A12 Chelmsford to A120 widening scheme

TR010060

6.3 ENVIRONMENTAL STATEMENT

APPENDIX 8.5 TECHNICAL PHOTOMONTAGE METHODOLOGY

APFP Regulation 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

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A12 Chelmsford to A120 widening scheme

Development Consent Order 202[ ]

ENVIRONMENTAL STATEMENT
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Regulation Reference	Regulation 5(2)(a)
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CONTENTS

1 Introduction

1.1.1 This methodology document explains the visualisation production process undertaken in accordance with the following core guidance documents (refer to end of document for full details):

- Landscape Institute Technical Guidance Note 06-19 Visual Representation of Development Proposals (LI TGN 06/19) (Landscape Institute, 2019); and
- Guidelines for Landscape and Visual Impact Assessment, Third Edition (GLVIA3) (Landscape Institute and Institute of Environmental Management and Assessment, 2013).

2 Viewpoint selection

2.1.1 A mix of representative viewpoints have been chosen to illustrate likely significant effects from a range of different types of visual receptors.

Visualisation type determination

2.1.2 LI TGN 06/19 identities a process of determining the Visualisation Type by way of a proportionate appraisal of project type/scale, likely audience, visualisation purpose and anticipated level of visual effect. This has been undertaken by a suitably qualified Landscape Architect based on site and design data, and in accordance with GLVIA3 and the Design Manual for Roads and Bridges (DMRB) LA 107 Landscape and Visual Effects Revision 2 (Highways England, 2020).

2.1.3 The proposed scheme comprises a major highway scheme, which would result in likely significant landscape and visual effects. The purpose of the visualisations is to illustrate the likely change in view from a proportionate selection of representative viewpoints that may occur as a result of the proposed scheme being introduced into that view. The visualisations have been incorporated within the Landscape and Visual Impact Assessment (LVIA), reported in Chapter 8: Landscape and visual, of the Environmental Statement [TR010060/APP/6.1].

2.1.4 Representative viewpoint and photomontage panoramic images have been proposed to include up to a 90o Horizontal Field of View (HFoV) for viewing on an A1 sheet at a comfortable arm's length as prescribed in LI TGN 06/19 (sections 4.2.3 & 4.4.9). Whilst some impacts of the proposed scheme may be noticeable beyond this HFoV, it has been deemed appropriate to keep to 90^{o} and describe other effects within the visual impact assessment contained within Appendix 8.3 of the Environmental Statement [TR010060/APP/6.3]. This approach has been transparently communicated throughout the consultation with key stakeholders and agreed in October 2021 (LI TGN 06/19_Chapter 3).

2.1.5 Type 3 Visualisations - Photomontages / Photowires as defined within LI TGN 06/19 have been produced for this project.

2.1.6 The objective of Type 3 visualisation is to present a printed image which gives a realistic impression of appearance, context, form and extent of the proposed development. Type 3 is summarised in TGN06/19 Section 4 – Type 3 Summary as '*… appropriate for many planning applications, LVAs and LVIAs, where photomontage is required but a verifiable process and printed scale representation are not needed.*'

2.1.7 The recommendations from this summary that have been adhered to are as follows:

- *'Use a Full Frame Sensor camera with 50mm lens or cropped frame sensor camera with 35mm or 28mm fixed lens….*
- *…The enlargement factor should be stated on each page, together with the label 'Visualisation Type: 3'….*
- *…For very wide linear infrastructure, cylindrical panoramas up to 90° at A1 width, with multiple sheets for very wide panoramas will be produced.*
- *Accompany visualisations with a Technical Methodology (see Appendix 10). Images will typically be presented with a 100% enlargement (27°@ A3, or 90° @ A1)'*

2.1.8 The visualisations have been produced using 3D modelling, to reflect two timeframes at each viewpoint location. The Type 3 Photomontages are illustrated on the figures beneath the existing 'baseline' views and reflect:

- Operation winter year 1: Timeframe with both the completed scheme and traffic using it, as well as landscape mitigation at the beginning of the operational stage, when planting mitigation would not yet be fully effective
- Operation summer year 15: Timeframe with the proposed scheme and traffic using it, as well as the landscape mitigation following 15 years of establishment of the planting mitigation

2.1.9 The Type 3 visualisation locations are shown on the inset plans on each photomontage (Figure 8.5) as well as on Figure 8.3 Zone of Theoretical Visibility and Viewpoints - Bare Earth and Figure 8.4 Photosheets – Viewpoint Location Plan [TR010060/APP/6.2].

