3. Methodology

3.3 Surveying : Baseline Photography

Following the selection of all views for the production of the VVMs, all of the chosen baseline photos are carefully and precisely marked up and labelled for field surveying purposes (see per Fig 7 below.) Fixed reference points within each photo, such as parapet heights, kerbing, lamp posts etc are coloured coded on the baseline photos. All 'marked up' baseline photos are then issued to our qualified topographical surveyor for a thorough survey from each viewpoint.

On site, the survey team records the camera/tripod position using GPS and Total Station to an accuracy of +/-1cm Northing and Easting and to an accuracy of +/- 2cm Elevation. The 'marked up' fixed reference points identified in each photo are then surveyed to establish exact orientation of the view and to verify the photomontage process. They are clearly numbered to ensure ease of modelling. (Fig 8 below). This survey data is fed back to the production team and subsequently 3D modelled and included in the digital 3D model of the proposed development allowing for accurate positioning of the digital model within each baseline photo. (See section 3.4)

Fig.7: Fixed reference points marked for surveyor in each chosen baseline photo.

Fig.8: Fixed reference points fully surveyed and numbered.

3. Methodology

3.4 The Digital Model

3.4.1 - 3D Modelling

An accurate digital 3D model of the 'proposed' development is produced using 3D software of choice. All of 3D Design Bureau's 3D modelling is carried out within AutoDesk's Revit. The digital 3D model is created from a combination of the third party architectural, engineering and landscape drawings and/or supplied models. The 'masterfile' for a project follows 3DDB's strict internal processes and workflows, including modelling techniques, worksets, linked and bound models etc. Depending on the type of project being produced, the appropriate file set for the digital model will be employed.

The 'marked up' fixed reference points (see section 3.3) which have been surveyed, are also 3D modelled along with any other relevant survey information from the supplied topographical survey drawings. This 3D data is federated into the 'Masterfile' model of project and geospatially positioned relative to the proposed model. This process is imperative to ensure the accurate positioning and camera matching of the proposed digital 3D model within each chosen baseline photograph.

3.4.2 - 3D Visualisation

Once the digital 3D Revit model is complete, it is handed over to 3DDB's 3D visualisation team for this next stage of production. This visualisation stage involves the application of textures & finishes to the model (buildings and site), lighting setup to accurately match daylight/evening time conditions in the baseline photographs and asset population for the proposed scheme, such as soft landscaping, street furniture etc.

This visualisation process ensures the accurate visual representation of the digital 3D model is as close as possible to the intended future 'As Built' development. Note: For accurate camera matching of the digital 3D model to the chosen baseline photography (which can take place prior to the visualisation process) please see Section 3.5.

There are various 3D visualisation software's that are widely used for this stage of production. 3D Design Bureau use Autodesk 3D Studio Max as its main software of choice for the visualisation process. This is accepted as the leading industry standard for architectural visualisation work and production of VVMs.

3. Methodology

3.4 The Digital Model (cont`d)

Fig.9: 'Masterfile' digital 3D model containing the proposed scheme and survey elements.

