Cundy Street Quarter

Internal Daylight, Sunlight and Overshadowing Report

Prepared by GIA

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GROSVENOR

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1 EXECUTIVE SUMMARY

1.1 EXECUTIVE SUMMARY

The purpose of this report is to ascertain whether the proposed development will provide residential accommodation considered acceptable in terms of daylight and sunlight. Contained within this report are the final assessments undertaken for all proposed residential units within buildings A, B and C of the Cundy Street Quarter scheme.

The architecture and massing of this scheme respond directly to the area's character and heritage, successfully rebuilding the historic streetscape. In historic areas such as this, as well as in an urban context, the National Planning Policy Framework (NPPF) calls for making the best use of land possible with the aim of delivering much needed residential accommodation.

It is against this background that both BRE Guidelines and the Housing SPG call for contextually appropriate daylight and sunlight targets, as opposed to measuring a development's performance based on nationally applicable numerical targets which are less suitable in denser urban environments.

Further to the above, any contemporary development has a duty to consider all manners of sustainability measures to avoid overheating and reduce its energy consumption all the while balancing daylight and sunlight amenity.

Further information can be found in sections 3 and 6 of this report.

Having taken the above into consideration, GIA have worked alongside DSDHA in an iterative process to optimise the design in terms of daylight and sunlight. This optimisation process consisted in improvements on the massing, the façade and the internal layouts. This process is described further in Section 6.1 of this report.

All habitable rooms within the Proposed Development have been technically assessed for daylight quantity (Average Daylight Factor or ADF) and distribution (No Sky Line or NSL and Room Depth Criterion or RDC). In addition, all living areas with a southerly aspect have been assessed for sunlight availability both annually (Annual Probable Sunlight Hours or APSH) and in winter (Winter Probable Sunlight Hours or WPSH). Finally, the exterior amenity spaces within the site have been assessed for overshadowing through the Sun Hours on Ground (SHOG) metric. Detailed results are shown in Sections 8 and 9 of this report.

Overall, the Cundy Street Quarter development performs well in terms of daylight and sunlight and in-line with what is expected from a scheme in a historic, urban context. Further explanation of the performance of the scheme can be found in Sections 6.3 and 6.4 of this report.

In relation to overshadowing, the overall sunlight availability for the development is very good and, in our opinion, exceeding expectations for a historic site within a densely-built environment. The future occupants of the scheme will enjoy excellent sunlight levels in the ground-floor open space and the five south-facing communal terraces within the site.

We therefore conclude that the proposed scheme delivers good overall daylight and sunlight amenity.

2 INTRODUCTION

2.1 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 DSDHA. GIA was specifically instructed to carry out the following:

- To create a 3D computer model of the proposal based upon drawings prepared by DSDHA.
- Carry out a daylight assessment using the methodologies set out in the BRE guidance for Average Daylight Factor, No-Sky Line and Room Depth Criterion.
- Carry out a sunlight assessment using the methodologies set out in the BRE guidance for Annual Probable Sunlight Hours (APSH) to the fenestration facing within 90° of due south.
- Carry out an overshadowing assessment using the methodology set out in the BRE guidance for Sun Hours On Ground (SHOG) for all relevant amenity areas.
- Prepare a report setting out the analysis and our findings.

3 RELEVANT PLANNING POLICY

3.1 NATIONAL PLANNING POLICY

Revised National Planning Policy Framework (2019)

The National Planning Policy Framework was revised in June 2019 and paragraph 123, part C stipulates that *"...local planning authorities should refuse applications which they consider fail to make efficient use of land, taking into account the policies in this Framework. In this context, when considering applications for housing, authorities should take a flexible approach in applying policies or guidance relating to daylight and sunlight, where they would otherwise inhibit making efficient use of a site."*

Planning Practice Guidance (2019 update)

Paragraph 6 of the section '*Effective use of land*' states that *"Where a planning application is submitted, local planning authorities will need to consider whether the proposed development would have an unreasonable impact on the daylight and sunlight levels enjoyed by neighbouring occupiers, as well as assessing whether daylight and sunlight within the development itself will provide satisfactory living conditions for future occupants. [...]"*

Paragraph 7 states that *"All developments should maintain acceptable living standards. What this means in practice, in relation to assessing appropriate levels of sunlight and daylight, will depend to some extent on the context for the development as well as its detailed design. For example, in areas of high-density historic buildings, or city centre locations where tall modern buildings predominate, lower daylight and daylight and sunlight levels at some windows may be unavoidable if new developments are to be in keeping with the general form of their surroundings.*

In such situations good design (such as giving careful consideration to a building's massing and layout of habitable rooms) will be necessary to help make the best use of the site and maintain acceptable living standards.

REGIONAL PLANNING POLICY

The Greater London Authority (GLA): The London Plan – Spatial Development Strategy for Greater London Consolidated with Alterations Since 2011 (March 2016)

Policy 7.6 Architecture states that : *"...buildings and structures should...not cause unacceptable harm to the amenity of surrounding land and buildings, particularly residential buildings, in relation to privacy, overshadowing, wind and micro-climate."*

- Policy 7.7, Locatiotion and Design of tall buildings, notes that large buildings should not adversely affect their surroundings in terms of overshadowing and solar reflected glare: *"Location and design of tall buildings should not affect their surroundings adversely in terms of microclimate, wind turbulence, overshadowing, noise, reflected glare, aviation, navigation and telecommunication interference."*

The Greater London Authority (GLA): The London Plan Intend to Publish – Spatial Development Strategy for Greater London (December 2019)

Whilst not adopted, the policies within the Intend to publish London Plan have been taken into consideration throughout where relevant.

- Policy D6, Housing quality and housing *states: "The design of development should provide sufficient daylight and sunlight to new and surrounding housing that is appropriate for its context, whilst avoiding overheating, minimising overshadowing and maximising the usability of outside amenity space".*
- Policy D9, Tall Housing, *states that "...development proposals should address the following impacts: ...buildings should not cause adverse reflected glare [and] ...buildings should be designed to minimise light pollution from internal and external lighting." It continues that "wind, daylight, sunlight penetration and temperature conditions around the building(s) and neighbourhood must be carefully considered and not compromise comfort and the enjoyment of open spaces, including water spaces, around the building".*

GLA: Housing Supplementary Planning Guidance (March 2016)

The SPG draws on the London Plan, primarily the relevant policy 7.6Bd, and provides further guidance on standards to daylight and sunlight.

Paragraph 1.3.45 of the guidance states that *"an appropriate degree of flexibility needs to be applied when using BRE guidelines to assess the daylight and sunlight impacts of new development on surrounding properties, as well as within new developments themselves."*

The paragraph continues *"guidelines should be applied sensitively to higher density development...*

where BRE advice suggests considering the use of alternative targets' taking in to account the 'local circumstances; the need to optimise housing capacity; and scope for character and form of an area to change over time."

GLA: Sustainable Design and Construction Supplementary Planning Guidance (2014)

Section 2.3 of the SPG provides guidance on key areas such as site layout and micro-climate in relation to site layout and building design.

With regard to site layout, paragraph 2.3.6 refers to measures to reduce carbon dioxide emissions *"include enabling access to daylight and sunlight for uses that require [light]."* In addition, the guidance states that *"site planning can minimise the impact of the shadow created by the new buildings to protect existing features such as open space and renewable solar technologies on roofs."* It goes on to say that *"developers should ensure the layout of their site and buildings maximises the opportunities provided by natural systems, such as light."*

Paragraph 2.3.8 of the SPG continues with effects on the micro-climate caused by new buildings which include *"overshadowing and reducing access to sunlight."*

The guidance states that the above effects should *"be considered during the design of a development and assessed once the designed is finalised."*

3.2 LOCAL PLANNING POLICY

Unitary Development Plan (UDP) 'Saved Policies' (2007)

Chapter 9, policy ENV 13 states that *"The City Council will ensure that both new and replacement accommodation, particularly residential, receives adequate daylight and sunlight."* Policy 9.228 further states that *"That will include maintaining and improving the amount of daylight and sunlight reaching buildings, particularly housing."* and that *"New buildings should also be designed to ensure that future occupants will enjoy adequate levels of daylight and sunlight."*

4 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)' (BRE BR209), guidelines and methodology for the measurement and assessment of daylight and sunlight within proposed buildings.

This document states that it is intended to be used in conjunction with the 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. 1999).

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 and states that its 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 also acknowledges 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.

In May 2019 the British Standard BS8206-2:2008 was superseded by the new European Standard on daylight "BS EN 17037:2018 Daylight in buildings". The Standard adopts a new methodology for testing daylight and sunlight in proposed developments based on climatic data as opposed the 'Standard CIE overcast sky' adopted in BS8206-2:2008, and also includes views out and glare.

Following on from the review of the European Standard by a dedicated commission of UK experts (which included the author of the BRE BR209 guidance Dr. Paul Littlefair), the British Standard Institution appended to BS EN 17037:2018 a UK National Annex which brings the recommended light levels in-line with those of BS8206-2:2008.

BRE is currently looking to update and re-publish BR209 to align their guidance with the new BS EN 17037:2018 in 2020. Until then, the position of BRE can be summarised from a post by Dr. Littlefair on the LinkedIn Planning Daylight & Sunlight Group (BRE BR209): *"Until BR 209 is rewritten, we are adopting a flexible approach to applying the two standards, for example in assessing the daylight and sunlight available in new buildings. So, for example, if we were reviewing a daylight report for a local authority, we would consider it reasonable to accept either average daylight factor tables using BS 8206 or median daylight factors/median illuminance calculated using EN 17037, provided they were calculated and presented properly"*.

Given the above and the reference to the BRE guidance in planning policies, the assessments within this report are carried out with the criteria and methodologies set out in BRE BR209 and BS8206-2:2008. It is not considered that calculations undertaken according to BS EN 17037:2018 would alter the conclusions meaningfully.

4.1 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. These are summarised below.

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 Code of practice for daylighting (BS 8206-2) and the CIBSE Lighting Guide LG 10 Daylighting and window design contain advice and guidance on interior daylighting. The guidance contained in this publication (BR 209) is intended to be used with BS 8206-2 and LG 10. Both these publications refer to BR 209.

For skylight BS 8206-2 and LG 10 put forward three main criteria, based on average daylight factor (ADF); room depth; and the position of the no sky line."

These assessments are set out below.

Average Daylight Factor (ADF)

"If a predominantly daylit appearance is required, then the ADF 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 additional recommendations are minimum values of ADF which should be attained even if a predominantly daylit appearance is not achievable."

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.

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.

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 (normally more than 20%) lies beyond the no sky line (ie 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 Part 2 2008.

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.

4.2 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 properties, 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. Furthermore, 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.

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 for 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"*.

4.3 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)*
- *make outdoor activities, like sitting out and children's play more pleasant (mainly warmer months)*
- *encourage plant growth (mainly spring and summer)*
- *dry out the ground, reducing moss and slime (mainly in colder months)*
- *melt frost, ice and snow (in winter)*
- *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."

4.4 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 65° (obstruction angle less than 25° or VSC at least 27 percent) conventional window design will usually give reasonable results.

If 'theta' is between 45° and 65° (obstruction angle between 25° and 45°, 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 25° and 45° (obstruction angle between 45° and 65°, 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 25° (obstruction angle more than 65°, VSC less than 5 percent) it is often impossible to achieve reasonable daylight, even if the whole window wall is glazed."

5 METHODOLOGY

In order to undertake the daylight and sunlight assessments set out in the previous pages, 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 DSDHA. 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.

5.1 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.

For the purpose of this assessment, a visible light transmittance of 0.65 was used for all glazing, as well as a light veneer for the internal floors, as specified by DSDHA.

Table 01: Typical reflectance, transmittance and maintenance factors

REFLECTANCE VALUES:	
Surrounding	0.2
Pavement	0.2
Grass	0.1
Water	0.1
Yellow brick	0.3
Red brick	0.2
Portland Stone	0.6
Concrete	0.4
Internal walls (light grey)	0.68
Internal ceiling (white paint)	0.85
Internal floor (medium veneer)	0.3
Internal floor (light veneer)	0.4

TRANSMITTANCE VALUES	TV
Triple glazing (Low-E): Pilkington K Glass 4/12/4/12/4 Argon filled 90%	0.63
Double glazing (Low-E): Pilkington K Glass 4/16/4 Argon filled 90%	0.75
Single glazing: Pilkington Optifloat Clear 4mm Annealed	0.90
Translucent glazing (Low-E): Pilkington Optifloat Opal - 4mm K /16/4mm Opal	0.74

MAINTENANCE FACTORS: GLAZING TYPE	TV (Normal)	A.3	A.4	A.5	A.6	TV (Total)
Triple Low-E (frames modelled)	0.63	8	1	1	1	0.58
Triple Low-E (frames not modelled)	0.63	8	1	1	0.8	0.46
Triple Low-E (inclined, frames modelled)	0.63	8	2	1	1	0.53
Triple Low-E (inclined, frames not modelled)	0.63	8	2	1	0.8	0.42
Triple Low-E (horizontal, frames modelled)	0.63	8	3	1	1	0.48
Triple Low-E (horizontal, frames not modelled)	0.63	8	3	1	0.8	0.38
Double Low-E (frames modelled)	0.65	8	1	1	1	0.65
Double Low-E (frames not modelled)	0.65	8	1	1	0.8	0.52
Double Low-E (inclined, frames modelled)	0.65	8	2	1	1	0.60
Double Low-E (inclined, frames not modelled)	0.65	8	2	1	0.8	0.48
Double Low-E (horizontal, frames modelled)	0.65	8	3	1	1	0.54
Double Low-E (horizontal, frames not modelled)	0.65	8	3	1	0.8	0.43
Single (frames modelled)	0.9	8	1	1	1	0.83
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
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
Single (horizontal, frames not modelled)	0.9	8	3	1	0.8	0.55
Double Translucent Low-E (frames modelled)	0.74	8	1	1	1	0.68
Double Translucent Low-E (frames not modelled)	0.74	8	1	1	0.8	0.54
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
Double Translucent Low-E (horizontal, frames modelled)	0.74	8	3	1	1	0.56
Double Translucent Low-E (horizontal, frames not modelled)	0.74	8	3	1	0.8	0.45

6 CONCLUSIONS

From the start of the development of Belgravia in the early 19th Century, the area has maintained a very strong sense of urban and architectural unity, characterised by stately town houses and garden squares. With more than 1,500 listed buildings, a large section of Belgravia lies within a conservation area, in order to maintain its unique character.

Today, we are faced with a real challenge when designing new buildings that aim to fit within an historic city centre whilst meeting a wide range of efficiency targets that become paramount given the current climatic crisis. Achieving these targets often means balancing somewhat competing strategies, amongst which housing typology and urban characteristics like density and proximity, or overheating and energy efficiency, which will require smaller windows with solar coatings that in turn will allow less daylight into the spaces.

In this context, lower light levels are a natural consequence of balancing different design constraints. This is acknowledged by BRE, which explains the advisory nature of the BRE Guidelines in section 1.6 of its handbook:

"The advice given here is not mandatory and the guide should not be seen as an instrument of planning policy. ... Although it gives numerical guidelines, these should be interpreted flexibly since natural lighting is only one of many factors in site layout design. In special circumstances the developer or planning authority may wish to use different target values. For example, in a historic city centre... a higher degree of obstruction may be unavoidable if new developments are to match the height and proportions of existing buildings."

As mentioned in Section 3 of this report, the NPPF further states the following (p37 para 123):

"When considering applications for housing, authorities should take a flexible approach in applying policies or guidance relating to daylight and sunlight, where they would otherwise inhibit making efficient use of a site."

The Housing SPG also agrees to the flexible and contextual approach regarding the guidance (CD-B12):

"An appropriate degree of flexibility needs to be applied when using BRE Guidelines"

"The degree of harm on adjacent properties and the daylight targets within a proposed scheme should be assessed drawing on broadly comparable residential typologies within the area and of a similar nature across London"

The results presented in this report are therefore not meant to be interpreted as a strict pass/fail test based on a nation-wide applicable target, they should instead be appreciated considering the historic context, density and character of the development typology and site.

All habitable rooms within the Proposed Development have been technically assessed for daylight quantity (Average Daylight Factor or ADF) and distribution (No Sky Line or NSL and Room Depth Criterion or RDC). In addition, all living areas with a southerly aspect have been assessed for sunlight availability both annually (Annual Probable Sunlight Hours or APSH) and in winter (Winter Probable Sunlight Hours or WPSH). Finally, the exterior amenity spaces within the site been assessed for overshadowing through the Sun Hours on Ground metric. The results can be found in Sections 8 and 9 of this report and are discussed in detail below.

6.1 CONCLUSIONS ON DAYLIGHT

As mentioned above, GIA have worked alongside DSDHA in an iterative process to optimise the design in terms of daylight and sunlight. This optimisation process consisted in improvements on the massing, the façade and the internal layouts.

Regarding the massing, several proposals were tested and the following key moves were made: The width of Building A was reduced and the distance between wings increased, thus increasing the area of the courtyard and allowing greater levels of daylight to reach the internal façades. Moreover, Building B has been modified from an enclosed courtyard massing to an open C-shaped building, thus reducing its overshadowing and creating a larger exterior amenity space (See Figure 1).

The façade optimisation took advantage of a careful dialogue between the overheating and daylight specialists. For Building C, which has a wide south-facing façade, the window sizes on Ebury Street and Elizabeth Place were increased (see Figure 2), and the overhang depth reduced (See Figure 3), to allow as much daylight in the spaces whilst avoiding

direct sunlight during summer. Further strategies were implemented, such as dual-aspect and through flats, which facilitate natural ventilation and provide better views.

As for the internal layouts, a clear hierarchy was defined to place living areas in locations with the highest availability of daylight and sunlight, as this is where the occupants are mostly going to spend their time and therefore have higher daylight expectations. To this end, balconies were located above bedrooms, whilst kitchens were set to the rear end of the Living/Kitchen/Dining Rooms (LKDs). These and other design strategies resulted in a scheme with makes the most out of the site's available daylight and sunlight.

However, this scheme has other strong attributes that simultaneously cause lower light levels and balance this loss. Primarily, the proposal follows a mansion block typology which is typical of the area and contributes to the historic urban identity of Belgravia. Moreover, by having large internal courtyards, the occupants will be able to enjoy high quality external amenity, both at ground level as accessible open spaces and visually from their flats (See Figures 4 and 5). The scheme also enjoys prime views of the surrounding open areas and streetscape, for example the expected location of the communal living areas of the Senior Living in Building A which would enjoy direct views of Ebury Square Gardens. This is also the case for Building B, where the flats have a large arched terrace that provides depth and texture to the façade, while offering views of external gardens and the streetscape around Pimlico Road.

Regarding the daylight performance of the scheme as a whole, 469 (67%) out of the 702 rooms have Average Daylight Factor (ADF) levels at or above those recommended by the BRE Guidelines. However, out of the 41 Living/Kitchen/Dining Rooms (LKDs) that are not meeting the 2% ADF criteria recommended for rooms including a kitchen, 17 still meet the 1.5% ADF criteria for Living Rooms, which is where occupants are expected to spend most of their time. Furthermore, 90 of the rooms that fall short of recommendations do so only marginally, by either 0.1 or 0.2% ADF, and are still considered to be acceptably daylit, especially within the historic urban setting. As such, 559 (80%) out of the 702 total assessed rooms would be considered accepably daylit considering the context and scale of the development.

