

PROPOSED SCHEME DAYLIGHT, SUNLIGHT & OVERSHADOWING

Barnes Hospital

Produced by XCO2 for Star Land Realty UK Ltd

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PROPOSED SCHEME DAYLIGHT, SUNLIGHT & OVERSHADOWING

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EXECUTIVE SUMMARY

The daylight, sunlight and overshadowing analysis indicates that the habitable rooms of the proposed development at Barnes Hospital will achieve good levels of daylight and sunlight.

Daylight and Sunlight analysis was carried out for the proposed development at South Worple Way, located within the London Borough of Richmond upon Thames. 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 and dining spaces, and bedrooms within the proposed development.

The assessment was carried out for 38 no. sample dwellings considered to be the worst-case units in terms of daylight access across the scheme. All habitable rooms within these dwellings have been included in the assessment.

The analysis results indicated that 89 out of 105 rooms 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.

14 out of the 16 rooms (14 bedrooms) that are falling short of the BRE criteria have their windows located under balconies provided for the dwellings above them. The other two rooms are a bedroom and a living/dining room on the top floor of Block C, which fall very slightly short of their ADF targets (with ADFs of 0.99% and 1.48%, respectively).

It is worth noting that 12 of the 15 bedrooms will receive acceptable levels of daylight ($ADF \geq 0.75$), their glazing area was maximised where possible in order to enhance their performance. The other three bedrooms are located next to the entrance of Blocks B and C on the ground floor. In addition to increasing their glazing area, the design team reduced the entrance canopy depth and modified the internal layout of the room to achieve an appropriate configuration to maximise daylight levels as far as feasible.

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

SUNLIGHT ASSESSMENT

The assessment was carried out for 38 no. dwellings considered to be the worst-case units in terms of sunlight access across the scheme.

A total of 36 living spaces with at least one main window facing within 90° of due south each were assessed for solar access.

The analysis has shown that 34 living spaces will achieve adequate annual and winter sunlight based on the BRE Guide.

The remaining 2 rooms falling short of the target achieve a percentage slightly below the recommended ASPH ($ASPH \geq 17\%$). The two rooms falling short of the WSPH have only one of their windows facing due south but they are not considered main windows.

It should be noted that most of the apartments have private outdoor amenity areas and that most KLDs windows are east or west facing due to site constraints, and therefore the sunlight results are considered satisfactory given the limit south facing aspect of the windows.

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The design team has aimed to strike a balance between sunlight/daylight access and the provision of private outdoor amenity space, and therefore the sunlight and daylight results are considered acceptable on this basis.

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

OVERSHADOWING ASSESSMENT

A solar access analysis was undertaken for a total of three amenity spaces for the full 24 hours on 21st of March in line with the BRE guidance.

All the three amenity spaces are predicted to achieve a minimum of 2 hours of sunlight on 21 March over at least 50% of their area.

The open spaces of the proposed development are therefore considered to be adequately sunlit.

INTRODUCTION

The site is located in a low-density urban area. Site analysis was carried out to identify any potential daylight and sunlight impacts on the surrounding development. environment and the interpretation of the results requires careful consideration of the BRE guidance.

SITE

The proposed development is a residential 3-block development located within the London Borough of Richmond upon Thames on South Worple Way Street. The total new build area is approximately 7,500 square metres bringing a total of 109 residential units. The site is in a low-density urban area made up of mostly semi-detached and terraced houses with front and back gardens. The site comprises a number of red-brick buildings ranging in date from 1889-1999.

An outline application was submitted in 2018 (Application Reference Number: 18/3642/OUT) and was granted in September 2020. This current submission has been prepared in relation to the

detailed application for the residential plot of the Barnes Hospital Site as approved under the Outline Planning Permission.

The adjoining site is assessed under the Outline Planning Permission scenario as this is considered worst-case given that the outline planning permission buildings are higher than the existing scenario. The scenario against which the assessment has been made is considered the worst case and therefore any alternative scenarios are likely to result in an improvement over the assessment.

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Figure 1: Site location plan

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

For housing, BS8206 Part 2 states that where a room has a shared use the higher target should apply. However, in practice, many local authorities will accept the target values for living rooms in a shared kitchen/living space, as small kitchens may not be considered habitable spaces. In such situations, the living space usually represents the majority of the room area. We have assumed that a 1.5% target ADF would

be considered satisfactory for a combined kitchen/living/dining room which is in line with a recent note by the GLA on daylight.

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.

OVERSHADOWING

Open spaces should retain a reasonable amount of sunlight throughout the year. The BRE states that for an amenity space to “*appear adequately sunlit throughout the year, at least half of the area should receive at least two hours of sunlight on 21 March*”.

DESIGN DEVELOPMENT

The findings presented in the following sections are the result of an iterative design process in which discussions were held between XCO2 and Scott Brownrigg in order to optimise the scheme’s performance in terms of daylight levels given the context of the site.

Initial drawings from the architect were received where the original internal room layouts and glazing specifications were outlined. From these, baseline assessments were able to be carried out on a worst-case scenario basis following the methodology highlighted in the previous section. This first stage of assessment allowed underperforming rooms to be identified in order for appropriate mitigation measures to be decided and agreed with Scott Brownrigg to aid in meeting the recommended ADF targets.

Some examples of measures that have been implemented into the proposal in order to improve the levels of natural daylight within the dwellings include are outlined below.

INCREASED GLAZED AREAS

A large proportion of rooms requiring mitigation in the initial drawings were only marginally below their recommended ADF target. These rooms were highlighted with an appropriate percentage increase in size which was duly taken on board by Scott Brownrigg and incorporated into the current layouts.

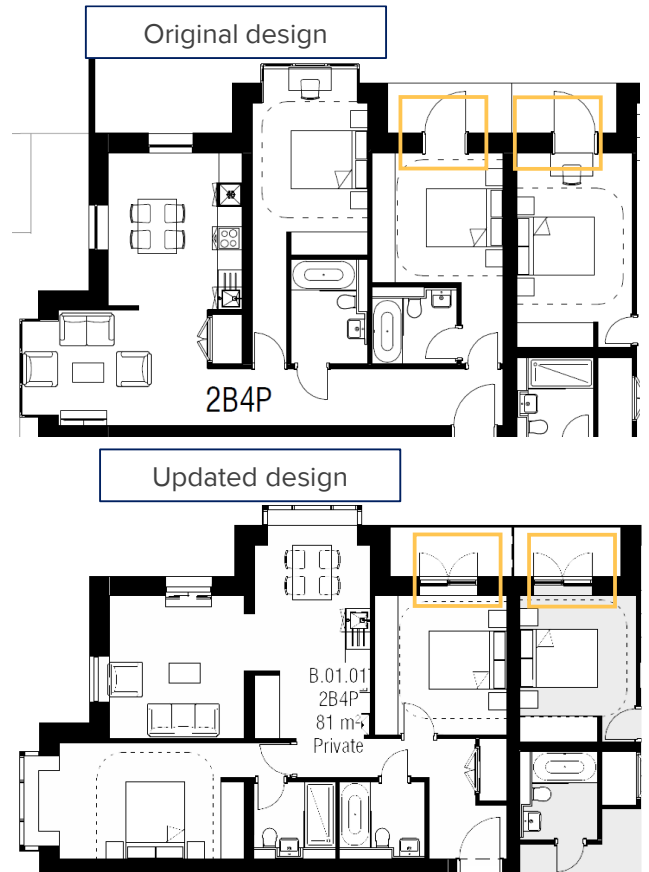


Figure 2: Demonstration of how the glazing area was increased appropriately for some of the rooms struggling with achieving the ADF target

ADDITIONAL ROOFLIGHTS

For rooms at top floors struggling to achieve the ADF target, the recommendation of adding rooflights was incorporated by Scott Brownrigg for the current layouts.

are considered the main habitable space of the dwellings with have higher ADF target than bedrooms. In addition, where needed, a semi-permanent wall was added to separate the kitchen from living/dining room (kitchens below 13-15 sqm).



Figure 3: Demonstration of the addition of rooflight to deeper rooms at the top floors that are achieving lower ADF levels

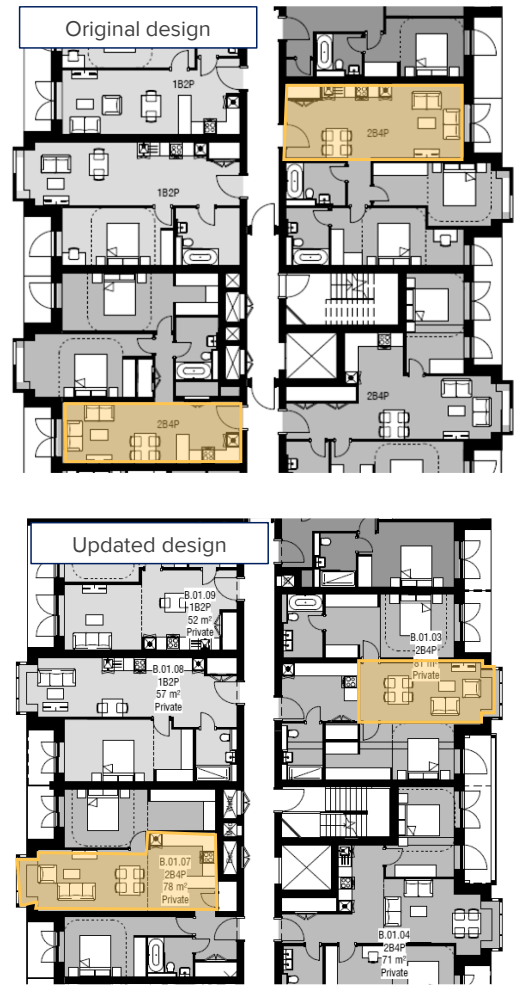


Figure 4: Design development of two units where the KLD had lower ADF levels - the KLDs were switched for the space with the bay windows where the bedrooms were (a KLD has a higher daylight expectations and greater ADF target than a bedroom)

REVISION OF ROOM LAYOUTS

A number of KLDs with low ADF levels, mainly because of their smaller glazing area and deep layout configuration. The design layout was enhanced by accommodating bay windows to the KLDs that were previously occupied by bedrooms. Thus, the performance of daylight was improved by switching room uses to increase the glazing area of KLDs which

DAYLIGHT ASSESSMENT

The analysis indicates that the habitable spaces of the proposed development will receive good levels of daylighting.

