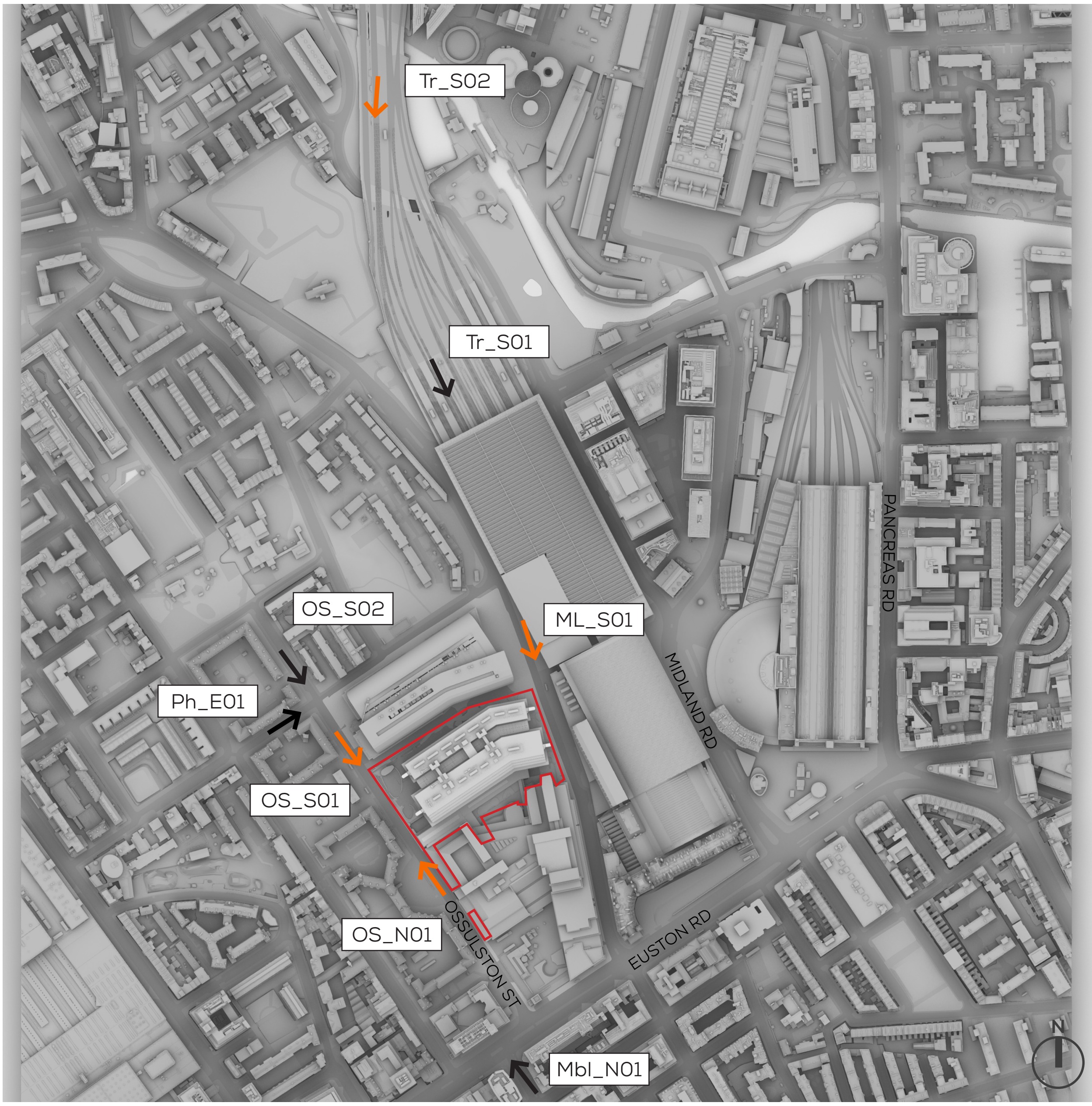


Fig. 02: Site Plan - Viewpoints

→ Building visible from the viewpoint
→ Building NOT visible from the viewpoint

2 GIA'S APPROACH

Following the guidance documents referenced above, GIA have developed specialised computer software in order to undertake reflected glare assessments.

The preparation of reflected solar glare assessments is based upon the approach described below, which entails:

- The construction of a three-dimensional computer model that includes the proposed building and its relevant setting;
- The physically accurate description of the reflective surface properties;
- Rendering of stills or video animations of the solar reflections;
- Masking the images to represent the human field of view; and
- Image analysis;

The individual steps of our work flow are further explained below.

Fig. 03: High-resolution aerial photograph

2.1 3D COMPUTER MODELLING

Detailed geometry of the proposed building, specifically of its facade and glazing configuration is provided by the project architects either in 2d format i.e. plans, sections and elevation drawings, or 3d format as a computer model. The received information is processed by GIA and prepared for assessment with our proprietary software.

A computer model of the proposed building's context is built from high resolution stereoscopic aerial photographs, examples of which are shown in Figs 04 and 05.

This includes rail tracks, sleepers, gantries and signals as well as relevant neighbouring buildings. An example is provided in Fig. 06.

Fig. 04: High-resolution aerial photograph (close-up)

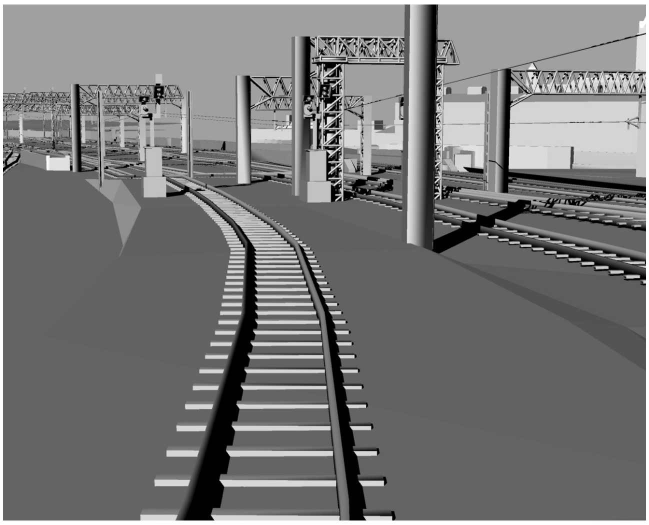


Fig. 05: Computer model of train tracks & signals from photogrammetry

2.3 IMAGE ANALYSIS

The assessment shows the path of the sun for the entire year around the development. Two computer generated angular images are produced for each selected viewpoint, indicating the area which sees the reflection of the sunpath at any point during the year. A modified diagram portraying a standardised extent of human vision (Fig. 10) is then overlaid onto the image.

The image highlights the degrees of vision corresponding to the foveal view with a red circle of 3° of angle in order to identify the area most sensitive to reflected solar glare.

Another red circle represents the incidence of the 30° radius of our typical field of view in order to identify a secondary area of sensitivity to potential reflected glare instances.

As stated in the CIE 146:2002 occurrences at angles beyond 30° would be of little significance in most situations, but may be relevant in exceptional circumstances. When seated in a driving seat of a typical car, for example, the limits of the windscreen would generally obstruct the driver's view at angles beyond 30° from the line of sight.

2.4 LIMITATIONS

The methodology described above is not suitable to quantify the intensity of reflected solar glare. Wherever the potential for reflected solar glare is identified it should be assumed that its intensity is sufficient to cause nuisance and thus mitigating measures ought to be investigated.

