DAYLIGHT, SUNLIGHT & OVERSHADOWING

Barnes Hospital

Produced by XCO2 for South West London and St George's Mental Health NHS Trust

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XCO2
56 Kingsway Place, Sans Walk
London EC1R 0LU

+44 (0)20 7700 1000
mail@xco2.com
xco2.com

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Remarks	Draft	Draft	For planning		
Prepared by	LT	LT	LT		
Checked by	AL	AL	AL		
Authorised by	LM	LM	LM		
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EXECUTIVE SUMMARY

The daylight, sunlight and overshadowing analysis indicates that there will be no impact on surrounding properties arising from the proposed development at Barnes Hospital.

Daylight and sunlight analysis was carried out for the proposed development at Barnes Hospital, located within the London Borough of Richmond upon Thames. This report outlines the results of the analysis for the planning application, assessing the daylight and sunlight impacts on surrounding developments.

Outline planning permission for the demolition and comprehensive redevelopment (phased development) of land at Barnes Hospital to provide a mixed use development comprising a health centre (Use Class D1), a Special Educational Needs (SEN) School (Use Class D1), up to 80 new build residential units (Use class C3), the conversion of two of the retained BTMs for use for up 3no. residential units (Use Class C3), the conversion of one BTM for medical use (Use Class D1), car parking, landscaping and associated works. All matters reserved save for the full details submitted in relation to access points at the site boundaries.

The methodology set out in this report is in accordance with BRE's "Site Layout Planning for Daylight and Sunlight, A Guide to Good Practice" by PJ Littlefair (2011) which is accepted as good practice by Planning Authorities.

The following assessments were carried out:

- Daylight: 25 Degree Line
- Sunlight: Sunlight Access
- Sunlight: Sunlight Overshadowing

Computer modelling software was used to carry out the assessments. The model used was based on drawings and a 3D model provided by the design team together with desktop research on neighbouring properties.

DAYLIGHT ASSESSMENT

A total of 93 windows from buildings surrounding the site were highlighted as being in proximity to, and facing the proposed development.

Daylighting levels for potentially affected windows of surrounding developments by the proposed development at Barnes Hospital were found to be acceptable.

In summary, all windows passed the 25-degree line test.

Overall, the development is not anticipated to have any notable impact on the daylight received by neighbouring properties.

SUNLIGHT ASSESSMENT

A total of 17 windows from buildings surrounding the site were assessed for sunlight access. The analysis indicated that all windows passed the 25-degree line test.

Therefore, the proposed development at Barnes Hospital is not considered to have any notable impact on sunlight access to windows of surrounding developments.

OVERSHADOWING ASSESSMENT

A solar access analysis was undertaken for a total of 25 amenity spaces for the full 24 hours on 21st of March including 12 residential gardens to the east and the Old Mortlake Burial Ground cemetery to the west. All the amenity spaces are predicted to have a minimum of 2 hours of sunlight on 21 March over at least 50% of each assessed amenity space.

The proposed development is therefore not considered to have any significant impact on sunlight access to the amenity spaces surrounding the site.

Table 1: Daylight results summary

Assessment type	Daylight	Sunlight
Number of windows tested	**93**	**17**
Number of windows passing the 25° initial test	93	17
Number of windows that do not meet any of the above criteria	0	0

INTRODUCTION

The site is located in an urban environment and the interpretation of the results requires careful consideration of the BRE guidance.

This report assesses the daylight, sunlight and overshadowing impacts the proposed new build residential development may have on the existing properties and open spaces surrounding the site.

The approach is based on the BRE's "*Site Layout Planning for daylight and sunlight, a Guide to good practice"* PJ Littlefair 2011, which is generally accepted as good practice by Town and Country Planning authorities.

It should be noted that although the numerical values stated by the BRE provide useful guidance to designers, consultants and planning officials, these are purely advisory and may vary depending on context. Dense urban areas, for example, may often experience greater site constraints when compared to low-rise suburban areas, and thus a high degree of obstruction is often unavoidable. Appendix F of the BRE document is dedicated to the use of alternative values and it also demonstrates the manner in which the criteria for skylight was determined for the summary given above, i.e. the need for 27% vertical sky component for adequate daylighting.

This figure of 27% was achieved using the following methodology: a theoretical road was created with two storey terraced houses upon either side, approximately twelve metres apart. The houses have windows at ground and first floor level, and a pitched roof with a central ridge. Thereafter, a reference point was taken at the centre of a ground floor window of one of the properties and a line was drawn from this point to the central ridge of the property on the other side of the road.