A total of 38 no. of units located on Block A (ground and second floor), Block B (ground, first and third floor) and Block C (ground, first and third floor) of the development that are considered to be the worst-case dwellings in terms of daylight access have been included in the assessment which makes a total of 105 rooms. 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. 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

Some of the kitchen/living/dining rooms (11 in total) where their area was below 13-15sqm were considered as living/dining rooms, following the justification in the London Housing SPG that only kitchens above this area are considered 'habitable'. Thus, the kitchen shows a separation from the LD area in these rooms. The dividing partition can be semi-permanent like a sliding door or folding wall (preferably full height).

The proposed development has been designed to maximise daylight penetration. Strategic positioning of windows at the dwellings, substantial glazing area for each room and the incorporation of rooflights in the top floors of the three blocks maximise the provision of daylight to all habitable rooms.

The analysis result indicated that 23 out of the 27 KLD rooms, 10 out of the 11 L/D rooms and 52 out of the 67 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 4 out of 27 KLD rooms falling short of the ADF 2% meet the recommended target of 1.5%, which is

considered adequate for spaces where living rooms are the main function of the space (including KLDs). The daylight access to these rooms was maximised through the use of large windows.

Only 1 living/dining room out of 11 has an ADF level falling marginally short of the BRE recommendation, it has an ADF of 1.48%, considering that the ADF target for these rooms is 1.5%.

The 15 out of 67 bedrooms that fall short from the ADF target of 1.0% are located on the ground and first floors, except for one located in the top floor of Block C. 12 of the 15 bedrooms will receive acceptable levels of daylight ($ADF \geq 0.75$), their glazing area was maximised where possible in order to enhance their performance. The other three bedrooms are located next to the entrance of Blocks B and C on the ground floor. In addition to increasing their glazing area, the design team reduced the entrance canopy depth and modified the internal layout of the room to achieve an appropriate configuration.

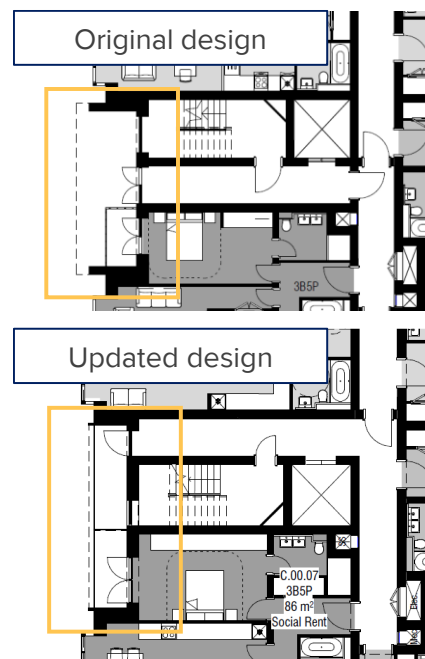


Figure 5: Demonstration of the reduction of the canopy at the entrance and the enlargement of the glazing area

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Overall, 14 out of the 16 rooms that are falling short of the BRE criteria have their windows located under balconies provided for the dwellings above them. The other two rooms are a bedroom and a LD room in the top floor of Block C, which fall slightly short of their ADF targets (0.99% and 1.48%, respectively).

In summary the ADFs achieved in these 16 rooms show satisfactory daylight access considering that most of these rooms are below balconies, and that the design team is trying to strike a balance between daylight and the provision of private amenity.

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Table 1: Daylight results summary

Number of habitable rooms tested	105
Number of kitchen/living/dining rooms	27
Number of kitchen/living/dining rooms with ADF meeting 2% target for kitchens	23
Number of kitchen/living/dining rooms with ADF meeting 1.5% target for living rooms	4
Number of living/dining rooms	11
Number of living/dining rooms with ADF meeting 1.5% target for living rooms	10
Number of bedrooms	67
Number of bedrooms with ADF meeting 1% target	52
Number of rooms with ADF below the BRE recommendations	16
Number of living/dining rooms with ADF above 1.4%	1
Number of bedrooms with ADF above 0.75%	12

SUNLIGHT ASSESSMENT

The analysis indicates that the south facing living spaces of the proposed development will receive good levels of sunlight considering that implementations for maximising daylight within the development have been included.

A sunlight access assessment has been carried out for south facing living rooms of the proposed development in line with the BRE methodology.

The assessment was carried out for 38 dwellings of the proposed development.

From the assessed dwellings, 36 living/kitchen/dining rooms have been assessed as they all have at least one main window facing within 90° of due south each to be assessed for solar access.

The windows facing due south of the two rooms falling short of the APSH and WPSH targets are not considered as main windows since they are bay windows and the smallest of their respective rooms.

The proposed development’s design has maximised glazing areas where feasible to optimise levels of sunlight entering the rooms, therefore results are deemed acceptable when the urban location of the proposed development is considered. It should be noted that most of the apartments have private outdoor amenity areas and that most KLDs windows are east or west facing due to site constraints, and therefore the level of sunlight access is expected to be slightly lower than rooms that are predominantly south facing.

Overall, it can be concluded that the proposed design offers acceptable accessibility to sunlight in living spaces after consideration has been given to maximise daylight into the development.

Table 2: Sunlight results summary

Number of living rooms tested	36
Number of living rooms with at least one south facing window achieving APSH > 25% & WPSH > 5%	34
Number of living rooms with at least one south facing window achieving APSH > 25%	0
Number of living rooms with at least one south facing window achieving WPSH > 5%	0
Number of living rooms not meeting any of the above criteria	2

OVERSHADOWING ASSESSMENT

The analysis indicates that the open spaces of the proposed development will receive adequate sunlight.

A review of the site plan showed that there are 3 amenity or open spaces on ground floor which are part of the proposed development, as shown in the figure below. A Solar Access Analysis was undertaken on these amenity areas for the full 24 hours on 21 March as set out by the BRE.

The results show that all amenity spaces analysed will receive more than 2 hours of sunlight on 21 March on at least 50% of the area, under proposed conditions, meeting the BRE requirements for overshadowing.

Table 3: Amenity overshadowing results for the proposed development

Amenity Ref.	Proposed Lit Area (%)
A1	100%
A2	100%
A3	93%

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Figure 6: Amenity and open spaces in close proximity to development site

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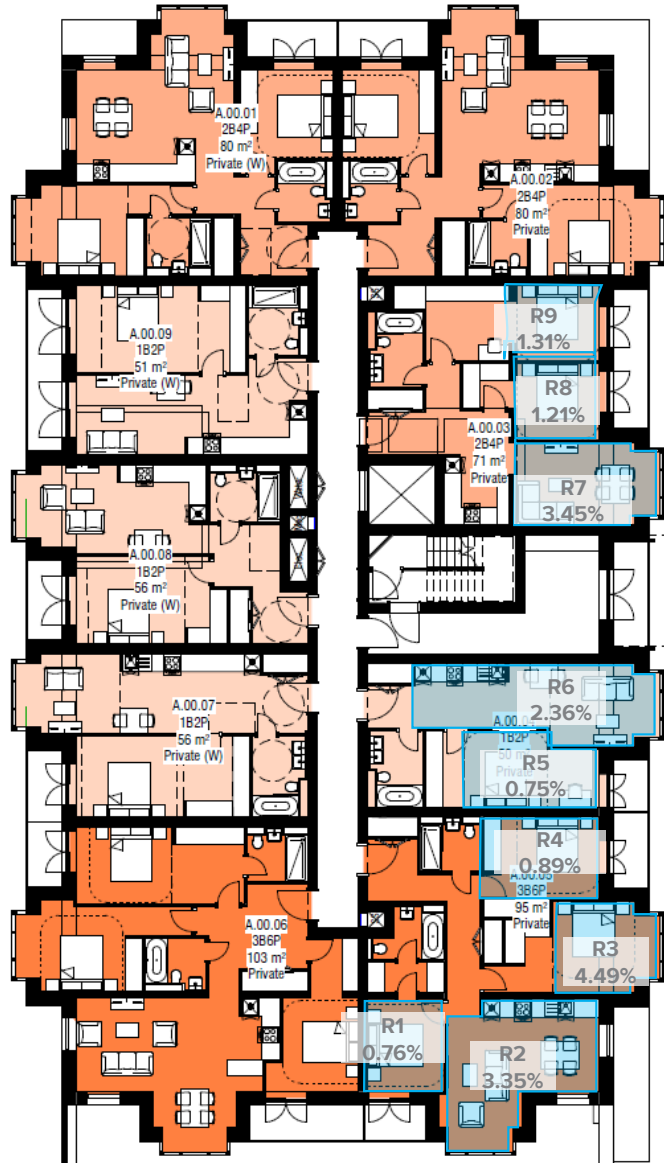


Figure 7: Overshadowing results for the three proposed open amenity spaces, where only A3 receives 2 hours of sunlight slightly below 100% of its area on 21 March

