### Charlotte Street 66, London W1T 4QD

Daylight and Sunlight Assessment

15 May 2017 Revision: Version 01 Prepared by: Rishika Shroff Reviewed by: Deepika Singhal Project number: 26004

\* STRUCTURES & GEOMETRICS OF SUSTAINABILITY OINFRASTRUCTURE

### Contents

С	ontents	5	2						
1	Introduction4								
2	Site	Analysis	5						
	2.1	Site surrounding buildings	5						
	2.2	Site Model	5						
3	Day	light and Sunlight Assessment	7						
	3.1	Determining Significance of impact	3						
	3.2	Daylight	9						
	3.3	Sunlight	3						
	3.4	Annual Probable Sunlight Hours (APSH) / Winter Probable Sunlight Hours (WPSH) 14	1						
4	Cor	nclusion	3						

### Executive Summary

Price & Myers have carried out a daylight and sunlight impact assessment to support the planning application of the proposed works at 66 Charlotte Street in the London Borough of Camden. The application site is being redeveloped for residential and commercial purpose providing commercial spaces on the ground storey and residential on the upper 4 storeys.

This report is an assessment of the impact of the proposed scheme on the availability of daylight of the existing surrounding buildings. It determines whether the proposed design meets the criteria set out in Building Research Establishment Report 'Site layout planning for daylight and sunlight: A guide to good practice' 2011and British Standard BS 8206-02 'Lighting for buildings – Part 2: Code of practice for daylighting' (2008).

The assessment was carried out on the windows of the adjacent properties which are most likely to be affected by the proposed building. Following the BRE guidelines, the assessment boundary was determined by the height of the new extension at 66 Charlotte Street. Based on the site analysis, all of the existing neighbouring properties that might be affected by the proposed development were identified and studied. This included developments at 64, 68, 73, 77-79, 81 Charlotte Street, 3 Charlotte Mews and 22 Tottenham Street.

The results of the daylight assessment showed that all the identified windows meet the BRE criteria for daylighting. Therefore, it can be concluded that the proposed development will have **no impact** on the daylight availability of the surrounding buildings.

Sunlight assessment was also undertaken for the facades that faces 90° of due south and are likely to be affected by the proposed extension. Site analysis indicated that only the rear windows of 3 Charlotte Mews are likely to have an impact on their sunlight availability from the proposed extension. The results indicated that one window on the ground floor and two windows on the second floor fail to meet the BRE criteria for sunlight availability. As these windows fail in the baseline scenario also, the proposed extension cannot be attributed alone for the lack of sunlight in the associated rooms. Therefore, it can be concluded that the proposed development is likely to have an impact of **negligible significance** on the sunlight availability of the adjacent properties.

Site analysis indicated there are no existing or proposed amenity spaces in close proximity of the application site. Therefore overshadowing assessment was not undertaken for 66 Charlotte Street.

### 1 Introduction

Price & Myers have been instructed by Roland Cowan Architects to carry out a daylight and sunlight impact assessment for the proposed extension of 66 Charlotte Street in the London Borough of Camden.

The linear shaped building is oriented in northeast and southwest axis. The proposed scheme comprises a 5-storey mixed-use development with commercial spaces on the ground floor and dwellings on the upper floors. Figure 1-1 shows the three dimensional view of the proposed scheme. The first and second floors have one apartment each, whereas, the third and fourth floors house a single duplex apartment



Figure 1-1 3D view showing the proposed scheme

This report is an assessment of the impact of the proposed scheme on the availability of daylight and sunlight of the adjacent building and amenities. The purpose of this report is to determine whether the proposed design meets the criteria set out in the Building Research Establishment Report 'Site layout planning for daylight and sunlight - A guide to good practice' (2011) and British Standard BS 8206-02 'Lighting for buildings – Part 2: Code of practice for daylighting' (2008).

The assessment is based on drawings provided by the Architects for the proposed development including information on the adjacent buildings. Street views, survey drawings and site photos were also used to model the surroundings of the project site.

