Internal Daylight Report Update

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The O2 Masterplan Site Finchley Road London NW3 6LU
Internal Daylight Assessment – Updated Daylight Calculations

1. Introduction

1.1. This report sets out the results and provides commentary on the new Climate Based Daylight Modelling (CBDM) calculations which have been undertaken to the proposed habitable rooms.

1.2. The report provided at Appendix 12.27 of the submitted ES sets out the likely levels of daylight to the proposed habitable rooms within the detailed elements of the Proposed Development (the 'Submitted Internal Daylight Report'). The daylight test undertaken to the proposed habitable rooms was the Average Daylight Factor (ADF) calculation. This followed the guidance set out in the 2011 version of the Building Research Establishment (BRE) report entitled 'Site layout planning for daylight and sunlight: A guide to good practice' (referred to as the 'BRE guidelines').

1.3. The planning application for the O2 Masterplan Site was submitted in February 2022 and is currently still under consideration. However, the BRE guidelines were republished in June 2022 which now recommends that when assessing proposed habitable rooms that CBDM calculations should be used.

1.4. The new CBDM methodology, is more complex and has targets that are generally more difficult to achieve in an urban context, particularly in comparison to the previous guidance. This report sets out the results of the proposed habitable rooms, within the detailed elements of the proposed application, based on the updated methodology, and provides commentary on the results.

2. Climate Based Daylight Modelling Methodology

2.1. The new CBDM methodology is based on the British Standard 'Daylight in Buildings' (BS EN17037 (2018)) and replicated in the latest version of the BRE guidelines. BS EN17037 contains advice and guidance on interior daylighting for all buildings across Europe but also has a UK National Annex which provides suggested targets for dwellings in the UK.

2.2. The CBDM methodology is based on target illuminances from daylight. This is the Daylight Illuminance (DI) to be achieved over half the area of the room (measured on a reference plane at tabletop level) for at least half of the daylight hours in a typical year. The calculations are based on weather data files which cover different regions of the UK. The calculations are done for each hour of the day for every day of the year. There are 8760 hours in the year, of which 4380 are daylight hours, and therefore the targets should be achieved for 2190 hours in the

year. The methodology uses a more accurate sky model which simulates the movement of the sun throughout the day and accounts for the weather conditions at the time. As a result, CBDM accounts for the presence of sunlight and therefore the orientation of the rooms/windows is accounted for. A south-facing room is likely to have access to higher levels of natural light than a north-facing room and as a result, in order to comply a north-facing room would typically need larger windows.

2.3. The UK National Annex gives illuminance recommendations of 100 Lux in bedrooms, 150 Lux in living rooms and 200 Lux in kitchens. These are median illuminances to be achieved over 50% of the assessment grid for at least half of the daylight hours.

2.4. Where a room has a shared use, the highest target should apply. However, it also says that Local Authorities could use discretion here and that a living room target of 150 Lux could be used for a combined living/kitchen/dining room if the kitchens are not treated as habitable spaces, as it may avoid small separate kitchens in the design.

2.5. There is a further simplistic methodology based on daylight factors (which is not the same as the old ADF methodology), which does not use climate-based data but uses a simple fixed sky model. However, since this alternative methodology is simplistic and does not account for the effect of sunlight, or the orientation of the room, it has not been used in these updated assessments.

3. Comparing the Old and New Methodologies and Criteria on a Hypothetical Scheme

3.1. To help understand the differences between the old and new methodologies and criteria, we considered a relatively simple courtyard scheme of 5 storeys as illustrated below:

