Proximity

PBSA Development, Plot 9B First Street, Manchester

The Solar Glare Impact of the Proposed Development on Highway Infrastructure

For Vita Meadow Limited

Our Ref: 2266A/MPS Rev 02
08 November 2024

Executive Summary

Certain parts of the Proposed Development may reflect sunlight (and create glare).

The impact of this has been evaluated at 19 selected locations (“viewpoints”) within the primary highway infrastructure around the Site, including Medlock Street, The Mancunian Way, and the east/north bound slip road that exists between the two.

Glare may be experienced at viewpoints on Medlock Street and on the slip road.

However, the glare will not amount to a significant impact.

Generally, the glare will not be encountered by motorists within their central vision. Furthermore, motorists would use their windscreen visors to mitigate any glare impact.

Introduction

Vita Meadow Limited have developed a proposal for the redevelopment of the land known as “Plot 9B” as defined by the First Street development framework.

As part of the Pre-Application consultation, Manchester City Council enquired as to the solar glare impact of the Proposed Development on the highway infrastructure in the vicinity of the Site. Proximity has subsequently been appointed to evaluate this.

Proximity is a firm of Chartered Surveyors specialising in the assessment, management, and mitigation of the Proximity Risk™, including, amongst other things, solar glare impacts.

This Report sets out our assessment parameters, methodology, findings and opinion.

In preparing this Report we have inspected the Site and the adjacent highway provision.

We have undertaken a solar glare technical analysis utilising a photogrammetric massing model of the Site and its surroundings (prepared by Accucities) and using market leading specialist computer software (Waldram Tools by MBS).

The Technical Assessment parameters are confirmed later in this Report (see pages 12-13).

Our understanding of the Proposed Development, in terms of its massing and external finishes (which are an influence on whether the Proposed Development will promote solar glare), is based on information supplied to us by Tim Groom Architects.

What is Solar Glare

In simple terms, solar glare (or dazzle) is reflected sunlight.

There are several factors that influence whether glare will be experienced:

- Receptor sensitivity in a direction of view;
- The suns position in the sky, which changes throughout both the course of the day and the seasons. For example, in the winter, sunlight hours are reduced, and the sun is lower in the sky. In the summer, sunlight hours are increased, and the sun is higher in the sky. Both will give rise to different solar glare patterns;
- The location and orientation of the Proposed Development; and

- The reflective quality / characteristics of the Proposed Development. All building materials will reflect sunlight to some degree, however, a predominantly brick elevation / façade will reflect less sunlight than, say, a heavily glazed façade.

There are two types of 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.

The design guidance (see this Report below) identifies that disability glare creates 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.

The Design Guidance confirms (between them):

- That solar glare can occur when sunlight is reflected from a glazed façade or area of metal cladding. In our opinion, this can be extended to any reflective building material.

- If it is considered likely that a building may cause solar glare the exact scale of the problem should be evaluated. This is done by identifying key locations such as road junctions and railway signals and working out the number of hours of the year that sunlight can be reflected to these points. BRE IP3/87 gives details.

- Where solar glare would be created, the next step is to calculate the angle between the driver's line of view and the reflected sun. For building elements in a vertical plane, for a driver on a level road, solar glare could be a significant issue if this angle is less than 10°. That would see glare experienced in the central vision.

- If the solar glare would be experienced close to the driver's line of sight, i.e. central vision, then further assessments and/or mitigation would likely be required.

Design Guidance

Solar glare design guidance is limited to the following publications:

- Building Research Establishment's Digest 209 - Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice.
- BRE IP3 / 87 - Solar Dazzle Reflected from Sloping Glazed Facades.
- CIE Report 146: 2002 - Equations for Disability Glare.

The City of London Planning Advice Note *"Guidance and Best Practice for assessing Solar Glare ..."* is often cited as a reference in solar glare reports (even outside of London).

It does not, however, add anything that is not already covered in the other guidance (and in fact borrows from them heavily). It is acknowledged for the avoidance of doubt.

The Human Field of Vision

The solar glare design guidance is clear that solar glare could become an issue if it is experienced in a particular part of the human field of vision.

The field of vision is the area that can be seen without moving the eyes or head. It is measured as degrees visible with both eyes while looking straight ahead. A wide field of vision reduces unnecessary head and eye movement.

The field of vision is generally defined as follows:

- Central vision 0-3° from focal point;
- Paracentral 3-10° from focal point;
- Near periphery 10-20° from focal point;
- Mid-periphery 20-30° from focal point; and
- Outer-periphery >30° from focal point.

Generally, solar glare has potential to cause visibility issues if experienced at an angle of less than 10°, i.e. within the central vision. Less so, in the mid / outer periphery (>30°).

The Site

“Plot 9B” of the First Street Development Framework, fronting Medlock Street to the West and located to the immediate north of Plot 9A (under construction).

The Proposed Development

The erection of a purpose-built student accommodation (PBSA) building (Sui Generis), alongside ancillary amenity space, landscaping, secure cycle parking and other associated works; and use of Land east of River Street as a construction compound.



The Proposed Development ...

Massing Image from the Technical Analysis Model.

Proposed External Finishes

As confirmed earlier in this Report, (1) the external finishes of the Proposed Development are an influence on whether solar glare / reflected sunlight will be promoted, and (2) all building materials reflect the sun to some degree but some more than others.

Glazing has a high potential to reflect sunlight. Accordingly, we have identified the windows of the Proposed Development as a possible glare source.

The 12-storey part of the Proposed Development, which fronts Medlock Street, is to be faced with a brick. We do not acknowledge that as a glare source.

However, the 33-storey part of the Proposed Development is to be finished with an anodised metal cladding, and we have acknowledged this as a possible glare source.

Technical Assessment

We have undertaken a solar glare technical analysis. We have built a topographically accurate 3D model of the Proposed Development, acknowledging its elevational treatments and window positions, and have measured the potential for the Proposed Development to create solar glare that might distract motorists in the vicinity of the Site.

The glare impact assessment measures the glare that might be created by the Proposed Development at the established or confirmed viewpoints only.

The assessment is not a cumulative assessment that acknowledges the reflectivity or solar glare potential of any other structures or surfaces in the vicinity of the Site.

The assessment does not measure glare intensity. It will measure glare potential by assuming that the Proposed Development (or relevant parts thereof – in this case the window glazing) operate as a mirror. On this basis, a “worst case” position is established.

Proximity

The assessment has evaluated the glare impact by reference to where any glare is experienced in the human field of vision at the viewpoints and with reference to when the glare is experienced in terms of time of day (including duration) and time of year.

The centre of each Viewpoint is at a height of 1.5m above road level level.

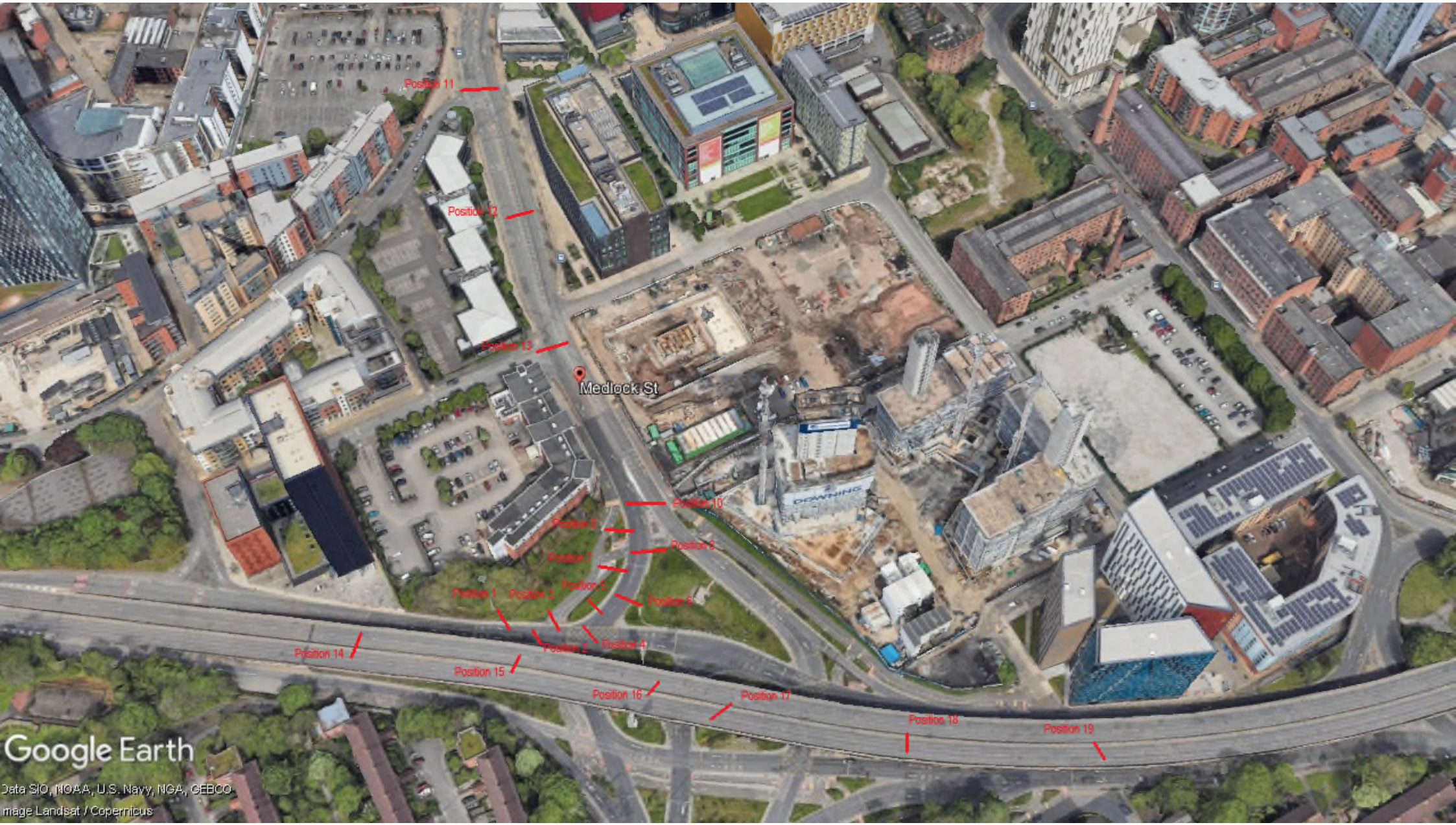
The temporary use of Construction Compound has not been quantitively appraised. It is remote of the identified Receptors / Viewpoints (see below).

Receptors / Viewpoints

The potential for the Proposed Development to create adverse solar glare has been evaluated at 19 viewpoints within the primary highway infrastructure around the Site.

- Ten viewpoints (viewpoints 1-10 inclusive) have been identified along the slip road between the Mancunian Way and Medlock Street to the south-west of the Site;
- Three viewpoints (viewpoints 11, 12, 13) have been identified along the southbound carriageway of Medlock Street to the north of the Site; and
- Six viewpoints have been identified on the Mancunian Way (viewpoints 14-19 inclusive). Three on the eastbound carriageway and three on the westbound carriageway.

The position of these viewpoints are annotated on the Receptor Plan below.