### 2 Site Analysis

### 2.1 Site surrounding buildings

The site is located on Charlotte Street with Tottenham Street to the south. 66 Charlotte Street is bound by 4-5 storey mixed use developments on either side and is currently occupied by commercial spaces.



Figure 2-1 Site surroundings

The adjacent buildings that have highest probability of experiencing an impact from the proposed development are; 64 Charlotte Street and 68 Charlotte Street of it's either side, 3 Charlotte Mews and 22 Tottenham Street to its rear, and 73 Charlotte Street, 77-79 Charlotte Street and 81 Charlotte Street across the front side of the building.

### 2.2 Site Model

A three-dimensional model was built in AutoCAD using the drawings provided by Roland Cowan Architects for the proposed development at 66 Charlotte Street and adjacent properties. Other surrounding buildings were modelled on the basis of information available from site pictures and internet mapping.

The proposed building is expected to have an insignificant level of impact on the daylight and sunlight availability on the adjacent properties and those across the street. Figure 2-2 and Figure 2-3 below show the site model generated for the assessment.

### DAYLIGHT & SUNLIGHT REPORT





Figure 2-3 Model of the Proposed building on site and surrounding buildings

### 3 Daylight and Sunlight Assessment

The BRE guide is intended to aid designers in considering the relationship between new and existing buildings to ensure that each retains the potential to achieve good daylighting and sunlight levels. The author of the guide, Dr Paul Littlefair states in the introduction that:

"The guide is intended for building designers and their clients, consultants and planning officials. The advice given here is not mandatory and should not be used as an instrument of planning policy. Its aim is to help rather than constrain the designer. Although it gives numerical guidelines, these should be interpreted flexibly because natural lighting is only one of many factors in site layout design".

In designing a new development or extension to a building, care should be taken to safeguard the access to daylight and sunlight for existing buildings. The guidelines given in the BRE guide are intended for use for rooms in adjoining dwellings where daylight and sunlight is required, including living rooms, kitchens and bedrooms. Windows to bathrooms, toilets, storerooms, circulation areas and garages need not be analysed. The guidelines may also be applied to any existing non-domestic building where the occupants have a reasonable expectation of daylight and sunlight, like schools, hospital and offices.

Following the BRE guidelines, the assessment boundary is generally determined by the height of the new development. Based on the site analysis, the shaded area in Fig 3-1 shows the existing neighbouring properties that might be affected by the proposed development with respect to the daylight and sunlight acceptability. Developments at 64, 68, 73, 77-79, 81 Charlotte Street, 3 Charlotte Mews and 22 Tottenham Street fall within the assessment range.



### 3.1 Determining Significance of impact

BRE guide outlines the compliance criteria, however, it does not provide guidance on determining the significance of impact on the receptors. The impact on daylight and sunlight availability is dependent on the magnitude of change experienced by the surrounding windows. The compliance criteria for the effects on surrounding windows and magnitude of change has been detailed in Sections 3.2 and 3.3.

The significance of impact has been determined below using professional judgement, alongside the number of windows with a negligible change in daylight/sunlight availability from the proposed development.

% of windows with negligible change in daylight/sunlight availability	Significance of impact		
100%	None		
<100% and >90%	Minor		
$\leq$ 90% and >80%	Low		
$\leq$ 80% and >50%	Moderate		
≤50	High		

### 3.2 Daylight

Daylight can be described as the diffused light from the sky. It is assumed to be uniform and non-directional in nature. There are various methods of measuring and assessing daylight in buildings and the choice of test depends upon the circumstances of each particular window.

#### Vertical Sky Component (VSC)

A quantitative indicator of the amount of daylight available at the window wall requires the calculation of the Vertical Sky Component (VSC). The VSC is the ratio of the direct sky illuminance falling on a vertical wall at a reference point to the simultaneous horizontal illuminance under an unobstructed sky. The maximum value is almost 40% for a completely unobstructed vertical wall.

The VSC has been calculated using the Waldram tools through MBS Survey in AutoCAD. A Waldram diagram has azimuth angle on the horizontal scale and altitude on vertical scale. As explained in the BRE guide, for each vertical plane obstructions from the surrounding buildings should be plotted on the Waldram diagram. The remaining area on the diagram is then proportional to the sky component value on that plane. The software plots a Waldram diagram for each of the identified window and thus gives the VSC value for both the existing and the proposed scenario.

