A5 Methodology for the production of Accurate Visual Representations

Overview of Methodology

A5.1 The study was carried out by Millerhare (the Visualiser) by combining computer generated images of the Proposed Development with either large format photographs or with rendered images from a context model at key strategic locations around the site as agreed with the project team. Surveying was executed by Absolute Survey (the Surveyor).

A5.2 The methodology employed by Millerhare is compliant with Appendix C of the London View Management Framework: Supplementary Planning Guidance (March 2012) and Landscape Institute Technical Guidance Note 06/19.

A5.3 The project team defined a series of locations in London where the proposed buildings might have a significant visual effect. At each of these locations Millerhare carried out a preliminary study to identify specific Assessment Points from which a representative and informative view could be taken. Once the exact location had been agreed by the project team, a photograph was taken which formed the basis of the study. The precise location of the camera was established by the Surveyor using a combination of differential GPS techniques and conventional observations.

A5.4 For views where a photographic context was to be used additional surveying was carried out. A number of features on existing structures visible from the camera location were surveyed. Using these points, Millerhare has determined the appropriate parameters to permit a view of the computer model to be generated which exactly overlays the appropriate photograph. Each photograph has then been divided into foreground and background elements to determine which parts of the current context should be shown in front of the Proposed Development and which behind. When combined with the computer-generated image these give an accurate impression of the impact of the Proposed Development on the selected view in terms of scale, location and use of materials (AVR Level 3).

Spatial framework and reference database

A5.5 All data was assembled into a consistent spatial framework, expressed in a grid coordinate system with a local plan origin. The vertical datum of this framework is equivalent to Ordnance Survey (OS) Newlyn Datum.

A5.6 By using a transformation between this framework and the OSGB36 (National Grid) reference framework, Millerhare have been able to use other data sets (such as OS land line maps and ortho-corrected aerial photography) to test and document the resulting photomontages.

A5.7 In addition, surveyed observation points and line work from Millerhare's London Model database are used in conjunction with new data in order to ensure consistency and reliability.

A5.8 The models used to represent consented schemes have been assembled from a variety of sources. Some have been supplied by the original project team, the remainder have been built by Millerhare from available drawings, generally paper copies of the submitted planning application. While these models have not been checked for detailed accuracy by the relevant architects, Millerhare has used its best endeavours to ensure that the models are positioned accurately both in plan and in overall height.

Process – photographic context

Reconnaissance

A5.9 At each Study Location the Visualiser conducted a photographic reconnaissance to identify potential Assessment Points. From each candidate position, a digital photograph was taken looking in the direction of the Proposed Development using a wide angle lens. Its position was noted with field observations onto an OS map and recorded by a second digital photograph looking at a marker placed at the Assessment Point.

A5.10 In the situation where, in order to allow the appreciation of the wider setting of the proposal, the assessor requires more context than is practical to capture using a wide angle lens, multiple photographs may be combined to create a panorama, typically as a diptych or triptych. This will be prepared by treating each panel as a separate AVR and then combining in to a single panorama as a final process.

A5.11 The Visualiser assigned a unique reference to each Assessment Point and Photograph.

Final Photography

A5.12 From each selected Assessment Point a series of large format photographs were taken with a camera height of approximately 1.6m. The camera, lens, format and direction of view are determined in accordance with the policies set out above

A5.13 Where a panoramic view is specified the camera/tripod head is rotated through increments of 40 degrees to add additional panels to the left and/or right of the main view.

A5.14 The centre point of the tripod was marked and a digital photograph showing the camera and tripod in situ was taken to allow the Surveyor to return to its location. Measurements and field notes were also taken to record the camera location, lens used, target point and time of day.

Surveying the Assessment Points

A5.15 For each selected Assessment Point a survey brief was prepared, consisting of the Assessment Point study sheet and a marked up photograph indicating alignment points to be surveyed. Care was taken to ensure that a good spread of alignment points was selected, including points close to the camera and close to the target.

A5.16 Using differential GPS techniques the Surveyor established the location of at least two intervisible stations in the vicinity of the camera location. A photograph of the GPS antenna in situ was taken as confirmation of the position.

A5.17 From these the local survey stations, the requested alignment points were surveyed using conventional observation.

A5.18 The resulting survey points were amalgamated into a single data set by the Surveyor. This data set was supplied as a spreadsheet with a set of coordinates transformed and re-projected into OSGB36 (National Grid) coordinates, and with additional interpreted lines to improve the clarity of the surveyed data.

A5.19 From the point set, the Visualiser created a three dimensional alignment model in the visualisation system by placing inverted cones at each surveyed point.

