



RIGHT OF LIGHT  
CONSULTING  
Chartered Surveyors

**Right of Light Consulting**

Burley House  
15-17 High Street  
Rayleigh  
Essex  
SS6 7EW

**TEL** 0800 197 4836

**E-MAIL** [enquiries@right-of-light.co.uk](mailto:enquiries@right-of-light.co.uk)

**WEBSITE** [www.right-of-light.co.uk](http://www.right-of-light.co.uk)

## Daylight and Sunlight Study 59 to 61 Great Russell Street, London WC1B 3BE

13 January 2016



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Right of Light Consulting

Burley House  
15-17 High Street  
Rayleigh  
Essex SS6 7EW

Tel: 0800 197 4836

DAYLIGHT AND SUNLIGHT STUDY  
59 to 61 Great Russell Street, London WC1B 3BE

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# 1 EXECUTIVE SUMMARY

## 1.1 Overview

- 1.1.1 Right of Light Consulting has been commissioned by Heritage Surveys Limited to undertake a daylight and sunlight study in connection with the development at 59 to 61 Great Russell Street, London WC1B 3BE. The aim of the study is to check whether or not the habitable rooms within the proposed basement Flat No. 3 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 Whilst the results confirm that the proposed development does not fully comply with the BRE numerical recommendations, the isolated areas of non-compliance that we have identified in this case are not unusual in the context of an urban location. The BRE guide explains that the numerical guidelines should be interpreted flexibly, since natural lighting is only one of many factors in site layout design. The local authority should therefore balance daylight and sunlight considerations against all other material planning considerations when deciding whether to grant planning permission. We are of the opinion the proposed development achieves a good level of compliance when considering the design constraints and the urban context of the development site.

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## 2 INFORMATION SOURCES

### 2.1 Documents Considered

2.1.1 This report is based on the following drawings:

Heritage Surveys Ltd

|              |  |       |
|--------------|--|-------|
| 5922-S(1)001 | Proposed Basement Location Plan – Flat 3 | Rev – |
| 5922-S(1)002 | Proposed Basement Floor Plan – Flat 3    | Rev – |
| 5922-S(1)003 | Proposed North-West Elevations – Flat 3  | Rev – |
| 5922-S(1)004 | Proposed Light well Elevations – Flat 3  | Rev – |
| 5922-S(1)005 | Proposed Section A-A – Flat 3            | Rev – |

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### 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:

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

Where

- T is the diffuse visible transmittance of the glazing  
(client has specified a transmittance of 0.8)
- A<sub>w</sub> is the net glazed area of the window (m<sup>2</sup>)
- A is the total area of the room surfaces (m<sup>2</sup>)
- R is their average reflectance
- θ is the angle of visible sky in degrees

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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 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<sub>b</sub> is the average reflectance of the surfaces in the rear half of the room

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### 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 21<sup>st</sup> September and 21<sup>st</sup> March.



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## **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.

### **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 in Appendix 3.

### **4.3 Interior Daylighting**

4.3.1 All rooms meet or surpass the BRE Average Daylight Factor (ADF) targets with the exception of the Living/Dining/Kitchen served by windows 1 to 5. The room falls slightly short of the BRE recommended target of 2% (room achieves an ADF score of 1.6%). The BRE target of 2% is assigned to this room type as it contains a kitchen element. Whilst the room does not meet the recommended target of 2%, the BRE recommends that where small internal kitchens are inevitable, they should be linked to a well-lit living room. The results confirm that the living/dining/kitchen achieves an ADF score of 1.6% which is better than the minimum recommendation of a living room of 1.5%. The results confirm therefore that the kitchen is linked to a well-lit living room. Furthermore, we are of the opinion the proposed development achieves a good level of compliance when considering the design constraints and the context of an urban development site.

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.

### **4.4 Sunlight to Windows**

4.4.1 The living room contains at least one window which faces within 90 degrees of due south and has been tested for direct sunlight. The results are presented in Appendix 2. The windows do not receive ideal levels of direct sunlight. However, the BRE

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guide acknowledges that it is not always possible for every dwelling to be well situated to receive direct sunlight. The proposed development therefore satisfies the BRE direct sunlight to windows requirements.