3 Pre-application consultation

3.1.1 The type of visualisation and viewpoint locations for the requested Type 3 visualisations were agreed through consultation with Local Planning Authorities and Historic England to reflect representative views from sensitive receptors. Reference should be made to Section 8.3 within Chapter 8: Landscape and visual, of the Environmental Statement [TR010060/APP/6.1] for further details relating to stakeholder engagement.

4 Assumptions and limitations

4.1.1 Every effort has been made to ensure a reasonable level of accuracy was maintained throughout the production of the visualisations and that the scheme is represented accurately. The following assumptions and limitations have been identified below.

Seasonal constraints

4.1.2 As a result of a request from Historic England for an additional visualisation during consultation late in the project programme, the technical viewpoint photography suitable for creating visualisations from Viewpoint 24 was constrained and a further visit to capture technical photographs during the summer was not undertaken. Therefore, in this instance, just the winter view is represented as a photomontage (refer to Section A.6 Final Output Summary section below). This approach was agreed with Historic England at the time.

3D modelling

4.1.3 Whilst all modelling has been based on a core set of design 3D and 2D models, some elements of design has required additional interpretation and consultation with lead engineers / designers. The process of additional work to the modelling is further described in section A.5.15 to A.5.24. Further to this the following key limitations have been identified.

4.1.4 Proposals for the Beaulieu Park Radial Distributor Road (RDR), which is outside the limit of the proposed scheme, have not been modelled in any detail due to lack of available data. However the RDR scheme would be visible as it ties into the project proposals at A12 Junction 19. In this instance, the use of the indicative highways geometry model has been used and this element represented in blue base colour only. This is to reflect the continuity of two schemes adjacent to each other, but also to highlight the lack of detail or design information for the adjacent scheme. Therefore it should be understood that this is purely schematic to represent the Beaulieu Park RDR bridge.

4.1.5 Bridge widening proposals at Oliver's Bridge are provided as a worst-case scenario that would include extending the width of the bridge deck to the north and south supported with an additional pier structure designed to match the dimensions of the existing piers. It is also assumed the hard paved slope on each abutment are extended north and south as well and finished top match the existing concrete slab surface.

4.1.6 Furthermore, assumptions have been made regarding the design and finish of noise barriers. These will be subject to detailed design at the next stage of design development.

Existing vegetation

4.1.7 The vegetation growth of retained existing planting between year 1 and year 15 of operation has not been represented due to uncertainty of age, growth rates and future maintenance regimes, as it is outside the control of National Highways.

Planting mitigation details

4.1.8 With the exception of occasional feathered and standard trees, trees and shrubs have generally not been modelled for the operation Year 1 scenario, only suitable tree and shrub shelters. This is to reflect a worst-case scenario whereby the smallest plants within the typical range of proposed planting heights at year 1 (300mm) would not be visible above the shelters or would not be visually noticeable.

4.1.9 All mitigation planting proposals have been modelled in accordance with the preliminary environmental mitigation design, illustrated on Figure 2.1 Environmental Masterplan [TR010060/APP/6.2]. The planting stock height, growth rates and plant protection assumed for modelling purposes are described in detail in section A.5.26 below.

Committed future developments

4.1.10 Where applicable, major committed future developments surrounding the proposed scheme that would be visible in winter year 1 and summer year 15 have been labelled but not modelled, as it is unlikely that sufficient design detail is not available.

5 Type 3 visualisation process methodology

Photography and survey

5.1.1 The baseline photographs were undertaken in winter 2020 and 2022 before trees were in leaf, and in summer 2021 in fair weather when trees were in leaf.

