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DAYLIGHT & SUNLIGHT

SOLAR GLARE ASSESSMENT

Mayfield Masterplan - Phase 1B

20 February 2025

GIA No: 20569

PROJECT DATA:

Client **Mayfield Medlock Limited**
Architect **Shedkm Architects Ltd and Studio Egret West**
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1 EXECUTIVE SUMMARY

The purpose of this report is to ascertain whether of Phase 1B of the Mayfield Masterplan (the “Proposed Development”), Manchester, would result in likely significant solar glare effects to road or train drivers.

This solar glare assessment considers the worst-case scenario of Phase 1B assessed in isolation, without accounting for the remaining phases of the masterplan. Upon implementation of the masterplan, some of the reflections identified in this report would no longer be visible due to the screening by other buildings.

The Proposed Development consists of four buildings across Plots J and K of much greater scale than the surrounding context, which would therefore be visible from surrounding roads and railway lines.

The design of Plot K is characterised by punched windows and perforated anodised aluminium vent panels across non-reflective facades made of brickwork. Portions of Plot J would have a similar configuration with pre-cast concrete panels instead of brickwork, however most of the building and especially the upper floors will have anodised aluminium rainscreen panels on most of the facades.

All glazed elements on the proposed facades have been considered fully reflective. In addition, all metal surfaces have also been assumed to be reflective, although the anodised finish inherently reduces the intensity of reflections.

Viewpoints approximately within 500m of the Proposed Development have been considered.

Road viewpoints have been selected for main road junctions in the directions of travel towards the Proposed Development, where an action from drivers is required (for example stopping at a traffic light).

Train viewpoints have been assessed along two entire railway tracks to and from Piccadilly Station (Upward and Downward respectively) which are considered representative for all other tracks in each direction. Train signalling diagrams have not been made available and so signals have been placed based on observations from Google Maps and Bing Maps.

Assumptions and limitations of the assessment are set out in Section 4 of this report.

The assessment has shown that instances of reflections may be seen from a number of viewpoints which are discussed in detail in Section 7 of this report, however these have been found to be of minor significance at worst when the following factors are considered:

- duration and time of the day of solar reflections
- location of reflections within the drivers’ field of view
- size and location of reflections on the building facades
- expected reduced intensity for reflections from metal surfaces
- presence of vegetation which reduces the visibility of the Proposed Development

Overall, there would be minor effects on road drivers and negligible effects to train drivers. These effects are not considered to pose significant risks for solar glare.

2 INTRODUCTION

GIA have assessed the proposed scheme in order to ascertain whether solar reflections given off the proposed building's facade will be visible from sensitive viewpoints which may affect road users and train drivers.

2.1 GLARE

Glare is a phenomenon occurring in the eye that is caused by the presence of bright light sources within the visual field. It can lead to visual discomfort and, if the glare source is very bright compared to its surrounding, even be disabling in the sense that objects become hard or impossible to see. This is because they are cloaked by the high intensity glare source, whose light gets scattered within the eye.

The CIE 146:2002 Collection on Glare expresses the latter type of glare more formally as:

"Disability glare is glare that impairs vision (CIE, 1987). It is caused by scattering of light inside the eye [...]. The veiling luminance of scattered light will have a significant effect on visibility when intense light sources are present in the peripheral visual field and the contrast of objects to be seen is low."

"Disability glare is most often of importance at night when contrast sensitivity is low and there may well be one or more bright light sources near to the line of sight, such as car headlights, streetlights or floodlights. But even in daylight conditions disability glare may be of practical significance: think of traffic lights when the sun is close to them, or the difficulty viewing paintings hanging next to windows."

Glare is of particular concern if it affects drivers of motor vehicles or trains, since it might impair the visibility of signals and traffic signs, potentially putting the driver, passengers or other parties at risk.

2.2 GLARE FROM REFLECTED SUNLIGHT

Whether or not a sun reflection will cause an instance of glare depends upon a number of factors, these are summarised below:

- The location of the observer and his view direction;
- The sun's position in the sky, which changes not only with the hour of the day, but with the seasons too;
- The location and orientation of the reflective surface, e.g. a glazed facade, in relation to the observer's view direction;
- The specific quality of the reflective surface, e.g. sheen, specularity, etc.;
- The observer's physiology, e.g. age and eye pigmentation; and
- The background brightness defining the state of adaptation in the observer's eye;

This final point is an important one as the same brightness which could cause glare against a dark background may be perfectly acceptable when looked against a light one. A typical example of adaptation is illustrated in Figs. 01 and 02 where the same headlights cause glare at night whereas they do not during daytime hours.

Understanding whether solar glare is likely to occur is based on the observer's position and view direction. Given the transitory nature of the phenomenon, due to the sun's constant movement, any glare assessment should be carried out for a number of representative locations and view directions.

Such studies are often carried out with the help of sun path protractors, as depicted in Fig. 03 below, or with the aid of a full 3 dimensional computer simulation.

When a large number of locations need to be looked at, studies involving solar protractors become rather impractical. Computer software allows multiple viewpoints to be assessed with greater ease so that it has even become feasible to render video sequences showing when and where reflections may become an issue.

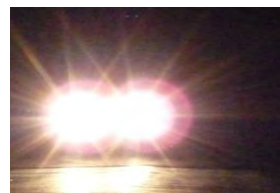


Fig. 01: Headlights at night



Fig. 02: Headlights during day

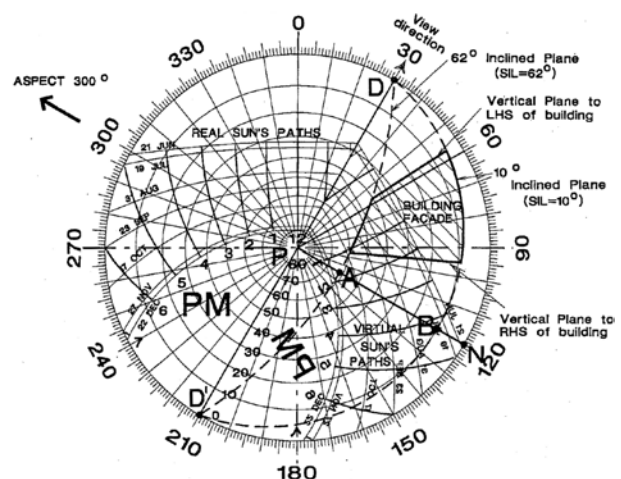


Fig. 03: Hassall's Protractor

3 GUIDANCE

3.1 EXISTING GUIDANCE

In the UK, guidance that is relevant to glare assessments is limited to a short section in the BRE's guidance "Site Layout Planning for Daylight and Sunlight: a guide to good practice" (BR209 - 2022 edition). It suggests that:

"If it is likely that a building may cause solar dazzle the exact scale of the problem should be evaluated. This is done by identifying key locations such as road junctions and windows of nearby buildings, and working out the number of hours of the year that sunlight can be reflected to these points. BRE Information Paper IP 3/87 gives details."

BR IP3/87 provides more detailed instructions on why and how solar dazzle can be calculated:

"Glare or dazzle can occur when sunlight is reflected from a glazed facade. For vertical façades this problem usually occurs only when the sun is low in the sky; but some types of modern design incorporate sloping glazed façades which can, under certain circumstances, reflect unwanted high altitude sunlight into the eyes of motorists, pedestrians and people in nearby buildings."

Both BR 209 and BR IP3/87 only deal with geometrical considerations of glare by identifying when and where reflections occur.

The City of London (CoL) published their own guidance in the form of a Planning Advice Note in July 2017. The aim was to establish "Guidelines and best practice for assessing solar glare in the City of London". These guidelines are considered best practice and so also relevant for this project.

The CoL Guidelines distinguish between discomfort glare and disability glare.

"There are two types of reflected glare problem that can occur. Discomfort glare causes visual discomfort without necessarily affecting the ability to see. Disability glare happens when a bright source of light (such as the reflected sun) impairs the vision of other objects."

"Outdoors, disability glare is easily the more serious problem, as it can affect motorists' ability to drive safely. It is especially important at locations where a driver has to make a key decision, for example approaching a road junction, traffic signal or pedestrian crossing. It can also affect train drivers, particularly if they are looking at illuminated signals."

"Discomfort glare is a less dangerous problem because it does not impair the ability to see. It can be important where work involves continuous viewing of the outdoor space from a fixed vantage point, for example in security surveillance."

Because discomfort glare a) does not impair the ability to see; and b) it only needs to be looked at where work involves continuous viewing of the outdoor space from a fixed vantage point – which is clearly the case for a train driver – GLA's solar glare assessments do not assess discomfort glare.

The CoL Guidelines also explains with regard to disability glare that:

"If the reflected sun would be visible close to the driver's line of sight, then either a more detailed calculation of solar glare is required, or measures should be taken to reduce the glare."

4 GIA'S APPROACH AND METHODOLOGY

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

The methodology described below is aimed at identifying the occurrence and duration of solar glare throughout the year in respect of a driver's field of view.

The potential for reflected solar glare or dazzle from the glazed or reflective façades of the development are assessed using specialist lighting software.

The solar glare assessment entails the following steps:

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

The individual steps and limitations of our workflow are further explained below.

4.1 3D COMPUTER MODELLING

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

Traffic lights and train signals have been introduced in the context 3d-model based aerial and street views from Google Maps and Bing Maps.

4.2 REFLECTIVE SURFACE PROPERTIES

The static assessment assumes all potential reflective portions of the Proposed Development as "mirrors", therefore portraying an absolute worst-case scenario which is however aimed at identifying whether a reflection can occur or not.

4.3 SENSITIVE VIEWPOINTS

Potentially sensitive viewpoints around the site are selected within approximately 500m from the Proposed Development. These viewpoints represent locations where reflected solar glare may cause adverse impacts to those travelling towards the development, such as road users or train drivers.

Roads viewpoints are generally located in junctions where an action by drivers is required (such as stopping at a traffic light), at the minimum stopping distance and at the driver's eye height. The focal point is a relevant traffic element, such as signals or incoming traffic. The height of the viewpoint is considered to be 1.5 m for cars, or 2.0 m for buses.

The stopping distance is calculated as the combination of thinking and breaking distances $D_{\text{total}} = D_{\text{thinking}} + D_{\text{breaking}} = V \cdot T + V^2 / (2 \mu \cdot g)$, where each component is:

V = Relevant vehicle speed, typically the road speed limit.

T = Thinking time (0.67 sec)

μ = Breaking effort (considered 0.65 for cars, 0.5 for buses and 0.031 for trains)

g = Gravity acceleration.

i.e. A viewpoint for car driving at 30 mph would be placed at 23 m (see Figure 4) from a traffic light and at 1.5 m above the ground.

Typical Stopping Distances



Fig. 04: Typical car stopping distances for various speed limits

For train drivers, UK recommendations set the eye level of the driver at 2.75 m above the rails. The view point is centred between the tracks for ease of reference. Although train drivers sit slightly to the left within the cabin, this bears no material effect on the analysis of the images as the signals are visible at a distance of hundreds of metres at which point the slight shift in the cabin equates to a very small angular change. Fig. 05 shows the typical set up of our viewpoints. Actual trains and driver's cabin are not included in our 3d computer model.

Individual virtual cameras are located in each viewpoint. Before the stills are compiled, a human field of view mask is overlayed onto them in order to define the angular distance between the instance of reflection and the observer's line of sight.

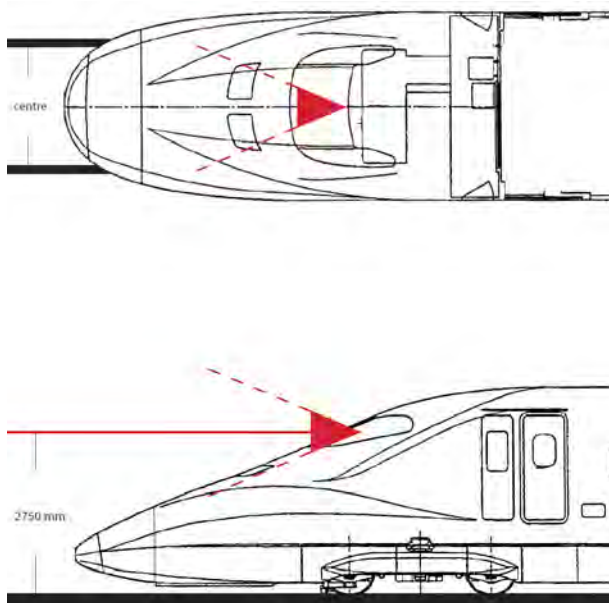


Fig. 05: Train Driver Viewpoint

4.4 HUMAN FIELD OF VIEW

The field of view is the angular extent within which objects can be observed by one or both eyes. Owing to the arrangement of the human eyes, the stereoscopic visual field extends to approximately 60° either side on the vertical and 90° either side on the horizontal.

In the United Kingdom, the minimum field requirement for driving is 60° either side of the vertical meridian, and 20° above and below horizontal.

The fovea centralis is the central area of the retina. It extends about 3° in all directions. The fovea is responsible for sharp vision that is used for reading, driving, and any other activity where visual detail is important. Fig. 06 shows our typical field of view overlay.

The CIE 146:2002 suggests that occurrences at angles beyond 30° would be of little significance in most situations, but may be relevant in exceptional circumstances. Any reflection within 30° is looked at in greater detail in terms of its duration, size of the reflective surface and where appropriate, predicted intensity.

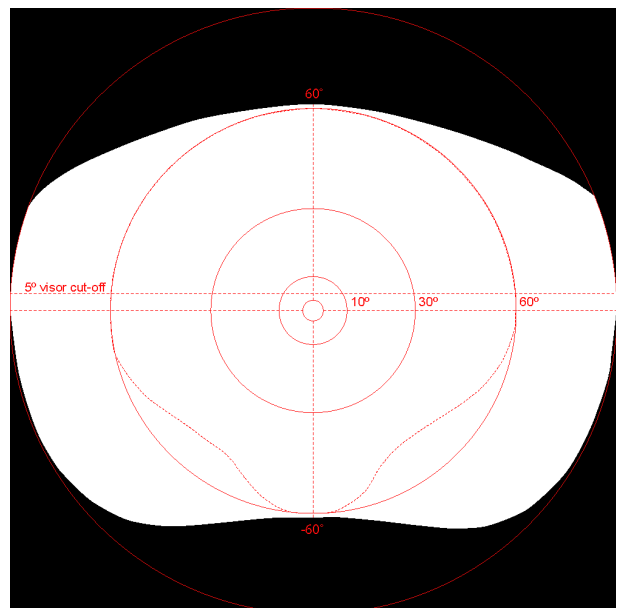


Fig. 06: Typical human field of view

4.5 STATIC ASSESSMENT

In the Static Assessment, images are generated based on the location to the observer's viewpoint to gauge the potential reflected sunlight in the hours of the day and time of the year this may happen.

To achieve this, the yearly sun path is mapped onto the sky and colour-coded so that the hours of the day and the period of the year can be distinguished. This sun path is picked up by the reflective elements of the proposed buildings in our rendered stills.

Fig. 07 shows the colour coded sunpaths projected onto the sky dome to visualise the time of day and season during which solar reflections occur.

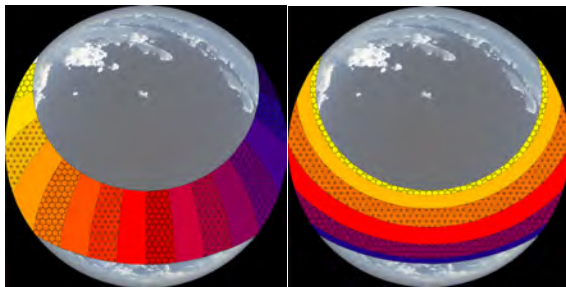


Fig. 07: Stage 1 - Colour coded sunpath for time of day and seasons

Two identical viewpoints are rendered as shown in Fig. 08 and Fig. 09: one focusing on the times of the day when the reflection would be visible, and the second looking at the months throughout the year.

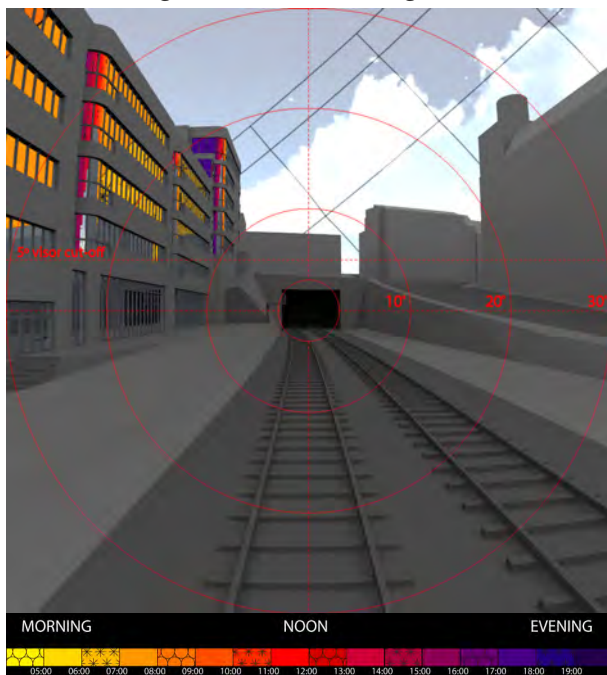


Fig. 08: Example of Static Assessment - Hours

4.6 IMAGE ANALYSIS

The images highlight 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.

The following guidance is used to determine the significance of a potential reflection:

- Solar reflections are visible within 30° to 10° of the driver's line of sight for a long period of time (large reflective surface) or between 10° to 5° for a short period of time;
- Solar reflections are visible within 10° and 5° of the driver's line of sight occurring for a long period of time; and
- Solar reflections are visible within 5° of a driver's line of sight.

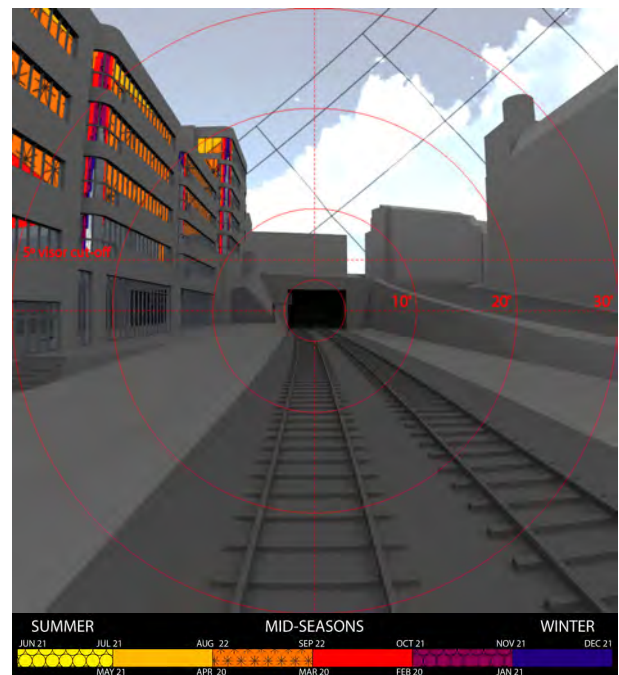


Fig. 09: Example of Static Assessment - Months

In addition, other factors are also taken in consideration, such as:

- duration and time of the day of solar reflections
- location of reflections within the drivers' field of view
- size and location of reflections on the building facades
- expected reduced intensity for reflections from metal surfaces
- presence of vegetation which reduces the visibility of the Proposed Development
- location and visibility of future other buildings of the Masterplan in gauging long term effects

4.7 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.

Train signalling diagrams have not been made available, and so signals have been placed in the 3d-model using aerial imagery and street views from Google Maps and Bing Maps as accurately as possible. This is however a limitation of the assessment should relevant signals not have been identified and assessed.

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.

A sample of the anodised aluminium panels was not provided and so GIA could not verify the specular properties of this material. To provide a worst case scenario, these have been assessed as fully reflective, however the discussion of results acknowledges the likely lesser intensity of reflections based on experience with similar materials in other projects.

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.

5 SCENARIO OVERVIEW

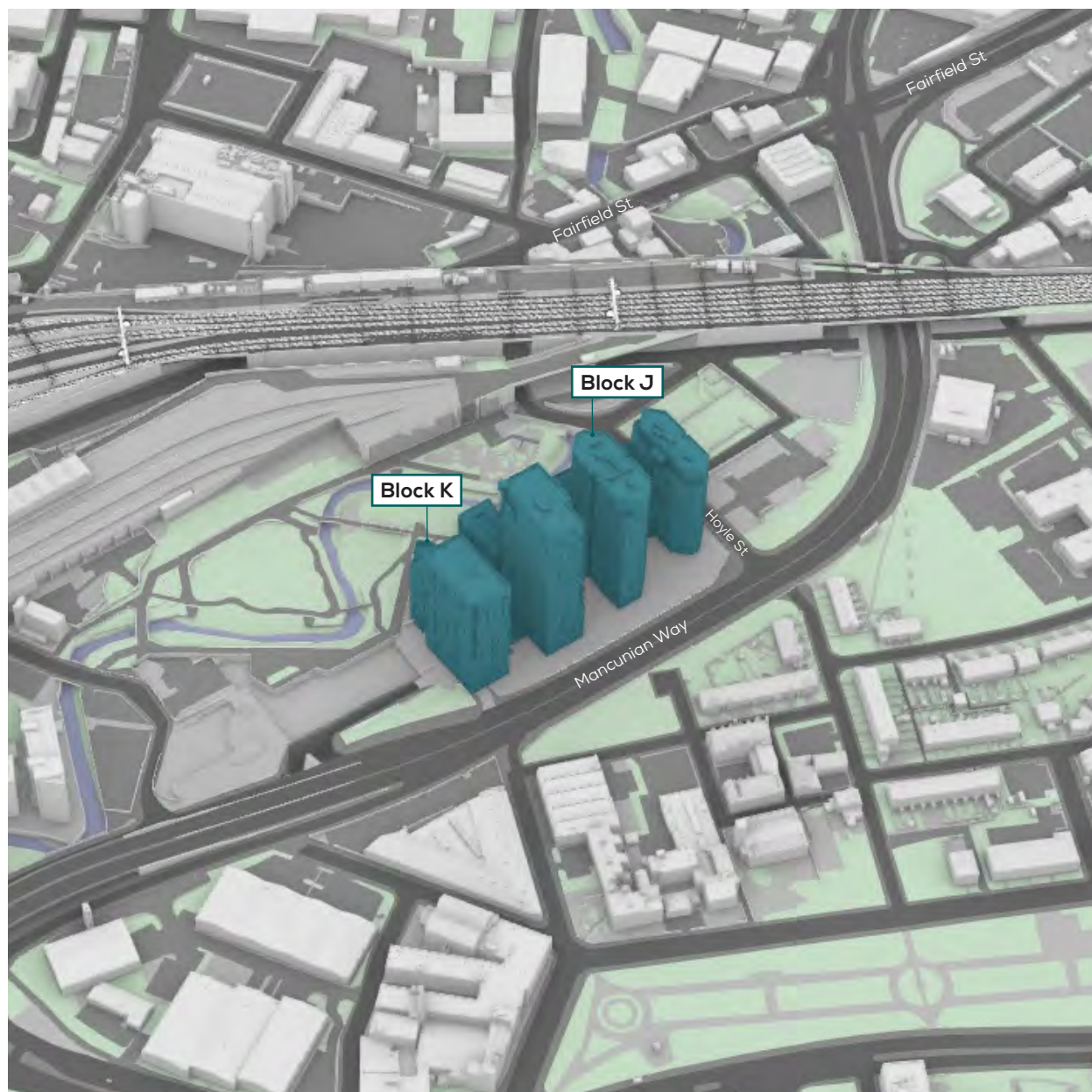


Fig. 10: View of Phase 1B within the Mayfield Masterplan in isolation to portray a worst-case scenario

6 VIEWPOINTS

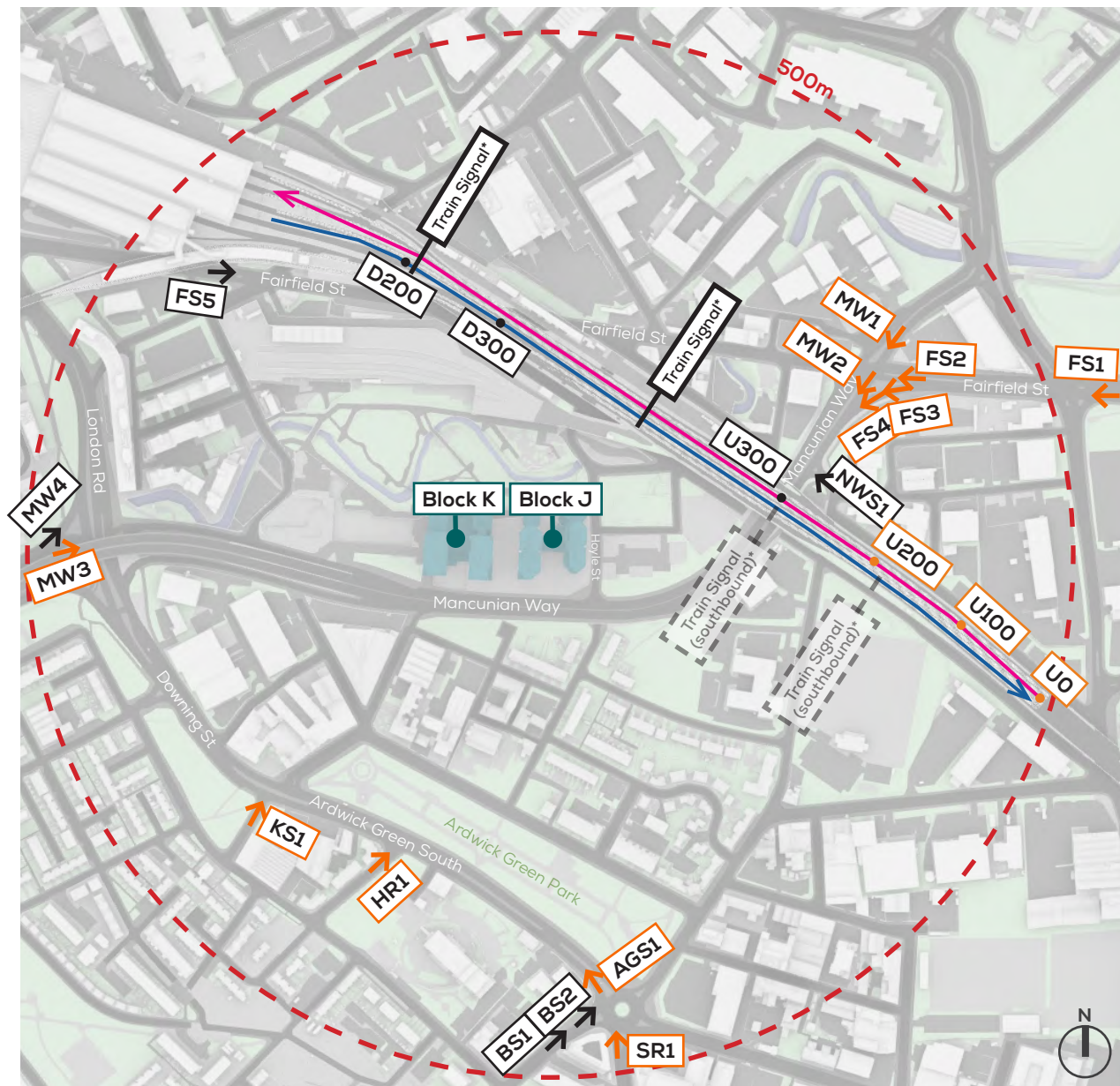


Fig. 11: Site Plan - Viewpoints

- Reflections visible within 30° at the sensitive location from the road
- Scheme not visible from the road
- Train Track - Upward direction (U)
- Train Track - Downward direction (D)
- - 500m radius

* Train signals are assumed based on observations from Google Maps and Bing Maps

ROAD VIEWPOINTS	
FS	Fairfield St
MW	Mancunian Way
SR	Stockport Rd
AGS	Ardwick Green South
BS	Brunswick St
HR	Hamsell Rd
KS	Kale St

7 DISCUSSION OF RESULTS

ROAD VIEWPOINTS

At the following road viewpoints there would not be visible reflections:

- North Western St - NWS1
- Brunswick St - BS1 and BS2
- Mancunian Way - MW5
- Fairfield St - FS5

Location where solar reflections may be visible within 30° of a driver's field of view are discussed below.

