PROPOSED SCHEME DAYLIGHT, SUNLIGHT & OVERSHADOWING

Ringers Road

Produced by XCO2 for Ringers Road Properties Ltd.

November 2021

XCO2
56 Kingsway Place, Sans Walk
London EC1R 0LU

+44 (0)20 7700 1000
mail@xco2.com
xco2.com

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	1.0	2.0					
Remarks	Draft	Revision					
Prepared by	AM	AM					
Checked by	HP	HP					
Authorised by	KM	KM					
Date	20/10/2021	10/11/2021					
Project reference	9.604	9.604					

EXECUTIVE SUMMARY

The daylight and sunlight analysis indicates that the habitable rooms of the proposed development at Ringers Road will achieve good levels of daylight and sunlight considering site constrains and the urban context.

Daylight and Sunlight analysis was carried out for the proposed development at Ringers Road, located within the London Borough of Bromley. This report outlines the results of the analysis for the planning application, assessing the daylight and sunlight received by the habitable spaces of the proposed development.

The methodology set out in this report is in accordance with BRE's "Site Layout Planning for Daylight and Sunlight, A Guide to Good Practice" by PJ Littlefair (2011) which is accepted as good practice by Planning Authorities.

Computer modelling software was used to carry out the assessments. The model used was based on drawings and a 3D model provided by the design team.

DAYLIGHT ASSESSMENT

The rooms evaluated in the internal daylight assessment include open plan kitchen, living room, dining spaces, and bedrooms within the proposed development.

The assessment was carried out for 22no. dwellings spanning 61no. habitable spaces (22no. LKD and 39no. Bedrooms) covering first, second and third floors which are considered to be the worst-case rooms in terms of daylight access across the scheme.

The analysis results indicated that 53no. spaces (17no. LKD and 36no. Bedrooms) satisfy the recommendations set out by the BRE's "Site Layout Planning for Daylight and Sunlight, A Guide to Good Practice" by PJ Littlefair (2011), which is accepted as good practice by Planning Authorities.

Out of the 22no. KLD rooms assessed; 8no. received an ADF of at least 2% and a further 8no. received an ADF of at least 1.5%. An additional 1no. is seen to achieve >80% of the living room target, which is considered adequate for spaces where living rooms are the main function of the space.

The remaining 5no. KLD rooms were found to be attaining an ADF below the recommended 1.5% for living rooms. This shortfall is largely owing to the unavoidable presence of large neighbouring buildings immediately adjacent to the proposal which are seen to be significantly obstructing daylight access. Furthermore, the desire of the design team to provide valuable private amenity spaces in the form of balconies to all units is also seen to play a role in the daylight impacts.

However, in the case of all of these 5no. KLD spaces, the kitchen portion of the room is located to the back of the space and is expected to be task lit in operation, therefore, the actual living room portion of the assessed area is deemed to be receiving ample daylight and is expected to perform better than the results currently demonstrate in reality. Considering the site constrains, the living, kitchen, dining spaces' access to daylight is therefore deemed to be acceptable for the proposed development within an urban environment.

Of the 39no. bedrooms assessed, 29no. meet the 1% ADF target as set out by the BRE. A further 3no. received an ADF of at least 0.9% and 4no. an ADF of at least 0.8%, which is deemed acceptable for bedrooms; therefore, 92% of all bedrooms assessed are expected to achieve adequate levels of daylight.

The remaining 3no. bedrooms are facing the inner courtyard between the two blocks or are immediately adjacent to neighbouring boundary walls of the site, therefore facing neighbouring buildings directly, limiting daylight access due to the existing obstructions.

It should be noted that the assessed windows and rooms are considered worst case scenario on the lowest floors. The remaining dwellings on the floors

above will perform significantly more favourably than the worst-case assessed units.

Out of the total number of proposed 249no. habitable spaces (94no. KLD and 155no. bedrooms) across the site in its entirety, 61no were assessed covering first, second and third floor, considered to be the worst-case rooms in terms of daylight access across the scheme. A side wide projection based on the results obtained at the assessed levels expects that 82% of the KLD spaces meet the BRE criteria and 11% are marginally below the BRE targets and meet the criteria for dining spaces. The remaining 7% of. KLD spaces obtain an ADF below the BRE recommendations due to neighbouring obstructions and external balconies.

A similar projection for the bedroom spaces projects that 91% of the bedrooms achieve and ADF above BRE criteria. A further 7% of them are marginally below the criteria (e.g., >80% of the target). The remaining 2% of the bedrooms are facing the inner courtyard and immediately adjacent to neighbouring boundary walls.

Overall, the proposed development as a whole is anticipated to achieve adequate levels of daylighting to all dwellings and habitable spaces in conjunction with valuable private amenity spaces and is therefore considered to provide good quality accommodation to the future occupants in terms of daylight.

An overall projection illustrates that circa 96% of the total number of habitable rooms across the site will achieve a ADF above BRE criteria or considered to be within acceptable levels in terms of daylight access.

SUNLIGHT ASSESSMENT

The assessment was carried out for 22no. dwellings considered to be the worst-case units in terms of sunlight access across first, second and third floor of the scheme.

A total of 14no. living spaces (open plan KLD rooms) with at least one main window facing within 90° of due south each were assessed for solar access.

The analysis has shown that 1no. of the 14no. assessed living spaces will achieve adequate annual and winter sunlight based on the BRE Guide, and a further 2no. achieving a minor reduction from the target criteria (>21% annual and standard 5% winter).

Of the remaining 11no. living spaces:

- 6no. achieve adequate winter sunlight levels; and,
- 5no. are seen to be predominantly east/west facing.

All of these spaces are predominantly east facing and below a private amenity (balcony) giving additional comfort to the future tenants.

Out of the 5no. rooms falling short of the BRE criteria, these are all seen to be predominantly east/west facing rather that explicitly south facing, furthermore, 1no. KLD space is located at Block B which faces the courtyard between the two blocks, therefore naturally receiving less sunlight.

As mentioned before, it should be noted that the assessed windows and rooms are considered worst case scenario on the lowest floors. The remaining dwellings on the floors above will perform significantly more favourably than the worst-case assessed units.

Overall, it can be concluded that the proposed design offers adequate accessibility to sunlight in living spaces considering the context and limitations of the site.

INTRODUCTION

The site is located in urban environment which is currently undergoing a wider regeneration and subsequently the interpretation of the results requires careful consideration of the BRE guidance.

SITE

The proposed development is a mixed-use building located between Ringers Road and Ethelbert Road in Bromley and includes the demolition of existing buildings and constructions of mixed-use development comprising residential units, ancillary residents' facilities (including co-working space) and commercial floor space (Use Class E) across two blocks, along with associated hard and soft landscaping, amenity spaces cycle and refuse storage.

Figure 1 below shows the approximate site location.