5.1.2 At each viewpoint location, the following survey data has been collected:

- Ordnance Survey Grid coordinates of the camera location
- date and time of photograph
- the height of the camera above ground level (1.6m)
- weather conditions at the time of photography

5.1.3 Camera locations were recorded using a range of survey techniques including a hand-held SatMap Active 20 GPS unit and/or iPhone ViewRanger and GPS OS Grid Reference by Tomstrail.com or similar applications.

5.1.4 The baseline photographs were taken using a Canon EOS 5D Mark III Digital Single Lens Reflex (SLR) camera with a fixed 50mm Focal Length lens. All photographs were taken on a tripod levelled to the vertical and horizontal axis.

5.1.5 Camera settings were be standardised for the correct exposure, shutter speed and resolution to enable clean production of high-resolution output and any panoramic images (see below).

5.1.6 All survey and settings information, as well as other relevant notes are provided on Figure 8.5 Sheets 1 to 11 [TR010060/APP/6.2].

Panoramic images

5.1.7 Due to the linear nature of road schemes, there is requirement for panoramic photographs, therefore panoramic photography has been undertaken using a series of photographs taken with a panoramic tripod head set to provide a 50% overlap (20° increments) between frames to reduce barrel distortion.

5.1.8 The photographs were taken in a landscape orientation due to the rural setting of viewpoints, in line with LI TGN 06/19.

5.1.9 Photographs were stitched together using PTGui software using cylindrical projection to produce a single panoramic image. During this process, only minor improvements, for example, to balance brightness and contrast, have been made where necessary due to variable light conditions on site.

5.1.10 Images have been fixed to a maximum field of view of 90° horizontal and 27° vertical (as determined by the 50mm focal lens used for the photography). Images have been sized to fit to the final A1 page plates (820 x 250mm) to reflect 96% image enlargement.

Camera matching process

5.1.11 To assist the process of matching the baseline photograph with the 3D digital model of the scheme, reference points were identified at each viewpoint location. Reference points are features that could be identified from a topographical survey or Ordnance Survey data. Examples include telegraph poles, field boundaries and pylons.

5.1.12 The baseline single and/or panoramic images were imported into the 3D modelling software (Autodesk 3DS Max) and used in the camera matching process as backdrops when rendering using the VRay 3.70 engine. As part of this process for panoramic images the ‘warped old-style camera’ settings were used to match the cylindrical projection of the image and allow accurate matching of reference points.

5.1.13 A baseline 3D model (existing environment and site context) has been produced using information from 3D topographical surveys and 2D and 3D OS contour information to vertically place reference objects. A local grid with a common global shift from OS National Grid was undertaken to enable the 3D modelling software to operate efficiently and all associated reference data has been moved using this information.

5.1.14 In the 3D modelling software, the locations of the viewpoints were added to the model using the survey data and then used as a starting point for fine-tuned fixing of the 3D camera by matching terrain, reference points and other information in the model to the corresponding features in the background image (the 3D camera backdrop).

3D design modelling

5.1.15 3D models of the proposed scheme were produced in Autodesk 3DS Max Design software using core design information provided by CJP Infrastructure Design team (see Annex 1) and added to the 3D base model.

5.1.16 Environmental lighting settings within the combined model have been configured to match the lighting conditions as surveyed on site at the time of the photography.

5.1.17 A record of the Design Freeze data has been kept and listed in Annex 1 of this appendix, and further description of 3D modelling work has been provided below to explain additional work undertaken for use in photorealistic photomontage production.

5.1.18 The following processes and additional work undertaken to the core information is detailed in the following sections:

Highways earthworks and drainage features

5.1.19 3D models and 2D drawings were converted into 3D models using Autodesk 3DS Max. Models included, highways, embankments, ponds, flood compensation areas and existing topographical surfaces. Additional modelling work to these included tidying up duplicate surfaces, trimming back some earthworks slopes to tie into existing, grading and modelling earthworks to tie into existing and proposed bridge wingwalls and abutments. This work was done within Autodesk 3DS Max in coordination with the authoring engineers. Other work to the models included the application of suitable materials for rendering.

