NRG CONSULTING

The Blue Lion

Daylight, Sunlight & Overshadowing Assessment

August 2022

Document Control Sheet

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Client	Lambournes
Site Address	133 Grays Inn Road, London, WC1X 8TU
Assessor	Alex Visintini
Approved By	Ryan Thrower
Date of Issue	08.08.2022

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CONTENTS

1 EXECUTIVE SUMMARY

1.1 NRG Consulting have been commissioned to undertake a Daylight, Sunlight and Overshadowing Assessment on a proposed development consisting of the partial retention/reconfiguration of the existing public house, together with the redevelopment of the site to provide 7 no. residential units at The Blue Lion, 133 Grays Inn Road, London, WC1X 8TU.

1.2 The following guidelines have been followed to assess the proposed development:

- BRE's *Site Layout Planning for Daylight and Sunlight, A guide to good practice (BR 209)*, by P J Littlefair, 3rd Ed.
- *BS EN 17037:2018 Daylight in Buildings*

1.3 The BRE document is a guide whose stated aim "is to help rather than constrain the designer". The document provides advice and states that "it should not be mandatory and should not be seen as an instrument of planning policy. In special circumstances, the developer or planning authority may wish to use different target values".

1.4 The results of this report show that there is no adverse effect on the sunlighting levels to the neighbouring properties and spaces at 131 and 135 Grays Inn Road. While the proposed development also shows that all the rooms achieve compliance with the internal daylight requirements set out in the BS EN 17037:2018.

1.5 In light of the above, it is considered that sunlight/daylight should not be a constraint to the granting of planning permission.