Fairfield St

FS1: At this location, drivers would be travelling westbound along Fairfield St.

Reflected sunlight from the top floors of Plot J may be visible between 07:00 and 08:00 GMT, occurring between late February and late March and between late September and late October.

These reflections would occur beyond 20° of the drivers' field of view and are therefore considered of minor significance.

FS2: At this location, drivers along Fairfield St would be approaching the junction with Mancunian Way and the relative traffic light, continuing in the westbound direction along Fairfield St.

Only very limited instances of solar reflections may occur from this viewpoint, all beyond 25° of the drivers' field of view. These reflections originate from punched windows and would be visible only at a grazing angle, making their duration extremely brief and not of material significance.

The Proposed Development would also gradually move outside the drivers' field of view. As such these reflections are considered negligible.

FS3: At this location, drivers along Fairfield St prepare to turn left to enter Mancunian Way ahead of a traffic light. The Proposed Development would gradually enter within the drivers' field of view.

Reflected sunlight predominantly from the eastern facades of Plot J may be visible between 07:00 and 09:00 GMT, occurring between late January to late March and between late September to late November.

Reflections, however, would mostly be outside 15° of the drivers' field of view.

Traffic lights are located on both sides of the road, with the one to the right remaining well outside the building's line of sight.

In addition, as shown in the supplementary Google street view images provided for this viewpoint, there is vegetation that would shelter or greatly reduce the visibility of the Proposed Development at the times of the year where reflections could occur, further reducing risk for solar glare.

As such, overall, the risk for solar glare effects is considered of minor significance.

It should also be noted that once Phase 3 of the Masterplan is developed, the Proposed Development would likely no longer be visible.

FS4: At this location, drivers merging with Mancunian Way would have just passed the traffic light discussed is FS3, with the Proposed Development well visible in front of them.

Reflected sunlight predominantly from the eastern facades of Plot J may be visible between 07:00 and 09:00 GMT, occurring between late January to late March and between late September to late November.

These reflections would occur approximately between 5° and 15° of the drivers' field of view and could be mitigated by using a car's sun visor.

As shown by the supplementary assessment provided for this viewpoint on pages 24-25 (where reflections from windows are isolated from the rest of the facade) the majority of reflections would come off the anodised aluminium panels which are expected to be scattered and less intense than those specular coming off windows. Reflections from the windows alone would be small in size and broken up across the facade.

Overall, whilst reflections could be visible, considering that the junction is regulated by the traffic light discussed in viewpoint FS3 and the likely reduced intensity of the reflections from the metal panels, the risk for solar glare at this viewpoint is also considered to be of minor significance.

Once Phase 3 of the Masterplan is developed, the Proposed Development would likely no longer be visible.

Mancunian Way

MW1 - MW2: At these locations, drivers would be driving southbound along Mancunian Way before and after the junction with Fairfield St.

Reflected sunlight from Plot J may be visible between 08:00 and 09:00 GMT between late January and late March, and between late September and late November.

These reflections occur beyond 20° of the drivers' field of view and are therefore considered to be of minor significance.

MW3: At this location, drivers would be driving eastbound along Mancunian Way approaching the junction with London Rd, regulated by a traffic light.

Very small reflections from the punched windows on the western facade of Plot K may be visible between 17:00 and 18:00 GMT from March to April and from August to September.

These reflections occur within 10° of the drivers' field of view, however they are very small in size and are considered of negligible significance.

Stockport Rd

SR1: At this location, drivers along Stockport Rd would be approaching a roundabout and would have a view of the Proposed Development in front of them.

Reflected sunlight from Plot J may be visible mainly between 06:00 and 08:00 GMT from late February to late March and late September to late October.

These would be visible between 3° and 10° from the drivers' field of view and the majority of them could be screened by deploying the car visor.

However, as shown in the supplementary Google street view image provided for this viewpoint, there are trees in Ardwick Green Park beyond the roundabout which would obstruct the view of the Proposed Development, especially within 10° of the field of view where most reflections could occur.

As such, the risk for solar glare effects for this viewpoint is also considered of minor significance.

Ardwick Green South

AGS1: At this location, drivers on Ardwick Green South would have just exited the roundabout discussed above and approach a pedestrian crossing regulated by traffic lights.

Reflections may be visible from portions of the elevations of Buildings K and J, and would all occur beyond 20°.

The Proposed Development would gradually move outside the drivers' field of view, and so the risk for solar glare effects is considered of minor significance.

Hamsell Rd

HR1: At this location on Hamsell Rd, drivers would slow down or stop before turning to Ardwick Green South.

Instances of solar reflections would occur from predominantly from the south-facing elevations of Plots J and K, between 10:00 and 11:00 GMT and 16:00 to 17:00 GMT. These may be visible at different times of the year depending on the area considered, mainly between late September to late March.

These reflections would occur between 5° and 30° of the driver's line of sight and could be mitigated by using a car's sun visor.

Similar to viewpoint SR1, Google street view images show that the trees in Ardwick Green Park would greatly shelter the view of the Proposed Development, especially within 15° of the drivers' field of view.

As such, the risk for solar glare effects for this viewpoint is also considered of minor significance.

Kale Rd

KS1: At this location on Kale St, drivers would slow down or stop before turning to Ardwick Green South.

Reflections similar to viewpoint HR1 could occur, however from this location they would be visible mainly beyond 20° of the drivers' field of view and so are considered of minor significance.

TRAIN VIEWPOINTS

There would be no reflections for train drivers:

- along the entire Downward track (exiting Piccadilly Station) - exemplified by viewpoints D200 and D300
- along the Upward track (approaching Piccadilly Station) from approximately the intersection with Mancunian Way - exemplified by viewpoint U300.

Upward (towards Piccadilly Station)

U0 - U100 - U200: Instances of solar reflection may occur beyond 20° of the train drivers' field of view at viewpoint U0, primarily between 05:00 and 06:00 GMT from late March to late April and late August to late September.

The Proposed Development would gradually move outside the drivers' field of view at viewpoints U100 and U200.

From the limited information available for train signals, it appears that the visibility of any signal identified in Google Maps and Bing Maps would not be impacted. This however does not exclude that other signals may have been missed.

Overall, due to the peripheral nature of the reflections identified, the risk of glare is considered of negligible significance.

8 SOLAR GLARE ASSESSMENT

The following pages present the results of the Static Assessment

60° FIELD OF VIEW: TIME OF DAY NORTH WESTERN ST - NWS1

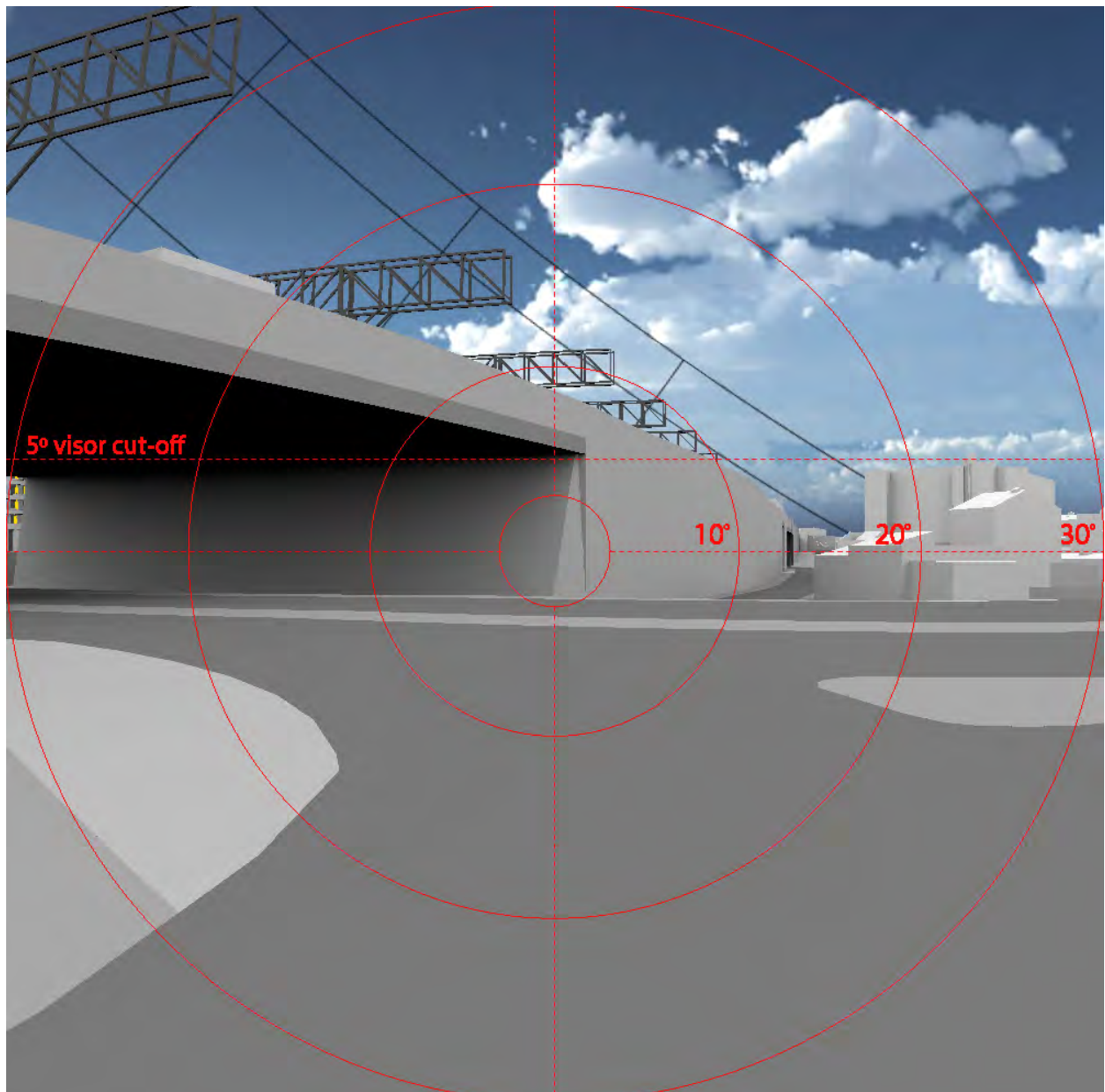


Fig. 12: Solar reflections



60° FIELD OF VIEW: SEASON
NORTH WESTERN ST - NWS1

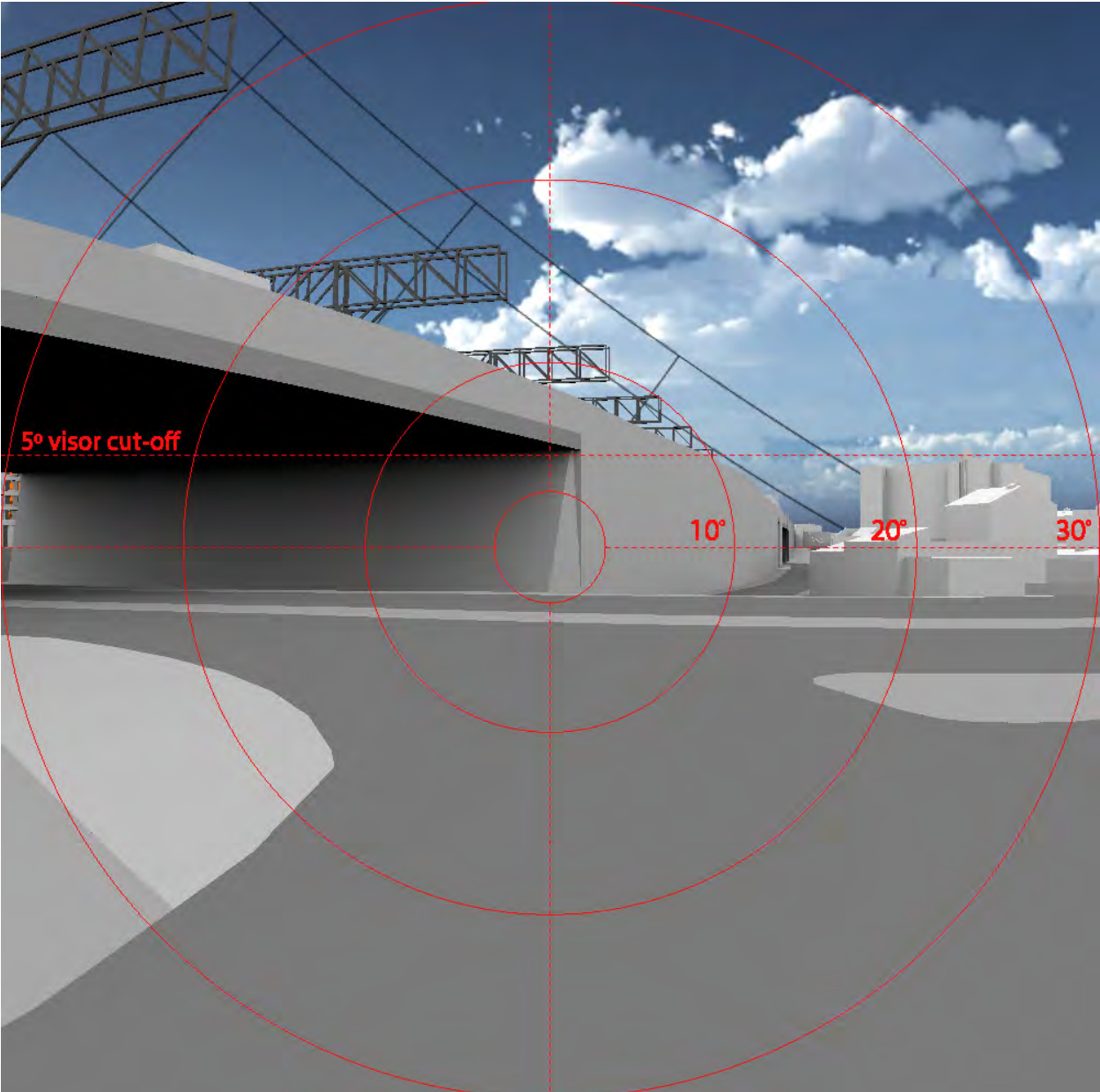


Fig. 13: Solar reflections



60° FIELD OF VIEW: TIME OF DAY
FAIRFIELD ST - FS1

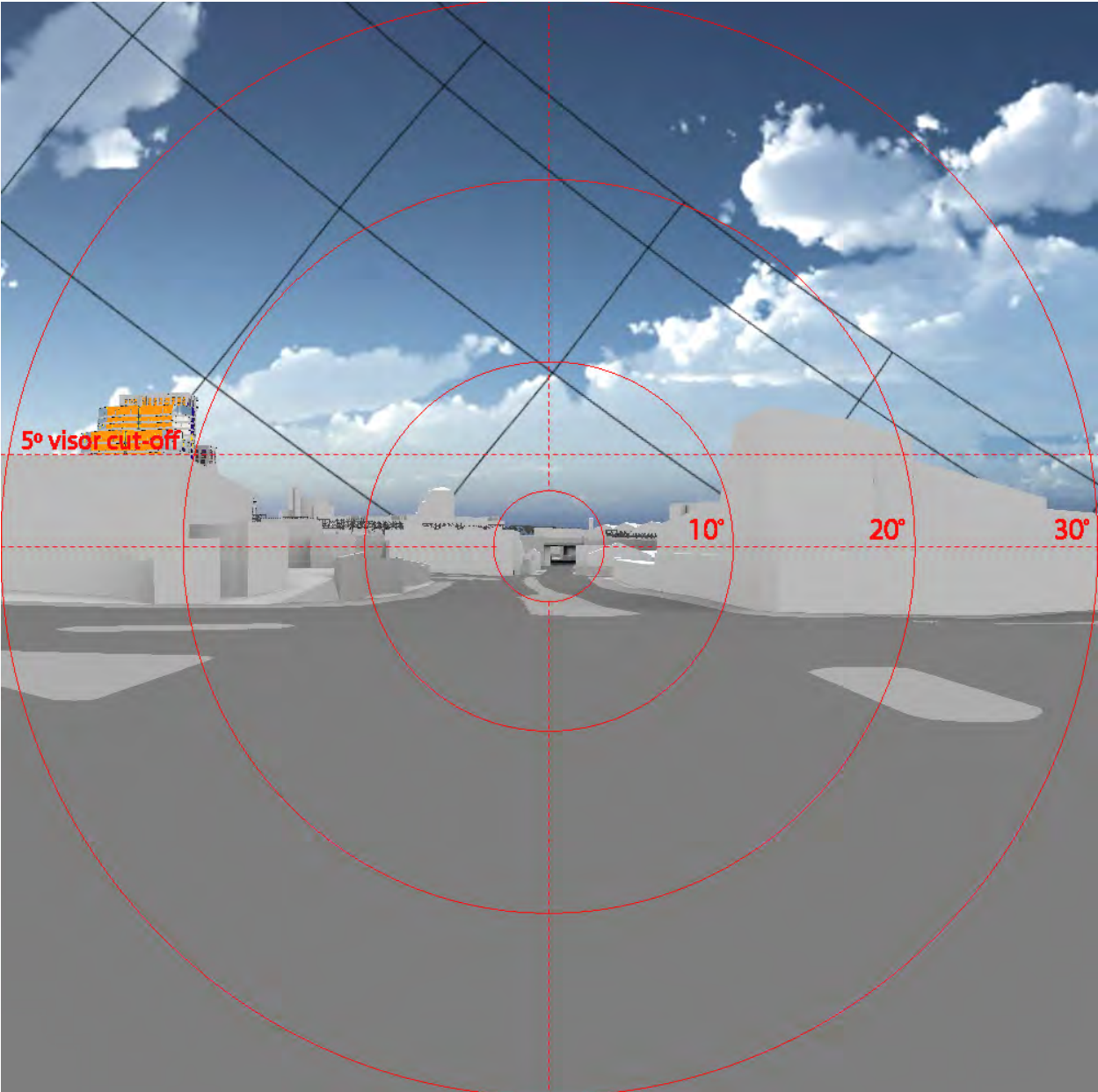
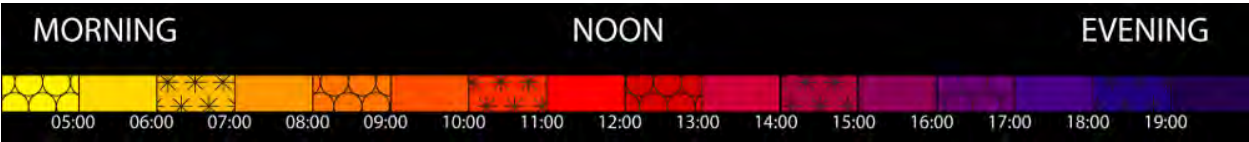


Fig. 14: Solar reflections



60° FIELD OF VIEW: SEASON
FAIRFIELD ST - FS1

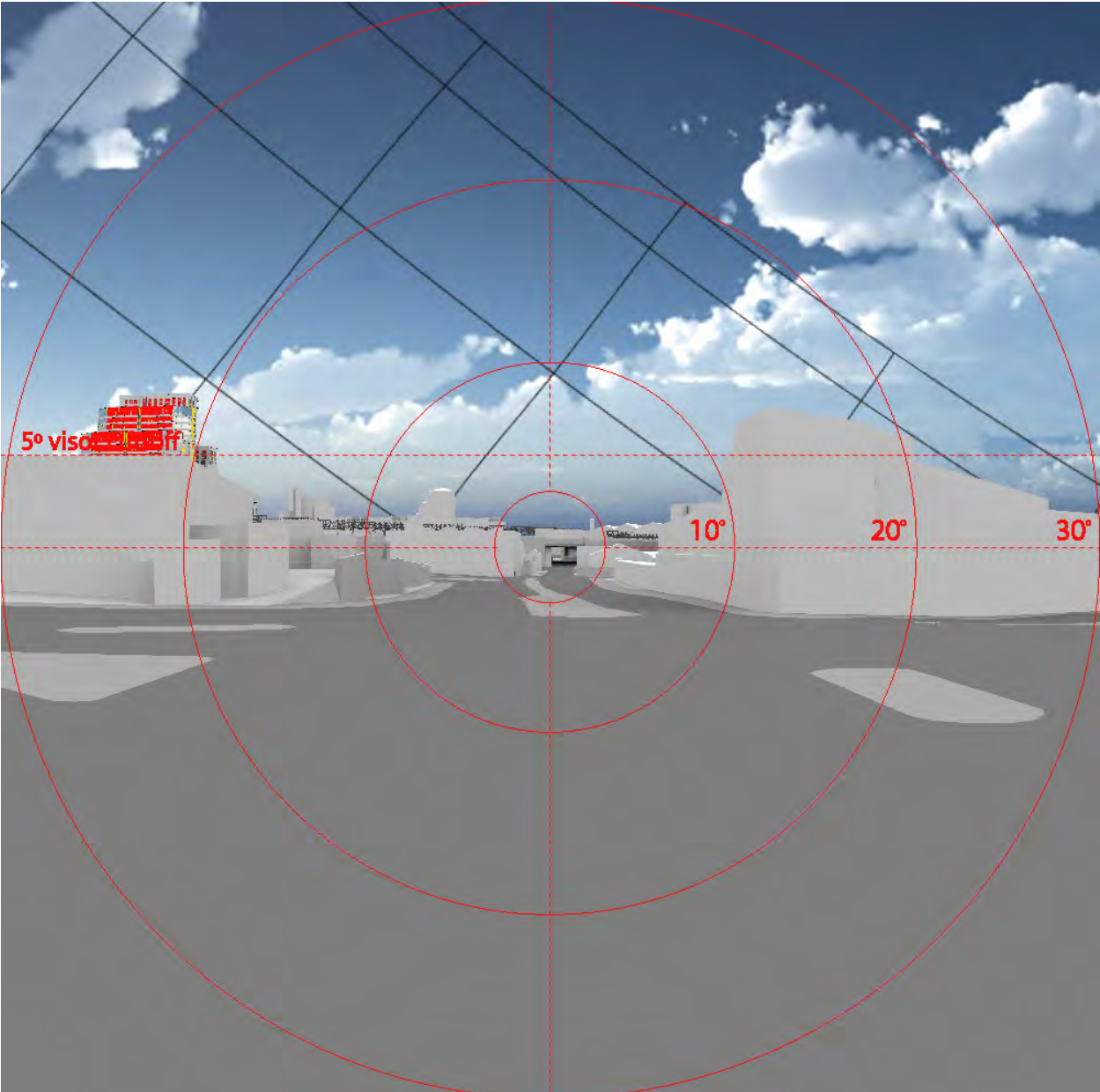


Fig. 15: Solar reflections



60° FIELD OF VIEW: TIME OF DAY
FAIRFIELD ST - FS2

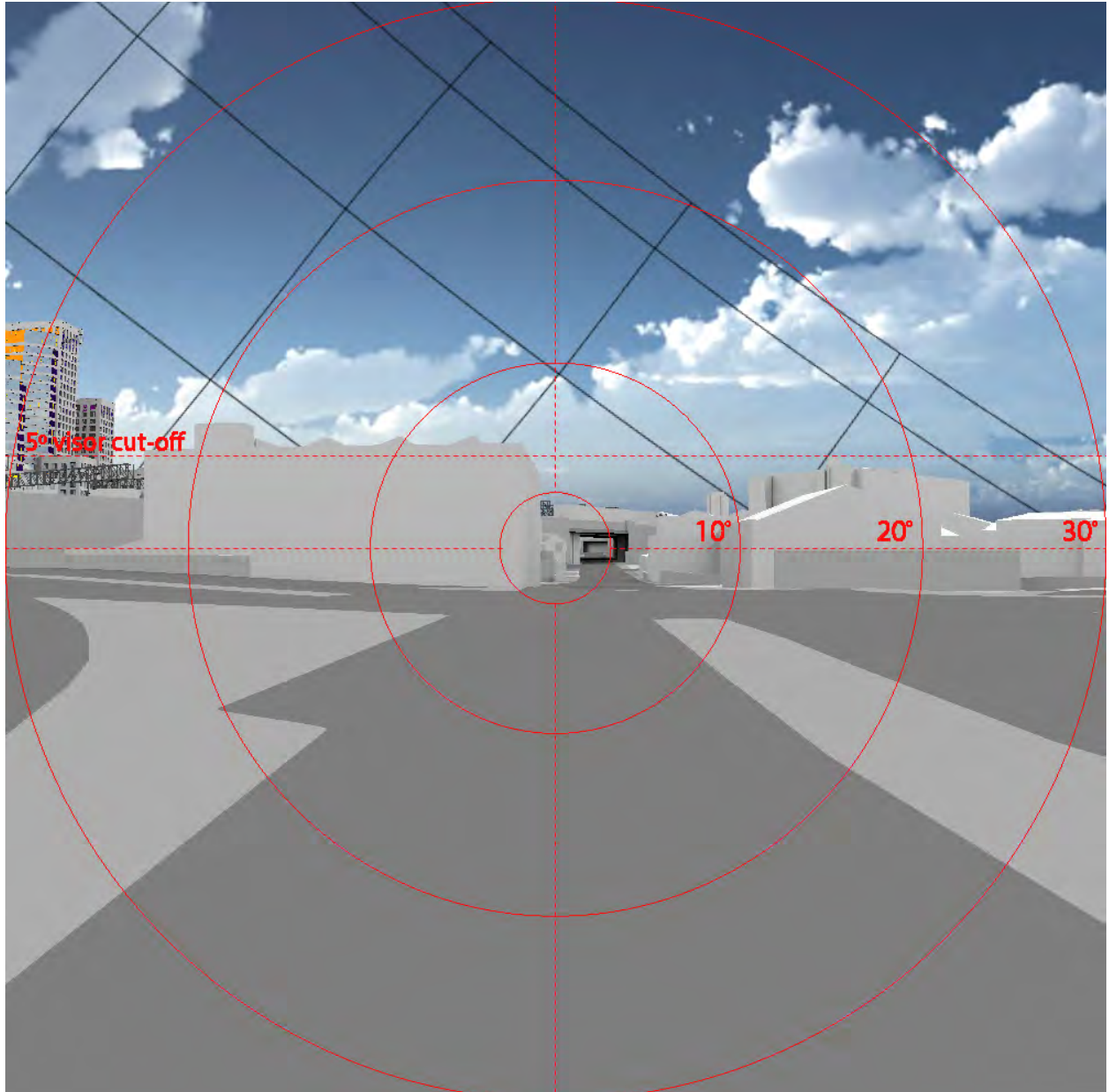


Fig. 16: Solar reflections



60° FIELD OF VIEW: SEASON
FAIRFIELD ST - FS2

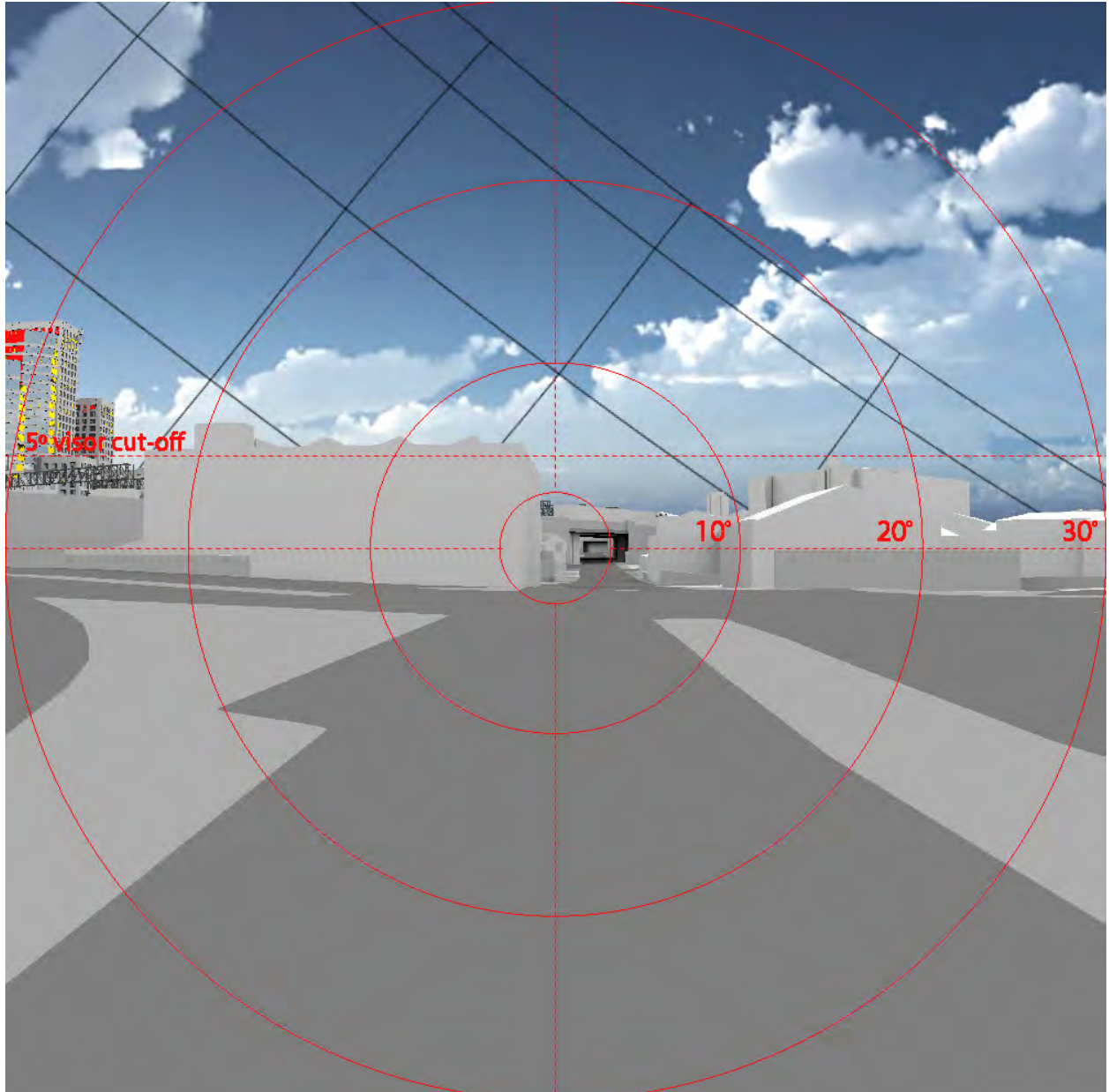


Fig. 17: Solar reflections



STREET VIEW IMAGE - MARCH 2021
(GOOGLE MAPS)