The angle of this line equated to 25 degrees (the 25 degrees referred to in the summaries given with reference to the criteria for skylight). This 25-degree line obstructs 13% of the totally unobstructed sky available, leaving a resultant figure of 27% which is deemed to give adequate daylighting. This figure of 27% is the recommended criteria referred to in this report. It will be readily appreciated that in an urban area, this kind of urban form and setting is unlikely and impractical.

Furthermore, the BRE guidance also focuses on 'relative change' which is likely to be exaggerated given the low-rise nature of the existing structures on site. Where there is more than a 20% reduction in VSC, this does not mean that the level of daylight will be unacceptable but, rather, that there may be a noticeable change in daylight levels to the occupants.

SITE

The site is in a low-density urban area made up of mostly semi-detached and terraced houses with front and back gardens facing the site; there is also a cemetery to the west, Old Mortlake Burial Ground. Site analysis was carried out to identify any potential daylight and sunlight impacts on the surrounding development.

Relevant properties tested in this report adjacent to the proposed development are annotated in the figure below. They were selected because the properties either face or look onto the site, therefore testing was required to assess the potential daylight, sunlight and overshadowing the proposed development might have. The following neighbouring buildings were tested in detail:

- 1 – 28 North Worple Way
- 1 – 2 South Worple Avenue
- 2 – 24 (even) Buxton Road
- 57 – 103 (odd) Grosvenor Avenue

Figure 1: Site location and neighbouring buildings assessed.

METHODOLOGY

The assessment is based on guidelines set out in the BRE "Site Layout Planning for Daylight and Sunlight, A Guide to Good Practice" (2011).

DAYLIGHT

DAYLIGHT TO SURROUNDING WINDOWS

A plane is drawn at 25 degrees from the horizontal, at the centre of an existing window. If the new development intersects with this plane, the internal daylight levels of the surrounding windows may be reduced. When an obstruction of the 25-degree plane occurs, a more detailed assessment involving the Vertical Sky Component of the affected window would need to be carried out.

ABSOLUTE VERTICAL SKY COMPONENT (VSC)

The Vertical Sky Component is the ratio of the direct sky illuminance falling on the vertical wall at a reference point, to the simultaneous horizontal illuminance under an unobstructed sky. To maintain good levels of daylight, the Vertical Sky Component of a window needs to be 27% or greater. If the VSC is less than 27%, then a comparison of existing and proposed levels of VSC level would need to be calculated.

RELATIVE VERTICAL SKY COMPONENT

Good levels of daylighting can still be achieved if VSC levels are within 0.8 of their former value.

% OF ROOM WITH VIEW OF THE SKY (NSL)

Rooms connected to the windows assessed will not experience a noticeable loss in daylight if the percentage (%) of the room's working plane with view of the sky is over 0.8 of its former value. The former value could refer either to the existing development in place or the mirror image buildings for properties with windows close to site boundaries.

SUNLIGHT

ACCESS TO SUNLIGHT (APSH)

The BRE test relates mainly to existing living room windows, although care should be taken to ensure that kitchens and bedrooms receive reasonable amounts of sunlight. Annual Probable Sunlight Hour (APSH) assessment is carried out when there is an obstruction within the 25-degree line and the window is facing within 90 degrees due south. The APSH assessment states that the existing living room window should receive at least:

- 25% of annual probable sunlight hours (APSH) throughout the year;
- 5% of annual probable sunlight hours during the winter months;
- not less than 80% of its former sunlight hours during either period;

The term 'annual probable sunlight hours' refers to the long-term average of the total of hours during a year in which direct sunlight reaches the unobstructed ground (when clouds are taken into account). The 'winter probable sunlight hours' is used to mean the same but only for the winter period (21 September – 21 March).

OVERSHADOWING

SUNLIGHT TO AMENITY SPACES

Open spaces should retain a reasonable amount of sunlight throughout the year. The BRE states that for an amenity space to "appear adequately sunlit throughout the year, at least half of the area should receive at least 2 hours of sunlight on 21 March". Where this is not achieved, the difference between the area achieving 2 hours of sun on 21 March should be no less than 0.8 times its former value.

DAYLIGHT ASSESSMENT

The analysis indicates that the proposed development is unlikely to have a significant impact on neighbouring windows in terms of daylight. The following subsections detail the findings for each neighbouring building individually.

