



Joynes House, Gravesend

Daylight and Sunlight Assessment

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Gravesend Borough Council

Contents

1.0 Introduction3

2.0 Project Summary.....4

3.0 Methodology.....5

4.0 Modelling & Data Sources.....6

5.0 BRE Guidance Targets.....7

6.0 Window Schedules.....8

7.0 Daylight Impact Results.....9

8.0 Sunlight To Neighbouring Gardens11

9.0 Daylight within the Proposal.....13

10.0 Conclusions.....16

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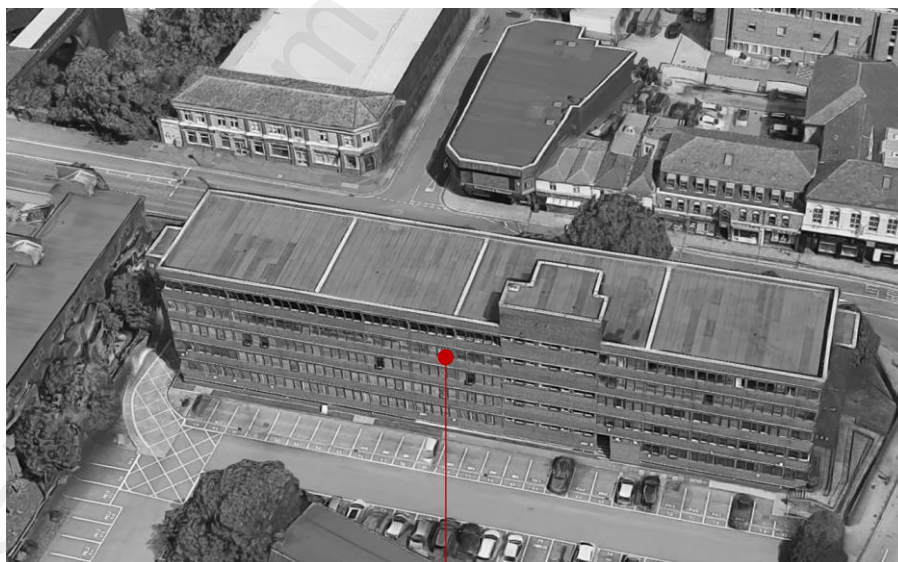
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1.0 Introduction

- 1.1 This daylight and sunlight assessment has been prepared to support a planning application for the proposed development at Joynes House, Gravesend.
- 1.2 The report assesses the proposals in respect of daylight, sunlight and overshadowing matters, having regard to industry standard guidance. The report concludes that the proposal is acceptable and in accordance with planning policy requirements in relation to daylight and sunlight.
- 1.3 There is no existing specific National Planning Policy relating to the prospective impacts of developments on daylight and sunlight on their surrounding environment.
- 1.4 However, the BRE Report 'Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice' (3rd Edition, 2022) is the established National guidance to aid the developer to prevent and/or minimise the impact of a new development on the availability of daylight and sunlight in the environs of the site.
- 1.5 It has been developed in conjunction with daylight and sunlight recommendations in BS EN 17037:2018 'Daylighting in Buildings'
- 1.6 This reference document is accepted as the authoritative work in the field on daylight, sunlight and overshadowing and is specifically referred to in many Local Authorities' planning policy guidance for daylighting.
- 1.7 The methodology therein has been used in numerous lighting analyses and the standards of permissible reduction in light are accepted as the industry standards.

2.0 Project Summary

- 2.1 The proposal site is at Joynes House, Gravesend and it is currently occupied by a 5 storey office block.
- 2.2 The proposal is for the for a two storey upwards extension to provide 24 residential homes.
- 2.3 The impacts of the scheme on all residential neighbours potentially affected by the scheme have been considered.
- 2.4 The design has been formulated with consideration of the impacts on the neighbouring dwellings.
- 2.5 Further details on the location of neighbours and their windows are given in Section 5.0
- 2.6 In addition to assessing the impacts of the scheme on neighbours, daylight within the proposed new dwellings within the extension has also been assessed.



