

C

Appendix C

Representative View Appraisal

Introduction

- C.1 A selection of representative views has been identified to recognise and assess the likely effects of the Scheme Proposal on the identified visual receptors, as shown in **Figure 3.4**. AVRs have been prepared for each of these representative views. Table 4.2 summarise the findings of this visual impact assessment.
- C.2 The AVRs provide two-dimensional representations of a complex scenic experience and as such are indicative. They have, however, been chosen to give an impression of the maximum effect of the Scheme Proposal in the viewing experience. These views are kinetic and variable in nature when experienced within the townscape.
- C.3 The imagery is no substitute for the actual visual experience from a representative view. It is essential when considering these views that the individual is aware of the viewing experience at each location and to be aware of traffic noise, weather, the surrounding buildings and any other similar matters. It is therefore recommended that this document is taken on site to fully appreciate the nature of the viewing experience in each representative view location.
- C.4 The selection of representative views considers the location of both conservation areas and surrounding townscape. In determining the effects of the Scheme Proposal, a judgement is made regarding the design quality of the completed scheme. This is informed by the AVR's and the supporting planning application information.
- C.5 The rationale behind why some AVRs are fully rendered and some are wireline is based on the distance from the Site; the identified sensitivity of the view; and, whether the inter-visibility between the Site and the viewpoint is prevented by built form or vegetation.
- C.6 **Appendix D** contains the methodology used for the AVRs produced by Cityscape. Within the blue wireline AVRs, where the buildings fall behind built form, or significant vegetation, the Scheme Proposal's mass has been shown with a dash demonstrating that they are unlikely to be seen within the view. The cumulative scheme of Lockcorp House is shown as a red wireline.



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Twickenham Green



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Warwick Road (South)



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Edwin Road (West)



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May Road (North)



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Kneller Gardens



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Craneford Way Recreational Ground



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Footbridge crossing the railway



Table of Views

| View | Location | Page | Style | Render/ Wireline | Ref | OS-E | OS-N | Height (AOD) | Heading | Lens | Field of View | Film | Date | Time |
|------|-----------------------------------|------|-------|---------------------|--------|-----------|-----------|--------------|---------|------|---------------|---------|----------|-------|
| 1 | Twickenham Green | 36 | AVR-1 | Wirelines | D17843 | 515257.65 | 172852.33 | 11.81 | 6.86° | 24mm | 74° | Digital | 22/12/18 | 09:13 |
| 2 | Warwick Road (South) | 38 | AVR-3 | Render | D17844 | 515411.52 | 173208.79 | 12.51 | 286.73° | 24mm | 74° | Digital | 22/12/18 | 09:52 |
| 3 | Edwin Road (West) | 40 | AVR-3 | Render | D17845 | 515306.00 | 173191.59 | 12.14 | 355.90° | 24mm | 74° | Digital | 22/12/18 | 09:47 |
| 4 | May Road (North) | 42 | AVR-3 | Render | D17836 | 515189.62 | 173281.60 | 11.70 | 64.11° | 24mm | 74° | Digital | 18/12/18 | 13:13 |
| 5 | Kneller Gardens | 44 | AVR-1 | Wirelines | D17846 | 514647.08 | 173306.27 | 16.41 | 75.95° | 24mm | 74° | Digital | 22/12/18 | 08:50 |
| 6 | Craneford Way Recreational Ground | 46 | AVR-3 | Render | D17847 | 515402.75 | 173565.00 | 10.27 | 193.38° | 24mm | 74° | Digital | 22/12/18 | 08:20 |
| 7 | Footbridge crossing the railway | 48 | AVR-3 | Render | D17848 | 515561.83 | 173428.18 | 16.84 | 254.35° | 24mm | 74° | Digital | 22/12/18 | 08:30 |





01

Twickenham Green



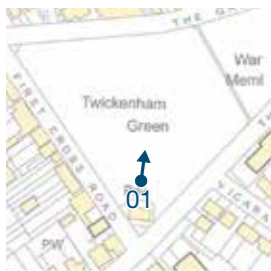
Existing View



Proposed View



Camera Location



View Location

Baseline condition

- C.7 This representative view illustrates the open nature of Twickenham Green and is positioned 435m to the south of the Site, within Twickenham Green Conservation Area. It is located in front of the sports pavilion that situated at the southern corner of the green, close to the junction of First Cross Road and Hampton Road (A311).
- C.8 The view is relatively open with the green present in the fore and middle ground. Mature trees frame the green and filter views to the buildings that line it during the summer when in leaf.
- C.9 In the far middle ground are the varied built form of residential, commercial and industrial properties that face the green and Staines Road (A305). These differ in age, height, architectural design and façade treatment, creating a varied skyline to Twickenham Green. A number of older buildings are Buildings of Townscape Merit. The built form prevents a view to the Site and its associated buildings.
- C.10 The representative view has a high to medium value as it is taken within Twickenham Green Conservation Area and the majority of the buildings in the far middle ground are Buildings of Townscape Merit.

Appraisal of the Effects

- C.11 The representative view will have a high susceptibility to change and a high sensitivity to the Scheme Proposal. The former is based on the occupation or activity of people and the presence of heritage assets and the latter is based on the baseline appraisal's identified value and the susceptibility to change. The approach to determining the view's 'susceptibility to change' and 'sensitivity' is set out in the supporting methodology within **Appendix B**.

Effects of the Scheme Proposal

- C.12 The Scheme Proposal will not be visible from this view due to intervening visual barriers such as the existing buildings that frame Twickenham Green and resulting in no magnitude of change and **no** effect to this representative view.

Cumulative Effects

- C.13 The cumulative scheme of Lockcorp House will not be visible within this view and, combined with the Scheme Proposal, will lead to **no** cumulative effect.

24mm - 37°

35mm - 31.5°

50mm - 20°

0°

50mm - 20°

35mm - 31.5°

24mm - 37°



Cumulative view



02

Warwick Road (South)



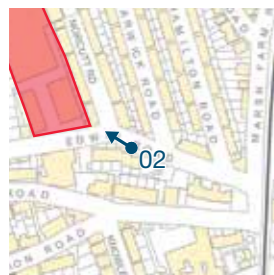
Existing View



Proposed View



Camera Location



View Location

Baseline condition

- C.14 Situated close to the Site's southern entrance, this representative view is positioned approximately 90m away to the southeast. It is taken from the southern side of the pavement opposite to the junction of Norcutt Road and Edwin Road. The flat landform and two storey built form provides a broadly linear view that takes in a large amount of sky.
- C.15 The foreground of the view is occupied by the residential properties of Edwin Road, a portion of the front gardens to the south (left) of the view and a rendered blank façade of the house positioned at the junction between it and Norcutt Road to the north (right).
- C.16 The Site's southern boundary wall and entrance are visible in the middle ground in to the west (centre) of the view. The Site's buildings are partially visible and set back from the Edwin Road residential properties building line. Opposite to the Site entrance, to the southwest (left), are further industrial buildings.
- C.17 In the far middle ground are further residential properties associated with Edwin Road and the residential properties along Crane Road are visible to the west in the background.
- C.18 The representative view has a medium to low value, due to the townscape of generally good to poor condition and with a moderate to low scenic quality. It is considered that there is potential for substitution of some elements in the view.

Appraisal of the Effects

- C.19 The representative view will have a medium susceptibility to change and a medium sensitivity to the Scheme Proposal.

Effects of the Scheme Proposal

- C.20 With the implementation of the Scheme Proposal the south facing elevation of the industrial building will be visible, set back from the road with the site bounded by a 2m high wall and railing. The representative view illustrates how the new building will replace the buildings three visible from Edwin Road in the existing (baseline) view. It demonstrates how the Scheme Proposal responds are of a similar form to pitched roof buildings, currently set back from the road.
- C.21 The Scheme Proposal will open up views through existing buildings Edwin Road. The proposed building will include a simple palate of façade materials, including a white brick base and light grey metal cladding, appropriate to the proposed use. The new boundary wall will be painted white to relate directly to the painted facades that exist in nearby buildings. The new boundary wall will provide a clear and consistent edge the pavement and over time it is anticipated that some of the proposed tree planting within the car park will become visible in the middle distance. It will have a local, direct, permanent, medium to low magnitude of change and a **moderate to minor** and **beneficial** effect.

Cumulative Effects

- C.22 The cumulative scheme of Lockcorp House will not be visible within this representative view.