## **4.5 Conclusion**

4.5.1 Whilst the results confirm that the proposed development does not fully comply with the BRE numerical recommendations, the isolated areas of non-compliance that we have identified in this case are not unusual in the context of an urban location. The BRE guide explains that the numerical guidelines should be interpreted flexibly, since natural lighting is only one of many factors in site layout design. The local authority should therefore balance daylight and sunlight considerations against all other material planning considerations when deciding whether to grant planning permission. We are of the opinion the proposed development achieves a good level of compliance when considering the design constraints and the urban context of the development site.

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## **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, reasonable 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 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

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## **APPENDICES**

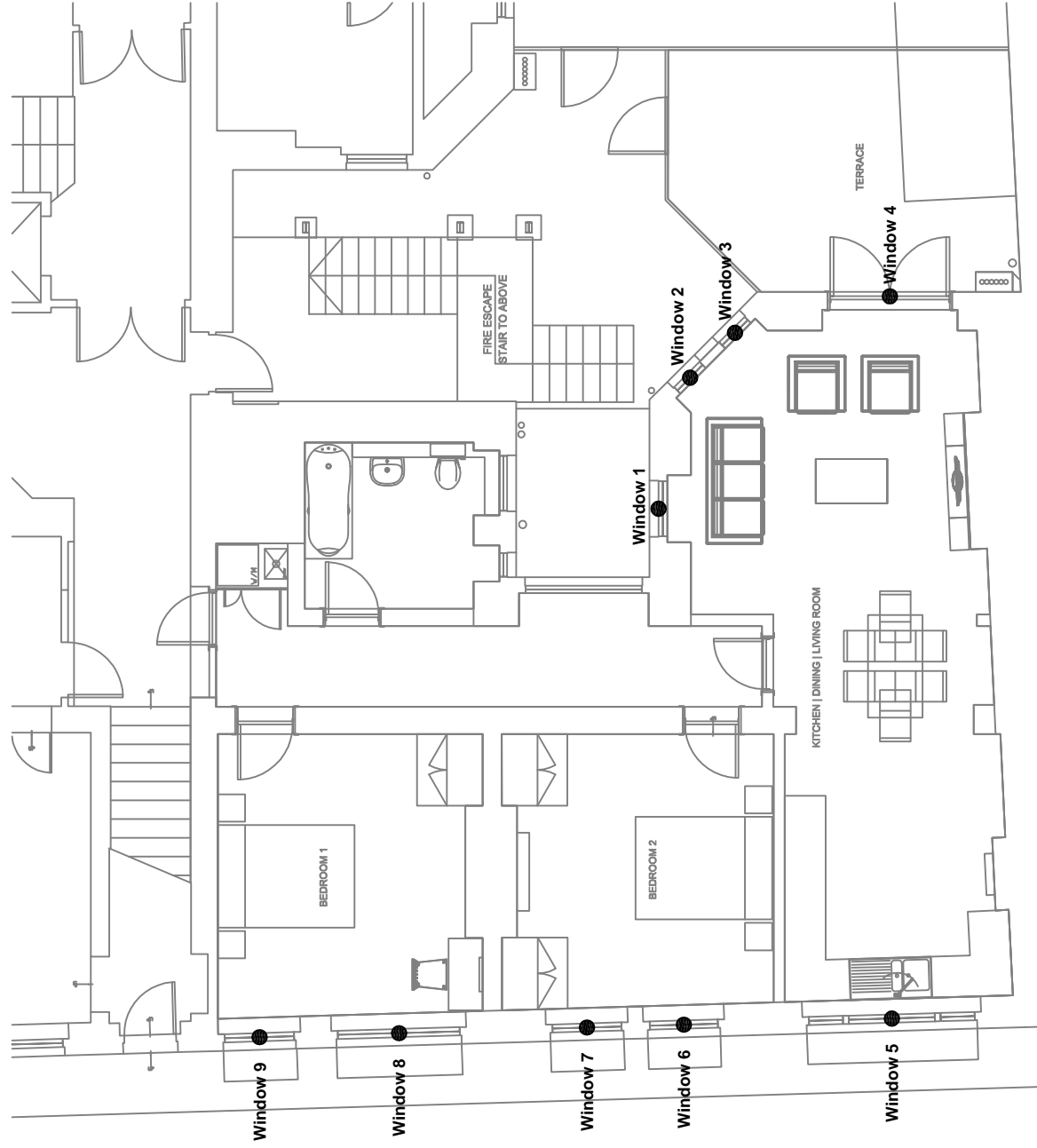
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## **APPENDIX 1**

