



# Park View Road Football Stadium & 1-3 Park View Road, Welling, DA16

## Daylight and Sunlight Assessment

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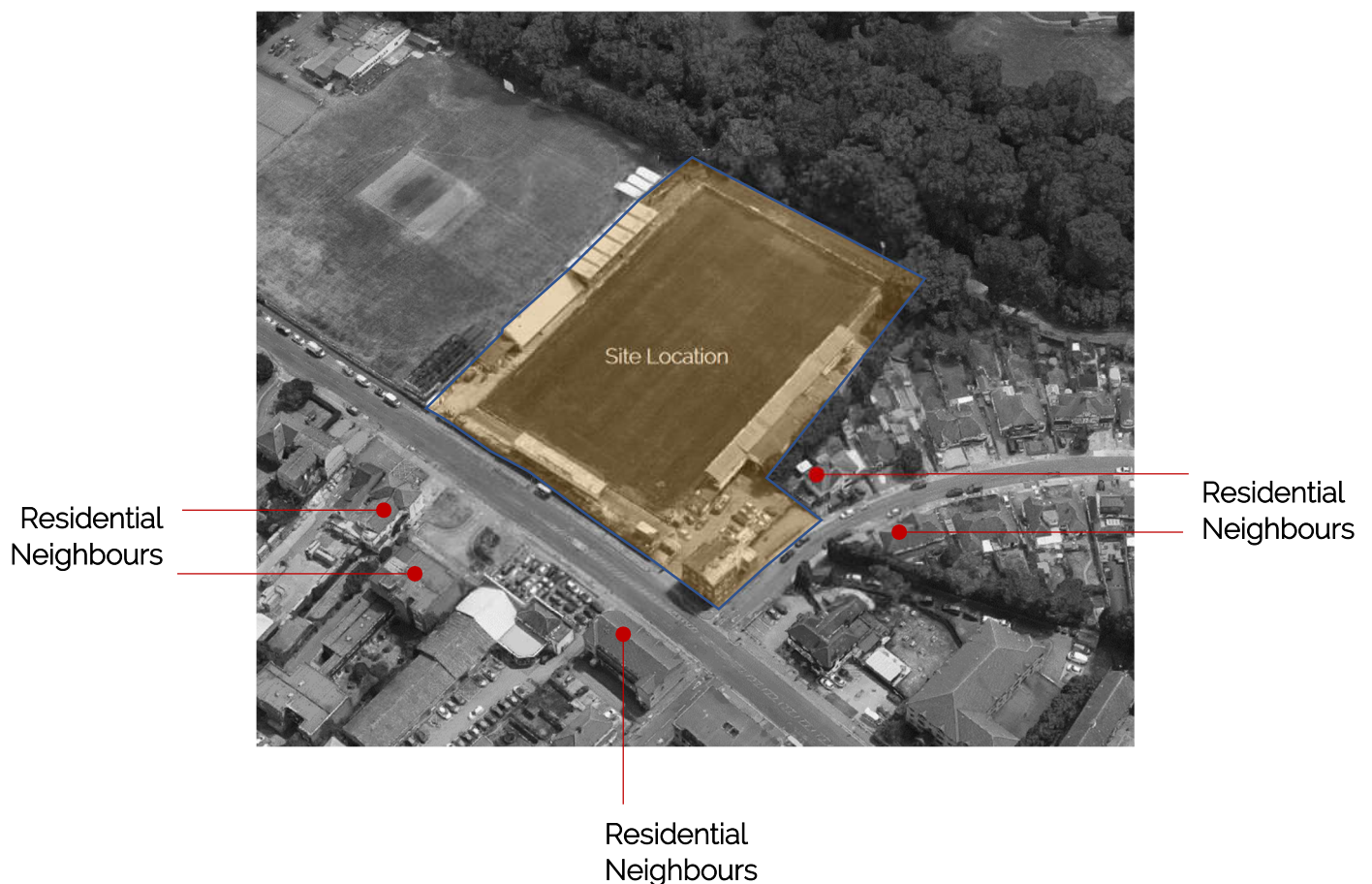
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## 1.0 Introduction

