

Solar Photovoltaic Glint and Glare Study

Flaxlands Solar Farm

AECOM Ltd

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PLANNING SOLUTIONS FOR:

- Solar
- Telecoms
- Railways
- Defence
- Buildings
- Wind
- Airports
- Radar
- Mitigation

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EXECUTIVE SUMMARY

Report Purpose

Pager Power has been retained to assess the potential effects of glint and glare from a fixed ground-mounted solar photovoltaic development located near Royal Wootton Bassett, Wiltshire, UK. This assessment pertains to the potential impacts upon road safety and residential amenity.

Overall Conclusions

No significant impacts are predicted upon road safety. Mitigation is not recommended.

A moderate impact is predicted for three dwellings due to the duration of effects and the lack of mitigating factors. Therefore, mitigation is recommended (see Section 5.4).

Guidance and Studies

A specific national guidance policy for determining the impact of glint and glare on road safety, and residential amenity has not been produced to date. Therefore, in the absence of this, Pager Power reviewed more general existing planning guidelines and the available studies (discussed below) in the process of defining its own glint and glare assessment guidance and methodology¹. This methodology defines the process for determining the impact upon road safety and residential amenity.

Pager Power's approach is to undertake geometric reflection calculations and, where a solar reflection is predicted, consider the screening (existing and/or proposed) between the receptor and the reflecting solar panels.

The available studies have measured the intensity of reflections from solar panels with respect to other naturally occurring and manmade surfaces. The results show that the reflections produced are of intensity similar to or less than those produced from still water and significantly less than reflections from glass and steel².

Assessment Conclusions – Road Safety

Solar reflections are geometrically possible towards approximately 2.96 km section of the M4, 1.71km section of Brinkworth Road, 1.39km section of the B4696 and 1.99km section of Greatfield Road.

For all sections of the M4, Brinkworth Road, the B4696, and Greatfield Road where a solar reflection is geometrically possible, screening in the form of existing vegetation, buildings, and/or intervening terrain is predicted to significantly obstruct views of reflecting panels, such that solar

¹ Pager Power Glint and Glare Guidance, Fourth Edition, September 2022.

² SunPower, 2009, SunPower Solar Module Glare and Reflectance (appendix to Solargen Energy, 2010).

reflections will not be experienced in practice. No impact is predicted, and mitigation is not required.

Assessment Conclusions – Residential Amenity

Solar reflections are geometrically possible towards 66 of the 86 assessed dwellings.

For 34 dwellings, screening in the form of existing vegetation, buildings and/or intervening terrain is predicted to significantly obstruct views of reflecting panels such that solar reflections will not be experienced in practice. No impact is predicted, and mitigation is not required.

For one dwelling, solar reflections are geometrically possible for less than three months of the year and less than 60 minutes on any given day. Screening in the form of existing vegetation is predicted to partially obstruct the views of reflecting panels such that views may still be possible. A low impact is predicted for these dwellings and mitigation is not recommended.

For 28 dwellings, the solar reflections are predicted to occur for more than three months of the year but less than 60 minutes on any given day. Partial screening in the form of existing vegetation and/or buildings has been identified for the dwellings. Mitigating factors in the form of reflections coinciding with direct sunlight, and that effects are expected to be limited to observers above the ground floor, reduces the significance of these reflections. A low impact is predicted, and mitigation is not recommended.

For the remaining three dwellings, the solar reflections are predicted to occur for more than three months of the year but less than 60 minutes on any given day and no sufficient mitigating factors have been identified that decrease the level of impact. A moderate impact is predicted, and mitigation is recommended (see Section 5.4).

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ABOUT PAGER POWER

Pager Power is a dedicated consultancy company based in Suffolk, UK. The company has undertaken projects in 60 countries within Europe, Africa, America, Asia, and Australasia.

The company comprises a team of experts to provide technical expertise and guidance on a range of planning issues for large and small developments.

Pager Power was established in 1997. Initially the company focus was on modelling the impact of wind turbines on radar systems. Over the years, the company has expanded into numerous fields including:

- Renewable energy projects;
- Building developments;
- Aviation and telecommunication systems.

Pager Power prides itself on providing comprehensive, understandable and accurate assessments of complex issues in line with national and international standards. This is underpinned by its custom software, longstanding relationships with stakeholders and active role in conferences and research efforts around the world.

Pager Power's assessments withstand legal scrutiny and the company can provide support for a project at any stage.

1 INTRODUCTION

1.1 Overview

Pager Power has been retained to assess the potential effects of glint and glare from a fixed ground-mounted solar photovoltaic development located near Royal Wootton Bassett, Wiltshire, UK. This assessment pertains to the potential impacts upon road safety and residential amenity.

This report contains the following:

- Solar development details;
- Explanation of glint and glare;
- Overview of relevant guidance and studies;
- Overview of Sun movement;
- Assessment methodology;
- Identification of receptors;
- Glint and glare assessment for identified receptors;
- Results discussion;
- Overall conclusions and recommendations.

1.2 Pager Power's Experience

Pager Power has undertaken over 1,500 Glint and Glare assessments in the UK and internationally. The studies have included assessment of civil and military aerodromes, railway infrastructure and other ground-based receptors including roads and dwellings.

1.3 Glint and Glare Definition

The definition³ of glint and glare is as follows:

- Glint – a momentary flash of bright light typically received by moving receptors or from moving reflectors;
- Glare – a continuous source of bright light typically received by static receptors or from large reflective surfaces.

The term 'solar reflection' is used in this report to refer to both reflection types i.e. glint and glare.

³These definitions are aligned with those presented within the National Policy Statement for Renewable Energy Infrastructure (EN-3) – published by the Department for Energy Security and Net Zero in January 2024 and the Federal Aviation Administration in the USA.

2 SOLAR DEVELOPMENT LOCATION AND DETAILS

2.1 Proposed Development Site Layout

Figure 1 below shows the site layout⁴ for the proposed development, the proposed locations for solar panels are indicated by blue rectangles.



Figure 1 Proposed Site layout

⁴ Source: 20240807_Concept Design_Flaxlands_R12_N-S_Without Constraints.pdf (cropped).

2.2 Panel Area

The bounding coordinates for the proposed development have been extrapolated from the site plans. The data can be found in Appendix G. Figure 2 below shows the assessed reflector area that has been used for modelling purposes.