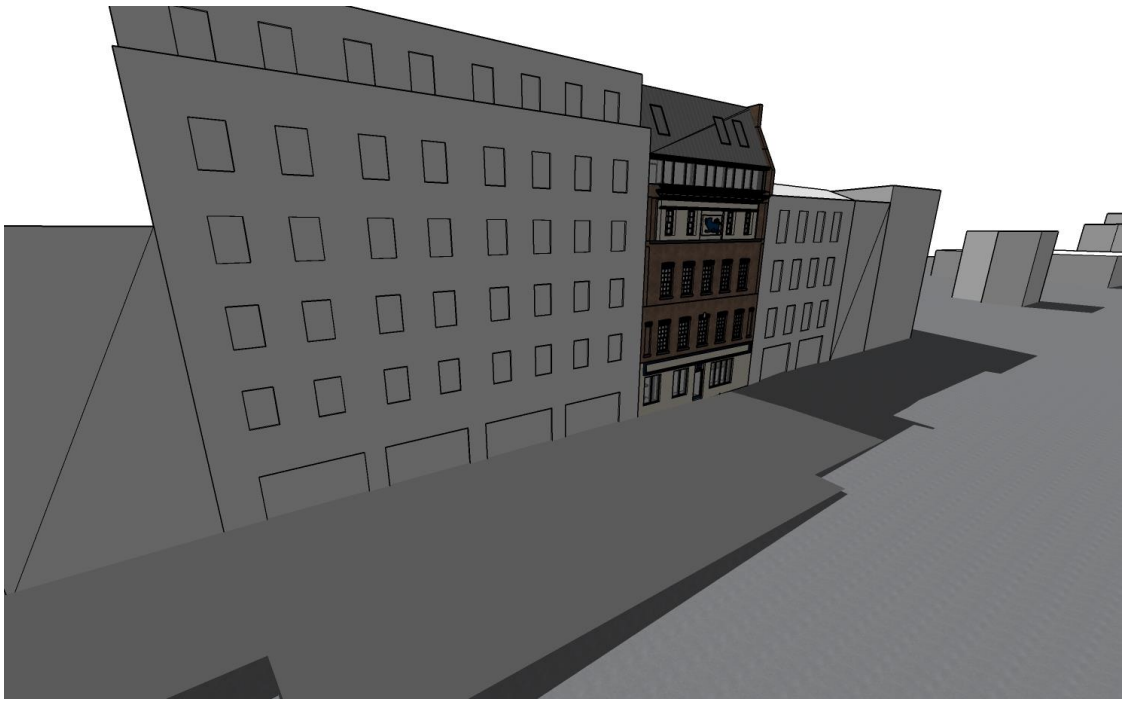

***Figure 1**: 3D model of proposed building.*

2 INTRODUCTION

2.1 Background

The Building Research Establishment (BRE) has set out in their handbook "Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice", 3rd Ed, guidelines and methodology for the measurement and assessment of daylight and sunlight within proposed buildings. This document states that it is also intended to be used in conjunction with the interior daylight recommendations found within the British StandaRoad BS EN 17037:2018 and the Applications Manual on Window Design of the Chartered Institution of Buildings Services Engineers (CIBSE).

The guide also provides advice on site layout planning to determine the quality of daylight and sunlight within open spaces between buildings.

The BSI has set out in BS EN 17037:2018 Daylight in Buildings guidance to good practice in daylighting design, and presents criteria intended to enhance the well-being and satisfaction of people in buildings.

This study assesses the availability of Daylight and Sunlight to the façades of the local dwellings and their amenity areas with respect to the design proposals prepared by the design team and the availability of internal daylight to the proposed building.

NRG Consulting has proposed the following methodology to assess the layouts proposed:

- Prepare a 3D computer model to understand and visualize sunlight for the neighbours.
- Carry out daylight sunlight assessment using the methodologies set out in by BRE and British StandaRoad Guidelines for diffuse daylight and sunlight conditions.
- Prepare a 3D computer model to assess the internal Daylight for the living rooms, kitchens and bedrooms of the proposed development.

2.2 The Nature and Effect of Daylight and Sunlight

The provision of daylight is as important as ensuring low levels of noise, or low levels of odour, in maintaining the enjoyment of one's property. Adequate levels of daylight are important not only to light and heat the home, but also for an occupant's emotional well-being. Daylight is widely accepted to have a positive psychological effect on human beings and there is a great deal of evidence to suggest that people who are deprived of daylight are more susceptible to depression and mood swings. This is common in northern countries, such as Norway, Iceland and Canada where daylight is scarce during the winter months.

3 DAYLIGHT AND SUNLIGHT ASSESSMENT GUIDANCE

3.1 Assessment of the Effect of Daylight and Sunlight

When assessing the effects of proposed building projects on the potential to cause issues relating to light, it is important to recognize the distinction between daylight and sunlight. Daylight is the combination of all direct and indirect sunlight during the daytime, whereas sunlight comprises only the direct elements of sunlight. On a cloudy or overcast day, diffused daylight still shines through windows, even when sunlight is absent.

Care should also be taken when the development is situated to the south of existing buildings, as in the northern hemisphere, the majority of the sunlight comes from the south. In the UK (and other northern hemisphere countries) south-facing facades will, in general, receive most sunlight, while north-facing facades will receive fewer sunlight hours during summer months, specifically early mornings and late evenings.

The Building Research Establishment (BRE) report, BRE 209 "Site Layout Planning for daylight and sunlight- a guide to good practice" by P J Littlefair, looks at three separate areas when considering the impacts of a new development on an existing property:

- Daylight - The impacts of all direct and indirect sunlight during daytime.
- Sunlight - The impacts of only the direct sunlight to a dwelling and its gaRoaden and open spaces.

Appendix 1 in the BRE Report details the methodologies and criteria.

The BRE report provides guidelines for when the obstruction to sunlight may become an issue:

- If the proposed or existing development has a window that faces within 90° of due south, and
- On this window wall, all points on a line 2m above ground level are within 4m (measured sideways) of a point which receives at least a quarter of annual probable sunlight hours, including at least 5% of annual probable sunlight hours during the winter months, between 21st September and 21st March.

BSI guidance BS EN 17037:2018 Daylight in Buildings provides criteria for internal daylight in various internal spaces.

Table 1 below summarises the criteria used in this report to assess the impacts from new development on the sunlight reaching existing properties, and for internal daylight.

