Tack Site

Sandyford

Daylight & Sunlight Analysis

IN2 Project No. D2005

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Revision History

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1.0 Executive Summary

The report has been prepared as a desktop exercise with 3D massing and survey information provided by others. No site visits took place as information provided included all relevant required information and our understanding is that any survey information or 3D models provided were carried out by relevant suitably qualified professionals.

Various software programs were utilised in the analysis of the proposed development. These included:

- Radiance Lighting Software
- TAS by EDSL

Section 4.0 introduces the various Guidelines and Standards utilised throughout the Daylight / Sunlight analysis undertaken. The specific methodology for each topic (as relevant) is detailed in the relevant section in the body of this report as identified.

Analysis Type	Relevance	Assessment Methodology	Compliance Guidelines Targets	Reference section of this report
Daylight	Proposed Development	Average Daylight Factors	BRE 209	Section 7.0 – Internal Daylight Analysis
Daylight	Existing Neighbouring Buildings	Vertical Sky Component	BRE 209	No applicable dwellings within surrounding curtilage as per section 6.0.
Sunlight	Proposed Development	Compliance with dual aspect requirements	2020 Apartment Guidelines	Not covered in this report. Refer to Architectural documentation.
Sunlight	Existing Neighbouring Buildings	Annual Probable Sunlight Hours	BRE 209	No applicable dwellings within surrounding curtilage as per section 6.0.
Sunlight	Proposed Development Amenity Spaces	Sunlight Hours	BRE 209	Section 5.0 – Site Sunlighting and Shading
Sunlight	Existing Neighbouring Buildings Amenity Spaces	Sunlight Hours	BER 209	No applicable dwellings within surrounding curtilage

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This report compiles the daylight and sunlight analysis as undertaken by IN2 Engineering Design Partnership for the Proposed development at Tack Sandyford, Dublin 18.

The report summarises the analysis undertaken, and conclusions determined for the proposed arrangements.

Section 5.0 details the results of sunlighting and shading to external Amenity spaces within proposed developments. 82% of proposed communal open space, and 60% of the public amenity is predicted to receive at least 2 hours of direct sunlight on the 21st March. Therefore, amenity spaces were found to be compliant with the guidelines.

The impact of the proposed development on neighbouring buildings is assessed in Section 6.0. The proposed development is sited in the Sandyford Business District and therefore there are no dwellings within the impact zone of the scheme. Dwellings are defined under the BRE guide as having an expectation of sunlight and daylight, as there are none, the analysis was deemed not applicable.

The internal daylight analysis, as detailed in section 7.0, has been undertaken for all units across the development. The analysis determined that 95% of rooms were in excess of the prescribed BRE/BS guidelines as set out within this report, for average daylight factors (ADF). This extent of compliance was achieved through design development, with increased glazing/ reduced balcony depths / balcony locations etc. applied to ensure the residences can benefit from maximised daylight availability.

The 2020 apartment guidelines advise that "*Where an applicant cannot fully meet all of the requirements of the daylight provisions above(...BR 209…), this must be clearly identified and a rationale for any alternative, compensatory design solutions must be set out, which planning authorities should apply their discretion in accepting taking account of its assessment",* therefore section 7.0 identifies these alternative, compensatory solutions.

We note the BRE guide should be seen as advisory only as the guide was developed for low density urban housing, and was developed to inform design rather than to constrain it. Although the guide provides numerical guidelines, these should be interpreted flexibly since natural lighting is only one of many factors in site layout design.

Whilst it should be noted that the current applicable guideline for calculation of daylight is the BRE'S BR 209, a comparative analysis has also been provided in Appendix A. This compares results under BR 209, BS EN.17037 and IS EN.17037, as defined in the standards and guidelines section of this report. This analysis determined generally good correlation between BR 209 and BS EN17037, which are both relevant for residential application. Unlike these documents, IS EN17037 does not provide specific guidance for residential application and is therefore more suited to commercial application.

Additionally, a further assessment has been compiled to include the results inclusive of the future development of the Avid site to the south of the scheme.

In summary, this report confirms that Best Practice Sunlight and Daylight Availability have been ensured for the proposed Tack Sandyford Residential development.

2.0 Development Overview

The Tack site measures approximately 0.7 hectares and is located at Carmanhall Road and Ravens Rock Road in Sandyford, Dublin.

The proposed residential development comprises three blocks ranging in height from seven to eight storeys.

The apartments include 48 studios, 103 one beds and 55 two beds with 415m2 of shared amenity.

The wider development includes a separate proposed residential development of 336 units on the adjacent former Avid Technology International site which is subject to a separate planning application.

3.0 Glossary

Working Plane

The working plane is the notional plane where visual tasks, and on which predicted light levels would normally be undertaken. For a residential assessment, the working plane is defined by BR209 and EN 17037 at 850mm above floor level.

Daylight Factor

The Daylight Factor (DF) is the ratio of the illuminance at a point on a working plane in a room, due to the combination of light received directly and indirectly from a sky, over the illuminance on an external horizontal plane based on an unobstructed sky. Daylight factor, as defined here, excludes the contribution of direct sunlight. The sky utilised for ADF and MDF assessments, as defined below, is the (theoretical) CIE Overcast Sky, which is unidirectional, therefore a north facing window is assumed to receive the same light as south etc.

Average Daylight Factor

Average Daylight Factor, also referred to as ADF, is a measure of daylight availability to a room based on the average values of multiple calculation points at the working plane within a space. ADF was utilised in BS.8206-2 standard, inferred also in BR.209, where it is used for daylight assessment of proposed developments (with impact on existing utilising VSC/ NSL as defined below).

Median Daylight Factor

Median Daylight Factor, also referred to as MDF, is a measure of daylight availability to a room based on the median daylight value, i.e., the value that is achieved for at least 50% of the space (50% of the calculation points on the working plane). MDF is calculated for compliance with EN 17037 Method 1.

Climate Based Daylight Assessment

Climate based daylight assessments, also referred to as CBD, involves the use of a detailed daylight calculation methods where hourly (or sub-hourly) internal daylight illuminance values for a typical year are computed using hourly (or sub-hourly) sky and sun conditions derived from climate data appropriate to the site. Unlike the DF methodology, CBD assessments are therefore orientation dependent: i.e. a south facing window would be expected to receive more daylight than north facing etc.

This calculation method determines daylight provision directly from simulated illuminance values on the working plane with results determined in lux (a measure of light). CBD is calculated for compliance with EN 17037 method 2.

Probable Sunlight Hours

Annual probable sunlight hours and winter probable sunlight hours, also referred to as APSH and WPSH, are used for the assessment of impact on neighbouring buildings by a proposed development. APSH and WPSH are a measure of probable direct sunlight to a window or surface and therefore are only relevant to windows within 90 degrees of south for buildings in the northern hemisphere. Therefore, any window with a northerly aspect (i.e. orientated between North and East and North and West) is therefore not assessed within the methodology.

Vertical Sky Component

Vertical Sky Component, also referred to as VSC, is used for the assessment of impact on neighbouring buildings by a proposed development with respect to daylight availability. VSC is a measure of the percentage of illuminance that a point can receive from the CIE Overcast Sky as percentage of that received at unobstructed horizontal locations. In simple terms, how much of the sky that can be seen for a given point. VSC assessments do not included reflected light. VSC is calculated for compliance with BR209 as detailed below.

No Sky Line

No sky line, also referred to as NSL, is used to assess the *internal* impact on neighbouring buildings by a proposed building when VSC assessment of the *external* façade determined further calculation is required. They can only be carried out where internal layouts of existing buildings are known, but do not require knowledge of internal room surface reflectance's.

No sky line is the delineation on the working plane between where the sky can and cannot be seen due to obstructions, such as walls, window reveals, external buildings. No sky line assessments do not include reflected light in terms of assessment of existing buildings. No sky line is calculated for compliance with BR209 as detailed below.

Amenity Sunlight

Amenity sunlight is a measure of direct daylight received on an area over the duration of 21st March based on the sun's solar position for a geographical location. As the 21st March is the solar equinox, the sun is at its mid-point of travel position through the year, therefore representing an average condition throughout the year of how well sunlit an amenity space will be. It may be noted that in the Northern Hemisphere, the sun rises due east and sets due west. Amenity sunlight is calculated for compliance with BR209 as detailed below.

4.0 Standards and Guidelines

The following standards and guidance documents have been consulted when compiling this report to ensure compliance with the various Daylight and Sunlight requirements as applicable and relevant:

a) Sustainable Urban Housing: Design Standards for New Apartments (December 2020) (the **"2020 Apartment Guidelines").** These are guidelines issued under section 28 of the 2000 Planning and Development Act.

b) The Building Research Establishment's (BRE) Site Layout Planning for Daylight and Sunlight: A guide to good practice (BRE 209) (2nd edition) (the **"BRE Guide").**

c) British Standard BS 8206-2:2008 – "Lighting for Buildings – Part 2: Code of Practice for Daylighting" (the "**2008 British Standard**").

d) British Standard BS EN 17037:2018 – Daylight in Buildings (the "**2018 British EN Standard**").

e) Irish Standard IS EN 17037:2018 (the "**2018 Irish EN Standard**").

It should be noted at the outset that the 2008 British Standard has been superseded by the 2018 British Standard. This is the UK implementation of EN 17037:2018, which was approved by the CEN on 29 July 2018. In Ireland, EN 17037:2018 has been implemented by the 2018 Irish Standard. The texts of the 2018 British Standard and the 2018 Irish Standard are the same, with one exception. The exception is that the 2018 British Standard contains an additional "National Annex" which specifically sets out requirements within dwellings, to ensure some similarity to the now superseded 2008 British Standard.

The 2020 Apartment Guidelines state:

"[6.5] The provision of acceptable levels of natural light in new apartment developments is an important planning consideration as it contributes to the liveability and amenity enjoyed by apartment residents. In assessing development proposals, planning authorities must however weigh up the overall quality of the design and layout of the scheme and the measures proposed to maximise daylight provision with the location of the site and the need to ensure an appropriate scale of urban residential development.

[6.6] Planning authorities should have regard to quantitative performance approaches to daylight provision outlined in guides like the BRE guide 'Site Layout Planning for Daylight and Sunlight' (2nd edition) or BS 8206-2:2008 – 'Lighting for Buildings – Part 2: Code of Practice for Daylighting' when undertaken by development proposers which offer the capability to satisfy minimum standards of daylight provision.

[6.7] Where an applicant cannot fully meet all of the requirements of the daylight provisions above, this must be clearly identified and a rationale for any alternative, compensatory design solutions must be set out, which planning authorities should apply their discretion in accepting taking account of its assessment of specific. This may arise due to a design constraints associated with the site or location and the balancing of that assessment against the desirability of achieving wider planning objectives. Such objectives might include securing comprehensive urban regeneration and or an effective urban design and streetscape solution."

It can be noted from this section that the 2020 Apartment Guidelines continue to refer to the BRE Guide (published in 2011) and to the 2008 British Standard. They do not take into account the 2018 British Standard and/or the 2018 Irish Standard and as the BRE Guide is still current and applicable, the 2011 edition will therefore provide the basis for the assessments detailed within this report.

The BRE Guide

The BRE Guide describes its purpose in the following terms in the "Summary" section (v):

> *"This guide gives advice on site layout planning to achieve good sunlighting and daylighting both within buildings and in the open spaces between them. It is intended to be used in conjunction with the interior daylight recommendations in the [2008] British Standard… It contains guidance on site layout to provide good natural lighting within a new development; safeguarding of daylight and sunlight within existing buildings nearby; and the protection of daylighting of adjoining land for future development."*

The BRE Guide also notes that:

> *"It (the guide) is purely advisory and the numerical target values within it may be varied to meet the needs of the development and its location. Appendix F explains how this can be done in a logical way, while retaining consistency with the British Standard recommendations on interior daylighting."*

> *"The guide is intended for building designers and their clients, consultants and planning officials. The advice given here is not mandatory and the guide should not be seen as an instrument of planning policy; its aim is to help rather than constrain the designer. Although it gives numerical guidelines, these should be interpreted flexibly since natural lighting is only one of many factors in site layout design (see Section 5). In special circumstances the developer or planning authority may wish to use different target values. For example, in a historic city centre, or in an area with modern high rise buildings, a higher degree of obstruction may be unavoidable if new developments are to match the height and proportions of existing buildings."*

Therefore, if the situation arises where the targets identified within the Guide are not achieved, these should be highlighted and either justified in the context of the development / site or where relevant and applicable, compensatory measure will be proposed. In the context of this report, any deviations from the Guides recommendations have therefore been identified, with an approach throughout to ensure that good quality daylight/sunlight in achieved through analysis and design improvements as far as practicable and viable as detailed in the report as relevant.

The main sections in the guide that the assessments within this report will reference (as applicable) are:

1. Light from the Sky (Daylight) – *Based on a theoretical mathematical uniform sky (CIE overcast sky) which does not alter based on orientation.*
    - 1.1. New Development – Within this section the guide sets values for internal Average Daylight Factors (ADF) for various space types and relevant calculation methodologies.
    - 1.2. Existing Buildings – The guide sets a quantitative assessment method for determining the impact of new developments on light from the sky (VSC) on existing neighbouring buildings.
2. Sunlighting – *Based on site location, longitude and latitude, and solar azimuths. i.e. buildings south of a site will not be impacted for sunlight in the northern hemisphere.*
    - 2.1. New Development – This topic is addressed in the 2020 Apartment Guidelines under the issue of dual aspect units and is not covered within this report.
    - 2.2. Existing Buildings – As above, the guide has quantitative assessment for determining the impact of sunlight on existing neighbouring buildings.
    - 2.3. Gardens and open spaces – The amenity criteria set out is used for both proposed new amenity and the impact on existing neighbouring amenities.

The specific methodology for each topic (as relevant) is detailed in the relevant section in the body of this report.

The 2008 British Standard

The BRE guide specifically refers to this standard and most of the quantitative criteria set out have already been mentioned in relation to the BRE Guide above. However the BRE guide provides more detail as to context and implementation. In relation to average daylight factor (ADF), the standard states the following:

> *"The average daylight factor… is used as the measure of general illumination from skylight. It is considered good practice to ensure that rooms in dwellings and in most other buildings have a predominantly daylit appearance. In order to achieve this the average daylight factor should be at least 2%."*

However, the standard then acknowledges that lower lighting levels may be applicable for dwellings, offering minimum ADFs for different room types within dwellings, i.e. 1% for bedrooms; 1.5% for living rooms; and 2% for kitchens (Table 2), and notes that:

> *"Where one room serves more than one purpose, the minimum average daylight factor should be that for the room type with the highest value. For example, in a space which combines a living room and a kitchen the minimum average daylight factor should be 2%."*

Whilst specifically applicable to houses, it should be noted that there is no specific reference within the British Standard to apartment internal galley type kitchens as recognised in the BRE Guide which states:

> *"2.1.14 Non-daylit internal kitchens should be avoided wherever possible, especially if the kitchen is used as a dining area too. If the layout means that a small internal galley-type kitchen is inevitable, it should be directly linked to a well daylit living room."*

The standard's guidance on loss of daylight and sunlight to existing buildings is similar to, but less extensive or detailed than, that contained in the BRE Guide, and in particular Appendix F of the BRE Guide.

The 2018 British and Irish Versions of the EN Standards

The EN 17037:2018 standard—which is the basis of both the 2018 British EN Standard and the 2018 Irish EN Standard—approaches the assessment of daylight provision on a different basis from that utilised in the 2008 British Standard and the BRE Guide. Instead of **average** daylight factors the standard considers a new metric based on **median** daylight, in order to ensure both extent and a degree of uniformity of daylight.

> *"A space is considered to provide adequate daylight if a target illuminance level is achieved across a fraction of the reference plane within a space for at least half of the daylight hours."*

EN 17037:2018 also address other aspects in addition to daylight - including sunlight, glare and quality of view, which are not addressed in the context of this report.

The National Annex

As is noted above, the 2018 British Standard includes a "National Annex", containing "Further recommendations and data for daylight provision in the UK and Channel Islands". This is referenced further in the appendix of this report. As there is no equivalent in the 2018 Irish Standard the 2018 British Standard National Annex will be referenced, which states:

> *"NA.1 Introduction: The UK committee supports the recommendations for daylight in buildings given in BS EN 17037:2018; however, it is the opinion of the UK committee that the recommendations for daylight provision in a space (see Clause A.2) may not be achievable for some buildings, particularly dwellings. The UK committee believes this could be the case for dwellings with basement rooms or those with significant external obstructions (for example, dwellings situated in a dense urban area or with tall trees outside), or for existing buildings being refurbished or converted into dwellings. This National Annex therefore provides the UK committee's guidance on minimum daylight provision in all UK dwellings."*

NA.2 addresses minimum daylight provision in UK dwellings. It contains a table, in which target illuminance, ET (lx), levels are recommended for different room types. These are: bedroom at 100 lx; living room at 150 lx; and kitchen at 200 lx, which may be compared to EN 17037's recommendation of 300 lux (irrespective of room application). The commentary is as follows:

> *"Even if a predominantly daylit appearance is not achievable for a room in a UK dwelling, the UK committee recommends that the target illuminance values given in Table NA.1 are exceeded over at least 50% of the points on a reference plane 0.85 m above the floor, for at least half of the daylight hours."*

5.0 Site Sunlighting and Shading

5.1 Methodology

The BRE Site Layout Planning for Daylight and Sunlight Design Guide 209 provides guidance with regards to sunlighting and shading to external Amenity spaces within proposed developments.

The guidance recommends “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 21st March”.

The methodology assesses sunlight performance at the Equinox, as this is the mid solar position throughout the year (as illustrated in Fig. 5.1.1), with compliance indicative of spaces that will receive adequate sunlight and appealing useful spaces, including that the following attributes will be achieved as identified in BRE.209:

- 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).

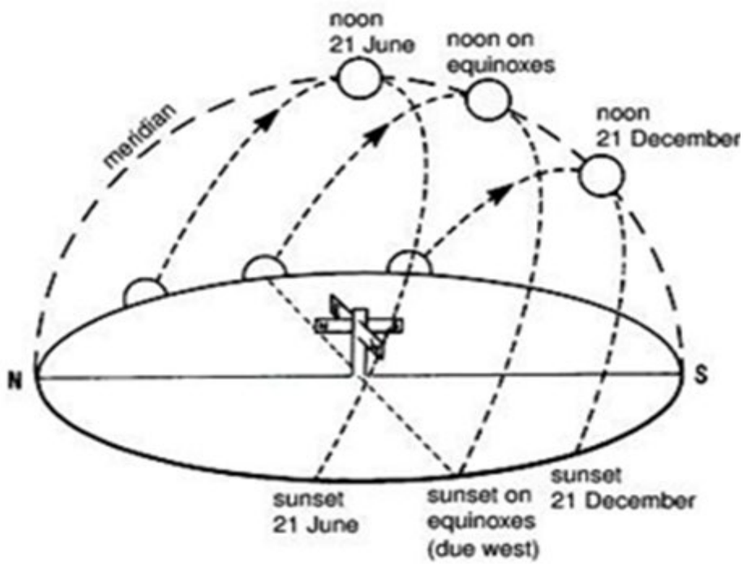


Fig 5.1.1 – Annual Solar Position

An example analysis of Amenity Spaces is indicated in Figure 5.1.2. In this development, the main amenity space (to right hand side) is located to the North of a building block which provides some degree of overshadowing (dark green contours).

However, as the majority of the Amenity Space was determined to be able to receive at least 2 hours of sunlight at the Equinox (green contours), this would be deemed to be compliant.

The results for sunlight to the proposed amenity space are detailed in Fig 4.2.1 (overleaf). These results show that the proposed development is determined to receive at least 2 hours of sunlight to 68% of its area on 21st March. Therefore the space is predicted to receive adequate sunlight, in excess of the 50% minimum requirement of the methodology utilised.

Fig 5.1.2 – Example Analysis

5.2 Results

The results for sunlight to the proposed amenity space are detailed in Fig 5.2.1 below. These results show that the proposed development is determined to receive at least 2 hours of sunlight to the amenity areas on 21st March. The public amenity achieved 60% of the space sunlit, with private courtyard achieving 68% and roof terraces on Block A 99% and Block B 66%. Therefore the spaces are predicted to receive adequate sunlight, in excess of the 50% minimum requirement of the methodology utilised.

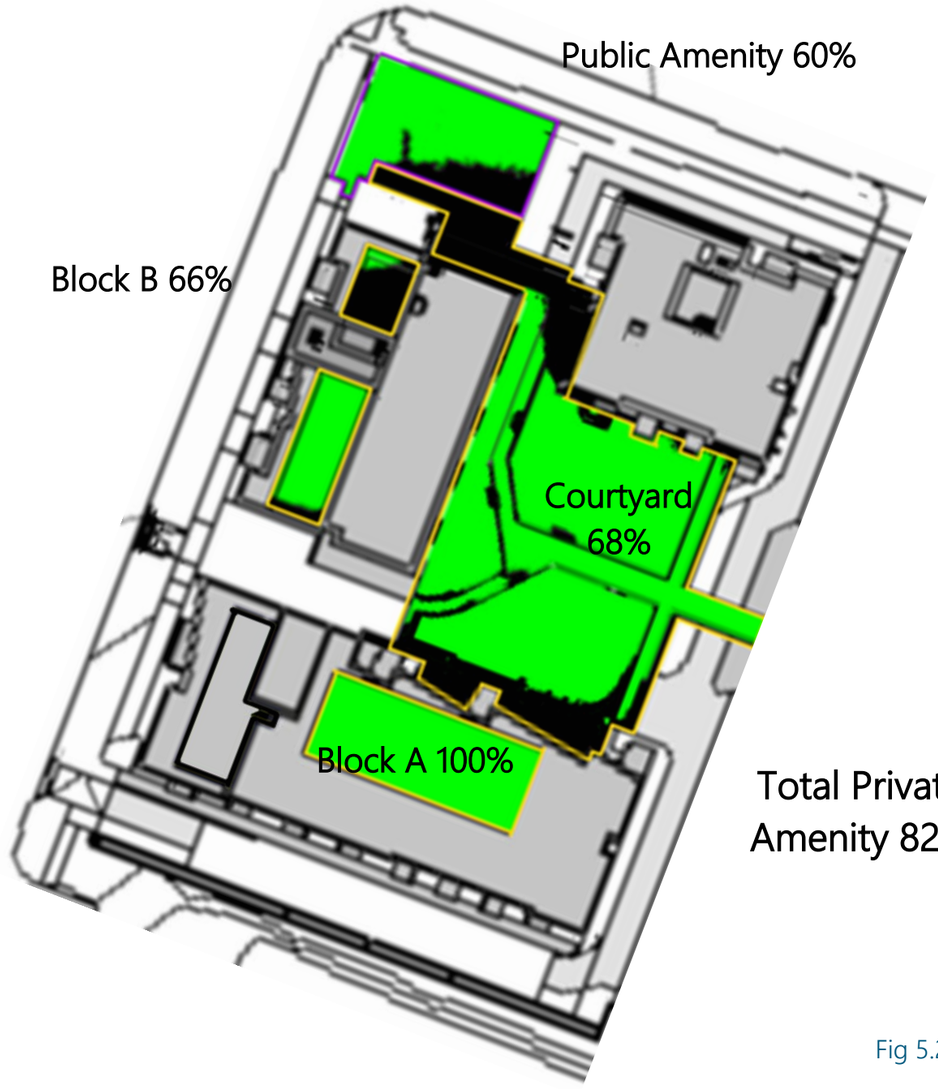
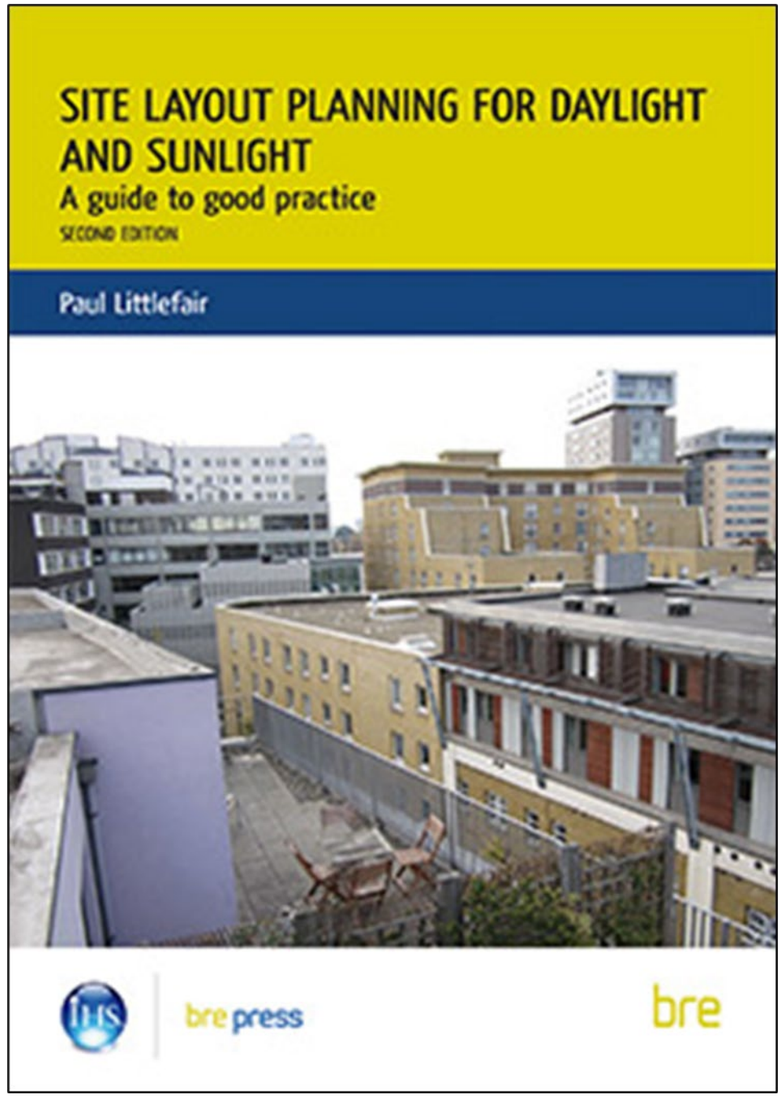


Fig 5.2.1 – Results for Tack Site

6.0 Impact on Neighbouring Buildings

6.1 Guidance

As set out within the introduction, the impact on existing buildings may be assessed utilising quantitative assessment method as detailed in the BRE publication “Site Layout Planning for Daylight and Sunlight – A guide to good Practice (Second Edition)”.



BRE Guidelines state:

Light from the Sky

“If any part of a new building or extension, measured in a vertical section perpendicular to a main window wall of an existing building, from the centre of the lowest window, subtends an angle of more than 25° to the horizontal, then the diffuse daylighting of the existing building may be adversely affected. This will be the case if either:

The VSC (Vertical Sky Component) measured at the centre of an existing main window is less than 27%, and less than 0.8 times its former value.

The analysis is based on measuring the VSC at the existing main windows. Main windows included, living rooms, kitchens, and bedrooms. Existing windows with VSC above 27% after proposed development are considered to still receive good daylight availability.

Sunlighting

If a living room of an existing dwelling has a main window facing within 90° of due south, and any part of a new development subtends an angle of more than 25° to the horizontal measured from the centre of the window in a vertical section perpendicular to the window, then the Sunlighting of the existing dwelling may be adversely affected. This will be the case if the centre of the window:

- *receives less than 25% of annual probable sunlight hours, or less than 5% of annual probable sunlight hours between 21 September and 21 March and*
- *receives less than 0.8 times its former sunlight hours during either period and*
- *has a reduction in sunlight received over the whole year greater than 4% of annual probable sunlight hours.*

6.2 Analysis

The proposed development site and its surroundings is highlighted in Fig 6.2.1 below.

It should be noted that the BRE Guide recommends that the guidelines outlined in the introduction and Section 5.1 should be applied to residential dwellings. However, all existing buildings surrounding the proposed development are commercial buildings, which have no expectation or requirement for sunlight or daylight. There are no existing residential dwellings within the zone of analysis.

Fig 6.2.1 – Proposed Site and Surroundings

7.0 Daylight Analysis

7.1 Methodology

Daylighting analysis was undertaken for the proposed residential development using radiance lighting software to determine Average Daylight Factors (ADF's) in accordance with BRE 209 and BS. 8206-2, as referenced in the Sustainable Urban Housing: Design Standards for New Apartments (December 2020), as well as an assessment comparison to BS EN 17037 (National Annex). These guidelines and standards have been outlined in section 2.0.

ADF's were determined for a CIE Overcast Sky equivalent to providing an external, unobstructed ground illumination level of 10,000 Lux. CIE Overcast skies are theoretical sky models, with brightness highest at the zenith and reducing to the horizon, but also unidirectional (as illustrated in Figure 7.1.1); therefore ADF's do not differ for façade orientation, with North facing rooms achieving identical metric performance to South facing, (all else being equal), as results account for diffuse natural light only and exclude any direct sunlight effects.

The daylight analysis accounted for all aspects that can potentially restrict natural light availability including any adjacent / opposing buildings, along with explicitly modelling Building Details as illustrated in Figure 7.1.2 such as balcony structures, window frames, reveal and cill depth etc. in accordance with the architectural design.

The daylighting models were calculated based on the following assumptions regarding transmittance and reflectance (based on measured manufacturer's test data):

- Glazing Transmission = 70%
- Ceilings: 82% reflectance (BS 00E55 White)
- Walls: 62% reflectance (BS 10C31 Ivory)
- Floors: 36% reflectance (BS 00A05 Platinum Grey)

Daylight Factors for each space were then calculated for a working plane height of 0.85m on a 0.25 x 025 m grid basis to enable a detailed calculation within each room, the average of which was then determined to calculate ADF.

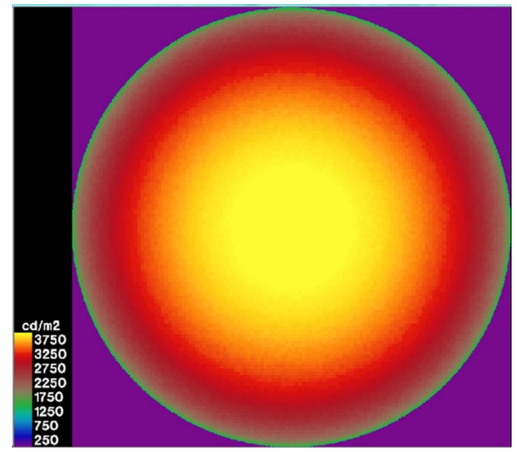


Fig 7.1.1 - CIE Overcast sky as viewed from below.