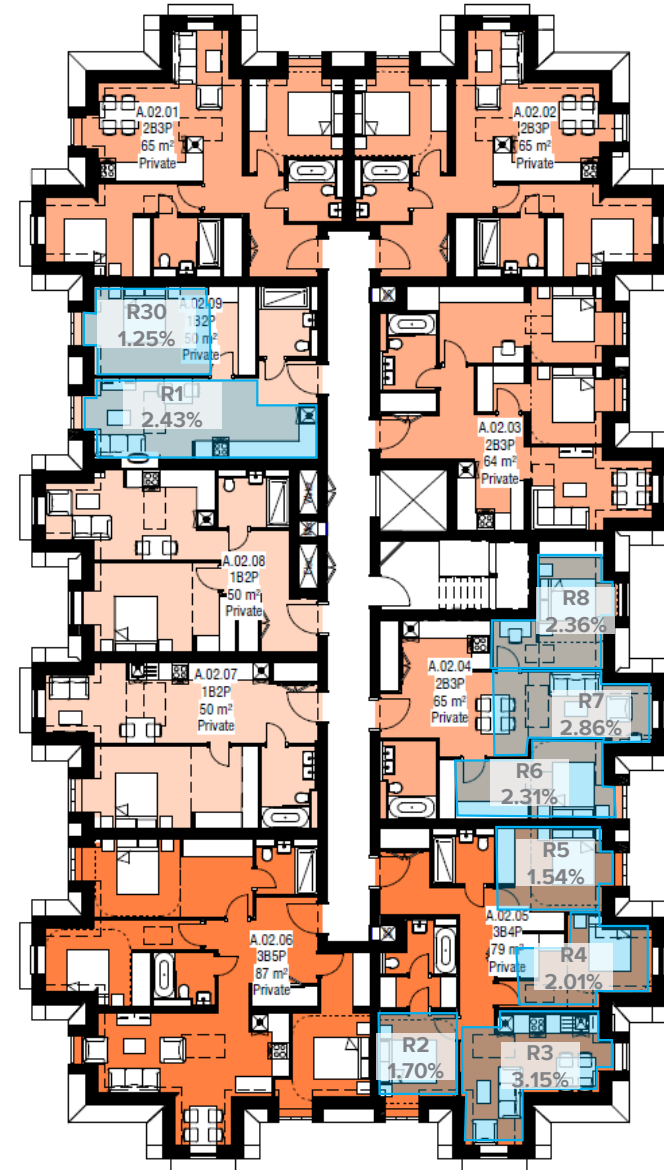
APPENDIX A – WINDOW/ROOM REFERENCE

Block A

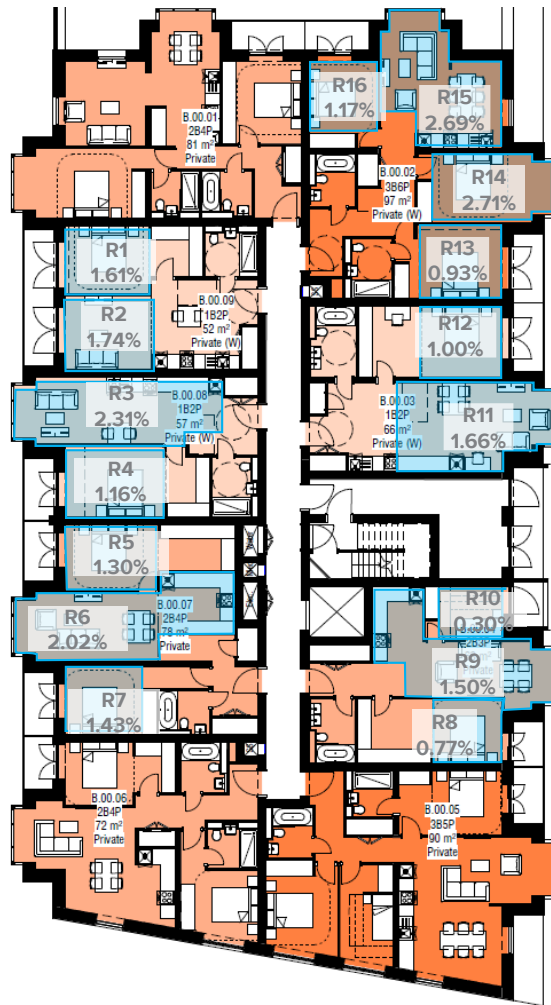
Level 00



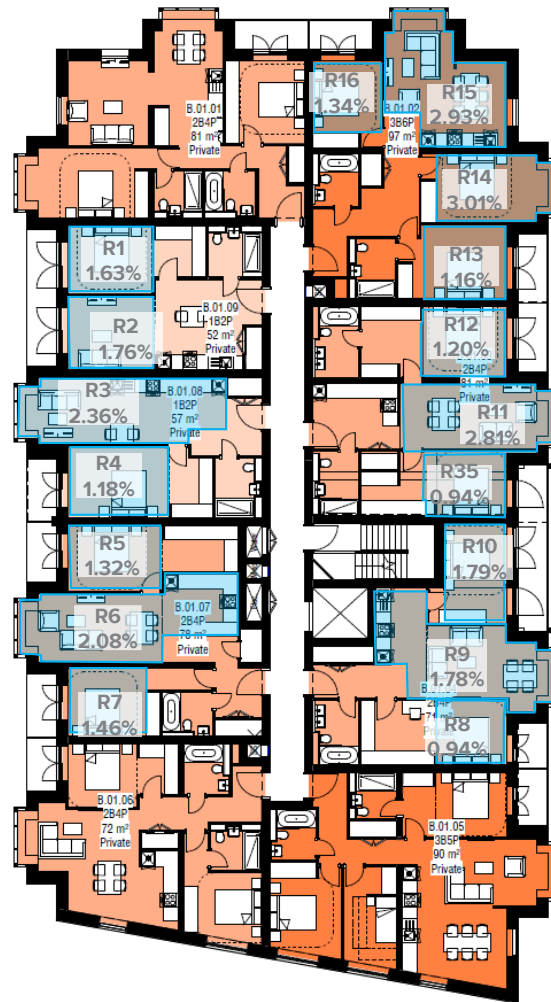
Level 02



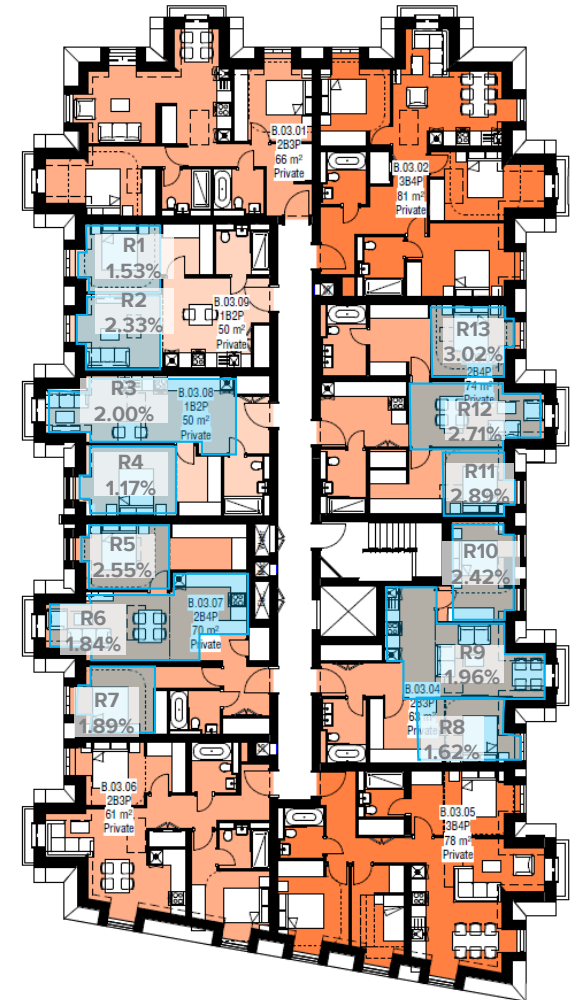
Block B
Level 00



Level 01



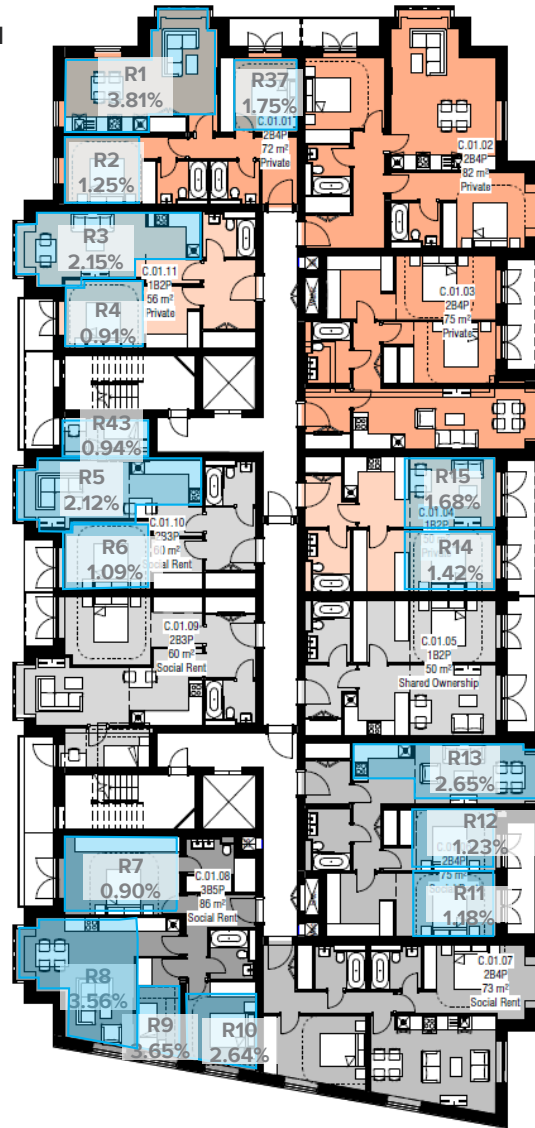
Level 03



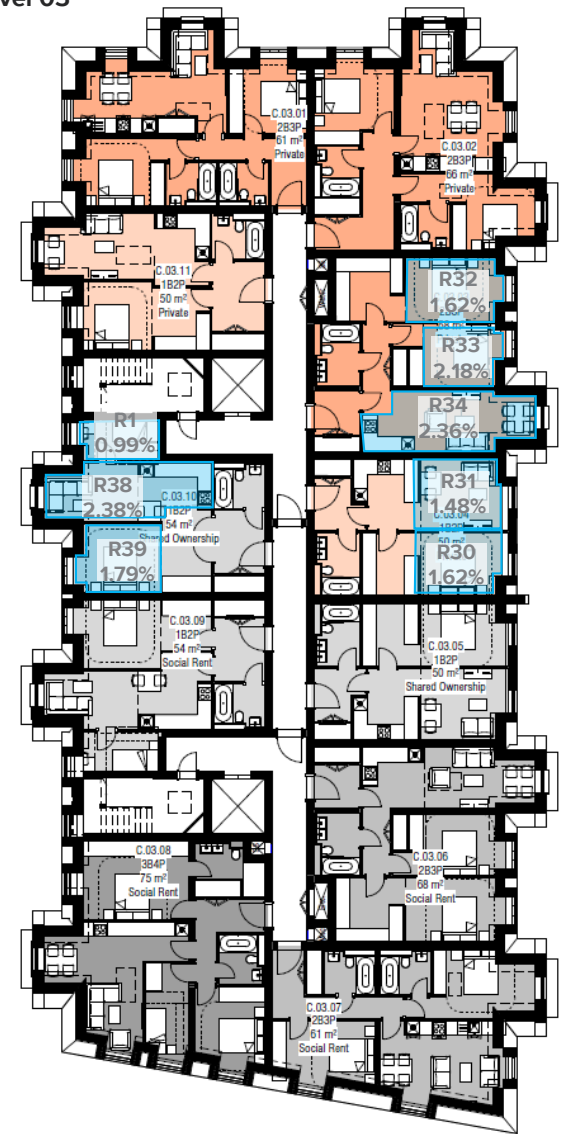
Block C
Level 00



Level 01



Level 03



APPENDIX B – DETAILED DAYLIGHT RESULTS

Project Name: 8972_Updated_All_210728
 Project No.: 1
 Report Title: Average Daylight Factor - Neighbour Analysis
 Date: 27/07/2021



Floor Ref.	Room Ref.	Room Use.	Window Ref.	Clear Sky Angle Proposed	SC Proposed	ADF Proposed	Req'd Value	Meets BRE Criteria
Block A								
Ground	R1	Bedroom	W1-L	40.77	12.92	0.11	1.00	NO
		Bedroom	W1-U	24.65	5.07	0.65		
						0.76		
Ground	R2	LKD	W2-L	44.43	15.02	0.02	1.50	YES
		LKD	W2-U	45.78	15.81	0.20		
		LKD	W3-L	57.40	22.81	0.11		
		LKD	W3-U	58.84	23.68	1.51		
		LKD	W4-L	45.87	15.86	0.02		
		LKD	W4-U	46.67	16.33	0.21		
		LKD	W5-L	52.02	19.54	0.05		
		LKD	W5-U	52.73	19.98	0.53		
		LKD	W6-L	62.67	25.98	0.06		
		LKD	W6-U	62.84	26.07	0.63		
						3.35		
Ground	R3	Bedroom	W7-L	43.27	14.34	0.03	1.00	YES
		Bedroom	W7-U	44.18	14.87	0.35		
		Bedroom	W8-L	73.90	32.30	0.26		
		Bedroom	W8-U	74.85	32.80	3.46		
		Bedroom	W9-L	42.82	14.08	0.03		
		Bedroom	W9-U	44.46	15.03	0.36		
						4.49		
Ground	R4	Bedroom	W10-L	53.21	20.27	0.11	1.00	NO
		Bedroom	W10-U	40.20	12.61	0.78		
						0.89		
Ground	R5	Bedroom	W11-L	52.96	20.12	0.09	1.00	NO
		Bedroom	W11-U	39.60	12.27	0.66		
						0.75		
Ground	R6	LKD	W12-L	41.12	13.12	0.01	1.50	YES
		LKD	W12-U	42.65	13.99	0.19		
		LKD	W13-L	72.87	31.76	0.14		
		LKD	W13-U	74.35	32.54	1.88		
		LKD	W14-L	32.38	8.51	0.01		
		LKD	W14-U	29.21	7.01	0.13		
						2.36		
Ground	R7	LD	W15-L	31.16	7.91	0.02		
		LD	W15-U	27.49	6.25	0.18		
		LD	W16-L	70.09	30.24	0.20		

Project Name: 8972_Updated_All_210728
 Project No.: 1
 Report Title: Average Daylight Factor - Neighbour Analysis
 Date: 27/07/2021



Floor Ref.	Room Ref.	Room Use.	Window Ref.	Clear Sky Angle Proposed	SC Proposed	ADF Proposed	Req'd Value	Meets BRE Criteria
		LD	W16-U	73.01	31.83	2.73		
		LD	W17-L	44.10	14.82	0.02		
		LD	W17-U	45.84	15.84	0.30		
						3.45	1.50	YES
Ground	R8	Bedroom	W18-L	51.29	19.10	0.14		
		Bedroom	W18-U	39.05	11.97	1.07		
						1.21	1.00	YES
Ground	R9	Bedroom	W19-L	52.55	19.87	0.15		