Site Location

3.0 Methodology

- 3.1 For this analysis, we have undertaken the most common calculations for the change in daylight and sunlight to existing buildings, as recommended in BRE Digest 209. These are:
- Vertical Sky Component (VSC) for daylight impacts and Daylight Factor (DF) for daylight within the proposal
 - Annual Probable Sunlight Hours and Winter Probable Sunlight Hours (WPSH) (APSH) for sunlight impacts
- 3.2 The VSC method measures the general amount of light available on the outside plane of the window as a ratio (%) of the amount of total unobstructed sky viewable following introduction of visible barriers such as buildings. The maximum value is just under 40% for a completely unobstructed vertical wall.
- 3.3 The VSC is calculated using computer simulation under a CIE overcast sky. This works by simulating the amount of visible sky from the centre point of each window. It is not affected by orientation and so all potentially affected windows are assessed.
- 3.4 Annual Probable Sunlight Hours (APSH) and Winter Probable Sun light Hours (WPSH) are a measure of the amount of potential direct sunlight that is available to a given surface. APSH covers sunlight over the whole year and WPSH from September 21st to March 21st.
- 3.5 The number of total available hours is calculated from a data file in the software, built up over a number of years of actual weather data records.
- 3.6 Only windows which face within 90° of due south need be assessed for sunlight. This is looked at in Section 8.
- 3.7 APSH can also be used to assess the impact on external spaces such as gardens. This is looked at in Section 9

4.0 Modelling & Data Sources

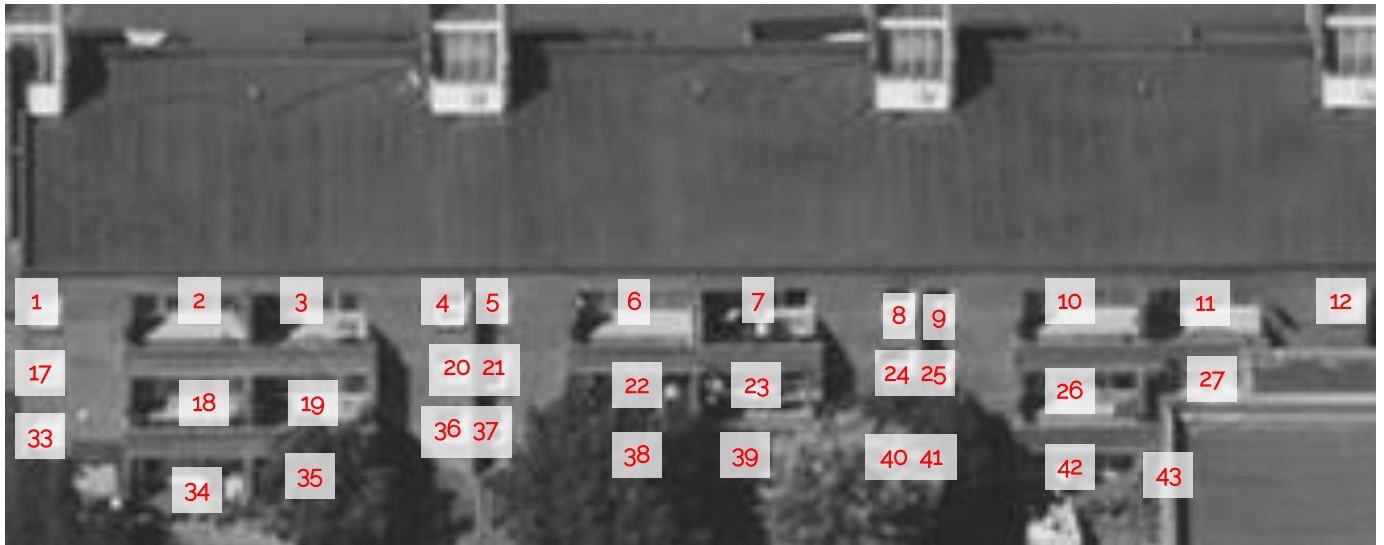
- 4.1 The first stage of the analysis is to create the analysis model of the existing site condition and the proposal. This allows us to analyse the impact of the proposal when compared to the existing condition.
- 4.2 2D drawings have been provided by the design team. These drawings are used to construct a 3D analysis model which is exported into the specialist daylight software. Calculations are then run, for both existing and proposed scenarios.
- 4.3 Sufficient detail is added to the model for the analysis. In accordance with BRE recommendations, trees and foliage have been omitted from the calculations.
- 4.4 Information on the properties has been provided to us by the design team in the form of drawings giving the site as existing and proposed and photographs of the site and surroundings.
- 4.5 Web-based mapping sources and planning records for neighbouring buildings have also been used.

