79 CAMDEN ROAD
& 86-100 ST PANCRAS WAY

internal sunlight & daylight report

November 2013

by GIA

Client	Barratt Homes
Architect	Sheppard Robson
Project Title	79 Camden Road
Project Number	6206
Report Title	Internal Daylight, Sunlight and Overshadowing Report
Dated	October 14, 2013

Prepared by	GL
Checked by	AB
Type	Planning

Revisions		Date:	Notes:	Signed:
	A	18/10/13	Issue for Planning	AB

1. Executive Summary

The purpose of this report is to ascertain whether the proposed development will provide accommodation considered acceptable in terms of daylight, sunlight and overshadowing.

In terms of daylight, the proposed development performs well with 86% of all rooms tested achieving the levels of Average Daylight Factor recommended by the BRE. The rooms falling short are generally located on the lowest floors and the design optimisation has sought to ensure that even those units with levels of daylight below those recommended by the BRE are still daylit to an acceptable level.

Sunlight levels have shown to be generally excellent on all external elevations and only on the lower floors of the courtyards can living rooms be found with Annual Probable Sunlight Hours levels below those recommended by the BRE. This is a consequence of any courtyard design and the design has responded by situating living rooms on external facades wherever practically possible.

As is typical with any courtyard, the two proposed are heavily overshadowed throughout the year and neither are compliant with the BRE's recommendations. This is to be expected, however, and so the development has provided two additional large areas of amenity on the roof which will see excellent levels of sunlight well in excess of the minima recommended by the BRE. Further assessments have shown that during the summer, when they are most likely to be utilised, the courtyards are still overshadowed but can enjoy up to three hours of direct sunlight.

We therefore conclude that the proposed development will provide residential accommodation considered acceptable in terms of daylight, sunlight and overshadowing considering the high density nature of the design and the surrounding context.

2. Introduction and Objective

GIA has been instructed to provide a report upon the potential availability of Daylight and Sunlight to the proposed accommodation within the residential scheme prepared by Sheppard Robson. GIA was specifically instructed to carry out the following:

- To create a 3D computer model of the proposal based upon drawings prepared by Sheppard Robson;
- Carry out a daylight assessment using the methodologies set out in the BRE guidelines for Average Daylight Factor, No-Sky Line and Room Depth Criterion;
- Carry out a sunlight assessment using the methodologies set out in the BRE guidelines for Annual Probable Sunlight Hours (APSH) to the fenestration facing within 90 degrees of due south;
- Carry out an overshadowing assessment using the methodologies set ou in the BRE guidelines for Sun Hours on Ground;
- Prepare a report setting out the analysis and our findings.

3. BRE guidelines

The Building Research Establishment (BRE) have set out in their handbook *Site Layout Planning for Daylight and Sunlight a Guide to Good Practice (2011)*, guidelines and methodology for the measurement and assessment of daylight and sunlight within proposed buildings. This document states that it is also intended to be used in conjunction with the interior daylight recommendations found within the *British Standard BS8206-2:2008* and *The Applications Manual on Window Design* of the Chartered Institution of Building Services Engineers (CIBSE).

The guide also provides advice on site layout planning to determine the quality of daylight and sunlight within open spaces between buildings.

It is important to note, however, that this document is a guide whose stated aim *"is to help rather than constrain the designer".*

The document provides advice, but also clearly states that it *"is not mandatory and this document should not be seen as an instrument of planning policy."* The report acknowledges also in its introduction that *"in special circumstances the developer or planning authority may wish to use different target values. For example, in a historic City centre a higher degree of obstruction may be unavoidable if new developments are to match the height and proportions of existing buildings."*

It is an inevitable consequence of the built up urban environment that daylight and sunlight will be more limited in these areas. It is well acknowledged that in such situations there may be many other conflicting and potentially more important planning and urban design matters to consider other than just the provision of ideal levels of daylight and sunlight.

3.1. Daylight

The BRE set out various methods for assessing the daylight within a proposed building within section 2.1 and Appendix C of the handbook. The summary of this, given at the end of section 2.1 of the guide, states as follows:

> *"In general, a building will retain the potential for good interior diffused daylighting provided that on all its main faces:*
>
> *A. No obstruction, measured in a vertical section perpendicular to the main face, from a point two metres above ground level, subtends an angle of more than 25 degrees to the horizontal;*
>
> *Or*
>
> *B. If (A) is not satisfied, then all points on the main face on a line two metres above ground level are within four metres (measured sideways) of a point which has a vertical sky line component of 27% or more."*

3.1.1. Vertical Sky Component (VSC)

This method of assessment can be undertaken using a skylight indicator or a Waldram diagram. It measures from a single point, at the centre of the window if known at the early design stage, the quantum of sky visible taking into account all external obstructions. Whilst these obstructions can be either other buildings or the general landscape, trees are usually ignored unless they form a continuous or dense belt of obstruction.

The VSC method is a useful 'rule of thumb' but has some significant limitations in determining the true quality of daylight within a proposed building. It does not take into account the size of the window, any reflected light off external obstructions, any reflected light within the room, or the use to which that room is put. Appendix C of the guide goes into more detail on these matters and sets forward alternative methods for assessment to overcome these limitations.

Appendix C of the BRE guide: Interior Daylighting Recommendations, states:

> *"The British Standard for daylighting, and the CIBSE Applications manual: window design, contain advice and guidance on interior daylighting. This guide to good practice is intended to be used in conjunction with them, and its guidance is intended to fit in with their recommendations.*
>
> *For skylight, the British Standard and the CIBSE manual put forward three main criteria, based on the average daylight factor, room depth, and the position of the no skyline."*

These assessments are set out below.

3.1.2. Average Daylight Factor (ADF)

> *"If a predominantly daylit appearance is required, then df should be 5% or more if there is no supplementary electric lighting, or 2% or more if supplementary electric lighting is provided. There are additional recommendations for dwellings, of 2% for kitchens, 1.5% for living rooms and 1% for bedrooms. These last are minimum values of Average Daylight Factor, and should be attained even if a predominantly daylit appearance is not required."*

This method of assessment takes into account the total glazed area to the room, the transmittance quality of the glazing proposed, the total area of the room surfaces including ceilings and floors, and the internal average reflectance for the room being assessed. The method also takes into account the Vertical Sky Component and the quantum of reflected light off external surfaces.

This is, therefore, a significantly more detailed method of assessment than the Vertical Sky Component method set out above.

3.1.3. Room Depth Criterion (RDC)

Where it has access to daylight from windows in one wall only, the depth of a room can become a factor in determining the quantity of light within it. The BRE guidance provides a simple method for examining the ratio of room depth to window area. However, whilst it does take into account internal surface reflections, this method also has significant limitations in that it does not take into account any obstructions outside the window and therefore draws no input from the quantity of light entering the room.

3.1.4. No Sky Line (NSL)

This third method of assessment is a simple test to establish where within the proposed room the sky will be visible through the windows, taking into account external obstructions. The assessment is undertaken at working plane height (850mm above floor level) and the method of calculation is set out in Appendix D of the BRE handbook.

Appendix C of the BRE handbook states *"if a significant area of the working plane lies beyond the no skyline (i.e., it receives no direct skylight), then the distribution of daylight in the room will look poor and supplementary electric lighting will be required."* To guarantee a satisfactory daylight uniformity, the area which does not receive direct skylight should not exceed 20% of the floor area, as quantified in the BS 8206 Part2 2008.

3.1.5. Summary

The Average Daylight Factor gives a more detailed assessment of the daylight within a room and takes into account the highest number of factors in establishing a quantitative output.

However, the conclusion of Appendix C of the BRE guide states:

> *"All three of the criteria need to be satisfied if the whole of the room is to look adequately daylit. Even if the amount of daylight in a room (given by the Average Daylight Factor) is sufficient, the overall daylight appearance will be impaired if its distribution is poor."*

In most urban areas it is important to recognise that the distribution of daylight within a room may be difficult to achieve, given the built up nature of the environment. Consequently, most local authorities seek to ensure that there is sufficient daylight within the room as determined by the Average Daylight Factor calculation. However, the additional recommendations of the BRE and British Standard for residential accommodation, set out above, ought not to be overlooked.

3.2. Sunlight

The BRE provide guidance in respect of sunlight quality for new developments within section 3.1 of the handbook. It is generally acknowledged that the presence of sunlight is more significant in residential accommodation than it is in commercial, and this is reflected in the BRE document.

It states, *"in housing, the main requirement for sunlight is in living rooms, where it is valued at any time of the day, but especially in the afternoon. Sunlight is also required in conservatories. It is viewed as less important in bedrooms and in kitchens where people prefer it in the morning rather than the afternoon."*

The BRE guide considers the critical aspects of orientation and overshadowing in determining the availability of sunlight at a proposed development site.

The guide proposes minimizing the number of dwellings whose living room face solely north unless there is some compensating factor such as an appealing view to the north, and it suggests a number of techniques to do so. Further to this it discusses massing solutions with a sensitive approach to overshadowing, so as to maximize access to sunlight.

At the same time it acknowledges that the site's existing urban environment may impose orientation or overshadowing constraints which may not be possible to overcome.

So as to quantify sunlight access for interiors where sunlight is expected, it refers to the BS 82606-2 criterion of Annual Probable Sunlight Hours. APSH is defined as *"the total number of hours in the year that the sun is expected to shine on unobstructed ground, allowing for average levels of cloudiness at the location in question."* In line with the recommendation, APSH is measured from a point on the inside face of the window, should the locations have been decided. If these are unknown, sunlight availability is checked at points 1.6m above the ground or the lowest storey level on each main window wall, and no more than 5m apart. If a room has multiple windows on the same wall or on adjacent walls, the highest value of APSH should be taken into account. If a room has two windows on opposite walls, the APSH due to each can be added together.

The summary of section 3.1 of the guide states as follows:

"In general, a dwelling or non-domestic building which has a particular requirement for sunlight, will appear reasonably sunlit provided that:

At least one main window faces within 90 degrees 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. "

In paragraph 3.1.11 the BRE guidance suggests that if a room faces significantly North of due East or West it is unlikely to meet the recommended levels proposed by the BS 8206-2. As such, it is clear that only windows facing within 90 degrees of due South can be assessed using this methodology.

It is also worth noting how paragraph 5.3 of the BS 8206-2 suggests that with regards to sunlight duration "the degree of satisfaction is related to the expectation of sunlight if a room is necessarily north facing or if the building is in a densely-built urban area, the absence of sunlight is more acceptable than when its exclusion seems arbitrary".

3.3. Overshadowing

The BRE guidance in respect of overshadowing of amenity spaces is set out in section 3.3 of the handbook. Here it states as follows:

> *"Sunlight in the spaces between buildings has an important impact on the overall appearance and ambiance of a development. It is valuable for a number of reasons:*
>
> - *To provide attractive sunlit views (all year)*
> - *To make outdoor activities, like sitting out and children's play more pleasant (mainly during the warmer months)*
> - *To encourage plant growth (mainly in spring and summer)*
> - *To dry out the ground, reducing moss and slime (mainly during the colder months)*
> - *To melt frost, ice and snow (in winter)*

- *To dry clothes (all year)"*

Again, it must be acknowledged that in urban areas the availability of sunlight on the ground is a factor which is significantly controlled by the existing urban fabric around the site in question and so may have very little to do with the form of the development itself. Likewise there may be many other urban design, planning and site constraints which determine and run contrary to the best form, siting and location of a proposed development in terms of availability of sun on the ground.