The BRE guide states that if the VSC is greater than 27% with the proposed development then enough daylight should still be reaching the existing windows. If the VSC calculated at the centre of the windows is less than 27% with the proposed development, then the BRE guide suggests that the former VSC (that is, the VSC without the proposed development) should be calculated. If the VSC with the proposed development in place is both less than 27% and less than 80% of its former value, then occupants of the existing building will notice the reduction in daylight and electric lighting will be needed more often. The magnitude of change for the identified receptors has been classified in Table 3-1 on the basis of professional judgement. It depends on the ratio of impact between the 'Baseline' and 'Proposed' scenario and on the vertical sky component at the centre of the windows. Rooms with poor layout which fail to receive adequate daylight in the baseline scenario are less likely to experience a perceptible change in the proposed scenario.

VSC Proposod	VSC Existing	Ratio of Impact	Magnitude of	
VSC Floposed			change	
< 27%	>27%	< 80%	Perceptible	
< 27%	<27%	< 80%	Negligible	
< 27%	-	≥80%	Negligible	
≥27%	-	< 80%	Negligible	
≥27%	-	$\geq 80\%$	Imperceptible	

Table 3-1	Compliance cri	teria and Magnitude	of change
-----------	----------------	---------------------	-----------

In this study, VSC calculations have been carried out on the windows of the potentially affected properties. Figure 3-2 and Figure 3-3 below illustrate the identified windows that required to be tested to ensure the daylight and sunlight availability in line with the BRE Guide.



Figure 3-2 Windows assessed for daylight – 64 charlotte Street, 22 Tottenham Street , 68 Charlotte Street, 3 Charlotte Mews

Property	Tested Windows		VSC% Proposed	VSC % Existing	% of Existing Case (>=80%)	BRE Criteria Met?
	First	W1	23.70	23.90	99%	YES
64 Charlotte Street	Second	W1	31.90			YES
Officer	Third	W1	35.64			YES
	First	W1	27.25			YES
	Second	W1	33.86			YES
22 Tottophom		W2	23.34			YES
Street		W3	32.61			YES
0.000	Third	W1	37.9			YES
	Third	W2	37.11			YES
	Charling	W4	21.68	21.68	100%	YES
	Ground	W5	15.66	15.66	100%	YES
68 Charlotte		W4	20.91	20.91	100%	YES
Oncor	First	W5	25.00	25.00	100%	YES
		W6	20.44	20.44	100%	YES

Property	Testec	l Windows	VSC% Proposed	VSC % Existing	% of Existing Case (>=80%)	BRE Criteria Met?
		W4	34.78			YES
	Second	W5	34.07			YES
		W6	29.18			YES
68 Charlotte	Third	W4	36.69			YES
Street	Third	W5	35.03			YES
	Fourth	W1	48.42			YES
		W2	48.28			YES
		W3	48.05			YES
	Ground	W1	6.76	7.19	94%	YES
		W2	6.53	7.56	86%	YES
		W1	12.57	13.08	96%	YES
3 Charlotte	First	W2	12.38	13.08	95%	YES
Mews		W3	11.42	12.63	90%	YES
	Casarad	W1	19.00	19.55	97%	YES
	Second	W2	18.13	18.92	96%	YES
	Third	W1	24.15	24.76	98%	YES

Table 3-2 VSC results for the tested windows



Figure 3-3 Windows assessed for daylight (73 Charlotte Street, 77-79 Charlotte Street, 81 Charlotte street)