Position 11
Position 12
Position 13
Medlock St
Position 10
Position 9
Position 8
Position 7
Position 5
Position 6
Position 1
Position 3
Position 2
Position 4
Position 14
Position 15
Position 16
Position 17
Position 18
Position 19
Google Earth
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image Landsat / Copernicus

The Slip Road

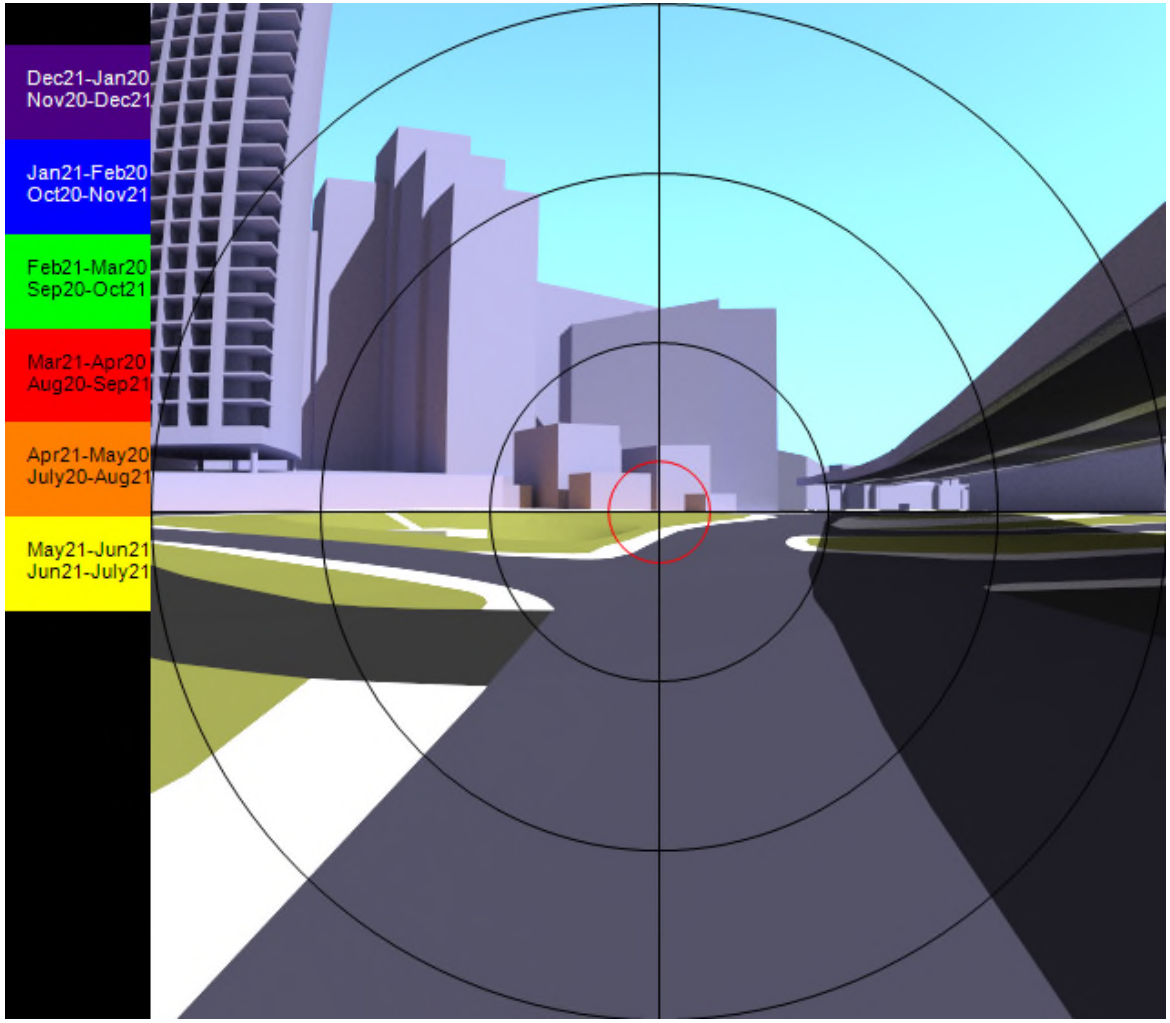
Viewpoints 1-10 are located along the slip road between the Mancunian Way and Medlock Street. This slip road is located to the south-west of the Site, and it is therefore feasible that the Proposed Development could reflect sunlight in their direction.

It is important that the glare impact of the Proposed Development be evaluated along this slip road. At certain points on the slip road motorists will be driving directly towards the Proposed Development. Further, in using the slip road motorists are transitioning between one road and another and therefore engaged key decision making.

Viewpoint 1

Located (facing east) at the traffic lights at the beginning of the slip road.

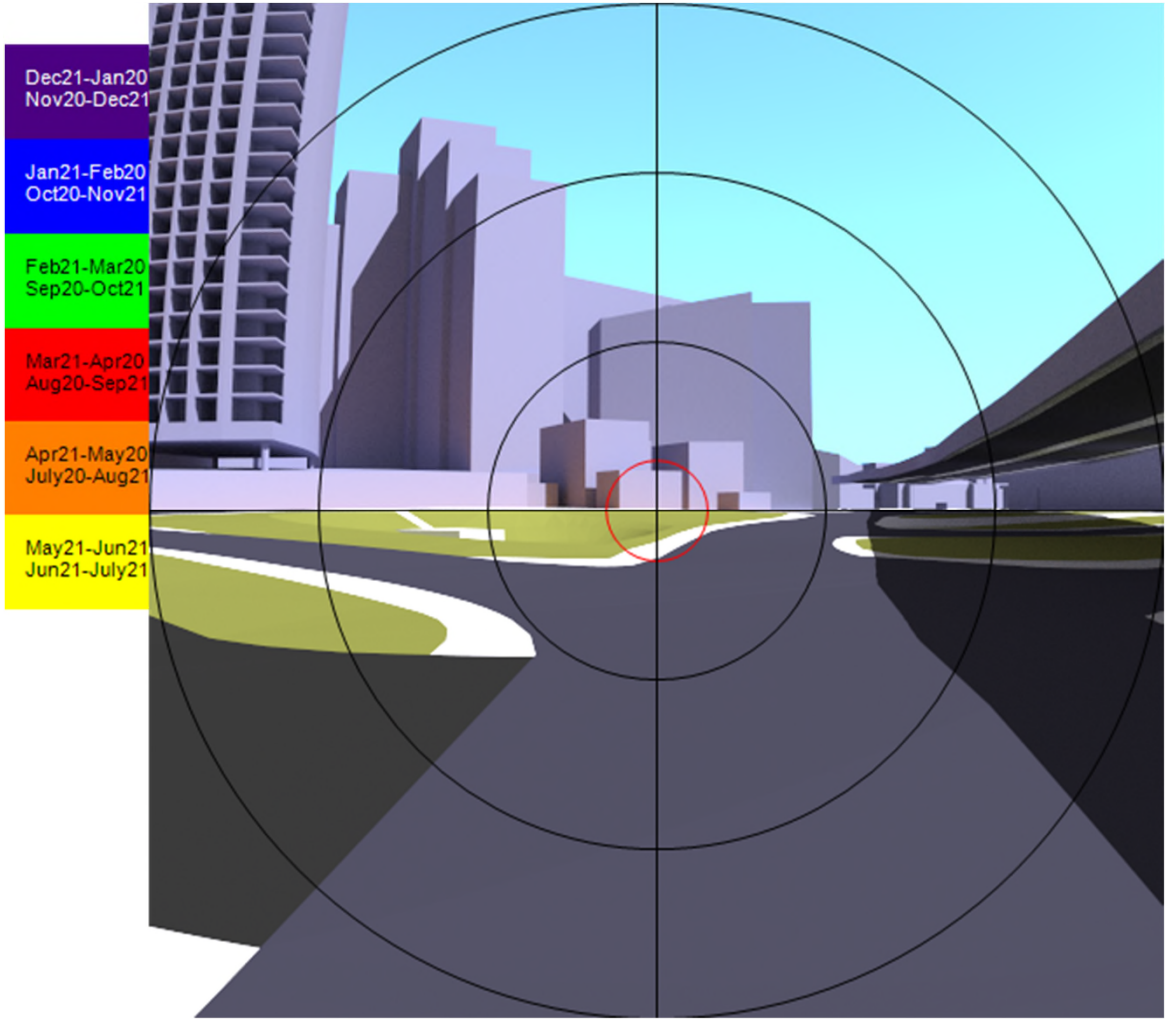
At motorist eye level the Proposed Development will not be seen in the motorist's near or mid periphery vision.



Viewpoint 2

10m on from the aforementioned traffic lights (Viewpoint 1) before the slip road is joined.

At motorist eye level the Proposed Development will not be seen in the motorist's near or mid periphery vision.



Viewpoint 3

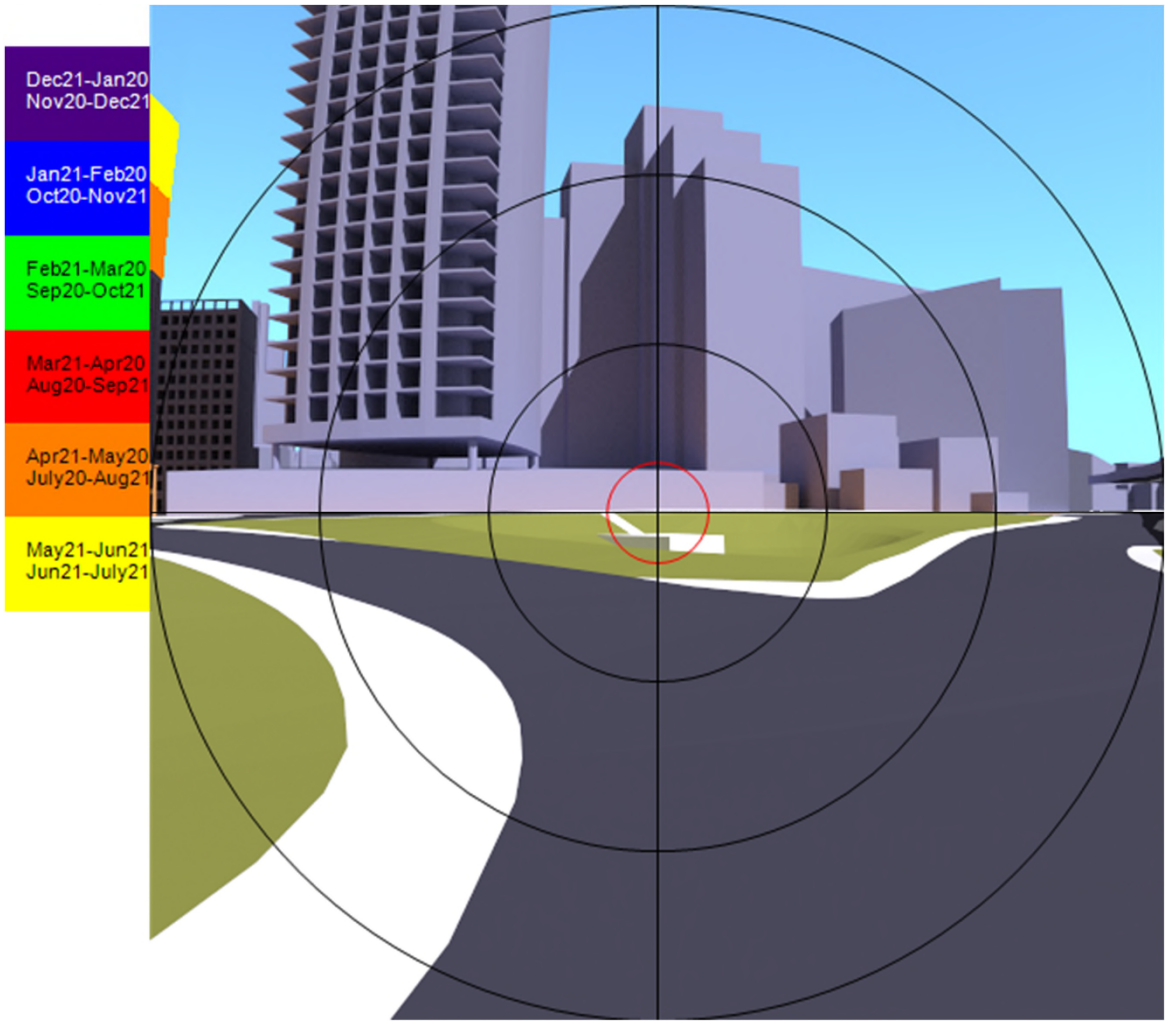
20m on from the aforementioned traffic lights (Viewpoint 1) before the slip road is joined.