The summary of section 3.3 of the guide states as follows:

> *"3. 3 .17 It is recommended that for it to appear adequately sunlit throughout the year, at least half of a garden or amenity area should receive at least two hours of sunlight on 21 March. If as a result of new development an existing garden or amenity area does not meet the above, and the area which can receive two hours of sun on 21 March is less than 0.8 times its former value, then the loss of sunlight is likely to be noticeable. If a detailed calculation cannot be carried out, it is recommended that the centre of the area should receive at least two hours of sunlight on 21 March."*

3.4. Further relevant information

Further information can be found in *The Daylight in Urban Areas Design Guide* (Energy Saving Trust CE257, 2007) which provides the following recommendation with regards to VSC levels in urban areas:

> *"If 'theta' (Visible sky angle) is greater than 65º (obstruction angle less than 25º or VSC at least 27 percent) conventional window design will usually give reasonable results.*
>
> *If 'theta' is between 45º and 65º (obstruction angle between 25º and 45º, VSC between 15 and 27 percent), special measures such as larger windows and changes to room layout are usually needed to provide adequate daylight.*
>
> *If 'theta' is between 25º and 45º (obstruction angle between 45º and 65º, VSC from 5 to 15 percent), it is very difficult to provide adequate daylight unless very large windows are used.*
>
> *If 'theta' is less than 25º (obstruction angle more than 65º, VSC less than 5 percent) it is often impossible to achieve reasonable daylight, even if the whole window wall is glazed."*

4. Methodology

In order to undertake the daylight and sunlight assessments set out above, we have prepared a three dimensional computer model and used specialist lighting simulation software.

The three dimensional representation of the proposed development has been modelled using the scheme drawings provided to us by Sheppard Robson. This has been placed in the context of its surrounding buildings which have been modelled from survey information, photogrammetry, OS and site photographs. This allows for a precise model, which in turn ensures that analysis accurately represents the amount of daylight and sunlight available to the building facades, internal and external spaces, considering all of the surrounding obstructions and orientation.

4.1. Simulation assumptions

Where no values for reflectance, transmittance and maintenance factor were specified by the designer the following values from *BS 8206-2:2008, Annex A, tables A.1-A.6* were used for the calculation of Average Daylight Factor values. These values are shown in table 1.

Reflectance values:		**Maintenance factors:**	Tv(normal)	A.3	A.4	A.5	A.6	Tv(total)
Surrounding	0.2	Double Low-E (frames modelled)	0.75	8	1	1	1	0.69
Pavement	0.2	Double Low-E (frames not modelled)	0.75	8	1	1	0.8	0.55
Grass	0.1	Double Low-E (inclined, frames modelled)	0.75	8	2	1	1	0.63
Yellow brick	0.3	Double Low-E (inclined, frames not modelled)	0.75	8	2	1	0.8	0.50
Red brick	0.2	Double Low-E (horizontal, frames modelled)	0.75	8	3	1	1	0.57
Concrete	0.4	Double Low-E (horizontal, frames not modelled)	0.75	8	3	1	0.8	0.46
Internal walls (light grey)	0.68							
Internal ceiling (white paint)	0.85	Single (frames modelled)	0.9	8	1	1	1	0.83
Internal floor (light veneer)	0.4	Single (frames not modelled)	0.9	8	1	1	0.8	0.66
		Single (inclined, frames modelled)	0.9	8	2	1	1	0.76
Transmittance values:		Single (inclined, frames not modelled)	0.9	8	2	1	0.8	0.60
		Single (horizontal, frames modelled)	0.9	8	3	1	1	0.68
Double glazing:		Single (horizontal, frames not modelled)	0.9	8	3	1	0.8	0.55
Pilkington K Glass 4/16/4 Argon filled 90%	Tv= 0.75							
		Double Translucent Low-E (frames modelled)	0.74	8	1	1	1	0.68
Single glazing:		Double Translucent Low-E (frames not modelled)	0.74	8	1	1	0.8	0.54
Pilkington Optifloat Clear, Annealed, 4mm	Tv=0.90	Double Translucent Low-E (inclined, frames modelled)	0.74	8	2	1	1	0.62
		Double Translucent Low-E (inclined, frames not modelled)	0.74	8	2	1	0.8	0.50
Translucent glazing:		Double Translucent Low-E (horizontal, frames modelled)	0.74	8	3	1	1	0.56
Pilkington Optifloat Opal - 4mm K /16/4mm Opal	Tv= 0.74	Double Translucent Low-E (horizontal, frames not modelled)	0.74	8	3	1	0.8	0.45

Table 1: Typical reflectance, transmittance and maintenance factors

5. Conclusions

5.1. The Site

The Site is located within the London Borough of Camden with Camden Rd to the southeast, St Pancras Way to the southwest and Rochester Place to the northeast. Generally the external facades are shown to enjoy the best daylight with lower levels only found at the north-west elevation and within the courtyards. The north-west elevation has lower daylight potential due to the proximity of 102 St Pancras Way and the courtyards see lower potential simply due to their enclosed nature.

With the above in mind, GIA was instructed to work alongside the design team so as to maximise the levels of daylight and sunlight within the proposed residential units. The scheme responded to the constraints identified above through:

- Not locating residential units until first floor opposite 102 St Pancras Way;
- Where possible, balconies were not positioned within the courtyards or opposite 102 St Pancras Way. Where this was not possible, the design has aimed to ensure that any overshadowing from balconies is situated from main living areas;
- In general, balconies have been carefully designed to minimise their impact on living rooms' levels of daylight;
- Flat layouts have been carefully designed alongside GIA in order to position the rooms where daylight and sunlight is most appreciated, such as living rooms, in the areas of greatest daylight potential;
- Window sizes in the courtyards have been maximised where possible so as to ensure good levels of daylight ingress;
- Some duplex units are provided with two living areas and the design always seeks to ensure that at least one of these sees acceptable levels of daylight.

5.2. Conclusion on Daylight

Technical assessments have been undertaken within all 500 proposed residential rooms and the results have shown that 428 (86%) of these rooms are compliant with the BRE's recommendations for Average Daylight Factor (ADF). The detailed results of all rooms can be seen in pages 10 to 23 of this report.

In high density residential schemes, it is often wished to provide future occupants with large combined Living/Kitchen/Dining Rooms and the inclusion of a kitchen to the space increases the recommended levels of ADF to 2% from the 1.5% recommended for a living room. Should we consider 1.5% to be an acceptable level of daylight for the large L/K/Ds the ADF compliance ratio increases from 86% to 91%.

There are 27 living rooms within the development which see levels of daylight below the 1.5% recommended but only 7 of these see below 1.0% (the level recommended for a bedroom). These 7 we would consider as having rather low levels of daylight but here it should be noted that the design optimisation has meant that 6 of these rooms are secondary rooms serving duplex apartments which all have a main habitable room seeing significantly better levels of daylight (1.5%, 1.5%, 1.7%, 1.7% 2.3% and 2.4% ADF). As the future occupants of these units can all enjoy good levels of daylight in their main living rooms we find that lower levels in their secondary rooms is acceptable.

The singular remaining main living room with a level of ADF below 1% is a large living area on the first floor looking into the south courtyard. This room's window is already large and as the lower level of ADF is due simply to the very generous room size. All other rooms in the dwelling are compliant with the BRE's recommendations and the daylight levels do increase as you move up the floors.

Lower levels of NSL than recommended can be seen 30% of rooms across the development but this is an expected consequence of scheme designed around two courtyards. With large floor to ceiling windows, with all rooms meeting the BRE's Room Depth Criterion and with the great majority achieving above the recommended levels of ADF however, we consider that the majority of these rooms will see good levels of daylight.

Overall therefore we conclude that the development presents a design with maximised levels of daylight and performs very well considering the dense urban nature of the project.

5.3. Conclusion on Sunlight

All proposed elevations within 90 degrees of due south have been assessed for Annual Probable Sunlight Hours (APSH) and the results can be seen on pages 25 to 28 of this report.

The assessments undertaken have shown the levels of APSH to generally be excellent with the great majority of the areas assessed seeing levels of APSH in excess of the minimum recommended by the BRE both during the summer and winter. However, the lower floors of the two courtyards see lower levels of APSH than recommended by the BRE.

Pages 25 and 26 present the south and east elevations and show how every living room not situated directly behind and below a balcony will see excellent levels of sunlight both throughout the year and during the winter months.

Living Room windows provisioned with balconies in front generally see lower levels of sunlight than recommended, particularly during the summer months, due to the overshadowing cause by those balconies. We have therefore also assessed the balcony balustrades to show how the summer sun transfers to the balcony from the windows behind. Therefore occupants can still enjoy excellent levels of sunlight through the utilisation of their private amenity and this is generally considered to be an acceptable trade-off of amenities.

A number of living rooms are positioned within the two proposed courtyards and those on the lower floors see reduced levels of sunlight. Again, this is to be expected within a design of this nature and the design has responded by situating the main living rooms on the outer facades wherever possible. Unfortunately this is not possible everywhere and so in a courtyard design there will always be a few units with lower levels of sunlight than recommended. These are identified on pages 27 and 28 of this report.

Overall, with the great majority of all living rooms seeing excellent levels of sunlight, we find that the proposed scheme performs well in terms of sunlight.

5.4. Conclusion on Overshadowing

The development has provided future occupants with four areas of communal amenity; two courtyards and two rooftop areas (one on each half of the site). The excellently sunlit rooftop areas of amenity have been provided as it was expected that there would be very little direct sunlight reaching the ground of each courtyard.

BRE Sun Hours on Ground assessments have been undertaken on all four areas of proposed amenity but in addition to this, in order to better understand the sunlight levels seen, additional assessments have been undertaken showing the predicted levels of sunlight both on 21st March (equinox) and 21st June (summer solstice).

On 21st March, neither courtyard sees two hours of sunlight (the level recommended by the BRE) but with the great majority (94% and 97%) of both rooftop areas seeing at least 2 hours of sunlight, the future occupants will be able to enjoy well sunlit spaces through the utilisation of these areas of amenity.

The assessments on 21st June show that in the summer, when outside spaces are most likely to be utilised, the northern areas of both courtyards see up to 3 hours of direct sunlight although the southern half is still in shadow. Again, low levels of sunlight in courtyards are expected and the rooftops areas continue to enjoy excellent levels of direct sunlight.

Overall, although the two courtyards are heavily overshadowed we find the scheme to be acceptable as future occupants can all enjoy well sunlit amenity on the rooftops.

5.5. Summary

In terms of daylight, the proposed development performs well with 86% of all rooms tested achieving the levels of ADF recommended by the BRE. The rooms falling short are generally located on the lowest floors and the design optimisation has sought to ensure that even those units with levels of daylight below those recommended by the BRE are still daylit to an acceptable level.

Sunlight levels have shown to be generally excellent on all external elevations and only on the lower floors of the courtyards can living rooms be found with APSH levels below those recommended by the BRE. This is a consequence of any courtyard design and the design has responded by situating living rooms on external facades wherever practically possible.

As is typical with any courtyards, the two proposed are heavily overshadowed throughout the year and neither are compliant with the BRE's recommendations. This is to be expected, however, and so the development has provided two additional large areas of amenity on the roof which will see excellent levels of sunlight well in excess of the minima recommended by the BRE. Further assessments have shown that during the summer, when they are most likely to be utilised, the courtyards are still overshadowed but can enjoy up to three hours of direct sunlight.

We therefore conclude that the proposed development will provide residential accommodation considered acceptable in terms of daylight, sunlight and overshadowing considering the high density nature of the design and the surrounding context.