- 1.1 This daylight and sunlight assessment has been prepared to support a planning application for the proposed redevelopment of the site of Park View Road Football Stadium and 1-3 Park View Road, Welling.
- 1.2 The report assesses the proposals in respect of daylight, sunlight and overshadowing matters, having regard to industry standard guidance.
- 1.3 The report concludes that the proposal is generally considered acceptable and in accordance with planning policy requirements in relation to daylight and sunlight.
- 1.4 There is no existing specific National Planning Policy relating to the prospective impacts of developments on daylight and sunlight on their surrounding environment.
- 1.5 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.
- 1.6 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 on Park View Road, Welling and is occupied by the football ground of Welling United FC.
- 2.2 The proposal is for the redevelopment of the site to deliver a new football stadium and associated facilities, Class E commercial spaces, and residential units above (104 new dwellings)
- 2.3 The impacts of the scheme have been assessed, in line with BRE guidance. Generally, it is the impacts on residential neighbours which are of primary concern.
- 2.4 Further details on the location of the assessed neighbours and their windows are given in Section 5.0
- 2.5 In addition to assessing the impacts of the scheme on neighbours, daylight within the proposed new dwellings has also been assessed.





## 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
- Annual Probable Sunlight Hours and Winter Probable Sunlight Hours (WPSH) (APSH) for sunlight impacts
- Target Daylight Factor ( $DF_T$ ) for daylight within the proposal

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  $90^\circ$  of due south need be assessed for sunlight. This is looked at in Section 8.

3.7 The sunlight hours test is also used to assess the impact on external spaces such as gardens. This is looked at in Section 9.

3.8 In addition to the numerical BRE tests, a shadow study has been produced. This is given at Appendix A.

## 4.0 Modelling & Data Sources

- 4.1 The first stage of the assessment 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 and a 3D model 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 and a 3D model 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.



Architect's 3D Model - as Proposed

## 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:
- "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.
  - Although it gives numerical guidelines, these should be interpreted flexibly because natural lighting is only one of the many factors in site layout design."
- 5.4 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.

## 5.0 BRE Guidance Targets

- 5.5 It should be noted however that the daylight targets are intended to cover all situations and are acknowledged to be unrealistic in urban scenarios.
- 5.6 The GLA representation hearing D&P/3067/03 states the following: "In an inner-city urban environment, VSC values in excess of 20% should be considered as reasonably good, and that VSC in the mid-teens should be acceptable"
- 5.7 In addition, the report "Guiding Light – Unlocking London's Residential Density", produced by London First, in partnership with GLA, acknowledges the need for good urban density in London and that the BRE guidance has significant limitations, when applied strictly, in delivering development that makes best use of the available land.
- 5.8 The results within this report give a summary of "compliance" with both the BRE guidance and also the GLA representation report whereby windows which retain a VSC in the "mid-teens" (taken to mean 16%) should be considered acceptable.

## 6.0 Window Schedules



45 & 56 Roseacre Avenue



1-8 Ellard Court



## 6.0 Window Schedules



1 -36 Denham Close



122 Park View Road



114-120 Park View Road

## 7.0 Daylight Impact Results

- 7.1 The Vertical Sky Component has been calculated for each of the 57 assessed windows for both the existing and proposed conditions.
- 7.2 As can be seen in the results below, of the 57 windows assessed, 42 (74%) retain 80% of their current values or a VSC in excess of 27% in full compliance with the BRE guidance.
- 7.3 The windows which fall short of this target, are on 1-8 Ellard Court and 1-36 Denham Close.
- 7.4 The windows on Ellard Court have all been assessed although it is likely that not all serve habitable rooms or serve bedrooms where light is considered of lesser importance.
- 7.5 Those on Denham Court are large windows and all retain a residual VSC of greater than 18%, in excess of what is considered an adequate level for an urban location.
- 7.6 As the windows are large, it is likely that the rooms which they serve, despite falling short of the VSC test, will continue to be well lit.
- 7.7 No floor plans for these neighbours could be obtained, to verify the layouts and hence undertake the more detailed No Sky Line test, but from external appearances, it is clear that these are average sized rooms, served by very large windows.
- 7.8 The remaining windows meet the BRE guidance by virtue of retaining 80% of their current values.
- 7.9 In the context of an urban site, we consider these results to be acceptable and in line with the aims of the BRE guidance.