60° FIELD OF VIEW: TIME OF DAY
FAIRFIELD ST - FS3

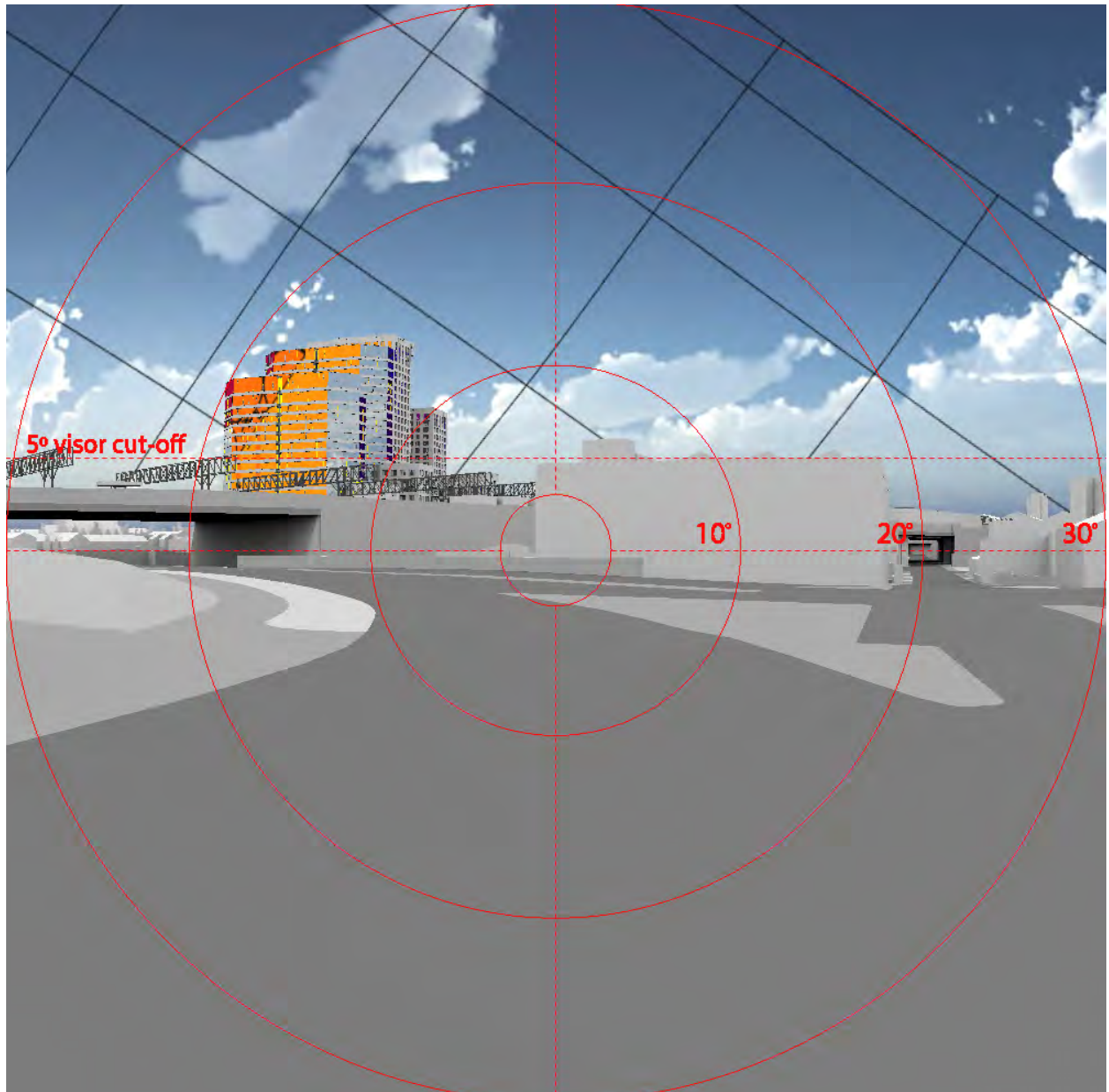
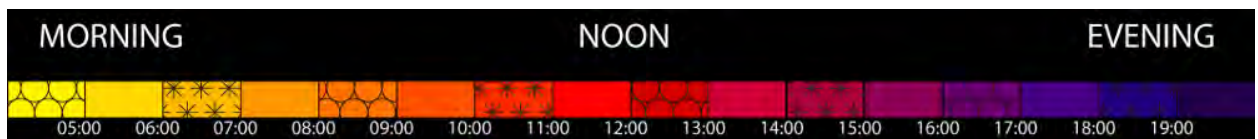


Fig. 18: Solar reflections



STREET VIEW IMAGE - NOVEMBER 2020
(GOOGLE MAPS)



60° FIELD OF VIEW: SEASON
FAIRFIELD ST - FS3

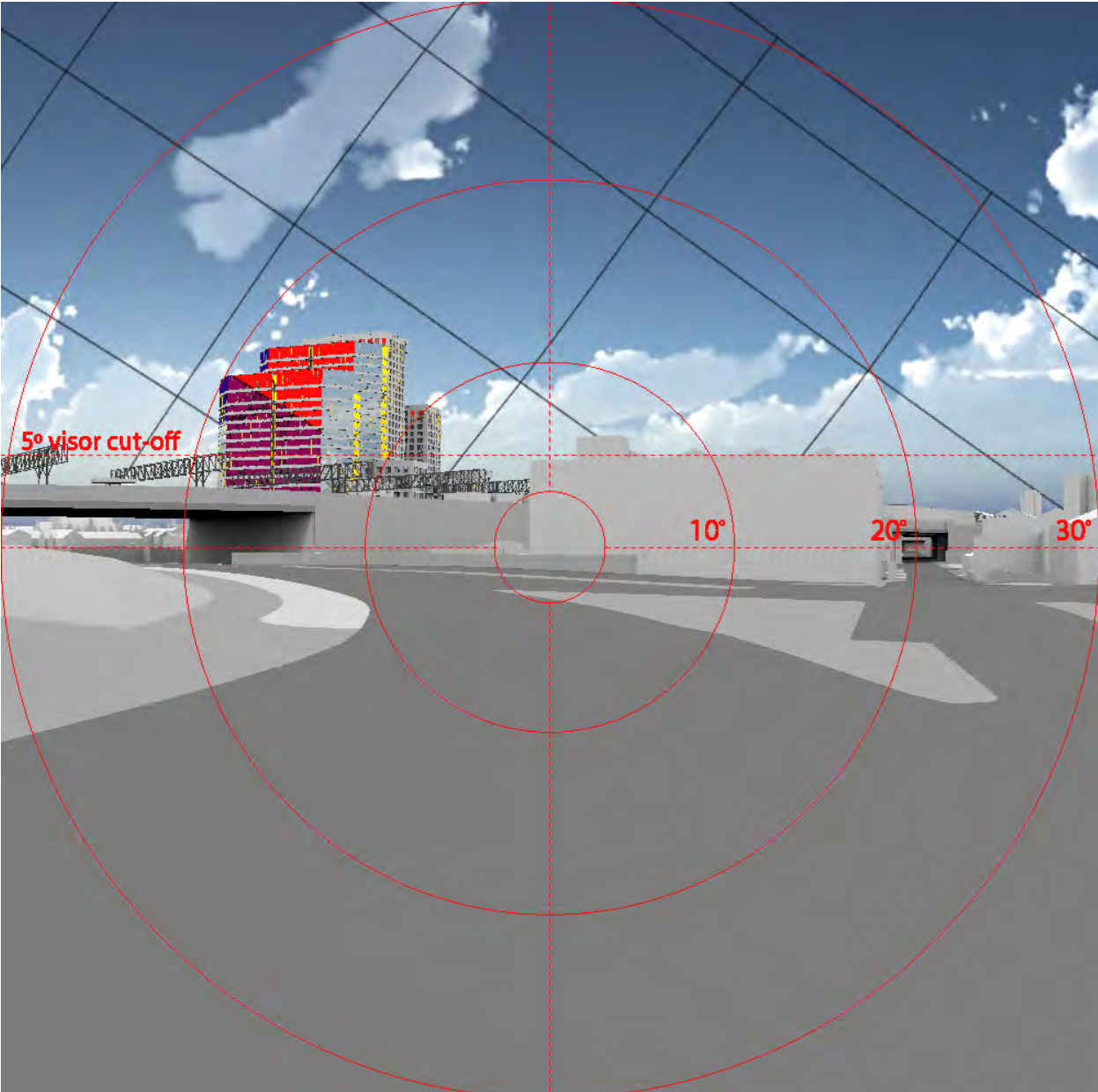


Fig. 19: Solar reflections



60° FIELD OF VIEW: TIME OF DAY
FAIRFIELD ST - FS4

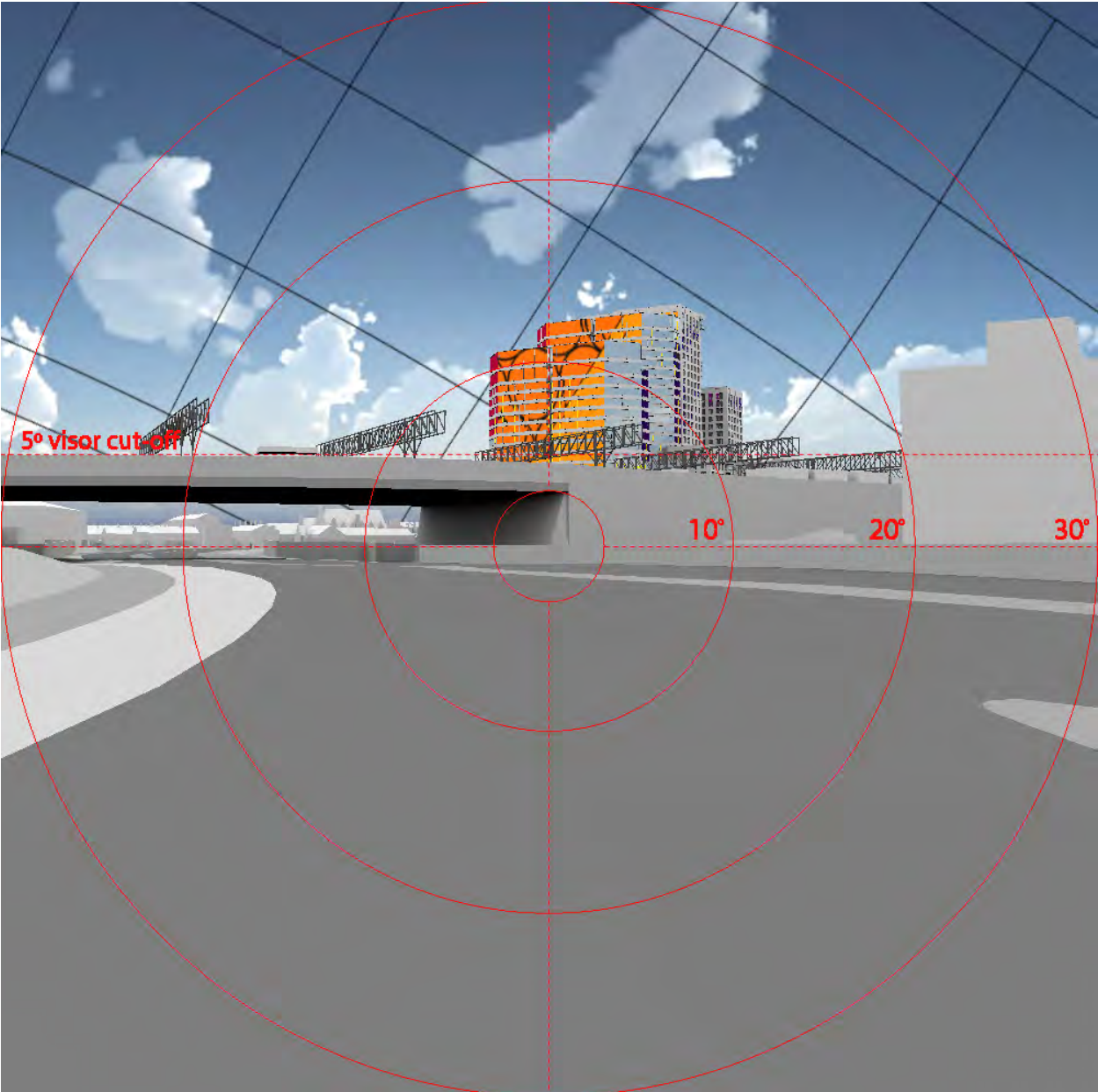
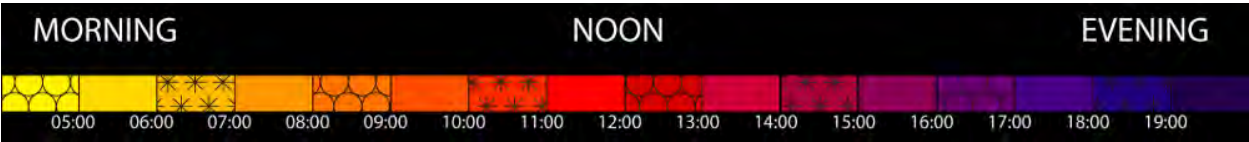


Fig. 20: Solar reflections



60° FIELD OF VIEW: SEASON
FAIRFIELD ST - FS4

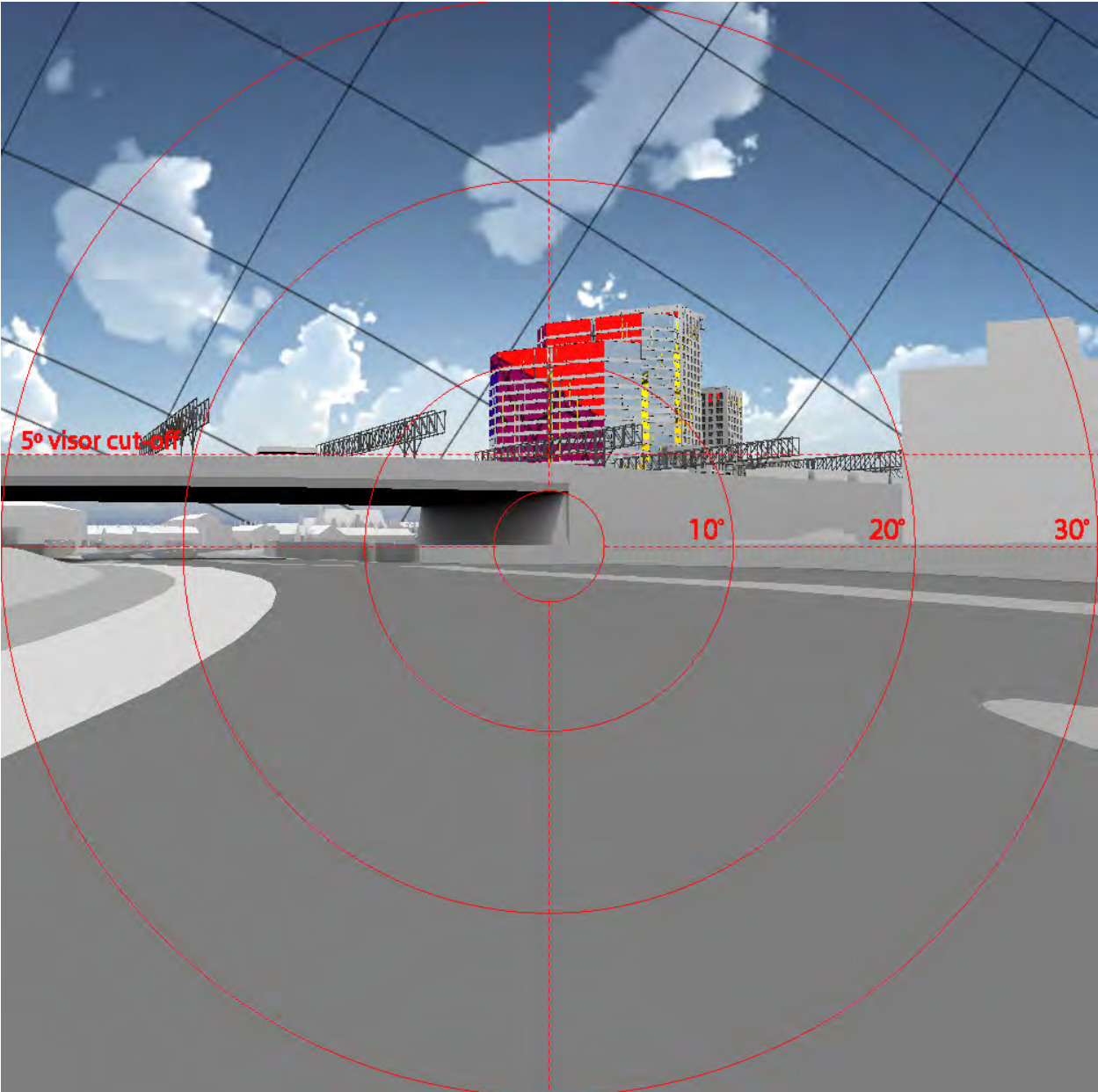


Fig. 21: Solar reflections



SUPPLEMENTARY ASSESSMENT FOR VIEWPOINT FS4 - ONLY WINDOWS CONSIDERED REFLECTIVE

60° FIELD OF VIEW: TIME OF DAY
FAIRFIELD ST - FS4

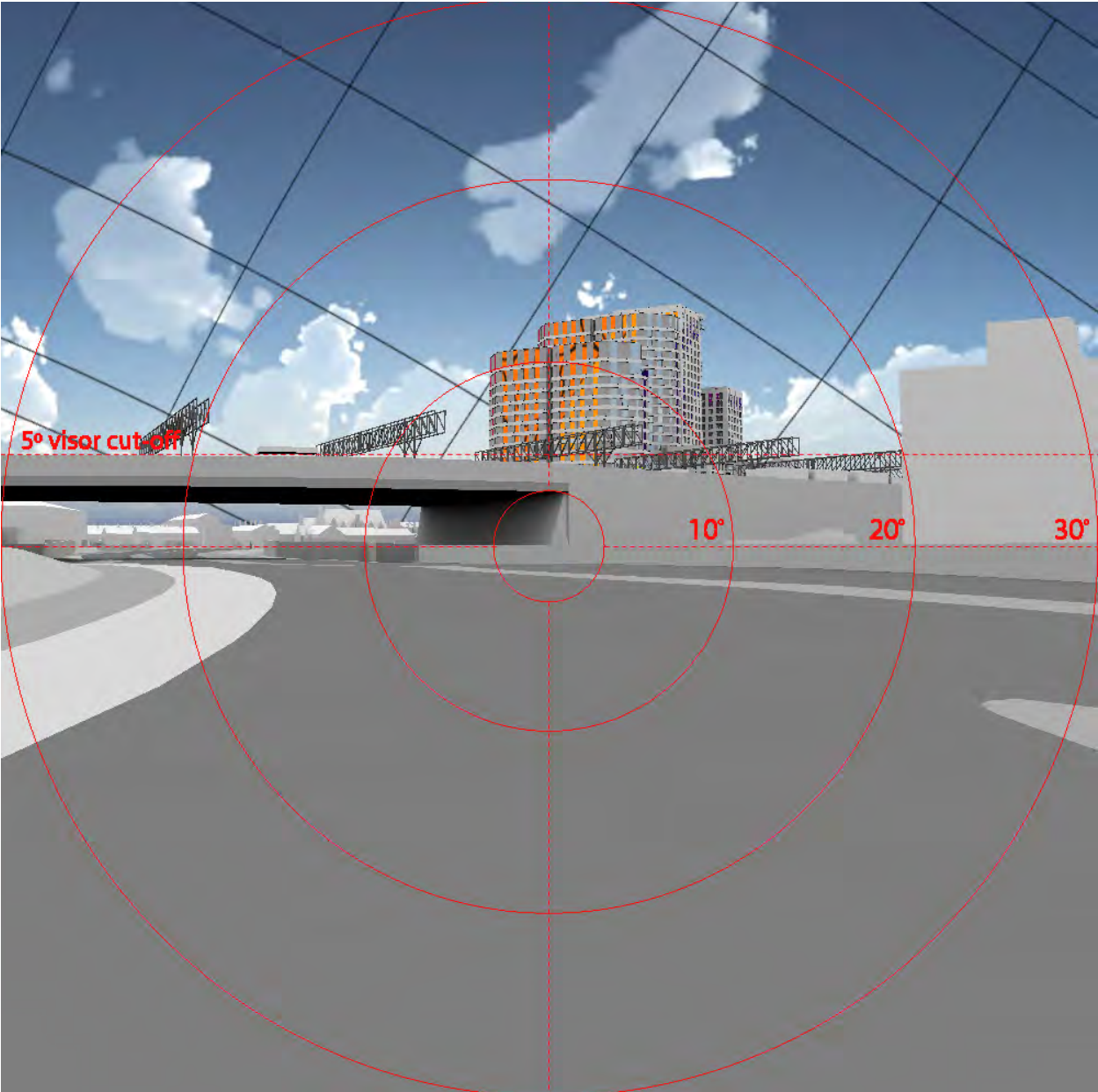
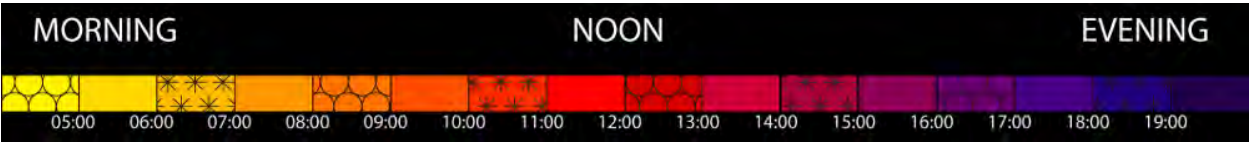