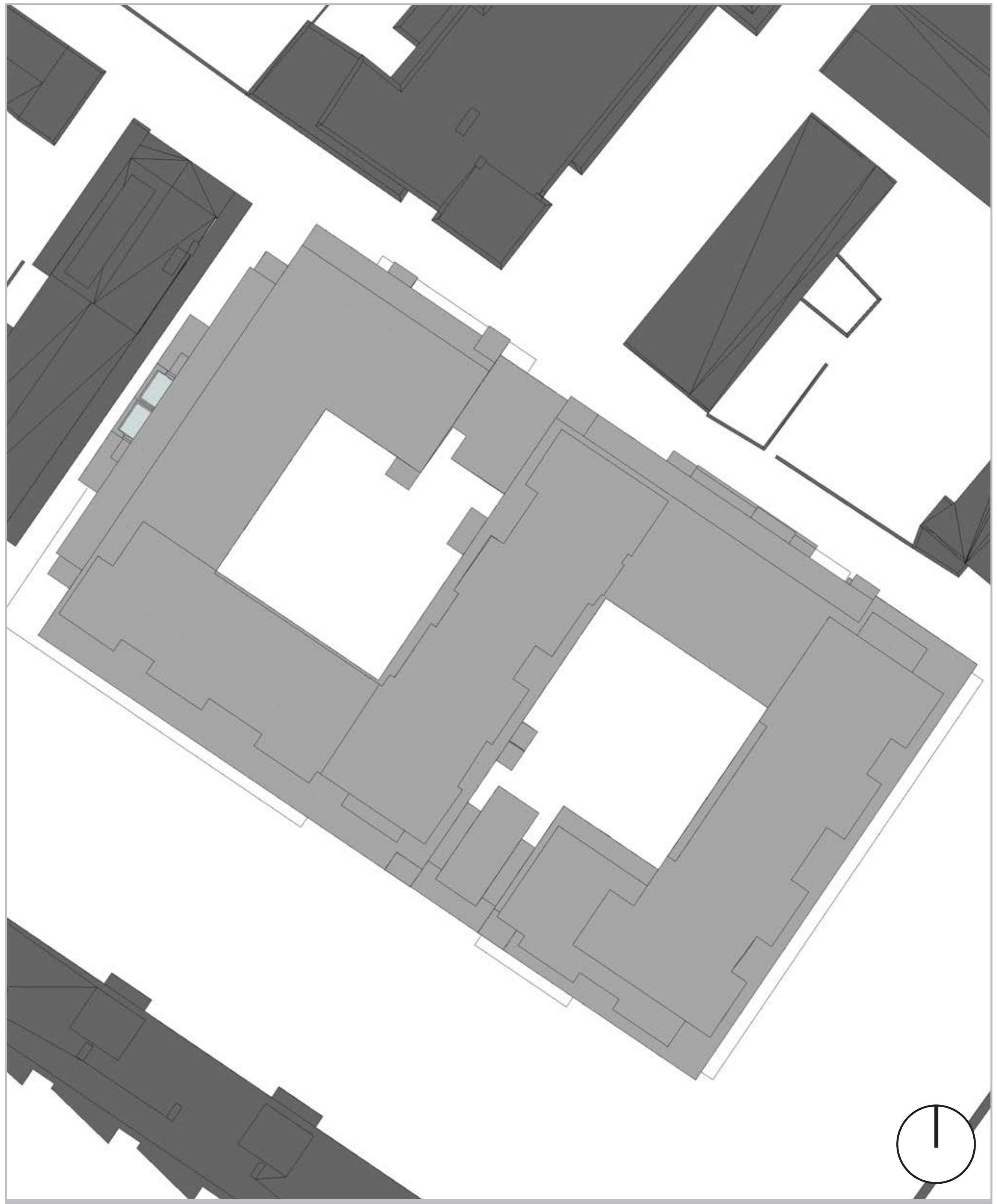

Figure 1: Top view

Figure 2: Perspective view

Internal Daylight Assessment - Lower Ground Floor

		Daylight Quantum	Distribution of Daylight	
Room Ref.	**Room Use**	**ADF (%)**	**NSL (%)**	**RDC**
Lower ground Floor				
0	Bedroom	0.5	40	Met
1	Bedroom	0.8	64	Met
2	Bedroom	1.2	97	Met
3	Bedroom	0.9	98	Met
4	L/K/D	1.5	98	Met
5	L/K/D	2.3	99	Met
6	L/K/D	2.4	99	Met
7	L/K/D	1.7	98	Met
8	Bedroom	1.8	99	Met
9	Bedroom	3.9	100	Met
10	Bedroom	2.6	95	Met
11	Bedroom	2.1	98	Met
12	L/K/D	1.9	97	Met
13	L/K/D	3.1	99	Met
14	L/K/D	1.9	98	Met
15	Bedroom	1.5	96	Met
16	Bedroom	2.0	94	Met
17	Bedroom	2.4	100	Met
18	Bedroom	1.7	99	Met
19	L/K/D	1.6	63	Met
20	L/K/D	1.9	63	Met
21	L/K/D	1.3	60	Met
22	Bedroom	0.9	60	Met
23	Bedroom	2.3	59	Met
24	Bedroom	1.9	57	Met
25	Bedroom	1.9	54	Met
26	Bedroom	1.8	54	Met
27	Bedroom	1.9	57	Met
28	Bedroom	2.0	100	Met
29	Bedroom	3.4	85	Met
30	Bedroom	2.5	72	Met
31	Bedroom	3.0	77	Met
32	Bedroom	1.7	85	Met
33	Bedroom	1.6	90	Met
34	Bedroom	1.4	63	Met
35	Bedroom	1.2	21	Met
36	Living Room	1.6	28	Met
37	L/K/D	1.4	27	Met
38	Bedroom	1.0	64	Met
39	Bedroom	1.5	80	Met
40	Bedroom	1.6	54	Met

Table 2: Assessment Data

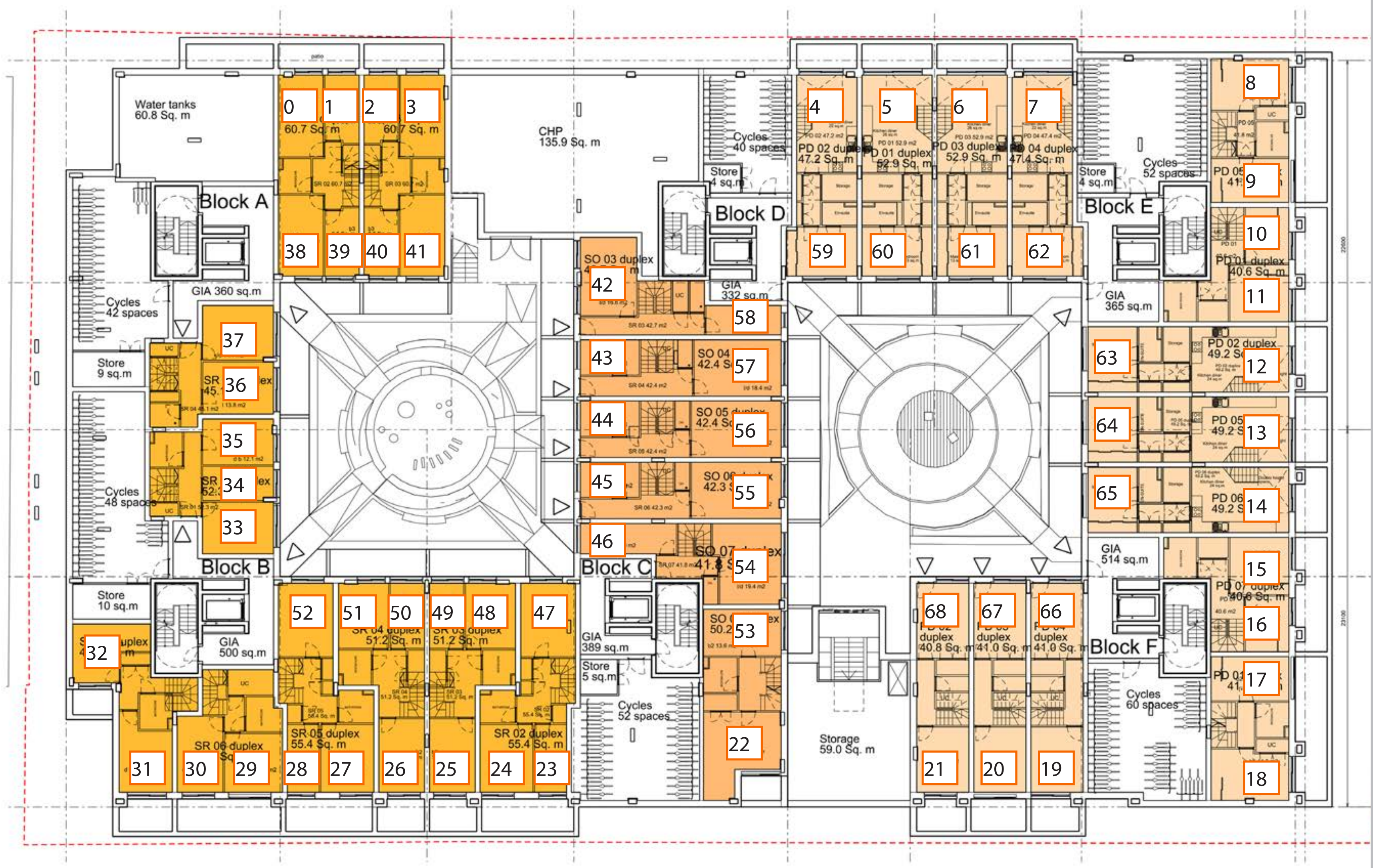

Figure 3: Floor Plan

		Daylight Quantum	Distribution of Daylight	
Room Ref.	**Room Use**	**ADF (%)**	**NSL (%)**	**RDC**
41	Bedroom	1.3	42	Met
42	Living Room	1.5	91	Met
43	L/K/D	1.3	40	Met
44	L/K/D	1.4	41	Met
45	L/K/D	1.6	42	Met
46	L/K/D	0.9	26	Met
47	Bedroom	1.5	95	Met
48	Bedroom	1.6	74	Met
49	Bedroom	2.4	100	Met
50	Bedroom	2.2	87	Met
51	Bedroom	1.3	72	Met
52	Bedroom	1.1	98	Met
53	Bedroom	0.4	22	Met
54	Living Room	1.7	93	Met
55	Living Room	p	26	Met
56	Living Room	1.4	60	Met
57	Living Room	1.4	85	Met
58	L/K/D	0.5	22	Met
59	Bedroom	2.6	97	Met
60	Bedroom	2.8	87	Met
61	Bedroom	2.6	92	Met
62	Bedroom	2.2	83	Met
63	Bedroom	1.9	40	Met
64	Bedroom	2.0	35	Met
65	Bedroom	1.9	35	Met
66	Living Room	1.0	90	Met
67	Living Room	1.0	59	Met
68	Living Room	1.2	26	Met