Figure 2 Assessed panel area

The Pager Power model has used a resolution of 15m for this assessment. This means that a geometric calculation is undertaken for each identified receptor every 15m from within the defined areas. This resolution is sufficiently high to maximise the accuracy of the results – increasing the resolution further would not significantly change the modelling output. If a reflection is experienced from an assessed panel location, then it is likely that a reflection will be viewable from similarly located panels within the proposed solar development.

2.3 Solar Panel Technical Information

The technical information⁵ of the modelled solar panels used in this assessment is summarised below. The centre of the solar panel has been used as the assessed height in metres above ground level (agl).

- Azimuth angle⁶: 180°;
- Elevation angle⁷: 13°;
- Assessed centre height⁸: 1.8m agl.

⁵ Confirmed via email dated 30/10/2024.

⁶ Direction the panels are facing clockwise from true north as an absolute value relative to the horizon.

⁷ Solar panel tilt relative to the horizontal.

⁸ Relative to the lowest (0.6m) and highest (3.0m).

3 GLINT AND GLARE ASSESSMENT METHODOLOGY

3.1 Overview

The following sub-sections provide a general overview with respect to the guidance studies and methodology which informs this report. Pager Power has also produced its own Glint and Glare Guidance which draws on assessment experience, consultation, and industry expertise.

3.2 Guidance and Studies

Appendix A and B present a review of relevant guidance and independent studies with regard to glint and glare issues from solar panels and glass. The overall conclusions from the available studies are as follows:

- Specular reflections of the Sun from solar panels and glass are possible;
- The measured intensity of a reflection from solar panels can vary from 2% to 30% depending on the angle of incidence;

Published guidance shows that the intensity of solar reflections from solar panels are equal to or less than those from still water and similar to those from glass. It also shows that reflections from solar panels are significantly less intense than many other reflective surfaces, which are common in an outdoor environment, including steel⁹.

3.3 Background

Details of the Sun's movements and solar reflections are presented in Appendix C.

3.4 Methodology

3.4.1 Pager Power's Methodology

The glint and glare assessment methodology has been derived from the information provided to Pager Power through consultation with stakeholders and by reviewing the available guidance, studies and Pager Power's practical experience. The methodology for this glint and glare assessment is as follows:

- Identify receptors in the area surrounding the proposed development;
- Consider direct solar reflections from the proposed development towards the identified receptors by undertaking geometric calculations;
- Consider the visibility of the reflectors from the receptor's location. If the reflectors are not visible from the receptor then no reflection can occur;
- Based on the results of the geometric calculations, determine whether a reflection can occur, and if so, at what time it will occur;
- Consider the solar reflection intensity, if appropriate;

⁹ SunPower, 2009, SunPower Solar Module Glare and Reflectance (appendix to Solargen Energy, 2010).

- Consider both the solar reflection from the proposed development and the location of the direct sunlight with respect to the receptor's position;
- Consider the solar reflection with respect to the published studies and guidance;
- Determine whether a significant detrimental impact is expected in line with Appendix D.

Within the Pager Power model, the reflector area is defined, as well as the relevant receptor locations. The result is a chart that states whether a reflection can occur, the duration and the panels that can produce the solar reflection towards the receptor.

3.5 Assessment Methodology and Limitations

Further technical details regarding the methodology of the geometric calculations and limitations are presented in Appendix E and Appendix F.

4 IDENTIFICATION OF RECEPTORS

4.1 Overview

The following sections present the relevant receptors assessed within this report. Terrain data has been interpolated based on Ordnance Survey of Great Britain (OSGB) 50 Digital Terrain Model (DTM) data. The receptor details for all receptors are presented in Appendix G.

4.2 Ground Based Receptors Overview

There is no formal guidance with regard to the maximum distance at which glint and glare should be assessed. From a technical perspective, there is no maximum distance for potential reflections. The significance of a reflection however decreases with distance because the proportion of an observer's field of vision that is taken up by the reflecting area diminishes as the separation distance increases. Terrain and shielding by vegetation are also more likely to obstruct an observer's view at longer distances.

A 1km assessment area is considered appropriate for glint and glare effects on ground-based receptors (road users and dwellings), bounded by orange (Figure 3 on the following page) outlined area. Receptors within this distance are identified based on mapping and aerial photography of the region. Receptors to the north of the development are not included because solar reflections would not be geometrically possible towards the north when the azimuth angle is considered¹⁰.

Potential receptors within the associated assessment area are identified based on mapping and aerial photography of the region. The initial judgement is made based on high-level consideration of aerial photography and mapping i.e. receptors are excluded if it is clear from the outset that no visibility would be possible. A more detailed assessment is made if the modelling reveals a reflection would be geometrically possible.

¹⁰ For fixed, south-facing panels at this latitude, reflections towards ground-based receptors located further north than any proposed panel are highly unlikely.



Figure 3 1km assessment area

4.3 Road Receptors

4.3.1 Road Receptors Overview

Road types can generally be categorised as:

- Major National – Typically a road with a minimum of two carriageways with a maximum speed limit of up to 70mph. These roads typically have fast moving vehicles with busy traffic;
- National – Typically a road with a one or more carriageways with a maximum speed limit 60mph or 70mph. These roads typically have fast moving vehicles with moderate to busy traffic density;
- Regional – Typically a single carriageway with a maximum speed limit of up to 60mph. The speed of vehicles will vary with a typical traffic density of low to moderate;
- Local – Typically roads and lanes with the lowest traffic densities. Speed limits vary.

Technical modelling is not recommended for local roads, where traffic densities are likely to be relatively low. Any solar reflections from the proposed development that are experienced by a road user along a local road would be considered low impact in the worst-case in accordance with the guidance presented in Appendix D.

The analysis has also considered major national, national, and regional roads that:

- Are within the one-kilometre assessment area;
- Have a potential view of the panels.

4.3.2 Identified Road Receptors

An approximate 2.96 km section of the M4, 2.73km section of Brinkworth Road, 1.39km section of the B4696 and 2.3km section of Greatfield Road have been identified within the assessment area with potential views of the panel area.

Receptors are placed approximately 100m apart along the identified sections of road.

- A1 to A30 along the M4;
- B1 to B28 along Brinkworth Road;
- C1 to C15 along the B4696;
- D1 to D24 along Greatfield Road.

A height of 1.5m above ground level has been taken as the typical eye level of a road user¹¹.

Road receptors are shown in Figures 4 to 7 on the following pages.

¹¹ This fixed height for the road receptors is for modelling purposes. Small changes to the modelling height by a few metres is not expected to significantly change the modelling results. Views for elevated drivers are also considered in the results discussion, where appropriate.