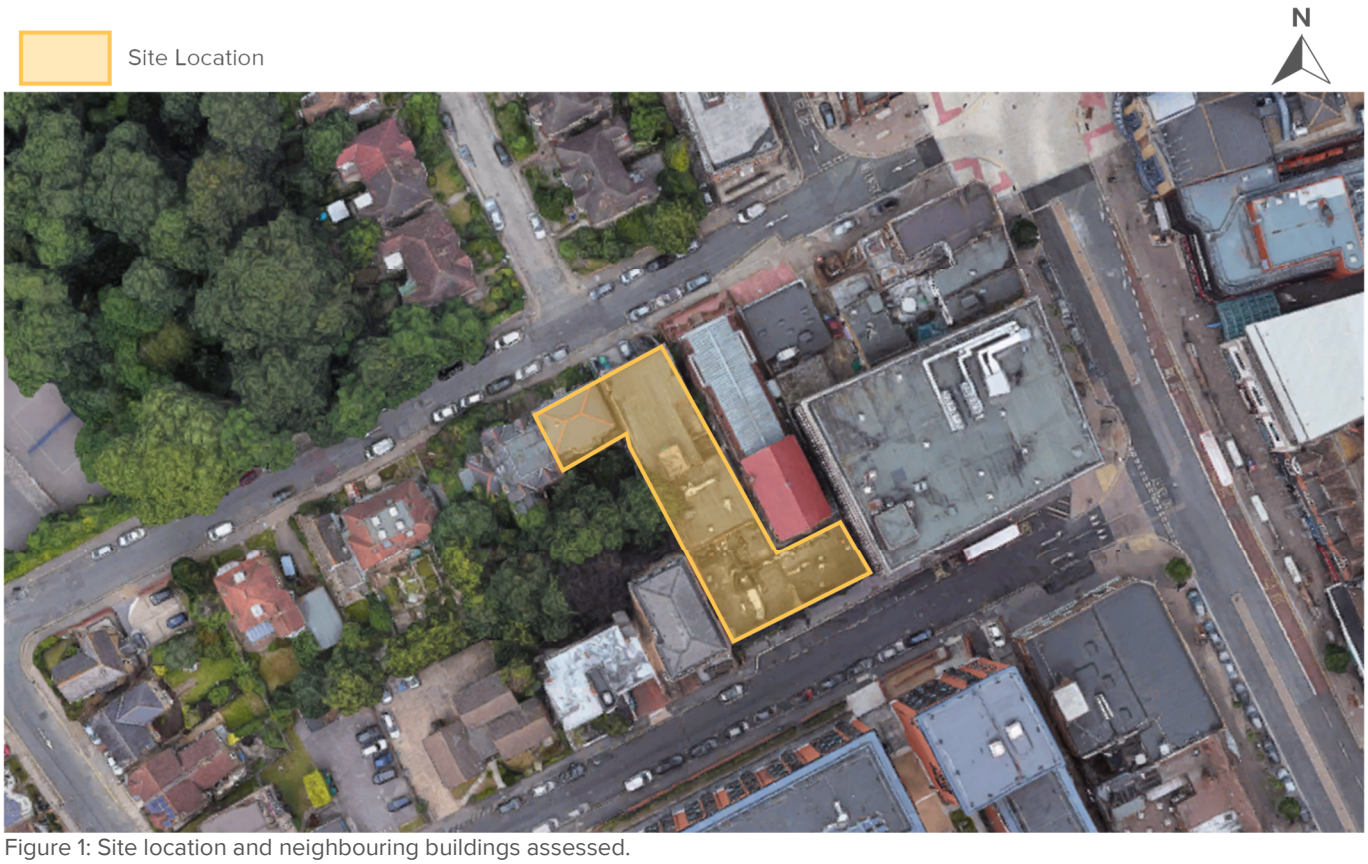

Figure 1: Site location and neighbouring buildings assessed.

METHODOLOGY

The assessment is based on guidelines set out in the BRE "Site Layout Planning for Daylight and Sunlight, A Guide to Good Practice" (2011).

The methodology is based on the British Research Establishment's (BRE) publication "Site Layout Planning for Daylight and Sunlight - A Guide to Good Practice," by PJ Littlefair (2011).

The BRE publication Site Layout Planning for Daylight and Sunlight gives advice on site layout planning to achieve good daylighting in buildings. It is important to note that the advice given in the BRE guide is *"not mandatory"* and *"its aim is to help rather than constrain the designer".*

The guide also clearly states that *"this document should not be seen as an instrument of planning policy"* and that *"in special circumstances the developer or planning authority may wish to use different target values".*

DAYLIGHT

The BRE guidelines use the average daylight factor calculation (ADF). The ADF is a measure of internal daylight indicating the ratio of inside illuminance to the outside illuminance expressed as a percentage. The BRE states that daylighting in new rooms can be determined using average daylight factor (ADF) calculations. BS8206-2 Code of Practice for Daylighting recommends different average daylight factors for different habitable spaces. These are as follows:

- 1% for bedrooms
- 1.5% for living rooms and
- 2% for kitchens, or rooms with kitchens

SUNLIGHT

The term 'annual probable sunlight hours' refers to the long-term average of the total of hours during a year in which direct sunlight reaches the unobstructed ground (when clouds are taken into account). The 'winter probable sunlight hours' is used to mean the same but only for the winter period (21 September – 21 March).

The BRE guide states that *"in general, a dwelling or non-domestic building which has a particular requirement for sunlight, will appear reasonably sunlit provided: at least one main window faces within 90o of due south and the centre of at least one window to a main living room can receive 25% of annual probable sunlight hours, including at least 5% of annual probable sunlight hours in the winter months between 21 September and 21 March. "*

Note that the BRE sunlight tests relate mainly to living room windows, although care should be taken to ensure that kitchens and bedrooms receive reasonable amounts of sunlight.

DAYLIGHT ASSESSMENT

The analysis indicates that the habitable spaces of the proposed development will receive satisfying levels of daylighting considering the context and limitations of the site.

A total of 61no. of habitable spaces located on first to third floors of the development that are considered to be the worst-case dwellings in terms of daylight access have been included in the assessment. All habitable rooms (kitchens, living, dining rooms and bedrooms) within these dwellings were assessed.

The references of the evaluated dwellings and the corresponding habitable rooms can be found in the Appendix A - Window/Room Reference. The tables below show the Average Daylight Factor (ADF) results for all the assessed rooms.

For the calculations, the following assumptions have been made:

- 50% average internal surface reflectivity
- 70% light transmission for vertical glazing
- 96% maintenance factor

Detailed output can be found in Appendix B – Detailed Daylight Results.

The analysis results indicated that approximately 77% of the selected open plan KLD spaces and 92% of selected bedrooms satisfy the recommendations set out by the BRE's "Site Layout Planning for Daylight and Sunlight, A Guide to Good Practice" by PJ Littlefair (2011), which is accepted as good practice by Planning Authorities.