Table 3: Assessment Data

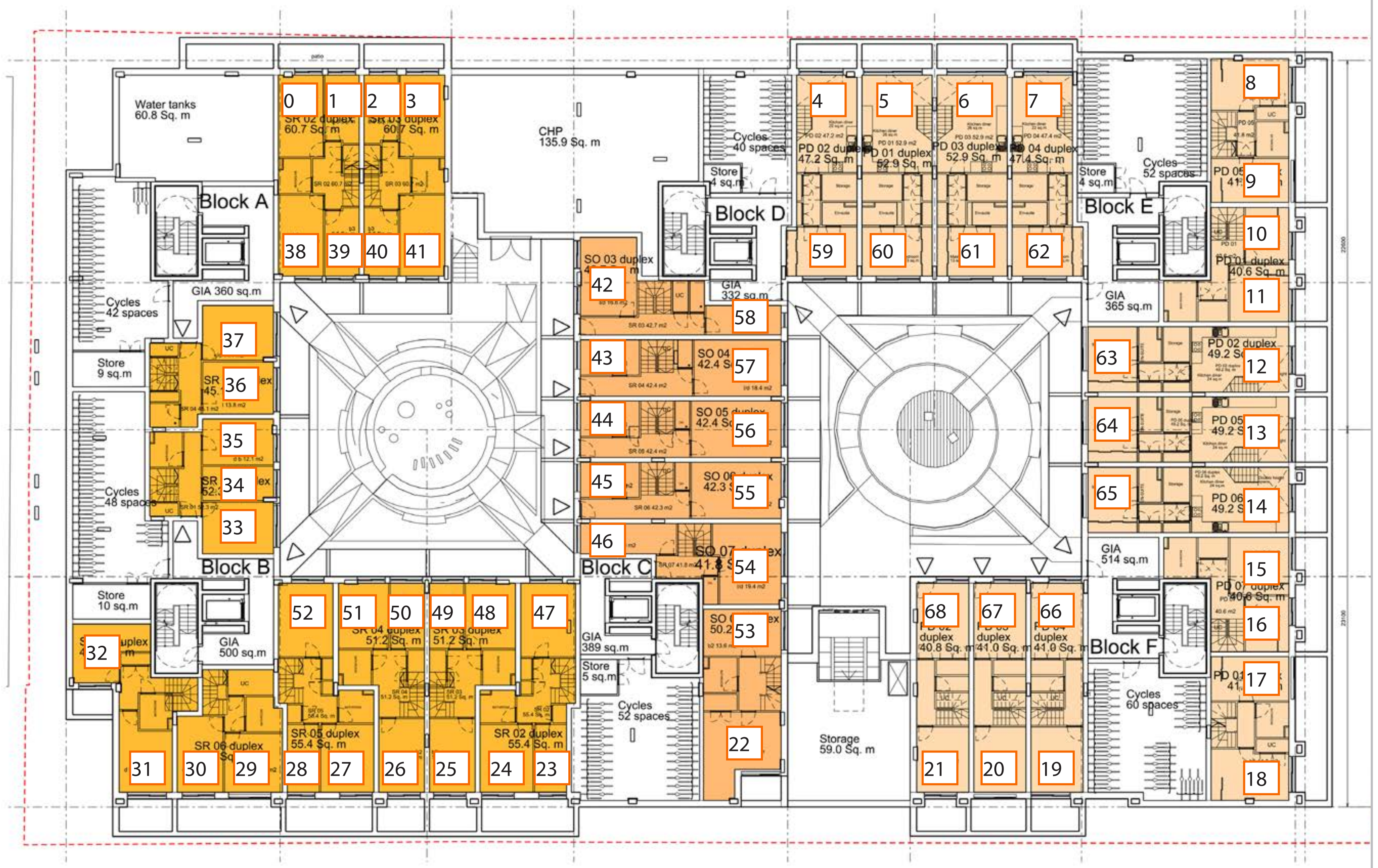

Figure 4: Floor Plan

		Daylight Quantum	Distribution of Daylight	
Room Ref.	**Room Use**	**ADF (%)**	**NSL (%)**	**RDC**
Ground Floor				
69	L/K/D	1.8	96	N/A
70	Bedroom	0.5	20	Met
71	Living Room	1.2	87	Met
72	Living Room	1.7	98	Met
73	Bedroom	2.4	99	Met
74	L/K/D	1.6	64	Met
75	Living Room	0.5	81	Met
76	Living Room	0.8	96	Met
77	Living Room	0.8	100	Met
78	Living Room	0.7	95	Met
79	Living Room	5.1	100	N/A
80	Kitchen	4.1	100	Met
81	L/K/D	4.3	98	Met
82	Living Room	1.2	95	Met
83	Living Room	2.0	99	Met
84	Living Room	1.4	98	Met
85	L/K/D	5.6	97	Met
86	Kitchen	6.0	100	Met
87	Living Room	8.6	100	N/A
88	Bedroom	4.5	99	Met
89	Bedroom	4.8	99	Met
90	Bedroom	3.3	99	Met
91	Kitchen	2.8	93	Met
92	Living Room	2.8	76	Met
93	Living Room	2.3	78	Met
94	Living Room	2.4	79	Met
95	Living Room	2.9	76	Met
96	Kitchen	3.1	75	Met
97	Living Room	2.6	77	Met
98	Living Room	5.6	97	N/A
99	Kitchen	2.8	94	N/A
100	Bedroom	1.0	29	Met
101	Bedroom	0.4	35	Met
102	Kitchen	1.7	96	Met
103	Living Room	2.1	100	Met
104	Bedroom	1.3	56	Met
105	Bedroom	1.5	55	Met
106	Bedroom	1.6	93	Met
107	Kitchen	1.7	70	Met
108	Kitchen	1.5	62	Met
109	Bedroom	1.3	100	Met

Table 4: Assessment Data

Figure 5: Floor Plan

6206 - 79 Camden Road
Internal Daylight, Sunlight and Overshadowing Report

Internal Daylight Assessment - Ground Floor

Sources of information:

- IR28-6206-sheppard_robson

		Daylight Quantum	Distribution of Daylight	
Room Ref.	**Room Use**	**ADF (%)**	**NSL (%)**	**RDC**
110	Bedroom	2.4	99	Met
111	Bedroom	2.7	96	Met
112	Bedroom	2.6	94	Met
113	Bedroom	2.2	98	Met
114	Kitchen	2.5	97	Met
115	Kitchen	2.9	97	Met
116	Kitchen	2.6	98	Met
117	Kitchen	2.0	95	Met
118	Living Room	1.1	44	Met
119	Bedroom	0.9	62	Met
120	Bedroom	1.6	61	Met
121	Bedroom	2.3	72	Met
122	Bedroom	2.2	54	Met
123	Bedroom	2.0	92	Met
124	Bedroom	2.7	94	Met
125	Bedroom	3.0	89	Met
126	Bedroom	2.8	92	Met
127	Bedroom	2.5	73	Met
128	Bedroom	3.1	96	Met
129	Bedroom	3.2	98	Met
130	Bedroom	3.2	100	Met
131	Bedroom	2.5	75	Met
132	Bedroom	2.8	90	Met
133	Bedroom	3.0	88	Met

Table 5: Assessment Data

Figure 6: Floor Plan

Room Ref.	Room Use	Daylight Quantum ADF (%)	Distribution of Daylight NSL (%)	RDC
1st Floor				
134	L/K/D	1.8	80	N/A
135	Bedroom	0.9	21	Met
136	Bedroom	0.5	13	Met
137	Bedroom	1.2	46	Met
138	Bedroom	2.6	95	Met
139	L/K/D	2.2	96	N/A
140	Bedroom	3.0	98	N/A
141	Bedroom	2.6	97	Met
142	Bedroom	1.5	99	Met
143	L/K/D	2.0	99	Met
144	L/K/D	2.2	99	N/A
145	L/K/D	2.0	99	N/A
146	L/K/D	2.1	99	Met
147	Bedroom	1.4	99	Met
148	Bedroom	2.2	89	Met
149	Bedroom	2.3	62	Met
150	L/K/D	4.0	98	N/A
151	L/K/D	2.8	99	Met
152	Bedroom	4.3	99	Met
153	L/K/D	2.1	100	N/A
154	L/K/D	2.2	99	N/A
155	Bedroom	4.8	99	Met
156	L/K/D	2.7	99	Met
157	L/K/D	4.3	99	Met
158	Bedroom	3.0	100	Met
159	Bedroom	4.7	100	Met
160	Bedroom	2.2	92	Met
161	Bedroom	3.3	96	Met
162	L/K/D	3.2	99	N/A
163	L/K/D	3.1	98	N/A
164	Bedroom	3.2	96	Met
165	Bedroom	1.1	49	Met
166	L/K/D	2.1	61	Met
167	L/K/D	1.4	40	N/A
168	L/K/D	1.6	40	N/A
169	L/K/D	1.8	66	Not Met
170	Bedroom	0.8	34	Met
171	Bedroom	3.2	85	Met
172	Living Room	4.0	96	N/A
173	Kitchen	2.1	54	Met
174	Bedroom	2.0	46	Met

Table 6: Assessment Data

Figure 7: Floor Plan

		Daylight Quantum	Distribution of Daylight	
Room Ref.	Room Use	ADF (%)	NSL (%)	RDC
175	Bedroom	1.9	49	Met
176	L/K/D	3.2	42	N/A
177	L/K/D	3.0	42	N/A
178	L/K/D	1.0	42	Met
179	Bedroom	1.0	84	N/A
180	Bedroom	1.5	35	Met
181	Bedroom	2.2	44	Met
182	Bedroom	2.2	43	Met
183	Bedroom	1.4	33	Met
184	Bedroom	1.7	47	Met
185	L/K/D	1.8	49	N/A
186	L/K/D	1.9	79	N/A
187	L/K/D	1.4	43	Met
188	Bedroom	1.0	22	Met
189	Bedroom	1.8	41	Met
190	Bedroom	2.1	58	Met
191	Bedroom	2.1	73	Met
192	Bedroom	2.3	71	Met
193	Bedroom	3.2	91	Met
194	Bedroom	1.8	65	Met
195	L/K/D	1.6	57	Met
196	Bedroom	1.2	17	Met
197	Bedroom	0.7	19	Met
198	L/K/D	1.4	23	Met
199	L/K/D	0.8	15	Met
200	Bedroom	1.7	48	Met
201	Bedroom	1.9	68	Met
202	Bedroom	2.2	71	Met
203	Bedroom	1.9	66	Met
204	Bedroom	2.6	86	Met
205	Bedroom	1.7	47	Met
206	Bedroom	1.7	57	Met
207	Bedroom	1.7	58	Met
208	Bedroom	1.6	39	Met
209	Bedroom	1.1	59	Met
210	Bedroom	1.8	59	Met
211	L/K/D	1.3	30	N/A

Table 7: Assessment Data

Figure 8: Floor Plan

Room Ref.	Room Use	Daylight Quantum ADF (%)	Distribution of Daylight NSL (%)	RDC
2nd Floor				
212	L/K/D	2.4	85	N/A
213	Bedroom	1.4	38	Met
214	Bedroom	0.7	23	Met
215	Bedroom	1.5	58	Met
216	Bedroom	3.0	96	Met
217	L/K/D	2.5	98	N/A
218	Bedroom	4.2	99	Met
219	Bedroom	3.6	99	Met
220	Bedroom	2.1	100	Met
221	L/K/D	2.4	99	Met
222	L/K/D	2.4	99	N/A
223	L/K/D	2.3	99	N/A
224	L/K/D	2.4	99	Met
225	Bedroom	1.7	100	Met
226	Bedroom	3.0	97	Met
227	Bedroom	3.2	99	Met
228	L/K/D	4.4	100	N/A
229	L/K/D	2.8	99	N/A
230	Bedroom	4.4	99	Met
231	L/K/D	2.2	100	N/A
232	L/K/D	2.2	99	N/A
233	Bedroom	5.2	99	Met
234	L/K/D	3.0	99	N/A
235	L/K/D	4.2	99	N/A
236	Bedroom	2.8	100	N/A
237	Bedroom	4.9	100	Met
238	Bedroom	2.4	92	Met
239	Bedroom	3.5	96	Met
240	L/K/D	3.6	100	N/A
241	L/K/D	3.4	100	N/A
242	Bedroom	3.5	100	Met
243	Bedroom	1.3	98	Met
244	L/K/D	2.3	99	N/A
245	L/K/D	1.6	84	N/A
246	L/K/D	1.9	85	N/A
247	L/K/D	2.2	86	N/A
248	Bedroom	1.6	93	Met
249	Bedroom	3.7	99	N/A
250	L/K/D	4.3	99	N/A
251	Kitchen	3.5	100	Met
252	Bedroom	3.7	99	Met

Table 8: Assessment Data

Figure 9: Floor Plan

DAYLIGHT+SOLAR DESIGN

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6206 - 79 Camden Road

Internal Daylight, Sunlight and Overshadowing Report

Internal Daylight Assessment - Second Floor

Sources of information:

- IR28-6206-sheppard_robson

		Daylight Quantum	Distribution of Daylight	
Room Ref.	**Room Use**	**ADF (%)**	**NSL (%)**	**RDC**
253	Bedroom	3.4	98	Met
254	L/K/D	2.2	80	N/A
255	L/K/D	1.9	81	N/A
256	L/K/D	1.7	85	Met
257	Bedroom	1.7	93	Met
258	Bedroom	1.8	34	Met
259	Bedroom	2.7	43	Met
260	Bedroom	2.8	45	Met
261	Bedroom	1.8	39	N/A
262	Bedroom	2.1	73	Met
263	L/K/D	2.2	63	N/A
264	L/K/D	2.4	89	N/A
265	L/K/D	1.8	58	Met
266	Bedroom	1.3	45	Met
267	Bedroom	2.2	68	Met
268	Bedroom	2.5	75	Met
269	Bedroom	2.4	83	Met
270	Bedroom	2.6	88	Met
271	Bedroom	3.8	98	Met
272	Bedroom	2.2	79	Met
273	L/K/D	1.8	61	Met
274	Bedroom	1.4	25	Met
275	Bedroom	0.8	27	Met
276	L/K/D	1.7	29	Not Met
277	L/K/D	1.0	20	Met
278	Bedroom	2.1	59	Met
279	Bedroom	2.2	76	Met
280	Bedroom	2.5	79	Met
281	Bedroom	2.3	73	Met
282	Bedroom	3.0	93	Met
283	Bedroom	2.1	54	Met
284	Bedroom	2.1	59	Met
285	Bedroom	2.1	58	Met
286	Bedroom	2.0	40	Met
287	Bedroom	1.3	76	Met
288	Bedroom	2.3	84	Met
289	L/K/D	1.6	35	N/A

