DAYLIGHT, SUNLIGHT & OVERSHADOWING

2 Windmill Street

Produced by XCO2 for Heriot UK Limited

May 2018

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Date	29/05/2018	31/05/2018					
Project reference	9.165	9.165					

EXECUTIVE SUMMARY

The daylight, sunlight and overshadowing analysis indicates that there will not be a significant impact on surrounding properties arising from the proposed development at 2 Windmill Street.

Daylight and Sunlight analysis was carried out for the proposed development at 2 Windmill Street, located within the London Borough of Camden. This report outlines the results of the analysis for the planning application, assessing the daylight and sunlight impacts on surrounding developments.

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
- Daylight: 45 Degree Line
- Daylight: Vertical Sky Component
- Daylight: No Sky 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 18 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 at 2 Windmill Street were found to be acceptable.

In summary,

- no windows passed the 25-degree line test;
- three windows passed the 45-degree line test;
- 8 windows achieved VSCs greater than 27%; and
- the remaining 7 windows achieved relative VSCs over 0.8 of their former values.

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

SUNLIGHT ASSESSMENT

A total of 2 windows from buildings surrounding the site were assessed for sunlight access. The analysis indicated that no windows passed the 25-degree line test but satisfied the BRE criteria for annual probable sunlight hours (APSH) and winter probable sunlight hours (WPSH).

Therefore, the proposed development at 2 Windmill Street is not considered to have any notable impact on sunlight access to windows of surrounding developments.

OVERSHADOWING ASSESSMENT

A review of the proposed development site shows that there are no surrounding amenity spaces which could be potentially affected by the proposed extension.

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

Number of windows tested	18
Number of windows passing the 25° initial test	0
Number of windows passing the 45° test	3
Number of windows with a VSC higher than 27%	8
Number of windows with a VSC of at least 0.8 of existing value	7
Number of windows that do not meet any of the above criteria	0

Table 2: Sunlight results summary

Total number of windows facing within 90° of south	2
Number of south facing windows passing the 25° initial test	0
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	2
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

INTRODUCTION

The proposed development site is located in dense city 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 extension to the existing building 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 proposed development is a mixed-use office and residential building located in Central London at 2 Windmill Street, within the London Borough of Camden. The site is within close proximity of Tottenham Court Road, with Goodge Street Station to the north and Tottenham Court Station to the south.

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.

The following neighbouring buildings were tested in detail:

- 3-4 Windmill Street
- 12 Charlotte Street
- 10 Charlotte Street
- 8 Charlotte Street

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.

For proposed extensions to existing buildings positioned perpendicularly to neighbouring properties, two 45-degree planes are drawn in both elevation and in plan from the outer-most adjacent corner of a proposed extension, towards the existing windows assessed as shown in the image below. If the centre of the assessed window intersects with both 45-degree planes there may be an impact on the levels of daylight received.

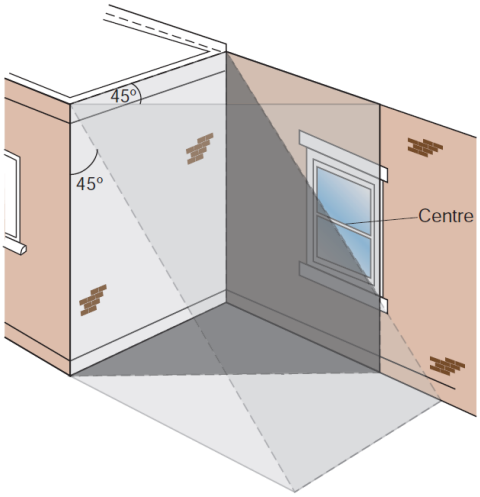


Figure 2: application of the 45-degree approach to an extension.

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.

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;

- not more than a 4% reduction in sunlight received over the whole year (APSH).

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.

3-4 WINDMILL STREET

This building is located to the northeast of the proposed development. Figure 3 shows potentially affected windows.

The results show that both windows and both rooflights pass the relevant tests. The table below summarises the findings.

Detailed results are presented in Appendix B - Detailed Daylight Results.

