

**REPORT
ON
DAYLIGHT AND SUNLIGHT**

**AS A RESULT OF THE
EXTENSION OF
69-73 THEOBALDS ROAD
LONDON WC1**

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1. INTRODUCTION

- 1.1.1 We are instructed by Dorrington Properties Plc to assess the impact on natural daylight and sunlight on the dwellings at Kingsgate Mansions, 33 Red Lion Square as a result of the extension of 69-73 Theobalds Road in the context of the planning guidelines contained in the UDP of the London Borough of Camden.
- 1.1.2 The principal purpose of the Council's policy in connection with the amenity of neighbouring and adjoining buildings, is to safeguard the daylight and sunlight to those buildings and to ensure that new development does not materially or adversely affect the amenity of those buildings in the context of daylight, sunlight, sense of enclosure, privacy and overshadowing. To assess these considerations objectively, the scientific empirical measurements contained in the Building Research Establishment (BRE) Guidelines 'Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice' 1991, and the British Standard Code of Practice for Daylighting, BS8206 Part 2 are the standards to be applied.
- 1.1.3 Our assessment has been based on the McDowell + Beneditti Drawing Nos. 224.07, 224.08, 224.10, 224.11 and 224.12. We have also obtained copies of the Tilney Shane drawings for the extension of Churchill House, 35 Red Lion Square for the Royal College of Anaesthetists approved by Camden Council in October 2004 ref 2004/3744/P which is presently being implemented. The impact of that scheme has been factored into our calculations.

2. TESTS TO BE APPLIED TO EXISTING BUILDINGS.

- 2.1.1 The main purpose of the guidelines is to assist in the consideration of the relationship of new and existing buildings to ensure that each retain a potential to achieve good daylighting and sunlighting levels. That is, by following and satisfying the tests contained in the guidelines, new and existing buildings should be sufficiently spaced apart in relation to their relative heights so that both continue to have the potential to achieve good levels of daylight and sunlight. They have been drafted primarily for use with low density suburban developments and should therefore be used flexibly when dealing with a dense urban city centre site – a fact recognised by the Report's author in the Introduction where Dr Paul Littlefair says:

'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 designer. Although it gives numerical guidelines, these should be interpreted flexibly because natural lighting is only one of many factors in site layout design..... In special circumstances the developer or Planning Authority may wish to use different target values. For example, in a historic city centre a higher degree of obstruction may be unavoidable if new developments are to match the height and proportions of existing buildings.....'

- 2.1.2 In addition, the block spacing criteria for daylight and sunlight are a major determinant of other amenity considerations such as *sense of enclosure, privacy, overlooking and overshadowing*. That is to say, if the relationship between height, distance and massing of the new and existing buildings is sufficient to meet the sunlight and daylight criteria, they should generally be sufficiently well-spaced as not to be oppressive by creating an unacceptable degree of sense of

enclosure nor would they unreasonably interfere with privacy or overlooking or cast an unreasonable amount of shadow.

- 2.1.3 There are various methods of measuring and assessing daylight and the choice of test depends on the circumstances of each particular window. For example, the adequacy tests need only be applied to windows serving 'habitable rooms'. A 'habitable room' includes bedrooms, living rooms and dining rooms. A 'kitchen' is generally only considered to be a habitable room if it is of sufficient size so that it can be practically used for an additional purpose other than food preparation. The generally accepted distinction between a 'non-habitable' kitchen and a 'family kitchen' is:

'a room within a dwelling, the primary purpose of which is for living, sleeping or dining – including kitchens where the total area (including fittings), is more than 13m²'

- 2.1.4 As such, for a kitchen to be generally classed as a habitable room, there should be sufficient area to accommodate an additional activity such as dining or a children's dayroom.

- 2.1.5 In addition, the definition of a 'habitable room' in the Building Regulations is:

'.....a room used for dwelling purposes but which is not solely a kitchen'

- 2.1.6 This definition is also used in the application of Environmental Health standards.

