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Daylight and Sunlight Study (Within Development)
26 Netherhall Gardens, London NW3 5TL

14 February 2019

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CONTENTS

APPENDICES

1 EXECUTIVE SUMMARY

1.1 Overview

1.1.1 Right of Light Consulting has been commissioned to undertake a daylight and sunlight study in connection with the development at 26 Netherhall Gardens, London NW3 5TL. The aim of the study is to check whether or not the proposed development receives satisfactory levels of daylight and sunlight.

1.1.2 The study is based on the numerical tests laid down in the Building Research Establishment (BRE) guide 'Site Layout Planning for Daylight and Sunlight: a good practice guide' by P J Littlefair 2011.

1.1.3 Appendix 1 identifies the windows analysed in this study. The numerical test results (including all calculation workings) are provided in Appendix 2. No sky line contours are presented in Appendix 1.

1.1.4 Right of Light Consulting confirms that the proposed design satisfies all of the requirements set out in the BRE guide 'Site Layout Planning for Daylight and Sunlight'.

2 INFORMATION SOURCES

2.1 Documents Considered

2.1.1 This report is based on the following drawings:

Squire and Partners

C645_E_E_001	Proposed East Elevation	Rev -
C645_E_N_001	Proposed North Elevation	Rev -
C645_E_S_001	Proposed South Elevation	Rev -
C645_E_W_001	Proposed West Elevation	Rev A
C645_E_W_002	Proposed Elevation Pavement Edge	Rev -
C645_P_00_001	Planning Ground Floor Plan	Rev -
C645_P_01_001	Planning First Floor Plan	Rev -
C645_P_LG_002	Planning Ground Floor Plan	Rev -
C645_S_AA_1	Proposed Section AA	Rev -
C645_S_BB_001	Proposed Section BB	Rev -

3 METHODOLOGY OF THE STUDY

3.1 BRE Guide : Site Layout Planning for Daylight and Sunlight

3.1.1 The study is based on the numerical tests laid down in the Building Research Establishment (BRE) guide 'Site Layout Planning for Daylight and Sunlight: a good practice guide' by P J Littlefair 2011.

3.1.2 The standards set out in the BRE guide are intended to be used flexibly. In instances where there is a special requirement for daylight or sunlight, higher levels may be deemed necessary. In other situations, such as with urban developments, lower daylight and sunlight levels may be unavoidable. The following statement is quoted directly from the BRE guide:

3.1.3 "The guide is intended for building designers and their clients, consultants and planning officials. The advice given is not mandatory and this document should not be considered 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 the many factors in site layout design."

3.2 National Planning Policy Framework

3.2.1 The BRE numerical guidelines should be considered in the context of the National Planning Policy Framework (NPPF), which stipulates that local planning authorities should take a flexible approach to daylight and sunlight to ensure the efficient use of land. The NPPF states:

3.2.2 "Local planning authorities should refuse applications which they consider fail to make efficient use of land, taking into account the policies in this Framework. In this context, when considering applications for housing, authorities should take a flexible approach in applying policies or guidance relating to daylight and sunlight, where they would otherwise inhibit making efficient use of a site (as long as the resulting scheme would provide acceptable living standards)."

3.3 Interior Daylighting

3.3.1 The interior daylighting recommendations set out in BRE guide are based on British Standard BS 8206 Part 2 and the Chartered Institute of Building Services Engineers Applications Manual on window design. Collectively, the guides set out three main criteria for interior daylighting. These are summarised as follows:

3.3.2 Test 1 Average Daylight Factor *(df)*

The Average Daylight Factor can be calculated using the following formula:

$$df = \frac{T\ Aw\ \theta}{A\ (1-R^2)}\ \%$$

Where

T is the diffuse visible transmittance of the glazing Awis the net glazed area of the window (m^2)
A is the total area of the room surfaces (m^2)
R is their average reflectance
Θ is the angle of visible sky in degrees

The Average Daylight factor test is applied to habitable rooms within domestic properties. A kitchen is generally deemed to be a habitable room if it is large enough to accommodate a dining area. If the kitchen is small or if the property has a separate dining area then the accepted practice is to treat the kitchen as a non habitable room.

For the purpose of this study we have assumed BRE internal reflectance values pertaining to medium wooden floors (Coefficient value of 0.4), light painted walls (0.8) and matte white painted ceilings (0.85).

For the purpose of this study we have assumed the windows consist of modern double-glazed units with a frame to glazing ratio of 0.85. A maintenance factor has been applied to consider the effect of dirt and grime on the visibility of the window. On this basis, the transmittance value used within this study is 0.68.