Photo preparation

A5.20 From the set of photographs taken from each Assessment Point, one single photograph was selected for use in the study. This choice was made on the combination of sharpness, exposure and appropriate lighting.

A5.21 The selected photograph was copied into a template image file of predetermined dimensions. The resulting image was then examined and any artefacts related to the digital image capture process were rectified.

A5.22 Where vertical rise has been used the image is analysed and compensation is applied to ensure that the centre of the image corresponds to the location of the camera's optical axis.

Calculating the photographic alignment

A5.23 A preliminary view definition was created within the visualisation system using the surveyed camera location, recorded target point and FOV based on the camera and lens combination selected for the shot

A5.24 A lower resolution version of the annotated photograph was attached as a background to this view, to assist the operator to interpret on-screen displays of the alignment model and other relevant datasets.

A5.25 Using this preliminary view definition, a rendering was created of the alignment model at a resolution to match the scanned photograph. This was overlaid onto the background image to compare the image created by the actual camera and its computer equivalent. Based on the results of this process adjustments were made to the camera definition. When using a wide angle lens observations outside the circle of distortion are given less weighting.

A5.26 This process was iterated until a match had been achieved between the photograph and alignment model. At this stage, a second member of staff verified the judgements made. An A3 print was made of the resulting photograph overlaid with the alignment model as a record of the match. This was annotated to show the extents of the final views to be used in the study.

Example of alignment model overlaid on the photograph

Preparing models of the Proposed Development

A5.27 A CAD model of the Proposed Development was supplied by the Architect. The level of detail applied to the model is appropriate to the AVR type of the final images.

A5.28 Models of the Proposed Development and other schemes are located within the spatial framework using reference information supplied by the Architect or, when not available, by best fit to other data from the spatial framework reference database . Study renders of the model are supplied back to the Architect for confirmation of the form and the overall height of the Proposed Development. The method used to locate each model is recorded. Each distinct model is assigned a unique reference code by the Visualiser.

Determining occlusion and creating simple renderings

A5.29 A further rendering was created using the aligned camera, which combined the Proposed Development with a computer-generated context. This was used to assist the operator to determine which parts of the source image should appear in front of the Proposed Development and which behind it. Using this image and additional site photography for information, the source file is divided into layers representing foreground and background elements.

A5.30 In cases where the Proposed Development is to be represented in silhouette or massing form (AVR1 or AVR2), final renderings of an accurate massing model were generated and inserted into the background image file between the foreground and background layers.

A5.31 Final graphical treatments were applied to the resulting image as agreed with the Architect and environmental and planning consultants. These included the application of coloured outlines to clarify the reading of the images or the addition of tones to indicate occluded areas.

Creating more sophisticated renderings

A5.32 Where more sophisticated representations of the Proposed Developments were required (AVR3) the initial model is

developed to show the building envelope in greater detail. In addition, definitions were applied to the model to illustrate transparency, indicative material properties and inter-reflection with the surrounding buildings.

A5.33 For each final view, lighting was set in the visualisation system to match the theoretical sunlight conditions at the time the source photograph was taken, and additional model lighting placed as required to best approximate the recorded lighting conditions and the representation of its proposed materials.

A5.34 By creating high resolution renderings of the detailed model, using the calculated camera specification and approximated lighting scenario, the operator prepared an image of the building that was indicative of its likely appearance when viewed under the conditions of the study photograph. This rendering was combined with the background and foreground components of the source image to create the final study images.

A5.35 A single CAD model of the Proposed Development has been used for all distant and local views, in which the architectural detail is therefore consistently shown. Similarly a single palette of materials has been applied. In each case the sun angles used for each view are transferred directly from the photography records.

A5.36 Material definitions have been applied to the models assembled as described. The definitions of these materials have been informed by technical notes on the planning drawings and other available visual material, primarily renderings created by others. These resulting models have then been rendered using the lighting conditions of the photographs.

A5.37 Where the Proposed Development is shown at night-time, the lightness of the scheme and the treatment of the materials was the best judgment of the visualiser as to the likely appearance of the scheme given the intended lighting strategy and the ambient lighting conditions in the background photograph.

A5.38 Where a panoramic view is specified each panel is prepared by treating each photograph as an individual AVR following the process described in the previous paragraphs. The panels are then arranged side by side to construct the panorama. Vertical dividers are added to mark the edge of each panel in order to make clear that the final image has been constructed from more than one photograph.