A motorist will see the Proposed Development at this point

Glare may be experienced, for varying durations, between 06:04 and 06:43 on 06 May-06 August, experienced in the mid periphery field of vision.

This possible glare occurrence cannot be described as a fleeting incidence because it could be substantially present for the best part of three full months of the year.

However, it would happen at a localised time of the day - early morning at which point fewer motorists will be on the road. The glare would also be apparent for no more than 11 minutes at its worst on any one occasion. That the glare occurrence would be experienced towards the top of the field of vision means that it can be easily mitigated through the use of a windscreen visor.



Viewpoint 4

The motorist has just entered onto the slip road and has started driving towards the Proposed Development.

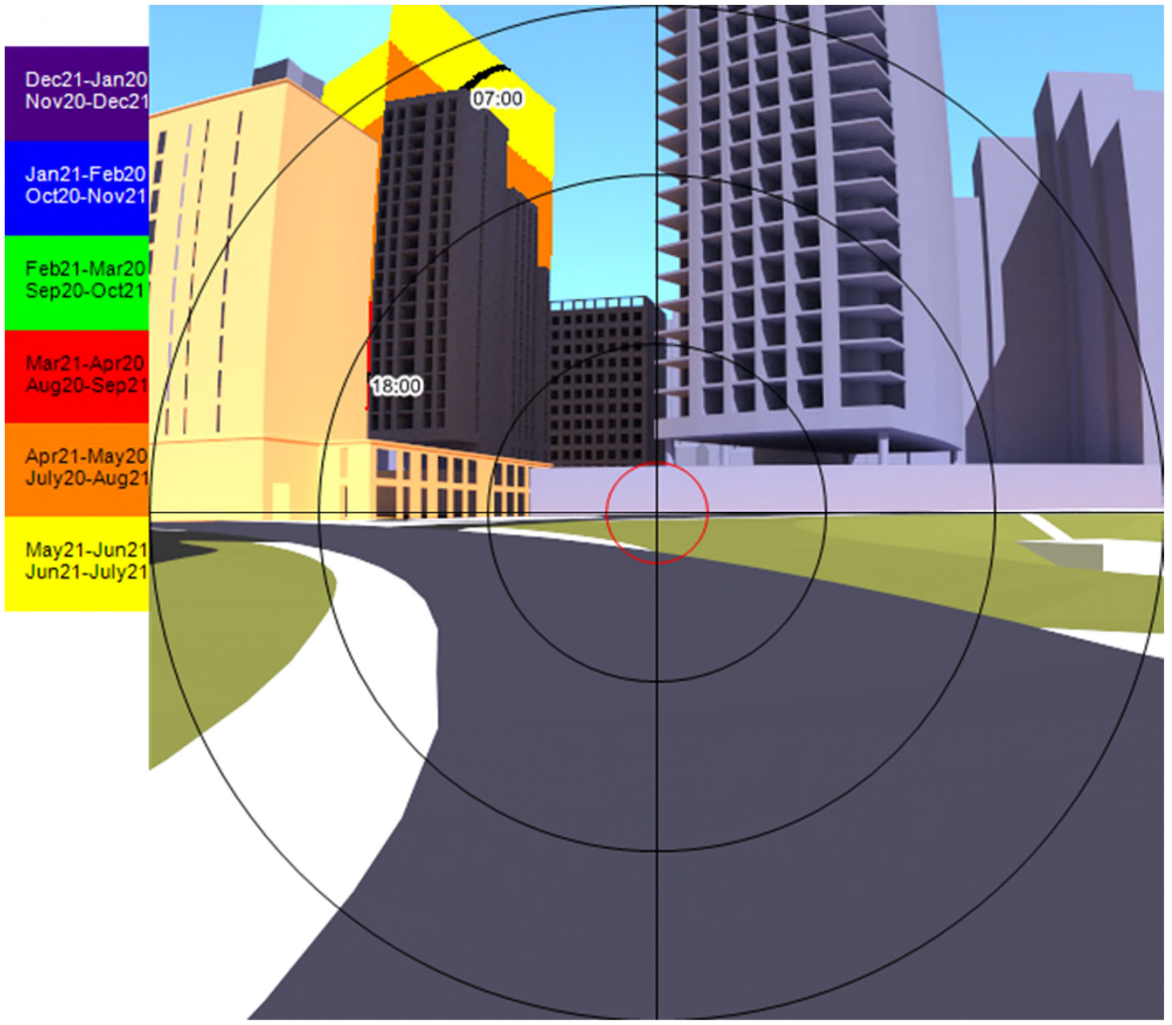
A motorist will see the Proposed Development at this point.

Glare may be experienced in the evenings from 07 April through to 04 September for varying durations between 17:10 - 18:06.

In the period 04 May - 08 August, glare, again for varying durations, could be experienced between 06:17 - 07:25.

The glare would be experienced in the outer-near, mid and outer periphery fields of vision.

This possible glare occurrence cannot be described as a fleeting incidence because it would be present for the best part of six months of the year. The longest daily glare duration is approximately one hour in the early morning in the summer months when realistically fewer motorists will be on the road. Furthermore, that the glare would be experienced towards the top of the field of vision means that it could easily be mitigated through the use of a windscreen visor.



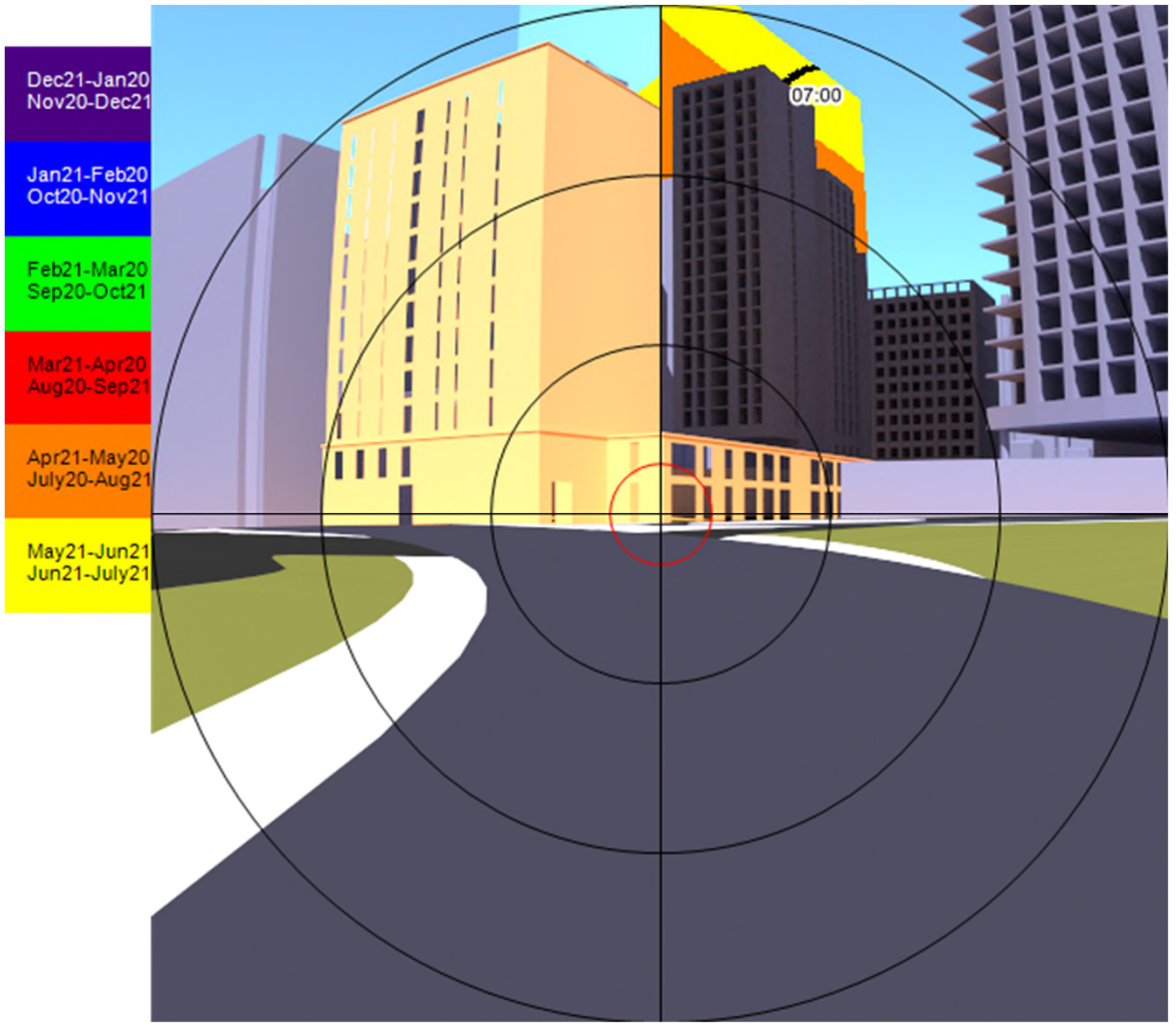
Viewpoint 5

The motorist is on the slip road and is driving towards the Proposed Development.

The motorist will see the Proposed Development at this point.

Glare may be experienced in the mornings from 24 April - 18 August, for varying durations, between 06:18 - 07:36. In the period 01 June - 11 July, glare may also be experienced in the evenings, again, for varying durations, between 17:22 - 17:26. The glare would be experienced in the mid and outer periphery field of vision.

The evening glare occurrence is for a fleeting period of time - only five minutes on the worst case occurrence. The morning glare cannot be described as a fleeting incidence because it would be present for the best part of five months of the year. The longest daily glare duration is approximately one hour in the early morning in the summer months when realistically fewer motorists will be on the road. Furthermore, that the glare would be experienced towards the top of the field of vision means that it could easily be mitigated through the use of a windscreen visor.