The assessment was carried out for 22no. dwellings spanning 61no. habitable spaces (22no. LKD and 39no. Bedrooms) covering first, second and third floors which are considered to be the worst-case rooms in terms of daylight access across the scheme.

The analysis results indicated that 53no. spaces (17no. LKD and 36no. Bedrooms) satisfy the recommendations set out by the BRE's "Site Layout Planning for Daylight and Sunlight, A Guide to Good Practice" by PJ Littlefair (2011), which is accepted as good practice by Planning Authorities.

Out of the 22no. KLD rooms assessed; 8no. received an ADF of at least 2% and a further 8no. received an ADF of at least 1.5%. An additional 1no. is seen to achieve >80% of the living room target, which is considered adequate for spaces where living rooms are the main function of the space.

The remaining 5no. KLD rooms were found to be attaining an ADF below the recommended 1.5% for living rooms. This shortfall is largely owing to the unavoidable presence of large neighbouring buildings immediately adjacent to the proposal which are seen to be significantly obstructing daylight access. Furthermore, the desire of the design team to provide valuable private amenity spaces in the form of balconies to all units is also seen to play a role in the daylight impacts.

However, in the case of all of these 5no. KLD spaces, the kitchen portion of the room is located to the back of the space and is expected to be task lit in operation, therefore, the actual living room portion of the assessed area is deemed to be receiving ample daylight and is expected to perform better than the results currently demonstrate in reality. Considering the site constrains, the living, kitchen, dining spaces' access to daylight is therefore deemed to be acceptable for the proposed development within an urban environment.

Of the 39no. bedrooms assessed, 29no. meet the 1% ADF target as set out by the BRE. A further 3no. received an ADF of at least 0.9% and 4no. an ADF of at least 0.8%, which is deemed acceptable for bedrooms; therefore, 92% of all bedrooms assessed are expected to achieve adequate levels of daylight.

The remaining 3no. bedrooms are facing the inner courtyard between the two blocks or are immediately adjacent to neighbouring boundary walls of the site, therefore facing neighbouring buildings directly, limiting daylight access due to the existing obstructions.

It should be noted that the assessed windows and rooms are considered worst case scenario on the lowest floors. The remaining dwellings on the floors above will perform significantly more favourably than the worst-case assessed units.

Out of the total number of proposed 249no. habitable spaces (94no. KLD and 155no. bedrooms) across the site in its entirety, 61no were assessed covering first, second and third floor, considered to be the worst-case rooms in terms of daylight access across the scheme. A side wide projection based on the results obtained at the assessed levels expects that 82% of the KLD spaces meet the BRE criteria and 11% are marginally below the BRE targets and meet the criteria for dining spaces. The remaining 7% of. KLD spaces obtain an ADF below the BRE recommendations due to neighbouring obstructions and external balconies.

A similar projection for the bedroom spaces projects that 91% of the bedrooms achieve and ADF above BRE criteria. A further 7% of them are marginally below the criteria (e.g., >80% of the target). The remaining 2% of the bedrooms are facing the inner courtyard and immediately adjacent to neighbouring boundary walls.

Overall, the proposed development as a whole is anticipated to achieve adequate levels of daylighting to all dwellings and habitable spaces in conjunction with valuable private amenity spaces and is therefore considered to provide good quality accommodation to the future occupants in terms of daylight.

An overall projection illustrates that circa 96% of the total number of habitable rooms across the site will achieve a ADF above BRE criteria or considered to be within acceptable levels in terms of daylight access.

Figure 2: Daylight results summary.

Number of habitable rooms tested	**61**
Number of kitchen/living/dining rooms	**22**
Number of kitchen/living/dining rooms with ADF meeting 2% target for kitchens	8
Number of kitchen/living/dining rooms with ADF meeting 1.5% target for living rooms	8
Number of kitchen/living/dining rooms with ADF meeting 80% of 1.5% target (>1.2%)	1
Number of KLD with ADF below the BRE recommendations due to neighbouring obstructions and external balconies	5
Number of bedrooms	**39**
Number of bedrooms with ADF meeting 1% target	29
Number of bedrooms with ADF within 90% of target	3
Number of bedrooms with ADF within 80% of target	4
Number of rooms facing the inner courtyard and immediately adjacent to neighbouring boundary walls	3

SUNLIGHT ASSESSMENT

The analysis indicates that the south facing living spaces of the proposed development will receive good levels of sunlight considering the context and limitations of the site.

A sunlight access assessment has been carried out for south facing kitchen, living, dining (KLD) rooms of the proposed development in line with the BRE methodology.

Detailed results for all habitable spaces can be found in Appendix C - Detailed Sunlight Results.

The assessment was carried out for dwellings on first to third floor considered to be the worst-case units in terms of sunlight access across the scheme.

A total of 14no. living spaces (open plan KLD rooms) with at least one main window facing within 90° of due south each were assessed for solar access.

The analysis has shown that 1no. of the 14no. assessed living spaces will achieve adequate annual and winter sunlight based on the BRE Guide, and a further 2no. achieving a minor reduction from the target criteria (>21% annual and standard 5% winter).

Of the remaining 11no. living spaces:

- 6no. achieve adequate winter sunlight levels; and,
- 5no. are seen to be predominantly east/west facing.

All of these spaces are predominantly east facing and below a private amenity (balcony) giving additional comfort to the future tenants.

Out of the 5no. rooms falling short of the BRE criteria, these are all seen to be predominantly east/west facing rather that explicitly south facing, furthermore, 1no. KLD space is located at Block B which faces the courtyard between the two blocks, therefore naturally receiving less sunlight.

As mentioned before, it should be noted that the assessed windows and rooms are considered worst case scenario on the lowest floors. The remaining dwellings on the floors above will perform significantly more favourably than the worst-case assessed units.

Overall, it can be concluded that the proposed design offers adequate accessibility to sunlight in living spaces considering the context and limitations of the site.

