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Daylight and Sunlight Study (Within Development)
10 Elsworthy Road, London NW3 3DJ

4 December 2017

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CONTENTS

1 EXECUTIVE SUMMARY

1.1 Overview

1.1.1 Right of Light Consulting has been commissioned by Lorna Klimt to undertake a daylight and sunlight study in connection with the development at 10 Elsworthy Road, London NW3 3DJ. The aim of the study is to check whether or not the proposed basement and ground floors receive 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 3.

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:

ZAC MONRO ARCHITECTS

ER.002	Existing Site Plan	Rev –
ER.011	Existing Ground Floor Plan	Rev –
ER.012	Existing First Floor Plan	Rev –
ER.020	Existing Front and Rear Elevations	Rev –
ER.030	Existing Section AA	Rev –
ER.102	Proposed Site Plan	Rev –
ER.110	Proposed Basement Plan	Rev –
ER.111	Proposed Ground Floor Plan	Rev –
ER.112	Proposed First Floor Plan	Rev –
ER.120	Proposed Elevations	Rev –
ER.121	Proposed Side Elevation	Rev –
ER.130	Proposed Section AA	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 Interior Daylighting

3.2.1 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:

3.2.2 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 (BRE standard of 0.68)
Aw is 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, light painted walls and matte white painted ceilings.

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.

3.2.3 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

3.2.4 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.

3.3 Sunlight to Windows

3.3.1 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.

3.3.2 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.

3.3.3 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.

3.4 Overshadowing to Gardens and Open Spaces

3.4.1 The availability of sunlight should be checked for all open spaces where sunlight is required. This would normally include:

- Gardens, usually the main back garden of a house
- Parks and playing fields
- Children's playgrounds
- Outdoor swimming pools and paddling pools
- Sitting out areas, such as those between non-domestic buildings and in public squares
- Focal points for views such as a group of monuments or fountains.

3.4.2 The BRE guide recommends that for an open space to appear adequately lit throughout the year, at least 50% of its area should receive two hours of sunlight on 21st March

4 RESULTS OF THE STUDY

4.1 Window Reference Points

4.1.1 Refer to Appendix 1 for a drawing which identifies the positions of the windows analysed in this study. No Sky line .

4.2 Numerical Results and No Sky Line Contours

4.2.1 The numerical test results including all calculation workings are provided in Appendix 2. No sky line contours for the habitable rooms are presented alongside the window keys in Appendix 1.

4.3 Interior Daylighting

4.3.1 All rooms surpass their 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 3. The contours illustrate good access to daylight over a significant part of the working plane.

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.

