Great Yarmouth Third River Crossing

Application for Development Consent Order

Document 6.2: Environmental Statement Volume II: Technical Appendix 10B: Photomontage Production Methodology

Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (as amended) ("APFP")

APFP regulation Number: 5(2)*(a)*

Planning Inspectorate Reference Number: TR010043

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Document Reference: 6.2 – Technical Appendix 10B

Version Number: 0 – Revision for Submission

Date: 30 April 2019

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1 Verified Photomontage Methodology

1.1 Overview

1.1.1 The purpose of this document is to set out the method that was followed when preparing the verifiable computer-generated photomontages, with the aid of 3D visualisations, from an agreed range of viewpoints for the Scheme townscape assessment.

1.1.2 These are used to visually represent the Scheme within the Environmental Statement (document reference 6.1), and to ensure they comply with current industry best practice. The methodology is based upon the following documents:

- Landscape Institute Advice Note 01/2011: Photography and photomontage in landscape and visual assessment (Ref 10B.1).
- Guidelines for Landscape and Visual Impact Assessment - 3rd edition (GLVIA3) – Landscape Institute IEMA (Ref 10B.2).
- Scottish Natural Heritage – Visual Representation of wind farms February 2017 (Ref 10B.3).

1.1.3 The verifiable photomontages have been based on accurately captured and surveyed verifiable photography. Summer photography was captured between March 2017 and October 2017.

1.2 Photography

1.2.1 The photographs were captured by the following method:

- Where possible, the Scheme was positioned in the middle of the panorama. Photographs were taken in suitable weather conditions and ideally in clear visibility.
- The views have been photographed with a full frame digital SLR camera with a fixed 50mm lens. A Canon 6D Mark III was used.
- The camera was mounted in portrait format on a tripod with a panoramic head attached. The lens centre (its nodal point) was set at an eye level of

approximately 1.6m although the camera height may have been different if features such as fences or hedges obscured the view.

- The Camera's location was recorded using a X,Y,Z coordinate from the total station with offset to account for the lens. Camera setup levelled using levelling plate and levelling centre column.
- Camera set to manual focus; ISO100-400 with an aperture set to record an adequate depth of field (F8-F11) and white balance set appropriately to conditions.
- The camera was rotated between 15-20° to allow for a 50% overlap between each photograph.
- Images were captured in High Resolution JPEG format which includes lens distortion correction.
- The photography and surveying were undertaken simultaneously in order to avoid problems with markers in soft ground moving or being removed altogether.

1.3 Field of View

1.3.1 For the Scheme under consideration each viewpoint required a panorama using stitched individual images each with a field of view of 27 degrees. The extents of the Scheme and its relevant context determined the horizontal field of view required for photography and photomontage from any given viewpoint. Professional judgement based on experience of similar schemes was used to determine the required horizontal field of view to best represent the development from each viewpoint.

1.4 Verifiable Surveying

1.4.1 The following techniques were used to verify the survey data:

- A Leica Total Station was used by the surveyor to accurately record the camera position and also capture an array of selected survey reference points used to camera match and calibrate the photography. All survey points were captured in the British National Grid (BNG) co-ordinate system, recording an X, Y and Z co-ordinate for each.
- Each camera location was surveyed together with a series of clearly defined detail points within the image (e.g. corners of road markings, features on road signs, corners of building features etc.). Where a viewpoint does not contain many or any fixed targets suitable for

surveying, temporary targets were set up to allow the survey to be completed at the same time as the photography.