		Bedroom	W19-U	39.99	12.49	1.15		
						1.31	1.00	YES
First	R1	LKD	W2-L	82.01	36.29	0.09		
		LKD	W2-U	82.09	36.33	0.86		
		LKD	W3	192.32	95.73	1.48		
						2.43	1.50	YES
First	R2	Bedroom	W4-L	69.26	29.78	0.15		
		Bedroom	W4-U	71.70	31.12	1.55		
						1.70	1.00	YES
First	R3	LKD	W5-L	70.05	30.22	0.02		
		LKD	W5-U	68.54	29.37	0.52		
		LKD	W6	191.52	95.29	1.73		
		LKD	W7-L	76.63	33.71	0.08		
		LKD	W7-U	78.23	34.50	0.80		
						3.15	1.50	YES
First	R4	Bedroom	W8	185.37	91.87	1.14		
		Bedroom	W9-L	81.16	35.90	0.03		
		Bedroom	W9-U	78.61	34.68	0.83		
						2.01	1.00	YES
First	R5	Bedroom	W10-L	78.12	34.45	0.14		
		Bedroom	W10-U	79.52	35.12	1.40		
						1.54	1.00	YES
First	R6	Bedroom	W11-L	77.83	34.31	0.12		
		Bedroom	W11-U	79.48	35.11	1.18		
		Bedroom	W12	185.04	91.69	1.01		
						2.31	1.00	YES
First	R7	LD	W13-L	82.07	36.32	0.03		
		LD	W13-U	79.41	35.07	0.74		
		LD	W14	192.36	95.76	2.09		
						2.86	1.50	YES
First	R8	Bedroom	W15-L	80.49	35.58	0.04		
		Bedroom	W15-U	80.61	35.64	1.26		

Project Name: 8972_Updated_All_210728
 Project No.: 1
 Report Title: Average Daylight Factor - Neighbour Analysis
 Date: 27/07/2021



Floor Ref.	Room Ref.	Room Use.	Window Ref.	Clear Sky Angle Proposed	SC Proposed	ADF Proposed	Req'd Value	Meets BRE Criteria
		Bedroom	W16	185.22	91.79	1.06		
						2.36	1.00	YES
First	R30	Bedroom	W1-L	81.54	36.07	0.12		
		Bedroom	W1-U	81.66	36.12	1.13		
						1.25	1.00	YES
Block B								
Ground	R1	Bedroom	W1-L	63.83	26.66	0.18		
		Bedroom	W1-U	51.52	19.24	1.43		
						1.61	1.00	YES
Ground	R2	LD	W2-L	64.47	27.03	0.20		
		LD	W2-U	52.06	19.57	1.55		
						1.74	1.50	YES
Ground	R3	LKD	W3-L	44.47	15.04	0.01		
		LKD	W3-U	44.62	15.13	0.17		
		LKD	W4-L	85.44	37.81	0.16		
		LKD	W4-U	83.99	37.18	1.80		
		LKD	W5-L	42.69	14.01	0.01		
		LKD	W5-U	43.12	14.26	0.16		
						2.31	1.50	YES
Ground	R4	Bedroom	W6-L	61.90	25.52	0.13		
		Bedroom	W6-U	50.22	18.46	1.03		
						1.16	1.00	YES
Ground	R5	Bedroom	W7-L	62.98	26.16	0.15		
		Bedroom	W7-U	51.08	18.97	1.16		
						1.30	1.00	YES
Ground	R6	LKD	W8-L	44.93	15.31	0.01		
		LKD	W8-U	45.01	15.36	0.15		
		LKD	W9-L	84.69	37.48	0.14		
		LKD	W9-U	83.32	36.88	1.57		
		LKD	W10-L	41.74	13.47	0.01		
		LKD	W10-U	42.30	13.79	0.14		
						2.02	1.50	YES
Ground	R7	Bedroom	W11-L	60.37	24.60	0.16		
		Bedroom	W11-U	49.32	17.91	1.27		
						1.43	1.00	YES
Ground	R8	Bedroom	W12-L	39.58	12.26	0.10		
		Bedroom	W12-U	28.43	6.66	0.68		
						0.77	1.00	NO