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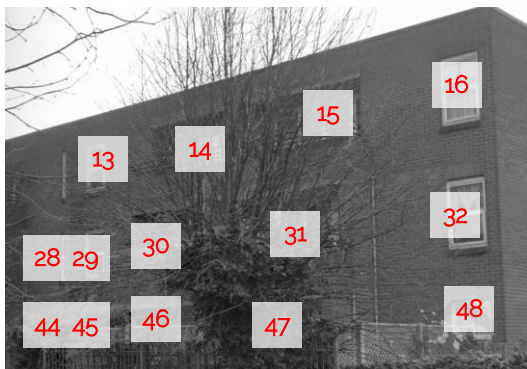
5.0 BRE Guidance Targets

- 5.1 The reference document for this analysis, BRE Digest 209, gives the methodology for undertaking the calculations. It also provides benchmark figures for the acceptable reduction in the daylight on existing properties which might be affected by development.
- 5.2 Specifically, the guidance gives figures for the VSC and APSH, as a percentage reduction that is "permissible" for the effect on existing windows.
- 5.3 It is worth noting the following statement in the Guidance introduction:
- 5.4 "The guide is intended for building designers and their clients, consultants and planning officials. The advice given here is not mandatory and this document should not be seen as an instrument of planning policy. Its aim is to help rather than constrain the developer.
- 5.5 Although it gives numerical guidelines, these should be interpreted flexibly because natural lighting is only one of the many factors in site layout design."
- 5.6 The relevant BRE recommendations for daylight and sunlight are:
 - The Vertical Sky Component measured at the centre of a window should be no less than 27%, or if reduced to below this, no less than 0.8 times the former value.
 - The window should receive at least 25% of available annual sunlight hours and more than 5% during the winter months (September 21st to March 21st), or, where this is not the case, 80% of its former value.

6.0 Window Schedules



Elizabeth Court (Rear)



Elizabeth Court (Rear)



54 - 60 New Road (Front)

7.0 Daylight Impact Results

- 7.1 The Vertical Sky Component has been calculated for each of the 69 assessed windows for both the existing and proposed conditions.
- 7.2 As can be seen in the results below, all windows retain in excess of 80% of their current values.
- 7.3 The scheme is therefore compliant with BRE recommendations in relation to daylight impacts.

Vertical Sky Component				
Window	Existing VSC	Proposed VSC	% Retained	Meets BRE Guidance?
1	33.33	32.23	96.72%	Yes
2	29.46	28.28	95.98%	Yes
3	29.23	27.84	95.24%	Yes
4	33.02	31.37	95.02%	Yes
5	32.93	31.23	94.84%	Yes
6	27.81	25.94	93.28%	Yes
7	27.11	25.06	92.44%	Yes
8	30.89	28.64	92.72%	Yes
9	30.58	28.34	92.67%	Yes
10	24.70	22.76	92.17%	Yes
11	22.90	20.75	90.63%	Yes
12	25.42	22.73	89.42%	Yes
13	25.47	22.71	89.18%	Yes
14	23.14	20.63	89.13%	Yes
15	25.40	23.17	91.25%	Yes
16	31.35	29.04	92.61%	Yes
17	30.82	30.03	97.45%	Yes
18	14.73	13.90	94.39%	Yes
19	14.24	12.96	90.99%	Yes
20	30.00	28.50	95.01%	Yes
21	30.17	28.65	94.97%	Yes
22	13.54	12.74	94.09%	Yes
23	12.72	11.82	92.96%	Yes
24	27.74	26.12	94.16%	Yes
25	27.49	25.93	94.32%	Yes
26	11.36	11.33	99.76%	Yes
27	9.88	9.88	100.00%	Yes
28	21.71	20.11	92.65%	Yes
29	21.88	20.24	92.52%	Yes
30	10.38	10.38	100.00%	Yes
31	12.49	12.49	100.00%	Yes
32	28.47	26.88	94.40%	Yes
33	28.37	27.41	96.63%	Yes
34	12.36	11.69	94.61%	Yes