1 – 28 NORTH WORPLE WAY

Properties 1 – 28 on North Worple Way are located north of the proposed development. We have identified 10 buildings comprising of semi-detached houses and flats in close proximity to the development.

Figure 2 shows a view of the street and the typical property characteristic of this area. The potentially affected windows were identified to be at ground floor level in the front façade of the properties, facing the proposed development (see Figure 3)

The results, summarised in the table below, show that all the windows assessed achieve the BRE daylight criteria by passing the 25-degree plane test (see Figure 4. For simplicity, bay windows have been considered as one window.

Figure 3: Mark-up of analysed properties and windows.

Figure 2: 5 – 16 North Worple Way street façade.

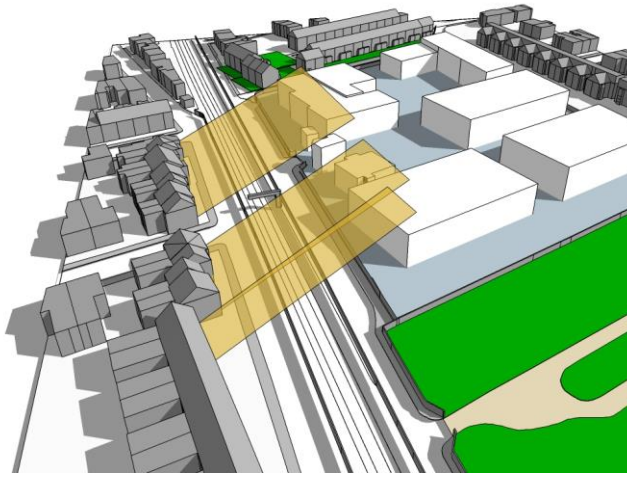

Figure 4: 25° plane view from potentially affected windows.

Table 2: Daylight results summary for North Worple Way

Number of windows tested	17
Number of windows passing the 25° initial test	17
Number of windows that do not meet any of the above criteria	0

1 - 2 SOUTH WORPLE AVENUE

Properties 1 & 2 on South Worple Avenue are located east of the proposed development.

Figure 5 shows a birds eye view of the site and the two semi-detached properties. Figure 6 shows potentially affected windows. The potentially affected windows were identified to be at ground floor level on the front elevation of the properties, facing the proposed development.

The results show that all the windows assessed achieve the BRE daylight criteria by passing the 25-degree plane test (see Figure 7). The table below summarises the findings.

Figure 6: Mark-up of analysed properties and windows.

Figure 5: South Worple Avenue front elevation & birds eye view.

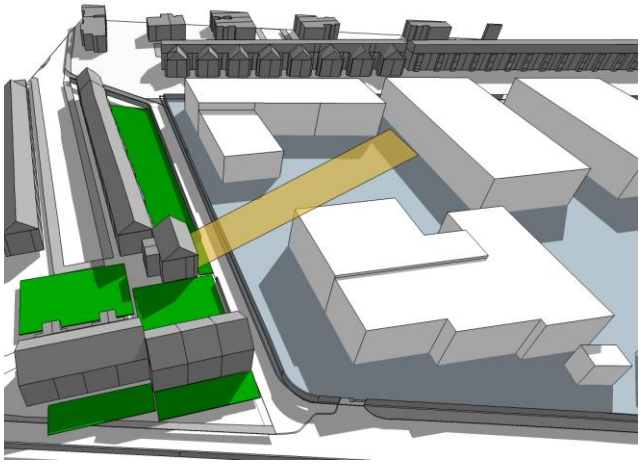

Figure 7: 25° plane view from potentially affected windows.

Table 3: Daylight results summary for South Worple Avenue

Number of windows tested	4
Number of windows passing the 25° initial test	4
Number of windows that do not meet any of the above criteria	0

2 – 24 BUXTON ROAD

Properties 2 – 24 (even numbers) on Buxton Road are located east of the proposed development.

Figure 8 shows a birds eye view of the site and the 12 terraced properties. Figure 9 shows potentially affected windows. The potentially affected windows were identified to be at ground floor level on the rear façade of the properties, facing the proposed development.

The results show that all the windows assessed achieve the BRE daylight criteria by passing the 25-degree plane test (see Figure 10). The table below summarises the findings.

Figure 8: Buxton Road birds eye view of rear elevations.

Figure 9: Mark-up of analysed properties and windows.

Figure 10: 25° plane view from potentially affected windows.