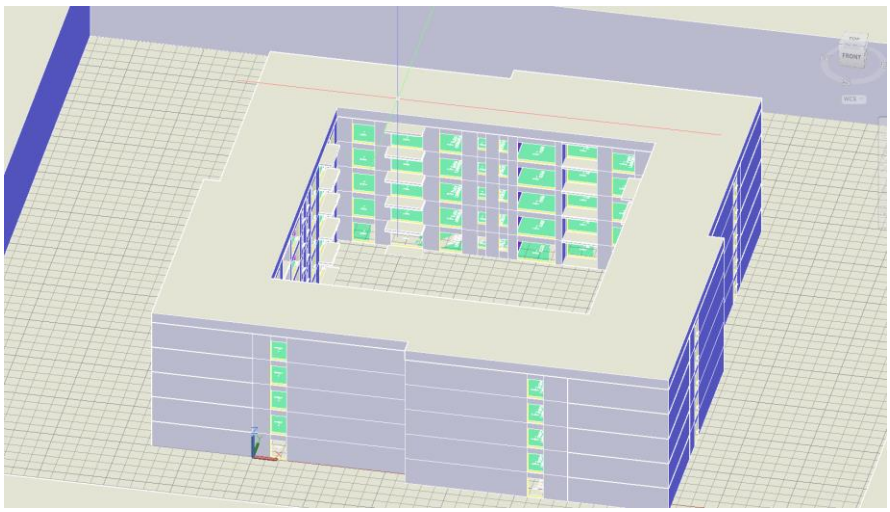

Figure 1: Illustrative courtyard scheme

3.2. For this scheme we ran the standard ADF test, and the new CBDM tests for which the results for the ground floor rooms are given below:

BRE/SOL ADF	CBDM
	Fplane acheived (%)
0.9	17.2
1.7	38.6
1.0	16.6
2.8	78
1.0	19.8
1.2	13.8
1.2	13.9
1.2	20.2
4.0	68.3
3.7	68.9
2.0	24.3
2.2	22.6
5.8	100
2.2	44.9
2.8	60.5
5.8	100
6.3	100
2.2	77.1
3.5	96.4
6.3	100
4.7	100
2.7	100
4.7	100
96%	57%

Figure 2: Tabular Results Comparing the ADF test and CBDM test

3.3. The above tabular shows that when using the ADF tests and criteria 96% of the rooms would have met the relevant criteria. However, when using the new CBDM tests and criteria only 57% of the rooms meet the suggested guidance. This is therefore a notable reduction in compliance due to the change in test and criteria.

4. Parameters and Assumptions

4.1. In order to calculate the various measures of daylight and sunlight it is necessary to construct a 3D computer model. The model is then analysed using proprietary software to calculate the various measures of daylight and sunlight.

4.2. In relation to the CBDM assessment of the daylight and sunlight within the proposed scheme, the following assumptions and parameters have been used. The design team have specified light-coloured internal finishes and therefore, in accordance with paragraph C24 of Appendix C of the new BRE guidelines, the following Reflectance values have been used: light pastel walls with a reflectance of 0.7, light wood veneer floors/ cream carpets with a reflectance of 0.4, and white ceilings with a reflectance of 0.8. All external reflectance's have been assumed to 0.2 as per the BRE guidelines.

4.3. As per the BRE guidelines, for the windows a transmittance factor of 0.68 has been used. A window framing factor of 0.80 has been used against the window openings and a maintenance factor of 8% has been allowed to account for the effect of dirt on the glass in an urban

environment. The room assessment grid area excludes a 300mm band around the perimeter of the room, as per the paragraph C28 of the BRE guidelines.

5. Assessment Results and Discussion

5.1. Within the Submitted Internal Daylight Report, calculations were undertaken to the Blocks known as N3E, N4 and N5. These were the blocks that formed part of the detailed application.

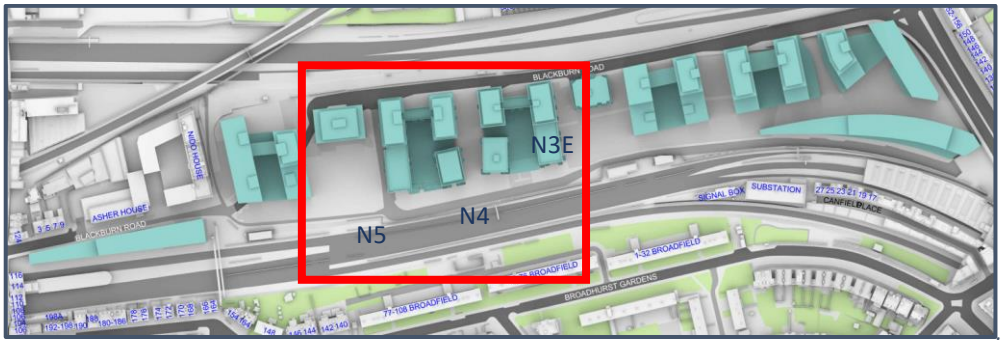

Figure 3: Proposed Development Site

5.2. In total, the Submitted Internal Daylight Report assessed 1635 proposed habitable rooms using the ADF calculation. The results showed that 86% of rooms met the relevant ADF standards, which was the guidance at the time of submission. Based on this methodology, it was considered that this level of compliance was considered very good for a high-density scheme in an urban environment.