Although great care is taken in identifying typical viewpoints around a new development this does not guarantee that there are no further sensitive locations where reflected solar glare could present a particular risk. This assessment is based on the assumption that in an urban environment moving traffic represents the biggest risk factor and so viewpoints and focus points are selected accordingly.

For practical reasons the area of the assessment is limited to the vicinity of a new development. The occurrence of reflected solar glare at greater distances is not subject of this assessment.

IMPORTANT: The hours shown in the diagrams and described in the text reflect solar time and therefore do not take Daylight Saving Hours into account.

3 SOLAR GLARE ASSESSMENT

The following pages present our Stage 1 Assessment results

60° FIELD OF VIEW: TIME OF DAY
VIEWPOINT MBL_N01 - LOOKING FORWARD

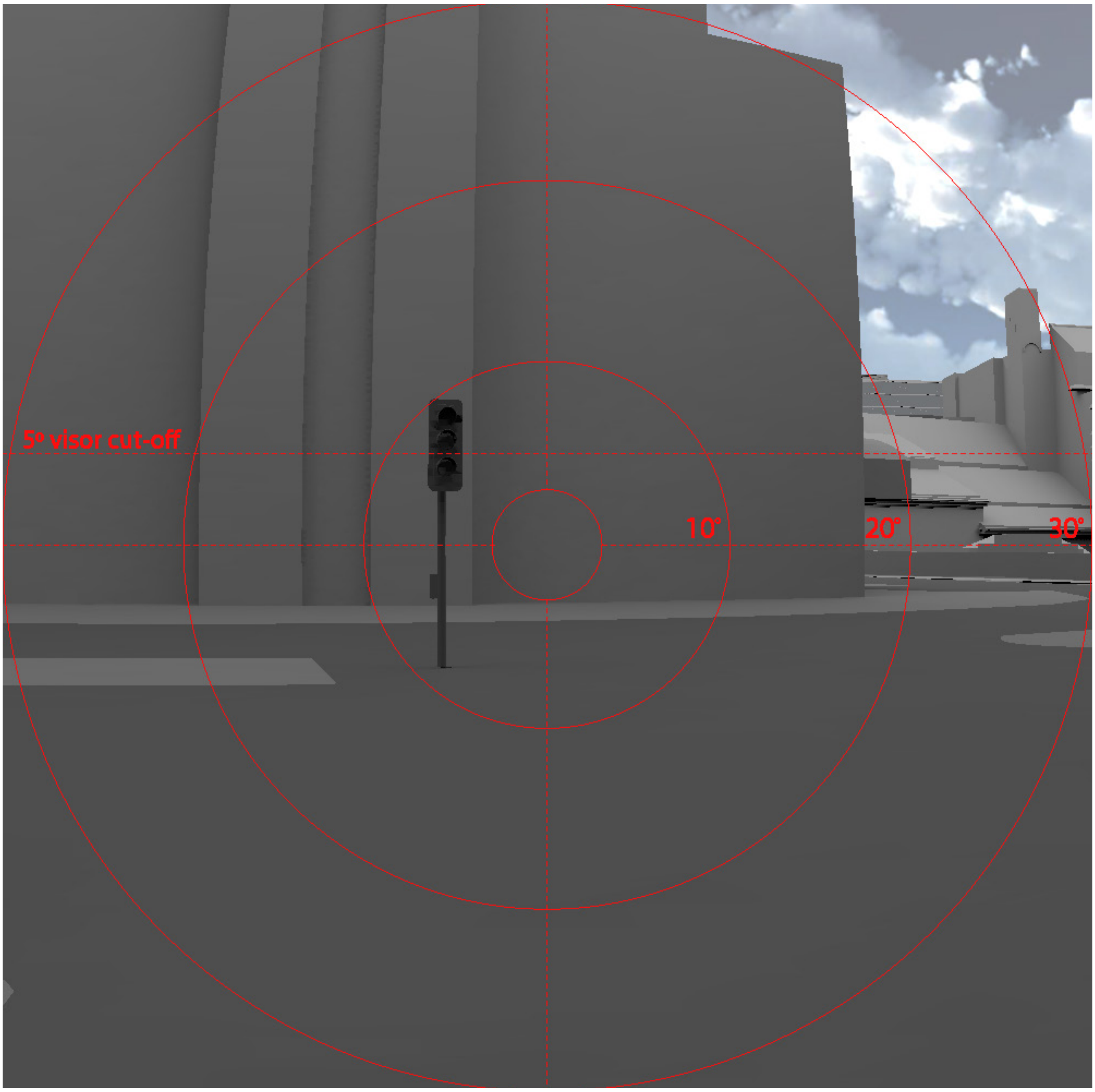
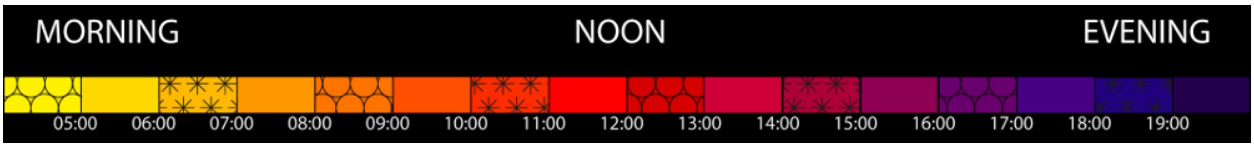