Viewpoint 6

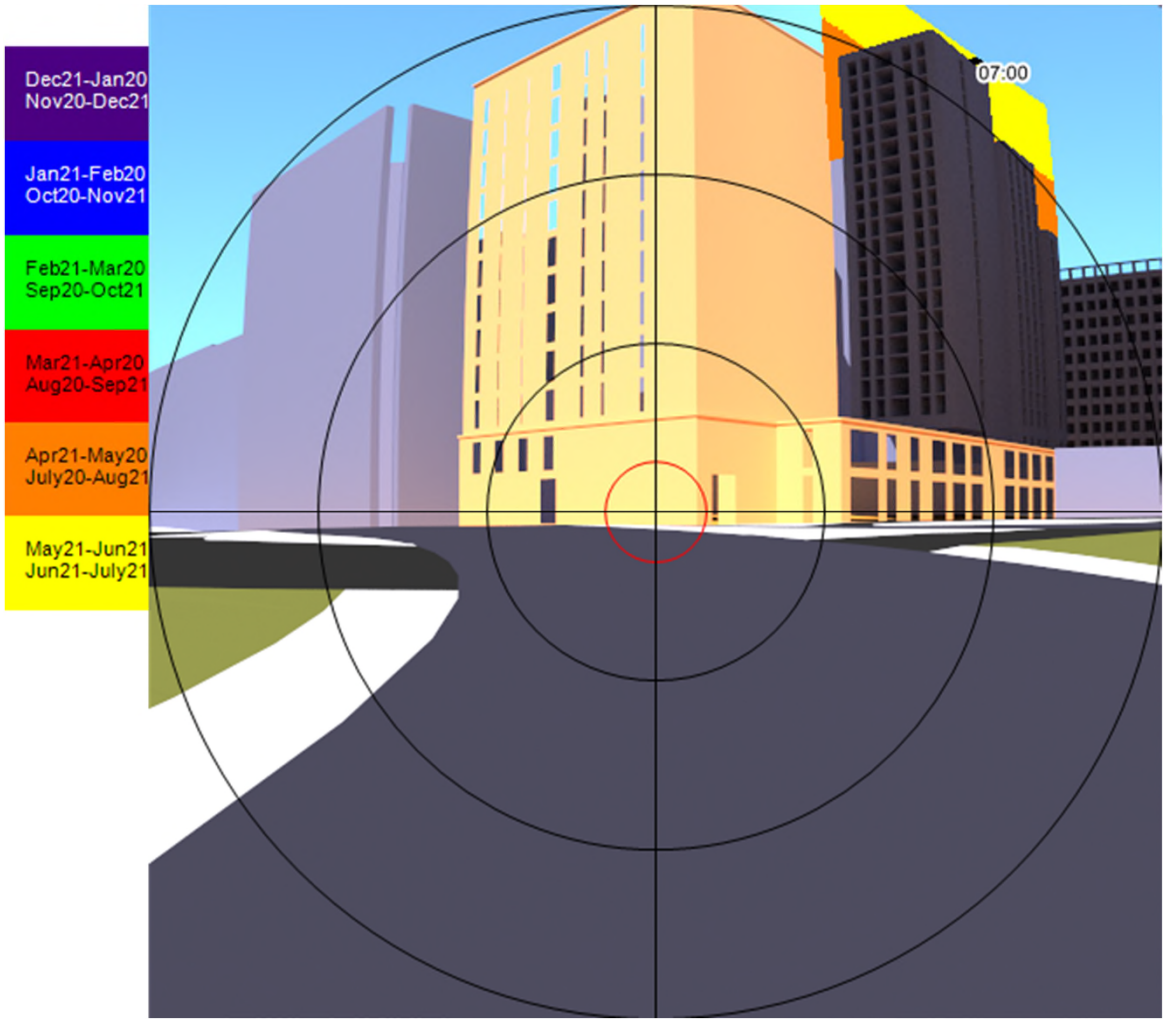
The motorist is on the slip road and is driving directly towards the Proposed Development.

The motorist will see the Proposed Development at this point.

Glare could be experienced between 06:16 - 07:35 on 26 April - 16 August. It would be experienced in the near but primarily mid and outer periphery field of vision.

This possible glare occurrence cannot be described as a fleeting incidence because it could be substantially present for the best part of four months of the year.

However, the glare occurrence would only exist for no more than 20 minutes at its worst on any one occasion in that four month period. Furthermore, that the glare would be experienced towards the top of the field of vision means that it could be easily mitigated through the use of a windscreen visor.



Viewpoint 7

The motorist is on the slip road.

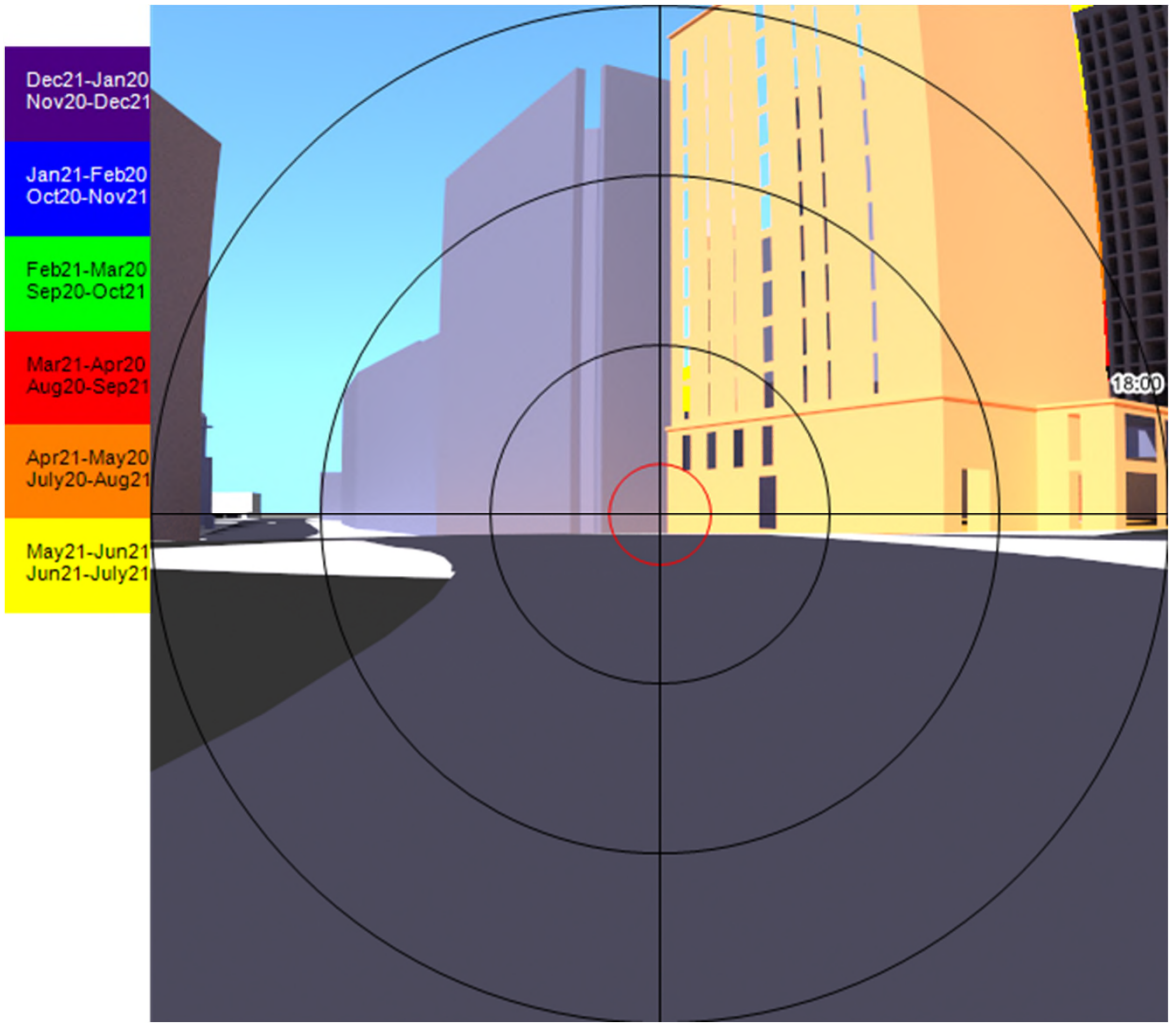
The motorist will see the Proposed Development at this point.

Glare could be experienced between the hours of 07:23 - 07:27 from 25 May - 18 July.

Glare could also be experienced between 17:10 - 19:23 (for varying durations) for the period 11 April - 31 August.

Largely, this glare would be experienced in the outer periphery field of vision. However, glare could be experienced within the paracentral vision for the period April - August. Glare could, therefore, be experienced for the best part of five months in spring / summer. However, it is for a fleeting duration - no more than 3 minutes - on any given day during this period.

The glare impact could be mitigated through the use of a windscreen visor.



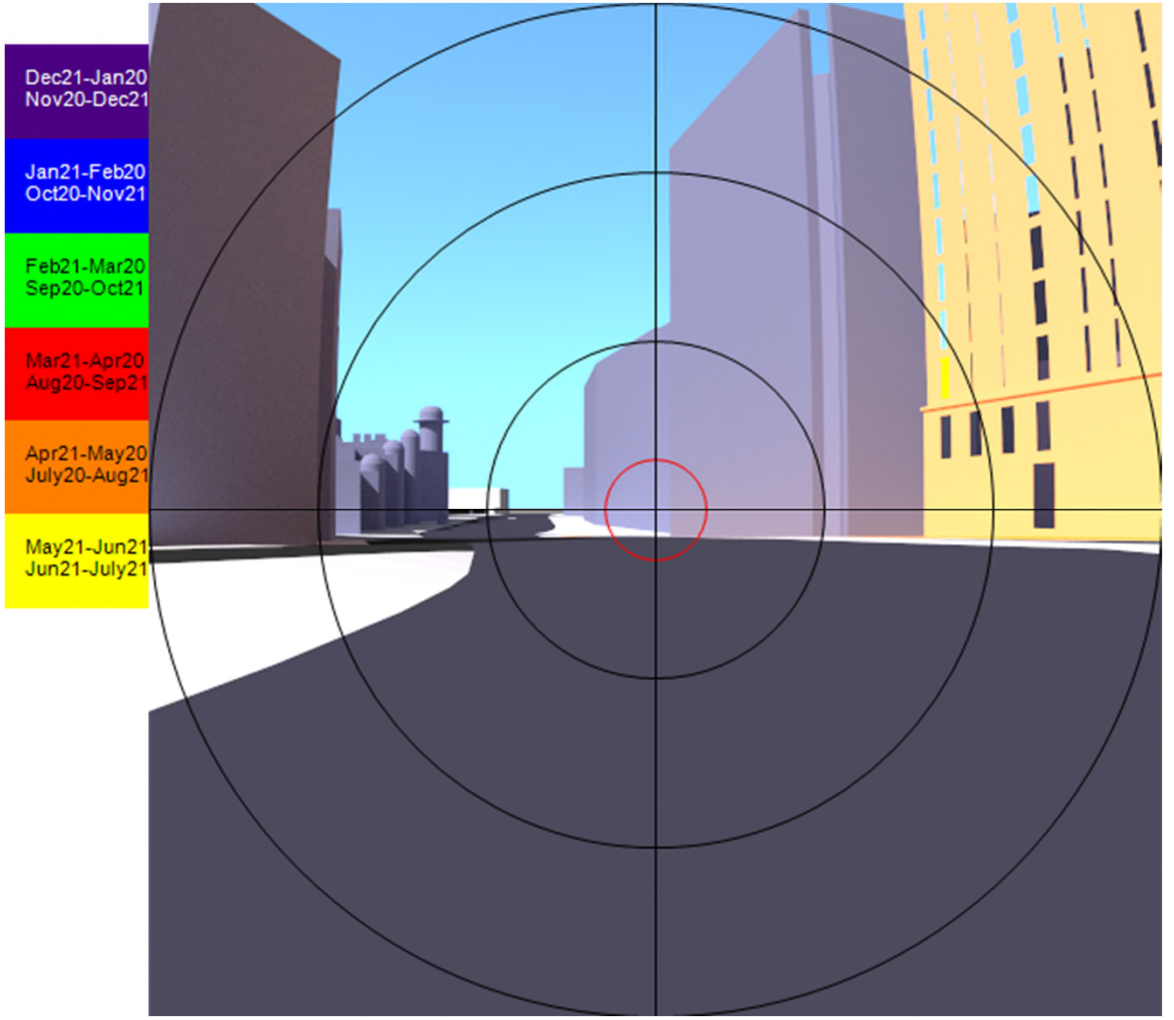
Viewpoint 8

The motorist is leaving the slip road and joining Medlock Street travelling north towards Manchester city centre.

The motorist will see the Proposed Development at this point.

Glare could be experienced between 19:20 - 19:23 between 28 May - 15 July in the outer-near periphery field of vision.