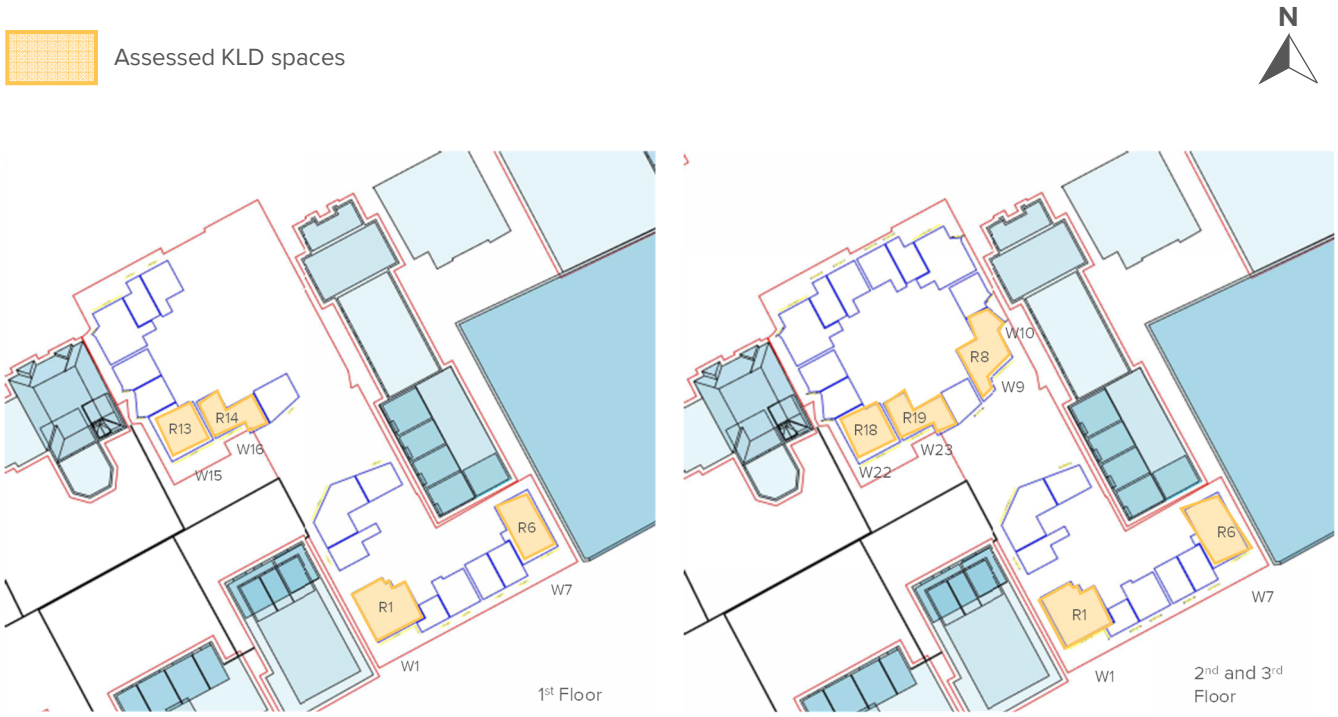

Figure 3: Assessed KLD spaces. 1st Floor (left), 2nd and 3rd Floors (right).

Figure 4: Sunlight results summary.

Number of living rooms tested	14
Number of living rooms with at least one south facing window achieving APSH > 25% & WPSH > 5%	1
Number of living rooms with at least one south facing window achieving ASHP marginally below (> 21%) & WPSH > 5%	2
Number of living rooms with at least one south facing window achieving WPSH > 5%	6
Number of living rooms predominantly facing east/west	5
Number of living rooms not meeting any of the above criteria	0

CONCLUSION

The daylight and sunlight analysis indicates that the habitable rooms of the proposed development at Ringers Road will achieve good levels of daylight and sunlight considering site constrains and the urban context.

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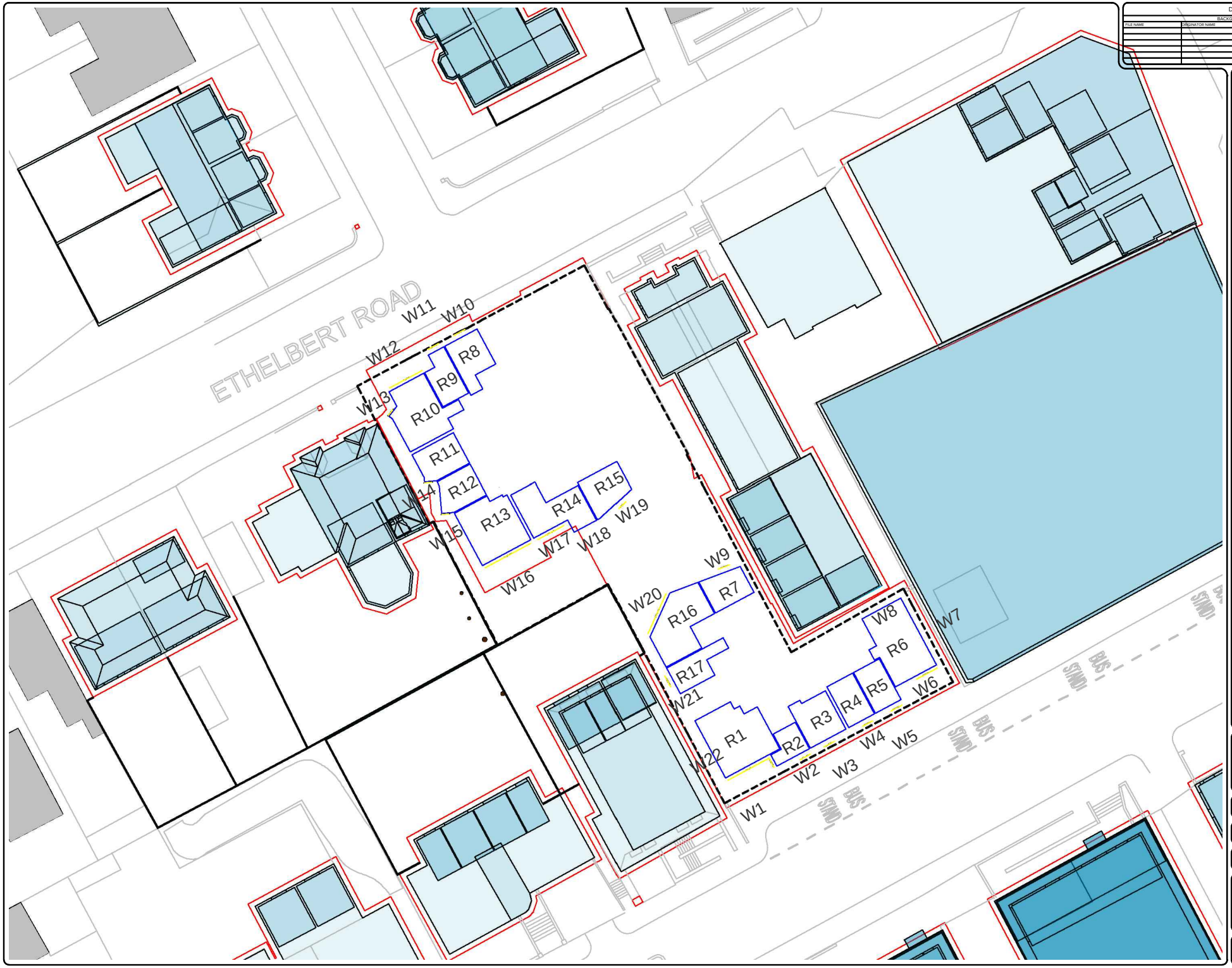
Overall, it can be concluded that the proposed design offers adequate accessibility to sunlight in living spaces considering the context and limitations of the site.