5.3. Under the new CBDM methodology, and when applying the standard of 150Lux to a combined living/dining/kitchen, 66.4% of the rooms meet the new guidance. This lower level of compliance is purely a result of the new methodology and suggested criteria and does not incorporate any changes to the internal design or massing of the proposed scheme.

5.4. On a block-by-block basis the results, when compared to the old ADF tests are as set out in the table below.

5.5. The highest results under the new CBDM calculations are seen to Block N3-E which is the smaller rectangular block to the eastern side of N4. This block achieves better levels of daylight as it is a smaller block compared to the others and the main elevations (facing north and south) are generally unobstructed. However, applying this scale/size of block across the site would not be appropriate in urban designing and master planning terms and would result in reduced density standards and therefore less homes being provided.

		NEW (June 22) CBDM TESTS	OLD ADF TESTS
N3-E	Meets Guidance	122	
	Below Guidance	30	
	% Meeting Guidance	**80.3%**	**96.7%**

		NEW (June 22) CBDM TESTS	OLD ADF TESTS
N4	Meets Guidance	498	
	Below Guidance	238	
	% Meeting Guidance	**67.7%**	**88.6%**
N5	Meets Guidance	467	
	Below Guidance	281	
	% Meeting Guidance	**62.4%**	**80.2%**
TOTALS	Meets Guidance	1087	
	Below Guidance	549	
	% Meeting Guidance	**66.4%**	**86%**

5.6. To blocks N4 and N5, the CBDM results are lower (particularly on the lower floors) because the blocks are larger and of a higher density. However, this block design, and the level of density, is not considered unusual for an urban area, and there are many examples across London and Camden where this size and density of block, whilst it will receive lower levels of daylight, are enjoyable places to live with adequate daylight amenity.

The southern and north-facing elevations of Blocks N4 and N5 (which are mostly unobstructed) receive levels of daylight that are generally above the new standards. Those facing into the proposed courtyards and towards to the other neighbouring blocks are lower but the relationship between the blocks and the courtyard sizes is typical for these types of blocks across London. It must also be remembered that whether assessed against the old ADF standards or new CBDM standards, daylighting is just one of many factors that need to be considered. For example, another main factor when deciding on the size and position of the windows and balconies is overheating. This is usually a factor that conflicts with the daylight tests, as the larger the window the more likely it is to be able to overheat.

6. Discussion

6.1. The new CBDM calculations have not yet been considered in detail by the inner London Boroughs, and, unlike the ADF calculations, there is no historical data or decided applications on which to compare the levels of compliance.

6.2. In the absence of historical data, and what is considered more relevant to the overall planning balance decision that Officers and the planning committee need to make, we can consider the general design of the proposals to other similar high-density developments across London to understand if these other built and occupied schemes are considered to provide an acceptable balance of daylight provision and inner London living conditions.

6.3. 3 schemes which are considered to be of a comparable scale to the Proposed Development are:

1. St George Wharf Development in Vauxhall
2. Goodmans Fields in Aldgate
3. Camden Goods Yards

St George Wharf Development in Vauxhall

6.4. St Georges Wharf in Vauxhall has a similar U-shaped footprint to the proposed Blocks N4 and N5. External balconies are also present. It is clear from the block spacing, heights and presence of the balconies, means that similar levels of daylight will be enjoyed.

Figure 4: St Georges Wharf, Vauxhall (northern facing

6.5. The rear, southern elevations of this development are illustrated and commented on in the BRE guidelines:

Figure 5: extract from the BRE guidelines:

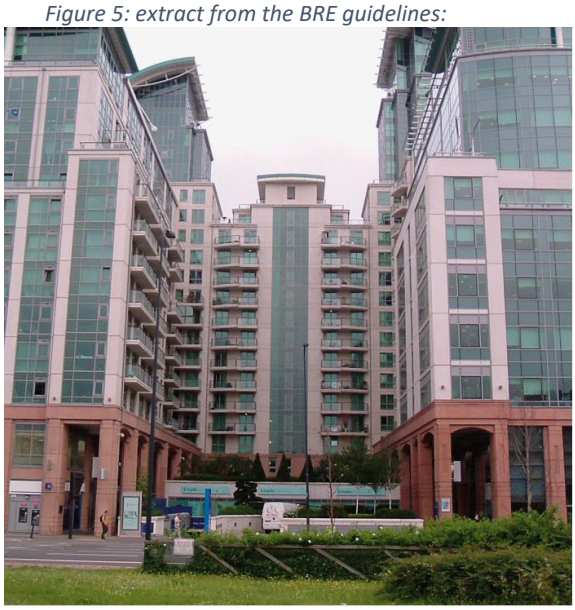

Figure 7: A tunnel effect can occur if a window has projecting wings on both sides of it. In this development in South London (architects Broadway Malyan), the windows have been increased in size to compensate

6.6. Whilst the BRE guidelines highlight an issue with the 'tunnel effect' they do point out that the window sizes have been increased to compensate. The window sizes to the proposed development have equally been increased as far as possible to help ensure the available daylight is utilised as much as possible, whilst also balancing other design factors such as overheating.