Figure 4 Receptors A1 to A30 along the M4

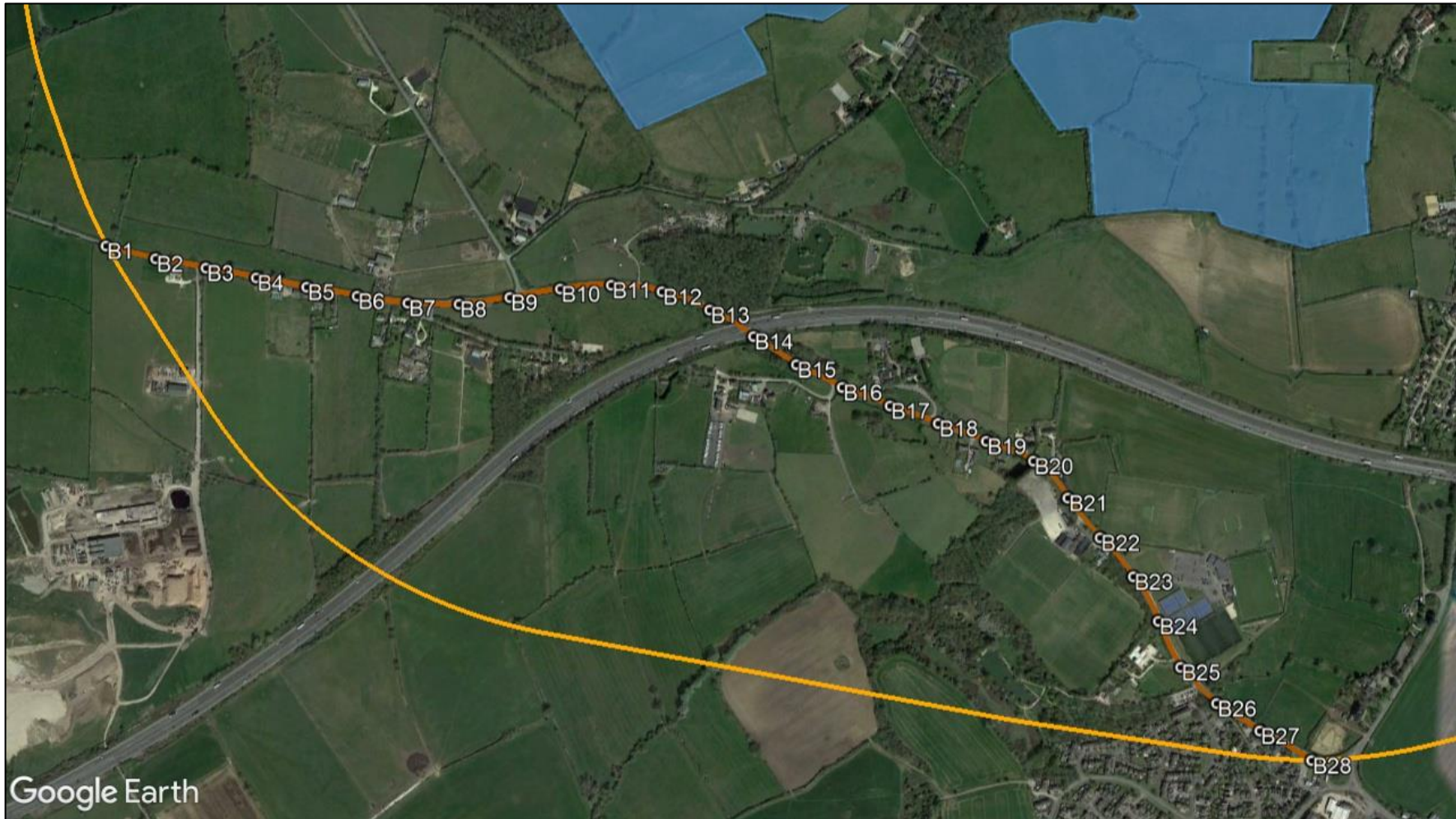


Figure 5 Receptors B1 to B28 along Brinkworth Road

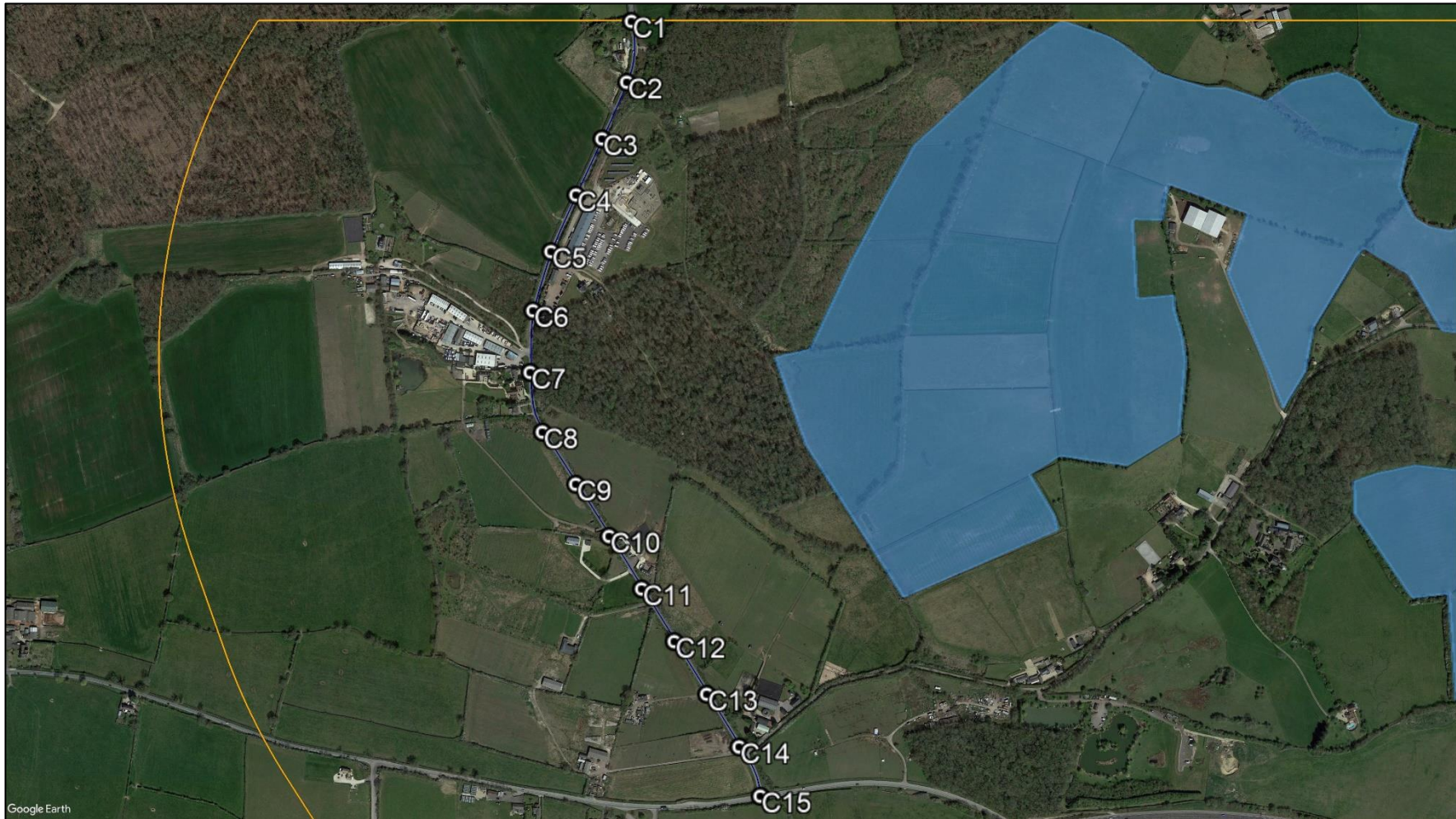


Figure 6 Receptors C1 to C15 along the B4696



Figure 7 Receptors D1 to D24 along Greatfield Road

4.4 Dwelling Receptors

4.4.1 Dwelling Receptors Overview

The analysis has considered dwellings that:

- Are within the one-kilometre assessment area; and
- Have a potential view of the panels.

In residential areas with multiple layers of dwellings, only the outer dwellings have been considered for assessment. This is because they will mostly obscure views of the solar panels to the dwellings behind them, which will therefore not be impacted by the proposed development because line of sight will be removed, or they will experience comparable effects to the closest assessed dwelling.

