Photoviewpoint 20 - Proposed View + Cumulative Effects

Tritax Scheme (see Parameters Plan DWG 14-019SGPXXXXDRA131003 for heights)

Western Parcel Build Zone (modelled to MAX 23m above SSL - see DWG 2005-SK018-C)

Eastern Parcel Build Zone (modelled to MAX 23m above SSL - see DWG 2005-SK024-B)

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:	27 February 2024
Drawing Number:	D2543/03
Drawn by:	AP
Checked by:	MP

Project title:	**Junction 10 - M40**
Client:	**Albion Land**
Drawing Title:	**Photomontage Viewpoint 20 (Winter)**

troopers hill

Braeside, Cotswold Close, Bourne, Brimscombe, Stroud, Gloucestershire GL5 UA
t 01454 323348 **e** info@troopershill.co.uk www.troopershill.co.uk

Appendix A:
AVR Technical Methodology

Overview
The process of generating verified views (also referred to as accurate visual representations (AVR)) for the Proposed Development at J10, M40, carried out by Troopers Hill (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. 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 with one eye closed and curved through an arc of 90 degrees, while viewed at a constant distance of 500mm.

Site visit
Troopers Hill visited the site on the 12th March 2022 and 24th February 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 in detail the processes involved in the preparation of Accurate Visual Representations (AVR) The following procedures set out an efficient, consistently accurate, robust, repeatable and traceable approach to achieve a high level of accuracy.

Verified photomontages, also referred to as Accurate Visual Representations (AVR) or Visually Verified Montages (VVM), are the 'top level' in terms of accuracy and documentation. Verified imagery is relied upon at public inquiry and in support of contentious planning applications/appeals and must therefore be robust and free from erroneous/ambiguous information. From the outset, a project where verified photomontages are required MUST be approached with the intention of absolute precision and will be based upon a traceable data set.

Standards
The work fully complies with the following guidance:

1. The Landscape Institute/IEMA Guidelines for Landscape and Visual Impact Assessment (3rd edition 2013);
2. The Landscape Institute Advice Note 01/11 Photography and Photomontage in Landscape and Visual Impact Assessment.
3. The Landscape Institute TGN 2/17 Visual representation of development proposals
4. The SPG London View Management Framework (March 2012).
5. Landscape Institute TGN 06/19.

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 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 March 2022 and 24th February 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 (see Appendix B for specification):
1. Camera, in working order with charged batteries (Canon EOS 5DS R)
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/1.4 USM)
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 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.

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 1.60m 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 degredation 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 depositied 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 Photoshop, the processed RAW files were stitched to form a panorama of cylindrical projection.
6. The completed panorama was saved as an 8bit tiff file.

AVR Control (Survey)

The AVR control survey was carried out 12th March 2022 and 24th February 2024.

Survey Methodology

Survey Equipment Required (see Appendix B for specification)

- Leica 1200 series GPS Smartnet enabled dual receiver (GPS and GLONASS)
- Leica Total Station (1201 or TS16) 1' accuracy with 1000m reflectorless laser

Field Survey Methodology

- **Camera locations:** where possible, the camera position was used as a setup point for the total station, enabling the re-creation of the view as seen in the imagery and reducing the risk of incorrect interpretation of detail. Connection was via GPS Smartnet derived control points in OSGB datum and grid. 3-4 control stations were used, to ensure long distance accuracies and to identify possible outliers.
- Reference points visible in the photography were measured with reflectorless means from the total station. Where long distance views had suitable detail too far from the camera station, further setups were used closer to the detail. Common visible detail points were observed from different setup points to check and increase accuracy achieved.
- Using realtime correction (RTK) accuracies of camera positions are to the low centimetre, while accuracies of surveyed detail vary due to setup geometry and distance, but will be usually in the low centimetre range and always below 30 centimetres.

Data Processing & Delivery

Data was processed using industry standard software (Leica GeoOffice and TerraModel) to create points listings. Digital photos were taken by the survey Total Station to aid identification of points. All points are to OSGB36 grid and datum, to allow the use of common Ordnance Survey products and industry standard site surveys.