24mm – 37°

35mm – 31.5°

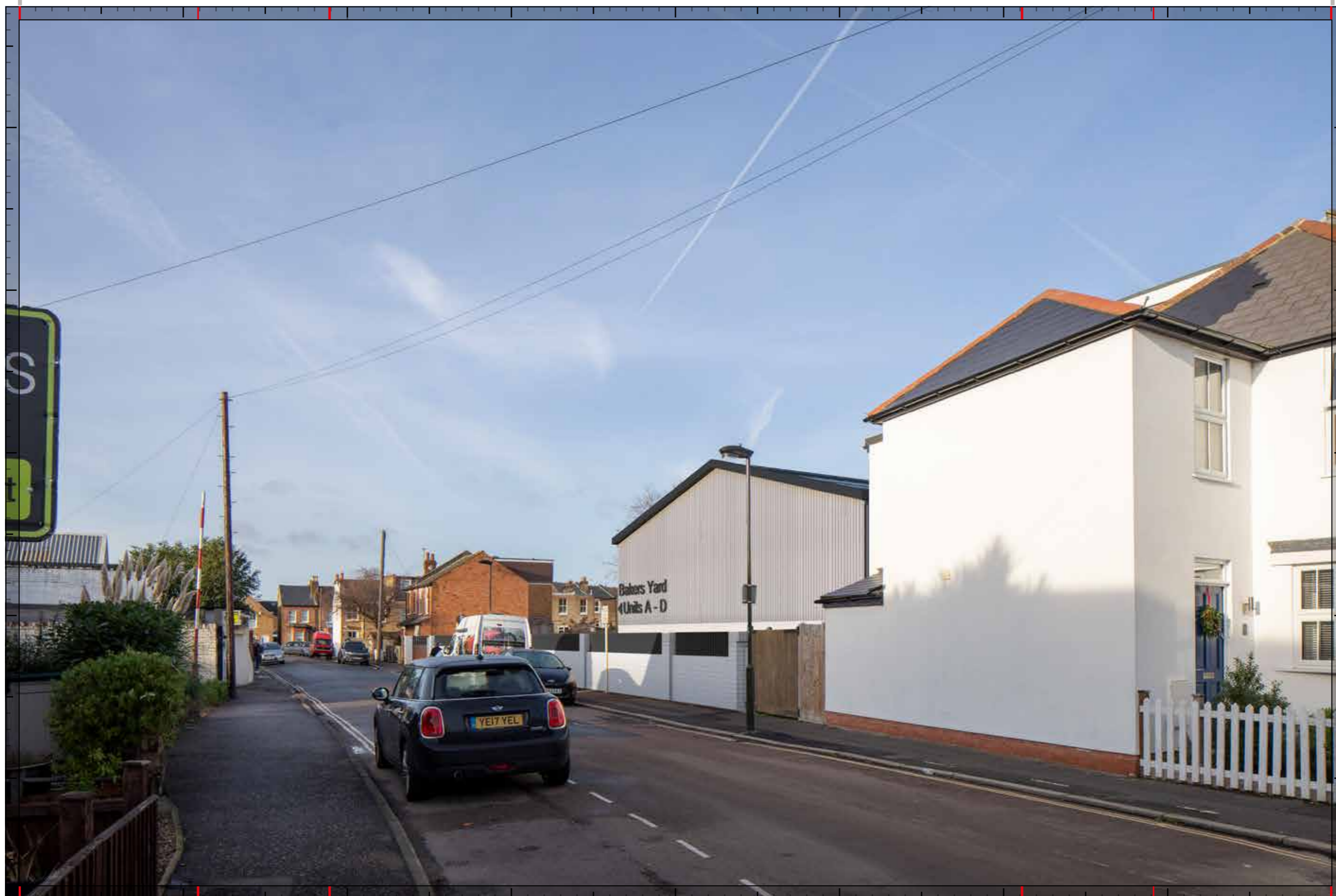
50mm – 20°

0°

50mm – 20°

35mm – 31.5°

24mm – 37°



Cumulative view



03

Edwin Rd (West)



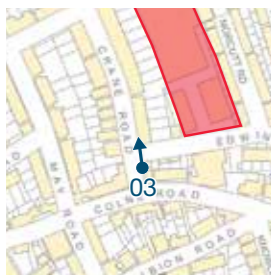
Existing View



Proposed View



Camera Location



View Location

Baseline condition

- C.23 This representative view has been taken from the western end of Edwin Road, at its junction with Crane Road, approximately 95m away from the Site's south western boundary. It is situated on the southern pavement of the junction and illustrates the narrow, linear view afforded by Crane Road that provides an intimate townscape.
- C.24 The foreground is occupied by the junction of the two roads. In the middle ground, on both sides of Crane Road, are two storey houses set back from the pavement with narrow front gardens. This route has a gentle bend and in the background of the view, to the north (centre), the Site's three storey office building and northwest entrance can be glimpsed.
- C.25 The view is across a townscape of generally good condition with moderate scenic quality. There is limited potential for substitution of some elements in the view. Therefore, it is considered that this representative view has a medium to low value.

Appraisal of the Effects

- C.26 The representative view will have a medium susceptibility to change and a medium sensitivity to the Scheme Proposal.

Effects of the Scheme Proposal

- C.27 The part three and four storey element of the Scheme Proposal's apartment block, adjacent to the Site's northwest entrance, will be glimpsed in the background of the view. The step in building height helps to integrate the Scheme Proposal into the existing terrace of houses along Crane Road..
- C.28 With the clearance of the Site's existing buildings and development of the Scheme Proposal a new view will be opened up to the River Crane through the northwest entrance. This will aid with legibility and orientation around the townscape.
- C.29 The proposed palette of façade materials, predominantly brick and shallow pitched roof, would help to break up the overall mass and integrate the Scheme Proposal into the surrounding townscape. Overall, the Scheme Proposal will have a local, direct, permanent, low magnitude of change and a **minor** and **beneficial** effect.

Cumulative Effects

- C.30 The cumulative scheme of Lockcorp House will not be visible within this representative view.

24mm - 37°

35mm - 31.5°

50mm - 20°

0°

50mm - 20°

35mm - 31.5°

24mm - 37°



Cumulative view



04

May Rd (North)



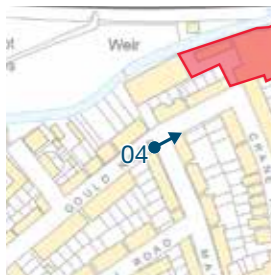
Existing View



Proposed View



Camera Location



View Location

Baseline condition

- C.31 Positioned approximately 150m away to the west of the Site this representative view illustrates the residential nature of the surrounding streets. It is taken from the south-western pavement of the junction of Gould Road and May Road.
- C.32 The view is fairly open in the foreground with the road junction but the built form of Gould Road provides a linear view and intimate townscape. In the middle ground, to the northeast (left) of the view are two storey residential properties set back from the pavement with narrow front gardens.
- C.33 To the southeast (right) are the flank wall of the residential properties facing May Road and, in the far middle ground, Crane Road. Wooden fencing hides the view toward their associated back gardens. In the far middle ground, to the east (centre) are the two storey houses along Crane Road which abut the Site's boundary. A glimpsed view can be gained to the three storey office building associated with the Site.
- C.34 It is considered that this representative view has a medium to low value. The view is across a townscape of generally good condition with moderate to poor scenic quality.

Appraisal of the Effects

- C.35 The representative view will have a medium susceptibility to change and a medium sensitivity to the Scheme Proposal.

Effects of the Scheme Proposal

- C.36 The Scheme Proposal's apartment block associated with the Riverside area will be partially visible in the far middle ground of the view. This block varies in height between three and five storeys and has a varying façade material and roof treatment that helps to break up its mass within the view.
- C.37 The Scheme Proposal will have a local, direct, permanent, medium to low magnitude of change and a **moderate to minor** and **beneficial** effect.

Cumulative Effects

- C.38 The cumulative scheme of Lockcorp House will not be visible within this representative view.