- Each image had a sufficient amount of clearly defined detail points taken across the width of the image and at near, mid and far distance (i.e. a balance of points across the photograph). Where possible these numbered between 8-12 points. Each detail point was given a unique number that related to the viewpoint number.
- The survey data was post-processed by the chartered surveyor to increase accuracy and then supplied in an Excel table for each set of viewpoint photography.
- A CAD file was provided containing the detail points and camera positions;

1.5 Model Assembly

1.5.1 The following methods were used to assemble the 3D model:

- Surveyed X, Y, Z co-ordinates of reference points and the camera position were set up in 3DS Max;
- The 3D building computer model of the Scheme as defined within the Scheme Description;
- The 3D computer model was georeferenced using supplied drawing data;
- Within the 3D software a virtual camera was set up using the coordinates provided by the surveyor and aligned with the reference markers;
- A lighting environment was set up within the 3D software, using the metadata stored in the image and also surveyor location data;
- A 3DS Max model file for each viewpoint was assembled before rendering. The assembled model contains the relevant Proposed Scheme digital terrain model tiles and any structures, buildings or further elements (as defined above) that can be seen in the viewpoint.

1.6 Camera Matching

1.6.1 The following describes the process of ‘camera matching’ to create a virtual camera:

- The process of camera matching creates a virtual camera in the same location and height, and pointing in the same direction as the physical camera used on site to capture the image.
- Each viewpoint has it survey points in place and the camera was set to the required field of view and view direction. (Generally, between 75-90°).
- The process involved accurately positioning the 3D model of the Proposed Scheme within each existing view. This was achieved through a process of matching the surveyed points in the digitised image with those recorded by the survey team on the existing photographs.
- The survey points and specifications of the lens type relating to each view were also entered into 3DS Max.
- The survey points of the camera position and each clearly defined detail point (relating to specified objects in the view) were then highlighted on the digitised image.
- Once the process of camera matching was completed, the 3D model of the Scheme was accurately positioned within each of the views captured. This was achieved by rendering the camera matched 3D model of the Scheme within 3DS Max at the same size as the digitised existing view.
- To aid in greater accuracy of real life camera settings and the production of cylindrical projection, wide angle panoramas which match the photography stitch, a plug-in programme called Vray was used. Each of the views was rendered using the Vray Rendering Engine software.
- Individual elements were rendered out using different map channels to create masks (for example mask for the digital terrain model, earthworks, overhead line equipment, fencing, shadows etc). These masks ensured each visible element of the Scheme could be independently selected when individually placed into the Adobe Photoshop file for final production.

1.7 Producing the Photomontage

1.7.1 The following describes the process of producing of photomontage:

- The JPEGs were lens corrected and then stitched into a panorama using a cylindrical projection using Adobe Photoshop.
- At this stage panoramas were checked for acceptability by the project landscape architect.
- The renders of the 3D model were superimposed onto the existing photos in Photoshop. The foreground of the existing photos visible in front of the Proposed Scheme were then carefully copied and masked to ensure the render of the 3D model sat accurately within the depth of the view. The

compositing process involved digitally removing existing features such as trees that were within the extents of the proposed development.

- The textured render of the 3D model was then further adjusted to match the resolution, colouring and saturation of the photograph captured to create an accurate impression of what the textures of the buildings and structures will look like.
- Soft landscaping was generated within the virtual model and rendered or added in Photoshop to as accurately as possibly reflect how the Scheme would look in Years 1 and 15, taking into account growth rates of any planting.

1.8 Photomontage Presentation Layouts

1.8.1 The following describes how each photomontage is presented:

- The standard Layout is A1 Landscape with a field of view generally between 75° - 90°.
- Each view is annotated with specific camera and viewpoint information and if necessary any disclaimers.
- When printing there should be no scaling or fit to page options selected as this would alter the size of the image. A high-quality print setting with a minimum resolution of 300 dpi should be used.

2 References

Ref 10B.1: Landscape Institute (2017). Photography and photomontage Advice Note 01/2011. (online) (Accessed June 2018).

Ref 10B.2: Landscape Institute and Institute of Environmental Management and Assessment (2013) Guidelines for Landscape and Visual Impact Assessment 3rd Edition, London: Routledge

Ref 10B.3: Scottish Natural Heritage (2017). Visual Representation of Wind Farms. Guidance. Version 2.2.