Fig. 06: Solar reflections



60° FIELD OF VIEW: SEASON
VIEWPOINT MBL_N01 - LOOKING FORWARD

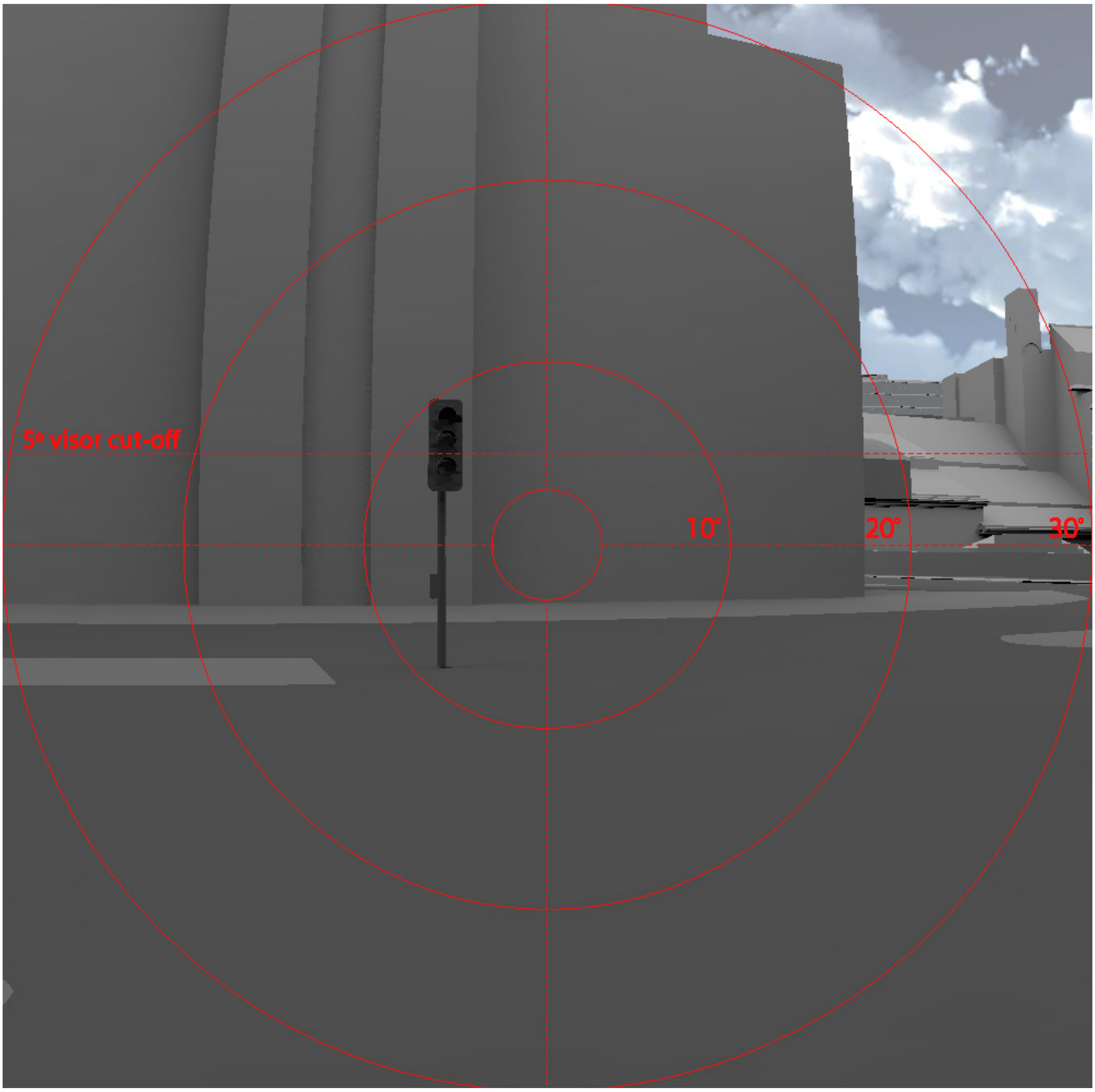


Fig. 07: Solar reflections

60° FIELD OF VIEW: TIME OF DAY
VIEWPOINT OS_N01 - LOOKING FORWARD

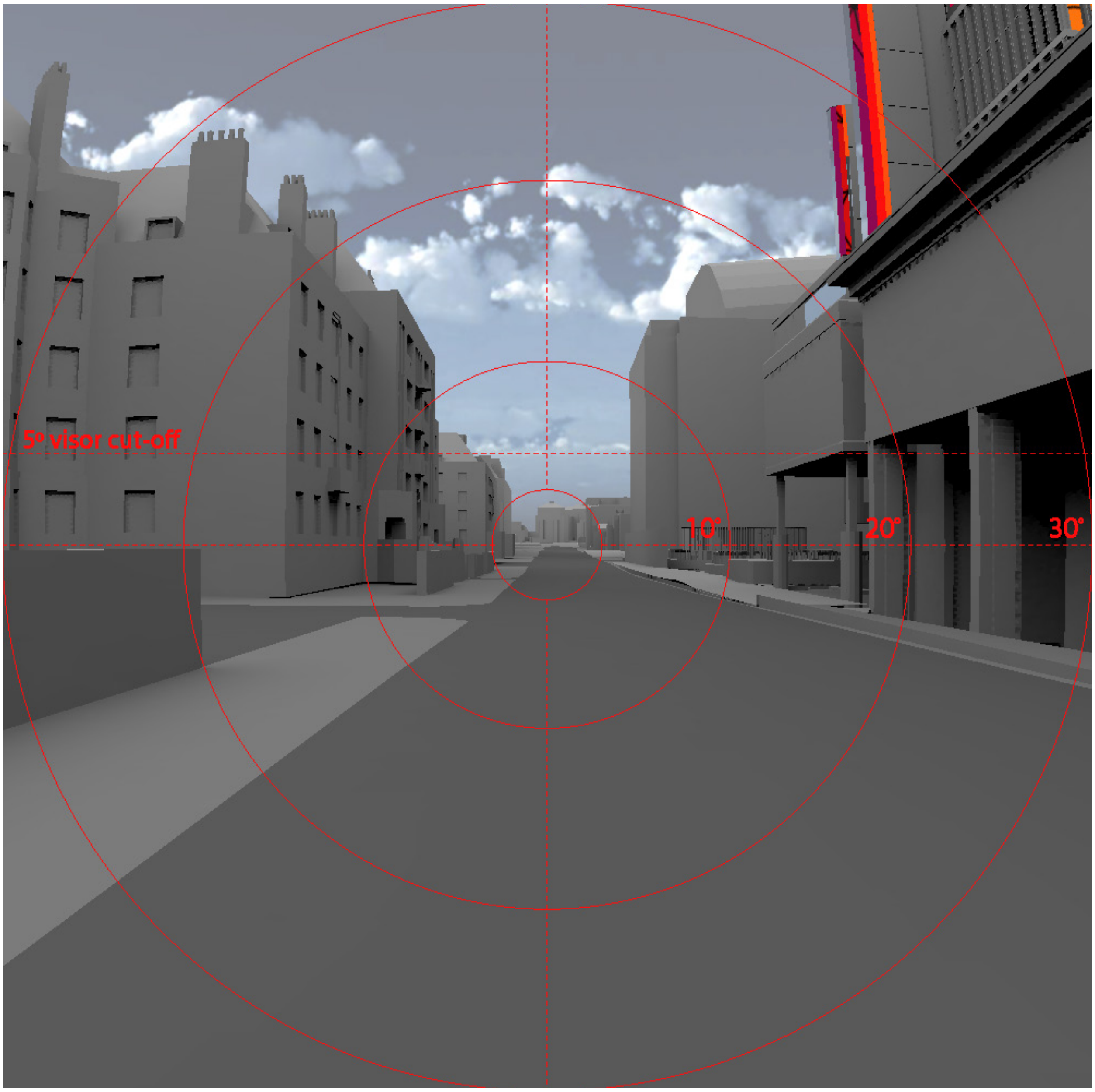
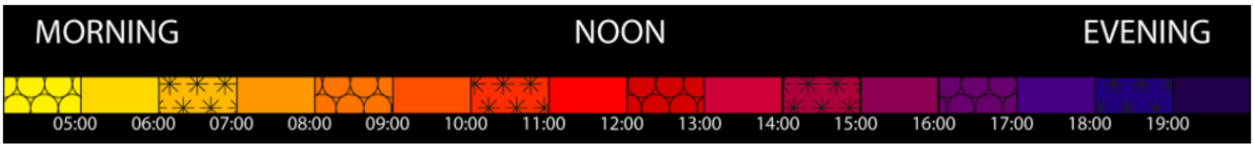