### WINDOW KEY

Key:

Window 1 ● Window reference



Project Name: 59 to 61 Great Russell Street, London WC1B 3BE

Drawing Title: Window Key

Scale: Do not scale

Drawing No: 1 of 1

| Rev. | Date | Details of revision | Rev. | - |
|------|------|---------------------|------|---|
|      |      |                     |      |   |



Burley House  
16 - 17 High Street  
Rayleigh  
Essex SS6 7EW

Tel. 0800 197 4836

enquiries@right-of-light.co.uk  
www.right-of-light-consulting.com

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## **APPENDIX 2**

### **DAYLIGHT AND SUNLIGHT CALCULATIONS**

**Appendix 2 - Average Daylight Factor (ADF)  
59 to 61 Great Russell Street, London WC1B 3BE**

| Reference                               | Target ADF based on room use |      | Average Daylight Factor Coefficients |      |        |      |       | Actual ADF  |             |
|---|------------------------------|------|--------------------------------------|------|--------|------|-------|-------------|-------------|
|   | Primary room use             | ADF  | T                                    | Aw   | A      | R    | Theta | ADF         | Result      |
| <u>Proposed Basement Floor Flat 3</u>   |                              |      |                                      |      |        |      |       |             |             |
| Window 1                                |                              |      | 0.8                                  | 1.1  | 135.64 | 0.64 | 6.4   | 0.1%        |             |
| Window 2                                |                              |      | 0.8                                  | 0.72 | 135.64 | 0.64 | 13.5  | 0.1%        |             |
| Window 3                                |                              |      | 0.8                                  | 0.72 | 135.64 | 0.64 | 13.5  | 0.1%        |             |
| Window 4 (lower)                        |                              |      | 0.8                                  | 1.1  | 135.64 | 0.64 | 17.5  | 0.1%        |             |
| Window 4 (upper)                        |                              |      | 0.8                                  | 2.53 | 135.64 | 0.64 | 18.9  | 0.5%        |             |
| Window 5 (above street level)           |                              |      | 0.8                                  | 1.19 | 135.64 | 0.64 | 30.7  | 0.4%        |             |
| Window 5 - (below street level - lower) |                              |      | 0.8                                  | 0.63 | 135.64 | 0.64 | 6.5   | 0.0%        |             |
| Window 5 - (below street level - upper) |                              |      | 0.8                                  | 3.29 | 135.64 | 0.64 | 8.5   | 0.3%        |             |
| <b>Total ADF for room</b>               | Living/Dining/Kitchen        | 2.0% |                                      |      |        |      |       | <b>1.6%</b> | <b>Fail</b> |
| Window 6 (above street level)           |                              |      | 0.8                                  | 0.52 | 70.13  | 0.68 | 30.8  | 0.3%        |             |
| Window 6 - (below street level - lower) |                              |      | 0.8                                  | 0.26 | 70.13  | 0.68 | 6.9   | 0.0%        |             |
| Window 6 - (below street level - upper) |                              |      | 0.8                                  | 1.35 | 70.13  | 0.68 | 11.3  | 0.3%        |             |
| Window 7 - (above street level)         |                              |      | 0.8                                  | 0.53 | 70.13  | 0.68 | 30.0  | 0.3%        |             |
| Window 7 - (below street level - lower) |                              |      | 0.8                                  | 0.26 | 70.13  | 0.68 | 6.9   | 0.0%        |             |
| Window 7 - (below street level - upper) |                              |      | 0.8                                  | 1.37 | 70.13  | 0.68 | 11.2  | 0.3%        |             |
| <b>Total ADF for room</b>               | Bedroom                      | 1.0% |                                      |      |        |      |       | <b>1.2%</b> | <b>Pass</b> |
| Window 8 - (above street level)         |                              |      | 0.8                                  | 0.9  | 70.47  | 0.67 | 28.1  | 0.5%        |             |
| Window 8 - (below street level - lower) |                              |      | 0.8                                  | 0.46 | 70.47  | 0.67 | 7.3   | 0.0%        |             |
| Window 8 - (below street level - upper) |                              |      | 0.8                                  | 2.42 | 70.47  | 0.67 | 12.0  | 0.6%        |             |
| Window 9 - (above street level)         |                              |      | 0.8                                  | 0.52 | 70.47  | 0.67 | 26.7  | 0.3%        |             |
| Window 9 - (below street level - lower) |                              |      | 0.8                                  | 0.26 | 70.47  | 0.67 | 6.8   | 0.0%        |             |
| Window 9 - (below street level - upper) |                              |      | 0.8                                  | 1.38 | 70.47  | 0.67 | 11.1  | 0.3%        |             |
| <b>Total ADF for room</b>               | Bedroom                      | 1.0% |                                      |      |        |      |       | <b>1.7%</b> | <b>Pass</b> |