Retaining walls

5.1.20 Retaining wall structures were imported as a surface from the original 3D modelling within the highways geometry files. These were separated and materials applied in consultation with the lead highways engineers. Furthermore, in consultation the length of one retaining wall was trimmed back to tie into the to the northeast abutment extension of Oliver's Bridge.

Highways lighting

5.1.21 Locations and references to heights and type were received in 2D CAD and used to model lighting locations through use of bespoke 3D models for each type and height of lighting column and lantern. Autodesk 3DS Max and Itoosoft Forest Pack Pro was used to link the models via the locations to the proposed verge / highways geometry.

Bridges

5.1.22 3D model renditions from the structural models were exported to Navisworks and then imported to Autodesk 3D Max. Materials were then applied.

5.1.23 A 2D CAD GA design with sections for the bridge widening works at Olivers Bridge were modelled into 3D objects in Autodesk 3DS Max.

Noise fencing

5.1.24 Fencing polylines included in the General Arrangement 2D CAD information were used as base alignments for 3D fence objects in Autodesk 3DS Max. These were linked to topographical surfaces. Final material finish of the barriers was discussed with the noise specialist and highways engineers, and it was

agreed to use an assumption at this stage for timber close board fence finish for the purposes of the photomontages.

Environmental Masterplan

5.1.25 Additional work was carried out on the core 2D CAD format layers including indicative planting types and areas to check polylines were drawn correctly and associated with the correct planting type.

5.1.26 Once confirmed, the 3D modelling details of all mitigation proposals have been agreed with the Landscape Architect undertaking Figure 2.1 Environmental Masterplan [TR010060/APP/6.2], as follows:

Operation year 1

- *Woodland / Wet woodland: 1.2m tall tree shelters and 600mm tall shrub shelters (both 100mm diameter) modelled along with occasional feathered trees at approximately 1.2m tall x 0.8m wide*
- *Intermittent trees and shrubs: 1.2m tall tree shelters and 600mm tall shrub shelters (both 100mm diameter) modelled along with occasional feathered trees at approximately 1.2m tall x 0.8m wide*
- *Tall screen planting to elevate flight path of bats and barn owls (and individual trees along street edges): Feathered trees at approximately 1.2m tall x 0.8m wide and some 2m standards*
- *Individual tree planting: 2m tall selected standard trees at each identified location*
- *Hedge with trees planting: A double staggered row of 450mm tall x 40mm diameter shelters at 300mm centres with 2m tall selected standard trees at each identified location*

Operation year 15

- *Woodland: 6-8m tall*
- *Wet woodland: 8-10m tall*
- *Intermittent trees and shrubs: 6-8m tall intermittent trees and 1.5-2m tall shrubs*
- *Tall screen planting / Bat / barn Owl hop over areas: 6-8m tall*
- *Managed hedgerows: 2m tall (including hedgerows with trees) 2m tall hedgerows with 6-8m tall trees*

5.1.27 The above specifications were modelling using an Autodesk 3DS Max plugin called Itoosoft Forest Pack Pro, using the boundaries from the 2D Environmental Design linked to the 3D surfaces in the core model.

Compilation of type 3 visualisations: photomontages

5.1.28 Baseline panoramic images were adjusted in Adobe Photoshop to reflect any elements and/or vegetation lost to facilitate the proposed scheme and any retained foreground elements. Rendered images were then generated from Autodesk 3DS Max Design software and inserted into the working Photoshop file and all layered accordingly.

5.1.29 Once all layering and final adjustment to brightness and contrast levels were complete, panoramic photographs and visualisations to 820 mm x 250 mm (to a reflect a 96% enlargement of 90° horizontal x 27° vertical field of view). All images have been saved at 300 pixels per cm resolution.

5.1.30 All final images were then imported to scale within AutoCAD with accompanying information as detailed below:

- Visualisation type
- Date and time of photograph
- Viewpoint ground elevation
- OS National Grid Reference and elevation
- Season within which the photography was taken
- Site lighting conditions when the photography was taken
- Camera height above ground
- Camera lens size
- Aperture, ISO and shutter speed details
- Bearing to centre of the panoramic
- Sheet size
- Enlargement factor
- Camera specification
- Field of view information
- Direction of view
- Key notes on use such as details on a comfortable viewing distance from the eye
- Inset plans showing the location and orientation of the viewpoints

5.1.31 Once each viewpoint sheet set was complete, all figures were printed to a single pdf document, set at high resolution and to 1:1 scale to ensure no loss of image size or quality.