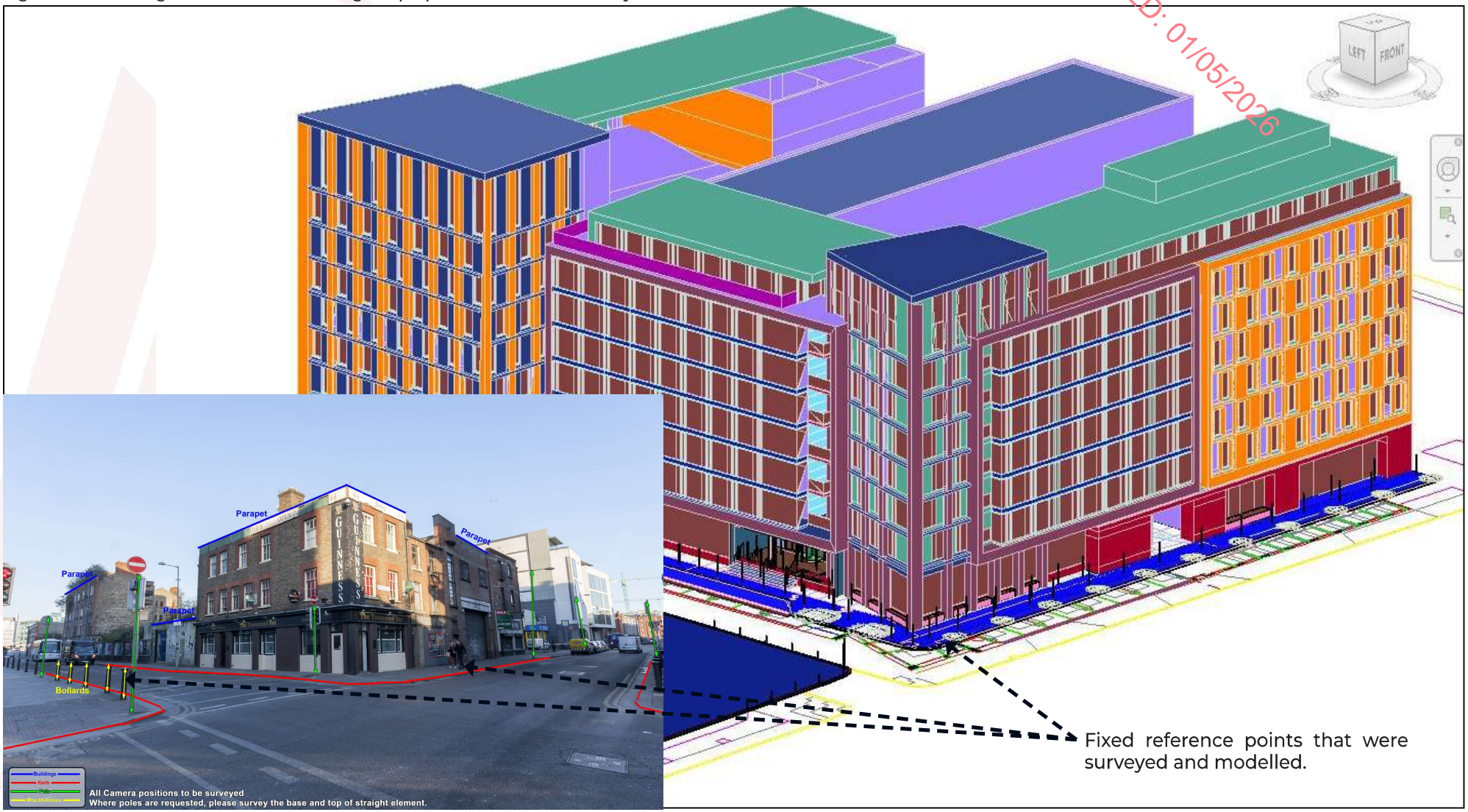

Fig.10: Fixed reference points, surveyed, modelled and included in the digital model

3. Methodology

3.5 The Verification Process

The following section is an integral part of the verification process for all verified view montages (VVMs). Following the completion (but in some instances prior/ in parallel) of the 3D visualisation process, Section 3.4, the below methodology is implemented ensuring views are verifiable.

3.5.1 Camera Matching: Real World to 3D Scene

All of the information recorded at the time of the baseline photographic site visit, that is, camera co-ordinates, angle of view, and direction of view, is programmed into the virtual camera within the 3D software package of choice - 3D Studio Max. Insertion of 'virtual' cameras within the software, with the matching attributes and settings to replicate the 'real life' cameras, is carried out.

All elements of the photo survey (the reference points), that have been modelled into the digital 3D model, and that have been geolocated relative to the proposed development, are a key component to the camera matching process. It is these surveyed elements, contained within the 3D model, that are matched to their real world counterparts in the baseline photos with the replica 'virtual' camera.
This careful camera placement methodology ensures that the size, position, and height, of the proposed development in each VVM is correct to an accuracy of 0.33% i.e. +/- 1mm on an A3 print.

See Fig 11. next page for illustrations of the 'virtual' cameras inserted within a 3D scene.

3.5.2 Image Rendering

Once all selected views have had the camera matching and 3D visualisation processes completed, each of the views are 'rendered' at high resolution and placed onto their matching baseline photograph. Software of choice for this part of the VVM process is Adobe Photoshop.

The mathematical accuracy is then double checked and verified by ensuring the existing 'marked up' fixed reference point features, which are present in the 'rendered' images, line up and match their real life counterparts in the baseline photo. See Fig 12. on page 12 for an illustration of this.

3.5.3 Post Production

Post production for each of the selected views is the last stage in the VVM process. The VVM specialist determines which existing features, within the baseline photo, such as buildings, infrastructure and vegetation, are in the foreground of the proposed development and those that are in the background, i.e. which features will mask the development and which ones will appear behind the development. Careful attention is paid to existing trees and foliage in particular, to ensure a true representation of any potential visual impact is shown/screened.

Disclaimer: Where existing background information, which is not visible in the baseline photo but revealed when the proposed development is shown in the view, is unattainable due to coverage/blocking of elements in the baseline photos, 3DDB use various methods and online information to portray these elements as accurately as possible. Some tolerance should be allowed for such views.

When it is found that the development is not visible due to foreground features, its extremities will be indicated with a red outline. Furthermore on selected wide angle views, the extent of the 50mm lens is identified on the final shot. See Figure 14.2 for an example of this.