<table>
<tr><th>PARAMETER</th><th>REPORT REFERENCE</th><th colspan="4">ACCEPTABILITY CRITERIA</th></tr>
<tr><td>Vertical Sky Component</td><td>BRE 209 Section 2.2</td><td colspan="4">Any reduction in the total amount of skylight can be calculated by finding the VSC at the centre of each existing window. If the VSC is both less than 27%, and less than 0.8 times its former value occupants will notice the reduction in the amount of skylight..</td></tr>
<tr><td>APSH/WPSH</td><td>BRE 209 Section 3.2</td><td colspan="4">It is recommended that interiors where the occupants expect sunlight receive at least one quarter (25%) of Annual Probable Sunlight Hours (APSH), including the winter months between 21st September and 21st March at least 5% of Annual Probable Sunlight Hours (WPSH). If the available sunlight hours are both less than these values and less than 0.8 times their former value, then the occupants will notice the loss of sunlight.</td></tr>
<tr><td rowspan="3">Internal Daylight</td><td rowspan="3">BS EN 17037:2018</td><td colspan="2">Illuminance method</td><td colspan="2">Daylight factor method</td></tr>
<tr><td>E_T (lx)</td><td>E_{TM} (lx)</td><td>D_T</td><td>D_{TM}</td></tr>
<tr><td>300</td><td>100</td><td>2.1 %</td><td>0.7%</td></tr>
</table>

***Table 1**:BRE daylighting criteria*

3.2 Angle to sky from horizontal.

In general, a building will retain the potential for good interior diffuse daylighting provided that, on all its main faces no obstruction, measured in a vertical section perpendicular to the main face, from the centre of the lowest window, subtends an angle of 25 ° to the horizontal or less.

If this criterion is satisfied, no further calculations are required as it is unlikely that daylighting will be significantly affected.

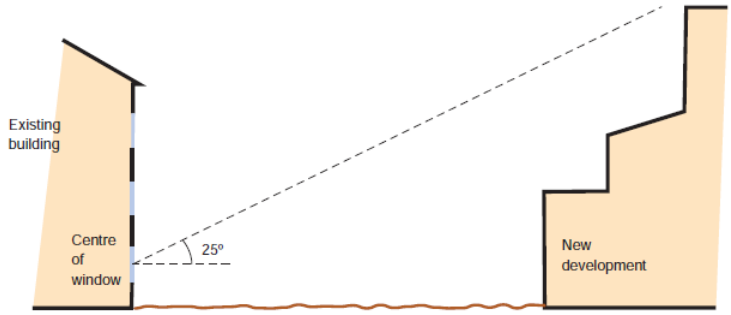

***Figure 2**: Section showing the angle to sky from horizontal criteria for diffuse daylighting*

4 METHODOLOGY APPLIED

4.1 Data

All the information has been taken directly from digital files provided by the Design Team. A site survey to collect the surrounding existing window placements and heights was conducted by NRG on 07 March 2022.