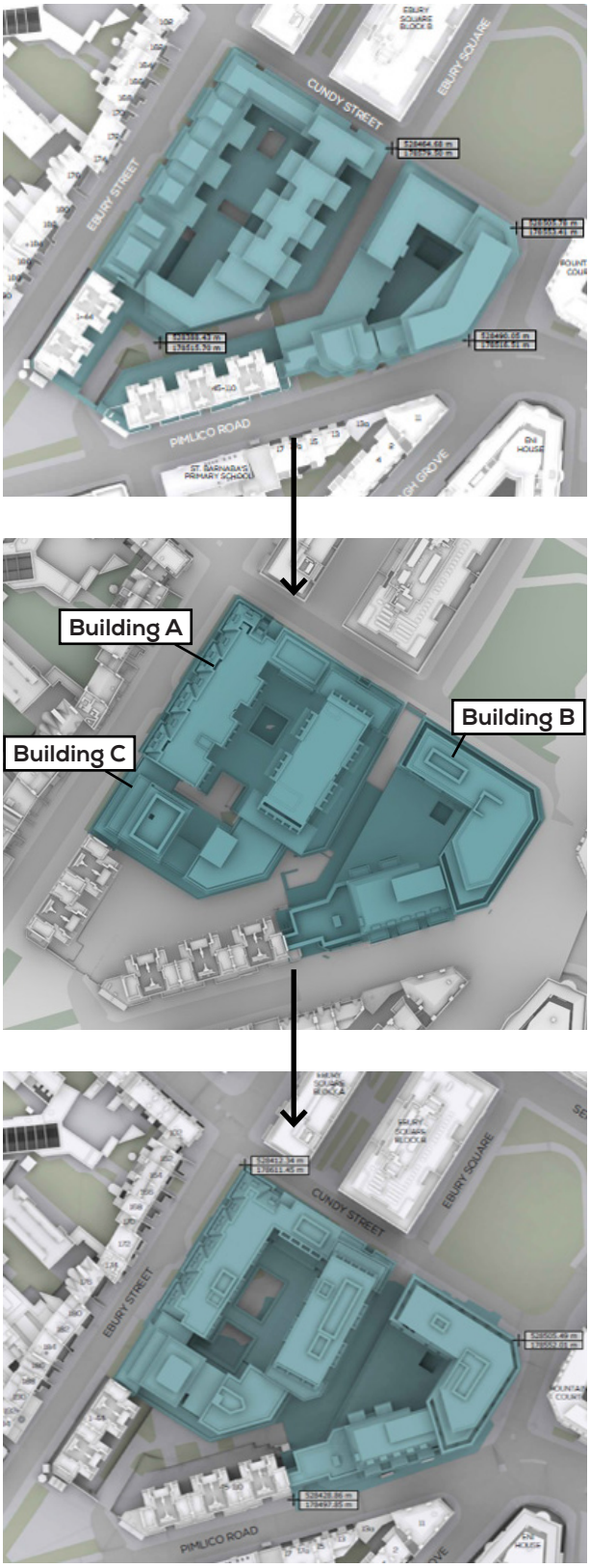


Fig. 01: Design iterations - Massing optimisation

Fig. 02: Design iterations - Increase in window sizes

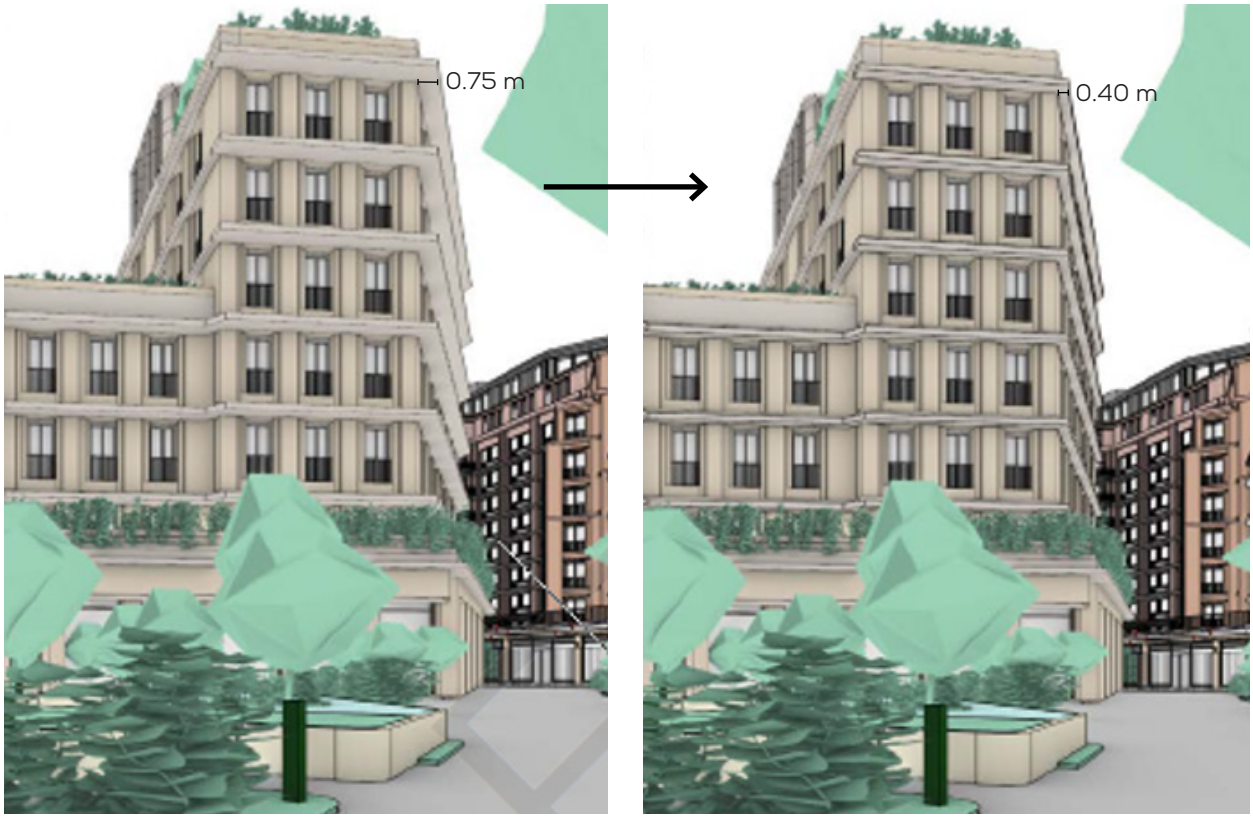


Fig. 03: Design iterations - Reduction of overhang sizes

As for light distribution, 487 (69%) of the 702 rooms meet or exceed BRE's recommendation for NSL and all applicable rooms were designed in accordance with BRE's RDC.

Conclusions for each of the assessed buildings are presented below.

Building A

This building contains the Senior Living accomodation, in which most floors are expected to be characterised by one large communal living area and an array of bedroom suites.

Building A sees 183 (92%) out of its 199 habitable rooms meet or exceed the ADF criteria, and 132 (66%) meeting the guidelines for NSL.

In this building, one LKD still meets the ADF criteria for living rooms, while 10 rooms fail only marginally (by 0.1 and 0.2%), achieving a total of 194 (98%) out of 199 rooms with acceptable levels of daylight.

Two of the three communal living rooms still below the ADF targets are the large living areas of the Senior Living, located on the lowest two floors. These spaces are large, multi-use areas that have ample windows with unobstructed views of both the courtyard and Ebury Square Gardens. In such large areas, it is generally difficult to obtain high levels of light in the centre of the room, whilst the perimeter near the windows will receive plenty of daylight. The remaining living room, as well as the only bedroom falling short of recommendation, are both slightly obstructed by the massing of Building B.

Building B

This building sees 205 (57%) out of its 357 habitable rooms meet or exceed the BRE criteria for ADF, whilst 264 (74%) of its rooms do so for NSL.

As explained previously, context should be considered when assessing daylight performance. In Building B, 12 out of the 27 LKDs falling short of guidance still meet the BRE criteria for Living Rooms, whilst 53 bedroms and living rooms are only falling marginally short of guidance. In this case, a total of 258 (72%) out of 357 rooms are considered to be acceptably daylit when taking the scheme's setting into account.

Out of those rooms in Building B below recommended levels, some facing Pimlico Road offer generous balconies, which is a common trade-off of amenity which enriches the quality of the architecture and its surrounding context. Other rooms fall short because they face the internal courtyard, however, they enjoy high quality views of this large landscaped amenity. The presence of balconies is also addressing one of the auspices of GLA's Housing Design Guidance.

Building C

Out of the 146 habitable rooms in Building C, 81 (56%) meet or exceed the BRE recommended levels for ADF, while 91 (62%) do so for NSL.

In this building, 4 LKDs which fall short of the BRE criterion for kitchens, do meet the criterion for living rooms, while 26 living rooms and bedrooms fall only marginally short of recommendations, by either 0.1 or 0.2%.In this case, a total of 107 (73%) out of 146 rooms can be considered as acceptably daylit, when taking context into account.

Out of the 39 rooms below recommended levels in Building C, 24 are located on the lowest two floors, and, as was the case with Building B, they are obstructed by the surrounding context as it is typical of central London. The remaining rooms fail to achieve the recommended levels of daylight mainly to balance the overheating requirements or because windows face into courtyards.

Overall, the Cundy Street Quarter development performs well in terms of daylight, in-line with what is expected from a scheme in a similar context.

6.2 CONCLUSIONS ON SUNLIGHT

BRE states that sunlight is most appreciated in living areas and the greatest expectation of sunlight is within south facing rooms. Therefore, Annual Probable Sunlight Hours (APSH) assessments have been undertaken for all of the living rooms with a window facing within 90 degrees of due south.

Overall, 101 (67%) out of the 151 south-facing living rooms of the scheme meet both the annual and winter recommendations. 102 (68%) of the living rooms assessed meet the recommendation annually (APSH) and 121 (80%) in winter (WPSH).

Fig. 04: View from Elizabeth Place looking toward Buildings A and C

Conclusions for each of the assessed buildings are presented below.

Building A

Out of the 28 south-facing living rooms of Building A, 21 (75%) meet both the annual and the winter recommendation. 21 (75%) meet the APSH recommendation, while 23 (82%) meet the WPSH recommendation.

Of the seven rooms below the annual recommendation, three have their main windows directly below a terrace overlooking the main courtyard of Building A, whilst the remaining four are mainly obstructed by the massing of Building B. Moreover, two of those rooms will still get the recommended levels of sunlight during the winter period, which is when they are mostly appreciated.

Building B

In Building B, 52 (58%) out of the 89 south-facing living rooms meet both annual and summer recommended sunlight levels. 52 (58%) of the living rooms assessed meet the recommendation annually and 69 (78%) do so in winter.

Out of the 37 rooms below the recommended annual levels, 17 meet the winter recommendation and will receive direct sunlight during the coldest period of the year. Of the remaining 20 rooms, as it is the case with the daylight, nine are in the lowest floors and are obstructed by the surrounding context, eight are located inside corners of the courtyard and three are located below balconies. However, all of these properties will have direct access to large courtyards, open spaces and terraces on site, where they would be able to enjoy direct sunlight.

Building C

Out of the 34 south-facing living rooms in Building C, 28 (82%) meet both the annual and the winter sunlight recommendation. 29 (85%) of these rooms meet the annual recommendation, whilst also 29 (85%) do so during the winter period.

Of the six rooms that are below either the summer or the winter recommendations, five of them are

Fig. 05: View towards Orange Square from Building C

located on the lowest two floors of the building and are therefore heavily obstructed. The remaining room below recommendation is an LKD facing the internal courtyard façade, which in turn is a dual-aspect room and has direct views to the internal courtyards of Buildings A and C.

Overall, we can conclude that the scheme will perform well in terms of sunlight, considering the courtyard housing typology and surrounding context.

6.3 CONCLUSIONS ON OVERSHADOWING

BRE recommends that, in order for an outdoor space to be well sunlit throughout the year, at least 50% of its area should receive direct sunlight for two hours or more on 21 March. This assessment has included all exterior amenity within the site where there would be an expectation of sunlight, and comprises two main courtyards, one external ground-floor open space, two public squares and five communal terraces.

In courtyard arrangements, the sunlight availability at ground level is typically restricted in winter and mid-season, as the massing intercepts lower-angle sunlight. For this reason, both courtyards present in the scheme would see levels of sunlight below those recommended by the BRE. This is also the case for the ground-floor open space given its location between the buildings, although falling only slightly short of guidance. However, as can be appreciated in the sun exposure diagrams on pages 71 to 74 of this report, they would receive plenty of sunlight in the spring and summer months, when the areas are more likely to be used. These fully landscaped areas will provide excellent visual amenity year round as it is visible in Figures 04 and 05.

Ebury Square, Orange Square and the five south-facing terraces above the buildings perform very well in terms of sunlight, exceeding BRE's recommendation on 21 March and receiving in excess of 6 hours of direct sunlight during the month of June in all but one of the terraces.

In conclusion, although some areas fall slightly short of BRE's recommendation, this would give future residents a choice should they wish to avoid direct sunlight and is in-line with expectations for courtyards within a densely-built environment, and the occupants of the scheme will be able to enjoy excellent sunlight levels in both squares and the many other external amenity spaces offered by the scheme.

7 SITE OVERVIEW

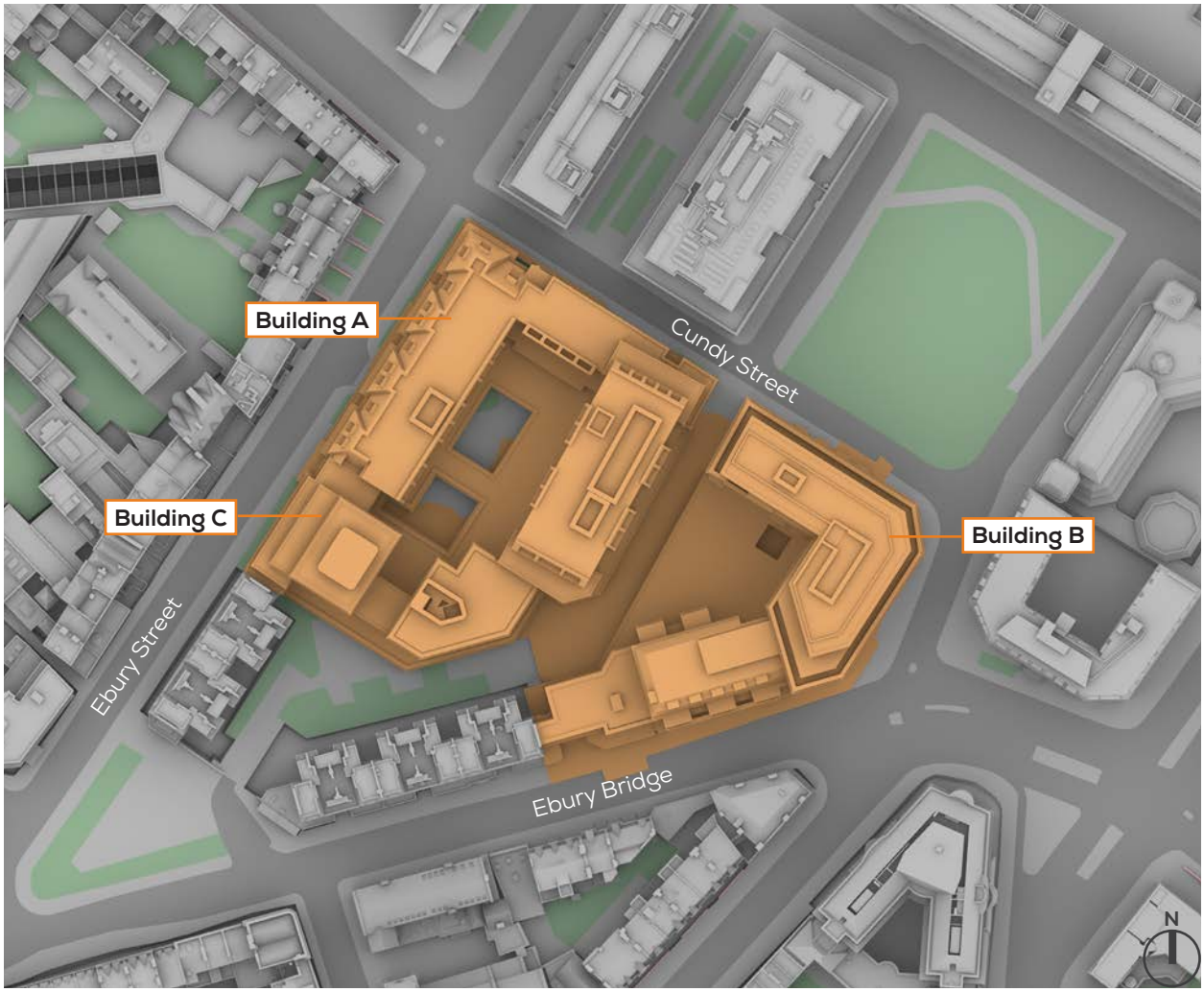


Fig. 06: Top view

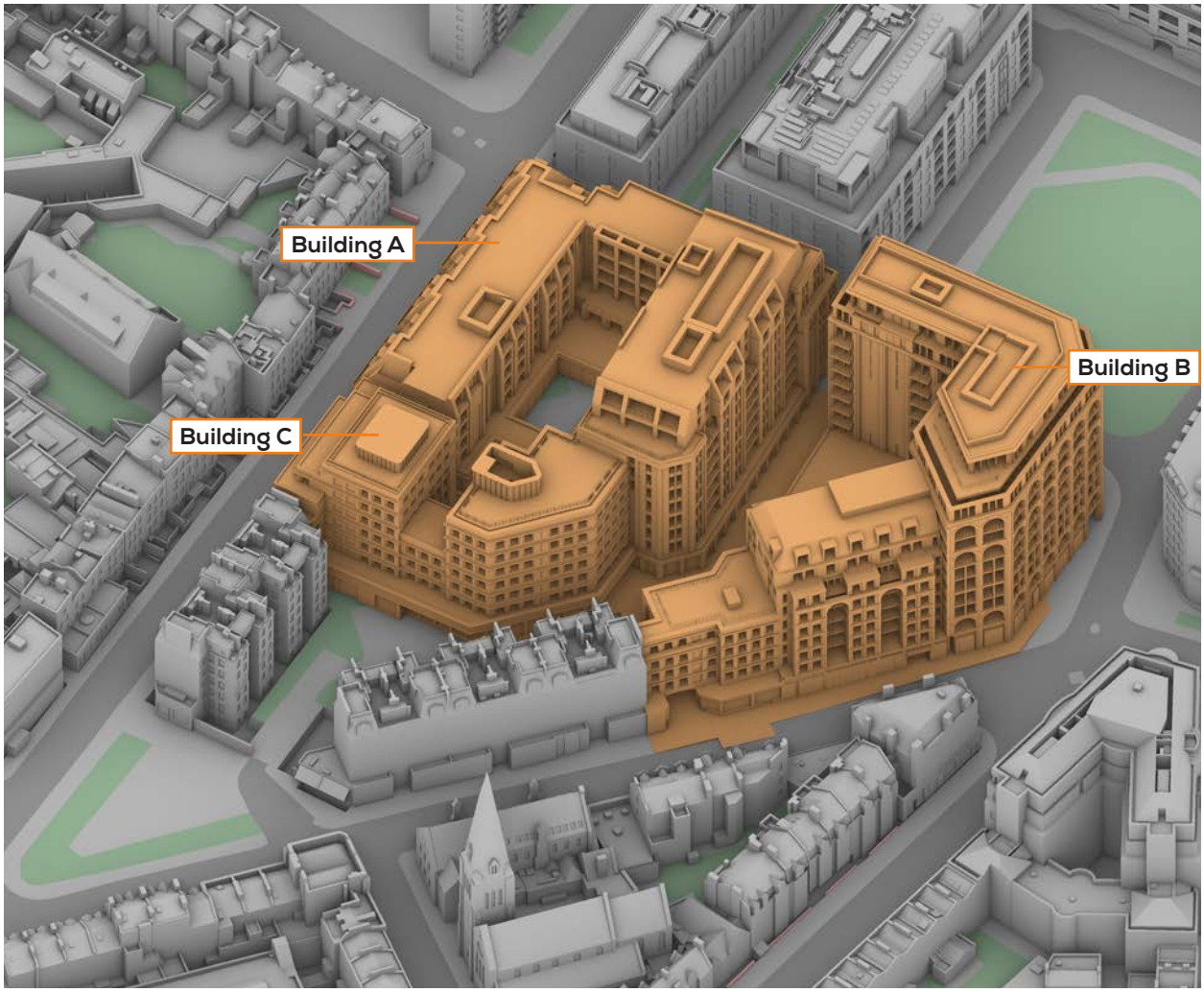


Fig. 07: Perspective view

8 INTERNAL DAYLIGHT AND SUNLIGHT ASSESSMENTS

KEY TO UNDERSTANDING THE TABLES - DAYLIGHT

DAYLIGHT QUANTUM

Average Daylight Factor (ADF)

Refers to the average percentage of daylight flux in a room against an external unobstructed plane.