- 2.1.7 It is also recognised that different room uses have different daylight requirements. For example, greater protection should be afforded to windows which serve living rooms or family kitchens, with a lesser standard for bedrooms due to the fact that bedrooms are not generally occupied during normal daylight hours.

- 2.1.8 The criteria for protecting daylight to existing buildings is contained in Section 2.2 of the BRE Guidelines. The BRE have developed a series of tests which begin with very simple block spacing formulae followed by increasingly sophisticated measurements of Vertical Sky Component (VSC) on the face of each window, and measurement of internal daylighting by calculating Average Daylight Factor (df) followed by the plotting of Sky Factor or No Skyline contours.

- 2.1.9 The simple test for block spacing should only be used where the proposed development is of a reasonable uniform profile and is directly opposite the existing building. It is more appropriate for low-density well-spaced developments such as individual housing developments and is often not a particularly useful tool in assessing urban and in-fill sites.

- 2.1.10 The Vertical Sky Component is a unit of measurement that represents the amount of available daylight from a standard overcast sky available at a particular window. It is measured on the outside face of the window. The 'unit' is expressed as a percentage as it is the ratio of the amount of sky visible at a given reference point compared to the amount of light that would be available from a totally unobstructed hemisphere of sky. To put this unit of measurement in perspective, the maximum percentage value for a window with a completely unobstructed outlook (i.e. for a totally unobstructed view through 90° in every direction) is 50% VSC. In practice, the true measurement of this value can in fact

be nearer to 40% VSC, due to unavoidable losses at extreme angles and the effect of windows set in window reveals. The target figure recommended by the BRE is 27% VSC, and if the value is in excess of 27% VSC, the window in question will continue to receive a good level of daylight.

- 2.1.11 27% VSC is a relatively good level of daylight and is the target level that we would expect to find for habitable rooms with windows on principal elevations. This level is often difficult to achieve on secondary elevations and in densely built-up urban environments.
- 2.1.12 The Vertical Sky Component is a measure of daylight on the face of a window and does not take account of the size of the window (area of glazing) or the size and internal dimensions of the room being tested. It is generally used as an initial test to determine whether further tests for adequacy are required. If a window does not achieve a VSC value of 27% or more, it becomes necessary to calculate the Average Daylight Factor (*df*). The ADF takes account of the interior dimensions and reflectances within the room being tested and for this reason is a more detailed and representative measure of adequacy of light. The recommended ADF values contained in the British Standard Code of Practice for Daylighting, BS8206 Part 2, and the Chartered Institution of Building Services Engineers (CIBSE), Applications Manual for Window Design (1987) is:
- 2% for family kitchens
 - 1.5% for living rooms
 - 1% for bedrooms

2.2 Sunlight

- 2.2.1 Unlike daylight, which is non-directional and assumes that light from the sky is uniform, the availability of sunlight is dependent on direction. That is, as the United Kingdom is in the northern hemisphere, we only receive our sun from the south and the sun rises in the east and sets in the west. The availability of sunlight is therefore dependent on the orientation of the window or area of ground being assessed relative to the position of due south.
- 2.2.2 Accordingly, sunlight need only be measured where an existing building has a 'window wall' (i.e. a wall with a window serving a habitable room) within 90° of due south.
- 2.2.3 The guidelines also state that the sunlight criteria will be met if: -
- (i) The *window wall* faces within 90° of due south and no obstruction measured in the section perpendicular to the window wall, subtends an angle of more than 25° from the horizontal. Obstructions within 90° due north of the reference point need not count.
 - (ii) The window wall faces within 20° due south and the reference point has a Vertical Sky Component of 27% or more.

