NRG CONSULTING

Claremont Road

Internal Daylight Assessment

March 2024

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1 Executive Summary

NRG Consulting have been commissioned to undertake an Internal Daylight Assessment on a proposed development at **George House, 2A Claremont Road, Teddington, TW11 8DG**.

The proposed description of development is: *Conversion of an existing building to create three residential units.*

Our assessment of the proposed development is in adherence to the following best-practice guidance and industry standards:

- *BRE's Site Layout Planning for Daylight and Sunlight, A guide to good practice (BR 209),* 3rd Ed. (2022)
- *Daylight in Buildings* – (BS EN 17037:2018)

The findings of this report illustrate that all the rooms achieve compliance with the internal daylight requirements as set out in the above guidances.

Based on these findings, it is considered that internal daylight levels should not be a constraint to the granting of planning permission.

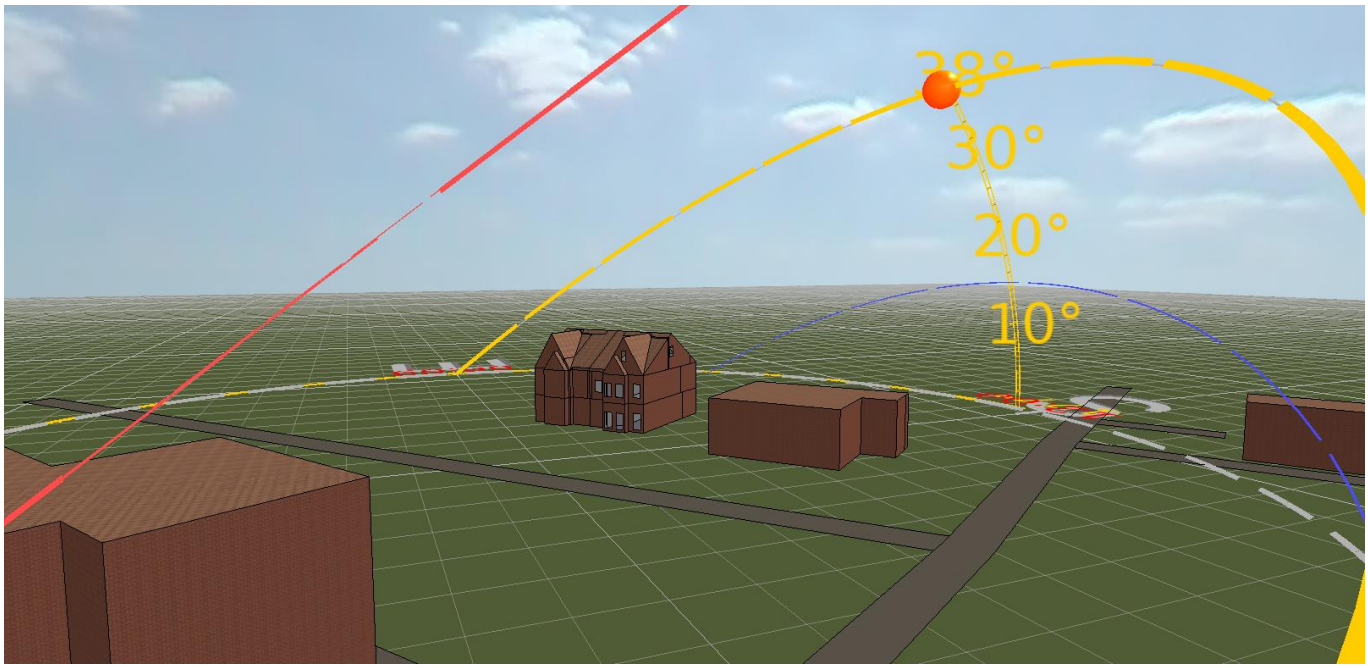

Figure 1*: 3D model of proposed buildings*

2 Introduction

2.1 Background

British Standard *Daylight in Buildings* (BS EN 17037) provides advice and guidelines on interior daylighting. It offers two methodologies for daylight provision in buildings: one based on achieving target illuminances from daylight, and an alternative method based on calculating daylight factors.