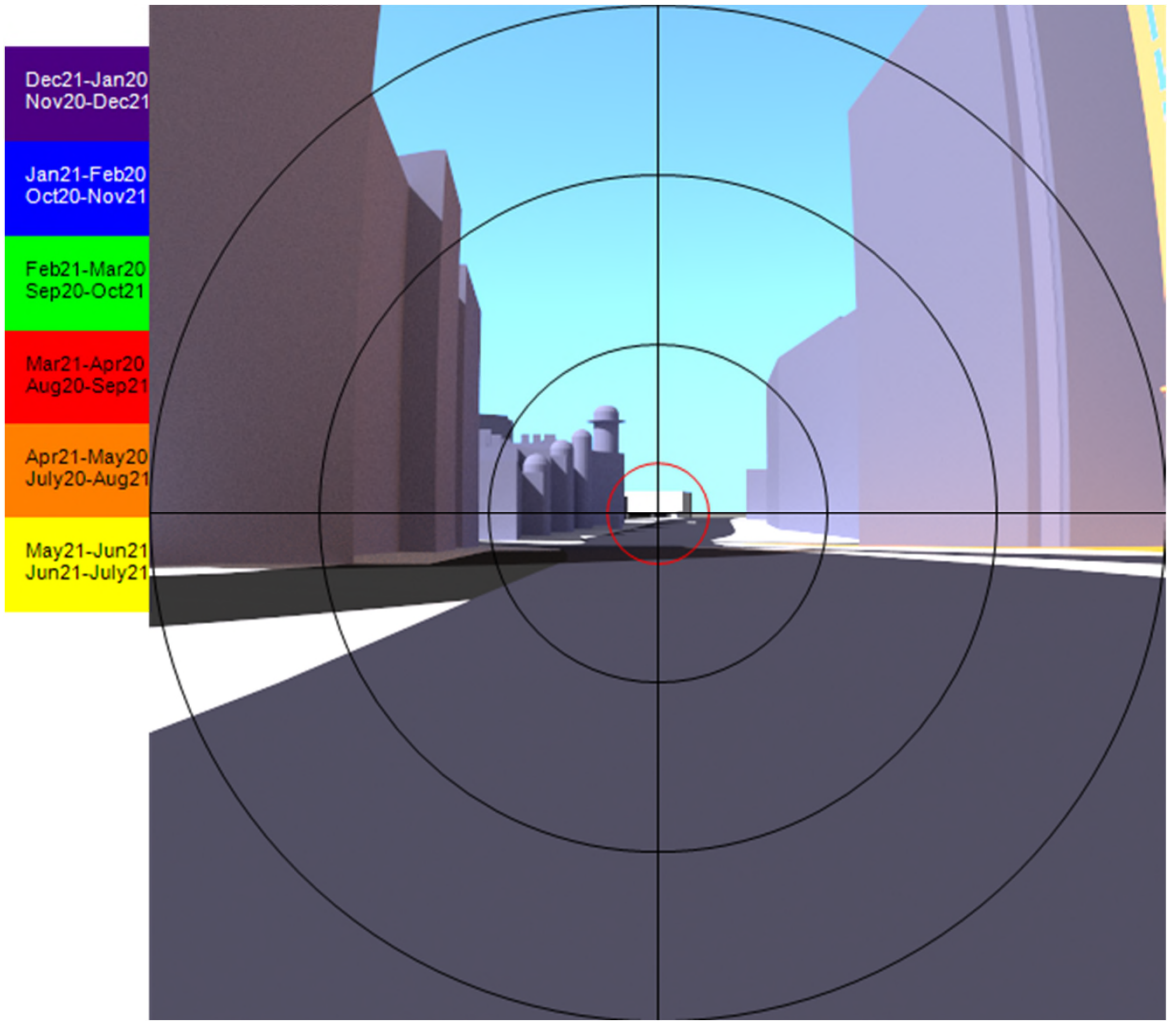
This is a fleeting incidence of glare of no more than 1-3 minutes on any one occasion and would not be experienced in the central vision. The glare impact could be mitigated through the use of a windscreen visor.



Viewpoint 9

The motorist is on Medlock Street and travelling towards Manchester city centre.

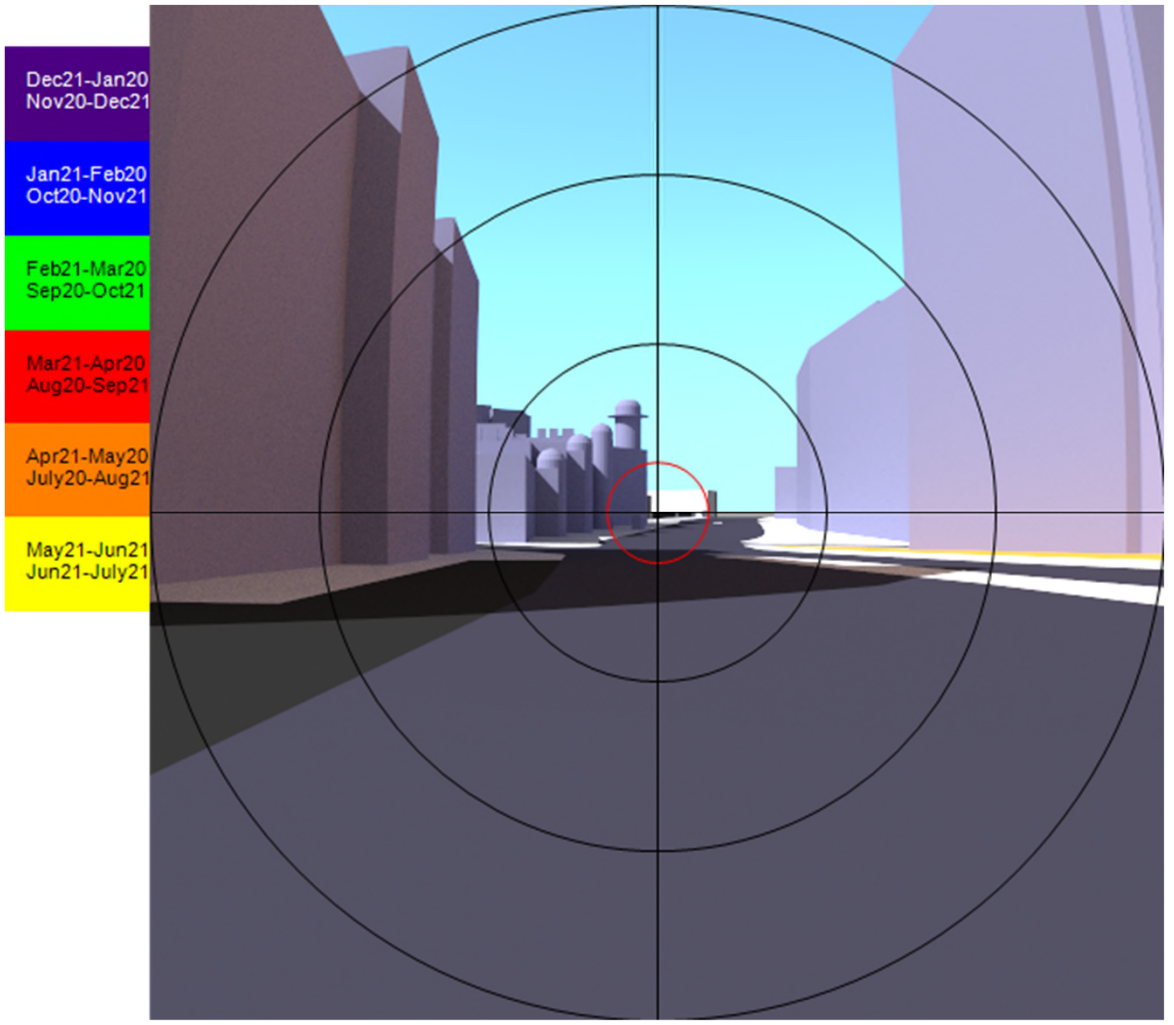
A motorist will see the Proposed Development at this point. However, no glare would be experienced within the motorist's central to mid periphery vision.



Viewpoint 10

The motorist is on Medlock Street and travelling towards Manchester city centre.

A motorist will see the Proposed Development at this point. However, no glare would be experienced within the motorist's central to mid periphery vision.



Medlock Street

Viewpoints 11, 12, and 13 are located on the southbound carriageway of Medlock Street. Here, car drivers are leaving Manchester city centre and approaching the Site from the north.

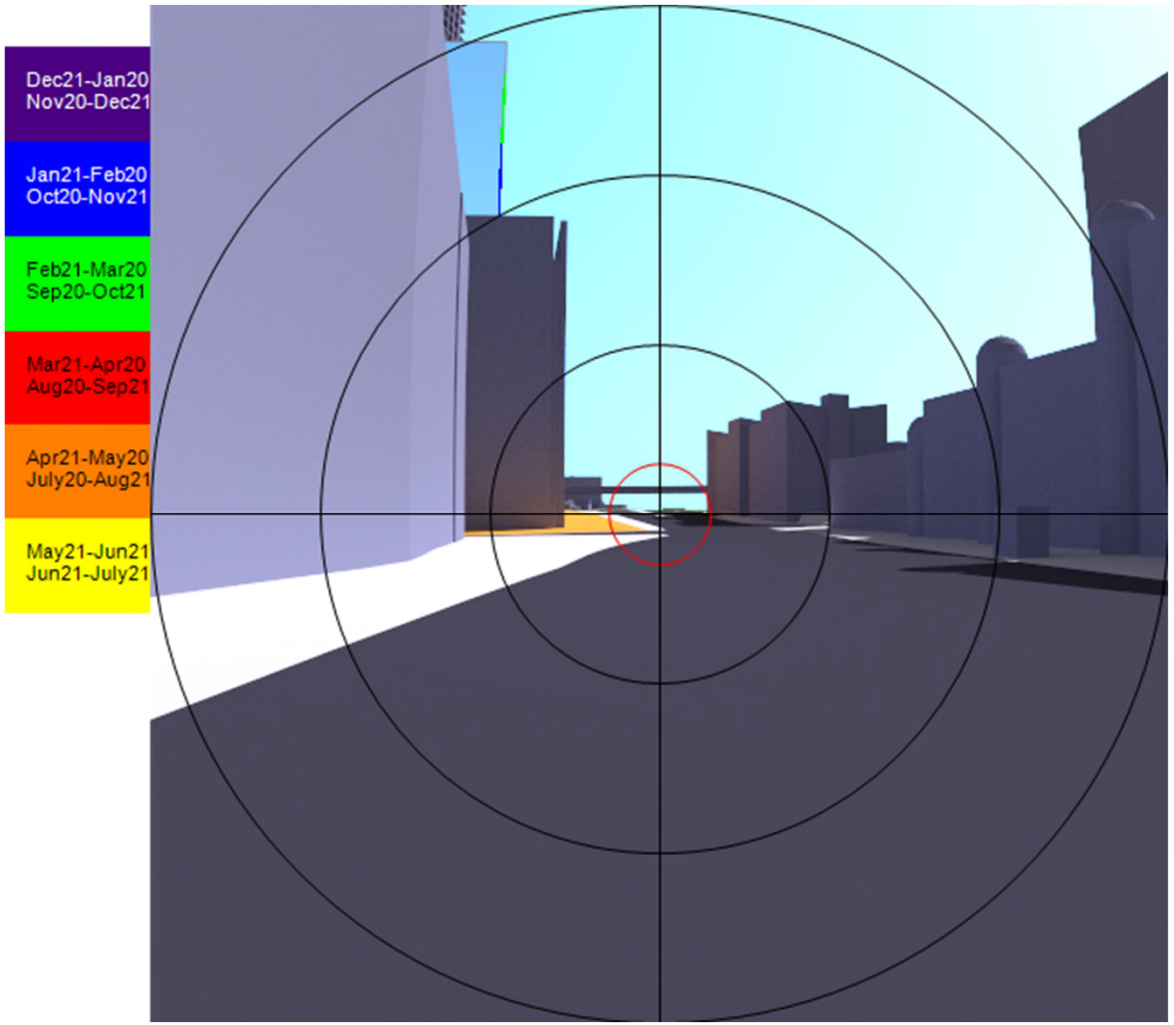
Viewpoint 11

Located on the southbound carriageway of Medlock Street to the north of the Site / Proposed Development.

