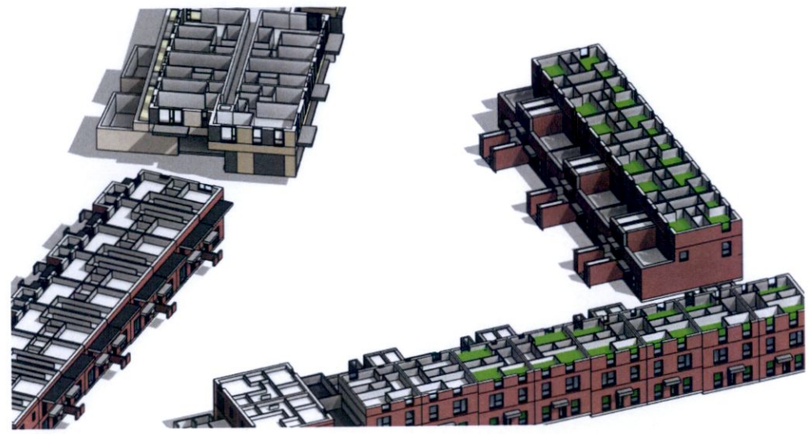
Clonburris
Adamstown



Sunlight and Daylight Analysis

IN2 Project No. D2243

24/10/2023

REV03

Revision History

13/10/2023	00	Issue for review for RFI
19/10/2023	01	Issue for review for RFI
24/10/2023	02	Issue for review for RFI with Apartment blocks changes
24/10/2023	03	Issue for RFI Response

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1.0 Executive Summary

The analysis within this report demonstrates the positive redesign which has been implemented to address the SDCC RFI.

This report identifies the daylight and sunlight analysis undertaken by IN2 Engineering Design Partnership for the proposed development at Clonburris, Adamstown, Dublin. The report has been prepared as a desktop exercise, with 3D massing and survey information provided by others. No site visits took place, as the provided information included all the relevant required data, and our understanding is that any survey information or 3D models provided were carried out by suitably qualified professionals.

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

- Radiance Lighting Software
- TAS by EDSL

Section 2.0 introduces the various Guidelines and Standards utilised throughout the Daylight / Sunlight analysis. Section 3.0 is a glossary of common terms found in the report. The specific methodology for each relevant topic is detailed in the corresponding section in the body of this report, as identified below.

Analysis Type	**Relevance**	**Assessment Methodology**	**Compliance Guidelines Targets**	**Reference section of this report**
Sunlight	Proposed Development Amenity Spaces	Sunlight Hours	BRE Guide BR 209 (2022 Edition)	Section 4.0 – Site Sunlight and Shading
Sunlight	Existing Neighbouring Amenity Spaces	Sunlight Hours	BRE Guide BR 209 (2022 Edition)	Section 5.0 – Impact on Neighbouring Buildings
Daylight	Existing Neighbouring Buildings	Vertical Sky Component	BRE Guide BR 209 (2022 Edition)	Section 5.0 – Impact on Neighbouring Buildings
Sunlight	Existing Neighbouring Buildings	Annual Probable Sunlight Hours	BRE Guide BR 209 (2022 Edition)	Section 5.0 – Impact on Neighbouring Buildings
Daylight	Proposed Development	Spatial Daylight Autonomy	BRE Guide BR 209 (2022 Edition)	Section 6.0 – Internal Daylight Analysis
Sunlight	Proposed Development	Sunlight Exposure	BRE Guide BR 209 (2022 Edition)	Section 7.0 – Exposure to Sunlight

1.0 Executive Summary (Cont'd)

Section 4.0 outlines the results of the assessed amenity spaces of the proposed development in accordance with the BRE Guide. The proposed amenity spaces were predicted to receive excellent overall sunlight availability, as every amenity space was determined to receive at least 2 hours of sunlight on 21st March, which is well above the recommended 50%.

The impact of the proposed development on neighbouring buildings is discussed in Section 5.0. All neighbouring buildings are situated at a distance away from the proposed buildings, such that they cannot be impacted by the proposed development. Therefore, due to the nature of the site and surroundings, there are no neighbouring buildings to be assessed for impact.

Section 6.0 includes daylight analysis that has been undertaken for the kitchen/living/dining (KLD), living room and bedroom spaces in assessed units (Apartment and Duplex).
It may be noted that, as described in the 2023 Apartment Guidelines, " An apartment, for the purpose of these guidelines, may be defined as "a self-contained residential unit in a multi-unit building with grouped or common access"". Hence, only the unit types that include shared access, such as Apartments and Duplexes, are required to be assessed for internal daylight and sunlight. All units were assessed for the Spatial Daylight Autonomy (SDA) methodology as detailed in the BRE Guide. 99% of the rooms, were found to be compliant for BRE Guide recommendation and detailed results are presented in Appendix A. As per the Apartment Guidelines, in cases where rooms were determined not to comply with the BRE Guide (totalling 8 rooms), these have been identified, and compensatory measures are provided in Appendix A.

Section 7.0 included the results for the Exposure to Sunlight Analysis. This metric assesses the sunlight availability to each unit. The proposed development achieves a high compliance rate, with 99.6% of units exceeding the minimum recommendations. Detailed results are included in Appendix B

In summary, this report confirms that best practice Daylight and Sunlight availability has been ensured for the proposed development at Clonburris, Adamstown, Dublin, with no impact on the existing neighbouring environment.

2.0 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 (2023 version) (the **"2023 Apartment Guidelines").** These are guidelines issued under section 28 of the 2000 Planning and Development Act (as amended).
b) The Building Research Establishment's (BRE) Site Layout Planning for Daylight and Sunlight: A guide to good practice (BRE Guide) 3rd edition/ 2022 edition, (the **"BRE Guide").**
c) British Standard BS EN 17037:2018 – Daylight in Buildings (the "**2018 British EN Standard**").
d) 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, and BRE Guide 2nd Edition has been superseded by BRE Guide 2022 edition. Both previous revisions have now been withdrawn.

European Standard EN 17037:2018, which was approved by the Comité Européen de Normalisation (CEN) on 29 July 2018 has been adopted in the UK as BS EN 17037:2018, and in Ireland as IS EN 17037:2018. 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.

This report has been therefore carried out based on the guidance contained within the Building Research Establishment's (BRE) Site Layout Planning for Daylight and Sunlight: A guide to good practice (BRE 209) 3rd edition/ 2022 edition, (the **"BRE Guide")**. This document is specifically designed to facilitate good building design within the planning context and is referenced in the 2023 Apartment Guidelines. The BRE Guide clarifies and expands on the methodologies contained in IS EN 17037 and BS EN 17037 with specific relevance to residential buildings, and as such has been deemed to take precedence over these other documents.

The 2023 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 ensure appropriate expert advice and input where necessary, and have regard to quantitative performance approaches to daylight provision outlined in guides like A New European Standard for Daylighting in Buildings EN17037 or UK National Annex BS EN17037 and the associated BRE Guide 209 2022 Edition (June 2022), or any relevant future guidance specific to the Irish context, 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."

The BRE Guide (2022 Edition)

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 for new buildings in the British Standard Daylight in buildings, BS EN 17037. 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:

"1.6 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. Alternatively, where natural light is of special importance, less obstruction and hence more sunlight and daylight may be deemed necessary. The calculation methods in Appendices A and B are entirely flexible in this respect. Appendix F gives advice on how to develop a consistent set of target values for skylight under such circumstances."

"1.7 The guidance here is intended for use in the United Kingdom and in the Republic of Ireland, though recommendations in the Irish Standard IS EN 17037 may vary from those in BS EN 17037. Many of the principles outlined will apply to other temperate climates. More specific guidance for other locations and climate types is given in BRE Report Environmental site layout planning."

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 measures will be proposed. However, the Guide does not impose absolute standards that must be achieved under all circumstances. In the context of this report, any deviations from the Guide's recommendations have, therefore, been identified, with an approach throughout to ensure that good quality daylight/sunlight is 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).
    1.1. New Development – Within Appendix C of the BRE Guide, the targets for internal daylight are provided for both optional methodologies, Climate Based Daylight Modelling (CBDM) with targets provided for Lux levels as determined through Spatial Daylight Autonomy (SDA), and Daylight Sky analysis with targets provided for Median Daylight Factor (MDF), please refer to internal daylight methodology section for detailed explanation of the methods utilised in this report.
    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 – The guide sets a quantitative method for determining sunlight to a habitable room within a dwelling.

2.2. Existing Buildings – The guide sets a quantitative assessment method for determining the impact of new developments on sunlight, annual probable sunlight hours (APSH) and winter probable sunlight hours (WPSH), 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 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 considers a 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."

The BS EN 17037 standard varies from the IS EN 17037 standard as it contains a national annex developed by the Building Research Establishment (BRE) to specifically address daylight requirements in domestic dwellings. These requirements are further clarified in the BRE Guide, e.g.: the correct delineation of spaces allowing for the removal of corridor spaces attached to a room; the mandatory inclusion of kitchen spaces in combined living spaces; revised rational upper limits for surface reflectances; default framing factors; maintenance factors. None of which are specified in IS EN 17037, instead requiring, for example, daylight assessment on the ambiguously worded "*at least on the required area of the space*". Therefore, for domestic applications, the BRE Guide remains the most applicable document to utilise for daylight assessments.

The National Annex

As is noted above, the 2018 British Standard (BS EN 17037:2018) 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 (European standard including both BS EN 17037:2018 and IS EN 17037:2018)'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."

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 BRE Guide at 850mm above floor level.

Climate Based Daylight Modelling

Climate based daylight modelling, also referred to as CBDM, 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. CBDM 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). CBDM is utilised for compliance with EN 17037 method 2 Spatial Daylight Autonomy (SDA).

Spatial Daylight Autonomy

Climate based daylight modelling, also referred to as CBDM, 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, CBDM 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). CBDM is utilised for compliance with EN 17037 method 2 Spatial Daylight Autonomy (SDA).

Sunlight Exposure

Sunlight exposure is assessed on a window of at least one habitable room per dwelling (preferably a living room) for the number of hours of direct sunlight exposure on the 21st March.

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 a 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 BRE Guide 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 BRE Guide as detailed below.

4.0 Site Sunlight and Shading

4.1 Methodology

The BRE Site Layout Planning for Daylight and Sunlight Design Guide 209 (BRE Guide) 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 Figure 4.1.1), 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 Guide:

- 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).

4.2 Results

Figure 4.2.1 illustrates that all amenity space was found to be compliant with the BRE Guide. Green contours indicate areas which receive at least 2 hours of sunlight on the 21st March, darker contours indicate some degree of overshadowing. Every proposed amenity space was predicted to receive at least 2 hours of direct sunlight on the 21st March.