24mm – 37°

35mm – 31.5°

50mm – 20°

0°

50mm – 20°

35mm – 31.5°

24mm – 37°



Cumulative view



05

Kneller Gardens



Existing View



Proposed View



Camera Location



View Location

Baseline condition

- C.39 This representative view illustrates the public open space of Kneller Gardens. It is taken from the western corner of the park, some 705m to the north west of the Site. The park was originally laid out in the early 20th century.
- C.40 The fore and middle ground of the view are mostly occupied by a large extent of amenity lawn, framed by two asphalt footpaths going northeast (left) of the view and south (right). The north eastern footpath (left) is bordered by a line of trees. In the middle ground, a pavilion is visible to the east (centre) and a fenced off playground can be glimpsed to the south east (right) partially hidden behind a group of trees and ornamental planting.
- C.41 The view is framed in the background by a dense line of trees and scrubs that follows the River Crane and the Duke of Northumberland's River. This vegetation prevents a view to the Site and its associated buildings.
- C.42 The view is across a park of good condition with high scenic quality. There is no potential for substitution of some elements in the view. Therefore, it is considered that this representative view has a medium value.

Appraisal of the Effects

- C.43 The representative view will have a high susceptibility to change and a high sensitivity to the Scheme Proposal.

Effects of the Scheme Proposal

- C.44 A limited glimpsed view will be possible to the Scheme Proposal's Riverside apartment building in the winter, with the remaining buildings screened by intervening vegetation. These buildings will be read in conjunction with the existing built form present in the background of the view. It is therefore considered that the Scheme Proposal will have a negligible to no magnitude of change is therefore assessed as resulting in a **negligible** and **neutral** effect.

Cumulative Effects

- C.45 The cumulative scheme of Lockcorp House will not be visible within this representative view.

24mm - 37°

35mm - 31.5°

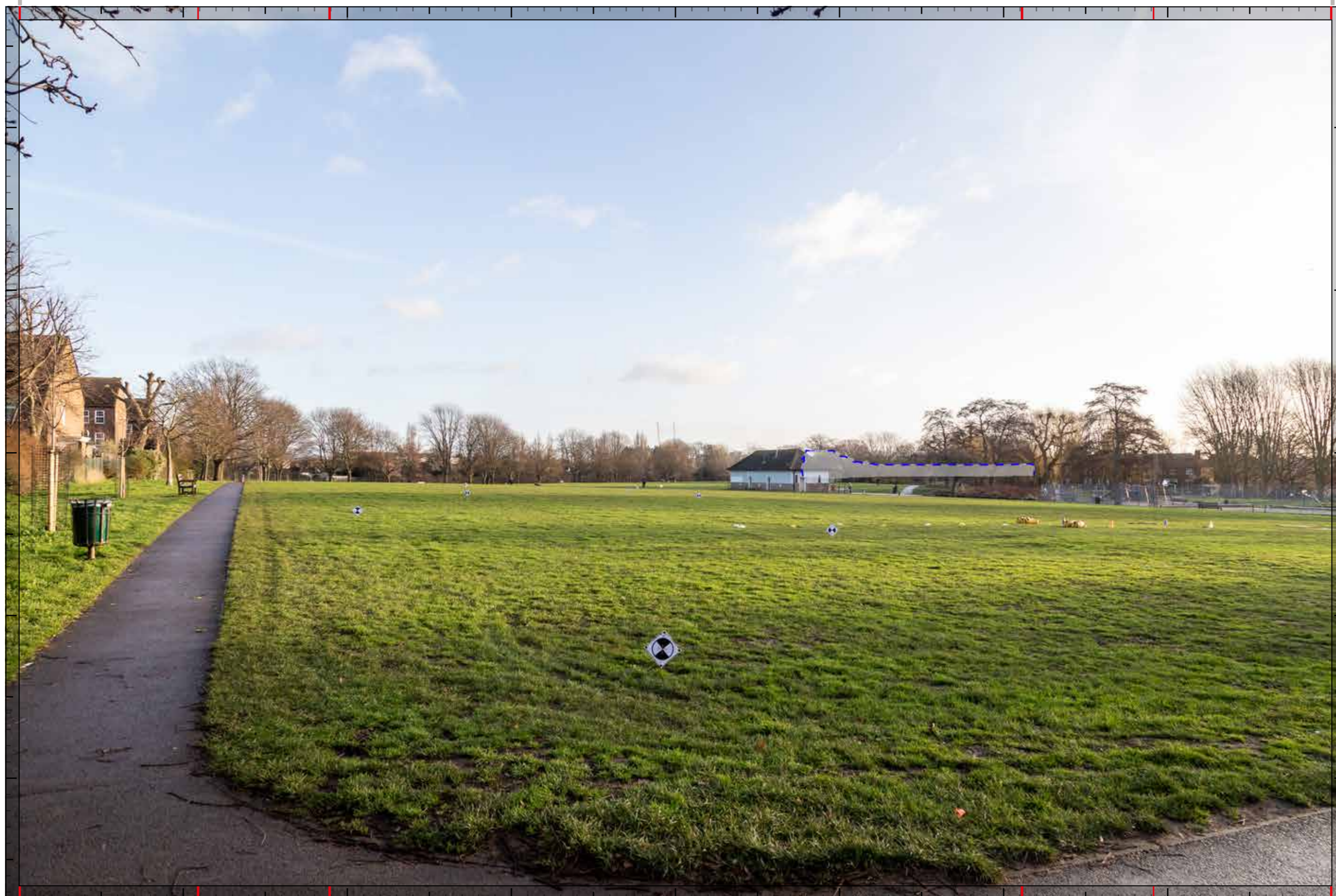
50mm - 20°

0°

50mm - 20°

35mm - 31.5°

24mm - 37°



Cumulative view



06

Craneford Way Recreational Ground



Existing View



Proposed View



Camera Location



View Location

Baseline condition

- C.46 This public area of open space provides an area for formal and informal play and is located some 270 metres away from the Site.
- C.47 The simple layout of the recreational ground provides an open view with the amenity grass visible in the fore and middle ground. In the background of the view a line of vegetation and scrub denotes the route of the western branch of the railway line and the route of the River Crane. Beyond this the built form associated with the Site, the former electric building (Athelsan Place) and residential properties can be glimpsed. The Site's silos can be glimpsed in the far background of the view above the existing roofline.
- C.48 It is considered that this representative view has a medium to low value. The view is across a park of generally good condition with moderate scenic quality and there is limited potential for substitution of some elements in the view.

Appraisal of the Effects

- C.49 The representative view will have a low susceptibility to change and a medium to low sensitivity to the Scheme Proposal.

Effects of the Scheme Proposal

- C.50 The Scheme Proposal's apartment blocks associated with the Riverside area will be partially visible in the background of the view to the south-west (right), behind the line of trees associated with the River Crane.
- C.51 These blocks vary in height between three and five storeys and have varying façade material and roof treatment, which helps break up the overall mass of the Scheme Proposal in the view. The treatment of the Scheme Proposal reflects the recently constructed developments along the River Crane and railway line corridor.
- C.52 The Scheme Proposal will have local, direct, permanent, medium to low magnitude of change and a **moderate to minor** and **beneficial** effect.

Cumulative Effects

- C.53 The cumulative scheme of Lockcorp, House, shown in the red outline, will be visible within this view and screens a proportion of the Scheme Proposal reducing its visibility. Overall the cumulative effect of the Scheme Proposal with the consented scheme of Lockcorp House will have a medium to low magnitude of change and a **moderate to minor** and **beneficial** effect.



Cumulative view



07

Footbridge crossing the railway,



Existing View



Proposed View



Camera Location



View Location

Baseline condition

- C.54 This pedestrian footbridge provides a raised vantage point to appreciate views over the study areas townscape and skyline. It is situated to the east of the Site, some 260 metres away.
- C.55 The foreground includes the southern staircase of the bridge and the western branch railway line, to the west (centre) of the view. To the southwest (left) is an area of car parking associated with Marsh Farm Road and, to the northwest vegetation screens the view to the River Crane and Craneford Way Recreational Ground.
- C.56 In the middle ground the view is dominated by the Marsh Farm Road residential properties. Rising above this is the roof of the former electric building (Athelsan Place) and, to the southwest and west, a limited glimpsed view can be gained to the Site's silos and northern warehouses.
- C.57 The representative view has a medium to low value.

Appraisal of the Effects

- C.58 The representative view will have a medium susceptibility to change and a medium to low sensitivity to the Scheme Proposal.

Effects of the Scheme Proposal

- C.59 The top floor of the Scheme Proposal's Riverside apartment block will be glimpsed in the background of the view, rising above the existing built form. It provides a varied skyline and helps with orientation around the townscape.
- C.60 The Scheme Proposal will have local, direct, permanent, low magnitude of change and a **minor** and **beneficial** effect.

Cumulative Effects

- C.61 The cumulative scheme of Lockcorp House, shown in the red outline, will be visible and screens a proportion of the Scheme Proposal reducing its visibility in the view. Overall the cumulative effect of the Scheme Proposal with the consented scheme of Lockcorp House will have a low magnitude of change and a **minor** and **beneficial** effect.