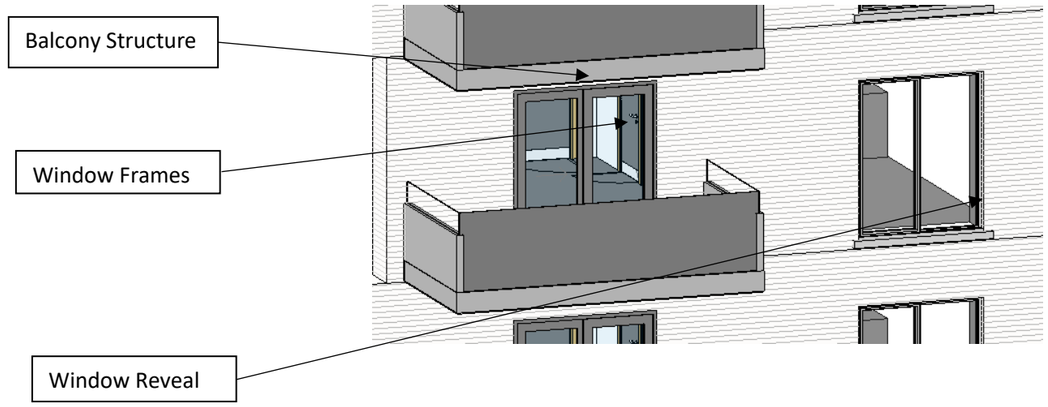


Fig 7.1.2 – Building Details included within Daylight Analysis

7.2 Methodology (Cont'd)

In relation to daylight, the BRE Guide suggest that:

> *"Daylight provision in new rooms may be checked using the average daylight factor (ADF). The ADF is a measure of the overall amount of daylight in a space… [The 2008 British Standard] recommends an ADF of 5% for a well daylit space and 2% for a partly daylit space. Below 2% the room will look dull and electric lighting is likely to be turned on. In* ***housing*** *[the 2008 British Standard] also gives minimum values of ADF of 2% for kitchens, 1.5% for living rooms and 1% for bedrooms." (emphasis added)*

The 2008 British Standard further clarifies the targets by stipulating:

> *"Where one room serves more than one purpose, the minimum average daylight factor should be that for the room type with the highest value. For example, in a space which combines a living room and a kitchen the minimum average daylight factor should be 2%."*

With regard to the above, the minimum values targeted for relevant spaces are:

- > 2.0% for KLD Areas
- > 1.0% for Bedrooms

We note the BRE guide should be seen as advisory only as the guide was developed for low density urban housing, and was developed to inform design rather than to constrain it. Although the guide provides numerical guidelines, these should be interpreted flexibly since natural lighting is only one of many factors in site layout design.

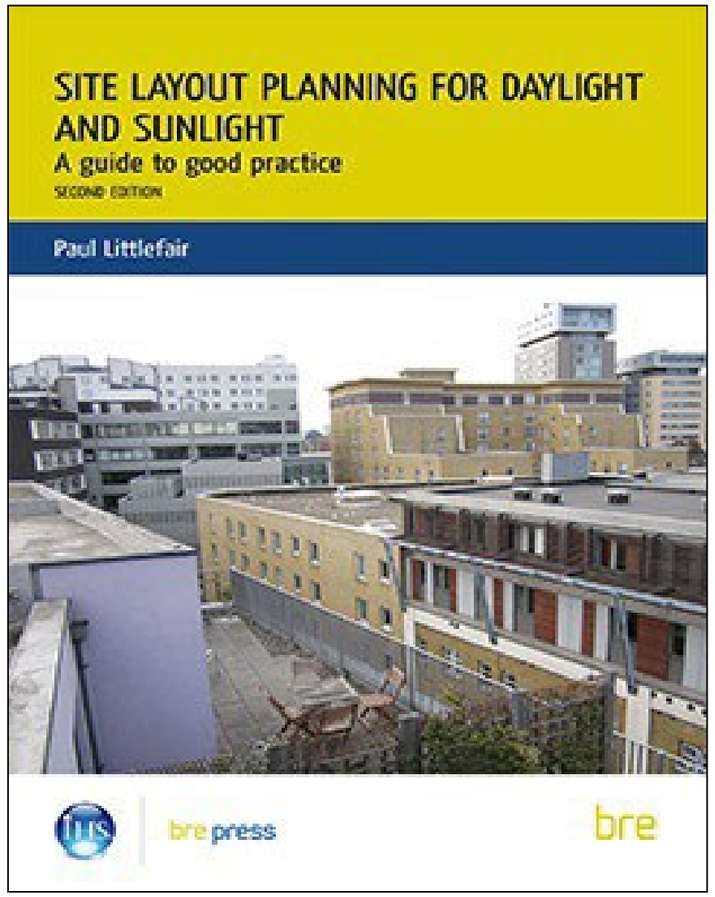


Fig 7.1.3 – The BRE Guide

7.3 Results Summary – ADF

The analysis determined that 95% of KLD and bedrooms would achieve or exceed the BRE guidance targets in terms of ADF compliance.

The assessment has been carried out for all spaces throughout the proposed development as illustrated within this section.

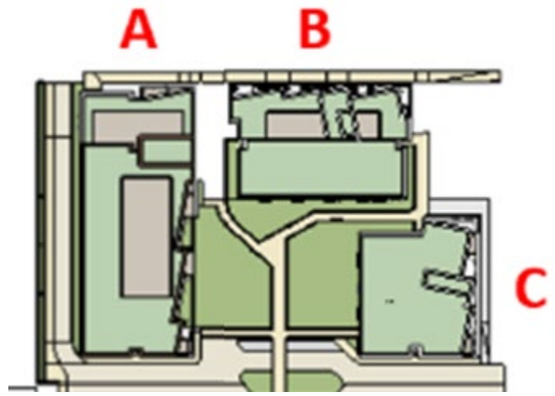
The tables below give a breakdown of compliance rates for each block as well as overall development.

Block A	Pass	Fail	Total	Units
Ground Floor	22	3	25	12
First Floor	23	3	26	13
Second Floor	23	3	26	13
Third Floor	23	3	26	13
Fourth Floor	24	2	26	13
Fifth Floor	25	1	26	13
Sixth Floor	19	1	20	11
Seventh Floor	20	0	20	11
Total	**179**	**16**	**195**	**99**
	92%	**8%**		

Block B	Pass	Fail	Total	Units
Lower Ground Floor	3	1	4	2
Mezzanine	2	0	2	0
Ground Floor	6	0	6	3
First Floor	16	2	18	8
Second Floor	16	2	18	8
Third Floor	18	0	18	8
Fourth Floor	18	0	18	8
Fifth Floor	18	0	18	8
Sixth Floor	18	0	18	8
Seventh Floor	10	0	10	5
Total	**125**	**5**	**130**	**58**
	96%	**4%**		

Block C	Pass	Fail	Total	Units
Ground Floor	3	0	3	2
First Floor	12	0	12	6
Second Floor	11	1	12	6
Third Floor	12	0	12	6
Fourth Floor	12	0	12	6
Fifth Floor	12	0	12	6
Sixth Floor	12	0	12	6
Seventh Floor	12	0	12	6
Eighth Floor	12	0	12	6
Total	**98**	**1**	**99**	**50**
	99%	**1%**		

	Pass	Fail	Total
Block A	**179**	**16**	**195**
Block B	**125**	**5**	**130**
Block C	**98**	**1**	**99**
Total	**402**	**22**	**424**
	95%	**5%**	



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7.4 Compensatory Measures

The 2020 Apartment Guidelines state the following:

> *"[6.7] Where an applicant cannot fully meet all of the requirements of the daylight provisions above, this must be clearly identified and a rationale for any alternative, compensatory design solutions must be set out, which planning authorities should apply their discretion in accepting taking account of its assessment of specific. This may arise due to a design constraint associated with the site or location and the balancing of that assessment against the desirability of achieving wider planning objectives. Such objectives might include securing comprehensive urban regeneration and or an effective urban design and streetscape solution."*

Compensatory Design Solutions

All units, which do not achieve the 2% ADF for shared Kitchen/Living/Dining (KLD) rooms or 1.0% for Bedrooms, include compensatory measures in accordance with the requirements of the *Sustainable Urban Housing – Design Standards for New Apartments 2020*.

The compensatory measures for each unit below target are indicated on the relevant results images and summarised as follows: -

1. Unit Size

   Units with rooms below the BRE target values which are oversized, +10% on the Apartment Guidelines minimum areas, will avail of enhanced residential amenity due to the larger space provided.

2. Private Amenity Space

   The space has direct access to a balcony for private amenity space ensuring there is facility to easily enter a daylit space.

3. Aspect

   In addition to their private amenity space, a number of ground floor units have direct aspect out onto landscaped communal or public open space providing an excellent view from the KLD space. Also, all of the units are east, west or south facing, with no single aspect north facing.

4. Communal Open Space

   Compensatory measures have been provided outside of the individual units with a large portion of the site being landscaped for communal open space. The proposed development includes the provision of a large quantum of communal open space.

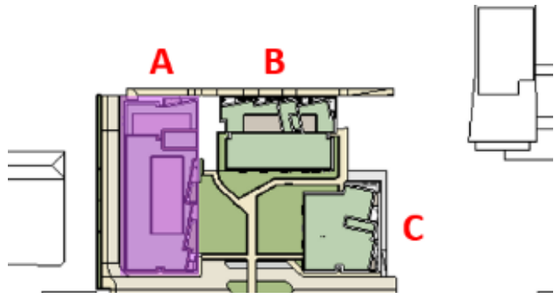
5. Dual Aspect

   Room is within unit that has the added benefit of dual aspect ensuring multiple options for aspect and sunlight / daylight availability.

7.5 Results – Block A

Block A – Ground Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's).



KEY

Compensatory Measures:

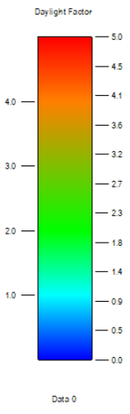
1: Unit Size

2: Private Amenity Space

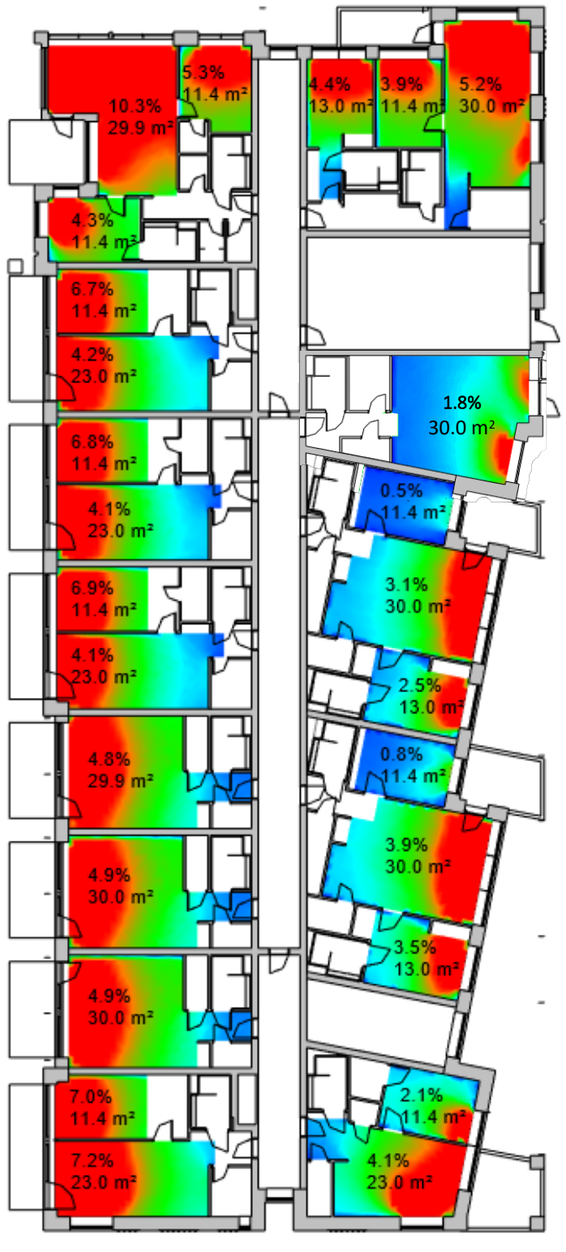
3: Aspect

4: Communal Open Space

5: Dual Aspect



ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%



CM: 1, 2, 3, 4

CM: 1, 2, 3, 4

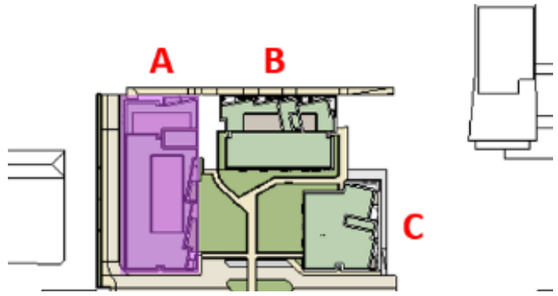
CM: 1, 2, 3, 4

Block A	Pass	Fail	Total	Units
Ground Floor	22	3	25	12
First Floor	23	3	26	13
Second Floor	23	3	26	13
Third Floor	23	3	26	13
Fourth Floor	24	2	26	13
Fifth Floor	25	1	26	13
Sixth Floor	19	1	20	11
Seventh Floor	20	0	20	11
Total	**179**	**16**	**195**	**99**
	92%	**8%**		

7.6 Results – Block A

Block A – First Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's).



KEY

Compensatory Measures:

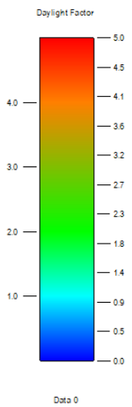
1: Unit Size

2: Private Amenity Space

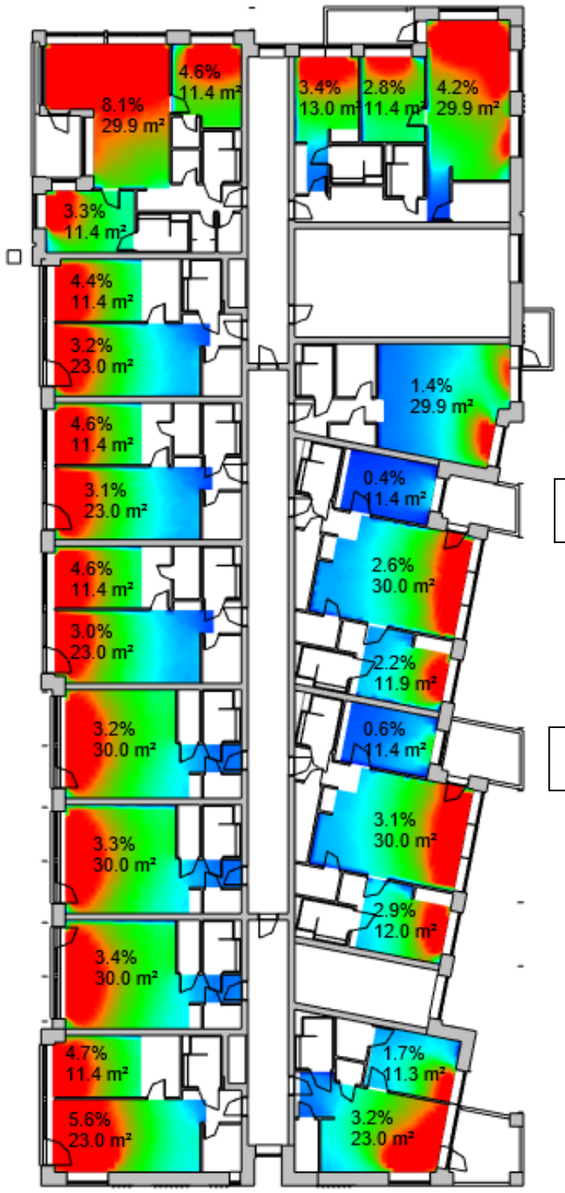
3: Aspect

4: Communal Open Space

5: Dual Aspect



ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%



CM: 1, 2, 3, 4

CM: 1, 2, 3, 4

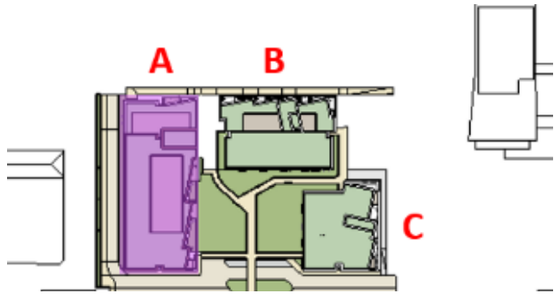
CM: 1, 2, 3, 4

Block A	Pass	Fail	Total	Units
Ground Floor	22	3	25	12
First Floor	23	3	26	13
Second Floor	23	3	26	13
Third Floor	23	3	26	13
Fourth Floor	24	2	26	13
Fifth Floor	25	1	26	13
Sixth Floor	19	1	20	11
Seventh Floor	20	0	20	11
Total	**179**	**16**	**195**	**99**
	92%	**8%**		

7.7 Results – Block A

Block A – Second Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's).



KEY

Compensatory Measures:

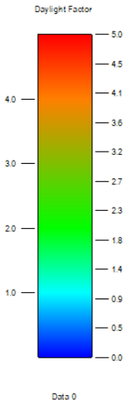
1: Unit Size

2: Private Amenity Space

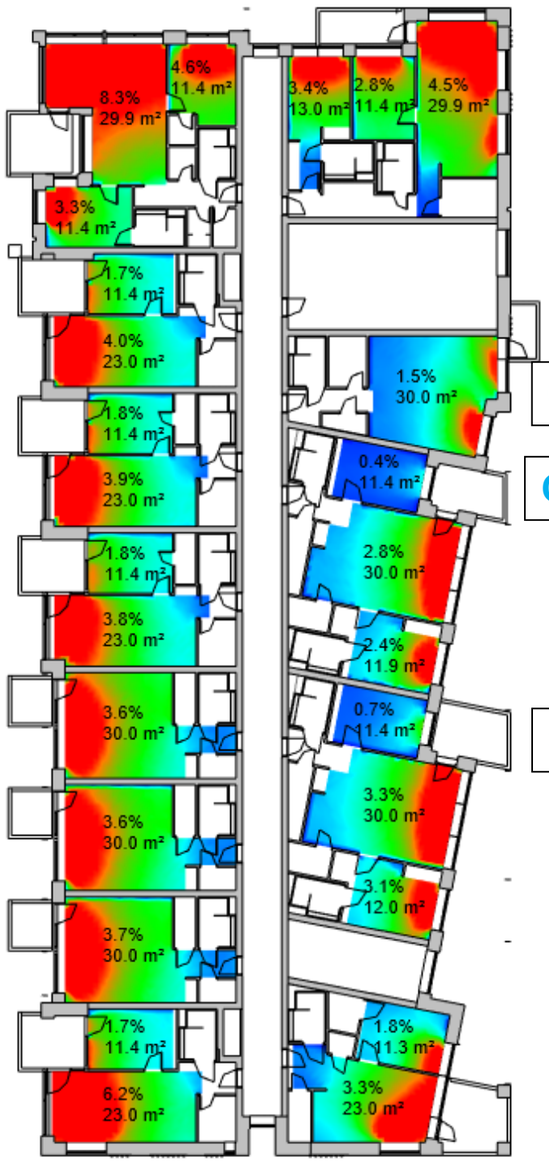
3: Aspect

4: Communal Open Space

5: Dual Aspect



ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%



CM: 1, 2, 3, 4

CM: 1, 2, 3, 4

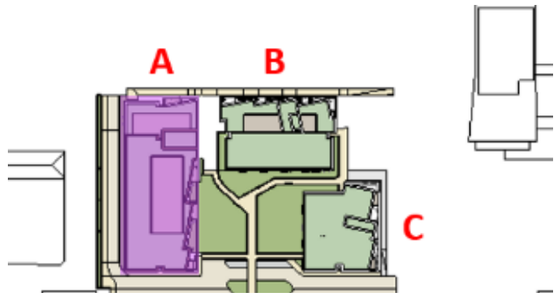
CM: 1, 2, 3, 4

Block A	Pass	Fail	Total	Units
Ground Floor	22	3	25	12
First Floor	23	3	26	13
Second Floor	23	3	26	13
Third Floor	23	3	26	13
Fourth Floor	24	2	26	13
Fifth Floor	25	1	26	13
Sixth Floor	19	1	20	11
Seventh Floor	20	0	20	11
Total	**179**	**16**	**195**	**99**
	92%	**8%**		

7.8 Results – Block A

Block A – Third Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's).



KEY

Compensatory Measures:

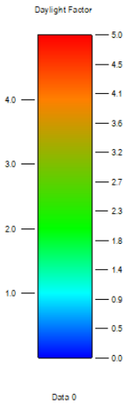
1: Unit Size

2: Private Amenity Space

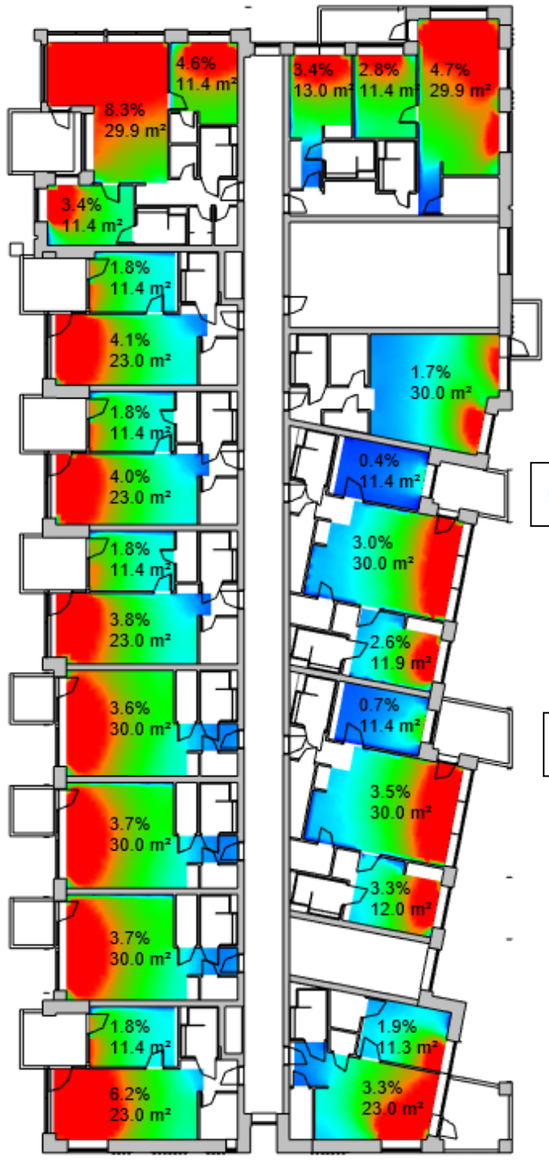
3: Aspect

4: Communal Open Space

5: Dual Aspect



ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%



CM: 1, 2, 3, 4

CM: 1, 2, 3, 4

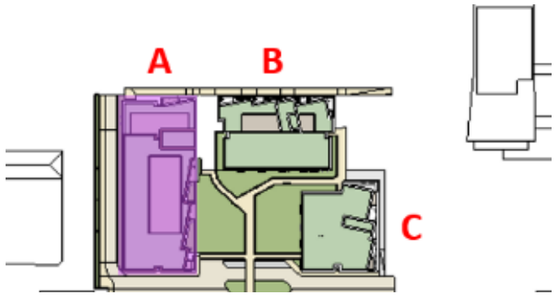
CM: 1, 2, 3, 4

Block A	Pass	Fail	Total	Units
Ground Floor	22	3	25	12
First Floor	23	3	26	13
Second Floor	23	3	26	13
Third Floor	23	3	26	13
Fourth Floor	24	2	26	13
Fifth Floor	25	1	26	13
Sixth Floor	19	1	20	11
Seventh Floor	20	0	20	11
Total	**179**	**16**	**195**	**99**
	92%	**8%**		

7.9 Results – Block A

Block A – Fourth Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's).



KEY

Compensatory Measures:

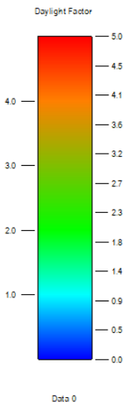
1: Unit Size

2: Private Amenity Space

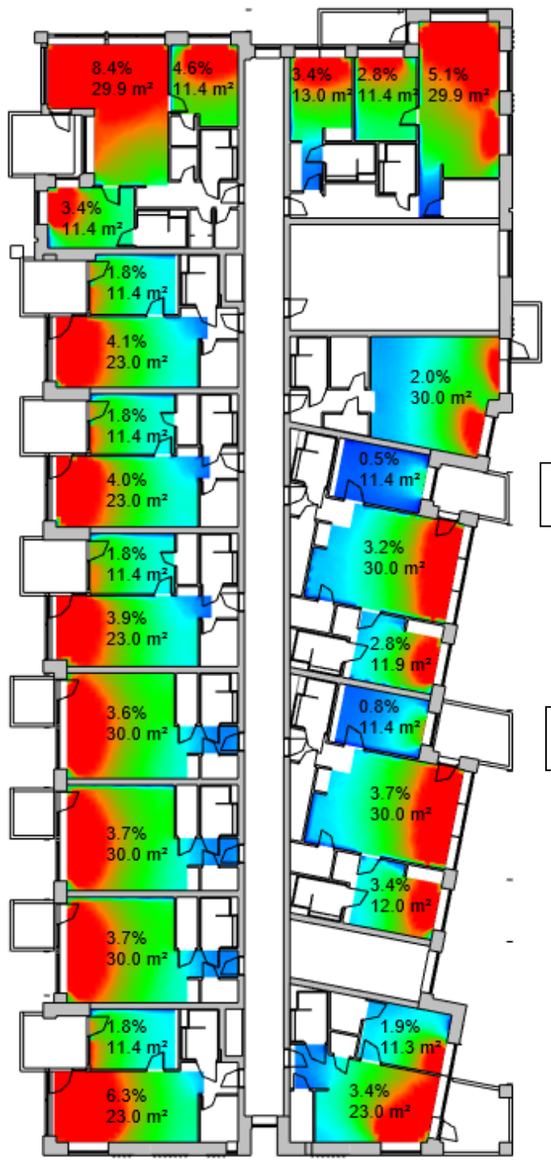
3: Aspect

4: Communal Open Space

5: Dual Aspect



ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%



CM: 1, 2, 3, 4

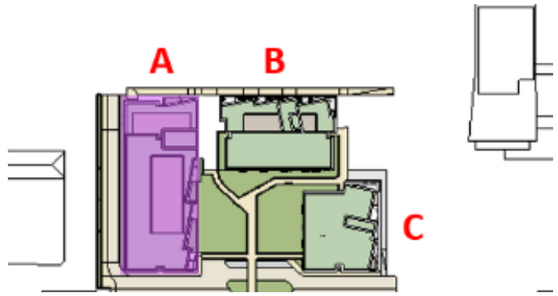
CM: 1, 2, 3, 4

Block A	Pass	Fail	Total	Units
Ground Floor	22	3	25	12
First Floor	23	3	26	13
Second Floor	23	3	26	13
Third Floor	23	3	26	13
Fourth Floor	24	2	26	13
Fifth Floor	25	1	26	13
Sixth Floor	19	1	20	11
Seventh Floor	20	0	20	11
Total	**179**	**16**	**195**	**99**
	92%	**8%**		

7.10 Results – Block A

Block A – Fifth Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's).



KEY

Compensatory Measures:

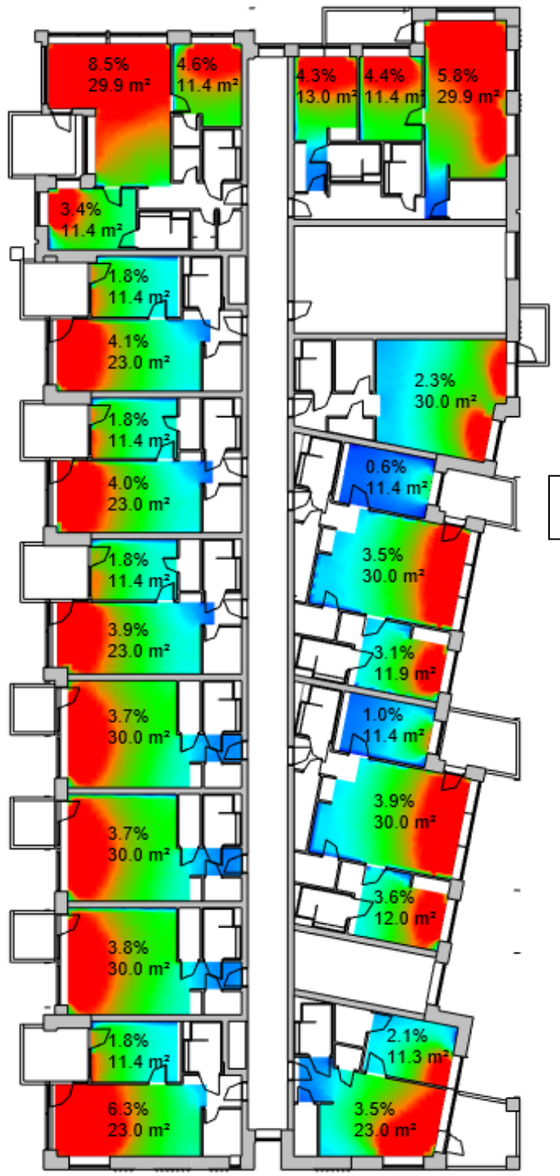
1: Unit Size

2: Private Amenity Space

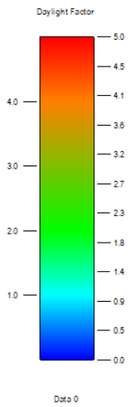
3: Aspect

4: Communal Open Space

5: Dual Aspect



CM: 1, 2, 3, 4



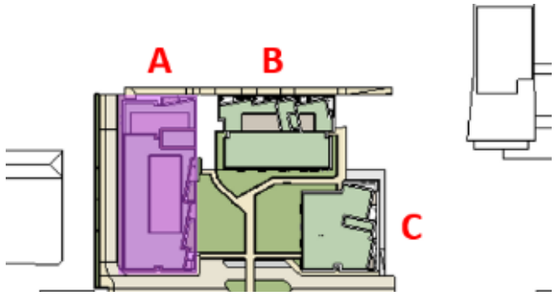
ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

Block A	Pass	Fail	Total	Units
Ground Floor	22	3	25	12
First Floor	23	3	26	13
Second Floor	23	3	26	13
Third Floor	23	3	26	13
Fourth Floor	24	2	26	13
Fifth Floor	25	1	26	13
Sixth Floor	19	1	20	11
Seventh Floor	20	0	20	11
Total	**179**	**16**	**195**	**99**
	92%	**8%**		

7.11 Results – Block A

Block A – Sixth Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's).



