



DAYLIGHT & SUNLIGHT

INTERNAL DAYLIGHT AND SUNLIGHT
ASSESSMENT

Plots E and F

Station Hill, Reading

13 March 2019

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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. This report has been prepared to support the submission of the Reserved Matters Application of Station Hill, Plots E & F. Contained within this report are the final assessments undertaken for all proposed units within Plots E and F of the Station Hill redevelopment.

GIA has worked comprehensively with the architects throughout the design process in order to ensure the scheme performs as well as possible in terms of daylight and sunlight amenity. Owing to the schemes high-density nature, a number of design strategies have been incorporated to maximise daylight ingress, as discussed in section 5.2.

The proposed development makes the most of the available daylight with 1003 (79%) of the 1270 habitable rooms meeting or exceeding the levels of Average Daylight Factor (ADF) recommended by the BRE. However, as is typical within urban schemes, lower levels of daylight are to be expected on façades that face other developments either in the form of adjacent buildings or into a courtyard.

As is common of high-density urban locations and courtyard schemes, lower levels of sky visibility are to be expected, where 691 (54%) of the 1270 habitable rooms are meeting or exceeding the BRE recommendation for No-Sky Line (NSL). The design has however sought to maximise the NSL through careful balcony placement, shallow rooms and increased distance between adjacent façades. To aid in the distribution of daylight within the proposed habitable rooms, all applicable rooms have been designed in accordance with the Room Depth Criterion (RDC).

In terms of sunlight, the proposed development sees good levels in both the summer and winter within 72% of the living rooms facing within 90° of due south. Slightly lower levels of sunlight can be seen behind or beneath balconies. This is an expected consequence of the balconies intercepting high-angle sun thus working as shading devices.

Some isolated areas within the west façade of Plot F and the Plot E courtyards are also experiencing lower levels of sunlight where the living rooms look onto other development façades. These areas are generally located on the lower floors where the adjacent buildings obstruct the low-angle sun, however, this is in line with the end users' expectation for a high density urban development, as discussed within the BS8206-2.

The proposed public and communal amenity areas of Plots E and F offer future residents a variety of open spaces to enjoy on a sunny day. The main public realm, Friars Walk, is well sunlit as it exceeds the BRE recommendation for Sun Hours on Ground (SHOG) with 53% of its area seeing two or more hours of direct sunlight on 21st March and in excess of six hours of direct sunlight on 21st June. As is common of courtyard schemes, lower levels of sun exposure are seen within the ground level amenity areas, however, very well sunlit roof terraces have been provided on both plots to offer residents an alternative space to use on sunny winter days.

We therefore conclude that the Plots E and F make the most of the available daylight and sunlight, and the design team have responded to the sites constraints by maximising daylight and sunlight provision throughout the scheme. The achieved levels are overall good and commensurate with recently consented schemes in Reading and of similar nature in London. As such, we can conclude that the scheme offers future residents good levels of daylight and sunlight amenity.

2 INTRODUCTION

1.1 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 CallisonRTKL. GIA was specifically instructed to carry out the following:

- To create a 3D computer model of the proposal based upon drawings prepared by CallisonRTKL.
- 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 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.

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.

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. These are summarised below.

Average Daylight Factor (ADF)

"If a predominantly daylight 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 daylight 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 Part2 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 daylight. 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 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. Further more, 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"*.

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)*
- *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."

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 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."

4 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 CallisonRTKL. 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.

Table 01: Typical reflectance, transmittance and maintenance factors

REFLECTANCE VALUES:		MAINTENANCE FACTORS: GLAZING TYPE		TV (Normal)	A.3	A.4	A.5	A.6	TV (Total)
Surrounding	0.2	Triple Low-E (frames modelled)	0.63	8	1	1	1	1	0.58
Pavement	0.2	Triple Low-E (frames not modelled)	0.63	8	1	1	1	0.8	0.46
Grass	0.1	Triple Low-E (inclined, frames modelled)	0.63	8	2	1	1	1	0.53
Water	0.1	Triple Low-E (inclined, frames not modelled)	0.63	8	2	1	1	0.8	0.42
Yellow brick	0.3	Triple Low-E (horizontal, frames modelled)	0.63	8	3	1	1	1	0.48
Red brick	0.2	Triple Low-E (horizontal, frames not modelled)	0.63	8	3	1	1	0.8	0.38
Portland Stone	0.6								
Concrete	0.4	Double Low-E (frames modelled)	0.75	8	1	1	1	1	0.69
Internal walls (light grey)	0.68	Double Low-E (frames not modelled)	0.75	8	1	1	1	0.8	0.55
Internal ceiling (white paint)	0.85	Double Low-E (inclined, frames modelled)	0.75	8	2	1	1	1	0.63
Internal floor (medium veneer)	0.3	Double Low-E (inclined, frames not modelled)	0.75	8	2	1	1	0.8	0.50
Internal floor (light veneer)	0.4	Double Low-E (horizontal, frames modelled)	0.75	8	3	1	1	1	0.57
		Double Low-E (horizontal, frames not modelled)	0.75	8	3	1	1	0.8	0.46
TRANSMITTANCE VALUES		TV							
Triple glazing (Low-E): Pilkington K Glass 4/12/4/12/4 Argon filled 90%	0.63	Single (frames modelled)	0.9	8	1	1	1	1	0.83
		Single (frames not modelled)	0.9	8	1	1	1	0.8	0.66
Double glazing (Low-E): Pilkington K Glass 4/16/4 Argon filled 90%	0.75	Single (inclined, frames modelled)	0.9	8	2	1	1	1	0.76
		Single (inclined, frames not modelled)	0.9	8	2	1	1	0.8	0.60
Single glazing: Pilkington Optifloat Clear 4mm Annealed	0.90	Single (horizontal, frames modelled)	0.9	8	3	1	1	1	0.68
		Single (horizontal, frames not modelled)	0.9	8	3	1	1	0.8	0.55
Translucent glazing (Low-E): Pilkington Optifloat Opal - 4mm K /16/4mm Opal	0.74	Double Translucent Low-E (frames modelled)	0.74	8	1	1	1	1	0.68
		Double Translucent Low-E (frames not modelled)	0.74	8	1	1	1	0.8	0.54
		Double Translucent Low-E (inclined, frames modelled)	0.74	8	2	1	1	1	0.62
		Double Translucent Low-E (inclined, frames not modelled)	0.74	8	2	1	1	0.8	0.50
		Double Translucent Low-E (horizontal, frames modelled)	0.74	8	3	1	1	1	0.56
		Double Translucent Low-E (horizontal, frames not modelled)	0.74	8	3	1	1	0.8	0.45

5 DESIGN EVOLUTION & CONCLUSIONS

5.1 OUTLINE SCHEME

Plots E and F are located in the southern portion of the Station Hill Masterplan and are consented in outline for residential uses. Within Chapter 16 of the 2015 ES, Vertical Sky Component (VSC) facade studies were presented for the maximum parameter envelope of Plots E and F. An illustrative scheme for Plot E is also included within the Outline Planning Permission (OPP) which consists of a large central courtyard.

Within the 2015 ES, the VSC facade studies identified that care would be needed in the detailed design of these plots owing to the density of the scheme and its urban location. This was demonstrated by just 50% of the façades of Plot E and 25% of the façades of Plot F meeting the VSC recommendation of 27%. Furthermore, 34% of the façades of Plot E and 45% of the façades of Plot F were found to experience a VSC of 15% or less, which generally proves a more challenging starting point from which to offer acceptable levels of light indoors.

That said, VSC levels of 15% are typical of built up areas and city centres. As such it was anticipated that in specific areas of the proposed buildings, the daylight levels may not comply with the nationally applicable numerical recommendations of the BRE guidelines, in particular where the façades face the North Site (Plots D and G in particular).

The key departures from the OPP illustrative scheme comprises the opening of the eastern facade and the creation of two courtyards. Daylight and Sunlight was a key driver in the decision, as it allows better quality of amenity to the courtyards, public realm and Plot F.

It is also worth noting that the OPP was for standard residential uses whilst the proposed development is Build-to-Rent and therefore required a variation on the product compared to what the illustrative scheme offered.

5.2 DESIGN OPTIMISATION

Owing to the plot's inherent design constraints, GIA and the architects, CallisonRTKL, have worked closely to maximise the ingress of daylight and sunlight. In terms of daylight, sunlight and overshadowing levels, the primary constraints of Plots E and F are typical of its urban location.

In response to the site constraints identified in the OPP, numerous preliminary daylight and sunlight assessments were undertaken to inform the Development from the early design stages through to this RMA submission. This iterative process led to a number of design changes that seek to maximise the daylight and sunlight conditions within the Development. The following aspects of the design were influenced by this process:

Massing Strategy

The massing has been refined to improve the daylight reaching the building façades and sunlight ingress into the courtyard. This has included:

- a stepped northern facade to provide greater distance between Plots D and E;
- an optimised footprint to increase the number of dual-aspect living rooms and remove acute corners;
- opening of the eastern elevation of Plot E to improve daylight and sunlight within Friars Walk, the courtyards of Plot E and the western elevation of Plot F; and
- an increased gap between Plots E and F to improve daylight availability to their respective façades, and sunlight to the Central Square of the North Site.

Layout Evolution

To provide better quality of accommodation, the decision was made at the outset to reduce unit depths to 7.2m compared to the standard 8m. This decision was beneficial to the daylight performance as it led to shallower rooms and better light distribution.

Furthermore, the internal layouts have evolved to maximise daylight ingress within living areas, where daylight is most valued. As a result, many living rooms enjoy dual aspects. Single aspect units have been designed to give priority to the living space over the kitchen and bedrooms, by including breakfast bars to delineate the front and back part of the living/

kitchen/dining rooms.

Balcony Strategy

Daylight availability has informed the balcony strategy. Projecting balconies have been provided on the upper floors and south facing units where the daylight availability is generally very good, whilst on the northern façades and lower floors where daylight is more challenged, the majority of units have been provided with Juliette balconies to minimise the obstruction of windows beneath.

Fenestration

In areas of lower daylight potential, window sizes have been maximised to deliver greater daylight ingress. This has also included increased floor to ceiling heights on the ground floor of the northern courtyard and chamfered reveals to allow greater light to be captured from either end of Garrard Street.

Surface Finishes

Lighter surface finishes have been applied to reflect light deeper into the rooms. This is achieved by the adoption of light colour bricks in the courtyard and a lighter veneer for the flats' flooring.

Open Space Strategy

Roof terraces have been introduced in both plots to provide future occupants with additional open space which is well sunlit throughout the year.

Given the nature of the site, and the comprehensive optimisation process carried out, we believe the Development makes best use of the daylight and sunlight available to the Site and provides very good daylight and sunlight amenity overall.

5.3 DAYLIGHT

In order to ascertain the levels of daylight within the Development, all habitable rooms have been assessed for Average Daylight Factor (ADF), No Sky Line (NSL) and Room Depth Criterion (RDC).

The results given on pages 20-87 show that 79% (1003 out of 1270) of the habitable rooms within the Development will see levels of ADF that either meet or exceed the BRE recommendations. In addition, the Development delivers acceptable distribution of daylight given its urban context and courtyard configuration, with 54% of the rooms seeing levels of NSL that meet or exceed the BRE recommendation. Furthermore, all applicable rooms have been designed in accordance with BRE's RDC.

Within Plot E, 722 (82%) of the 886 rooms meet or exceed BRE guidance for ADF and 487 (55%) meet the recommendation for NSL. An additional 12 open-plan living/kitchen/dining rooms that fall short of the recommendation of 2% for rooms with a kitchen, meet or exceed the BRE recommendation of 1.5% ADF for living rooms and can therefore be considered acceptably daylight.

Within Plot F, 281 (73%) of the 384 rooms meet or exceed BRE guidance for ADF and 204 (53%) meet the recommendation for NSL. Furthermore, 11 open-plan living/kitchen/dining rooms that fall short of the recommendation of 2% meet or exceed the recommended 1.5% ADF for living rooms and can therefore be considered acceptably daylight.

Overall, main living spaces were the primary focus within this Development as they are the areas where occupants spend most of their time during daylight hours and good daylight is most valued. As a result of the design teams' efforts to deliver well daylight living spaces, 382 (73%) of the 526 main living spaces (both open-plan living/kitchen/dining rooms and independent living rooms) meet or exceed the BRE recommendation of 1.5% ADF. Of the remaining 124 main living spaces, a further 27 fall marginally below the recommended level, with 1.3% or 1.4% ADF.

71 of the remaining 117 main living spaces see lower levels of daylight owing to their location on the lower floors in close proximity to other Development façades namely Plots D, G and E itself, including those within the northern courtyard. Within these 76 rooms the windows have been maximised and priority has been given to daylight within the living area. Lower levels of light in areas such as this are an expected consequence of the urban location of the scheme, and were anticipated at the outline planning stage.

Whilst the architects have sought to minimise the effects of balconies on daylight performance, 42 of the main living spaces see lower levels of light owing to their main window being obstructed by a balcony overhead and their proximity with another building. The main window serving these rooms has been maximised however this is a typical trade-off in amenity common of most large scale residential developments where balconies provide a valuable form of amenity for the occupants.

The four remaining main living rooms fall short of guidance owing to their corner location and limited facade area for fenestration. The windows have however been maximised.

The Development generally delivers well daylighted bedrooms by way of 86% (631 out of 730) meeting or exceeding the BRE recommendation of 1% ADF. In addition, 46 of the 99 bedrooms that fall short of the recommendation do so marginally (0.1-0.2% ADF lower than the recommendation). The remaining bedrooms see lower levels of light owing to their close relationship with other Development façades, again, this is an expected consequence of the density and urban location of the scheme.

92% (11 out of 12) of the studios, where the kitchen has not been visually separate at the rear, are seeing good levels of daylight and meet or exceed the BRE recommendation of 2% ADF. All other studios are treated as living rooms as they have been designed so as to visually separate the kitchen at the rear which would be more reliant on artificial lighting and would allow the living area and bedroom to appear brighter. The one studio that falls short of guidance is obstructed by an opposite development.

The two kitchens both meet the BRE recommendation of 2% ADF.

Further to good levels of daylight in main living spaces, distribution of daylight has been prioritised within the main living spaces and is evidenced by 62% of the main living spaces and 92% of the studios meeting or exceeding the BRE recommendation for NSL. As is to be expected, bedrooms see lower sky visibility as they have been located within the more obstructed areas of the Development.

Overall, we conclude that the Development performs well with respect to daylight amenity and makes the most of the available daylight. The areas that see lower levels of daylight ingress are in line with what was anticipated within the 2015 ES, and the Development performs very well for a large scale urban development of this nature.

5.4 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 (ASPH) assessments have been undertaken for all living rooms with a window facing within 90 degrees of due south.

The results given on pages 20-87 show that overall the Development delivers well sunlit living areas with 203 (72%) of the 282 that have an expectation of sunlight meeting or exceeding the winter and total levels of APSH recommended by BRE.

Within Plot E, 135 (79%) of the 170 living rooms assessed meet or exceed BRE guidance for total and winter APSH. Whilst 68 (61%) of the 112 living rooms assessed within Plot F meeting or exceeding BRE guidance for total and winter APSH. The 79 rooms falling short of BRE recommendation comprise 34 living rooms and one studio within Plot E as well as 22 living/kitchen/dining rooms and 22 living rooms within Plot F.

As is common of courtyard schemes, 30 rooms on the lower floors of Plot E see lower levels of sunlight. 11 of these 30 rooms would meet the BRE recommendation for annual sunlight however in the winter months, when the sun is lower in the sky, the massing opposite intercepts the sun's rays.

22 rooms see slightly lower levels of sunlight owing to balconies being located overhead in conjunction with the obstruction from adjacent Development massing, as is inherent in any large scale urban development of this nature. This is, however, an expected consequence of the provision of balconies and is a common feature of most modern buildings with balconies. It is worth noting that 21 of these living spaces would see acceptable winter sunlight hours when sunlight ingress within living spaces is most valued.

The images on pages 88-93 demonstrate that in the summer months, occupants of these units served by balconies would be able to enjoy good levels of sunlight on their balconies. This is considered an acceptable trade-off in amenity

where occupants can enjoy good sunlight on their balconies throughout the year and within their living spaces in the winter months when it is most valued and less likely to lead to overheating concerns.

The 26 living rooms of Plot F fall short of guidance owing to their almost due west orientation and close relationship with Plot E. As these windows are westerly facing they only have the potential to capture half the sun path with the greatest availability being in the afternoons when the sun is lower in the sky. It is at these times that the massing of Plot E intercepts the sun's rays from reaching the lower floors of this facade. 13 of these rooms would however meet the recommendation for winter sunlight whilst three see acceptable total APSH. This is an expected consequence of its urban location. The one remaining room is a westerly facing studio within Plot E which is shaded by neighbouring properties.