Table 9: Assessment Data

Figure 10: Floor Plan

Internal Daylight Assessment - Third Floor

Room Ref.	Room Use	Daylight Quantum ADF (%)	Distribution of Daylight NSL (%)	RDC
3rd Floor				
290	L/K/D	3.3	95	N/A
291	Bedroom	2.4	95	Met
292	Bedroom	2.1	85	Met
293	Bedroom	2.4	82	Met
294	Bedroom	3.8	98	Met
295	L/K/D	3.2	99	N/A
296	Bedroom	4.6	99	Met
297	Bedroom	4.1	99	Met
298	Bedroom	3.4	100	Met
299	L/K/D	2.5	99	Met
300	L/K/D	2.6	99	N/A
301	L/K/D	2.6	99	N/A
302	L/K/D	2.5	99	Met
303	Bedroom	2.9	100	Met
304	Bedroom	3.7	97	Met
305	Bedroom	4.6	100	Met
306	L/K/D	4.5	100	N/A
307	L/K/D	3.0	99	N/A
308	Bedroom	4.4	99	Met
309	L/K/D	2.2	100	N/A
310	L/K/D	2.3	99	N/A
311	Bedroom	5.0	99	Met
312	L/K/D	2.9	99	N/A
313	L/K/D	4.3	100	N/A
314	Bedroom	2.9	100	N/A
315	Bedroom	5.1	100	Met
316	Bedroom	2.5	92	Met
317	Bedroom	3.8	96	Met
318	L/K/D	4.0	100	N/A
319	L/K/D	3.7	100	N/A
320	Bedroom	3.7	100	Met
321	Bedroom	1.5	98	Met
322	L/K/D	2.5	99	N/A
323	L/K/D	1.8	99	N/A
324	L/K/D	2.0	100	N/A
325	L/K/D	2.4	100	N/A
326	Bedroom	2.0	97	Met
327	Bedroom	4.1	99	N/A
328	L/K/D	4.6	100	N/A
329	Kitchen	4.6	100	Met
330	Bedroom	5.0	99	Met

Table 10: Assessment Data

Figure 11: Floor Plan

Room Ref.	Room Use	Daylight Quantum ADF (%)	Distribution of Daylight NSL (%)	RDC
331	Bedroom	4.8	98	Met
332	L/K/D	3.3	99	N/A
333	L/K/D	2.9	99	Met
334	L/K/D	3.0	97	Met
335	Bedroom	2.7	95	Met
336	Bedroom	2.3	52	Met
337	Bedroom	3.3	58	Met
338	Bedroom	3.5	61	Met
339	Bedroom	2.3	62	N/A
340	Bedroom	2.6	94	Met
341	L/K/D	2.7	86	N/A
342	L/K/D	3.0	95	N/A
343	L/K/D	2.5	90	Met
344	Bedroom	1.8	83	Met
345	Bedroom	2.7	79	Met
346	Bedroom	3.1	80	Met
347	Bedroom	2.7	86	Met
348	Bedroom	3.1	96	Met
349	Bedroom	4.6	99	Met
350	Bedroom	2.7	91	Met
351	L/K/D	2.2	68	Met
352	Bedroom	3.0	76	Met
353	Bedroom	2.1	50	Met
354	L/K/D	2.2	39	Not Met
355	L/K/D	1.2	33	Met
356	Bedroom	2.6	80	Met
357	Bedroom	2.6	81	Met
358	Bedroom	3.0	85	Met
359	Bedroom	2.7	80	Met
360	Bedroom	3.6	98	Met
361	Bedroom	2.6	79	Met
362	Bedroom	2.5	78	Met
363	Bedroom	2.6	78	Met
364	Bedroom	2.4	61	Met
365	Bedroom	1.6	80	Met
366	Bedroom	2.7	92	Met
367	L/K/D	1.9	67	N/A

Table 11: Assessment Data

Figure 12: Floor Plan

Room Ref.	Room Use	Daylight Quantum ADF (%)	Distribution of Daylight NSL (%)	RDC
4th Floor				
368	L/K/D	6.4	100	N/A
369	Bedroom	3.9	91	Met
370	L/K/D	2.5	96	Met
371	L/K/D	5.0	100	N/A
372	L/K/D	6.9	99	N/A
373	Bedroom	6.2	99	Met
374	Bedroom	4.2	100	Met
375	L/K/D	4.5	100	N/A
376	L/K/D	3.8	100	Met
377	L/K/D	4.8	99	Met
378	Bedroom	3.7	100	Met
379	Bedroom	3.9	97	Met
380	Bedroom	4.3	100	Met
381	L/K/D	4.6	100	N/A
382	L/K/D	2.7	99	N/A
383	Bedroom	4.1	99	Met
384	L/K/D	2.2	100	N/A
385	L/K/D	2.3	99	N/A
386	Bedroom	4.8	99	Met
387	L/K/D	2.8	99	N/A
388	L/K/D	4.3	100	N/A
389	Bedroom	2.9	100	Met
390	Bedroom	4.8	99	Met
391	Bedroom	2.1	94	Met
392	Bedroom	3.0	96	Met
393	L/K/D	4.4	100	N/A
394	L/K/D	3.9	100	N/A
395	Bedroom	3.8	99	Met
396	Bedroom	1.6	98	Met
397	L/K/D	2.3	99	N/A
398	L/K/D	2.0	99	N/A
399	L/K/D	2.0	100	N/A
400	L/K/D	2.5	100	N/A
401	Bedroom	2.3	97	Met
402	Bedroom	4.2	99	N/A
403	L/K/D	4.3	100	N/A
404	Bedroom	3.3	88	Met
405	L/K/D	3.4	99	Met
406	L/K/D	3.3	99	Met
407	Bedroom	3.8	92	Met
408	Bedroom	3.0	92	Met

Table 12: Assessment Data

Figure 13: Floor Plan

Internal Daylight Assessment - Fourth Floor

Sources of information:

- IR28-6206-sheppard_robson

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		Daylight Quantum	Distribution of Daylight	
Room Ref.	Room Use	ADF (%)	NSL (%)	RDC
409	Bedroom	5.4	100	Met
410	L/K/D	3.5	99	N/A
411	Bedroom	4.7	99	Met
412	Bedroom	3.2	97	Met
413	Bedroom	3.5	95	Met
414	Bedroom	4.3	92	Met
415	Bedroom	3.5	87	Met
416	Bedroom	3.5	92	Met
417	Bedroom	3.2	94	Met
418	Bedroom	3.3	97	Met
419	Bedroom	3.3	99	Met
420	Bedroom	3.4	98	Met
421	Bedroom	3.2	92	Met
422	L/K/D	3.5	91	Met
423	Bedroom	3.6	99	Met
424	Bedroom	2.4	86	Met
425	L/K/D	1.6	55	Not Met
426	L/K/D	1.4	57	Met
427	Bedroom	3.1	98	Met
428	Bedroom	2.9	77	Met
429	Bedroom	3.1	95	Met
430	Bedroom	3.2	97	Met
431	Bedroom	3.3	96	Met
432	Bedroom	3.0	99	Met
433	Bedroom	3.1	98	Met
434	Bedroom	3.0	84	Met
435	Bedroom	1.9	86	Met
436	Bedroom	3.2	96	Met
437	L/K/D	3.5	76	N/A

Table 13: Assessment Data

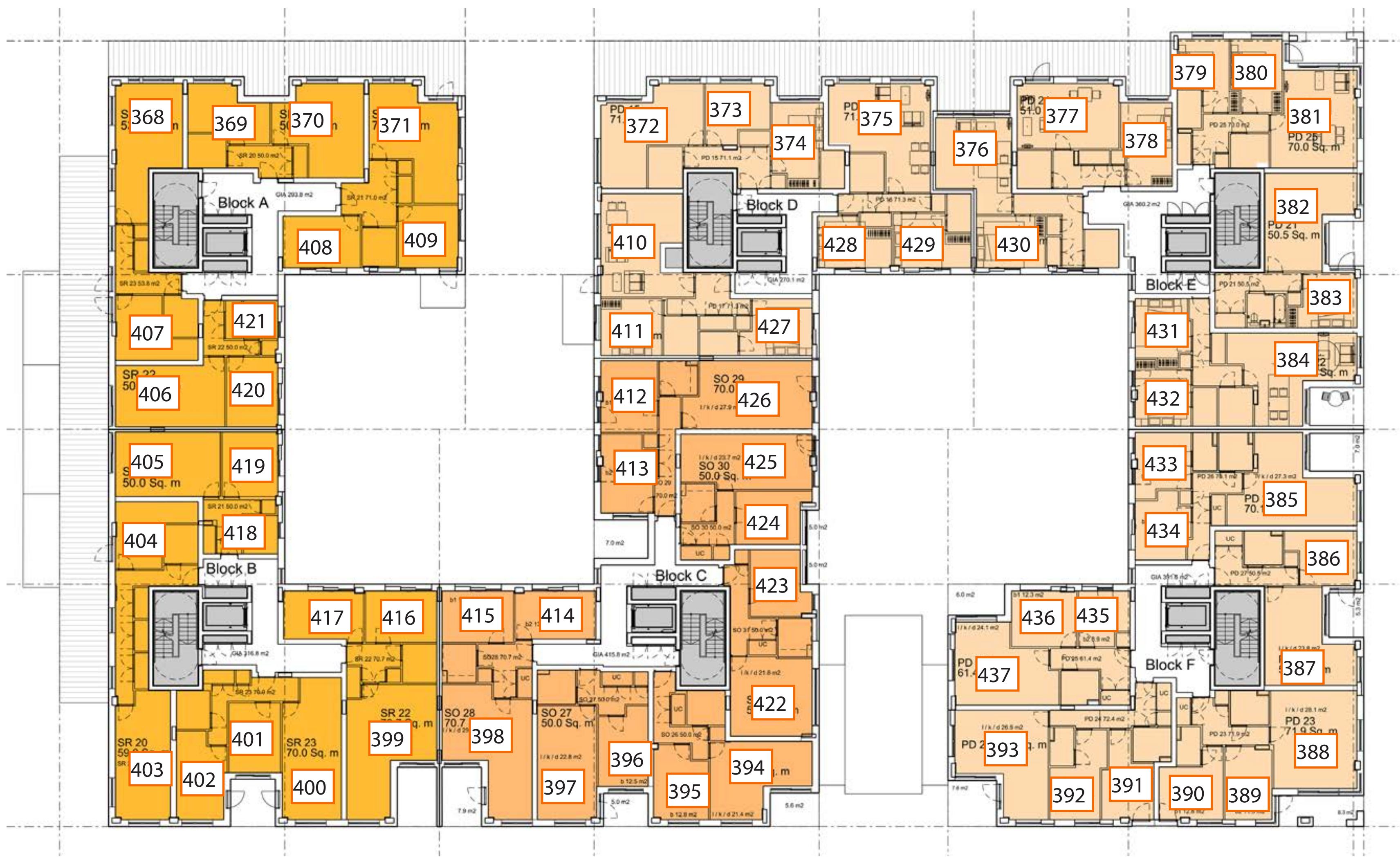


Figure 14: Floor Plan

		Daylight Quantum	Distribution of Daylight	
Room Ref.	Room Use	ADF (%)	NSL (%)	RDC
5th Floor				
438	Bedroom	8.8	100	N/A
439	Bedroom	6.7	100	N/A
440	Bedroom	7.7	100	Met
441	Bedroom	6.7	99	Met
442	L/K/D	4.5	99	N/A
443	Bedroom	2.3	80	Met
444	L/K/D	7.2	100	N/A
445	Bedroom	4.4	98	Met
446	Bedroom	4.8	99	Met
447	L/K/D	2.4	92	Met
448	L/K/D	4.1	99	N/A
449	L/K/D	2.8	97	Met
450	L/K/D	4.0	99	N/A
451	Bedroom	8.0	99	Met
452	Bedroom	4.2	100	Met
453	Bedroom	3.6	94	Met
454	Bedroom	3.2	94	Met
455	L/K/D	6.3	99	Met
456	Bedroom	5.4	97	Met
457	L/K/D	4.6	99	Met
458	Bedroom	4.9	95	Met
459	Bedroom	4.7	100	Met
460	L/K/D	6.2	100	N/A
461	L/K/D	4.3	98	N/A
462	Bedroom	2.1	97	Met
463	Bedroom	2.0	97	Met
464	L/K/D	4.3	97	N/A
465	L/K/D	5.6	100	N/A
466	Bedroom	5.2	100	Met
467	Bedroom	4.3	98	Met
468	Bedroom	6.3	100	Met
469	L/K/D	4.3	100	N/A
470	Bedroom	3.3	96	Met
471	Bedroom	2.8	95	Met
472	Bedroom	2.4	84	Met
473	Bedroom	4.4	100	Met
474	Bedroom	5.2	100	Met
475	Bedroom	5.3	100	Met
476	Bedroom	4.6	100	Met