The guide recommends an Average Daylight Factor of 5% or more if there is no supplementary electric lighting, or 2% or more if supplementary lighting is provided. There are additional minimum recommendations for dwellings of 2% for kitchens, 1.5% for living rooms and 1% for bedrooms.

A special procedure is required for floor to ceiling windows such as patio doors. If part of a window is below the height of the working plane (a horizontal plane 0.85m above the floor in housing), this portion should be treated as a separate window. The ADF for this window has an extra factor applied to it, to take account of the reduced effectiveness of low level glazing in lighting the room. A value equal to the floor reflectance may be taken for this factor. The ADF for the portion of the window above the working plane is calculated in the normal way without this additional factor, and the ADFs for the two portions are added together.

Where a window has a large obstruction in front of it, the angle of visible sky can be increased by around 6° assuming the obstruction is painted a light colour.

3.3.3 Test 2 Room Depth

If a daylit room is lit by windows in one wall only, the depth of the room L should not exceed the limiting value given by:

$$\frac{L}{W} + \frac{L}{H} \leq \frac{2}{1-R_b}$$

Where

W is the room width
H is the window-head height above floor level
R_b is the average reflectance of the surfaces in the rear half of the room

3.3.4 Test 3 Position of the no sky line

If a significant area of the working plane lies beyond the no sky line (i.e. it receives no direct skylight), then the distribution of daylight in the room will look poor and supplementary electric lighting will be required.

The no sky line assessment is not applicable where a room derives its daylight solely from a light well or atrium. In these situations the room relies on borrowed light instead of direct skylight.

3.4 Sunlight to Windows

3.4.1 The BRE guide recommends that where possible each dwelling should have at least one main living room window that faces within 90 degrees of due south. However, the guide acknowledges that this is not always possible when it comes to flats.

3.4.2 The BRE sunlight tests should be applied to all main living rooms and conservatories which have a window which faces within 90 degrees of due south. The guide states that sunlight is viewed as less important in kitchens and bedrooms. In non-domestic buildings, any spaces which are deemed to have a specific requirement for sunlight should be checked.

3.4.3 The BRE guide recommends that main living room windows should receive 25% of the total annual probable sunlight hours, including 5% of the annual probable sunlight hours during the winter months between 21st September and 21st March.

4 RESULTS OF THE STUDY

4.1 Window Reference Points and No Sky Line Contours

4.1.1 Refer to Appendix 1 for a drawing which identifies the positions of the windows analysed in this study. The no skyline contours for the habitable rooms are also presented in Appendix 1.

4.2 Numerical Results

4.2.1 The numerical test results including all calculation workings are provided in Appendix 2.

4.3 Interior Daylighting

4.3.1 All rooms meet or surpass the BRE Average Daylight Factor targets.

4.3.2 All rooms pass the room depth test.

4.3.3 The BRE guide does not give fixed numerical pass/fail criteria for the No Sky Line test when applied to new dwellings (guidance is given for when this test is applied to existing neighbouring buildings). However, for completeness, we have illustrated the no sky line contours in Appendix 1.

4.4 Sunlight to Windows

4.4.1 Living rooms which face within 90 degrees of due south have been tested for direct sunlight. The results are presented in Appendix 2. Not all windows receive ideal levels of direct sunlight. However, the BRE guide acknowledges that it is not always possible for every dwelling to be well situated to receive direct sunlight.

4.5 Conclusion

4.5.1 Right of Light Consulting confirms that the proposed design satisfies all of the requirements set out in the BRE guide ‘Site Layout Planning for Daylight and Sunlight’.

5 CLARIFICATIONS

5.1 General

5.1.1 The report provided is solely for the use of the client and no liability to anyone else is accepted.

5.1.2 We have undertaken the survey following the guidelines of the RICS publication “Surveying Safely”.

5.1.3 Where limited access is available, assumptions will have been made.

5.1.4 Right of Light Consulting have endeavoured to include in the report those matters, which they have knowledge of or of which they have been made aware, that might adversely affect the validity of the opinion given.

5.1.5 Right of Light Consulting will notify those instructing them immediately and confirm in writing if for any reason the report requires any correction or qualification.

5.1.6 This report is based upon and subject to the scope of work set out in Right of Light Consulting’s quotation and standard terms and conditions.

5.1.7 Right of Light Consulting confirm that they have used their best endeavours to ensure that the facts stated in this report are correct and that the opinions expressed represent a true and complete professional opinion.