Figure 3: 3-4 Windmill Street windows

Table 3: Daylight results summary for 3-4 Windmill Street

Number of windows tested	4
Number of windows passing the 25° initial test	0
Number of windows passing the 45° test	0
Number of windows with a VSC higher than 27%	4
Number of windows with a VSC of at least 0.8 of existing value	0
Number of windows that do not meet any of the above criteria	0

12 CHARLOTTE STREET

This building is located to the west of the proposed development, with the rear site boundary abutting the property at 2 Windmill Street. Figure 4 shows potentially affected windows.

The results show that all windows meet the relevant tests. The table below summarises the findings, and detailed results can be found in Appendix B - Detailed Daylight Results.

Figure 4: 12 Charlotte Street windows

Table 4: Daylight results summary for 12 Charlotte Street

Number of windows tested	4
Number of windows passing the 25° initial test	0
Number of windows passing the 45° test	1
Number of windows with a VSC higher than 27%	0
Number of windows with a VSC of at least 0.8 of existing value	3
Number of windows that do not meet any of the above criteria	0

10 CHARLOTTE STREET

This building is located to the west of the proposed development. Figure 5 shows potentially affected windows.

The results show that all 7 windows and 2 rooflights meet the relevant tests.

The table below summarises the findings, and detailed results can be found in Appendix B - Detailed Daylight Results.

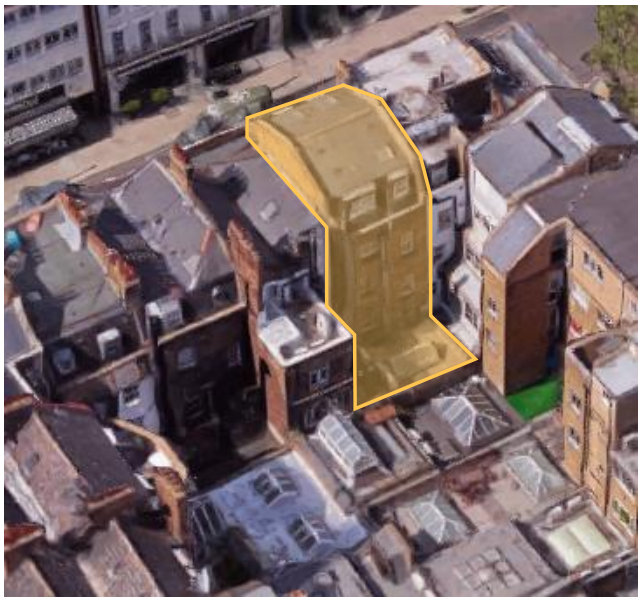


Figure 5: 10 Charlotte Street windows

Table 5: Daylight results summary for 10 Charlotte Street

Number of windows tested	9
Number of windows passing the 25° initial test	0
Number of windows passing the 45° test	2
Number of windows with a VSC higher than 27%	3
Number of windows with a VSC of at least 0.8 of existing value	4
Number of windows that do not meet any of the above criteria	0

8 CHARLOTTE STREET

This building is located to the west of the proposed development. Figure 6 shows the elevation where one window was identified as potentially affected.

The results show that this window meets all relevant tests. The table below summarises the findings, and detailed results can be found in Appendix B - Detailed Daylight Results.

Figure 6: 8 Charlotte Street windows

Table 6: Daylight results summary for 8 Charlotte Street

Number of windows tested	1
Number of windows passing the 25° initial test	0
Number of windows passing the 45° test	0
Number of windows with a VSC higher than 27%	1
Number of windows with a VSC of at least 0.8 of existing value	0
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 2 windows from buildings surrounding the site were highlighted as facing the development and within 90° of due south. These windows belong to the building at 3-4 Charlotte Street.

The analysis indicated that both windows within 90° due south satisfy the BRE criteria for sunlight.

The table below shows the results summary. The detailed results can be found in Appendix C - Detailed Sunlight Results.

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

Table 7: Sunlight results summary

Total number of windows facing within 90° of south	2
Number of south facing windows passing the 25° initial test	0
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	2
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

CONCLUSION

The daylight, sunlight and overshadowing analysis indicates that there will not be a significant impact on surrounding properties arising from the proposed development at 2 Windmill Street.