Fig. 22: Solar reflections



SUPPLEMENTARY ASSESSMENT FOR VIEWPOINT FS4 - ONLY WINDOWS CONSIDERED REFLECTIVE

60° FIELD OF VIEW: SEASON
FAIRFIELD ST - FS4

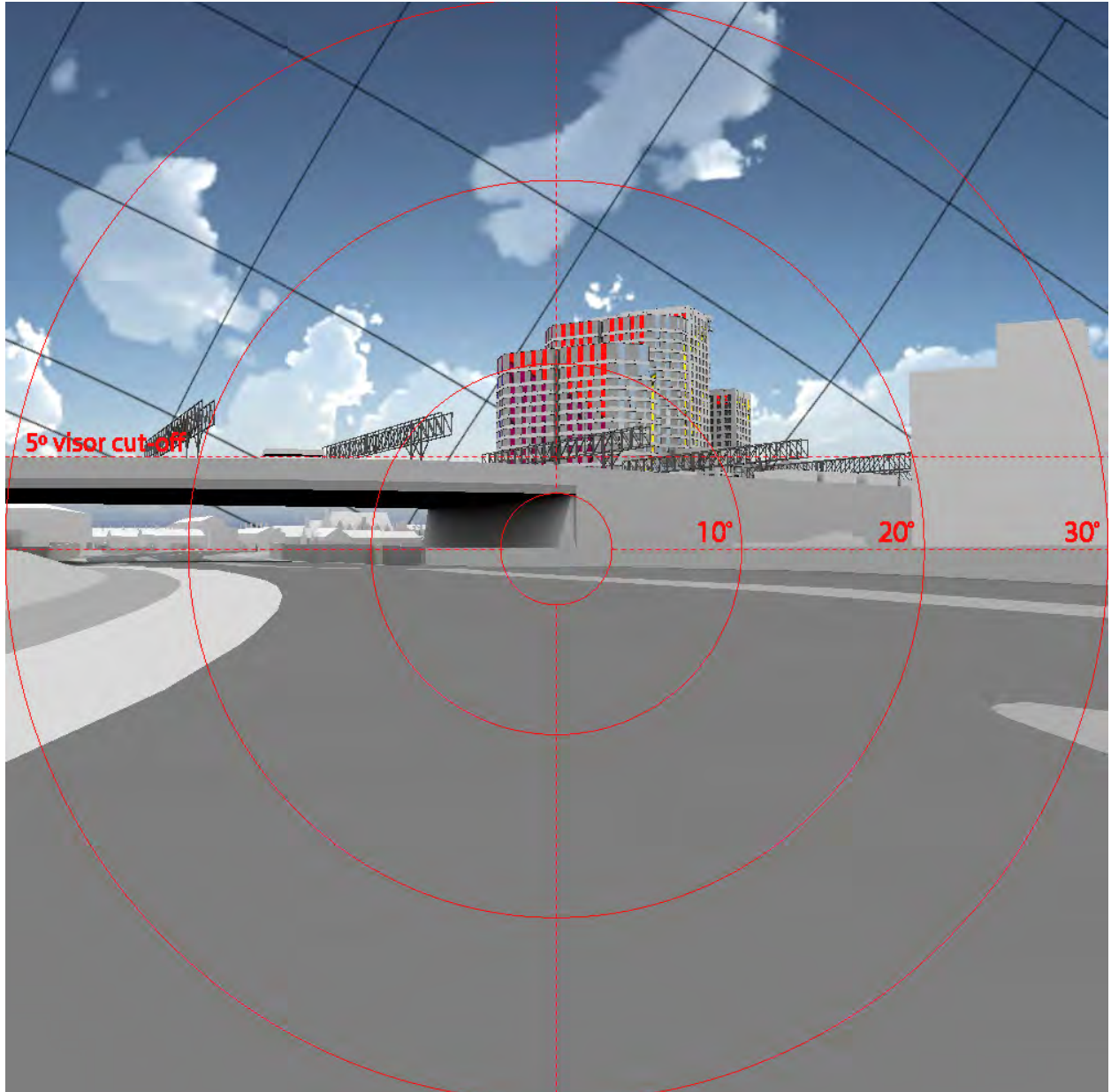


Fig. 23: Solar reflections



60° FIELD OF VIEW: TIME OF DAY
FAIRFIELD ST - FS5

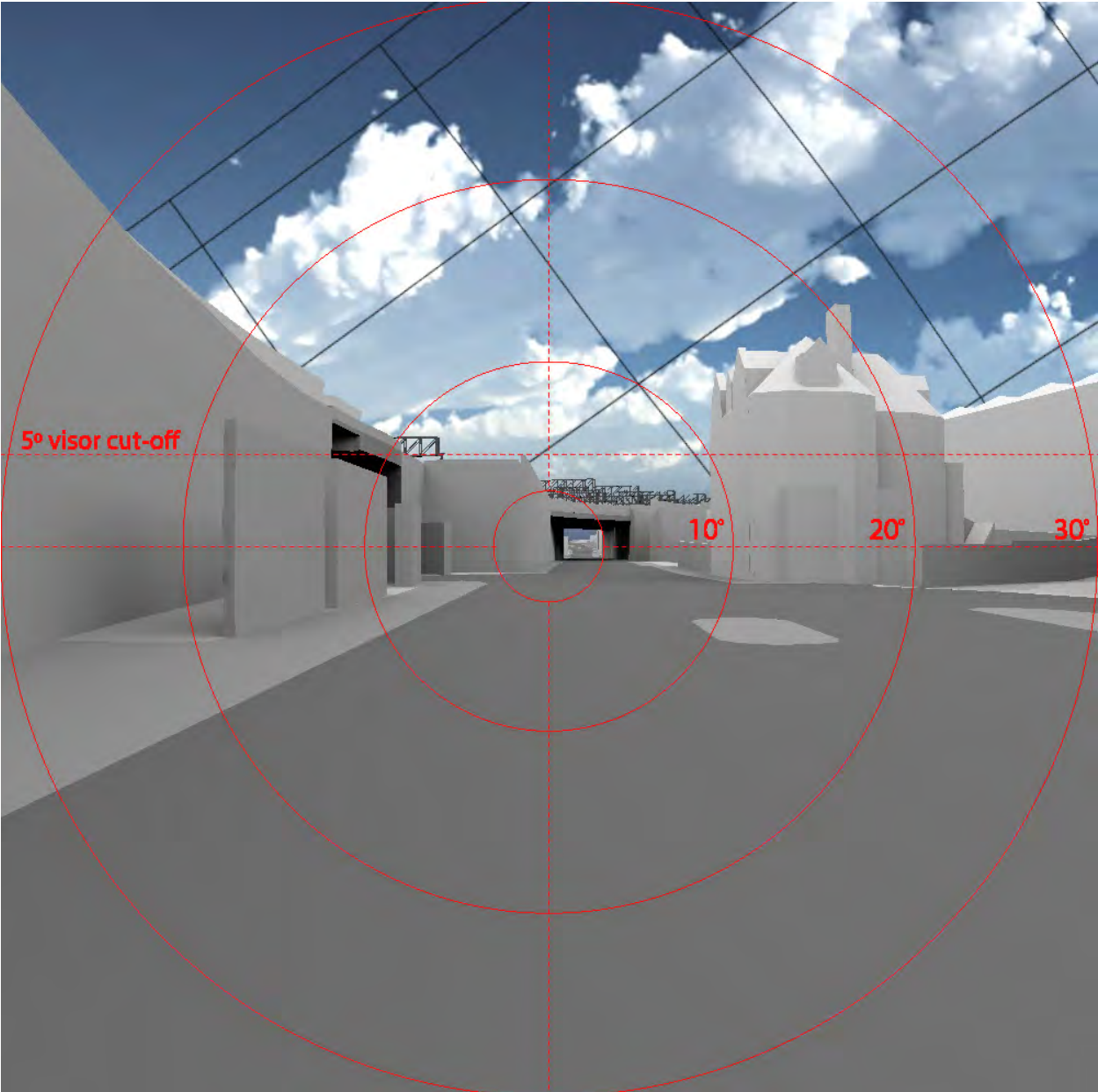
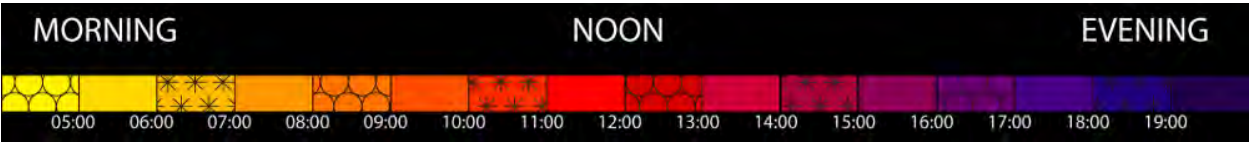


Fig. 24: Solar reflections



60° FIELD OF VIEW: SEASON
FAIRFIELD ST - FS5

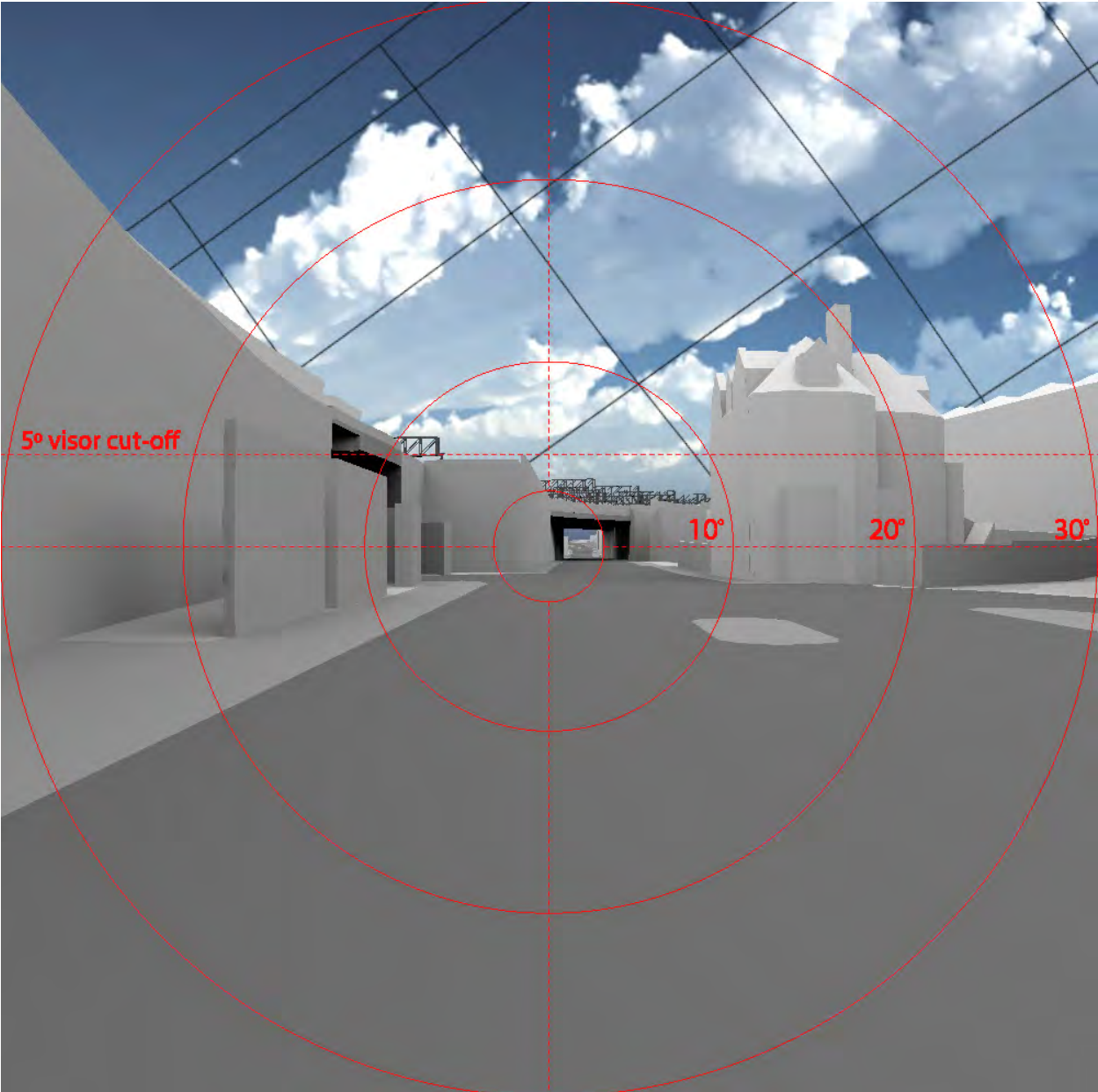


Fig. 25: Solar reflections



60° FIELD OF VIEW: TIME OF DAY
MANCUNIAN WAY - MW1

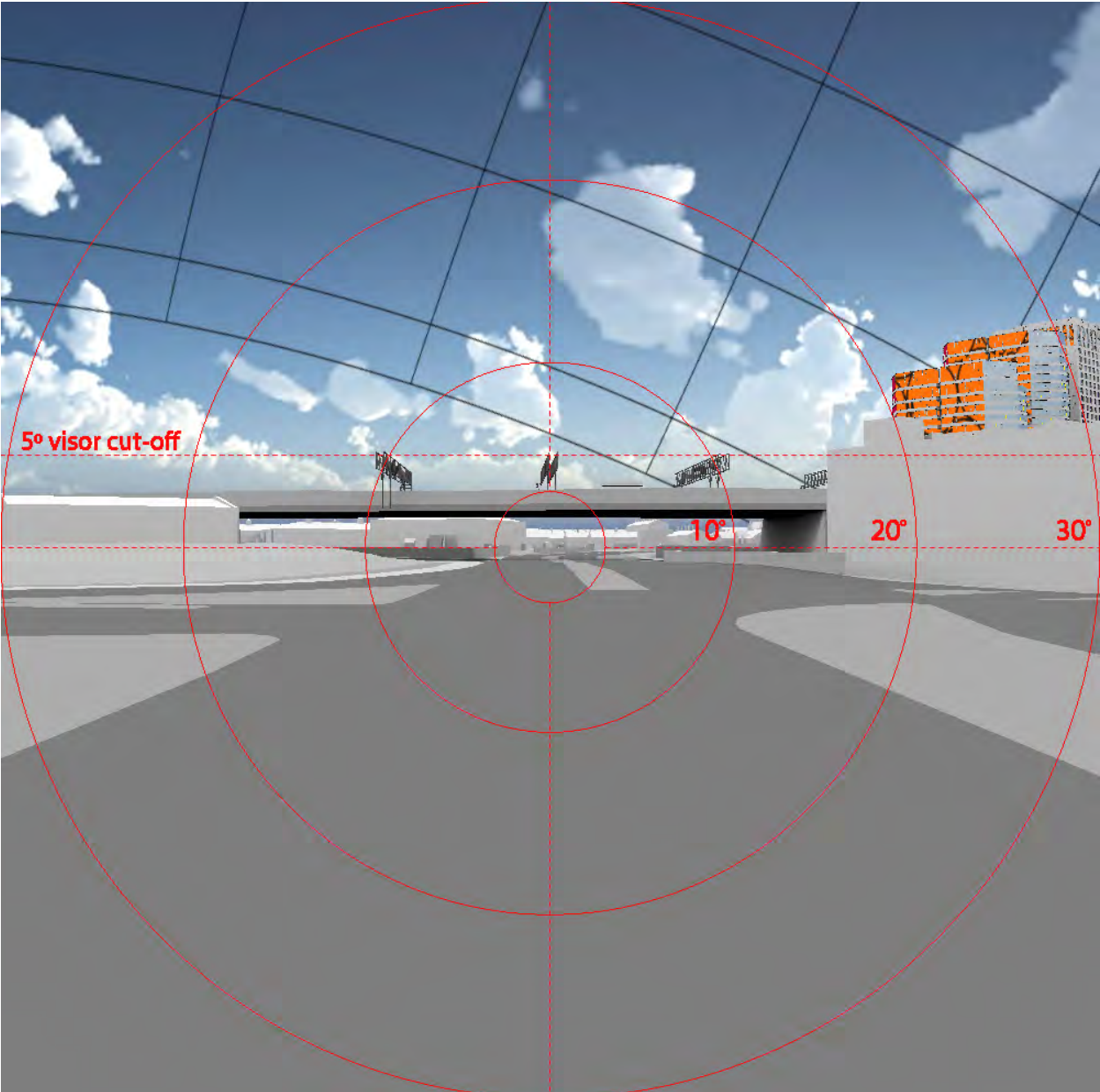


Fig. 26: Solar reflections



60° FIELD OF VIEW: SEASON
MANCUNIAN WAY - MW1

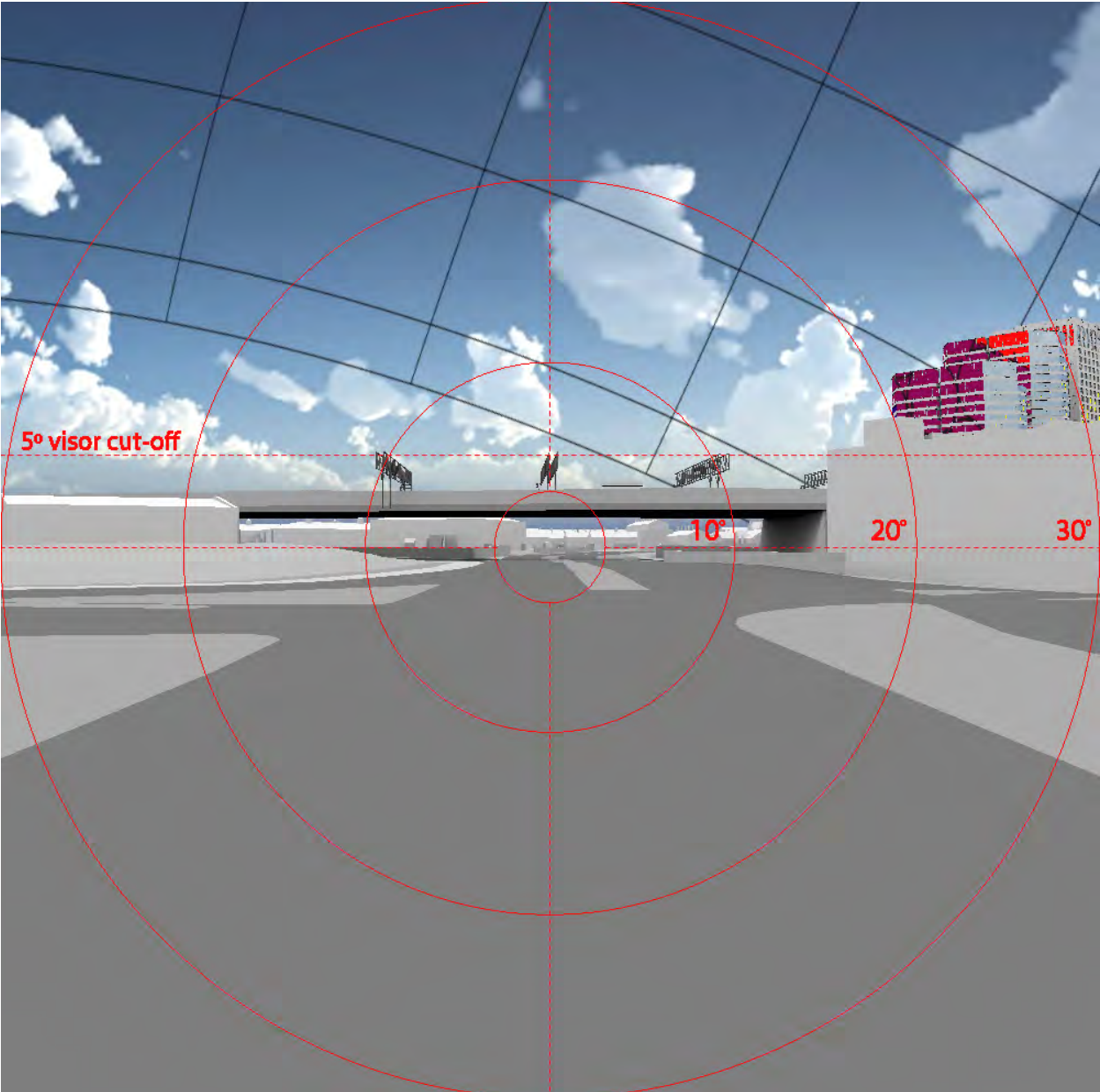


Fig. 27: Solar reflections



60° FIELD OF VIEW: TIME OF DAY
MANCUNIAN WAY - MW2

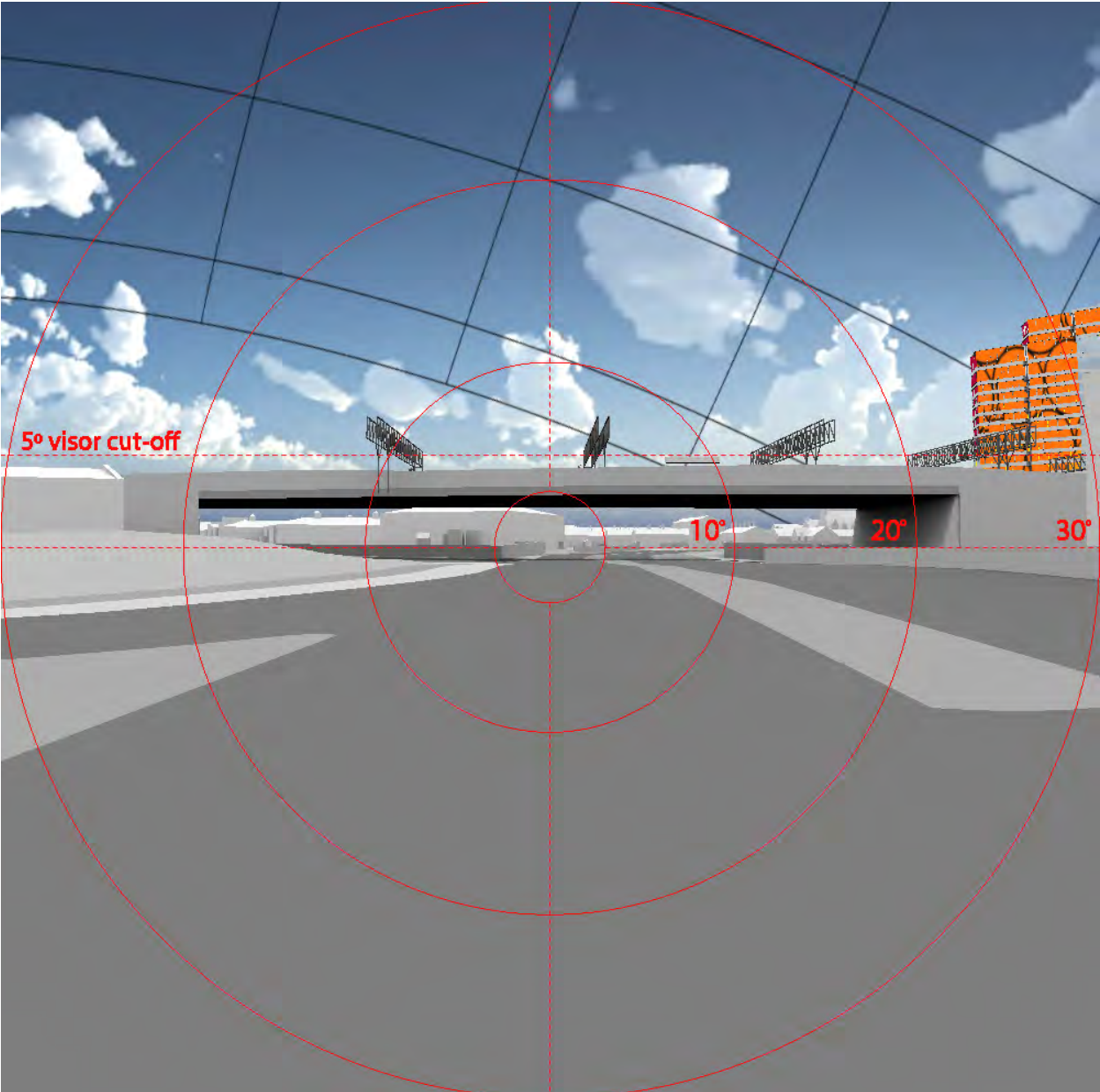
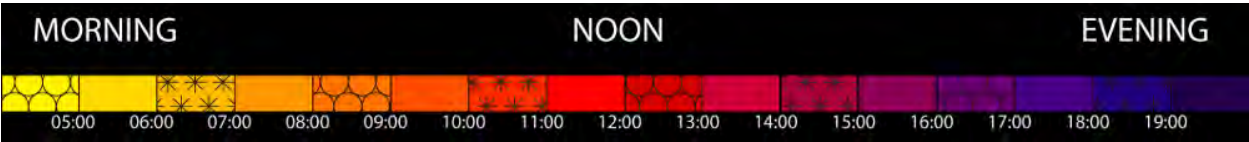


Fig. 28: Solar reflections



60° FIELD OF VIEW: SEASON
MANCUNIAN WAY - MW2

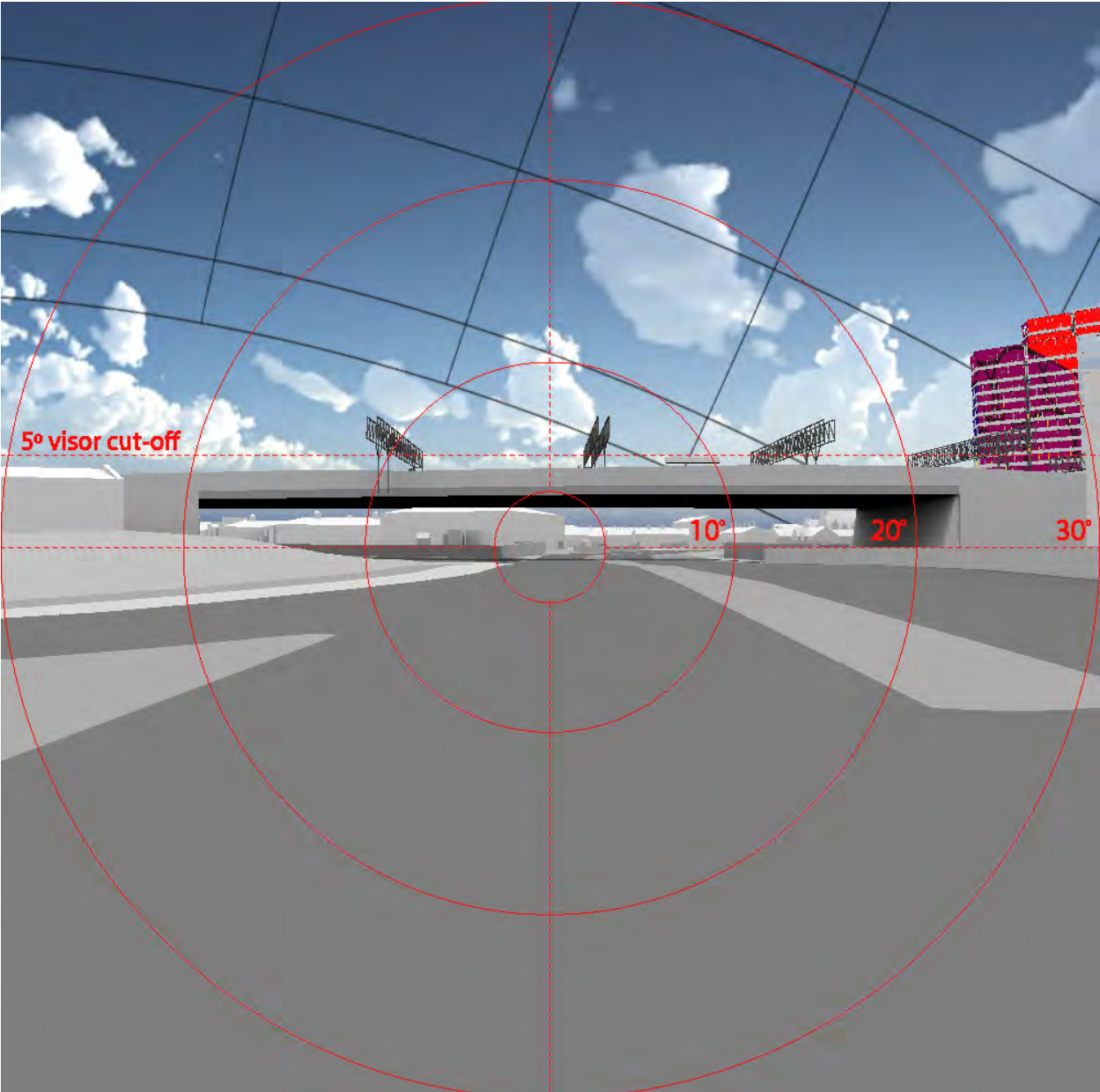


Fig. 29: Solar reflections



60° FIELD OF VIEW: TIME OF DAY
MANCUNIAN WAY - MW3

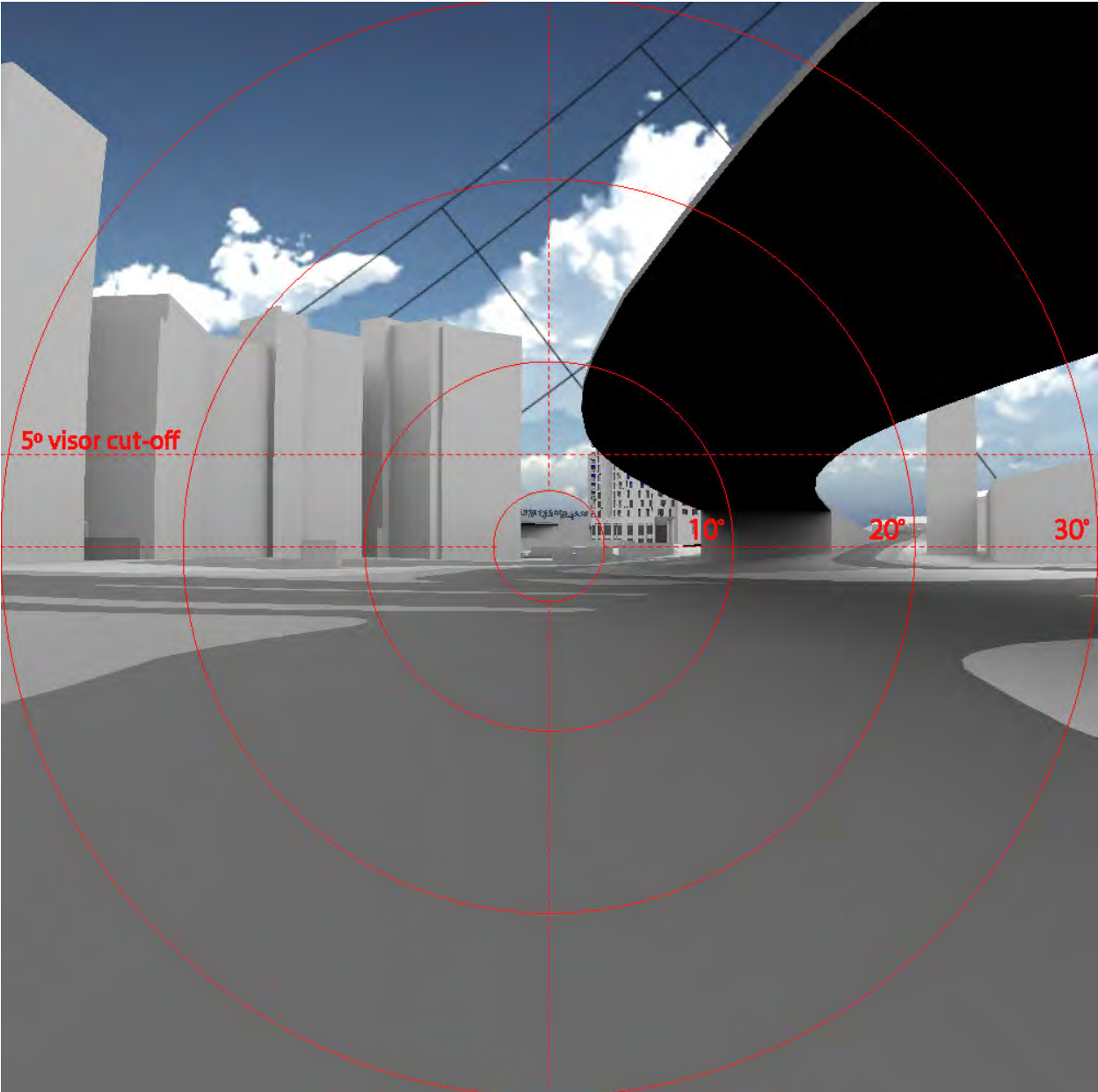
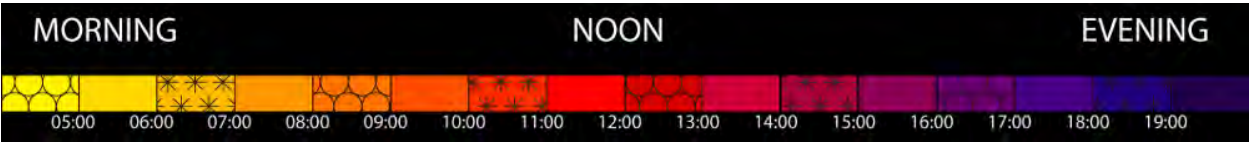