## 7.0 Daylight Impact Results

Vertical Sky Component					
Window	Existing VSC	Proposed VSC	% Retained	Meets BRE Guidance?	Meets GLA Guidance
1	18.463	17.574	95.19%	Yes	Yes
2	28.867	26.921	93.26%	Yes	Yes
3	28.185	25.858	91.75%	Yes	Yes
4	35.801	33.692	94.11%	Yes	Yes
5	35.359	30.247	85.54%	Yes	Yes
6	36.537	30.259	82.82%	Yes	Yes
7	36.974	30.911	83.60%	Yes	Yes
8	35.952	28.787	80.07%	Yes	Yes
9	35.059	28.170	80.35%	Yes	Yes
10	36.545	28.582	78.21%	Yes	Yes
11	37.148	29.452	79.28%	Yes	Yes
12	35.901	27.211	75.80%	Yes	Yes
13	35.678	27.309	76.54%	Yes	Yes
14	36.467	25.828	70.83%	No	Yes
15	37.060	27.094	73.11%	Yes	Yes
16	35.933	24.230	67.43%	No	Yes
17	35.699	24.599	68.90%	No	Yes
18	36.709	23.376	63.68%	No	Yes
19	36.172	23.602	65.25%	No	Yes
20	36.641	22.067	60.22%	No	Yes
21	35.040	21.448	61.21%	No	Yes
22	28.940	18.792	64.93%	No	Yes
23	32.001	22.877	71.49%	No	Yes
24	36.606	27.218	74.35%	Yes	Yes
25	37.192	29.315	78.82%	Yes	Yes
26	35.714	23.767	66.55%	No	Yes
27	37.437	27.147	72.51%	Yes	Yes
28	38.834	29.338	75.55%	Yes	Yes



## 7.0 Daylight Impact Results

Vertical Sky Component					
Window	Existing VSC	Proposed VSC	% Retained	Meets BRE Guidance?	Meets GLA Guidance?
29	39.013	31.097	79.71%	Yes	Yes
30	36.769	24.807	67.47%	No	Yes
31	37.966	27.239	71.74%	Yes	Yes
32	38.821	29.441	75.84%	Yes	Yes
33	39.017	31.207	79.98%	Yes	Yes
34	36.799	25.006	67.95%	No	Yes
35	37.954	27.389	72.16%	Yes	Yes
36	38.793	29.578	76.25%	Yes	Yes
37	39.019	31.303	80.22%	Yes	Yes
38	33.875	22.622	66.78%	No	Yes
39	35.132	24.971	71.08%	No	Yes
40	36.176	27.275	75.39%	Yes	Yes
41	36.943	29.610	80.15%	Yes	Yes
42	29.154	25.720	88.22%	Yes	Yes
43	28.152	24.137	85.74%	Yes	Yes
44	30.631	26.844	87.64%	Yes	Yes
45	36.996	22.701	61.36%	No	Yes
46	38.323	31.051	81.03%	Yes	Yes
47	36.968	30.242	81.81%	Yes	Yes
48	37.457	31.644	84.48%	Yes	Yes
49	36.832	30.587	83.04%	Yes	Yes
50	37.457	32.246	86.09%	Yes	Yes
51	36.757	30.990	84.31%	Yes	Yes
52	36.896	31.473	85.30%	Yes	Yes
53	37.460	32.805	87.58%	Yes	Yes
54	36.881	31.844	86.34%	Yes	Yes
55	38.208	32.743	85.70%	Yes	Yes
56	36.870	32.172	87.26%	Yes	Yes
57	37.462	33.302	88.90%	Yes	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, 53 windows fall into this category.
- 8.2 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)
- 8.3 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
- 8.4 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.
- 8.5 The results below show that all of the assessed windows retain 25% of available sunlight hours annually and 5% over the winter months.
- 8.6 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 BRE Guidance?
	Ex. Hrs Received (%)	Prop. Hrs Received	% Retained	Ex. Hrs Received	Prop. Hrs Received	% Retained	
1	27.304	26.888	N/A	5.119	5.106	N/A	Yes
2	48.718	47.817	N/A	16.909	16.355	N/A	Yes
3	46.708	45.184	N/A	16.493	15.523	N/A	Yes
4	71.933	66.736	N/A	26.888	26.681	N/A	Yes
6	79.556	63.271	N/A	29.383	13.098	N/A	Yes
7	77.685	63.756	N/A	29.383	15.454	N/A	Yes
8	78.794	60.984	N/A	29.245	11.435	N/A	Yes
9	74.567	60.222	N/A	29.245	14.900	N/A	Yes
10	79.556	60.568	N/A	29.383	10.395	N/A	Yes
11	78.863	61.954	N/A	29.383	12.474	N/A	Yes
12	78.794	57.796	N/A	29.245	8.247	N/A	Yes
13	75.191	57.173	N/A	29.245	11.227	N/A	Yes
14	79.349	56.202	N/A	29.175	6.029	N/A	Yes
15	78.170	57.173	N/A	29.383	8.385	N/A	Yes
16	78.794	54.955	N/A	29.245	5.405	N/A	Yes
17	75.191	53.430	N/A	29.245	7.484	N/A	Yes
18	79.556	53.915	N/A	29.037	5.568	N/A	Yes
19	76.369	52.945	N/A	29.591	6.168	N/A	Yes
20	78.309	51.421	N/A	28.690	5.176	N/A	Yes
21	73.458	48.926	N/A	29.245	6.289	N/A	Yes
22	53.153	37.214	N/A	24.671	8.732	N/A	Yes
23	60.984	46.847	N/A	25.364	11.227	N/A	Yes
24	71.656	59.113	N/A	26.958	14.414	N/A	Yes
25	74.220	64.449	N/A	26.958	17.186	N/A	Yes
26	72.072	54.678	N/A	27.027	9.633	N/A	Yes
27	81.358	66.043	N/A	28.690	13.375	N/A	Yes
28	83.229	70.755	N/A	29.938	17.464	N/A	Yes