24mm – 37°

35mm – 31.5°

50mm – 20°

0°

50mm – 20°

35mm – 31.5°

24mm – 37°



Cumulative view

APPENDIX D

AVR METHODOLOGY

D

Appendix D

Cityscape Verified Views Methodology

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0.0 INTRODUCTION

0.1 Methodology overview

The methodology applied by Cityscape Digital Limited to produce the verified images or views contained in this document is described below. In the drafting of this methodology and the production and presentation of the images, guidance has been taken from the Technical Guidance Note 06/19: Visual Representation of Development Proposals from the Landscape Institute published on 17 September 2019 in support of GLVIA3. The disciplines employed are of the highest possible levels of accuracy and photo-realism which are achievable with today's standards of architectural photography and computer-generated models.

0.2 View selection

The viewpoints have been selected through a process of consultation with relevant statutory consultees and having regard to relevant planning policy and guidance.

1.0 PHOTOGRAPHY

1.1 Digital photography

With the latest advances in Digital Photography it is now possible to match the quality of plate photography.

1.2 Lenses

For local views a wide angle lens of 24mm or 35mm is generally used in order to capture as much of the proposal and its surroundings as possible. Intermediate distance views were photographed with a lens between 35mm to 70mm and occasionally long range views may be required with lens options ranging from 70mm to 600mm. As a guide, the following combinations were used:

| Distance to subject | View | Lens Options |
|---------------------|--------------|---------------|
| 0 – 800 metres | Local | 24mm to 35mm |
| 800 to 5000 metres | Intermediate | 35mm to 70mm |
| 5000+ metres | Long | 70mm to 600mm |

Examples of these views are shown in Figures 4 and 5.

1.3 Digital camera

Cityscape use high quality professional DSLR (Digital Single Lens Reflex) and DSLM (Digital Single Lens Mirrorless) cameras. The cameras utilise Full Frame Sensors so declared focal lengths require no conversion to be understood in line with TGN 06/19 guidelines. The quality of the lenses is matched to the resolution of the cameras to ensure high contrast and sharp rendition of the images.

1.4 Position, time and date recording

The photographer was provided with (i) an Ordnance Survey map or equivalent indicating the position of each viewpoint from which the required photographs were to be taken, and (ii) a digital photograph taken by Cityscape of the desired view. For each shot the camera was positioned at a height of 1.60 metres above the ground level which closely approximates the human eye altitude, and falls into the 1.5-1.65m range provided by TGN 06/19. If local conditions required a deviation to capture the view, the exact height used can be found in the Table of Views. A point vertically beneath the centre of the lens was marked on the ground as a survey reference point and two digital reference photographs were taken of (i) the camera/tripod location and (ii) the survey reference point (as shown in Figures 2 and 3). The date and time of the photograph were recorded by the camera.





2



3



1 Canon 5D MK IV Digital Camera

2 Camera Location

3 Survey reference point

4 Local view

5 Intermediate view

2.0 DIGITAL IMAGE CORRECTION

2.1 Raw file conversion

Canon cameras produce a raw file format, which is then processed digitally for both high detail and colour accuracy. The final image is outputted as a tiff¹ file.

2.2 Digital image correction

The digital images were then loaded into Cityscape's computers to prepare the digital image for the next stage of camera matching (see section 5). The image is also 'bank'² corrected which means ensuring that the horizon in each digital image is precisely horizontal.

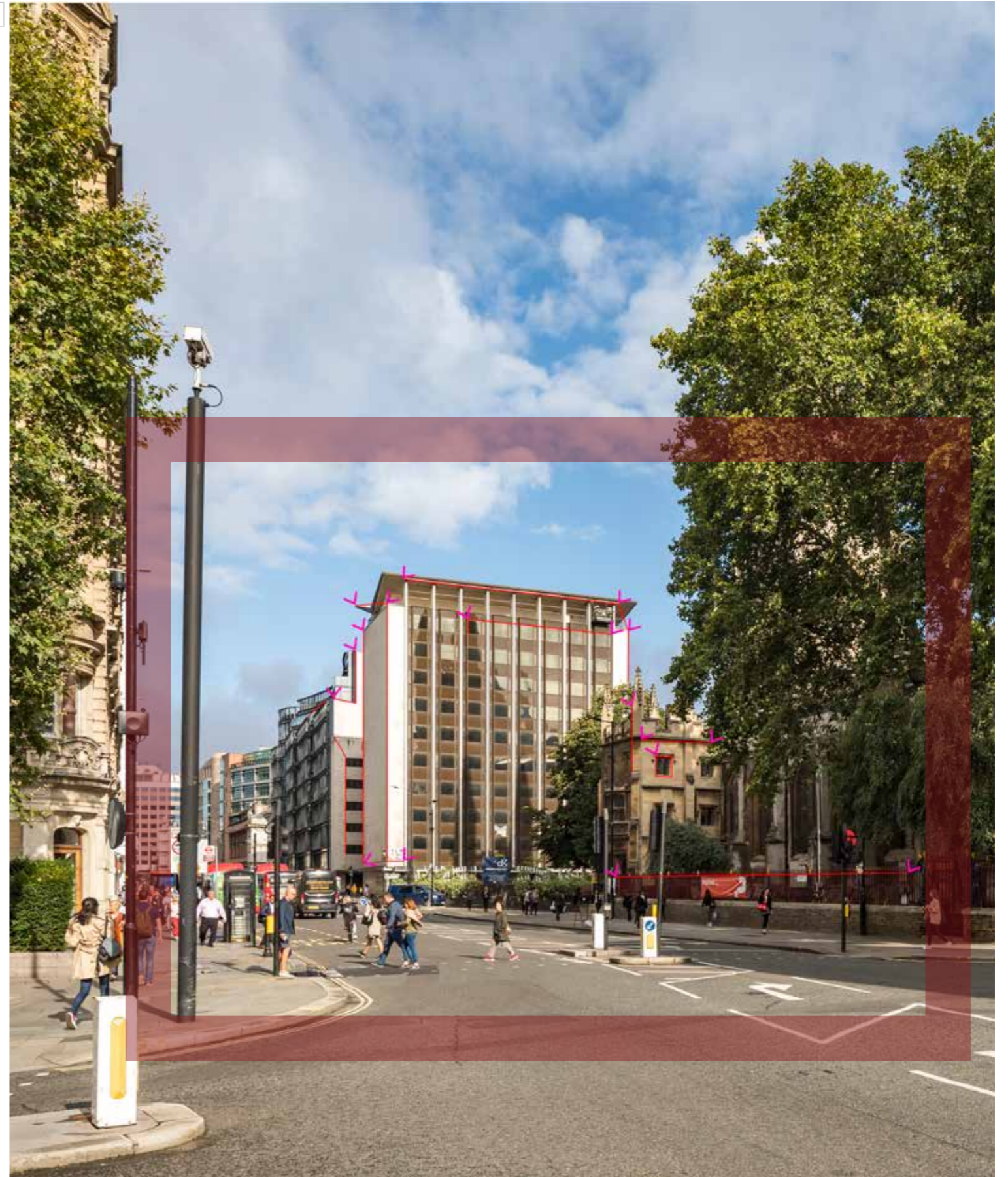
In spite of the selection of the most advanced photographic equipment, lenses are circular which results in a degree of distortion on the perimeter of images. The outer edges of an image are therefore not taken into consideration; this eliminates the risk of inaccuracy. Figure 17 in section 5 illustrates the 'safe' or non-distortive area of an image which is marked by the red circle.

The adjusted or corrected digital image, known as the 'background plate', is then saved to the Cityscape computer system ready for the camera matching process (see section 5). In preparation for the survey (see section 4) Cityscape indicates on each background plate the safe area and priority survey points, such as corners of buildings, for survey (see Figures 6 and 7).

¹ TIFF is the name given to a specific format of image file stored digitally on a computer.

² By aligning the vanishing points.

6





7

6 Background plate highlighting critical survey points in purple and secondary survey strings in red

7 Area of interest to be surveyed as shown in Figure 7

3.0 GPS SURVEY

3.1 Survey

An independent surveyor was contracted to undertake the survey of (i) each viewpoint as marked on the ground beneath the camera at the time the photograph was taken (and recorded by way of digital photograph (see section 1 above) and (ii) all the required points on the relevant buildings within the safe zone.