Table 14: Assessment Data

Figure 15: Floor Plan

		Daylight Quantum	Distribution of Daylight	
Room Ref.	Room Use	ADF (%)	NSL (%)	RDC
6th Floor				
477	Bedroom	8.3	99	Met
478	Bedroom	8.3	100	N/A
479	Bedroom	8.5	100	Met
480	Bedroom	7.9	99	Met
481	L/K/D	5.4	99	N/A
482	Bedroom	3.0	80	Met
483	L/K/D	6.8	100	N/A
484	Bedroom	7.5	99	Met
485	L/K/D	7.4	100	Met
486	Bedroom	4.8	97	Met
487	L/K/D	5.5	100	N/A
488	Bedroom	6.1	92	Met
489	Bedroom	2.4	82	Met
490	L/K/D	6.3	100	N/A
491	L/K/D	5.5	98	Met
492	Bedroom	2.1	96	Met
493	Bedroom	2.2	96	Met
494	L/K/D	4.9	97	N/A
495	Bedroom	2.7	88	Met
496	Bedroom	8.5	100	N/A
497	L/K/D	9.1	100	N/A
498	Bedroom	7.8	100	N/A
499	Bedroom	7.2	100	N/A

Table 15: Assessment Data

Figure 16: Floor Plan

Sunlight Assessments

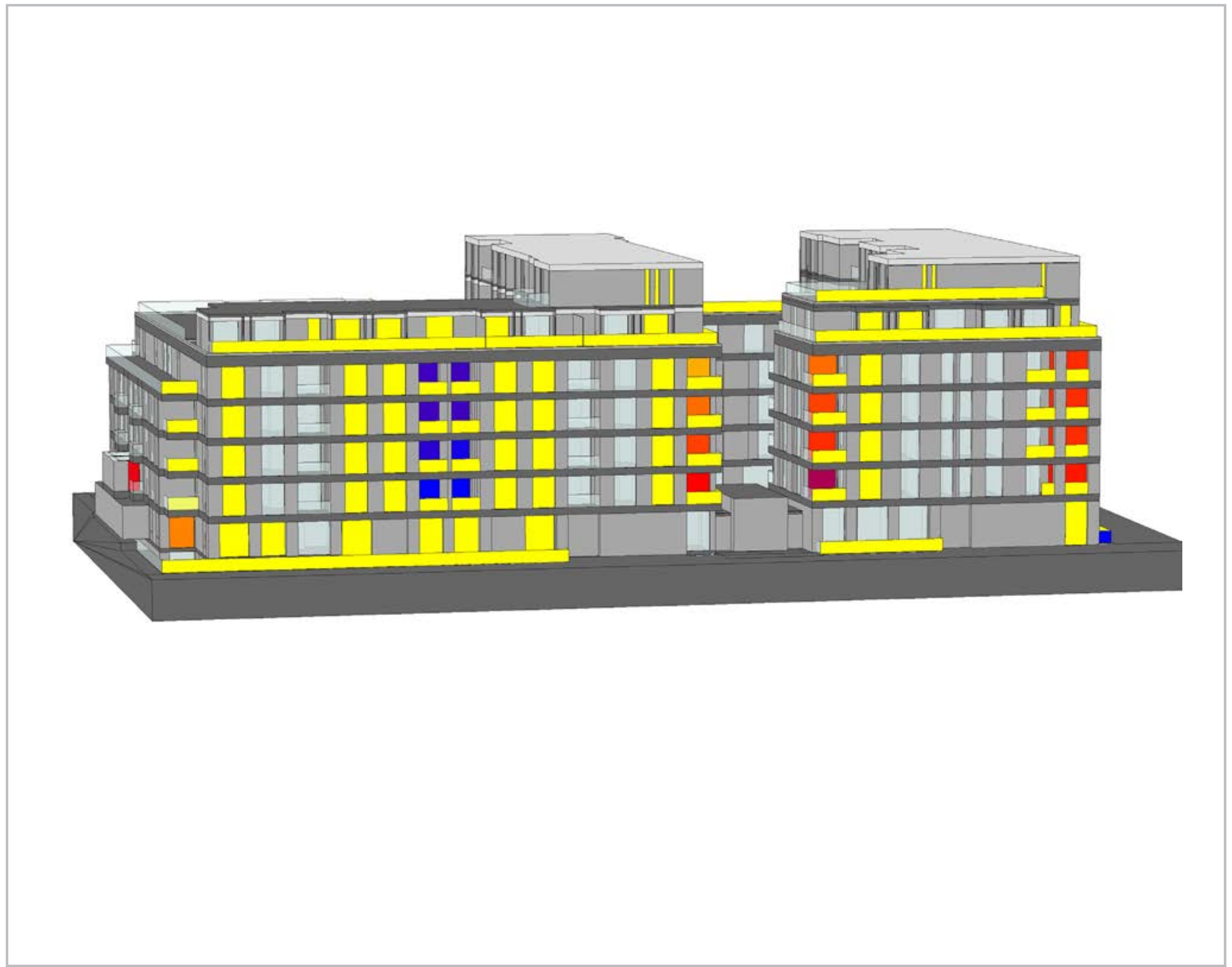
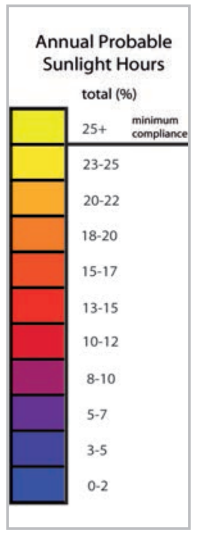


Figure 17: Annual Probable Sunlight Hours - Total

Figure 18: Annual Probable Sunlight Hours - Winter



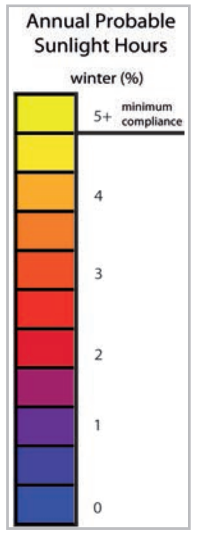


Figure 19: Annual Probable Sunlight Hours - Total

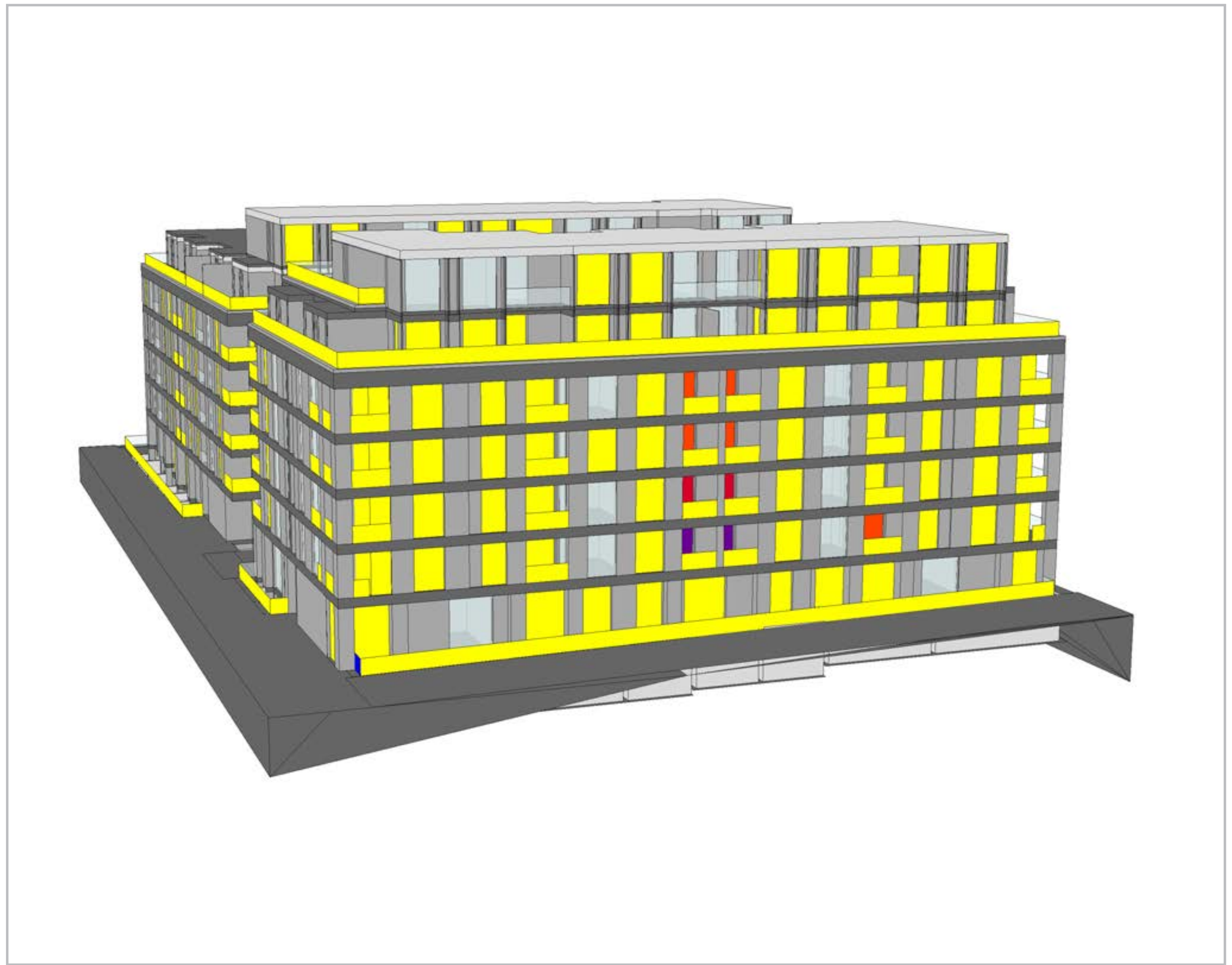
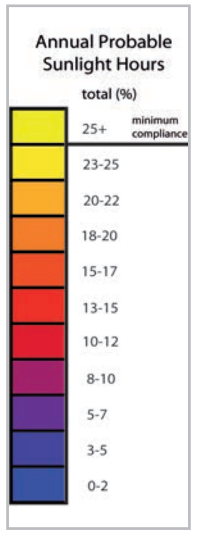