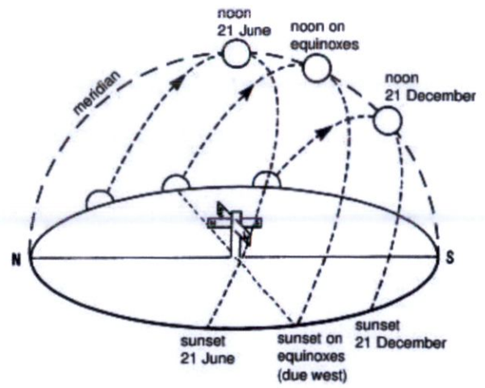


Fig 4.1.1 – Solar Position Throughout the Year

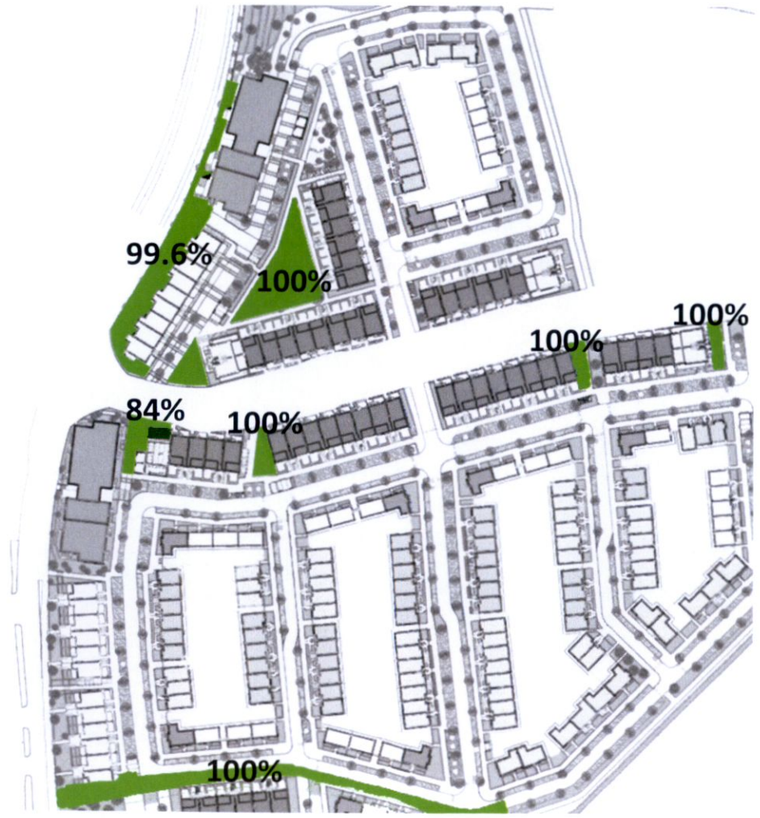


Fig 4.2.1 –Sunlight Availability to Amenity Spaces for Proposed Development

5.0 Impact on Neighbouring Buildings

5.1 Guidance

As set out within the introduction, the impact on existing buildings can be assessed utilising quantitative assessment method as detailed in the BRE Guide "Site Layout Planning for Daylight and Sunlight – A guide to good Practice (2022 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 measured at the centre of an existing main window is less than 27%, and less than 0.80 times its former value"*

The analysis is based on measuring the VSC at the existing main windows. As per the BRE Guide, 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 and therefore not adversely affected.

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 and less than 0.80 times its former annual value; or less than 5% of annual probable sunlight hours between 21 September and 21 March and less than 0.80 times its former value during that period;*
- *and also has a reduction in sunlight received over the whole year greater than 4% of annual probable sunlight hours."*

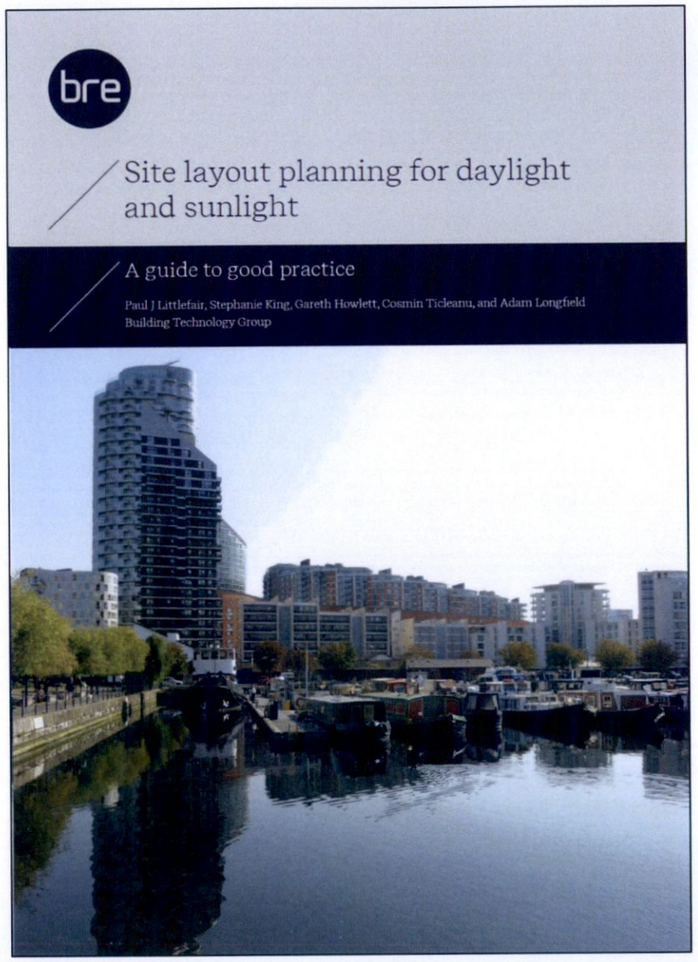


Fig 5.1.1 – BRE publication "Site Layout Planning for Daylight and Sunlight – A guide to good practice (Third Edition)

Amenity Sunlighting

> *"It is recommended that for it to appear adequately sunlit throughout the year, at least half of a garden or amenity area should receive at least two hours of sunlight on 21 March. If as a result of new development an existing garden or amenity area does not meet the above, and the area that can receive two hours of sun on 21 March is less than 0.80 times its former value, then the loss of sunlight is likely to be noticeable. If a detailed calculation cannot be carried out, it is recommended that the centre of the area should receive at least two hours of sunlight on 21 March":*

BRE Guide, therefore, employs a similar methodology for assessing sunlight availability in existing gardens and amenity areas as that used for new developments. This method requires that at least 50% of the space should potentially receive two hours of sunlight during the Equinox. Additionally, it imposes the condition that a proposed development cannot reduce the extent of sunlight to an existing garden or amenity area to less than 80% of what was previously available, similar to the rules for sunlight and daylight for windows.

The Equinox serves as the basis for this assessment, as it represents the solar mid-position in the year. Analysing sunlight availability during winter months is generally not useful for determining the impacts of a proposed development due to existing shading from other objects, structures, or vegetation.

5.2 Results

The quantitative assessment is based on the proximity to neighbouring buildings. The BRE Guide includes a decision chart to determine when an assessment is required (fig 5.2.1).

The distance to the proposed development is more than three times the height above the lowest neighbouring windows. Therefore, there are no neighbouring buildings that need to be assessed for impact, as indicated in Figures 5.2.2 and 5.2.3 on the following page.

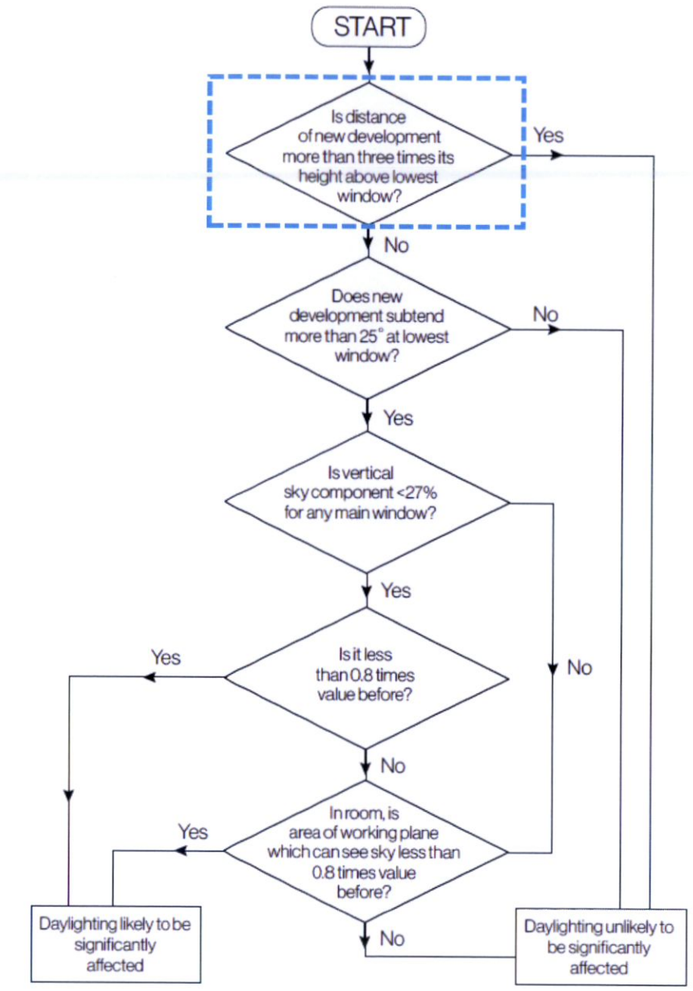


Fig 5.2.1 – BRE publication "Site Layout Planning for Daylight and Sunlight – A guide to good practice (Third Edition) Decision Chart

5.2 Results (Cont'd)

The first criterion in Figure 5.2.1, 'Is the distance of the new development more than three times its height above the lowest window?' was assessed as illustrated below.

The tallest block of the proposed development is the apartment block on the northwestern side of the site, as shown in Figure 5.2.2.

The height of the apartment block above the lowest neighbouring window was measured at 23.65 meters (refer to Figure 5.2.3). The distance between the apartment block and the nearest dwellings exceeds three times this height. Therefore, the proposed development does not have a significant impact on neighbouring buildings and is not subject to assessment.