KEY

Compensatory Measures:

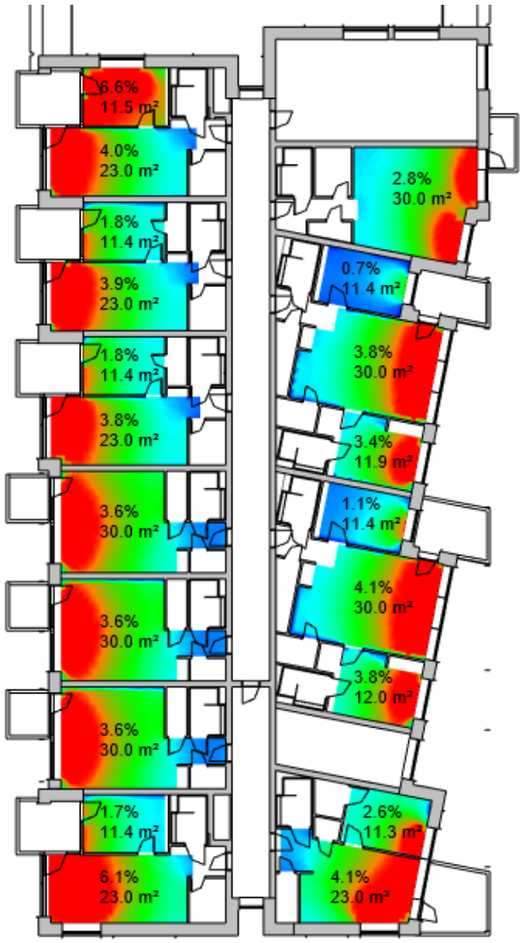
1: Unit Size

2: Private Amenity Space

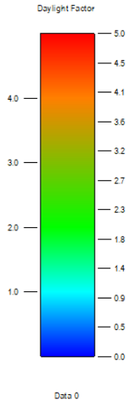
3: Aspect

4: Communal Open Space

5: Dual Aspect



CM: 1, 2, 3, 4



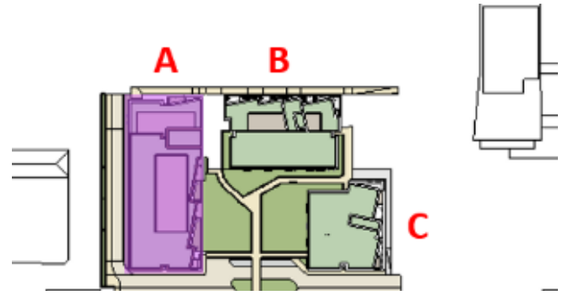
ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

Block A	Pass	Fail	Total	Units
Ground Floor	22	3	25	12
First Floor	23	3	26	13
Second Floor	23	3	26	13
Third Floor	23	3	26	13
Fourth Floor	24	2	26	13
Fifth Floor	25	1	26	13
Sixth Floor	19	1	20	11
Seventh Floor	20	0	20	11
Total	**179**	**16**	**195**	**99**
	92%	**8%**		

7.12 Results – Block A

Block A – Seventh Floor

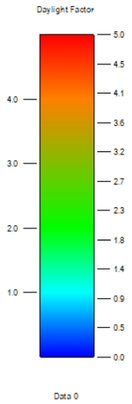
Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's).



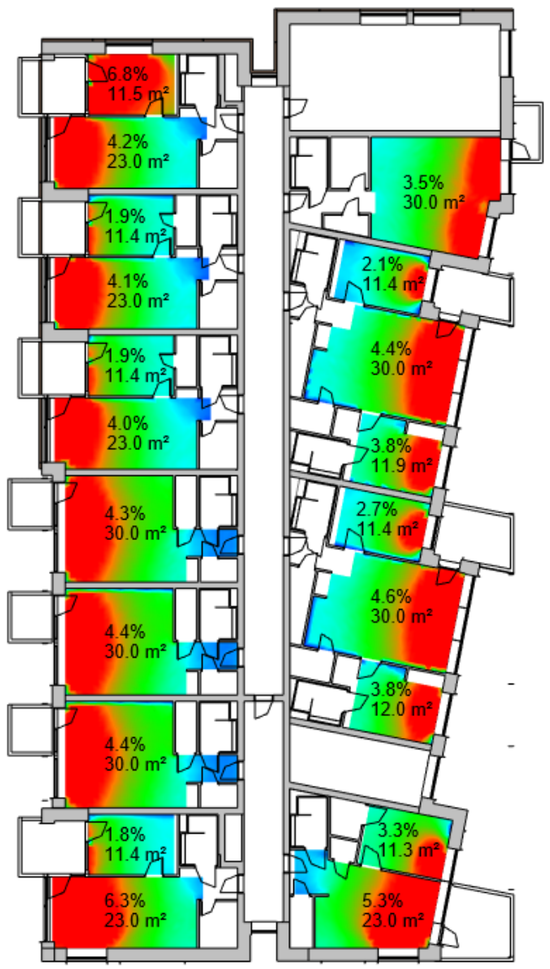
KEY

Compensatory Measures:

Not applicable, all units on this floor determined to be compliant with ADF target values.



ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

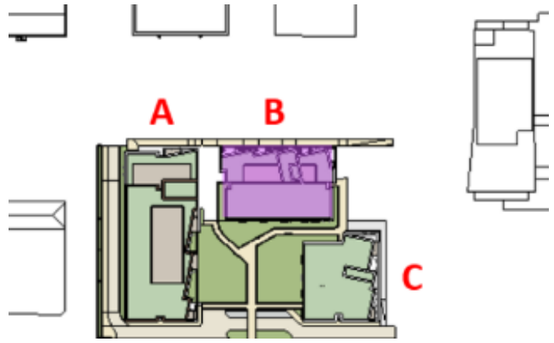


Block A	Pass	Fail	Total	Units
Ground Floor	22	3	25	12
First Floor	23	3	26	13
Second Floor	23	3	26	13
Third Floor	23	3	26	13
Fourth Floor	24	2	26	13
Fifth Floor	25	1	26	13
Sixth Floor	19	1	20	11
Seventh Floor	20	0	20	11
Total	**179**	**16**	**195**	**99**
	92%	**8%**		

7.13 Results – Block B

Block B – Lower Ground Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's).



KEY

Compensatory Measures:

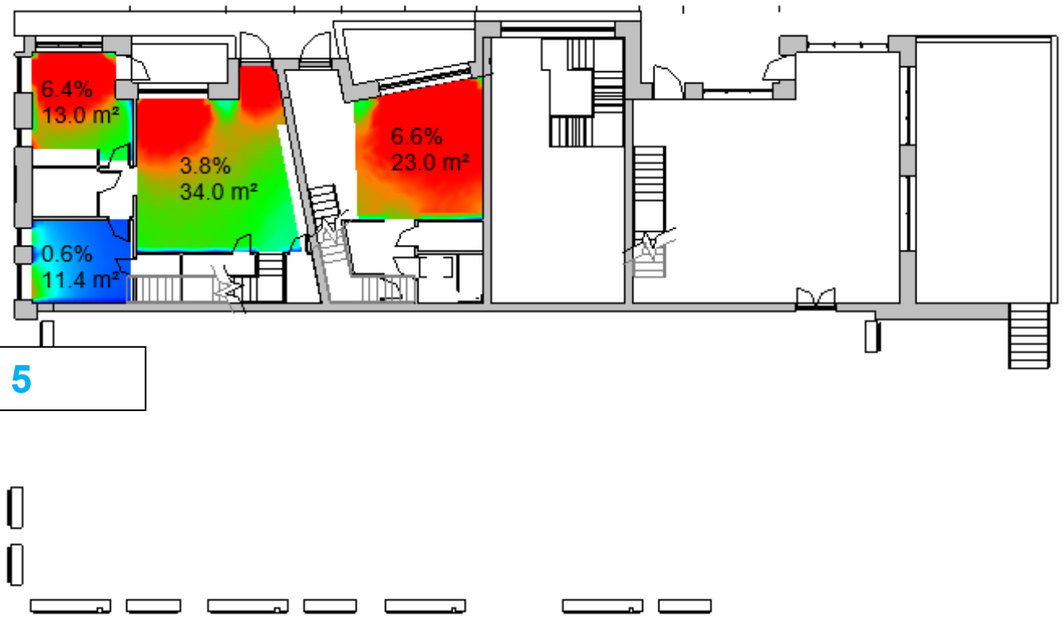
1: Unit Size

2: Private Amenity Space

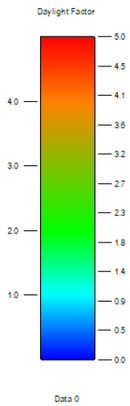
3: Aspect

4: Communal Open Space

5: Dual Aspect



CM: 1, 3, 4, 5



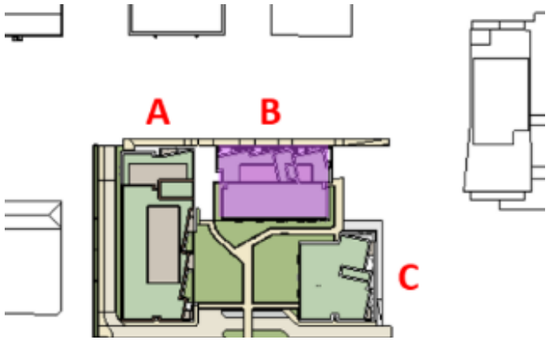
ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

Block B	Pass	Fail	Total	Units
Lower Ground Floor	3	1	4	2
Mezzanine	2	0	2	0
Ground Floor	6	0	6	3
First Floor	16	2	18	8
Second Floor	16	2	18	8
Third Floor	18	0	18	8
Fourth Floor	18	0	18	8
Fifth Floor	18	0	18	8
Sixth Floor	18	0	18	8
Seventh Floor	10	0	10	5
Total	**125**	**5**	**130**	**58**
	96%	**4%**		

7.14 Results – Block B

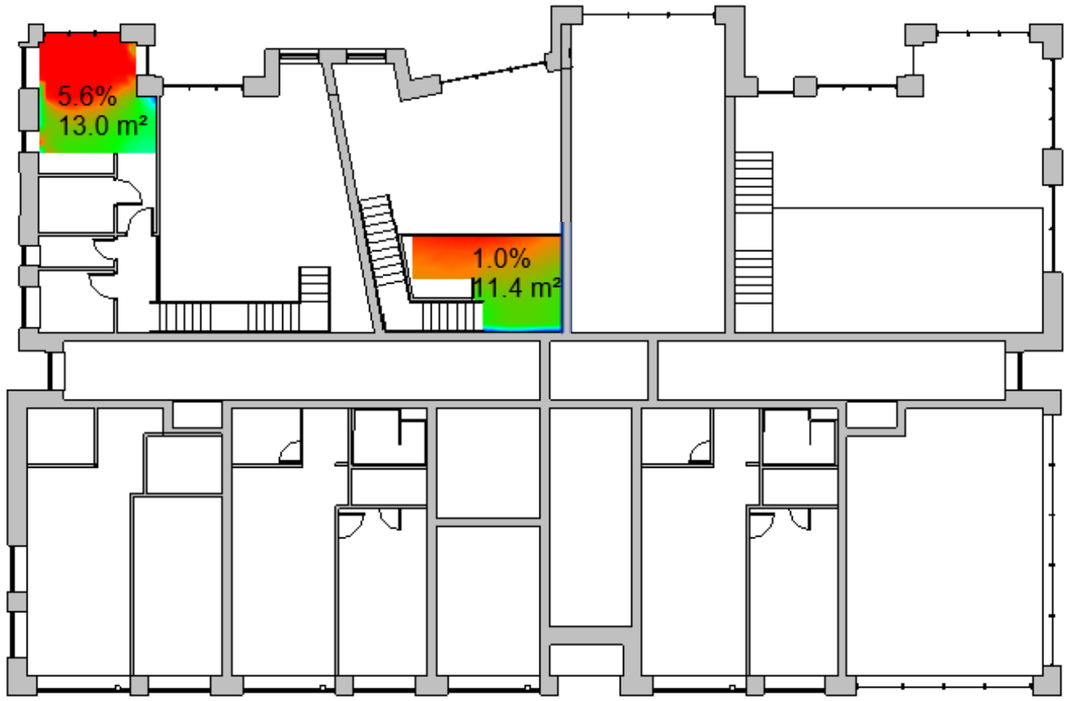
Block B – Mezzanine Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's).

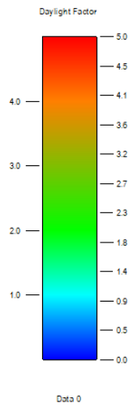


Compensatory Measures:

Not applicable, all units on this floor determined to be compliant with ADF target values.



KEY



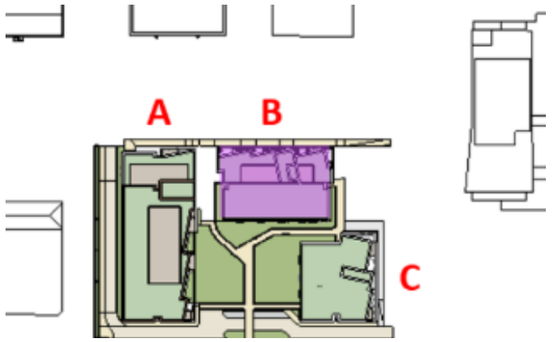
ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

Block B	Pass	Fail	Total	Units
Lower Ground Floor	3	1	4	2
Mezzanine	2	0	2	0
Ground Floor	6	0	6	3
First Floor	16	2	18	8
Second Floor	16	2	18	8
Third Floor	18	0	18	8
Fourth Floor	18	0	18	8
Fifth Floor	18	0	18	8
Sixth Floor	18	0	18	8
Seventh Floor	10	0	10	5
Total	**125**	**5**	**130**	**58**
	96%	**4%**		

7.15 Results – Block B

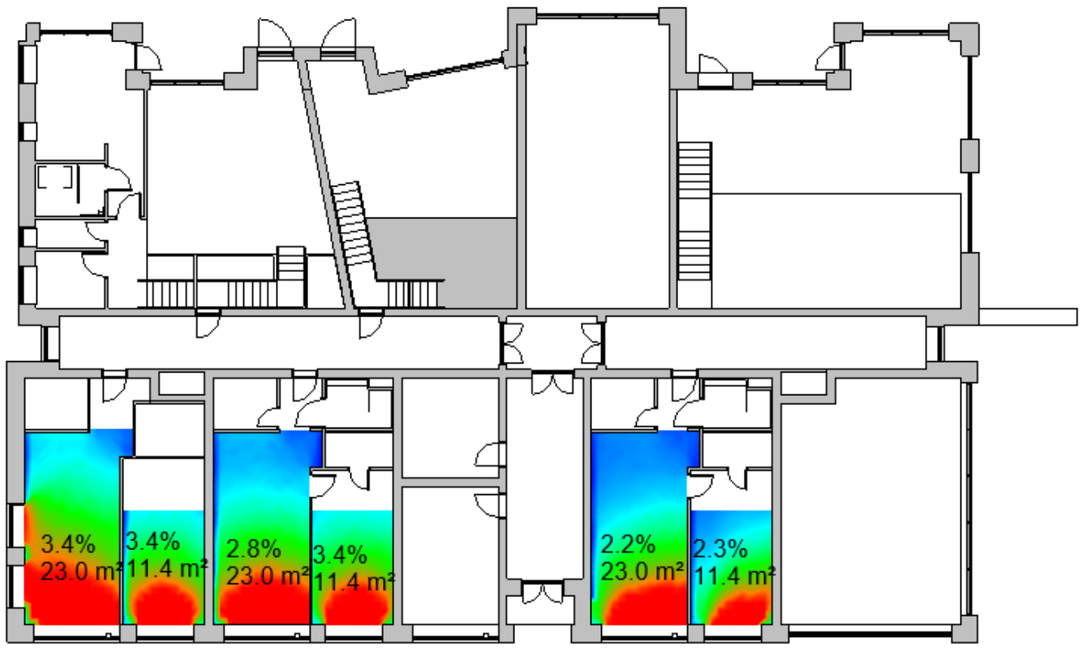
Block B –Ground Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's).

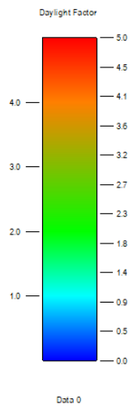


Compensatory Measures:

Not applicable, all units on this floor determined to be compliant with ADF target values.



KEY



ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

Block B	Pass	Fail	Total	Units
Lower Ground Floor	3	1	4	2
Mezzanine	2	0	2	0
Ground Floor	6	0	6	3
First Floor	16	2	18	8
Second Floor	16	2	18	8
Third Floor	18	0	18	8
Fourth Floor	18	0	18	8
Fifth Floor	18	0	18	8
Sixth Floor	18	0	18	8
Seventh Floor	10	0	10	5
Total	**125**	**5**	**130**	**58**
	96%	**4%**		

7.16 Results – Block B

Block B – First Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's).

Compensatory Measures:

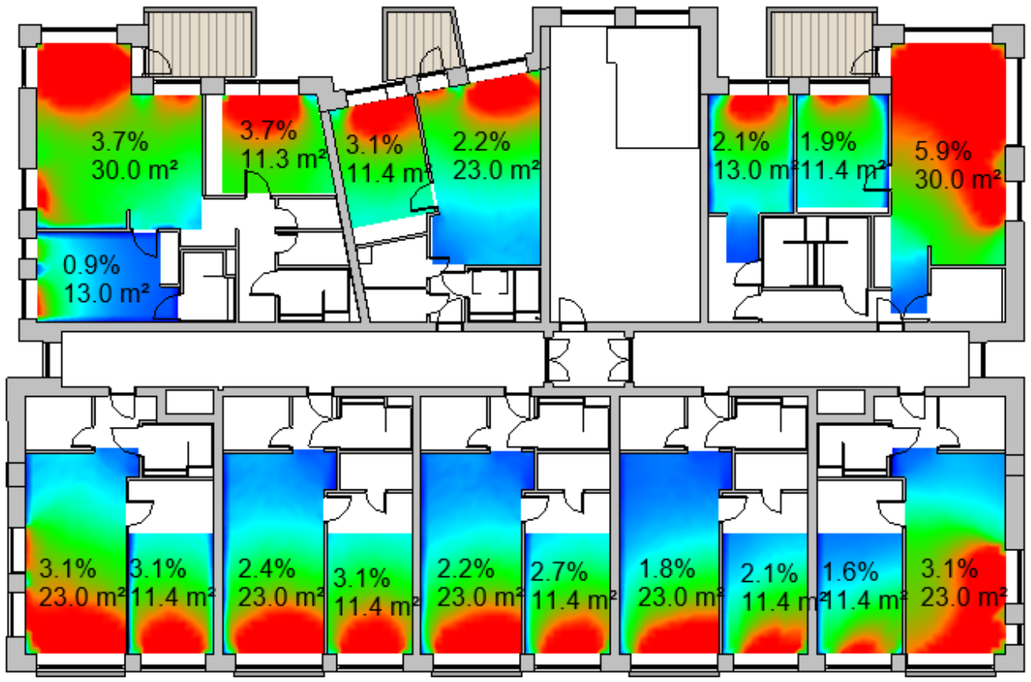
1: Unit Size

2: Private Amenity Space

3: Aspect

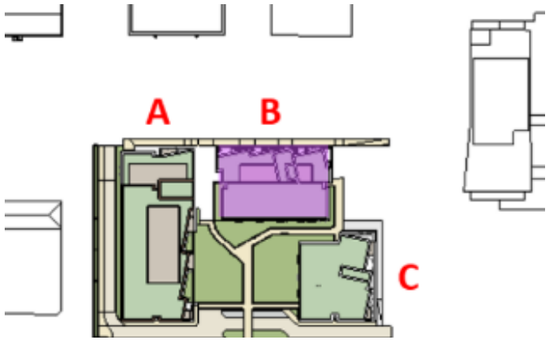
4: Communal Open Space

5: Dual Aspect

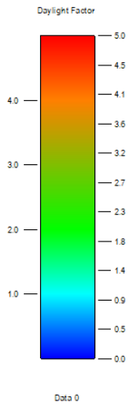


CM: 1, 4, 5

CM: 3, 4



KEY



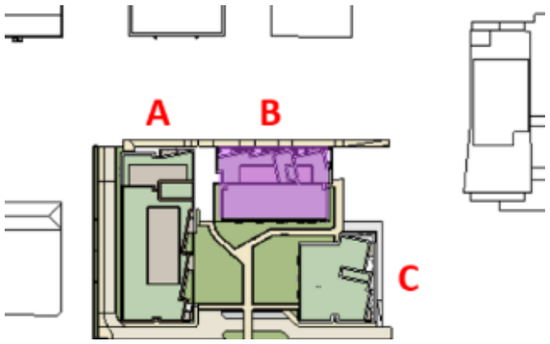
ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

Block B	Pass	Fail	Total	Units
Lower Ground Floor	3	1	4	2
Mezzanine	2	0	2	0
Ground Floor	6	0	6	3
First Floor	16	2	18	8
Second Floor	16	2	18	8
Third Floor	18	0	18	8
Fourth Floor	18	0	18	8
Fifth Floor	18	0	18	8
Sixth Floor	18	0	18	8
Seventh Floor	10	0	10	5
Total	**125**	**5**	**130**	**58**
	96%	**4%**		

7.17 Results – Block B

Block B – Second Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's).



KEY

Compensatory Measures:

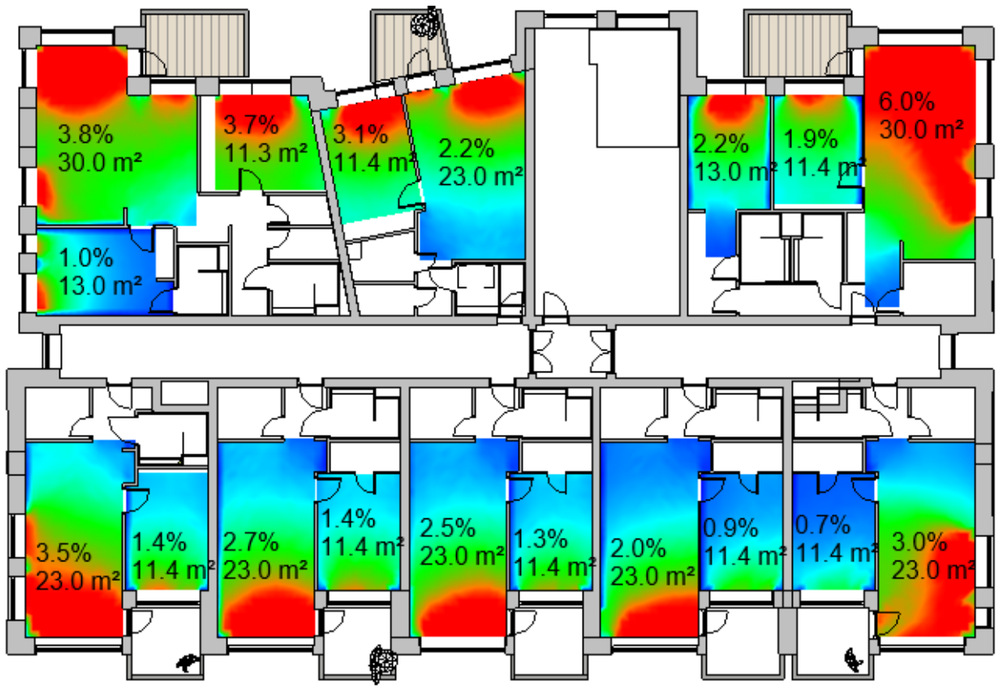
1: Unit Size

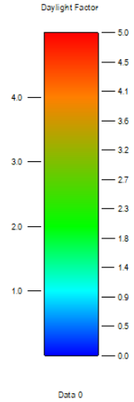
2: Private Amenity Space

3: Aspect

4: Communal Open Space

5: Dual Aspect





ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

CM: 2, 3, 4

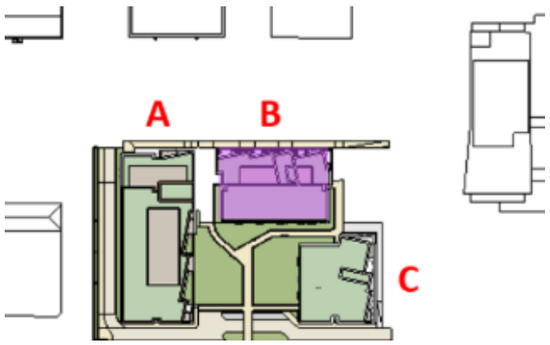
CM: 2, 3, 4, 5

Block B	Pass	Fail	Total	Units
Lower Ground Floor	3	1	4	2
Mezzanine	2	0	2	0
Ground Floor	6	0	6	3
First Floor	16	2	18	8
Second Floor	16	2	18	8
Third Floor	18	0	18	8
Fourth Floor	18	0	18	8
Fifth Floor	18	0	18	8
Sixth Floor	18	0	18	8
Seventh Floor	10	0	10	5
Total	**125**	**5**	**130**	**58**
	96%	**4%**		

7.18 Results – Block B

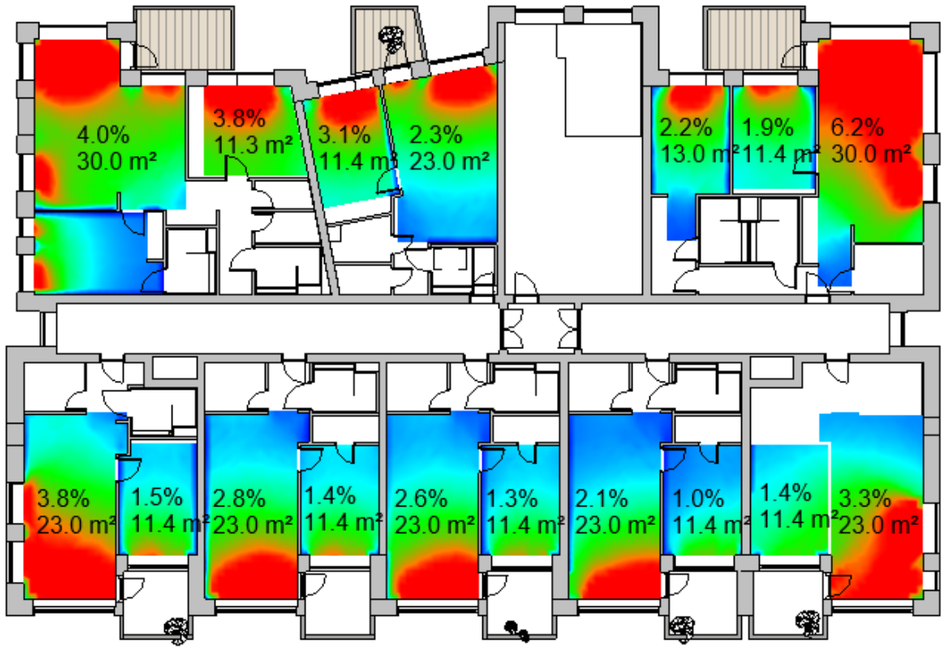
Block B – Third Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's).

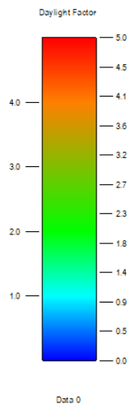


Compensatory Measures:

Not applicable, all units on this floor determined to be compliant with ADF target values.



KEY



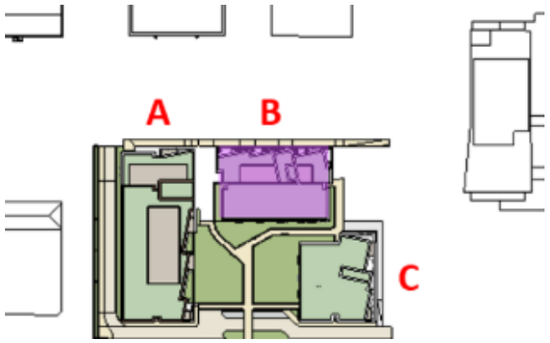
ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

Block B	Pass	Fail	Total	Units
Lower Ground Floor	3	1	4	2
Mezzanine	2	0	2	0
Ground Floor	6	0	6	3
First Floor	16	2	18	8
Second Floor	16	2	18	8
Third Floor	18	0	18	8
Fourth Floor	18	0	18	8
Fifth Floor	18	0	18	8
Sixth Floor	18	0	18	8
Seventh Floor	10	0	10	5
Total	**125**	**5**	**130**	**58**
	96%	**4%**		

7.19 Results – Block B

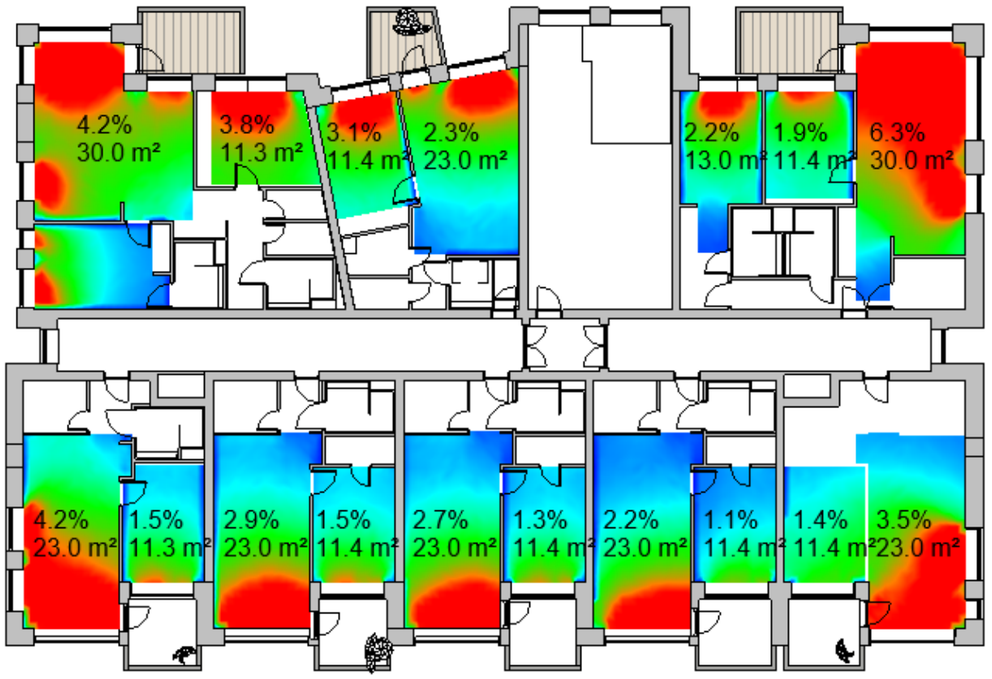
Block B – Fourth Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's).

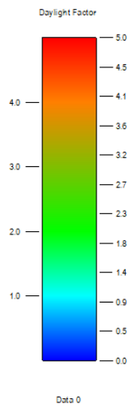


Compensatory Measures:

Not applicable, all units on this floor determined to be compliant with ADF target values.