Table 4: Daylight results summary for 2-24 Buxton Road

Number of windows tested	24
Number of windows passing the 25° initial test	24
Number of windows that do not meet any of the above criteria	0

57 – 103 GROSVENOR AVENUE

Properties 57 – 103 (odd) on Grosvenor Avenue are located south of the proposed development. We have identified 24 buildings in close proximity to the development that could be potentially affected.

Figure 11 shows a birds eye view of the site and the 24 identified properties, of a terraced house characteristic. Figure 12 shows the potentially affected windows were identified to be at ground floor level in the rear, facing the proposed development.

The results, summarised in the table below, show that all the windows assessed achieve the BRE daylight criteria by passing the 25-degree plane test (see Figure 13). For simplicity, bay windows have been considered as one window.

Figure 11: 77 – 93 Grosvenor Avenue street façade and birds eye view of rear elevations.

Figure 12: Mark-up of analysed properties and windows.

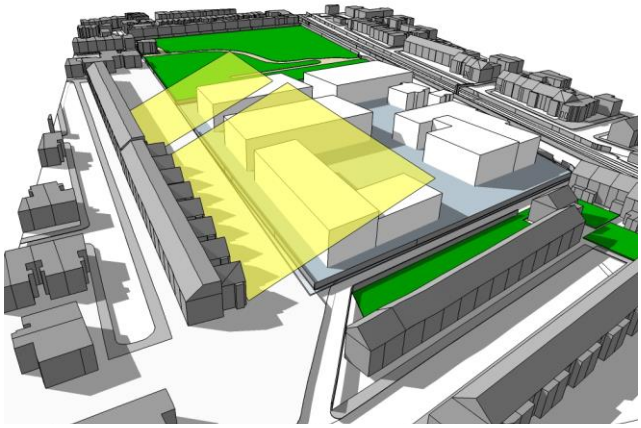

Figure 13: 25° plane view from potentially affected windows.

Table 5: Daylight results summary for Grosvenor Avenue

Number of windows tested	48
Number of windows passing the 25° initial test	48
Number of windows that do not meet any of the above criteria	0

SUNLIGHT ASSESSMENT

The analysis indicates that the proposed development is unlikely to have a significant impact on neighbouring south facing windows in terms of sunlight.

The BRE guide states that:

"if a living room of an existing dwelling has a main window facing within 90° of due south, and any part of a new development subtends an angle of more than 25° to the horizontal measured from the centre of the window in a vertical section perpendicular to the window, then the sunlighting of the existing dwelling may be adversely affected"

A total of 17 windows from buildings surrounding the site were highlighted as facing the development and within 90° of due south. These windows belong to properties in North Worple Way included within this assessment.

The analysis results, summarised in the table below, indicated that all windows within 90° due south satisfy the BRE criteria for sunlight.

Overall, the proposed development is not considered to have any notable impact on sunlight access to windows of surrounding developments.

Table 6: Sunlight results summary

Total number of windows facing within 90° of south	**17**
Number of south facing windows passing the 25° initial test	17
Number of south facing windows with APSH greater than 25% and WPSH greater than 5%, or of at least 0.8 of their former existing value	0
Number of south facing windows with less than 4% reduction in annual sunlight	0
Number of windows that do not meet any of the above criteria	0

OVERSHADOWING ASSESSMENT

The analysis indicates that the proposed development is unlikely to have a significant impact on the sunlight received by neighbouring amenity spaces.

A review of the site plan showed that there are 25 amenity/open spaces in close proximity to the proposed development, including 24 residential gardens to the east, and the Old Mortlake Burial Ground cemetery to the west, as shown in Figure 14.

A solar access analysis was undertaken on these amenity areas for the full 24 hours on 21 March as set out by the BRE.

The existing scheme does not affect negatively the amenity spaces surrounding the site. Therefore, an analysis of the new proposed massing was undertaken to understand if it created any new overshadowing impact on the surrounding amenity spaces.

Shadowing analysis shows that all of the analysed spaces under the proposed conditions, on 21 March, meet the BRE requirements for overshadowing. Detailed images from the results from each area can be found in the Appendices.

Therefore, the proposed development is not considered to have any significant impact on sunlight access to neighbouring amenity and open spaces.