APPENDIX A - WINDOW/ROOM REFERENCE



DO NOT SCALE

BACKGROUND DRAWING INFORMATION

FILE NAME	ORIGINATOR NAME	DESCRIPTION NAME	REV	DATE RECD

Notes

Rev	Date	Description	Chk'd	Appr
01	15.10.21	Windows and rooms layout	AM	HP

XCO2
The Gymnasium,
56 Kingsway Place,
Sans Walk, London
EC1R 0LU
+44 (0) 20 7700 1000
mail@xco2.com
www.xco2.com

Client
Ringers Road Properties Ltd.

Architect
XCO2

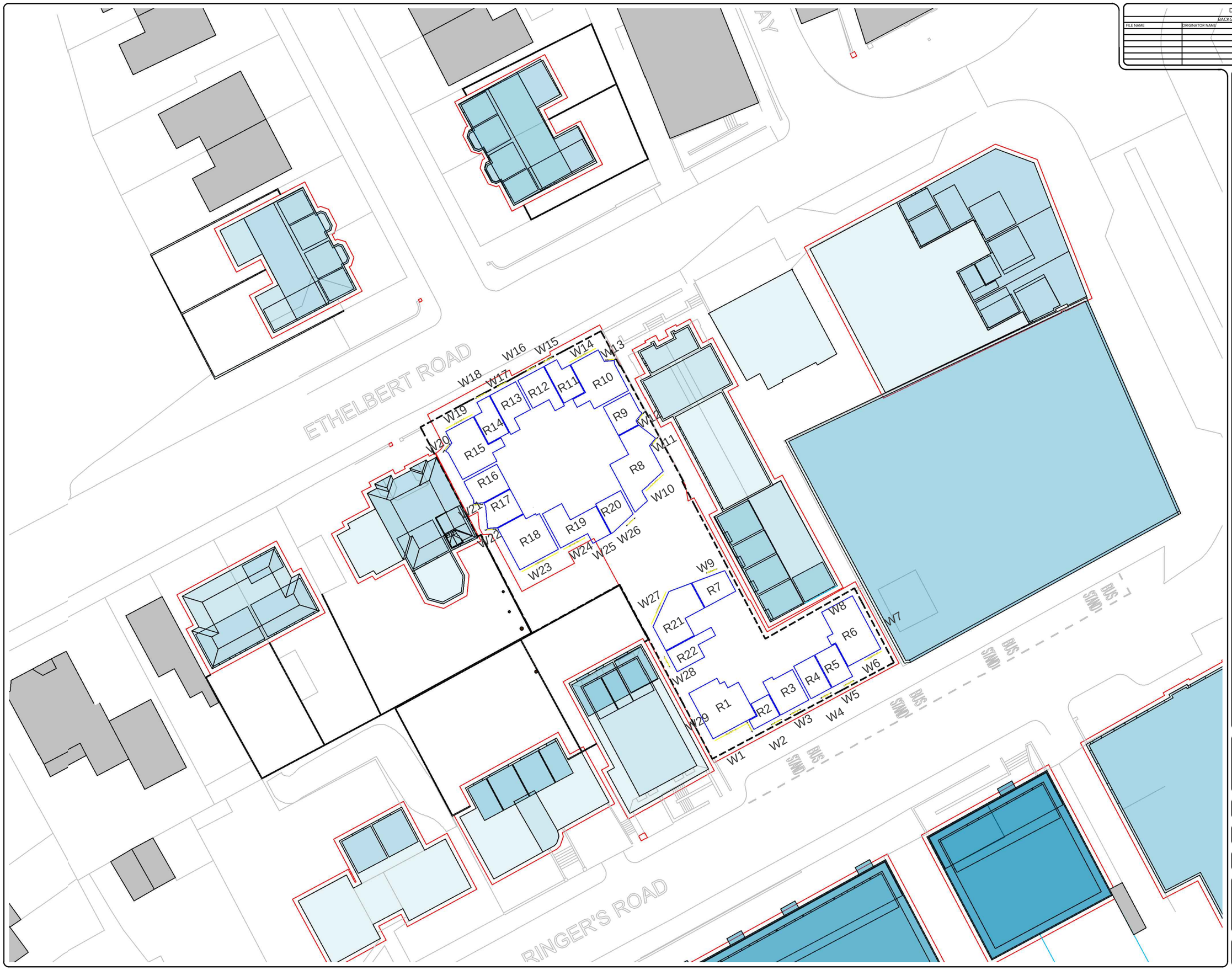
Project
Ringers Road

Title
Windows and rooms layout
Proposed scheme
First Floor

Scale@A3	Drawn	Checked	Date
N.T.S	AM	HP	18.10.21

Drawing Number
9_604 Ringers Rd

Revision
1



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BACKGROUND DRAWING INFORMATION

FILE NAME	ORIGINATOR NAME	DESCRIPTION NAME	REV	DATE REC'D

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Rev	Date	Description	Chk'd	Appr
01	15.10.21	Windows and rooms layout	AM	HP

XCO2
The Gymnasium,
56 Kingsway Place,
Sans Walk, London
EC1R 0LU
+44 (0) 20 7700 1000
mail@xco2.com
www.xco2.com

Client: Ringers Road Properties Ltd.

Architect: XCO2

Project: Ringers Road

Title: Windows and rooms layout
Proposed scheme
2nd and 3rd Floor

Scale@A3	Drawn	Checked	Date
N.T.S	AM	HP	18.10.21

Drawing Number	Revision
9_604 Ringers Rd	1

APPENDIX B – DETAILED DAYLIGHT RESULTS

Project Name: 9_604_Ringers Road_DSO_211101_v2_v2014_recover
Project No.: 1
Report Title: Average Daylight Factor - Neighbour Analysis
Date: 01/11/2021