KEY



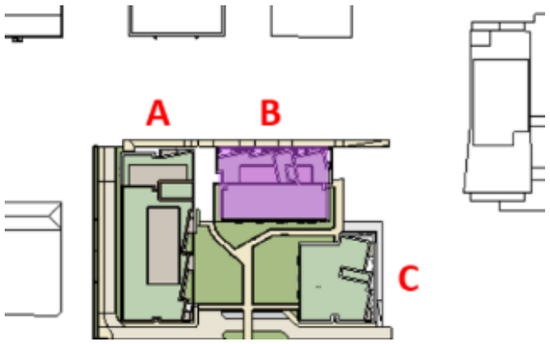
ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

Block B	Pass	Fail	Total	Units
Lower Ground Floor	3	1	4	2
Mezzanine	2	0	2	0
Ground Floor	6	0	6	3
First Floor	16	2	18	8
Second Floor	16	2	18	8
Third Floor	18	0	18	8
Fourth Floor	18	0	18	8
Fifth Floor	18	0	18	8
Sixth Floor	18	0	18	8
Seventh Floor	10	0	10	5
Total	**125**	**5**	**130**	**58**
	96%	**4%**		

7.20 Results – Block B

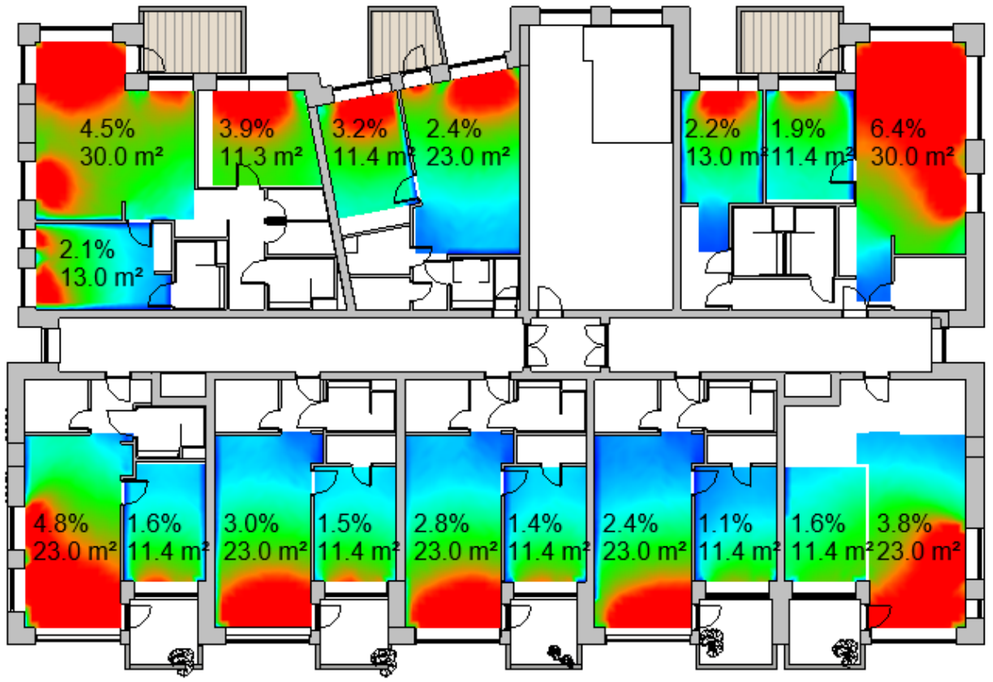
Block B – Fifth Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's).

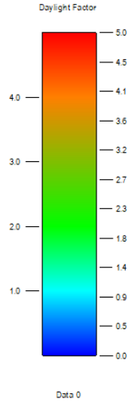


Compensatory Measures:

Not applicable, all units on this floor determined to be compliant with ADF target values.



KEY



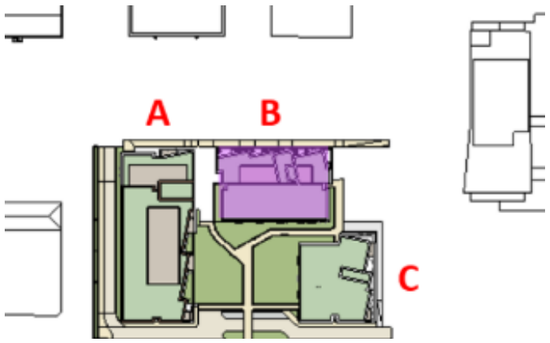
ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

Block B	Pass	Fail	Total	Units
Lower Ground Floor	3	1	4	2
Mezzanine	2	0	2	0
Ground Floor	6	0	6	3
First Floor	16	2	18	8
Second Floor	16	2	18	8
Third Floor	18	0	18	8
Fourth Floor	18	0	18	8
Fifth Floor	18	0	18	8
Sixth Floor	18	0	18	8
Seventh Floor	10	0	10	5
Total	**125**	**5**	**130**	**58**
	96%	**4%**		

7.21 Results – Block B

Block B – Sixth Floor

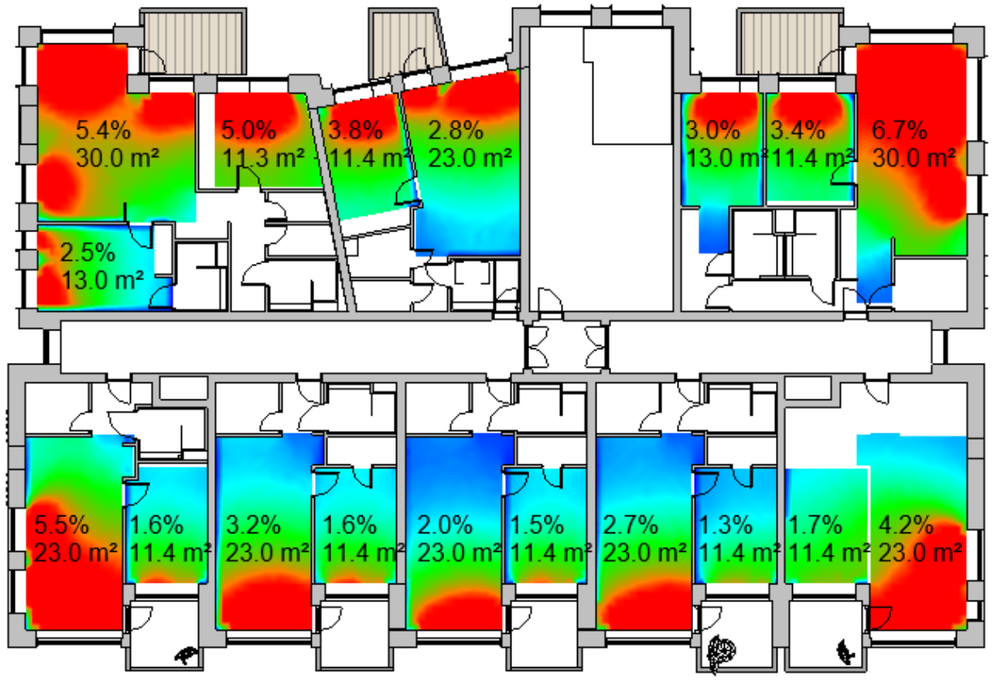
Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's).

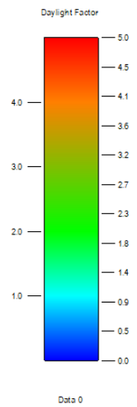


KEY

Compensatory Measures:

Not applicable, all units on this floor determined to be compliant with ADF target values.





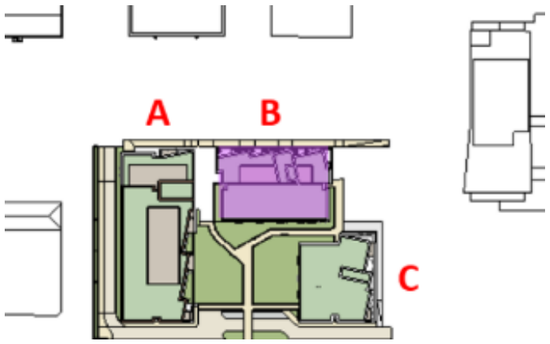
ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

Block B	Pass	Fail	Total	Units
Lower Ground Floor	3	1	4	2
Mezzanine	2	0	2	0
Ground Floor	6	0	6	3
First Floor	16	2	18	8
Second Floor	16	2	18	8
Third Floor	18	0	18	8
Fourth Floor	18	0	18	8
Fifth Floor	18	0	18	8
Sixth Floor	18	0	18	8
Seventh Floor	10	0	10	5
Total	**125**	**5**	**130**	**58**
	96%	**4%**		

7.22 Results – Block B

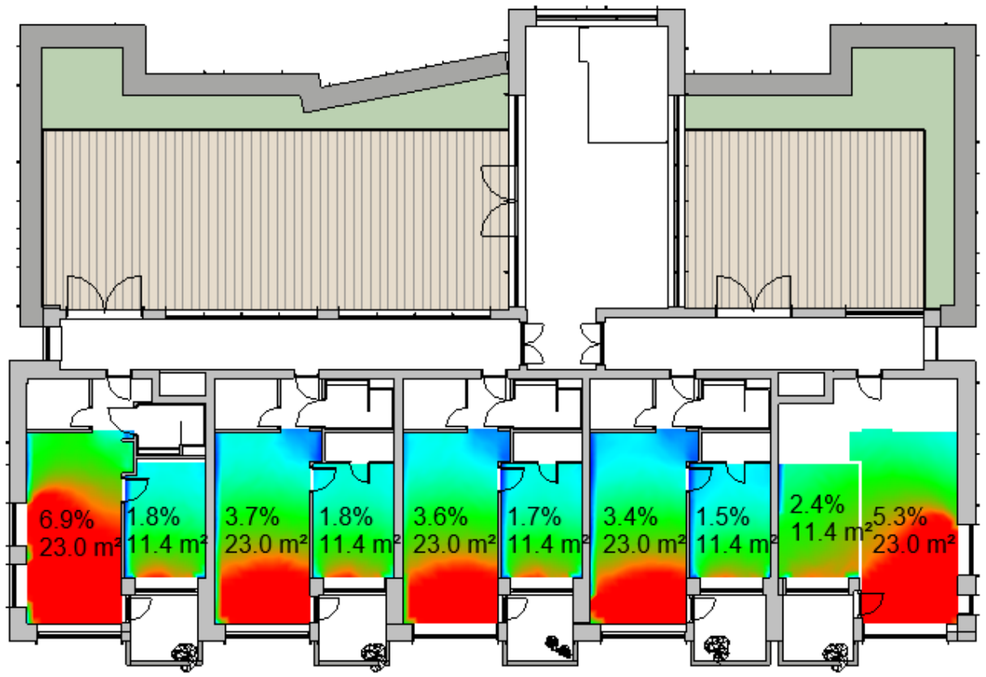
Block B – Seventh Floor

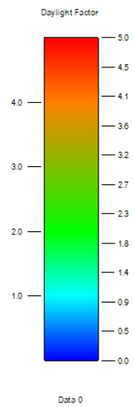
Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's).



Compensatory Measures:

Not applicable, all units on this floor determined to be compliant with ADF target values.





KEY

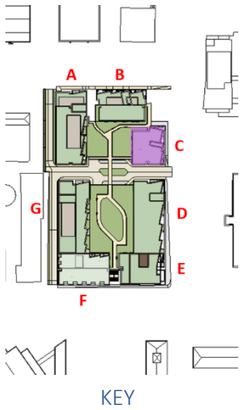
ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

Block B	Pass	Fail	Total	Units
Lower Ground Floor	3	1	4	2
Mezzanine	2	0	2	0
Ground Floor	6	0	6	3
First Floor	16	2	18	8
Second Floor	16	2	18	8
Third Floor	18	0	18	8
Fourth Floor	18	0	18	8
Fifth Floor	18	0	18	8
Sixth Floor	18	0	18	8
Seventh Floor	10	0	10	5
Total	**125**	**5**	**130**	**58**
	96%	**4%**		

7.23 Results – Block C

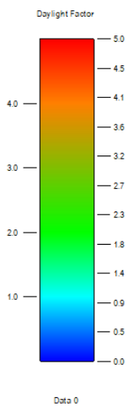
Block C – Ground Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's).



Compensatory Measures:

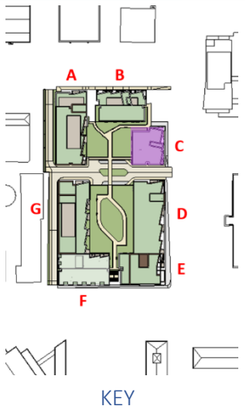
Not applicable, all units on this floor determined to be compliant with ADF target values.



ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

Block C	Pass	Fail	Total	Units
Ground Floor	3	0	3	2
First Floor	12	0	12	6
Second Floor	11	1	12	6
Third Floor	12	0	12	6
Fourth Floor	12	0	12	6
Fifth Floor	12	0	12	6
Sixth Floor	12	0	12	6
Seventh Floor	12	0	12	6
Eighth Floor	12	0	12	6
Total	**98**	**1**	**99**	**50**
	99%	**1%**		

7.24 Results – Block C

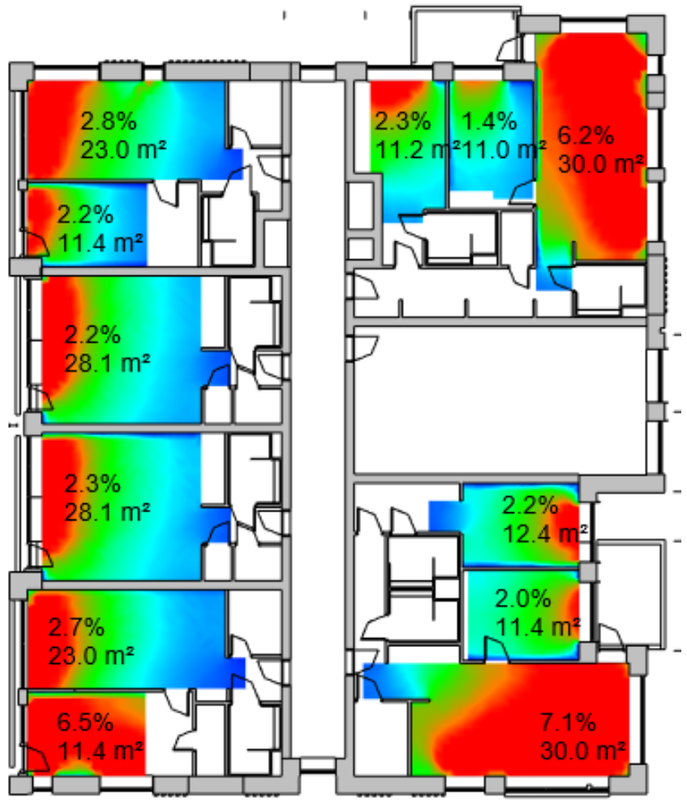


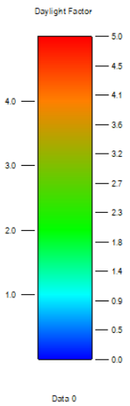
Block C – First Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's). f

Compensatory Measures:

Not applicable, all units on this floor determined to be compliant with ADF target values.





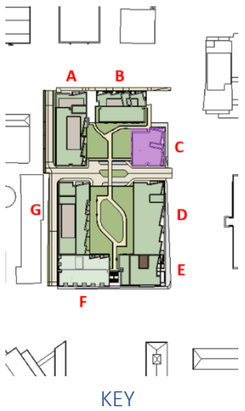
ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

Block C	Pass	Fail	Total	Units
Ground Floor	2	1	3	2
First Floor	12	0	12	6
Second Floor	11	1	12	6
Third Floor	12	0	12	6
Fourth Floor	12	0	12	6
Fifth Floor	12	0	12	6
Sixth Floor	12	0	12	6
Seventh Floor	12	0	12	6
Eighth Floor	12	0	12	6
Total	**97**	**2**	**99**	**50**
	98%	**2%**		

7.25 Results – Block C

Block C – Second Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's).



Compensatory Measures:

1: Unit Size

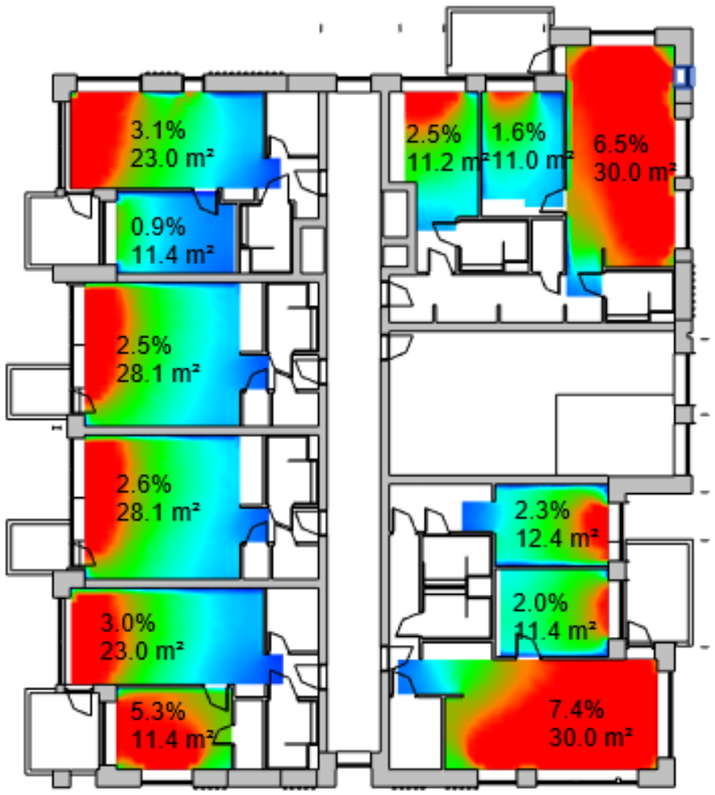
2: Private Amenity Space

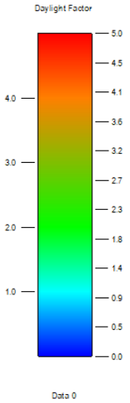
3: Aspect

4: Communal Open Space

5: Dual Aspect

CM: 2, 3, 4, 5





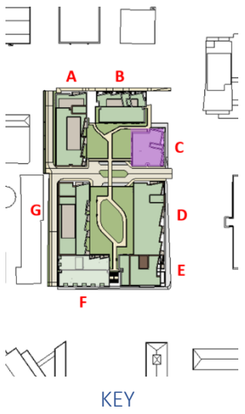
ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

Block C	Pass	Fail	Total	Units
Ground Floor	2	1	3	2
First Floor	12	0	12	6
Second Floor	11	1	12	6
Third Floor	12	0	12	6
Fourth Floor	12	0	12	6
Fifth Floor	12	0	12	6
Sixth Floor	12	0	12	6
Seventh Floor	12	0	12	6
Eighth Floor	12	0	12	6
Total	**97**	**2**	**99**	**50**
	98%	**2%**		

7.26 Results – Block C

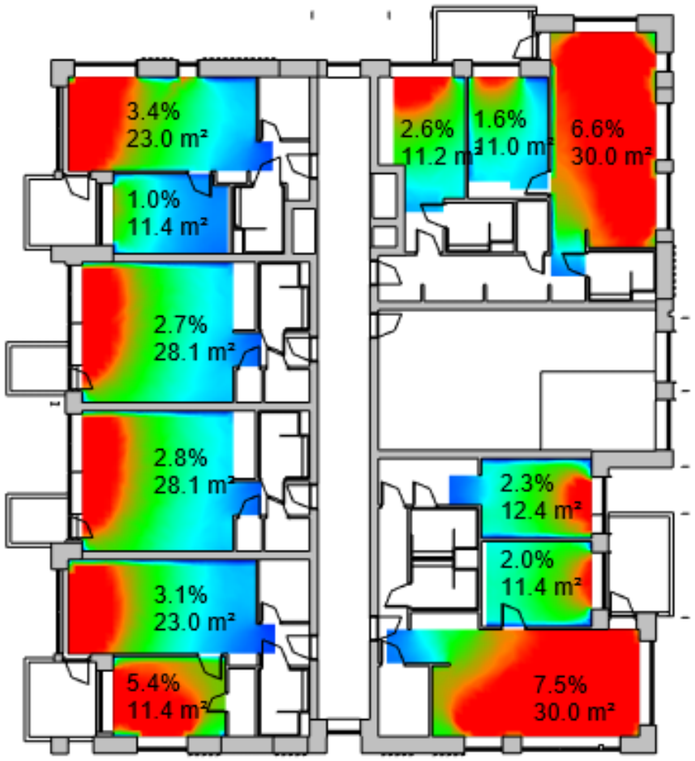
Block C – Third Floor

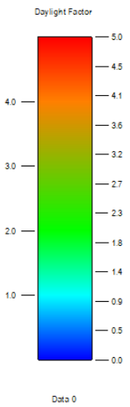
Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's).



Compensatory Measures:

Not applicable, all units on this floor determined to be compliant with ADF target values.





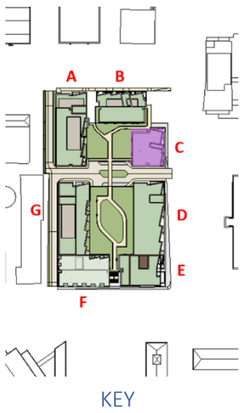
ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

Block C	Pass	Fail	Total	Units
Ground Floor	2	1	3	2
First Floor	12	0	12	6
Second Floor	11	1	12	6
Third Floor	12	0	12	6
Fourth Floor	12	0	12	6
Fifth Floor	12	0	12	6
Sixth Floor	12	0	12	6
Seventh Floor	12	0	12	6
Eighth Floor	12	0	12	6
Total	**97**	**2**	**99**	**50**
	98%	**2%**		

7.27 Results – Block C

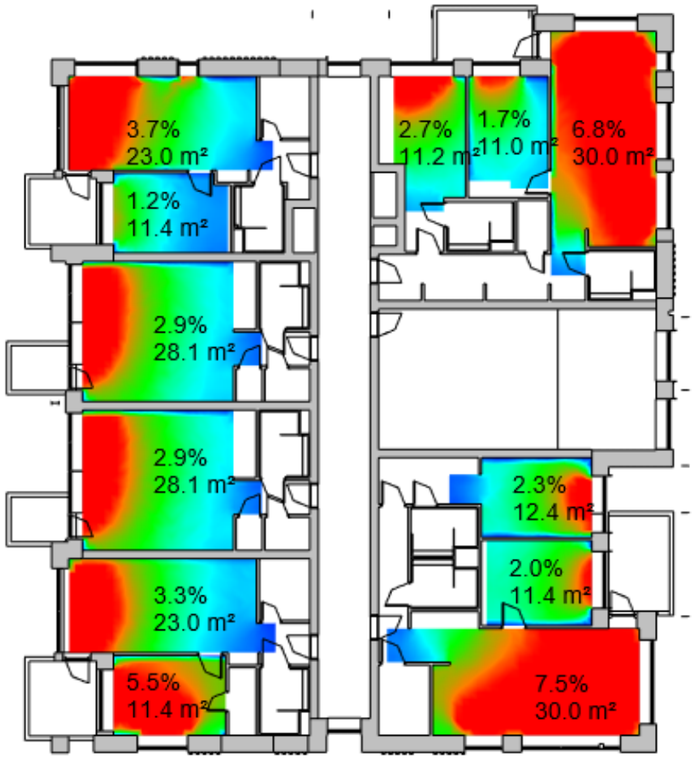
Block C – Fourth Floor

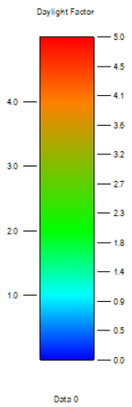
Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's). f



Compensatory Measures:

Not applicable, all units on this floor determined to be compliant with ADF target values.





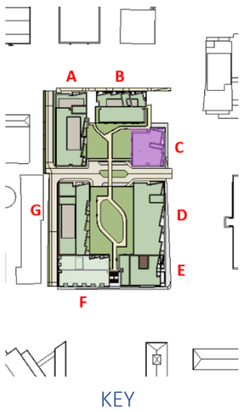
ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

Block C	Pass	Fail	Total	Units
Ground Floor	2	1	3	2
First Floor	12	0	12	6
Second Floor	11	1	12	6
Third Floor	12	0	12	6
Fourth Floor	12	0	12	6
Fifth Floor	12	0	12	6
Sixth Floor	12	0	12	6
Seventh Floor	12	0	12	6
Eighth Floor	12	0	12	6
Total	**97**	**2**	**99**	**50**
	98%	**2%**		

7.28 Results – Block C

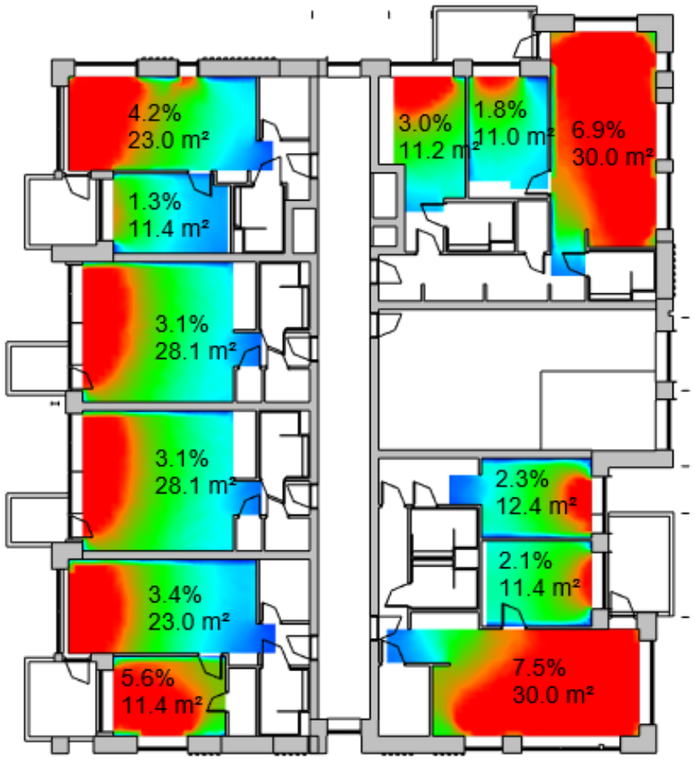
Block C – Fifth Floor

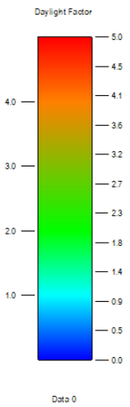
Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's).



Compensatory Measures:

Not applicable, all units on this floor determined to be compliant with ADF target values.





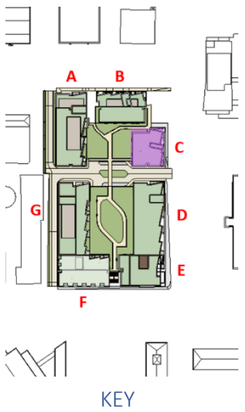
ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

Block C	Pass	Fail	Total	Units
Ground Floor	2	1	3	2
First Floor	12	0	12	6
Second Floor	11	1	12	6
Third Floor	12	0	12	6
Fourth Floor	12	0	12	6
Fifth Floor	12	0	12	6
Sixth Floor	12	0	12	6
Seventh Floor	12	0	12	6
Eighth Floor	12	0	12	6
Total	**97**	**2**	**99**	**50**
	98%	**2%**		

7.29 Results – Block C

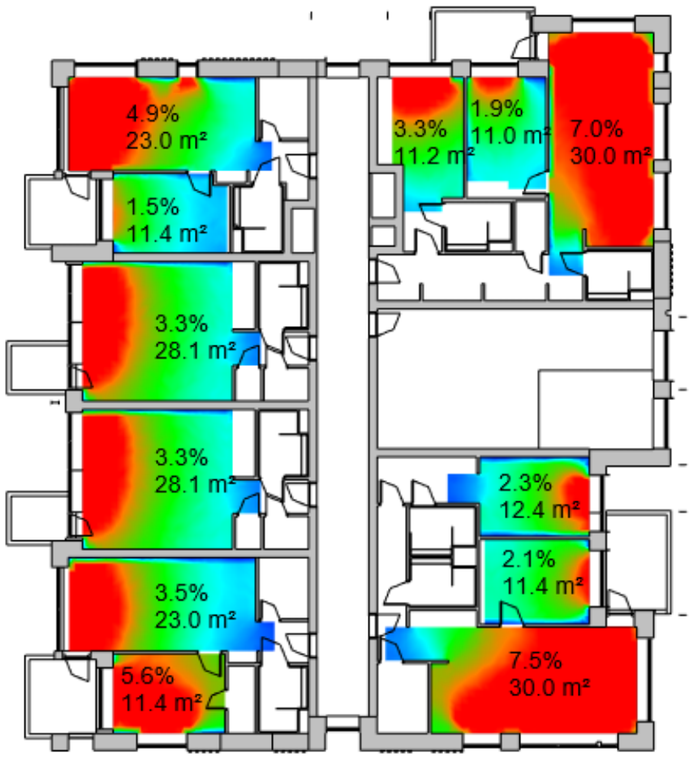
Block C – Sixth Floor

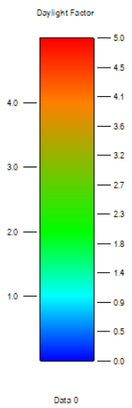
Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's).



Compensatory Measures:

Not applicable, all units on this floor determined to be compliant with ADF target values.





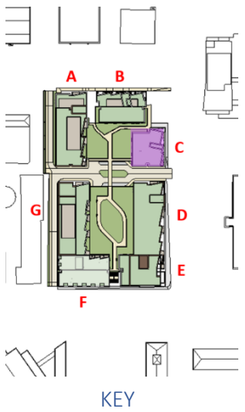
ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

Block C	Pass	Fail	Total	Units
Ground Floor	2	1	3	2
First Floor	12	0	12	6
Second Floor	11	1	12	6
Third Floor	12	0	12	6
Fourth Floor	12	0	12	6
Fifth Floor	12	0	12	6
Sixth Floor	12	0	12	6
Seventh Floor	12	0	12	6
Eighth Floor	12	0	12	6
Total	**97**	**2**	**99**	**50**
	98%	**2%**		

7.30 Results – Block C

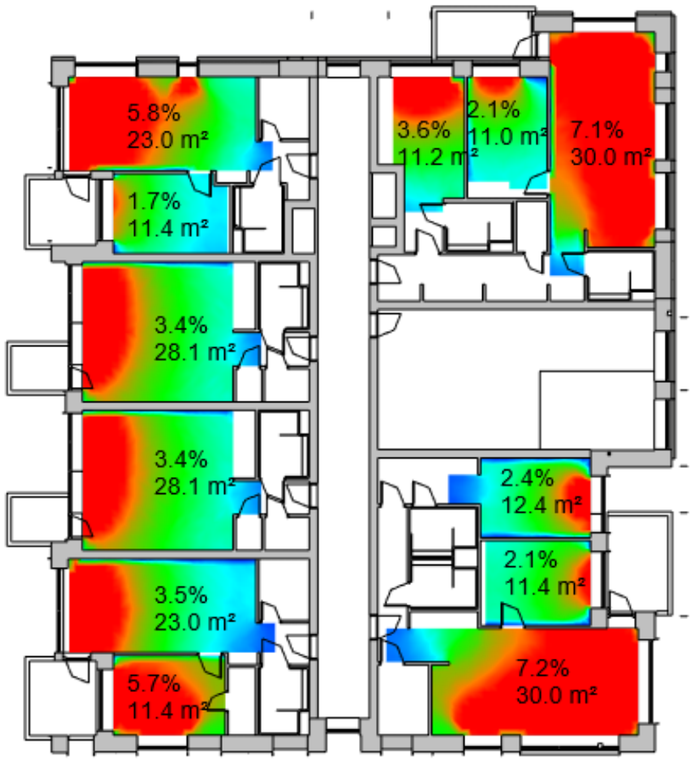
Block C – Seventh Floor

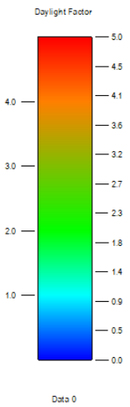
Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's).



Compensatory Measures:

Not applicable, all units on this floor determined to be compliant with ADF target values.