Overall, we conclude that the Development performs well in terms of sunlight with the exception of isolated areas that are inherent in any large scale urban development and were anticipated within the 2015 ES. We expect the vast majority of future occupants will have access to good levels of sunlight throughout the year.

5.5 OVERSHADOWING

Overshadowing assessments have been undertaken for the areas of public and communal open space provided within the Proposed Development. The results from these assessments are shown on pages 94-97 of this report.

Overall, Plots E and F offers future residents and visitors to the site a variety of sunlit open spaces, where 35% of the total open space provided will see two or more hours of direct sunlight on the 21st of March.

Providing well sunlit public realm was a key consideration of the design team. This lead to the opening of the eastern facade of Plot E to maximise direct sunlight hitting the ground in Friars Walk and improve the sunlit perception of the space through light reflected off the façades of Plots E and F. As a result, Friars Walk exceeds the BRE recommendation with 53% of the area seeing two or more hours of direct sunlight on the 21st March. The 21st June sun exposure image, as shown on page 97, demonstrates that in the summer months Friars Walk will enjoy upwards of six hours of direct sunlight within the central portion.

The adjacent images demonstrate that the proposed Friars Walk enjoys considerably more sunlight throughout the year when compared to the illustrative scheme.

Whilst the design team sought to maximise sunlight within the courtyard amenity areas by opening the eastern facade, lower levels of sunlight reach the ground of Plot E’s two courtyards. This is common of most courtyard schemes and is the case in the consented illustrative scheme.

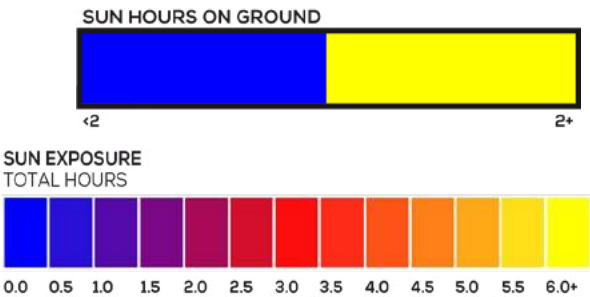
Given the orientation of this plot, the southerly façades will reflect sunlight into the courtyard spaces and increase the perceived brightness on sunny days. The two northern courtyard spaces see less than two hours of direct sunlight on 21st March, whilst the southern courtyard sees 4% of its area with two or more hours of direct sunlight on 21st March.

The annual compliance diagrams on pages 95 show that whilst the courtyards fall short of guidance on the 21st March, the southern courtyard would meet the recommendation of 50% of its area on 25th April, approximately one month later. In addition, the two northern courtyard spaces see two or more hours of direct sunlight within approximately 20% and 37% of their respective areas at the peak of summer. Furthermore, the sun exposure image on page 97 shows that the southern courtyard will enjoy in excess of six hours of direct sunlight on 21st June within much of its area.

Whilst overshadowing within the courtyard has been a concern from the OPP stage and throughout the design stages, the adjacent images demonstrate that overshadowing within the proposed courtyard amenity spaces is in line with that of the illustrative scheme in terms of sun hours on ground. Whilst in the summer months they will perform better than the illustrative scheme.

As a response to the challenging urban location on the site, roof terraces were introduced for residents to access in both Plots E and F. Both roof terraces offer future residents well sunlit amenity space to enjoy on sunny days throughout the year. The terraces see 100% and 94% of their respective areas seeing two or more hours of direct sunlight on 21st March. The sun exposure images on pages 96 and 97 show that both roof terraces will in fact see in excess of six hours of direct sunlight on both 21st March and 21st June.

We therefore conclude that the design seeks to maximise sunlight within the public realm, courtyards and communal roof terraces. This sees future residents of Plots E and F having access to a variety of spaces to enjoy on a sunny day. Lower levels of sunlight hitting the ground within the courtyards are in line with expectation, as the proposed courtyards experience similar levels of overshadowing to the OPP illustrative scheme.



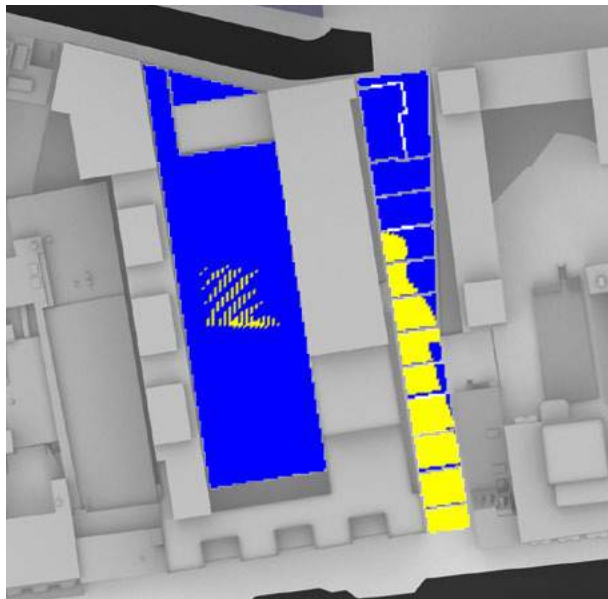


Fig. 01: Illustrative Scheme - Sun Hours on Ground



Fig. 02: Proposed Scheme - Sun Hours on Ground

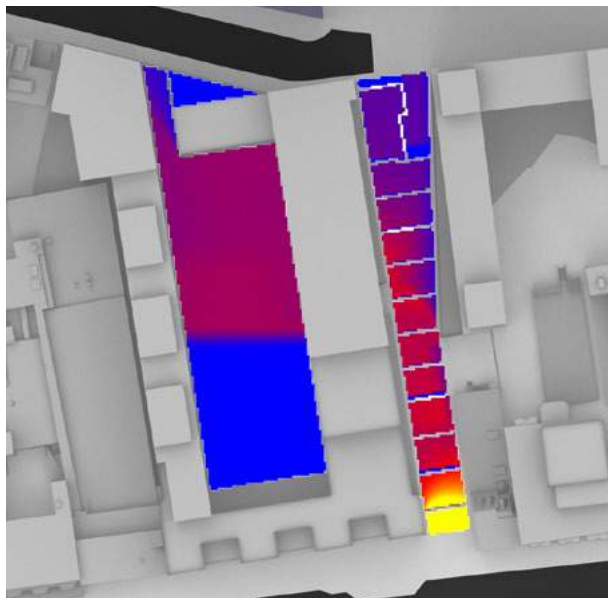


Fig. 03: Illustrative Scheme - March Sun Exposure

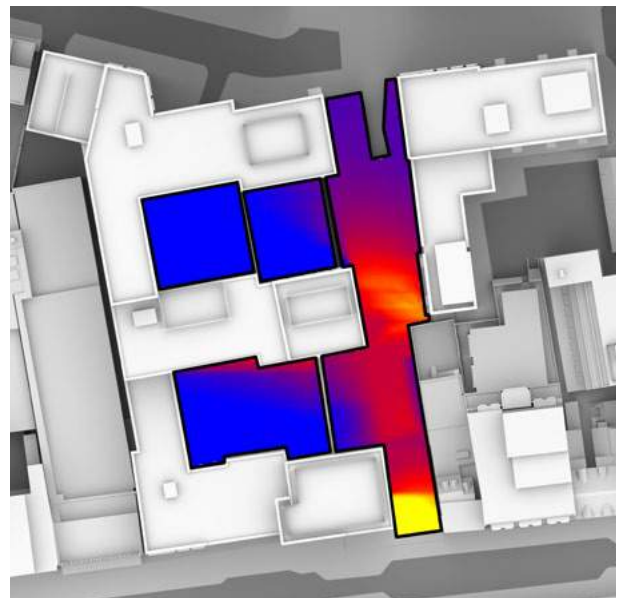


Fig. 04: Proposed Scheme - March Sun Exposure

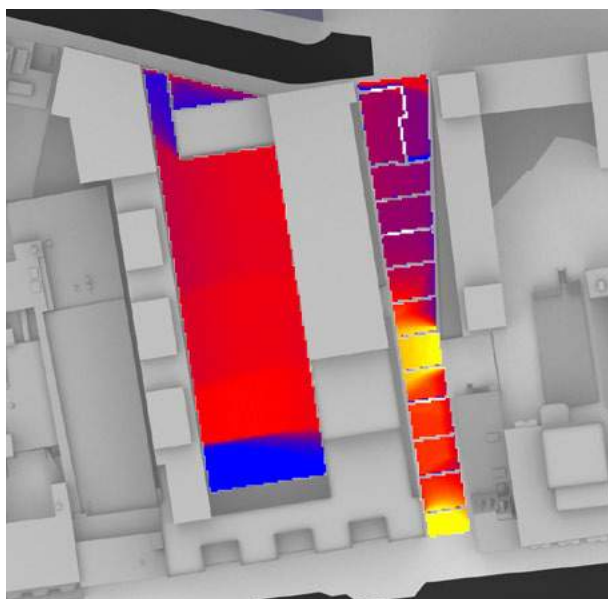


Fig. 05: Illustrative Scheme - June Sun Exposure

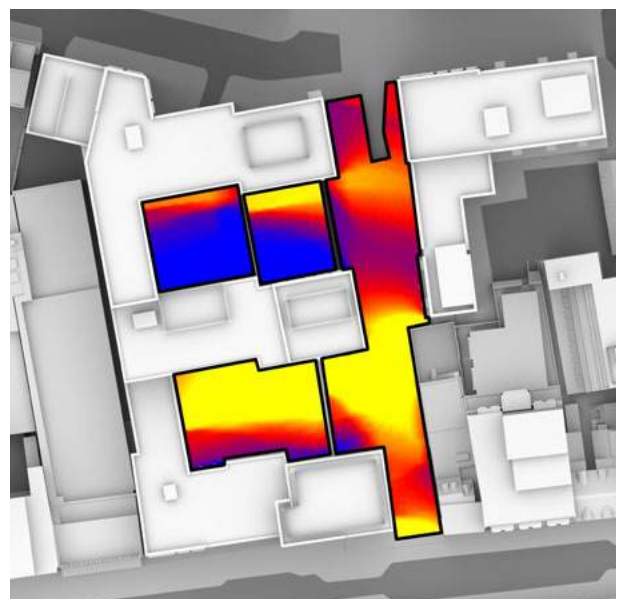


Fig. 06: Proposed Scheme - June Sun Exposure

5.6 CUMULATIVE SCENARIO

It is understood that the neighbouring consented scheme 52-55 Friar Street and 12 Greyfriars Road is unlikely to be implemented, therefore the main assessments and conclusions have been conducted in the proposed scenario, with no neighbouring consented schemes in place. It is however prudent to understand the quantum of alterations should the neighbouring developments come forward. Therefore, the assessments have also been run in a cumulative scenario with the following neighbouring schemes in place, to align with Chapter 16 of the ES Addendum:

- Building B Station Hill 3 (Reserved Matters Application);
- 29-35 Station Road (22 storey tower);
- Garrard House 30 Garrard Street (2 storey extension); and
- 52-55 Friar Street and 12 Greyfriars Road.

Only the 52-55 Friar Street and 12 Greyfriars Road scheme has the potential to impact daylight and sunlight within the proposed development as no windows from Plots E or F overlook 29-35 Station Road or 30 Garrard Street, and given that the consented Building B is within the maximum parameters, it would lead to less obstruction than the maximum parameter massing used in the proposed scenario.

Just 78 rooms within Plot E overlook 52-55 Friars Street and 12 Greyfriars Road, therefore any alterations experienced in the cumulative scenario would be isolated to these 78 rooms. The below summaries therefore provide the performance of the scheme in the cumulative scenario.

In terms of daylight, 970 (76%) of the 1270 rooms would meet or exceed the BRE recommendations for ADF whilst 639 (50%) would meet the BRE recommendation for NSL.

In terms of sunlight, 175 (62%) of the 282 living rooms would meet the BRE recommendations for annual and winter APSH.

In terms of overshadowing, no alteration will be experienced within Friars Walk, the courtyard spaces and the both roof terraces.

As such, a minor alteration in the overall daylight and sunlight amenity would be experienced in the cumulative scenario, however this is attributed to the 52-55 Friar Street and 12 Greyfriars Road scheme which it is understood is unlikely to be implemented. Therefore, the conclusions given for the proposed scenario remain valid should any neighbouring consented schemes come forward.

5.7 OVERALL CONCLUSIONS

The design team sought to maximise daylight and sunlight within the proposed development leading to a multitude of design strategies to enhance the performance. This sees 79% of the proposed habitable rooms achieve good levels of daylight and 72% of the living rooms assessed enjoying good levels of sunlight. Overall, the Development performs very well for a large scale urban development of this nature.

The scheme also offers a variety of spaces to enjoy on a sunny day. Whilst lower levels of sunlight are seen in courtyards, they show an improvement on those of the OPP illustrative scheme in the summer months when people would be most likely to seek well sunlit amenity space.

In addition, the cumulative assessment has shown that in the instance that the neighbouring consents do come forward, there would be a minor alteration to the overall daylight and sunlight performance however the conclusion reported would remain valid.