Additionally, in some cases, a single receptor point may be used to represent a small number of separate addresses. In such cases, the results for the receptor will be representative of the adjacent observer locations, such that the overall level of effect in each area is captured reliably.

4.4.2 Identified Dwelling Receptors

The assessed dwelling receptors are shown in Figure 8 on the following page. In total, 86 dwellings have been assessed. An additional 1.8m height above ground is used in the modelling to simulate the typical viewing height of an observer on the ground floor¹².

¹² This fixed height for the dwelling receptors is for modelling purposes. Changes to the modelling height by a few metres is not expected to significantly change the modelling results. Views above ground floor are considered in the results discussion where necessary.

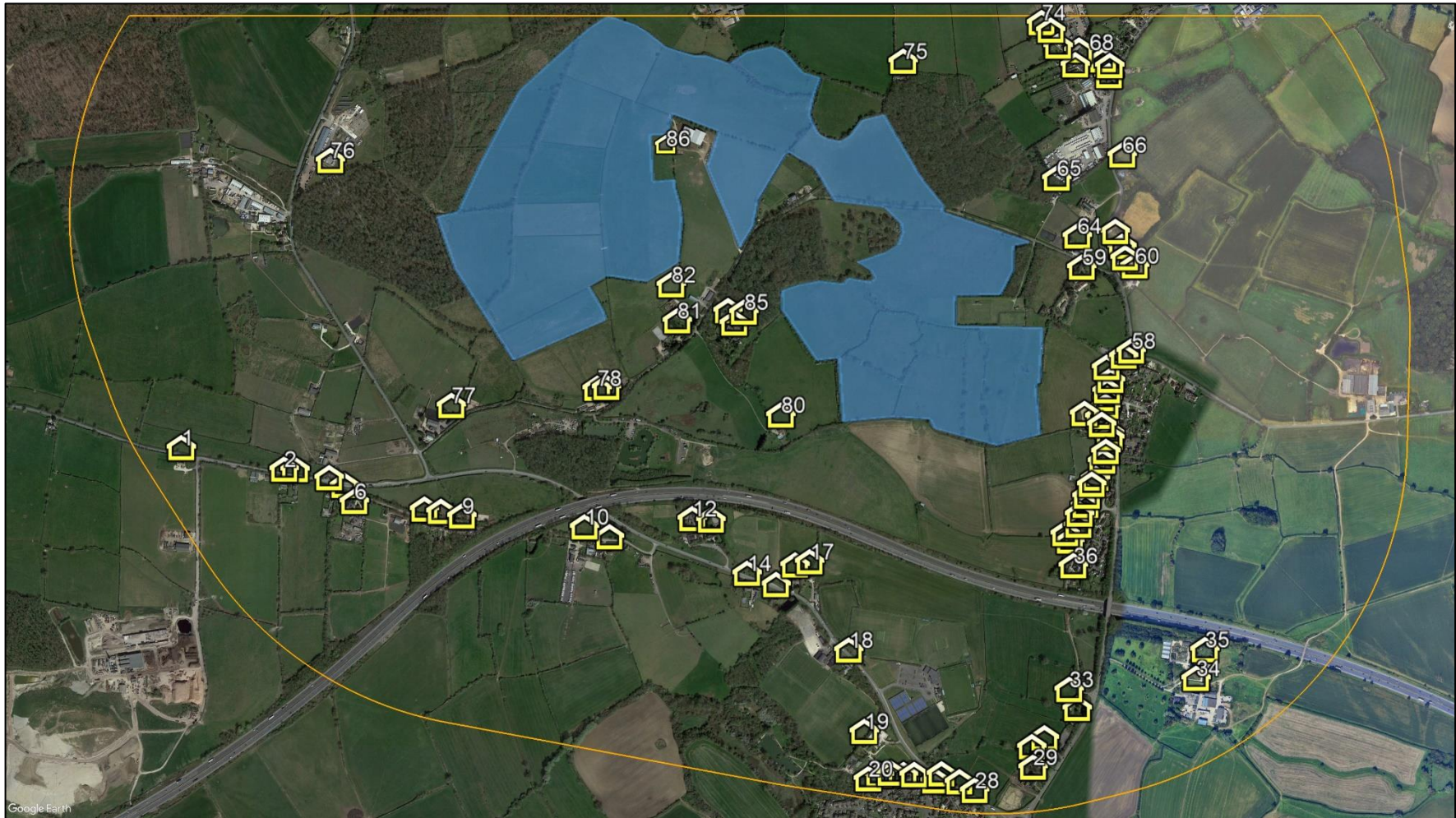


Figure 8 Overview of dwelling receptors

5 GEOMETRIC ASSESSMENT RESULTS AND DISCUSSION

5.1 Overview

The following sections present:

- The key considerations for each receptor type. The criteria are determined by the assessment process for each receptor, which are set out in Appendix D;
- Geometric modelling results of the assessment based solely on bare-earth terrain i.e., without consideration of screening in the form of buildings, dwellings, (existing or proposed) vegetation, and/or terrain. The modelling output for receptors, shown in Appendix H, presents the precise predicted times and the reflecting panel areas;
- Whether a reflection will be experienced in practice. When determining the visibility of the reflecting panels for an observer, a conservative review of the available imagery, landscape strategy plan, google earth viewshed (high-level terrain analysis), and/or site photography (if available) is undertaken, whereby it is assumed views of the panels are possible if it cannot be reliably determined that existing and/or proposed screening will remove effects. Detailed screening analysis may be undertaken to determine visibility, where appropriate;
- The impact significance and any mitigation recommendations/requirements;
- The desk-based review of the available imagery, where appropriate.

5.2 Assessment Results – Road Receptors

5.2.1 Key Considerations – Roads

The process for quantifying impact significance is defined in the report appendices. The key considerations for road users along major national, national, and regional roads are:

- Whether a reflection is predicted to be experienced in practice;
- The location of the reflecting panel relative to a road user's direction of travel.

Where no solar reflections are geometrically possible or where solar reflections are predicted to be significantly screened, no impact is predicted, and mitigation is not required.

Where reflections originate from outside of a road user's primary field of view (50 degrees either side of the direction of travel), or where the separation distance to the nearest visible reflecting panel is over 1km, the impact significance is low, and mitigation is not recommended.

Where reflections are predicted to be experienced from inside of a road user's primary field of view, expert assessment of the following factors is required to determine the impact significance:

- Whether visibility is likely for elevated drivers (applicable to dual carriageways and motorways only) – there is typically a higher density of elevated drivers (such as HGVs) along dual carriageways and motorways compared to other types of road;
- Whether a solar reflection is fleeting in nature. Small gap/s in screening (e.g., an access point to the site) may not result in a sustained reflection for a road user;

- The separation distance to the panel area – larger separation distances reduce the proportion of an observer's field of view that is affected by glare;
- The position of the Sun – effects that coincide with direct sunlight appear less prominent than those that do not;
- Whether the solar reflection originates from directly in front of a road user – a solar reflection that is directly in front of a road user is more hazardous than a solar reflection to one side.

Following consideration of these relevant factors, where the solar reflection is not deemed significant, a low impact is predicted, and mitigation is not recommended. Where the solar reflection is deemed significant, the impact significance is moderate, and mitigation is recommended.

Where reflections originate from directly in front of a road user and there are no mitigating factors, the impact significance is high, and mitigation is required.

5.2.2 Geometric Modelling Results and Discussion

Table 1 on the following pages present the following:

- Geometric modelling results (bare earth terrain i.e. without consideration of screening);
- Desk-based review of identified screening;
- Consideration of relevant factors where appropriate;
- Predicted impact significance.

Road Receptor	Geometric Modelling Results (screening not considered)	Identified Screening and Predicted Visibility (desk-based review)	Whether reflections occur inside a road user's primary FOV (with consideration of screening) ¹³	Mitigating Factors	Predicted Impact Classification	Mitigation Recommended/ Required?
A1 – A30	Solar reflections <u>are geometrically possible</u> Solar reflections occur <u>inside</u> a road user's primary FOV ¹⁴	Existing vegetation, buildings and/or terrain Predicted to significantly obstruct views of reflecting panels such that views are <u>not possible</u> in practice	N/A	N/A	No impact	No
B1 – B14	Solar reflections <u>are geometrically possible</u> Solar reflections occur <u>inside</u> a road user's primary FOV	Existing vegetation and buildings Predicted to significantly obstruct views of reflecting panels such that views are <u>not possible</u> in practice	N/A	N/A	No impact	No

¹³ Assessment scenario may include an initial conservative qualitative consideration of screening. The reflecting area of the solar development may be partially screened such that it does not meet the key criteria i.e. whether the solar reflection occurs within a road users' main field of view.

¹⁴ Reference to a driver's field-of-view (FOV) is made when analysing the geometric modelling results and overall predicted impact significance, which is defined as 50 degrees horizontally either side, relative to the direction of travel.

Road Receptor	Geometric Modelling Results (screening not considered)	Identified Screening and Predicted Visibility (desk-based review)	Whether reflections occur inside a road user's primary FOV (with consideration of screening) ¹³	Mitigating Factors	Predicted Impact Classification	Mitigation Recommended/ Required?
B15 – B18	Solar reflections <u>are geometrically possible</u> Solar reflections occur <u>inside</u> a road user's primary FOV	Existing vegetation, buildings and/or terrain Predicted to significantly obstruct views of reflecting panels such that views are <u>not possible</u> in practice	N/A	N/A	No impact	No
B19 – B28	Solar reflections are <u>not geometrically possible</u>	N/A	N/A	N/A	No impact	No
C2	Solar reflections <u>are geometrically possible</u> Solar reflections occur <u>outside</u> a road user's primary FOV	Existing vegetation and buildings Predicted to significantly obstruct views of reflecting panels such that views are <u>not possible</u> in practice	N/A	N/A	No impact	No

Road Receptor	Geometric Modelling Results (screening not considered)	Identified Screening and Predicted Visibility (desk-based review)	Whether reflections occur inside a road user's primary FOV (with consideration of screening) ¹³	Mitigating Factors	Predicted Impact Classification	Mitigation Recommended/ Required?
C3 – C6	Solar reflections <u>are geometrically possible</u> Solar reflections occur <u>inside</u> a road user's primary FOV	Existing vegetation and buildings Predicted to significantly obstruct views of reflecting panels such that views are <u>not possible</u> in practice	N/A	N/A	No impact	No
C7 – C15	Solar reflections <u>are geometrically possible</u> Solar reflections occur <u>outside</u> a road user's primary FOV	Existing vegetation and buildings Predicted to significantly obstruct views of reflecting panels such that views are <u>not possible</u> in practice	N/A	N/A	No impact	No
D1 – D5	Solar reflections are <u>not geometrically possible</u>	N/A	N/A	N/A	No impact	No