6.7. Whilst the St Georges Wharf scheme is a dense scheme where many rooms are unlikely to meet the new daylighting standards, it is clearly a highly desirable and enjoyable place to live. The lower levels of daylight compliance that would result when against the new CBDM tests does not therefore mean that the scheme is an undesirable or unenjoyable place to live.

Goodmans Fields in Aldgate

Figure 6: Goodman's Fields Courtyard View

6.8. Goodman's Fields is an award-winning 7-acre development in Aldgate. It is high density, and if assessed against the new CBDM methodology, likely to result in compliance levels that are similar, if not lower than the proposed scheme.

6.9. Whilst the compliance levels when assessed against the new guidance is likely to be low, the scheme is recognised as one that is of a high density and therefore lower levels of daylight, particularly to the lower floors are expected. Again, it is noted that larger windows have been incorporated to help compensate for the lower levels of direct daylight.

6.10. Whilst lower levels of compliance against the BRE guidelines are expected, it is clear that the high-quality design, and use of materials/planting ensure that the scheme is a highly desirable development.

Camden Goods Yards

6.11. Camden Goods Yards is located within the London Borough of Camden. It is a new 8-acre development located between Camden Town and Primrose Hill.

6.12. Within Camden's planning framework for the Camden Goods Yards Site (published in 2017), it was recognised as a site that could accommodate a high-density scheme. Similar characteristics are noted from the Draft Supplementary Planning Document for the Proposed Site entitled 'West End Lane to Finchley Road' (published in January 2021) which recognised that the Proposed Site requires *"Comprehensive development and intensification of an insular, low density and poorly connected place".*

Figure 7: Main Masterplan of Camden Goods Yards

6.13. The above image of a physical 3D model shows that the scheme is of a high density, with similar, or smaller block spacing than that proposed on the Proposed Site. Lower levels of compliance, similar to those shown for the Proposed Site, are therefore expected if they were to be assessed against the new CBDM methodology. However, whilst a lower level of compliance is expected, the scheme is not one that is of poor design and is again a highly desirable scheme.

7. Conclusions

7.1. Historically the ADF tests have been used when deciding on planning applications and when levels of compliance above 80% were achieved they were typically considered to enjoy acceptable or good levels of daylight for an urban area.

7.2. The new CBDM assessments show that a lower level of compliance will be achieved when compared to the ADF tests. This is because the new CBDM methodology has targets that are generally more difficult to achieve in an urban context and this is seen across the majority of schemes in London.

7.3. Should the Camden Council expect levels of compliance to the same levels of compliance seen with the ADF test, the bulk and massing of the proposals would have to be significantly reduced and much lower densities of housing would be achieved.

7.4. When comparing the general block massing of the Proposed Development against other recent developments across London, is it clear that the Proposed Development is not significantly different. Therefore, similar levels of compliance, if they were to be all assessed against the new CBDM tests, would occur. We have also seen that the recently completed comparable schemes are highly desirable and enjoyable places to live with adequate levels of daylight amenity. The fact that lower levels of daylight against those recommended by the BRE guidelines occur, does not therefore make these schemes a poor design or undesirable place to live.

7.5. Whilst lower levels of compliance against the new CBDM tests are evident from the results (when compared to the ADF tests), the levels of daylight enjoyed to the proposed habitable rooms are clearly comparable to other similar-sized schemes across London.

7.6. The levels of daylight experienced in the comparable schemes are considered acceptable/good as it is only one design factor of many that make the development an attractive and desirable place to live. The design of the proposal, including the sizes and locations of the windows, has considered all aspects, including daylight, sunlight and overheating to ensure the best balance of the factors is achieved. It is therefore clear that with a high level of design and use of high-quality materials the Proposed Development will be an enjoyable place to live, with acceptable / good levels of daylight for an urban area.