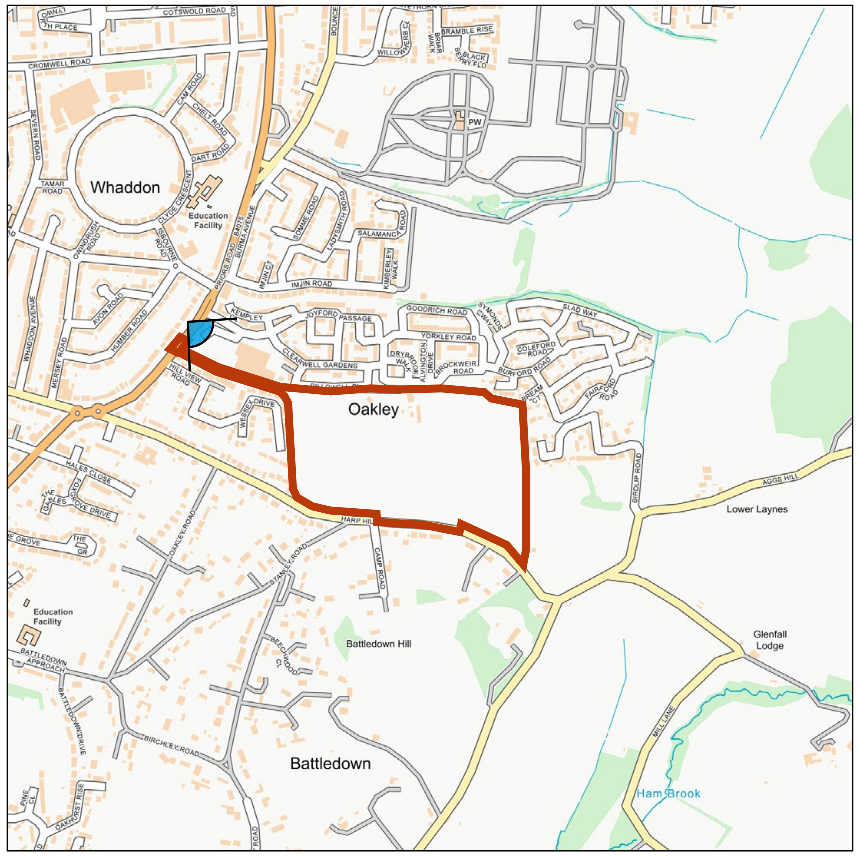
Extent of 53.5˚ planar panorama



Viewpoint Location

Notes:
90˚ cylindrical projection in the above panorama showing the existing view. For context purposes only.

Distance to nearest building:	306m
Bearing to site centre:	119˚
Viewpoint grid reference:	396588.367 E 222664.547 N
Viewpoint ground height:	68.71m
Camera Height (AGL)	1.5m
Horizontal Field of View:	90˚ (Cylindrical Projection)
Principal Distance:	255mm

Date & time of photo(s):	14/09/2020 15:08
Camera:	Canon 5D MkII
Lens, FL, max aperture:	Sigma, 50mm, f/1.4
LI Image Type:	Type 4

Rev:	A
Scale:	-
Drawn:	AM
Checked:	BD
Sheet Size:	A3 Landscape

Client: Robert Hitchins Ltd
Project: **Oakley Farm, Cheltenham**
Drawing Title: Viewpoint 1 - Existing
Fig 1

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Existing Baseline Photograph

Photomontage - Proposed Development at Year 1

Distance to nearest building:	306m
Bearing to site centre:	119°
Viewpoint grid reference:	396588.367 E 222664.547 N
Viewpoint ground height:	68.71m
Camera Height (AGL)	1.5m
Horizontal Field of View:	90° (Cylindrical Projection)
Principal Distance:	255mm

Date & time of photo(s):	14/09/2020 15:08
Camera:	Canon 5D MkII
Lens, FL, max aperture:	Sigma, 50mm, f/1.4
LI Image Type:	Type 4

Rev:	A
Scale:	-
Drawn:	AM
Checked:	BD
Sheet Size:	A3 Landscape

Client: Robert Hitchins Ltd

Project: **Oakley Farm, Cheltenham**

Drawing Title: Viewpoint 1 - Existing baseline photograph - Proposed development at Year 1