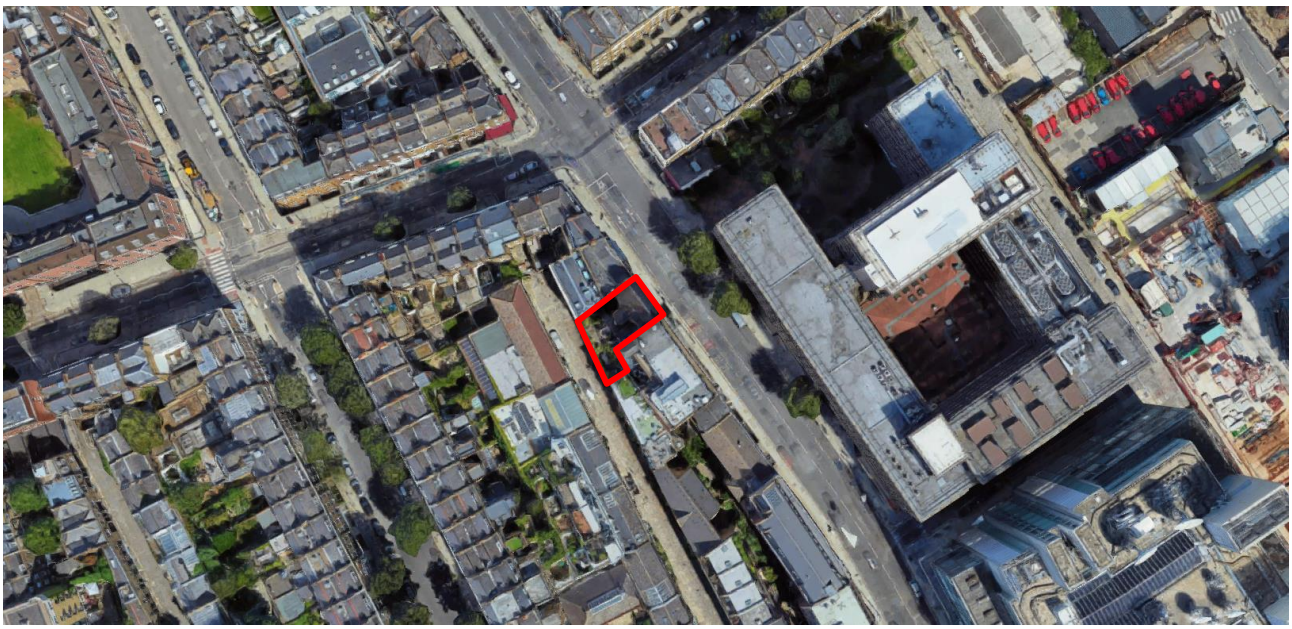

Figure 3: *Aerial view of the site as existing*

Figure 4: *Proposed site plan*

4.2 3D Model

To complete the daylight, sunlight and overshadowing assessment for the adjacent properties, a full-size 3D model of the existing area, including existing buildings and neighbouring properties was constructed in Trimble SketchUp 2021. The measure of the angle to sky from horizontal has been made manually within the model space, MBS Daylight software has been used to assess the Vertical Sky Component and the APSH/WPSH.

To measure the internal daylight levels for the proposed development a 3D model was constructed in IES ModelIT. The internal daylight has been assessed with IES Radiance, a thermal and environmental analysis program.

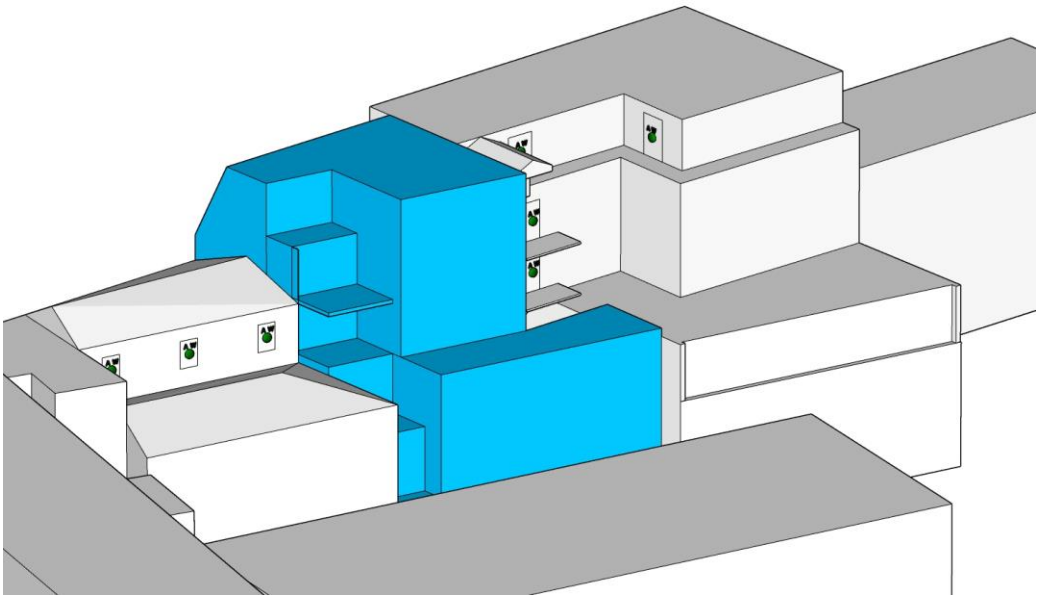

Figure 5: *SketchUp 3D model of the proposed development*

4.3 Internal Surface Properties

Reflectance for rooms internal surfaces affect the resulting internal daylight levels. Lighter colours result in higher reflectance (white: 1.0; black: 0.0). Windows Light Transmittance is the amount of light that enter the glazed surface.