6 SITE OVERVIEW

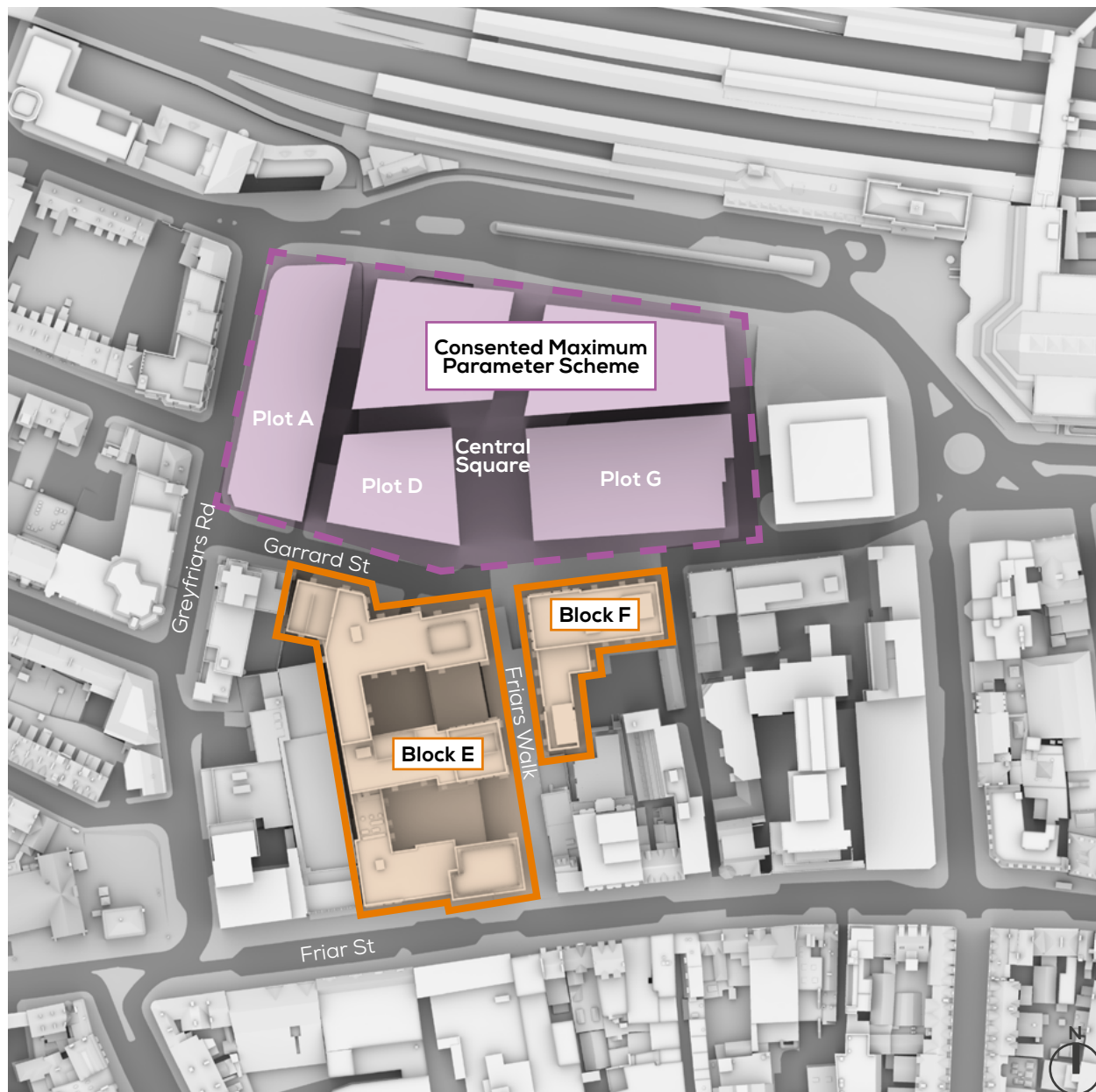


Fig. 07: Top view

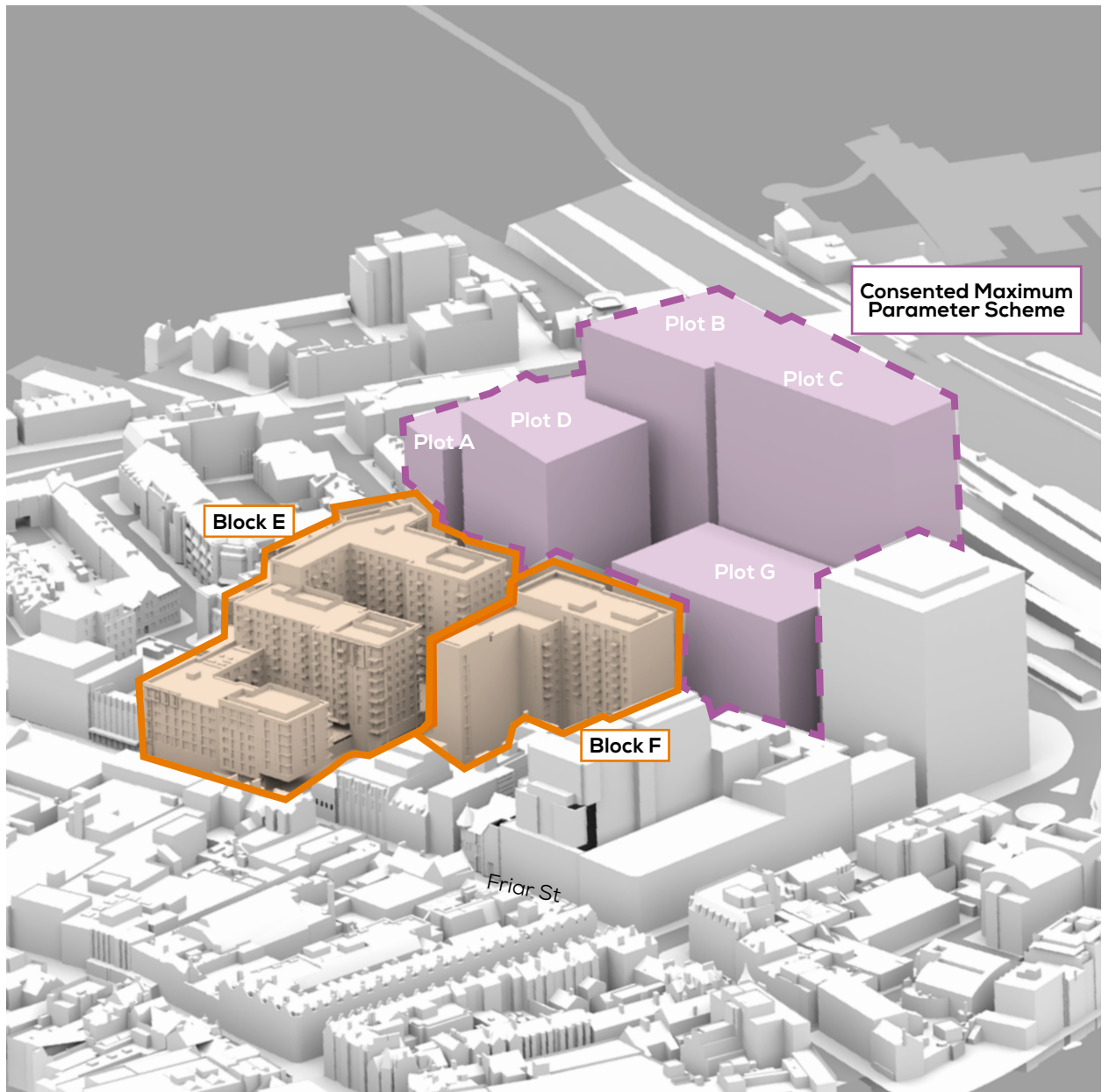


Fig. 08: Perspective view

7 INTERNAL DAYLIGHT AND SUNLIGHT ASSESSMENTS

Block E - Ground Floor - Part 1 of 1

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
BLOCK E (1 OF 2) - GROUND FLOOR							
1	Studio	0.6	64	MET		12	1
2	Bedroom	1.9	97	MET			
3	Living Room	0.8	79	MET		31	6
4	Bedroom	0.9	92	MET			
5	Bedroom	2.3	95	MET			
6	Living Room	2.3	97	MET		40	12
7	Bedroom	2.2	97	MET			
8	Bedroom	0.8	68	MET			
9	Living Room	0.8	74	MET			
10	Bedroom	0.6	54	MET			
11	Bedroom	0.6	30	MET			
12	Living Room	0.4	21	MET			
13	L/K/D	1.1	76	N/A			
14	Bedroom	1	72	MET			
15	Living Room	0.6	30	MET			
16	Bedroom	0.7	33	MET			
17	Bedroom	0.6	29	MET			
18	Living Room	1.3	49	N/A			
19	Bedroom	0.5	23	MET			
20	Living Room	0.9	76	MET			
21	Living Room	0.9	25	MET		0	0
22	Living Room	1	25	MET		0	0
23	Bedroom	0.8	25	MET			
24	Living Room	0.9	24	MET		0	0
25	Bedroom	0.9	39	MET			
26	Living Room	1.3	44	MET		9	0
27	Bedroom	1.3	41	MET			
28	Living Room	1.2	42	MET		10	0
29	Bedroom	1.2	40	MET			
30	Living Room	1.1	35	MET		8	0
31	Bedroom	0.8	31	MET			
32	Bedroom	1.3	74	MET			
33	Living Room	1.7	81	MET			
34	Bedroom	1.8	86	MET			
35	Living Room	2.2	91	MET			
36	Living Room	2.1	90	MET			
37	Bedroom	1.3	79	MET			

Table 02: Assessment Data

Block E - Level 01 - Part 1 of 2

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
BLOCK E (1 OF 2) - LEVEL 01							
38	Studio	2.5	98	MET		42	13
39	Bedroom	2.9	97	MET			
40	Living Room	1.2	90	MET		35	10
41	Bedroom	1.4	92	MET			
42	Bedroom	3.3	96	MET			
43	Living Room	3.2	98	MET		47	16
44	Bedroom	3.1	98	MET			
45	Bedroom	0.9	68	MET			
46	Living Room	0.9	74	MET			
47	Bedroom	0.8	59	MET			
48	Bedroom	0.8	32	MET			
49	Living Room	0.8	34	MET			
50	L/K/D	1.4	82	N/A			
51	Bedroom	1.3	76	MET			
52	Bedroom	0.4	14	MET			
53	Living Room	0.8	34	MET			
54	Bedroom	0.8	36	MET			
55	Bedroom	0.8	33	MET			
56	Living Room	1.6	56	N/A			
57	Bedroom	0.7	25	MET			
58	Living Room	1.2	78	MET			
59	Bedroom	1.2	56	MET			
60	Bedroom	0.6	29	MET			
61	L/K/D	1.6	77	N/A			
62	Bedroom	1	42	MET			
63	Bedroom	0.9	30	MET			
64	L/K/D	2	77	N/A		27	5
65	Bedroom	1.4	62	MET			
66	Bedroom	1.3	47	MET			
67	Living Room	1.5	46	MET		18	1
68	Bedroom	1.1	31	MET			
69	Bedroom	0.9	28	MET			
70	Living Room	1.2	34	MET		13	0
71	Bedroom	1	28	MET			
72	Living Room	1.1	25	MET		16	0
73	Bedroom	1	28	MET			
74	Living Room	1	27	MET		13	0
75	Bedroom	0.8	24	MET			
76	Bedroom	1.1	70	MET			
77	Living Room	1.4	79	MET			
78	Bedroom	1.4	77	MET			
79	Living Room	1.9	88	MET			
80	Living Room	1.8	87	MET			
81	Bedroom	1.2	75	MET			
82	Living Room	1.3	23	MET			
83	Living Room	1	20	MET			
84	Bedroom	0.9	17	MET			
85	Bedroom	0.9	18	MET			
86	Living Room	1.8	48	N/A			

Table 03: Assessment Data



Fig. 10: Floor Plan



Block E - Level 01 - Part 2 of 2

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
BLOCK E (2 OF 2) - LEVEL 01							
87	Bedroom	1.3	69	MET		1	1
88	Living Room	1.7	65	MET			
89	Bedroom	1.3	66	MET			
90	Bedroom	1.3	65	MET	0	0	
91	Living Room	1.3	64	MET			
92	Bedroom	1.1	75	MET			
93	Living Room	2.5	85	MET			
94	Bedroom	1.9	83	MET			
95	Living Room	2.7	93	MET			
96	Living Room	2.5	92	MET			
97	Bedroom	1.5	79	MET			
98	Bedroom	1	21	MET			
99	Living Room	1.6	24	MET			
100	Living Room	1.5	23	MET			
101	Bedroom	1.3	21	MET			
102	Bedroom	1.4	23	MET			
103	Living Room	2.8	75	N/A			
104	Bedroom	1.3	30	MET			
105	Living Room	2.2	43	MET			
106	Bedroom	1.6	43	MET			
107	Living Room	3.2	98	MET	66	18	
108	Bedroom	2.7	96	MET			
109	Living Room	3.5	99	MET			
110	Bedroom	2.6	95	MET	65	21	
111	Living Room	3.8	99	MET	69	25	
112	Bedroom	3.2	98	MET			
113	Bedroom	3.2	98	MET			
114	Living Room	3.9	100	MET	73	23	
115	Bedroom	3.1	97	MET			
116	Bedroom	3.1	97	MET			
117	Living Room	4	100	MET	72	25	
118	Bedroom	2.7	93	MET			

Table 04: Assessment Data

Block E - Level 02 - Part 1 of 2

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
BLOCK E (1 OF 2) - LEVEL 02							
119	Studio	2.6	98	MET		44	14
120	Bedroom	2.9	97	MET			
121	Living Room	1.2	91	MET		38	11
122	Bedroom	1.4	92	MET			
123	Bedroom	3.3	96	MET			
124	Living Room	3.2	98	MET		50	18
125	Bedroom	3.1	97	MET			
126	Bedroom	1	70	MET			
127	Living Room	1.1	76	MET			
128	Bedroom	0.9	63	MET			
129	Bedroom	0.9	38	MET			
130	Living Room	0.8	36	MET			
131	L/K/D	1.4	84	N/A			
132	Bedroom	1.3	76	MET			
133	Bedroom	0.4	10	MET			
134	Living Room	0.8	35	MET			
135	Bedroom	0.8	35	MET			
136	Bedroom	0.8	30	MET			
137	Living Room	1.6	56	N/A			
138	Bedroom	0.7	22	MET			
139	Living Room	1.1	77	MET			
140	Bedroom	1.1	56	MET			
141	Bedroom	0.5	27	MET			
142	L/K/D	1.7	77	N/A			
143	Bedroom	1.1	41	MET			
144	Bedroom	0.9	26	MET			
145	L/K/D	2.1	78	N/A		31	4
146	Bedroom	1.5	61	MET			
147	Bedroom	1.5	46	MET			
148	Living Room	1.5	44	MET		22	1
149	Bedroom	1.2	29	MET			
150	Bedroom	1	26	MET			
151	Living Room	1.3	32	MET		19	0
152	Bedroom	1.1	27	MET			
153	Living Room	1.2	30	MET		18	0
154	Bedroom	1	28	MET			
155	Living Room	1	26	MET		15	0
156	Bedroom	0.8	22	MET			
157	Bedroom	1.1	72	MET			
158	Living Room	1.4	80	MET			
159	Bedroom	1.4	78	MET			
160	Living Room	1.9	88	MET			
161	Living Room	1.8	88	MET			
162	Bedroom	1.2	76	MET			
163	Living Room	1.3	21	MET			
164	Living Room	0.9	16	MET			
165	Bedroom	0.9	14	MET			
166	Bedroom	0.9	15	MET			
167	Living Room	2	47	N/A			
168	Bedroom	1.1	25	MET			
169	Living Room	1.3	33	MET			
170	Bedroom	1.5	28	MET			
171	Bedroom	1.5	44	MET			
172	L/K/D	2	78	N/A			
173	Bedroom	1.3	61	MET			

Table 05: Assessment Data

Block E - Level 02 - Part 2 of 2

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
BLOCK E (2 OF 2) - LEVEL 02							
174	Bedroom	1.3	53	MET			
175	L/K/D	3.1	99	N/A		43	13
176	Bedroom	2.2	79	MET			
177	Living Room	2.1	90	MET		57	8
178	Bedroom	2.3	71	MET			
179	Living Room	2.5	78	MET		51	5
180	Bedroom	2.2	93	MET			
181	Living Room	2.7	92	MET		48	9
182	Bedroom	2.3	93	MET			
183	Bedroom	2.2	93	MET			
184	Living Room	2.2	90	MET		38	4
185	Bedroom	1.7	81	MET			
186	Bedroom	1.4	75	MET			
187	Living Room	2.7	86	MET			
188	Bedroom	1.9	85	MET			
189	Living Room	2.9	94	MET			
190	Living Room	2.7	94	MET			
191	Bedroom	1.7	82	MET			
192	Bedroom	1.2	27	MET			
193	Living Room	1.8	31	MET			
194	Living Room	1.7	30	MET			
195	Bedroom	2	28	MET			
196	Bedroom	2	29	MET			
197	Living Room	3.2	78	N/A			
198	Bedroom	1.6	34	MET			
199	Living Room	2.6	47	MET			
200	Bedroom	1.9	49	MET			
201	Bedroom	1.7	56	MET			
202	L/K/D	1.9	91	N/A			
203	Bedroom	3.1	99	MET			
204	Bedroom	3.1	99	MET			
205	L/K/D	3.6	100	N/A		84	29
206	Bedroom	3.9	99	MET			
207	Living Room	3.2	98	MET		74	26
208	Bedroom	3	96	MET			
209	Living Room	3.8	99	MET		70	26
210	Bedroom	2.8	95	MET			
211	Living Room	3.7	99	MET		72	28
212	Bedroom	3.4	98	MET			
213	Bedroom	3.5	98	MET			
214	Living Room	3.8	100	MET		77	27
215	Bedroom	3.2	97	MET			
216	Bedroom	3.2	97	MET			
217	Living Room	3.8	100	MET		75	28
218	Bedroom	2.2	93	MET			

Table 06: Assessment Data

Block E - Level 03 - Part 1 of 2

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
BLOCK E (1 OF 2) - LEVEL 03							
219	Studio	2.8	98	MET		47	15
220	Bedroom	3.1	97	MET			
221	Living Room	1.2	91	MET		40	12
222	Bedroom	1.4	92	MET			
223	Bedroom	3.5	96	MET			
224	Living Room	3.3	98	MET		52	19
225	Bedroom	3.3	98	MET			
226	Bedroom	1.1	70	MET			
227	Living Room	1.1	77	MET			
228	Bedroom	0.9	67	MET			
229	Bedroom	0.9	43	MET			
230	Living Room	0.9	38	MET			
231	L/K/D	1.5	86	N/A			
232	Bedroom	1.4	74	MET			
233	Bedroom	0.4	11	MET			
234	Living Room	0.8	40	MET			
235	Bedroom	0.8	37	MET			
236	Bedroom	0.9	34	MET			
237	Living Room	1.7	59	N/A			
238	Bedroom	0.7	25	MET			
239	Living Room	1.1	80	MET			
240	Bedroom	1.2	56	MET			
241	Bedroom	0.5	28	MET			
242	L/K/D	1.9	83	N/A			
243	Bedroom	1.2	47	MET			
244	Bedroom	1	29	MET			
245	L/K/D	2.2	78	N/A		35	5
246	Bedroom	1.6	65	MET			
247	Bedroom	1.6	50	MET			
248	Living Room	1.6	48	MET		28	1
249	Bedroom	1.4	36	MET			
250	Bedroom	1.1	35	MET			
251	Living Room	1.4	42	MET		22	0
252	Bedroom	1.2	34	MET			
253	Living Room	1.3	39	MET		23	0
254	Bedroom	1.2	34	MET			
255	Living Room	1.2	32	MET		20	0
256	Bedroom	0.9	29	MET			
257	Bedroom	1.3	75	MET			
258	Living Room	1.5	81	MET			
259	Bedroom	1.5	80	MET			
260	Living Room	2	90	MET			
261	Living Room	1.9	89	MET			
262	Bedroom	1.3	78	MET			
263	Living Room	1.4	24	MET			
264	Living Room	1	20	MET			
265	Bedroom	1	18	MET			
266	Bedroom	1	18	MET			
267	Living Room	2.2	57	N/A			
268	Bedroom	1.2	29	MET			
269	Living Room	1.5	38	MET			
270	Bedroom	1.6	31	MET			
271	Bedroom	1.6	48	MET			
272	L/K/D	2.2	82	N/A			
273	Bedroom	1.3	61	MET			