Fig. 08: Solar reflections



60° FIELD OF VIEW: SEASON
VIEWPOINT OS_N01 - LOOKING FORWARD

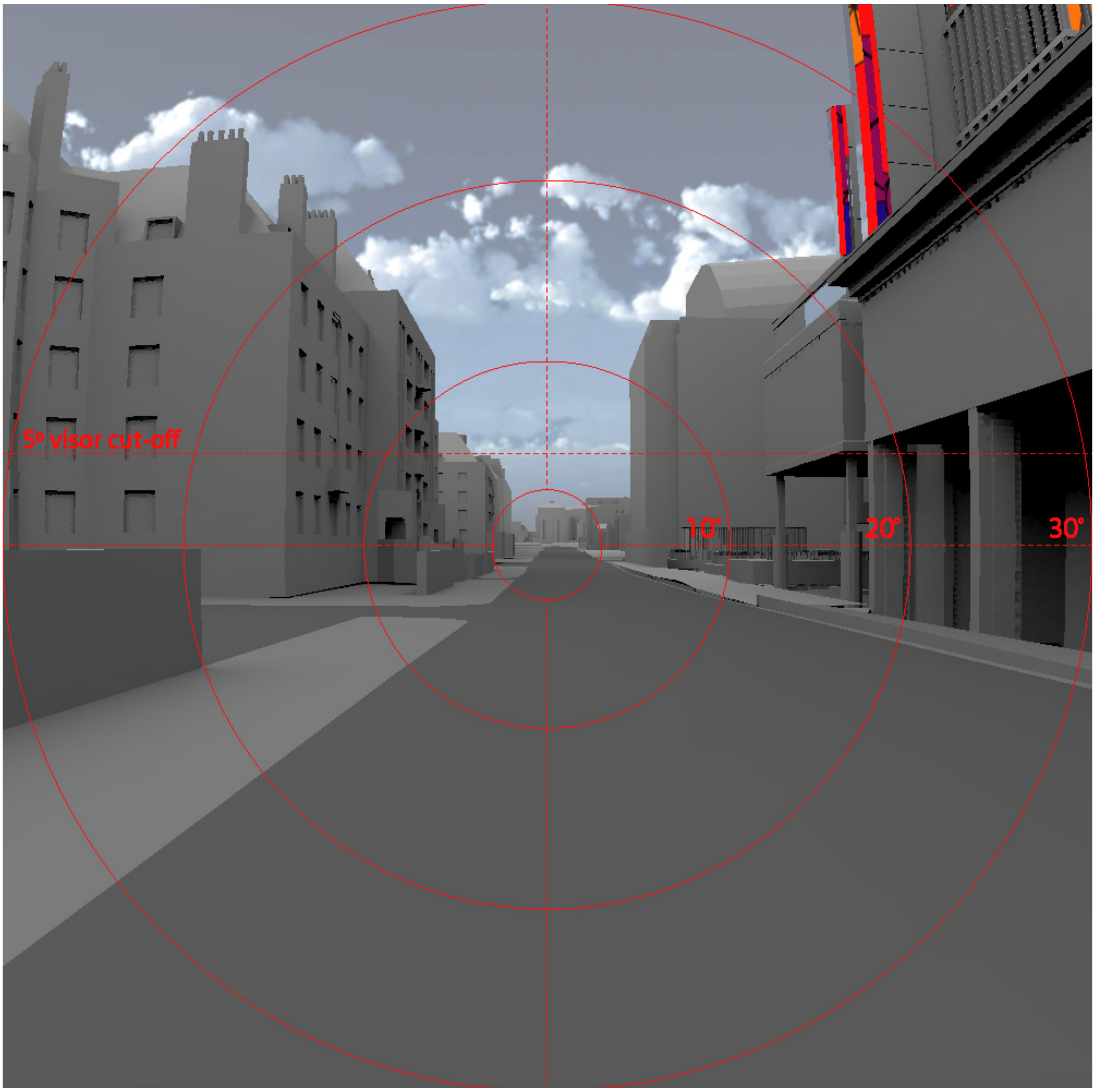


Fig. 09: Solar reflections

60° FIELD OF VIEW: TIME OF DAY
VIEWPOINT OS_S01 - LOOKING FORWARD

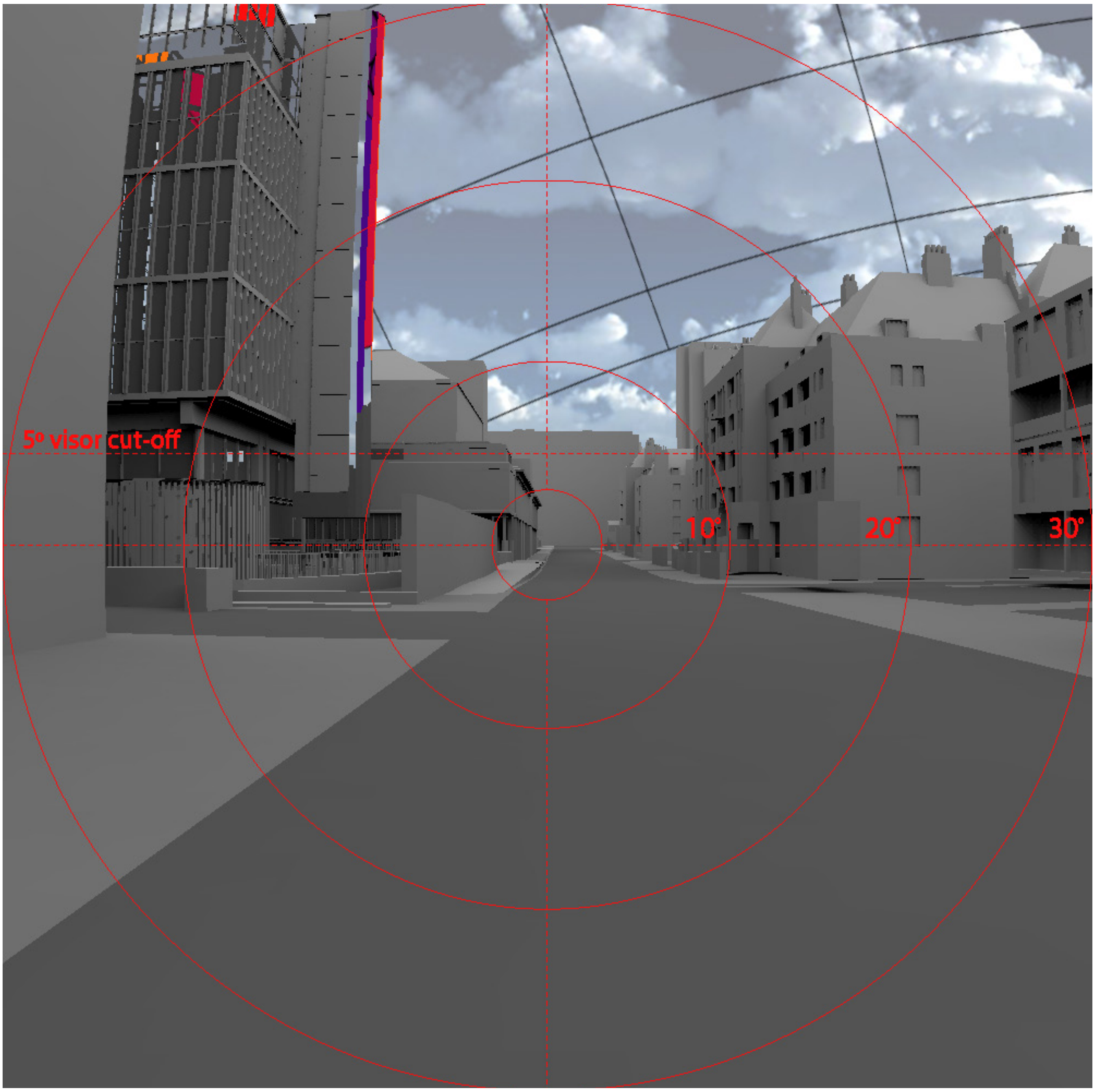
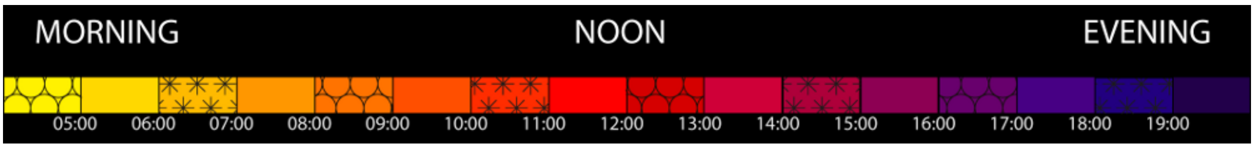