The survey was co-ordinated onto the Ordnance Survey National Grid (OSGB36) by using Global Positioning System (GPS) equipment (see, for example, Figure 9) and processing software. The Ordnance Survey National Grid (OSGB36) was chosen as it is the most widely used and because it also allows the captured data to be incorporated into other available digital products (such as Ordnance Survey maps). The height datum used was Ordnance Survey Newlyn Datum and was also derived using the GPS.

The surveyor uses a baseline consisting of two semi-permanent GPS base stations (see Figure 8). These stations are located approximately 5730 metres apart and positioned so as to optimise the results for the area of operation (see location map, Figure 13). The base stations are tied into the National GPS Network and are constantly receiving and storing data which allows their position to be monitored and evaluated over long periods of operation. By using the same base stations throughout the survey the surveyor ensures the consistency of the results obtained.

Using the Real Time Kinematic method a real time correction is supplied by each base station to the rover (shown in Figure 10) (over the GSM³ network) physically undertaking the field survey. This enables the rover to determine the co-ordinates of its location instantaneously (i.e. in 'real time'). The rover receives a 'corrected' fix (co-ordinates) from each base station. If the two independent fixes are each within a certain preset tolerance, the rover then averages the two fixes received. The viewpoints are, with a few exceptions, surveyed using this technique. This method of GPS survey (Real Time Kinematic) produces results to an accuracy in plan and height of between 15mm – 50mm as outlined in the "Guidelines for the use of GPS in Land Surveying" produced by the Royal Institute of Chartered Surveyors.

The required points on each building are surveyed using conventional survey techniques utilising an electronic theodolite and reflectorless laser technology (shown in Figures 11 and 12). There are two methods used to fix the building details, namely polar observations⁴ and intersection observations⁵. The position of the theodolite is fixed by the rover as described above. In certain circumstances, a viewpoint may need to be surveyed using conventional survey techniques as opposed to Real Time Kinematic, if, for example, the viewpoint is in a position where GPS information cannot be received.

³ GSM network: the mobile phone network.

⁴ Polar observation is the measurement of a distance and direction to a point from a known baseline in order to obtain co-ordinates for the point. The baseline is a line between two known stations.

⁵ Intersection observation is the co-ordination of a point using directions only from two ends of a baseline.



8



10



9



12



13



11

- 8 Marshall Survey semi-permanent GPS base station
- 9 GPS System
- 10 Field survey being carried out
- 11 Electronic Theodolite
- 12 Field survey being carried out
- 13 Location of Marshall Survey's GPS base stations

4.0 MODEL POSITIONING

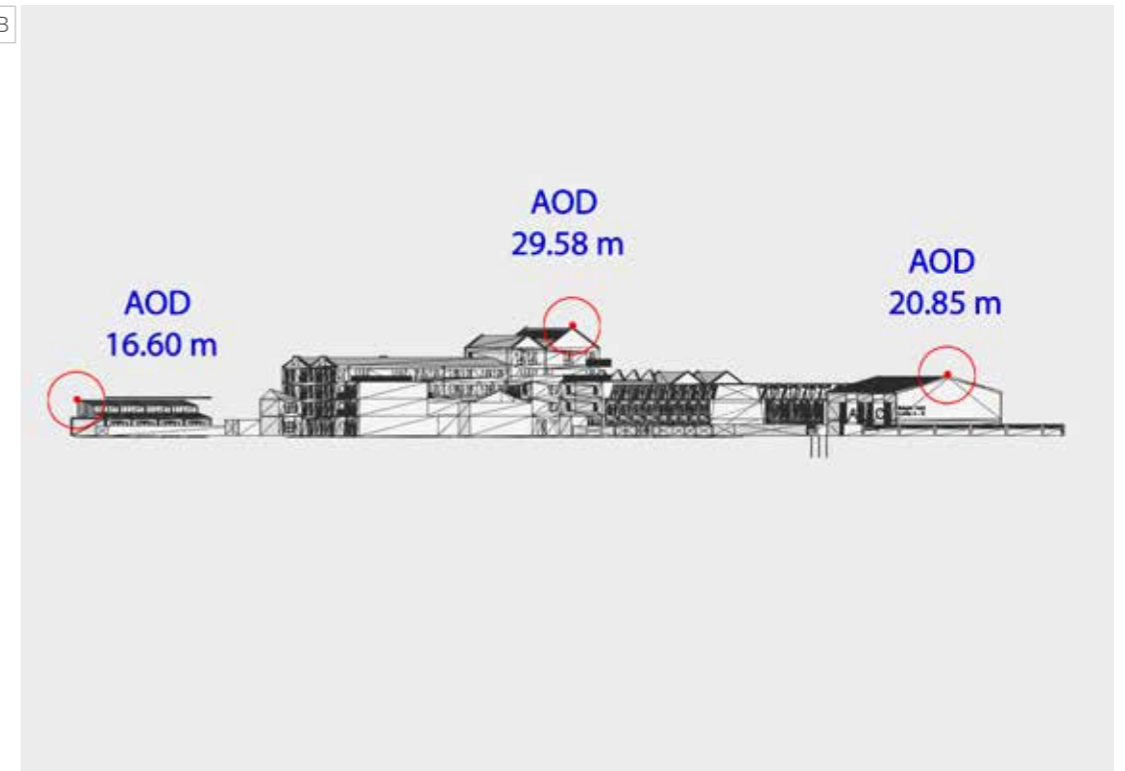
4.1 Height and position check

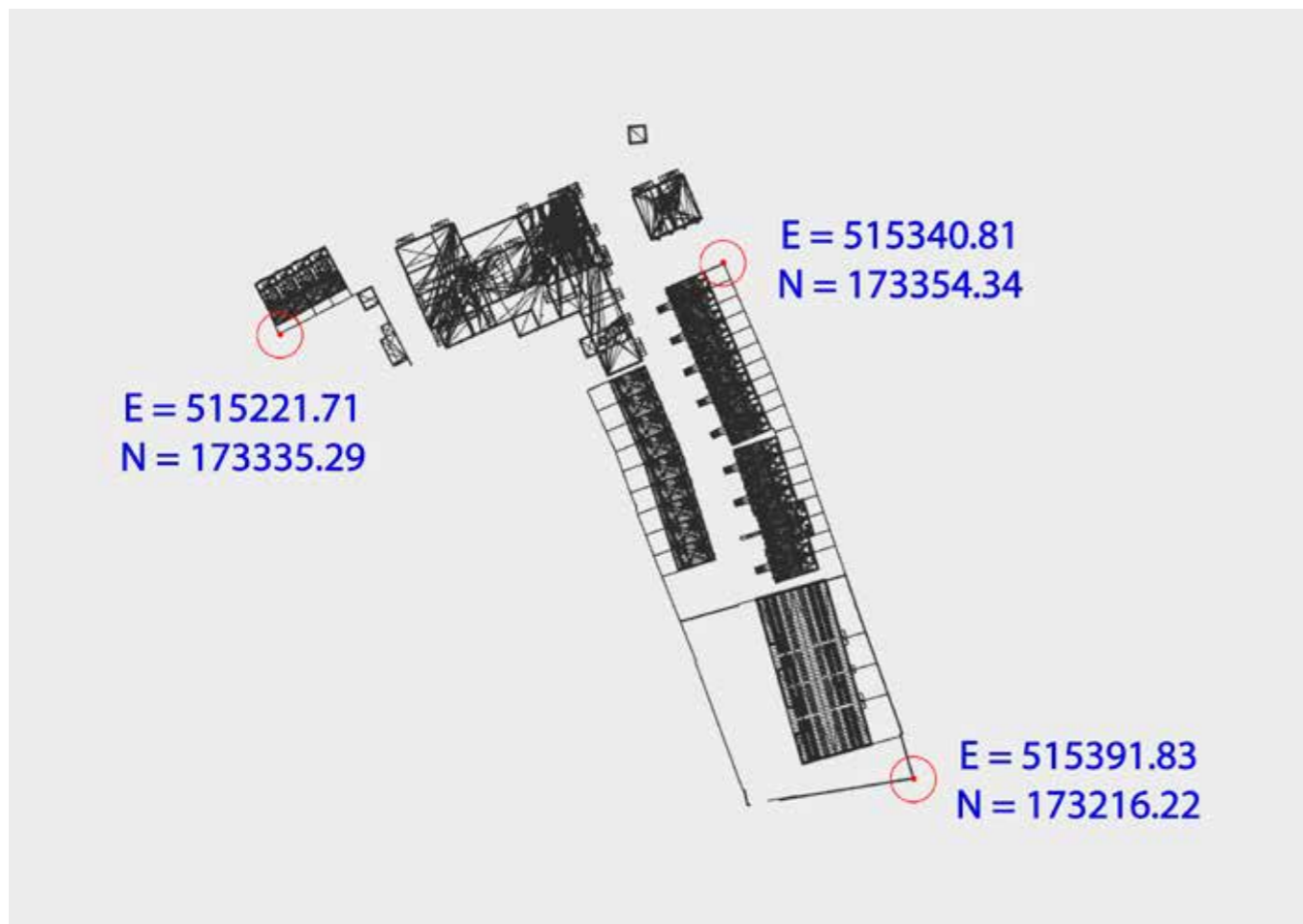
The model is positioned using a site plan provided by the architect. This is then overlaid onto OS positioned survey from a CAD provider. Once the building has been positioned, confirmation of height and position is requested from the architect. At least two clear reference points are agreed and used to confirm the site plan and Ordnance Survey. The height is cross checked against the architects section and given in metres Above Ordnance Survey Datum (AOD).