Fig. 30: Solar reflections



60° FIELD OF VIEW: SEASON
MANCUNIAN WAY - MW3

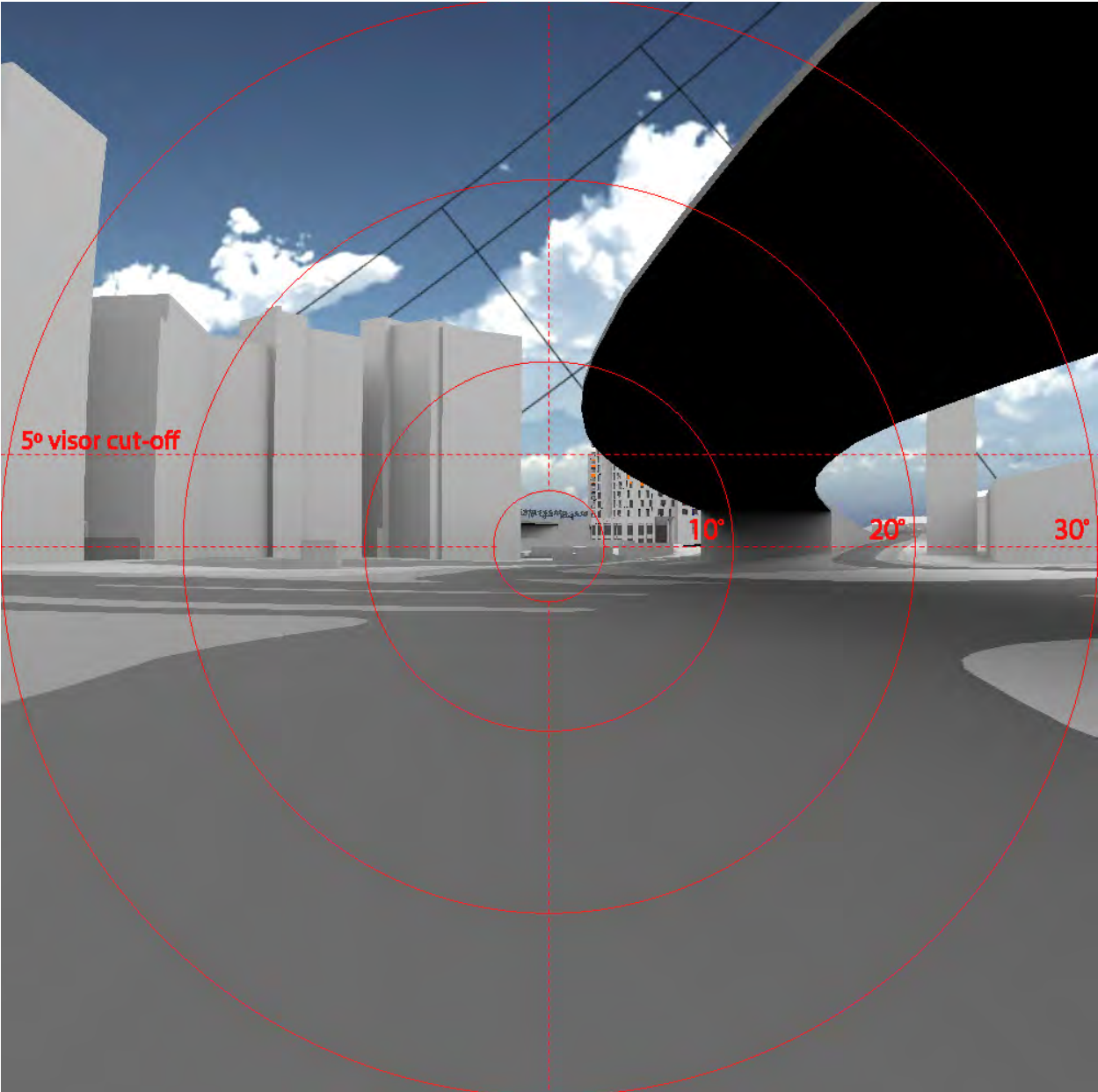


Fig. 31: Solar reflections



60° FIELD OF VIEW: TIME OF DAY
MANCUNIAN WAY - MW4

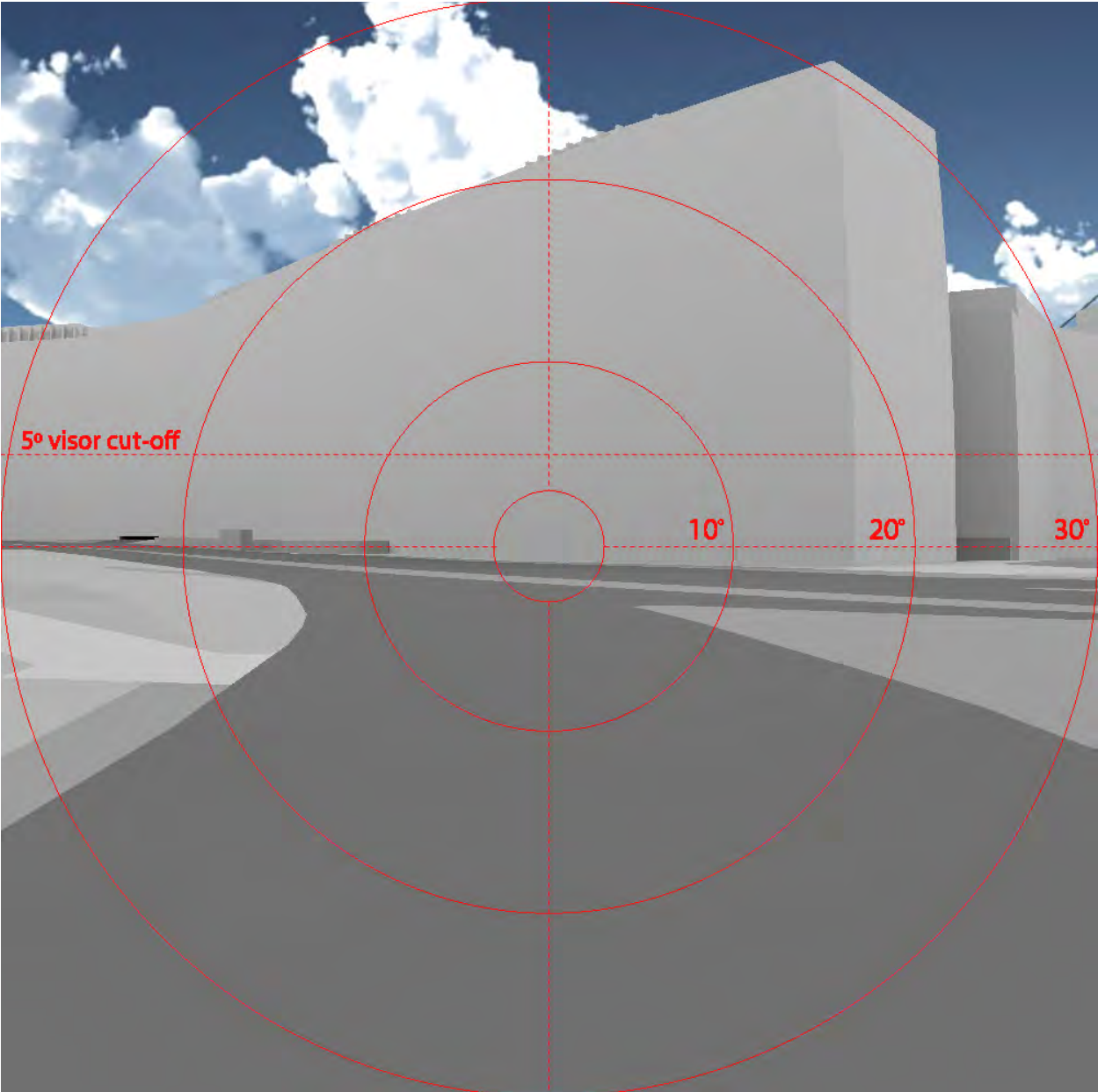
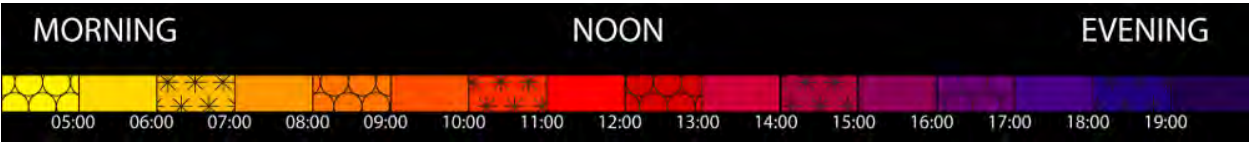


Fig. 32: Solar reflections



60° FIELD OF VIEW: SEASON
MANCUNIAN WAY - MW4

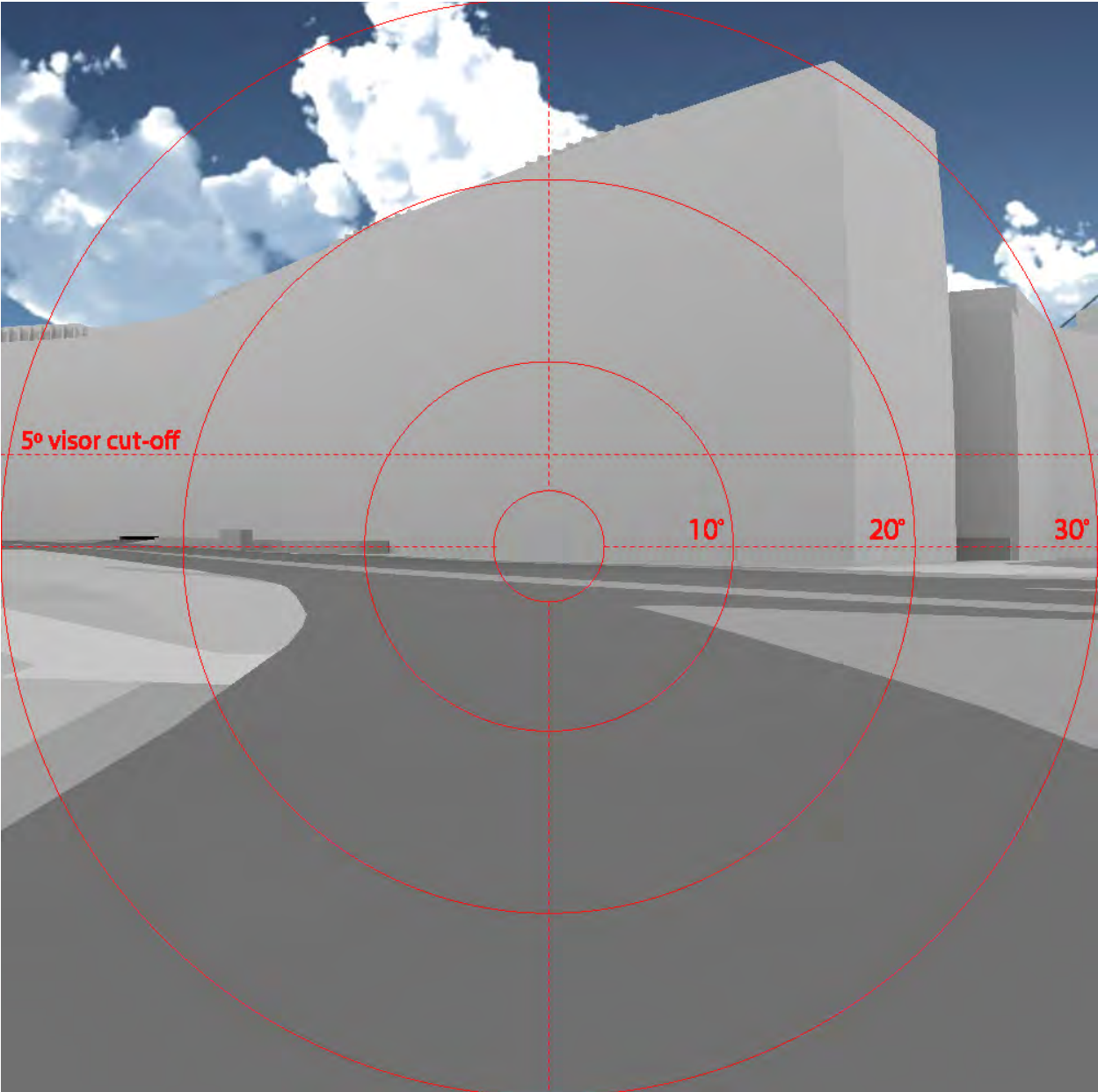


Fig. 33: Solar reflections



60° FIELD OF VIEW: TIME OF DAY
STOCKPORT RD - SR1

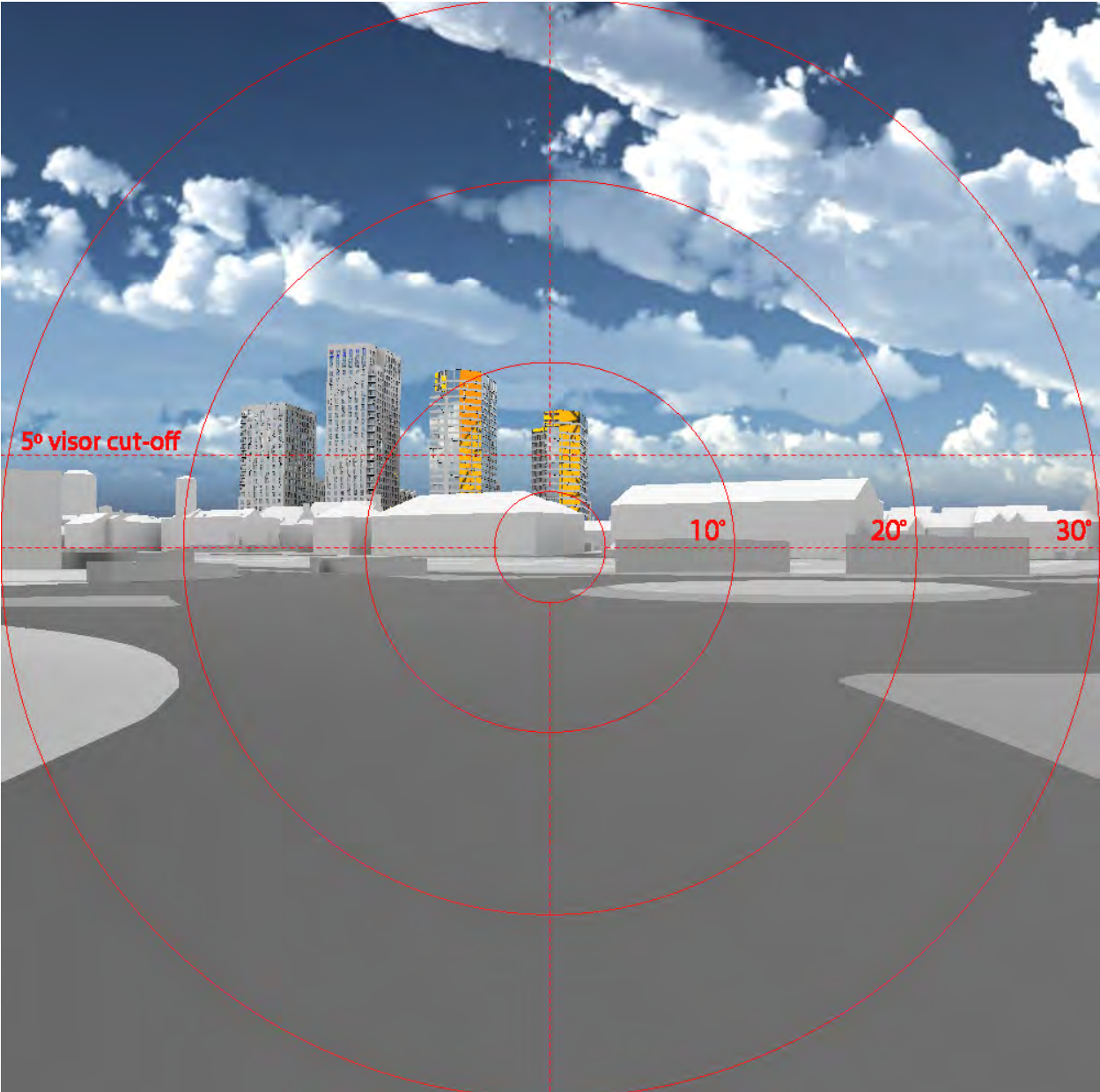


Fig. 34: Solar reflections



STREET VIEW IMAGE - SEPTEMBER 2016
(GOOGLE MAPS)



60° FIELD OF VIEW: SEASON
STOCKPORT RD - SR1

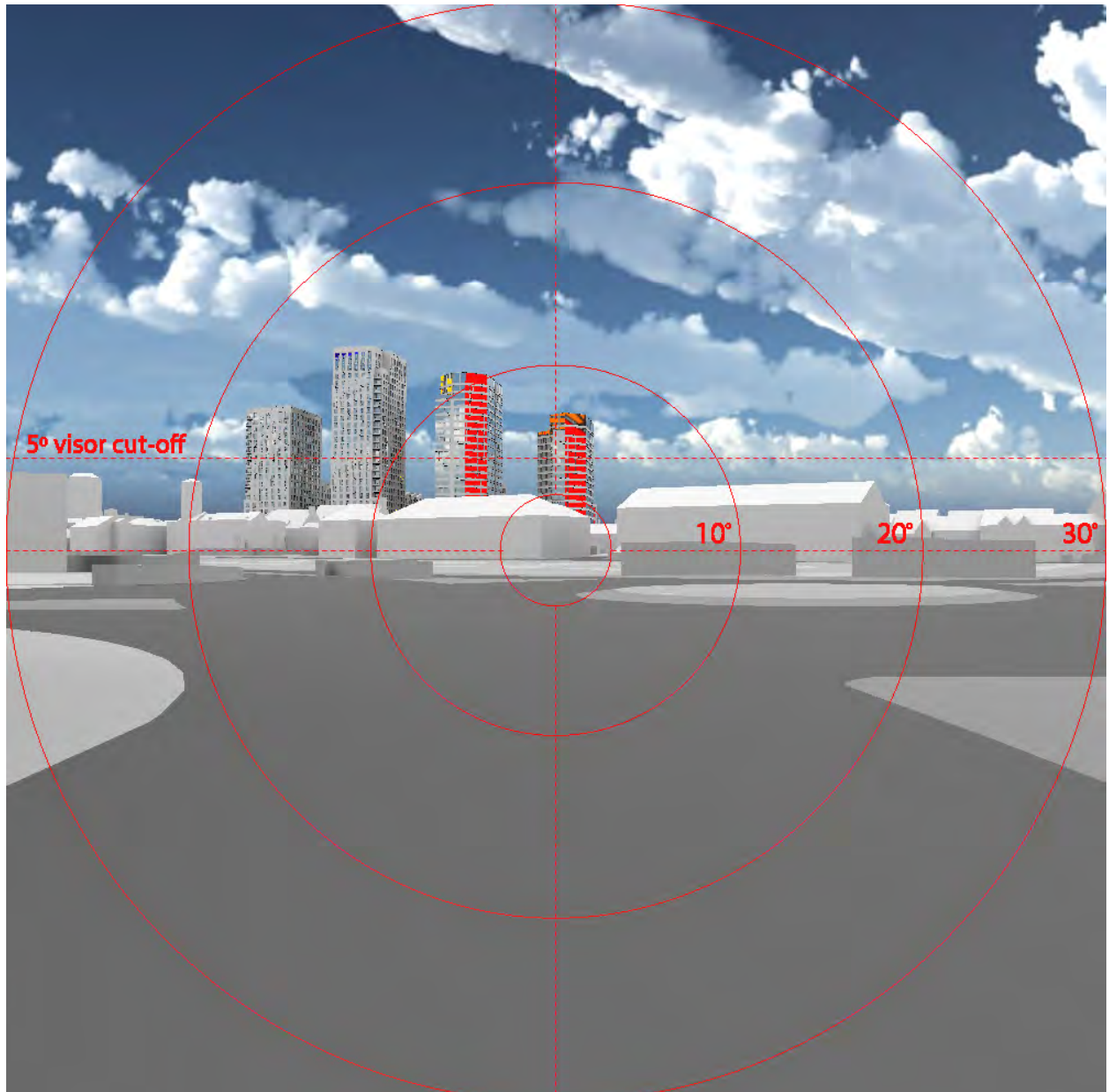


Fig. 35: Solar reflections



60° FIELD OF VIEW: TIME OF DAY
ARDWICK GREEN SOUTH - AGS1

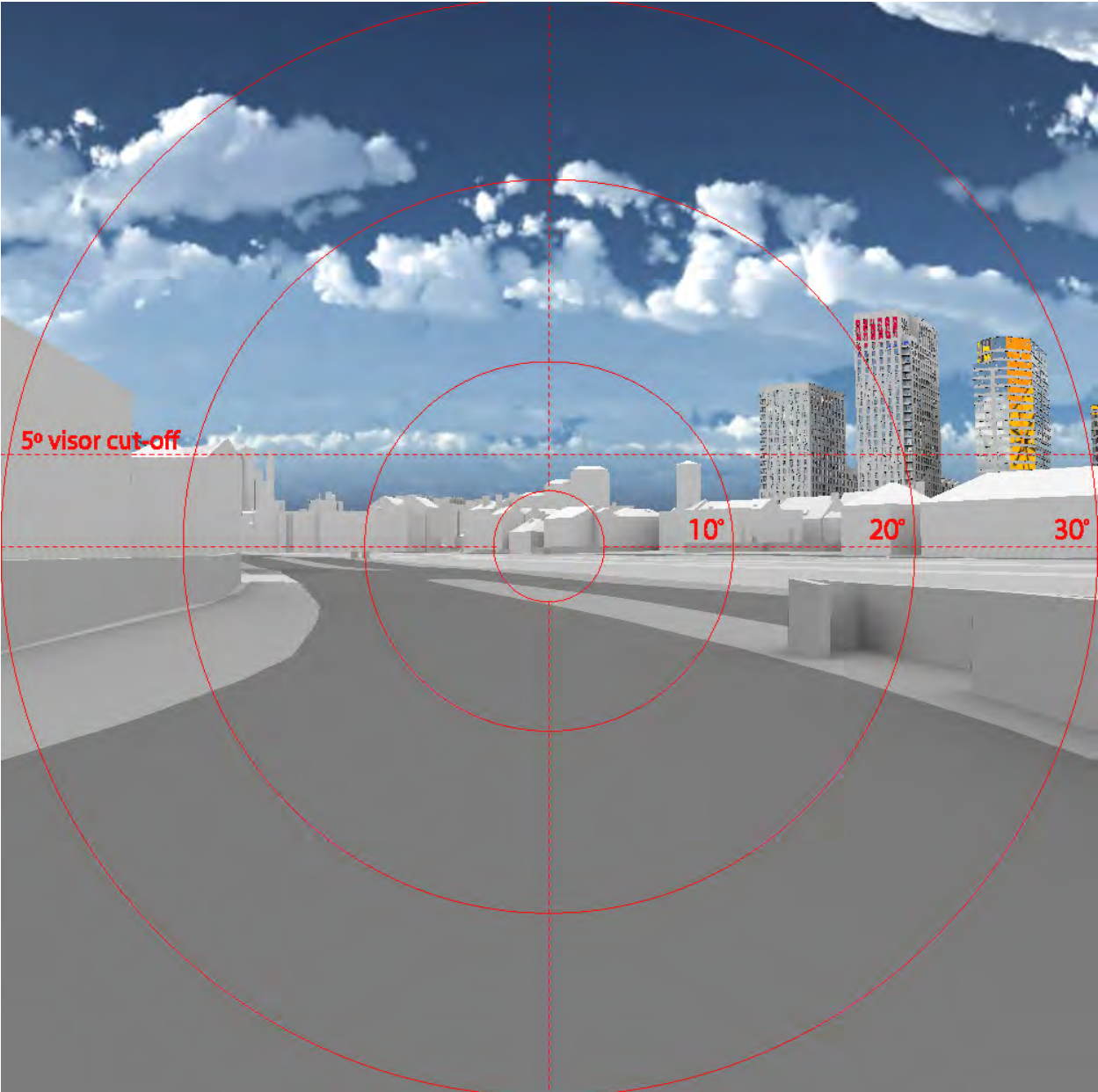
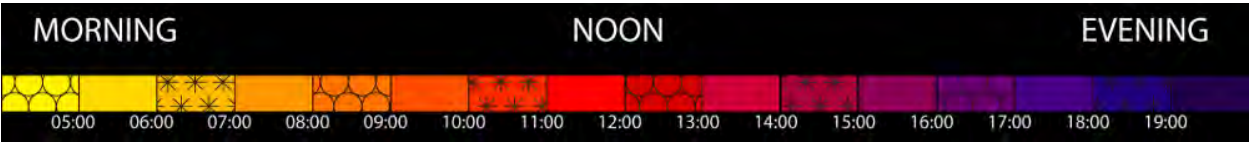