7.0 Daylight Impact Results

Vertical Sky Component				
Window	Existing VSC	Proposed VSC	% Retained	Meets BRE Guidance?
35	11.68	10.51	90.00%	Yes
36	26.89	25.57	95.08%	Yes
37	27.09	25.75	95.07%	Yes
38	12.05	11.48	95.20%	Yes
39	10.85	10.38	95.66%	Yes
40	24.78	23.66	95.45%	Yes
41	24.57	23.52	95.73%	Yes
42	10.63	10.61	99.77%	Yes
43	9.19	9.19	100.00%	Yes
44	18.68	17.73	94.92%	Yes
45	18.90	17.93	94.85%	Yes
46	9.87	9.87	100.00%	Yes
47	11.88	11.88	100.00%	Yes
48	25.94	24.90	95.99%	Yes
49	29.99	25.87	86.24%	Yes
50	30.24	26.20	86.62%	Yes
51	30.27	26.33	86.98%	Yes
52	30.70	26.89	87.58%	Yes
53	31.08	27.39	88.14%	Yes
54	31.62	28.11	88.93%	Yes
55	31.83	28.48	89.47%	Yes
56	31.77	28.59	90.00%	Yes
57	32.15	29.20	90.84%	Yes
58	27.41	23.40	85.39%	Yes
59	27.31	23.32	85.39%	Yes
60	27.83	23.88	85.79%	Yes
61	27.80	23.96	86.18%	Yes
62	27.92	24.10	86.32%	Yes
63	28.20	24.46	86.73%	Yes
64	28.27	24.62	87.11%	Yes
65	28.75	25.23	87.74%	Yes
66	29.79	26.54	89.10%	Yes
67	30.06	26.95	89.65%	Yes
68	30.07	27.12	90.21%	Yes
69	30.54	27.80	91.05%	Yes

8.0 Sunlight Impact Results

- 8.1 BRE guidance states that only windows which face within 90° of due south need be assessed for sunlight provision. In this instance, all 21 windows fall into this category. The Annual Probable Sunlight Hours has been calculated for each of these windows for both the existing and proposed conditions using the methodology described previously, both over the whole year, and through the "winter months" (September 21st until March 21st).
- 8.2 The BRE guidance states that the sun lighting may be adversely affected if the centre of the window:
- Receives less than 25% of annual hours or less than 5% of winter hours and
 - Receives less than 80% of its current sunlight hours during either period and
 - Has a reduction in sunlight over the whole year greater than 4% of annual probable sunlight hours
- 8.3 It is clear from the wording of the above that all three clauses need to be met to qualify as an adverse impact. Thus, if the window does not meet any one of these criteria, the impact is acceptable.
- 8.4 The results below show that all of the assessed windows retain in excess of 80% of their existing values both annually and over the winter months or retain over 25% of annual hours and over 5% of winter hours.
- 8.5 The scheme is therefore compliant with BRE guidance in relation to sunlight impacts.