14A

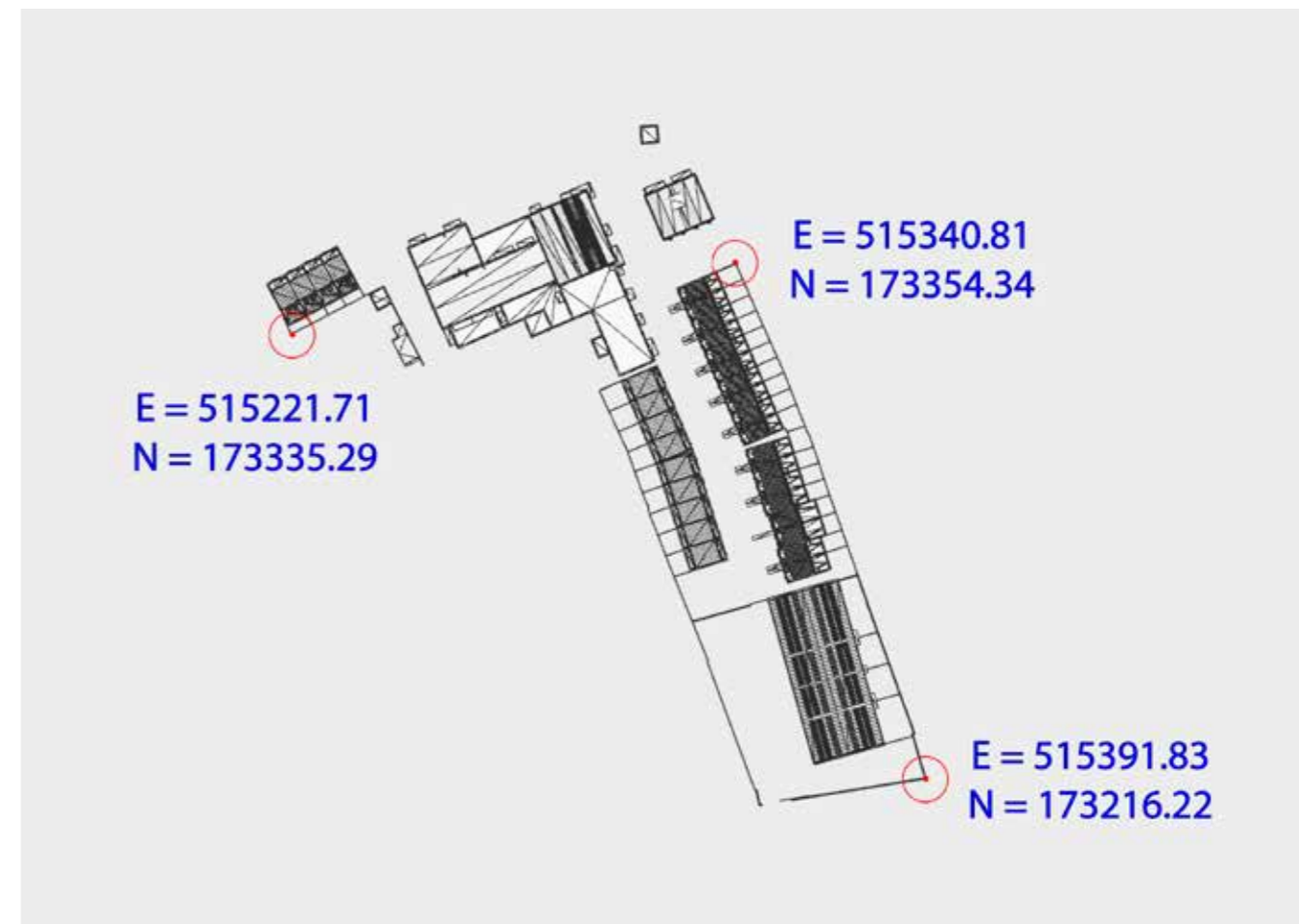


14B





15A



15B

14A Architect's Elevation Drawing

14B Cityscape's Elevation Model

15A Architect's Plan Drawing

15B Cityscape's Plan Model

5.0 CAMERA MATCHING

5.1 Cityscape's Database

Cityscape has built up a comprehensive database of survey information on buildings and locations in central London; the database contains both GPS survey information and information regarding the dimensions and elevations of buildings gathered from architects and other sources. Figure 16 shows a selection of GPS located models (yellow) within Cityscape's database which effectively represents a 3D verified computer 'model' of some prominent buildings in central London. The term '3D model' has been adopted with caution in this methodology as it is thought to be slightly misleading because not every building in central London is included in the database although the majority of those buildings which form part of the 'skyline' are included.

The outlines of buildings are created by connecting the surveyed points or from the information obtained from architects' drawings of particular buildings. By way of example of the high level of detail and accuracy, approximately 300 points have been GPS surveyed on the dome of St. Paul's. The database 'view' (as shown in Figure 16) is 'verified' as each building is positioned using coordinates acquired from GPS surveys.

In many instances, the various co-ordinates of a particular building featured in one of the background plates are already held by Cityscape as part of their database of London. In such cases the survey information of buildings and locations provided by the surveyor (see section 3 above) is used to cross-check and confirm the accuracy of these buildings. Where such information is not held by Cityscape, it is, where appropriate, used to add detail to Cityscape's database. The survey information provided by the surveyor is in all cases used in the verification process of camera matching.

5.2 Cityscape's Database

A wireframe⁶ 3D model of the proposed scheme if not provided is created by Cityscape from plans and elevations provided by the architects and from survey information of the ground levels on site and various other points on and around the site, such as the edge of adjacent roads and bollards etc. provided by the surveyor.

5.3 Camera Matching Process

The following information is required for the camera matching process:

- Specific details of the camera and lens used to take the photograph and therefore the field of view (see section 1);

- The adjusted or corrected digital image i.e. the 'background plate' (see section 2);
- The GPS surveyed viewpoint co-ordinates (see section 3);
- The GPS surveyed co-ordinates of particular points on the buildings within the photograph (the background plate) (see section 3);
- Selected models from Cityscape's database (see section 3);
- The GPS surveyed co-ordinates of the site of the proposed scheme (see section 3);
- A 3D model of the proposed scheme (see section 4).

A background plate (the corrected digital image) is opened on computer screen (for example, Figure 17), the information listed above is then used to situate Cityscape's virtual camera such that the 3D model aligns exactly over the background plate (as shown in Figures 18 and 21) (i.e. a 'virtual viewer' within the 3D model would therefore be standing exactly on the same viewpoint from which the original photograph was taken (Figure 20). This is the camera matching process.

5.4 Wireline Image

Cityscape is then able to insert the wireframe 3D model of the proposed scheme into the view in the correct location and scale producing a verified wireline image of the proposal (shown in Figures 19 & 22).

The camera matching process is repeated for each view and a wireline image of the proposal from each viewpoint is then produced. The wireline image enables a quantitative analysis of the impact of the proposed scheme on views.

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⁶ A wireframe is a 3D model, a wireline is a single line representing the outline of the building.