Within this report NRG Consulting proposes the following approach to assess the scheme:

- We will create a 3d model and use industry recognised software to evaluate internal daylight levels using the illuminance method for the living rooms, kitchens, and bedrooms of the proposed development.

2.2 The Nature and Effect of Daylight and Sunlight

The 3rd edition of the "Site Layout Planning for Daylight and Sunlight" guide by Paul J. Littlefair, released in June 2022, replaces the second edition. The key update is the methods for assessing daylight in a proposed building, as per Section 2.1 and Appendix C of the handbook. *Daylight in buildings* (BS EN 17037) supersedes BS 8206 Part 2 "Code of practice for daylighting", which contained a method of assessment based on Average Daylight Factor, which is now no longer recommended.

BS EN 17037 offers two methodologies for evaluating daylight across a room's working plane: the Illuminance Method and the Daylight Factor Method. BS EN 17037 further gives three levels of recommendation for daylight provision in interior spaces: minimum, medium and high. For compliance with the standard, a daylit space should achieve the minimum level of recommendation.

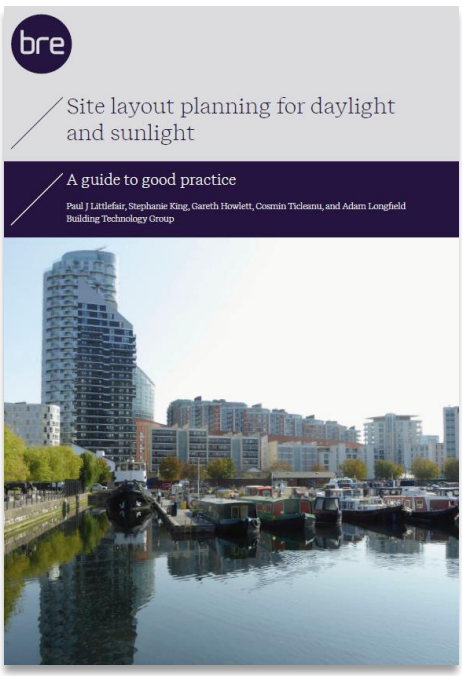

Figure 2: *BRE guidelines*

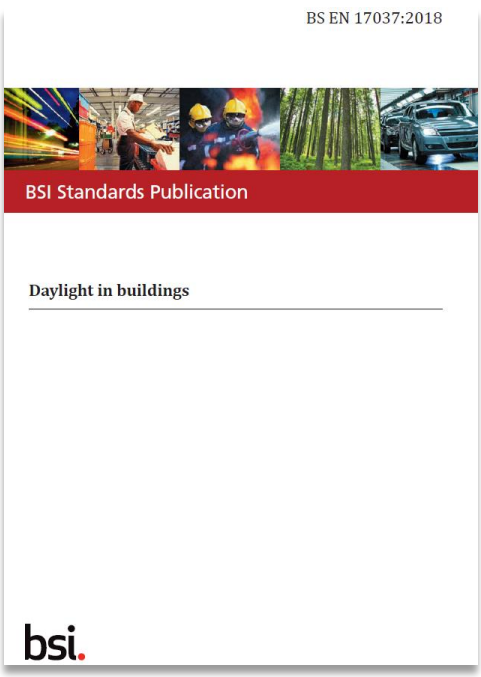

Figure 3*: BS EN 17037*

3 Daylight and Sunlight Assessment Guidance

3.1 Internal Daylight Assessment

In evaluating the internal daylight levels of proposed building projects, it is crucial to differentiate between daylight and sunlight. Daylight encompasses all direct and indirect sunlight during daytime hours, while sunlight refers solely to direct sunlight. Even on cloudy or overcast days, diffuse daylight can illuminate rooms through windows, despite the absence of sunlight.

The BS EN 17037 outlines criteria for two methodologies: the Illuminance Method and the Daylight Factor Method.

Illuminance Method

This method uses climatic data specific to the site location to calculate daylight illuminance at each point on a reference plane's assessment grid, at least hourly, for a typical year. A target illuminance (E_T) should be achieved across at least half of the reference plane in a daylit space for at least half of the daylight hours. Additionally, a minimum target illuminance (E_{TM}) should be achieved across 95% of the reference plane for at least half of the daylight hours; this is the minimum target illuminance to be achieved towards the back of the room. The E_{TM} target does not need to be achieved in UK dwellings.