Fig. 36: Solar reflections



60° FIELD OF VIEW: SEASON
ARDWICK GREEN SOUTH - AGS1

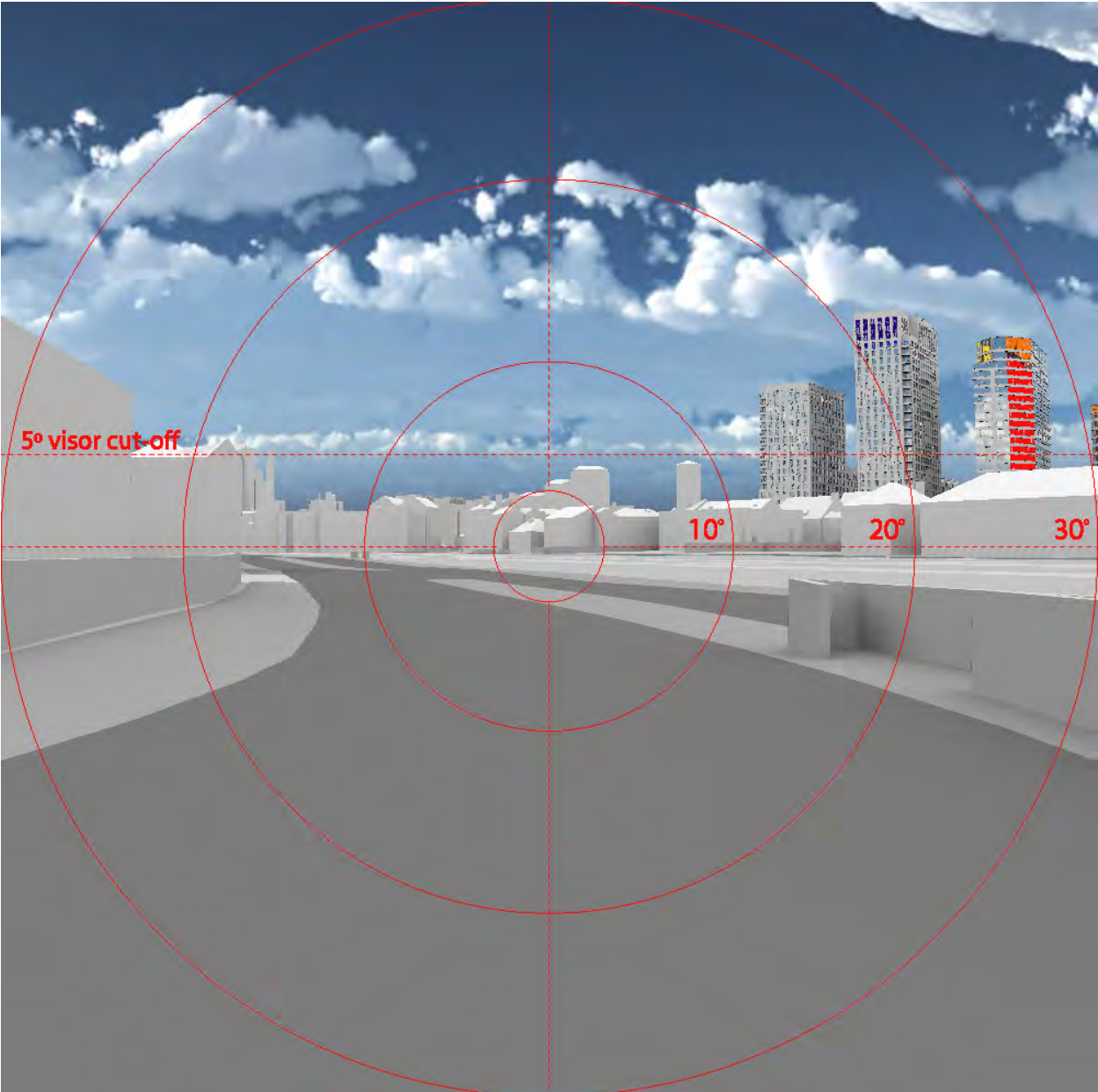


Fig. 37: Solar reflections



60° FIELD OF VIEW: TIME OF DAY
BRUNSWICK ST - BS1

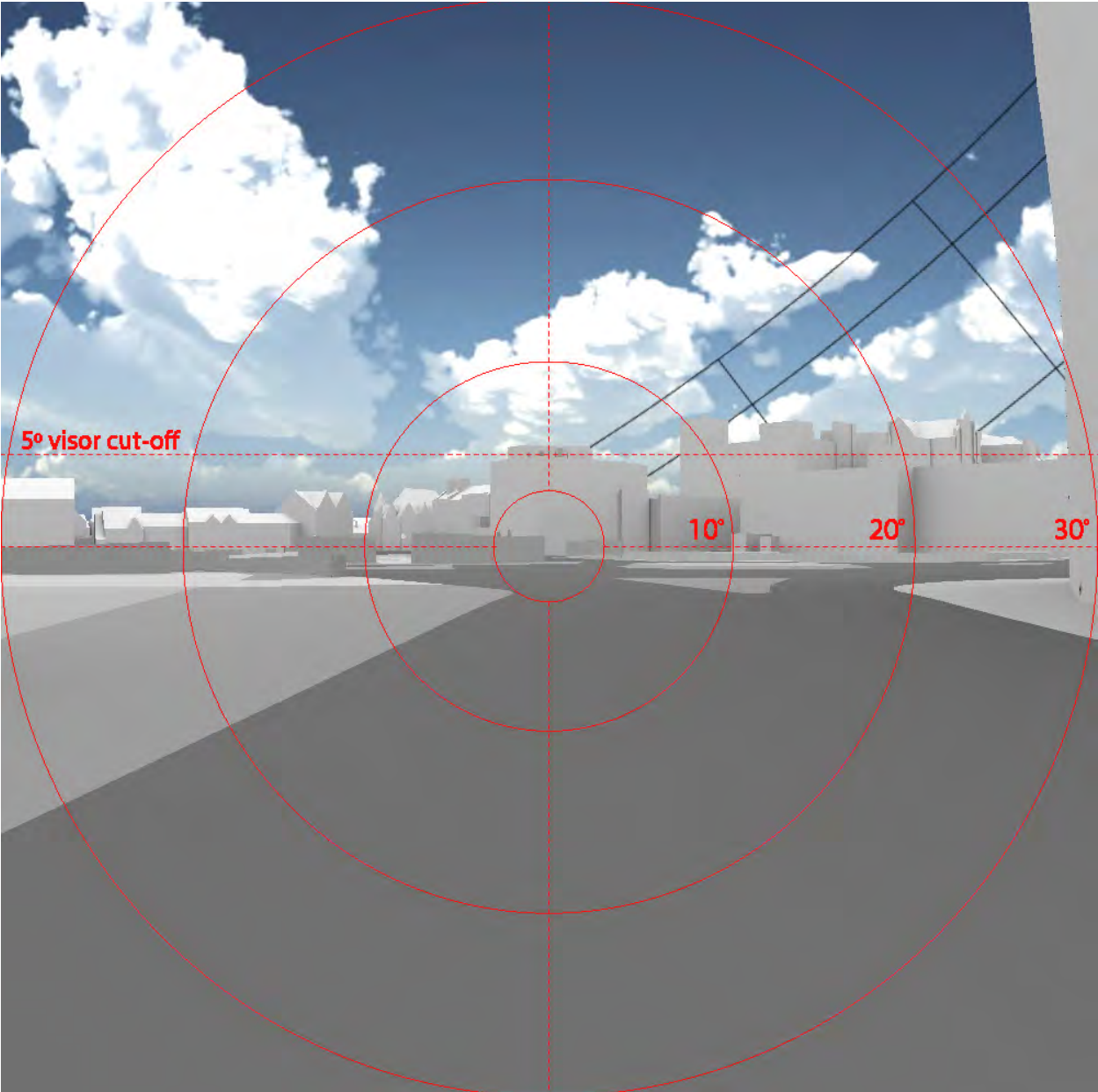
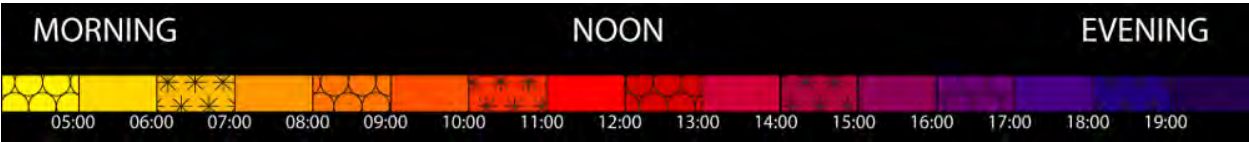


Fig. 38: Solar reflections



60° FIELD OF VIEW: SEASON
BRUNSWICK ST - BS1

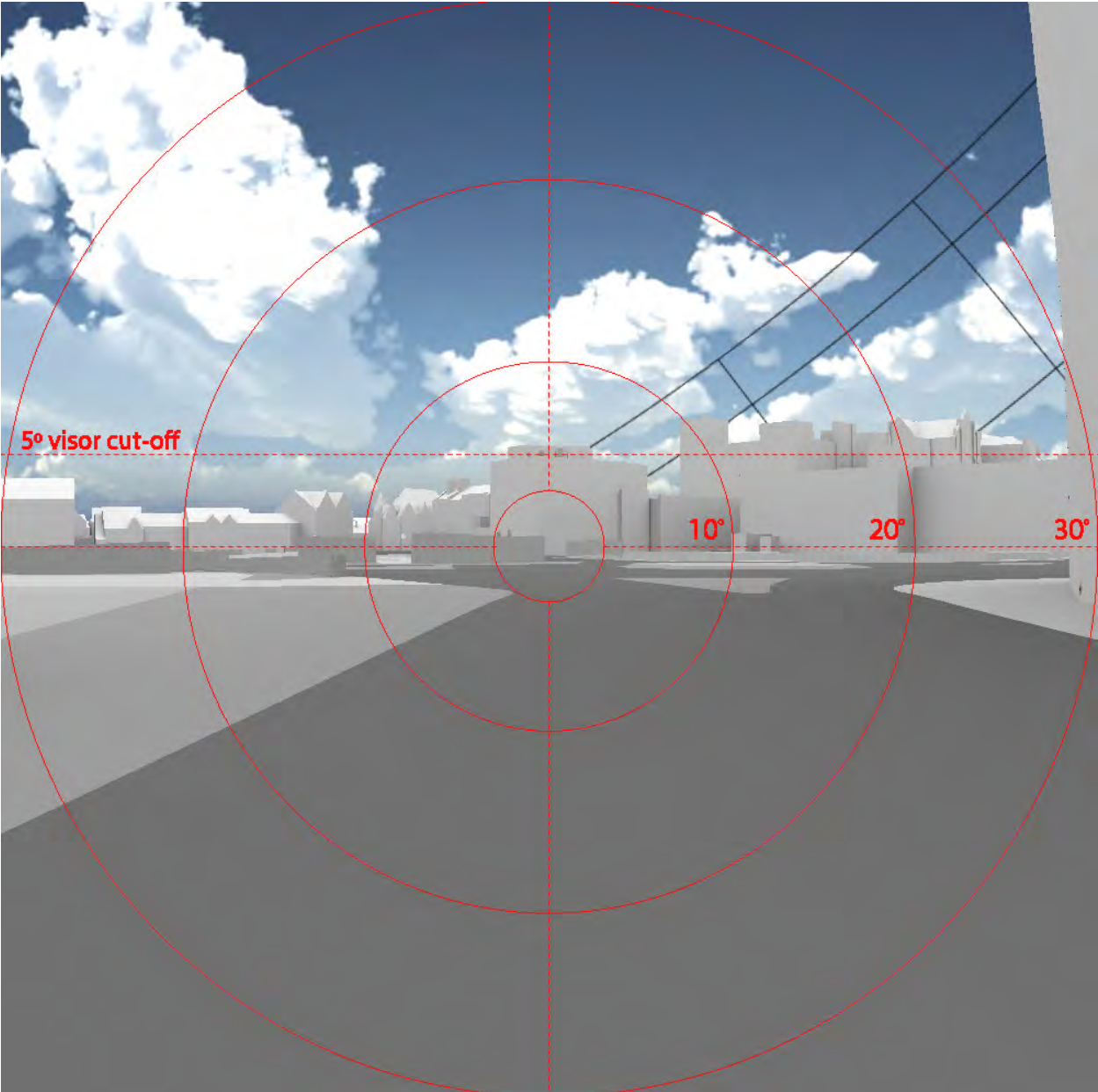


Fig. 39: Solar reflections



60° FIELD OF VIEW: TIME OF DAY
BRUNSWICK ST - BS2

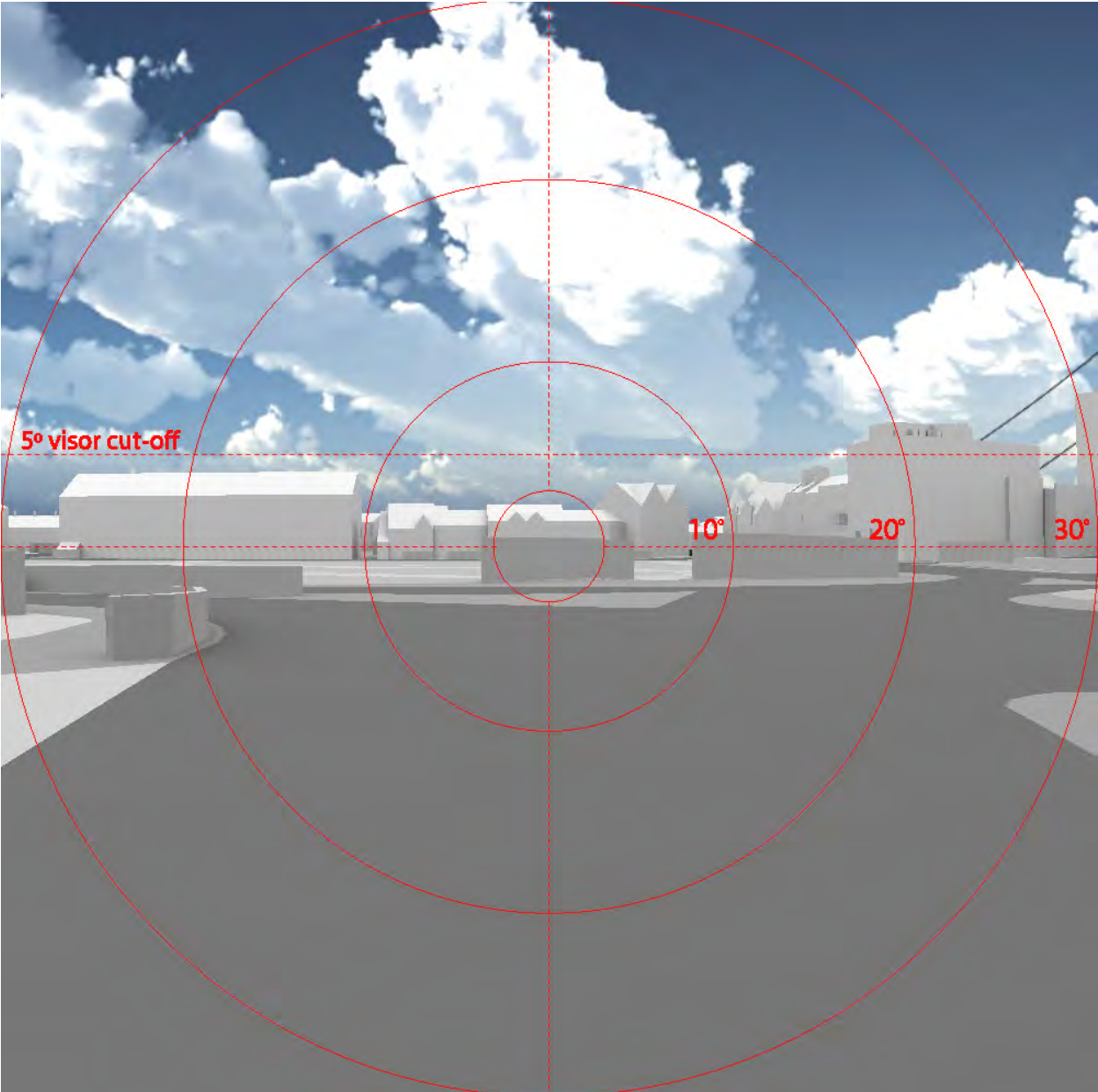
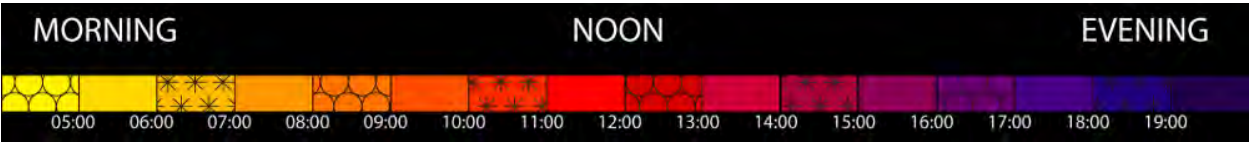


Fig. 40: Solar reflections



60° FIELD OF VIEW: SEASON
BRUNSWICK ST - BS2

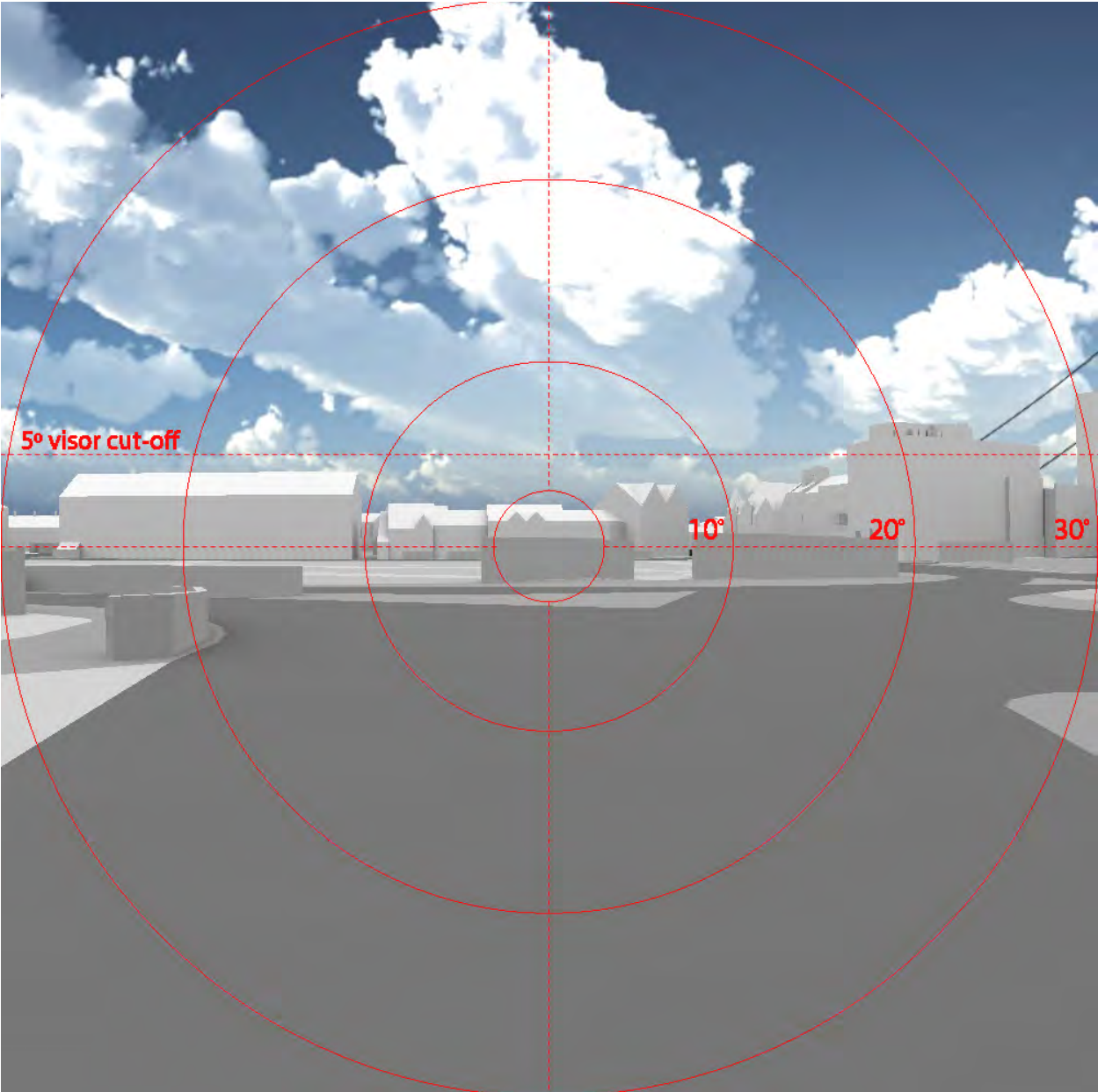


Fig. 41: Solar reflections



60° FIELD OF VIEW: TIME OF DAY
HAMSWELL RD - HR1

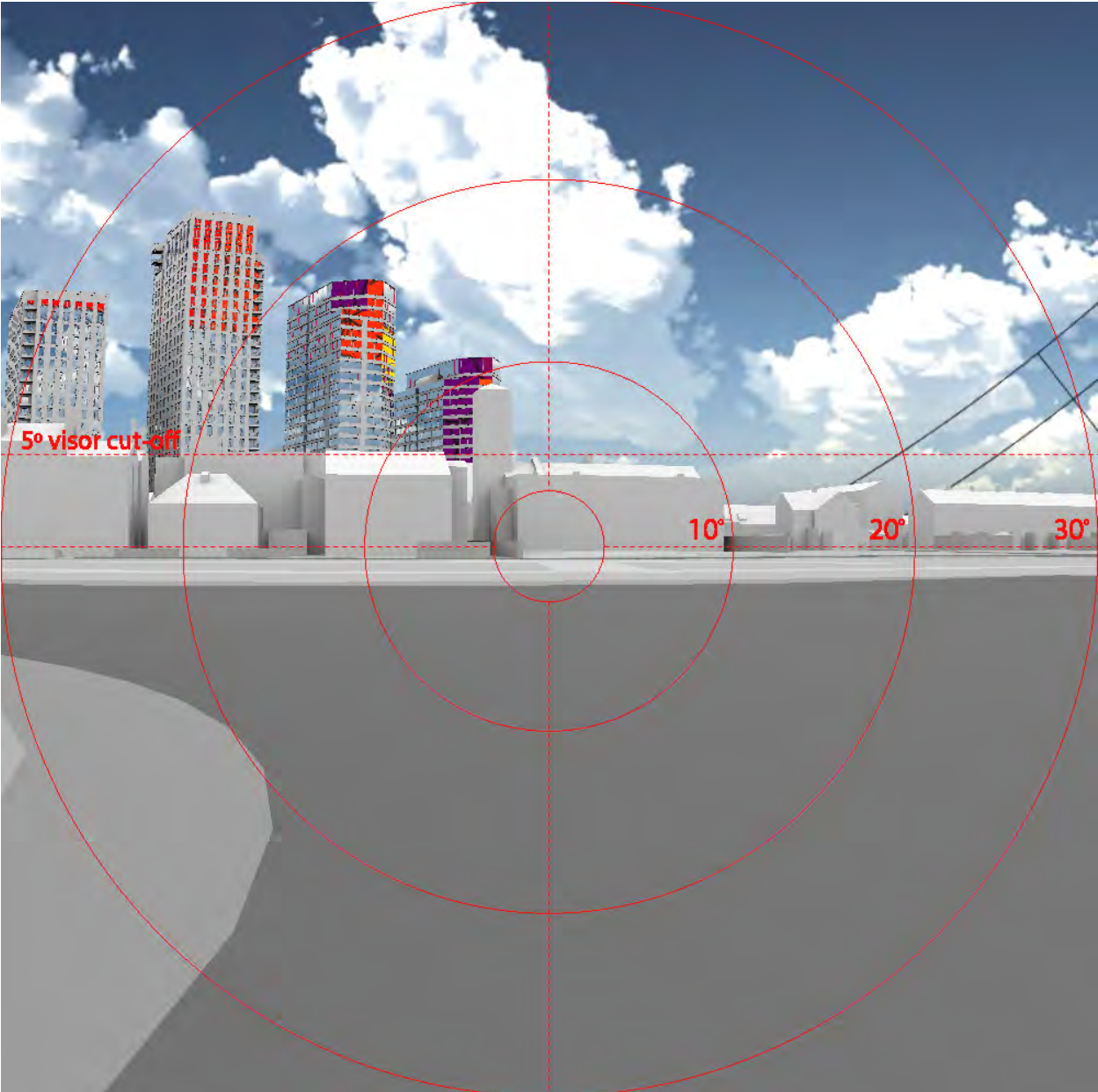
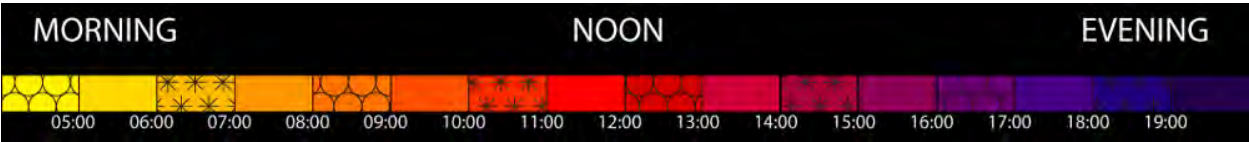


Fig. 42: Solar reflections



STREET VIEW IMAGE - NOVEMBER 2020
(GOOGLE MAPS)