6 Final output summary

Figure 8.5 [TR010060/APP/6.2]

- Sheet 1: Viewpoint 02 Existing winter view and proposed winter Year 1 photomontage.
- Sheet 2: Viewpoint 02 Existing summer view and proposed summer Year 15 photomontage.
- Sheet 3: Viewpoint 07 Existing winter view and proposed winter Year 1 photomontage.
- Sheet 4: Viewpoint 07 Existing summer view and proposed summer Year 15 photomontage.
- Sheet 5: Viewpoint 11a Existing winter view and proposed winter Year 1 photomontage.
- Sheet 6: Viewpoint 11a Existing summer view and proposed summer Year 15 photomontage.
- Sheet 7: Viewpoint 22 Existing winter view and proposed winter Year 1 photomontage.
- Sheet 8: Viewpoint 22 Existing summer view and proposed summer Year 15 photomontage.
- Sheet 9: Viewpoint 32 Existing winter view and proposed winter Year 1 photomontage.
- Sheet 10: Viewpoint 32 Existing summer view and proposed summer Year 15 photomontage.
- Sheet 11: Viewpoint 24 Existing winter view and proposed winter Year 1 photomontage.

Annex 1 Core design information

Design / Data element	3D Models / Autodesk Civil3D Export Files	2D CAD models / Drawings & PDF reference Document
Existing Topography	HE551497-JAC-GEN-SCHW-M3-C-0004.dwg	EXTENDED CONTOURS.dwg
Highways geometry	HE551497-JAC-HSR-S3_SR-M3-C-0009.dwg HE551497-JAC-HSR-S3_SR-M3-C-0008.dwg HE551497-JAC-HSR-S3_J25-M3-C-0001.dwg HE551497-JAC-HSR-S3_J24-M3-C-0001.dwg HE551497-JAC-HSR-S3_SR-M3-C-0024.dwg HE551497-JAC-HSR-S2_SR-M3-C-0016.dwg HE551497-JAC-HSR-S2_SR-M3-C-0012.dwg HE551497-JAC-HSR-S2_SR-M3-C-0006.dwg HE551497-JAC-HSR-S2_SR-M3-C-0002.dwg HE551497-JAC-HSR-S2_J22-M3-C-0001.dwg HE551497-JAC-HSR-S1_SR-M3-C-0004.dwg HE551497-JAC-HSR-S1_J21-M3-C-0001.dwg HE551497-JAC-HSR-S1_J19-M3-C-0001.dwg HE551497-JAC-HML-S3E-M3-C-0001.dwg HE551497-JAC-HML-S3D-M3-C-0001.dwg HE551497-JAC-HML-S3C-M3-C-0001.dwg HE551497-JAC-HML-S3B-M3-C-0001.dwg HE551497-JAC-HML-S3A-M3-C-0001.dwg	-

Design / Data element	3D Models / Autodesk Civil3D Export Files	2D CAD models / Drawings & PDF reference Document
	HE551497-JAC-HML-S2C-M3-C-0001.dwg HE551497-JAC-HML-S2B-M3-C-0001.dwg HE551497-JAC-HML-S2A-M3-C-0001.dwg HE551497-JAC-HML-S1F-M3-C-0001.dwg HE551497-JAC-HML-S1E-M3-C-0001.dwg HE551497-JAC-HML-S1D-M3-C-0001.dwg HE551497-JAC-HML-S1A-M3-C-0001.dwg	
Highways drainage	HE551497-JAC-HGN-S3-MR-C-0001.dwg HE551497-JAC-HGN-S2-MR-C-0002.dwg HE551497-JAC-HSR-S3_SR-MR-C-0006.dwg HE551497-JAC-HSR-S3_SR-MR-C-0004.dwg HE551497-JAC-HSR-S3_SR-MR-C-0003.dwg HE551497-JAC-HSR-S2_SR-MR-C-0005.dwg HE551497-JAC-HSR-S2_SR-MR-C-0003.dwg HE551497-JAC-HSR-S2_SR-MR-C-0002.dwg HE551497-JAC-HSR-S1_SR-MR-C-0004.dwg HE551497-JAC-HSR-S1_SR-MR-C-0001.dwg HE551497-JAC-HGN-S3-MR-C-0003.dwg HE551497-JAC-HGN-S2-MR-C-0003.dwg HE551497-JAC-HGN-S3E-MR-C-0001.dwg	-