Floor Ref.	Room Ref.	Room Use.	Window Ref.	Glass Transmittance	Maintenance Factor	Glazed Area	Clear Sky Angle Proposed	Room Surface Area	Average Surface Reflectance	Below Working Plane Factor	ADF Proposed	Req'd Value
Proposed Building Ringers Road												
First	R1	LKD	W1-L	0.74	0.96	3.62	22.81	123.71	0.50	0.30	0.19	
		LKD	W1-U	0.74	0.96	7.66	1.11	123.71	0.50	1.00	0.07	
		LKD	W22-L	0.74	0.96	1.02	17.05	123.71	0.50	0.30	0.04	
		LKD	W22-U	0.74	0.96	2.12	19.33	123.71	0.50	1.00	0.31	
											0.61	2.00
First	R2	Bedroom	W2-L	0.74	0.96	0.76	45.57	49.75	0.50	0.30	0.20	
		Bedroom	W2-U	0.74	0.96	1.45	46.27	49.75	0.50	1.00	1.28	
											1.48	1.00
First	R3	Bedroom	W3-L	0.74	0.96	0.76	43.46	73.07	0.50	0.30	0.13	
		Bedroom	W3-U	0.74	0.96	1.45	44.25	73.07	0.50	1.00	0.83	
											0.96	1.00
First	R4	Bedroom	W4-L	0.74	0.96	0.71	45.69	59.58	0.50	0.30	0.16	
		Bedroom	W4-U	0.74	0.96	1.36	46.43	59.58	0.50	1.00	1.00	
											1.16	1.00
First	R5	Bedroom	W5-L	0.74	0.96	0.82	49.05	59.58	0.50	0.30	0.19	
		Bedroom	W5-U	0.74	0.96	1.56	49.61	59.58	0.50	1.00	1.23	
											1.42	1.00
First	R6	LKD	W6-L	0.74	0.96	2.74	28.02	123.25	0.50	0.30	0.18	
		LKD	W6-U	0.74	0.96	5.80	14.22	123.25	0.50	1.00	0.63	
		LKD	W7-L	0.74	0.96	1.02	3.22	123.25	0.50	0.30	0.01	
		LKD	W7-U	0.74	0.96	2.12	0.00	123.25	0.50	1.00	0.00	
		LKD	W8-L	0.74	0.96	1.02	7.11	123.25	0.50	0.30	0.02	
		LKD	W8-U	0.74	0.96	2.12	7.49	123.25	0.50	1.00	0.12	
											0.96	2.00
First	R7	Bedroom	W9-L	0.74	0.96	0.82	33.23	61.15	0.50	0.30	0.13	
		Bedroom	W9-U	0.74	0.96	1.70	36.57	61.15	0.50	1.00	0.96	
											1.09	1.00
First	R8	Bedroom	W10-L	0.74	0.96	0.82	80.58	73.30	0.50	0.30	0.25	
		Bedroom	W10-U	0.74	0.96	1.70	81.34	73.30	0.50	1.00	1.79	
											2.04	1.00
First	R9	Bedroom	W11-L	0.74	0.96	0.82	80.77	62.99	0.50	0.30	0.30	
		Bedroom	W11-U	0.74	0.96	1.70	81.53	62.99	0.50	1.00	2.08	
											2.38	1.00
First	R10	LKD	W12-L	0.74	0.96	2.38	59.78	116.85	0.50	0.30	0.35	
		LKD	W12-U	0.74	0.96	5.04	42.12	116.85	0.50	1.00	1.72	
		LKD	W13-L	0.74	0.96	0.47	61.35	116.85	0.50	0.30	0.07	
		LKD	W13-U	0.74	0.96	1.01	62.14	116.85	0.50	1.00	0.51	
											2.64	2.00
First	R11	Bedroom	W14-L	0.74	0.96	0.47	28.08	66.63	0.50	0.30	0.06	
		Bedroom	W14-U	0.74	0.96	1.01	35.43	66.63	0.50	1.00	0.51	
											0.56	1.00
First	R12	Bedroom	W15-L	0.74	0.96	0.46	55.43	62.19	0.50	0.30	0.12	
		Bedroom	W15-U	0.74	0.96	0.99	56.48	62.19	0.50	1.00	0.85	
											0.96	1.00
First	R13	LKD	W16-L	0.74	0.96	3.33	39.23	109.88	0.50	0.30	0.34	
		LKD	W16-U	0.74	0.96	7.06	24.73	109.88	0.50	1.00	1.50	
											1.84	2.00
First	R14	LKD	W17-L	0.74	0.96	1.94	33.36	106.40	0.50	0.30	0.17	
		LKD	W17-U	0.74	0.96	4.10	20.90	106.40	0.50	1.00	0.76	
		LKD	W18-L	0.74	0.96	0.68	43.52	106.40	0.50	0.30	0.08	
		LKD	W18-U	0.74	0.96	1.42	44.97	106.40	0.50	1.00	0.57	
											1.58	2.00
First	R15	Bedroom	W19-L	0.74	0.96	0.82	35.77	67.48	0.50	0.30	0.12	
		Bedroom	W19-U	0.74	0.96	1.70	37.15	67.48	0.50	1.00	0.89	
											1.01	1.00
First	R16	LKD	W20-L	0.74	0.96	2.84	35.73	110.85	0.50	0.30	0.26	
		LKD	W20-U	0.74	0.96	6.00	24.25	110.85	0.50	1.00	1.24	
											1.50	2.00
First	R17	Bedroom	W21-L	0.74	0.96	0.82	16.21	69.55	0.50	0.30	0.05	
		Bedroom	W21-U	0.74	0.96	1.70	18.90	69.55	0.50	1.00	0.44	
											0.49	1.00
Second	R1	LKD	W1-L	0.74	0.96	3.62	28.65	123.71	0.50	0.30	0.24	
		LKD	W1-U	0.74	0.96	7.66	3.28	123.71	0.50	1.00	0.19	
		LKD	W29-L	0.74	0.96	1.02	27.71	123.71	0.50	0.30	0.06	
		LKD	W29-U	0.74	0.96	2.12	34.70	123.71	0.50	1.00	0.56	