Fig 2

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Existing Baseline Photograph

Photomontage - Proposed Development at Year 10

Distance to nearest building:	306m
Bearing to site centre:	119˚
Viewpoint grid reference:	396588.367 E 222664.547 N
Viewpoint ground height:	68.71m
Camera Height (AGL)	1.5m
Horizontal Field of View:	90˚ (Cylindrical Projection)
Principal Distance:	255mm

Date & time of photo(s):	14/09/2020 15:08
Camera:	Canon 5D MkII
Lens, FL, max aperture:	Sigma, 50mm, f/1.4
LI Image Type:	Type 4

Rev:	A
Scale:	-
Drawn:	AM
Checked:	BD
Sheet Size:	A3 Landscape

Client: Robert Hitchins Ltd

Project: **Oakley Farm, Cheltenham**

Drawing Title: Viewpoint 1 - Existing baseline photograph - Proposed development at Year 10

Fig 3

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Rev:	A		
Scale:	-		
Drawn:	AM		
Checked:	BD		
Sheet Size:	841 x 297mm		

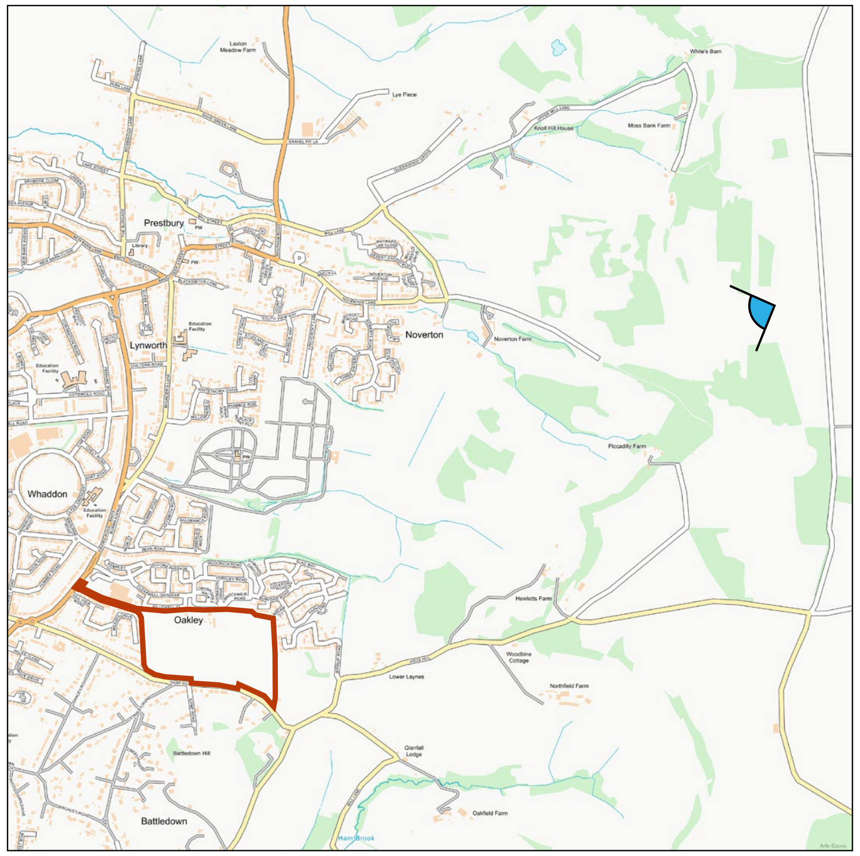
Fig **4**

Distance to nearest building:	306m	Camera Height (AGL):	1.5m	Date & time of photo(s):	14/09/2020 15:08
Bearing to site centre:	119˚	Horizontal Field of View:	53.5˚ (Planar Projection)	Camera:	Canon 5D MkII
Viewpoint grid reference:	396588.367 E 222664.547 N	Principal Distance:	812.5mm	Lens, FL, max aperture:	Sigma, 50mm, f/1.4
Viewpoint ground height:	68.71m				

Rev:	A	Distance to nearest building:	306m	Camera Height (AGL):	1.5m	Date & time of photo(s):	14/09/2020 15:08
Scale:	-	Bearing to site centre:	119˚	Horizontal Field of View:	53.5˚ (Planar Projection)	Camera:	Canon 5D MkII
Drawn:	AM	Viewpoint grid reference:	396588.367 E 222664.547 N	Principal Distance:	812.5mm	Lens, FL, max aperture:	Sigma, 50mm, f/1.4
Checked:	BD	Viewpoint ground height:	68.71m				
Sheet Size:	841 x 297mm						

Fig 5

Extent of 53.5˚ planar panorama



Viewpoint Location

Notes:
90˚ cylindrical projection in the above panorama showing the existing view. For context purposes only.