Table 07: Assessment Data

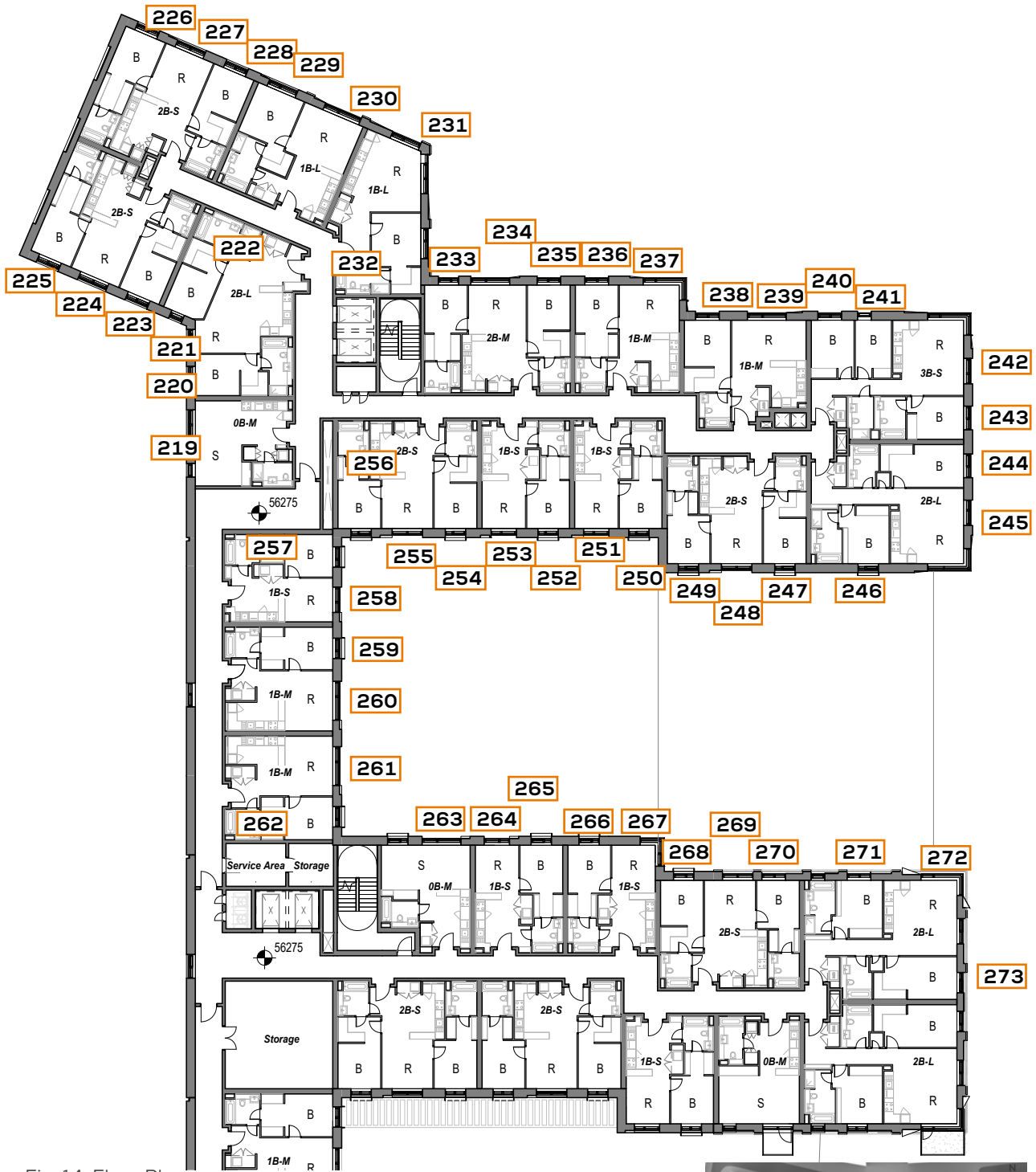


Fig. 14: Floor Plan



Block E - Level 03 - Part 2 of 2

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
BLOCK E (2 OF 2) - LEVEL 03							
274	Bedroom	1.4	55	MET			
275	L/K/D	3.4	100	N/A		49	18
276	Bedroom	2.1	91	MET			
277	Living Room	2.2	98	MET		63	16
278	Bedroom	2.2	94	MET			
279	Living Room	2.9	98	MET		61	15
280	Bedroom	2.2	94	MET			
281	Living Room	3.3	98	MET		53	13
282	Bedroom	2.3	98	MET			
283	Bedroom	2.2	97	MET			
284	Living Room	2.8	98	MET		43	7
285	Bedroom	1.6	84	MET			
286	Bedroom	1.5	76	MET			
287	Living Room	2	85	MET			
288	Bedroom	2	86	MET			
289	Living Room	2.2	90	MET			
290	Living Room	2.1	93	MET			
291	Bedroom	1.8	84	MET			
292	Bedroom	1.4	37	MET			
293	Living Room	2.1	43	MET			
294	Living Room	1.9	39	MET			
295	Bedroom	1.8	35	MET			
296	Bedroom	1.8	34	MET			
297	Living Room	3.4	83	N/A			
298	Bedroom	1.7	42	MET			
299	Living Room	2.6	55	MET			
300	Bedroom	2	54	MET			
301	Bedroom	1.9	62	MET			
302	L/K/D	2	92	N/A			
303	Bedroom	3.3	99	MET			
304	Bedroom	3.3	99	MET			
305	L/K/D	3.9	100	N/A		85	29
306	Bedroom	4	99	MET			
307	Living Room	3.4	98	MET		76	28
308	Bedroom	3.1	96	MET			
309	Living Room	3.9	98	MET		71	27
310	Bedroom	2.9	95	MET			
311	Living Room	3.8	99	MET		73	29
312	Bedroom	3.5	98	MET			
313	Bedroom	3.6	98	MET			
314	Living Room	3.9	100	MET		78	28
315	Bedroom	3.3	97	MET			
316	Bedroom	3.3	97	MET			
317	Living Room	3.9	100	MET		75	28
318	Bedroom	2.9	93	MET			

Table 08: Assessment Data

Block E - Level 04 - Part 1 of 2

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
BLOCK E (1 OF 2) - LEVEL 04							
319	Studio	2.8	98	MET		47	15
320	Bedroom	3.2	97	MET			
321	Living Room	1.3	91	MET		40	12
322	Bedroom	1.4	92	MET			
323	Bedroom	3.6	96	MET			
324	Living Room	3.5	98	MET		54	20
325	Bedroom	3.4	98	MET			
326	Bedroom	1.1	70	MET			
327	Living Room	1.1	77	MET			
328	Bedroom	1	68	MET			
329	Bedroom	1	45	MET			
330	Living Room	0.9	40	MET			
331	L/K/D	1.6	88	N/A			
332	Bedroom	1.4	79	MET			
333	Bedroom	0.5	12	MET			
334	Living Room	0.9	45	MET			
335	Bedroom	0.9	41	MET			
336	Bedroom	0.9	37	MET			
337	Living Room	1.8	63	N/A			
338	Bedroom	0.7	27	MET			
339	Living Room	1.2	82	MET			
340	Bedroom	1.2	57	MET			
341	Bedroom	0.5	29	MET			
342	L/K/D	2	86	N/A			
343	Bedroom	1.1	51	MET			
344	Bedroom	1	35	MET			
345	L/K/D	2.5	79	N/A		39	4
346	Bedroom	1.5	71	MET			
347	Bedroom	1.4	57	MET			
348	Living Room	1.9	56	MET		37	1
349	Bedroom	1.3	44	MET			
350	Bedroom	1.1	47	MET			
351	Living Room	1.7	52	MET		29	0
352	Bedroom	1.2	46	MET			
353	Living Room	1.7	49	MET		26	0
354	Bedroom	1.2	42	MET			
355	Living Room	1.4	42	MET		22	0
356	Bedroom	0.9	36	MET			
357	Bedroom	1.2	76	MET			
358	Living Room	1.7	82	MET			
359	Bedroom	1.5	81	MET			
360	Living Room	2.2	92	MET			
361	Living Room	2.1	93	MET			
362	Bedroom	1.4	80	MET			
363	Living Room	1.6	31	MET			
364	Living Room	1.2	26	MET			
365	Bedroom	1.1	24	MET			
366	Bedroom	1.2	24	MET			
367	Living Room	2.4	72	N/A			
368	Bedroom	1.3	34	MET			
369	Living Room	1.6	42	MET			
370	Bedroom	1.7	38	MET			
371	Bedroom	1.8	51	MET			
372	L/K/D	1.7	80	N/A			
373	Bedroom	1.5	63	MET			

Table 09: Assessment Data

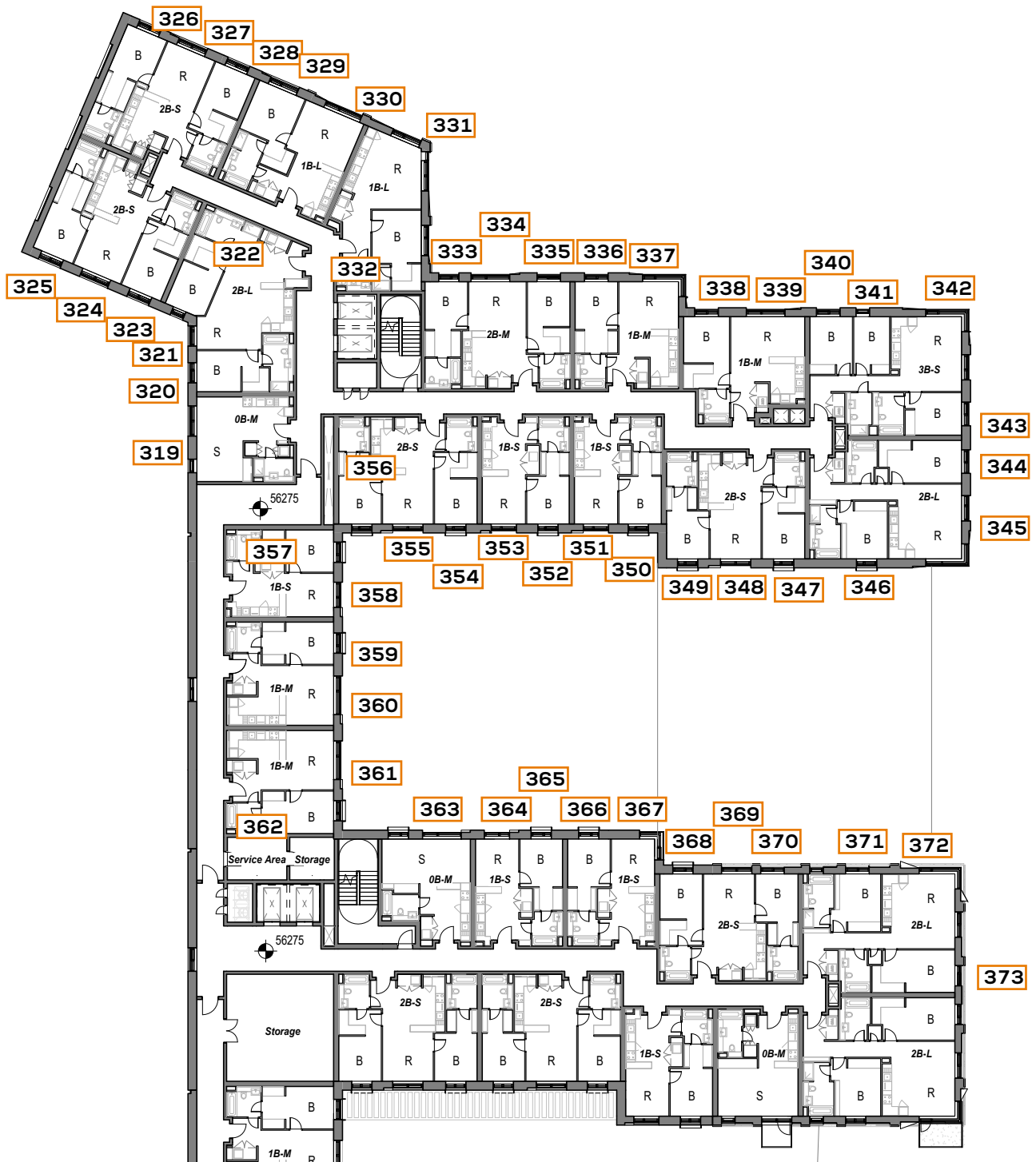


Fig. 16: Floor Plan



Block E - Level 04 - Part 2 of 2

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
BLOCK E (2 OF 2) - LEVEL 04							
374	Bedroom	1.5	58	MET			
375	L/K/D	3.2	100	N/A		43	19
376	Bedroom	2.4	98	MET			
377	Living Room	2.5	98	MET		69	20
378	Bedroom	2.4	98	MET			
379	Living Room	2.2	100	MET		46	22
380	Bedroom	2.3	94	MET			
381	Living Room	2.4	98	MET		37	20
382	Bedroom	2.5	98	MET			
383	Bedroom	2.5	98	MET			
384	Living Room	2.1	96	MET		31	15
385	Bedroom	1.8	90	MET			
386	Bedroom	1.6	76	MET			
387	Living Room	2.5	88	MET			
388	Bedroom	2.2	90	MET			
389	Living Room	2.7	98	MET			
390	Living Room	2.6	95	MET			
391	Bedroom	2.1	93	MET			
392	Bedroom	1.6	50	MET			
393	Living Room	2.5	59	MET			
394	Living Room	2.1	51	MET			
395	Bedroom	1.8	47	MET			
396	Bedroom	1.8	47	MET			
397	Living Room	3.6	87	N/A			
398	Bedroom	1.9	52	MET			
399	Living Room	3.1	65	MET			
400	Bedroom	2.2	63	MET			
401	Bedroom	2.1	69	MET			
402	L/K/D	2.1	94	N/A			
403	Bedroom	3.4	99	MET			
404	Bedroom	3.4	99	MET			
405	L/K/D	4	100	N/A		87	30
406	Bedroom	4.2	99	MET			
407	Living Room	3.4	98	MET		76	28
408	Bedroom	3.2	96	MET			
409	Living Room	4	98	MET		72	28
410	Bedroom	3	95	MET			
411	Living Room	3.9	99	MET		74	30
412	Bedroom	3.6	98	MET			
413	Bedroom	3.6	98	MET			
414	Living Room	3.9	100	MET		77	28
415	Bedroom	3.3	97	MET			
416	Bedroom	3.2	97	MET			
417	Living Room	3.7	100	MET		73	28
418	Bedroom	2.3	93	MET			

Table 10: Assessment Data

Block E - Level 05 - Part 1 of 2

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
BLOCK E (1 OF 2) - LEVEL 05							
419	Studio	2.9	98	MET		47	15
420	Bedroom	3.3	97	MET			
421	Living Room	1.3	91	MET		40	12
422	Bedroom	1.5	92	MET			
423	Bedroom	3.6	96	MET			
424	Living Room	3.5	98	MET		54	20
425	Bedroom	3.5	98	MET			
426	Bedroom	1.3	72	MET			
427	Living Room	1.3	78	MET			
428	Bedroom	1.1	70	MET			
429	Bedroom	1.1	52	MET			
430	Living Room	1	43	MET			
431	L/K/D	1.7	88	N/A			
432	Bedroom	1.5	79	MET			
433	Bedroom	0.5	14	MET			
434	Living Room	0.9	50	MET			
435	Bedroom	1	44	MET			
436	Bedroom	1	40	MET			
437	Living Room	1.9	68	N/A			
438	Bedroom	0.7	27	MET			
439	Living Room	1.2	85	MET			
440	Bedroom	1.3	57	MET			
441	Bedroom	0.7	29	MET			
442	L/K/D	2.2	90	N/A			
443	Bedroom	1.3	55	MET			
444	Bedroom	1.1	40	MET			
445	L/K/D	2.7	80	N/A		46	7
446	Bedroom	1.7	76	MET			
447	Bedroom	1.6	69	MET			
448	Living Room	2.1	66	MET		45	1
449	Bedroom	1.6	60	MET			
450	Bedroom	1.3	65	MET			
451	Living Room	2	70	MET		34	1
452	Bedroom	1.5	62	MET			
453	Living Room	2	64	MET		32	0
454	Bedroom	1.4	58	MET			
455	Living Room	1.6	53	MET		28	0
456	Bedroom	1	46	MET			
457	Bedroom	1.3	77	MET			
458	Living Room	1.8	84	MET			
459	Bedroom	1.6	83	MET			
460	Living Room	2.5	94	MET			
461	Living Room	2.3	94	MET			
462	Bedroom	1.5	81	MET			
463	Living Room	1.8	39	MET			
464	Living Room	1.4	34	MET			
465	Bedroom	1.4	31	MET			
466	Bedroom	1.4	31	MET			
467	Living Room	2.7	83	N/A			
468	Bedroom	1.5	41	MET			
469	Living Room	1.8	47	MET			
470	Bedroom	1.9	43	MET			
471	Bedroom	1.9	57	MET			
472	L/K/D	2.4	82	N/A			
473	Bedroom	1.3	64	MET			