8.0 Sunlight Impact Results

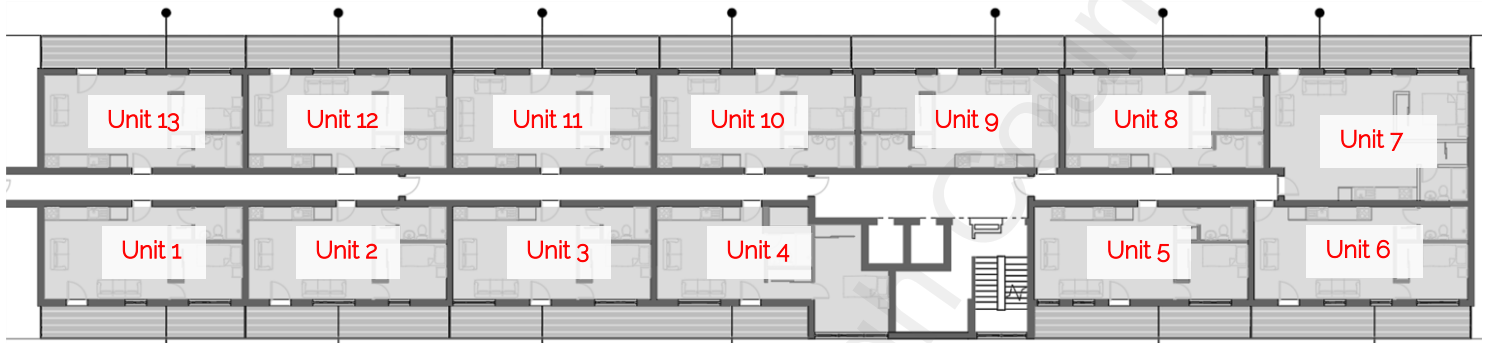
Window	Annual Sunlight Hours			Winter Sunlight Hours			Meets Guidance?
	Ex. Hrs Received (%)	Prop. Hrs Received	% Retained	Ex. Hrs Received	Prop. Hrs Received	% Retained	
1	66.87	59.88	89.53%	18.02	11.02	N/A	Yes
2	68.88	62.02	90.04%	18.50	11.64	N/A	Yes
3	67.98	61.33	90.21%	19.13	12.47	N/A	Yes
4	70.82	64.31	90.80%	19.61	13.10	N/A	Yes
5	71.45	65.28	91.37%	20.24	14.07	N/A	Yes
6	73.11	67.15	91.85%	20.79	14.83	N/A	Yes
7	73.67	67.84	92.10%	21.34	15.52	N/A	Yes
8	72.14	66.81	92.60%	21.97	16.63	N/A	Yes
9	72.21	67.29	93.19%	22.04	17.12	N/A	Yes
10	63.55	57.93	91.17%	11.71	6.10	N/A	Yes
11	62.79	57.24	91.17%	11.57	6.03	N/A	Yes
12	67.50	62.09	91.99%	12.06	6.65	N/A	Yes
13	65.63	60.36	91.97%	12.68	7.42	N/A	Yes
14	62.51	56.96	91.13%	13.65	8.11	N/A	Yes
15	64.52	59.46	92.16%	14.14	9.08	N/A	Yes
16	63.96	58.77	91.87%	15.11	9.91	N/A	Yes
17	66.94	62.02	92.65%	15.73	10.81	N/A	Yes
18	69.51	64.66	93.02%	17.19	12.34	N/A	Yes
19	70.13	65.63	93.58%	17.81	13.31	N/A	Yes
20	68.81	64.52	93.76%	18.64	14.35	N/A	Yes
21	69.16	65.56	94.79%	18.99	15.38	N/A	Yes

9.0 Daylight within the Proposal

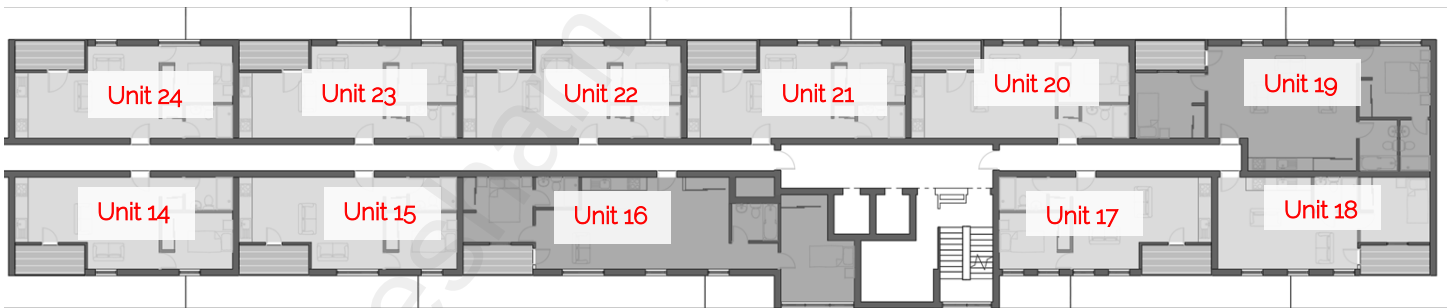
- 9.1 Daylight Factor (DF) values have been calculated for all habitable rooms in the proposed new unit, in accordance with BRE methodology, using a CIE overcast sky at an illuminance value of 8500 lux.
- 9.2 The calculations have assumed a white ceiling, cream walls and mid-grey carpet or wooden floor.
- 9.3 The benchmark values for all habitable rooms which are recommended by the BRE guidance and BS:EN 17037:2018 are:
- Kitchen – 50% of room has a DF of 1.4%
 - Living/Dining Rooms – 50% of the room has a DF of 1.1%
 - Bedrooms – 50% of the room has a DF of 0.7%
- 9.4 It is deemed by the guidance that if the DF criteria are met, then the occupiers of the dwelling will have sufficient daylight. As can be seen from the results below that all assessed habitable rooms meet and exceed the minimum levels of internal daylight.