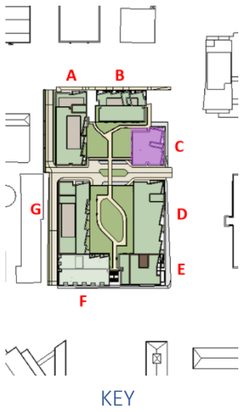
ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

Block C	Pass	Fail	Total	Units
Ground Floor	2	1	3	2
First Floor	12	0	12	6
Second Floor	11	1	12	6
Third Floor	12	0	12	6
Fourth Floor	12	0	12	6
Fifth Floor	12	0	12	6
Sixth Floor	12	0	12	6
Seventh Floor	12	0	12	6
Eighth Floor	12	0	12	6
Total	**97**	**2**	**99**	**50**
	98%	**2%**		

7.31 Results – Block C

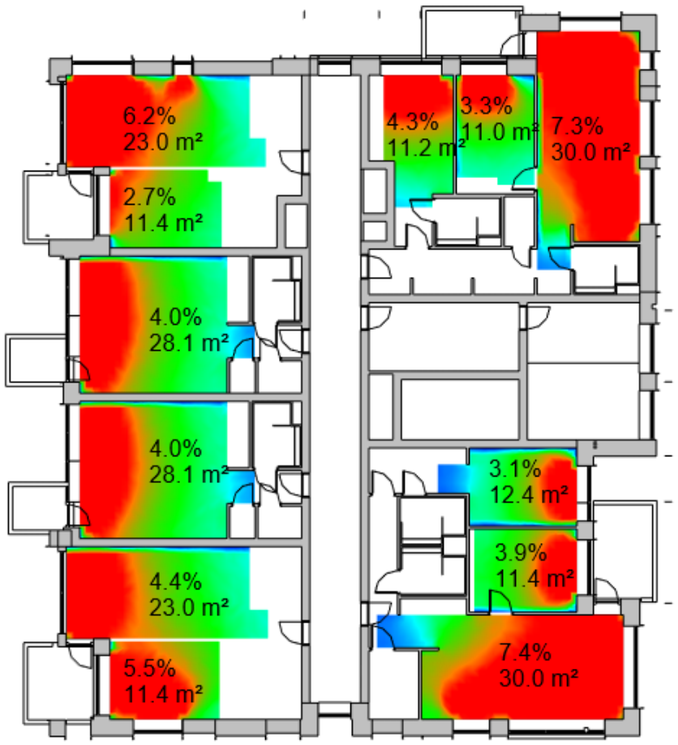
Block C – Eighth Floor

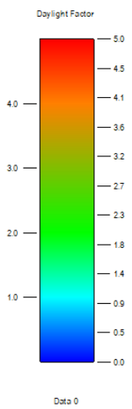
Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's).



Compensatory Measures:

Not applicable, all units on this floor determined to be compliant with ADF target values.





ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

Block C	Pass	Fail	Total	Units
Ground Floor	2	1	3	2
First Floor	12	0	12	6
Second Floor	11	1	12	6
Third Floor	12	0	12	6
Fourth Floor	12	0	12	6
Fifth Floor	12	0	12	6
Sixth Floor	12	0	12	6
Seventh Floor	12	0	12	6
Eighth Floor	12	0	12	6
Total	**97**	**2**	**99**	**50**
	98%	**2%**		

Appendix A – Alternative Daylight Calculations

Methodology

The proposed development has been assessed against 3 Internal Daylight standards: BR 209, IS EN 17037, and BS EN 17037. The results for each standard are illustrated in Fig A.1. A comparison of the results of each of these assessments for every room analysed across the proposed development are presented in summary overleaf.

1. <u>BR 209</u>

Within Section 7.0, daylighting analysis was undertaken to determine Average Daylight Factors (ADF's) in accordance with BR 209, as referenced in the 2020 Apartment Guidelines. Based on the follow prescribed targets:

- ADF > 2.0% for Kitchen/Living/ Dining Areas (KLD)
- ADF > 1.0% for Bedrooms

- Overall Compliance for Proposed Development = 95%

2. <u>IS EN 17037:2018</u>

Alternative calculations have been provided for IS EN 17037 Method 1. It should be noted that IS EN17037 does not provide specific guidance for residential application and only provides one target value which is:

- MDF > 2.0% for All Spaces

This means that results are overly onerous for residential application.

- Overall Compliance for Proposed Development = 65%

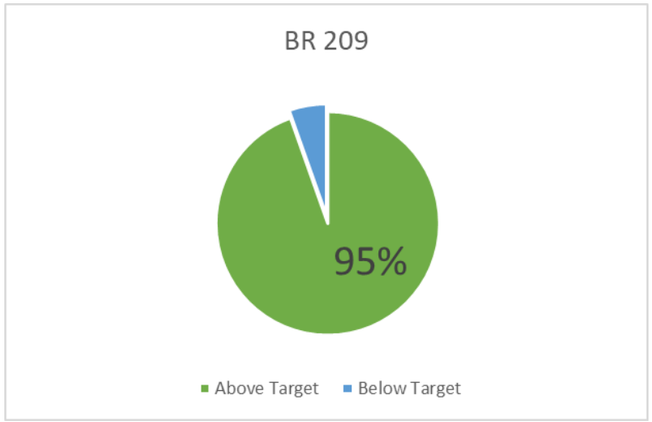
3. <u>BS.EN.17037:2018</u>

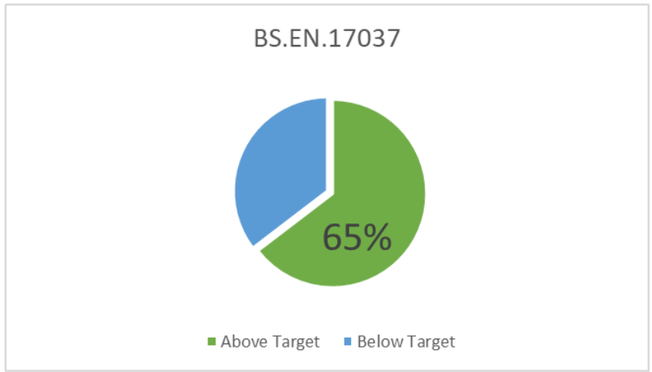
However, BS EN 17037 NA Method 1 specifically provides guidance for residential application.

- MDF > 1.3% for KLD Areas
- MDF > 0.7% for Bedrooms

Although the MDF calculation used is more onerous than ADF, these results are comparable to those achieved for BR 209 (as contained in the body of this report).

- Overall Compliance for Proposed Development = 95%





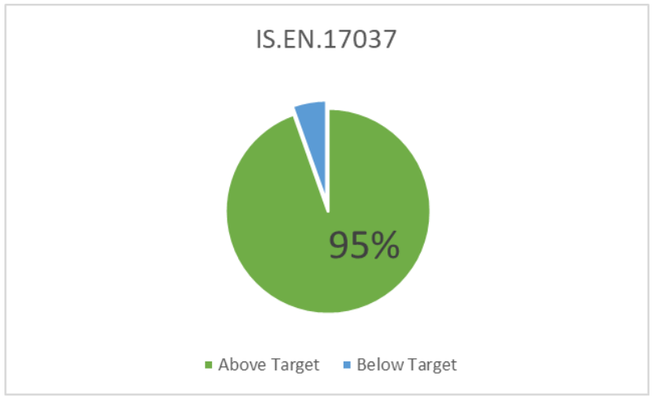


Fig A.1 – Compliance Results for Each Standard

A.1 Block 1

Block B			BR 209	BS EN 17037	IS EN 17037
Floor	Name	Room No.	ADF (%)	MDF (%)	MDF (%)
Ground Floor	KLD	20	4.2	2.4	2.4
Ground Floor	KLD	22	4.1	2.2	2.2
Ground Floor	KLD	24	4.1	2.3	2.3
Ground Floor	KLD	25	4.8	3.3	3.3
Ground Floor	KLD	26	4.9	3.4	3.4
Ground Floor	KLD	27	4.9	3.4	3.4
Ground Floor	KLD	29	7.2	4.4	4.4
Ground Floor	KLD	30	10.3	7.7	7.7
Ground Floor	KLD	62	5.2	3.9	3.9
Ground Floor	KLD	64	3.1	1.7	1.7
Ground Floor	KLD	67	3.9	2.2	2.2
Ground Floor	KLD	70	4.1	3.0	3.0
Ground Floor	BED	17	5.3	4.1	4.1
Ground Floor	BED	18	4.3	3.1	3.1
Ground Floor	BED	19	6.7	5.1	5.1
Ground Floor	BED	21	6.8	5.1	5.1
Ground Floor	BED	23	6.9	5.1	5.1
Ground Floor	BED	28	7.0	5.1	5.1
Ground Floor	BED	60	4.4	3.7	3.7
Ground Floor	BED	61	3.9	3.3	3.3
Ground Floor	BED	63	0.5	0.4	0.4
Ground Floor	BED	65	2.5	1.4	1.4
Ground Floor	BED	66	0.8	0.7	0.7
Ground Floor	BED	68	3.5	2.0	2.0
Ground Floor	BED	69	2.1	1.3	1.3
First Floor	KLD	7	4.2	3.2	3.2
First Floor	KLD	8	1.4	0.9	0.9
First Floor	KLD	12	3.1	1.8	1.8
First Floor	KLD	15	3.2	2.1	2.1
First Floor	KLD	16	2.6	1.5	1.5
First Floor	KLD	34	3.2	1.7	1.7
First Floor	KLD	36	3.1	1.7	1.7
First Floor	KLD	38	3.0	1.6	1.6
First Floor	KLD	39	3.2	2.3	2.3
First Floor	KLD	40	3.3	2.4	2.4
First Floor	KLD	41	3.4	2.5	2.5
First Floor	KLD	43	5.6	3.4	3.4
First Floor	KLD	44	8.1	6.0	6.0
First Floor	BED	5	3.4	2.7	2.7
First Floor	BED	6	2.8	2.3	2.3
First Floor	BED	9	0.4	0.3	0.3
First Floor	BED	10	2.2	1.3	1.3
First Floor	BED	11	0.6	0.5	0.5
First Floor	BED	13	2.9	1.6	1.6
First Floor	BED	14	1.7	1.1	1.1
First Floor	BED	31	4.6	3.5	3.5
First Floor	BED	32	3.3	2.3	2.3
First Floor	BED	33	4.4	3.6	3.6
First Floor	BED	35	4.6	3.8	3.8
First Floor	BED	37	4.6	3.8	3.8
First Floor	BED	42	4.7	3.6	3.6
Second Floor	KLD	48	4.0	2.4	2.4
Second Floor	KLD	50	3.9	2.4	2.4
Second Floor	KLD	52	3.8	2.3	2.3
Second Floor	KLD	53	3.6	2.7	2.7
Second Floor	KLD	54	3.6	2.7	2.7
Second Floor	KLD	55	3.7	2.7	2.7
Second Floor	KLD	57	6.2	3.9	3.9
Second Floor	KLD	58	8.3	6.2	6.2
Second Floor	KLD	73	4.5	3.6	3.6
Second Floor	KLD	74	1.5	1.1	1.1
Second Floor	KLD	78	3.3	1.9	1.9
Second Floor	KLD	81	3.3	2.1	2.1
Second Floor	KLD	82	2.8	1.6	1.6
Second Floor	BED	45	4.6	3.5	3.5
Second Floor	BED	46	3.3	2.3	2.3
Second Floor	BED	47	1.7	1.5	1.5
Second Floor	BED	49	1.8	1.5	1.5
Second Floor	BED	51	1.8	1.5	1.5
Second Floor	BED	59	1.7	1.5	1.5
Second Floor	BED	71	3.4	2.7	2.7
Second Floor	BED	72	2.8	2.3	2.3
Second Floor	BED	75	0.4	0.3	0.3
Second Floor	BED	76	2.4	1.5	1.5
Second Floor	BED	77	0.7	0.6	0.6
Second Floor	BED	79	3.1	1.8	1.8
Second Floor	BED	80	1.8	1.1	1.1
Third Floor	KLD	86	4.1	2.5	2.5
Third Floor	KLD	88	4.0	2.4	2.4

Third Floor	KLD	90	3.8	2.4	2.4
Third Floor	KLD	91	3.6	2.7	2.7
Third Floor	KLD	92	3.7	2.7	2.7
Third Floor	KLD	93	3.7	2.8	2.8
Third Floor	KLD	94	6.2	3.9	3.9
Third Floor	KLD	95	8.3	6.2	6.2
Third Floor	KLD	99	4.7	3.8	3.8
Third Floor	KLD	100	1.7	1.2	1.2
Third Floor	KLD	104	3.5	2.0	2.0
Third Floor	KLD	107	3.3	2.1	2.1
Third Floor	KLD	108	3.0	1.8	1.8
Third Floor	BED	83	4.6	3.5	3.5
Third Floor	BED	84	3.4	2.3	2.3
Third Floor	BED	85	1.8	1.5	1.5
Third Floor	BED	87	1.8	1.6	1.6
Third Floor	BED	89	1.8	1.5	1.5
Third Floor	BED	96	1.8	1.5	1.5
Third Floor	BED	97	3.4	2.7	2.7
Third Floor	BED	98	2.8	2.4	2.4
Third Floor	BED	101	0.4	0.4	0.4
Third Floor	BED	102	2.6	1.7	1.7
Third Floor	BED	103	0.7	0.6	0.6
Third Floor	BED	105	3.3	2.1	2.1
Third Floor	BED	106	1.9	1.1	1.1
Fourth Floor	KLD	112	4.1	2.5	2.5
Fourth Floor	KLD	114	4.0	2.4	2.4
Fourth Floor	KLD	116	3.9	2.4	2.4
Fourth Floor	KLD	117	3.6	2.7	2.7
Fourth Floor	KLD	118	3.7	2.7	2.7
Fourth Floor	KLD	119	3.7	2.8	2.8
Fourth Floor	KLD	120	6.3	4.0	4.0
Fourth Floor	KLD	121	8.4	6.4	6.4
Fourth Floor	KLD	125	5.1	4.2	4.2
Fourth Floor	KLD	126	2.0	1.4	1.4
Fourth Floor	KLD	130	3.7	2.2	2.2
Fourth Floor	KLD	133	3.4	2.1	2.1
Fourth Floor	KLD	134	3.2	1.9	1.9
Fourth Floor	BED	109	4.6	3.5	3.5
Fourth Floor	BED	110	3.4	2.3	2.3
Fourth Floor	BED	111	1.8	1.5	1.5
Fourth Floor	BED	113	1.8	1.6	1.6
Fourth Floor	BED	115	1.8	1.6	1.6
Fourth Floor	BED	122	1.8	1.5	1.5
Fourth Floor	BED	123	3.4	2.8	2.8
Fourth Floor	BED	124	2.8	2.4	2.4
Fourth Floor	BED	127	0.5	0.4	0.4
Fourth Floor	BED	128	2.8	1.8	1.8
Fourth Floor	BED	129	0.8	0.7	0.7
Fourth Floor	BED	131	3.4	2.2	2.2
Fourth Floor	BED	132	1.9	1.2	1.2
Fifth Floor	KLD	138	4.1	2.5	2.5
Fifth Floor	KLD	140	4.0	2.5	2.5
Fifth Floor	KLD	142	3.9	2.4	2.4
Fifth Floor	KLD	143	3.7	2.8	2.8
Fifth Floor	KLD	144	3.7	2.8	2.8
Fifth Floor	KLD	145	3.8	2.8	2.8
Fifth Floor	KLD	146	6.3	4.1	4.1
Fifth Floor	KLD	147	8.5	6.3	6.3
Fifth Floor	KLD	151	5.8	4.9	4.9
Fifth Floor	KLD	152	2.3	1.6	1.6
Fifth Floor	KLD	156	3.9	2.4	2.4
Fifth Floor	KLD	159	3.5	2.3	2.3
Fifth Floor	KLD	160	3.5	2.1	2.1
Fifth Floor	BED	139	1.8	1.6	1.6
Fifth Floor	BED	141	1.8	1.6	1.6
Fifth Floor	BED	148	1.8	1.5	1.5
Fifth Floor	BED	149	4.3	3.3	3.3
Fifth Floor	BED	150	4.4	3.3	3.3
Fifth Floor	BED	153	0.6	0.5	0.5
Fifth Floor	BED	154	3.1	2.1	2.1
Fifth Floor	BED	155	1.0	0.8	0.8
Fifth Floor	BED	157	3.6	2.4	2.4
Fifth Floor	BED	158	2.1	1.3	1.3
Sixth Floor	KLD	164	4.0	2.5	2.5
Sixth Floor	KLD	166	3.9	2.4	2.4
Sixth Floor	KLD	168	3.8	2.3	2.3
Sixth Floor	KLD	169	3.6	2.7	2.7
Sixth Floor	KLD	170	3.6	2.7	2.7
Sixth Floor	KLD	171	3.6	2.7	2.7
Sixth Floor	KLD	172	6.1	3.9	3.9
Sixth Floor	KLD	178	2.8	1.9	1.9
Sixth Floor	KLD	182	4.1	2.6	2.6
Sixth Floor	KLD	185	4.1	2.8	2.8
Sixth Floor	KLD	186	3.8	2.4	2.4

Sixth Floor	BED	163	6.6	5.8	5.8
Sixth Floor	BED	165	1.8	1.5	1.5
Sixth Floor	BED	167	1.8	1.5	1.5
Sixth Floor	BED	174	1.7	1.5	1.5
Sixth Floor	BED	179	0.7	0.6	0.6
Sixth Floor	BED	180	3.4	2.2	2.2
Sixth Floor	BED	181	1.1	0.9	0.9
Sixth Floor	BED	183	3.8	2.5	2.5
Sixth Floor	BED	184	2.6	1.6	1.6
Seventh Floor	KLD	190	4.2	2.5	2.5
Seventh Floor	KLD	192	4.1	2.4	2.4
Seventh Floor	KLD	194	4.0	2.4	2.4
Seventh Floor	KLD	195	4.3	3.0	3.0
Seventh Floor	KLD	196	4.4	3.0	3.0
Seventh Floor	KLD	197	4.4	3.0	3.0
Seventh Floor	KLD	198	6.3	3.9	3.9
Seventh Floor	KLD	204	3.5	2.5	2.5
Seventh Floor	KLD	208	4.6	2.8	2.8
Seventh Floor	KLD	211	5.3	3.3	3.3
Seventh Floor	KLD	212	4.4	2.7	2.7
Seventh Floor	BED	189	6.8	6.1	6.1
Seventh Floor	BED	191	1.9	1.6	1.6
Seventh Floor	BED	193	1.9	1.6	1.6
Seventh Floor	BED	200	1.8	1.5	1.5
Seventh Floor	BED	205	2.1	1.6	1.6
Seventh Floor	BED	206	3.8	2.5	2.5
Seventh Floor	BED	207	2.7	2.0	2.0
Seventh Floor	BED	209	3.8	2.6	2.6
Seventh Floor	BED	210	3.3	2.2	2.2

Block B			**BR 209**	**BS EN 17037**	**IS EN 17037**
Floor	**Name**	**Room No.**	**ADF (%)**	**MDF (%)**	**MDF (%)**
Lower Ground Floor	KLD	6	6.6	5.5	5.5
Lower Ground Floor	KLD	2	3.8	3.0	3.0
Lower Ground Floor	BED	3	0.6	0.5	0.5
Lower Ground Floor	BED	1	6.4	4.8	4.8
Mezzaine Floor	BED	7	5.6	4.4	4.4
Mezzaine Floor	BED	9	1.0	1.0	1.0
Ground Floor	KLD	10	3.4	2.4	2.4
Ground Floor	KLD	12	2.8	1.5	1.5
Ground Floor	KLD	14	2.2	1.2	1.2
Ground Floor	BED	11	3.4	2.5	2.5
Ground Floor	BED	13	3.4	2.4	2.4
Ground Floor	BED	15	2.3	1.5	1.5
First Floor	KLD	16	3.1	2.3	2.3
First Floor	KLD	18	2.4	1.4	1.4
First Floor	KLD	20	1.8	1.0	1.0
First Floor	KLD	22	2.2	1.2	1.2
First Floor	KLD	24	3.1	2.8	2.8
First Floor	KLD	26	3.7	2.5	2.5
First Floor	KLD	30	2.2	1.6	1.6
First Floor	KLD	33	5.9	4.7	4.7
First Floor	BED	17	3.1	2.5	2.5
First Floor	BED	19	3.1	2.4	2.4
First Floor	BED	21	2.1	1.5	1.5
First Floor	BED	23	2.7	2.1	2.1
First Floor	BED	25	1.6	1.2	1.2
First Floor	BED	27	3.7	2.9	2.9
First Floor	BED	28	0.9	0.7	0.7
First Floor	BED	29	3.1	2.3	2.3
First Floor	BED	31	2.1	1.7	1.7
First Floor	BED	32	1.9	1.6	1.6
Second Floor	KLD	34	3.5	2.7	2.7
Second Floor	KLD	36	2.7	1.6	1.6
Second Floor	KLD	38	2.0	1.2	1.2
Second Floor	KLD	40	2.5	1.4	1.4
Second Floor	KLD	44	3.8	2.7	2.7
Second Floor	KLD	48	2.2	1.6	1.6

Second Floor	KLD	51	6.0	4.9	4.9
Second Floor	KLD	52	3.0	2.6	2.6
Second Floor	BED	35	1.4	1.2	1.2
Second Floor	BED	37	1.4	1.2	1.2
Second Floor	BED	39	0.9	0.8	0.8
Second Floor	BED	41	1.3	1.0	1.0
Second Floor	BED	45	3.7	2.9	2.9
Second Floor	BED	46	1.0	0.8	0.8
Second Floor	BED	47	3.1	2.3	2.3
Second Floor	BED	49	2.2	1.7	1.7
Second Floor	BED	50	1.9	1.6	1.6
Second Floor	BED	53	0.7	0.6	0.6
Third Floor	KLD	54	4.0	2.8	2.8
Third Floor	KLD	58	2.3	1.6	1.6
Third Floor	KLD	61	6.2	5.0	5.0
Third Floor	KLD	62	3.3	2.6	2.6
Third Floor	KLD	65	2.1	1.2	1.2
Third Floor	KLD	67	2.6	1.5	1.5
Third Floor	KLD	69	2.8	1.6	1.6
Third Floor	KLD	71	3.8	2.9	2.9
Third Floor	BED	55	3.8	2.9	2.9
Third Floor	BED	56	1.3	0.9	0.9
Third Floor	BED	57	3.1	2.4	2.4
Third Floor	BED	59	2.2	1.7	1.7
Third Floor	BED	60	1.9	1.7	1.7
Third Floor	BED	63	1.4	1.3	1.3
Third Floor	BED	64	1.0	0.8	0.8
Third Floor	BED	66	1.3	1.1	1.1
Third Floor	BED	68	1.4	1.2	1.2
Third Floor	BED	70	1.5	1.3	1.3
Fourth Floor	KLD	72	4.2	3.0	3.0
Fourth Floor	KLD	76	2.3	1.6	1.6
Fourth Floor	KLD	79	6.3	5.2	5.2
Fourth Floor	KLD	80	3.5	2.7	2.7
Fourth Floor	KLD	83	2.2	1.3	1.3
Fourth Floor	KLD	85	2.7	1.5	1.5
Fourth Floor	KLD	87	2.9	1.6	1.6
Fourth Floor	KLD	89	4.2	3.2	3.2
Fourth Floor	BED	73	3.8	3.0	3.0
Fourth Floor	BED	74	1.6	1.1	1.1
Fourth Floor	BED	75	3.1	2.4	2.4
Fourth Floor	BED	77	2.2	1.7	1.7
Fourth Floor	BED	78	1.9	1.7	1.7
Fourth Floor	BED	81	1.4	1.4	1.4
Fourth Floor	BED	82	1.1	0.9	0.9
Fourth Floor	BED	84	1.3	1.1	1.1
Fourth Floor	BED	86	1.5	1.2	1.2
Fourth Floor	BED	88	1.5	1.3	1.3
Fifth Floor	KLD	91	4.5	3.2	3.2
Fifth Floor	KLD	94	2.4	1.7	1.7
Fifth Floor	KLD	97	6.4	5.3	5.3
Fifth Floor	KLD	98	3.8	2.9	2.9
Fifth Floor	KLD	101	2.4	1.3	1.3
Fifth Floor	KLD	103	2.8	1.6	1.6
Fifth Floor	KLD	105	3.0	1.7	1.7
Fifth Floor	KLD	107	4.8	3.6	3.6
Fifth Floor	BED	90	2.1	1.4	1.4
Fifth Floor	BED	92	3.9	3.1	3.1
Fifth Floor	BED	93	3.2	2.4	2.4
Fifth Floor	BED	95	2.2	1.7	1.7
Fifth Floor	BED	96	1.9	1.7	1.7
Fifth Floor	BED	99	1.6	1.5	1.5
Fifth Floor	BED	100	1.1	0.9	0.9
Fifth Floor	BED	102	1.4	1.2	1.2
Fifth Floor	BED	104	1.5	1.3	1.3
Fifth Floor	BED	106	1.6	1.3	1.3

Block C			**BR 209**	**BS EN 17037**	**IS EN 17037**
Floor	**Name**	**Room No.**	**ADF (%)**	**MDF (%)**	**MDF (%)**
Ground Floor	KLD	1	3.3	1.8	1.8
Ground Floor	BED	2	3.0	1.7	1.7
First Floor	KLD	3	2.8	1.7	1.7
First Floor	KLD	5	2.2	1.4	1.4
First Floor	KLD	6	2.3	1.5	1.5
First Floor	KLD	7	2.7	1.4	1.4
First Floor	KLD	9	7.1	6.4	6.4
First Floor	KLD	12	6.2	5.7	5.7
First Floor	BED	4	2.2	1.5	1.5
First Floor	BED	8	6.5	5.7	5.7
First Floor	BED	10	2.0	1.7	1.7
First Floor	BED	11	2.2	1.7	1.7
First Floor	BED	13	1.4	1.1	1.1

First Floor	BED	14	2.3	1.8	1.8
Second Floor	KLD	15	3.1	2.0	2.0
Second Floor	KLD	17	2.5	1.6	1.6
Second Floor	KLD	18	2.6	1.6	1.6
Second Floor	KLD	19	3.0	1.6	1.6
Second Floor	KLD	21	7.4	6.7	6.7
Second Floor	KLD	24	6.5	5.9	5.9
Second Floor	BED	16	0.9	0.8	0.8
Second Floor	BED	20	5.3	4.6	4.6
Second Floor	BED	22	2.0	1.7	1.7
Second Floor	BED	23	2.3	1.8	1.8
Second Floor	BED	25	1.6	1.2	1.2
Second Floor	BED	26	2.5	2.0	2.0
Second Floor	KLD	27	3.4	2.1	2.1
Third Floor	KLD	29	2.7	1.8	1.8
Third Floor	KLD	30	2.8	1.8	1.8
Third Floor	KLD	31	3.1	1.7	1.7
Third Floor	KLD	33	7.5	6.7	6.7
Third Floor	KLD	36	6.6	6.1	6.1
Third Floor	BED	28	1.0	0.8	0.8
Third Floor	BED	32	5.4	4.7	4.7
Third Floor	BED	34	2.0	1.8	1.8
Third Floor	BED	35	2.3	1.8	1.8
Third Floor	BED	37	1.6	1.3	1.3
Third Floor	BED	38	2.6	2.0	2.0
Fourth Floor	KLD	39	3.7	2.4	2.4
Fourth Floor	KLD	41	2.9	1.9	1.9
Fourth Floor	KLD	42	2.9	2.0	2.0
Fourth Floor	KLD	43	3.3	1.8	1.8
Fourth Floor	KLD	45	7.5	6.7	6.7
Fourth Floor	KLD	48	6.8	6.1	6.1
Fourth Floor	BED	40	1.2	0.9	0.9
Fourth Floor	BED	44	5.5	4.8	4.8
Fourth Floor	BED	46	2.0	1.8	1.8
Fourth Floor	BED	47	2.3	1.8	1.8
Fourth Floor	BED	49	1.7	1.3	1.3
Fourth Floor	BED	50	2.7	2.1	2.1
Fifth Floor	KLD	51	4.2	2.8	2.8
Fifth Floor	KLD	53	3.1	2.2	2.2
Fifth Floor	KLD	54	3.1	2.2	2.2
Fifth Floor	KLD	55	3.4	1.9	1.9
Fifth Floor	KLD	57	7.5	6.7	6.7
Fifth Floor	KLD	60	6.9	6.2	6.2
Fifth Floor	BED	52	1.3	1.1	1.1
Fifth Floor	BED	56	5.6	4.8	4.8
Fifth Floor	BED	58	2.1	1.8	1.8
Fifth Floor	BED	59	2.3	1.8	1.8
Fifth Floor	BED	61	1.8	1.4	1.4
Fifth Floor	BED	62	3.0	2.3	2.3
Sixth Floor	KLD	63	4.9	3.3	3.3
Sixth Floor	KLD	65	3.3	2.3	2.3
Sixth Floor	KLD	66	3.3	2.3	2.3
Sixth Floor	KLD	67	3.5	2.0	2.0
Sixth Floor	KLD	69	7.5	6.7	6.7
Sixth Floor	KLD	72	7.0	6.4	6.4
Sixth Floor	BED	64	1.5	1.2	1.2
Sixth Floor	BED	68	5.6	4.8	4.8
Sixth Floor	BED	70	2.1	1.8	1.8
Sixth Floor	BED	71	2.3	1.8	1.8
Sixth Floor	BED	73	1.9	1.5	1.5
Sixth Floor	BED	74	3.3	2.5	2.5
Seventh Floor	KLD	75	5.8	4.0	4.0
Seventh Floor	KLD	77	3.4	2.4	2.4
Seventh Floor	KLD	78	3.4	2.5	2.5
Seventh Floor	KLD	79	3.5	2.1	2.1
Seventh Floor	KLD	81	7.2	6.4	6.4
Seventh Floor	KLD	84	7.1	6.5	6.5
Seventh Floor	BED	76	1.7	1.4	1.4
Seventh Floor	BED	80	5.7	5.0	5.0
Seventh Floor	BED	82	2.1	1.9	1.9
Seventh Floor	BED	83	2.4	1.8	1.8
Seventh Floor	BED	85	2.1	1.7	1.7
Seventh Floor	BED	86	3.6	2.8	2.8
Eight Floor	KLD	87	6.2	4.3	4.3
Eight Floor	KLD	89	4.0	2.8	2.8
Eight Floor	KLD	90	4.0	2.8	2.8

Eight Floor	KLD	91	4.4	3.0	3.0
Eight Floor	KLD	93	7.4	6.4	6.4
Eight Floor	KLD	96	7.3	6.7	6.7
Eight Floor	BED	88	2.7	2.5	2.5
Eight Floor	BED	92	5.5	4.8	4.8
Eight Floor	BED	94	3.9	3.0	3.0
Eight Floor	BED	95	3.1	2.3	2.3
Eight Floor	BED	97	3.3	2.3	2.3
Eight Floor	BED	98	4.3	3.2	3.2

Appendix B – Future Development

Site Sunlighting and Shading

Methodology

The BRE Site Layout Planning for Daylight and Sunlight Design Guide 209 provides guidance with regards to sunlighting and shading to external Amenity spaces within proposed developments.

The guidance recommends “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 21st March”.

The methodology assesses sunlight performance at the Equinox, as this is the mid solar position throughout the year (as illustrated in Fig. B.1), with compliance indicative of spaces that will receive adequate sunlight and appealing useful spaces, including that the following attributes will be achieved as identified in BRE.209:

- 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).

An example analysis of Amenity Spaces is indicated in Figure B.2. In this development, the main amenity space (to right hand side) is located to the North of a building block which provides some degree of overshadowing (dark green contours).

However, as the majority of the Amenity Space was determined to be able to receive at least 2 hours of sunlight at the Equinox (green contours), this would be deemed to be compliant.