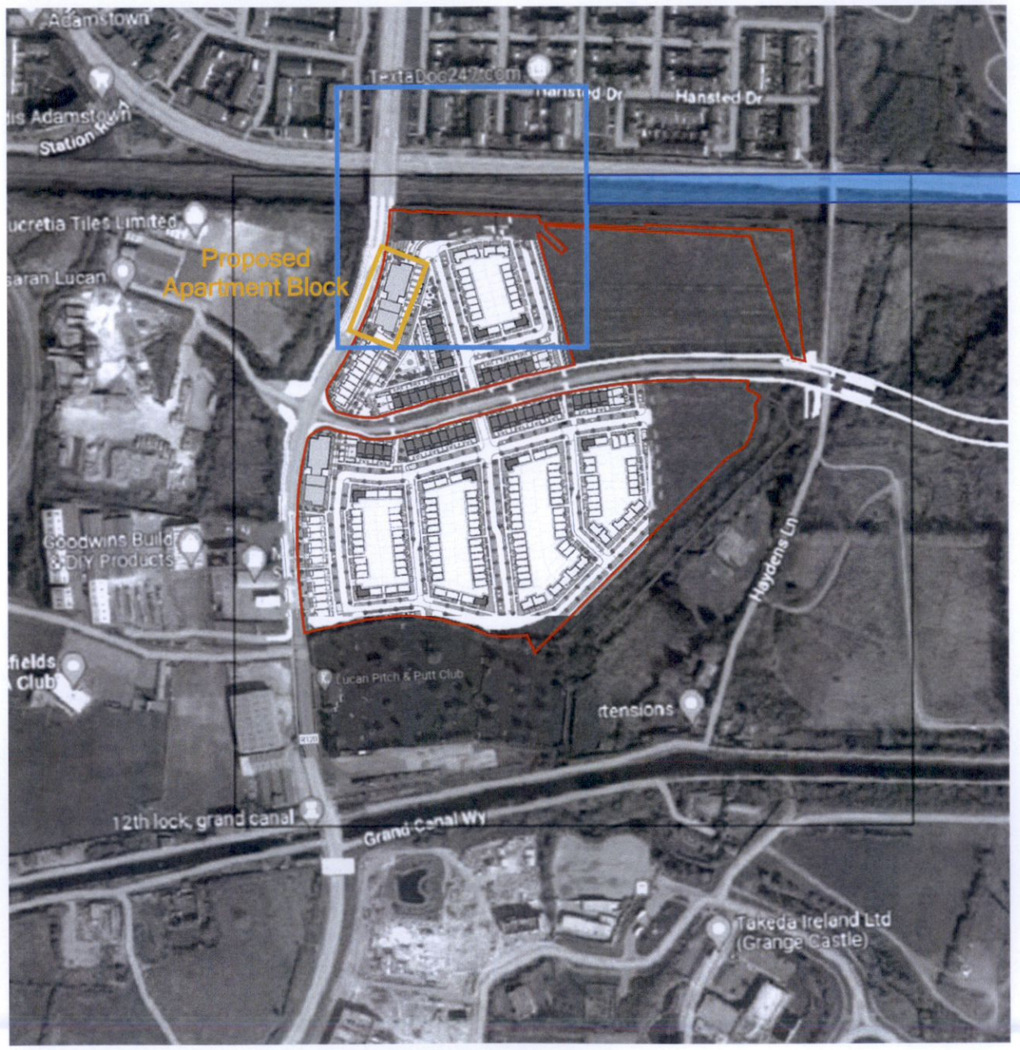


Fig 5.2.2 – Site with neighbouring buildings

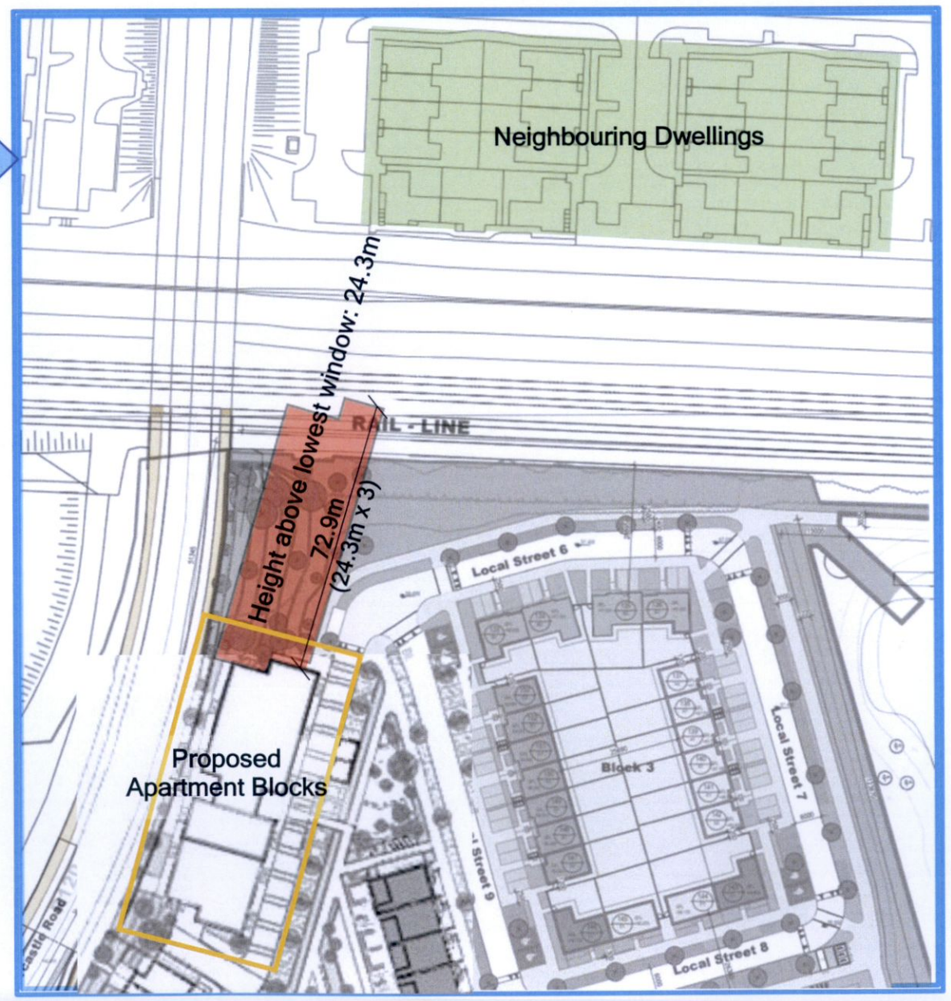


Fig 5.2.3 – Distance between proposed development and neighbouring dwellings

5.3 Impact on Neighbouring Solar Panels

To ensure the completeness of the analysis regarding the impact on neighbouring properties, an assessment of the potential impact on neighbouring solar panels was initially considered necessary. However, as noted in the section above (5.2), the distance between the proposed site and the nearest neighbouring properties exceeds the required distance for neighbouring impact assessment. Therefore, the assessment was not applicable.

6.0 Internal Daylight Analysis

6.1 Spatial Daylight Autonomy Methodology

Spatial Daylight Autonomy (SDA), method 2 EN17037, has been utilised for the assessment of internal daylight for the proposed development as it determines a more accurate result for building orientation and location as detailed in BRE Guide. These guidelines and standards have been outlined in Section 2.0.

The methodology utilises historic climate data (Dublin IWEC file 039690 was used for this assessment) predicting internal illumination due to natural light on an hour-by-hour basis, accounting for not only diffuse skylight but also the direct sunlight element. SDA results will differ for façade orientation, with those elevations with southerly aspect (correctly) being deemed to receive more daylight.

Fig 6.1.1 indicates overall compliance comparison, with green contours illustrating where daylight was predicted to achieve 100 Lux for bedroom 150 Lux for Livingroom and 200 Lux for KLD and Kitchen. These are the illuminance recommendations for dwellings included in Section C16 of the BRE Guide 2022 edition, based on BS.EN.17037:2018. Compliance for a room is then defined in the BRE Guide if at least 50% of the room achieves this target.

The daylighting models were calculated based on the following assumptions regarding transmittance and reflectance (as prescribed in the BRE Guide):

- Glazing Transmission = 68% with maintenance factor of 96%
- Ceilings: 80% reflectance
- Walls: 70% reflectance
- Floors: 40% reflectance

The daylight analysis accounted for all aspects that can potentially restrict natural light availability including any adjacent / opposing buildings, along with explicitly modelling typical Building Details as exampled in Figure 6.1.2 such as balcony structures, window frames, reveal and cill depth etc. in accordance with the architectural design. As the window frames have been explicitly modelled there is no requirement to include framing factors as prescribed in the BRE Guide.

Daylight Factors for each space were then calculated for a working plane height of 0.85m on a 0.25 x 0.25m grid basis and a wall offset of 0.3m (as defined in the BRE Guide) to enable a detailed calculation within each room (Figure 6.1.3), the median of which was then determined the space compliance.

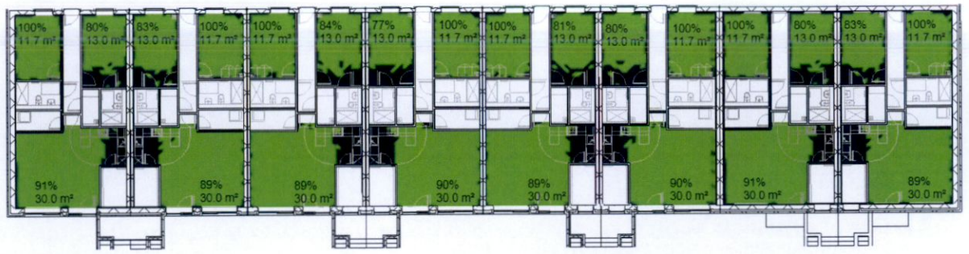


Fig 6.1.1 –Daylight Analysis Results

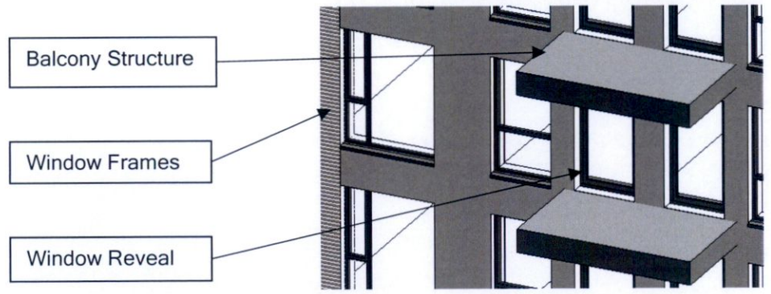


Fig 6.1.2 – Building Details included within Daylight Analysis (Sample)

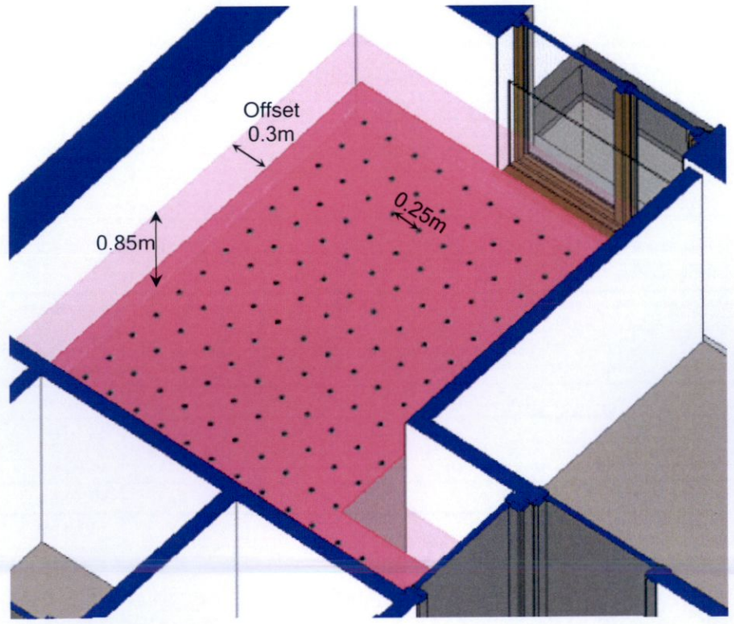


Fig 6.1.3 Calculating working plane

6.1 Spatial Daylight Autonomy Methodology (Cont'd)

The rooms have been assessed to the minimum areas as prescribed in the 2023 Apartment Guidelines, Fig 6.1.3 taking consideration for the notes in the BRE Guide which stipulate:

> *"Where a room has a shared use, the highest target should apply. For example in a bed sitting room in student accommodation, the value for a living room should be used if students would often spend time in their rooms during the day. Local authorities could use discretion here. For example, the target for a living room could be used for a combined living/dining/kitchen area if the kitchens are not treated as habitable spaces, as it may avoid small separate kitchens in a design.* ***The kitchen space would still need to be included in the assessment area"*** *(**Emphasis added**)*

BRE Guide provides additional guidance on room definitions, identifying that corridors/ annexed entrances can be excluded from the assessment area as illustrated in Fig. 6.1.4.

Fig 6.1.5 illustrates an example of how the above has been interpreted to define areas of assessment (highlighted green). The blue highlighted area represents the excluded areas of the aforementioned corridor space. The assessment area is defined, ensuring:

- Minimum required room area as defined in Apartment Guidelines (i.e., min. 30m^2 for 2bedroom 4 persons Apartment KLD).
- Inclusion of kitchen area within KLD (i.e. assessment to rear of room).
- Exclusion of circulation/ annexed entrances (i.e., adjacent to doors illustrated).