A motorist will see the Proposed Development at this point.

Glare could be experienced between 10:36-10:44 on 08 February-03 March and 09 October-01 November. It would be present in the mid periphery field of vision.

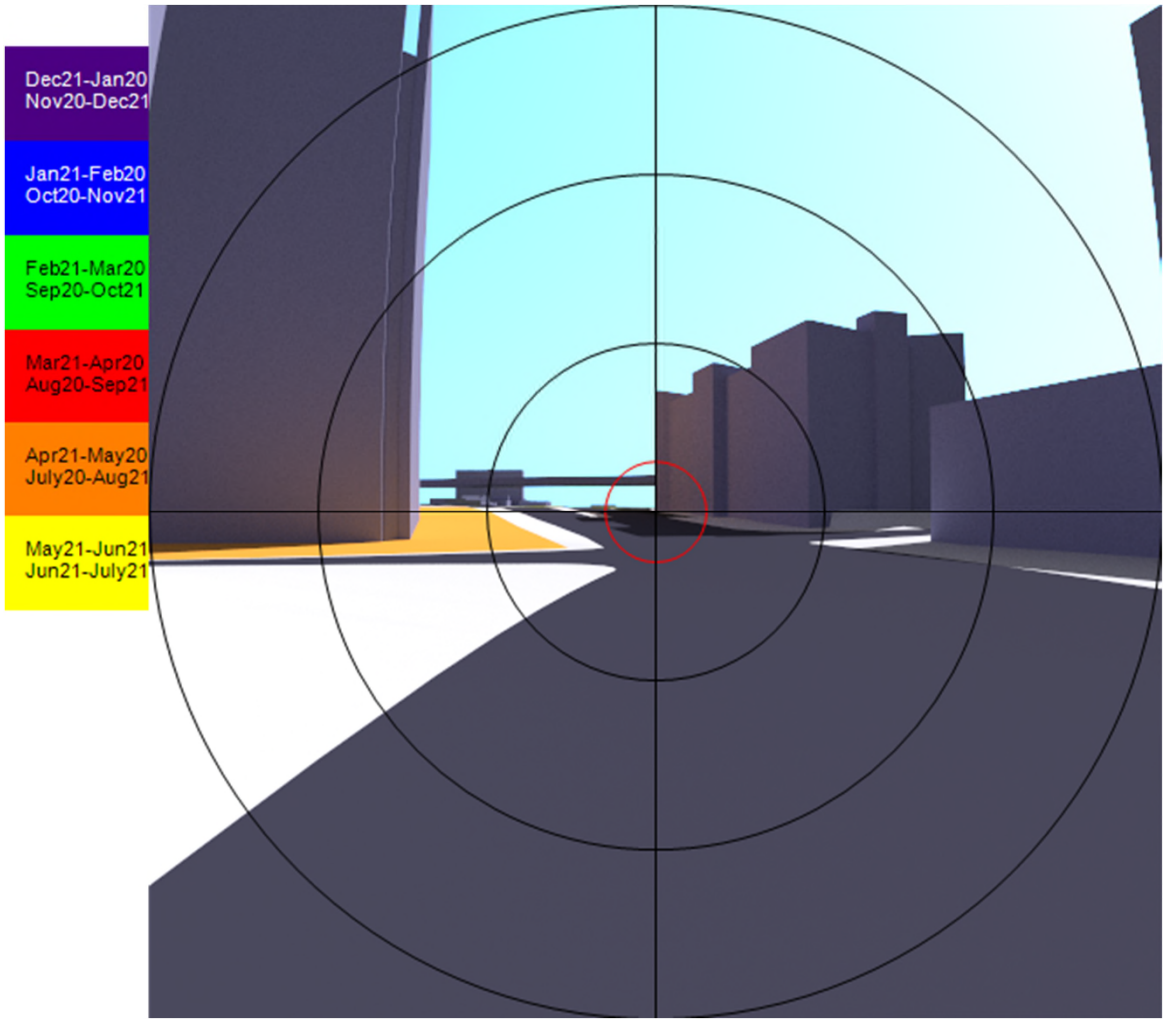
This is a fleeting incidence of glare of no more than 1-2 minutes on any one occasion and would not be experienced in the central vision. Further, any possible glare would be experienced at the top of the field of vision and could therefore be very easily mitigated through the use of a windscreen visor.



Viewpoint 12

Located on the southbound carriageway of Medlock Street to the north of the Site / Proposed Development.

A motorist will not see the Proposed Development at this point - at motorist eye level the Proposed Development will be substantially obstructed from view by the massing of the adjacent building that is being constructed on Plot 9A, First Street.



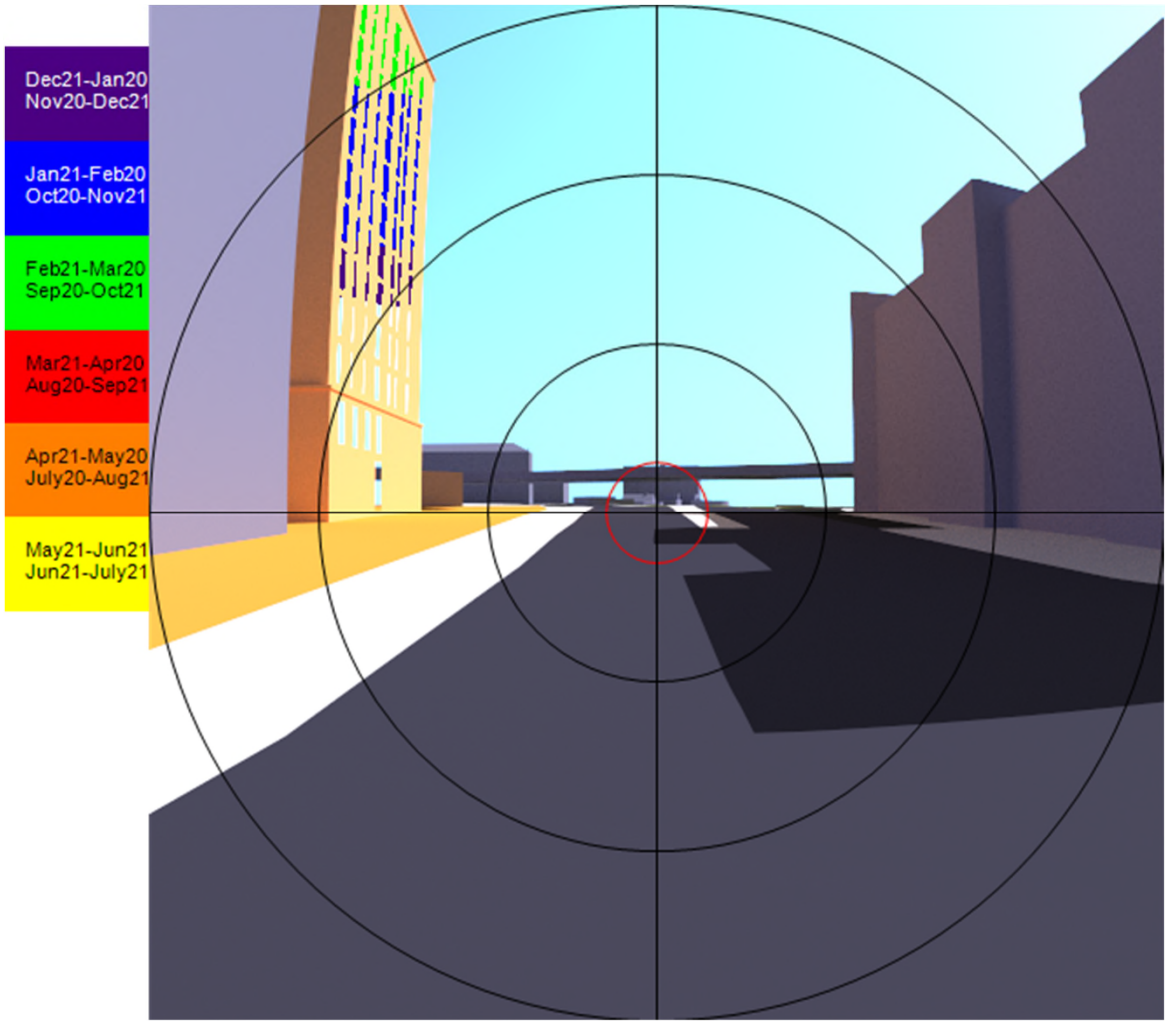
Viewpoint 13

Located on the southbound carriageway of Medlock Street to the north of the Site / Proposed Development.

A motorist will see the Proposed Development at this point.

Glare may be experienced (for varying durations) from early October through to early March between 11:11 - 11:45, experienced in the near and mid periphery field of vision.

This possible glare occurrence cannot be described as a fleeting incidence because it could be substantially present for almost five full months of the year. However, it would happen at a localised time of the day for no more than 10 minutes at its worst on any one occasion. Further, that the glare would be experienced towards the top of the field of vision means that it could be easily mitigated through the use of a windscreen visor.



The Mancunian Way

A major highway located to the south of the Site / Proposed Development. Because of orientation, it is feasible that sunlight could be reflected in its direction.

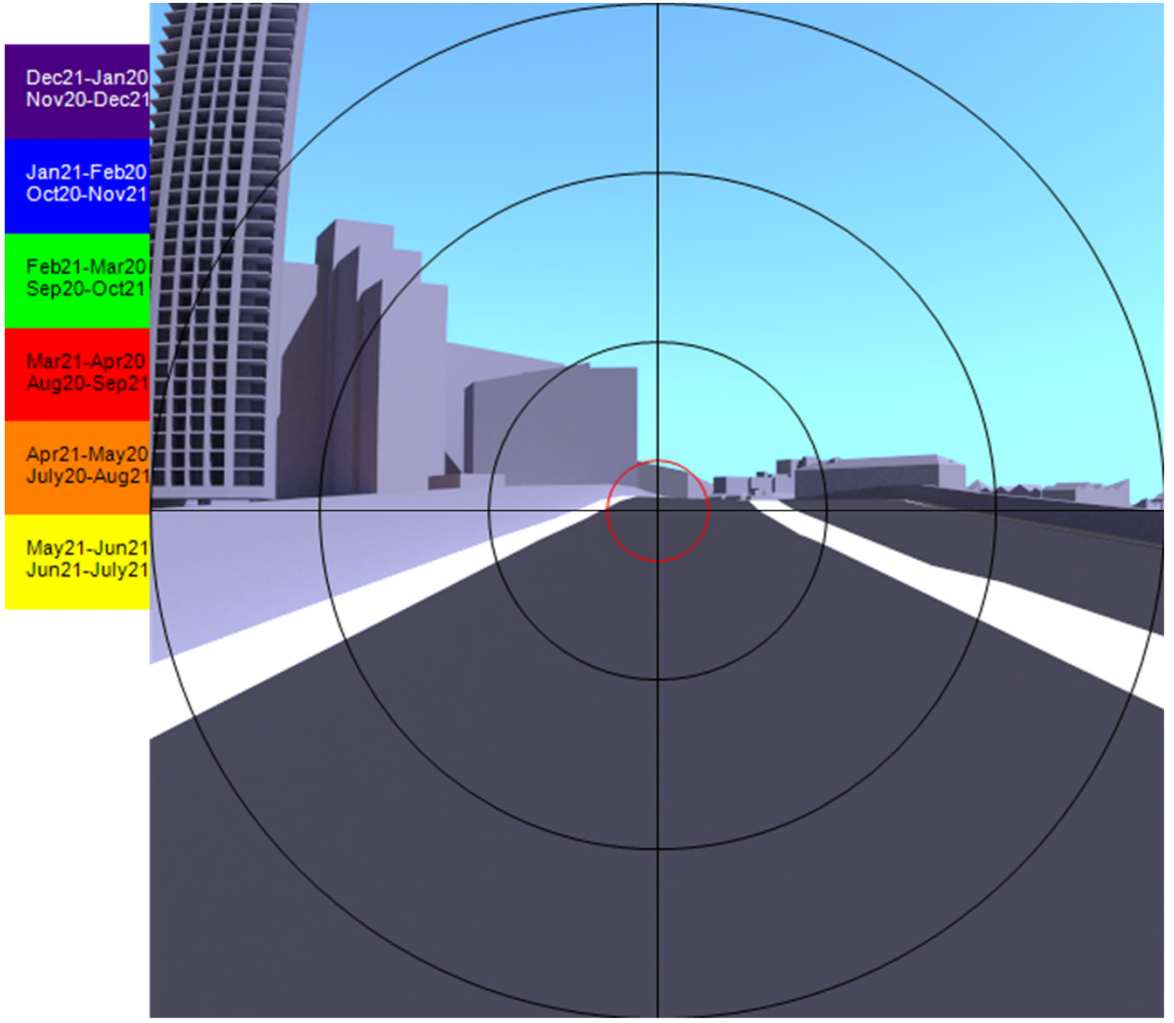
As part of the Pre-Application consultation dialogue we confirmed that we did not contemplate any materially adverse glare impact along this highway.