AVR Production

Modelling of the Proposals

A model of the proposed development was built by Troopers Hill using CAD (DWG) parameter plans that were made available by the project architect. DWG 2005-SK018-C and DWG 2005-SK024-B. The resulting model is shown below.

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 Survey 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. This 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 data, and all control points were positioned where specified in the 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

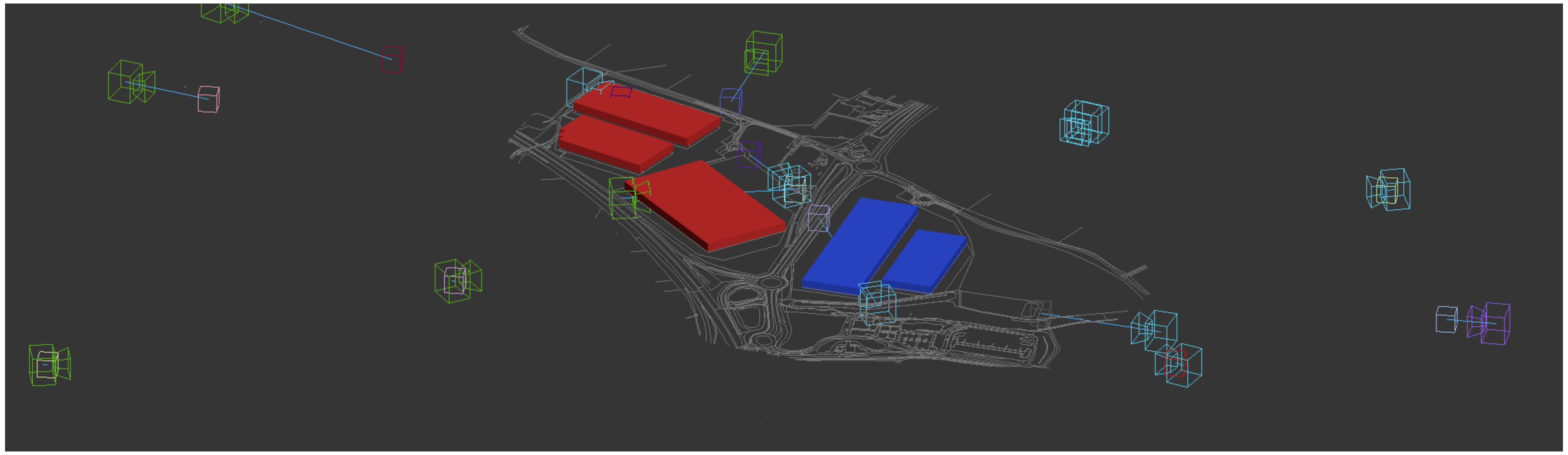
**Rendering is the process of generating an image from a model (or models in what collectively could be called the 3D environment), by means of computer programs - specifically, in this case Chaos Group V-Ray 3.6 for Autodesk 3Ds Max 2019.*

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

The render from each camera shows each control point as a red cross. In order for the render to match the cylindrical projection of the photograph it was necessary to render the points to a cylindrical projection (using the spherical camera type in VRay 5.0 by specifying exact horizontal and vertical field of view parameters)

This render of the control points 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 control point markers aligned to the same objects measured by the surveyor. 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 a wireline visualisations were required - it was also agreed that a semi opaque fill would assist in the perception of depth, position and scale within the landscape.

For the wireline visualisations a basic outline render was taken in to the aligned smart object. Simple lines were traced demonstrating the maximum mass extents of the proposed building height parameter. Masks were applied to the smart object to hide aspects of the proposed scheme that are hidden by existing features.