16 Selected GPS located models (yellow) from Cityscape's database, situated on Cityscape's London digital terrain model

17 Background plate & selected 3D models as seen by the computer camera. Red circle highlights the safe or non-distortive area of the image

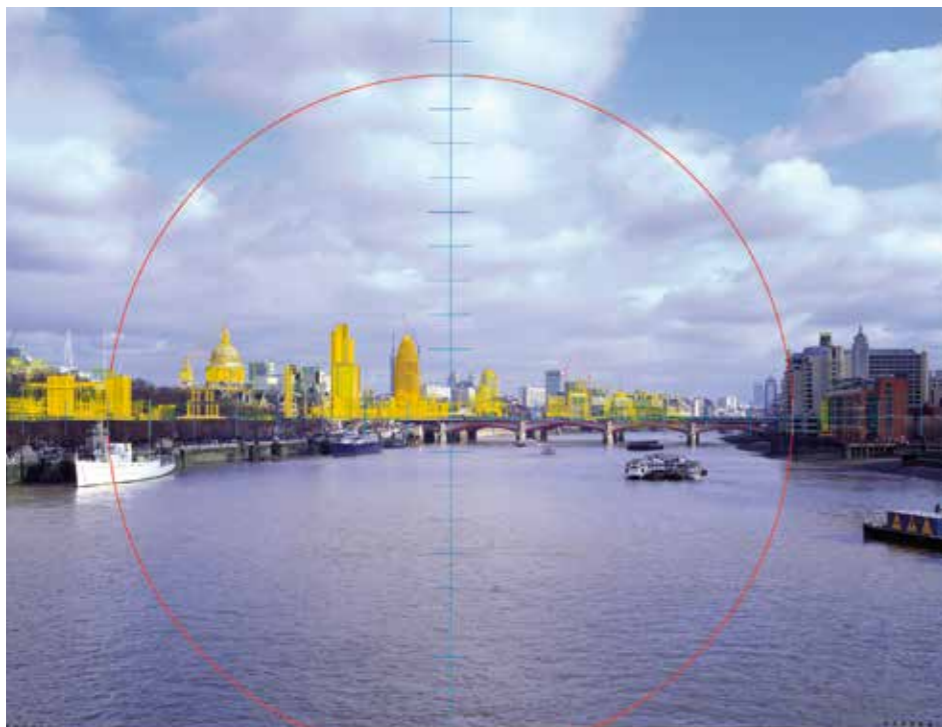
18 Background plate matched to the 3D GPS located models

19 The camera matched background plate with an example of a proposed scheme included in red

20 Background plate: digital photograph, size and bank corrected as described in section 3

21 Camera matching: the background plate matched in the 3D GPS located models

22 The camera matched background plate with the proposed scheme included



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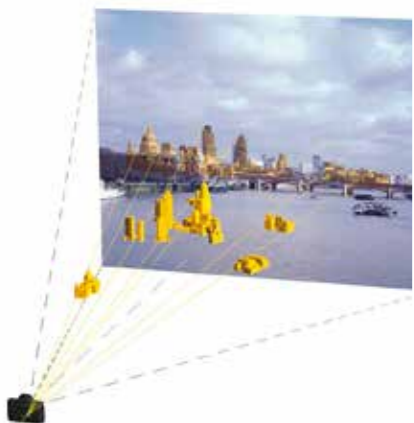


20

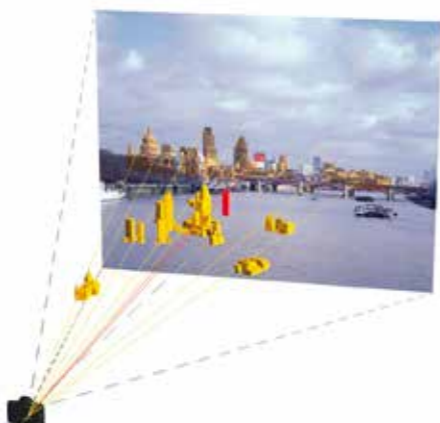


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6.0 RENDERING

6.1 Rendering

Rendering is a technical term referring to the process of creating a two-dimensional output image from the 3D model.

6.2 Texturing

In order to assist a more qualitative assessment of the proposals, the output image needs to be a photo-realistic reflection of what the proposed scheme would look like once constructed. The process of transforming the wireframe 3D scheme model (see Section 7) into one that can be used to create a photo-realistic image is called texturing⁷

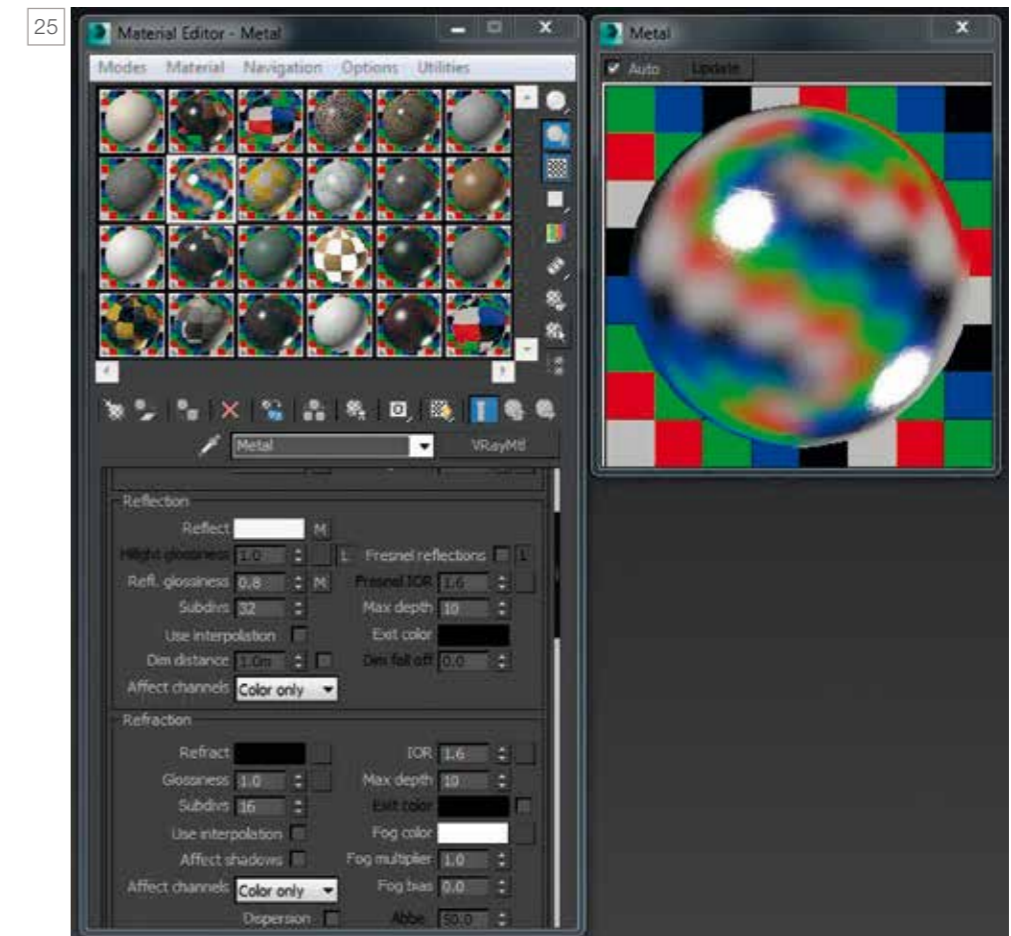
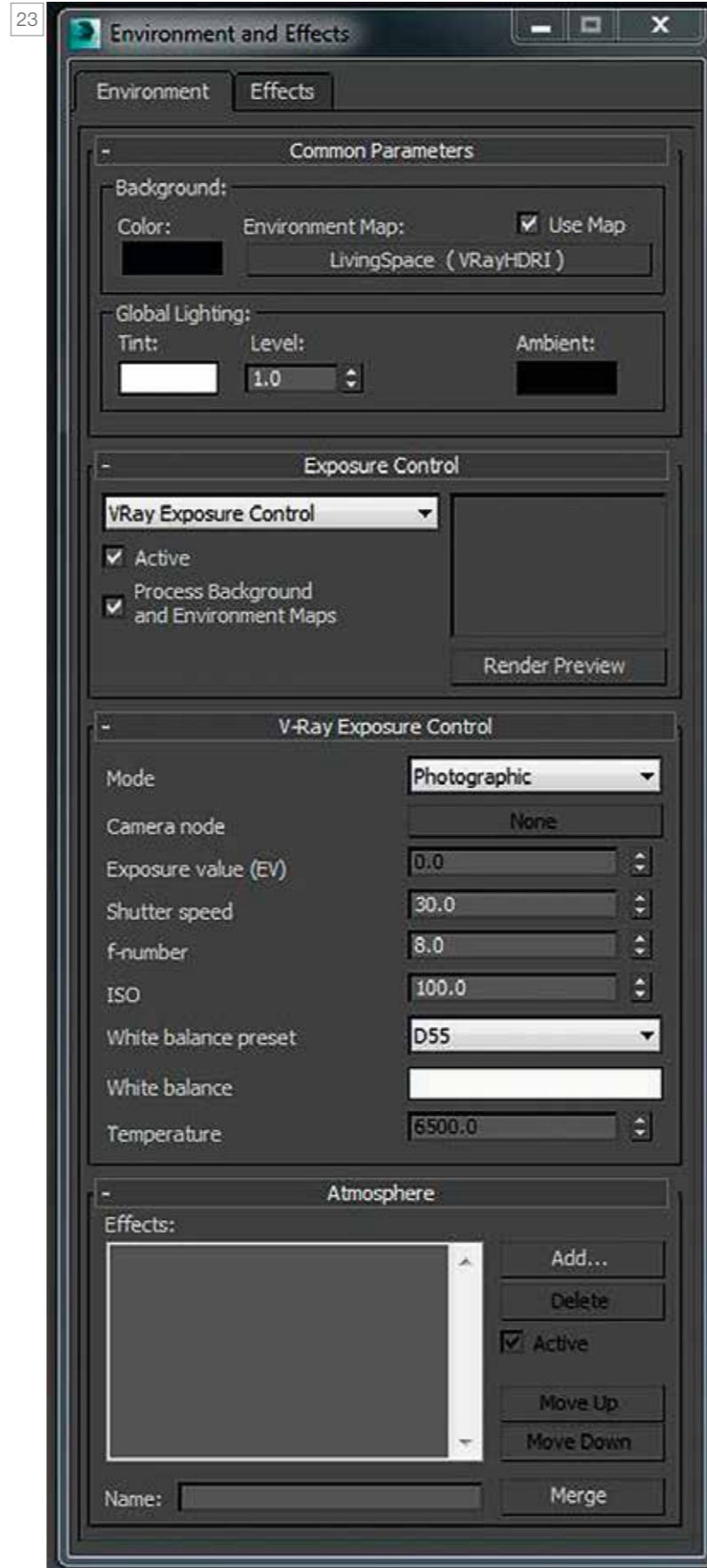
Prior to rendering, Cityscape requires details from the architect regarding the proposed materials (e.g. type of glass, steel, aluminium etc.) to be utilised. Cityscape also use high resolution photographic imagery of real world material samples, supplied by the client or the manufacturer, to create accurate photorealistic textures for use in all our images. This information is used to produce the appearance and qualities in the image that most closely relates to the real materials to be used (as shown in Figures 24 and 25).

