Barhos Development Ltd

10-11 KING'S MEWS, LONDON

Daylight Assessment Addendum

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APRIL 2018

CONFIDENTIAL

Barhos Development **Ltd**

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1 INTRODUCTION

1.1.1. Further to the assessment carried out in November 2017 WSP has been appointed by Barhos Development Ltd to provide an addendum report to support the planning application of the proposed development at 10-11 King's Mews site with the results of the reassessment of the revised layouts provided by MAA Architects for the Basement and Ground Floor of the proposed development.

1.1.1.1 This addendum addresses the comments raised by council with regards to the levels of daylight within the habitable rooms in the basement and ground floor.

1.1.1.2 A workshop was carried out with the design team in order to address the daylight related issues within these units.

Figure 1 Location plan

2 METHODOLOGY AND CRITERIA

2.1.1. A 3D model has been developed for the purpose of the daylight assessments. This model has been based on the drawings provided by MAA Architects and includes the built area within a radius of approximately 200 m around the site.

2.1.1. The assessment has been undertaken following the guidance given in the BRE's Site Layout Planning for Daylight and Sunlight, A Guide to Good Practice also known as the 'BRE Guide'. These guidelines were first published in 1991, and superseded the document Sunlight and Daylight Planning Criteria and Design of Buildings. The second and latest edition of the BRE Guide was released in 2011.

2.1.2. The BRE Guide gives criteria and methods for calculating daylight and sunlight both within new developments and the impact on existing surrounding windows.

ANGLE OF VISIBLE SKY (θ)

2.1.3. The visible sky angle (θ) gives the availability of daylight to a window and is measured from the top of the obstruction to the top of the window. For an unobstructed window θ is 90^{o}. If the Visible Sky Angle VSA is greater than 65^{o} conventional window design usually gives reasonable results. If the VSA is between 45^{o} and 65^{o} then larger windows and shallow plan internal layouts would be needed to provide adequate daylight. For VSA between 25^{o} and 45^{o} it is very difficult to provide adequate daylight unless large windows are used. In situations where the VSA is lower than 25^{o} no adequate daylight is possible even with a fully glazed wall.

VERTICAL SKY COMPONENT

2.1.4. When the obstruction is not continuous, the visible sky angle (θ) is complex to calculate and the Vertical Sky Component (VSC) may be used instead. The calculation of VSC usually requires specialist computer software. The VSC measures the amount of sky that can be viewed from the centre of a window accounting for all external obstructions, (with 40% being the maximum value for an unobstructed window). The minimum recommended figure for VSC is 27% or greater to maintain good levels of daylight. For existing surrounding windows if the VSC is lower, then a comparison of existing and proposed VSC levels with the new development in place is calculated.

2.1.5. The BRE advises that acceptable levels of daylight can still be achieved if VSC levels are not reduced by more than 20%. If the loss is greater, then the reduction in daylight would be noticeable with rooms likely to become darker, though the closer to the target the less noticeable the impact will be.

AVERAGE DAYLIGHT FACTOR

2.1.6. The VSC described earlier provides an indication of the potential for daylight entering the space; however, **it does not quantify the actual daylight levels inside the rooms**. If the VSC standard is not met on any window, a more detailed assessment based on the Average Daylight Factor (ADF) should be undertaken, as below.

2.1.7. The CIBSE Guide LG10 defines the Average Daylight Factor as:

> *"…the measure of the amount of skylight in a room. If the room is not too deep or obstructed, an average daylight factor of 5% or more will ensure that an interior looks substantially daylit, except early in the morning, late in the afternoon or on exceptionally dull days. An average daylight factor below 2% generally makes a room look dull; electric lighting is likely to be in frequent use"*

2.1.8. In dwellings, the following minimum ADF values should be achieved as per the BS 8206-02 (BSI, 1992):

- 1% in bedrooms,
- 1.5% in living rooms,
- 2% in kitchens, and
- where living and kitchens are integrated into one room, 2% should be used as the target.