BRE recommends ADF levels of 2% for rooms with kitchens (including LKDs and studios with kitchens), 1.5% for living rooms and studies, and 1% for bedrooms.

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION		SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC	ANNUAL	WINTER
Building C - SIXTH FLOOR						
686	L/K/D	2.8	99	N/A		
687	L/K/D	2.5	100	N/A	78	27
688	Bedroom	1.1	90	MET		
689	Bedroom	1.4	87	MET		
690	Bedroom	1.4	89	MET		
691	Bedroom	2	85	N/A		
692	Bedroom	1.6	82	MET		
693	Bedroom	1.4	95	MET		
694	Bedroom	1.6	98	MET		
695	Bedroom	2.2	93	N/A		
696	Living Room	2.6	100	N/A	56	24
697	Bedroom	2.5	100	N/A		
698	Bedroom	2.3	97	MET		
699	L/K/D	1.3	95	MET	57	28
700	Living Room	1.8	96	N/A	64	27
701	Bedroom	1.4	98	MET		
702	Living Room	1.2	96	MET	39	14

DAYLIGHT DISTRIBUTION

No-SkyLine (NSL)

Refers to the percentage of the room with a view of the sky from a working plane at desk hight.

BRE recommends the NSL to be at least 80% for the room to guarantee satisfactory daylight uniformity.

Room Depth Criterion (RDC)

Defines adequate room proportions that enable good distribution of light. It applies to rooms lit by windows in one wall only.

MET : The room meets the Room Depth criterion

NOT MET: The room does not meet BRE's RDC

N/A (Not Applicable): The room is not lit by windows in one wall only, and cannot be assessed by BRE's RDC

KEY TO UNDERSTANDING THE TABLES - SUNLIGHT

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION		SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC	ANNUAL	WINTER
Building C - SIXTH FLOOR						
686	L/K/D	2.8	99	N/A		
687	L/K/D	2.5	100	N/A	78	27
688	Bedroom	1.1	90	MET		
689	Bedroom	1.4	87	MET		
690	Bedroom	1.4	89	MET		
691	Bedroom	2	85	N/A		
692	Bedroom	1.6	82	MET		
693	Bedroom	1.4	95	MET		
694	Bedroom	1.6	98	MET		
695	Bedroom	2.2	93	N/A		
696	Living Room	2.6	100	N/A	56	24
697	Bedroom	2.5	100	N/A		
698	Bedroom	2.3	97	MET		
699	L/K/D	1.3	95	MET	57	28
700	Living Room	1.8	96	N/A	64	27
701	Bedroom	1.4	98	MET		
702	Living Room	1.2	96	MET	39	14

SUNLIGHT QUANTUM

Probable Sunlight Hours (PSH)

Refers to the average of hours during a year in which a surface receives direct sunlight (%).

BRE states that sunlight is most appreciated in living areas and the greatest expectation of sunlight is within south facing rooms. PSH assessments therefore consider all of the living rooms with a main window facing within 90 degrees of due south.

Annual Probable Sunlight Hours (APSH)

BRE recommends at least 25% of Annual Probable Sunlight Hours for rooms where sunlight is expected.

Winter Probable Sunlight Hours (WPSH)

BRE recommends at least 5% of Winter Probable Sunlight Hours for rooms where sunlight is expected.

Building A - First Floor

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
Building A - FIRST FLOOR							
1	L/K/D	3.4	98	MET			
2	Bedroom	3.7	100	MET			
3	Bedroom	2.6	98	MET			
4	Bedroom	2.4	99	MET			
5	Bedroom	2.2	98	MET			
6	Bedroom	2.6	100	MET			
7	Bedroom	2.6	100	MET			
8	Bedroom	2.3	98	MET			
9	Bedroom	2.2	98	MET			
10	Living Room	2.3	99	N/A			
11	Living Room	1	92	N/A		46	7
12	Bedroom	0.8	32	MET			
13	Bedroom	0.9	38	MET			
14	Bedroom	0.8	12	MET			
15	Bedroom	1.1	38	MET			
16	Bedroom	1	32	MET			
17	Bedroom	1.2	43	MET			
18	L/K/D	1.4	82	N/A		32	7
19	Bedroom	1.9	66	MET			
20	Bedroom	2	54	MET			
21	Bedroom	2	52	MET			
22	Bedroom	1.4	46	MET			
23	Bedroom	1.8	52	MET			
24	Bedroom	1.2	21	MET			
25	Bedroom	1.3	25	MET			
26	Bedroom	0.9	19	MET			
27	Bedroom	1.2	28	MET			
28	Bedroom	1.3	29	MET			
29	Bedroom	0.9	22	MET			

Table 02: Assessment Data

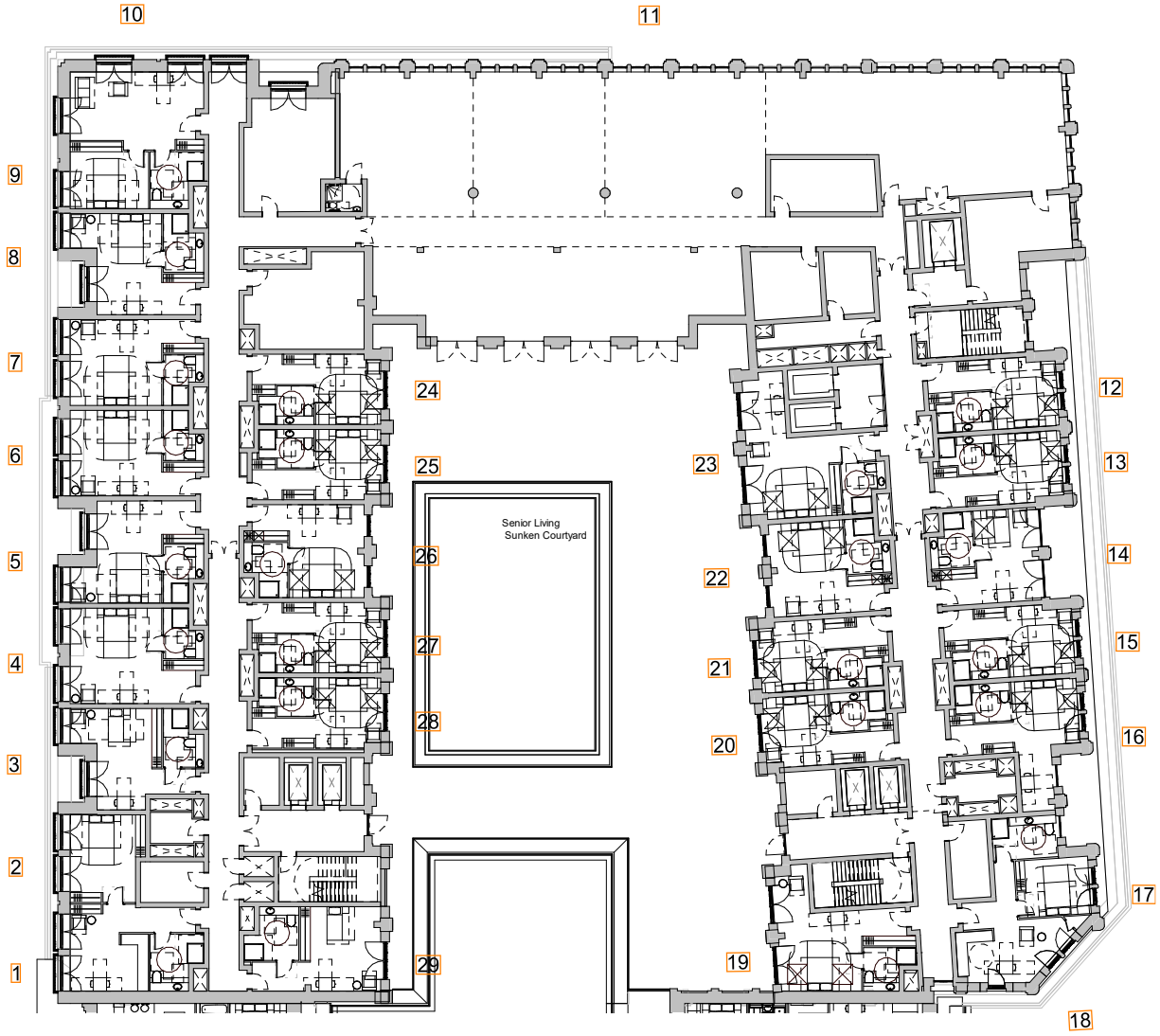
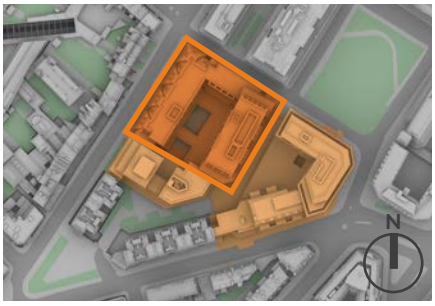


Fig. 08: Floor Plan

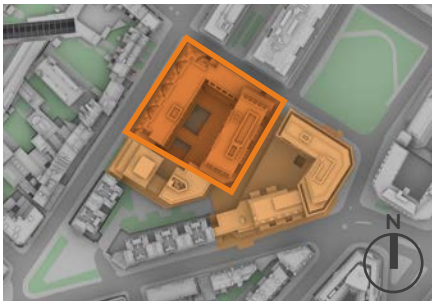


Building A - Second Floor

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
Building A - SECOND FLOOR							
30	L/K/D	3	98	MET			
31	Bedroom	3.4	100	MET			
32	Bedroom	2.3	96	MET			
33	Bedroom	2	99	MET			
34	Bedroom	2	96	MET			
35	Bedroom	2.5	99	MET			
36	Bedroom	2.3	99	MET			
37	Bedroom	2.1	96	MET			
38	Bedroom	1.9	97	MET			
39	Living Room	2.1	98	N/A			
40	Living Room	1.2	94	N/A		15	2
41	Bedroom	1	38	MET			
42	Bedroom	1.1	45	MET			
43	Bedroom	1	22	MET			
44	Bedroom	1.2	47	MET			
45	Bedroom	1.1	45	MET			
46	Bedroom	1.4	55	MET			
47	L/K/D	1.8	88	N/A		38	12
48	Bedroom	2.1	84	MET			
49	Bedroom	2.2	73	MET			
50	Bedroom	2.2	71	MET			
51	Bedroom	1.6	63	MET			
52	Bedroom	2.1	67	MET			
53	Bedroom	1.4	25	MET			
54	Bedroom	1.5	31	MET			
55	Bedroom	1.1	23	MET			
56	Bedroom	1.5	35	MET			
57	Bedroom	1.5	37	MET			
58	Bedroom	1.1	29	MET			

Table 03: Assessment Data

Fig. 09: Floor Plan



Building A - Third Floor

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION		SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC	ANNUAL	WINTER
Building A - THIRD FLOOR						
59	L/K/D	2.8	98	MET		
60	Bedroom	3.3	100	MET		
61	Bedroom	2.2	96	MET		
62	Bedroom	2	99	MET		
63	Bedroom	1.9	96	MET		
64	Bedroom	2.4	99	MET		
65	Bedroom	2.2	99	MET		
66	Bedroom	2	97	MET		
67	Bedroom	1.8	97	MET		
68	Living Room	2.3	98	N/A		
69	Living Room	1.4	99	N/A	18	3
70	Bedroom	1.1	46	MET		
71	Bedroom	1.2	54	MET		
72	Bedroom	1.1	34	MET		
73	Bedroom	1.4	58	MET		
74	Bedroom	1.3	67	MET		
75	Bedroom	1.7	68	MET		
76	L/K/D	2.1	91	N/A	50	18
77	Bedroom	2.4	94	MET		
78	Bedroom	2.5	99	MET		
79	Bedroom	2.5	99	MET		
80	Bedroom	1.8	94	MET		
81	Bedroom	2.4	86	MET		
82	Bedroom	1.6	35	MET		
83	Bedroom	1.7	40	MET		
84	Bedroom	1.2	30	MET		
85	Bedroom	1.8	42	MET		
86	Bedroom	1.8	46	MET		
87	Bedroom	1.3	39	MET		

Table 04: Assessment Data

Fig. 10: Floor Plan

Building A - Fourth Floor

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
Building A - FOURTH FLOOR							
88	Bedroom	2.2	92	MET			
89	Bedroom	1.7	71	MET			
90	Bedroom	2.6	98	MET			
91	Bedroom	1.4	76	MET			
92	Bedroom	1.8	94	MET			
93	Bedroom	1.8	94	MET			
94	Bedroom	1.4	70	MET			
95	Bedroom	2.9	98	MET			
96	Bedroom	4.7	100	N/A			
97	Living Room	1.7	99	N/A		23	6
98	Bedroom	1.4	65	N/A			
99	Bedroom	1.4	65	MET			
100	Bedroom	1.4	56	MET			
101	Bedroom	1.7	73	MET			
102	Bedroom	1.8	85	N/A			
103	Bedroom	2.2	79	MET			
104	L/K/D	2.5	93	N/A		58	21
105	Bedroom	2.6	98	MET			
106	Bedroom	2.8	99	MET			
107	Bedroom	2.8	99	MET			
108	Bedroom	2	97	MET			
109	Bedroom	2.8	99	MET			
110	Bedroom	1.8	49	MET			
111	Bedroom	1.8	48	MET			
112	Bedroom	1.4	41	MET			
113	Bedroom	1.8	51	MET			
114	Bedroom	1.9	56	MET			
115	Bedroom	1.5	61	MET			

Table 05: Assessment Data

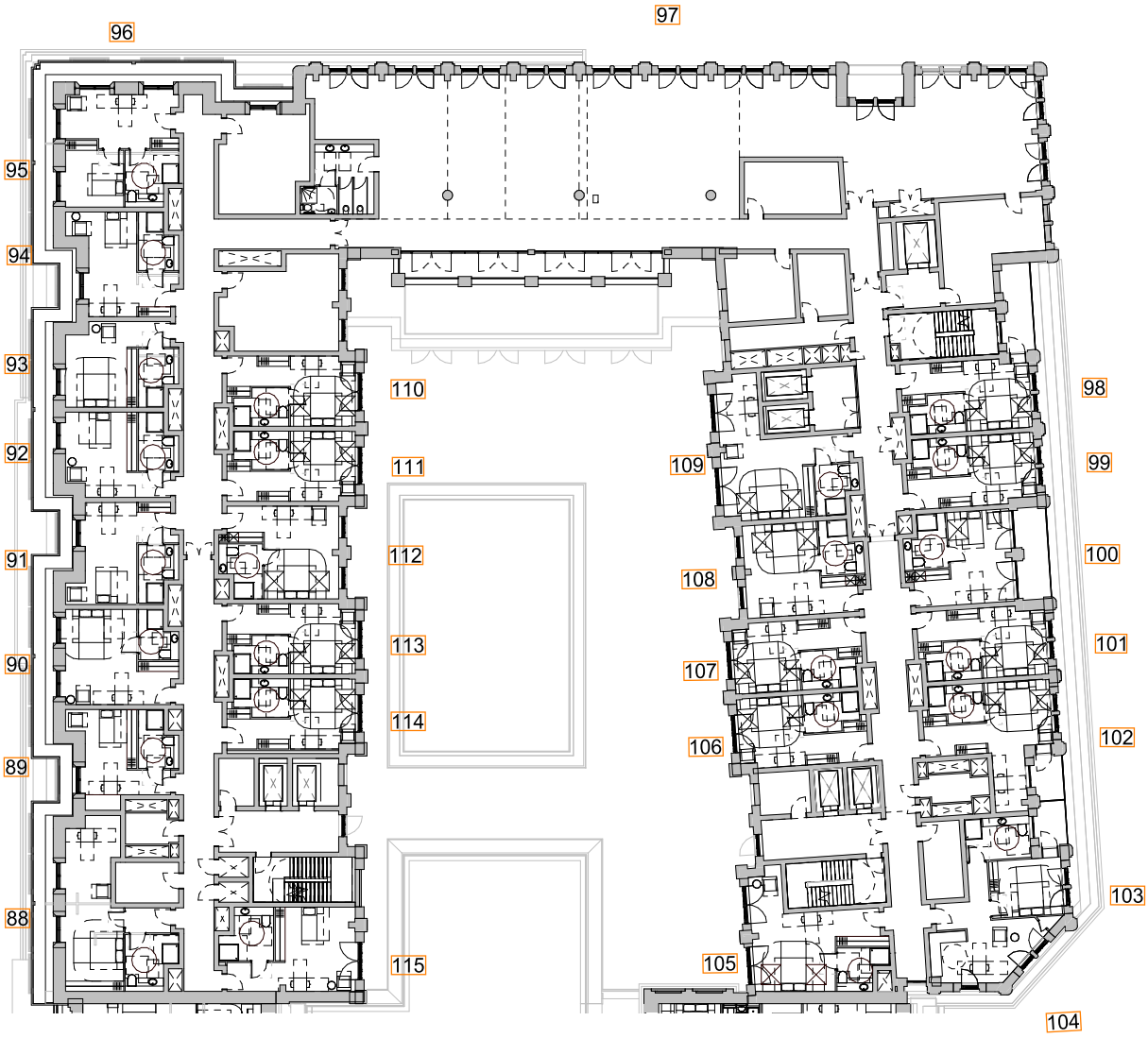


Fig. 11: Floor Plan

Building A - Fifth Floor

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION		SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC	ANNUAL	WINTER
Building A - FIFTH FLOOR						
116	L/K/D	2.7	99	MET		
117	Bedroom	2.8	98	MET		
118	Living Room	2.9	99	MET		
119	Bedroom	2.6	98	MET		
120	Living Room	2.7	98	MET		
121	Bedroom	2.6	97	MET		
122	Living Room	3.1	100	N/A		
123	Kitchen	2.7	100	MET		
124	Bedroom	2.4	99	MET		
125	Living Room	3.5	100	MET		
126	Bedroom	1.7	99	MET		
127	Bedroom	2.4	99	MET		
128	Living Room	1.6	99	MET		
129	L/K/D	2.2	99	N/A	14	1
130	Bedroom	0.5	66	MET		
131	Living Room	1.1	51	MET	23	6
132	Bedroom	2	93	MET		
133	Bedroom	2.2	91	MET		
134	Living Room	1.6	89	MET	37	10
135	Bedroom	0.8	49	MET		
136	L/K/D	2.5	96	N/A	66	21
137	Living Room	2.1	99	MET		
138	Bedroom	3.2	94	MET		
139	Living Room	2.4	99	MET		
140	Bedroom	1.7	92	MET		
141	Bedroom	1.8	99	MET		
142	Bedroom	1.6	56	MET		
143	Bedroom	2.4	69	MET		
144	Living Room	1.8	70	MET	31	6
145	Bedroom	1.4	45	MET		
146	Living Room	2	85	MET	34	9
147	Bedroom	2	93	MET		