## 8.0 Sunlight Impact Results

Window	Annual Sunlight Hours			Winter Sunlight Hours			Meets BRE Guidance?
	Ex. Hrs Received (%)	Prop. Hrs Received	% Retained	Ex. Hrs Received	Prop. Hrs Received	% Retained	
29	83.576	73.943	N/A	30.284	20.651	N/A	Yes
30	76.784	59.252	N/A	26.126	8.593	N/A	Yes
31	81.843	66.875	N/A	28.552	13.583	N/A	Yes
32	83.299	71.171	N/A	30.007	17.879	N/A	Yes
33	83.576	74.359	N/A	30.284	21.067	N/A	Yes
34	77.893	61.746	N/A	25.087	8.940	N/A	Yes
35	81.012	67.082	N/A	27.720	13.791	N/A	Yes
36	83.368	72.072	N/A	30.076	18.780	N/A	Yes
37	83.576	74.983	N/A	30.284	21.691	N/A	Yes
38	68.261	52.945	N/A	23.077	7.762	N/A	Yes
39	72.072	58.766	N/A	26.681	13.375	N/A	Yes
40	75.260	64.103	N/A	29.868	18.711	N/A	Yes
41	75.745	67.845	N/A	30.353	22.453	N/A	Yes
45	80.873	61.331	N/A	30.492	14.484	N/A	Yes
46	81.982	71.448	N/A	30.076	23.423	N/A	Yes
47	76.923	68.191	N/A	29.660	23.077	N/A	Yes
48	76.161	68.954	N/A	29.660	23.285	N/A	Yes
49	76.854	68.191	N/A	29.660	23.146	N/A	Yes
50	76.161	69.785	N/A	29.660	24.116	N/A	Yes
51	76.784	69.231	N/A	29.660	23.978	N/A	Yes
52	77.200	70.478	N/A	29.799	24.809	N/A	Yes
53	76.161	71.240	N/A	29.660	25.502	N/A	Yes
54	77.200	71.240	N/A	29.799	25.364	N/A	Yes
55	81.843	74.636	N/A	29.868	25.364	N/A	Yes
56	77.339	71.864	N/A	29.799	25.710	N/A	Yes
57	76.161	71.795	N/A	29.660	26.057	N/A	Yes