2.1.9. The daylight assessment for the internal spaces is a two-stepped process requiring initially the calculation of the VSC at the face of each window to assess the level of obstruction / availability of daylight in relation to the proposed massing and other obstructions such as balconies.

2.1.10. The ADF calculations have been carried out for the additional proposed units only and are based on room layouts derived from drawings provided by MAA Architects, glazing characteristics from the National Calculation Methodology (NCM) modelling guide and reflectance values from BS 8206-2:2008, Annex A, table A.1-A.6. These values are shown in **Table 1**.

Table 1. Reflectance values assumptions

	Reflectance Values
Surroundings	0.2
Internal walls (light grey)	0.68
Internal ceiling (white paint)	0.85
Internal floor (light veneer)	0.4

2.1.11. The following assumptions were taken for the calculation of the ADF calculations:

- Glass transmittance: 0.68;
- Maintenance factor: 0.9;
- Frame factor: 0.85;
- Average reflectance: 65%

2.1.12. For floor-to-ceiling windows a factor has been applied for the portion of window below the working plane height of 850 mm, in line with the BRE Guidelines.

2.2 ASSESSMENT MODELLING

The daylight and sunlight calculations have been undertaken using the specialist software Ecotect 2011 by AutoDesk in which a three dimensional model comprising the existing building on the Site, the existing surrounding properties and the Proposed Development. The model was created based on drawings provided by AMM Architects and satellite images.

3 LIMITATIONS AND ASSUMPTIONS

3.1.1. All calculations have been based on best practice guidance and on drawing or models of the proposed development provided by the architects. Where required, estimations have been made with regards to the height and massing of surrounding properties, based on available satellite photographs and mapping.

4 ASSESSMENT OF DAYLIGHT WITHIN THE PROPOSED DEVELOPMENT

4.1.1. The daylight assessment included the calculation of VSC for each window to measure the level of obstruction and the potential of the daylight availability at the window, and based on the internal rooms' characteristics, the Average Daylight Factor (ADF) was calculated for each room.

4.1.2. WSP worked along with the design team in order to improve the daylight levels within the proposed properties and where possible meet the BRE criteria by incorporating in the design several mitigation strategies which are:

- The internal layouts have been amended to duplex flats on ground and basement levels, whilst a new flat has been introduced at the rear of the ground level;
- Allocating the living and kitchen areas where the daylight availability is greater;
- Increasing window sizes;
- Railings have been introduced at the Juliet balconies in the ground floor to allow higher daylight availability within the rooms.

4.1.3. The results of the daylight assessment for the revised layouts show that all habitable rooms assessed achieve adequate levels of daylight by either meeting or exceeding the minimum BRE recommendation.

4.1.4. The results are presented in **Tables** and **Figures** below supported by the plans of each floor.

Table 2 Daylight Results Basement

Room No.	Room Use	ADF Target (%)	ADF (%)	BRE Compliance
1	Bedroom	1%	1.5%	Above
2	Bedroom	1%	1%	Above
3	Kitchen	2%	2%	Above
4	Kitchen	2%	2.5%	Above
5	Bedroom	1%	2.7%	Above
6	Bedroom	1%	2.2%	Above