Table 06: Assessment Data

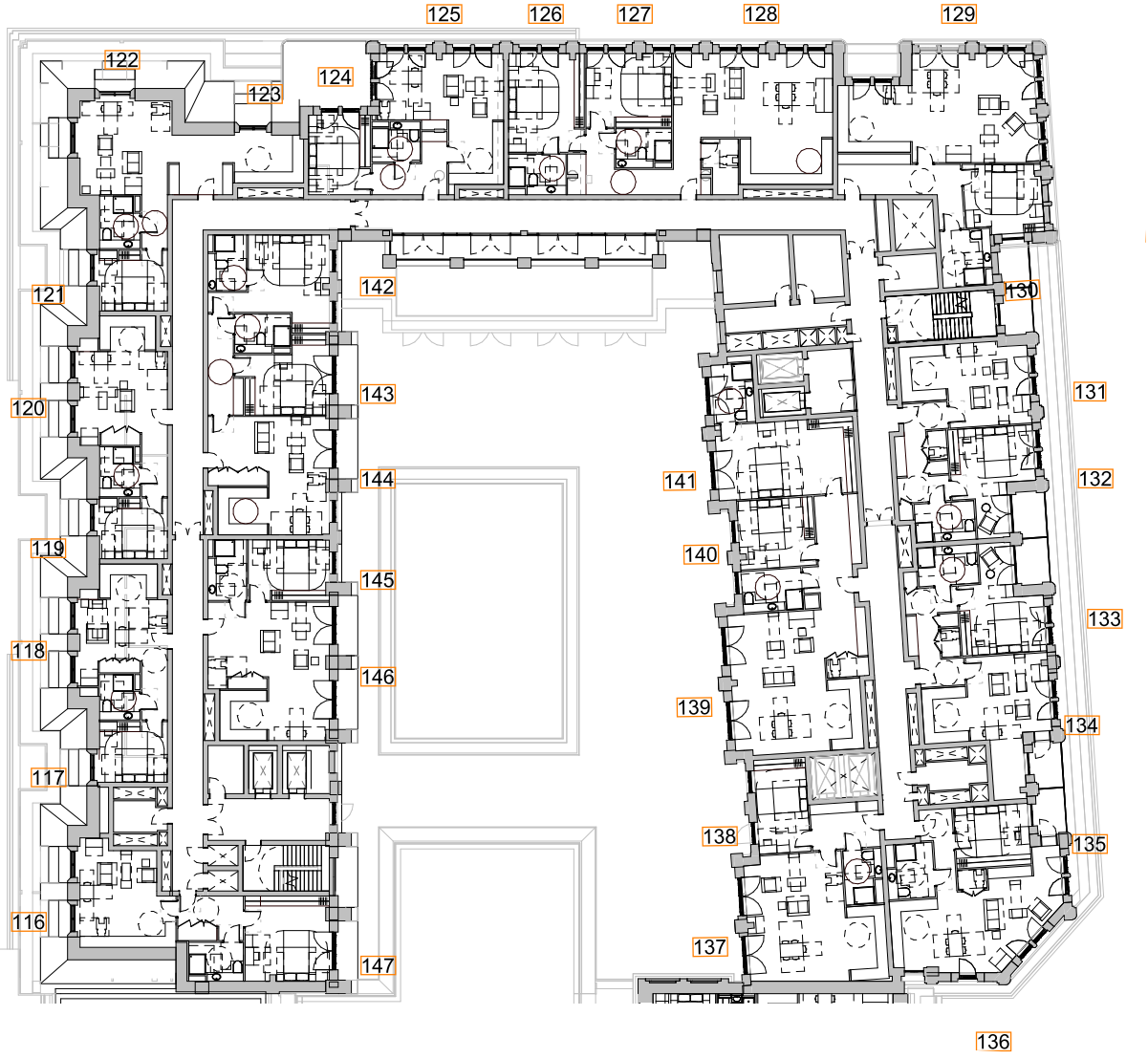


Fig. 12: Floor Plan

Building A - Sixth Floor

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
Building A - SIXTH FLOOR							
148	Living Room	2.3	100	MET			
149	Bedroom	1.7	96	MET			
150	Living Room	2.3	99	MET			
151	Bedroom	1.6	92	MET			
152	Bedroom	1.7	100	MET			
153	Bedroom	1.7	93	MET			
154	L/K/D	3.1	100	N/A			
155	L/K/D	2.6	96	N/A		10	0
156	Bedroom	1.5	90	N/A			
157	Living Room	1.3	81	N/A		28	8
158	Bedroom	1.9	97	MET			
159	Bedroom	2	94	MET			
160	Living Room	1.7	93	N/A		38	12
161	Bedroom	0.9	74	MET			
162	L/K/D	2.5	98	N/A		76	24

Table 07: Assessment Data

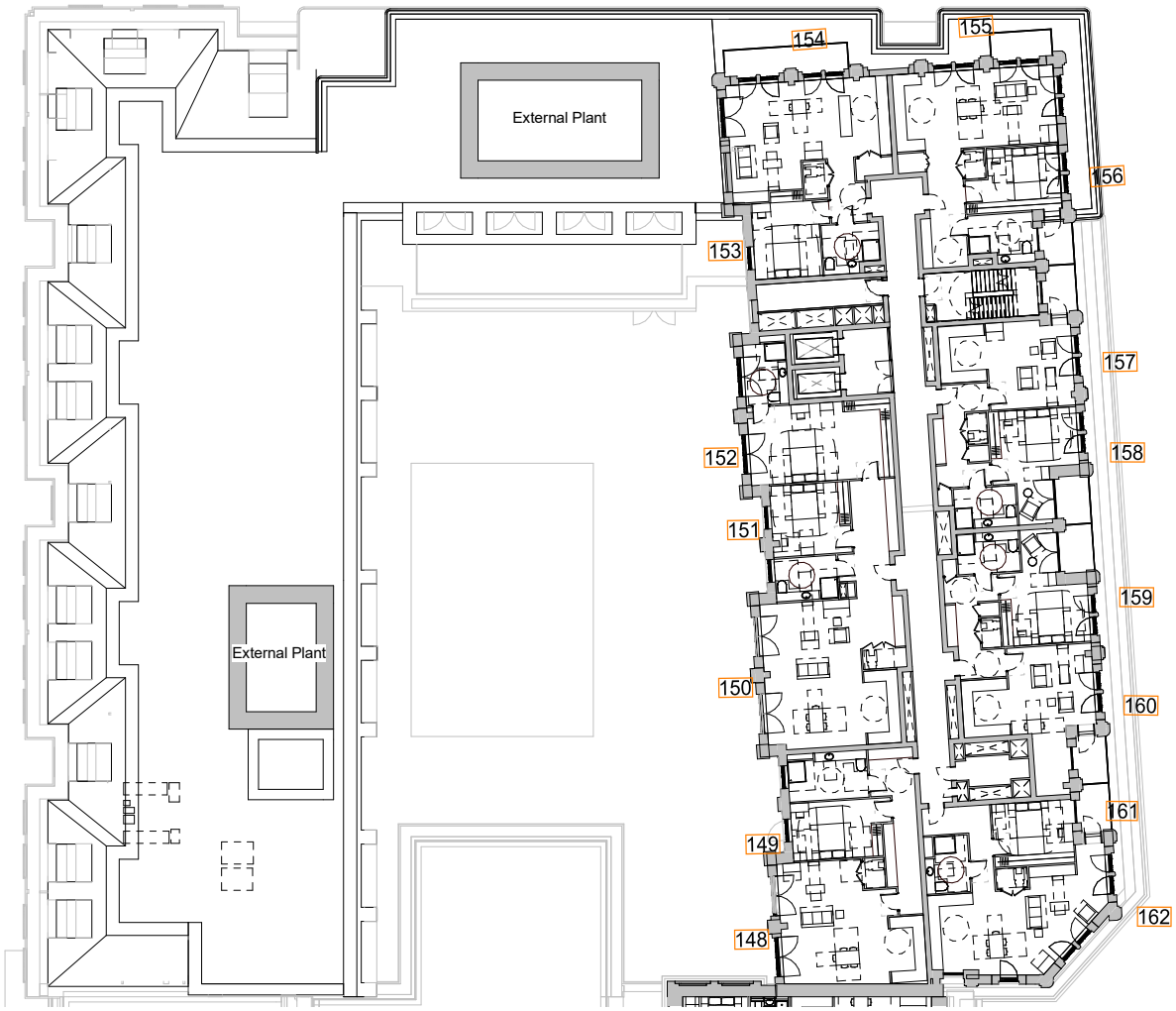
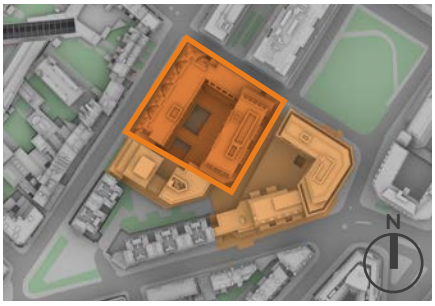


Fig. 13: Floor Plan



Building A - Seventh Floor

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
Building A - SEVENTH FLOOR							
163	Living Room	2.7	100	MET			
164	Bedroom	1.8	97	MET			
165	Living Room	2.4	99	MET			
166	Bedroom	1.7	93	MET			
167	Bedroom	1.8	100	MET			
168	Bedroom	1.9	93	MET			
169	L/K/D	3.1	100	N/A			
170	L/K/D	2.7	96	N/A		17	0
171	Bedroom	2	90	N/A			
172	Living Room	1.7	92	N/A		32	11
173	Bedroom	2.7	99	MET			
174	Bedroom	2.8	98	MET			
175	Living Room	2.3	96	N/A		57	19
176	Bedroom	1.8	95	MET			
177	L/K/D	2.6	99	N/A		81	28

Table 08: Assessment Data

Fig. 14: Floor Plan

Building A - Eighth Floor

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION		SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC	ANNUAL	WINTER
Building A - EIGHTH FLOOR						
178	Living Room	2.5	99	MET		
179	Bedroom	1.8	92	MET		
180	Bedroom	1.9	99	MET		
181	L/K/D	2.8	99	N/A		
182	Bedroom	2.7	99	MET		
183	Living Room	1.8	85	MET	45	17
184	Bedroom	2.7	97	MET		
185	Bedroom	2.8	98	MET		
186	Living Room	2.4	95	MET	52	16
187	Living Room	3.8	100	N/A	82	29

Table 09: Assessment Data

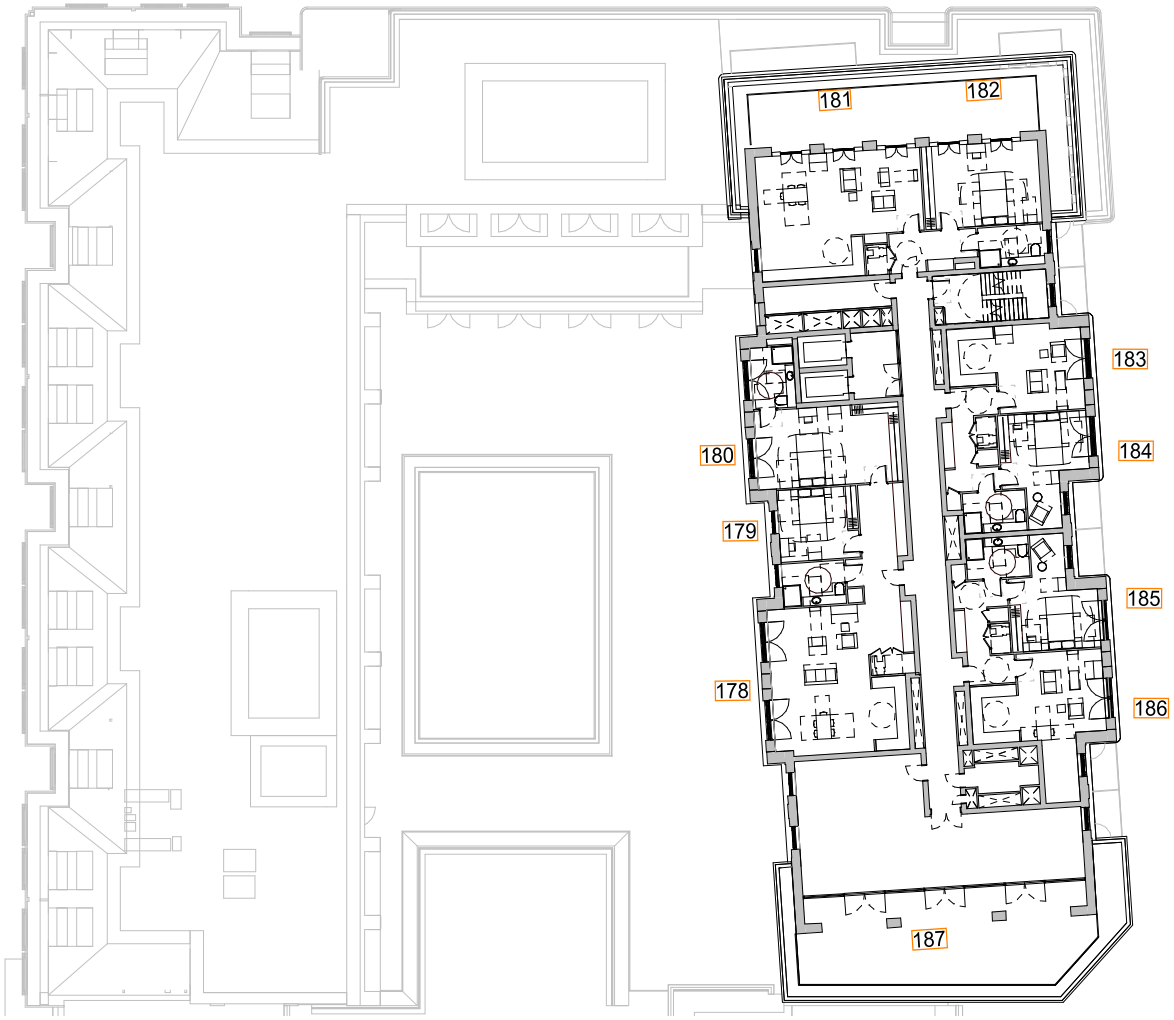
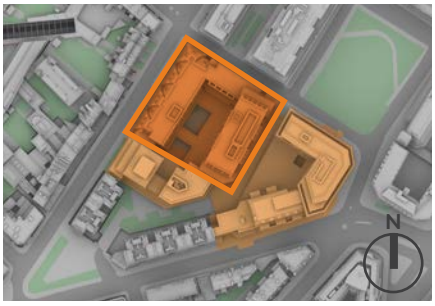


Fig. 15: Floor Plan



Building A - Ninth Floor

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION		SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC	ANNUAL	WINTER
Building A - NINTH FLOOR						
188	Kitchen	5.2	100	N/A		
189	Bedroom	2.3	99	MET		
190	Bedroom	2.3	99	MET		
191	Kitchen	1.9	96	MET		
192	Living Room	1.8	98	MET		
193	L/K/D	2.8	99	N/A		
194	Bedroom	2.6	95	MET		
195	L/K/D	2.2	99	MET	43	12
196	Bedroom	1.8	96	MET		
197	Bedroom	1.7	95	MET		
198	L/K/D	2.5	98	MET	56	18
199	Living Room	6.4	100	N/A	97	30

Table 10: Assessment Data

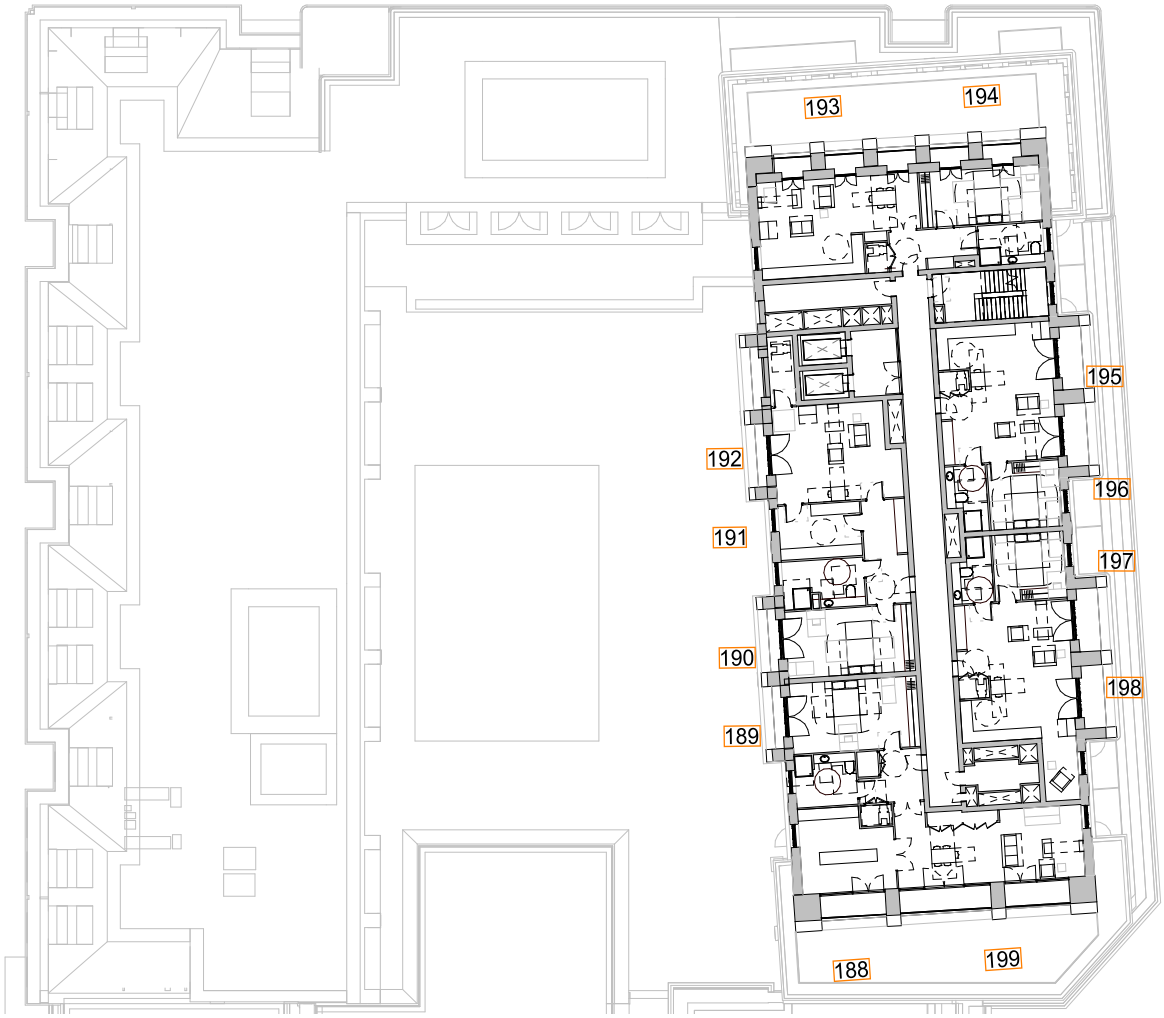
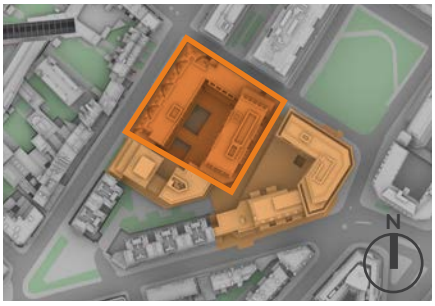