Table 11: Assessment Data



Fig. 18: Floor Plan



Block E - Level 05 - Part 2 of 2

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
BLOCK E (2 OF 2) - LEVEL 05							
474	Bedroom	1.4	60	MET			
475	L/K/D	3.7	100	N/A		58	26
476	Bedroom	2.6	98	MET			
477	Living Room	2.8	98	MET		75	26
478	Bedroom	2.6	98	MET			
479	Living Room	2.5	100	MET		50	26
480	Bedroom	2.5	94	MET			
481	Living Room	2.7	98	MET		42	25
482	Bedroom	2.7	98	MET			
483	Bedroom	2.7	98	MET			
484	Living Room	2.6	99	MET		45	20
485	Bedroom	2.3	96	MET			
486	Bedroom	1.7	77	MET			
487	Living Room	3.5	91	MET			
488	Bedroom	2.3	94	MET			
489	Living Room	4.1	98	MET			
490	Living Room	4.1	98	MET			
491	Bedroom	2.5	97	MET			
492	Bedroom	2	72	MET			
493	Living Room	3	76	MET			
494	Living Room	2.5	66	MET			
495	Bedroom	2.7	64	MET			
496	Bedroom	2.7	63	MET			
497	Living Room	4	91	N/A			
498	Living Room	2.9	72	MET			
499	Kitchen	2.2	65	MET			
500	Living Room	2.5	97	N/A			
501	Living Room	3.6	100	N/A		87	30
502	Kitchen	4	100	MET			
503	L/K/D	2.7	99	MET		81	30
504	L/K/D	3.5	99	MET		79	29
505	Bedroom	3.1	95	MET			
506	Living Room	3.9	99	MET		74	30
507	Bedroom	3.6	98	MET			
508	Bedroom	3.7	98	MET			
509	Living Room	3.9	99	MET		77	28
510	Bedroom	2.8	94	MET			
511	Bedroom	2.8	94	MET			
512	Living Room	3.4	99	MET		64	26
513	Bedroom	3.1	97	MET			

Table 12: Assessment Data



STATION HILL, READING (5847)
DAYLIGHT & SUNLIGHT: INTERNAL DAYLIGHT AND SUNLIGHT ASSESSMENT

Block E - Level 06 - Part 1 of 2

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
BLOCK E (1 OF 2) - LEVEL 06							
514	Studio	2.4	98	MET		45	15
515	Bedroom	3.3	97	MET			
516	Living Room	1	91	MET		34	12
517	Bedroom	1.1	92	MET			
518	Bedroom	3.7	96	MET			
519	Living Room	2.6	97	MET		33	21
520	Bedroom	3.6	98	MET			
521	Bedroom	1.4	74	MET			
522	Living Room	1.3	79	MET			
523	Bedroom	1.2	72	MET			
524	Bedroom	1.2	58	MET			
525	Living Room	0.7	35	MET			
526	L/K/D	1.4	87	N/A			
527	Bedroom	1.5	79	MET			
528	Bedroom	0.5	18	MET			
529	Living Room	0.6	25	MET			
530	Bedroom	1.1	49	MET			
531	Bedroom	1.1	44	MET			
532	Living Room	1.5	71	N/A			
533	Bedroom	0.8	29	MET			
534	Living Room	0.7	87	MET			
535	Bedroom	1.4	59	MET			
536	Bedroom	0.6	31	MET			
537	L/K/D	1.9	95	N/A			
538	Bedroom	1.5	59	MET			
539	Bedroom	1.3	46	MET			
540	L/K/D	2.4	77	N/A		30	10
541	Bedroom	1.9	88	MET			
542	Bedroom	1.9	89	MET			
543	Living Room	1.6	78	MET		27	5
544	Bedroom	1.9	85	MET			
545	Bedroom	1.6	91	MET			
546	Living Room	1.5	87	MET		26	8
547	Bedroom	1.7	85	MET			
548	Living Room	1.5	74	MET		20	5
549	Bedroom	1.6	81	MET			
550	Living Room	1.2	66	MET		18	3
551	Bedroom	1.2	64	MET			
552	Bedroom	1.3	77	MET			
553	Living Room	2	85	MET			
554	Bedroom	1.8	87	MET			
555	Living Room	1.9	90	MET			
556	Living Room	2	93	MET			
557	Bedroom	1.7	83	MET			
558	Living Room	2.2	47	MET			
559	Living Room	1.6	44	MET			
560	Bedroom	1.6	41	MET			
561	Bedroom	1.6	41	MET			
562	Living Room	3	87	N/A			
563	Bedroom	1.7	50	MET			
564	Living Room	2	54	MET			
565	Bedroom	2.2	51	MET			
566	Bedroom	2.1	62	MET			
567	L/K/D	2.2	79	N/A			
568	Bedroom	1.4	68	MET			

Table 13: Assessment Data



Fig. 20: Floor Plan



Block E - Level 06 - Part 2 of 2

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
BLOCK E (2 OF 2) - LEVEL 06							
569	Bedroom	1.5	65	MET			
570	L/K/D	3.9	100	N/A		60	27
571	Bedroom	2.7	98	MET			
572	Living Room	2.9	98	MET		77	28
573	Bedroom	2.8	98	MET			
574	Living Room	2.8	100	MET		56	28
575	Bedroom	2.6	94	MET			
576	Living Room	2.9	98	MET		43	26
577	Bedroom	2.8	98	MET			
578	Bedroom	2.9	98	MET			
579	Living Room	2.9	99	MET		53	27
580	Bedroom	2.9	97	MET			
581	Bedroom	2.7	96	MET			
582	Living Room	1.7	94	MET		42	23
583	Bedroom	2.6	95	MET			
584	Bedroom	5	91	MET			
585	Bedroom	2.7	92	MET			
586	Bedroom	2.3	78	MET			
587	Bedroom	6.1	100	N/A			
588	Bedroom	3.6	98	MET			
589	Bedroom	3.7	98	MET			
590	Bedroom	7.6	100	N/A			
591	Bedroom	3.8	99	MET			
592	Bedroom	3.6	98	MET			
593	Bedroom	3.6	98	MET			
594	Bedroom	4.1	98	MET			
595	Bedroom	4.5	100	MET			

Table 14: Assessment Data

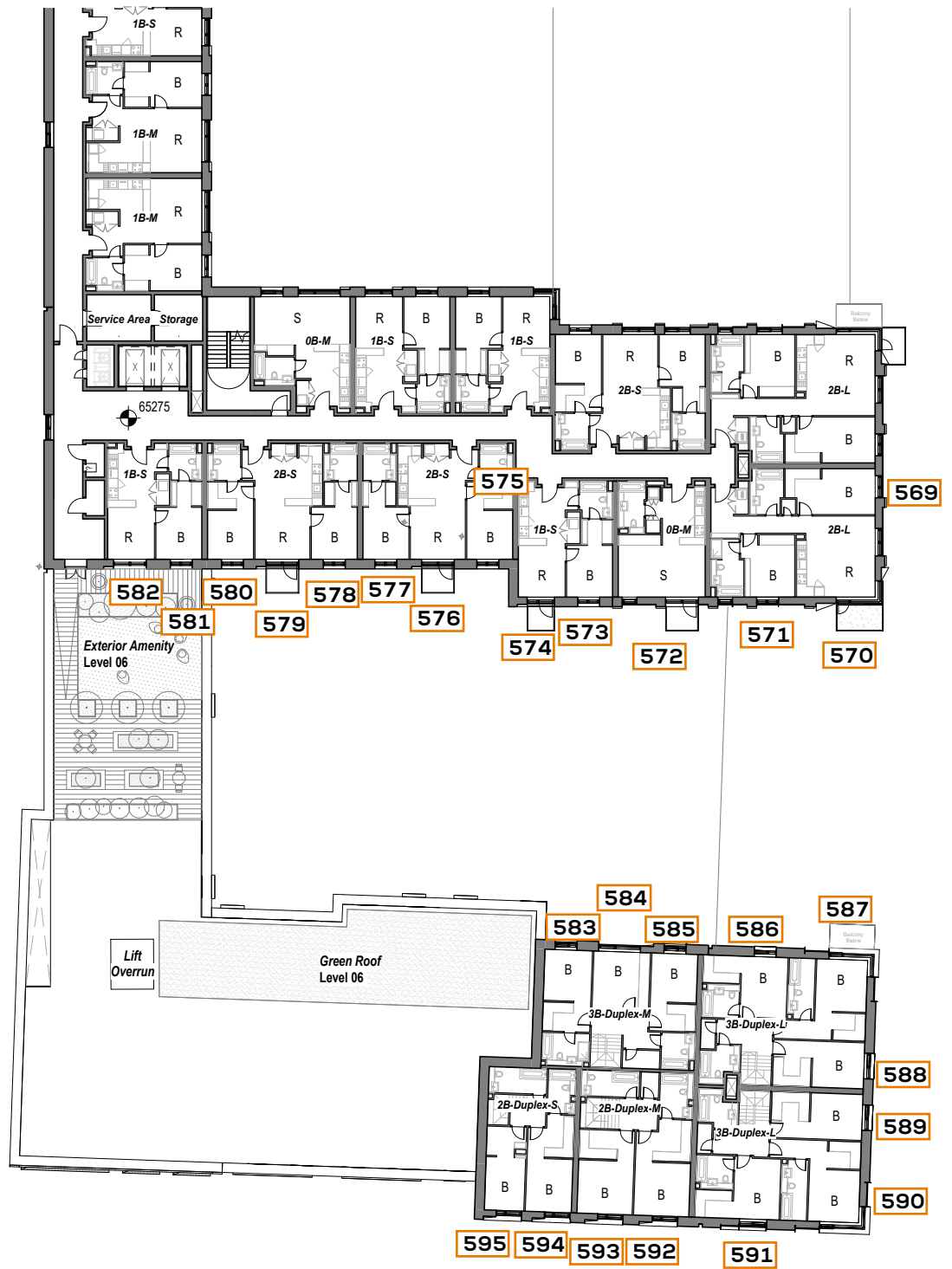


Fig. 21: Floor Plan



Block E - Level 07 - Part 1 of 2

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
BLOCK E (1 OF 2) - LEVEL 07							
596	Studio	2.4	98	MET		45	15
597	Bedroom	3.3	97	MET			
598	Living Room	0.9	91	MET		34	12
599	Bedroom	1.1	92	MET			
600	Bedroom	3.7	96	MET			
601	Living Room	2.6	98	MET		33	21
602	Bedroom	3.7	98	MET			
603	Bedroom	1.4	75	MET			
604	Living Room	0.9	76	MET			
605	Bedroom	1.3	72	MET			
606	Bedroom	1.3	65	MET			
607	Living Room	0.8	39	MET			
608	L/K/D	1.5	87	N/A			
609	Bedroom	1.6	79	MET			
610	Bedroom	0.6	20	MET			
611	Living Room	0.7	42	MET			
612	Bedroom	1.3	53	MET			
613	Bedroom	1.2	47	MET			
614	Living Room	1.6	74	N/A			
615	Bedroom	0.8	32	MET			
616	Living Room	0.9	88	MET			
617	Bedroom	1.5	60	MET			
618	Bedroom	0.6	33	MET			
619	L/K/D	2.2	97	N/A			
620	Bedroom	1.8	67	MET			
621	Bedroom	1.6	55	MET			
622	L/K/D	2.8	78	N/A		40	14
623	Bedroom	2.2	97	MET			
624	Bedroom	2.3	98	MET			
625	Living Room	2.1	99	MET		35	12
626	Bedroom	2.2	98	MET			
627	Bedroom	1.9	96	MET			
628	Living Room	2	99	MET		32	13
629	Bedroom	2	97	MET			
630	Living Room	1.8	94	MET		29	10
631	Bedroom	1.9	95	MET			
632	Living Room	1.6	84	MET		22	7
633	Bedroom	1.4	82	MET			
634	Bedroom	1.4	78	MET			
635	Living Room	2.2	87	MET			
636	Bedroom	2	91	MET			
637	Living Room	2.4	96	MET			
638	Living Room	2.3	93	MET			
639	Bedroom	1.9	86	MET			
640	Living Room	2.5	63	MET			
641	Living Room	2	59	MET			
642	Bedroom	1.9	56	MET			
643	Bedroom	1.9	55	MET			
644	Living Room	3.4	90	N/A			
645	Bedroom	1.9	65	MET			
646	Living Room	1.7	53	MET			
647	Bedroom	1.9	53	MET			
648	Bedroom	1.8	57	MET			
649	L/K/D	2.3	82	N/A			
650	Bedroom	1.6	74	MET			

Table 15: Assessment Data

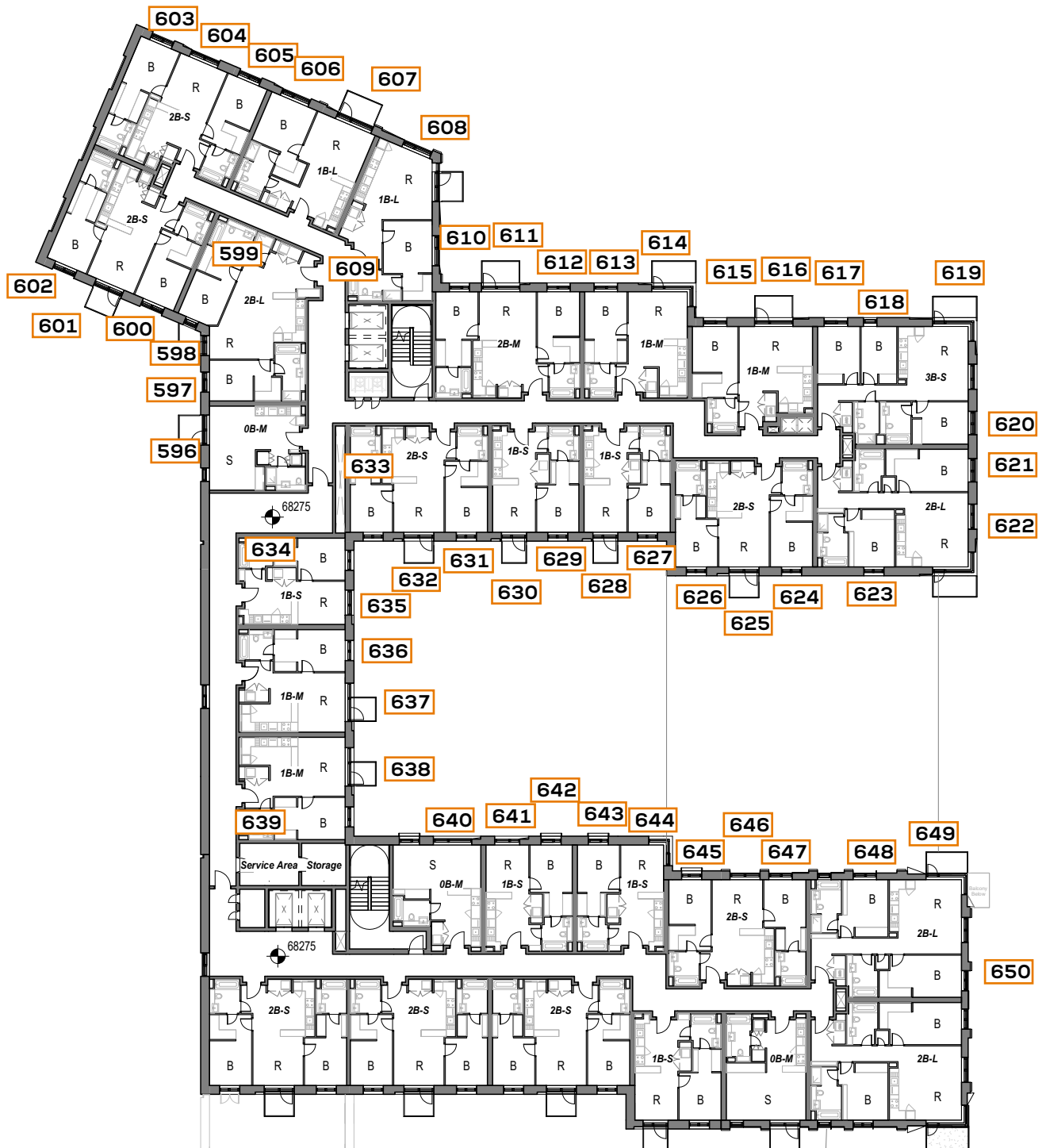


Fig. 22: Floor Plan



Block E - Level 07 - Part 2 of 2

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
BLOCK E (2 OF 2) – LEVEL 07							
651	Bedroom	1.7	73	MET			
652	L/K/D	3.6	99	N/A		49	26
653	Bedroom	2	98	MET			
654	Living Room	2.7	98	MET		49	28
655	Bedroom	2.9	98	MET			
656	Living Room	2.9	100	MET		56	28
657	Bedroom	2.7	94	MET			
658	Living Room	3	98	MET		44	27
659	Bedroom	2.9	98	MET			
660	Bedroom	2.9	98	MET			
661	Living Room	3	99	MET		54	28
662	Bedroom	3	97	MET			
663	Bedroom	2.9	96	MET			
664	Living Room	2.4	99	MET		42	23
665	Bedroom	2.8	98	MET			