5.2 Project Specific

5.2.1 None.

APPENDICES

APPENDIX 1

WINDOW KEY & NO SKY LINE CONTOURS

Proposed Lower Ground Floor

Window Key and No Sky Line Contours

Key:

- Window reference
- Area receives no direct sky light (applied to habitable rooms)
- Area does receive direct sky light.
- Light aperture.

Project Name: 26 Netherhall Gardens, London NW3 5TL

Drawing Title: Window Key and No Sky Line Contours

Scale: Do not scale

Drawing No: 1 of 4 | Rev. -

Rev	Date	Details of revision

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Proposed Ground Floor

Window Key and No Sky Line Contours

Key:

- Window reference
- Area receives no direct sky light (applied to habitable rooms)
- Area does receive direct sky light.
- Light aperture.

Project Name: 26 Netherhall Gardens, London NW3 5TL

Drawing Title: Window Key and No Sky Line Contours

Scale: Do not scale

Drawing No: 2 of 4 | Rev. -

Rev	Date	Details of revision

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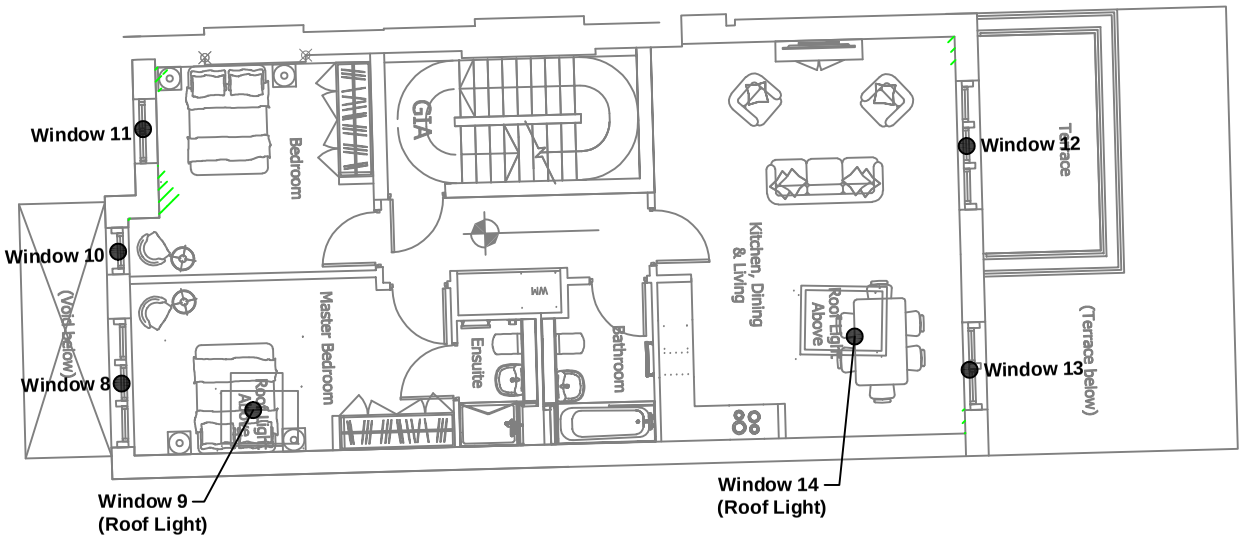
Proposed First Floor

Window Key and No Sky Line Contours



Key:

- Window reference
- Area receives no direct sky light (applied to habitable rooms)
- Area does receive direct sky light.
- Light aperture.