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Ground	R9	LKD	W13-L	40.20	12.61	0.01	1.50	YES
		LKD	W13-U	40.81	12.95	0.15		
		LKD	W14-L	54.61	21.11	0.10		
		LKD	W14-U	56.14	22.05	1.17		
		LKD	W15-L	39.80	12.38	0.01		
		LKD	W15-U	40.54	12.79	0.15		
						1.59		
Ground	R10	Bedroom	W16-L	32.08	8.36	0.09	1.00	NO
		Bedroom	W16-U	7.19	0.41	0.21		
						0.30		
Ground	R11	LD	W17-L	38.64	11.74	0.01	1.50	YES
		LD	W17-U	39.52	12.23	0.16		
		LD	W18-L	55.05	21.38	0.11		
		LD	W18-U	56.55	22.29	1.29		
		LD	W19-L	42.70	14.02	0.01		
		LD	W19-U	43.16	14.28	0.17		
						1.76		
Ground	R12	Bedroom	W20-L	42.17	13.71	0.12	1.00	YES
		Bedroom	W20-U	30.34	7.53	0.88		
						1.00		
Ground	R13	Bedroom	W21-L	41.64	13.41	0.12	1.00	NO
		Bedroom	W21-U	29.82	7.29	0.81		
						0.93		
Ground	R14	Bedroom	W22-L	38.58	11.72	0.02	1.00	YES
		Bedroom	W22-U	39.39	12.16	0.22		
		Bedroom	W23-L	59.55	24.11	0.17		
		Bedroom	W23-U	60.62	24.75	1.98		
		Bedroom	W24-L	49.67	18.12	0.02		
		Bedroom	W24-U	50.16	18.42	0.28		
						2.71		
Ground	R15	LKD	W25-L	55.89	21.89	0.06	1.50	YES
		LKD	W25-U	56.61	22.33	0.57		
		LKD	W26-L	47.00	16.53	0.02		
		LKD	W26-U	47.58	16.87	0.19		
		LKD	W27-L	66.94	28.46	0.13		
		LKD	W27-U	67.82	28.96	1.54		
		LKD	W28-L	44.07	14.81	0.02		
		LKD	W28-U	44.31	14.94	0.17		
						2.69		
Ground	R16	Bedroom	W29-L	49.97	18.30	0.14		

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		Bedroom	W29-U	38.89	11.88	1.04		
						1.17	1.00	YES
First	R1	Bedroom	W1-L	64.52	27.06	0.18		
		Bedroom	W1-U	52.15	19.62	1.45		
						1.63	1.00	YES
First	R2	LD	W2-L	65.04	27.37	0.20		
		LD	W2-U	52.57	19.88	1.56		
						1.76	1.50	YES
First	R3	LKD	W3-L	45.83	15.84	0.01		
		LKD	W3-U	46.72	16.36	0.17		
		LKD	W4-L	86.91	38.42	0.16		
		LKD	W4-U	85.28	37.74	1.83		
		LKD	W5-L	44.81	15.24	0.01		
		LKD	W5-U	45.93	15.90	0.17		
						2.36	1.50	YES
First	R4	Bedroom	W6-L	62.76	26.03	0.13		
		Bedroom	W6-U	51.02	18.94	1.05		
						1.18	1.00	YES
First	R5	Bedroom	W7-L	63.62	26.54	0.15		
		Bedroom	W7-U	51.66	19.32	1.17		
						1.32	1.00	YES
First	R6	LKD	W8-L	46.43	16.19	0.01		
		LKD	W8-U	47.29	16.70	0.15		
		LKD	W9-L	86.56	38.27	0.14		
		LKD	W9-U	84.95	37.60	1.60		
		LKD	W10-L	44.98	15.34	0.01		
		LKD	W10-U	46.20	16.06	0.15		
						2.08	1.50	YES
First	R7	Bedroom	W11-L	61.44	25.24	0.16		
		Bedroom	W11-U	50.35	18.53	1.30		
						1.46	1.00	YES
First	R8	Bedroom	W12-L	46.01	15.94	0.11		
		Bedroom	W12-U	36.24	10.47	0.84		
						0.94	1.00	NO
First	R9	LKD	W13-L	43.11	14.25	0.01		
		LKD	W13-U	44.44	15.02	0.16		
		LKD	W14-L	62.81	26.06	0.11		
		LKD	W14-U	64.72	27.18	1.34		
		LKD	W15-L	43.55	14.50	0.01		
		LKD	W15-U	45.11	15.41	0.16		

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						1.80	1.50	YES
First	R10	Bedroom	W16-L	46.50	16.24	0.07	1.00	YES
		Bedroom	W16-U	36.11	10.40	0.54		
		Bedroom	W17-L	50.45	18.59	0.14		
		Bedroom	W17-U	38.67	11.76	1.04		
						1.79	1.00	YES
First	R11	LD	W19-L	42.46	13.88	0.02	1.50	YES
		LD	W19-U	44.04	14.79	0.24		
		LD	W20-L	63.11	26.23	0.18		
		LD	W20-U	64.97	27.33	2.09		
		LD	W21-L	44.78	15.22	0.02		
		LD	W21-U	45.86	15.85	0.26		
						2.81	1.50	YES
First	R12	Bedroom	W22-L	48.68	17.53	0.14	1.00	YES
		Bedroom	W22-U	38.11	11.46	1.06		
						1.20	1.00	YES
First	R13	Bedroom	W23-L	48.36	17.34	0.13	1.00	YES
		Bedroom	W23-U	37.83	11.31	1.03		
						1.16	1.00	YES
First	R14	Bedroom	W24-L	41.79	13.50	0.02	1.00	YES
		Bedroom	W24-U	43.42	14.43	0.25		
		Bedroom	W25-L	66.82	28.39	0.19		
		Bedroom	W25-U	68.16	29.16	2.23		
		Bedroom	W26-L	51.49	19.22	0.03		
		Bedroom	W26-U	51.82	19.42	0.29		
						3.01	1.00	YES
First	R15	LKD	W27-L	61.04	25.00	0.06	1.50	YES
		LKD	W27-U	61.76	25.43	0.63		
		LKD	W28-L	49.15	17.81	0.02		
		LKD	W28-U	49.71	18.15	0.19		
		LKD	W29-L	73.59	32.14	0.15		
		LKD	W29-U	74.41	32.57	1.69		
		LKD	W30-L	45.67	15.74	0.02		
		LKD	W30-U	46.65	16.32	0.18		
						2.93	1.50	YES
First	R16	Bedroom	W31-L	55.22	21.49	0.15	1.00	YES
		Bedroom	W31-U	44.51	15.06	1.19		
						1.34	1.00	YES
First	R35	Bedroom	W18-L	46.25	16.08	0.11	1.00	YES
		Bedroom	W18-U	35.83	10.25	0.83		

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						0.94	1.00	NO
Second	R1	Bedroom	W2-L	83.15	36.81	0.15	1.00	YES
		Bedroom	W2-U	82.78	36.64	1.39		
						1.53		
Second	R2	LD	W3-L	83.04	36.76	0.13	1.50	YES
		LD	W3-U	82.73	36.62	1.20		
		LD	W4	185.71	92.06	1.00		
						2.33		
Second	R3	LKD	W5-L	85.04	37.64	0.03	1.50	YES
		LKD	W5-U	81.67	36.13	0.54		
		LKD	W6	192.36	95.76	1.43		
						2.00		
Second	R4	Bedroom	W7-L	82.49	36.51	0.04	1.00	YES
		Bedroom	W7-U	81.90	36.24	1.13		
						1.17		
Second	R5	Bedroom	W8-L	82.37	36.45	0.04	1.00	YES
		Bedroom	W8-U	81.84	36.21	1.25		
		Bedroom	W9	185.71	92.06	1.27		
						2.55		
Second	R6	LKD	W10	192.36	95.76	1.32	1.50	YES
		LKD	W11-L	85.04	37.64	0.02		
		LKD	W11-U	81.67	36.13	0.50		
						1.84		
Second	R7	Bedroom	W12-L	81.58	36.09	0.18	1.00	YES
		Bedroom	W12-U	82.08	36.32	1.71		
						1.89		
Second	R8	Bedroom	W13-L	76.47	33.63	0.15	1.00	YES
		Bedroom	W13-U	79.26	35.00	1.47		
						1.62		
Second	R9	LKD	W14	192.31	95.73	1.43	1.50	YES
		LKD	W15-L	79.77	35.24	0.02		
		LKD	W15-U	78.36	34.57	0.51		
						1.96		
Second	R10	Bedroom	W16-L	77.49	34.14	0.04	1.00	YES
		Bedroom	W16-U	78.90	34.83	1.16		
		Bedroom	W17-L	80.40	35.54	0.04		
		Bedroom	W17-U	80.74	35.70	1.19		
						2.42		
Second	R11	Bedroom	W18-L	78.10	34.44	0.04	1.00	YES
		Bedroom	W18-U	79.61	35.17	1.39		