This primarily because the highway runs along an east-west axis and perpendicular to the Site / Proposed Development. The design guidance confirms that most glare problems are encountered when motorists are travelling directly at the glare source.

Viewpoint 14

Located on the eastbound carriageway of the Mancunian Way to the south-west of the Site / Proposed Development.

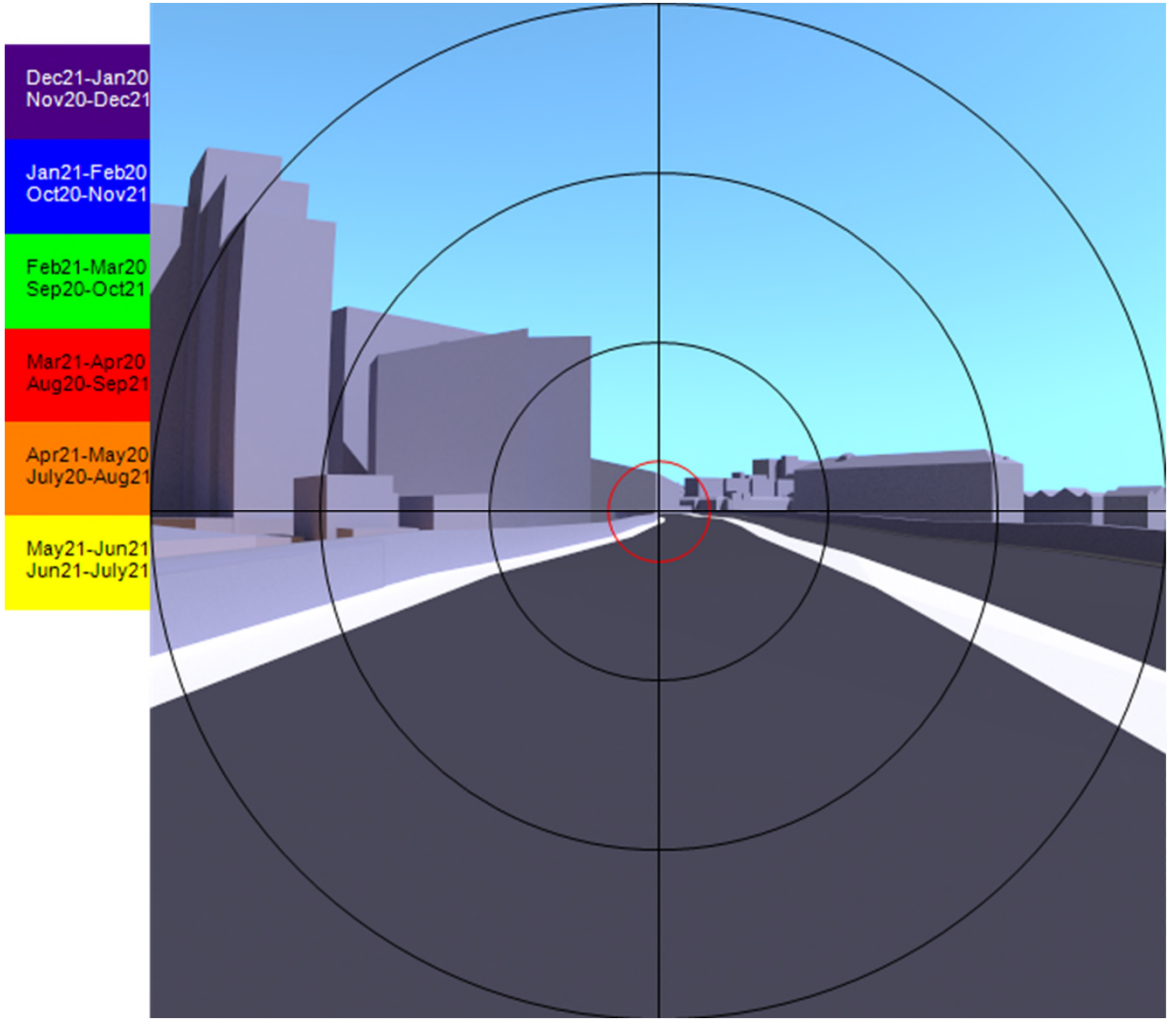
At motorist eye level, the Proposed Development will not be seen in the motorist's near / mid periphery vision.



Viewpoint 15

Located on the eastbound carriageway of the Mancunian Way to the south-west of the Site / Proposed Development.

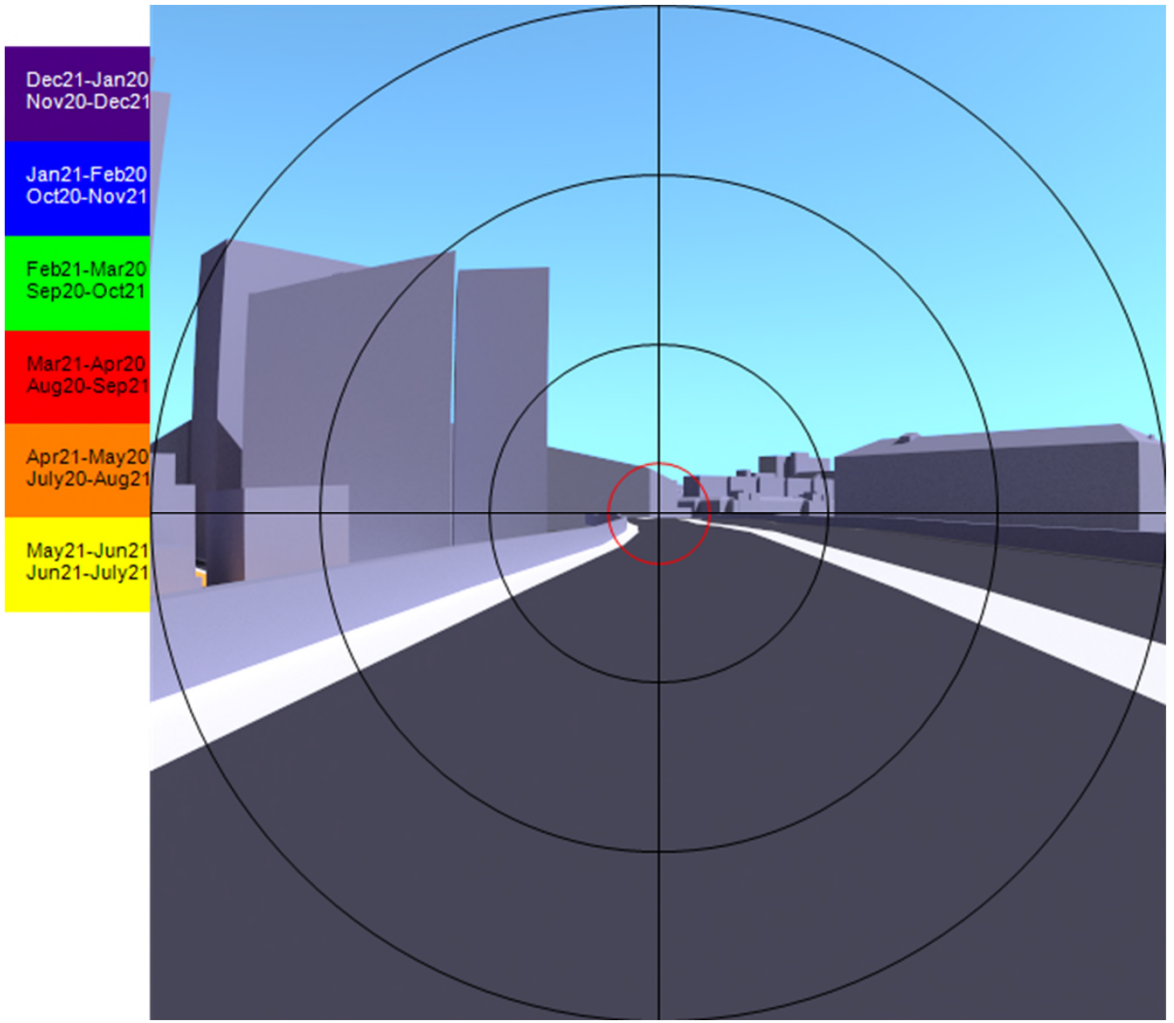
At motorist eye level, the Proposed Development will not be seen in the motorist's near / mid periphery vision.



Viewpoint 16

Located on the eastbound carriageway of the Mancunian Way to the south of the Site / Proposed Development.

At motorist eye level, the Proposed Development will not be seen in the motorist's near / mid periphery vision.