- 2.2.4 In this context, the sunlight criteria only applies where a window faces within 90° of due south and where the Vertical Sky Component value for daylight is less than 27% within 20° of due south. The criteria should also be viewed flexibly with account taken for the actual orientation relative to due south.
- 2.2.5 The two tests referred to above at paragraph 2.2.3. are used as a rule of thumb and where sunlight needs to be tested to a greater level of detail, sunlight is measured using the Sunlight Availability Indicator contained in Appendix 1 of the Guidelines. That indicator calculates the anticipated Annual Probable Sunlight Hours (APSH) that a window can receive over and around a proposed new building. For this report, the sunlight levels have been calculated by our software package which has been developed using the Sunlight Availability Indicators but is more accurate as it measures sunlight availability to a much higher degree of accuracy than the "spotting" method in the Guidelines. The sunlight criteria only applies to windows serving living rooms of an existing dwelling. This is in contrast to the daylight criteria which applies to kitchens and bedrooms as well as living rooms. The sunlight criteria taken from section 3.2 of the BRE guidelines (page 12 of the guidelines) is as follows: -

'If a living room of an existing dwelling has a main window facing within 90° of due south, and any part of a new development subtends an angle of more than 25° to the horizontal measured from the centre of the window in a vertical section perpendicular to the window, then the sunlighting of the existing dwelling may be adversely effected. This will be the case if a point at the centre of the window, in the plane of the inner window wall, received in the year less than one quarter of annual probable sunlight hours including at least 5% of annual probable sunlight hours between 21 September and 21 March, and less than 0.8 times its former sunlight hours during either period.'

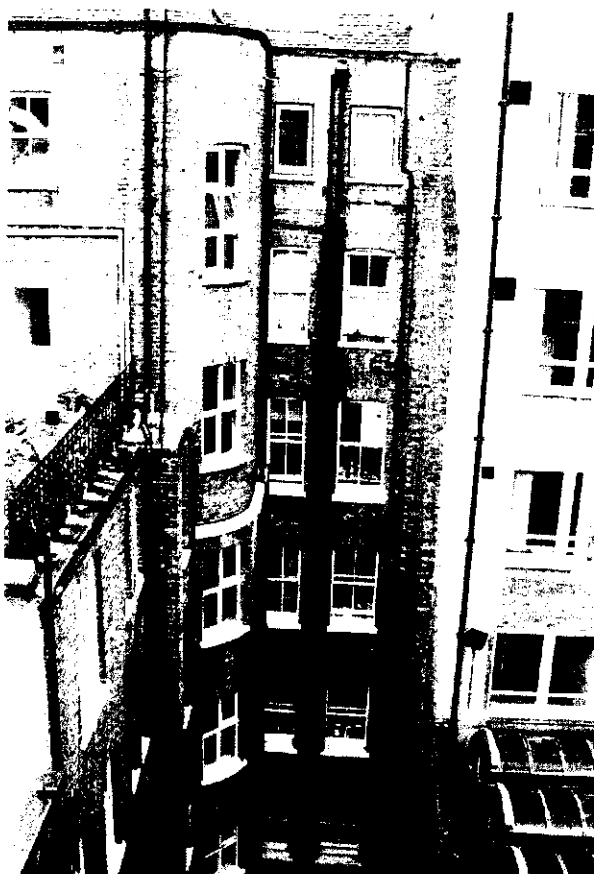
3. ASSESSMENT

3.1 Daylight

- 3.1.1 The guidelines are generally applicable to habitable rooms within domestic residential dwellings. We have not had the benefit of an internal inspection of Kingsgate Mansions, 33 Red Lion Square but from a visual inspection it would appear that the rear elevation windows (north facing windows) looking into the light well, serve habitable rooms. These windows were identified as the windows that would experience the greatest impact as a result of the proposed development as they lie directly opposite the proposed new core and the extension at fifth and sixth floor levels. There are other windows in the rear elevation of the building fronting on to Old North Street but those windows face west and the proposed additional 'massing' on 69-73 Theobalds Road will be at an oblique angle. These windows will experience a far greater impact from the extension of Churchill House by the Royal College of Anaesthetists, which has already received planning approval and is presently being implemented.
- 3.1.2 The simple angle test of striking an angle of 25° from the mid-point of the lowest window (Test 1 of the BRE Guidelines) is not appropriate in the present circumstances due to the fact that the angle already sub-tended from the lowest window exceeds this angle. The most appropriate test to be applied is therefore the calculation of Vertical Sky Component on the face of the windows in question. We have calculated the 'existing' and 'proposed' VSC values for the windows at