Surface	Reflectance	
Floor	0.2	
Walls	0.5	
Ceiling	0.7	
Window	Light Transmittance	0.68

Table 2*: Internal surface properties*

4.4 Design Data

Architects: Ackroyd Lowrie
Drawing pack issued for Assessment: June 2022

001 Location & Site Plan	Adobe Acrobat D...	158 KB
010 Existing LGF Plan	Adobe Acrobat D...	30 KB
011 Existing GF Plan	Adobe Acrobat D...	36 KB
012 Existing 1F Plan	Adobe Acrobat D...	31 KB
013 Existing 2F Plan	Adobe Acrobat D...	28 KB
014 Existing 3F Plan	Adobe Acrobat D...	30 KB
015 Existing Roof Plan	Adobe Acrobat D...	28 KB
020 Existing East & West Elevations	Adobe Acrobat D...	421 KB
030 Existing Section AA	Adobe Acrobat D...	54 KB
031 Existing Section BB	Adobe Acrobat D...	90 KB
032 Existing Section CC	Adobe Acrobat D...	61 KB
033 Existing Section DD	Adobe Acrobat D...	76 KB
050 Demolition LGF Plan	Adobe Acrobat D...	34 KB
051 Demolition GF Plan	Adobe Acrobat D...	40 KB
052 Demolition 1F Plan	Adobe Acrobat D...	36 KB
053 Demolition 2F Plan	Adobe Acrobat D...	31 KB
054 Demolition 3F Plan	Adobe Acrobat D...	33 KB
055 Demolition Roof Plan	Adobe Acrobat D...	30 KB
060 Demolition East & West Elevations	Adobe Acrobat D...	483 KB
070 Demolition Section AA	Adobe Acrobat D...	83 KB
071 Demolition Section BB	Adobe Acrobat D...	133 KB
072 Demolition Section CC	Adobe Acrobat D...	77 KB
073 Demolition Section DD	Adobe Acrobat D...	110 KB
100 Proposed LGF Plan	Adobe Acrobat D...	66 KB
101 Proposed GF Plan	Adobe Acrobat D...	72 KB
102 Proposed 1F Plan	Adobe Acrobat D...	62 KB
103 Proposed 2F Plan	Adobe Acrobat D...	61 KB
104 Proposed 3F Plan	Adobe Acrobat D...	67 KB
105 Proposed 4F Plan	Adobe Acrobat D...	49 KB
106 Proposed 5F Plan	Adobe Acrobat D...	44 KB
107 Proposed Roof Plan	Adobe Acrobat D...	33 KB
110 Proposed East & West Elevations	Adobe Acrobat D...	740 KB
111 Proposed South Elevation	Adobe Acrobat D...	281 KB
120 Proposed Section AA	Adobe Acrobat D...	97 KB
121 Proposed Section BB	Adobe Acrobat D...	154 KB
122 Proposed Section CC	Adobe Acrobat D...	119 KB
123 Proposed Section DD	Adobe Acrobat D...	238 KB

5 RESULTS

5.1 Vertical Sky Component Analysis and APSH/WPSH Analysis

The assessment of the VSC demonstrates that there is minimal change between the VSC available to the windows analysed as existing and after the proposed development. The analysis of Annual and Winter Probable Sunlight Hours shows that there is no adverse effect to existing properties.

The analysed windows and their addresses are found in Table 3 and 4 below, all are deemed BRE compliant.