The results for sunlight to the proposed amenity space are detailed in Fig 4.2.1 (overleaf). These results show that the proposed development is determined to receive at least 2 hours of sunlight to 68% of its area on 21st March. Therefore the space is predicted to receive adequate sunlight, in excess of the 50% minimum requirement of the methodology utilised.

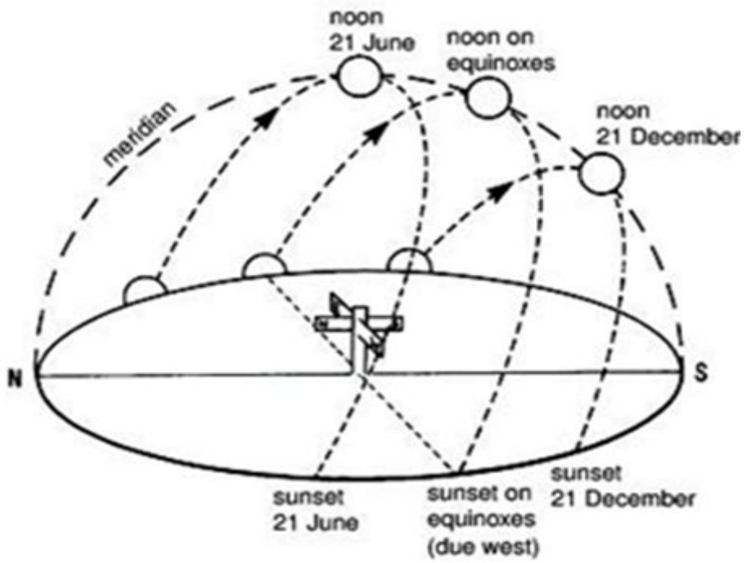


Fig B.1 – Annual Solar Position

Fig B.2 – Example Analysis

Results

The results for sunlight to the proposed amenity space are detailed in Fig B.3 below. These results show that the proposed development is determined to receive at least 2 hours of sunlight to 68% of its area on 21st March. Therefore the space is predicted to receive adequate sunlight, in excess of the 50% minimum requirement of the methodology utilised.

Fig B.3 – Results for Tack Courtyard Including the Avid Development

Daylight Analysis

Methodology

Daylighting analysis was undertaken for the proposed residential development using radiance lighting software to determine Average Daylight Factors (ADF's) in accordance with BRE 209 and BS. 8206-2, as referenced in the Sustainable Urban Housing: Design Standards for New Apartments (December 2020), as well as an assessment comparison to BS EN 17037 (National Annex). These guidelines and standards have been outlined in section 2.0.

ADF's were determined for a CIE Overcast Sky equivalent to providing an external, unobstructed ground illumination level of 10,000 Lux. CIE Overcast skies are theoretical sky models, with brightness highest at the zenith and reducing to the horizon, but also unidirectional (as illustrated in Figure B.4); therefore ADF's do not differ for façade orientation, with North facing rooms achieving identical metric performance to South facing, (all else being equal), as results account for diffuse natural light only and exclude any direct sunlight effects.

The daylight analysis accounted for all aspects that can potentially restrict natural light availability including any adjacent / opposing buildings, along with explicitly modelling Building Details as illustrated in Figure B.5 such as balcony structures, window frames, reveal and cill depth etc. in accordance with the architectural design.

The daylighting models were calculated based on the following assumptions regarding transmittance and reflectance (based on measured manufacturer's test data):

- Glazing Transmission = 70%
- Ceilings: 82% reflectance (BS 00E55 White)
- Walls: 62% reflectance (BS 10C31 Ivory)
- Floors: 36% reflectance (BS 00A05 Platinum Grey)

Daylight Factors for each space were then calculated for a working plane height of 0.85m on a 0.25 x 025 m grid basis to enable a detailed calculation within each room, the average of which was then determined to calculate ADF.

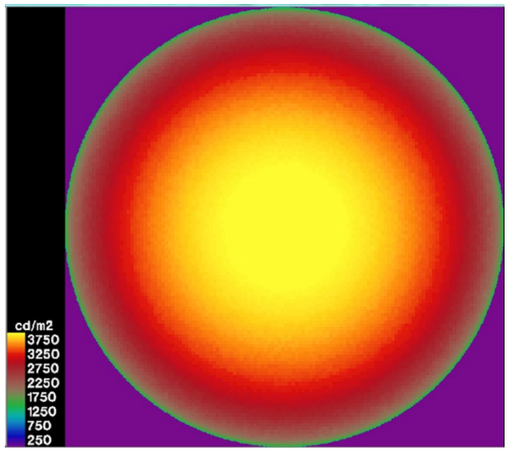


Fig B.4- CIE Overcast sky as viewed from below.

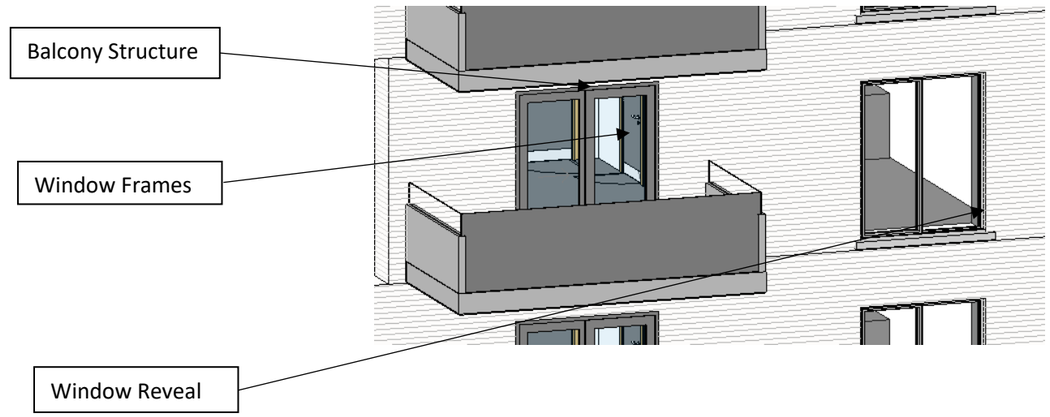


Fig B.5 – Building Details included within Daylight Analysis

7.0 Methodology (Cont'd)

In relation to daylight, the BRE Guide suggest that:

> *"Daylight provision in new rooms may be checked using the average daylight factor (ADF). The ADF is a measure of the overall amount of daylight in a space… [The 2008 British Standard] recommends an ADF of 5% for a well daylit space and 2% for a partly daylit space. Below 2% the room will look dull and electric lighting is likely to be turned on. In* ***housing*** *[the 2008 British Standard] also gives minimum values of ADF of 2% for kitchens, 1.5% for living rooms and 1% for bedrooms." (emphasis added)*

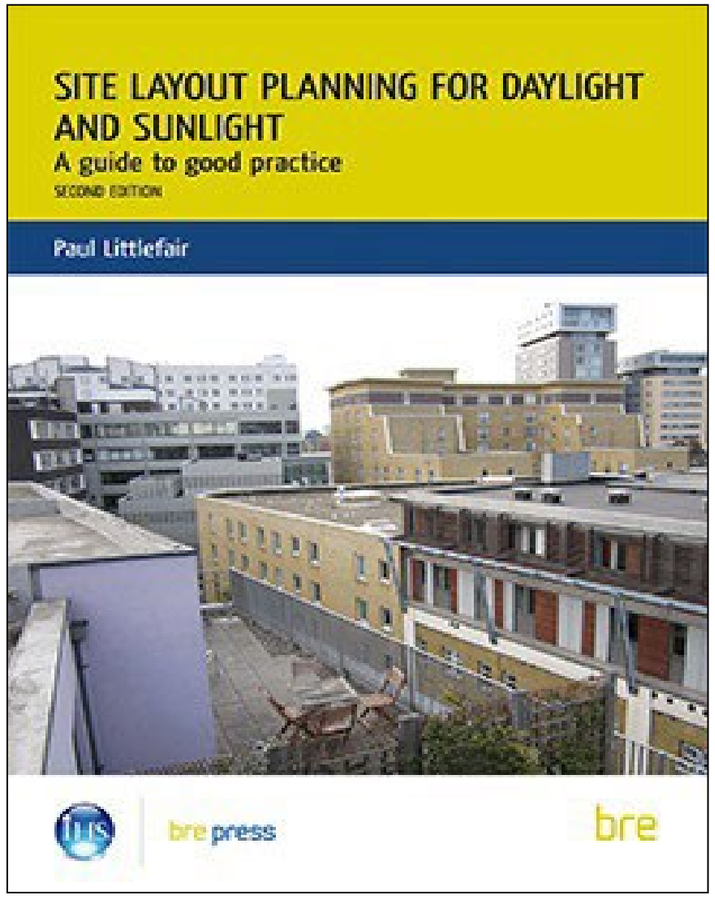
The 2008 British Standard further clarifies the targets by stipulating:

> *"Where one room serves more than one purpose, the minimum average daylight factor should be that for the room type with the highest value. For example, in a space which combines a living room and a kitchen the minimum average daylight factor should be 2%."*

With regard to the above, the minimum values targeted for relevant spaces are:

- > 2.0% for KLD Areas
- > 1.0% for Bedrooms

We note the BRE guide should be seen as advisory only as the guide was developed for low density urban housing, and was developed to inform design rather than to constrain it. Although the guide provides numerical guidelines, these should be interpreted flexibly since natural lighting is only one of many factors in site layout design.



7.1 Results Summary – ADF

The analysis determined that 94% of KLD and bedrooms would achieve or exceed the BRE guidance targets in terms of ADF compliance.

The assessment has been carried out for all spaces throughout the proposed development as illustrated within this section.

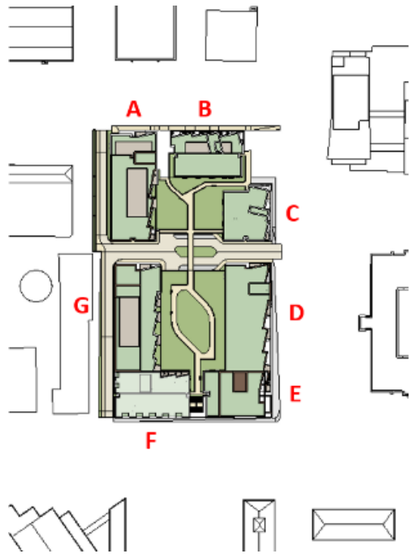
The tables below give a breakdown of compliance rates for each block as well as overall development.

Block A	Pass	Fail	Total	Units
Ground Floor	22	3	25	12
First Floor	23	3	26	13
Second Floor	23	3	26	13
Third Floor	23	3	26	13
Fourth Floor	23	3	26	13
Fifth Floor	24	2	26	13
Sixth Floor	19	1	20	11
Seventh Floor	20	0	20	11
Total	**177**	**18**	**195**	**99**
	91%	**9%**		

Block B	Pass	Fail	Total	Units
Lower Ground Floor	3	1	4	2
Mezzanine	2	0	2	0
Ground Floor	6	0	6	3
First Floor	16	2	18	8
Second Floor	15	3	18	8
Third Floor	17	1	18	8
Fourth Floor	18	0	18	8
Fifth Floor	18	0	18	8
Sixth Floor	18	0	18	8
Seventh Floor	10	0	10	5
Total	**123**	**7**	**130**	**58**
	95%	**5%**		

Block C	Pass	Fail	Total	Units
Ground Floor	3	0	3	2
First Floor	12	0	12	6
Second Floor	11	1	12	6
Third Floor	12	0	12	6
Fourth Floor	12	0	12	6
Fifth Floor	12	0	12	6
Sixth Floor	12	0	12	6
Seventh Floor	12	0	12	6
Eighth Floor	12	0	12	6
Total	**98**	**1**	**99**	**50**
	99%	**1%**		

	Pass	Fail	Total
Block A	**177**	**18**	**195**
Block B	**123**	**7**	**130**
Block C	**98**	**1**	**99**
Total	**398**	**26**	**424**
	94%	**6%**	

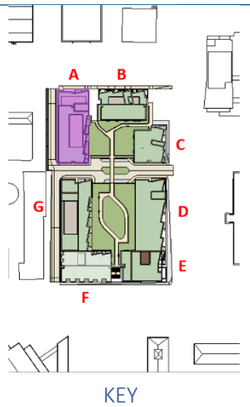


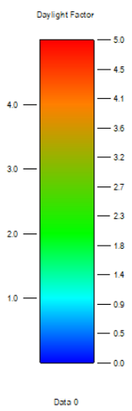
KEY

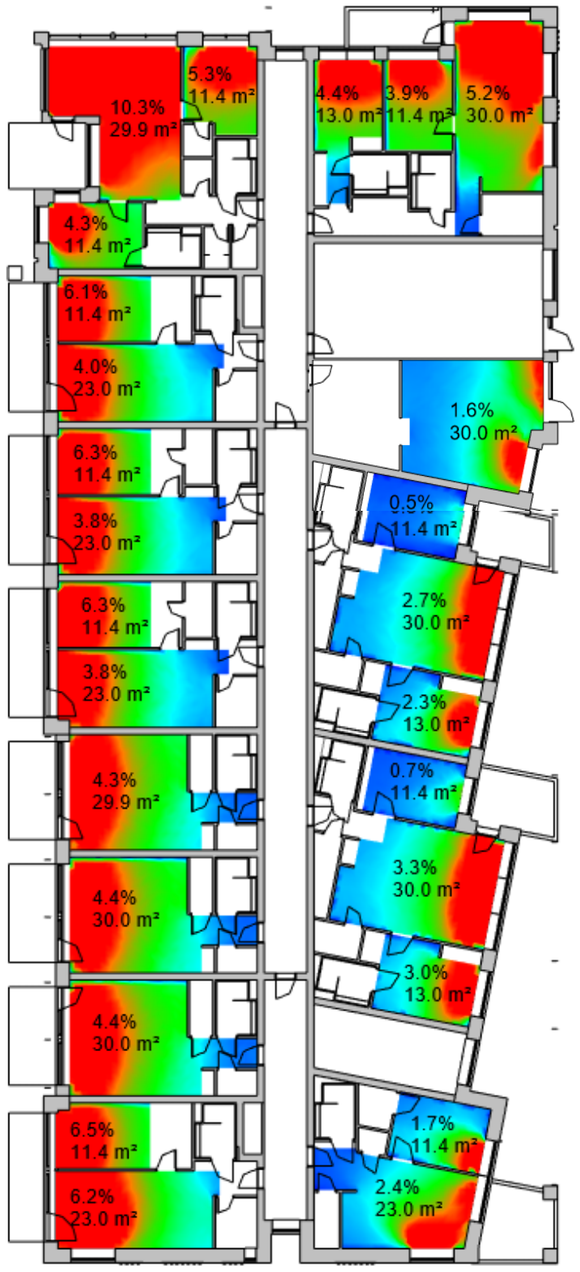
Results – Block A

Block A – Ground Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's) for various room arrangements to determine optimum typology arrangements.



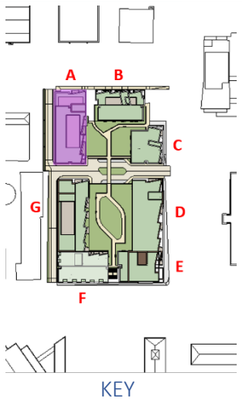




ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

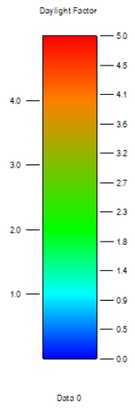
Block A	Pass	Fail	Total	Units
Ground Floor	22	3	25	12
First Floor	23	3	26	13
Second Floor	23	3	26	13
Third Floor	23	3	26	13
Fourth Floor	23	3	26	13
Fifth Floor	24	2	26	13
Sixth Floor	19	1	20	11
Seventh Floor	20	0	20	11
Total	**177**	**18**	**195**	**99**
	91%	**9%**		

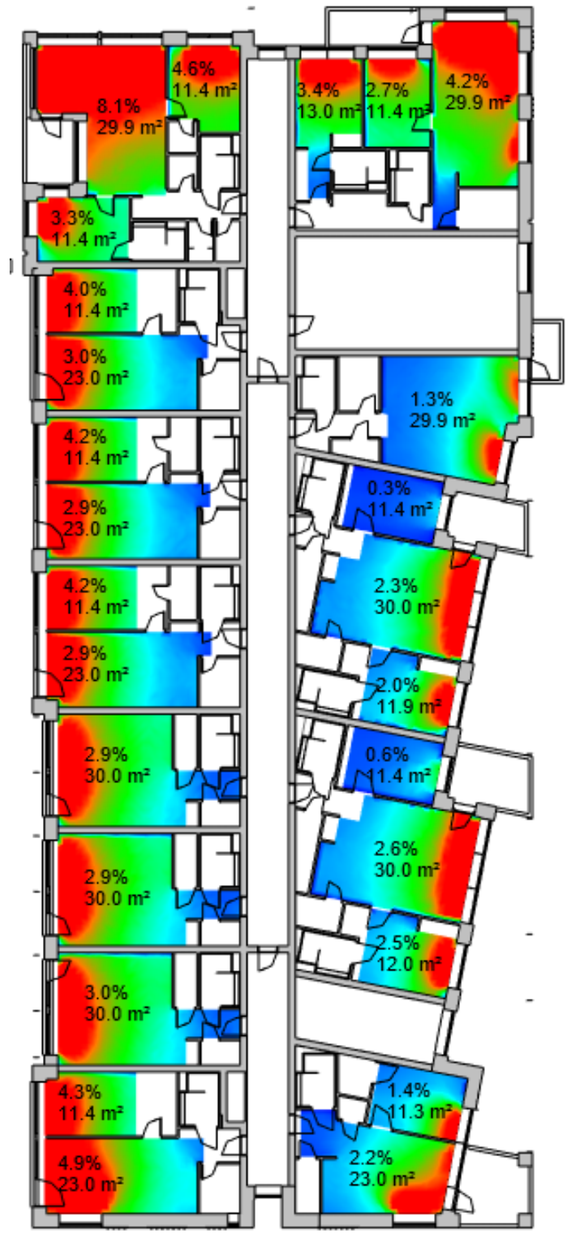
Results – Block A



Block A – First Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's) for various room arrangements to determine optimum typology arrangements.





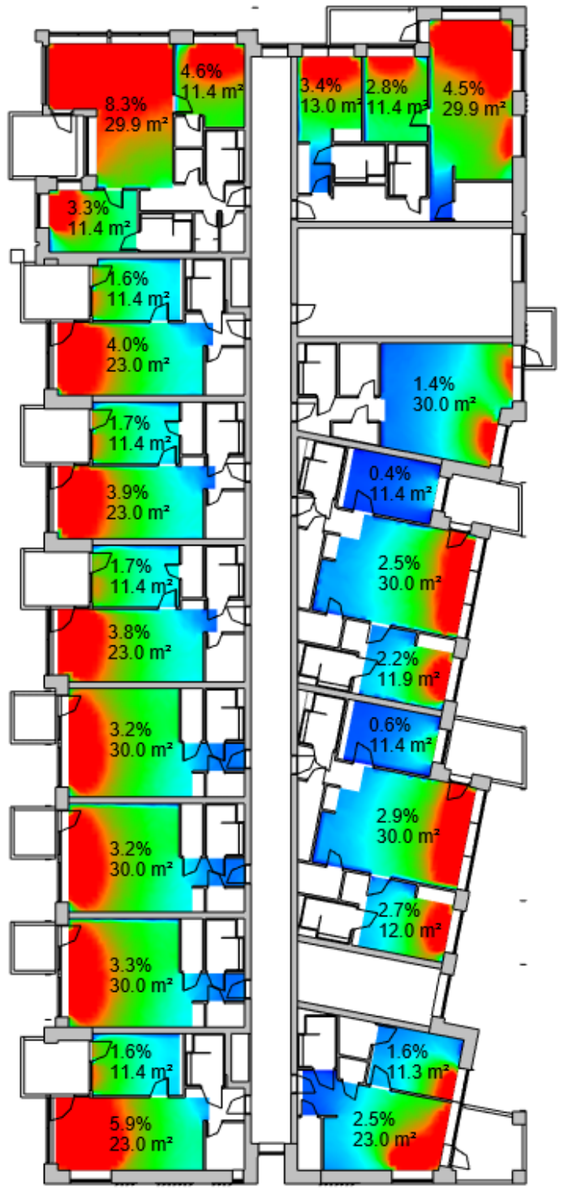
ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

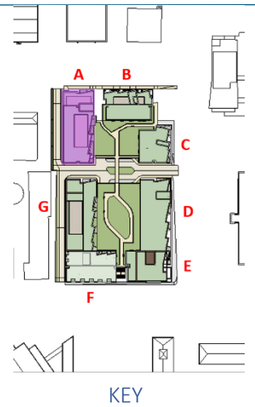
Block A	Pass	Fail	Total	Units
Ground Floor	22	3	25	12
First Floor	23	3	26	13
Second Floor	23	3	26	13
Third Floor	23	3	26	13
Fourth Floor	23	3	26	13
Fifth Floor	24	2	26	13
Sixth Floor	19	1	20	11
Seventh Floor	20	0	20	11
Total	**177**	**18**	**195**	**99**
	91%	**9%**		

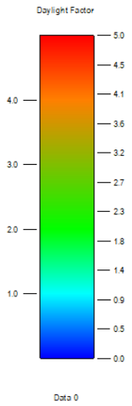
Results – Block A

Block A – Second Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's) for various room arrangements to determine optimum typology arrangements.



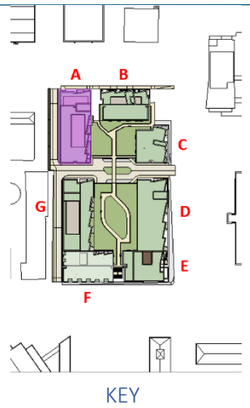




ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

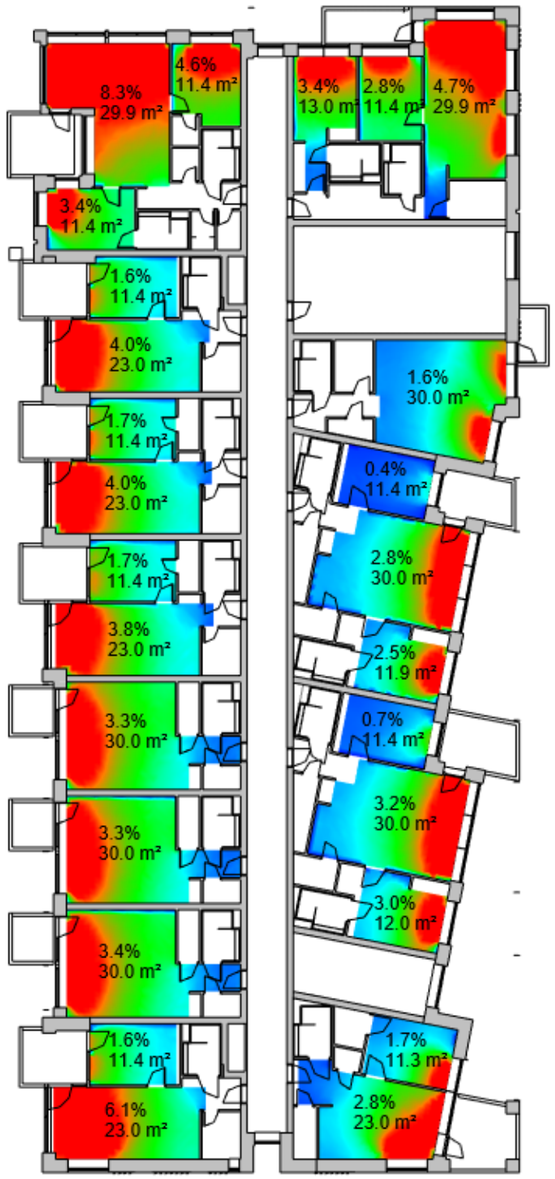
Block A	Pass	Fail	Total	Units
Ground Floor	22	3	25	12
First Floor	23	3	26	13
Second Floor	23	3	26	13
Third Floor	23	3	26	13
Fourth Floor	23	3	26	13
Fifth Floor	24	2	26	13
Sixth Floor	19	1	20	11
Seventh Floor	20	0	20	11
Total	**177**	**18**	**195**	**99**
	91%	**9%**		

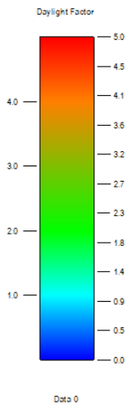
Results – Block A



Block A – Third Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's) for various room arrangements to determine optimum typology arrangements.

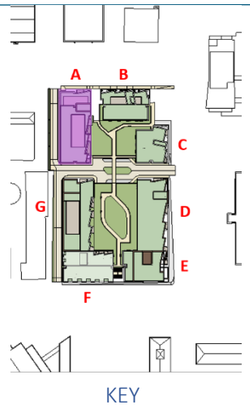




ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

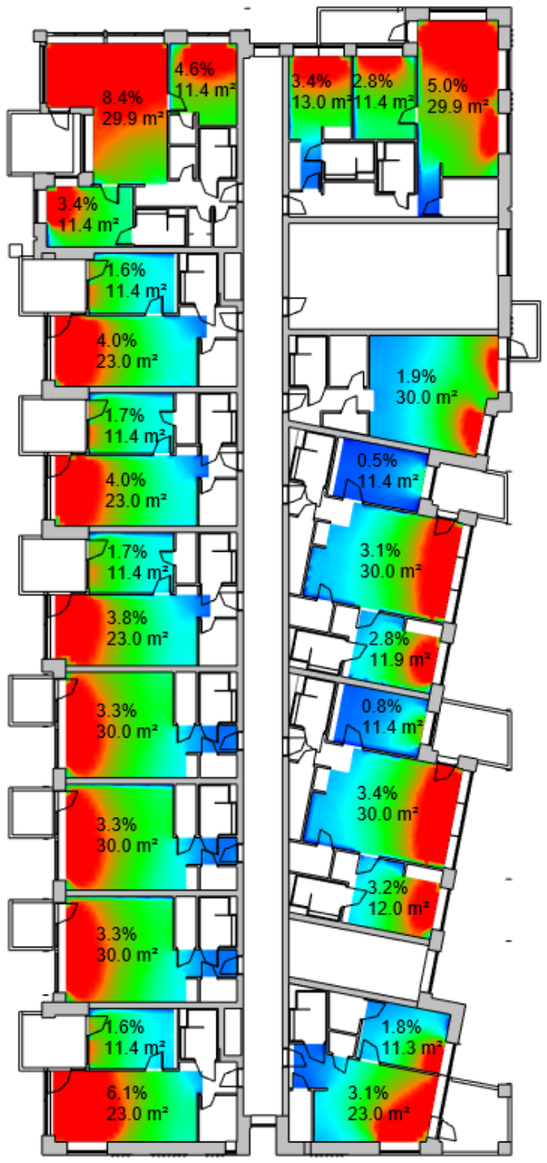
Block A	Pass	Fail	Total	Units
Ground Floor	22	3	25	12
First Floor	23	3	26	13
Second Floor	23	3	26	13
Third Floor	23	3	26	13
Fourth Floor	23	3	26	13
Fifth Floor	24	2	26	13
Sixth Floor	19	1	20	11
Seventh Floor	20	0	20	11
Total	**177**	**18**	**195**	**99**
	91%	**9%**		

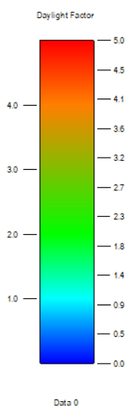
Results – Block A



Block A – Fourth Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's) for various room arrangements to determine optimum typology arrangements.

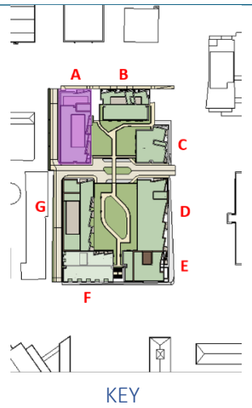




ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

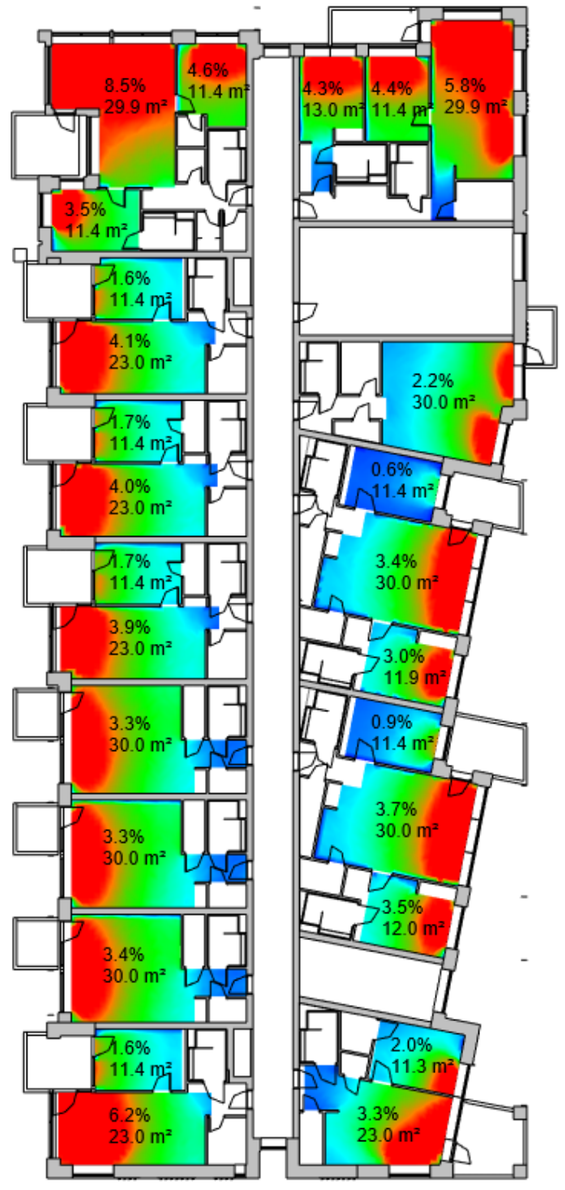
Block A	Pass	Fail	Total	Units
Ground Floor	22	3	25	12
First Floor	23	3	26	13
Second Floor	23	3	26	13
Third Floor	23	3	26	13
Fourth Floor	23	3	26	13
Fifth Floor	24	2	26	13
Sixth Floor	19	1	20	11
Seventh Floor	20	0	20	11
Total	**177**	**18**	**195**	**99**
	91%	**9%**		

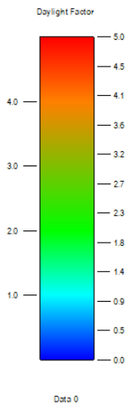
Results – Block A



Block A – Fifth Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's) for various room arrangements to determine optimum typology arrangements.