DAYLIGHT ASSESSMENT

A total of 18 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,

- no windows passed the 25-degree line test;
- Three windows passed the 45-degree line test;
- 7 windows achieved VSCs greater than 27%; and
- All remaining windows achieved VSCs values of at least 0.8 of their former values.

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

SUNLIGHT ASSESSMENT

A total of two windows from buildings surrounding the site were assessed for sunlight access. The analysis indicated that both windows satisfied the BRE criteria for annual probable sunlight hours (APSH) and winter probable sunlight hours (WPSH).

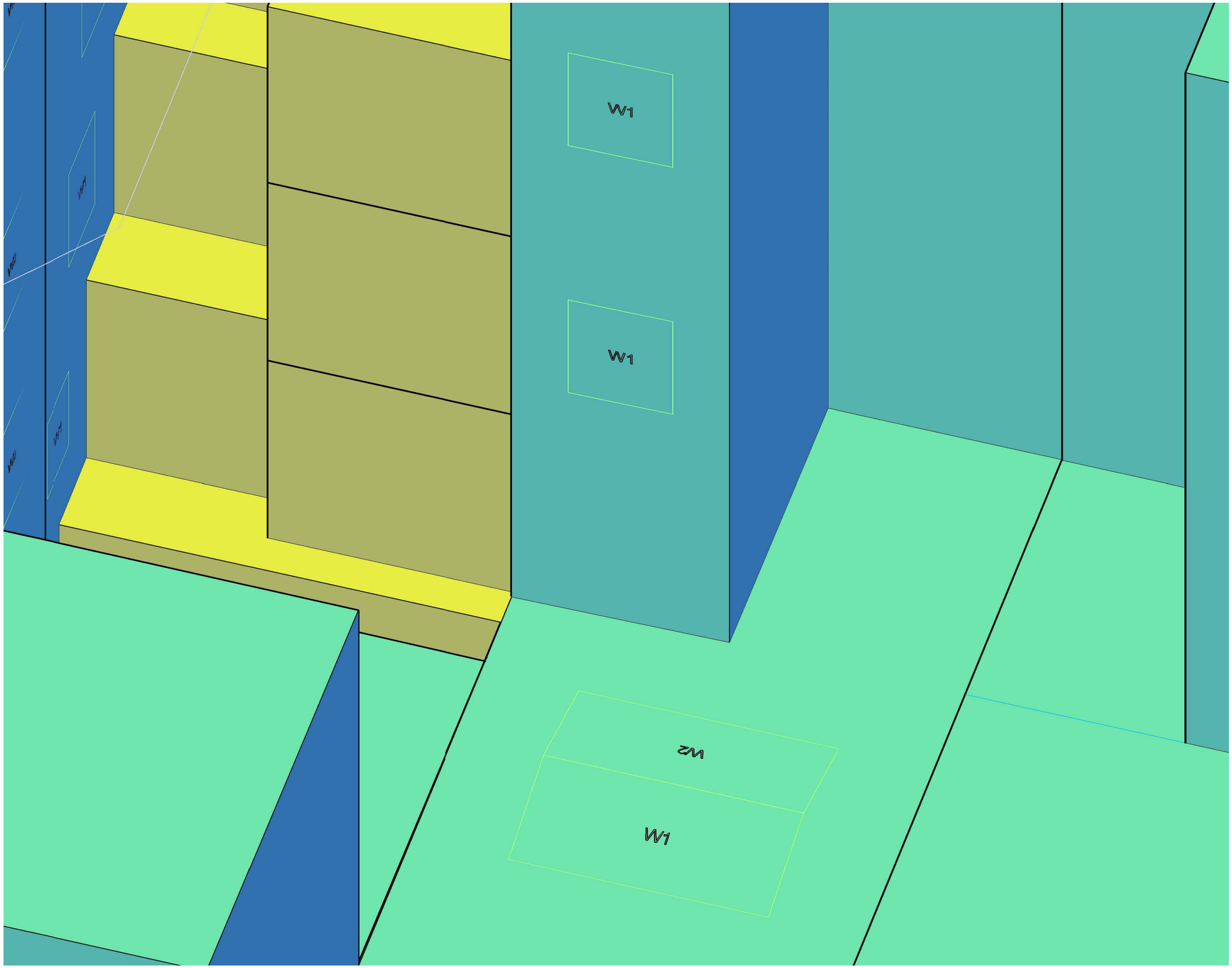
Therefore, the proposed extension at 2 Windmill Street is not considered to have any notable impact on sunlight access to windows of surrounding developments.