Fig. 10: Solar reflections



60° FIELD OF VIEW: SEASON
VIEWPOINT OS_S01 - LOOKING FORWARD

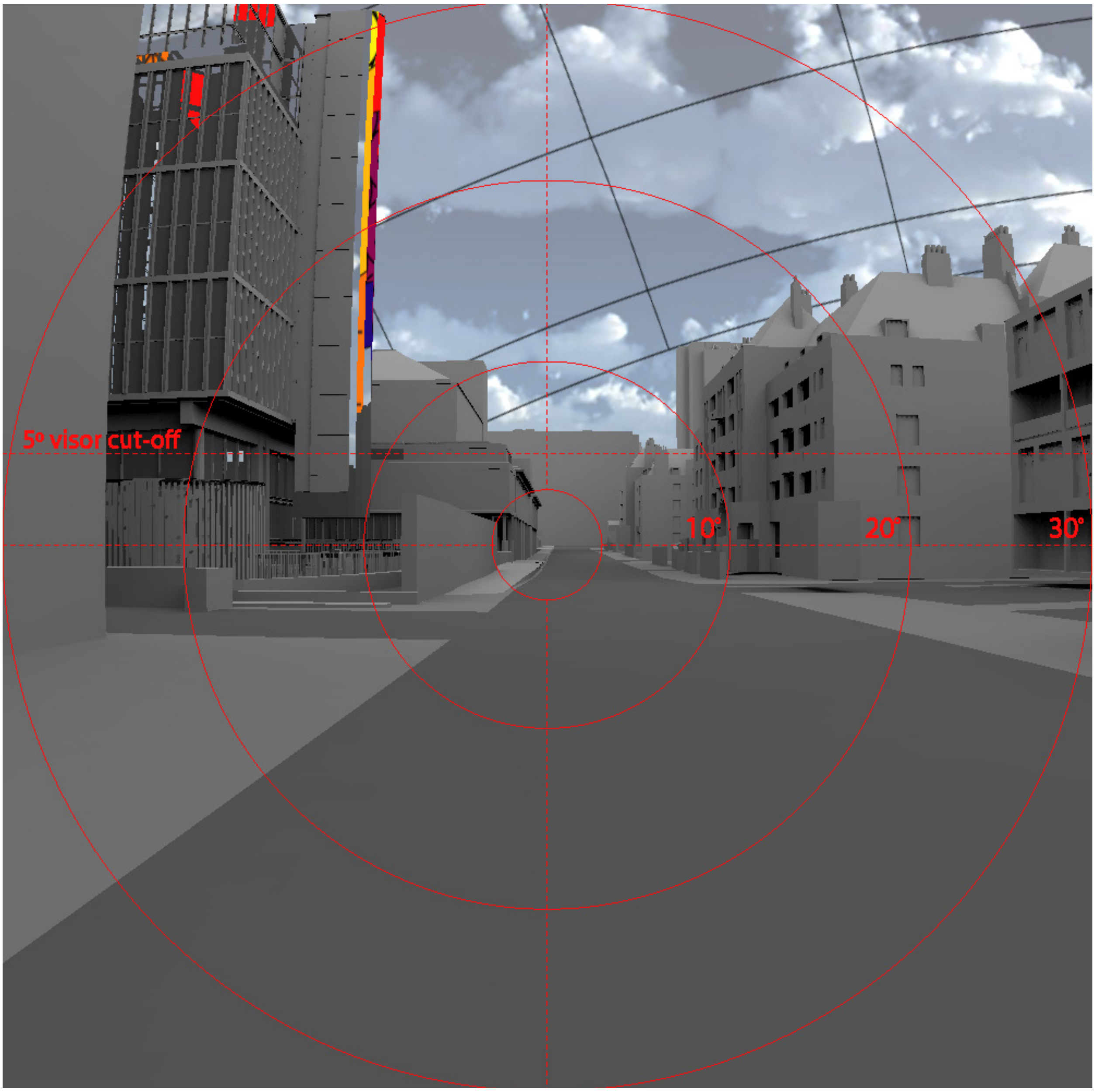


Fig. 11: Solar reflections

60° FIELD OF VIEW: TIME OF DAY

VIEWPOINT OS_S02 - LOOKING FORWARD

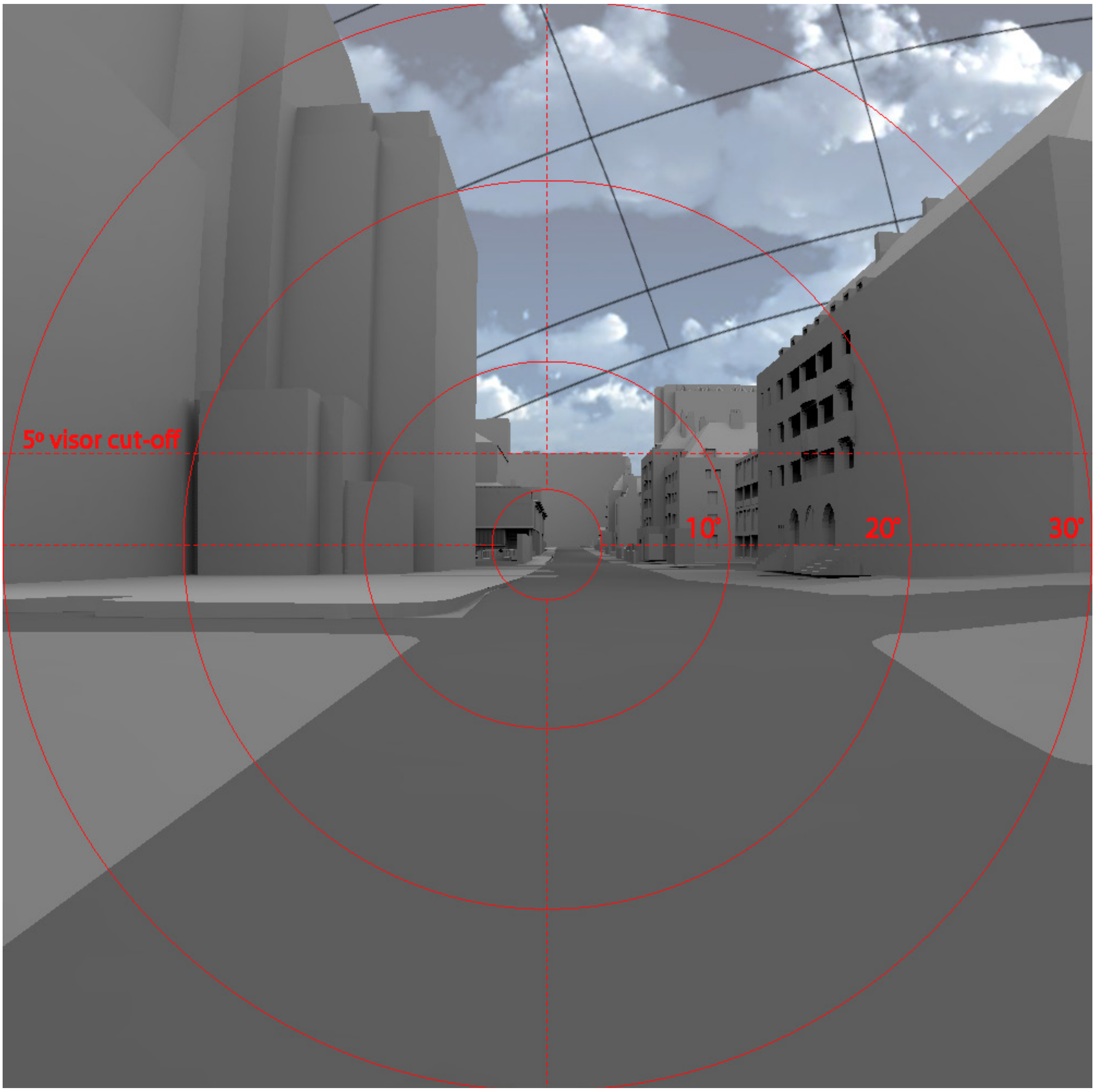
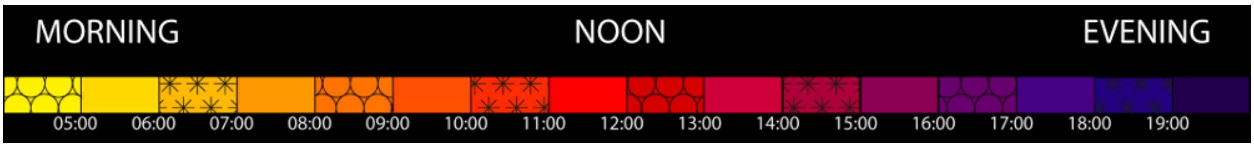