60° FIELD OF VIEW: SEASON
HAMSWELL RD - HR1

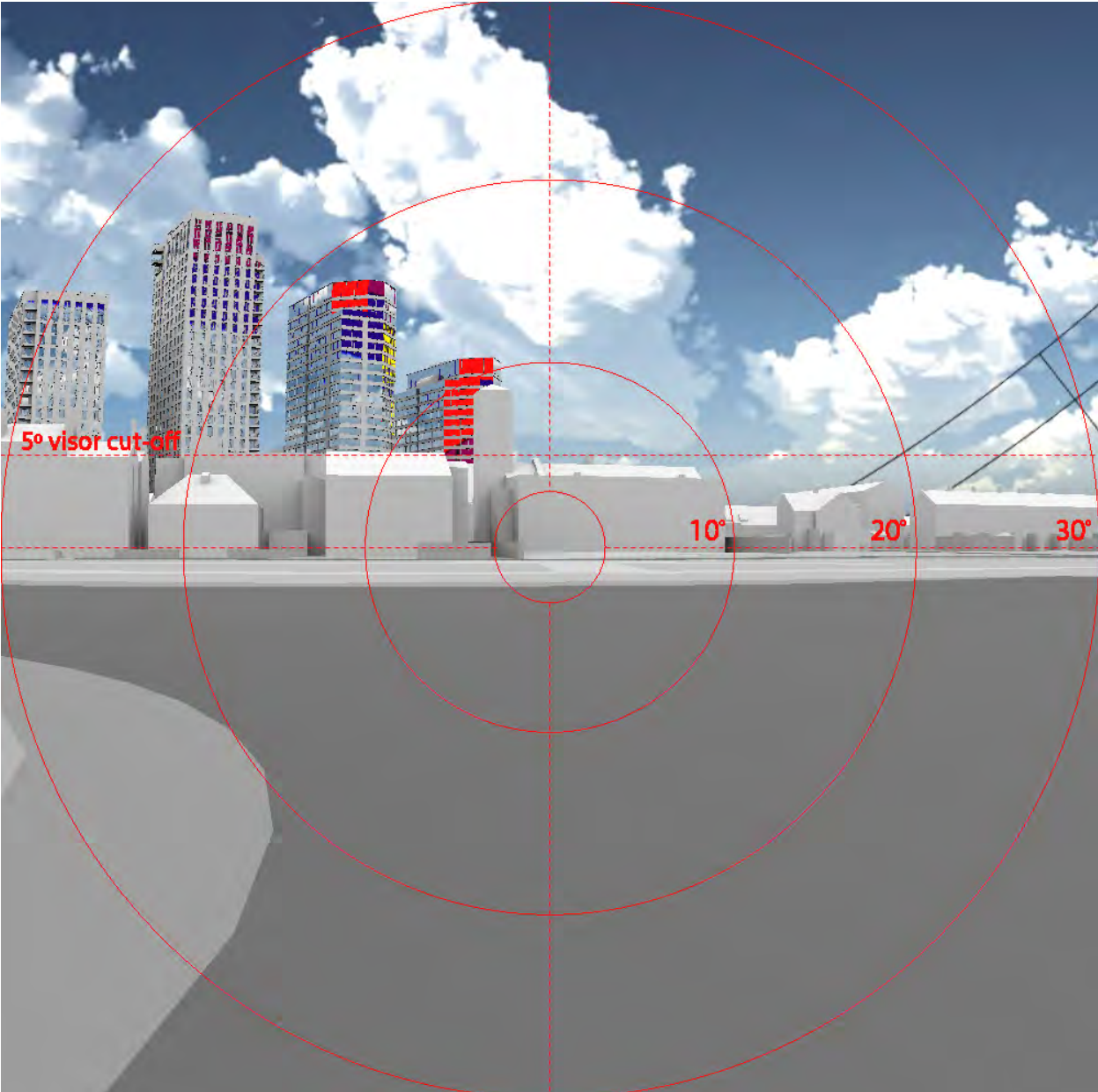


Fig. 43: Solar reflections



60° FIELD OF VIEW: TIME OF DAY
KALE ST - KS1

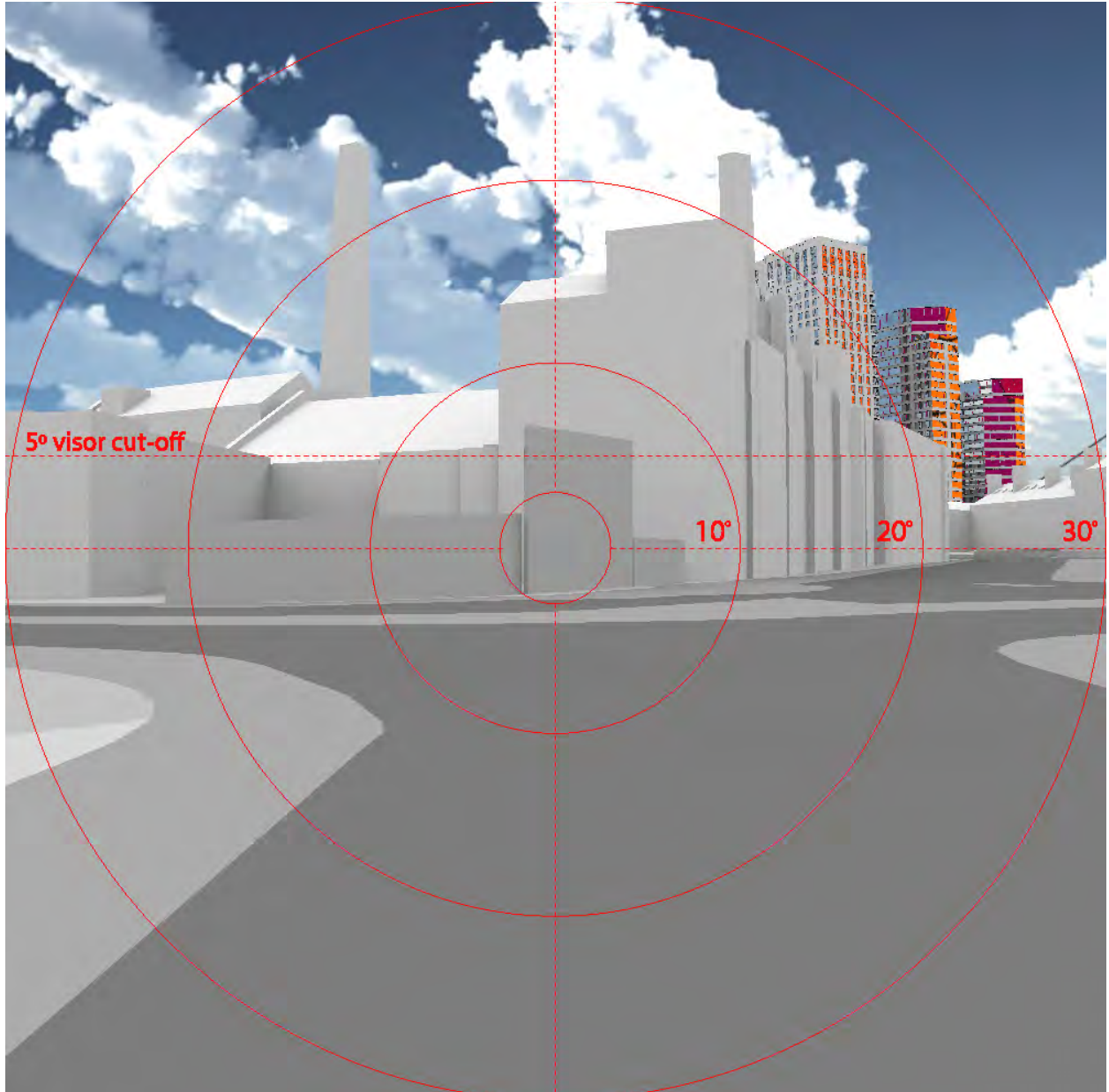


Fig. 44: Solar reflections



60° FIELD OF VIEW: SEASON
KALE ST - KS1

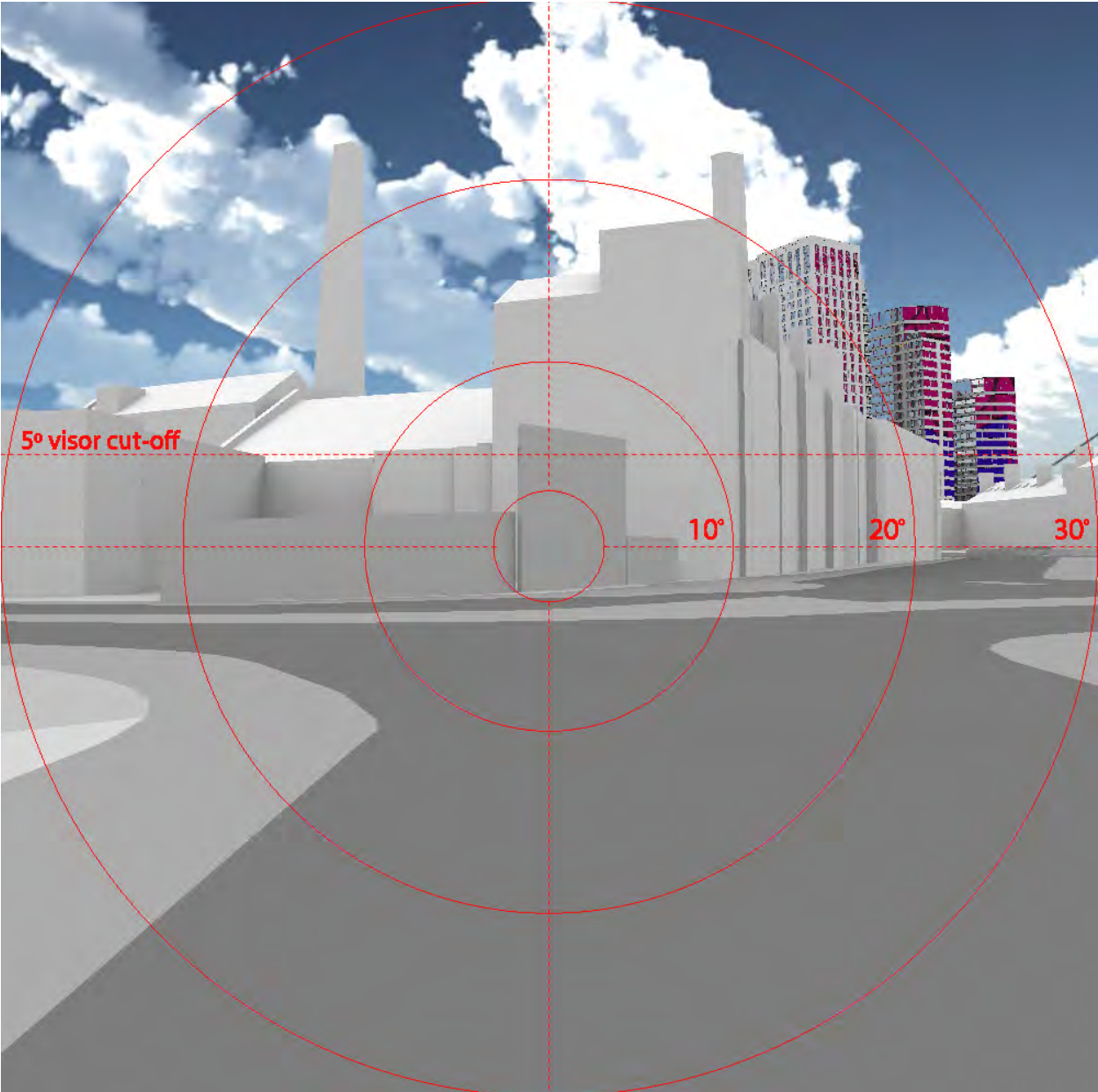


Fig. 45: Solar reflections



60° FIELD OF VIEW: TIME OF DAY
UP TRACK - U0

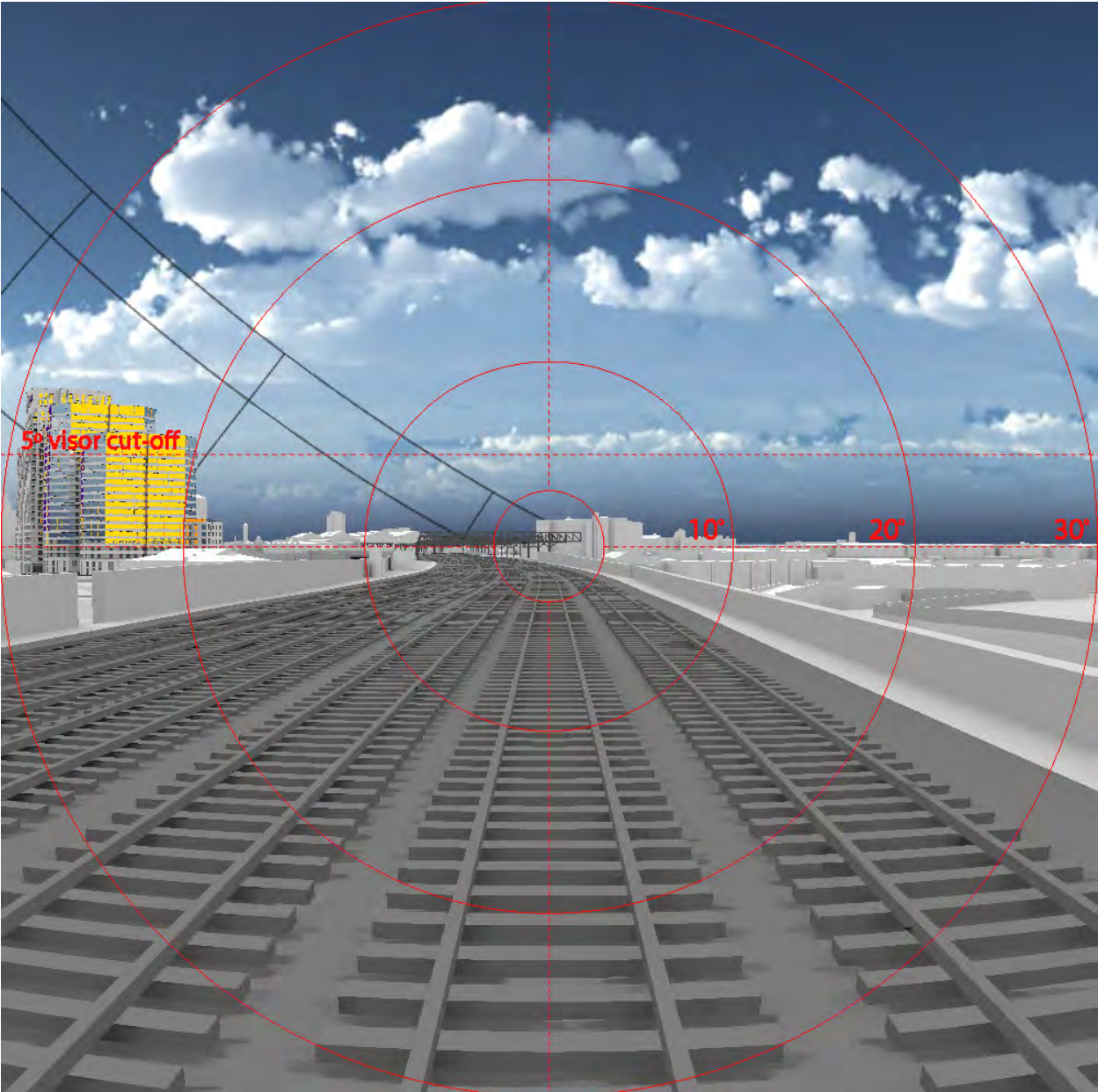
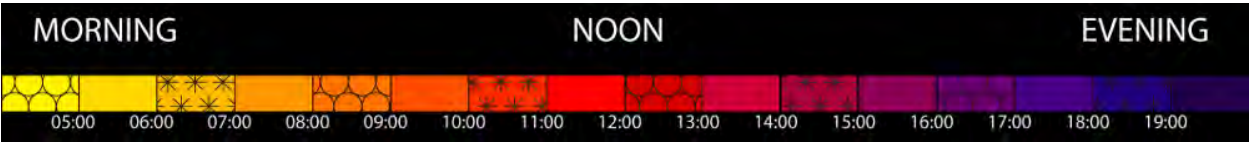


Fig. 46: Solar reflections



60° FIELD OF VIEW: SEASON
UP TRACK - U0

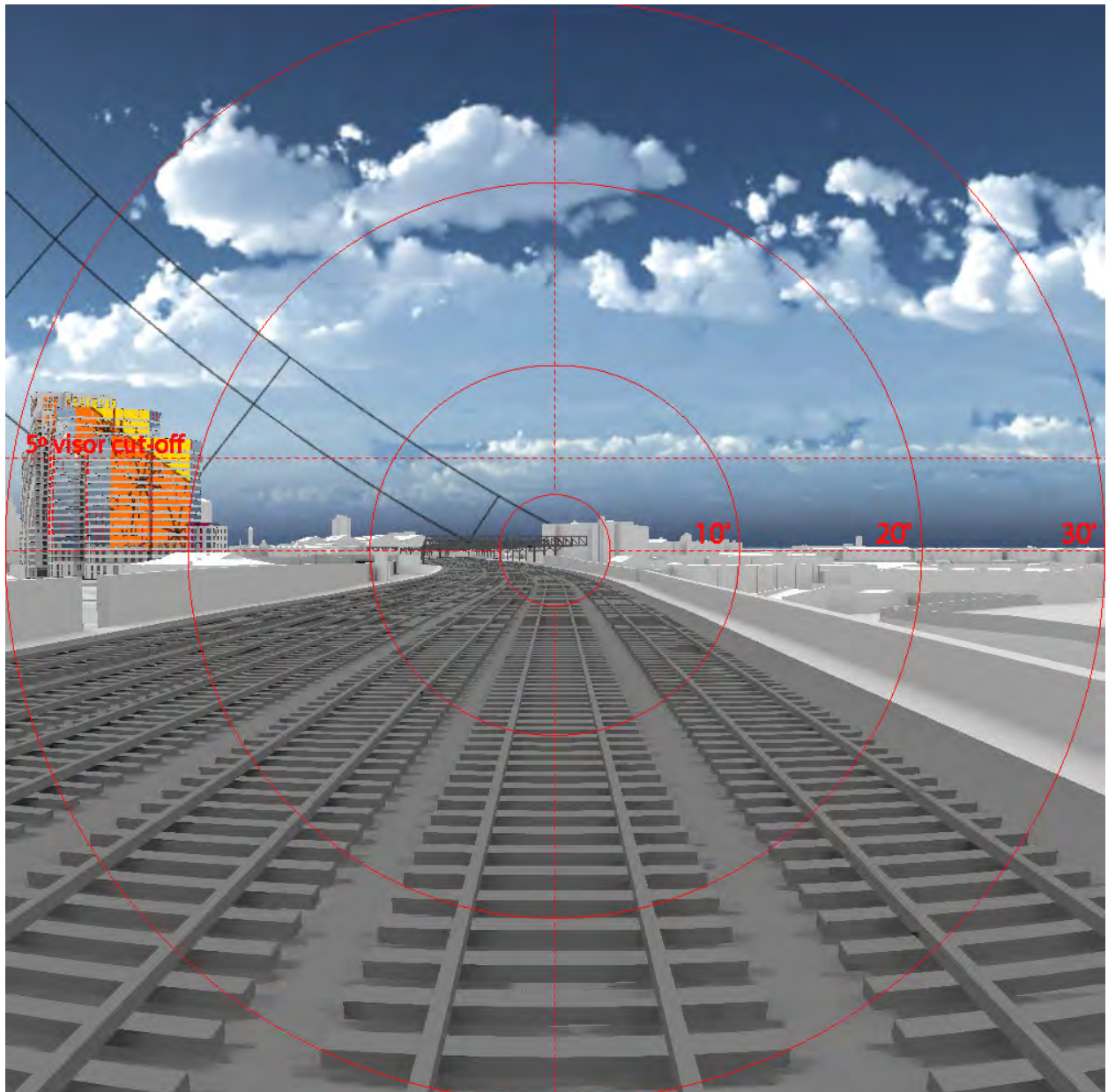


Fig. 47: Solar reflections



60° FIELD OF VIEW: TIME OF DAY
UP TRACK - U100

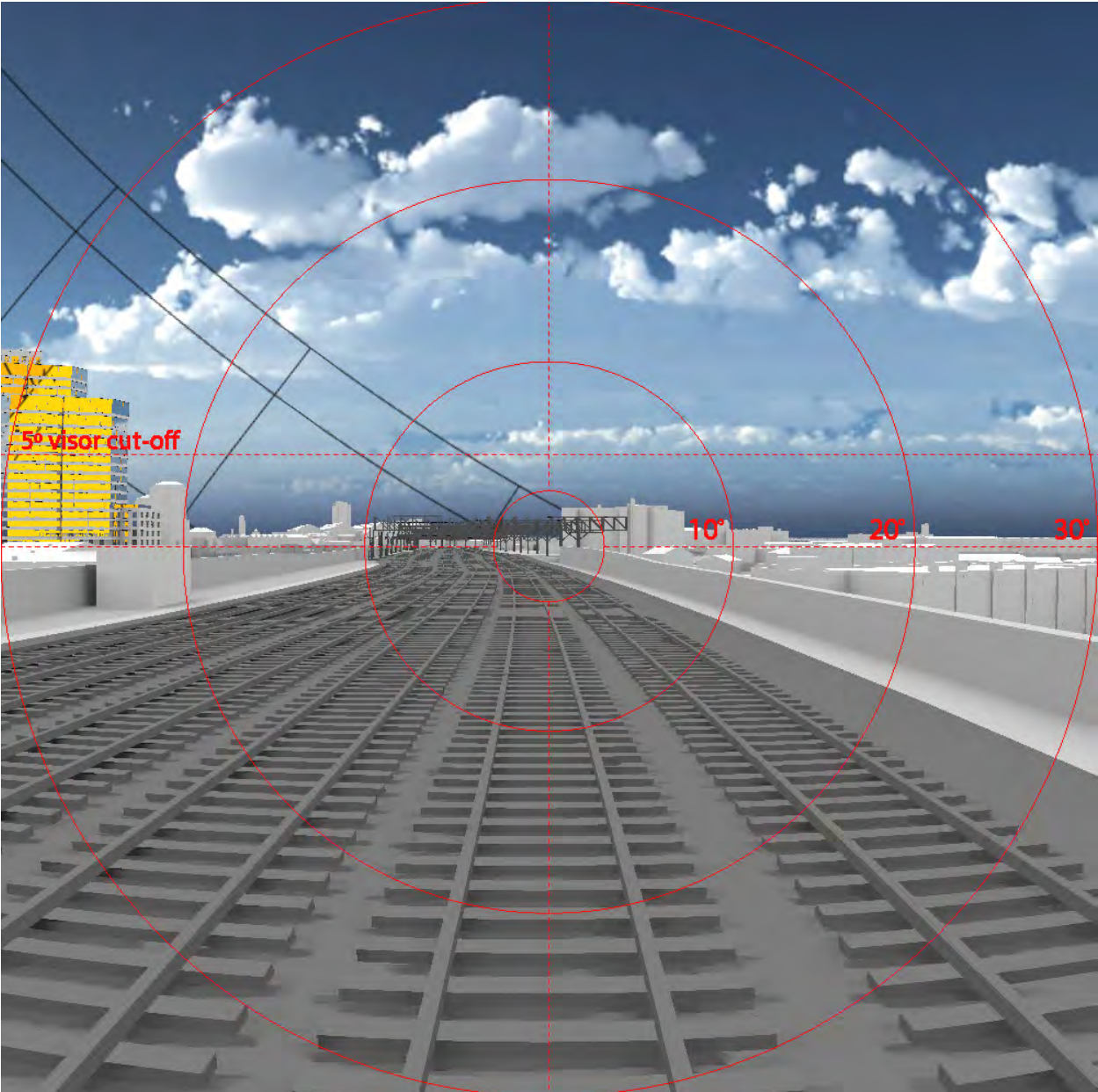
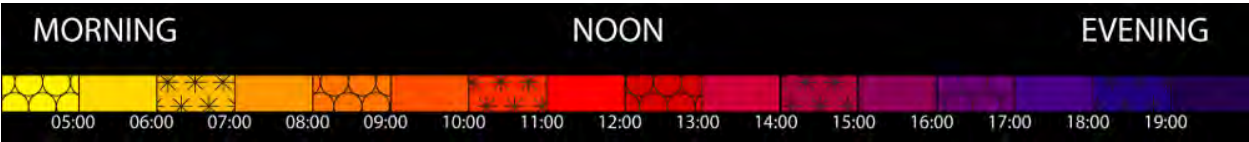


Fig. 48: Solar reflections



60° FIELD OF VIEW: SEASON
UP TRACK - U100

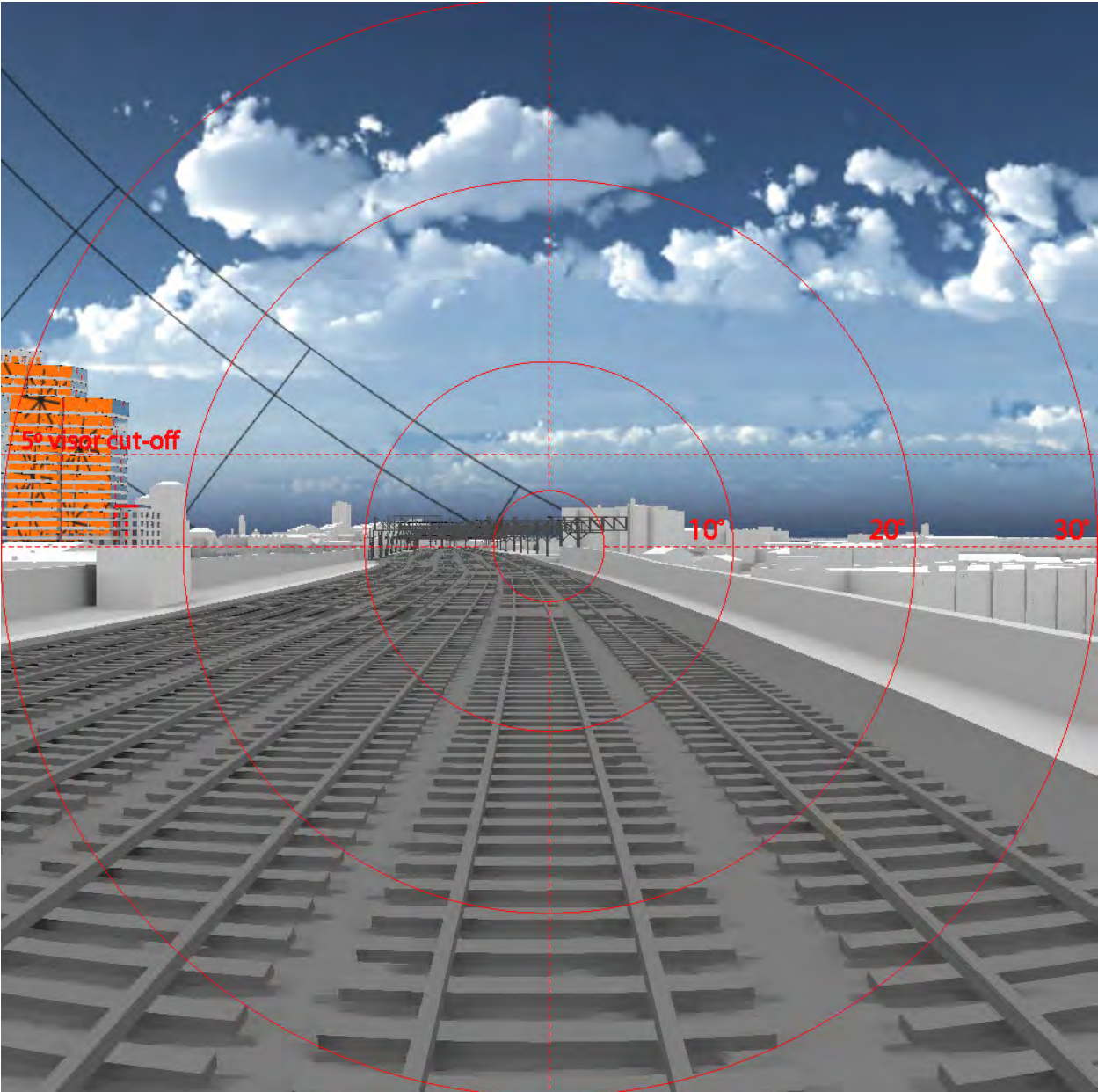


Fig. 49: Solar reflections



60° FIELD OF VIEW: TIME OF DAY
UP TRACK - U200

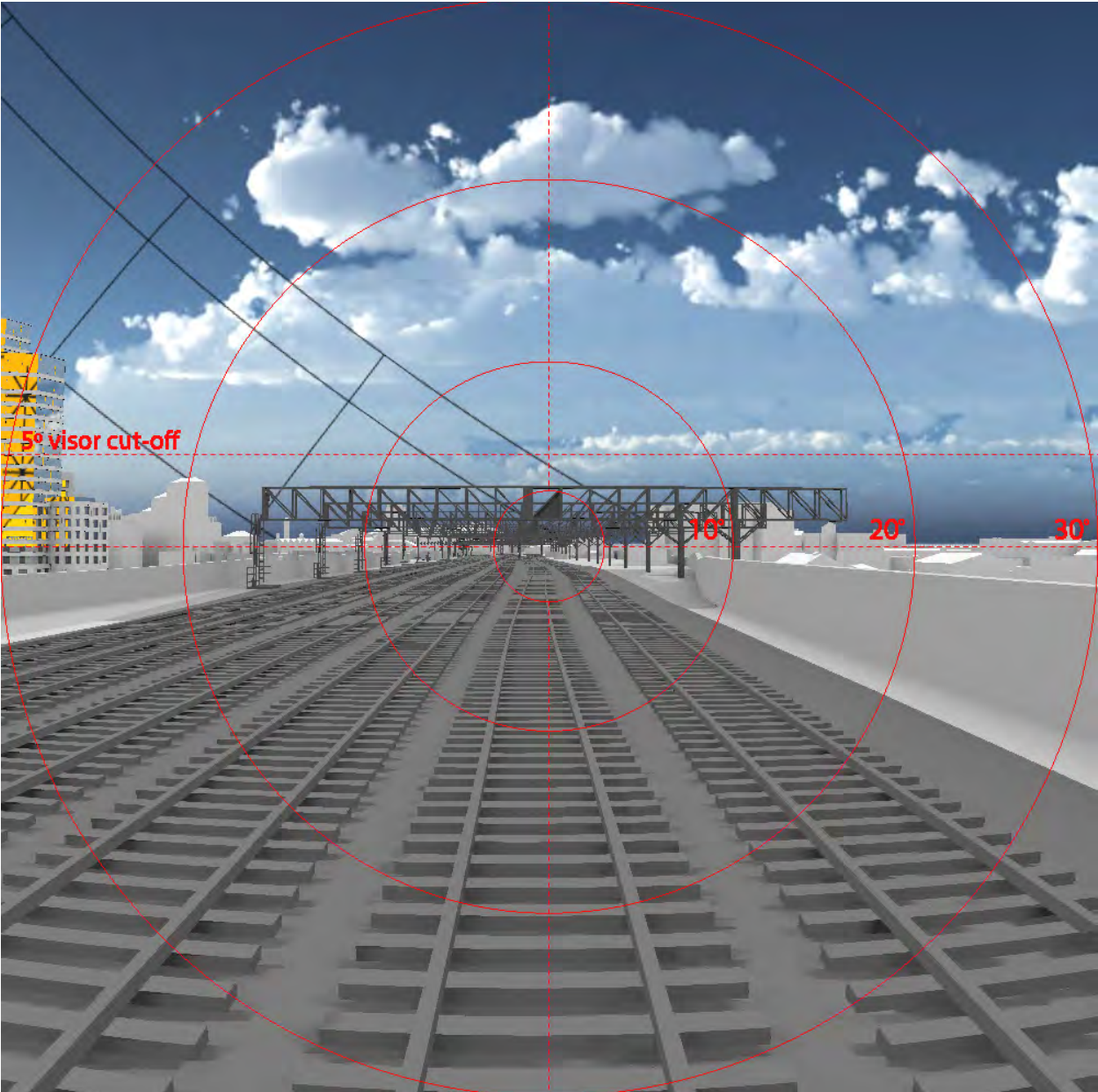
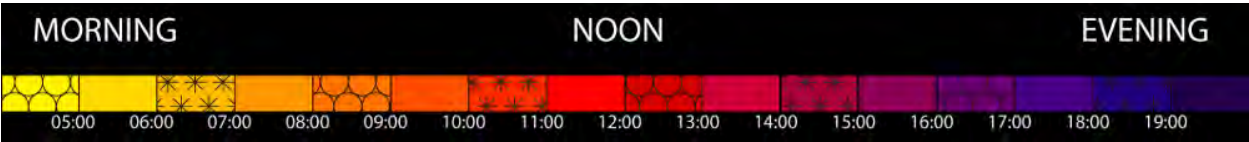