Design / Data element	3D Models / Autodesk Civil3D Export Files	2D CAD models / Drawings & PDF reference Document
	HE551497-JAC-HGN-S3D-MR-C-0001.dwg HE551497-JAC-HGN-S3C-MR-C-0001.dwg HE551497-JAC-HGN-S3B-MR-C-0001.dwg HE551497-JAC-HGN-S3A-MR-C-0001.dwg HE551497-JAC-HML-S3-MR-C-0001.dwg HE551497-JAC-HGN-S2C-MR-C-0001.dwg HE551497-JAC-HGN-S2B-MR-C-0001.dwg HE551497-JAC-HGN-S2A-MR-C-0001.dwg HE551497-JAC-HML-S2-MR-C-0001.dwg HE551497-JAC-HML-S1-MR-C-0002.dwg HE551497-JAC-HML-S1-MR-C-0001.dwg	
Highways lighting	-	HE551497-JAC-HLG-SCHW-M2-EO-0001.dwg HE551497-JAC-HLG-SCHW-M2-EO-0002.dwg
Highways Signage	HE551497-JAC-HSN-S1-MR-C-0001.dwg HE551497-JAC-HSN-S1-MR-C-0002.dwg HE551497-JAC-HSN-S2-MR-C-0001.dwg HE551497-JAC-HSN-S2-MR-C-0002.dwg HE551497-JAC-HSN-S2-MR-C-0001.dwg HE551497-JAC-HSN-S2-MR-C-0002.dwg	HE551497-JAC-HSN-SCHW-M2-C-0002.dwg HE551497-JAC-HSN-SCHW-M2-C-0011.dwg HE551497-JAC-HSN-SCHW-DR-C-0101.pdf HE551497-JAC-HSN-SCHW-DR-C-0102.pdf HE551497-JAC-HSN-SCHW-DR-C-0103.pdf HE551497-JAC-HSN-SCHW-DR-C-0104.pdf HE551497-JAC-HSN-SCHW-DR-C-0105.pdf

Design / Data element	3D Models / Autodesk Civil3D Export Files	2D CAD models / Drawings & PDF reference Document
		HE551497-JAC-HSN-SCHW-DR-C-0106.pdf HE551497-JAC-HSN-SCHW-DR-C-0107.pdf HE551497-JAC-HSN-SCHW-DR-C-0108.pdf HE551497-JAC-HSN-SCHW-DR-C-0109.pdf
Highways road markings	-	HE551497-JAC-HMK-SCHW-M2-C-0003.dwg
Noise barriers	-	HE551497-JAC-ELS-SCHW-M2-L-0002.dwg
Structures	HE551497-JAC-SBR-S2_J22-MR-S-0001.nwc HE551497-JAC-SBR-S2A_ES5830-MR-S-0001.nwc HE551497-JAC-SBR-S3B_ES5843-MR-S-0005.nwc HE551497-JAC-SBR-S3D-MR-S-0002.nwc	Olivers Bridge DCO Export.dwg
Traffic Lights and gantries	HE551497-JAC-HMC-SCHW-MR-TE-0001.dwg	HE551497-JAC-HMC-SCHW-MR-EC-0001.dwg HE551497-JAC-HMC-SCHW-M2-TE-0002.dwg
Environmental Masterplan	-	HE551497-JAC-ELS-S1-M2-L-0001.dwg HE551497-JAC-ELS-S2-M2-L-0001.dwg HE551497-JAC-ELS-S3-M2-L-0001.dwg

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