Target illuminances from daylight over at least half of the daylight hours		
Level of recommendation	**Target illuminance E_T (lx) for half of assessment grid**	**Target illuminance E_{TM} (lx) for 95% of assessment grid**
Minimum* *(See Table 3 for UK min)*	*300*	*100*
Medium	500	300
High	750	500
Table 1: *Target illuminance for side lit rooms*		

Daylight Factor Method

This method involves calculating the daylight factor at each point on an assessment grid. The CIE standard overcast sky is used for this calculation, and the result is expressed as a percentage. The table below provides the daylight factor targets for side-lit rooms in London. The recommendations are considered met if the target daylight factor D for half of the floor area is achieved.

Target daylight factors (D) for London		
Level of recommendation	**Target daylight factor D for half of assessment grid**	**Target daylight factor D for 95% of assessment grid**
Minimum	2.1%	0.7%
Medium	3.5%	2.1%
High	5.3%	3.5%
Table 2: *Target illuminance for side lit rooms*		

Specific Recommendations for Daylight Provision in UK Dwellings

It is opinion of the UK committee that the recommendations for daylight provision set out in the BS EN 17037 may not be achievable for some buildings, particularly dwellings. It also highlights the relation between high internal daylight levels and risk of summer-time overheating recommending that any room in a dwelling where a daylight illuminance of 500lx is exceeded on 50% of the grid point for more than half of the daylight hours is checked for overheating.

The UK National Annex (Appendix C of the BRE Guidance) gives specific recommendations for habitable rooms in dwellings built in the United Kingdom. These recommendations are particularly relevant for 'hard to light' dwellings, such as those located in basements, those with significant external obstructions, or existing buildings being refurbished or converted into dwellings.

The National Annex therefore provides the UK guidance on minimum daylight provision in all UK dwellings, superseding the figure shown in Table 1.

Furthermore, the recommended levels of illuminance achieved over 95% of a reference plane need not apply to dwellings in the UK and thus are not included in this report.

Target illuminances from daylight over at least half of the daylight hours	
Room	**Target illuminance E_T (lx) for half of assessment grid**
Kitchen	200
Living room	150
Bedroom	100

Table 3: *Specific recommendations for daylight provision in UK dwellings*

Target daylight factors (DT) to achieve over at least 50% of the assessment grid			
Location	**DT for 100 lx (Bedroom)**	**DT for 150 lx (Living room)**	**DT for 200 lx (Kitchen)**
London	0.7%	1.1%	1.4%

Table 4: *Daylight factor target for UK dwellings*

4 Methodology Applied

4.1 Data

All data utilised in this report has been sourced directly from digital files supplied by the Design Team. The height of any potential obstructions has been determined using survey data or derived from publicly accessible aerial photographs.