Figure 2 Basement

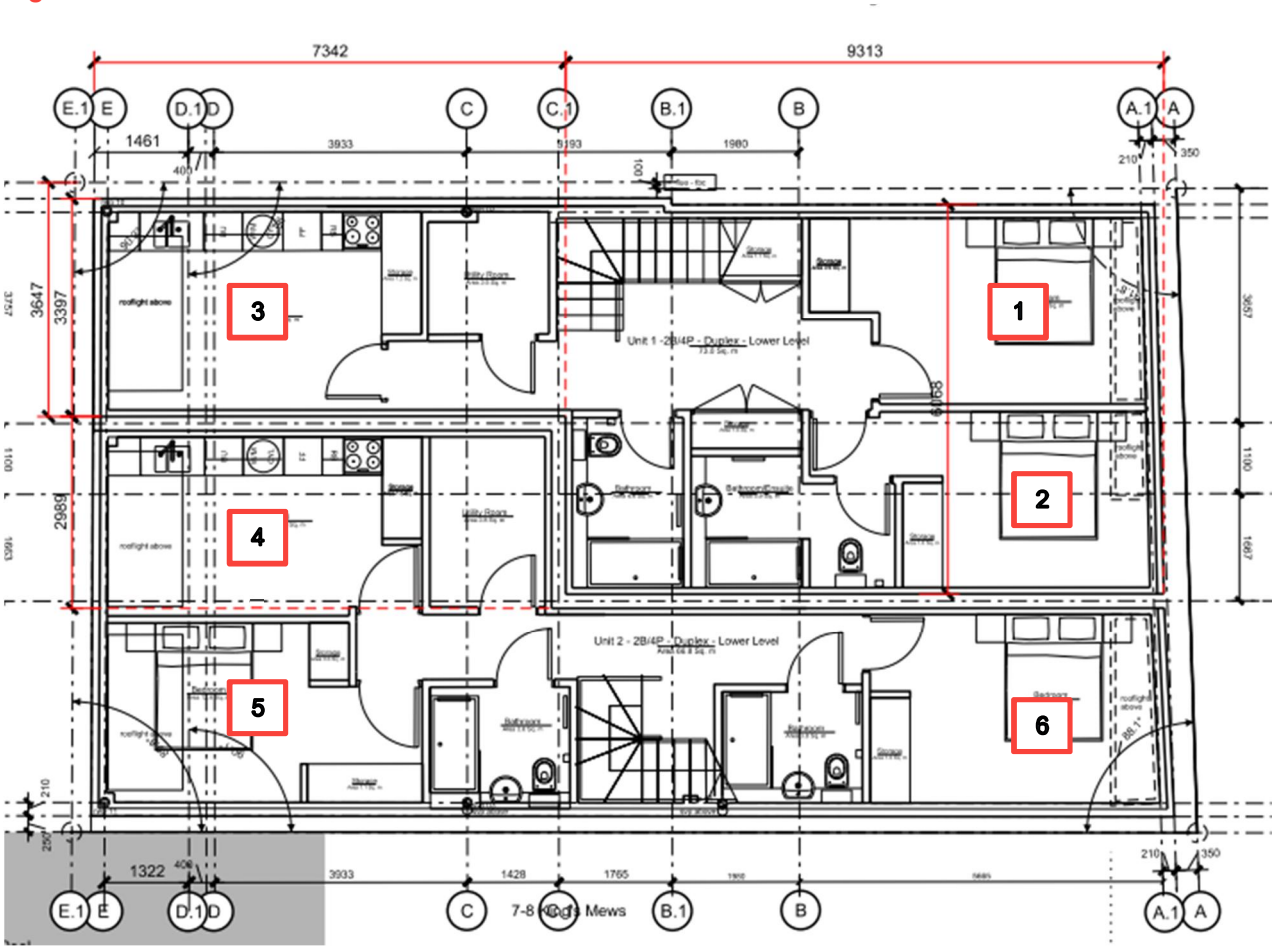