3. Methodology

3.5 The Verification Process (cont`d)

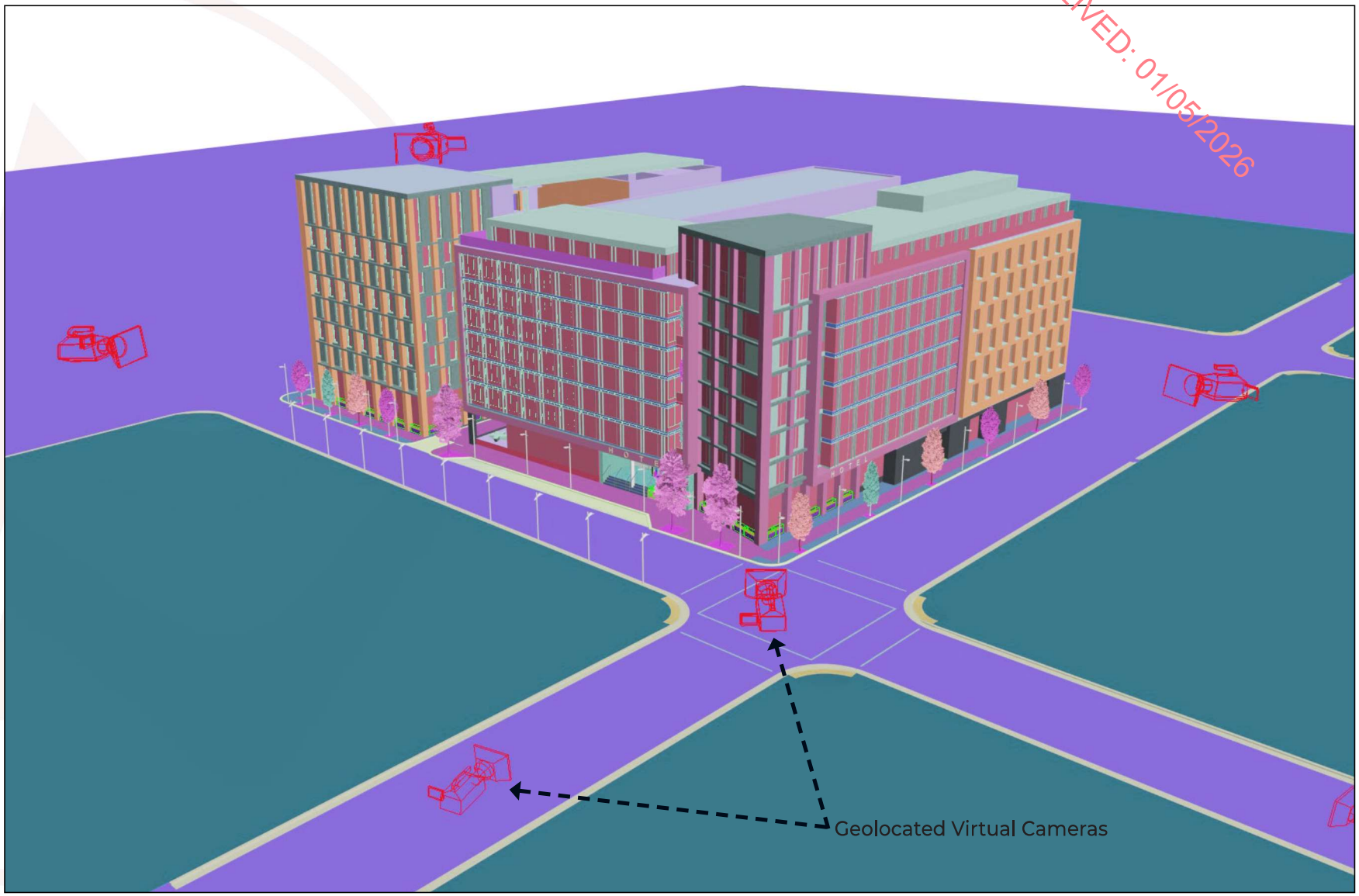

Fig.11: View from the 3DsMax model with the geolocated virtual cameras placed

3. Methodology

3.5 The Verification Process (cont`d)

Fig.12: Fixed reference points from surveyor on baseline photo.

3. Methodology

3.5 The Verification Process (cont`d)

Fig.13: Fixed reference points modelled, 'rendered' and overlaid on baseline photo confirming accuracy

4. Final Results

The final VVMs, having gone though the aforementioned extensive process, are considered as accurate and verified representations of the proposed development as viewed from the selected photo locations. The final imagery determines, as closely as possible, any future visual impact a proposed development may, or may not have on the surrounding environment and existing buildings. It should be noted that the foundation of any Landscape/ Townscape Visual Impact Assessment (LVIA / TVIA) report are accurate verified view montages in which the selected baseline photography and resulting VVMs are compared and commented upon by a suitably qualified consultant.

Fig.14.1: Baseline (w/ 50mm lens extents)

Fig.14.2: Proposed (wide angle view with 50mm lens extents included as standard)