Project Name: 26 Netherhall Gardens, London NW3 5TL

Drawing Title: Window Key and No Sky Line Contours

Scale: Do not scale

Drawing No: 3 of 4 | Rev. -

Rev	Date	Details of revision

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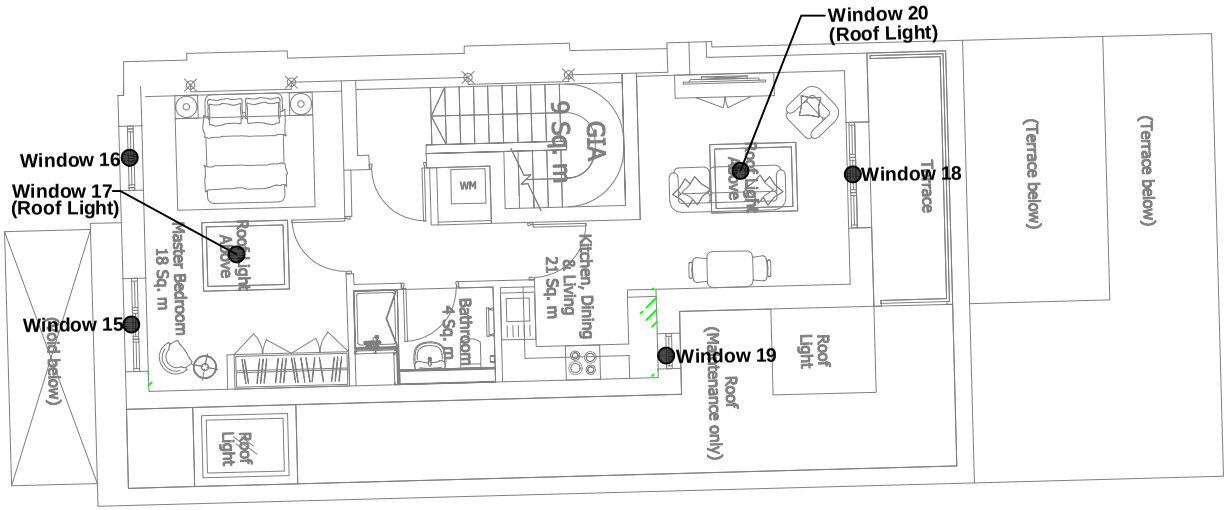
Proposed Second Floor

Window Key and No Sky Line Contours



Key:

- Window reference
- Area receives no direct sky light (applied to habitable rooms)
- Area does receive direct sky light.
- Light aperture.

Project Name: 26 Netherhall Gardens, London NW3 5TL

Drawing Title: Window Key and No Sky Line Contours

Scale: Do not scale

Drawing No: 4 of 4 | Rev. -

Rev	Date	Details of revision

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APPENDIX 2

DAYLIGHT AND SUNLIGHT CALCULATIONS

Appendix 2 - Average Daylight Factor (ADF)
26 Netherhall Gardens, London NW3 5TL

Reference	Target ADF based on room use		Average Daylight Factor Coefficients					Actual ADF	
	Primary room use	ADF	T	Aw	A	R	Theta	ADF	Result
Proposed Lower Ground Floor									
Window 1 (lower)			0.68	2.18	77.15	0.67	18.4	0.3%	
Window 1 (upper)			0.68	4.22	77.15	0.67	28.7	1.9%	
Total ADF for room	Bedroom	1.0%						**2.2%**	**Pass**
Window 2 (lower)			0.68	0.76	56.22	0.7	16.7	0.1%	
Window 2 (upper)			0.68	1.47	56.22	0.7	25.1	0.9%	
Total ADF for room	Bedroom	1.0%						**1.0%**	**Pass**
Proposed Ground Floor									
Window 3 (lower)			0.68	0.55	106.46	0.68	57.9	0.2%	
Window 3 (upper)			0.68	1.08	106.46	0.68	64.8	0.8%	
Window 4 (lower)			0.68	1.53	106.46	0.68	61.2	0.4%	
Window 4 (upper)			0.68	2.97	106.46	0.68	66.9	2.4%	
Total ADF for room	Living/Dining/Kitchen	2.0%						**3.8%**	**Pass**
Window 6 (lower)			0.68	0.55	112.18	0.68	29.5	0.1%	
Window 6 (upper)			0.68	1.08	112.18	0.68	39.7	0.5%	
Window 5 (lower)			0.68	1.53	112.18	0.68	25.9	0.2%	
Window 5 (upper)			0.68	2.97	112.18	0.68	39.3	1.3%	
Total ADF for room	Living/Dining/Kitchen	2.0%						**2.1%**	**Pass**
Window 7 (lower)			0.68	1.04	54.99	0.69	36.0	0.4%	
Window 7 (upper)			0.68	2.02	54.99	0.69	50.5	2.4%	
Total ADF for room	Bedroom	1.0%						**2.8%**	**Pass**
Proposed First Floor									
Window 8 (lower)			0.68	1.35	75.07	0.68	72.2	0.6%	
Window 8 (upper)			0.68	3.15	75.07	0.68	73.9	3.9%	
Window 9			0.68	1.3	75.07	0.68	97.5	2.1%	
Total ADF for room	Bedroom	1.0%						**6.6%**	**Pass**
Window 10 (lower)			0.68	0.55	67.12	0.7	71.6	0.3%	
Window 10 (upper)			0.68	1.14	67.12	0.7	73.4	1.7%	
Window 11 (lower)			0.68	0.13	67.12	0.7	65.6	0.1%	
Window 11 (upper)			0.68	1.58	67.12	0.7	67.2	2.1%	
Total ADF for room	Bedroom	1.0%						**4.2%**	**Pass**