Fig. 12: Solar reflections



60° FIELD OF VIEW: SEASON
VIEWPOINT OS_S02 - LOOKING FORWARD

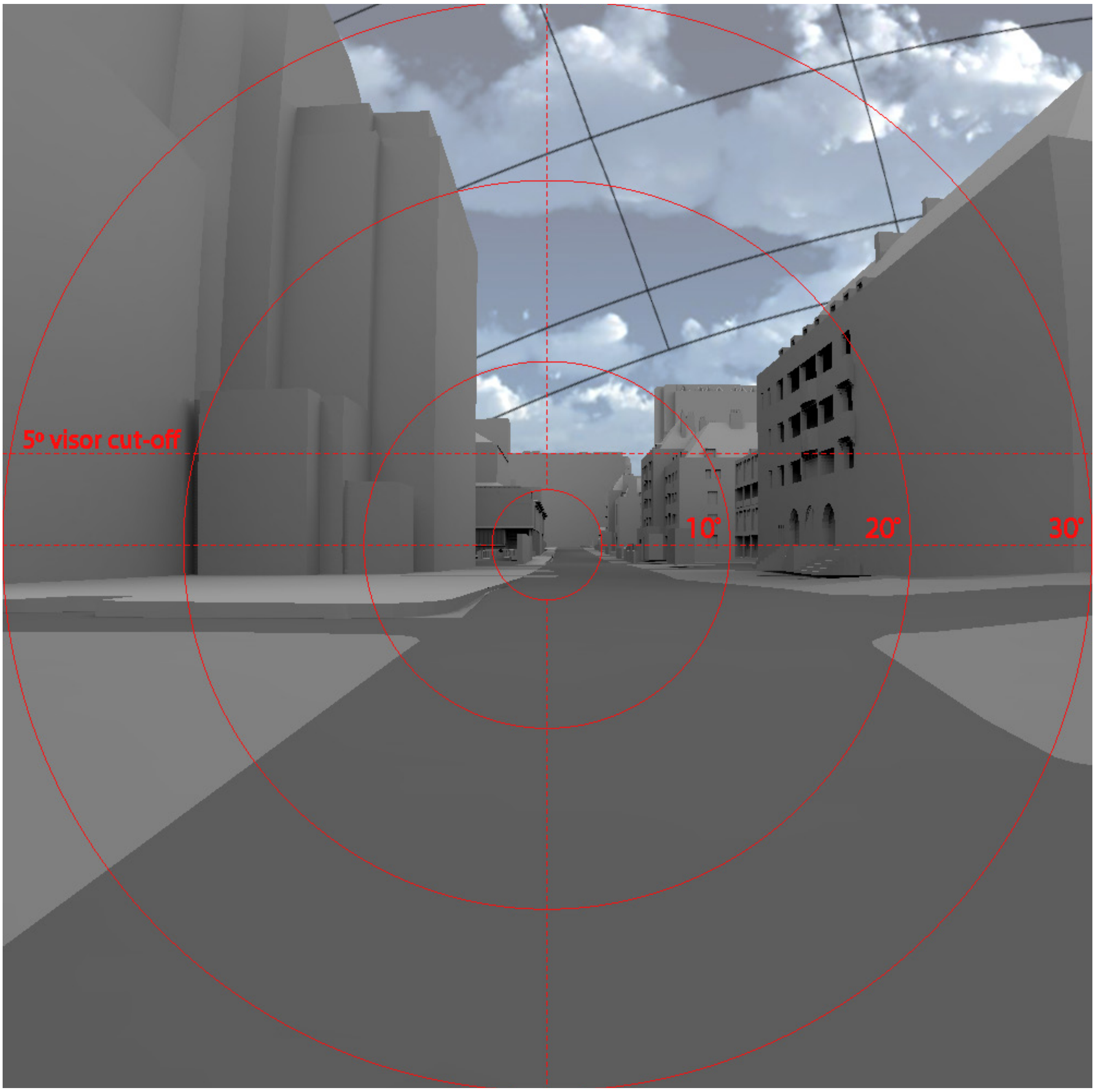


Fig. 13: Solar reflections

60° FIELD OF VIEW: TIME OF DAY
VIEWPOINT PH_E01 - LOOKING FORWARD

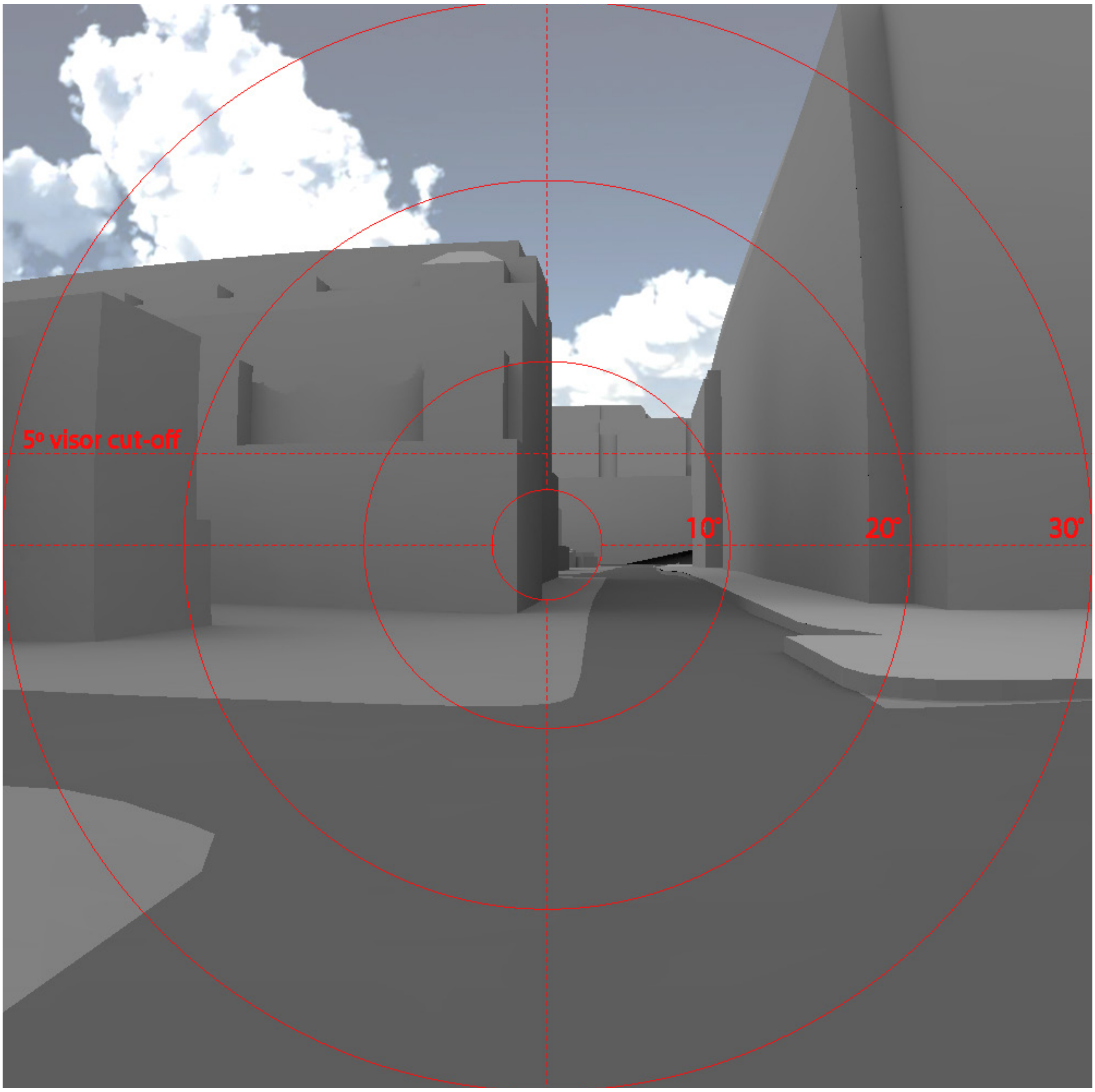
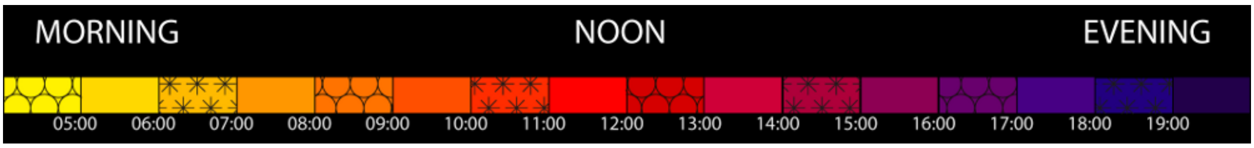