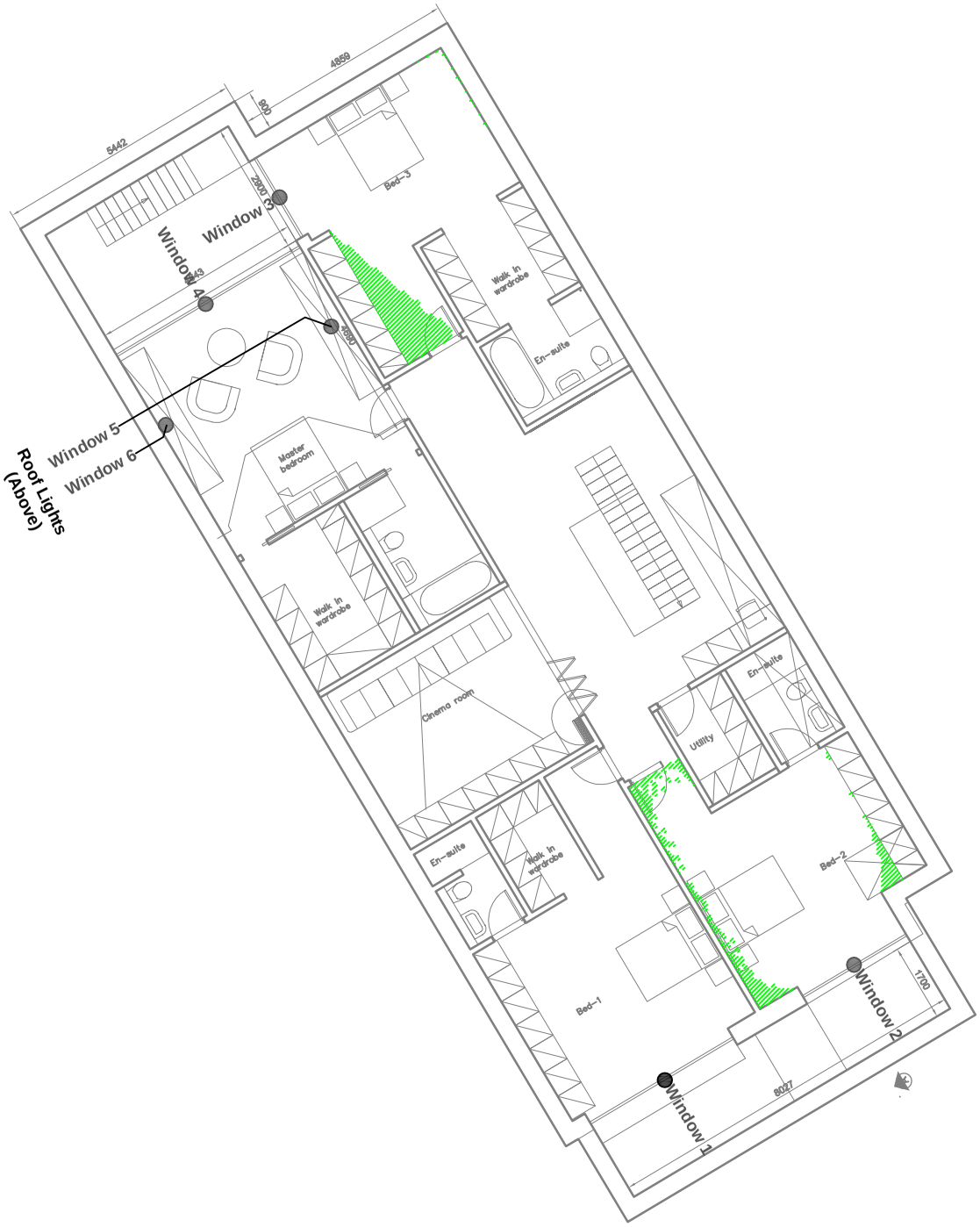
APPENDICES

APPENDIX 1

WINDOW KEY & NO SKY LINE CONTOURS

Proposed Basement Floor

Window Key and No Sky Line Contours



Window reference

G1 Gardens and Amenity Areas

Area receives no direct sky light (applied to habitable rooms)

Area does receive direct sky light.

Light aperture.