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

On behalf of Troopers Hill Limited
Braeside, Cotswold Close
Bourne
Brimscombe
Stroud
Gloucestershire
GL5 2UA

Appendix B: Equipment Specification

Camera: Canon 5DSR

Image sensor type	CMOS sensor
Image sensor size	Approx. 36.0 x 24.0 mm
Processor	Dual DIGIC 6
Effective pixels	Approx. 50.6 megapixels
Max resolution	8688 x 5792 pixels
Lens mount	Canon EF mount
Image type	JPEG, RAW (14-bit Canon original), RAW+JPEG simultaneous recording possible
Crop/aspect ratio	Full-frame / Approx. 1.3x (crop) / Approx. 1.6x (crop) / 1:1 (aspect ratio) / 4:3 (aspect ratio) / 16:9 (aspect ratio)
LCD Monitor-type	TFT color, liquid-crystal monitor
Monitor size and dots	3.2-in (3:2) with approx. 1.04 million dots
AF points	61 (up to 41 cross-type points)
Focus operation	One-Shot AF, AI Servo AF, AI Focus AF, Manual Focusing (MF)
AF fine adjustment	AF Micro adjustment (All lenses by the same amount, Adjust by lens)
Exposure Metering mode	Approx. 150,000-pixel RGB+IR metering sensor and 252-zone TTL metering at max. aperture EOS iSA (Intelligent Subject Analysis) system
ISO speed	100 – 6400 (expandable to 50 and 12800)
Exposure compensation	±5 (at 1/3 EV, 1/2 EV steps)
AE Bracketing	±3 stops in 1/3- or 1/2-stop increments (can be combined with manual exposure compensation)
Anti-flicker	Possible
Interval timer	Shooting interval and shot count settable
Bulb timer	Bulb exposure time settable
HDR Shooting - Dynamic range adjustment	Auto, ±1, ±2, ±3
Multiple exposures -Shooting method	Function/control priority, Continuous shooting priority
Number of multiple exposures	2 to 9 exposures
Multiple-exposures control	Additive, Average, Bright, Dark
Shutter speed	1/8000 sec. to 30 sec. Bulb, X-sync at 1/200 sec.
Continuous shooting speed	Approx. 5 frames-per-second
Max. burst (With full-frame)*	JPEG Large/Fine : Approx. 31 shots (approx. 510 shots) RAW : Approx. 12 shots (approx. 14 shots) RAW+JPEG Large/Fine : Approx. 12 shots (approx. 12 shots)
Compatible Speedlites	EX-series Speedlites
Flash metering	E-TTL II autoflash
Flash exposure compensation	±3 stops in 1/3- or 1/2-stop increments
PC terminal	Provided
Live view shooting - focus method	Contrast-detection AF system (Face+Tracking, FlexiZone-Single) Manual focus (approx. 6x and 16x magnified view possible for focus check)
Continuous AF	Provided
Recording format	MOV
Movie	MPEG-4 AVC / H.264 Variable (average) bit rate
Audio	Linear PCM
Recording size and frame rate	Full HD (1920x1080) : 29.97p/25.00p/23.98p HD (1280x720) : 59.94p/50.00p VGA (640x480) : 29.97p/25.00p
Dimensions (W x H x D):	Approx.152.0 x 116.4 x 76.4mm / 5.98 x 4.58 x 3.01 in.
Weight:	Approx. 930 g / 32.80 oz. (Based on CIPA Guidelines) Approx. 845 g / 29.80 oz. (Body only)

Lens: Canon 50mm f/1.4 USM

Angle of view (horzntl, vertl, diagnl)	40°, 27°, 46°
Lens construction (elements/groups)	7/6
No. of diaphragm blades	8
Minimum aperture	22
Closest focusing distance (m)	0.45
Maximum magnification (x)	0.15
AF actuator	Micro USM[1]
Filter diameter (mm)	58
Max. diameter x length (mm)	73.8 x 50.5
Weight (g)	290

Tripod Head: Manfrotto 303PIUS Panoramic Head + 300N Rotation Unit

- sliding plates for nodal point positioning
- Elbow bracket to allow camera to be mounted in either portrait or landscape orientation