lower ground floor, ground floor, first floor and second floor levels. All windows above second floor level will experience a lesser impact and it is therefore unnecessary for those windows to be tested. Those results are summarised in Table 1 below.

- 3.1.3 The results in Table 1 need to be interpreted in the context of the criteria contained in Section 2 of the BRE guidelines. Under existing circumstances, the VSC values to these windows are already below 27% VSC and are represented by the figures in column 2 of Table 1. Where the VSC value is below 27%, the guidelines will be satisfied provided that the percentage reduction in daylight does not exceed 20% of the present value. That is, the windows should continue to be able to receive at least 80% of the present level of daylight – summarised in column 4 of Table 1. From the research undertaken at the BRE, 20% is the maximum level of reduction permissible before the loss is considered to be noticeable.



Location	Existing VSC/%	Proposed VSC/%	% of Original VSC
Lower Ground Floor # 1	7.0	5.6	80.0
Ground Floor # 2	9.8	7.9	81.0
First Floor # 3	12.3	10.1	82.0
Second Floor # 4	16.4	14.2	86.6

TABLE 1

3.1.4 The most critical window is of course the lowest window at lower ground floor level. That window presently receives 7% VSC under 'existing' conditions which will be reduced to 5.6% under 'proposed' conditions. This represents a 20% reduction and is therefore within the acceptable limits of the BRE Guidelines. This window was used as the 'control' benchmark to determine the angle of set back of the proposed fifth and sixth floor extension so as to remain within the permissible limits of the Guidelines. For completeness, we have also tested the three windows above the lower ground floor level to check that there will be no further adverse effect. Unsurprisingly, the results show that there is a progressive improvement higher up the building.

3.1.5 As the loss of light is within the permissible 20% margin at each level, it complies with the BRE Guidelines.

3.2 Sunlight

3.2.1 The sunlight criteria only applies to windows that face within 90° of due south and where a proposed new development is perpendicular and opposite to the 'window wall' (i.e. the wall containing a habitable room). In this particular case, the rear elevation windows of 33 Red Lion Square face north and therefore receive no material sunlight. They therefore fall outside the BRE testing criteria and sunlight is not an issue.

4. CONCLUSION

4.1.1 We have identified that the key windows that will experience the greatest impact from the proposed development are the north facing light well windows in the rear elevation of 33 Red Lion Square. In order to ensure that the proposed development complied with the policy objectives of the Council's UDP, the proposed extension and new core was not to reduce daylight levels by more than 20%. The set back/terracing of the proposed fifth and sixth floor levels were therefore dictated by this design constraint.

4.1.2 'Existing' and 'proposed' daylight levels were measured on the face of these windows at lower ground, ground, first and second floor levels to ensure their compliance with the BRE Guidelines. The daylight level of the lowest window at lower ground floor level will be reduced from 7.0% VSC to 5.6% VSC representing a 20% reduction. The window at ground floor level will experience a 19% reduction with a corresponding value of 18% at the first floor level and 15.4% at second floor level. The impact will therefore lessen progressively higher up the building.

- 4.1.3 The BRE sunlight criteria does not apply as the windows do not face within 90° of due south and therefore do not receive any material sunlight throughout the year.
- 4.1.4 In conclusion, the proposed extension fits within the BRE Guidelines for daylight and sunlight and should therefore meet the Council's policy objectives in terms of protecting neighbouring residential amenity.

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