Appendix 2 - Average Daylight Factor (ADF)
26 Netherhall Gardens, London NW3 5TL

Reference	Target ADF based on room use		Average Daylight Factor Coefficients					Actual ADF	
	Primary room use	ADF	T	Aw	A	R	Theta	ADF	Result
Window 12 (lower)			0.68	1.34	137.13	0.66	77.0	0.4%	
Window 12 (upper)			0.68	3.16	137.13	0.66	79.6	2.2%	
Window 14			0.68	1.44	137.13	0.66	101.3	1.3%	
Window 13 (lower)			0.68	0.91	137.13	0.66	76.0	0.2%	
Window 13 (upper)			0.68	2.15	137.13	0.66	79.4	1.5%	
Total ADF for room	Living/Dining/Kitchen	2.0%						**5.6%**	**Pass**
Proposed Second Floor									
Window 15 (lower)			0.68	0.2	80.86	0.68	76.9	0.1%	
Window 15 (upper)			0.68	2.28	80.86	0.68	78.3	2.8%	
Window 17			0.68	1.44	80.86	0.68	127.0	2.8%	
Window 16 (lower)			0.68	0.14	80.86	0.68	73.3	0.1%	
Window 16 (upper)			0.68	1.58	80.86	0.68	74.5	1.8%	
Total ADF for room	Bedroom	1.0%						**7.6%**	**Pass**
Window 18 (lower)			0.68	1.11	99.34	0.69	81.9	0.5%	
Window 18 (upper)			0.68	2.58	99.34	0.69	83.0	2.8%	
Window 20			0.68	1.44	99.34	0.69	134.2	2.5%	
Window 19 (lower)			0.68	0.03	99.34	0.69	56.0	0.0%	
Window 19 (upper)			0.68	0.79	99.34	0.69	59.4	0.6%	
Total ADF for room	Living/Dining/Kitchen	2.0%						**6.4%**	**Pass**

Appendix 2 - Room Depth Calculation
26 Netherhall Gardens, London NW3 5TL

Room	Room Depth Coefficients				Room Depth Calculation			Result
	L	W	H	Rb	L/W + L/H	<=	2/1-Rb	
Proposed Lower Ground Floor								
Window 1	5.8	3.2	2.5	0.67	4.13	<=	6.07	Pass
Window 2	3.2	3.6	2.5	0.7	2.17	<=	6.76	Pass
Proposed Ground Floor								
Window 3	7.2	4.7	2.5	0.68	4.41	<=	6.32	Pass
Window 4	7.2	4.7	2.5	0.68	4.41	<=	6.32	Pass
Window 5	7.8	3.8	2.5	0.68	5.17	<=	6.2	Pass
Window 6	3.8	7.8	2.5	0.68	2.01	<=	6.2	Pass
Window 7	3.4	3.4	2.5	0.69	2.36	<=	6.55	Pass
Proposed First Floor								
Window 8	5.6	3.0	2.6	0.68	4.02	<=	6.17	Pass
Window 10	4.3	3.6	2.6	0.7	2.85	<=	6.62	Pass
Window 11	3.8	3.6	2.6	0.7	2.52	<=	6.62	Pass
Window 12	5.3	6.9	2.6	0.66	2.81	<=	5.9	Pass
Window 13	5.3	6.9	2.6	0.66	2.81	<=	5.9	Pass
Proposed Second Floor								
Window 15	3.5	5.3	2.6	0.68	2.01	<=	6.21	Pass
Window 16	3.5	5.3	2.6	0.68	2.01	<=	6.21	Pass
Window 18	6.1	5.3	2.6	0.69	3.5	<=	6.41	Pass
Window 19	2.7	5.3	2.5	0.69	1.59	<=	6.41	Pass

Appendix 2 - Sunlight to Windows
26 Netherhall Gardens, London NW3 5TL

Reference	Use Class	Annual Probable Sunlight Hours	
		Total	Winter
Proposed Ground Floor			
Window 3	Living/Dining/Kitchen	18%	2%
Window 4	Living/Dining/Kitchen	26%	6%
Window 5	Living/Dining/Kitchen	12%	2%
Window 6	Living/Dining/Kitchen	19%	2%
Proposed First Floor			
Window 12	Living/Dining/Kitchen	33%	7%
Window 13	Living/Dining/Kitchen	30%	5%
Window 14	Living/Dining/Kitchen	23%	0%
Proposed Second Floor			
Window 18	Living/Dining/Kitchen	35%	8%
Window 19	Living/Dining/Kitchen	20%	3%
Window 20	Living/Dining/Kitchen	21%	0%