Survey GPS: Leica 1200

Receiver	GX1230
Type	Dual frequency
Channels	12 L1 + 12 L2 / WAAS / EGNOS
RTK	Yes
Power consumption	5.2W (receiver + controller + antenna)
Batteries	Two Li-Ion 3.8Ah/7.2V mini batteries Power receiver + controller + antenna for about 15 hours (static mode) Power receiver + controller + antenna + radio for about 10 hours (RTK mode)
External supply	Nominal 12V DC (10.5 to 28V allowed)
Weight	1.20kg
Temperature	Operation: -40 to +65 C, Storage: -40 to 80 C
RTK Accuracy	Horizontal: 10mm + 1ppm, Vertical: 20mm + 1ppm (kinematic)
Post-Processed	Horizontal: 5mm + 0.5ppm, Vertical: 10mm + 0.5ppm (static)
Data logging	Compact Flash cards: 256Mb, typical spec:- About 4,400 hours L1+L2 logging at 15 sec rate About 17,600 hours L1+L2 logging at 60 sec rate About 360,000 RTK points with codes
Controller	**RX1210T**
Display	High contrast 1/4 VGA touch screen, 11 lines x 32 characters
Keypad	Full illuminated QWERTY keypad with user definable keys
Weight	0.48kg
Temperature	Operation: -30 to +65 C, Storage: -40 to 80 C
Antenna	**SmartTrack AX1202**
Weight	0.44kg
Temperature	Operation: -40 to +70 C, Storage: -55 to 85 C

Survey Total Station: Leica TPS 1201+

Angle measurement

		Type 1201+	Type 1202+	Type 1203+	Type 1205+
Accuracy (std.dev., ISO 17123-3)	Hz, V	1'' (0.3 mgon)	2'' (0.6 mgon)	3'' (1 mgon)	5'' (1.5 mgon)
	Display resolution:	0.1'' (0.1 mgon)	0.1'' (0.1 mgon)	0.1'' (0.1 mgon)	0.1'' (0.1 mgon)
Method	absolute, continuous, diametrical				
Compensator	Working range:	4' (0.07 gon)	4' (0.07 gon)	4' (0.07 gon)	4' (0.07 gon)
	Setting accuracy:	0.5'' (0.2 mgon)	0.5'' (0.2 mgon)	1.0'' (0.3 mgon)	1.5'' (0.5 mgon)
	Method:	centralized dual axis compensator			

Distance measurement (IR-Mode)

Range	Round prism (GPR1):	3000 m
(average atmospheric conditions)	360° reflector (GRZ4):	1500 m
	Mini prism (GMP101):	1200 m
	Reflective tape (60 mm x 60mm)	250 m
	Shortest measurable distance:	1.5 m
Accuracy / Measurement time	Standard mode:	1 mm + 1.5 ppm / typ. 2.4 s
(standard deviation, ISO 17123-4)	Fast mode:	3 mm + 1.5 ppm / typ. 0.8 s
	Tracking mode:	3 mm + 1.5 ppm / typ. <0.15 s
	Display resolution:	0.1 mm
Method	Special phase shift analyzer (coaxial, visible red laser)	

PinPoint R400/R1000 reflectorless distance measurement (RL-Mode)

Range	PinPoint R400:	400 m / 200 m (Kodak Gray Card: 90 % reflective / 18 % reflective)
(average atmospheric conditions)	PinPoint R1000:	1000 m / 500 m (Kodak Gray Card: 90 % reflective / 18 % reflective)
	Shortest measurable distance:	1.5 m
	Long Range to round prism (GPR1):	1000 m – 7500 m
Accuracy / Measurement time	Reflectorless < 500 m:	2 mm + 2 ppm / typ. 3 – 6 s, max. 12 s
(standard deviation, ISO 17123-4)	Reflectorless > 500 m:	4 mm + 2 ppm / typ. 3 – 6 s, max. 12 s
(object in shade, sky overcast)	Long Range:	5 mm + 2 ppm / typ. 2.5 s, max. 12 s
Laser dot size	At 30 m:	approx. 7 mm x 10 mm
	At 50 m:	approx. 8 mm x 20 mm
Method	PinPoint R400 / R1000:	System analyzer (coaxial, visible red laser)