Minimum aggregate floor areas for living/dining/kitchen rooms, and minimum widths for the main living/dining rooms

Apartment type ***	Width of living/dining room	Aggregate floor area of living / dining / kitchen area*
Studio	4m**	30 sq m**
One bedroom	3.3 m	23 sq m
Two bedrooms (3 person)	3.6m	28 sq m
Two bedrooms (4 person)	3.6 m	30 sq m
Three bedrooms	3.8 m	34 sq m

** Note: An enclosed (separate) kitchen should have a minimum floor area of 6.5 sq. metres*
***Note: Combined living/dining/bed space, also includes circulation*
**** Note: Variation of up to 5% can be applied to room areas and widths subject to overall compliance with required minimum overall apartment floor areas.*

Fig 6.1.3 – Apartment Guidelines – Minimum Room Sizes

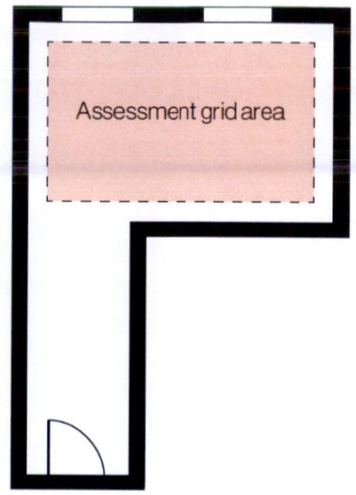


Fig 6.1.4 – BRE Guide Figure C3 – Assessment Area excluding Corridor

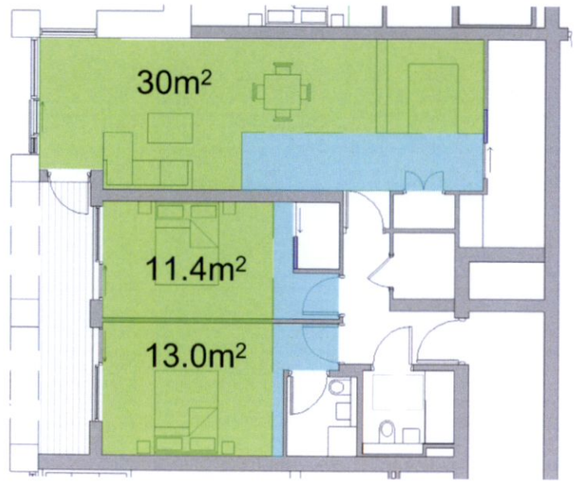
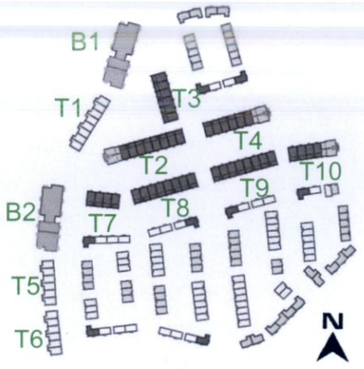


Fig 6.1.5 – Assessment Space Delineation

6.2 Results Summary – Spatial Daylight Autonomy (SDA)

The tables below provide a breakdown of compliance rates for each room based on Spatial Daylight Autonomy (SDA) and an overall SDA. 99% of the analysed rooms were determined to be compliant with the methodology utilised.
Detailed results are included in Appendix A.



Block 1	Number of rooms		
	Pass	Fail	Total
First Floor	30	0	30
Second Floor	30	0	30
Third Floor	30	0	30
Fourth Floor	21	0	21
Fifth Floor	15	0	15
	126	0	126
	100%	0%	

Block 2	Number of rooms		
	Pass	Fail	Total
Ground Floor	22	2	24
First Floor	30	0	30
Second Floor	30	0	30
Third Floor	30	0	30
Fourth Floor	30	0	30
Fifth Floor	15	0	15
	157	2	159
	99%	1%	

Terrace 1	Number of rooms		
	Pass	Fail	Total
Ground Floor	18	0	18
First Floor	18	0	18
Second Floor	18	0	18
Third Floor	27	0	27
	81	0	81
	100%	0.0%	

Terrace 2	Number of rooms		
	Pass	Fail	Total
Ground Floor	25	5	30
First Floor	12	0	12
Second Floor	30	0	30
	67	5	72
	93%	7%	

Terrace 3	Number of rooms		
	Pass	Fail	Total
Ground Floor	17	1	18
First Floor	6	0	6
Second Floor	18	0	18
	41	1	42
	98%	2%	

Terrace 4	Number of rooms		
	Pass	Fail	Total
Ground Floor	24	0	24
First Floor	10	0	10
Second Floor	24	0	24
	58	0	58
	100%	0%	

Terrace 5	Number of rooms		
	Pass	Fail	Total
Ground Floor	12	0	12
First Floor	12	0	12
Second Floor	12	0	12
Third Floor	18	0	18
	54	0	54
	100%	0%	

Terrace 6	Number of rooms		
	Pass	Fail	Total
Ground Floor	12	0	12
First Floor	12	0	12
Second Floor	12	0	12
Third Floor	18	0	18
	54	0	54
	100%	0%	

Terrace 7	Number of rooms		
	Pass	Fail	Total
Ground Floor	12	0	12
First Floor	4	0	4
Second Floor	12	0	12
	28	0	28
	100%	0%	

Terrace 8	Number of rooms		
	Pass	Fail	Total
Ground Floor	24	0	24
First Floor	8	0	8
Second Floor	24	0	24
	56	0	56
	100%	0%	

Terrace 9	Number of rooms		
	Pass	Fail	Total
Ground Floor	24	0	24
First Floor	8	0	8
Second Floor	24	0	24
	56	0	56
	100%	0%	

Terrace 10	Number of rooms		
	Pass	Fail	Total
Ground Floor	18	0	18
First Floor	8	0	8
Second Floor	18	0	18
	44	0	44
	100%	0%	

	Number of rooms		
	Pass	Fail	Total
Block 1	126	0	126
Block 2	157	2	159
Terrace 1	81	0	81
Terrace 2	67	5	72
Terrace 3	41	1	42
Terrace 4	58	0	58
Terrace 5	54	0	54
Terrace 6	54	0	54
Terrace 7	28	0	28
Terrace 8	56	0	56
Terrace 9	56	0	56
Terrace 10	44	0	44
	822	8	830
	99%	1%	

Overall SDA for the proposed scheme

6.3 Compensatory Measures

The 2023 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 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."*

Compensatory Design Solutions

The compensatory measures look to determine a balance between the spaces with reduced daylight by identifying how other metrics for sunlight and/or the unit's aspects can compensate for this reduced daylight.

2no. KLD rooms in apartment blocks 2, 5no. KLD rooms in Terrace 2 and 1 KLD in Terrace 3 were identified with compensatory measures in accordance with the requirements of the *Sustainable Urban Housing – Design Standards for New Apartments 2023*.

Each non-compliant room was identified, and compensatory measures are set out in Appendix A as per:

1. Daylight Adjacency

   In the cases where a room is below target, there are adjacent room/rooms with the apartment which were found to be comfortably compliant. Therefore, these units each have room/rooms that are well daylit, despite the assessed room being slightly below target.

2. Sunlight

   The KLDs or bedrooms with below target SDA (Spatial Daylight Autonomy), are located in units that receive over 3 hours of sunlight (Medium exposure). Therefore, whilst the rooms were found to be non-compliant for daylight, their apartment units achieve the above the requisite sunlight availability for compliance. (See Appendix B – Exposure to Sunlight Results of this report.)

3. Aspect

   In addition to their private amenity space, a number of units have direct aspect out onto landscaped communal or public open space providing an excellent view from the KLD space.

4. Direct Access to Courtyard

   A number of ground floor units have direct access to courtyard connecting with nature. It also provides a good ventilation through the units.

5. Private Amenity Space

   All apartments have been designed to allow direct access to a balcony for private

7.0 Sunlight Analysis

7.1 Exposure to Sunlight

The BRE Guide outlines that:

> *"3.1.15 In general a dwelling, or non-domestic building that has a particular requirement for sunlight, will appear reasonably sunlit provided:*
> - *at least one main window wall faces within 90° of due south and*
> - *a habitable room, preferably a main living room, can receive a total of at least 1.5 hours of sunlight on 21 March. This is assessed at the inside centre of the window(s); sunlight received by different windows can be added provided they occur at different times and sunlight hours are not double counted."*

As with Sunlight Amenity, the BRE Guide methodology therefore utilises the Equinox as being representative of the solar mid-position throughout the year, with the calculation of potential received sunlight during that day enabling a quantitative assessment in addition to idealised configuration of ensuring southerly aspect – preferably for living areas as described below:

> *"3.1.16 Where groups of dwellings are planned, site layout design should aim to maximise the number of dwellings with a main living room that meets the above recommendations."*

The guide further notes that:

> *"3.1.10 For interiors, access to sunlight can be quantified. BS EN 17037[1] recommends that a space should receive a minimum of 1.5 hours of direct sunlight on a selected date between 1 February and 21 March with cloudless conditions. It is suggested that 21 March (equinox) be used. The medium level of recommendation is three hours and the high level of recommendation four hours. For dwellings, at least one habitable room, preferably a main living room, should meet at least the minimum criterion."*

An analysis was undertaken for assessed units of the proposed development to assess the exposure to sunlight that each unit can receive, assessing initially KLD's and where these were found to be non-compliant, a check was undertaken to determine whether a Bedroom could achieve adequate sunlight in accordance with the methodology. It may be noted therefore that the tables and diagrams below indicate compliance for Exposure to Sunlight based on assessment of units as opposed to individual rooms, as is the case for Daylight analysis.

Figure 7.1.1 below is an example of how the results are illustrated, as presented within the report to indicate their Exposure to Sunlight classification in accordance with BRE Guide/ EN.17037 may be interpreted as follows:

- Orange – High (4.0 hrs+)
- Yellow – Medium (3.0 - 4.0 hrs)
- Green – Minimum (1.5 - 3.0 hrs)
- Blue – Low/ Non-Compliant (<1.5 hrs)

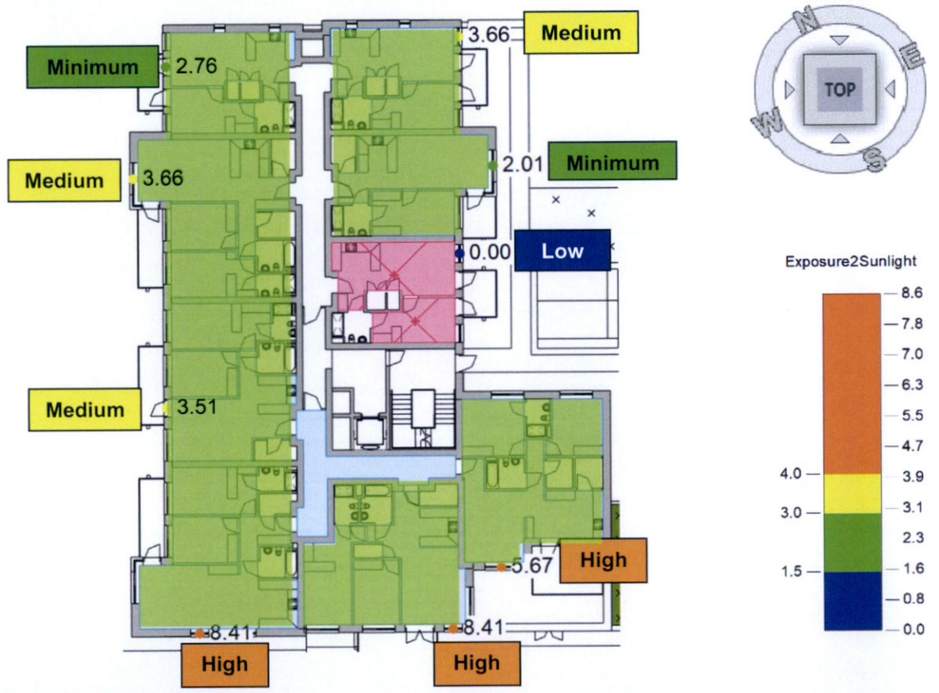
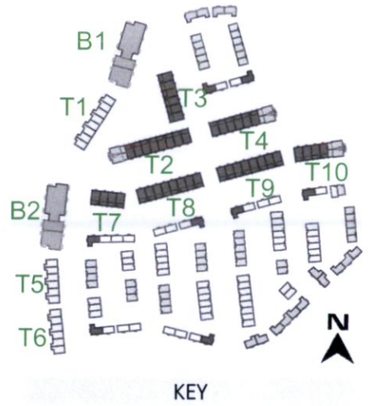


Fig 7.1.1 – Exposure to Sunlight Results – Example

In the example above, most KLD were determined to receive Medium to High range of Exposure to Sunlight, one unit was determined non-compliant and identified in pink.