OVERSHADOWING ASSESSMENT

A review of the proposed development site shows that there are no surrounding amenity spaces which could be potentially affected by the proposed extension.

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



Notes

Rev	Date	Description	Chk'd	Appr
01	31.05.18	Windows locations	KM	KM

ISSUE TYPE

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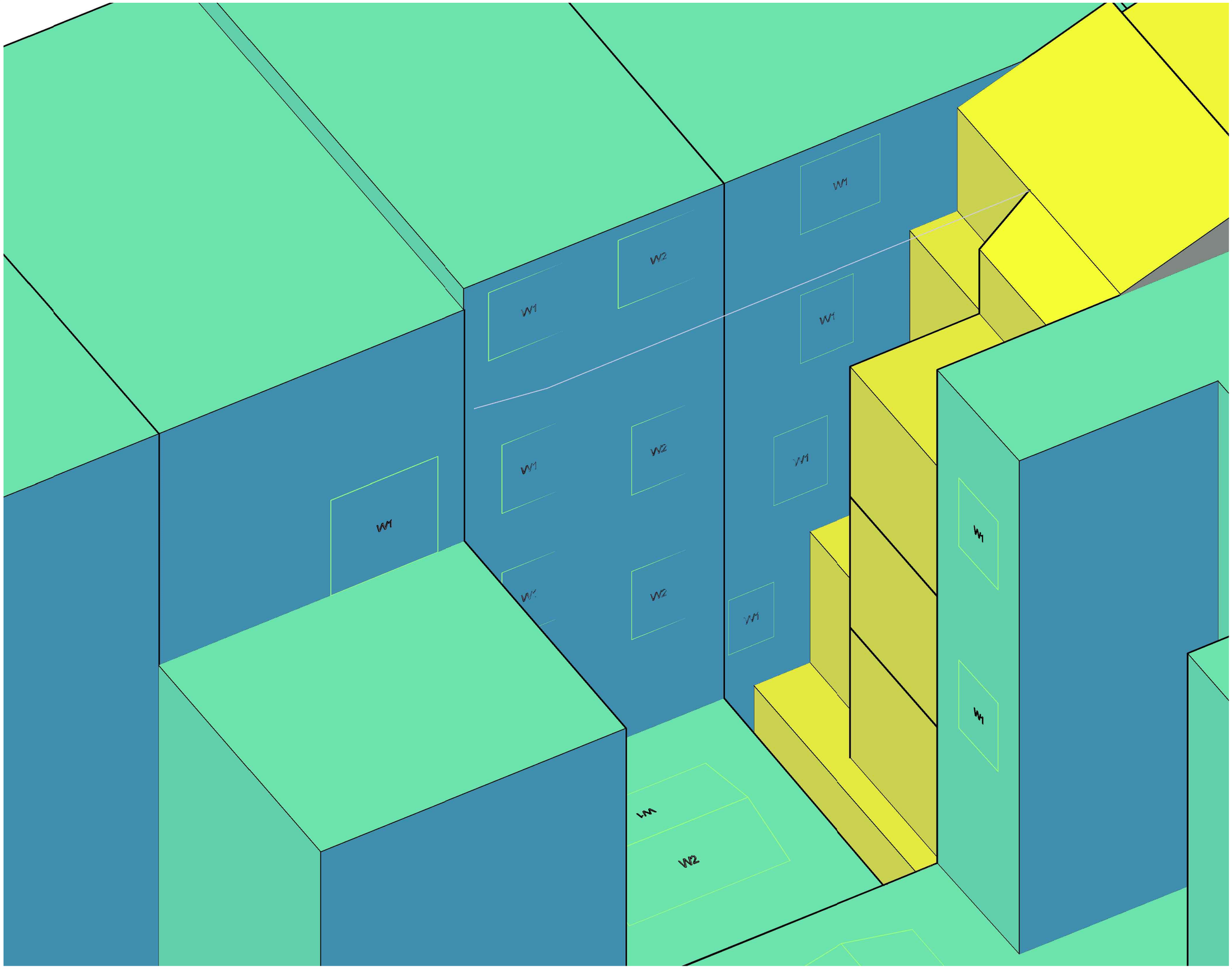
Project
2 Windmill Street