Figure 4: *Aerial view of the site as existing*

4.2 Proposed Floor Plans

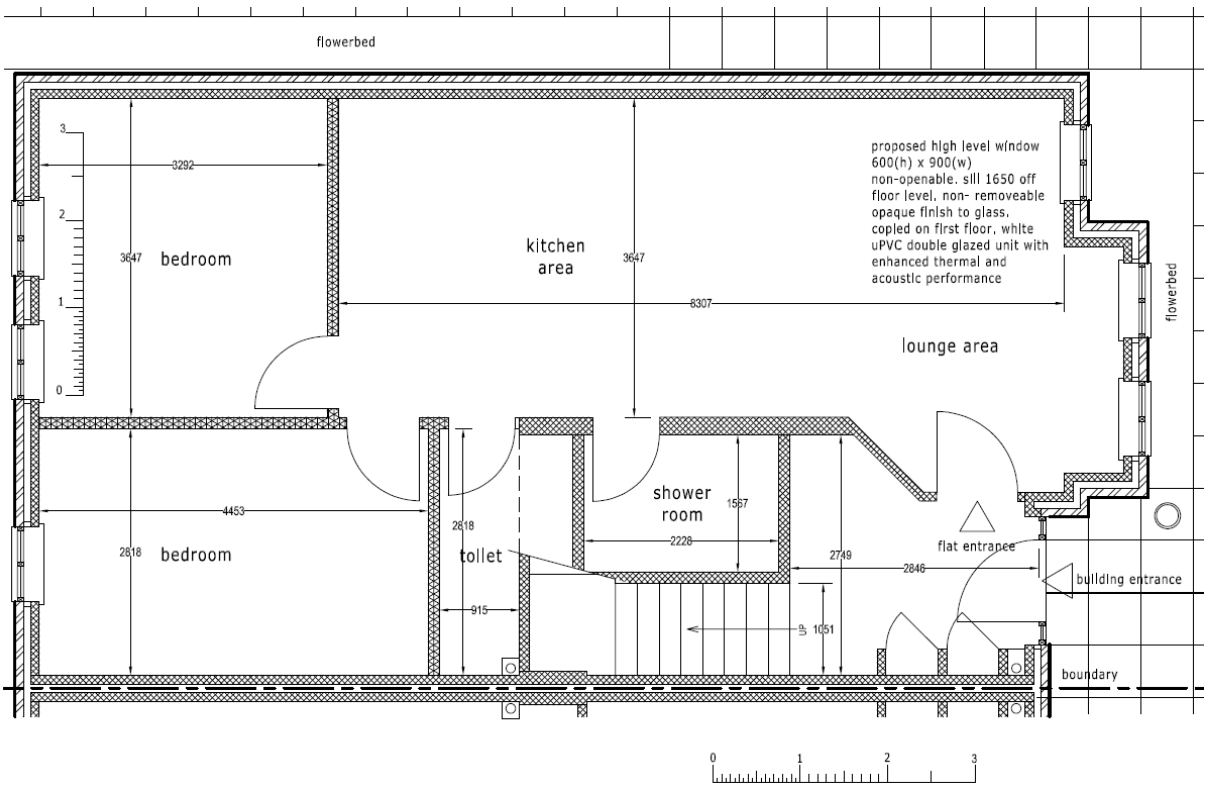

Figure 5: *Proposed ground floor plan*

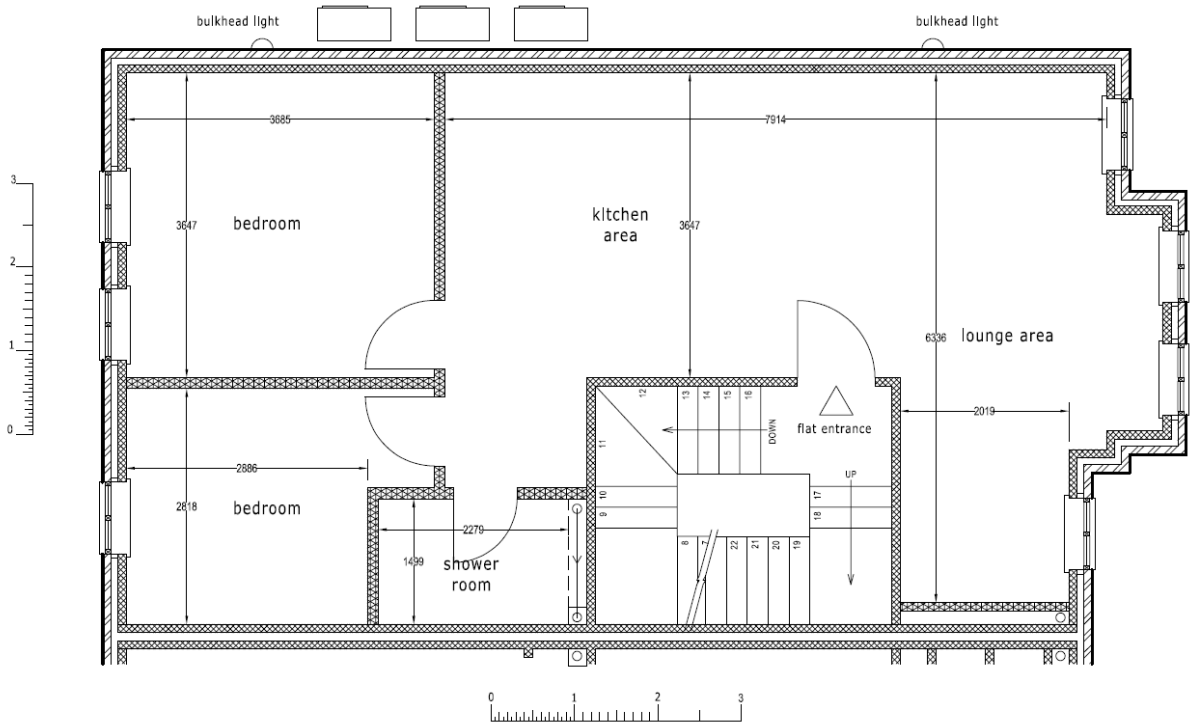

Figure 6: *Proposed first floor plan*

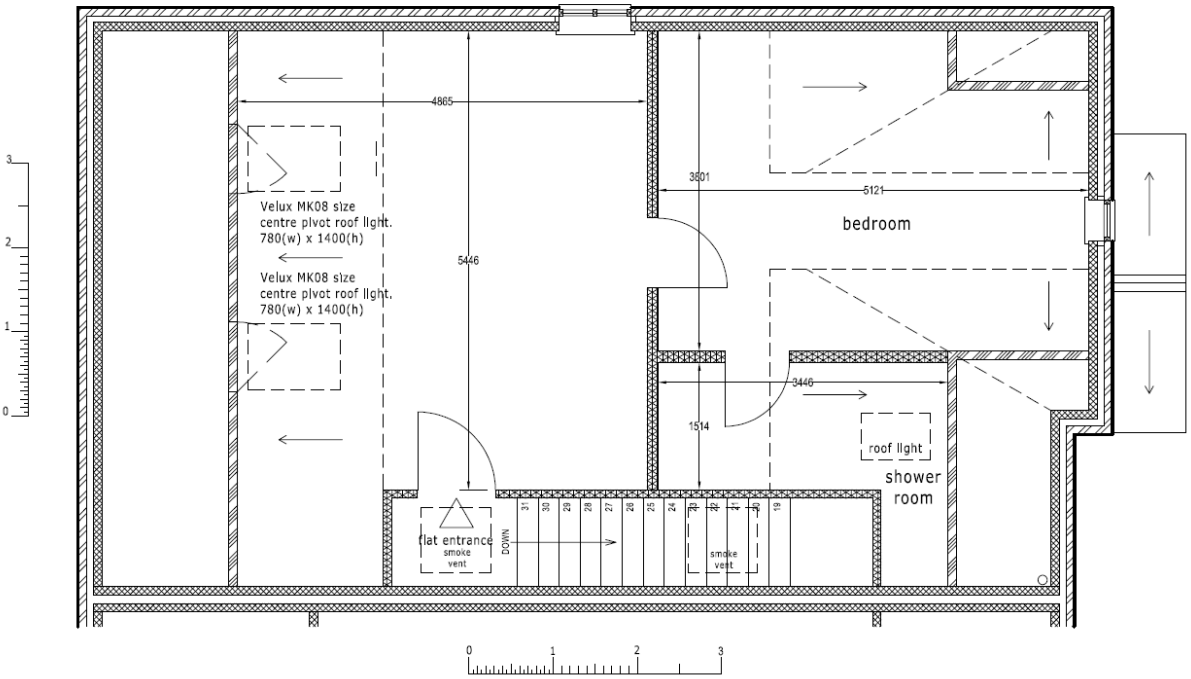

Figure 7*: Proposed second floor plan*

4.3 3D Model

To carry out the internal daylight assessment, a full-scale 3D model of the proposed development was created using IES ModelIT. The internal daylight was then evaluated using IES Radiance, a program designed for thermal and environmental analysis.