Road Receptor	Geometric Modelling Results (screening not considered)	Identified Screening and Predicted Visibility (desk-based review)	Whether reflections occur inside a road user's primary FOV (with consideration of screening) ¹³	Mitigating Factors	Predicted Impact Classification	Mitigation Recommended/ Required?
D6 - D15, D17	Solar reflections <u>are geometrically possible</u> Solar reflections occur <u>outside</u> a road user's primary FOV	Existing vegetation and buildings Predicted to significantly obstruct views of reflecting panels such that views are <u>not possible</u> in practice	N/A	N/A	No impact	No
D16, D18, D19	Solar reflections <u>are geometrically possible</u> Solar reflections occur <u>inside</u> a road user's primary FOV	Existing vegetation and buildings Predicted to significantly obstruct views of reflecting panels such that views are <u>not possible</u> in practice	N/A	N/A	No impact	No

Road Receptor	Geometric Modelling Results (screening not considered)	Identified Screening and Predicted Visibility (desk-based review)	Whether reflections occur inside a road user's primary FOV (with consideration of screening) ¹³	Mitigating Factors	Predicted Impact Classification	Mitigation Recommended/ Required?
D20 – D23	Solar reflections <u>are geometrically possible</u> Solar reflections occur <u>outside</u> a road user's primary FOV	Existing vegetation and buildings Predicted to significantly obstruct views of reflecting panels such that views are <u>not possible</u> in practice	N/A	N/A	No impact	No
D24	Solar reflections <u>are geometrically possible</u> Solar reflections occur <u>inside</u> a road user's primary FOV	Existing vegetation and buildings Predicted to significantly obstruct views of reflecting panels such that views are <u>not possible</u> in practice	N/A	N/A	No impact	No

Table 1 Geometric modelling results - road receptors

5.2.3 Desk-Based Review of Available Imagery

A desk-based review of the available imagery is presented in the following Figures 9 to 18 on the following pages. The cumulative reflecting panel areas are indicated by regions of yellow. The identified screening in the form of existing vegetation and buildings are outlined in white and blue respectively. Streetview images are used to show the point-of-view of a road user at specific locations, with blue triangles to illustrate a road users' primary field of view for the associated direction of travel. High-level Zones of Theoretical Visibility (ZTV Viewshed) generated¹⁵ by Google Earth have been used to show the intervening terrain between the proposed development and road receptors.

¹⁵The ZTV viewshed is depicted by the green highlighted extents which show the areas of terrain from the relevant receptor point that is visible to an observer. From a height above ground of 2m, the closest available height to the assessed height of 1.5m.



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Figure 10 Reflecting panels and screening for road receptors A18 to A28, with representative ZTV viewshed and Streetview imagery from A18



Figure 11 Reflecting panels and screening for road receptors A29 and A30, with representative ZTV viewshed and Streetview imagery from A29



Figure 12 Reflecting panels and screening for road receptors B1 to B5, with representative Streetview imagery from B5

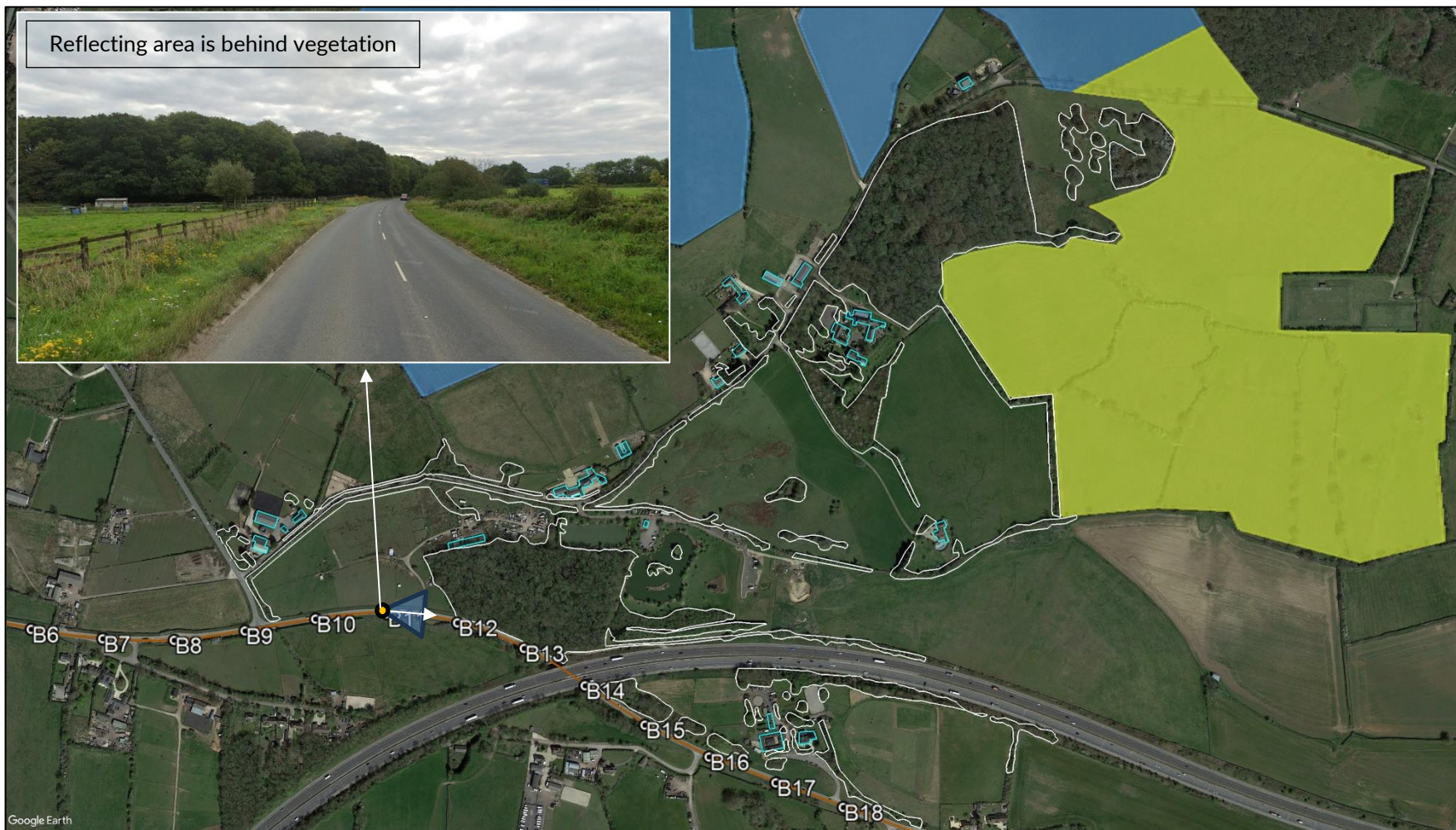


Figure 13 Reflecting panels and screening for road receptors B6 to B18, with representative Streetview imagery from B11