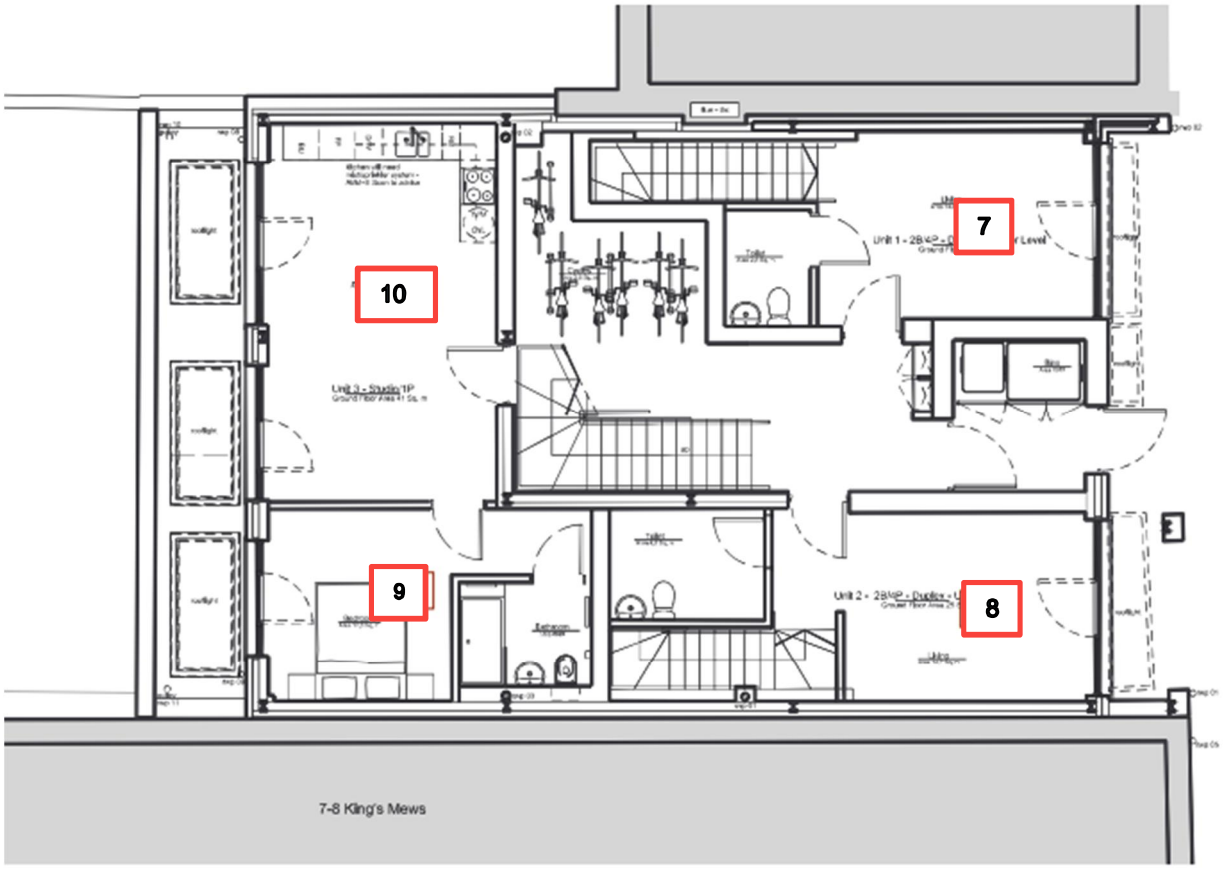