7.2 Results Summary – Exposure To Sunlight (ETS)

The tables below give a breakdowns of compliance rates for the proposed scheme based on Exposure to Sunlight (ETS) and an overall ETS. ETS was assessed for each unit, and the tables are presenting the number of units in each type. It was determined that 99.6% of the assessed units were found to be compliant for the BRE Guide recommended sunlight hours. The sole non-compliant unit for sun lighting (located at Terrace 4, ground floor), was determined to be fully compliant for daylighting performance, as detailed in Appendix A.
Detailed results for exposure to sunlight analysis for each unit are provided in Appendix B.



Block 1	Number of units		
	Pass	Fail	Total
First Floor	12	0	12
Second Floor	12	0	12
Third Floor	12	0	12
Fourth Floor	8	0	8
Fifth Floor	6	0	6
	50	0	50
	100%	0%	

Block 2	Number of units		
	Pass	Fail	Total
Ground Floor	10	0	10
First Floor	12	0	12
Second Floor	12	0	12
Third Floor	12	0	12
Fourth Floor	12	0	12
Fifth Floor	6	0	6
	64	0	64
	100%	0%	

Terrace 1	Number of units		
	Pass	Fail	Total
Type L (Level 00 & 01)	9	0	9
Type M (Level 02 & 03)	9	0	9
	18	0	18
	100%	0%	

Terrace 2	Number of units		
	Pass	Fail	Total
Type J (Level 00)	8	0	8
Type K (Level 01 & 02)	8	0	8
Type O (Level 00)	2	0	2
Type P (Level 01 & 02)	2	0	2
	20	0	20
	100%	0%	

Terrace 3	Number of units		
	Pass	Fail	Total
Type J (Level 00)	6	0	6
Type K (Level 01 & 02)	6	0	6
	12	0	12
	100%	0%	

Terrace 4	Number of units		
	Pass	Fail	Total
Type J (Level 00)	6	0	6
Type K (Level 01 & 02)	6	0	6
Type O (Level 00)	1	1	2
Type P (Level 01 & 02)	2	0	2
	15	1	16
	94%	6%	

Terrace 5	Number of units		
	Pass	Fail	Total
Type L (Level 00 & 01)	6	0	6
Type M (Level 02 & 03)	6	0	6
	12	0	12
	100%	0%	

Terrace 6	Number of units		
	Pass	Fail	Total
Type L (Level 00 & 01)	6	0	6
Type M (Level 02 & 03)	6	0	6
	12	0	12
	100%	0%	

Terrace 7	Number of units		
	Pass	Fail	Total
Type J (Level 00)	4	0	4
Type K (Level 01 & 02)	4	0	4
	8	0	8
	100%	0%	

Terrace 8	Number of units		
	Pass	Fail	Total
Type J (Level 00)	8	0	8
Type K (Level 01 & 02)	8	0	8
	16	0	16
	100%	0%	

Terrace 9	Number of units		
	Pass	Fail	Total
Type J (Level 00)	8	0	8
Type K (Level 01 & 02)	8	0	8
	16	0	16
	100%	0%	

Terrace 10	Number of units		
	Pass	Fail	Total
Type J (Level 00)	4	0	4
Type K (Level 01 & 02)	4	0	4
Type O (Level 00)	2	0	2
Type P (Level 01 & 02)	2	0	2
	12	0	12
	100%	0%	

	Number of units		
	Pass	Fail	Total
Block 1	50	0	50
Block 2	64	0	64
Terrace 1	18	0	18
Terrace 2	20	0	20
Terrace 3	12	0	12
Terrace 4	15	1	16
Terrace 5	12	0	12
Terrace 6	12	0	12
Terrace 7	8	0	8
Terrace 8	16	0	16
Terrace 9	16	0	16
Terrace 10	12	0	12
	255	1	256
	99.6%	0.4%	

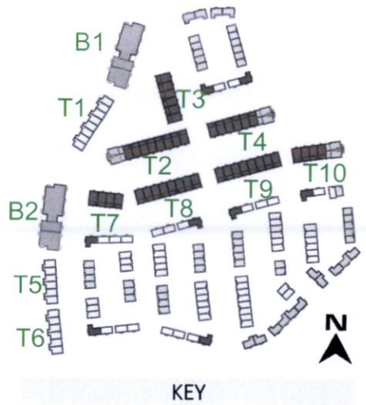
Overall ETS for the proposed scheme

Appendix A

Spatial Daylight Autonomy (SDA)

Results Summary - SDA

The tables below provide a breakdown of compliance rates for each room based on Spatial Daylight Autonomy (SDA) and an overall SDA. 99% of the analysed rooms were determined to be compliant with the methodology utilised.
Detailed results are included in overleaf.



Block 1	Number of rooms		
	Pass	Fail	Total
First Floor	30	0	30
Second Floor	30	0	30
Third Floor	30	0	30
Fourth Floor	21	0	21
Fifth Floor	15	0	15
	126	0	126
	100%	0%	

Block 2	Number of rooms		
	Pass	Fail	Total
Ground Floor	22	2	24
First Floor	30	0	30
Second Floor	30	0	30
Third Floor	30	0	30
Fourth Floor	30	0	30
Fifth Floor	15	0	15
	157	2	159
	99%	1%	

Terrace 1	Number of rooms		
	Pass	Fail	Total
Ground Floor	18	0	18
First Floor	18	0	18
Second Floor	18	0	18
Third Floor	27	0	27
	81	0	81
	100%	0.0%	

Terrace 2	Number of rooms		
	Pass	Fail	Total
Ground Floor	25	5	30
First Floor	12	0	12
Second Floor	30	0	30
	67	5	72
	93%	7%	

Terrace 3	Number of rooms		
	Pass	Fail	Total
Ground Floor	17	1	18
First Floor	6	0	6
Second Floor	18	0	18
	41	1	42
	98%	2%	

Terrace 4	Number of rooms		
	Pass	Fail	Total
Ground Floor	24	0	24
First Floor	10	0	10
Second Floor	24	0	24
	58	0	58
	100%	0%	

Terrace 5	Number of rooms		
	Pass	Fail	Total
Ground Floor	12	0	12
First Floor	12	0	12
Second Floor	12	0	12
Third Floor	18	0	18
	54	0	54
	100%	0%	

Terrace 6	Number of rooms		
	Pass	Fail	Total
Ground Floor	12	0	12
First Floor	12	0	12
Second Floor	12	0	12
Third Floor	18	0	18
	54	0	54
	100%	0%	

Terrace 7	Number of rooms		
	Pass	Fail	Total
Ground Floor	12	0	12
First Floor	4	0	4
Second Floor	12	0	12
	28	0	28
	100%	0%	

Terrace 8	Number of rooms		
	Pass	Fail	Total
Ground Floor	24	0	24
First Floor	8	0	8
Second Floor	24	0	24
	56	0	56
	100%	0%	

Terrace 9	Number of rooms		
	Pass	Fail	Total
Ground Floor	24	0	24
First Floor	8	0	8
Second Floor	24	0	24
	56	0	56
	100%	0%	

Terrace 10	Number of rooms		
	Pass	Fail	Total
Ground Floor	18	0	18
First Floor	8	0	8
Second Floor	18	0	18
	44	0	44
	100%	0%	

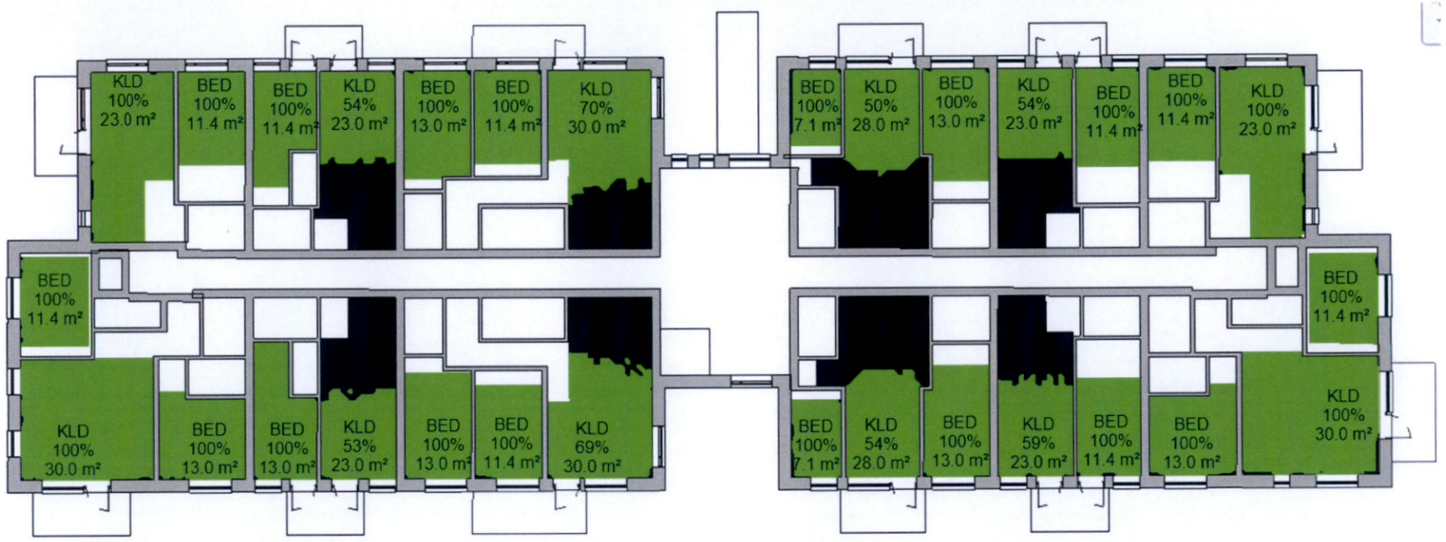
	Number of rooms		
	Pass	Fail	Total
Block 1	126	0	126
Block 2	157	2	159
Terrace 1	81	0	81
Terrace 2	67	5	72
Terrace 3	41	1	42
Terrace 4	58	0	58
Terrace 5	54	0	54
Terrace 6	54	0	54
Terrace 7	28	0	28
Terrace 8	56	0	56
Terrace 9	56	0	56
Terrace 10	44	0	44
	822	8	830
	99%	1%	

Overall SDA for the proposed scheme

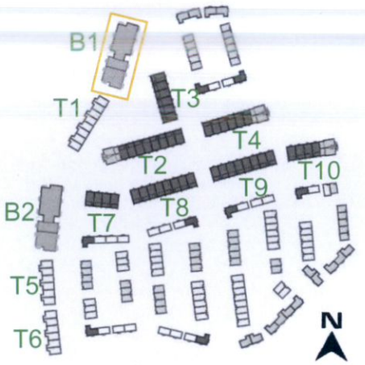
Results: Block 1

Daylight analysis results are illustrated below with green shaded area receiving targeted illuminance, 200Lux for KLDs, 150Lux for Living room, and 100Lux for Bedrooms. Black shade is showing area where it's receiving less than targeted illuminance. A space is deemed compliant where >50% of areas achieve target illuminance.
Every room was determined to be compliant for SDA on these levels.