ADDRESS	WINDOW No	PRE CONSTRUCTION VSC	POST CONSTRUCTION VSC	AFFECT RATIO	MEETS BRE CRITERIA
131, Grays Inn Road	1	39.62	34.11	0.86	YES
	2	39.62	35.01	0.88	YES
	3	39.62	37.75	0.95	YES
	4	39.38	37.72	0.96	YES
135, Grays Inn Road	5	39.62	39.48	1.00	YES
	6	39.62	39.21	0.99	YES
	7	39.62	37.35	0.94	YES

***Table 3**: Results of Visual Sky Component Analysis. If a window were to achieve less than 27% Post Construction VSC the Affect Ratio must be at least 0.80 to ensure BRE compliance.*

ADDRESS	WINDOW No	PRE CONSTRUCTION APSH	POST CONSTRUCTION APSH	AFFECT RATIO	PRE CONSTRUCTION WPSH	POST CONSTRUCTION WPSH	AFFECT RATIO	MEETS BRE CRITERIA
131, Grays Inn Road	1	69	64	0.93	25	25	1	YES
	2	69	64	0.93	25	25	1	YES
	3	68	65	0.96	24	24	1	YES
	4	21	21	1	2	2	1	YES
135, Grays Inn Road	5	64	62	0.97	23	21	0.91	YES
	6	64	60	0.94	23	19	0.83	YES
	7	64	51	0.8	23	13	0.57	YES

***Table 4**: Results of Annual Probable Sunlight Hours. If a window were to achieve less than 25% Post Construction APSH or 5% WPSH the Affect Ratio must be at least 0.80 to ensure BRE compliance*

5.2 Internal Daylight Levels – Proposed Development

We have assessed the proposed new accommodation to determine whether the internal spaces will be provided with adequate daylight. BS EN 17037:2018 prescribes two alternative methods to conduct the assessment and each of these two methods set out two targets that need to be achieved to demonstrate compliance:

- Illuminance method: $E_T \geq 300lx$ over 50% of the floor area & $E_{TM} \geq 100lx$ over 95% of the floor area
- Daylight factor method: $D \geq 2.1\%$ over 50% of the floor area % $D \geq 0.7$ % over 95% of the floor area

The analysis of the internal spaces following the Illuminance Method indicates that only one bedroom fails the daylight test while all the other rooms (96% of the habitable spaces) exceed the acceptable criteria of both the BRE Guide and as also set within BS EN 17037:2018 Daylight in Buildings in terms of internal daylight levels.

The results are summarised in the table below.

Unit	Room	% of floor area achieving target illuminance E_T = 300 lx	% of floor area achieving target illuminance E_{TM} = 100 lx	BRE Compliant
1	Kitchen/living room	53	95	YES
	Bedroom 1	98	100	YES
	Bedroom 2	86	100	YES
	Bedroom 3	90	100	YES
2	Kitchen/living room	10	100	YES
	Bedroom	93	100	YES
3	Kitchen/living room	100	100	YES
	Bedroom 1	99	100	YES
	Bedroom 2	100	100	YES
	Bedroom 3	92	100	YES
4	Kitchen/living room	100	100	YES
	Bedroom	100	100	YES
5	Kitchen/living room	87	100	YES
	Bedroom 1	100	100	YES
	Bedroom 2	100	100	YES
	Bedroom 3	25	83	NO
6	Kitchen/living room	100	100	YES
	Bedroom 1	92	100	YES
	Bedroom 2	100	100	YES
	Bedroom 3	100	100	YES
7	Kitchen/living room	100	100	YES
	Bedroom 1	100	100	YES
	Bedroom 2	78	100	YES