Figure 20: Annual Probable Sunlight Hours - Winter



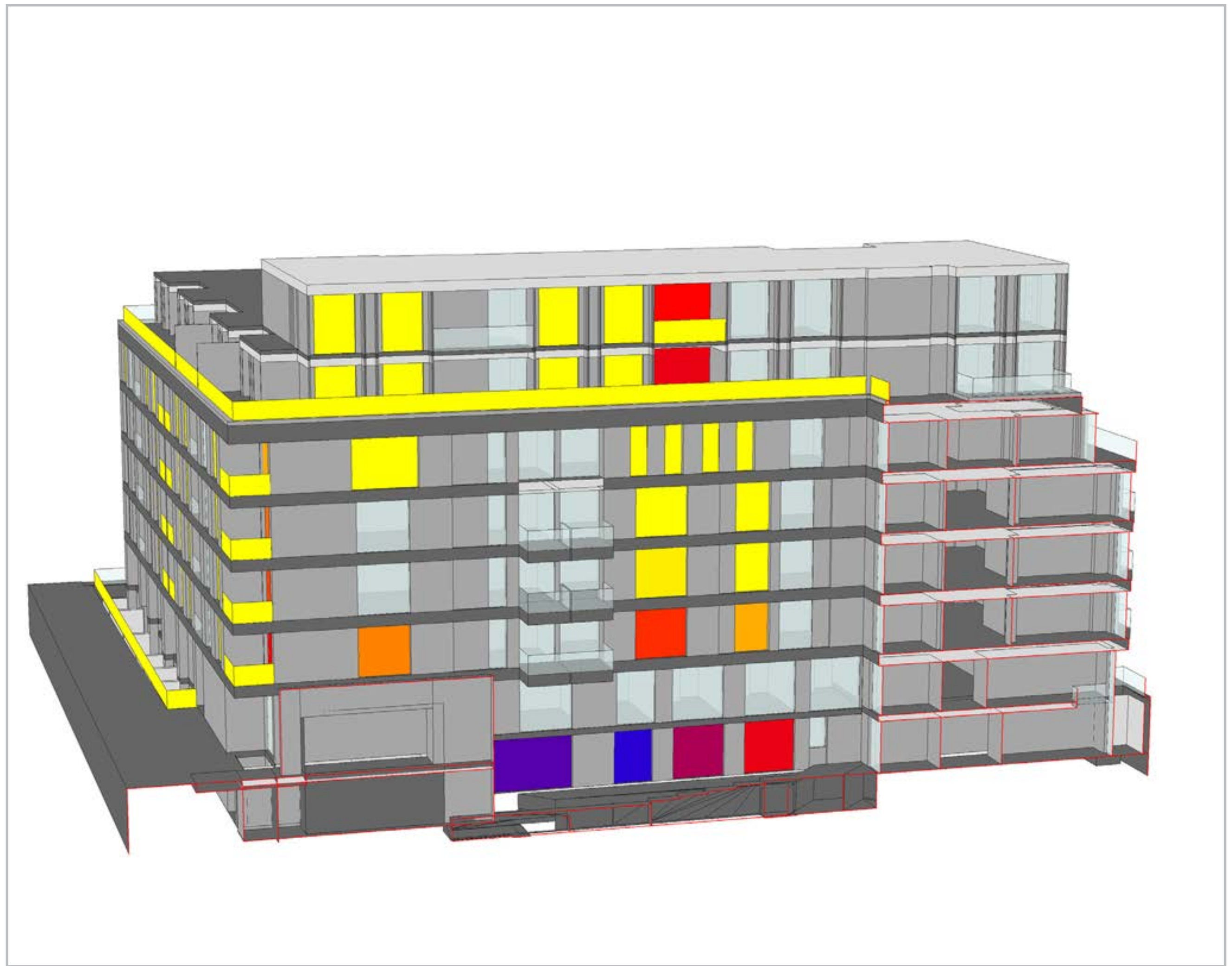


Figure 21: Annual Probable Sunlight Hours - Total

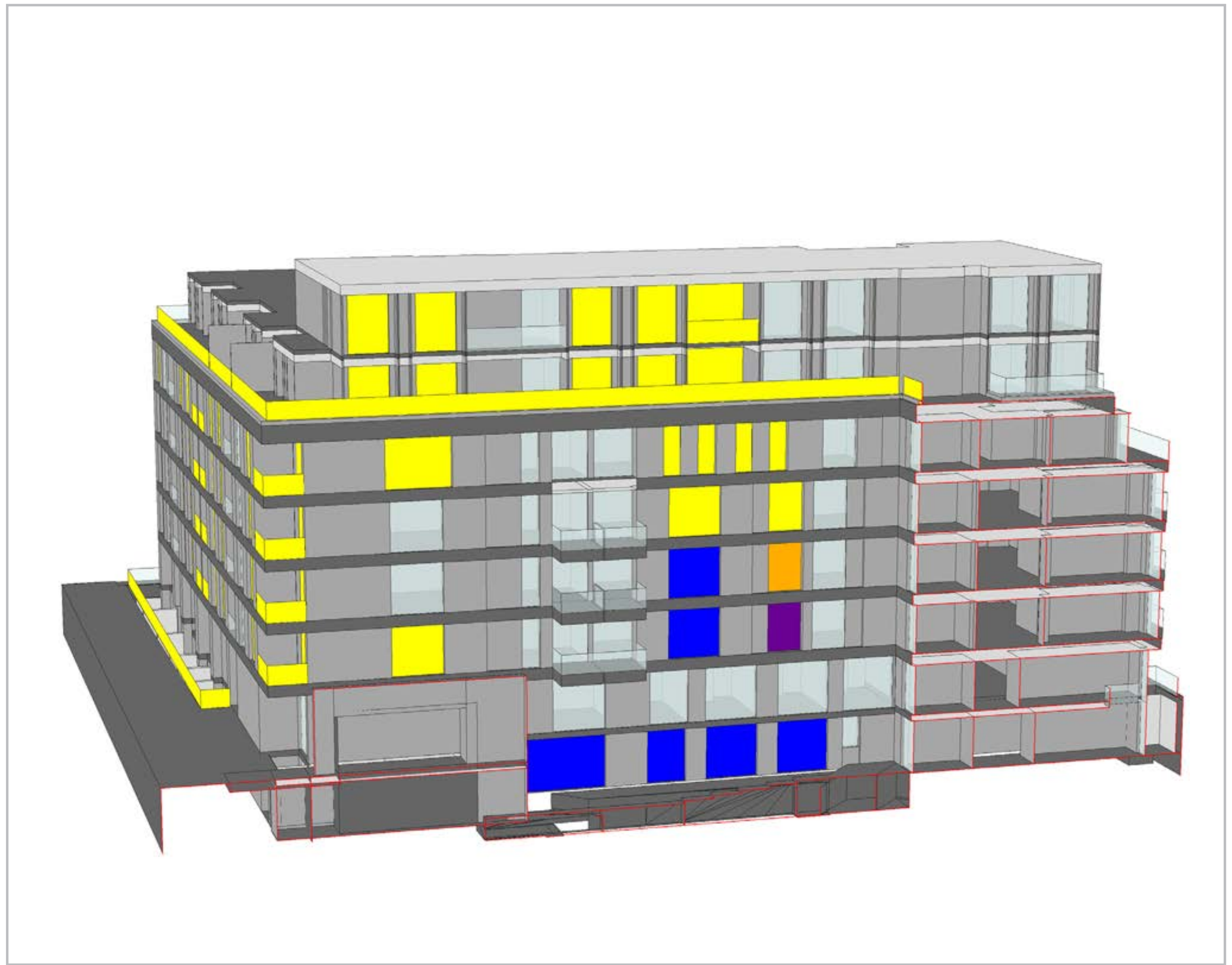
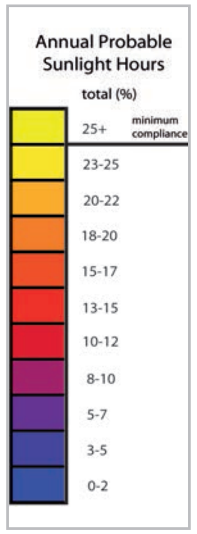


Figure 22: Annual Probable Sunlight Hours - Winter



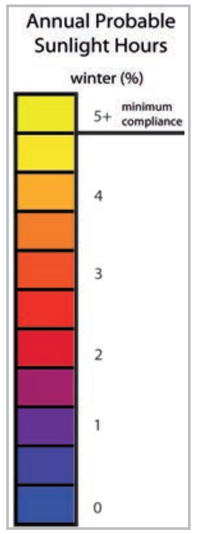


Figure 23: Annual Probable Sunlight Hours - Total

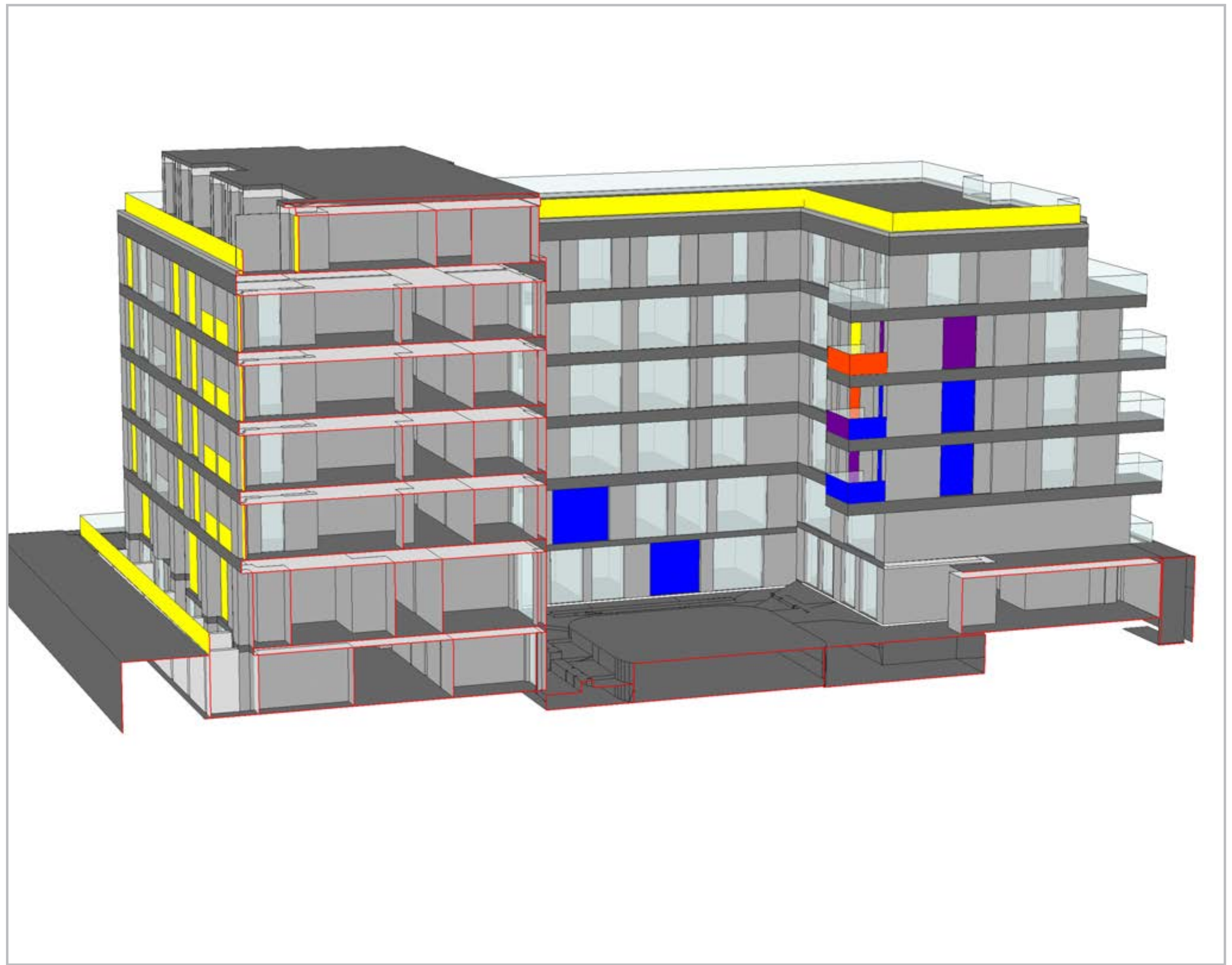
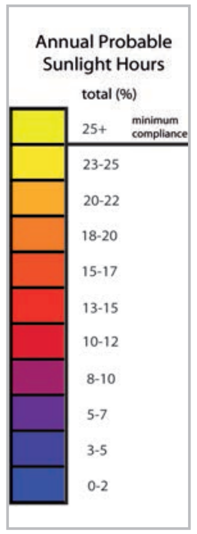


Figure 24: Annual Probable Sunlight Hours - Winter



Overshadowing Assessments

BRE Sun Hours on Ground Assessment - 21st March (equinox)