Fig. 50: Solar reflections



60° FIELD OF VIEW: SEASON
UP TRACK - U200

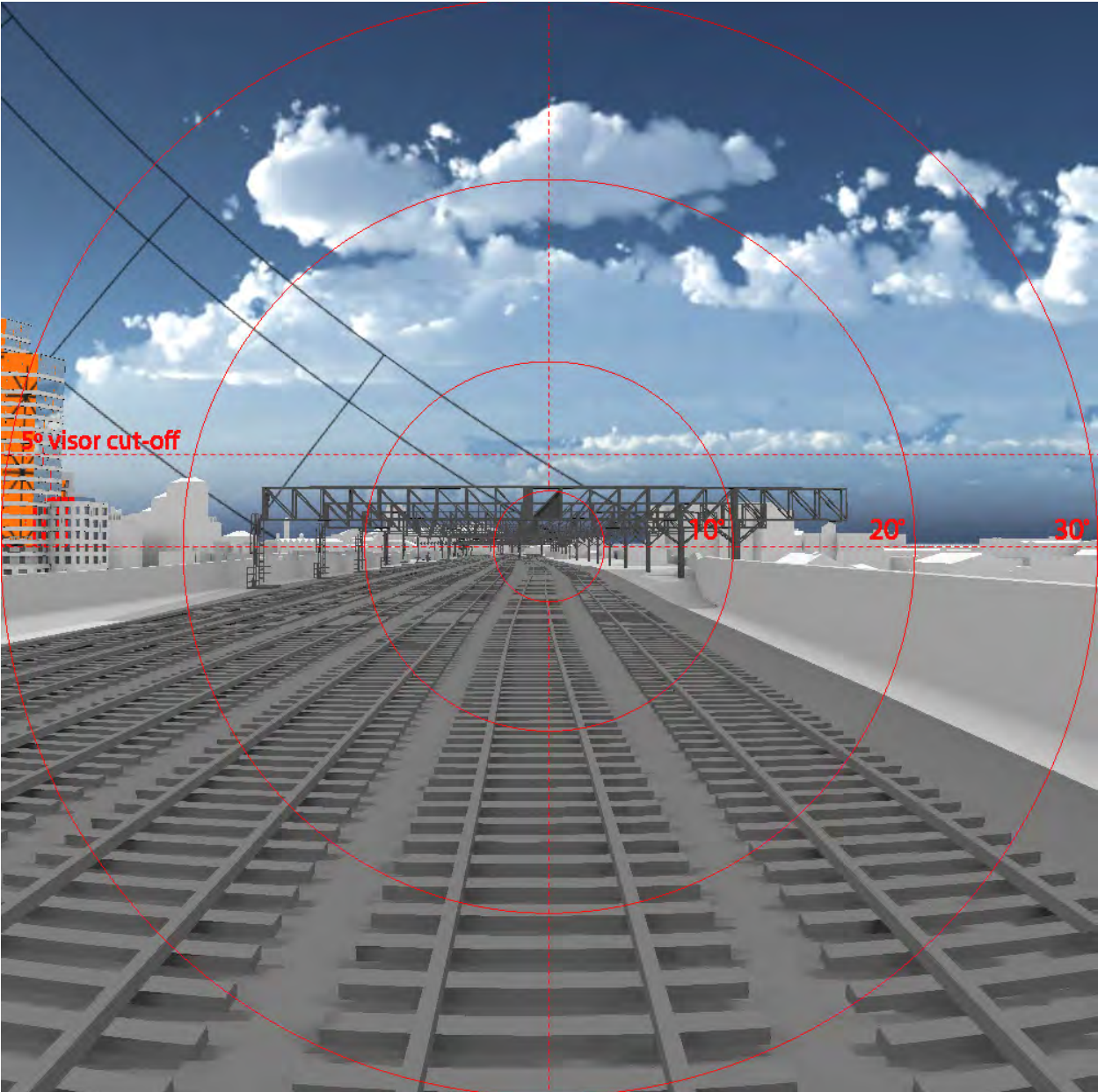


Fig. 51: Solar reflections



60° FIELD OF VIEW: TIME OF DAY
UP TRACK - U300

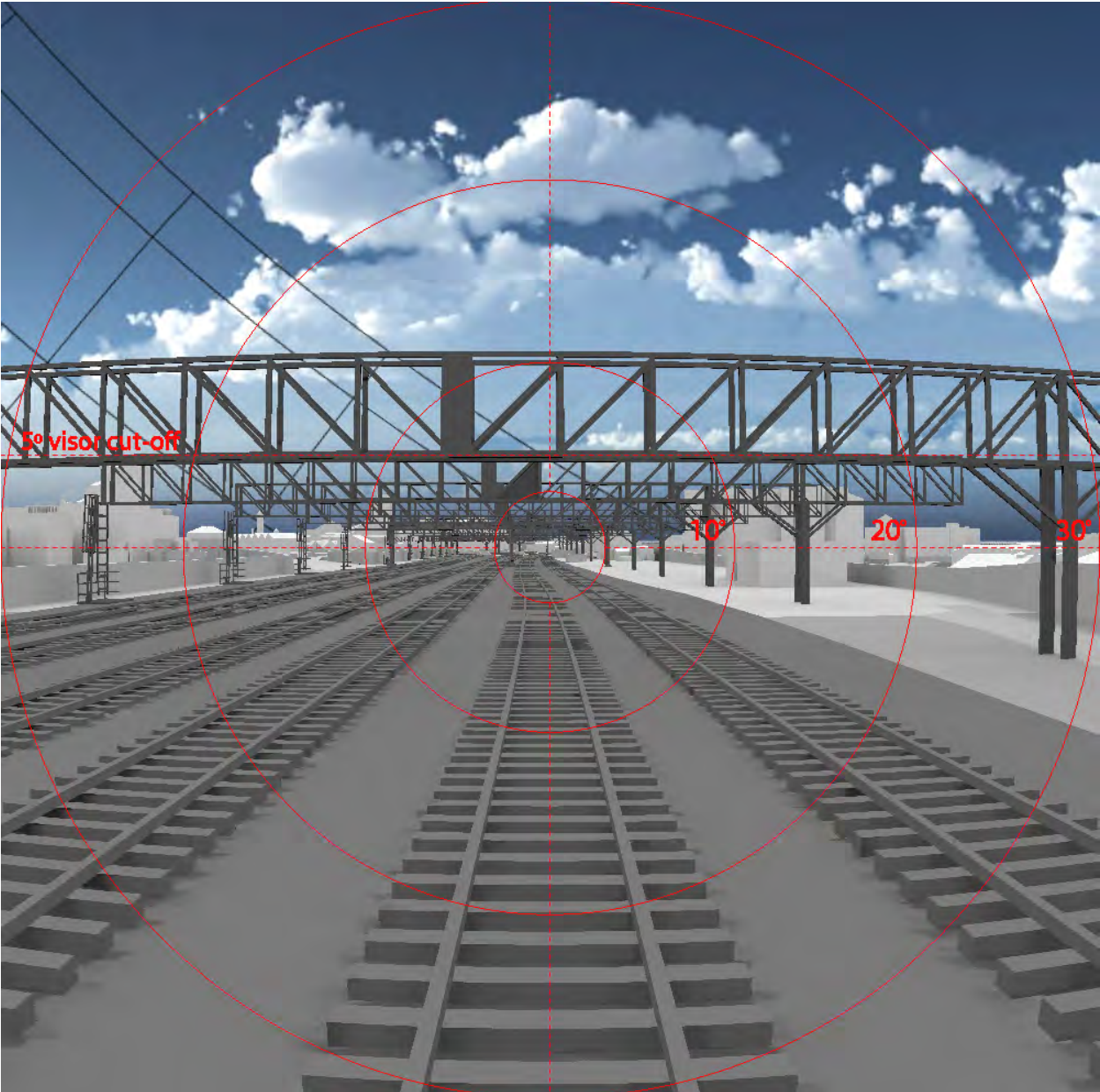


Fig. 52: Solar reflections



60° FIELD OF VIEW: SEASON
UP TRACK - U300

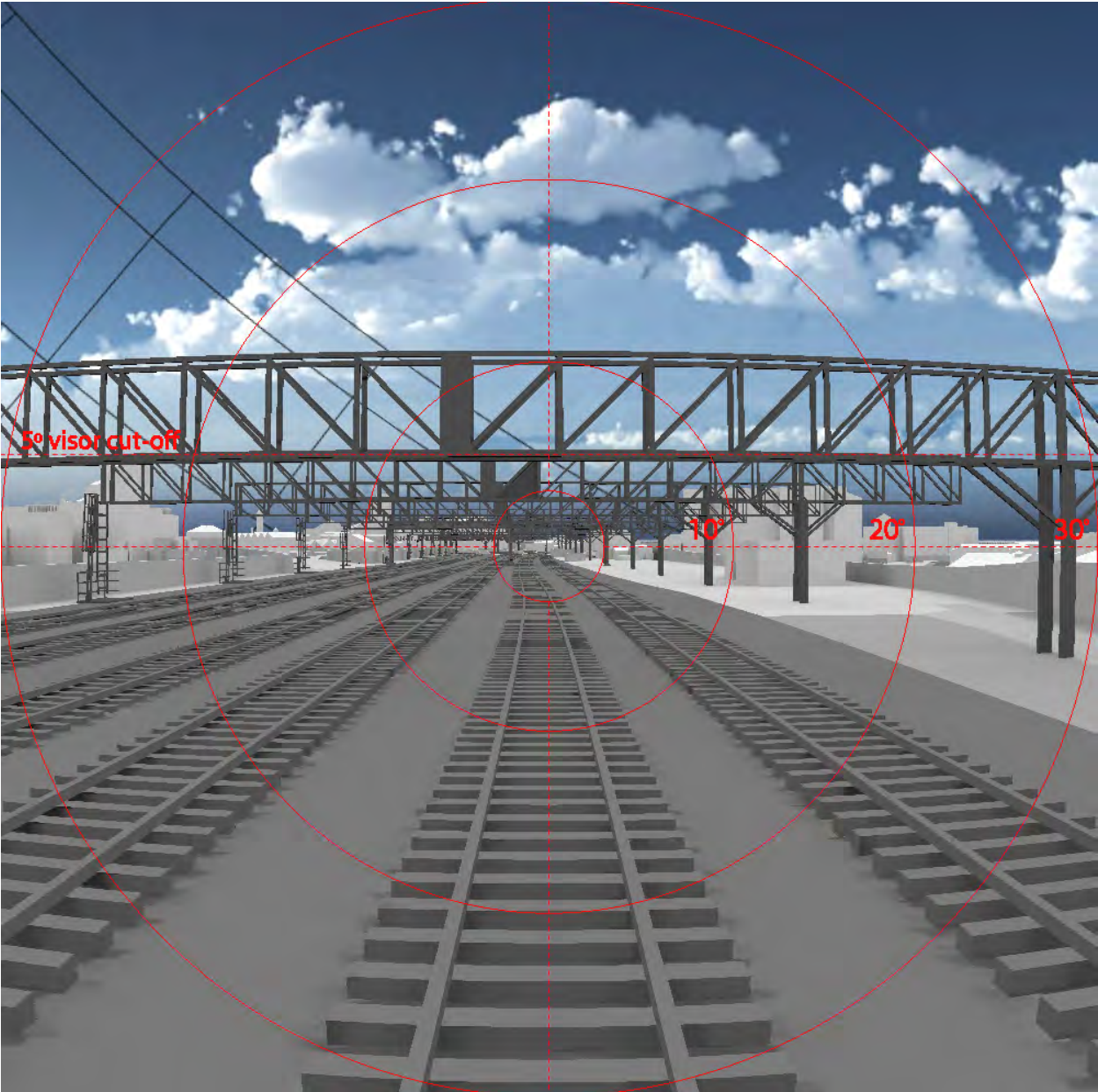


Fig. 53: Solar reflections



60° FIELD OF VIEW: TIME OF DAY
DOWN TRACK - D200

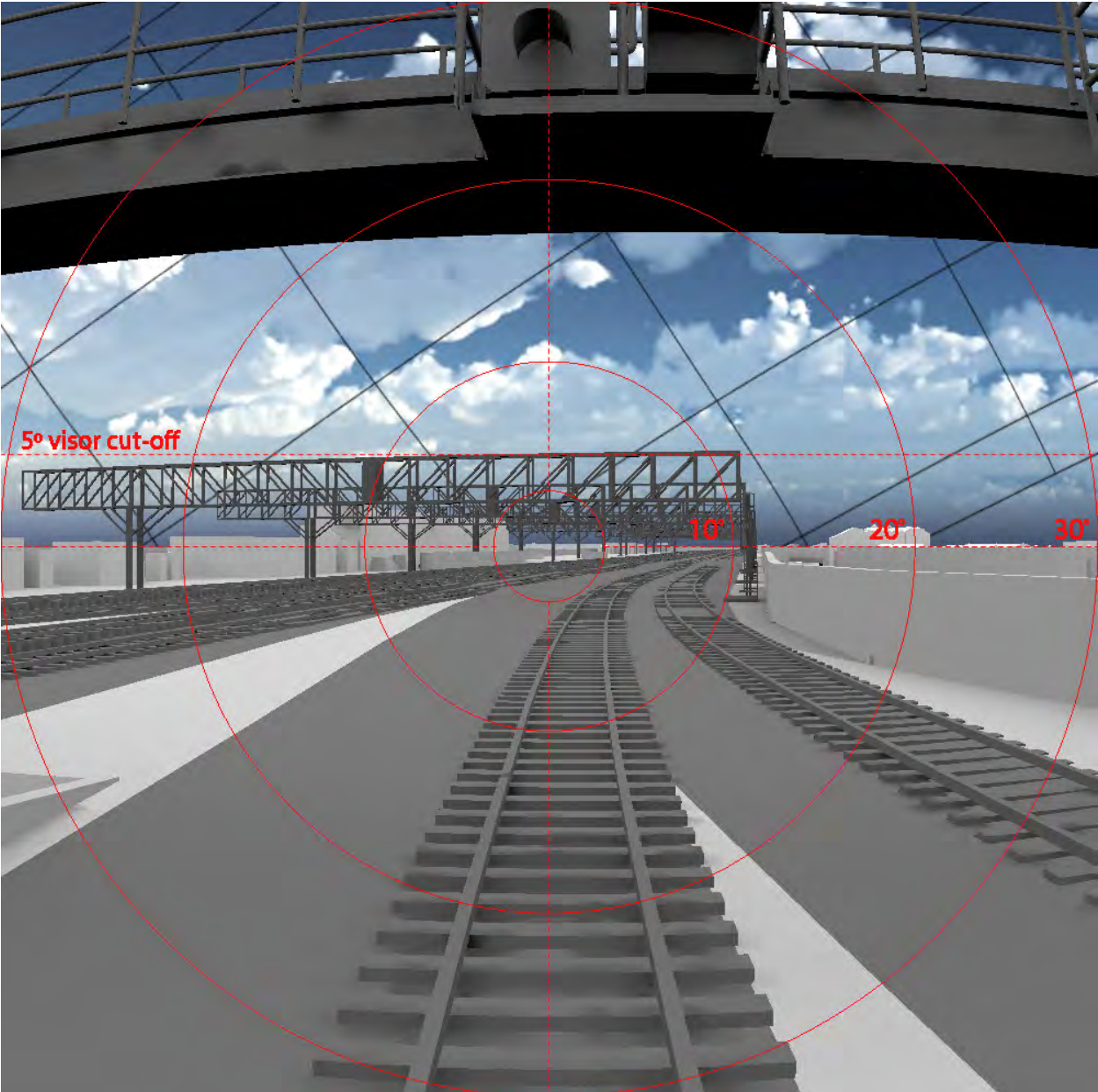
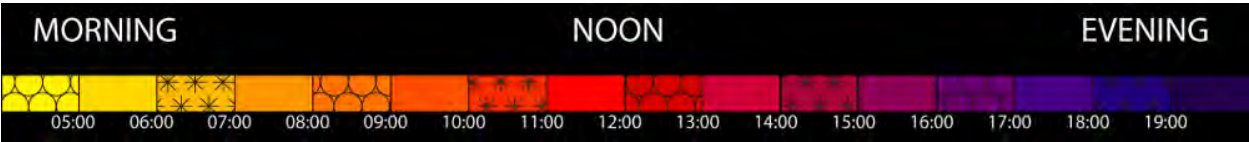


Fig. 54: Solar reflections



60° FIELD OF VIEW: SEASON
DOWN TRACK - D200

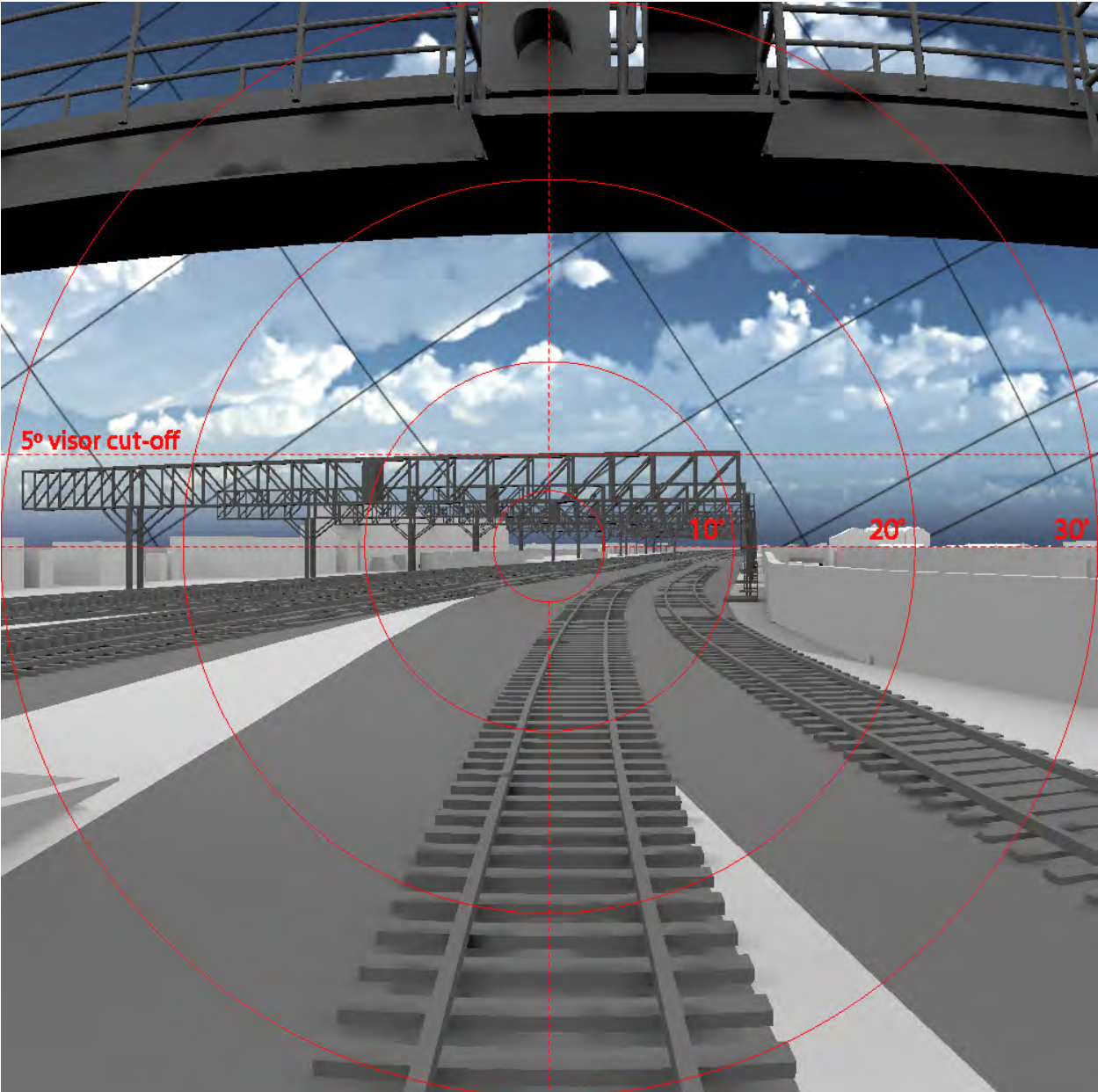


Fig. 55: Solar reflections



60° FIELD OF VIEW: TIME OF DAY
DOWN TRACK - D300

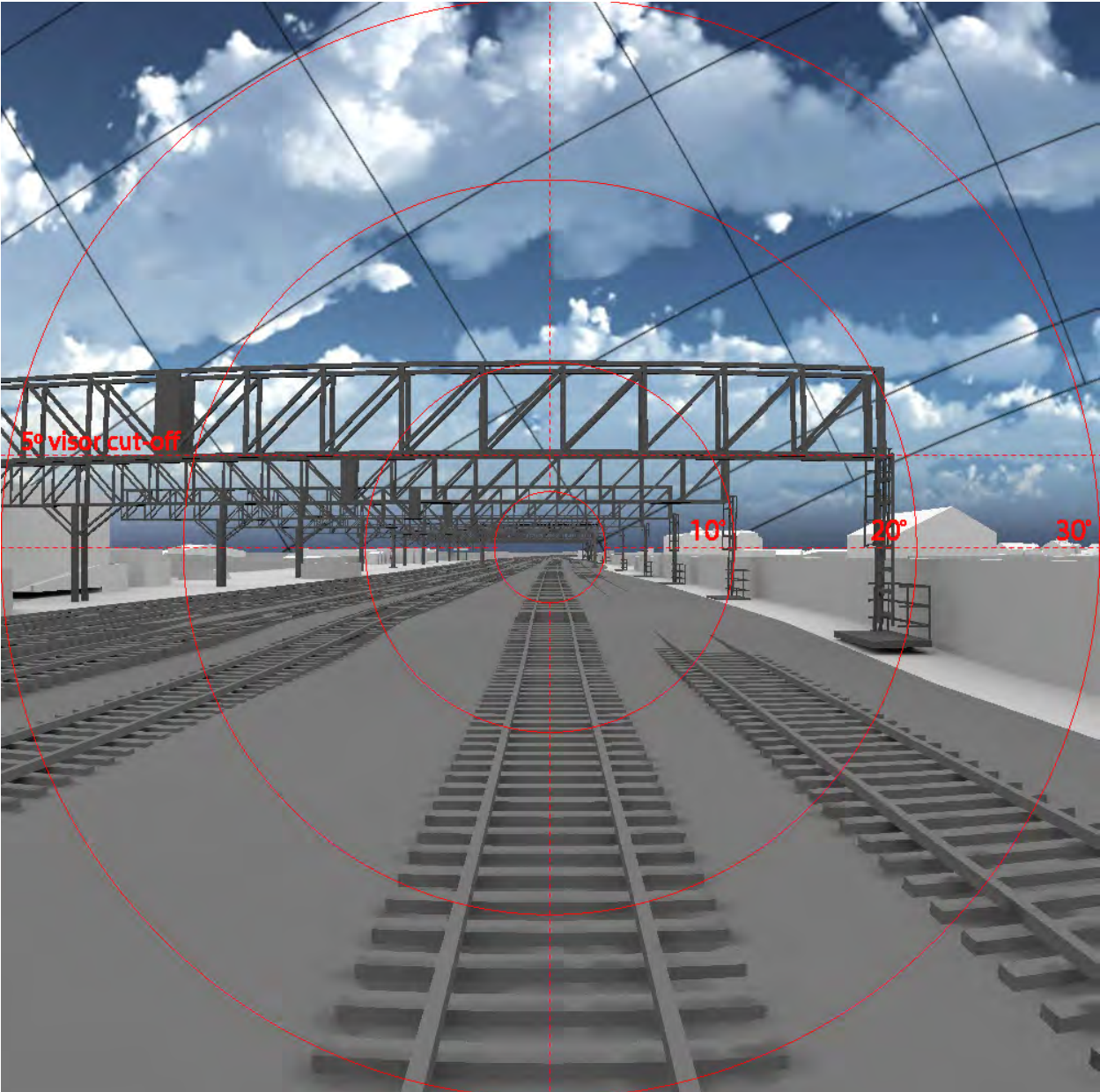


Fig. 56: Solar reflections



60° FIELD OF VIEW: SEASON
DOWN TRACK - D300

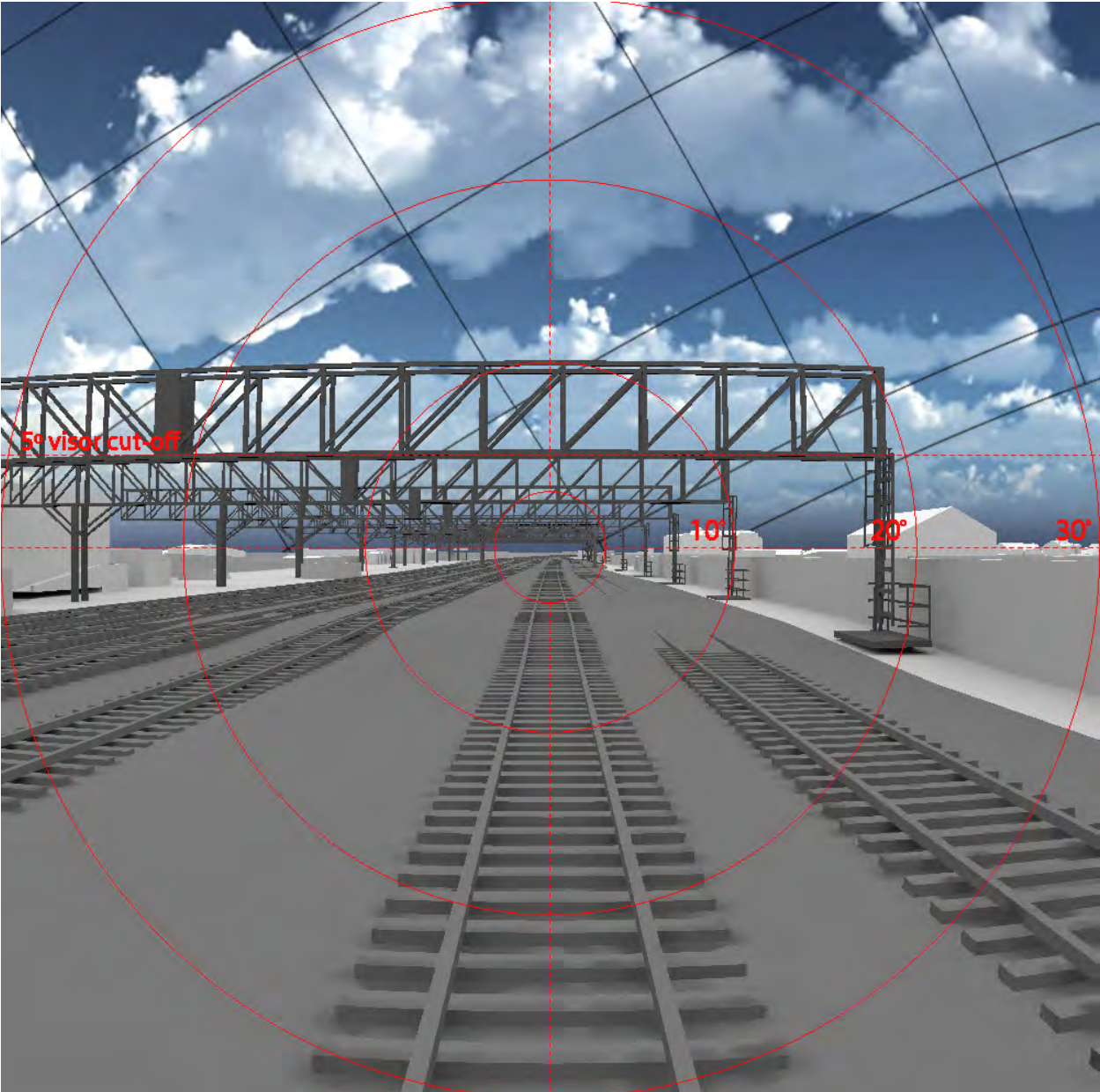


Fig. 57: Solar reflections





What we do:

Building Surveying
Daylight & Sunlight
Light Obstruction Notices
Measured Surveys
Party Wall & Neighbourly Matters
Rights of Light
Solar PV
Wind Analysis

Where we are:

Belfast
Birmingham
Bristol
Dublin
London
Manchester