**Appendix 2 - Room Depth Calculation  
59 to 61 Great Russell Street, London WC1B 3BE**

| Room                             | Room Depth Coefficients |     |     |      | Room Depth Calculation |    |        | Result |
|----------------------------------|-------------------------|-----|-----|------|------------------------|----|--------|--------|
|                                  | L                       | W   | H   | Rb   | L/W + L/H              | <= | 2/l-Rb |        |
| Proposed Basement Floor - Flat 3 |                         |     |     |      |                        |    |        |        |
| Window 6                         | 4.0                     | 4.0 | 3.0 | 0.68 | 2.33                   | <= | 6.27   | Pass   |
| Window 7                         | 4.0                     | 4.0 | 3.0 | 0.68 | 2.33                   | <= | 6.27   | Pass   |
| Window 8                         | 4.2                     | 3.9 | 3.0 | 0.67 | 2.48                   | <= | 5.97   | Pass   |
| Window 9                         | 4.2                     | 3.9 | 3.0 | 0.67 | 2.48                   | <= | 5.97   | Pass   |

**Appendix 2 - Sunlight to Windows**  
**59 to 61 Great Russell Street, London WC1B 3BE**

| Reference                               | Use Class             | Annual Probable Sunlight Hours |        |
|---|-----------------------|--------------------------------|--------|
|   |                       | Total                          | Winter |
| <u>Proposed Basement Floor - Flat 3</u> |                       |                                |        |
| Window 1                                | Living/Dining/Kitchen | 0%                             | 0%     |
| Window 2                                | Living/Dining/Kitchen | 0%                             | 0%     |
| Window 3                                | Living/Dining/Kitchen | 0%                             | 0%     |
| Window 4                                | Living/Dining/Kitchen | 0%                             | 0%     |
| Window 5                                | Living/Dining/Kitchen | 5%                             | 0%     |

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## **APPENDIX 3**

### **NO SKY LINE CONTOURS**

### Appendix 3 No Sky Line Contours

Proposed Basement Floor Flat 3 at 59 to 61 Great Russell Street



Key:

● 1 Window reference

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

□ Area does receive direct sky light.

▬ Light aperture.

Project Name: 59 to 61 Great Russell Street, London WC1B 3BE

Drawing Title: No Sky Line Contours

Scale: Do not scale

Drawing No: 1 of 1

Rev. -

Rev Date

Details of revision



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Rayleigh  
Essex SS6 7EW

Tel. 0800 197 4836

enquiries@right-of-light.co.uk  
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