***Table 5**: Internal daylight results*

5.3 Proposed Floor Plans

Figure 6: Proposed first floor plan

Figure 7: Proposed second floor plan

Figure 8: Proposed third floor plan

Figure 9: Proposed fourth floor plan

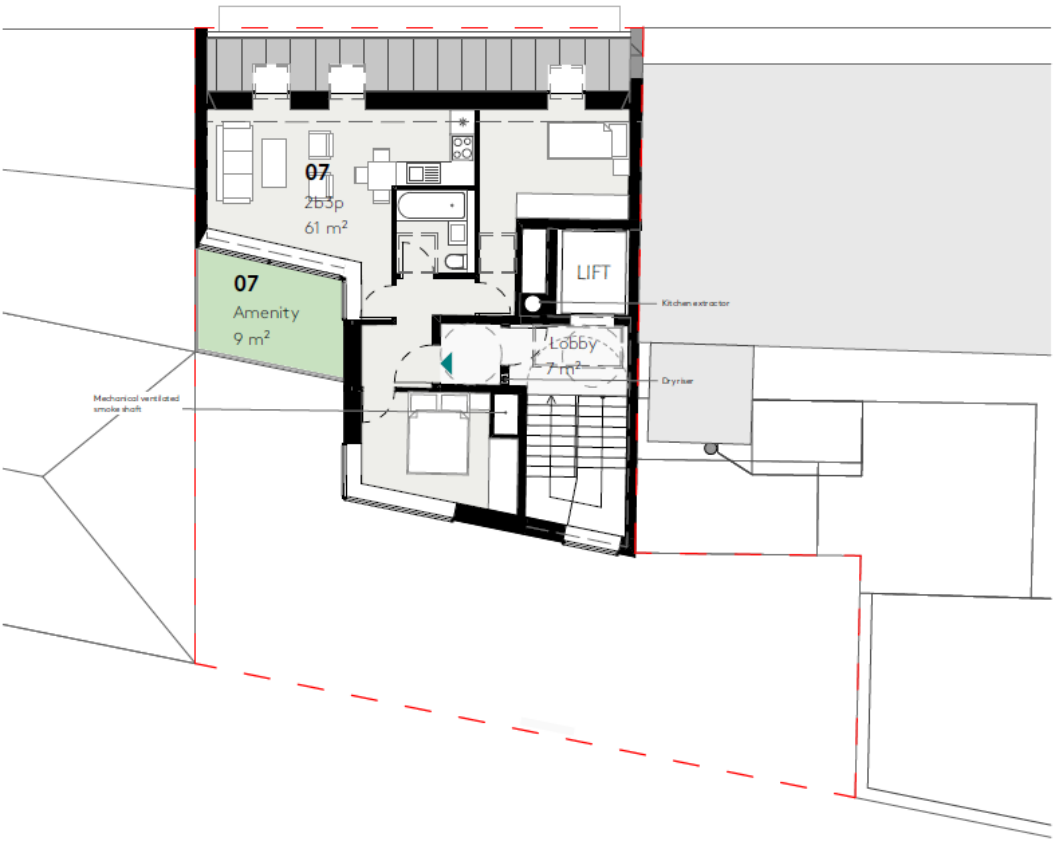

***Figure 10**: Proposed top floor plan*

6 CONCLUSION

6.1 The daylight and sunlight analysis indicates that there will be no impact on the surrounding properties at 131 and 135 Grays Inn Road arising from the proposed development at 133 Grays Inn Road, London, WC1X 8TU.

6.2 The results of our analysis [Sections 5.1-5.3] show that the neighbouring habitable windows/rooms analysed satisfy the target requirements of the BRE Guide in terms of daylight and sunlight in the proposed situation with no significant adverse material effect.

6.3 The VSC Analysis demonstrates that there is a minimal change between the access to daylight to the existing buildings before and after the proposed development. None of the various windows analysed were adversely affected by the proposed development and all comfortably comply with BRE guidelines for the recommended levels of adequate daylighting [Section 5.1].

6.4 The APSH and WPSH assessment show that proposed development doesn't significantly affect the existing buildings. None of the various windows analysed suffer a sunlight loss and all comfortably comply with and BS EN 17037:2018 [Section 5.1]

6.5 The illuminance method for the internal spaces of the proposed development has been carried out as part of this assessment. We conclude that daylight levels within the vast majority (96%) of the proposed habitable rooms are adequate and exceed the target criteria set within BS EN 17037:2018 and BRE publication "Site Layout Planning for Daylight & Sunlight – A guide to good practice" [Section 5.2].

6.6 Overall, the proposed development fully complies with BRE Guidelines and will not cause impact to daylight and sunlight access for the surrounding buildings. Its habitable rooms also largely achieve the minimum target internal daylight levels. **In light of the above, it is considered that sunlight/daylight should not be a constraint to the granting of planning permission.**

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