Property	Tested Wind	ows	VSC% Proposed	VSC % Existing	% of Existing Case (>=80%)	BRE Criteria Met?
		W1	20.75	21.14	98%	YES
	Ground	W2	20.48	20.91	98%	YES
		W3	20.58	21.04	98%	YES
		W1	23.95	24.35	98%	YES
	First	W2	23.86	24.3.0	98%	YES
		W3	24.06	24.55	98%	YES
		W1	27.5			YES
73 Charlotte	Second	W2	27.62			YES
Offeet		W3	27.86			YES
		W1	31.13			YES
	Third	W2	31.13			YES
		W3	31.64			YES
		W1	34.66			YES
	Fourth	W2	34.91			YES
		W3	35.19			YES
	Croupd	W1	20.79	21.26	98%	YES
	Ground	W2	21.07	21.50	98%	YES
	firet	W1	24.33	24.80	98%	YES
	IIISt	W2	24.62	25.07	98%	YES
77-79 Charlotta	Second	W1	28.2			YES
Street	Second	W2	28.5			YES
	Third	W1	32			YES
	THIC	W2	32.31			YES
	Fourth	W1	35.48			YES
	Fourth	W2	35.73			YES
	Ground	W1	21.92	22.21	99%	YES
	firet	W1	24.94	25.32	98%	YES
	IIISL	W2	25.46	25.75	99%	YES
	Cocord	W1	28.86			YES
81 Charlotte	Second	W2	29.33			YES
Oueer	Thind	W1	32.58			YES
	mira	W2	33.00			YES
	Fourth	W1	35.96			YES
	Fourth	W2	36.24			YES

Table 3-3 VSC results for the tested windows

The results show that all the tested windows of the adjacent properties have a reduction in their VSC values from the baseline scenario that are within the limits set by BRE. Therefore, it is concluded that there will be **no impact** on the surrounding buildings and this means that the

rooms associated with these windows will continue to receive good level of daylight even with the proposed extension in place.

### 3.3 Sunlight

Unlike daylight, sunlight is dependent upon direction. The UK lies in the northern hemisphere and we receive our sun from a southerly direction- with the sun rising in the east and setting in the west. The availability of sunlight is therefore dependent upon the orientation of the window or area in question relative to the position of due south.

Sunlight assessment is only applicable where some part of the new development is situated within 90° of due south of a main window wall of an existing building and if any part of the 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. Site analysis indicates that only the rear windows of 3 Charlotte Mews are likely to have an impact on their sunlight availability from the proposed extension.



Figure 3-4 Windows Likely to be affected (3 Charlotte Mews)

### DAYLIGHT & SUNLIGHT REPORT

### 3.4 Annual Probable Sunlight Hours (APSH) / Winter Probable Sunlight Hours (WPSH)

The criterion to assess sunlight suggests that an interior space appears reasonably sunlit when a window serving these spaces receives at least 25% of the Annual Probable Sunlight Hours (APSH) and at least 5% of the Winter Probable Sunlight Hours (WPSH) during the winter months of 21<sup>st</sup> September to 21<sup>st</sup> March.

The APSH and WPSH have been calculated using MBS Survey in AutoCAD. Sunlight availability can also be represented on a Waldram diagram. The software calculates the shading patterns from the surrounding buildings on a vertical plane and based on the unobstructed area of the Waldram diagram calculates the percentage of total sunlight hours reaching the plane, annually and in winter.

The BRE guide suggests minimum figures of 25% and 5% respectively. If a window fails this test then the BRE guide states that the former values of APSH and WPSH (i.e. the values without the proposed development) should be calculated. If the values with the proposed development in place are less than 0.8 times of their former value then occupants of the existing building will notice the loss of sunlight.

The magnitude of impact is based on the sensitivity of receptors, the total number of windows affected within a property and on whether the level of sunlight reduction due to the proposed development are significantly outside the recommended values. This is in accordance with the guidelines recommended in the BRE guide.

However, the significance of impact has been classified on the basis of professional judgement in Table 3-3 and Table 3-4. It depends on the ratio of impact between the 'Baseline' and 'Proposed' scenario.

APSH	Ratio of Impact	Difference in APSH	Significance of Impact
< 25%	< 80%	>4%	Perceptible
< 25%	< 80%	$\leq 4\%$	Negligible
< 25%	≥80%	-	Negligible
≥ 25%	< 80%	-	Negligible
≥ 25%	≥80%	-	Imperceptible

Table 3-3 Significance of impact for APSH

WPSH	Ratio of Impact	Significance of Impact
< 5%	< 80%	Perceptible
< 5%	≥80%	Negligible
$\geq$ 5%	< 80%	Negligible
$\geq$ 5%	≥80%	Imperceptible

Table 3-4 Significance of impact for WPSH

The results of the APSH and WPSH for the identified buildings are shown in Table 3-4 below. Please refer to Figure 3-5 for window numbers.