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9.0 Daylight within the Proposal



Fifth Floor



Sixth Floor

9.0 Daylight within the Proposal

Minimum Target Daylight Factor				
Unit	Room	DF Target Over 50% Area	Proposed % Receiving TDF	Meet BRE209?
1	L/K/D	1.4%	97.70%	Yes
1	Bedroom	0.7%	100.00%	Yes
2	L/K/D	1.4%	96.70%	Yes
2	Bedroom	0.7%	100.00%	Yes
3	L/K/D	1.4%	98.00%	Yes
3	Bedroom	0.7%	100.00%	Yes
4	L/K/D	1.4%	100.00%	Yes
4	Bedroom	0.7%	100.00%	Yes
5	L/K/D	1.4%	98.00%	Yes
5	Bedroom	0.7%	100.00%	Yes
6	L/K/D	1.4%	98.10%	Yes
6	Bedroom	0.7%	100.00%	Yes
7	L/K/D	1.4%	94.60%	Yes
7	Bedroom	0.7%	100.00%	Yes
8	L/K/D	1.4%	99.80%	Yes
8	Bedroom	0.7%	100.00%	Yes
9	L/K/D	1.4%	99.70%	Yes
9	Bedroom	0.7%	100.00%	Yes
10	L/K/D	1.4%	99.80%	Yes
10	Bedroom	0.7%	100.00%	Yes
11	L/K/D	1.4%	99.80%	Yes
11	Bedroom	0.7%	100.00%	Yes
12	L/K/D	1.4%	98.20%	Yes
12	Bedroom	0.7%	100.00%	Yes
13	L/K/D	1.4%	99.80%	Yes
13	Bedroom	0.7%	100.00%	Yes
14	L/K/D	1.4%	83.20%	Yes
14	Bedroom	0.7%	100.00%	Yes
15	L/K/D	1.4%	94.50%	Yes
15	Bedroom	0.7%	100.00%	Yes
16	L/K/D	1.4%	99.40%	Yes
16	Bedroom 1	0.7%	81.30%	Yes
16	Bedroom 2	0.7%	100.00%	Yes
17	L/K/D	1.4%	92.40%	Yes
17	Bedroom	0.7%	100.00%	Yes
18	L/K/D	1.4%	99.10%	Yes
18	Bedroom	0.7%	84.50%	Yes
19	L/K/D	1.4%	99.20%	Yes
19	Bedroom 1	0.7%	100.00%	Yes
19	Bedroom 2	0.7%	87.40%	Yes
20	L/K/D	1.4%	94.30%	Yes
20	Bedroom	0.7%	100.00%	Yes
21	L/K/D	1.4%	89.40%	Yes
21	Bedroom	0.7%	100.00%	Yes
22	L/K/D	1.4%	88.90%	Yes
22	Bedroom	0.7%	100.00%	Yes
23	L/K/D	1.4%	89.30%	Yes
23	Bedroom	0.7%	100.00%	Yes
24	L/K/D	1.4%	88.60%	Yes
24	Bedroom	0.7%	100.00%	Yes

10.0 Conclusions

- 10.1 Using industry standard methodology, we have made numerical analyses to ascertain the effects of the proposal at Joynes House, Gravesend and the levels of change in daylight and sunlight for the windows of the neighbouring properties.
- 10.2 The main criteria used in this analysis to show compliance are the Vertical Sky Component for daylight impacts and Annual and Winter Probable Sunlight Hours for sunlight impacts
- 10.3 As has been shown, the effect on VSC is within the 80% guidance value in all cases.
- 10.4 There will therefore be no adverse impact on neighbouring residents in terms of daylight.
- 10.5 In terms of sunlight, the assessed window retains 25% of annual sunlight hours and 5% of winter hours.
- 10.6 The scheme is therefore compliant with BRE guidance in relation to sunlight impacts.
- 10.7 The new residential units will benefit from daylight levels in excess of the requirements of BS:EN17037:2018 recommendations.
- 10.8 From a planning perspective therefore, it is the conclusion of this report that the proposed development is entirely acceptable for planning, in daylight and sunlight terms.

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