Table 16: Assessment Data

Block E - Level 08 - Part 1 of 2

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
BLOCK E (1 OF 2) - LEVEL 08							
666	Studio	2.5	98	MET		45	15
667	Bedroom	3.4	98	MET			
668	Living Room	1	91	MET		34	12
669	Bedroom	1.1	92	MET			
670	Bedroom	3.8	97	MET			
671	Living Room	2.7	98	MET		37	23
672	Bedroom	3.7	98	MET			
673	Bedroom	1.6	80	MET			
674	Living Room	1.1	80	MET			
675	Bedroom	1.5	74	MET			
676	Bedroom	1.5	67	MET			
677	Living Room	0.9	46	MET			
678	L/K/D	1.7	88	N/A			
679	Bedroom	1.8	80	MET			
680	Bedroom	0.6	22	MET			
681	Living Room	0.7	57	MET			
682	Bedroom	1.4	55	MET			
683	Bedroom	1.4	50	MET			
684	Living Room	1.7	75	N/A			
685	Bedroom	1	34	MET			
686	Living Room	1	89	MET			
687	Bedroom	1.6	61	MET			
688	Bedroom	0.7	35	MET			
689	L/K/D	2.5	97	N/A			
690	Bedroom	2.1	74	MET			
691	Bedroom	1.9	70	MET			
692	L/K/D	3.3	84	N/A		51	21
693	Bedroom	2.4	97	MET			
694	Bedroom	2.5	97	MET			
695	Living Room	2.5	99	MET		45	20
696	Bedroom	2.4	98	MET			
697	Bedroom	2.1	96	MET			
698	Living Room	2.3	99	MET		41	19
699	Bedroom	2.3	98	MET			
700	Living Room	2.2	97	MET		36	14
701	Bedroom	2.2	96	MET			
702	Living Room	1.9	90	MET		26	11
703	Bedroom	1.6	83	MET			
704	Bedroom	1.6	80	MET			
705	Living Room	2.4	93	MET			
706	Bedroom	2.2	96	MET			
707	Living Room	2.7	95	MET			
708	Living Room	2.6	97	MET			
709	Bedroom	2.1	93	MET			
710	Living Room	3	86	MET			
711	Living Room	2.3	81	MET			
712	Bedroom	2.2	78	MET			
713	Bedroom	2.2	77	MET			
714	Living Room	3.9	96	N/A			
715	Bedroom	2.2	91	MET			
716	Living Room	2.2	78	MET			
717	Bedroom	2.5	81	MET			
718	Bedroom	2.4	81	MET			
719	L/K/D	3.1	83	N/A			
720	Bedroom	1.9	83	MET			

Table 17: Assessment Data

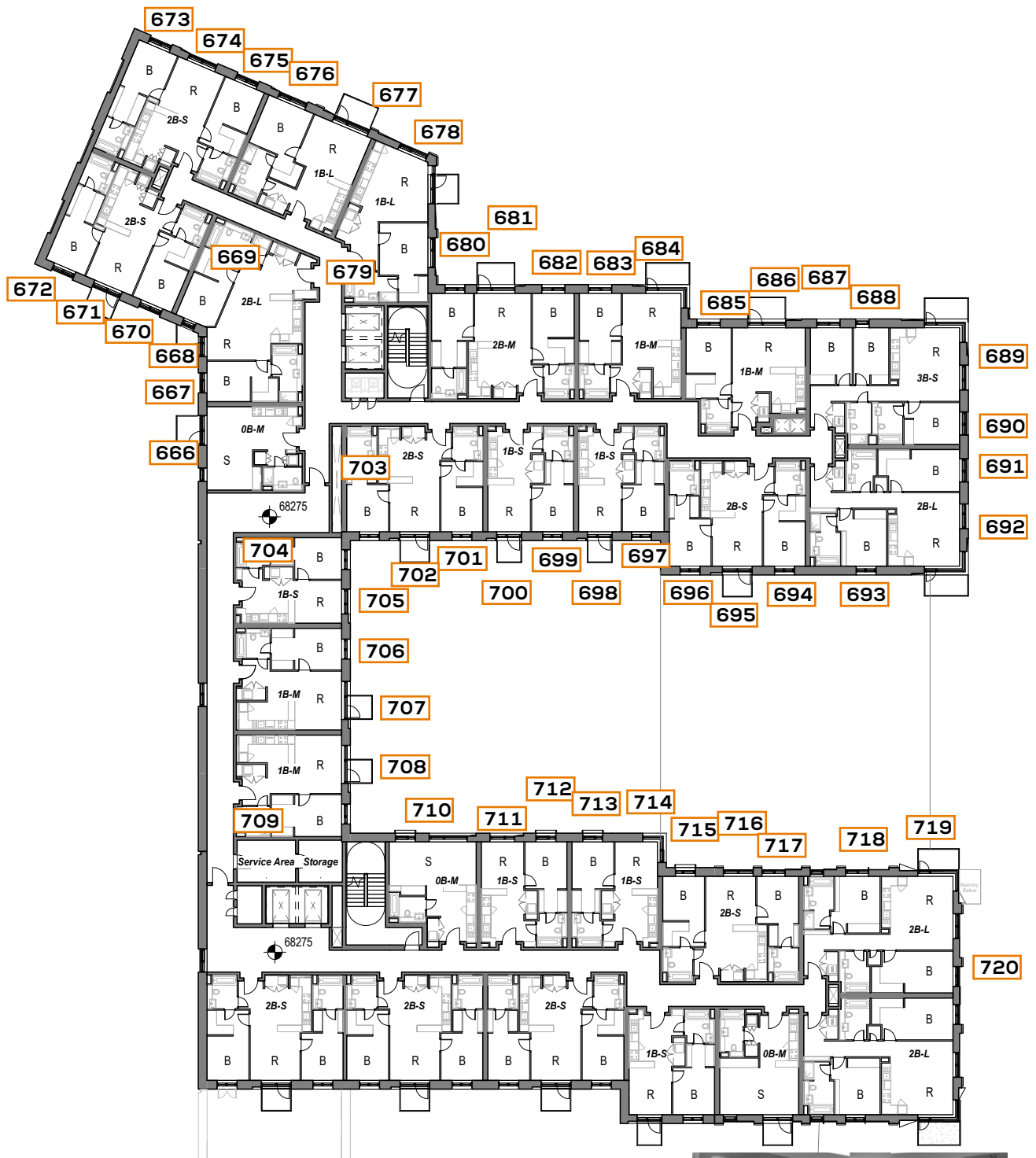


Fig. 24: Floor Plan



Block E - Level 08 - Part 2 of 2

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
BLOCK E (2 OF 2) - LEVEL 08							
721	Bedroom	1.9	84	MET			
722	L/K/D	4.3	100	N/A		60	27
723	Bedroom	2.6	96	MET			
724	Living Room	2.5	97	MET		51	24
725	Bedroom	2.9	98	MET			
726	Living Room	3	100	MET		56	28
727	Bedroom	2.7	94	MET			
728	Living Room	3	98	MET		45	27
729	Bedroom	2.9	98	MET			
730	Bedroom	2.9	98	MET			
731	Living Room	3.1	99	MET		54	28
732	Bedroom	3.1	97	MET			
733	Bedroom	2.8	96	MET			
734	Living Room	2.4	98	MET		42	23
735	Bedroom	2.8	98	MET			

Table 18: Assessment Data

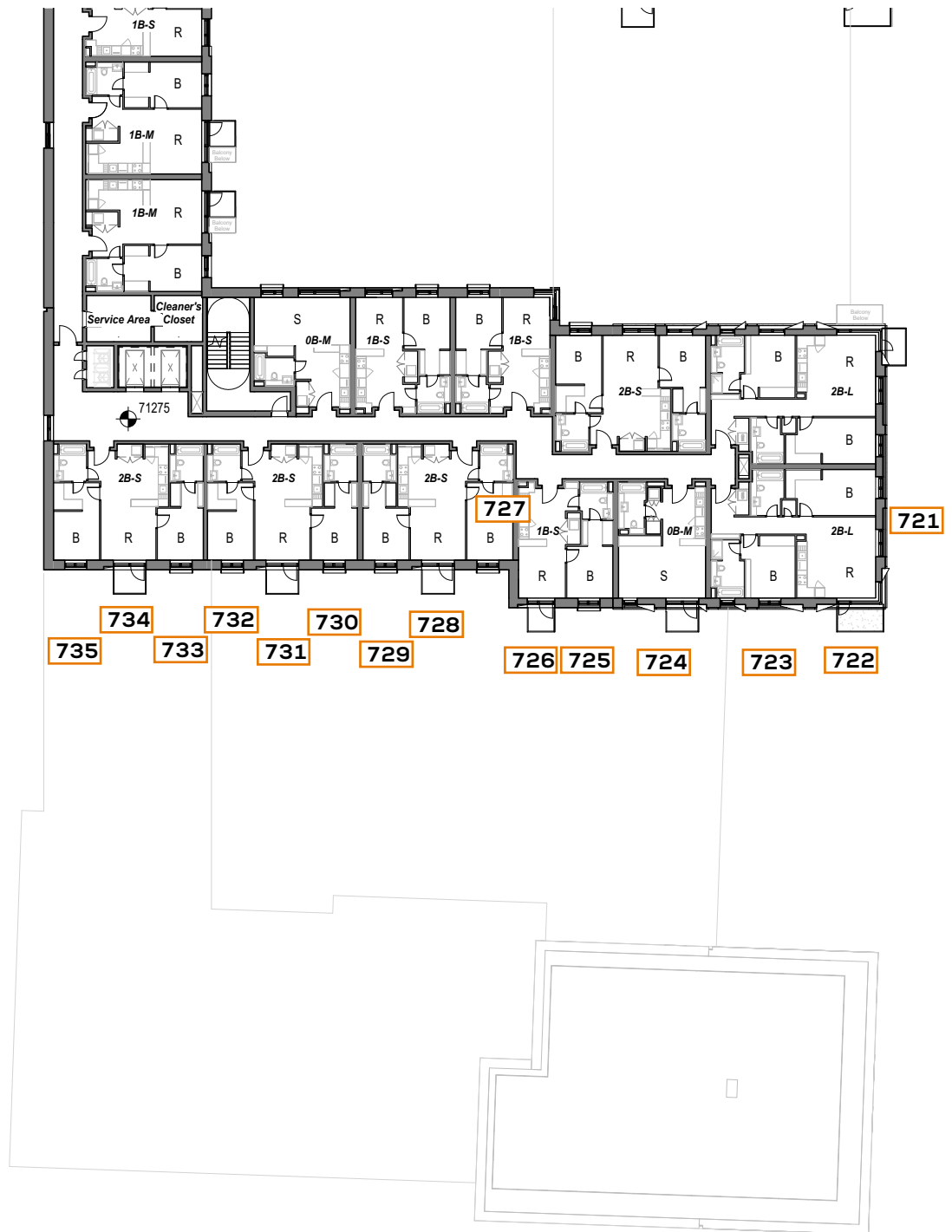


Fig. 25: Floor Plan



Block E - Level 09 - Part 1 of 2

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
BLOCK E (1 OF 2) - LEVEL 09							
736	Studio	2.5	99	MET		45	15
737	Bedroom	3.5	98	MET			
738	Living Room	1	91	MET		34	12
739	Bedroom	1.1	92	MET			
740	Bedroom	3.9	98	MET			
741	Living Room	2.8	99	MET		40	23
742	Bedroom	3.8	98	MET			
743	Bedroom	1.8	82	MET			
744	Living Room	1.2	83	MET			
745	Bedroom	1.7	74	MET			
746	Bedroom	1.7	68	MET			
747	Living Room	0.9	53	MET			
748	L/K/D	1.6	88	N/A			
749	Bedroom	1.8	83	MET			
750	Bedroom	0.8	30	MET			
751	Living Room	0.8	66	MET			
752	Bedroom	1.6	59	MET			
753	Bedroom	1.5	52	MET			
754	Living Room	1.9	76	N/A			
755	Bedroom	1.1	37	MET			
756	Living Room	1.1	89	MET			
757	Bedroom	1.7	62	MET			
758	Bedroom	0.8	40	MET			
759	L/K/D	2.8	98	N/A			
760	Bedroom	2.5	89	MET			
761	Bedroom	2.3	85	MET			
762	L/K/D	3.9	100	N/A		56	24
763	Bedroom	2.6	97	MET			
764	Bedroom	2.7	97	MET			
765	Living Room	2.8	99	MET		50	25
766	Bedroom	2.7	98	MET			
767	Bedroom	2.3	96	MET			
768	Living Room	2.6	99	MET		47	24
769	Bedroom	2.5	98	MET			
770	Living Room	2.5	100	MET		46	21
771	Bedroom	2.5	97	MET			
772	Living Room	2.2	94	MET		29	14
773	Bedroom	1.8	86	MET			
774	Bedroom	1.7	85	MET			
775	Living Room	2.7	97	MET			
776	Bedroom	2.4	97	MET			
777	Living Room	3.1	98	MET			
778	Living Room	3.1	98	MET			
779	Bedroom	2.5	97	MET			
780	Living Room	3.5	99	MET			
781	Living Room	2.7	99	MET			
782	Bedroom	2.5	97	MET			
783	Bedroom	2.6	97	MET			
784	Living Room	4.5	100	N/A			
785	Bedroom	2.5	96	MET			
786	Living Room	1.8	66	MET			
787	Bedroom	2.1	71	MET			
788	Bedroom	2	72	MET			
789	L/K/D	4.2	99	N/A			
790	Bedroom	2.2	97	MET			

Table 19: Assessment Data

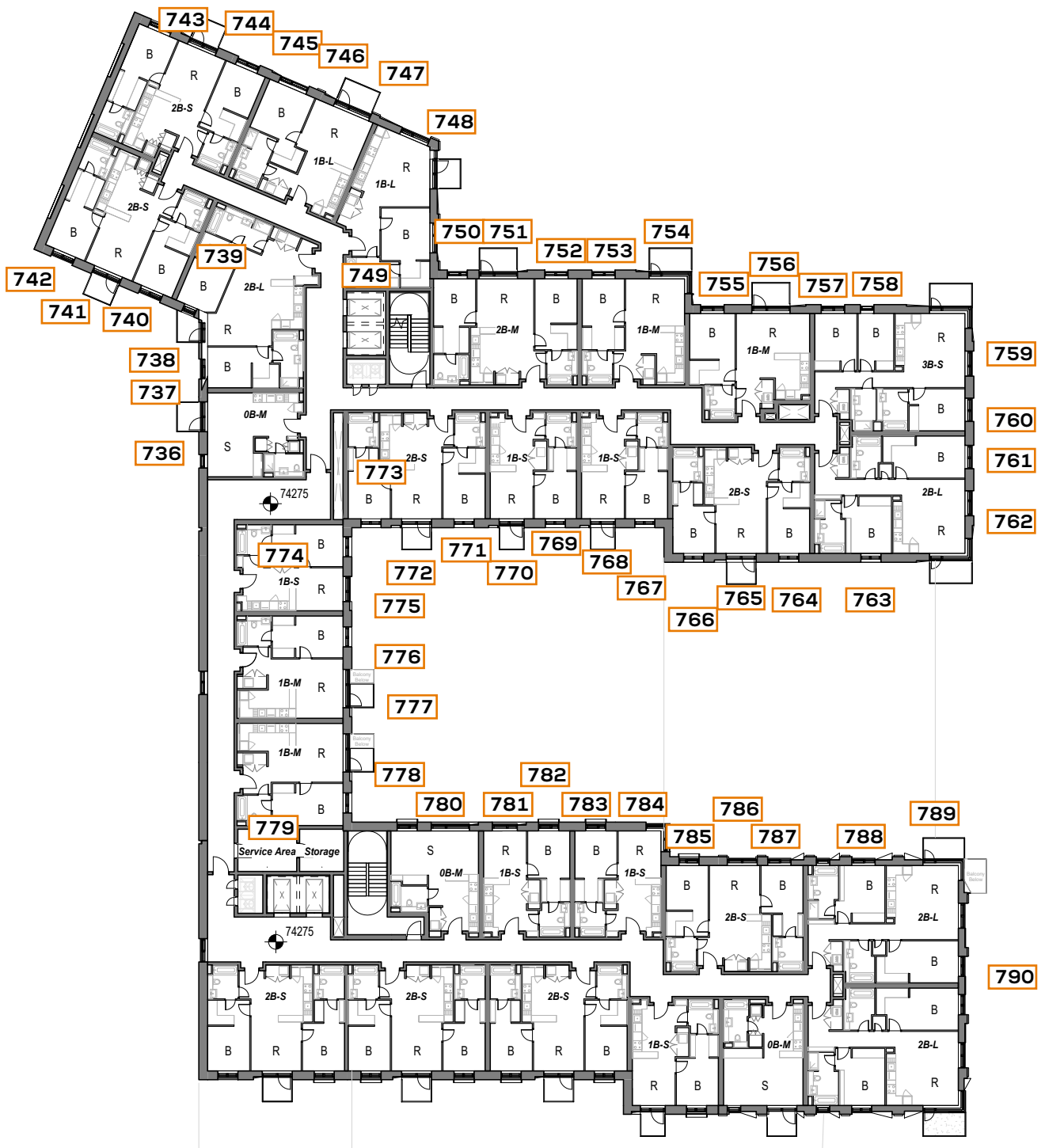


Fig. 26: Floor Plan



Block E - Level 09 - Part 2 of 2

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
BLOCK E (2 OF 2) – LEVEL 09							
791	Bedroom	2.2	97	MET			
792	L/K/D	5.4	100	N/A		82	28
793	Bedroom	1.6	95	MET			
794	Living Room	2.6	96	MET		57	24
795	Bedroom	2.9	98	MET			
796	Living Room	4.1	100	MET		74	28
797	Bedroom	2.9	97	MET			
798	Living Room	4.2	99	MET		76	28
799	Bedroom	3	98	MET			
800	Bedroom	3	98	MET			
801	Living Room	4.3	99	MET		78	28
802	Bedroom	3.1	97	MET			
803	Bedroom	3	96	MET			
804	Living Room	3.7	99	MET		71	28
805	Bedroom	2.8	98	MET			