Table 3 Daylight Results Ground Floor

Room No.	Room Use	ADF Target (%)	ADF (%)	BRE Complaince
7	Living room	1.5%	1.8%	Above
8	Living room	1.5%	1.6%	Above
9	Bedroom	1%	1.8%	Above
10	Kitchen	2%	2.4%	Above

Figure 3 Ground Floor



5 CONCLUSIONS

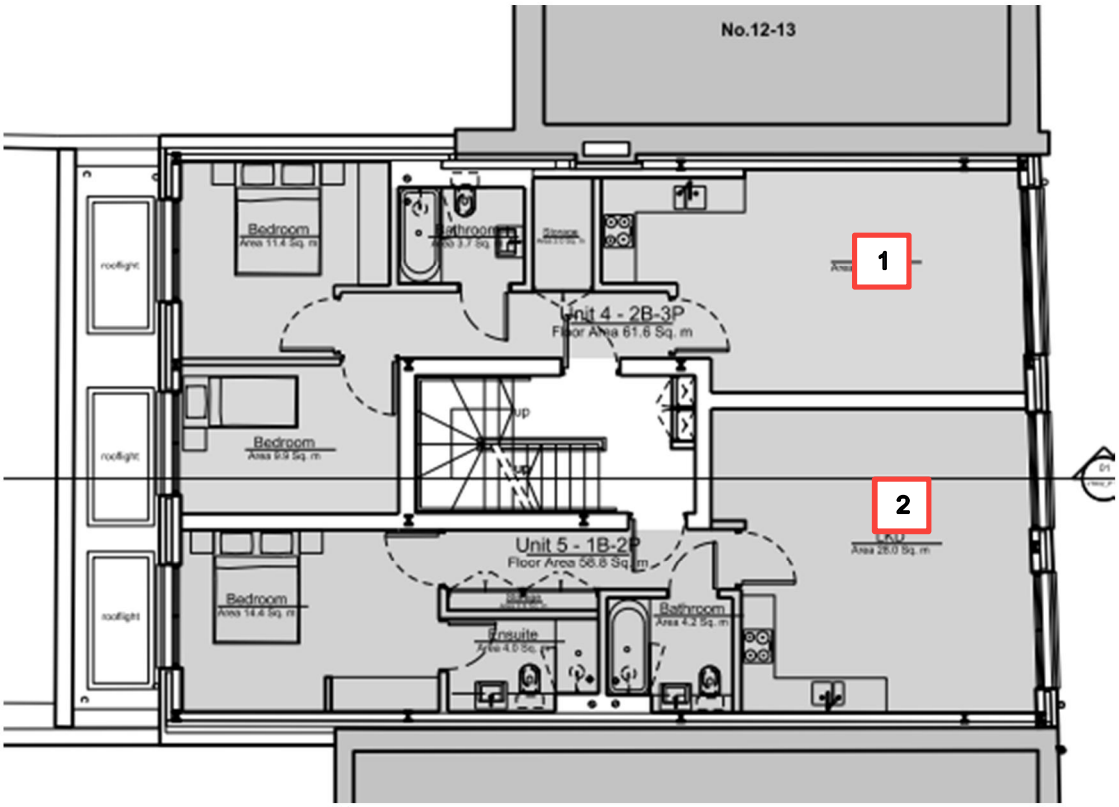
5.1.1. In conclusion, the results of the daylight and sunlight assessment demonstrate that the proposed development satisfies the recommended Average Daylight Factor (ADF) criteria, despite the fact that it is located in the very dense urban environment of the Borough of Camden. This is on the basis that in all rooms assessed the ADF is 1% or higher in bedrooms, 1.5% or higher in living rooms and 2% or higher in kitchens. We therefore consider that the future occupants of the proposed development will enjoy adequate levels of internal daylight.

5.1.2. In addition to the calculations above, as requested by the council the north-west façade of the first floor of the proposed development has been assessed replacing the railings with a solid brick balustrades. The results of this assessment show that the daylight availability within the living/kitchen rooms is reduced compared with the previous assessment with one room showing daylight levels below the minimum ADF recommended by the BRE Guidance. This is due to the effective loss of glazing area to the room compared to the railings Juliet balconies. It is therefore recommended to retain the railing system for the balconies to allow a higher level of daylight into the rooms. The results are shown in **Table 4** below:

Table 4 Daylight Results First Floor

Room No.	Room Use	ADF Target (%)	ADF (%)	BRE Complaince
1	L/K	2%	1.8%	Below
2	L/K	2%	2.5%	Above

Figure 4 First Floor



6 GLOSSARY

6.1.1. VSC – Vertical Sky Component - A measure of the percentage of skylight incident at a point on a vertical plane in relation to the unobstructed skylight incident on the horizontal plane.

6.1.2. ADF – Average Daylight Factor – It is the ratio of the average indoor illuminance on a working plane to the outdoor illuminance.

6.1.3. CIE – Commission Internationale De L'Eclairage – It is an authority which has developed a number of standard sky distributions (e.g. overcast, uniform) based on very specific mathematical formula.

6.1.4. θ - Angle of visible sky – It is the angle subtended in the vertical plane normal to the window by sky visible from centre of the window.

7 REFERENCE

- Ref. 1 Littlefair, P.J. (1995) Site Layout and Planning for Daylight and Sunlight: a guide to good practice. BRE Construction Research Communications, Garston, UK. 2011 edition;

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