Documenting the study

A5.39 For each Assessment Point a CAD location plan was prepared, onto which a symbol was placed using the coordinates of the camera supplied by the Surveyor. Two images of this symbol were created cross-referencing background mapping supplied by Ordnance Survey.

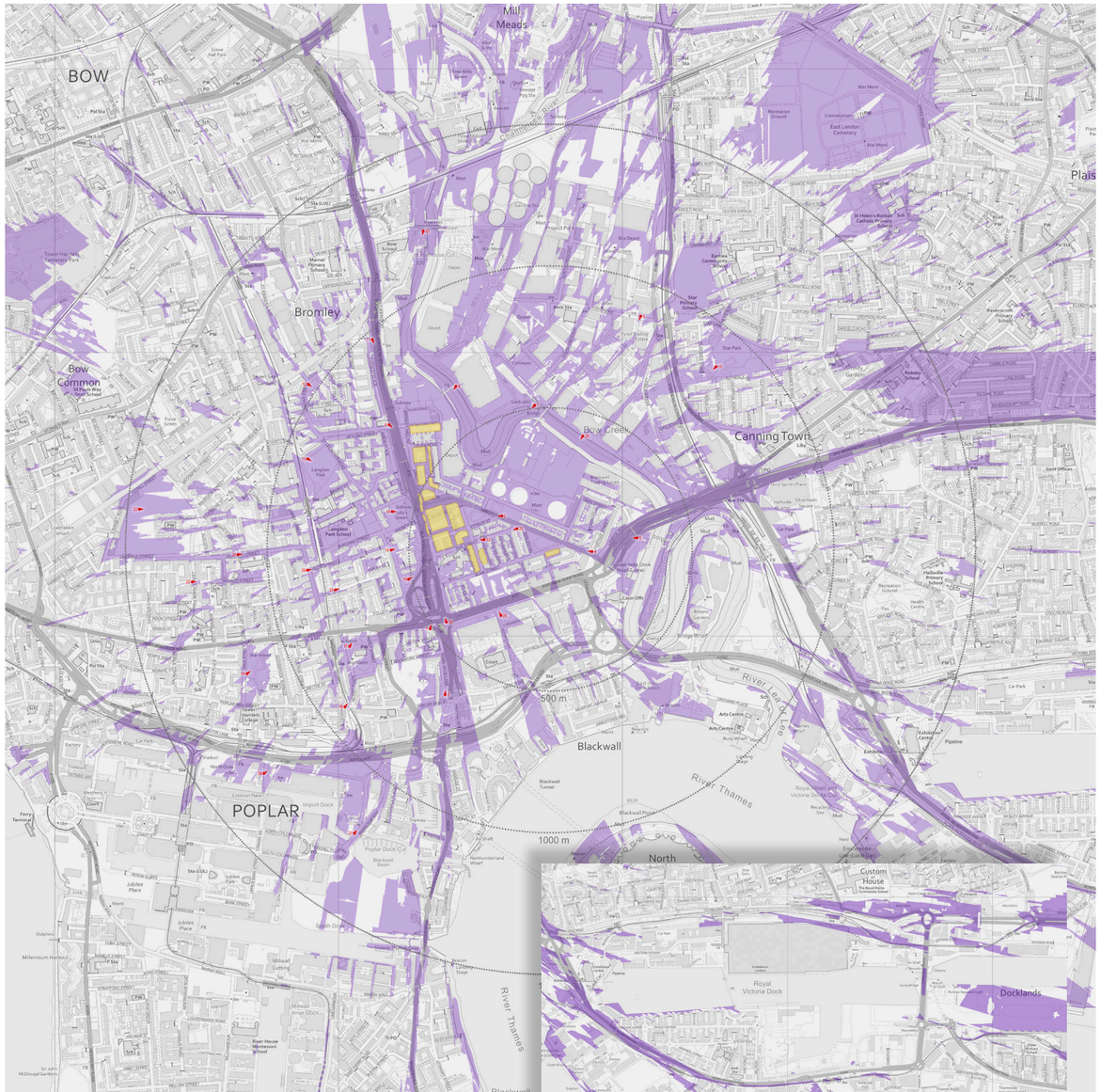
A5.40 The final report on the Study Location was created which shows side by side, the existing and proposed prospect. These were supplemented by images of the location map, a record of the camera location and descriptive text. The AVR level is described.

A5.41 Peripheral annotation was added to the image to clearly indicate the final FOV used in the image, any tilt or rise, and whether any cropping has been applied.

A5.42 Any exceptions to the applied policies or deviations from the methodology were clearly described.