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		Bedroom	W19	185.71	92.06	1.45		
						2.89	1.00	YES
Second	R12	LD	W20	192.36	95.76	1.97		
		LD	W21-L	79.82	35.27	0.03		
		LD	W21-U	78.41	34.59	0.71		
						2.71	1.50	YES
Second	R13	Bedroom	W22-L	78.42	34.59	0.16		
		Bedroom	W22-U	80.25	35.47	1.53		
		Bedroom	W23	185.71	92.06	1.32		
						3.02	1.00	YES
Block C								
Ground	R1	LKD	W1-L	56.52	22.28	0.05		
		LKD	W1-U	57.03	22.59	0.53		
		LKD	W26-L	36.86	10.79	0.01		
		LKD	W26-U	38.20	11.51	0.16		
		LKD	W27-L	N/A	32.10	0.28		
		LKD	W27-U	N/A	32.55	1.61		
		LKD	W28-L	45.26	15.50	0.01		
		LKD	W28-U	46.10	15.99	0.19		
		LKD	W29-L	N/A	27.38	0.13		
		LKD	W29-U	N/A	27.44	0.59		
						3.57	1.50	YES
Ground	R2	Bedroom	W2-L	49.93	18.28	0.10		
		Bedroom	W2-U	50.61	18.69	1.03		
						1.13	1.00	YES
Ground	R3	LKD	W3-L	N/A	16.20	0.03		
		LKD	W3-U	N/A	16.59	0.18		
		LKD	W4-L	52.17	19.64	0.11		
		LKD	W4-U	53.61	20.51	1.43		
		LKD	W5-L	N/A	11.05	0.03		
		LKD	W5-U	N/A	11.66	0.13		
						1.91	1.50	YES
Ground	R4	Bedroom	W6-L	28.46	6.68	0.07		
		Bedroom	W6-U	6.61	0.34	0.16		
						0.23	1.00	NO
Ground	R5	LKD	W7-L	N/A	11.75	0.03		
		LKD	W7-U	N/A	12.17	0.14		
		LKD	W8-L	49.74	18.17	0.11		

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		LKD	W8-U	51.29	19.10	1.41		
		LKD	W9-L	N/A	11.83	0.03		
		LKD	W9-U	N/A	12.27	0.14		
						1.86	1.50	YES
Ground	R6	Bedroom	W10-L	36.56	10.63	0.10		
		Bedroom	W10-U	27.10	6.08	0.75		
						0.85	1.00	NO
Ground	R7	Bedroom	W11-L	36.39	10.54	0.08		
		Bedroom	W11-U	20.12	3.39	0.41		
						0.48	1.00	NO
Ground	R8	LKD	W12-L	N/A	10.76	0.03		
		LKD	W12-U	N/A	11.27	0.13		
		LKD	W13-L	61.08	25.03	0.13		
		LKD	W13-U	62.00	25.58	1.65		
		LKD	W14-L	N/A	16.11	0.03		
		LKD	W14-U	N/A	16.61	0.18		
		LKD	W15-L	N/A	32.09	0.21		
		LKD	W15-U	N/A	32.02	0.93		
						3.27	1.50	YES
Ground	R9	Bedroom	W16-L	N/A	32.10	0.69		
		Bedroom	W16-U	N/A	32.06	2.75		
						3.44	1.00	YES
Ground	R10	Bedroom	W17-L	N/A	32.07	0.47		
		Bedroom	W17-U	N/A	32.05	2.02		
						2.49	1.00	YES
Ground	R11	Bedroom	W18-L	46.55	16.26	0.11		
		Bedroom	W18-U	38.08	11.44	0.92		
						1.03	1.00	YES
Ground	R12	Bedroom	W19-L	47.67	16.92	0.12		
		Bedroom	W19-U	39.63	12.29	0.97		
						1.09	1.00	YES
Ground	R13	LKD	W20-L	N/A	10.54	0.03		
		LKD	W20-U	N/A	11.15	0.15		
		LKD	W21-L	66.91	28.45	0.15		
		LKD	W21-U	67.98	29.05	1.91		
		LKD	W22-L	N/A	13.33	0.03		
		LKD	W22-U	N/A	13.76	0.16		
						2.42	1.50	YES
Ground	R14	Bedroom	W23-L	60.26	24.54	0.14		
		Bedroom	W23-U	49.89	18.25	1.17		

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						1.32	1.00	YES
Ground	R15	LD	W24-L	57.27	22.73	0.17	1.50	YES
		LD	W24-U	48.29	17.30	1.40		
						1.57		
Ground	R16	Bedroom	W25-L	N/A	22.87	0.37	1.00	YES
		Bedroom	W25-U	N/A	17.57	1.23		
						1.60		
First	R1	LKD	W1-L	62.44	25.84	0.06	1.50	YES
		LKD	W1-U	63.17	26.27	0.59		
		LKD	W26-L	40.78	12.93	0.01		
		LKD	W26-U	42.83	14.09	0.18		
		LKD	W27-L	N/A	34.70	0.30		
		LKD	W27-U	N/A	35.03	1.71		
		LKD	W28-L	47.57	16.87	0.02		
		LKD	W28-U	48.32	17.31	0.20		
		LKD	W29-L	N/A	29.31	0.14		
		LKD	W29-U	N/A	29.26	0.62		
						3.81		
First	R2	Bedroom	W2-L	55.25	21.50	0.11	1.00	YES
		Bedroom	W2-U	56.19	22.07	1.14		
						1.25		
First	R3	LKD	W3-L	N/A	17.37	0.04	1.50	YES
		LKD	W3-U	N/A	17.71	0.19		
		LKD	W4-L	58.90	23.72	0.12		
		LKD	W4-U	61.02	25.00	1.63		
		LKD	W5-L	N/A	13.03	0.03		
		LKD	W5-U	N/A	14.01	0.15		
						2.16		
First	R4	Bedroom	W6-L	40.55	12.80	0.10	1.00	NO
		Bedroom	W6-U	32.96	8.79	0.81		
						0.91		
First	R5	LKD	W7-L	N/A	13.62	0.03	1.50	YES
		LKD	W7-U	N/A	14.49	0.16		
		LKD	W8-L	56.81	22.45	0.12		
		LKD	W8-U	59.12	23.85	1.61		
		LKD	W9-L	N/A	13.34	0.03		
		LKD	W9-U	N/A	14.20	0.16		
						2.12		
First	R6	Bedroom	W10-L	42.89	14.12	0.12	1.00	NO
		Bedroom	W10-U	35.09	9.87	0.97		

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						1.09	1.00	YES
First	R7	Bedroom	W11-L	47.51	16.83	0.10	1.00	YES
		Bedroom	W11-U	39.48	12.21	0.80		
						0.90	1.00	NO
First	R8	LKD	W12-L	N/A	12.87	0.03	1.50	YES
		LKD	W12-U	N/A	13.87	0.15		
		LKD	W13-L	66.67	28.31	0.14		
		LKD	W13-U	68.18	29.17	1.81		
		LKD	W14-L	N/A	17.54	0.04		
		LKD	W14-U	N/A	18.00	0.19		
		LKD	W15-L	N/A	34.78	0.22		
		LKD	W15-U	N/A	34.55	0.99		
						3.56	1.50	YES
First	R9	Bedroom	W16-L	N/A	34.81	0.73	1.00	YES
		Bedroom	W16-U	N/A	34.58	2.92		
						3.65	1.00	YES
First	R10	Bedroom	W17-L	N/A	34.81	0.49	1.00	YES
		Bedroom	W17-U	N/A	34.59	2.15		
						2.64	1.00	YES
First	R11	Bedroom	W18-L	51.56	19.27	0.13	1.00	YES
		Bedroom	W18-U	43.88	14.70	1.06		
						1.18	1.00	YES
First	R12	Bedroom	W19-L	52.26	19.69	0.13	1.00	YES
		Bedroom	W19-U	44.78	15.22	1.10		
						1.23	1.00	YES
First	R13	LKD	W20-L	N/A	12.48	0.03	1.50	YES
		LKD	W20-U	N/A	13.57	0.17		
		LKD	W21-L	72.59	31.60	0.16		
		LKD	W21-U	74.00	32.36	2.08		
		LKD	W22-L	N/A	14.82	0.03		
		LKD	W22-U	N/A	15.73	0.18		
						2.65	1.50	YES
First	R14	Bedroom	W23-L	64.34	26.96	0.15	1.00	YES
		Bedroom	W23-U	53.87	20.67	1.26		
						1.42	1.00	YES
First	R15	LD	W24-L	60.61	24.75	0.18	1.50	YES
		LD	W24-U	51.61	19.29	1.50		
						1.68	1.50	YES
First	R37	Bedroom	W25-L	N/A	25.11	0.39	1.50	YES
		Bedroom	W25-U	N/A	19.70	1.36		

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						1.75	1.00	YES
First	R43	Bedroom	W89-L	40.40	12.72	0.10		
		Bedroom	W89-U	33.03	8.82	0.84		
						0.94	1.00	NO
Third	R1	Bedroom	W1-L	74.08	32.40	0.17		
		Bedroom	W1-U	69.50	29.91	0.82		
						0.99	1.00	NO
Third	R30	Bedroom	W5-L	84.65	37.47	0.00		
		Bedroom	W5-U	84.33	37.33	1.62		
						1.62	1.00	YES
Third	R31	LD	W6-L	82.15	36.35	0.00		
		LD	W6-U	82.93	36.71	1.48		
						1.48	1.50	NO
Third	R32	Bedroom	W10-L	80.68	35.67	0.11		
		Bedroom	W10-U	82.85	36.67	1.73		
						1.84	1.00	YES
Third	R33	Bedroom	W9-L	80.56	35.61	0.13		
		Bedroom	W9-U	82.76	36.63	2.06		
						2.18	1.00	YES
Third	R34	LKD	W7	192.36	95.76	1.71		
		LKD	W8-L	84.07	37.21	0.03		
		LKD	W8-U	81.15	35.89	0.62		
						2.36	1.50	YES
Third	R38	LKD	W2	192.36	95.75	1.78		
		LKD	W3-L	73.65	32.17	0.02		
		LKD	W3-U	72.45	31.53	0.58		
						2.38	1.50	YES
Third	R39	Bedroom	W4-L	71.88	31.22	0.10		
		Bedroom	W4-U	75.47	33.12	1.69		
						1.79	1.00	YES