Fig. 16: Floor Plan



Building B - First Floor

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
Building B - FIRST FLOOR							
200	L/K/D	1.1	92	MET		13	4
201	Bedroom	0.2	8	MET			
202	L/K/D	1.4	87	N/A			
203	Bedroom	1.6	86	MET			
204	Bedroom	2.7	97	MET			
205	Living Room	1.5	90	MET			
206	Living Room	2	99	MET			
207	Bedroom	1.4	95	MET			
208	Bedroom	1.5	94	MET			
209	Bedroom	3	100	MET			
210	L/K/D	1.4	91	N/A		0	0
211	Bedroom	0.6	76	MET			
212	Bedroom	0.6	91	MET			
213	Bedroom	0.5	54	MET			
214	Living Room	0.7	81	MET		11	6
215	Bedroom	0.9	89	MET			
216	Bedroom	1.1	97	MET			
217	Living Room	1.3	94	N/A		26	13
218	Living Room	0.4	52	MET		11	10
219	Bedroom	0.4	41	MET			
220	Living Room	1.4	70	N/A		65	16
221	Bedroom	0.5	74	MET			
222	Living Room	1.4	96	N/A		67	18
223	Bedroom	0.6	93	MET			
224	Kitchen	0.6	94	MET			
225	Living Room	2.1	100	N/A		69	20
226	Bedroom	0.7	84	MET			
227	Bedroom	1	95	MET			
228	Living Room	1.7	99	MET		63	23
229	Bedroom	1.1	96	MET			
230	L/K/D	1.3	97	N/A		63	23
231	Bedroom	0.4	15	MET			
232	Bedroom	0.5	11	MET			
233	Bedroom	0.8	44	MET			
234	Living Room	0.8	84	N/A			
235	Bedroom	0.2	2	MET			
236	Living Room	1.1	61	N/A		7	0
237	Bedroom	0.3	20	MET			
238	L/K/D	0.6	30	N/A		1	0
239	Bedroom	0.3	19	MET			
240	Bedroom	0.9	33	MET			
241	Bedroom	1	54	MET			
242	Bedroom	0.8	41	MET			
243	Bedroom	1.6	67	MET			
244	Living Room	0.5	64	MET		12	2
245	Bedroom	0.7	68	MET			
246	Bedroom	0.6	26	MET			

Table 11: Assessment Data

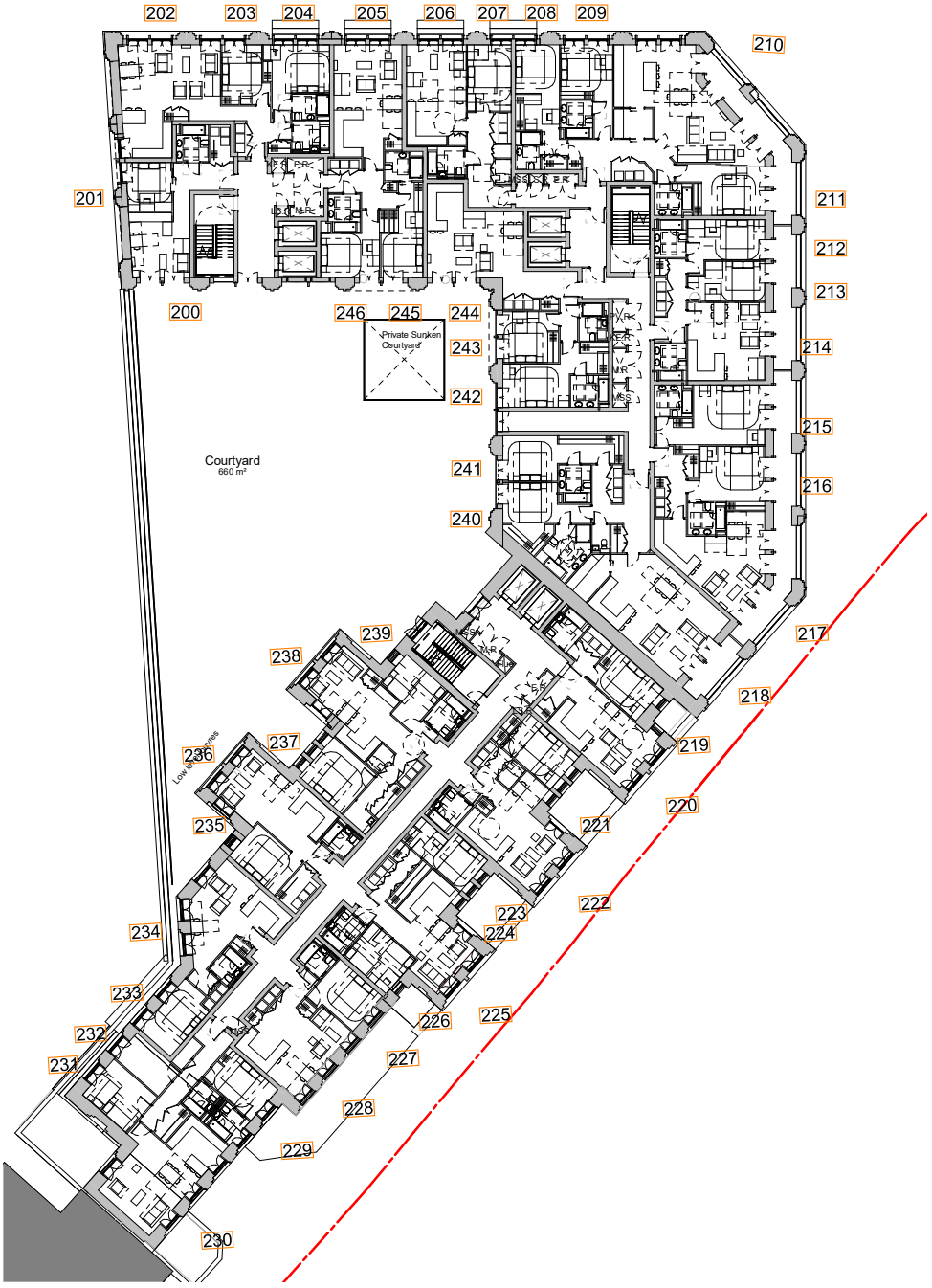


Fig. 17: Floor Plan

Building B - Second Floor

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
Building B - SECOND FLOOR							
247	L/K/D	1.3	94	MET		16	5
248	Bedroom	0.3	18	MET			
249	L/K/D	1.4	90	N/A			
250	Bedroom	1.5	92	MET			
251	Bedroom	2.3	96	MET			
252	Living Room	1.4	98	MET			
253	Living Room	1.9	99	MET			
254	Bedroom	1.2	92	MET			
255	Bedroom	1.5	91	MET			
256	Bedroom	2.8	100	MET			
257	L/K/D	1.3	97	N/A		4	0
258	Bedroom	0.6	77	MET			
259	Bedroom	0.5	93	MET			
260	Bedroom	0.5	56	MET			
261	Living Room	0.8	82	MET		13	8
262	Bedroom	0.9	91	MET			
263	Bedroom	1.1	98	MET			
264	Living Room	1.4	100	N/A		30	18
265	Living Room	0.4	77	MET		14	12
266	Bedroom	0.5	55	MET			
267	Living Room	1.5	99	N/A		70	21
268	Bedroom	0.7	96	MET			
269	Living Room	1.6	97	N/A		72	23
270	Bedroom	0.8	96	MET			
271	Kitchen	0.7	94	MET			
272	Living Room	2.3	100	N/A		73	24
273	Bedroom	0.7	84	MET			
274	Bedroom	1.1	95	MET			
275	Living Room	1.9	99	MET		66	25
276	Bedroom	1.2	96	MET			
277	L/K/D	1.5	97	N/A		65	25
278	Bedroom	0.6	18	MET			
279	Bedroom	0.7	15	MET			
280	Bedroom	1.2	51	MET			
281	Living Room	1.1	88	N/A			
282	Bedroom	0.2	4	MET			
283	Living Room	1.2	64	N/A		9	1
284	Bedroom	0.4	26	MET			
285	L/K/D	0.7	37	N/A		2	0
286	Bedroom	0.4	24	MET			
287	Bedroom	1.6	66	MET			
288	Bedroom	0.9	32	MET			
289	Bedroom	0.8	47	MET			
290	Bedroom	1.7	74	MET			
291	Living Room	0.7	69	MET		12	2
292	Bedroom	0.8	75	MET			
293	Bedroom	0.7	30	MET			

Table 12: Assessment Data

Fig. 18: Floor Plan

Building B - Third Floor

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION		SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC	ANNUAL	WINTER
Building B - THIRD FLOOR						
294	L/K/D	1.5	97	MET	21	9
295	Bedroom	0.4	24	MET		
296	L/K/D	1.7	96	N/A		
297	Bedroom	1.8	94	MET		
298	Bedroom	2.8	97	MET		
299	Living Room	1.7	98	MET		
300	Living Room	2.3	99	MET		
301	Bedroom	1.4	95	MET		
302	Bedroom	1.8	93	MET		
303	Bedroom	3.4	100	MET		
304	L/K/D	1.5	98	N/A	10	0
305	Bedroom	0.7	78	MET		
306	Bedroom	0.5	93	MET		
307	Bedroom	0.5	57	MET		
308	Living Room	1.1	83	MET	9	6
309	Bedroom	0.9	93	MET		
310	Bedroom	1.1	98	MET		
311	Living Room	1.4	100	N/A	22	15
312	Living Room	0.5	81	MET	11	11
313	Bedroom	0.5	65	MET		
314	Living Room	1.7	100	N/A	72	23
315	Bedroom	0.8	96	MET		
316	Living Room	1.7	98	N/A	74	25
317	Bedroom	0.8	96	MET		
318	Kitchen	0.8	94	MET		
319	Living Room	2.4	100	N/A	73	24
320	Bedroom	0.7	84	MET		
321	Bedroom	1.2	93	MET		
322	Living Room	2	99	MET	67	26
323	Bedroom	1.2	96	MET		
324	L/K/D	1.7	97	N/A	63	25
325	Bedroom	0.7	26	MET		
326	Bedroom	0.8	23	MET		
327	Bedroom	1.3	62	MET		
328	Living Room	1.2	92	N/A		
329	Bedroom	0.3	5	MET		
330	Living Room	1.3	66	N/A	10	2
331	Bedroom	0.5	32	MET		
332	L/K/D	0.7	45	N/A	2	0
333	Bedroom	0.4	30	MET		
334	Bedroom	1.9	77	MET		
335	Bedroom	1	38	MET		
336	Bedroom	1	55	MET		
337	Bedroom	2	84	MET		
338	Living Room	0.8	72	MET	15	2
339	Bedroom	0.9	83	MET		
340	Bedroom	0.8	35	MET		

Table 13: Assessment Data

Fig. 19: Floor Plan

Building B - Fourth Floor

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
Building B - FOURTH FLOOR							
341	L/K/D	1.7	99	MET		25	11
342	Bedroom	0.6	43	MET			
343	L/K/D	1.9	97	N/A			
344	Bedroom	1.9	95	MET			
345	Bedroom	3.1	97	MET			
346	Living Room	1.9	99	MET			
347	Living Room	2	99	MET			
348	Bedroom	1.7	95	MET			
349	Bedroom	2	94	MET			
350	Bedroom	3.7	100	MET			
351	L/K/D	1.9	99	N/A		20	2
352	Bedroom	1.1	90	MET			
353	Bedroom	0.8	95	MET			
354	Bedroom	0.8	81	MET			
355	Living Room	1.1	93	MET		21	11
356	Bedroom	1.3	98	MET			
357	Bedroom	1.5	98	MET			
358	Living Room	1.8	100	N/A		37	22
359	Living Room	0.6	96	MET		19	17
360	Bedroom	0.6	70	MET			
361	Living Room	1.8	100	N/A		75	26
362	Bedroom	0.9	96	MET			
363	Living Room	1.9	97	N/A		74	25
364	Bedroom	1	96	MET			
365	Kitchen	1	94	MET			
366	Living Room	2.5	100	N/A		75	26
367	Bedroom	0.7	84	MET			
368	Bedroom	1.2	93	MET			
369	Living Room	2.1	99	MET		66	26
370	Bedroom	1.2	96	MET			
371	L/K/D	1.5	95	N/A		68	26
372	Bedroom	0.8	39	MET			
373	Bedroom	1	43	MET			
374	Bedroom	1.5	78	MET			
375	Living Room	1.5	95	N/A			
376	Bedroom	0.3	7	MET			
377	Living Room	1.6	72	N/A		16	2
378	Bedroom	0.7	57	MET			
379	L/K/D	0.9	59	N/A		2	0
380	Bedroom	0.4	41	MET			
381	Bedroom	2	87	MET			
382	Bedroom	1.1	54	MET			
383	Bedroom	1	65	MET			
384	Bedroom	2.1	99	MET			
385	Living Room	0.9	77	MET		18	3
386	Bedroom	1	90	MET			
387	Bedroom	1	41	MET			

Table 14: Assessment Data

Fig. 20: Floor Plan

Building B - Fifth Floor

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
Building B - FIFTH FLOOR							
388	L/K/D	1.9	99	MET		30	13
389	Bedroom	0.9	57	MET			
390	L/K/D	2.2	98	N/A			
391	Bedroom	2.1	95	MET			
392	Bedroom	3.3	97	MET			
393	Living Room	2	99	MET			
394	Living Room	2.1	99	MET			
395	Bedroom	1.7	95	MET			
396	Bedroom	2.1	94	MET			
397	Bedroom	3.8	100	MET			
398	L/K/D	2.2	100	N/A		24	4
399	Bedroom	1.4	99	MET			
400	Bedroom	0.9	95	MET			
401	Bedroom	0.9	96	MET			
402	Living Room	1.2	94	MET		28	12
403	Bedroom	1.3	98	MET			
404	Bedroom	1.5	98	MET			
405	Living Room	1.9	100	N/A		37	21
406	Living Room	0.7	96	MET		18	17
407	Bedroom	0.6	71	MET			
408	Living Room	1.9	100	N/A		75	26
409	Bedroom	0.5	96	MET			
410	Living Room	1.7	98	N/A		76	27
411	Bedroom	0.5	97	MET			
412	Kitchen	0.7	94	MET			
413	Living Room	2.6	100	N/A		76	27
414	Bedroom	0.7	79	MET			
415	Bedroom	0.4	12	MET			
416	Living Room	2.1	93	N/A		24	5
417	Bedroom	0.8	64	MET			
418	L/K/D	1.1	71	N/A		2	0
419	Bedroom	0.5	48	MET			
420	Bedroom	2.4	98	MET			
421	Bedroom	1.3	71	MET			
422	Bedroom	1.2	81	MET			
423	Bedroom	2.5	99	MET			
424	Living Room	1	83	MET		22	5
425	Bedroom	1.2	93	MET			
426	Bedroom	1.1	52	MET			

Table 15: Assessment Data

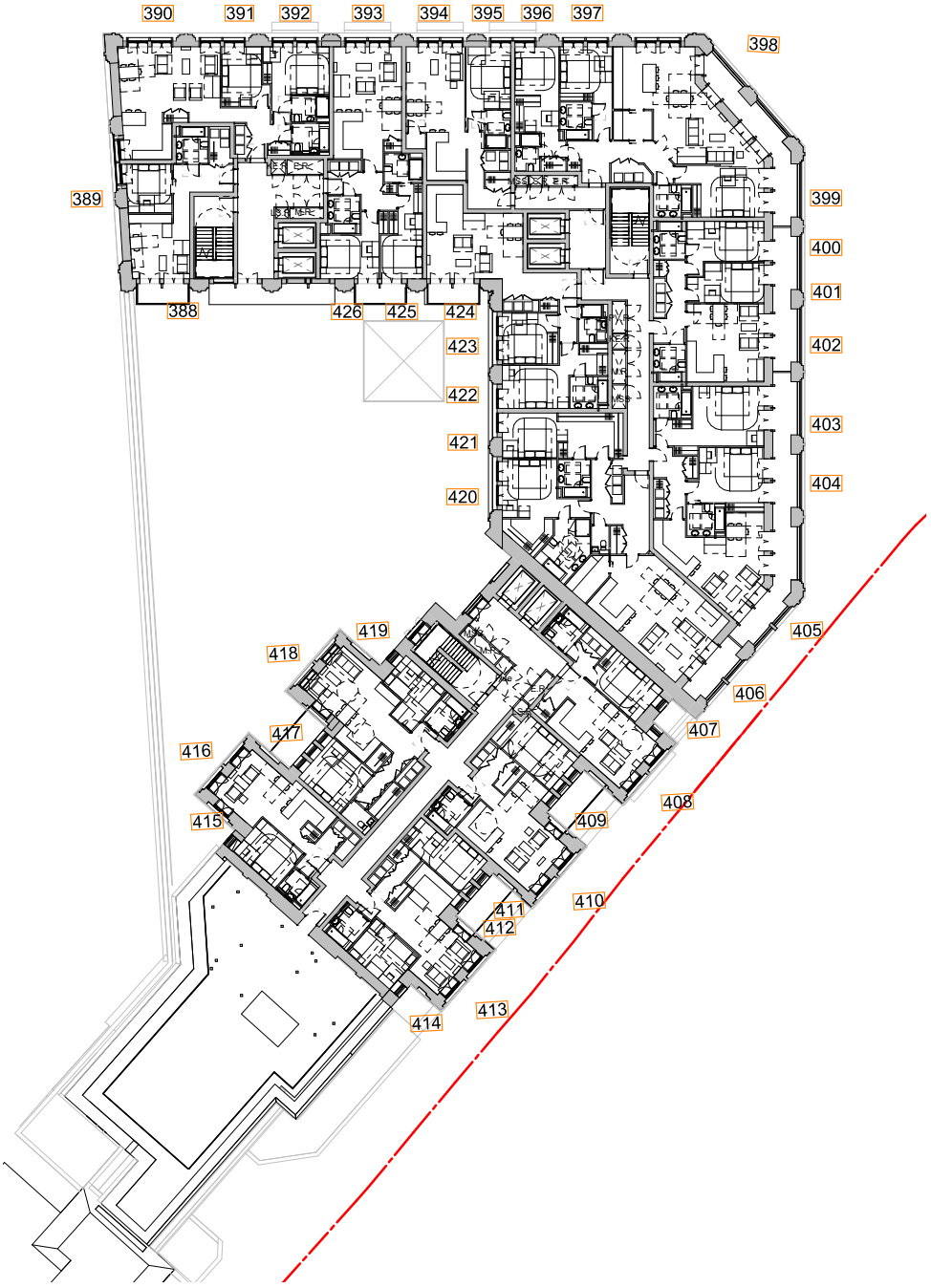


Fig. 21: Floor Plan

Building B - Sixth Floor

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
Building B - SIXTH FLOOR							
427	Bedroom	2.6	99	MET			
428	Bedroom	2	71	MET			
429	Bedroom	2.5	95	MET			
430	Living Room	2.2	99	MET			
431	Bedroom	2.3	99	MET			
432	Living Room	1.8	98	MET			
433	Bedroom	1.8	94	MET			
434	Bedroom	3.4	100	MET			
435	L/K/D	2	100	N/A		24	6
436	Bedroom	1.3	99	MET			
437	Bedroom	1.1	92	MET			
438	Bedroom	0.8	93	MET			
439	Bedroom	1	93	MET			
440	Living Room	1.2	98	MET		26	11
441	Bedroom	1.1	89	MET			
442	Living Room	1.2	100	N/A		37	21
443	Bedroom	0.7	71	MET			
444	Living Room	1.8	99	N/A		75	26
445	Bedroom	1.2	97	MET			
446	Living Room	2.1	97	N/A		77	28
447	Bedroom	1.3	97	MET			
448	Kitchen	1.2	95	MET			
449	Living Room	3	99	N/A		77	28
450	Bedroom	4.7	100	MET			
451	Bedroom	4.3	100	MET			
452	Living Room	2.5	97	N/A		26	5
453	Bedroom	1.5	85	MET			
454	L/K/D	1.6	79	N/A		7	0
455	Bedroom	0.6	58	MET			
456	Bedroom	2.7	99	MET			
457	Bedroom	1.4	76	MET			
458	Bedroom	1.3	96	MET			
459	Bedroom	2.7	100	MET			
460	L/K/D	0.9	89	MET		23	6
461	Bedroom	1.1	97	MET			
462	Bedroom	1.1	57	MET			