Fig. 14: Solar reflections



60° FIELD OF VIEW: SEASON
VIEWPOINT PH_E01 - LOOKING FORWARD

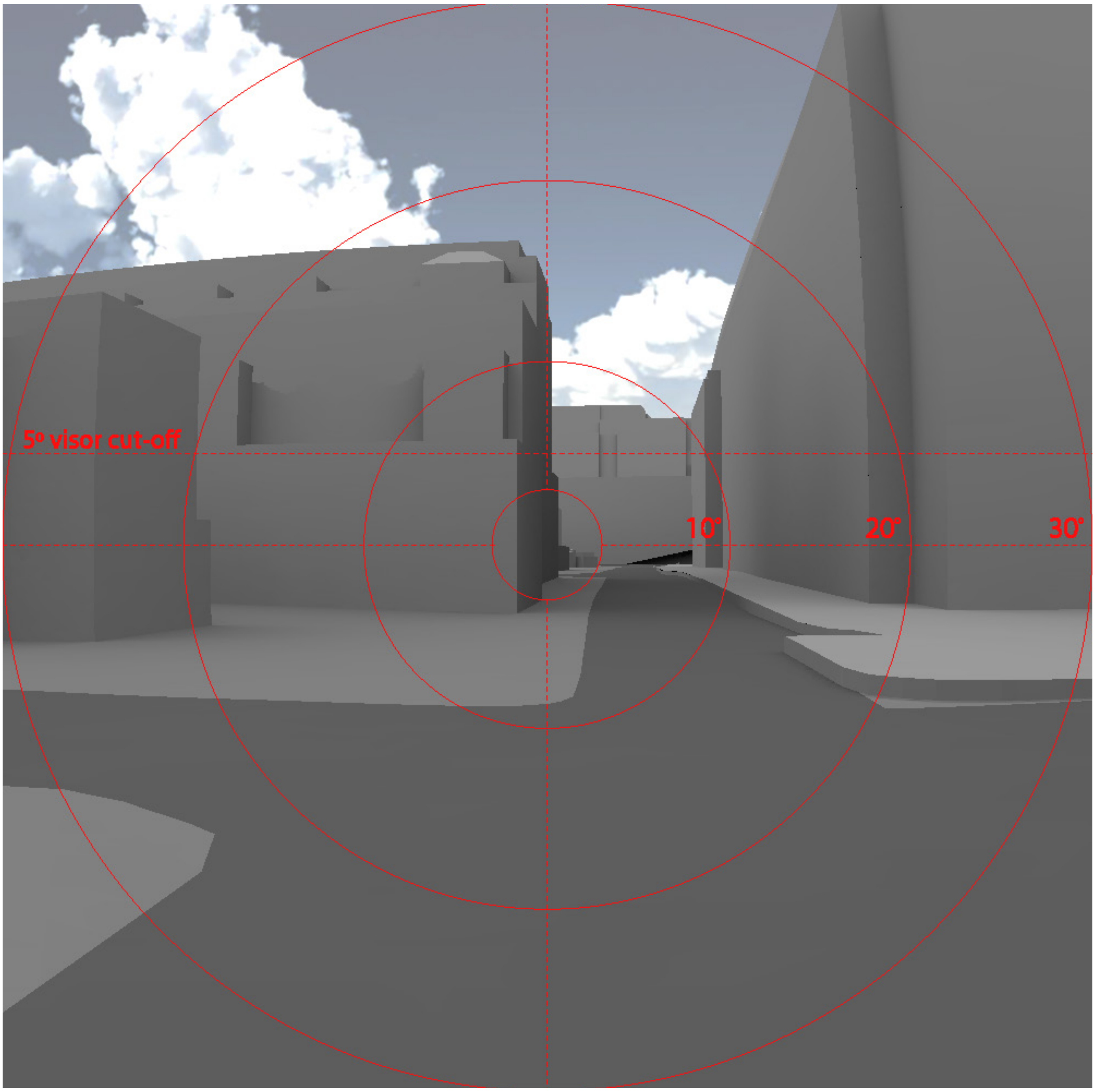


Fig. 15: Solar reflections

60° FIELD OF VIEW: TIME OF DAY
VIEWPOINT ML_S01 - LOOKING FORWARD

