RETFORD CIRCULAR ECONOMY PROJECT

TECHNICAL APPENDIX 7.4 ZONE OF THEORETICAL VISIBILITY (ZTV) METHODOLOGY

FEBRUARY 2023

APPENDIX 7.4: VIEWPOINT PHOTOGRAPHY AND ZONES OF THEORETICAL METHODOLOGY

1 INTRODUCTION

Viewpoint analysis is used to assist the LVIA and is conducted from selected viewpoints within the 2 km radius Study Area. The purpose of this is to assess both the level of visual impact for particular receptors and to help guide the design process and focus the landscape and visual assessment.

A range of viewpoints are examined in detail and analysed to determine whether a significant visual effect would occur. By arranging the viewpoints in order of distance it is possible to define a threshold or outer limit beyond which there would be no further significant effects.

The assessment involves visiting the viewpoint location and viewing wireframes and photomontages prepared for each viewpoint location. The fieldwork is conducted in periods of fine weather and good visibility and also considers seasonally reduced leaf cover.

Viewpoint selection followed good practice guidance and in particular paragraphs 6.18 to 6.20 of GLVIA3. The viewpoints chosen were used to aid the description of effects on both landscape and visual resources.

The selection of viewpoints was made on the basis of the following types of publicly accessible viewpoints, as follows:

- Representative viewpoints (for example, representing views of users of a particular footpath);
- Specific viewpoints (for example, a key view from a specific visitor attraction);
- Illustrative viewpoints (chosen to demonstrate a particular effect/specific issue);
- Any important sequential views, for example, along key transport routes; and
- Any additional viewpoints that have been requested by consultees at Scoping.

For the purposes of the LVIA, all of the viewpoints were taken from publicly accessible locations.

Baseline photographic panoramas have been produced for twelve viewpoints to illustrate the nature of existing baseline views in the direction of the Proposed Development. A baseline photographic survey has been undertaken using a digital SLR camera in accordance with current good practice guidance[1].

The methodology for photography follows GLVIA3 and the Landscape Institute's TGN 06/19 'Visual Representation of Development Proposals'[2]. A full methodology for photomontage preparation is included.

Photographs were taken in RAW format using both a Nikon D3 and Canon 5D Mark 3 Digital SLR camera for viewpoint photography and visualisations. The time, date, altitude and grid coordinates for each frame were recorded.

2 ZTV METHODOLOGY

To assist with viewpoint selection and to appreciate the potential influence of the development in the wider landscape, preliminary ZTV plans are used. ZTV plans illustrate

[1] Landscape Institute/ Institute of Environmental Management and Assessment (2013), 'Guidelines for Landscape and Visual Impact Assessment', 3rd Edition ('GLVIA3') Accessed 07.02.2023; and

[2] Landscape Institute, 2019, Technical Guidance Note 06/19 Visual representation of development proposals https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2019/09/LI_TGN-06-19_Visual_Representation.pdf Accessed 07.02.2023

the area from where it may be theoretically possible to view all, or part, of the Proposed Development. The ZTVs provide a starting point in the assessment process and accordingly tend towards giving a 'worst case' or greatest calculation of the theoretical visibility.

Arcus has developed an additional methodology to supplement the 'Bare Earth ZTV' and this has been refined using the topographic survey of the site, which enables a more accurate representation of viewpoint assessment and a greater understanding of the visual baseline. Ordnance Survey Terrain 5 dataset was used as the Digital Terrain Model (DTM) for the 'Bare Earth ZTV'. The "Bare Earth ZTV" is created by highlighting areas on the DTM where a potential piece of infrastructure may be visible, based on the DTM. This DTM is a 5 m by 5 m raster dataset that is representative of the landform across Great Britain. The ZTV "Bare Earth ZTV" does not however, take account of the screening effects of buildings, localised landform and vegetation. As a result, there may be roads, tracks and footpaths in the vicinity of the site and in the wider setting which, although shown as falling within the ZTV, are screened or filtered by banks, walls and vegetation which would otherwise preclude viewing opportunities.

In this instance, two ZTVs have been prepared: 'bare-earth' and 'screened' (refer to Figures 7.4 and 7.5).

The 'Screened ZTV' has been refined using Environment Agency LiDAR in combination with buildings and woodlands data, to enable a better understanding of the likely visual footprint of the Development. The "Screened ZTV" used LiDAR data to show the screening effects of all structures within the study area including built elements and existing vegetation.