Table 16: Assessment Data

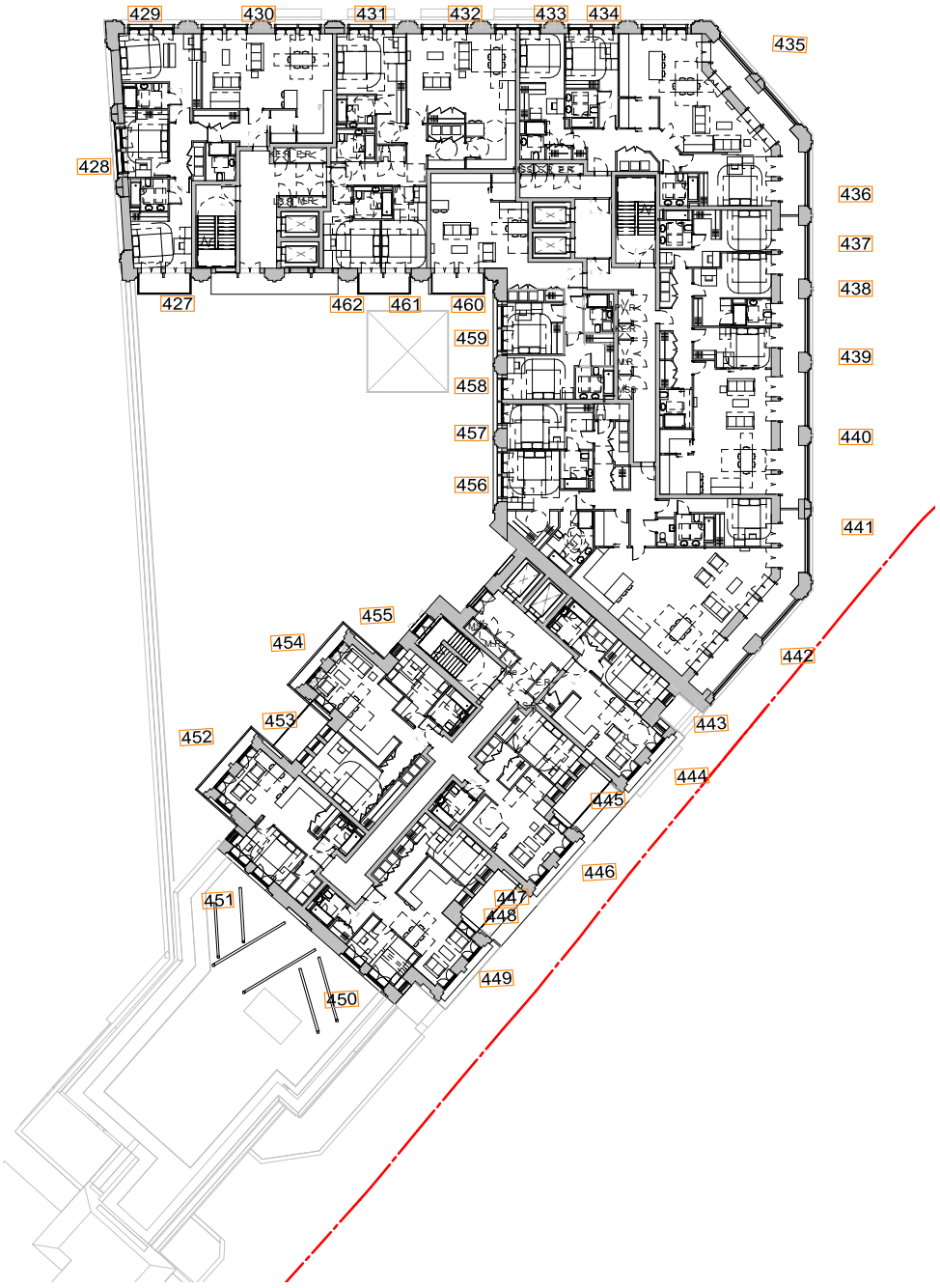


Fig. 22: Floor Plan

Building B - Seventh Floor

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION		SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC	ANNUAL	WINTER
Building B - SEVENTH FLOOR						
463	Bedroom	3.1	99	MET		
464	Living Room	1.4	98	N/A		
465	Kitchen	1.7	98	MET		
466	Bedroom	1.6	96	MET		
467	Bedroom	2.4	99	MET		
468	Bedroom	2.3	99	MET		
469	Living Room	1.8	98	MET		
470	Bedroom	1.8	94	MET		
471	Bedroom	3.3	100	MET		
472	L/K/D	2.1	100	N/A	26	6
473	Bedroom	1.6	99	MET		
474	Bedroom	1.2	92	MET		
475	Bedroom	0.9	93	MET		
476	Bedroom	1.1	93	MET		
477	Living Room	1.3	98	MET	28	12
478	Bedroom	1.2	90	MET		
479	Living Room	1.4	100	N/A	39	22
480	Bedroom	1.8	92	MET		
481	Living Room	2	97	MET	65	26
482	L/K/D	2	96	MET	65	26
483	Bedroom	2	95	MET		
484	L/K/D	2.3	99	N/A	89	30
485	Bedroom	1.7	96	MET		
486	L/K/D	3	100	N/A	41	12
487	Bedroom	1.2	84	MET		
488	Bedroom	1.1	86	MET		
489	Living Room	0.9	74	MET		
490	Bedroom	3.1	99	MET		
491	Bedroom	1.5	82	MET		
492	Bedroom	1.5	96	MET		
493	Bedroom	3.1	100	MET		
494	L/K/D	1	94	MET	25	8
495	Bedroom	1.3	97	MET		
496	Bedroom	1.2	62	MET		

Table 17: Assessment Data

Fig. 23: Floor Plan

Building B - Eighth Floor

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION		SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC	ANNUAL	WINTER
Building B - EIGHTH FLOOR						
497	Bedroom	4.3	100	MET		
498	Living Room	1.6	97	N/A		
499	Kitchen	1.9	98	MET		
500	Bedroom	1.7	96	MET		
501	Bedroom	2.6	99	MET		
502	Bedroom	2.4	99	MET		
503	Living Room	2	98	MET		
504	Bedroom	1.8	94	MET		
505	Bedroom	3.5	100	MET		
506	L/K/D	2.1	100	N/A	24	6
507	Bedroom	1.5	99	MET		
508	Bedroom	1.1	92	MET		
509	Bedroom	0.8	93	MET		
510	Bedroom	1	93	MET		
511	Living Room	1.2	98	MET	26	11
512	Bedroom	1.1	90	MET		
513	Living Room	1.3	100	N/A	37	21
514	L/K/D	0.9	77	MET	49	21
515	Bedroom	1.6	84	MET		
516	Kitchen	1.9	87	MET		
517	Living Room	1.4	93	MET	49	21
518	Bedroom	3.2	97	N/A		
519	Bedroom	3.5	99	MET		
520	Bedroom	1.8	93	MET		
521	Bedroom	1.7	96	MET		
522	Bedroom	3.6	100	MET		
523	L/K/D	1.5	94	MET	38	10
524	Bedroom	1.8	98	MET		
525	Bedroom	1.8	78	MET		

Table 18: Assessment Data

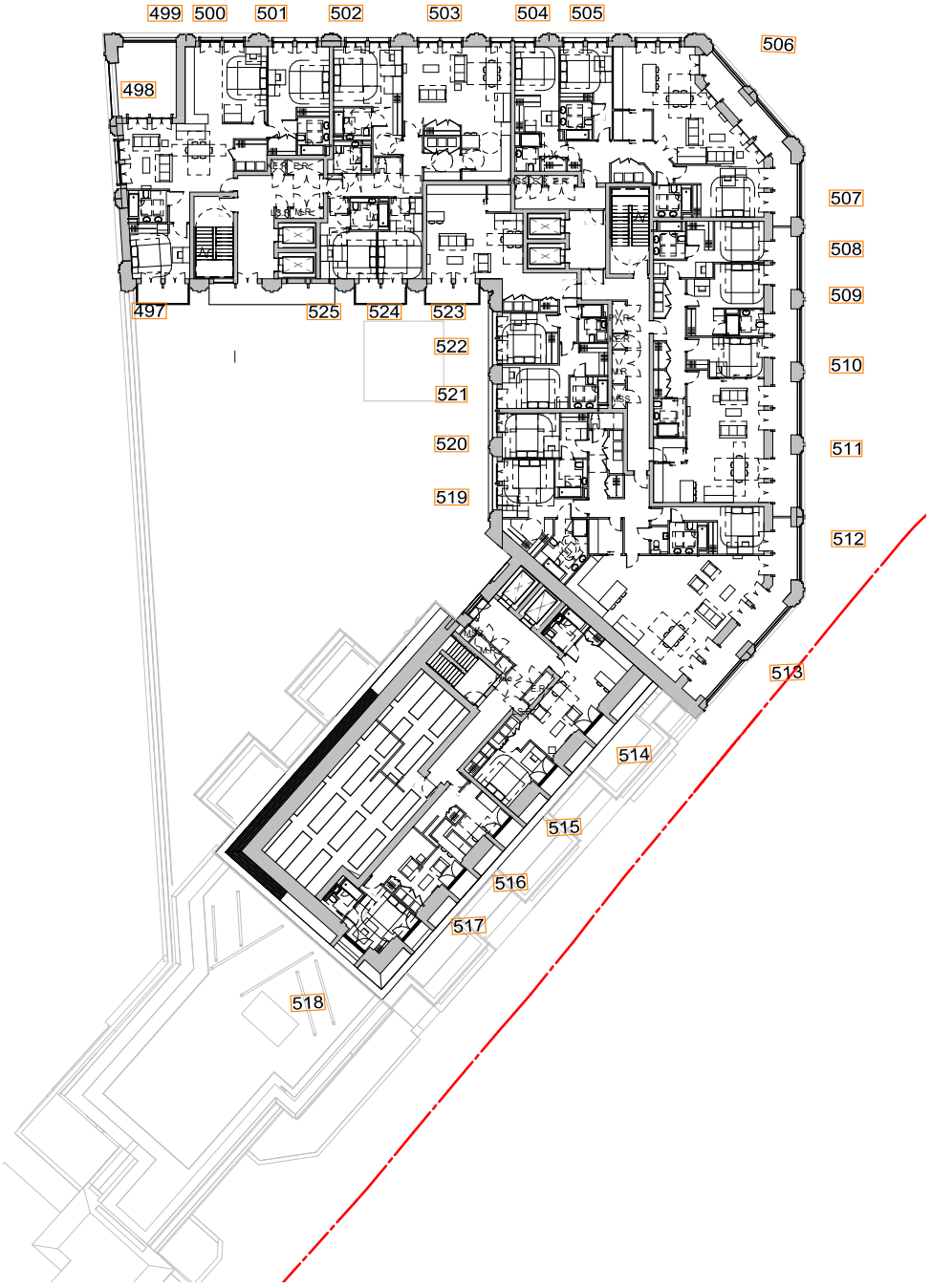


Fig. 24: Floor Plan

Building B - Ninth Floor

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION		SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC	ANNUAL	WINTER
Building B - NINTH FLOOR						
526	Living Room	2.1	100	N/A		
527	Kitchen	3.1	100	MET		
528	Bedroom	1.6	97	MET		
529	Bedroom	1.3	98	MET		
530	Living Room	1.8	98	MET		
531	Bedroom	1.2	92	MET		
532	Bedroom	1.3	95	MET		
533	L/K/D	2.4	100	N/A	37	9
534	Kitchen	2.1	96	MET		
535	Bedroom	1.2	88	MET		
536	Bedroom	2	94	MET		
537	Bedroom	1	92	MET		
538	Bedroom	2.3	99	MET		
539	Living Room	2.6	100	N/A	73	24
540	Kitchen	1.5	98	MET		
541	Bedroom	2.3	99	MET		
542	Bedroom	0.9	66	MET		
543	Bedroom	1.7	86	MET		
544	Bedroom	2.2	98	MET		

Table 19: Assessment Data

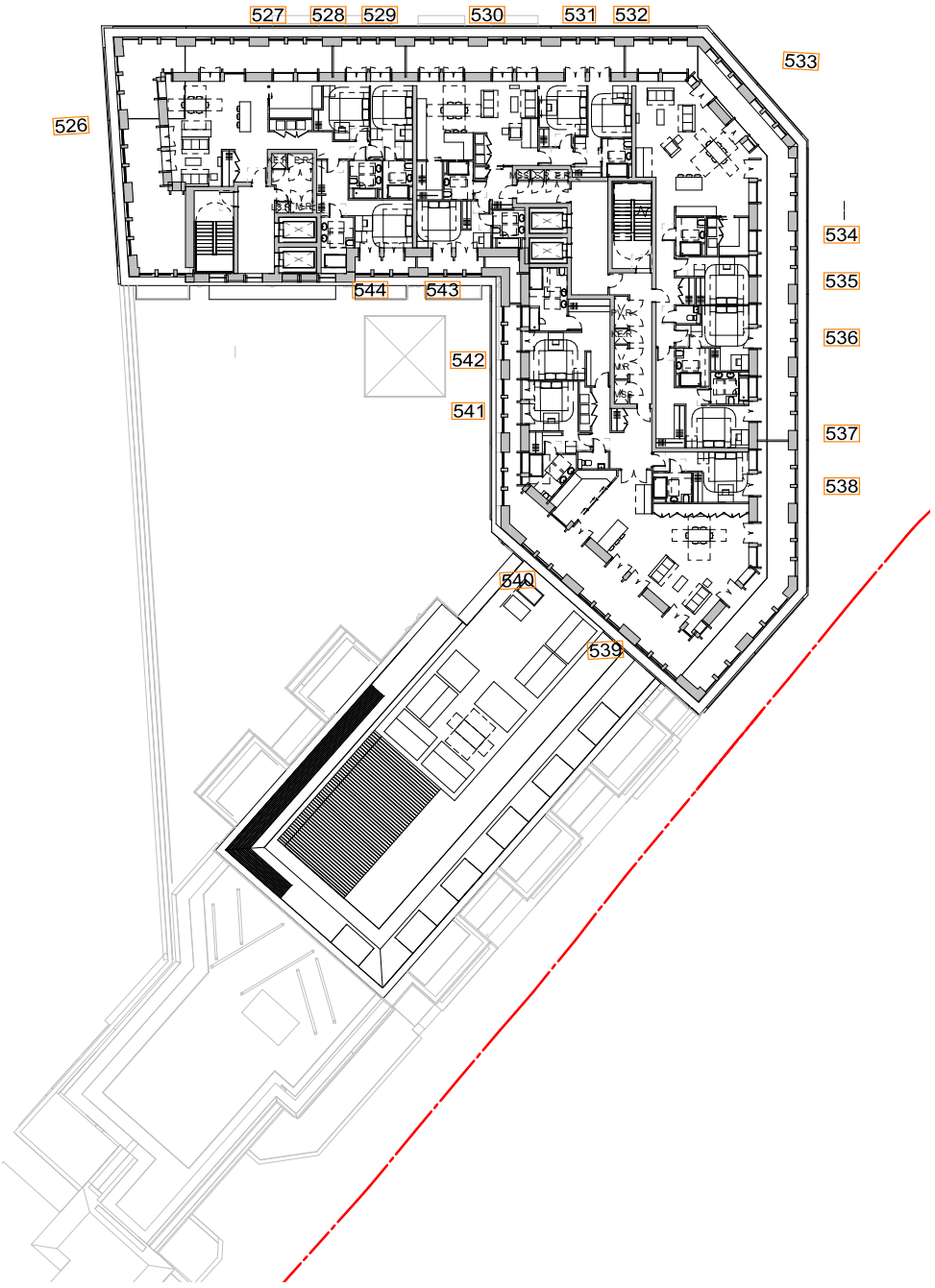


Fig. 25: Floor Plan

Building B - Tenth Floor

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
Building B - TENTH FLOOR							
545	Bedroom	7.9	100	N/A			
546	L/K/D	5.3	100	N/A			
547	L/K/D	3.9	98	N/A			
548	Bedroom	6.8	100	N/A			
549	Bedroom	5.7	100	MET			
550	Bedroom	2.6	94	MET			
551	Bedroom	2.8	94	MET			
552	L/K/D	6.1	100	N/A		100	30
553	Bedroom	7.2	100	N/A			
554	Bedroom	3.6	84	MET			
555	Bedroom	3.7	93	MET			
556	Bedroom	5.7	99	MET			

Table 20: Assessment Data

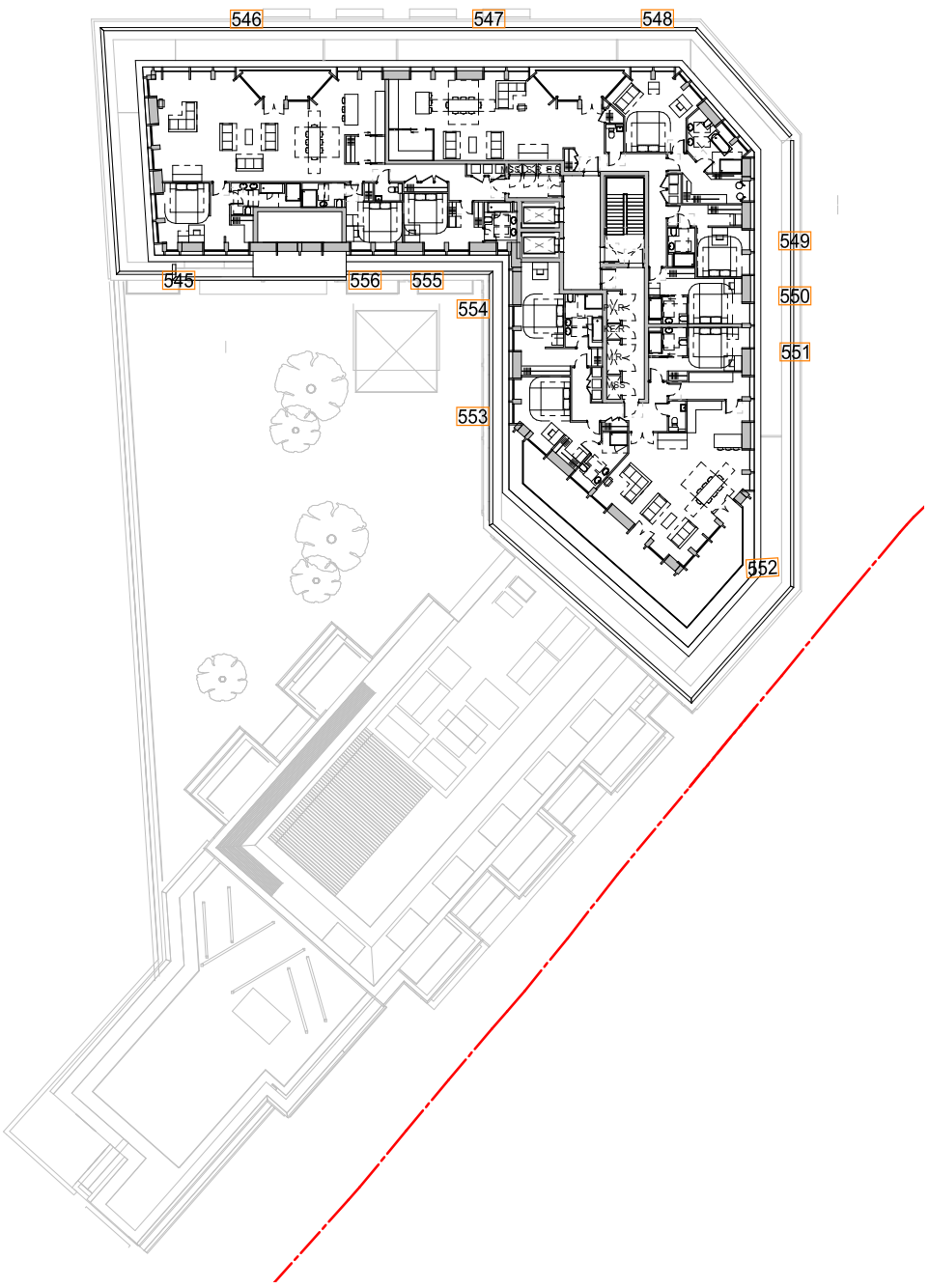


Fig. 26: Floor Plan

Building C - First Floor

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION		SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC	ANNUAL	WINTER
Building C - FIRST FLOOR						
557	Living Room	1.1	98	MET		
558	Living Room	1.1	100	MET		
559	Bedroom	1.1	92	MET		
560	Bedroom	1.1	94	MET		
561	Living Room	1.5	99	MET		
562	Bedroom	1.3	94	MET		
563	Living Room	1.1	96	N/A	34	7
564	Bedroom	0.8	73	MET		
565	Bedroom	1.1	78	MET		
566	Bedroom	0.8	61	MET		
567	L/K/D	1.4	96	N/A	37	14
568	Living Room	1.2	84	MET	39	12
569	Bedroom	1	51	N/A		
570	Bedroom	0.8	33	MET		
571	Bedroom	0.4	22	MET		
572	Bedroom	0.5	24	MET		
573	Living Room	0.6	25	N/A	27	4
574	Living Room	0.5	21	MET	16	4
575	Bedroom	0.8	36	MET		
576	Bedroom	0.9	50	MET		
577	Bedroom	1.3	60	MET		
578	Bedroom	0.8	64	MET		
579	Bedroom	0.5	5	MET		
580	L/K/D	0.8	38	N/A	3	0
581	Bedroom	0.3	14	MET		
582	Bedroom	0.5	21	MET		
583	Bedroom	0.4	18	MET		