Figure 14 Reflecting panels and screening for road receptors C2 to C6, with representative Streetview imagery from C6

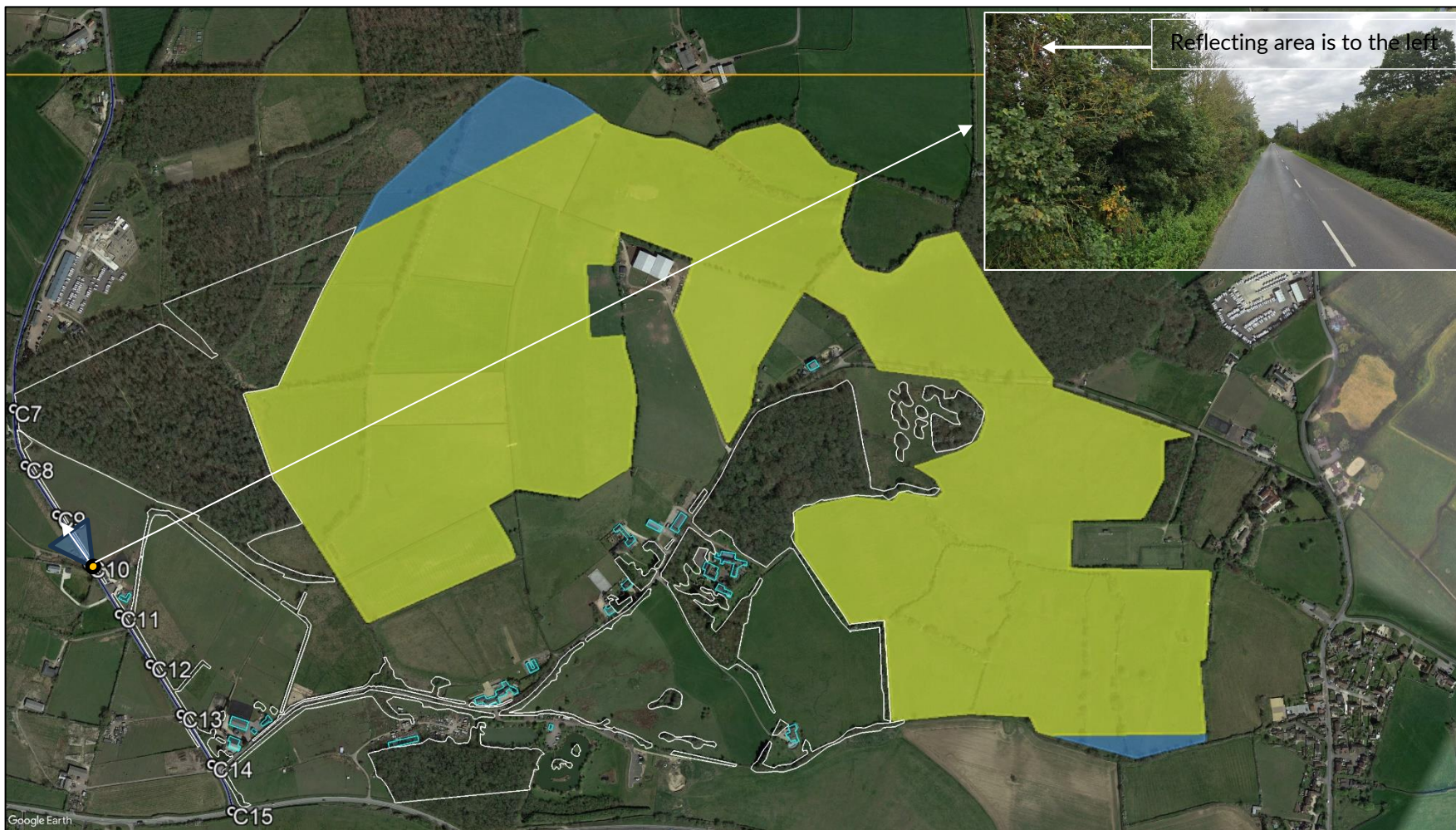


Figure 15 Reflecting panels and screening for road receptors C7 to C15, with representative Streetview imagery from C10