Level 01



Level 02



KEY

Compensatory Measures:
1. Daylight Adjacency
2. Sunlight
3. Aspect
4. Direct Access to Courtyard
5. Private Amenity Space

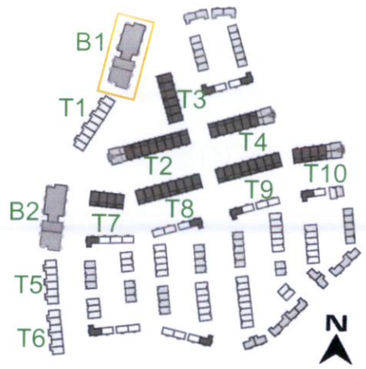
Passed-Failed

SDA Targets	> 50% at
Bedrooms	> 100 Lux
Living Areas	> 150 Lux
K/L/D / Kitchen	> 200 Lux

Block 1	Number of rooms		
	Pass	Fail	Total
First Floor	30	0	30
Second Floor	30	0	30
Third Floor	30	0	30
Fourth Floor	21	0	21
Fifth Floor	15	0	15
	126	0	126
	100%	0%	

Results: Block 1

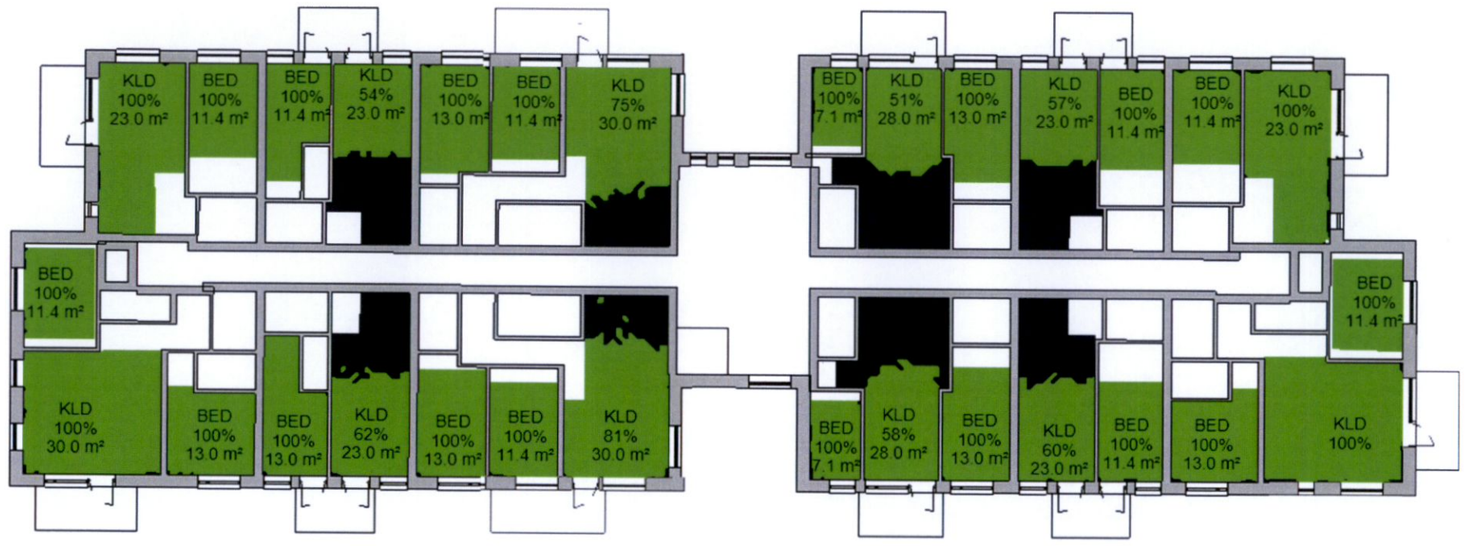
Daylight analysis results are illustrated below with green shaded area receiving targeted illuminance, 200Lux for KLDs, 150Lux for Living room, and 100Lux for Bedrooms. Black shade is showing area where it's receiving less than targeted illuminance. A space is deemed compliant where >50% of areas achieve target illuminance.
Every room was determined to be compliant for SDA on these levels.



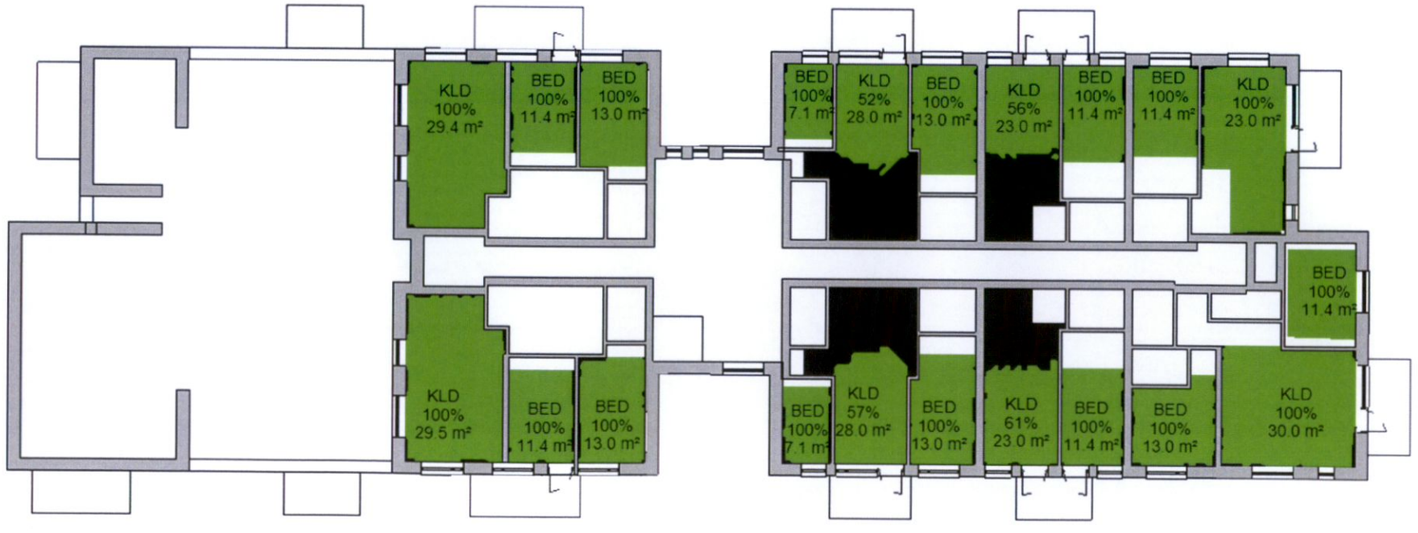
KEY

Compensatory Measures:
1. Daylight Adjacency
2. Sunlight
3. Aspect
4. Direct Access to Courtyard
5. Private Amenity Space

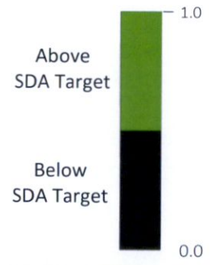
Level 03



Level 04



Passed-Failed

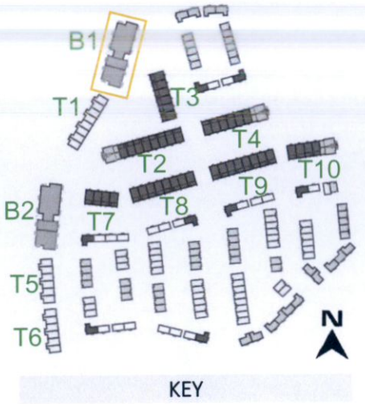


SDA Targets	> 50% at
Bedrooms	> 100 Lux
Living Areas	> 150 Lux
K/L/D / Kitchen	> 200 Lux

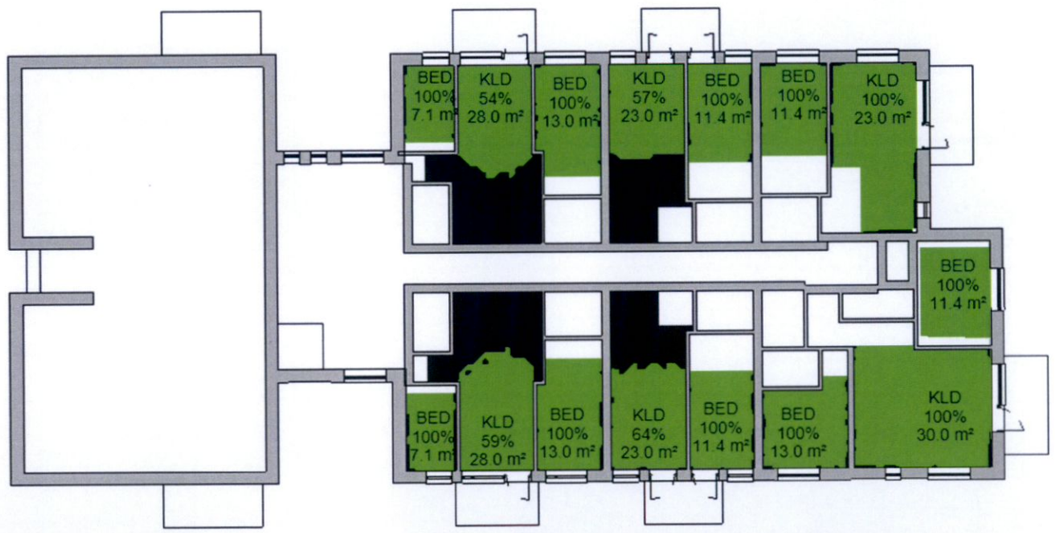
Block 1	Number of rooms		
	Pass	Fail	Total
First Floor	30	0	30
Second Floor	30	0	30
Third Floor	30	0	30
Fourth Floor	21	0	21
Fifth Floor	15	0	15
	126	0	126
	100%	0%	

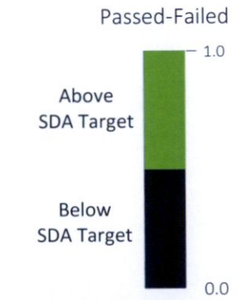
Results: Block 1

Daylight analysis results are illustrated below with green shaded area receiving targeted illuminance, 200Lux for KLDs, 150Lux for Living room, and 100Lux for Bedrooms. Black shade is showing area where it's receiving less than targeted illuminance. A space is deemed compliant where >50% of areas achieve target illuminance.
Every room was determined to be compliant for SDA on this level.