APPENDIX C - DETAILED SUNLIGHT RESULTS



Floor Ref.	Room Ref.	Room Use.	Window Ref.	VSC	Meets BRE Criteria	Window Orientation	Annual	Meets BRE Criteria	Winter	Meets BRE Criteria	Total Suns per Room Annual	Meets BRE Criteria	Total Suns per Room Winter	Meets BRE Criteria
Block A														
Ground	R1	Bedroom	W1	11.00	NO	162°	24.00	NO	9.00	YES	24.00	NO	9.00	YES
	R2	LKD	W2	17.35	NO	252°	37.00	YES	9.00	YES	74.00	YES	16.00	YES
			W3	24.06	NO	162°	67.00	YES	11.00	YES				
			W4	20.04	NO	72°N	31.00	YES	3.00	NO				
			W5	21.23	NO	162°	49.00	YES	8.00	YES				
			W6	27.84	YES	72°N	35.00	YES	6.00	YES				
	R3	Bedroom	W7	18.53	NO	162°	42.00	YES	8.00	YES	43.00	YES	9.00	YES
			W8	33.47	YES	72°N	37.00	YES	7.00	YES				
			W9	18.30	NO	342°N	0.00	NO	0.00	NO				
	R4	Bedroom	W10	18.58	NO	72°N	13.00	NO	0.00	NO	13.00	NO	0.00	NO
R5	Bedroom	W11	18.36	NO	72°N	21.00	NO	3.00	NO	21.00	NO	3.00	NO	
R6	LKD	W12	17.29	NO	162°	40.00	YES	7.00	YES	41.00	YES	8.00	YES	
		W13	33.18	YES	72°N	38.00	YES	8.00	YES					
		W14	9.50	NO	342°N	0.00	NO	0.00	NO					
R7	LD	W15	9.03	NO	162°	21.00	NO	5.00	YES	33.00	YES	5.00	YES	
		W16	32.14	YES	72°N	32.00	YES	5.00	YES					
		W17	18.74	NO	342°N	0.00	NO	0.00	NO					
R8	Bedroom	W18	17.88	NO	72°N	14.00	NO	2.00	NO	14.00	NO	2.00	NO	
R9	Bedroom	W19	18.46	NO	72°N	19.00	NO	4.00	NO	19.00	NO	4.00	NO	
First	R1	LKD	W2	37.99	YES	252°	53.00	YES	14.00	YES	98.00	YES	28.00	YES
			W3	99.81	YES	90° Hz	98.00	YES	28.00	YES				
	R2	Bedroom	W4	31.88	YES	162°	73.00	YES	22.00	YES	73.00	YES	22.00	YES
	R3	LKD	W5	32.78	YES	162°	82.00	YES	24.00	YES	96.00	YES	30.00	YES
			W6	99.11	YES	90° Hz	96.00	YES	30.00	YES				
			W7	36.32	YES	72°N	39.00	YES	8.00	YES				
	R4	Bedroom	W8	99.18	YES	90° Hz	94.00	YES	28.00	YES	94.00	YES	28.00	YES
			W9	38.09	YES	72°N	40.00	YES	9.00	YES				
	R5	Bedroom	W10	36.50	YES	72°N	32.00	YES	3.00	NO	32.00	YES	3.00	NO
R6	Bedroom	W11	36.46	YES	72°N	38.00	YES	7.00	YES	91.00	YES	25.00	YES	
		W12	98.63	YES	90° Hz	91.00	YES	25.00	YES					
R7	LD	W13	38.50	YES	72°N	40.00	YES	9.00	YES	93.00	YES	25.00	YES	
		W14	98.70	YES	90° Hz	93.00	YES	25.00	YES					
R8	Bedroom	W15	37.44	YES	72°N	36.00	YES	5.00	YES	95.00	YES	25.00	YES	
		W16	99.00	YES	90° Hz	95.00	YES	25.00	YES					
R30	Bedroom	W1	37.81	YES	252°	56.00	YES	19.00	YES	56.00	YES	19.00	YES	
Block B														
	R1	Bedroom	W1	25.11	NO	251°	39.00	YES	14.00	YES	39.00	YES	14.00	YES
	R2	LD	W2	25.44	NO	251°	35.00	YES	10.00	YES	35.00	YES	10.00	YES
	R3	LKD	W3	19.12	NO	342°N	11.00	NO	0.00	NO	59.00	YES	20.00	YES
			W4	38.43	YES	251°	59.00	YES	20.00	YES				
W5			17.97	NO	162°	48.00	YES	20.00	YES					
R4	Bedroom	W6	24.19	NO	251°	39.00	YES	14.00	YES					

Ground	R5	Bedroom	W7	24.69	NO	251°	34.00	YES	9.00	YES	39.00	YES	14.00	YES
	R6	LKD	W8	19.04	NO	342°N	11.00	NO	0.00	NO	59.00	YES	20.00	YES
			W9	38.12	YES	251°	59.00	YES	20.00	YES				
			W10	17.56	NO	162°	48.00	YES	20.00	YES				
	R7	Bedroom	W11	23.48	NO	251°	38.00	YES	14.00	YES	38.00	YES	14.00	YES
	R8	Bedroom	W12	11.29	NO	72°N	12.00	NO	3.00	NO	12.00	NO	3.00	NO
	R9	LKD	W13	14.90	NO	162°	28.00	YES	7.00	YES	30.00	YES	8.00	YES
			W14	21.92	NO	72°N	28.00	YES	8.00	YES				
			W15	5.55	NO	342°N	0.00	NO	0.00	NO				
	R10	Bedroom	W16	0.79	NO	72°N	1.00	NO	0.00	NO	1.00	NO	0.00	NO
	R11	LD	W17	5.06	NO	162°	10.00	NO	3.00	NO	28.00	YES	7.00	YES
			W18	22.17	NO	72°N	21.00	NO	3.00	NO				
			W19	16.25	NO	342°N	0.00	NO	0.00	NO				
	R12	Bedroom	W20	12.50	NO	72°N	7.00	NO	0.00	NO	7.00	NO	0.00	NO
	R13	Bedroom	W21	12.44	NO	72°N	11.00	NO	2.00	NO	11.00	NO	2.00	NO
R14	Bedroom	W22	14.00	NO	162°	28.00	YES	6.00	YES	29.00	YES	7.00	YES	
		W23	25.32	NO	72°N	27.00	YES	7.00	YES					
		W24	22.13	NO	342°N	0.00	NO	0.00	NO					
R15	LKD	W25	23.65	NO	72°N	7.00	NO	0.00	NO	17.00	NO	0.00	NO	
		W26	20.87	NO	72°N	0.00	NO	0.00	NO					
		W27	29.64	YES	342°N	10.00	NO	0.00	NO					
		W28	17.30	NO	252°	9.00	NO	0.00	NO					
R16	Bedroom	W29	17.24	NO	342°N	6.00	NO	0.00	NO	6.00	NO	0.00	NO	
First	R1	Bedroom	W1	25.50	NO	251°	39.00	YES	14.00	YES	39.00	YES	14.00	YES
	R2	LD	W2	25.82	NO	251°	35.00	YES	10.00	YES	35.00	YES	10.00	YES
	R3	LKD	W3	20.18	NO	342°N	11.00	NO	0.00	NO	60.00	YES	20.00	YES
			W4	39.01	YES	251°	59.00	YES	20.00	YES				
			W5	19.55	NO	162°	49.00	YES	20.00	YES				
	R4	Bedroom	W6	24.69	NO	251°	39.00	YES	14.00	YES	39.00	YES	14.00	YES
	R5	Bedroom	W7	25.09	NO	251°	34.00	YES	9.00	YES	34.00	YES	9.00	YES
	R6	LKD	W8	20.15	NO	342°N	11.00	NO	0.00	NO	60.00	YES	20.00	YES
			W9	38.84	YES	251°	59.00	YES	20.00	YES				
			W10	19.35	NO	162°	49.00	YES	20.00	YES				
	R7	Bedroom	W11	24.13	NO	251°	39.00	YES	14.00	YES	39.00	YES	14.00	YES
	R8	Bedroom	W12	15.20	NO	72°N	15.00	NO	4.00	NO	15.00	NO	4.00	NO
	R9	LKD	W13	17.38	NO	162°	32.00	YES	7.00	YES	33.00	YES	8.00	YES
			W14	27.59	YES	72°N	32.00	YES	8.00	YES				
			W15	17.67	NO	342°N	0.00	NO	0.00	NO				
R10	Bedroom	W16	15.33	NO	72°N	9.00	NO	0.00	NO	13.00	NO	2.00	NO	
		W17	17.15	NO	71°N	13.00	NO	2.00	NO					
R11	LD	W19	17.06	NO	162°	32.00	YES	6.00	YES	33.00	YES	7.00	YES	
		W20	27.78	YES	72°N	31.00	YES	7.00	YES					
		W21	18.25	NO	342°N	0.00	NO	0.00	NO					
R12	Bedroom	W22	16.53	NO	72°N	10.00	NO	0.00	NO	10.00	NO	0.00	NO	
R13	Bedroom	W23	16.50	NO	72°N	13.00	NO	2.00	NO	13.00	NO	2.00	NO	
R14	Bedroom	W24	16.72	NO	162°	32.00	YES	6.00	YES	33.00	YES	7.00	YES	
		W25	29.72	YES	72°N	31.00	YES	7.00	YES					
		W26	23.59	NO	342°N	0.00	NO	0.00	NO					
		W27	26.92	NO	72°N	9.00	NO	0.00	NO					