Table 21: Assessment Data

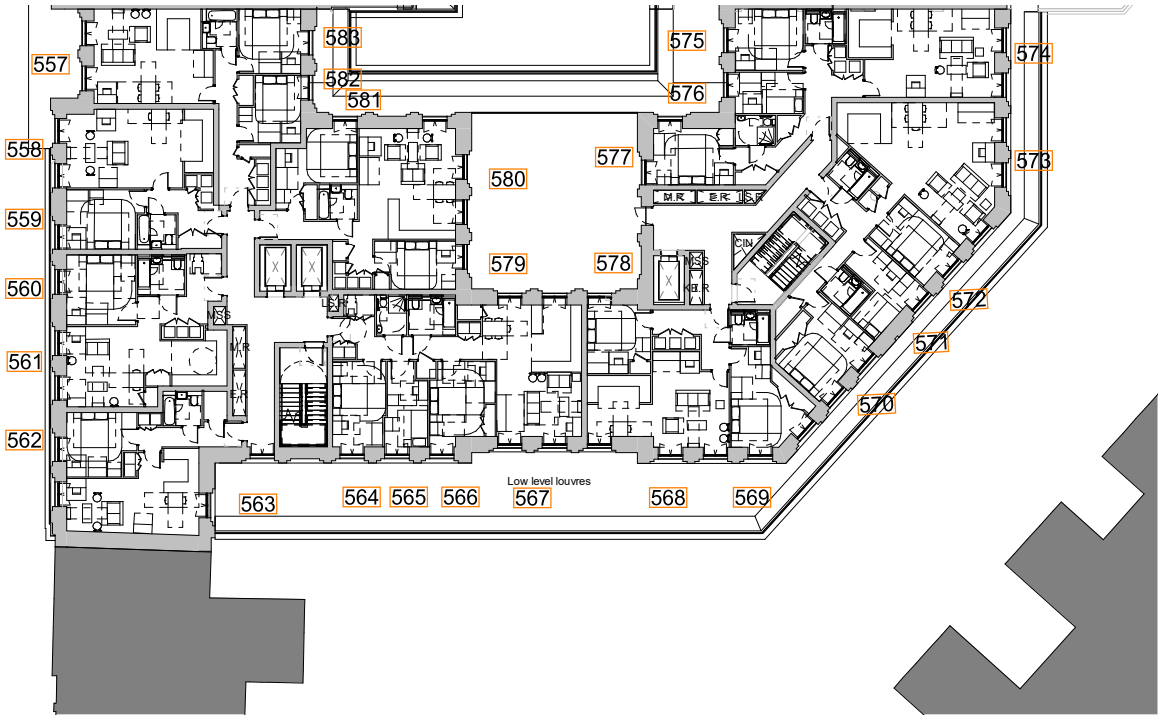


Fig. 27: Floor Plan

Building C - Second Floor

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
Building C - SECOND FLOOR							
584	Living Room	1.3	98	MET			
585	Living Room	1.4	99	MET			
586	Bedroom	1.2	91	MET			
587	Bedroom	1.3	97	MET			
588	Bedroom	1.2	97	MET			
589	Bedroom	1.4	99	MET			
590	Bedroom	1.3	89	MET			
591	L/K/D	0.9	95	N/A		37	9
592	Bedroom	0.8	77	MET			
593	Bedroom	1.2	86	MET			
594	Bedroom	0.8	68	MET			
595	L/K/D	1.5	98	N/A		43	18
596	Living Room	1.3	94	MET		44	16
597	Bedroom	1.2	72	N/A			
598	Bedroom	1	72	MET			
599	Bedroom	0.6	46	MET			
600	Bedroom	0.7	59	MET			
601	Living Room	0.8	49	N/A		40	11
602	Living Room	0.7	44	MET		23	6
603	Bedroom	0.9	60	MET			
604	Bedroom	1.1	79	MET			
605	Bedroom	1.4	65	MET			
606	Bedroom	0.9	69	MET			
607	Bedroom	0.5	7	MET			
608	L/K/D	0.8	49	N/A		6	0
609	Bedroom	0.4	18	MET			
610	Bedroom	0.6	28	MET			
611	Bedroom	0.6	24	MET			

Table 22: Assessment Data

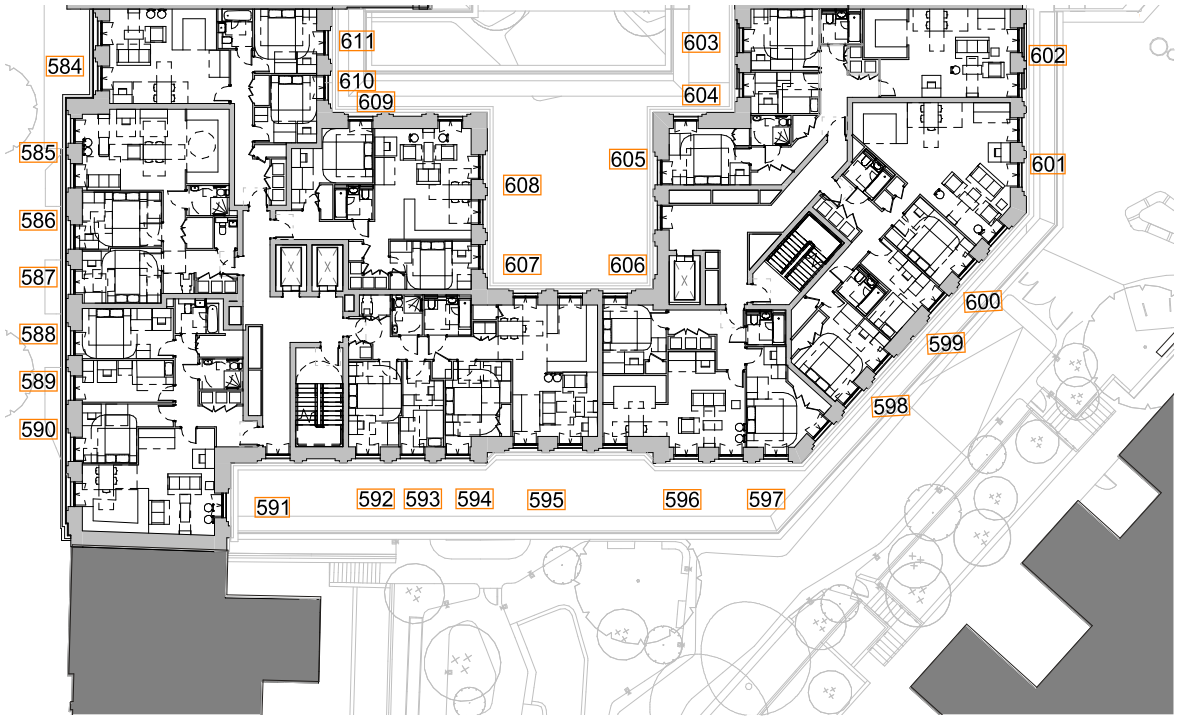


Fig. 28: Floor Plan

Building C - Third Floor

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
Building C - THIRD FLOOR							
612	Living Room	1.3	98	MET			
613	Living Room	1.5	99	MET			
614	Bedroom	1.3	91	MET			
615	Bedroom	1.4	97	MET			
616	Bedroom	1.3	97	MET			
617	Bedroom	1.5	99	MET			
618	Bedroom	1.4	89	MET			
619	L/K/D	1	96	N/A		42	12
620	Bedroom	1	90	MET			
621	Bedroom	1.3	96	MET			
622	Bedroom	0.9	83	MET			
623	L/K/D	1.7	100	MET		51	23
624	Living Room	1.5	96	MET		53	23
625	Bedroom	1.5	99	N/A			
626	Bedroom	1.5	98	MET			
627	Bedroom	0.9	79	MET			
628	Bedroom	1	96	MET			
629	Living Room	1.1	96	N/A		52	20
630	Living Room	0.9	88	MET		33	13
631	Bedroom	1.1	74	MET			
632	Bedroom	1.3	95	MET			
633	Bedroom	1.6	75	MET			
634	Bedroom	1	74	MET			
635	Bedroom	0.6	12	MET			
636	L/K/D	1	56	N/A		11	2
637	Bedroom	0.5	25	MET			
638	Bedroom	0.8	42	MET			
639	Bedroom	0.7	36	MET			

Table 23: Assessment Data

Fig. 29: Floor Plan

Building C - Fourth Floor

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
Building C - FOURTH FLOOR							
640	Living Room	1.4	98	MET			
641	Living Room	1.6	99	MET			
642	Bedroom	1.2	94	MET			
643	Bedroom	1.5	98	MET			
644	Bedroom	1.3	96	MET			
645	Bedroom	1.5	98	MET			
646	Living Room	1.9	99	N/A		26	5
647	L/K/D	1.8	99	N/A		57	23
648	Bedroom	0.5	40	MET			
649	Bedroom	0.8	18	MET			
650	Bedroom	0.8	18	MET			
651	Bedroom	1.4	58	N/A			
652	Bedroom	0.6	27	MET			
653	Bedroom	1	61	MET			
654	Bedroom	0.7	44	MET			
655	Bedroom	1.1	83	MET			
656	Bedroom	1.2	98	MET			
657	Bedroom	1.6	85	MET			
658	L/K/D	2	99	N/A		56	24
659	Bedroom	2.3	100	N/A			
660	Bedroom	1.2	91	MET			
661	Bedroom	1.5	97	MET			
662	Bedroom	1.3	97	MET			
663	Living Room	1.4	99	N/A		57	24
664	Living Room	0.9	87	MET		37	14

Table 24: Assessment Data

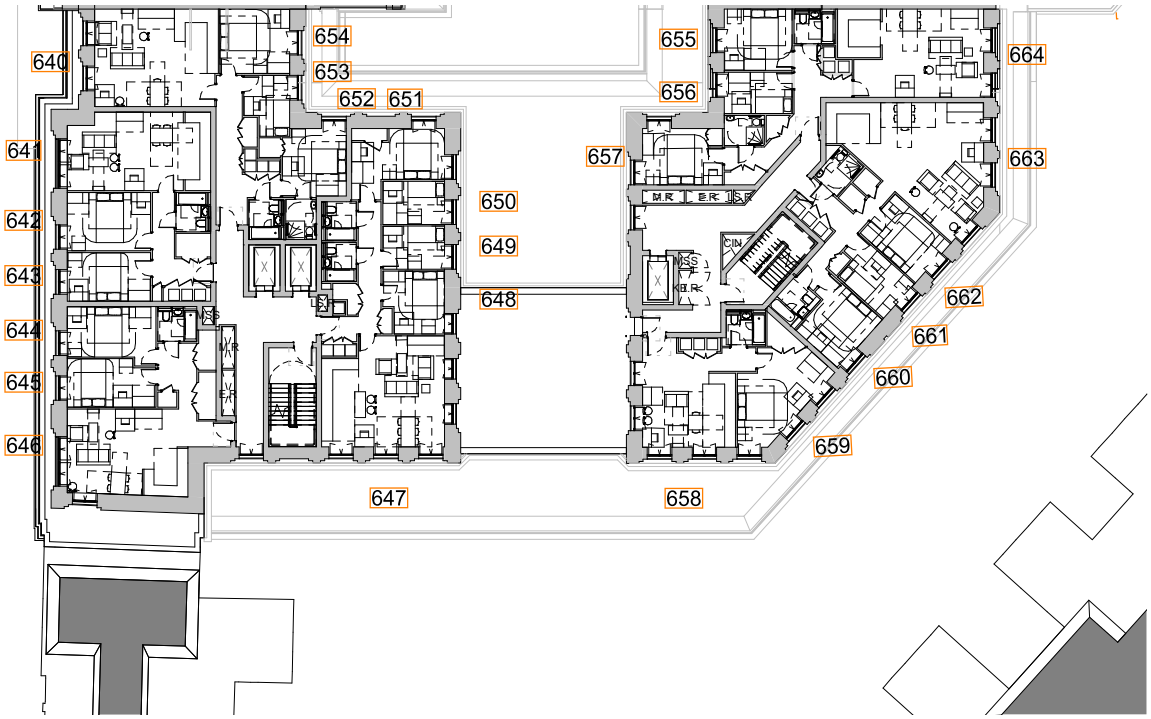


Fig. 30: Floor Plan

Building C - Fifth Floor

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
Building C - FIFTH FLOOR							
665	Bedroom	3	97	N/A			
666	Bedroom	2	97	MET			
667	Bedroom	2.3	96	MET			
668	L/K/D	1.5	100	N/A		55	22
669	L/K/D	2.2	99	N/A		71	25
670	Bedroom	0.9	31	MET			
671	Bedroom	1	43	MET			
672	Bedroom	2	68	N/A			
673	Bedroom	1.3	97	MET			
674	Bedroom	1.1	79	MET			
675	Bedroom	2	95	MET			
676	Bedroom	1.3	93	MET			
677	Bedroom	1.5	98	MET			
678	Bedroom	1.9	89	N/A			
679	Living Room	2.4	100	N/A		56	24
680	Bedroom	2.4	100	N/A			
681	Bedroom	2.2	97	MET			
682	L/K/D	1.3	95	MET		56	28
683	Living Room	1.7	96	N/A		59	25
684	Bedroom	1.3	93	MET			
685	Living Room	1.1	90	MET		37	14

Table 25: Assessment Data

Fig. 31: Floor Plan

Building C - Sixth Floor

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
Building C - SIXTH FLOOR							
686	L/K/D	2.8	99	N/A			
687	L/K/D	2.5	100	N/A		78	27
688	Bedroom	1.1	90	MET			
689	Bedroom	1.4	87	MET			
690	Bedroom	1.4	89	MET			
691	Bedroom	2	85	N/A			
692	Bedroom	1.6	82	MET			
693	Bedroom	1.4	95	MET			
694	Bedroom	1.6	98	MET			
695	Bedroom	2.2	93	N/A			
696	Living Room	2.6	100	N/A		56	24
697	Bedroom	2.5	100	N/A			
698	Bedroom	2.3	97	MET			
699	L/K/D	1.3	95	MET		57	28
700	Living Room	1.8	96	N/A		64	27
701	Bedroom	1.4	98	MET			
702	Living Room	1.2	96	MET		39	14

Table 26: Assessment Data

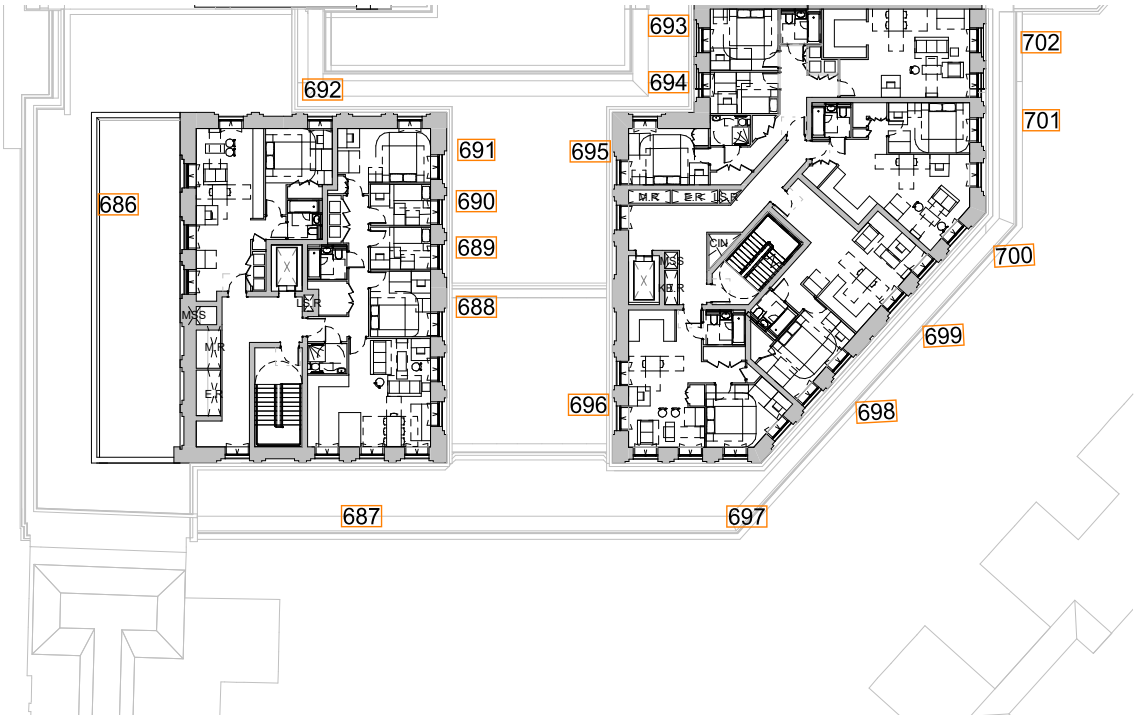
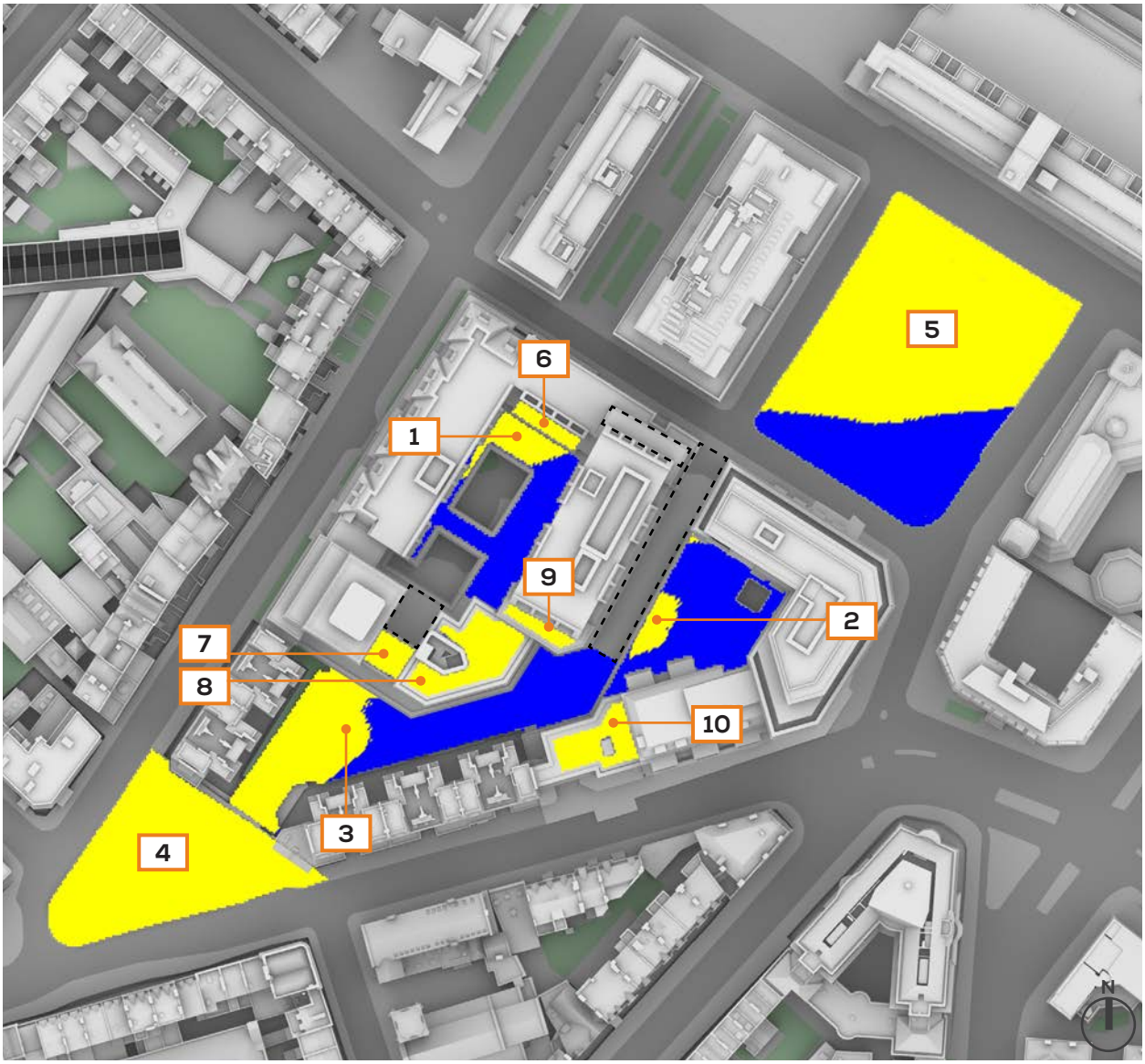