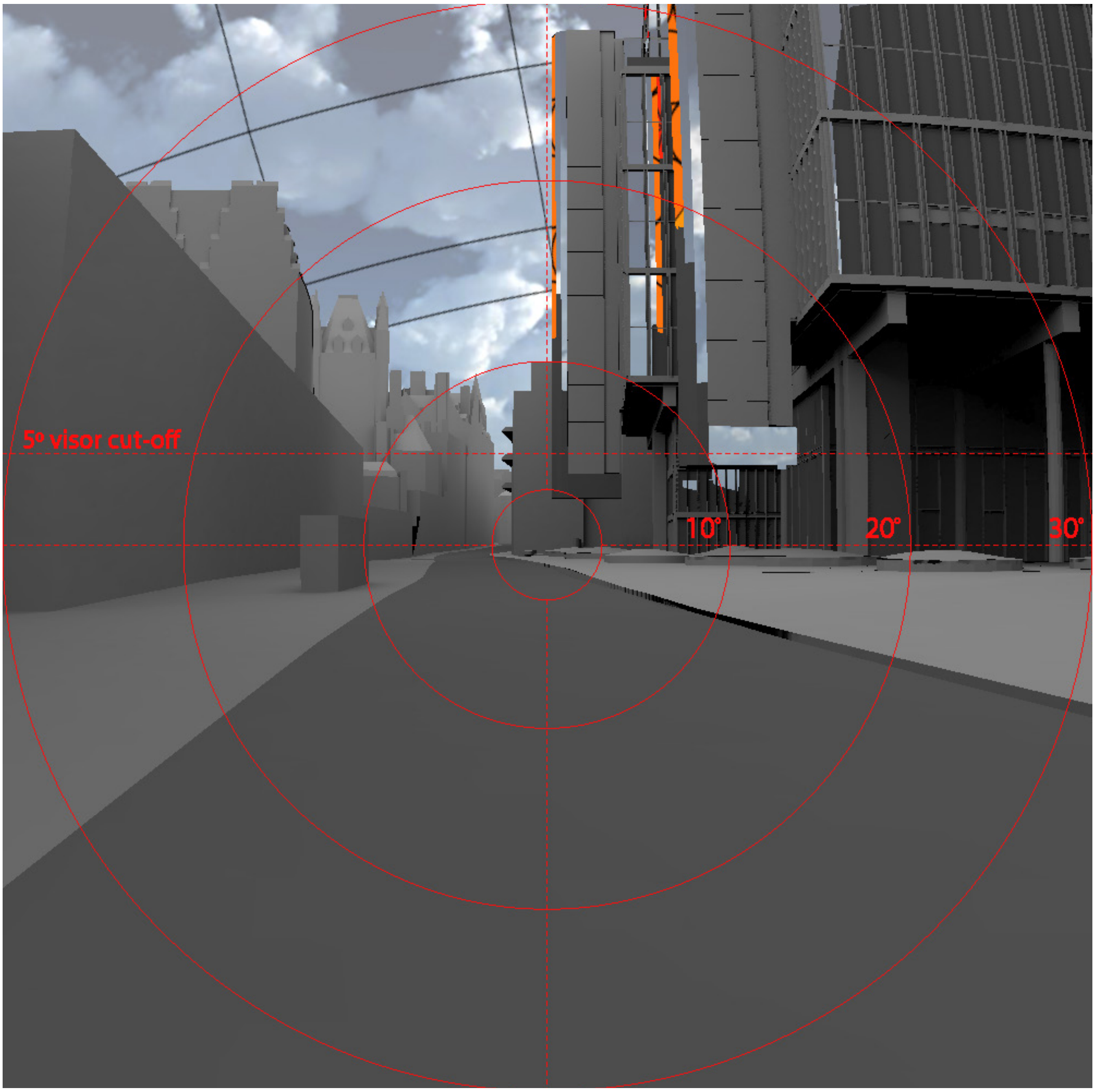
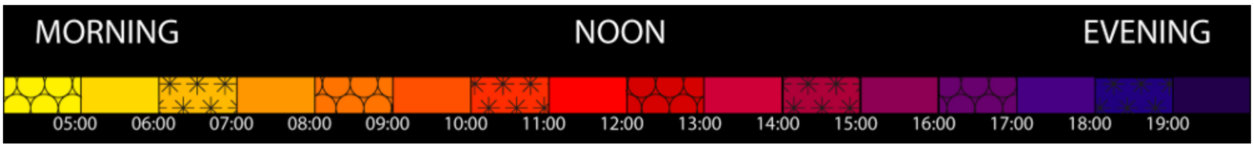


Fig. 16: Solar reflections



60° FIELD OF VIEW: SEASON
VIEWPOINT ML_S01 - LOOKING FORWARD

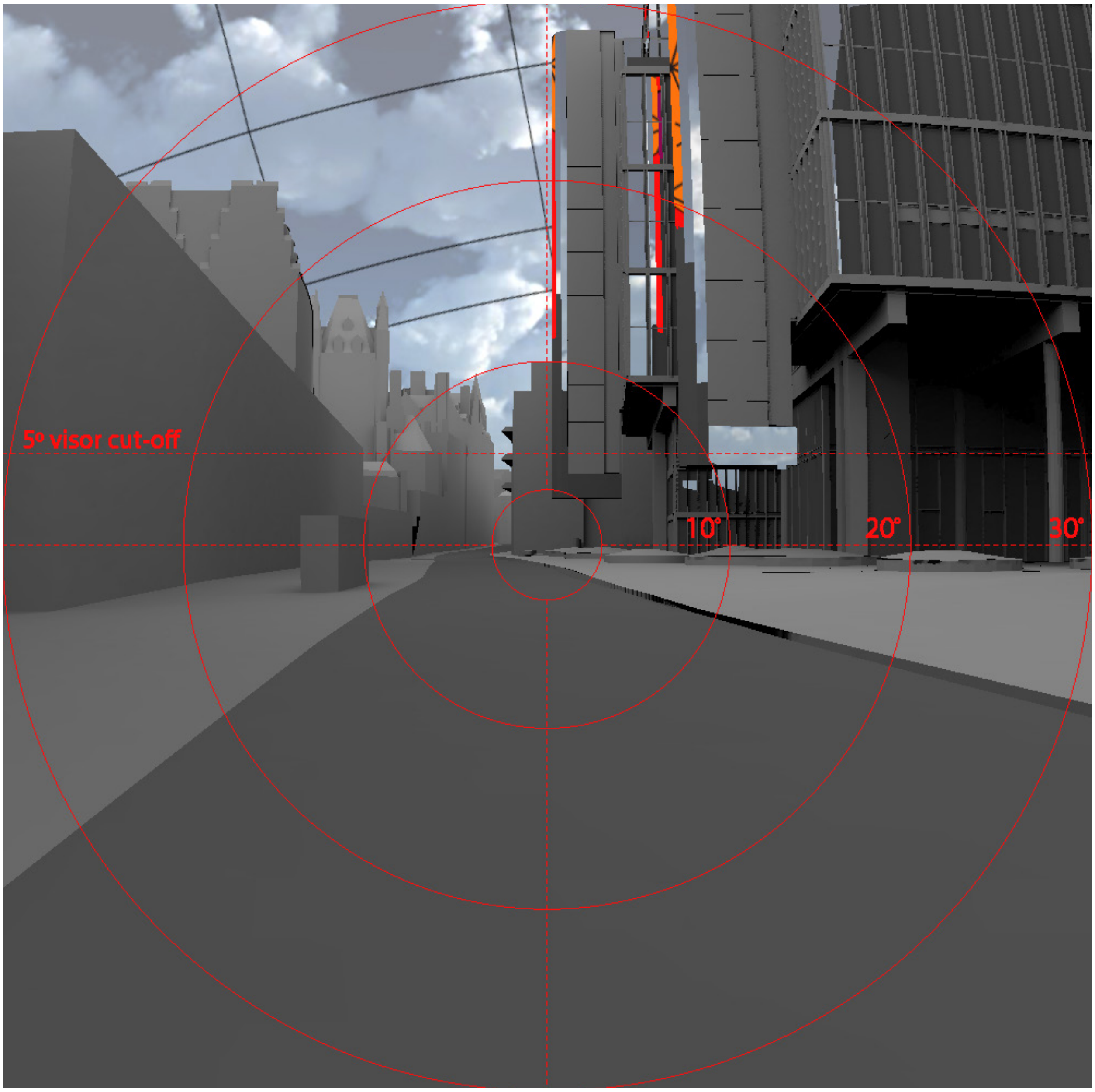


Fig. 17: Solar reflections