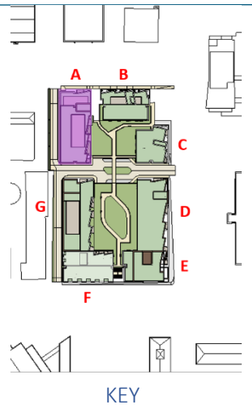




ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

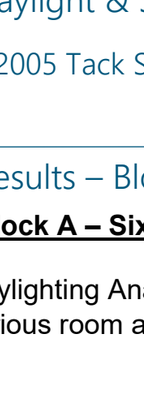
Block A	Pass	Fail	Total	Units
Ground Floor	22	3	25	12
First Floor	23	3	26	13
Second Floor	23	3	26	13
Third Floor	23	3	26	13
Fourth Floor	23	3	26	13
Fifth Floor	24	2	26	13
Sixth Floor	19	1	20	11
Seventh Floor	20	0	20	11
Total	**177**	**18**	**195**	**99**
	91%	**9%**		

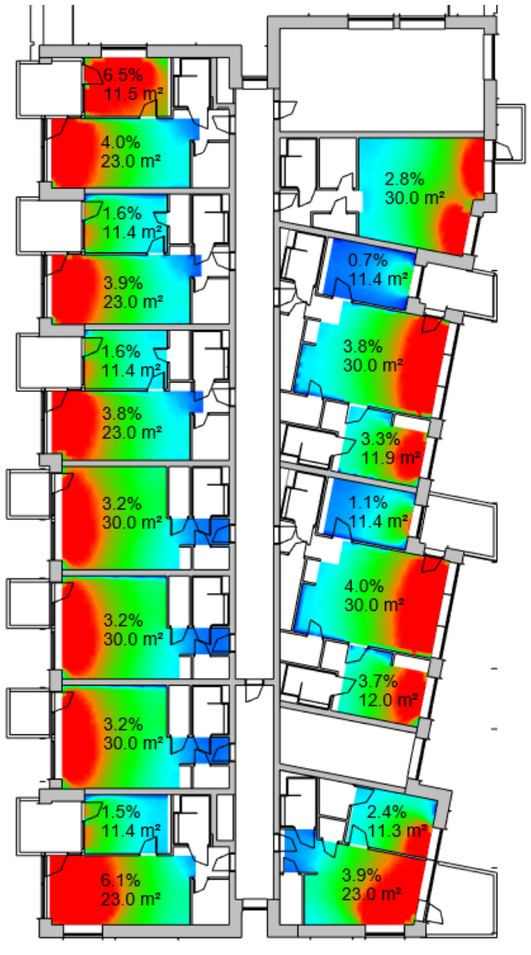
Results – Block A



Block A – Sixth Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's) for various room arrangements to determine optimum typology arrangements.





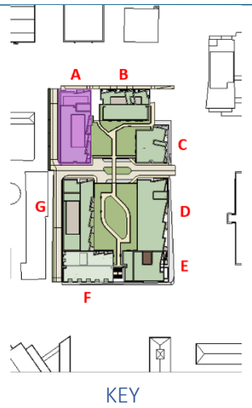
ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

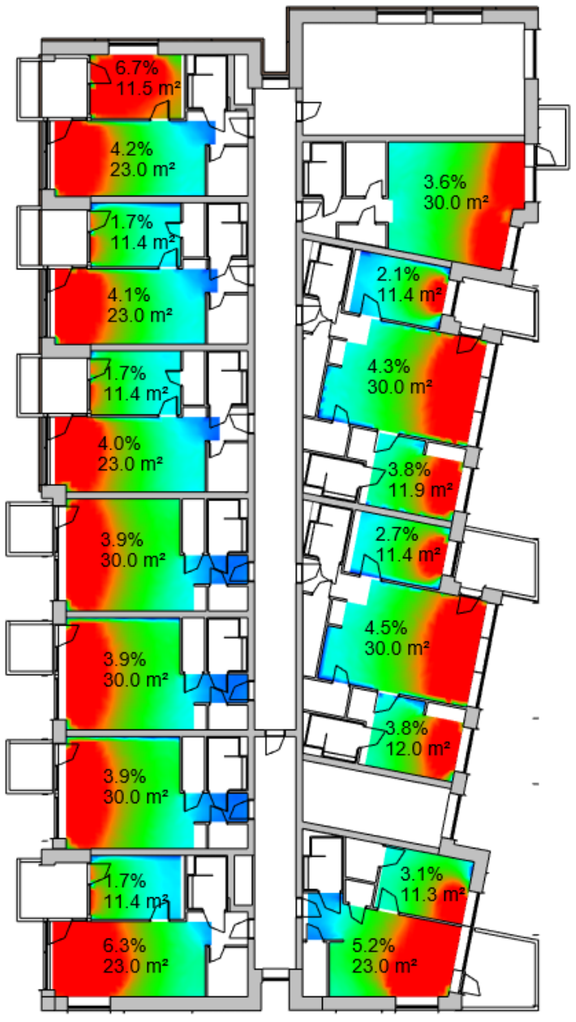
Block A	Pass	Fail	Total	Units
Ground Floor	22	3	25	12
First Floor	23	3	26	13
Second Floor	23	3	26	13
Third Floor	23	3	26	13
Fourth Floor	23	3	26	13
Fifth Floor	24	2	26	13
Sixth Floor	19	1	20	11
Seventh Floor	20	0	20	11
Total	**177**	**18**	**195**	**99**
	91%	**9%**		

Results – Block A

Block A – Seventh Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's) for various room arrangements to determine optimum typology arrangements.

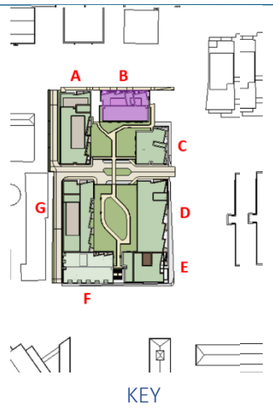




ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

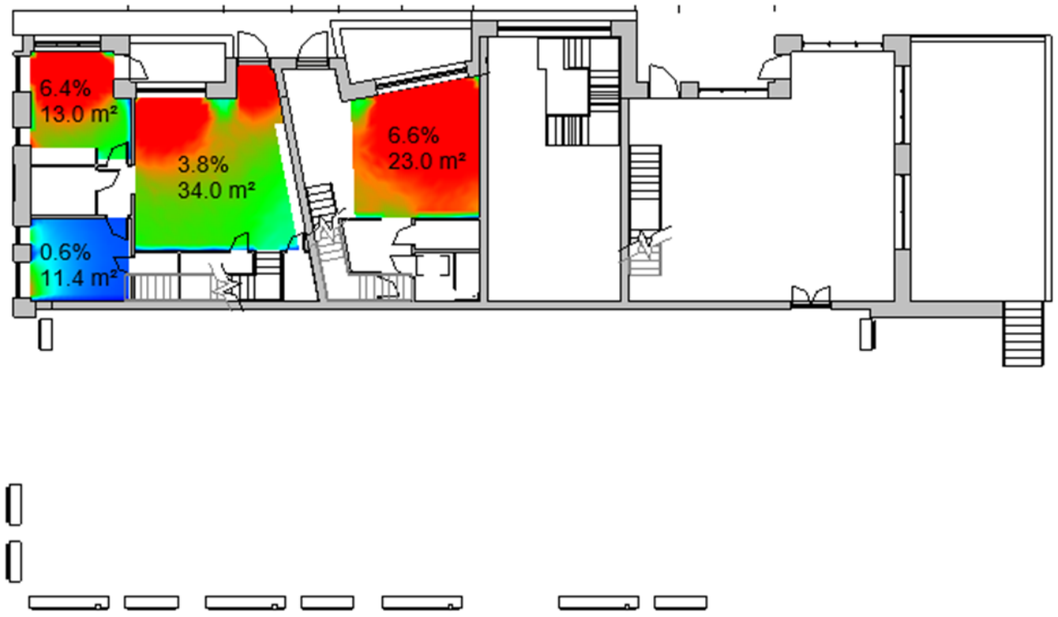
Block A	Pass	Fail	Total	Units
Ground Floor	22	3	25	12
First Floor	23	3	26	13
Second Floor	23	3	26	13
Third Floor	23	3	26	13
Fourth Floor	23	3	26	13
Fifth Floor	24	2	26	13
Sixth Floor	19	1	20	11
Seventh Floor	20	0	20	11
Total	**177**	**18**	**195**	**99**
	91%	**9%**		

Results – Block B



Block B – Lower Ground Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's) for various room arrangements to determine optimum typology arrangements.



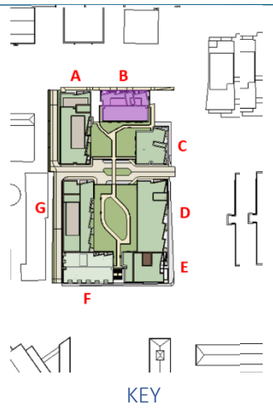
ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

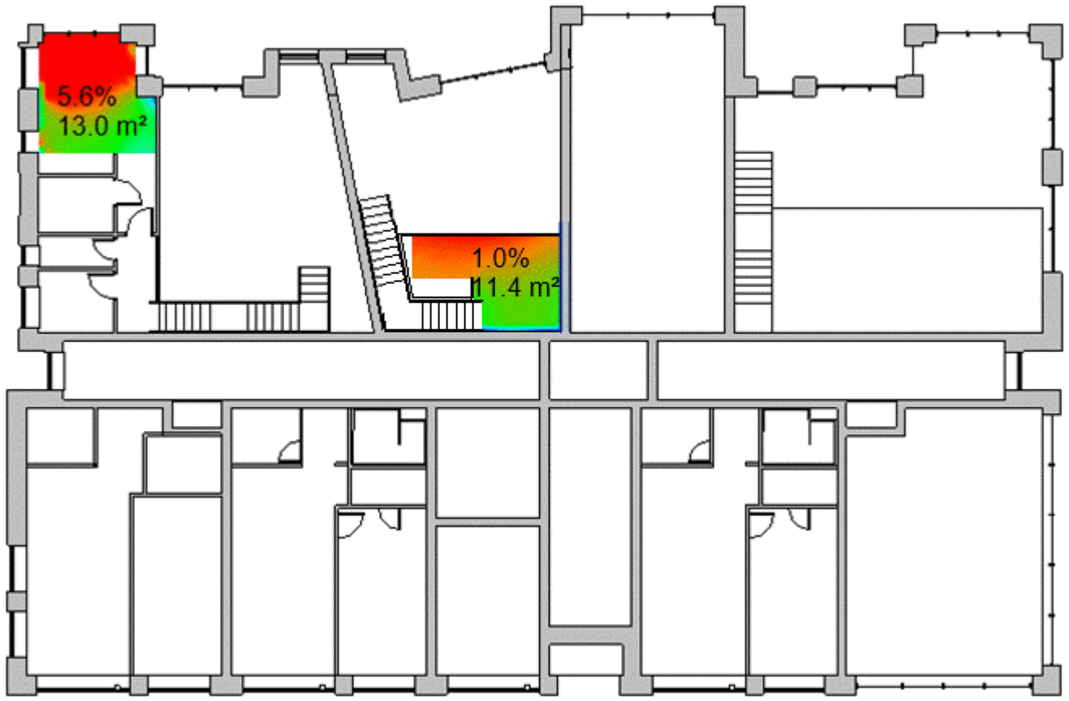
Block B	Pass	Fail	Total	Units
Lower Ground Floor	3	1	4	2
Mezzanine	2	0	2	0
Ground Floor	6	0	6	3
First Floor	16	2	18	8
Second Floor	15	3	18	8
Third Floor	17	1	18	8
Fourth Floor	18	0	18	8
Fifth Floor	18	0	18	8
Sixth Floor	18	0	18	8
Seventh Floor	10	0	10	5
Total	**123**	**7**	**130**	**58**
	95%	**5%**		

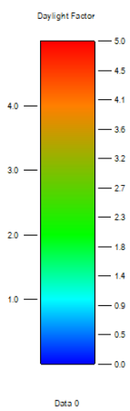
Results – Block B

Block B – Mezzanine Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's) for various room arrangements to determine optimum typology arrangements.







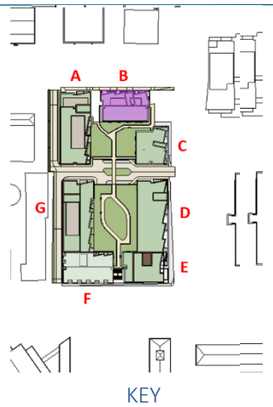
ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

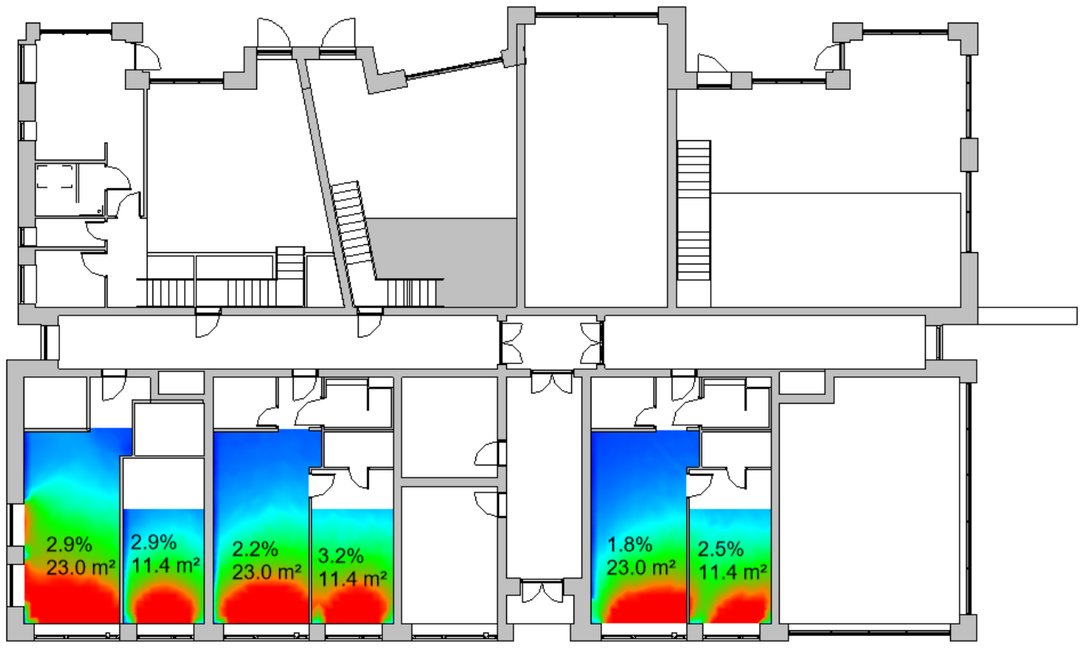
Block B	Pass	Fail	Total	Units
Lower Ground Floor	3	1	4	2
Mezzanine	2	0	2	0
Ground Floor	6	0	6	3
First Floor	16	2	18	8
Second Floor	15	3	18	8
Third Floor	17	1	18	8
Fourth Floor	18	0	18	8
Fifth Floor	18	0	18	8
Sixth Floor	18	0	18	8
Seventh Floor	10	0	10	5
Total	**123**	**7**	**130**	**58**
	95%	**5%**		

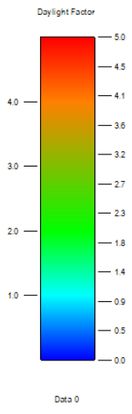
Results – Block B

Block B –Ground Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's) for various room arrangements to determine optimum typology arrangements.







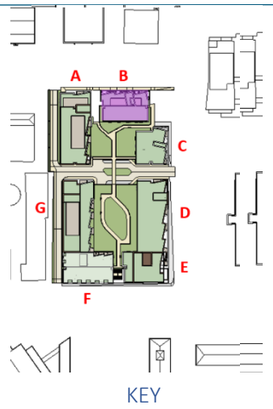
ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

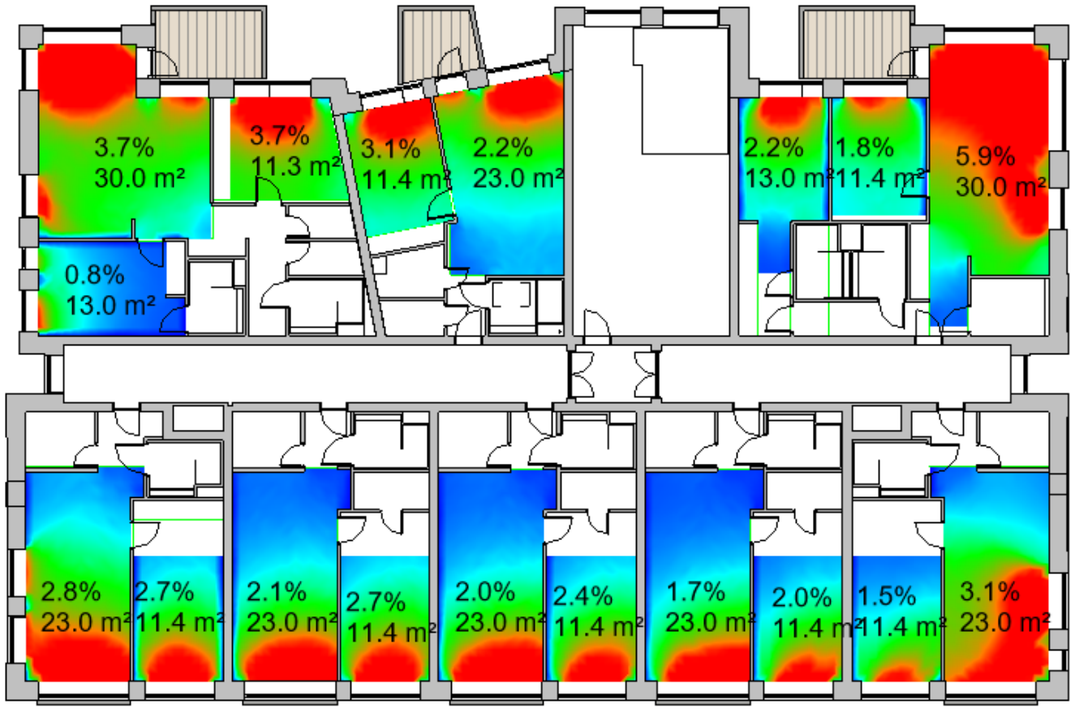
Block B	Pass	Fail	Total	Units
Lower Ground Floor	3	1	4	2
Mezzanine	2	0	2	0
Ground Floor	6	0	6	3
First Floor	16	2	18	8
Second Floor	15	3	18	8
Third Floor	17	1	18	8
Fourth Floor	18	0	18	8
Fifth Floor	18	0	18	8
Sixth Floor	18	0	18	8
Seventh Floor	10	0	10	5
Total	**123**	**7**	**130**	**58**
	95%	**5%**		

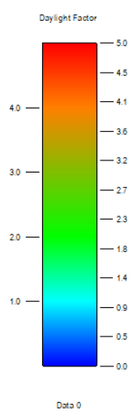
Results – Block B

Block B – First Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's) for various room arrangements to determine optimum typology arrangements.







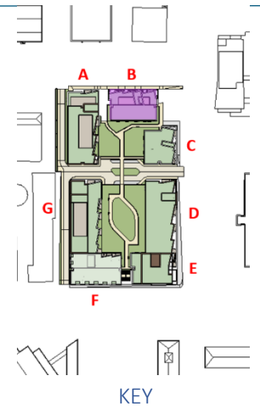
ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

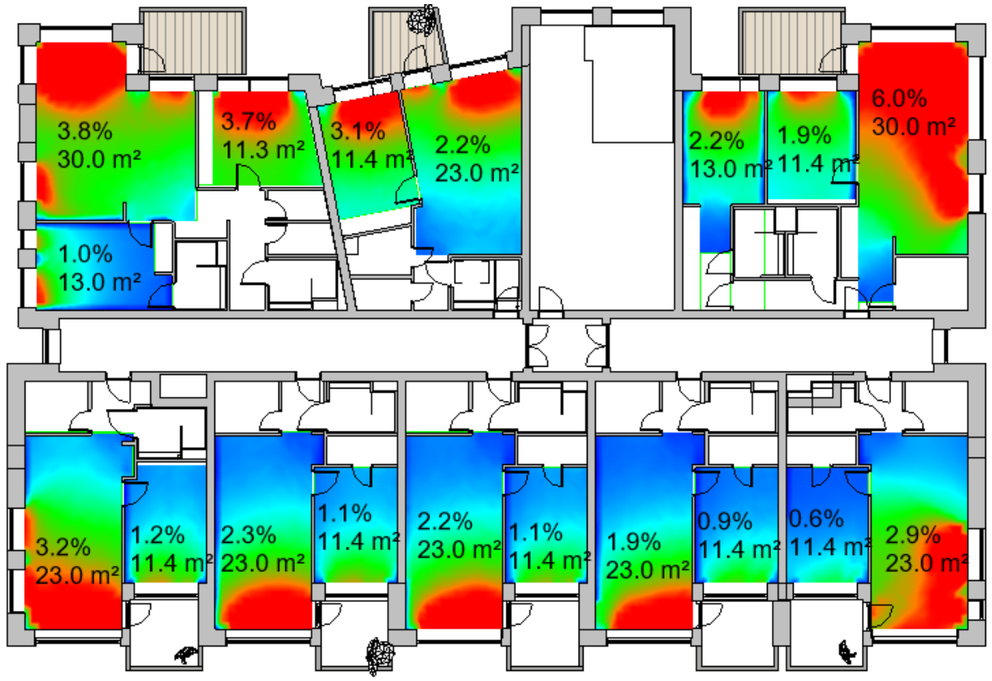
Block B	Pass	Fail	Total	Units
Lower Ground Floor	3	1	4	2
Mezzanine	2	0	2	0
Ground Floor	6	0	6	3
First Floor	16	2	18	8
Second Floor	15	3	18	8
Third Floor	17	1	18	8
Fourth Floor	18	0	18	8
Fifth Floor	18	0	18	8
Sixth Floor	18	0	18	8
Seventh Floor	10	0	10	5
Total	**123**	**7**	**130**	**58**
	95%	**5%**		

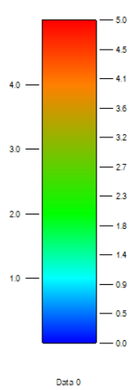
Results – Block B

Block B – Second Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's) for various room arrangements to determine optimum typology arrangements.







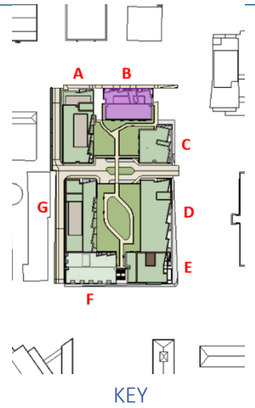
ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

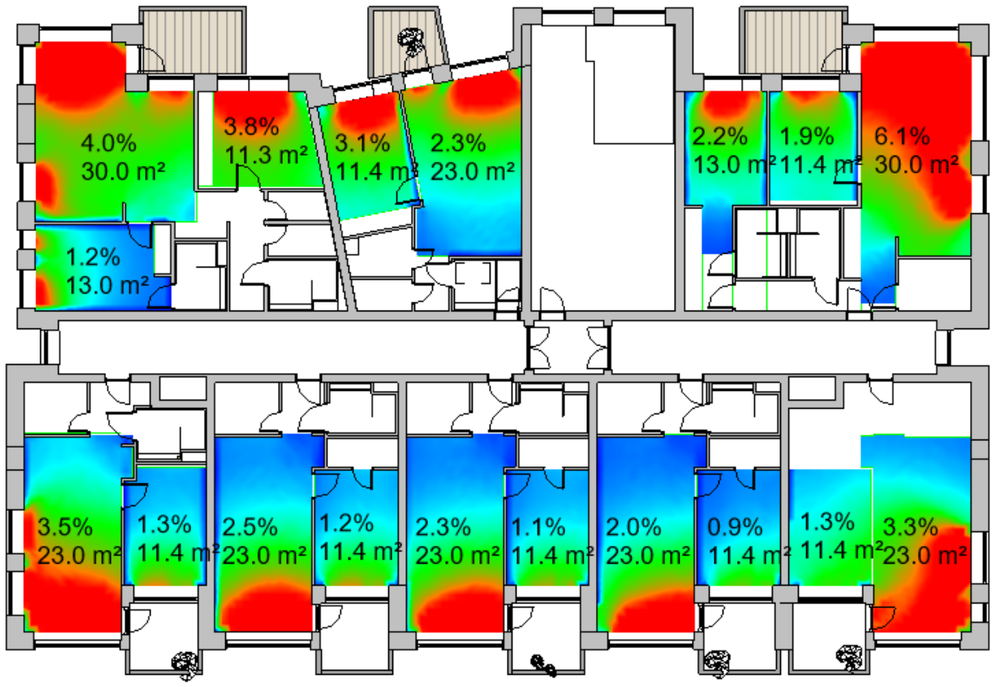
Block B	Pass	Fail	Total	Units
Lower Ground Floor	3	1	4	2
Mezzanine	2	0	2	0
Ground Floor	6	0	6	3
First Floor	16	2	18	8
Second Floor	15	3	18	8
Third Floor	17	1	18	8
Fourth Floor	18	0	18	8
Fifth Floor	18	0	18	8
Sixth Floor	18	0	18	8
Seventh Floor	10	0	10	5
Total	**123**	**7**	**130**	**58**
	95%	**5%**		

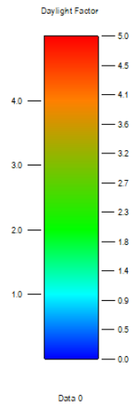
Results – Block B

Block B – Third Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's) for various room arrangements to determine optimum typology arrangements.







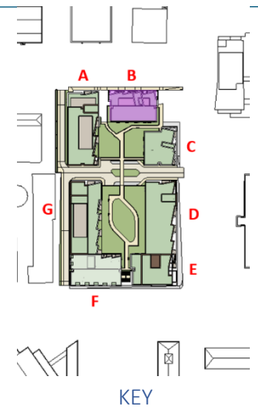
ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

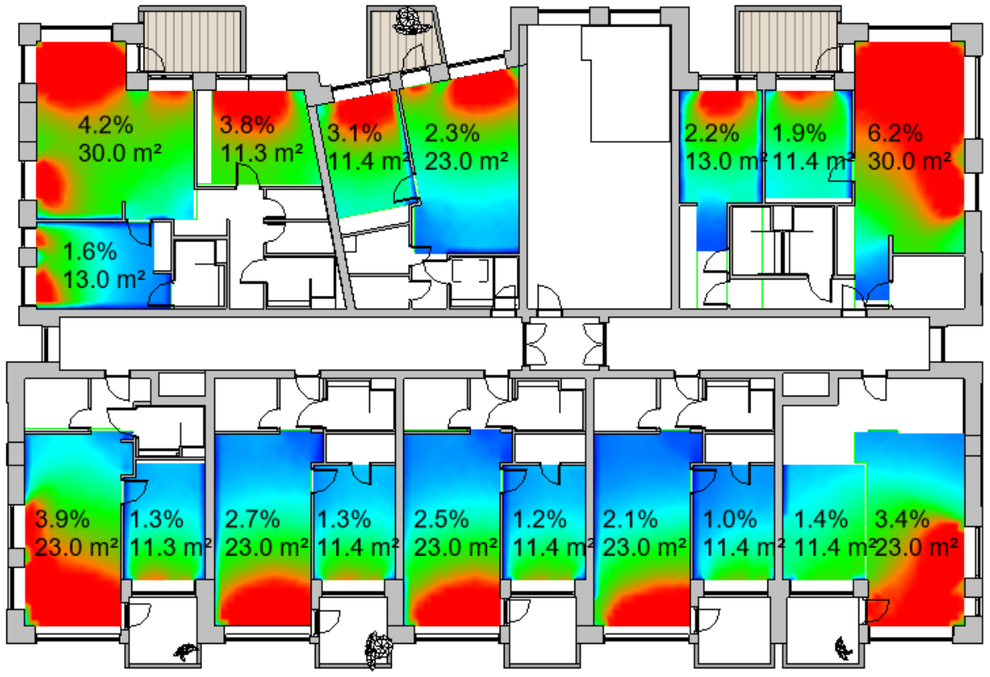
Block B	Pass	Fail	Total	Units
Lower Ground Floor	3	1	4	2
Mezzanine	2	0	2	0
Ground Floor	6	0	6	3
First Floor	16	2	18	8
Second Floor	15	3	18	8
Third Floor	17	1	18	8
Fourth Floor	18	0	18	8
Fifth Floor	18	0	18	8
Sixth Floor	18	0	18	8
Seventh Floor	10	0	10	5
Total	**123**	**7**	**130**	**58**
	95%	**5%**		

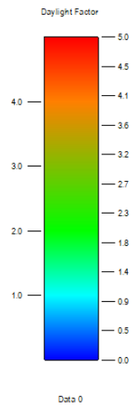
Results – Block B

Block B – Fourth Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's) for various room arrangements to determine optimum typology arrangements.







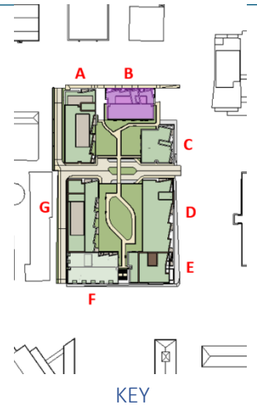
ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

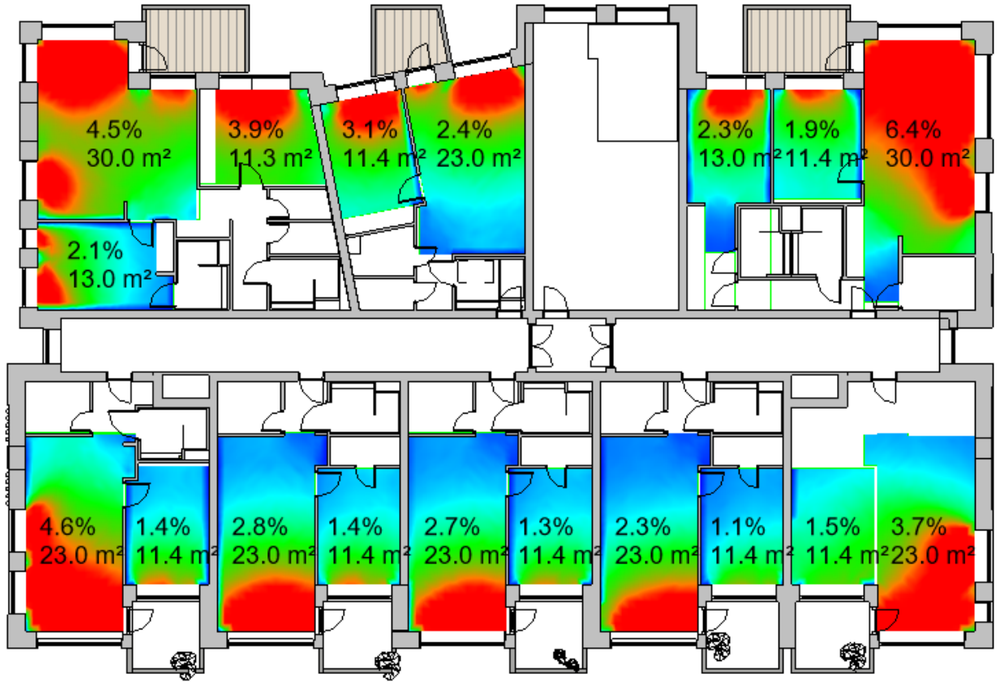
Block B	Pass	Fail	Total	Units
Lower Ground Floor	3	1	4	2
Mezzanine	2	0	2	0
Ground Floor	6	0	6	3
First Floor	16	2	18	8
Second Floor	15	3	18	8
Third Floor	17	1	18	8
Fourth Floor	18	0	18	8
Fifth Floor	18	0	18	8
Sixth Floor	18	0	18	8
Seventh Floor	10	0	10	5
Total	**123**	**7**	**130**	**58**
	95%	**5%**		

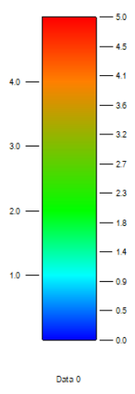
Results – Block B

Block B – Fifth Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's) for various room arrangements to determine optimum typology arrangements.