Project Name: 10 Elsworthy Road, London NW3 3DJ

Drawing Title: Window Key

Scale: Do not scale

Drawing No: | Rev. -

Rev	Date	Details of revision

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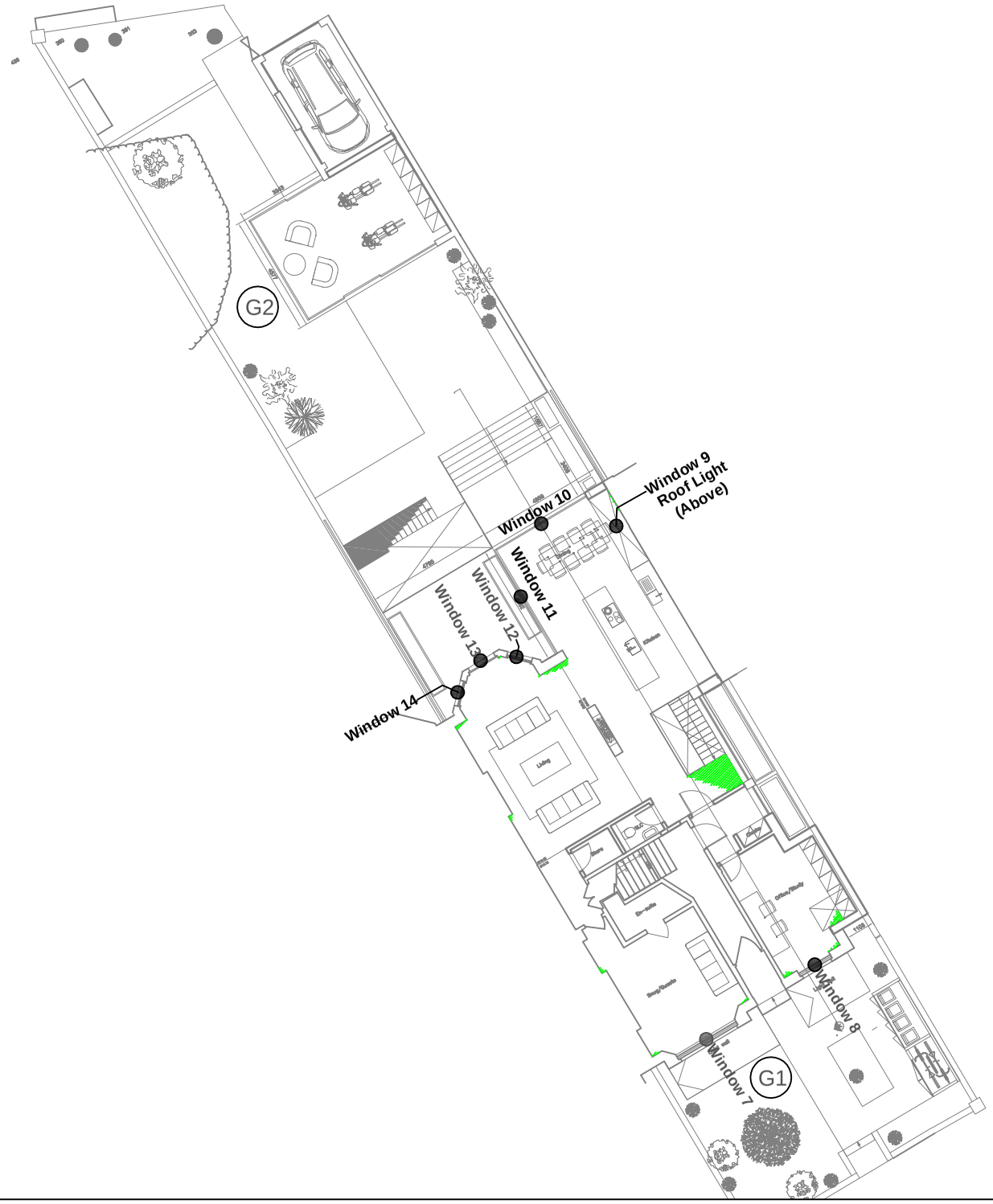
Proposed Ground Floor

Window Key and No Sky Line Contours



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Area does receive direct sky light.

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Project Name: **10 Elsworthy Road, London NW3 3DJ**