Table 20: Assessment Data

Block E - Level 10 - Part 1 of 1

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
BLOCK E (1 OF 2) - LEVEL 10							
806	Studio	2.6	99	MET		45	15
807	Bedroom	3.6	98	MET			
808	Living Room	1.4	92	MET		40	12
809	Bedroom	1.5	93	MET			
810	Bedroom	4.1	98	MET			
811	Living Room	3.9	100	MET		68	24
812	Bedroom	3.9	98	MET			
813	Bedroom	2.1	86	MET			
814	Living Room	2.3	86	MET			
815	Bedroom	2	76	MET			
816	Bedroom	1.9	69	MET			
817	Living Room	0.9	52	MET			
818	L/K/D	2.1	91	N/A			
819	Bedroom	2.1	90	MET			
820	Bedroom	0.9	38	MET			
821	Living Room	1.1	69	MET			
822	Bedroom	1.8	62	MET			
823	Bedroom	1.7	55	MET			
824	Living Room	2.2	78	N/A			
825	Bedroom	1.3	46	MET			
826	Living Room	1.3	91	MET			
827	Bedroom	1.9	64	MET			
828	Bedroom	1.1	44	MET			
829	L/K/D	3.2	99	N/A			
830	Bedroom	2.9	98	MET			
831	Bedroom	2.7	98	MET			
832	L/K/D	4.3	100	N/A		62	27
833	Bedroom	2.7	97	MET			
834	Bedroom	2.8	97	MET			
835	Living Room	3	99	MET		52	27
836	Bedroom	2.8	98	MET			
837	Bedroom	2.5	96	MET			
838	Living Room	2.8	99	MET		49	26
839	Bedroom	2.7	98	MET			
840	Living Room	2.7	100	MET		51	23
841	Bedroom	2.7	98	MET			
842	Living Room	2.4	96	MET		32	17
843	Bedroom	2.1	90	MET			
844	Bedroom	2	92	MET			
845	Living Room	3.2	99	MET			
846	Bedroom	2.7	97	MET			
847	Living Room	3.6	99	MET			
848	Living Room	3.3	98	MET			
849	Bedroom	2.9	96	MET			

Table 21: Assessment Data

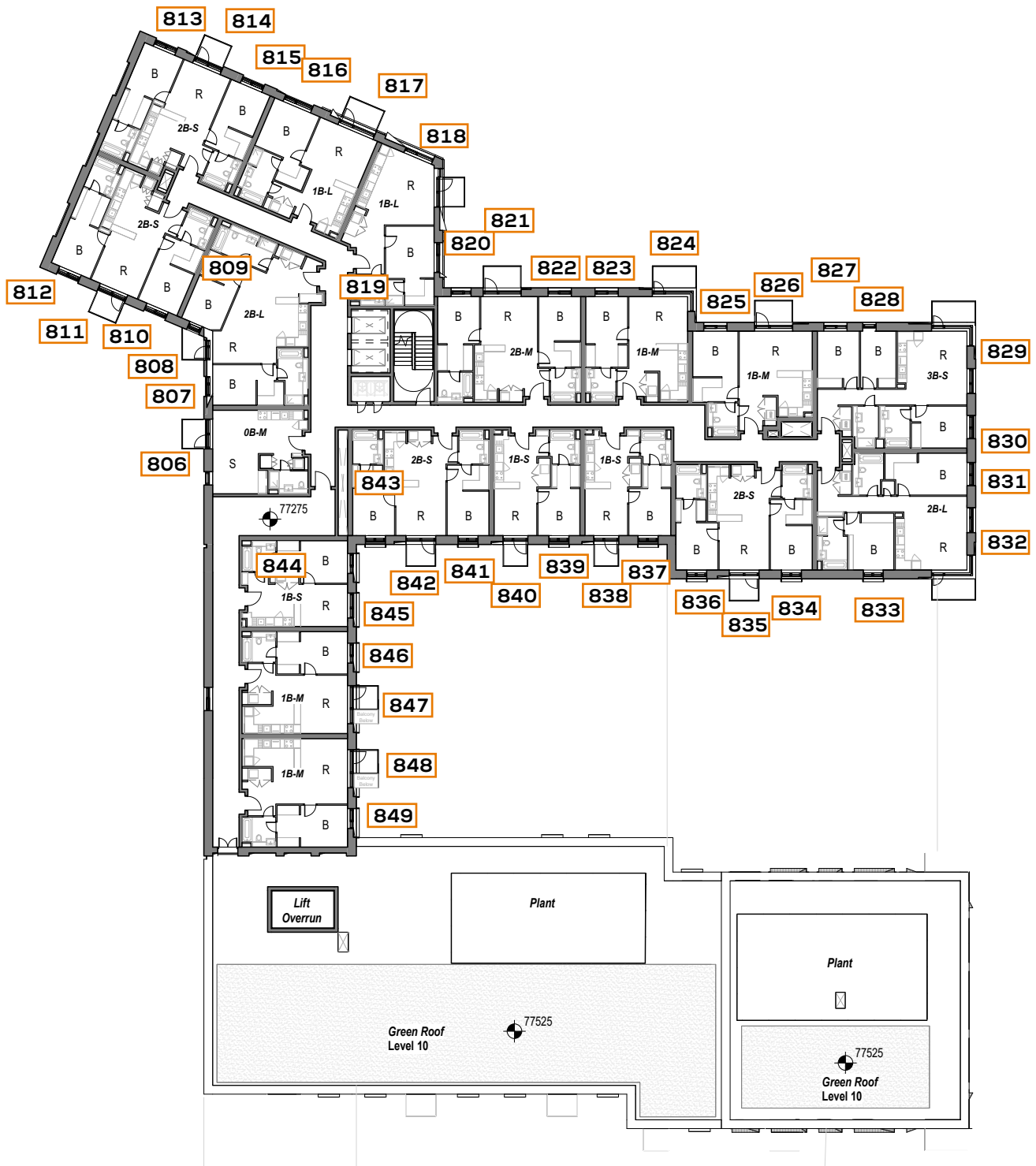


Fig. 28: Floor Plan



Block E - Level 11 - Part 1 of 1

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
BLOCK E (1 OF 2) - LEVEL 11							
850	Studio	3.2	99	MET		47	15
851	Living Room	4.2	97	MET			
852	Bedroom	2.7	95	MET			
853	Bedroom	1.7	46	MET			
854	L/K/D	2.3	92	N/A			
855	Bedroom	2.5	97	MET			
856	Bedroom	1.3	54	MET			
857	Living Room	2.6	85	MET			
858	Bedroom	2.2	67	MET			
859	Bedroom	2	61	MET			
860	Living Room	3.7	80	N/A			
861	Bedroom	1.6	54	MET			
862	Living Room	2.3	93	MET			
863	Bedroom	2.1	68	MET			
864	Bedroom	0.9	50	MET			
865	L/K/D	4.4	100	N/A			
866	Bedroom	3.2	98	MET			
867	Bedroom	3	98	MET			
868	L/K/D	5.8	99	N/A		88	30
869	Bedroom	2.8	97	MET			
870	Bedroom	2.9	97	MET			
871	Living Room	4.1	99	MET		76	27
872	Bedroom	2.9	98	MET			
873	Bedroom	2.6	97	MET			
874	Living Room	3.9	100	MET		71	27
875	Bedroom	2.9	98	MET			
876	Living Room	3.9	100	MET		72	26
877	Bedroom	3	98	MET			
878	Living Room	3.9	99	MET		69	21
879	Bedroom	2.3	97	MET			
880	Bedroom	2.3	97	MET			
881	Living Room	3.6	99	MET			
882	Bedroom	2.7	97	MET			
883	Living Room	4.9	99	MET			
884	L/K/D	3.9	100	MET			
885	Bedroom	3	96	MET			
886	Bedroom	3.1	97	MET			

Table 22: Assessment Data

Block F - Mezzanine - Part 1 of 1

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
BLOCK F - MEZZANINE							
887	L/K/D	0.5	55	N/A			
888	Bedroom	0.6	21	MET			
889	Bedroom	0.5	14	MET			
890	Living Room	0.5	19	MET			
891	Bedroom	0.4	14	MET			
892	Bedroom	0.5	17	MET			
893	Living Room	0.6	20	MET			
894	Bedroom	0.5	14	MET			
895	Bedroom	0.4	10	MET			
896	Living Room	0.5	18	MET			
897	Bedroom	0.4	6	MET			

Table 23: Assessment Data

RD STREET

Plot F



Fig. 30: Floor Plan



Block F - Ground Floor - Part 1 of 1

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
BLOCK F - GROUND FLOOR							
898	Living Room	0.4	18	MET			
899	Bedroom	0.4	11	MET			
900	Bedroom	0.5	11	MET			
901	Living Room	0.7	21	MET			
902	Bedroom	0.5	11	MET			
903	Living Room	0.6	13	MET			
904	Bedroom	0.5	8	MET			
905	Living Room	0.6	12	MET			
906	Bedroom	0.5	6	MET			
907	Bedroom	1.7	90	MET			
908	Living Room	2.3	98	MET		36	7
909	Bedroom	2	96	MET			
910	Living Room	2.2	96	MET		35	7
911	Bedroom	1.9	93	MET			
912	Living Room	2.2	94	MET		37	8
913	Bedroom	1.2	70	MET			

Table 24: Assessment Data

Plot F

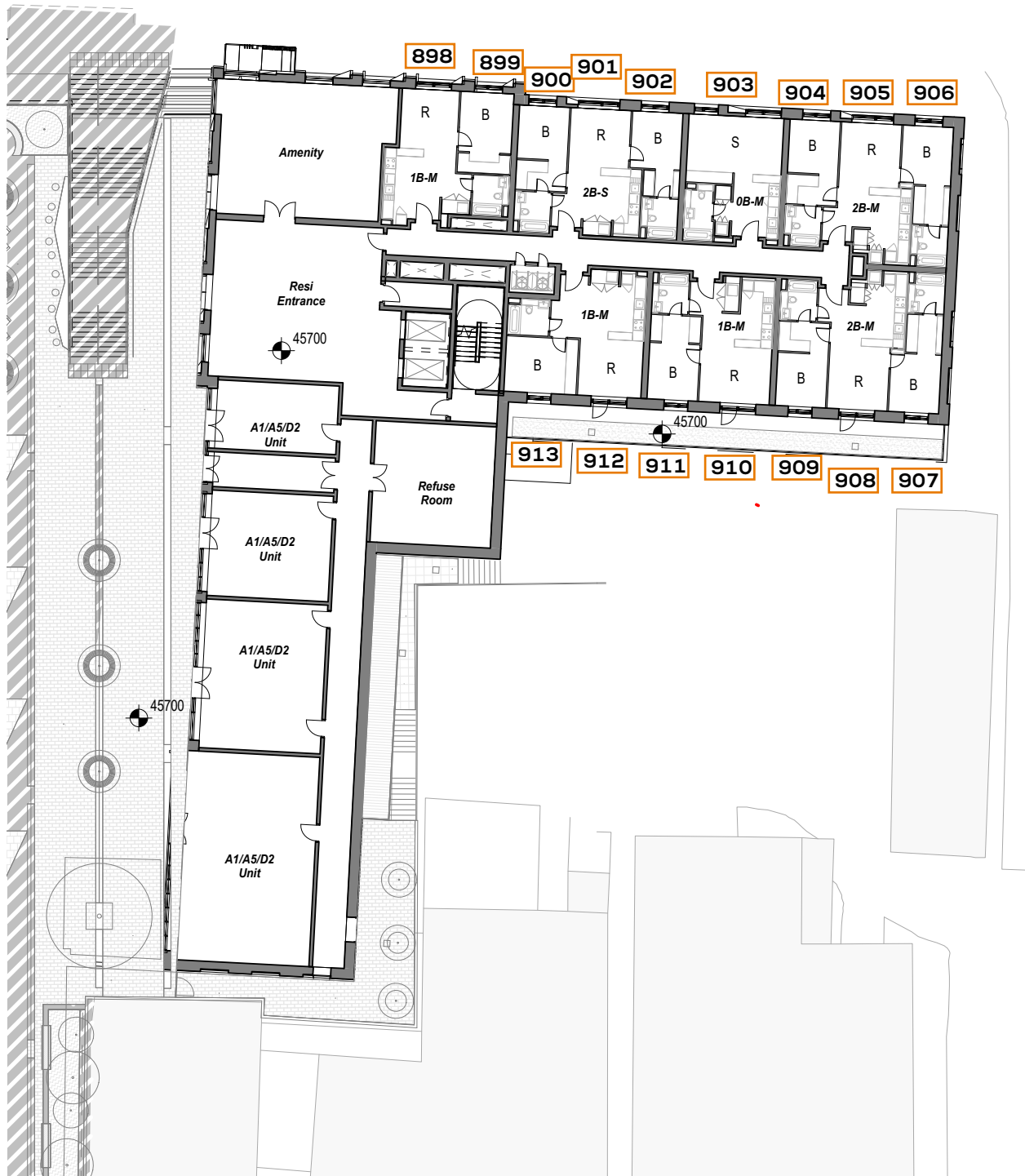


Fig. 31: Floor Plan



Block F - Level 01 - Part 1 of 1

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
BLOCK F - LEVEL 01							
914	Bedroom	1.8	81	MET			
915	L/K/D	1.2	67	MET		23	7
916	Bedroom	1.2	69	MET			
917	Living Room	2.2	91	MET		17	6
918	Bedroom	1.6	67	MET			
919	Living Room	2.2	85	MET		14	3
920	Bedroom	1.6	73	MET			
921	Living Room	2.2	88	MET		15	3
922	Bedroom	1.5	81	MET			
923	Living Room	1.9	86	MET		20	2
924	Bedroom	1.2	60	MET			
925	L/K/D	0.6	35	MET		18	3
926	Bedroom	1.7	86	MET			
927	L/K/D	1.5	83	N/A		15	4
928	Bedroom	0.7	23	MET			
929	Bedroom	0.7	21	MET			
930	Living Room	0.6	21	MET			
931	Bedroom	0.6	19	MET			
932	Bedroom	0.7	22	MET			
933	Living Room	0.8	25	MET			
934	Bedroom	0.7	19	MET			
935	Living Room	0.9	19	MET			
936	Bedroom	0.7	18	MET			
937	Living Room	0.7	16	MET			
938	Bedroom	0.7	15	MET			
939	Bedroom	2.2	97	MET			
940	Living Room	2.9	99	MET		47	12
941	Bedroom	2.5	98	MET			
942	Living Room	2.8	98	MET		44	10
943	Bedroom	2.3	96	MET			
944	Living Room	2.7	96	MET		42	11
945	Bedroom	1.5	72	MET			
946	Bedroom	1.4	82	MET			
947	Living Room	1.8	90	MET			