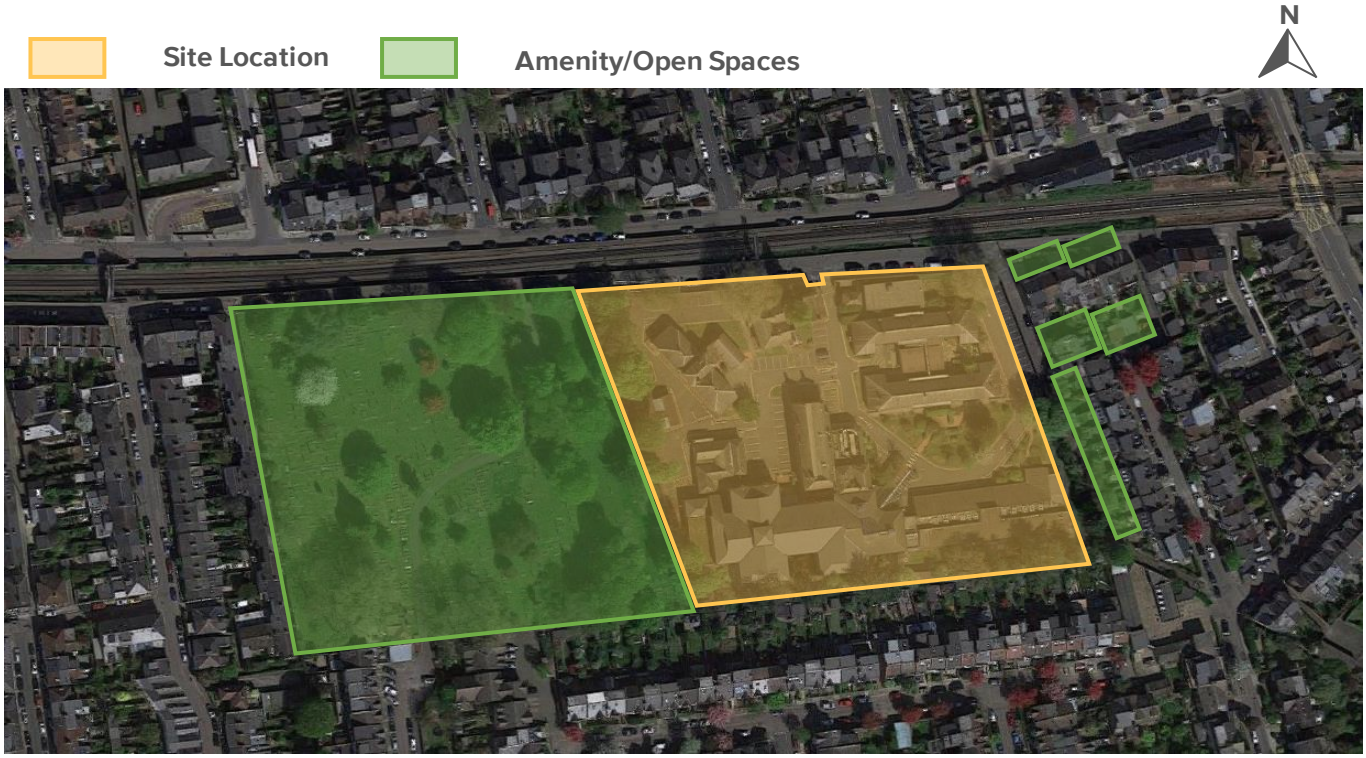

Figure 14: Amenity and open spaces in close proximity to development site.

CONCLUSION

The daylight, sunlight and overshadowing analysis indicates that there will be no impact on surrounding properties arising from the proposed development at Barnes Hospital.

DAYLIGHT ASSESSMENT

A total of 93 windows from buildings surrounding the site were highlighted as being in close proximity to, and facing the proposed development.

Daylighting levels for potentially affected windows of surrounding developments by the proposed development were found to be acceptable.

In summary, all windows passed the 25-degree test.

Overall, the development is not anticipated to have any notable impact on the daylight received by neighbouring properties.

SUNLIGHT ASSESSMENT

A total of 17 windows from buildings surrounding the site were assessed for sunlight access. The analysis indicated that all windows passed the 25-degree line test.

Therefore, the proposed development is not considered to have any notable impact on sunlight access to windows of surrounding developments.

OVERSHADOWING ASSESSMENT

A solar access analysis was undertaken for a total of 25 amenity/open spaces for the full 24 hours on 21st of March. All the amenity spaces are predicted to have a minimum of 2 hours of sunlight on 21 March over at least 50% of each assessed amenity space.

The proposed development is therefore not considered to have any significant impact on sunlight access to the amenity spaces surrounding the site.