Distance to nearest building:	2.1km
Bearing to site centre:	239˚
Viewpoint grid reference:	399126.673 E 223621.359 N
Viewpoint ground height:	304.43m
Camera Height (AGL)	1.5m
Horizontal Field of View:	90˚ (Cylindrical Projection)
Principal Distance:	255mm

Date & time of photo(s):	17/09/2020 08:56
Camera:	Canon 5D MkII
Lens, FL, max aperture:	Sigma, 50mm, f/1.4
LI Image Type:	Type 4

Rev:	A
Scale:	-
Drawn:	AM
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Sheet Size:	A3 Landscape

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Project: **Oakley Farm, Cheltenham**
Drawing Title: Viewpoint 2 - Existing
Fig **6**

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Existing Baseline Photograph

Photomontage - Proposed Development at Year 1

Distance to nearest building:	2.1km
Bearing to site centre:	239˚
Viewpoint grid reference:	399126.673 E 223621.359 N
Viewpoint ground height:	304.43m
Camera Height (AGL)	1.5m
Horizontal Field of View:	90˚ (Cylindrical Projection)
Principal Distance:	255mm

Date & time of photo(s):	17/09/2020 08:56
Camera:	Canon 5D MkII
Lens, FL, max aperture:	Sigma, 50mm, f/1.4
LI Image Type:	Type 4

Rev:	A
Scale:	-
Drawn:	AM
Checked:	BD
Sheet Size:	A3 Landscape

Client: Robert Hitchins Ltd

Project: **Oakley Farm, Cheltenham**

Drawing Title: Viewpoint 2 - Existing baseline photograph - Proposed development at Year 1

Fig: **7**

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Distance to nearest building:	2.1km
Bearing to site centre:	239˚
Viewpoint grid reference:	399126.673 E 223621.359 N
Viewpoint ground height:	304.43m
Camera Height (AGL)	1.5m
Horizontal Field of View:	90˚ (Cylindrical Projection)
Principal Distance:	255mm

Date & time of photo(s):	17/09/2020 08:56
Camera:	Canon 5D MkII
Lens, FL, max aperture:	Sigma, 50mm, f/1.4
LI Image Type:	Type 4

Rev:	A
Scale:	-
Drawn:	AM
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Client	Robert Hitchins Ltd
Project	**Oakley Farm, Cheltenham**
Drawing Title	Viewpoint 2 - Existing baseline photograph - Proposed development at Year 10
Fig	**8**

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Rev:	A
Scale:	-
Drawn:	AM
Checked:	BD
Sheet Size:	841 x 297mm

Fig

9

Distance to nearest building:	2.1km
Bearing to site centre:	239˚
Viewpoint grid reference:	399126.673 E 223621.359 N
Viewpoint ground height:	304.43m
Camera Height (AGL):	1.5m
Horizontal Field of View:	53.5˚ (Planar Projection)
Principal Distance:	812.5mm
Date & time of photo(s):	17/09/2020 08:56
Camera:	Canon 5D MkII
Lens, FL, max aperture:	Sigma, 50mm, f/1.4

Rev:	A	Fig	Distance to nearest building:	2.1km	Camera Height (AGL):	1.5m	Date & time of photo(s):	17/09/2020 08:56
Scale:	-	**10**	Bearing to site centre:	239˚	Horizontal Field of View:	53.5˚ (Planar Projection)	Camera:	Canon 5D MkII
Drawn:	AM		Viewpoint grid reference:	399126.673 E 223621.359 N	Principal Distance:	812.5mm	Lens, FL, max aperture:	Sigma, 50mm, f/1.4
Checked:	BD		Viewpoint ground height:	304.43m				
Sheet Size:	841 x 297mm							