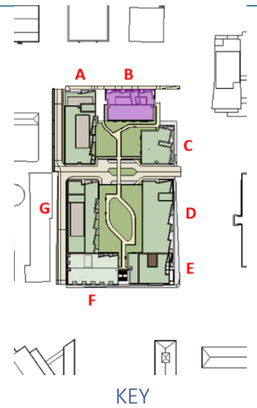
ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

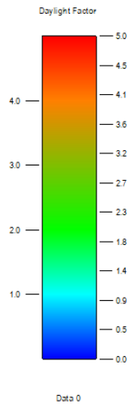
Block B	Pass	Fail	Total	Units
Lower Ground Floor	3	1	4	2
Mezzanine	2	0	2	0
Ground Floor	6	0	6	3
First Floor	16	2	18	8
Second Floor	15	3	18	8
Third Floor	17	1	18	8
Fourth Floor	18	0	18	8
Fifth Floor	18	0	18	8
Sixth Floor	18	0	18	8
Seventh Floor	10	0	10	5
Total	**123**	**7**	**130**	**58**
	95%	**5%**		

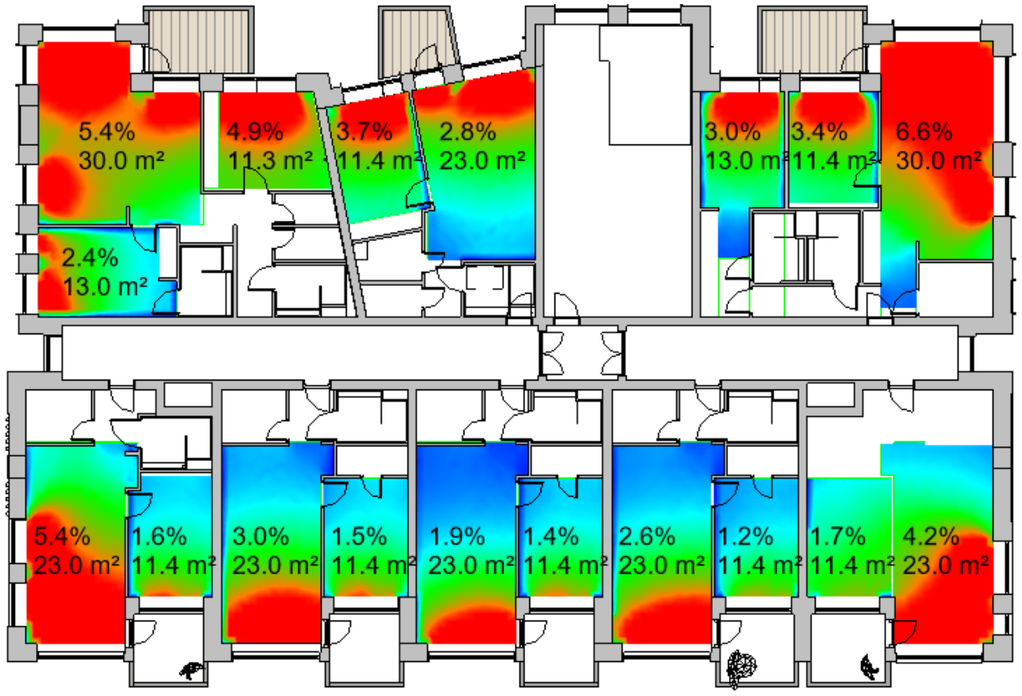
Results – Block B

Block B – Sixth Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's) for various room arrangements to determine optimum typology arrangements.







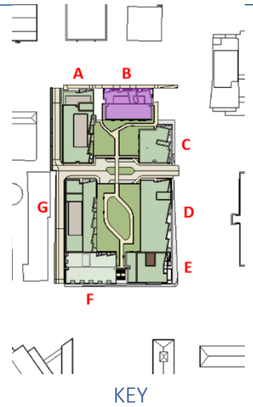
ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

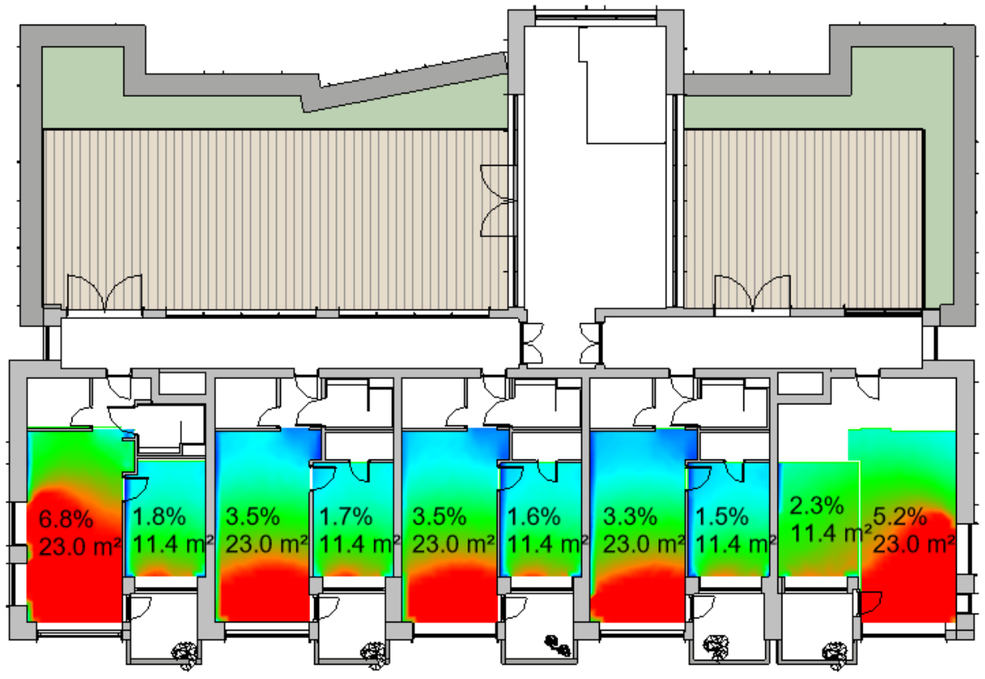
Block B	Pass	Fail	Total	Units
Lower Ground Floor	3	1	4	2
Mezzanine	2	0	2	0
Ground Floor	6	0	6	3
First Floor	16	2	18	8
Second Floor	15	3	18	8
Third Floor	17	1	18	8
Fourth Floor	18	0	18	8
Fifth Floor	18	0	18	8
Sixth Floor	18	0	18	8
Seventh Floor	10	0	10	5
Total	**123**	**7**	**130**	**58**
	95%	**5%**		

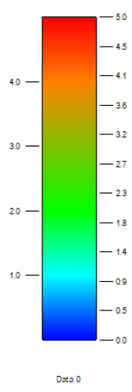
Results – Block B

Block B – Seventh Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's) for various room arrangements to determine optimum typology arrangements.



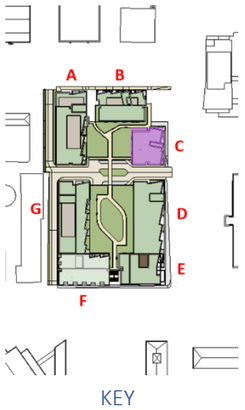




ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

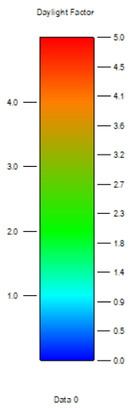
Block B	Pass	Fail	Total	Units
Lower Ground Floor	3	1	4	2
Mezzanine	2	0	2	0
Ground Floor	6	0	6	3
First Floor	16	2	18	8
Second Floor	15	3	18	8
Third Floor	17	1	18	8
Fourth Floor	18	0	18	8
Fifth Floor	18	0	18	8
Sixth Floor	18	0	18	8
Seventh Floor	10	0	10	5
Total	**123**	**7**	**130**	**58**
	95%	**5%**		

Results – Block C



Block C – Ground Floor

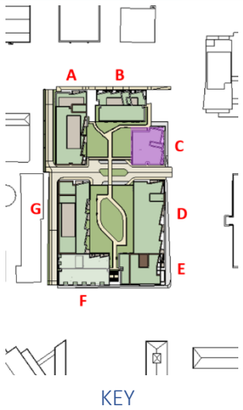
Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's) for various room arrangements to determine optimum typology arrangements.



ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

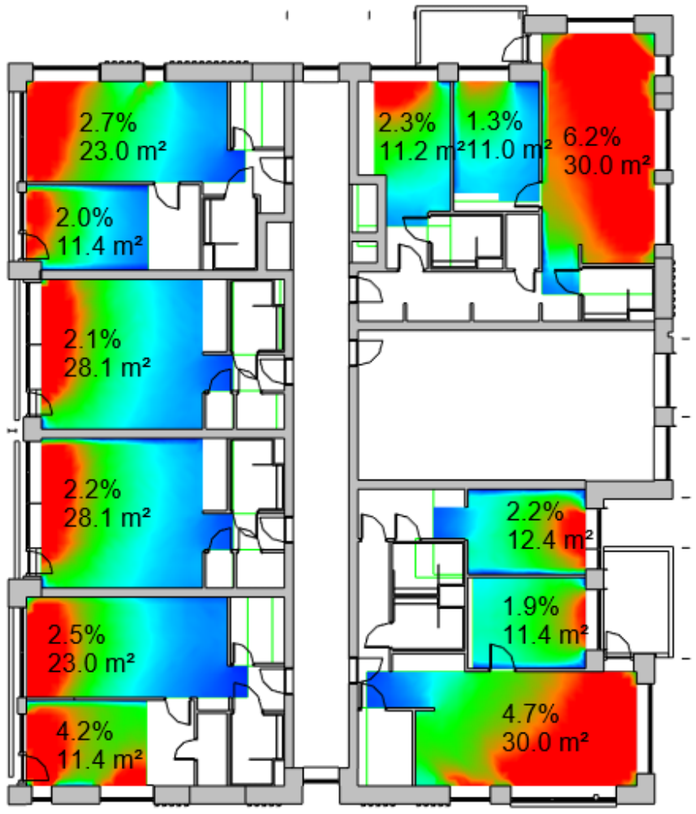
Block C	Pass	Fail	Total	Units
Ground Floor	3	0	3	2
First Floor	12	0	12	6
Second Floor	11	1	12	6
Third Floor	12	0	12	6
Fourth Floor	12	0	12	6
Fifth Floor	12	0	12	6
Sixth Floor	12	0	12	6
Seventh Floor	12	0	12	6
Eighth Floor	12	0	12	6
Total	**98**	**1**	**99**	**50**
	99%	**1%**		

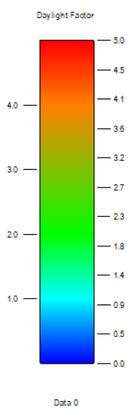
Results – Block C



Block C – First Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's) for various room arrangements to determine optimum typology arrangements.





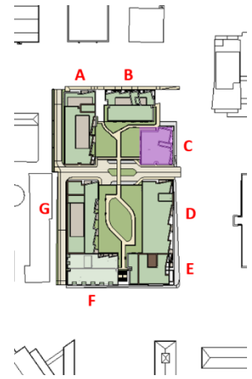
ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

Block C	Pass	Fail	Total	Units
Ground Floor	2	1	3	2
First Floor	12	0	12	6
Second Floor	11	1	12	6
Third Floor	12	0	12	6
Fourth Floor	12	0	12	6
Fifth Floor	12	0	12	6
Sixth Floor	12	0	12	6
Seventh Floor	12	0	12	6
Eighth Floor	12	0	12	6
Total	**97**	**2**	**99**	**50**
	98%	**2%**		

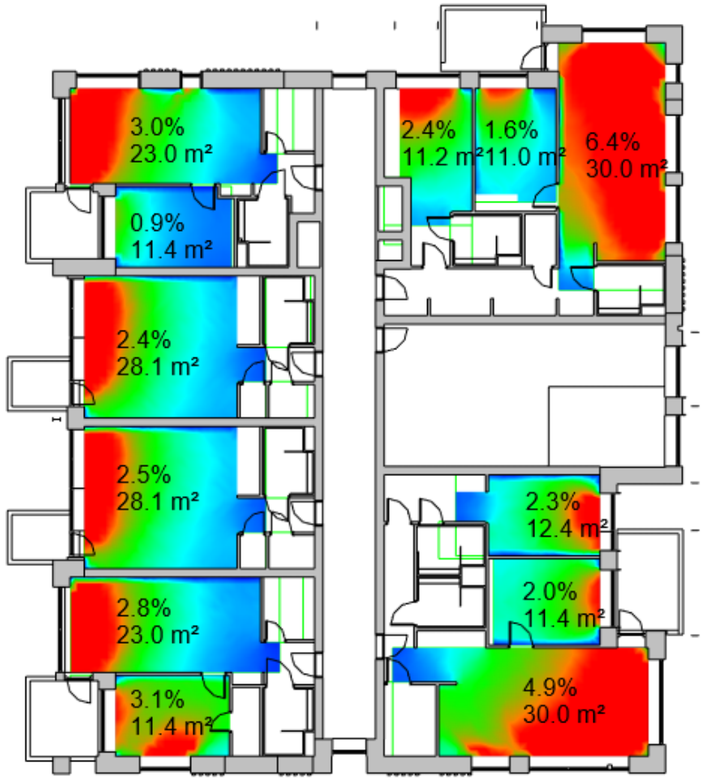
Results – Block C

Block C – Second Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's) for various room arrangements to determine optimum typology arrangements.



KEY



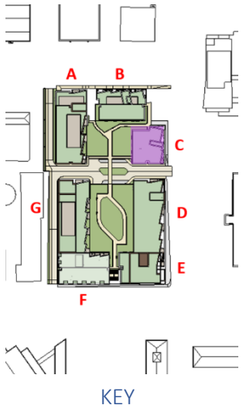
ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

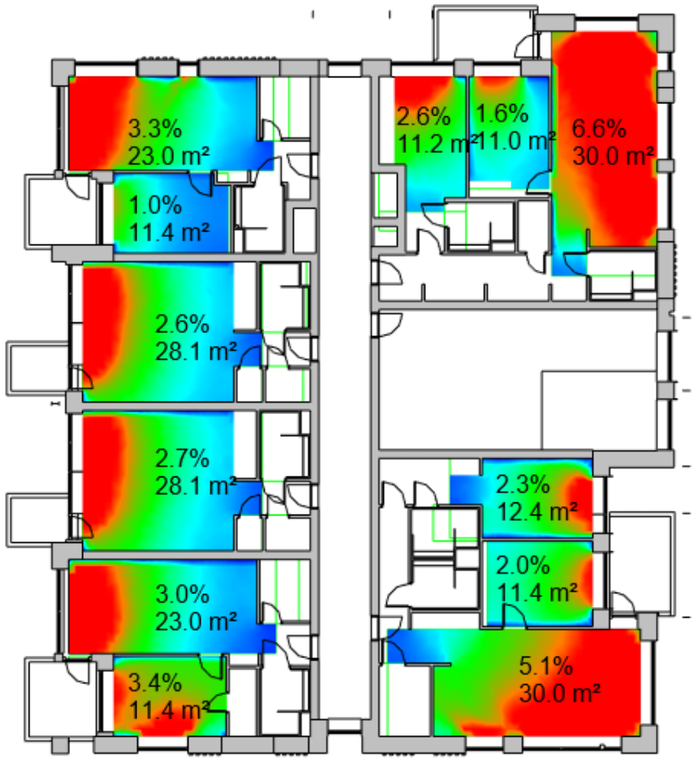
Block C	Pass	Fail	Total	Units
Ground Floor	2	1	3	2
First Floor	12	0	12	6
Second Floor	11	1	12	6
Third Floor	12	0	12	6
Fourth Floor	12	0	12	6
Fifth Floor	12	0	12	6
Sixth Floor	12	0	12	6
Seventh Floor	12	0	12	6
Eighth Floor	12	0	12	6
Total	**97**	**2**	**99**	**50**
	98%	**2%**		

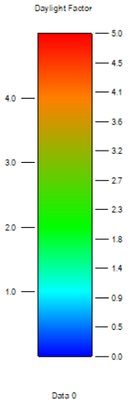
Results – Block C

Block C – Third Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's) for various room arrangements to determine optimum typology arrangements.







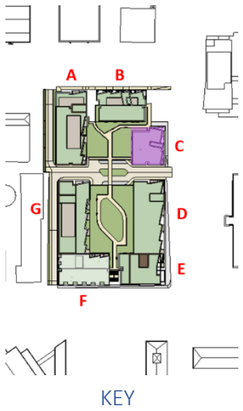
ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

Block C	Pass	Fail	Total	Units
Ground Floor	2	1	3	2
First Floor	12	0	12	6
Second Floor	11	1	12	6
Third Floor	12	0	12	6
Fourth Floor	12	0	12	6
Fifth Floor	12	0	12	6
Sixth Floor	12	0	12	6
Seventh Floor	12	0	12	6
Eighth Floor	12	0	12	6
Total	**97**	**2**	**99**	**50**
	98%	**2%**		

Results – Block C

Block C – Fourth Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's) for various room arrangements to determine optimum typology arrangements.



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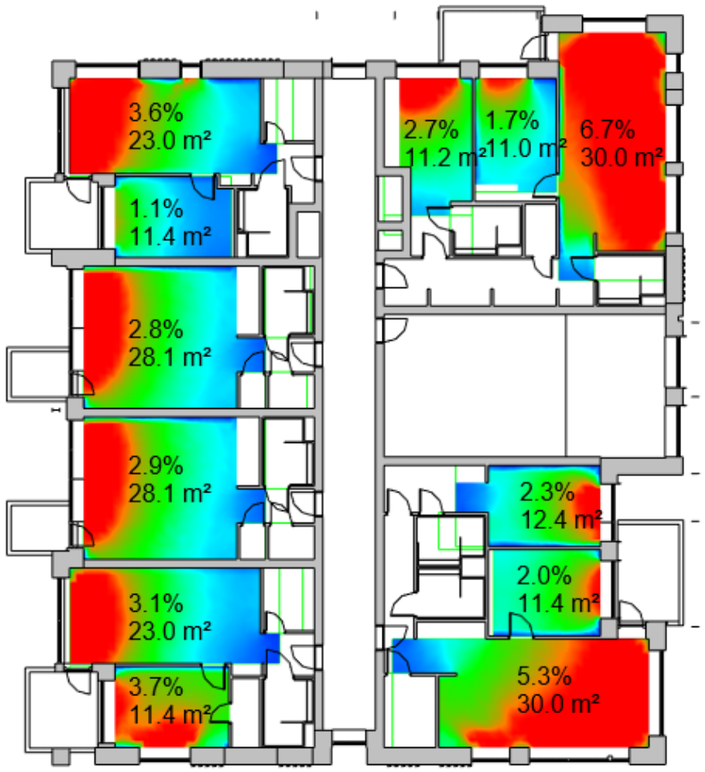
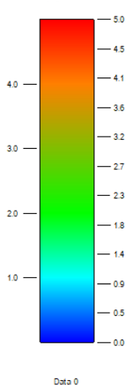




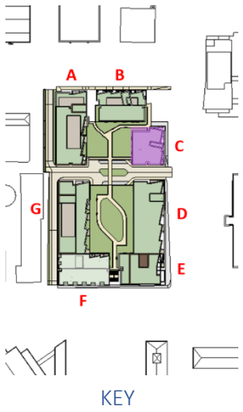
ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

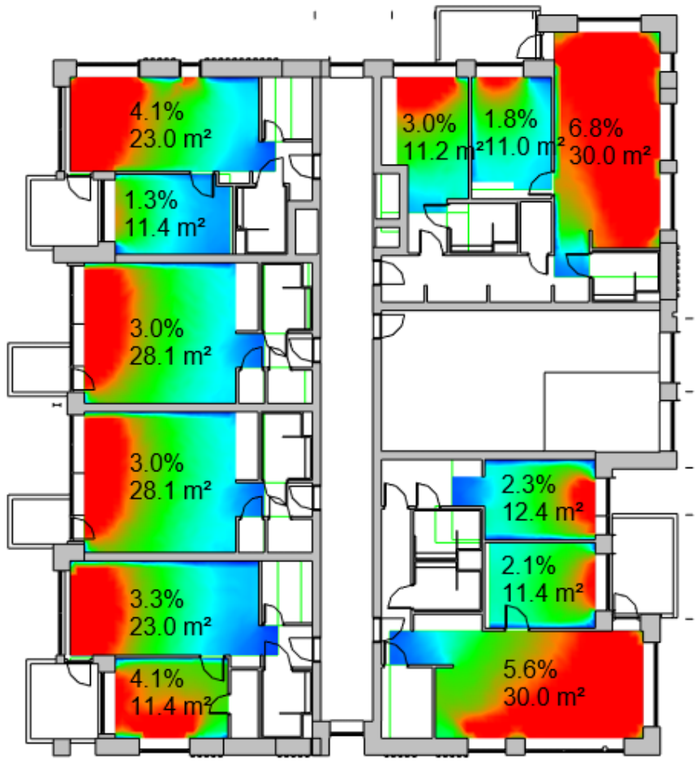
Block C	Pass	Fail	Total	Units
Ground Floor	2	1	3	2
First Floor	12	0	12	6
Second Floor	11	1	12	6
Third Floor	12	0	12	6
Fourth Floor	12	0	12	6
Fifth Floor	12	0	12	6
Sixth Floor	12	0	12	6
Seventh Floor	12	0	12	6
Eighth Floor	12	0	12	6
Total	**97**	**2**	**99**	**50**
	98%	**2%**		

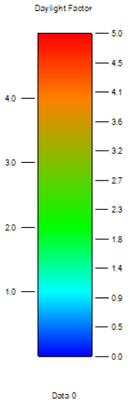
Results – Block C

Block C – Fifth Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's) for various room arrangements to determine optimum typology arrangements.



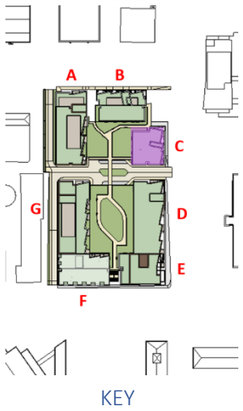




ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

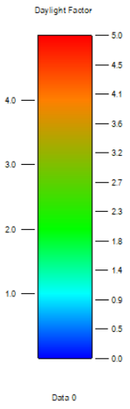
Block C	Pass	Fail	Total	Units
Ground Floor	2	1	3	2
First Floor	12	0	12	6
Second Floor	11	1	12	6
Third Floor	12	0	12	6
Fourth Floor	12	0	12	6
Fifth Floor	12	0	12	6
Sixth Floor	12	0	12	6
Seventh Floor	12	0	12	6
Eighth Floor	12	0	12	6
Total	**97**	**2**	**99**	**50**
	98%	**2%**		

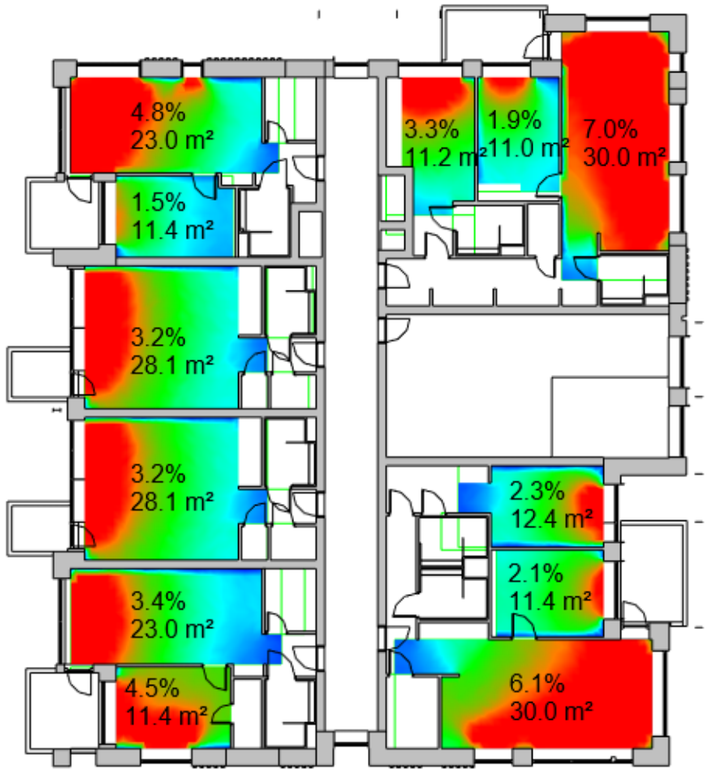
Results – Block C



Block C – Sixth Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's) for various room arrangements to determine optimum typology arrangements.





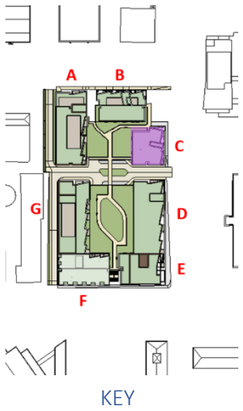
ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

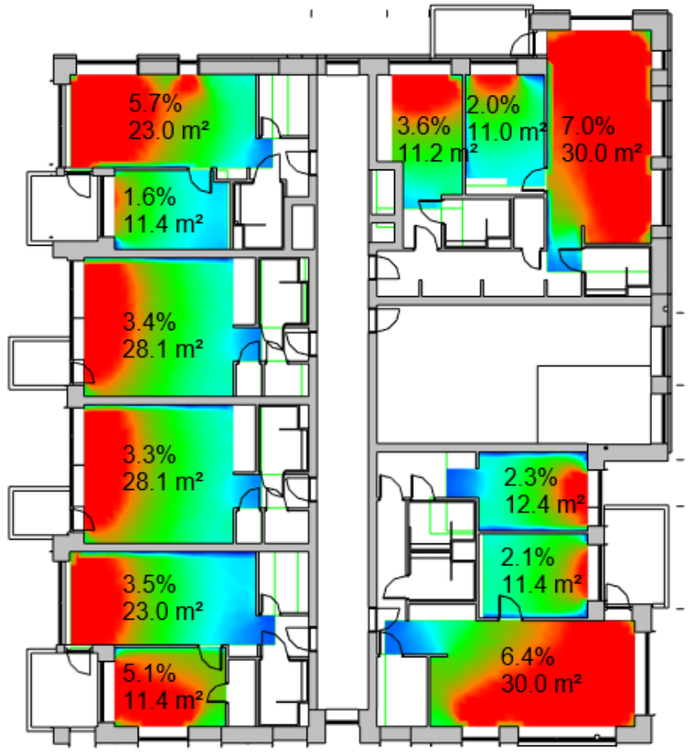
Block C	Pass	Fail	Total	Units
Ground Floor	2	1	3	2
First Floor	12	0	12	6
Second Floor	11	1	12	6
Third Floor	12	0	12	6
Fourth Floor	12	0	12	6
Fifth Floor	12	0	12	6
Sixth Floor	12	0	12	6
Seventh Floor	12	0	12	6
Eighth Floor	12	0	12	6
Total	**97**	**2**	**99**	**50**
	98%	**2%**		

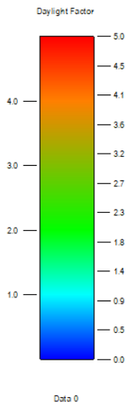
Results – Block C

Block C – Seventh Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's) for various room arrangements to determine optimum typology arrangements.







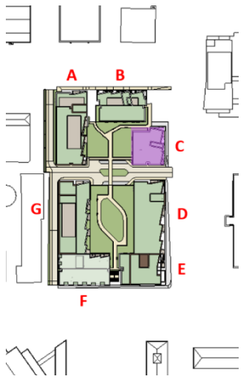
ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

Block C	Pass	Fail	Total	Units
Ground Floor	2	1	3	2
First Floor	12	0	12	6
Second Floor	11	1	12	6
Third Floor	12	0	12	6
Fourth Floor	12	0	12	6
Fifth Floor	12	0	12	6
Sixth Floor	12	0	12	6
Seventh Floor	12	0	12	6
Eighth Floor	12	0	12	6
Total	**97**	**2**	**99**	**50**
	98%	**2%**		

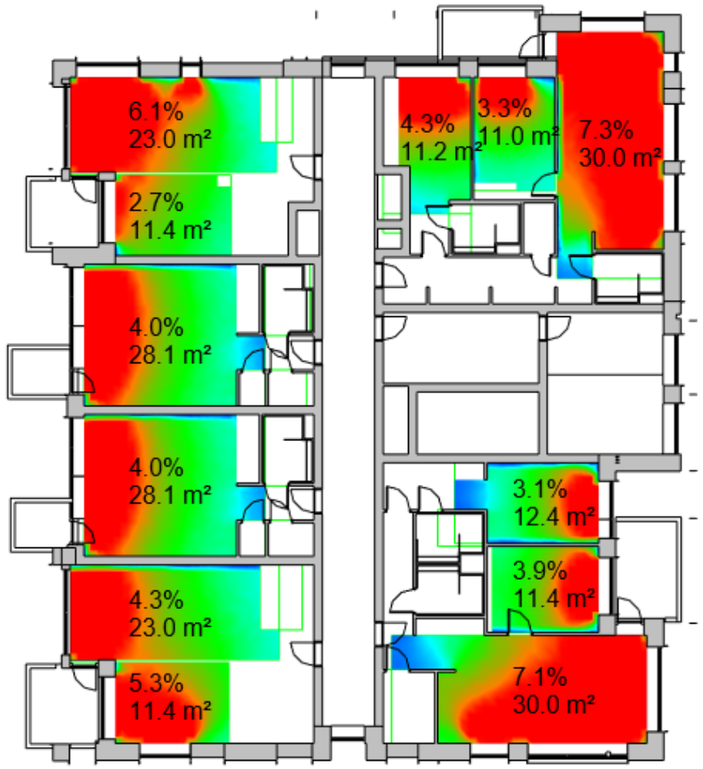
Results – Block C

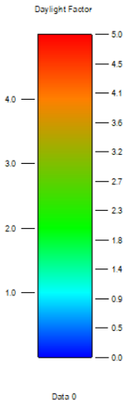
Block C – Eighth Floor

Daylighting Analysis as illustrated below, determined the following daylighting performance with associated Average Daylight Factors (ADF's) for various room arrangements to determine optimum typology arrangements.



KEY





ADF Targets	
Bedrooms	> 1.0%
K/L/D Areas	> 2.0%

Block C	Pass	Fail	Total	Units
Ground Floor	2	1	3	2
First Floor	12	0	12	6
Second Floor	11	1	12	6
Third Floor	12	0	12	6
Fourth Floor	12	0	12	6
Fifth Floor	12	0	12	6
Sixth Floor	12	0	12	6
Seventh Floor	12	0	12	6
Eighth Floor	12	0	12	6
Total	**97**	**2**	**99**	**50**
	98%	**2%**		