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APPENDIX 2

DAYLIGHT AND SUNLIGHT CALCULATIONS

Appendix 2 - Average Daylight Factor (ADF)
10 Elsworthy Road, London NW3 3DJ

Reference	Target ADF based on room use		Average Daylight Factor Coefficients					Actual ADF	
	Primary room use	ADF	T	Aw	A	R	Theta	ADF	Result
Basement Floor									
Window 1 (lower)			0.68	2.47	105.73	0.68	15.4	0.2%	
Window 1 (upper)			0.68	6.24	105.73	0.68	21.5	1.6%	
Total ADF for room	Bedroom	1.0%						**1.8%**	**Pass**
Window 2 (lower)			0.68	1.79	96.17	0.69	15.7	0.2%	
Window 2 (upper)			0.68	4.52	96.17	0.69	22.7	1.4%	
Total ADF for room	Bedroom	1.0%						**1.6%**	**Pass**
Window 3 (lower)			0.68	1.36	96.7	0.7	36.0	0.3%	
Window 3 (upper)			0.68	3.84	96.7	0.7	54.6	2.9%	
Total ADF for room	Bedroom	1.0%						**3.2%**	**Pass**
Window 4 (lower)			0.68	3.16	110.65	0.63	45.1	0.6%	
Window 4 (upper)			0.68	8.91	110.65	0.63	67.2	6.1%	
Window 5			0.68	1.62	110.65	0.63	82.5	1.4%	
Window 6			0.68	1.62	110.65	0.63	81.2	1.3%	
Total ADF for room	Living/Bedroom	1.5%						**9.4%**	**Pass**
Ground Floor									
Window 7 (lower)			0.68	0.19	95.42	0.7	76.6	0.1%	
Window 7 (upper)			0.68	4.02	95.42	0.7	77.8	4.3%	
Total ADF for room	Snug/Guests	1.5%						**4.4%**	**Pass**
Window 8 (lower)			0.68	0.09	71.37	0.71	76.6	0.1%	
Window 8 (upper)			0.68	2.04	71.37	0.71	74.7	2.9%	
Total ADF for room	Office/Study	1.5%						**3.0%**	**Pass**
Window 9			0.68	2.02	297.68	0.63	111.6	0.9%	
Window 10 (lower)			0.68	2.75	297.68	0.63	80.1	0.3%	
Window 10 (upper)			0.68	7.12	297.68	0.63	87.0	2.4%	
Window 11 (lower)			0.68	3.19	297.68	0.63	55.2	0.3%	
Window 11 (upper)			0.68	8.25	297.68	0.63	59.3	1.9%	
Window 12 (lower)			0.68	0.63	297.68	0.63	46.8	0.0%	

Appendix 2 - Average Daylight Factor (ADF)

10 Elsworthy Road, London NW3 3DJ

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 (upper)			0.68	1.62	297.68	0.63	53.4	0.3%	
Window 13 (lower)			0.68	0.73	297.68	0.63	71.7	0.1%	
Window 13 (upper)			0.68	1.88	297.68	0.63	81.8	0.6%	
Window 14 (lower)			0.68	0.63	297.68	0.63	46.2	0.0%	
Window 14 (upper)			0.68	1.63	297.68	0.63	70.7	0.4%	
Total ADF for room	Living / Dining / Kitchen	2.0%						**7.2%**	**Pass**

Appendix 2 - Room Depth Calculation

10 Elsworthy Road, London NW3 3DJ

Room	Room Depth Coefficients				Room Depth Calculation			Result
	L	W	H	Rb	L/W + L/H	<=	2/1-Rb	
Basement Floor								
Window 1	6.8	4.0	3.0	0.68	3.97	<=	6.17	Pass
Window 2	5.6	4.1	3.0	0.69	3.23	<=	6.38	Pass
Window 3	4.6	5.6	3.2	0.7	2.26	<=	6.62	Pass
Window 4	5.1	4.6	3.3	0.63	2.65	<=	5.41	Pass
Ground Floor								
Window 7	5.9	4.2	2.9	0.7	3.44	<=	6.62	Pass
Window 8	4.9	3.0	2.9	0.71	3.32	<=	6.93	Pass
Window 10	12.3	9.5	3.1	0.63	5.26	<=	5.47	Pass
Window 11	4.8	12.3	3.1	0.63	1.94	<=	5.47	Pass
Window 12	7.3	10.5	3.0	0.63	3.13	<=	5.47	Pass
Window 13	8.8	9.5	3.0	0.63	3.86	<=	5.47	Pass
Window 14	10.6	13.7	3.0	0.63	4.31	<=	5.47	Pass

Appendix 2 - Sunlight to Windows
10 Elsworthy Road, London NW3 3DJ

Reference	Use Class	Annual Probable Sunlight Hours	
		Total	Winter
Ground Floor			
Window 9	Living / Dining / Kitchen	34%	4%
Window 10	Living / Dining / Kitchen	18%	2%
Window 11	Living / Dining / Kitchen	25%	2%
Window 12	Living / Dining / Kitchen	1%	0%
Window 13	Living / Dining / Kitchen	16%	1%
Window 14	Living / Dining / Kitchen	13%	0%

Appendix 2 - Overshadowing to Gardens and Open Spaces
10 Elsworthy Road, London NW3 3DJ

Reference	Total Area	Area receiving at least 2 hours of sunlight on 21st March		Result
Ground Floor				
Garden 1	24.89 m2	23.12 m2	93%	Pass
Garden 2	58.89 m2	42.76 m2	73%	Pass