Level 05



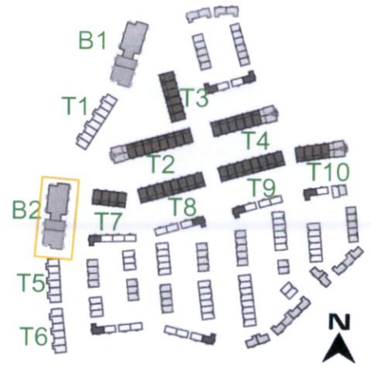


SDA Targets	> 50% at
Bedrooms	> 100 Lux
Living Areas	> 150 Lux
K/L/D / Kitchen	> 200 Lux

Block 1	Number of rooms		
	Pass	Fail	Total
First Floor	30	0	30
Second Floor	30	0	30
Third Floor	30	0	30
Fourth Floor	21	0	21
Fifth Floor	15	0	15
	126	**0**	**126**
	100%	**0%**	

Results: Block 2

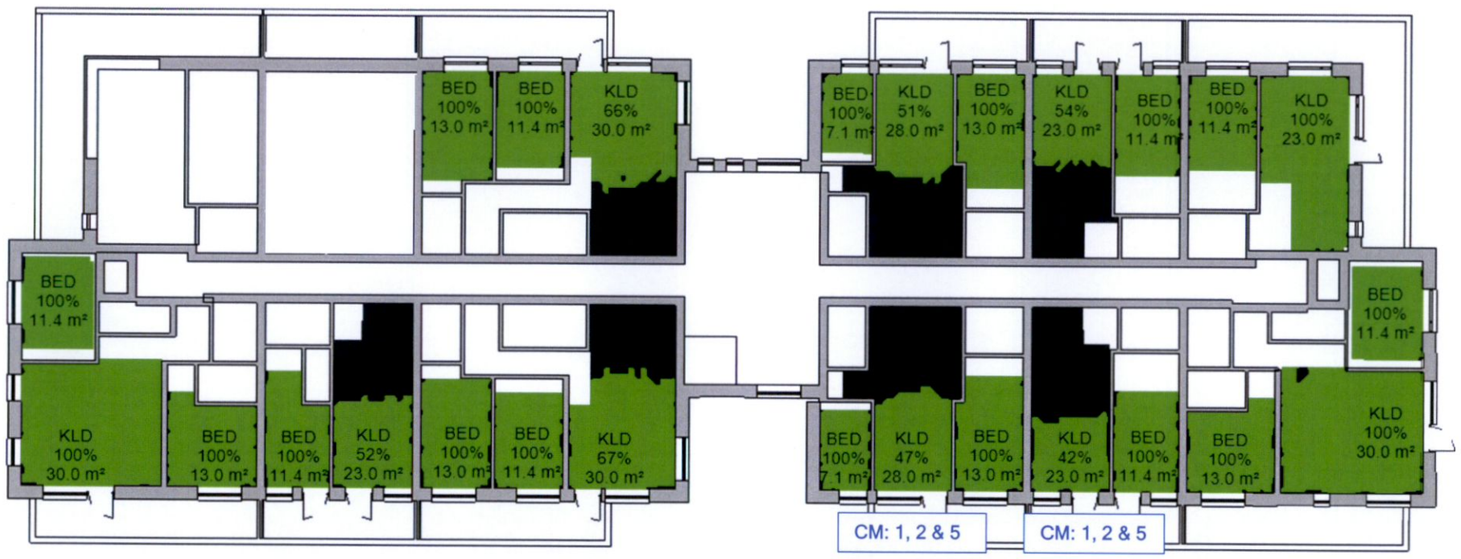
Daylight analysis results are illustrated below with green shaded area receiving targeted illuminance, 200Lux for KLDs, 150Lux for Living room, and 100Lux for Bedrooms. Black shade is showing area where it's receiving less than targeted illuminance. A space is deemed compliant where >50% of areas achieve target illuminance.
2no. KLDs were found to be non-compliant on Level 00 of block 2 and compensatory measures are set out (blue box).
The rest of the rooms were determined to be compliant for SDA.



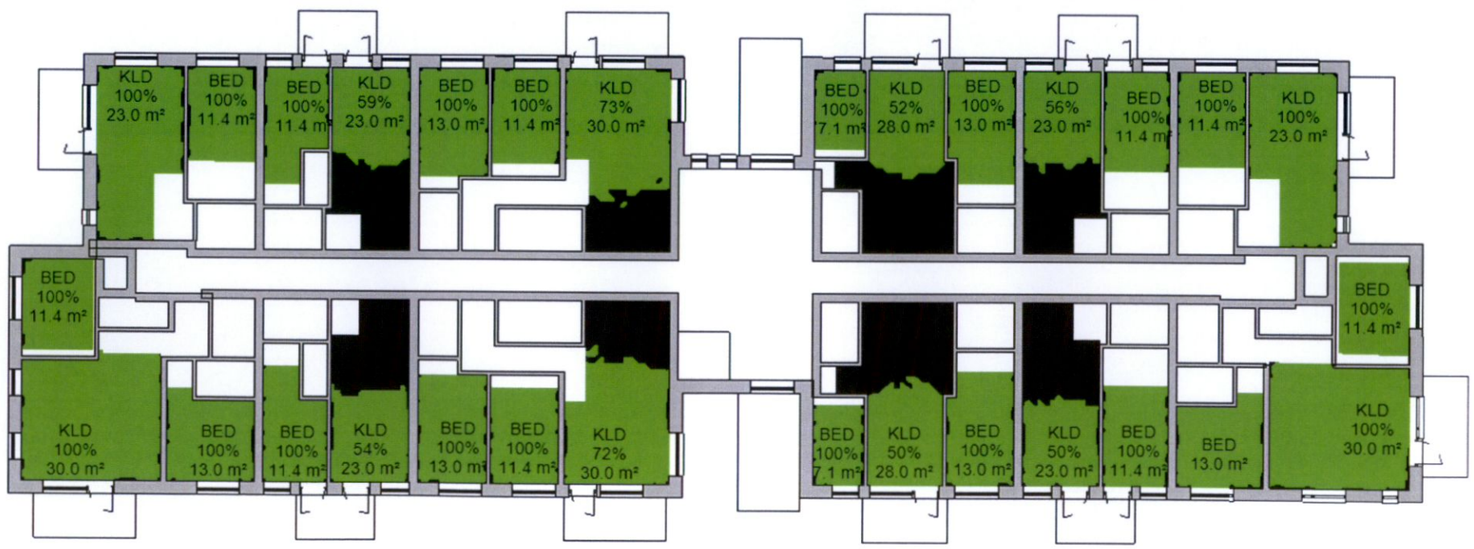
KEY

Compensatory Measures:
1. Daylight Adjacency
2. Sunlight
3. Aspect
4. Direct Access to Courtyard
5. Private Amenity Space

Level 00



Level 01



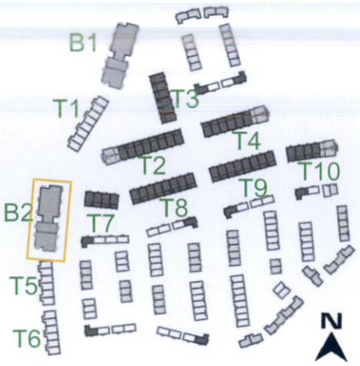
Passed-Failed

SDA Targets	> 50% at
Bedrooms	> 100 Lux
Living Areas	> 150 Lux
K/L/D / Kitchen	> 200 Lux

Block 2	Number of rooms		
	Pass	Fail	Total
Ground Floor	22	2	24
First Floor	30	0	30
Second Floor	30	0	30
Third Floor	30	0	30
Fourth Floor	30	0	30
Fifth Floor	15	0	15
	157	2	159
	99%	1%	

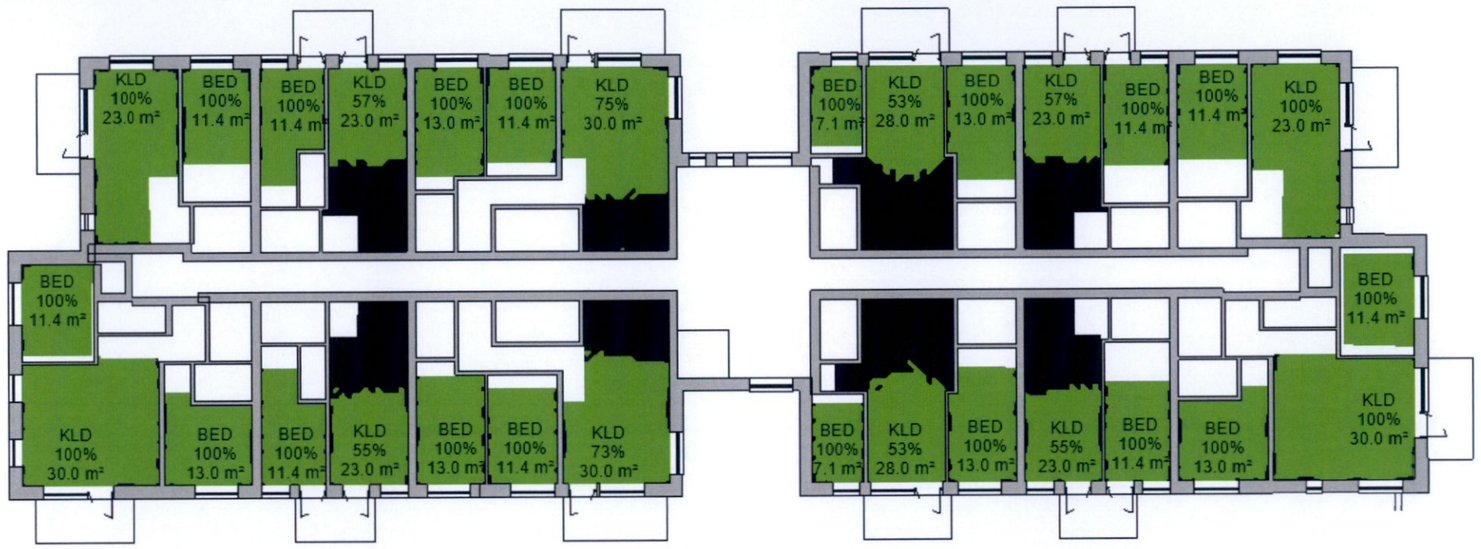
Results: Block 2

Daylight analysis results are illustrated below with green shaded area receiving targeted illuminance, 200Lux for KLDs, 150Lux for Living room, and 100Lux for Bedrooms. Black shade is showing area where it's receiving less than targeted illuminance. A space is deemed compliant where >50% of areas achieve target illuminance.
Every room was determined to be compliant for SDA on these levels.