Figure 3-5 Windows assessed for APSH and WPSH - 3 Charlotte Mews

Property	Tested Window		APSH (%) Propose d	APSH (%) Existing	% of existing case (80% and above)	BRE Criteria Met?	WPSH (%) Propose d	WPSH (%) Existing	% of existing case (80% and above)	BRE Criteria Met?
	Cround	W1	10	10	100%	YES	0	0	100%	YES
	Ground	W2	1	7	14%	NO	0	0	100%	YES
	First	W1	16	17	94%	YES	0	0	100%	YES
3 Charlotta		W2	13	16	81%	YES	0	0	100%	YES
Mews		W3	9	13	69%	YES *	0	0	100%	YES
	Second	W1	27			YES	1	3	33%	NO
	Second	W2	24	27	89%	YES	0	1	0%	NO
	Third	W1	41			YES	6			YES

Table 3-4 APSH and WPSH results for the tested windows

\* The BRE guide suggests that as a third criteria in addition to the first two, if the reduction in sunlight received over the whole year is greater than 4% of annual probable sunlight hours then the window will be adversely affected

The annual sunlight assessment indicates that most of the windows are able to meet the BRE criteria for sunlight availability. The only exception is W2 on the ground floor level. The results also show that the second floor windows fail to receive adequate level of sunlight in winter. However, as these windows fail in the baseline scenario also the proposed extension cannot be attributed alone for the lack of sunlight in the associated rooms. Therefore, it can be concluded that the proposed development is likely to have an impact of **negligible significance** on the sunlight availability of 3 Charlotte Mews.

#### Gardens and Amenity Spaces

Site analysis indicates that there are no amenity spaces associated with 66 Charlotte Street or neighbouring properties which would be overshadowed by the proposed extension. Therefore, an overshadowing analysis has not been undertaken for this project

### 4 Conclusion

An assessment of the daylight impact from the proposed development at 66 Charlotte Street on the existing surrounding buildings was carried out.

This report is an assessment of the impact of the proposed scheme on the availability of daylight and sunlight of the existing surrounding buildings and amenity spaces. It determines whether the proposed design meets the criteria set out in Building Research Establishment Report 'Site layout planning for daylight and sunlight: A guide to good practice' 2011 and British Standard BS 8206-02 'Lighting for buildings – Part 2: Code of practice for daylighting' (2008.)

The assessment was carried out on the windows of the adjacent properties which are most likely to be affected by the proposed building. Following the BRE guidelines, the assessment boundary was determined by the height of the new extension at 66 Charlotte Street. Based on the site analysis, all of the existing neighbouring properties that might be affected by the proposed development were identified and studied. This included developments at 64, 68, 73, 77-79, 81 Charlotte Street, 3 Charlotte Mews and 22 Tottenham Street.

The results of the daylight assessment showed that all the identified windows meet the BRE criteria for daylighting. Therefore, it can be concluded that the proposed development will have **no impact** on the daylight availability of the surrounding buildings.

Sunlight assessment was also undertaken for the facades that faces 90° of due south and are likely to be affected by the proposed extension. Site analysis indicated that only the rear windows of 3 Charlotte Mews are likely to have an impact on their sunlight availability from the proposed extension. The results indicated that one window on the ground floor and two windows on the second floor fail to meet the BRE criteria for sunlight availability. As these windows fail in the baseline scenario also, the proposed extension cannot be attributed alone for the lack of sunlight in the associated rooms. Therefore, it can be concluded that the proposed development is likely to have an impact of **negligible significance** on the sunlight availability of the adjacent properties.

Site analysis indicated there are no existing or proposed amenity spaces in close proximity of the application site. Therefore overshadowing assessment was not undertaken for 66 Charlotte Street.