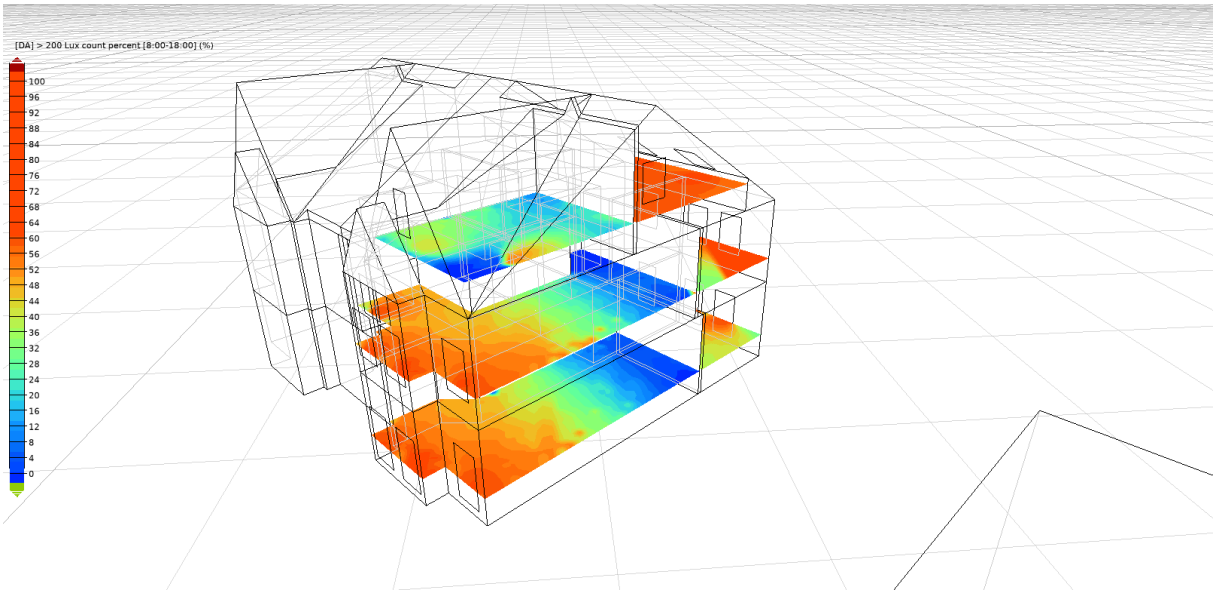

Figure 8: *3D model of the proposed development*

4.4 Internal Surface Reflectance and Glazing Transmission

The reflectance of a room's internal surfaces significantly influences the internal daylight result. Lighter colours result in higher reflectance (white: 1.0; black: 0.0). The glazing transmission factors including the appropriate maintenance factor have also been included in the simulation along with window framing factor. The internal surface and windows properties used in this assessment are detailed in the table below:

Surface	Reflectance	
Floor	0.4 (e.g. light wood or grey tiles)	
Walls	0.7 (e.g. light pastel or white paint)	
Ceiling	0.7 (e.g. light pastel or white paint)	
Window	Light Transmittance	0.68

Table 5: *Surface Properties*

4.5 Design Data

The architectural design for this project was provided by Dalton Design & Draw Architects. The drawing pack used for this assessment was issued in February 2024.

B_003_001_G issA	DWG File	1,746 KB

5 Results

5.1 Target Illuminance Factor – Proposed Development

We have evaluated the proposed new accommodation to ascertain if the internal spaces will receive adequate daylight, referencing Target Illuminance (ET) Factor. This method calculates the illuminance level at each point on an assessment grid.

Our analysis of the internal space of the proposed development reveals that the assessed rooms comfortably exceed both the BRE Guide and BS EN 17037:2018 acceptable criteria in terms of Illuminance Factor.

Room	Floor area that achieves the target (%)	Target to be achieved over 50% of the floor area (D_T/E_T)	BRE Compliant
Ground fl. Kitchen/living room	59	200	**YES**
Ground fl. Bedroom 1	99	100	**YES**
Ground fl. Bedroom 2	100	100	**YES**
First fl. Kitchen/living room	62	200	**YES**
First fl. Bedroom 1	100	100	**YES**
First fl. Bedroom 2	95	100	**YES**
Top fl. Kitchen/living room	100	200	**YES**
Top fl. Bedroom	98	100	**YES**

Table 6: *Internal daylight results*

6 Conclusion

We have conducted a Illuminance Factor (D) assessment for the internal spaces of the proposed development. Our analysis concludes that daylight levels within the proposed habitable rooms are adequate and surpass the target criteria outlined in BS EN 17037:2018 and the BRE publication “Site Layout Planning for Daylight & Sunlight – A Guide to Good Practice” [Section 5.1].

As per the findings of this report, it is considered that the proposed internal daylight levels should not be a constraint to the granting of planning permission.