	R15	LKD	W28 W29 W30	22.47 33.33 19.04	NO YES NO	72°N 342°N 252°	2.00 11.00 12.00	NO NO NO	0.00 0.00 0.00	NO NO NO	23.00	NO	0.00	NO
	R16	Bedroom	W31	20.45	NO	342°N	6.00	NO	0.00	NO	6.00	NO	0.00	NO
	R35	Bedroom	W18	15.18	NO	71°N	14.00	NO	3.00	NO	14.00	NO	3.00	NO
Second	R1	Bedroom	W2	38.44	YES	251°	58.00	YES	19.00	YES	58.00	YES	19.00	YES
	R2	LD	W3	38.40	YES	251°	54.00	YES	15.00	YES	99.00	YES	29.00	YES
			W4	99.99	YES	90° Hz	99.00	YES	29.00	YES				
	R3	LKD	W5	39.61	YES	251°	59.00	YES	20.00	YES	100.00	YES	30.00	YES
			W6	99.97	YES	90° Hz	100.00	YES	30.00	YES				
	R4	Bedroom	W7	38.49	YES	251°	58.00	YES	19.00	YES	58.00	YES	19.00	YES
	R5	Bedroom	W8	38.46	YES	251°	54.00	YES	15.00	YES	100.00	YES	30.00	YES
			W9	99.95	YES	90° Hz	100.00	YES	30.00	YES				
	R6	LKD	W10	99.94	YES	90° Hz	99.00	YES	30.00	YES	99.00	YES	30.00	YES
			W11	39.61	YES	251°	59.00	YES	20.00	YES				
	R7	Bedroom	W12	38.00	YES	251°	58.00	YES	19.00	YES	58.00	YES	19.00	YES
	R8	Bedroom	W13	36.14	YES	71°N	39.00	YES	8.00	YES	39.00	YES	8.00	YES
	R9	LKD	W14	99.66	YES	90° Hz	97.00	YES	30.00	YES	97.00	YES	30.00	YES
W15			37.83	YES	71°N	41.00	YES	10.00	YES					
R10	Bedroom	W16	36.99	YES	71°N	36.00	YES	5.00	YES	39.00	YES	8.00	YES	
		W17	37.76	YES	71°N	38.00	YES	8.00	YES					
R11	Bedroom	W18	37.12	YES	71°N	41.00	YES	10.00	YES	99.00	YES	29.00	YES	
		W19	99.80	YES	90° Hz	99.00	YES	29.00	YES					
R12	LD	W20	99.94	YES	90° Hz	100.00	YES	30.00	YES	100.00	YES	30.00	YES	
		W21	37.86	YES	71°N	41.00	YES	10.00	YES					
R13	Bedroom	W22	36.79	YES	71°N	36.00	YES	5.00	YES	100.00	YES	30.00	YES	
		W23	99.98	YES	90° Hz	100.00	YES	30.00	YES					
Block C														
Ground	R1	LKD	W1	23.80	NO	251°	31.00	YES	5.00	YES	34.00	YES	5.00	YES
			W26	14.75	NO	71°N	0.00	NO	0.00	NO				
			W27	33.18	YES	341°N	7.00	NO	0.00	NO				
			W28	19.75	NO	251°	10.00	NO	0.00	NO				
	R2	Bedroom	W2	19.93	NO	251°	19.00	NO	2.00	NO	19.00	NO	2.00	NO
			R3	LKD	W3	19.20	NO	341°N	3.00	NO	0.00	NO	29.00	YES
	W4	20.57			NO	251°	28.00	YES	5.00	YES				
	W5	4.47			NO	161°	11.00	NO	1.00	NO				
	R4	Bedroom	W6	0.16	NO	251°	0.00	NO	0.00	NO	0.00	NO	0.00	NO
	R5	LKD	W7	3.96	NO	341°N	1.00	NO	0.00	NO	33.00	YES	11.00	YES
W8			19.03	NO	251°	33.00	YES	11.00	YES					
W9			13.69	NO	161°	32.00	YES	11.00	YES					
R6	Bedroom	W10	9.76	NO	251°	20.00	NO	8.00	YES	20.00	NO	8.00	YES	
R7	Bedroom	W11	1.14	NO	251°	3.00	NO	2.00	NO	3.00	NO	2.00	NO	
R8	LKD	W12	4.57	NO	341°N	1.00	NO	0.00	NO	85.00	YES	28.00	YES	
		W13	25.74	NO	251°	44.00	YES	17.00	YES					
		W14	20.52	NO	161°	54.00	YES	23.00	YES					
R9	Bedroom	W15	33.48	YES	172°	85.00	YES	28.00	YES	85.00	YES	28.00	YES	
		W16	33.50	YES	172°	85.00	YES	28.00	YES					
R10	Bedroom	W17	33.47	YES	172°	84.00	YES	27.00	YES	84.00	YES	27.00	YES	

	R11	Bedroom	W18	15.46	NO	71°N	3.00	NO	0.00	NO	3.00	NO	0.00	NO	
	R12	Bedroom	W19	16.53	NO	71°N	11.00	NO	2.00	NO	11.00	NO	2.00	NO	
	R13	LKD	W20	12.74	NO	161°	24.00	NO	5.00	YES					
			W21	29.66	YES	71°N	26.00	YES	6.00	YES					
			W22	17.30	NO	341°N	0.00	NO	0.00	NO					
	R14	Bedroom	W23	23.12	NO	71°N	22.00	NO	3.00	NO	22.00	NO	3.00	NO	
	R15	LD	W24	21.92	NO	71°N	23.00	NO	3.00	NO	23.00	NO	3.00	NO	
	R16	Bedroom	W25	22.04	NO	341°N	0.00	NO	0.00	NO	0.00	NO	0.00	NO	
First	R1	LKD	W1	27.57	YES	251°	40.00	YES	6.00	YES					
			W26	17.38	NO	71°N	0.00	NO	0.00	NO					
			W27	35.72	YES	341°N	10.00	NO	0.00	NO					
			W28	21.40	NO	251°	13.00	NO	0.00	NO					
			W29	31.03	YES	341°N	10.00	NO	0.00	NO					
		R2	Bedroom	W2	23.45	NO	251°	25.00	YES	2.00	NO	25.00	YES	2.00	NO
		R3	LKD	W3	20.86	NO	341°N	4.00	NO	0.00	NO				
				W4	25.26	NO	251°	38.00	YES	10.00	YES				
				W5	15.85	NO	161°	38.00	YES	11.00	YES				
		R4	Bedroom	W6	12.14	NO	251°	23.00	NO	7.00	YES	23.00	NO	7.00	YES
		R5	LKD	W7	16.29	NO	341°N	2.00	NO	0.00	NO				
				W8	24.06	NO	251°	38.00	YES	12.00	YES				
				W9	16.03	NO	161°	38.00	YES	12.00	YES				
		R6	Bedroom	W10	13.51	NO	251°	24.00	NO	8.00	YES	24.00	NO	8.00	YES
		R7	Bedroom	W11	16.90	NO	251°	24.00	NO	7.00	YES	24.00	NO	7.00	YES
		R8	LKD	W12	15.62	NO	341°N	2.00	NO	0.00	NO				
				W13	29.60	YES	251°	46.00	YES	18.00	YES				
				W14	22.13	NO	161°	55.00	YES	24.00	YES				
				W15	36.11	YES	172°	87.00	YES	29.00	YES				
		R9	Bedroom	W16	36.14	YES	172°	87.00	YES	29.00	YES	87.00	YES	29.00	YES
	R10	Bedroom	W17	36.14	YES	172°	87.00	YES	29.00	YES	87.00	YES	29.00	YES	
	R11	Bedroom	W18	18.75	NO	71°N	9.00	NO	0.00	NO	9.00	NO	0.00	NO	
	R12	Bedroom	W19	19.46	NO	71°N	17.00	NO	2.00	NO	17.00	NO	2.00	NO	
	R13	LKD	W20	15.59	NO	161°	33.00	YES	6.00	YES					
			W21	32.93	YES	71°N	35.00	YES	7.00	YES					
			W22	19.21	NO	341°N	1.00	NO	0.00	NO					
	R14	Bedroom	W23	25.56	NO	71°N	23.00	NO	3.00	NO	23.00	NO	3.00	NO	
	R15	LD	W24	23.98	NO	71°N	24.00	NO	4.00	NO	24.00	NO	4.00	NO	
	R37	Bedroom	W25	24.31	NO	341°N	0.00	NO	0.00	NO	0.00	NO	0.00	NO	
	R43	Bedroom	W89	12.33	NO	251°	13.00	NO	0.00	NO	13.00	NO	0.00	NO	
Third	R1	Bedroom	W1	34.71	YES	251°	50.00	YES	13.00	YES	50.00	YES	13.00	YES	
	R30	Bedroom	W5	39.43	YES	71°N	41.00	YES	10.00	YES	41.00	YES	10.00	YES	
	R31	LD	W6	38.74	YES	71°N	41.00	YES	10.00	YES	41.00	YES	10.00	YES	
	R32	Bedroom	W10	37.99	YES	71°N	39.00	YES	8.00	YES	39.00	YES	8.00	YES	
	R33	Bedroom	W9	37.94	YES	71°N	35.00	YES	4.00	NO	35.00	YES	4.00	NO	
	R34	LKD	W7	99.93	YES	90° Hz	99.00	YES	29.00	YES					
			W8	39.44	YES	71°N	41.00	YES	10.00	YES					
R38	LKD	W2	99.56	YES	90° Hz	99.00	YES	30.00	YES						
W3		34.86	YES	251°	55.00	YES	18.00	YES							

											99.00	YES	30.00	YES
R39	Bedroom	W4	34.08	YES	251°	55.00	YES	17.00	YES		55.00	YES	17.00	YES

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