APPENDIX A - WINDOW REFERENCE

APPENDIX B - OVERSHADOWING RESULTS

Figure 15: Overshadowing results for proposed development at 1pm on 21st March.

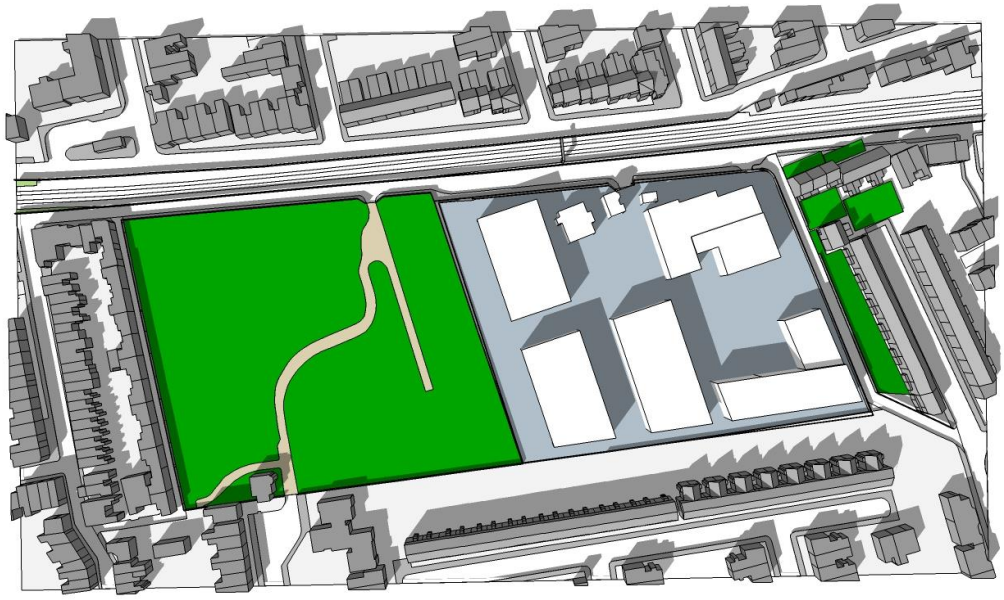

Figure 16: Overshadowing results for proposed development at 2pm on 21st March.

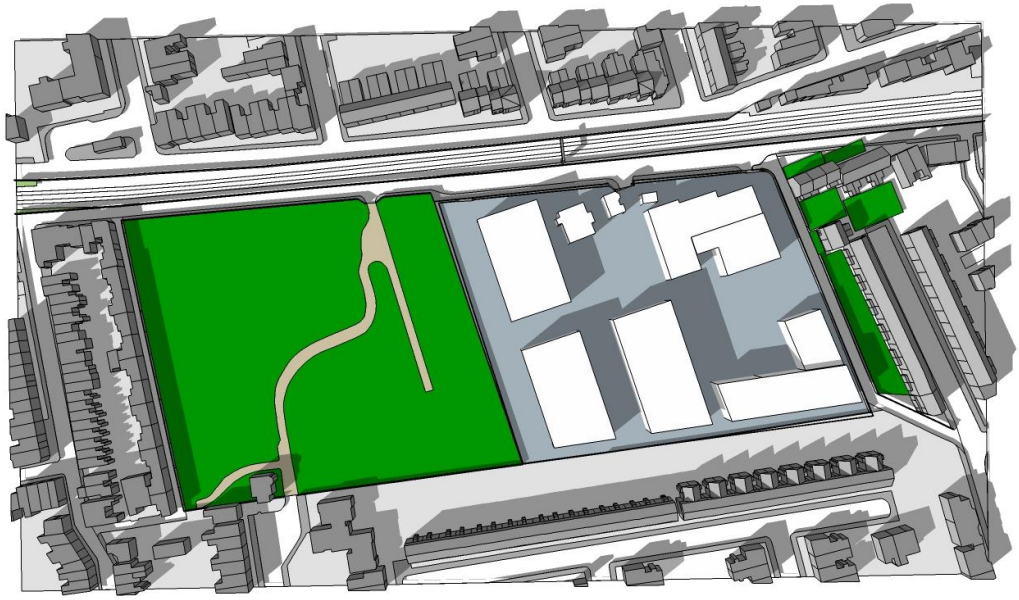

Figure 17: Overshadowing results for proposed development at 3pm on 21st March.

XCO2
56 Kingsway Place, Sans Walk
London EC1R 0LU

+44 (0)20 7700 1000
mail@xco2.com
xco2.com