A5.43 Where appropriate, additional images were included in the study report, showing the Proposed Development in the context of other consented schemes.

A6 Zone of Theoretical Visibility



Plan diagram showing areas of visibility – proposed condition

Plan diagram over The Thames Barrier – proposed condition

Plan diagram showing areas of visibility – cumulative condition

Plan diagram over The Thames Barrier – cumulative condition

Appendices (continued)

A7 Views for On-site Assessment

A7.1 The following pages show the Cumulative condition of each view printed at the optimum scale for assessing the Proposed Development on site. When these pages are held at a comfortable viewing distance features shown in the AVRs will appear at the same size as they do in the actual scene.

Desktop versus on-site assessment

A7.2 The AVRs prepared for this document have been based on photography taken with a small range of lenses. The choice of lens is based on the principles defined in the Method Statement. In making a lens selection, and hence of the Field of View to be included, the primary criterion is the need to provide clear reproduction whilst including adequate context to assess the Proposed Development.

A7.3 In Section 6 "Potential Effects" the presentation of the AVRs has been designed to present a clear assessment of the Proposed Development suitable for desktop study. In combining the AVRs with the assessment text a page layout has been adopted which facilitates comparison between the baseline, proposed and cumulative conditions and ensures that wherever possible the commentary can be read alongside the view being discussed.

A7.4 In situations where the decision makers or consultees wish to review the AVRs on site, which is highly recommended, there may be an additional requirement to provide a means of comparison between the view as perceived today and as it would appear were the Proposed Development present.

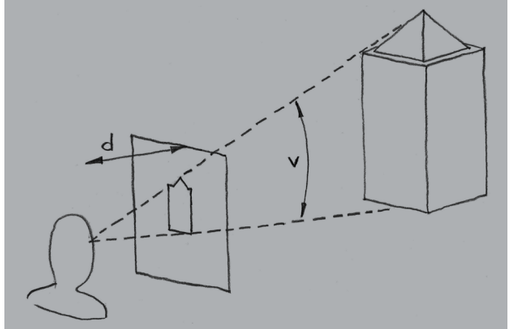
A7.5 In such situations it can be argued that the ideal presentation is one were, while holding the document at a comfortable viewing distance, features in the AVR have the same apparent scale on the paper as they do in the real scene. This effect is achieved if the images can be viewed at their "Natural Viewing Distance (see side panel).

A7.6 In the following pages, the Cumulative condition of each view is printed at a scale such that the Natural Viewing Distance is 40 cm. This means that each page can be held up to the view at approximately arms length and when doing so the angle subtended by a feature on the page will be very close to the angle subtended by the feature in the real scene.

Natural Viewing Distance

The Natural Viewing Distance of a print is the distance at which the perspective of the photograph correctly reproduces the perspective seen from the location from which the photograph was taken (distance d in the diagram below).

When viewed from this distance the angle occupied by a feature in the print will be the same as the angle occupied by the feature in the real world (v).



This distance is also referred to as the Correct Viewing Distance. Note that a camera and lens combination does not of itself have a Natural Viewing Distance; it is a function of both the lens used for the original photograph and the dimensions at which it is reproduced.

If the print is held further away from the eye than the Natural Viewing Distance then features will appear too small compared with the real world, and conversely if the print is held too close then objects will appear to be too large.

When using A3 sized prints a viewing distance in the range 30 cm to 50 cm is preferred. In this range the viewer is able to hold the document at a comfortable viewing distance and alternate their focus between the AVR and the existing scene and make a direct comparison between the two. If the Natural Viewing Distance is too small then only the AVR or the scene would be visible at one time.

A natural consequence of the use of A3 sized prints and a viewing distance in the range 30 cm to 50 cm is that images which exhibit either weak or strong perspective are avoided.

Methodology

A7.7 All images in this section have been placed on the page at a scale calculated to give a Natural Viewing Distance of 40 cm. Using this dimension, most assessors will be able to hold the document comfortably and focus on the print.

A7.8 Due to the maximum paper size of A3, some AVRs require cropping of the view in order to enlarge the image to a point where the correct viewing distance can be achieved.

A7.9 When the AVR fills the A3 page, the Horizontal Field of View represented is 55 degrees. Intermediate angles are indicated with a simplified graticule at the edge of the page.

A7.10 When the Horizontal Field of View of the base photograph is less than 55 degrees, some white space will be present around the AVR.

A7.11 Portrait format views are rotated by 90 degrees in order to show the maximum amount of the AVR.

1 South of East India Dock Road

Viewing distance 40cm

25 20 15 10 5 5 10 15 20 25