Fig. 32: Floor Plan

9 OVERSHADOWING ASSESSMENT

AMENITY WITHIN THE SITE

OVERSHADOWING ASSESSMENT
SUN HOURS ON GROUND - BRE COMPLIANCE - 21ST MARCH



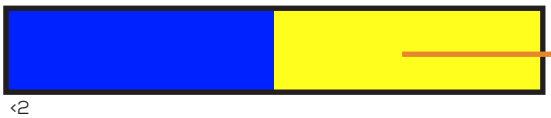
(BRE RECOMMENDS 2+ HOURS OF SUNLIGHT ON 21ST MARCH FOR AT LEAST 50% OF THE OPEN SPACE)

PERCENTAGE OF EACH AREA RECEIVING 2+ HOURS OF SUNLIGHT ON 21ST MARCH:

AREA 01 (COURTYARD): 23%
AREA 02 (COURTYARD): 13%
AREA 03 (GROUND FLOOR): 43%
AREA 04 (SQUARE): 100%
AREA 05 (SQUARE): 72%
AREA 06 (TERRACE): 100%
AREA 07 (TERRACE): 96%
AREA 08 (TERRACE): 99%
AREA 09 (TERRACE): 100%
AREA 10 (TERRACE): 99%

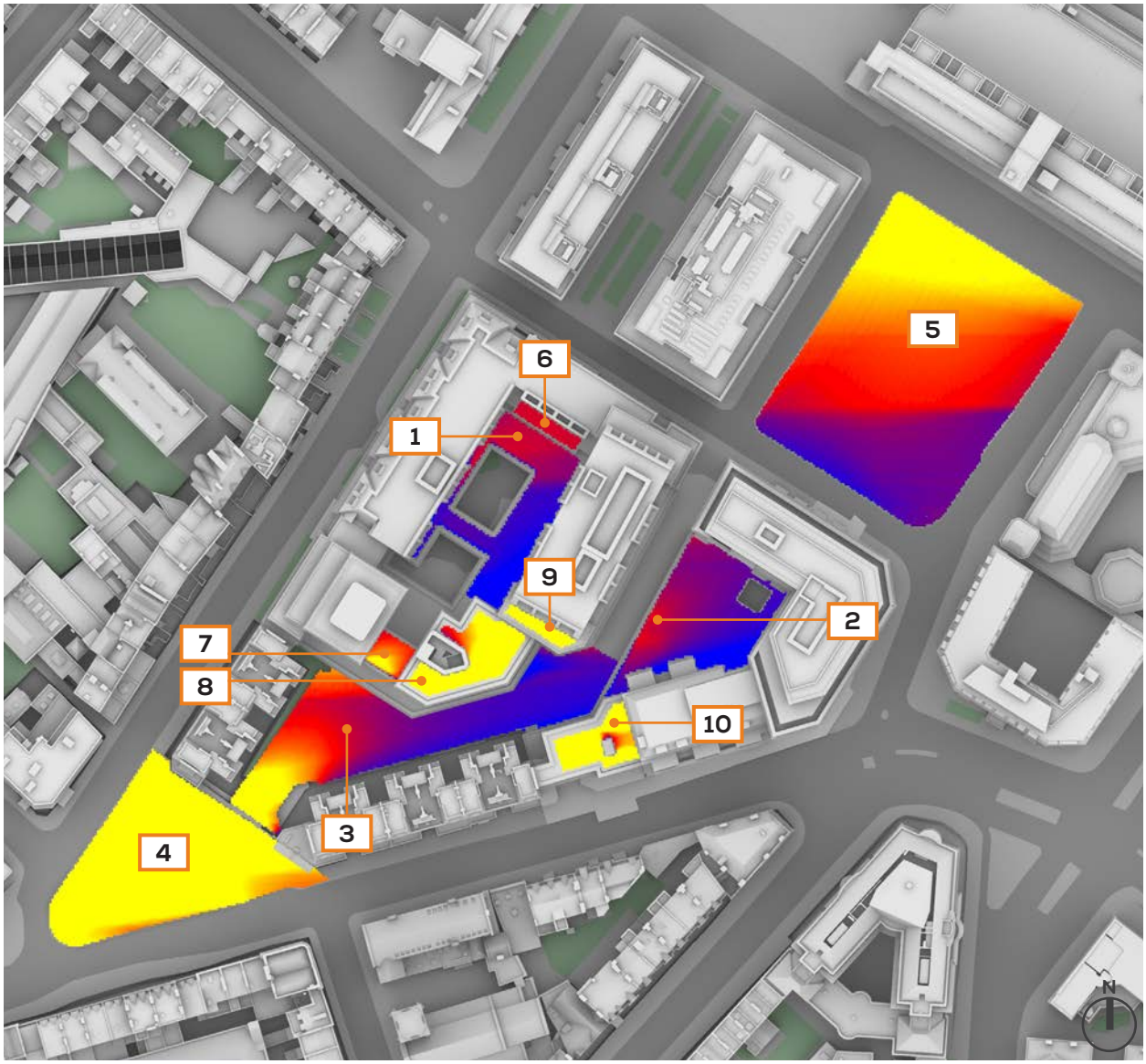
AREAS WITHOUT EXPECTATION OF SUNLIGHT

SUN HOURS ON GROUND



Area receiving at least 2 hours of direct sunlight on 21st March

OVERSHADOWING ASSESSMENT
SUN EXPOSURE ON GROUND - 21ST MARCH



SUN EXPOSURE
TOTAL HOURS

0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0+

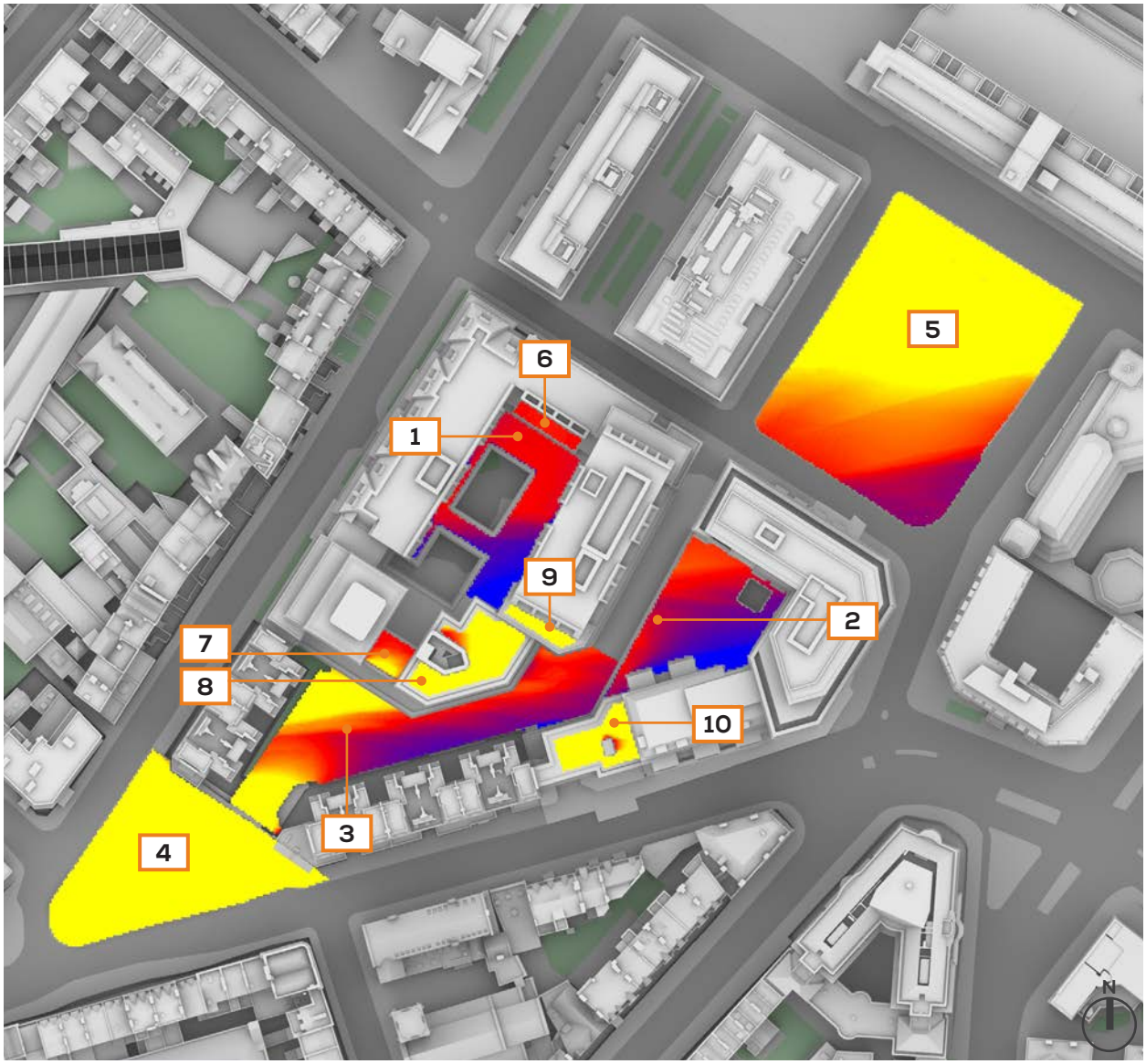
21st MARCH (SPRING EQUINOX)

LONDON

Latitude:	51.4
Longitude:	0.0
Sunrise:	06:02 GMT
Sunset:	18:14 GMT

Total Available Sunlight:
12hrs 12mins

OVERSHADOWING ASSESSMENT
SUN EXPOSURE ON GROUND - 21ST APRIL



SUN EXPOSURE
TOTAL HOURS

0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0+

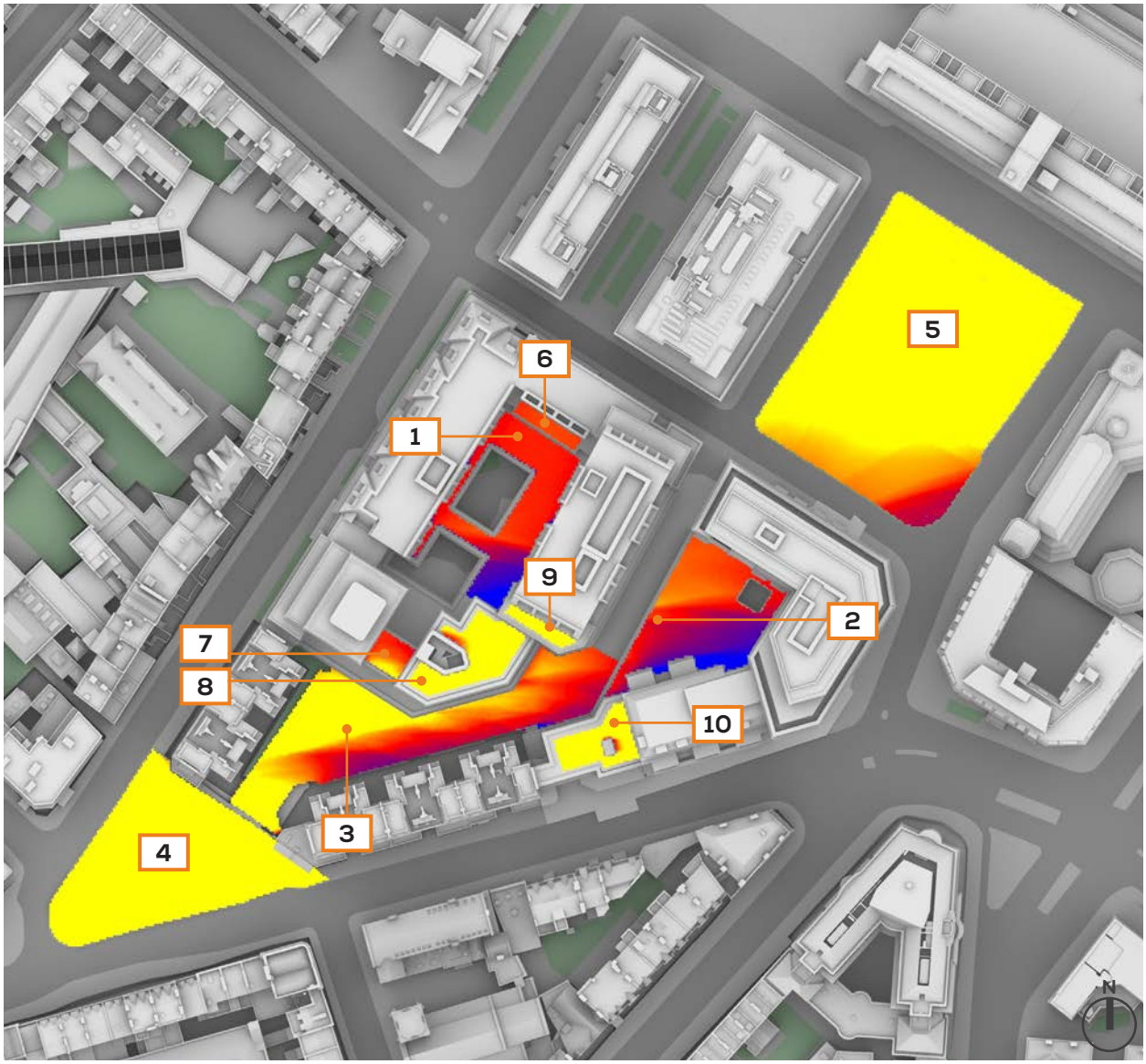
21st APRIL

LONDON

Latitude:	51.4
Longitude:	0.0
Sunrise:	05:53 BST
Sunset:	20:06 BST

Total Available Sunlight:
14hrs 14mins

OVERSHADOWING ASSESSMENT
SUN EXPOSURE ON GROUND - 21ST MAY



SUN EXPOSURE
TOTAL HOURS

0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0+

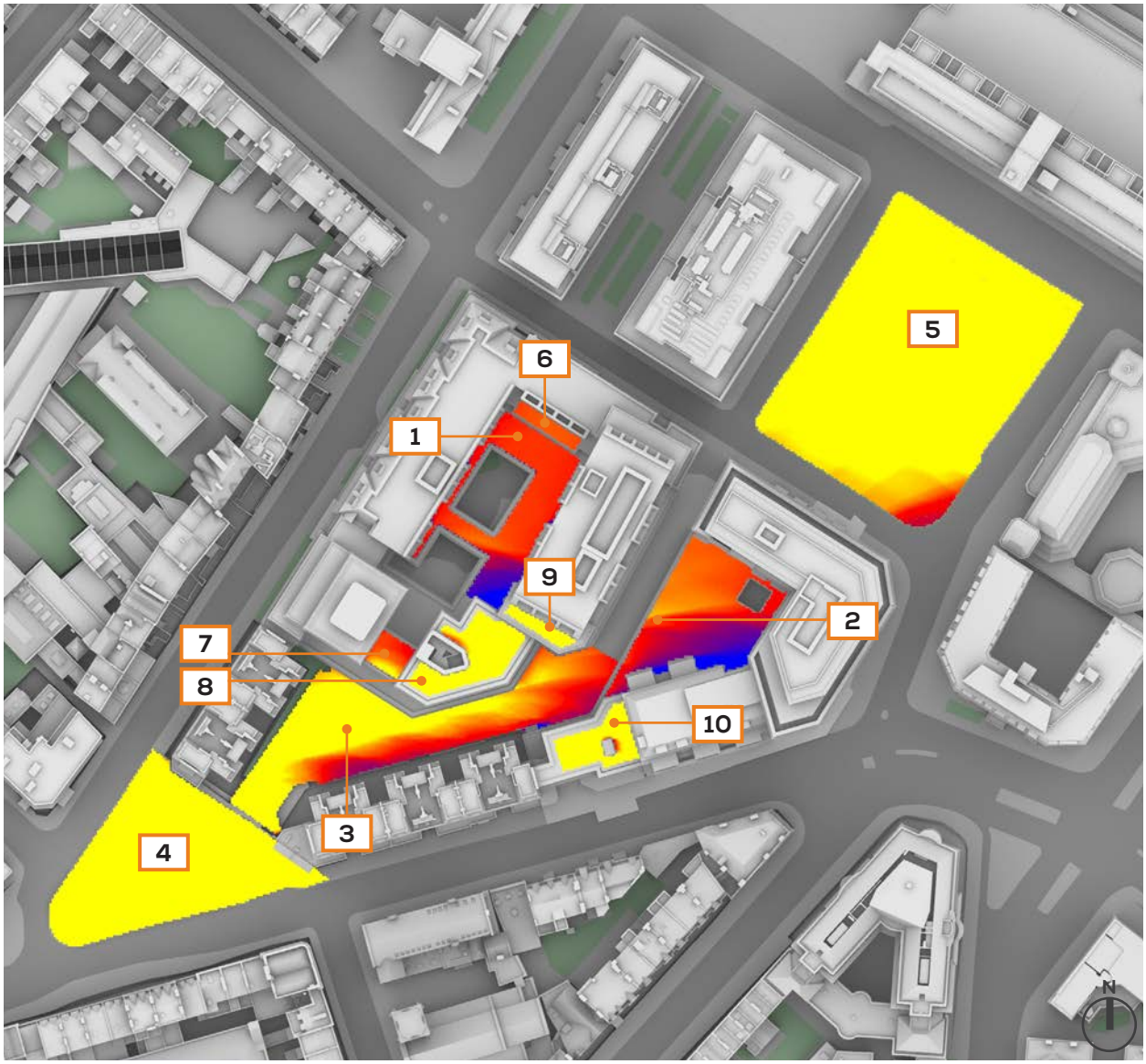
21st MAY

LONDON

Latitude:	51.4
Longitude:	0.0
Sunrise:	05:00 BST
Sunset:	20:54 BST

Total Available Sunlight:
15hrs 53mins

OVERSHADOWING ASSESSMENT
SUN EXPOSURE ON GROUND - 21ST JUNE



SUN EXPOSURE
TOTAL HOURS

0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0+

21st JUNE
(SUMMER SOLSTICE)

LONDON

Latitude:	51.4
Longitude:	0.0
Sunrise:	04:43 BST
Sunset:	21:21 BST

Total Available Sunlight:
16hrs 38mins

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