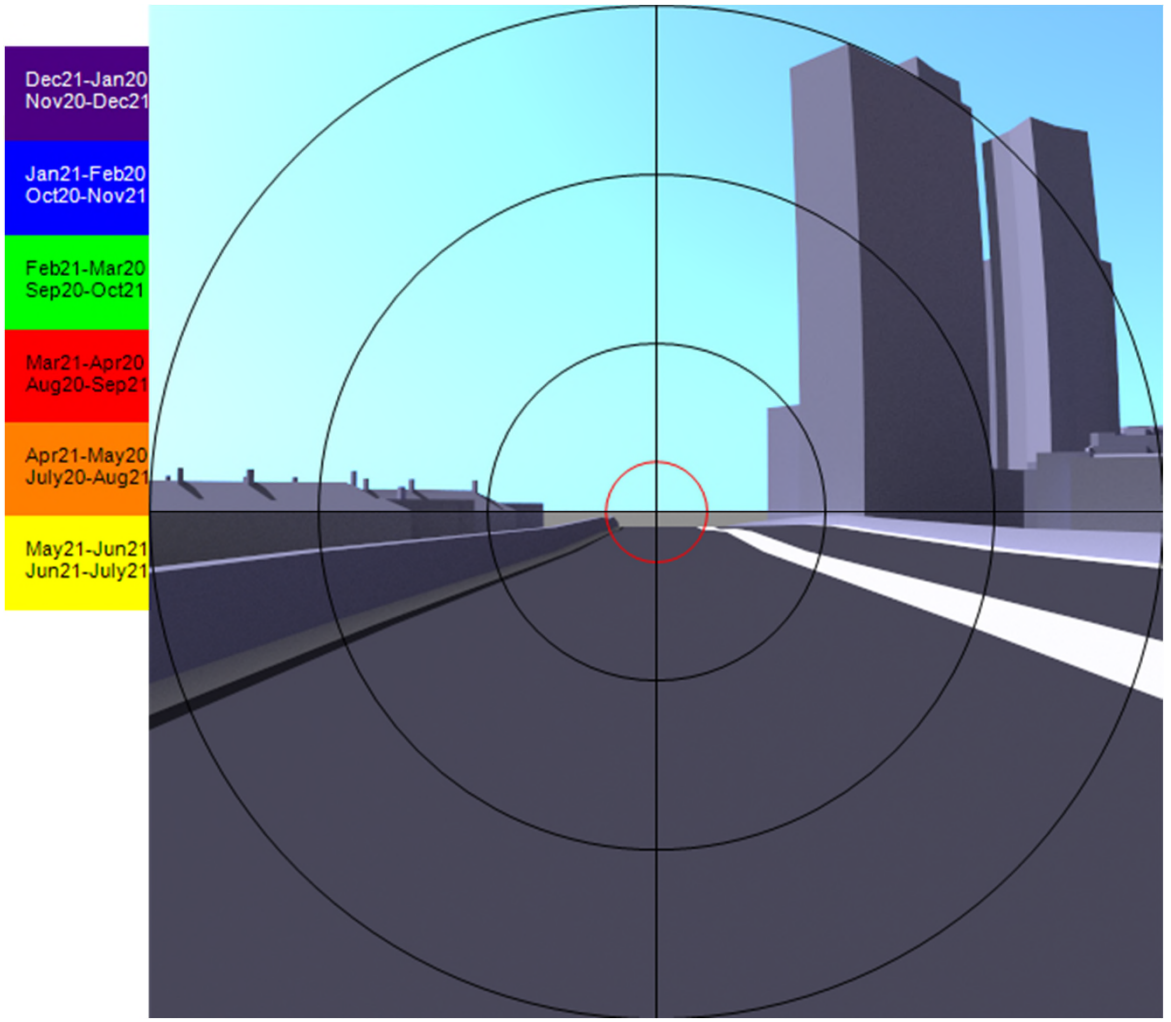


Viewpoint 17

Located on the westbound carriageway of the Mancunian Way to the south of the Site / Proposed Development.

At motorist eye level, the Proposed Development will not be seen in the motorist's near / mid periphery vision.

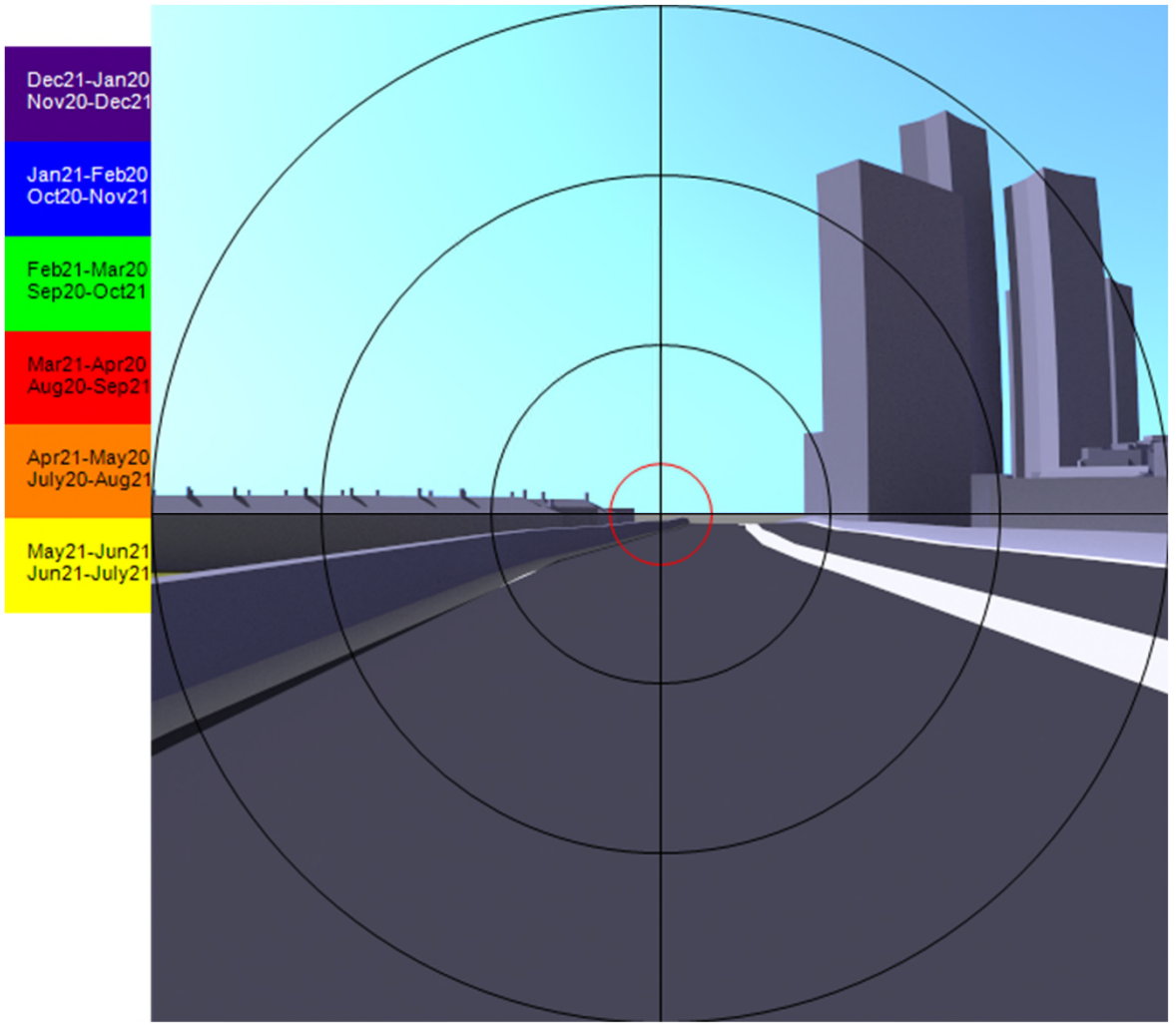
No significant glare impact.



Viewpoint 18

Located on the westbound carriageway of the Mancunian Way to the south-east of the Site / Proposed Development.

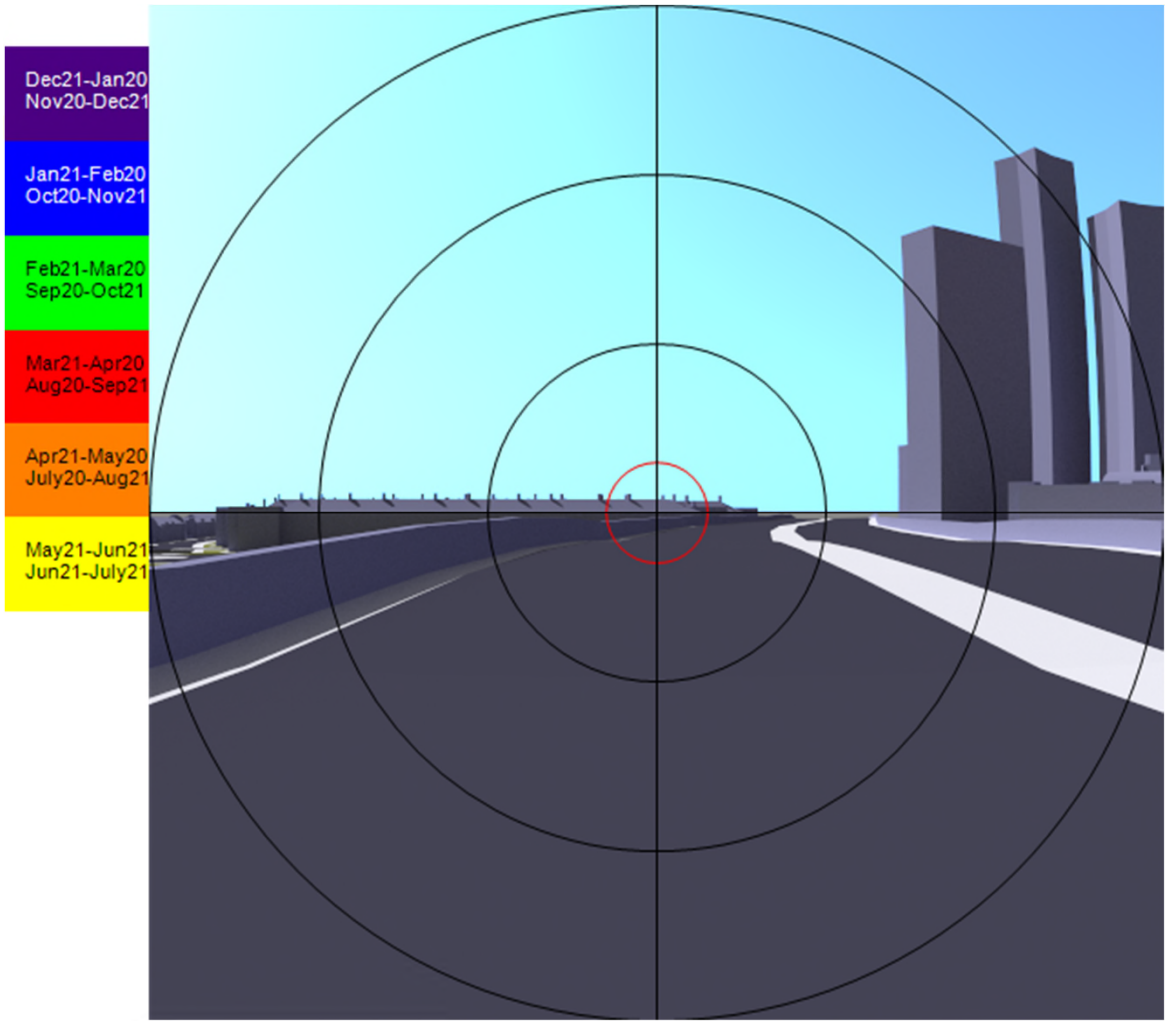
At motorist eye level, the Proposed Development will not be seen in the motorist's near / mid periphery vision.



Viewpoint 19

Located on the westbound carriageway of the Mancunian Way to the south-east of the Site / Proposed Development.

At motorist eye level, the Proposed Development will not be seen in the motorist's near / mid periphery vision.



Commentary

The proposed window glazing and metal cladding has been identified as a potential glare source. The results of the technical assessment confirm that these proposed external finishes could reflect sunlight towards the identified highway viewpoints.

The design guidance confirms that reflected sunlight will only be a problem for motorists if experienced in the central vision. The results of the technical assessment confirm that that will not be the case. Further, motorists have windscreen visors available to them to assist in the management of glare. We have noted in our viewpoint commentary that reflected sunlight will largely be experienced towards the top of the field of vision and on that basis, the windscreen visor will be an effective management tool.

The design guidance also highlights that glare duration is an influence on whether glare could cause a problem for motorists. In essence, the longer the period of time that glare is created then the increased chance that it might cause a problem.

The results of the technical analysis confirm that, even when glare could be experienced for several months of the year, it is to a short and localised part of the day only. M

As confirmed above, the computer software that has been utilised assumes that the glare source operates as a mirror. This is, therefore, very much a worst-case appraisal.

In real terms, the proposed window glazing and metal cladding are less reflective than has been demonstrated as part of this technical assessment.

The buildings that have been constructed on Plot 11 First Street to the south east of the Site are quite a significant (and favourable) obstruction or barrier to sunlight – they minimise the extent to which the façade of the Proposed Development will reflect sunlight. It can be seen from certain points (see Viewpoints 4- 7) that the massing of these neighbouring buildings is reflected in the façade of the Proposed Development.

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