6.3 Lighting and sun direction

The next stage is to light the 3D model to match the photographic environment. The date (including the year) and time of the photograph and the latitude and longitude of the city are input (see Figure 23) into the unbiased physically accurate render engine. Cityscape selects a 'sky' (e.g. clear blue, grey, overcast, varying cloud density, varying weather conditions) from the hundreds of 'skies' held within the database to resemble as closely as possible the sky in the background plate. The 3D model of the proposed scheme is placed within the selected sky (see Figure 27) and using the material properties also entered, the computer calculates the effects of the sky conditions (including the sun) on the appearance of the proposed scheme.

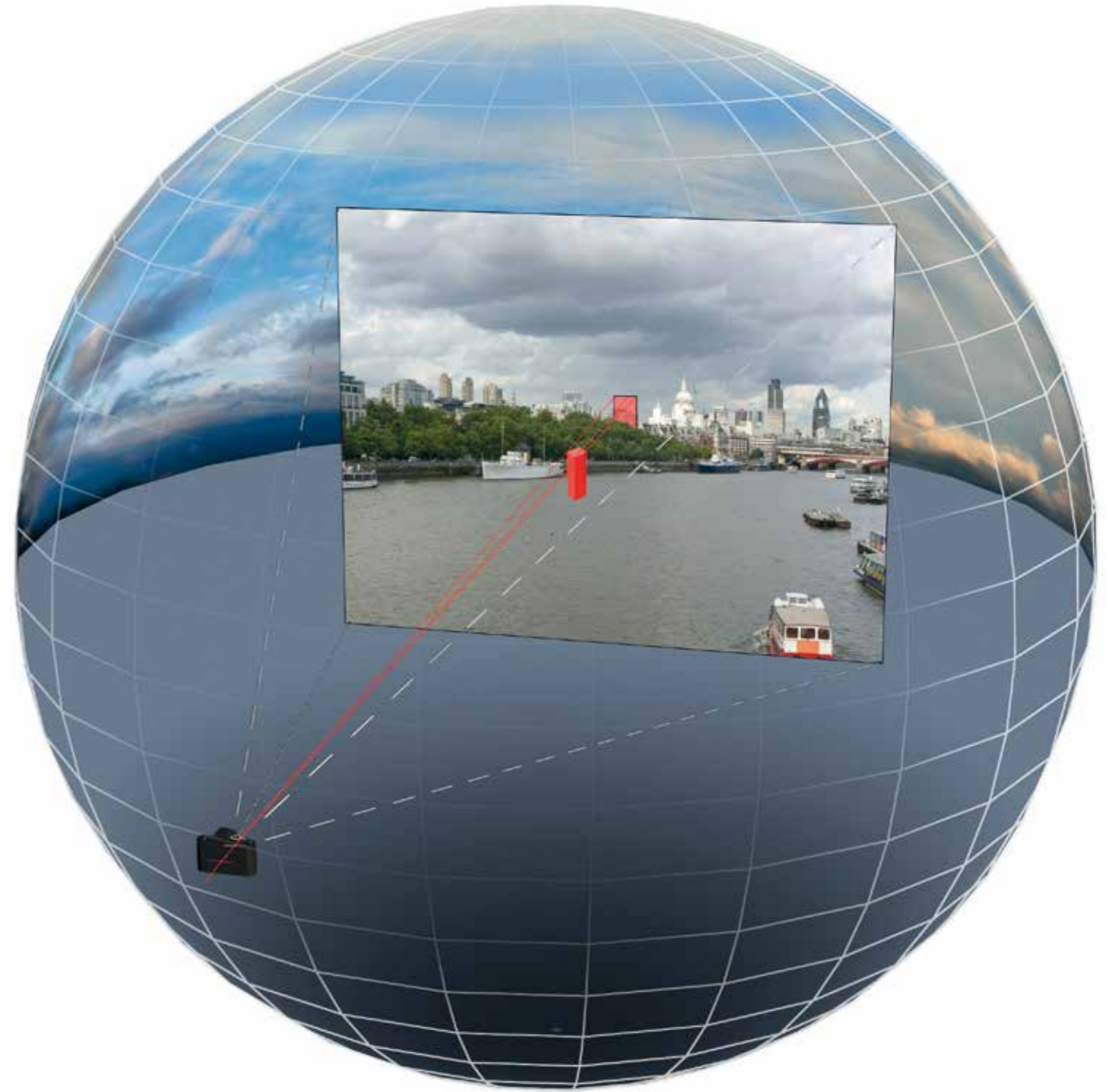
An image of the proposed scheme is produced showing the effect of light and sun (as shown in Figure 26). The selection of the matching sky is the only subjective input at this stage.

⁷ Texturing is often referred to as part of the rendering process, however, in the industry, it is a process that occurs prior to the rendering process.





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- 23 Screenshot of environment information (time, date and year) entered to locate the sun correctly (see section 7.3)
- 24 Screenshot of some materials in the 3D rendering package
- 25 Screenshot of material and surface properties
- 26 Example of rendered scheme using High Dynamic Range Imaging
- 27 Example of a proposed scheme highlighted in red within the selected sky and rendered onto the background plate

7.0 POST PRODUCTION

7.1 Post production

Finally the rendered image of the scheme model is inserted and positioned against the camera matched background plate. Once in position the rendered images are edited using Adobe Photoshop^{®8}. Masks are created in Photoshop where the line of sight to the rendered image of the proposed scheme is interrupted by foreground buildings (as shown in Figure 29).

The result is a verified image or view of the proposed scheme (as shown in Figure 30).

⁸ Adobe Photoshop[®] is the industry standard image editing software.





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28 Background plate

29 Process Red area highlights the Photoshop mask that hides the unseen portion of the render

30 Shows a photo-realistic verified image



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