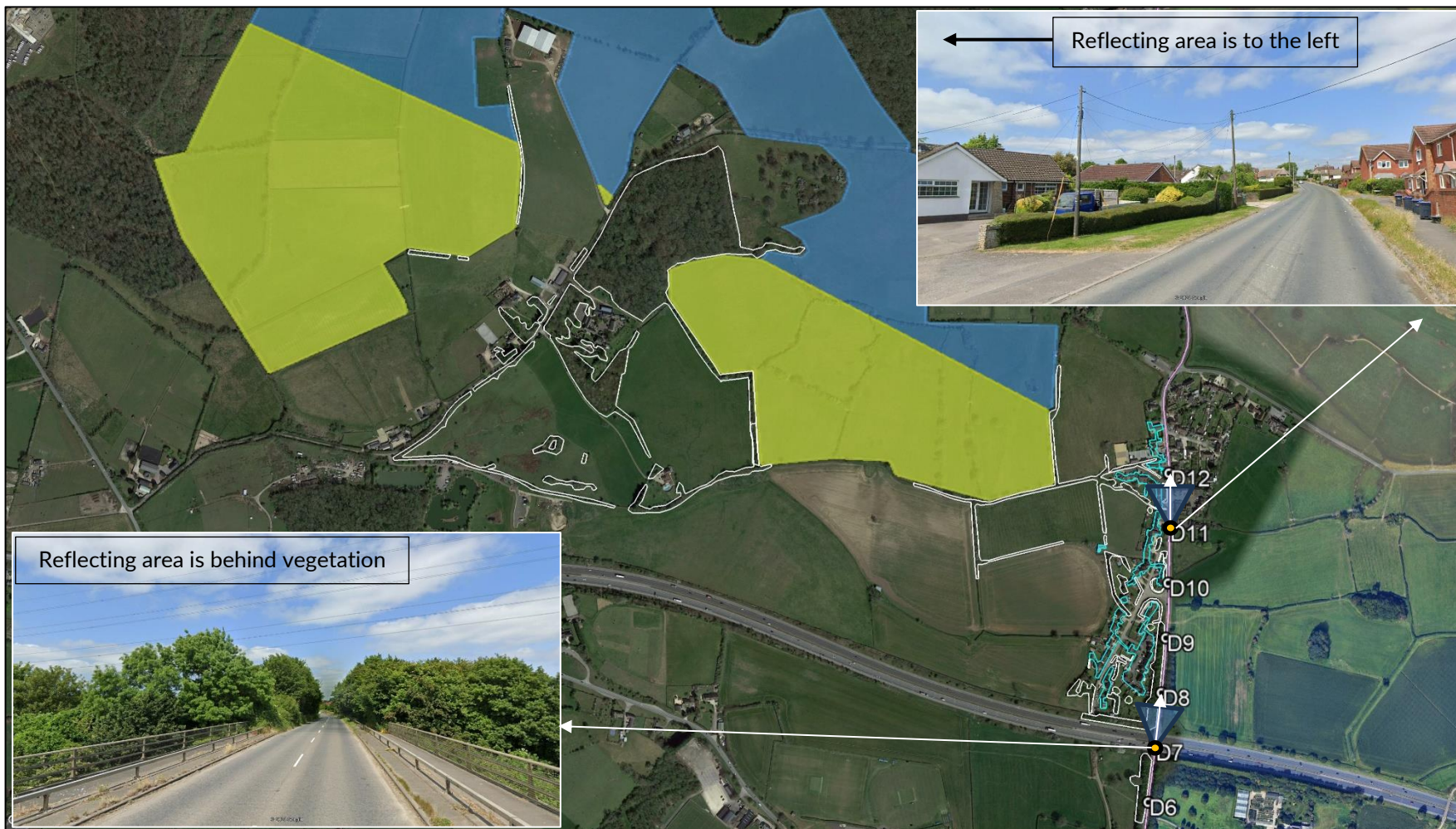


Figure 16 Reflecting panels and screening for road receptors D6 to D12, with representative Streetview imagery from D7 (bottom) and D11 (top)



Figure 17 Reflecting panels and screening for road receptors D13 to D18, with representative Streetview imagery from D14



Figure 18 Reflecting panels and screening for road receptors D19 to D24, with representative Streetview imagery from D22

5.3 Assessment Results – Dwelling Receptors

5.3.1 Key Considerations - Dwellings

The key considerations for quantifying the impact significance for dwelling receptors are:

- Whether a reflection is predicted to be experienced in practice;
- The duration of the predicted effects, relative to thresholds of:
 - Three months per year;
 - 60 minutes on any given day.

Where no solar reflections are geometrically possible or where solar reflections are predicted to be significantly screened, no impact is predicted, and mitigation is not required.

Where effects are predicted to be experienced for less than three months per year and less than 60 minutes on any given day, or where the separation distance to the nearest visible reflecting panel is over 1km, the impact significance is low, and mitigation is not recommended.

Where effects are predicted to be experienced for more than three months per year and/or for more than 60 minutes on any given day expert assessment of the following relevant factors is required to determine the impact significance:

- Whether solar reflections will be experienced from all storeys. The ground floor is typically considered the main living space and therefore has a greater significance with respect to residential amenity;
- The separation distance to the panel area. Larger separation distances reduce the proportion of an observer's field of view that is affected by glare;
- The position of the Sun. Effects that coincide with direct sunlight appear less prominent than those that do not. The Sun is a far more significant source of light;
- Whether the dwelling appears to have windows facing the reflecting areas. An observer may need to look from a wide angle to observe the reflecting areas.

Following consideration of these relevant factors, where the solar reflection is not deemed significant, a low impact is predicted, and mitigation is not recommended. Where the solar reflection is deemed significant, the impact significance is moderate, and mitigation is recommended.

Where effects are predicted to be experienced for more than three months per year and more than 60 minutes on any given day and there are no mitigating factors, the impact significance is high, and mitigation is required.

5.3.2 Geometric Modelling Results and Discussion

Table 2 on the following pages presents the following:

- Geometric modelling results (bare earth terrain i.e. without consideration of screening);
- Desk-based review of identified screening;
- Consideration of any relevant factors present, where appropriate;
- Predicted impact significance.

Results where a moderate impact is predicted are highlighted in red for ease of reference. See Section 5.4 for further analysis.

Dwelling Receptor	Geometric Modelling Results (without consideration of screening)	Identified Screening and Predicted Visibility (desk-based review)	Duration of effects (with consideration of screening) ¹⁶	Relevant Factors	Predicted Impact Classification
1 - 13	Solar reflections <u>are geometrically possible</u> for: <u>More</u> than 3 months <u>Less</u> than 60 minutes	Existing vegetation and building screening Predicted to significantly obstruct views of reflecting panels such that views are <u>not possible</u> in practice	N/A	N/A	No impact
14 - 33	Solar reflections are <u>not geometrically possible</u>	N/A	N/A	N/A	No impact
34 - 40	Solar reflections <u>are geometrically possible</u> for: <u>Less</u> than three months <u>Less</u> than 60 minutes	Existing vegetation, building and intervening terrain screening Predicted to significantly obstruct views of reflecting panels such that views are <u>not possible</u> in practice	None	N/A	No impact

¹⁶ Assessment scenario may include an initial conservative qualitative consideration of screening in determining the duration of predicated effects in practice. The reflecting area of the solar development may be partially screened such that it does not meet the two key criteria i.e. 1) The solar reflection occurs for more than 3 months per year. 2) and/or for more than 60 minutes on any given day.

Dwelling Receptor	Geometric Modelling Results (without consideration of screening)	Identified Screening and Predicted Visibility (desk-based review)	Duration of effects (with consideration of screening) ¹⁶	Relevant Factors	Predicted Impact Classification
41 - 64	Solar reflections <u>are geometrically possible</u> for: <u>More</u> than three months <u>Less</u> than 60 minutes	Existing vegetation screening Views of the reflecting panels may be <u>possible</u> despite the partial screening	<u>More</u> than three months <u>Less</u> than 60 minutes	Effects would mostly coincide with direct sunlight Any effects are likely to be limited to an observer above the ground floor	Low impact
65 - 74	Solar reflections <u>are geometrically possible</u> for: <u>Less</u> than three months <u>Less</u> than 60 minutes	Existing vegetation screening Predicted to significantly obstruct views of reflecting panels such that views are <u>not possible</u> in practice	None	N/A	No impact
75 - 78	Solar reflections <u>are geometrically possible</u> for: <u>More</u> than 3 months <u>Less</u> than 60 minutes	Existing vegetation and building screening Predicted to significantly obstruct views of reflecting panels such that views are <u>not possible</u> in practice	N/A	N/A	No impact