## 9.0 Sunlight to Neighbouring Open Spaces

- 9.1 Residential gardens and open spaces are generally assessed using the sunlight hours test, but only on March 21st. The guidance describes a well-lit space as being one which receives at least 2 hours of direct sunlight on this date over 50% of its area.
- 9.2 BRE guidance also uses the "80%" rule for this test, whereby the effects are considered acceptable if the remaining sunlight is in excess of 80% of the existing level. This clause applies if the space is reduced to less than 50% of the area well sunlit.
- 9.3 The gardens of the nearest neighbouring properties to the site were assessed using this methodology. These are labelled G1-G4 in the key below.
- 9.4 In addition to the residential gardens, the neighbouring cricket pitch has been assessed using the same methodology.
- 9.5 This has been undertaken in two zones – G5 in the key below is the entire pitch and G6 is just the area where the wickets are situated (this being the area of the pitch where light is most crucial to the game).
- 9.6 In addition to the numerical study below, a visual shadow study is provided at Appendix 1 showing the level of overshadowing the proposal will create on the adjacent cricket pitch.
- 9.7 As can be seen, the neighbouring gardens and open spaces all retain over 80% of their existing values and the scheme is therefore compliant with BRE guidance.
- 9.8 The gardens retain in excess of 99% and the cricket pitch, 100% of its area that receives 2 hours of sunlight on March 21<sup>st</sup>.

## 9.0 Sunlight to Neighbouring Open Spaces



Site Location

### Amenity Sunlight Hours

Space	Existing Area Receiving 2 Hours	Proposed Area Receiving 2 Hours	% Retained	Meets BRE Guidance?
G1	89.92%	89.77%	99.84%	Yes
G2	74.91%	74.79%	99.85%	Yes
G3	73.33%	73.25%	99.88%	Yes
G4	57.38%	56.98%	99.29%	Yes
G5	99.95%	99.95%	100.00%	Yes
G6	100.00%	100.00%	100.00%	Yes

## 10.0 Daylight within the Proposal

10.1 The BRE and BS EN 17037 guidance allows for two alternative methods to assess daylight within new dwellings. This report uses the following method:

### Target Daylight Factor ( $DF_T$ )

- 10.2 The  $DF_T$  method is a complex and representative calculation to determine natural internal luminance.
- 10.3 It takes into account such factors as window size, number of windows available to the room, room size and layout, room surface reflectance, and the angle of visible sky reaching the window.
- 10.4 Daylight Factor (DF) values have been calculated for the habitable rooms in a representative selection of the proposed new units, in accordance with BRE methodology, using a CIE overcast sky at an illuminance value of 8500 lux.
- 10.5 Where floor plans are repeated on higher floors, the guidance allows for only assessing the lower units, on the basis that higher ones will be at least as well-lit as those below.
- 10.6 The units which have been assessed are noted on the schedules below.
- 10.7 The calculations have assumed a white ceiling, cream walls and mid-grey carpet or wooden floor using reflectance values taken from the BS EN 170437 Guidance.
- 10.8 The minimum  $DF_T$  values for various UK locations and room types are provided below:

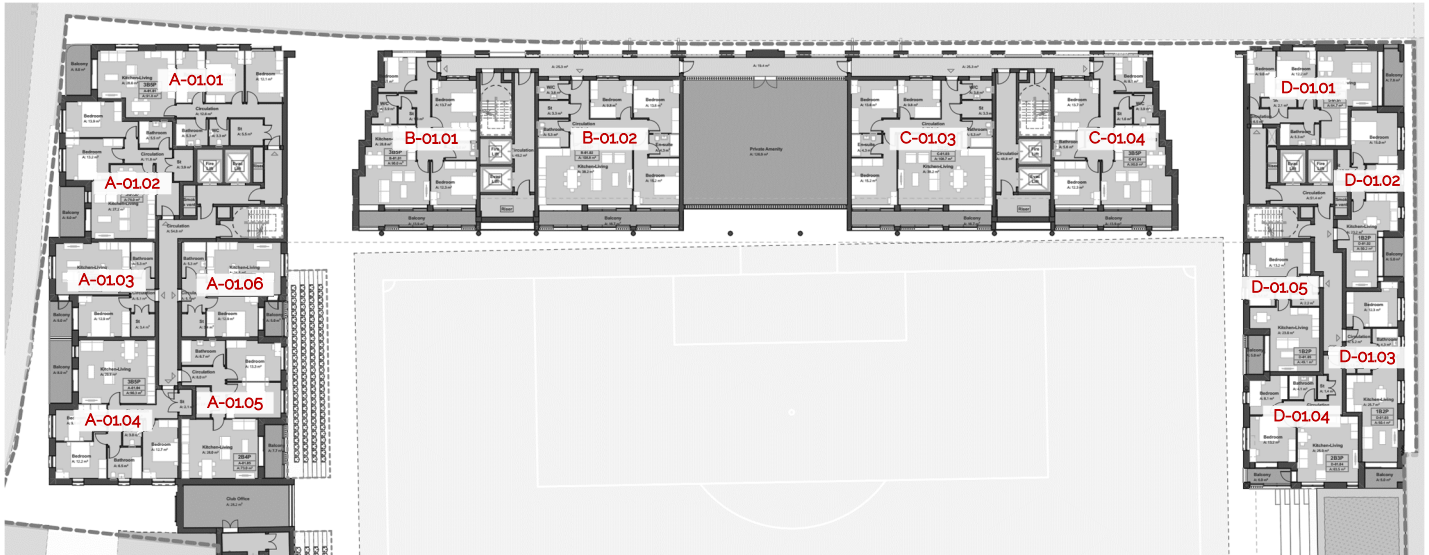
Table C2 – Target daylight factors (D) for London		
Level of recommendation	Target daylight factor D for half of assessment grid	Target daylight factor D for 95% of assessment grid
Minimum	2.1%	0.7%
Medium	3.5%	2.1%
High	5.3%	3.5%

10.9 It is deemed by the guidance that if the minimum 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.

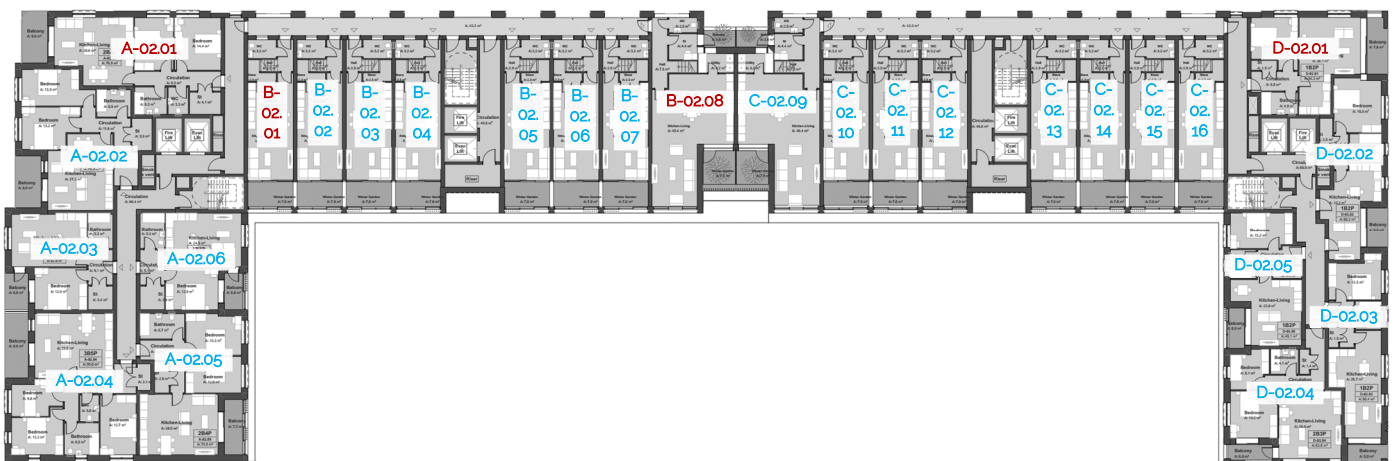


# 10.0 Daylight within the Proposal

Unit not assessed, as duplicate of another unit



First Floor as Proposed (Extract)



2<sup>nd</sup> Floor as Proposed (Extract)