Figure 26: Site Plan

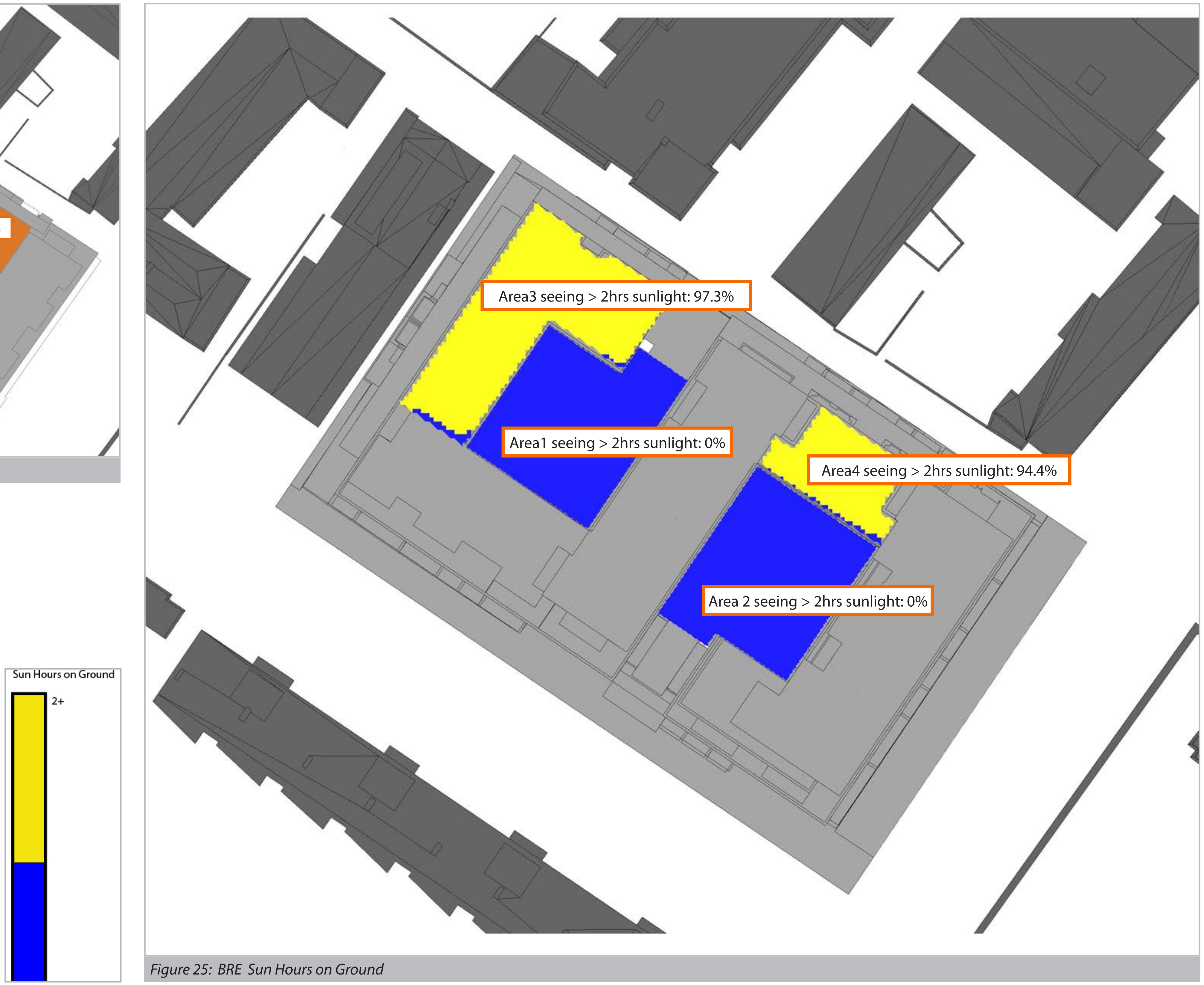


Figure 25: BRE Sun Hours on Ground

Figure 27: Site Plan

21st March
(Spring Equinox)

London

Latitude
51.4
Longitude
0.0

Sunrise
06:08 GMT
Sunset
18:05 GMT

Total Available Sunlight
11hrs 57mins

Sun Exposure

total hours

6.0+
5.4
4.8
4.2
3.6
3.0
2.4
1.8
1.2
0.6
0.0

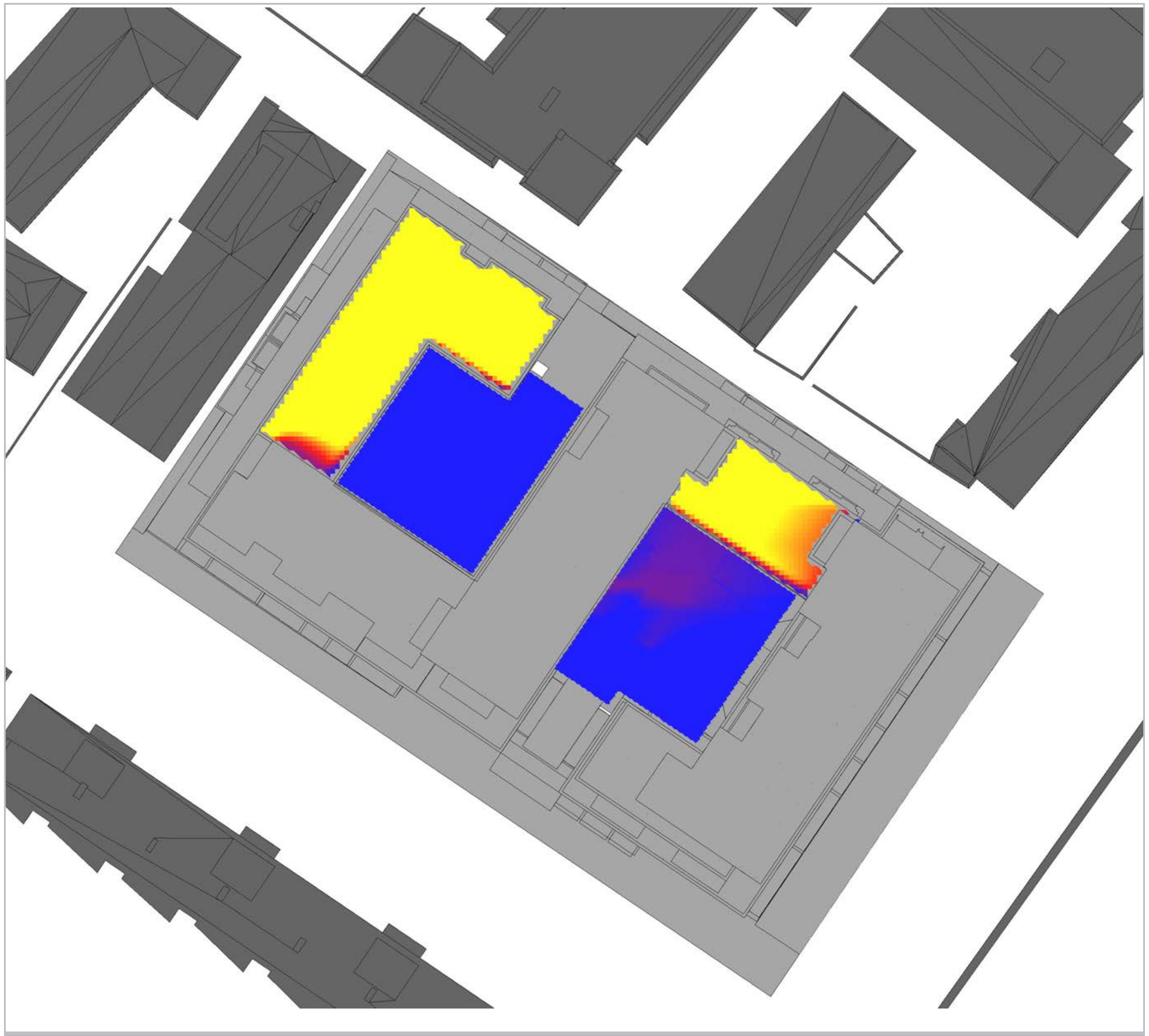


Figure 28: Sun Exposure 21st March

Sun Exposure Assessment - 21st June (summer solstice)

Figure 29: Site Plan

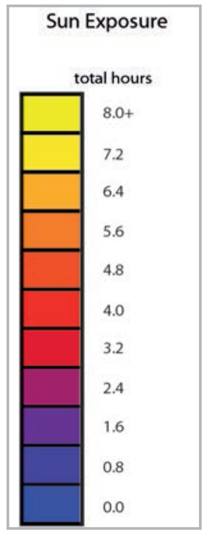
21st June
(Summer Solstice)

London

Latitude
51.4
Longitude
0.0

Sunrise
03:50 GMT
Sunset
20:13 GMT

Total Available Sunlight
16hrs 23mins



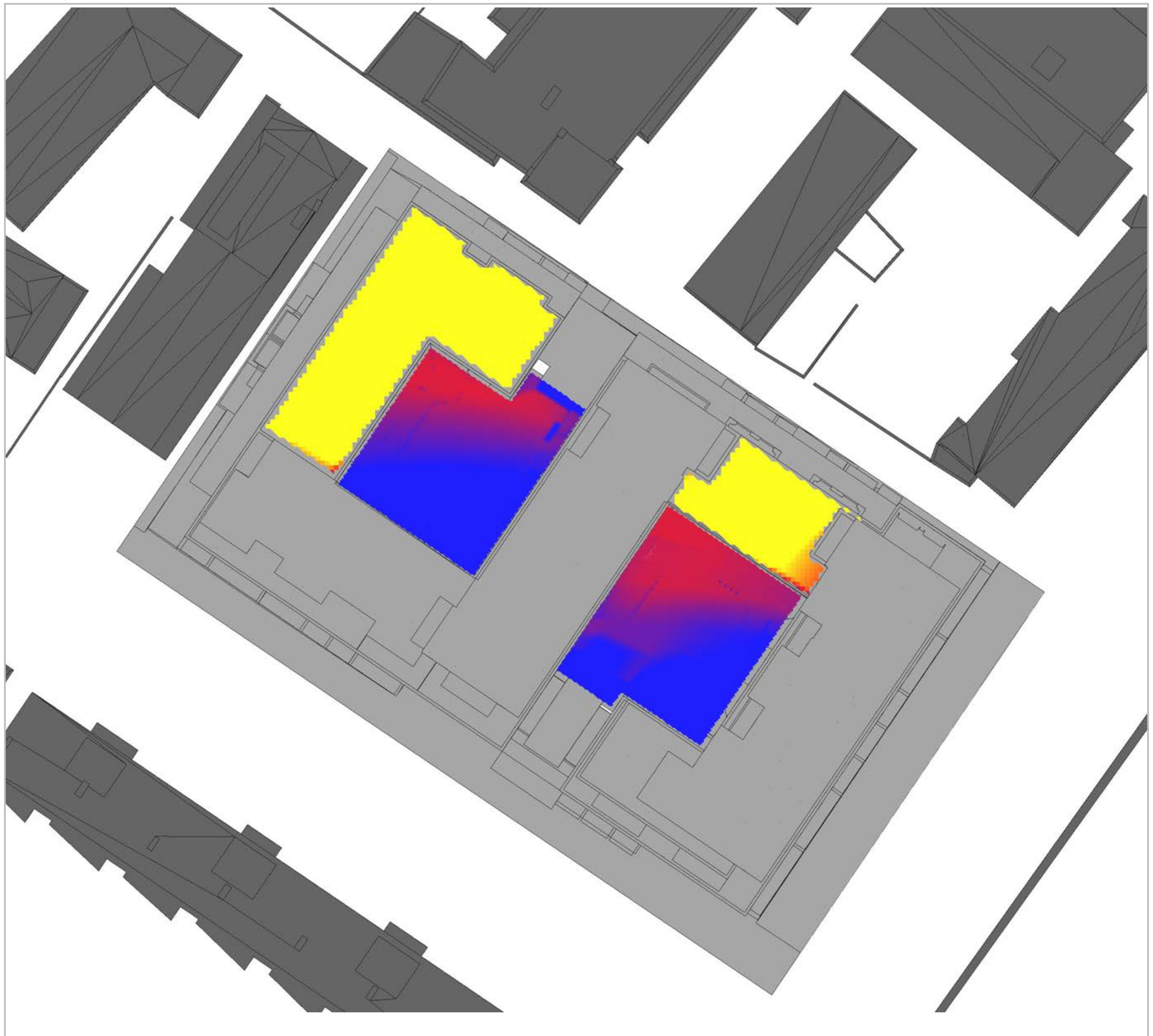


Figure 30: Sun Exposure 21st June