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											1.06	2.00
Second	R2	Bedroom	W2-L	0.74	0.96	0.76	49.50	49.75	0.50	0.30	0.22	
		Bedroom	W2-U	0.74	0.96	1.59	50.74	49.75	0.50	1.00	1.53	
											1.75	1.00
Second	R3	Bedroom	W3-L	0.74	0.96	0.76	47.10	73.07	0.50	0.30	0.14	
		Bedroom	W3-U	0.74	0.96	1.59	48.36	73.07	0.50	1.00	0.99	
											1.13	1.00
Second	R4	Bedroom	W4-L	0.74	0.96	0.71	49.22	59.58	0.50	0.30	0.17	
		Bedroom	W4-U	0.74	0.96	1.19	49.78	59.58	0.50	1.00	0.94	
											1.11	1.00
Second	R5	Bedroom	W5-L	0.74	0.96	0.82	52.58	59.58	0.50	0.30	0.20	
		Bedroom	W5-U	0.74	0.96	1.36	52.88	59.58	0.50	1.00	1.15	
											1.35	1.00
Second	R6	LKD	W6-L	0.74	0.96	2.74	32.09	123.25	0.50	0.30	0.20	
		LKD	W6-U	0.74	0.96	5.80	16.34	123.25	0.50	1.00	0.73	
		LKD	W7-L	0.74	0.96	1.02	5.53	123.25	0.50	0.30	0.01	
		LKD	W7-U	0.74	0.96	2.12	0.00	123.25	0.50	1.00	0.00	
		LKD	W8-L	0.74	0.96	1.02	13.84	123.25	0.50	0.30	0.03	
		LKD	W8-U	0.74	0.96	2.12	19.42	123.25	0.50	1.00	0.32	
											1.29	2.00
Second	R7	Bedroom	W9-L	0.74	0.96	0.82	42.52	61.15	0.50	0.30	0.16	
		Bedroom	W9-U	0.74	0.96	1.70	45.62	61.15	0.50	1.00	1.20	
											1.36	1.00
Second	R8	LKD	W10-L	0.74	0.96	1.90	20.21	136.32	0.50	0.30	0.08	
		LKD	W10-U	0.74	0.96	4.02	9.47	136.32	0.50	1.00	0.26	
		LKD	W11-L	0.74	0.96	0.46	38.08	136.32	0.50	0.30	0.04	
		LKD	W11-U	0.74	0.96	0.99	42.03	136.32	0.50	1.00	0.29	
											0.67	2.00
Second	R9	Bedroom	W12-L	0.74	0.96	0.47	33.95	62.51	0.50	0.30	0.07	
		Bedroom	W12-U	0.74	0.96	1.01	42.30	62.51	0.50	1.00	0.65	
											0.72	1.00
Second	R10	LKD	W13-L	0.74	0.96	0.47	63.80	116.79	0.50	0.30	0.07	
		LKD	W13-U	0.74	0.96	1.01	64.36	116.79	0.50	1.00	0.53	
		LKD	W14-L	0.74	0.96	2.38	63.31	116.79	0.50	0.30	0.37	
		LKD	W14-U	0.74	0.96	5.04	44.77	116.79	0.50	1.00	1.83	
											2.80	2.00
Second	R11	Bedroom	W15-L	0.74	0.96	0.82	83.96	63.00	0.50	0.30	0.31	
		Bedroom	W15-U	0.74	0.96	1.70	84.45	63.00	0.50	1.00	2.16	
											2.47	1.00
Second	R12	Bedroom	W16-L	0.74	0.96	0.82	84.01	73.35	0.50	0.30	0.27	
		Bedroom	W16-U	0.74	0.96	1.70	84.45	73.35	0.50	1.00	1.85	
											2.12	1.00
Second	R13	Bedroom	W17-L	0.74	0.96	0.82	84.17	73.34	0.50	0.30	0.27	
		Bedroom	W17-U	0.74	0.96	1.70	84.53	73.34	0.50	1.00	1.86	
											2.12	1.00
Second	R14	Bedroom	W18-L	0.74	0.96	0.82	84.32	62.96	0.50	0.30	0.31	
		Bedroom	W18-U	0.74	0.96	1.70	84.62	62.96	0.50	1.00	2.16	
											2.47	1.00
Second	R15	LKD	W19-L	0.74	0.96	2.38	63.60	116.85	0.50	0.30	0.37	
		LKD	W19-U	0.74	0.96	5.04	44.83	116.85	0.50	1.00	1.83	
		LKD	W20-L	0.74	0.96	0.47	62.66	116.85	0.50	0.30	0.07	
		LKD	W20-U	0.74	0.96	1.01	62.79	116.85	0.50	1.00	0.51	
											2.78	2.00
Second	R16	Bedroom	W21-L	0.74	0.96	0.47	46.16	66.63	0.50	0.30	0.09	
		Bedroom	W21-U	0.74	0.96	1.01	51.53	66.63	0.50	1.00	0.74	
											0.83	1.00
Second	R17	Bedroom	W22-L	0.74	0.96	0.46	58.09	62.19	0.50	0.30	0.12	
		Bedroom	W22-U	0.74	0.96	0.99	58.50	62.19	0.50	1.00	0.88	
											1.00	1.00
Second	R18	LKD	W23-L	0.74	0.96	3.33	43.18	109.89	0.50	0.30	0.37	
		LKD	W23-U	0.74	0.96	7.06	29.12	109.89	0.50	1.00	1.77	
											2.14	2.00
Second	R19	LKD	W24-L	0.74	0.96	1.94	35.15	106.40	0.50	0.30	0.18	
		LKD	W24-U	0.74	0.96	4.10	23.84	106.40	0.50	1.00	0.87	
		LKD	W25-L	0.74	0.96	0.68	48.23	106.40	0.50	0.30	0.09	
		LKD	W25-U	0.74	0.96	1.42	49.03	106.40	0.50	1.00	0.62	
											1.76	2.00
Second	R20	Bedroom	W26-L	0.74	0.96	0.82	40.95	59.04	0.50	0.30	0.16	