Both 'Bare Earth ZTV' and 'Screened ZTV' were produced using ArcGIS Pro 3.0 software, and the calculations were based on the proposed infrastructure. The height value given to the infrastructure was dependent on the height parameters set out in Chapter 7 LVIA, Section 7.8 Development Proposals Summary. This would still represent theoretical visibility and would be considered in line with fieldwork to ground truth the findings of the data.

3 PHOTOGRAPHY PROTOCOLS

The viewpoints are prioritised based on their location in relation to the proposed site. This is so that viewpoints east of the site are visited in the morning and viewpoints west of the site are visited in the afternoon to guarantee where possible that the sun is behind the photographer at the time of any viewpoint photography being captured. Viewpoint location maps at 1:25,000 are printed for each viewpoint to aid location once on site.

Upon arrival at each proposed viewpoint location, minor adjustments to position are made in order to obtain as clear and direct a view to the site centre as possible, avoiding trees, landscape or man-made obstructions where possible.

The tripod is set up. The camera is placed on the panoramic head in a portrait orientation where its height is confirmed and set at 1.6 m (please note: a portrait camera orientation is sometimes used in situations where the viewpoint is very close to a development in order that the top of the development is not cut off by the image boundaries). The head is then levelled followed by levelling of the camera itself using a hot-shoe spirit level. With the camera's viewfinder centred on the perceived site centre, exposure and focus settings are taken. These are then fixed manually on the camera so that they cannot be inadvertently altered. The head is rotated 90° to the left where the first frame of the 360° sequence is then taken. Each subsequent frame is taken using a 50% overlap of the previous frame until the full 360° sequence is captured.

The camera is then removed from the tripod and a viewpoint location photograph is captured showing the tripod in its position.

The camera and tripod configuration used is as follows:

Nikon D3 –Photography and Visualisations

- Camera body: Nikon D3 professional specification digital SLR (full frame CMOS sensor)
- Camera lens: Nikon AF 50mm f1.8 prime
- Tripod: Manfrotto 055MF4 with Manfrotto 438 ball leveller
- Panoramic head: Manfrotto 303SPH

Camera settings used for all photography:

- Camera mode: Manual Priority
- ISO: 200
- Aperture: f13
- Image format: RAW

The single frame photographs are opened in Adobe Photoshop CC2022 where they are checked and any dust spots are removed before being saved as a high-resolution TIFF image.

Photos are stitched together to create panoramas from the individual images making up the required field of view. Stitching is done in PTGui Pro version 10.0.12 professional photographic stitching software using the required projection settings. They are then checked and any further dust spots are removed before being saved as a high-resolution TIFF image.

4 PHOTOMONTAGE METHODOLOGY

The methodology used and outlined in further detail below was compliant with relevant sections of:

- 'Guidelines for Landscape and Visual Impact Assessment' Third Edition, Landscape Institute and the Institute of Environmental Assessment, 2013 (GLVIA3)[3]; and
- Landscape Institute (2019) Advice Note TGN 06/19 Visual Representation of Development Proposals[4].

In producing the computer model and verified view, the following methodology has been used:

- Viewpoint locations are inputted using GPS data collected on-site;
- 3DS max standard cameras are correctly positioned in virtual space;
- The viewpoint photography is loaded and aligned into the environment background;
- The cameras field of view is overwritten in 3DS max to match the field of view of the single photo the direction and viewing angle of each camera is aligned using GPS data and matched up to the surveyed reference points (provided by the surveyors);
- The rendered images have been stitched in cylindrical projection using the PTGui Software; and
- The lighting in the model is matched as closely as possible to the lighting within the day and time of the photography for each viewpoint.
- The stitched images are rendered for each viewpoint and merged with the full resolution base photographs using Adobe Photoshop; and
- Any foreground elements within the panorama are masked out.

[3] Landscape Institute/ Institute of Environmental Management and Assessment (2013), 'Guidelines for Landscape and Visual Impact Assessment', 3rd Edition ('GLVIA3');
[4] Landscape Institute (2019) Advice Note TGN 06/19 Visual Representation of Development Proposals Available online: https://www.landscapeinstitute.org/visualisation/ Accessed: 05/02/2023.