Title
Window Locations
3-4 Windmill Street

Scale@A3	Drawn	Checked	Date
N.T.S	TS	KM	31.05.18

Drawing Number	Revision
9165-0-0001	1



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2 Windmill Street

Title
Window Locations
12-8 Charlotte Street

Scale@A3	Drawn	Checked	Date
N.T.S	TS	KM	31.05.18

Drawing Number
9165-0-0002

Revision
1

APPENDIX B - DETAILED DAYLIGHT RESULTS

Building	Floor	Window no.	25/45-degree plane test	VSC tests			Comments
				Proposed VSC 27%?	Existing VSC (%)	Relative VSC >0.8?	
3-4 Windmill St	Ground	W1	Further testing required	>27.0%	-	-	Rooflight, BRE criteria met
3-4 Windmill St	Ground	W3	Further testing required	>27.0%	-	-	Rooflight, BRE criteria met
3-4 Windmill St	First	W1	Further testing required	>27.0%	-	-	BRE criteria met
3-4 Windmill St	Second	W1	Further testing required	>27.0%	-	-	BRE criteria met
12 Charlotte St	Ground	W1	Further testing required	17.2%	17.8%	0.97	BRE criteria met
12 Charlotte St	First	W1	Further testing required	16.7%	19.2%	0.87	BRE criteria met
12 Charlotte St	Second	W1	Further testing required	21.9%	22.7%	0.97	BRE criteria met
12 Charlotte St	Third	W1	Further testing required	>27.0%	-	-	BRE criteria met
10 Charlotte St	Ground	W1	Further testing required	25.3%	26.0%	0.97	Rooflight, BRE criteria met
10 Charlotte St	Ground	W3	Further testing required	14.2%	14.3%	0.99	Rooflight, BRE criteria met
10 Charlotte St	First	W4	Further testing required	>27.0%	-	-	BRE criteria met
10 Charlotte St	Second	W1	Further testing required	20.5%	20.5%	1.00	BRE criteria met

Building	Floor	Window no.	25/45-degree plane test	VSC tests			Comments
				Proposed VSC 27%?	Existing VSC (%)	Relative VSC >0.8?	
10 Charlotte St	Second	W2	Further testing required	20.6%	21.0%	0.98	BRE criteria met
10 Charlotte St	Third	W1	Further testing required	>27.0%	-	-	BRE criteria met
10 Charlotte St	Third	W2	Further testing required	>27.0%	-	-	BRE criteria met
10 Charlotte St	Fourth	W1	Further testing required	>27.0%	-	-	BRE criteria met
10 Charlotte St	Fourth	W2	Further testing required	>27.0%	-	-	BRE criteria met
8 Charlotte Street	Third	W1	Further testing required	>27.0%	-	-	BRE criteria met

APPENDIX C - DETAILED SUNLIGHT RESULTS

Building	Floor	Window no.	Orientation	25-degree plane test	APSH test			WPSH test			Total reduction<4%?	Comments
					Proposed APSH >25%?	Existing APSH (%)	Relative APSH >0.8?	Proposed WPSH >5%?	Existing WPSH (%)	Relative WPSH >0.8?		
3-4 Windmill St	First	W1	South	Further testing required	>25%	-	-	>5%	-	-	-	BRE criteria met
3-4 Windmill St	Second	W1	South	Further testing required	>25%	-	-	>5%	-	-	-	BRE criteria met

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