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		Bedroom	W26-U	0.74	0.96	1.70	42.06	59.04	0.50	1.00	1.15	
											1.31	1.00
Second	R21	LKD	W27-L	0.74	0.96	2.84	37.88	110.85	0.50	0.30	0.28	
		LKD	W27-U	0.74	0.96	6.00	26.05	110.85	0.50	1.00	1.34	
											1.61	2.00
Second	R22	Bedroom	W28-L	0.74	0.96	0.82	28.89	69.55	0.50	0.30	0.10	
		Bedroom	W28-U	0.74	0.96	1.70	38.18	69.55	0.50	1.00	0.88	
											0.98	1.00
Third	R1	LKD	W1-L	0.74	0.96	3.62	35.17	123.71	0.50	0.30	0.29	
		LKD	W1-U	0.74	0.96	7.66	6.32	123.71	0.50	1.00	0.37	
		LKD	W29-L	0.74	0.96	1.02	54.70	123.71	0.50	0.30	0.13	
		LKD	W29-U	0.74	0.96	2.12	72.99	123.71	0.50	1.00	1.19	
											1.98	2.00
Third	R2	Bedroom	W2-L	0.74	0.96	0.76	54.07	49.75	0.50	0.30	0.24	
		Bedroom	W2-U	0.74	0.96	1.63	55.68	49.75	0.50	1.00	1.73	
											1.96	1.00
Third	R3	Bedroom	W3-L	0.74	0.96	0.76	51.32	73.07	0.50	0.30	0.15	
		Bedroom	W3-U	0.74	0.96	1.63	52.90	73.07	0.50	1.00	1.12	
											1.27	1.00
Third	R4	Bedroom	W4-L	0.74	0.96	0.71	53.28	59.58	0.50	0.30	0.18	
		Bedroom	W4-U	0.74	0.96	1.36	54.43	59.58	0.50	1.00	1.18	
											1.36	1.00
Third	R5	Bedroom	W5-L	0.74	0.96	0.82	56.61	59.58	0.50	0.30	0.22	
		Bedroom	W5-U	0.74	0.96	1.56	57.55	59.58	0.50	1.00	1.42	
											1.64	1.00
Third	R6	LKD	W6-L	0.74	0.96	2.74	36.26	123.25	0.50	0.30	0.23	
		LKD	W6-U	0.74	0.96	5.80	18.59	123.25	0.50	1.00	0.83	
		LKD	W7-L	0.74	0.96	1.02	10.33	123.25	0.50	0.30	0.02	
		LKD	W7-U	0.74	0.96	2.12	12.15	123.25	0.50	1.00	0.20	
		LKD	W8-L	0.74	0.96	1.02	38.91	123.25	0.50	0.30	0.09	
		LKD	W8-U	0.74	0.96	2.12	49.92	123.25	0.50	1.00	0.81	
											2.19	2.00
Third	R7	Bedroom	W9-L	0.74	0.96	0.82	50.46	61.15	0.50	0.30	0.19	
		Bedroom	W9-U	0.74	0.96	1.70	51.92	61.15	0.50	1.00	1.37	
											1.56	1.00
Third	R8	LKD	W10-L	0.74	0.96	1.90	24.78	136.32	0.50	0.30	0.10	
		LKD	W10-U	0.74	0.96	4.02	16.02	136.32	0.50	1.00	0.45	
		LKD	W11-L	0.74	0.96	0.46	45.42	136.32	0.50	0.30	0.04	
		LKD	W11-U	0.74	0.96	0.99	47.25	136.32	0.50	1.00	0.32	
											0.91	2.00
Third	R9	Bedroom	W12-L	0.74	0.96	0.47	46.10	62.51	0.50	0.30	0.10	
		Bedroom	W12-U	0.74	0.96	1.01	47.52	62.51	0.50	1.00	0.73	
											0.82	1.00
Third	R10	LKD	W13-L	0.74	0.96	0.47	65.26	116.79	0.50	0.30	0.07	
		LKD	W13-U	0.74	0.96	1.01	65.70	116.79	0.50	1.00	0.54	
		LKD	W14-L	0.74	0.96	2.38	64.81	116.79	0.50	0.30	0.38	
		LKD	W14-U	0.74	0.96	5.04	45.47	116.79	0.50	1.00	1.86	
											2.85	2.00
Third	R11	Bedroom	W15-L	0.74	0.96	0.82	86.28	63.00	0.50	0.30	0.32	
		Bedroom	W15-U	0.74	0.96	1.70	85.65	63.00	0.50	1.00	2.19	
											2.51	1.00
Third	R12	Bedroom	W16-L	0.74	0.96	0.82	86.27	73.35	0.50	0.30	0.27	
		Bedroom	W16-U	0.74	0.96	1.70	85.65	73.35	0.50	1.00	1.88	
											2.15	1.00
Third	R13	Bedroom	W17-L	0.74	0.96	0.82	86.28	73.34	0.50	0.30	0.27	
		Bedroom	W17-U	0.74	0.96	1.70	85.65	73.34	0.50	1.00	1.88	
											2.15	1.00
Third	R14	Bedroom	W18-L	0.74	0.96	0.82	86.30	62.96	0.50	0.30	0.32	
		Bedroom	W18-U	0.74	0.96	1.70	85.65	62.96	0.50	1.00	2.19	
											2.51	1.00
Third	R15	LKD	W19-L	0.74	0.96	2.38	64.77	116.85	0.50	0.30	0.37	
		LKD	W19-U	0.74	0.96	5.04	45.42	116.85	0.50	1.00	1.86	
		LKD	W20-L	0.74	0.96	0.47	63.13	116.85	0.50	0.30	0.07	
		LKD	W20-U	0.74	0.96	1.01	63.16	116.85	0.50	1.00	0.52	
											2.82	2.00
Third	R16	Bedroom	W21-L	0.74	0.96	0.47	52.97	66.63	0.50	0.30	0.11	
		Bedroom	W21-U	0.74	0.96	1.01	52.90	66.63	0.50	1.00	0.76	
											0.86	1.00

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Third	R17	Bedroom	W22-L	0.74	0.96	0.46	59.19	62.19	0.50	0.30	0.12	
		Bedroom	W22-U	0.74	0.96	0.99	59.38	62.19	0.50	1.00	0.89	
											1.02	1.00
Third	R18	LKD	W23-L	0.74	0.96	3.33	45.24	109.89	0.50	0.30	0.39	
		LKD	W23-U	0.74	0.96	7.06	31.39	109.89	0.50	1.00	1.91	
											2.30	2.00
Third	R19	LKD	W24-L	0.74	0.96	1.94	37.03	106.40	0.50	0.30	0.19	
		LKD	W24-U	0.74	0.96	4.10	26.08	106.40	0.50	1.00	0.95	
		LKD	W25-L	0.74	0.96	0.68	51.08	106.40	0.50	0.30	0.09	
		LKD	W25-U	0.74	0.96	1.42	51.55	106.40	0.50	1.00	0.65	
											1.89	2.00
Third	R20	Bedroom	W26-L	0.74	0.96	0.82	45.21	59.04	0.50	0.30	0.18	
		Bedroom	W26-U	0.74	0.96	1.70	46.00	59.04	0.50	1.00	1.25	
											1.43	1.00
Third	R21	LKD	W27-L	0.74	0.96	2.84	39.51	110.85	0.50	0.30	0.29	
		LKD	W27-U	0.74	0.96	6.00	27.53	110.85	0.50	1.00	1.41	
											1.70	2.00
Third	R22	Bedroom	W28-L	0.74	0.96	0.82	56.49	69.55	0.50	0.30	0.19	
		Bedroom	W28-U	0.74	0.96	1.70	72.84	69.55	0.50	1.00	1.69	
											1.87	1.00

APPENDIX C - DETAILED SUNLIGHT RESULTS

Unit ref	Floor	Room type	Window No.	Window APSH > 25%?	Window WPSH > 5%?
R1	First	KLD	W1	1.00	0.00
			W22	6.00	0.00
R6	First	KLD	W6	8.00	3.00
			W7	1.00	0.00
			W8	0.00	0.00
R13	First	KLD	W16	21.00	16.00
R14	First	KLD	W17	14.00	11.00
			W18	46.00	15.00
R1	Second	KLD	W1	6.00	2.00
			W29	13.00	1.00
R6	Second	KLD	W6	11.00	6.00
			W7	2.00	0.00
			W8	0.00	0.00
R8	Second	KLD	W10	5.00	2.00
			W11	16.00	0.00
R18	Second	KLD	W23	22.00	17.00
R19	Second	KLD	W24	14.00	11.00
			W25	50.00	18.00

PROPOSED SCHEME DAYLIGHT, SUNLIGHT & OVERSHADOWING

Unit ref	Floor	Room type	Window No.	Window APSH > 25%?	Window WPSH > 5%?
R1	Third	KLD	W1	12.00	7.00
			W29	49.00	11.00
R6	Third	KLD	W6	15.00	10.00
			W7	3.00	0.00
			W8	0.00	0.00
R8	Third	KLD	W10	10.00	3.00
			W11	24.00	1.00
R18	Third	KLD	W23	26.00	21.00
R19	Third	KLD	W24	17.00	14.00
			W25	55.00	20.00

XCO2
56 Kingsway Place, Sans Walk
London EC1R 0LU

+44 (0)20 7700 1000
mail@xco2.com
xco2.com