Table 25: Assessment Data

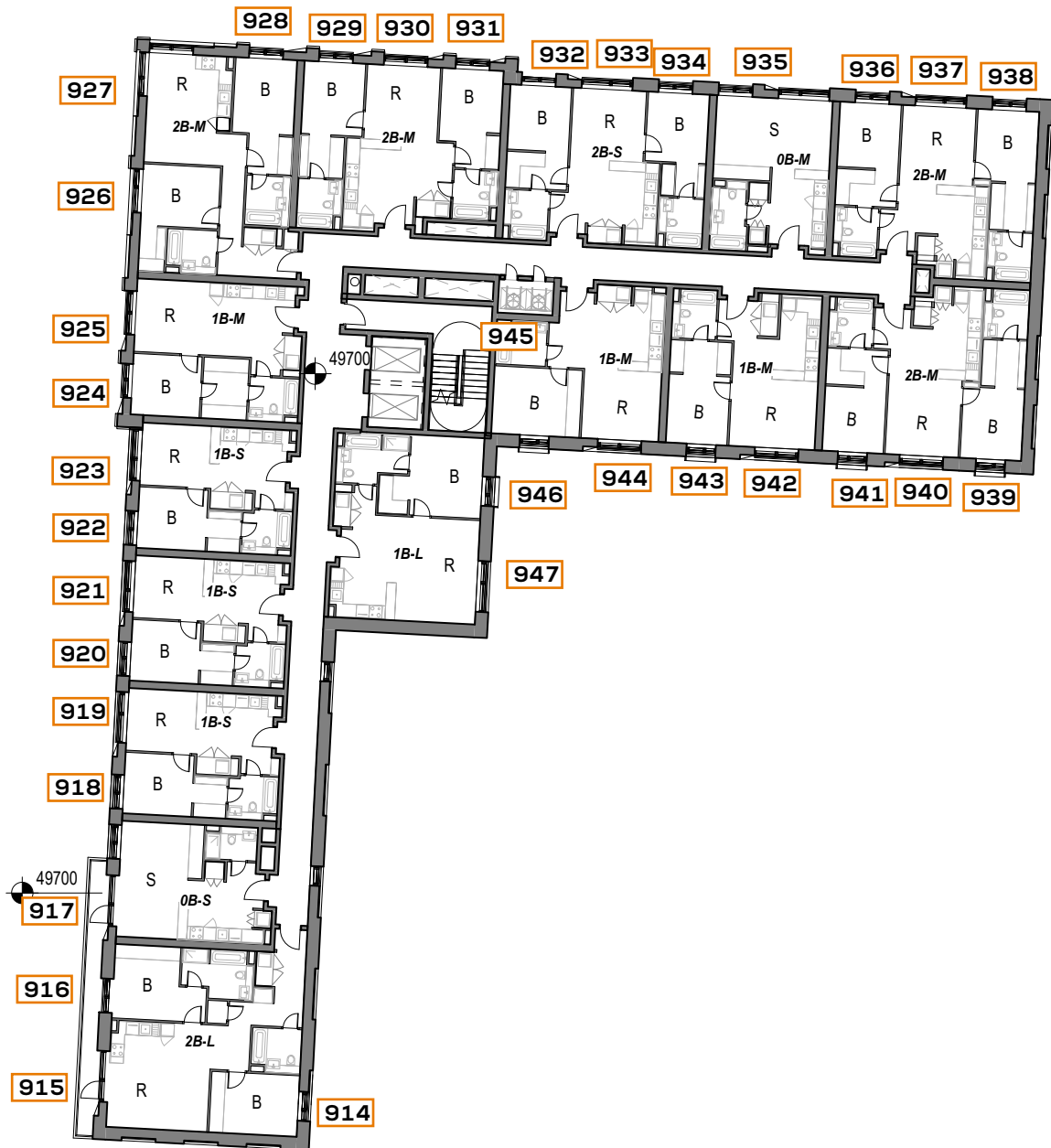


Fig. 32: Floor Plan



Block F - Level 02 - Part 1 of 1

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
BLOCK F - LEVEL 02							
948	Bedroom	2	88	MET			
949	L/K/D	1.2	72	MET		24	8
950	Bedroom	1.4	72	MET			
951	Living Room	2.4	98	MET		18	6
952	Bedroom	1.7	74	MET			
953	Living Room	2.3	95	MET		18	5
954	Bedroom	1.8	84	MET			
955	Living Room	2.3	98	MET		21	4
956	Bedroom	1.7	92	MET			
957	Living Room	2	94	MET		25	4
958	Bedroom	1.3	67	MET			
959	L/K/D	0.6	37	MET		20	3
960	Bedroom	1.8	88	MET			
961	L/K/D	1.6	84	N/A		15	4
962	Bedroom	0.8	26	MET			
963	Bedroom	0.7	24	MET			
964	Living Room	0.7	24	MET			
965	Bedroom	0.7	22	MET			
966	Bedroom	0.7	26	MET			
967	Living Room	0.9	26	MET			
968	Bedroom	0.7	23	MET			
969	Living Room	1	23	MET			
970	Bedroom	0.8	21	MET			
971	Living Room	0.8	18	MET			
972	Bedroom	0.7	19	MET			
973	Bedroom	2.4	97	MET			
974	Living Room	3.1	99	MET		50	13
975	Bedroom	2.7	98	MET			
976	Living Room	2.9	98	MET		48	12
977	Bedroom	2.4	96	MET			
978	Living Room	2.8	96	MET		44	12
979	Bedroom	1.5	72	MET			
980	Bedroom	1.4	84	MET			
981	Living Room	1.9	91	MET			

Table 26: Assessment Data

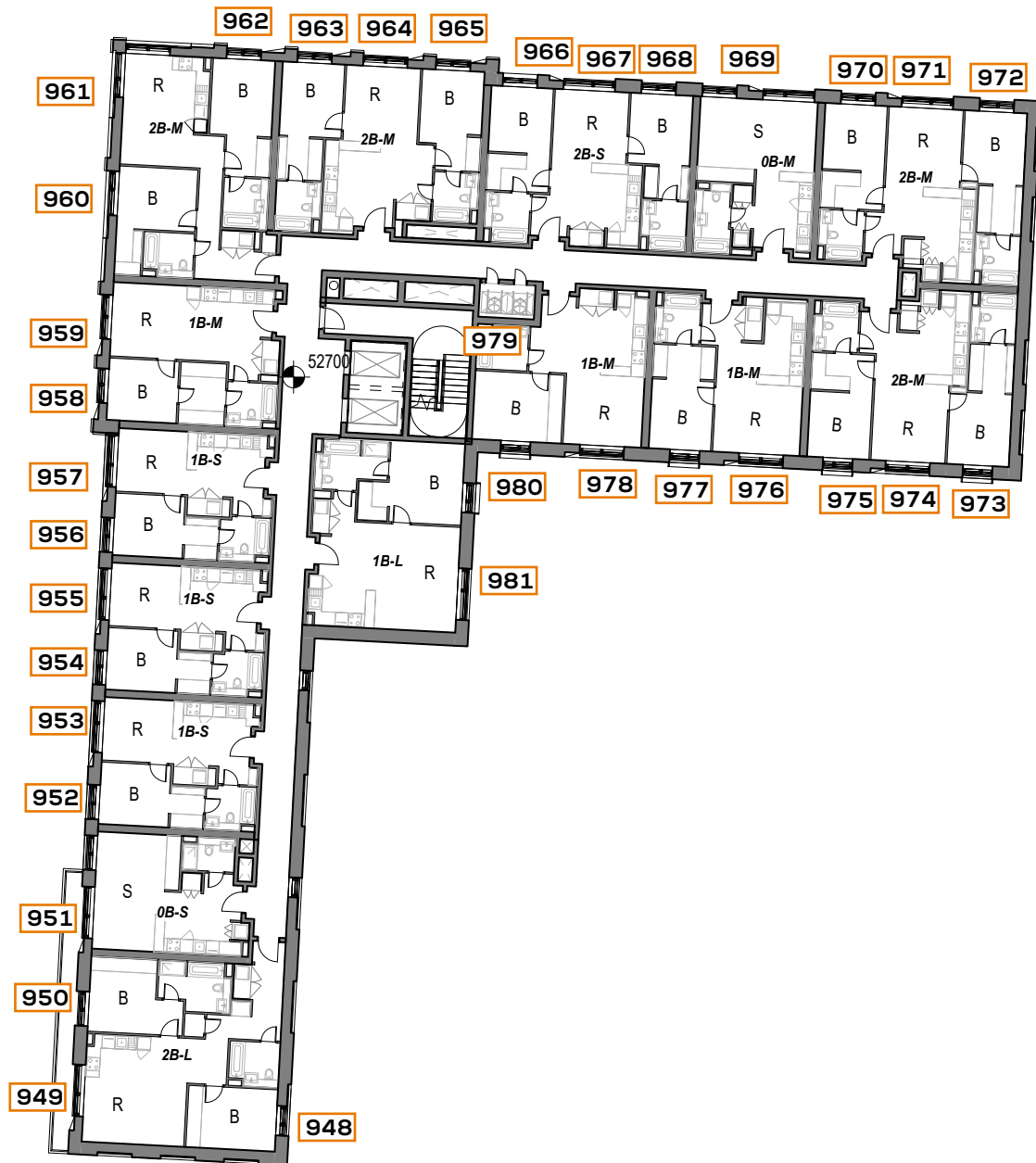


Fig. 33: Floor Plan



Block F - Level 03 - Part 1 of 1

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
BLOCK F - LEVEL 03							
982	Bedroom	2	97	MET			
983	L/K/D	1.2	71	MET		23	9
984	Bedroom	1.4	71	MET			
985	Living Room	2.4	100	MET		18	7
986	Bedroom	1.8	78	MET			
987	Living Room	2.4	100	MET		19	5
988	Bedroom	1.8	89	MET			
989	Living Room	2.3	100	MET		25	5
990	Bedroom	1.7	94	MET			
991	Living Room	2.1	96	MET		24	4
992	Bedroom	1.5	72	MET			
993	L/K/D	0.7	41	MET		20	3
994	Bedroom	1.9	90	MET			
995	L/K/D	1.7	85	N/A		16	5
996	Bedroom	0.9	29	MET			
997	Bedroom	0.8	26	MET			
998	Living Room	0.7	27	MET			
999	Bedroom	0.8	23	MET			
1000	Bedroom	0.7	21	MET			
1001	Living Room	0.8	25	MET			
1002	Bedroom	0.7	19	MET			
1003	Living Room	1	19	MET			
1004	Bedroom	0.8	18	MET			
1005	Living Room	0.8	16	MET			
1006	Bedroom	0.7	15	MET			
1007	Bedroom	2.5	97	MET			
1008	Living Room	3.1	99	MET		58	17
1009	Bedroom	2.7	98	MET			
1010	Living Room	2.9	98	MET		54	16
1011	Bedroom	2.4	96	MET			
1012	Living Room	2.7	95	MET		50	14
1013	Bedroom	1.5	72	MET			
1014	Bedroom	1.4	85	MET			
1015	Living Room	1.8	93	MET			

Table 27: Assessment Data

Block F - Level 04 - Part 1 of 1

		DAYLIGHT QUANTUM	DAYLIGHT DISTRIBUTION			SUNLIGHT QUANTUM (PROBABLE SUNLIGHT HOURS)	
ROOM REF.	ROOM USE	ADF (%)	NSL (%)	RDC		ANNUAL	WINTER
BLOCK F - LEVEL 04							
1016	Bedroom	2.4	99	MET			
1017	L/K/D	1.6	77	MET		28	11
1018	Bedroom	1.8	73	MET			
1019	Living Room	3.1	100	MET		23	8
1020	Bedroom	2.2	83	MET			
1021	Living Room	3.1	100	MET		25	6
1022	Bedroom	2.3	95	MET			
1023	Living Room	3	100	MET		26	5
1024	Bedroom	2.1	97	MET			
1025	Living Room	2.6	96	MET		27	4
1026	Bedroom	1.7	74	MET			
1027	L/K/D	0.8	42	MET		22	5
1028	Bedroom	2.1	91	MET			
1029	L/K/D	1.8	85	N/A		19	5
1030	Bedroom	1	33	MET			
1031	Bedroom	1	30	MET			
1032	Living Room	0.9	29	MET			
1033	Bedroom	0.9	29	MET			
1034	Bedroom	1	34	MET			
1035	Living Room	1.2	35	MET			
1036	Bedroom	1	30	MET			
1037	Living Room	1.4	32	MET			
1038	Bedroom	1.1	32	MET			
1039	Living Room	1.1	28	MET			
1040	Bedroom	1	27	MET			
1041	Bedroom	2.7	97	MET			
1042	Living Room	2.2	98	MET		37	19
1043	Bedroom	2.9	98	MET			
1044	Living Room	2	95	MET		30	18
1045	Bedroom	2.6	96	MET			
1046	Living Room	1.9	94	MET		29	15
1047	Bedroom	1.5	72	MET			
1048	Bedroom	1.4	85	MET			
1049	Living Room	1.2	93	MET			

Table 28: Assessment Data

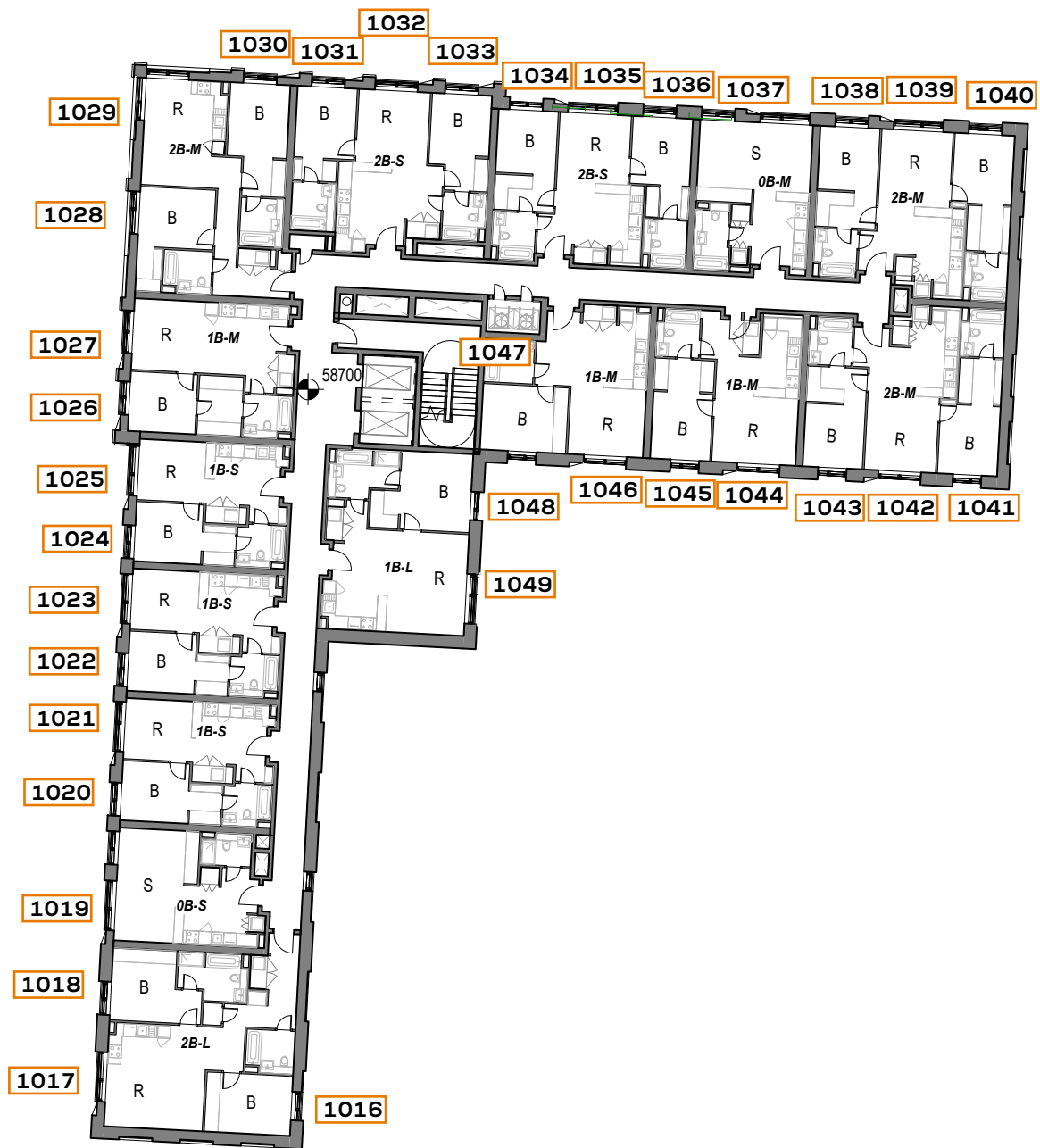


Fig. 35: Floor Plan