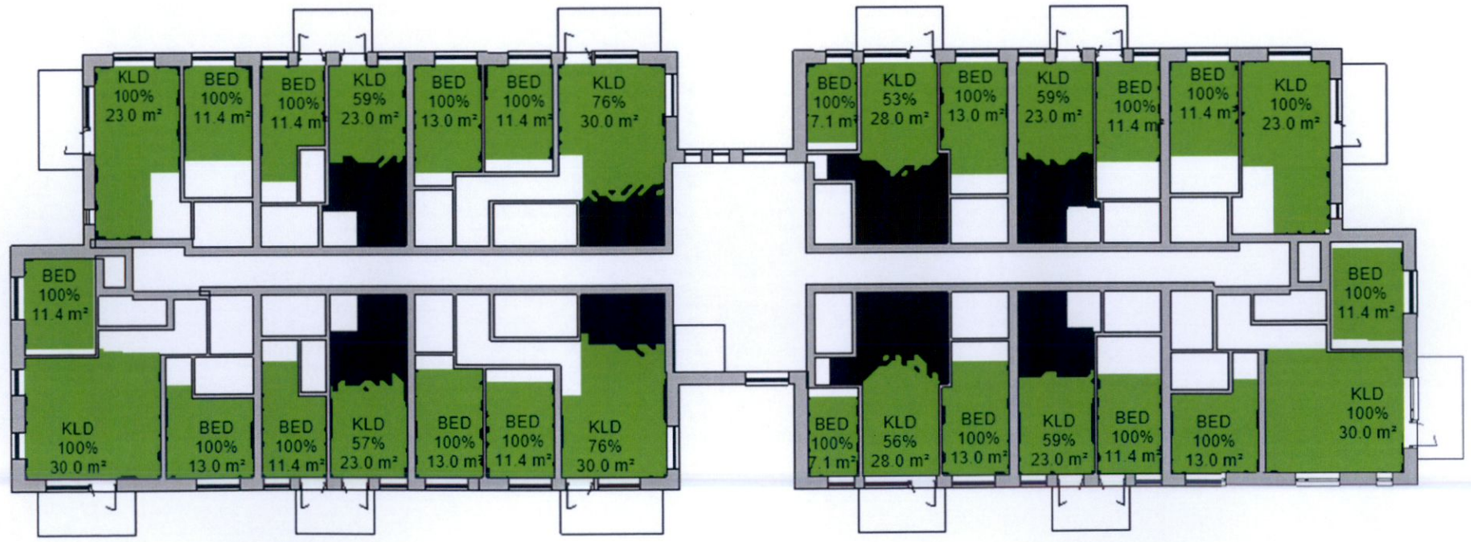


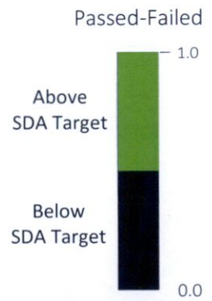
KEY

Level 02



Level 03



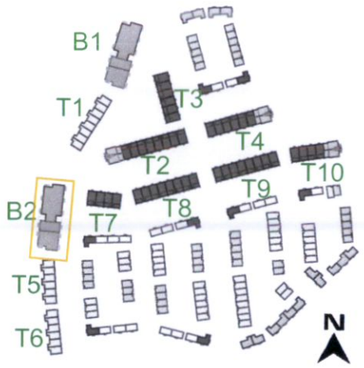


SDA Targets	> 50% at
Bedrooms	> 100 Lux
Living Areas	> 150 Lux
K/L/D / Kitchen	> 200 Lux

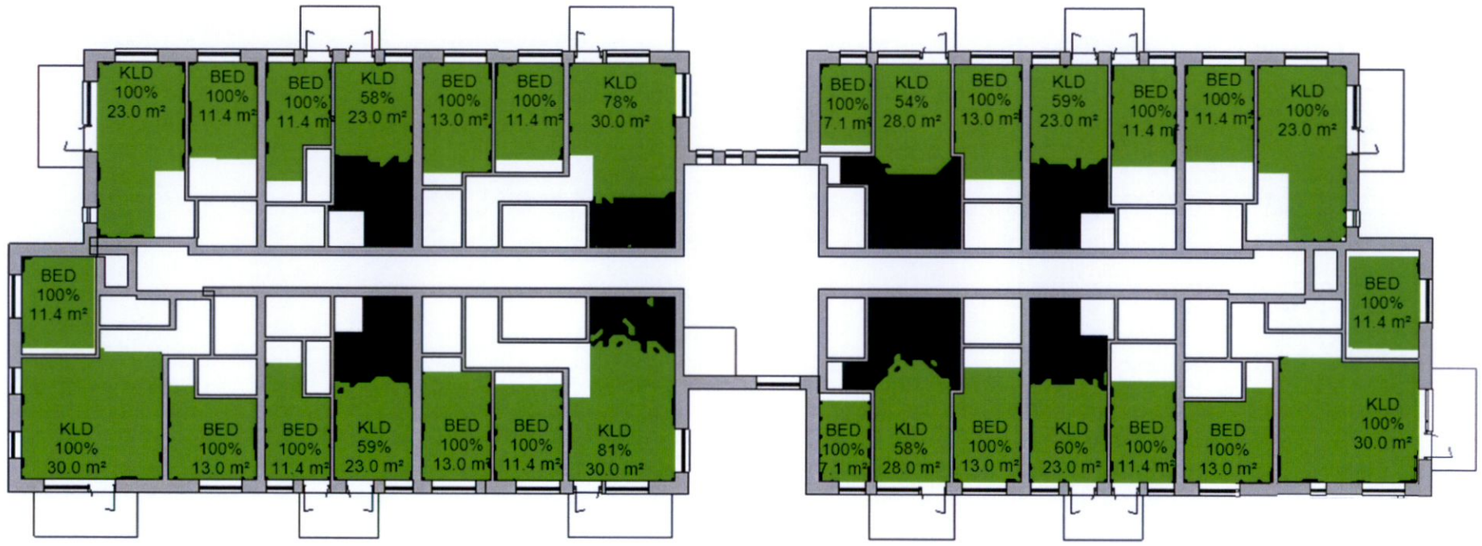
Block 2	Number of rooms		
	Pass	Fail	Total
Ground Floor	22	2	24
First Floor	30	0	30
Second Floor	30	0	30
Third Floor	30	0	30
Fourth Floor	30	0	30
Fifth Floor	15	0	15
	157	2	159
	99%	1%	

Results: Block 2

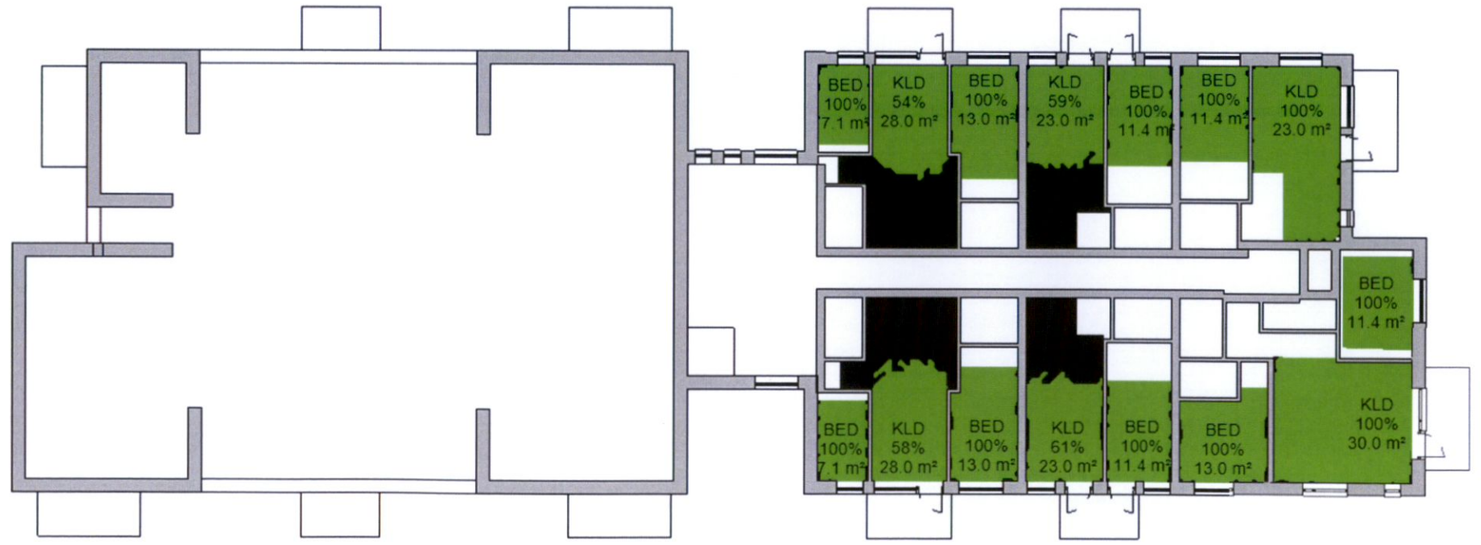
Daylight analysis results are illustrated below with green shaded area receiving targeted illuminance, 200Lux for KLDs, 150Lux for Living room, and 100Lux for Bedrooms. Black shade is showing area where it's receiving less than targeted illuminance. A space is deemed compliant where >50% of areas achieve target illuminance.
Every room was determined to be compliant for SDA on these levels.

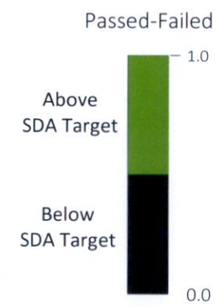


Level 04



Level 05



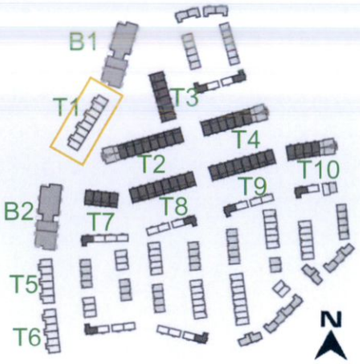


SDA Targets	> 50% at
Bedrooms	> 100 Lux
Living Areas	> 150 Lux
K/L/D / Kitchen	> 200 Lux

Block 2	Number of rooms		
	Pass	Fail	Total
Ground Floor	22	2	24
First Floor	30	0	30
Second Floor	30	0	30
Third Floor	30	0	30
Fourth Floor	30	0	30
Fifth Floor	15	0	15
	157	2	159
	99%	1%	

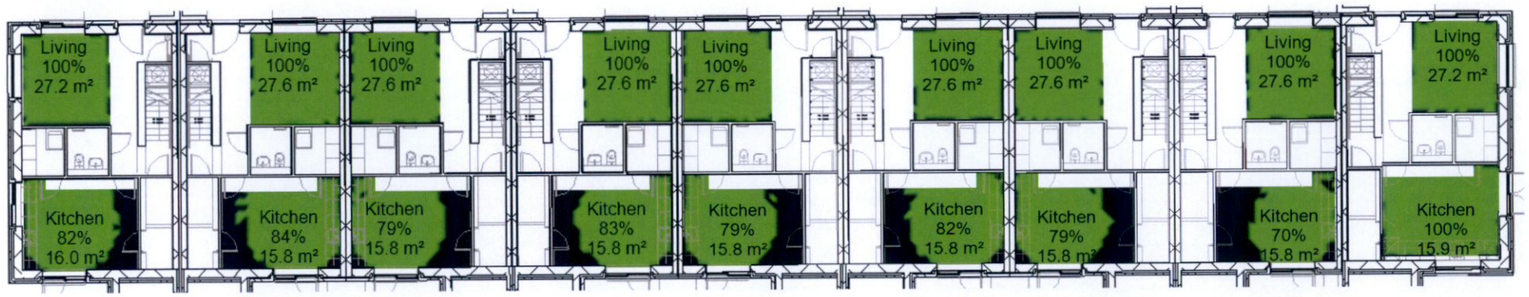
Results: Terrace 1

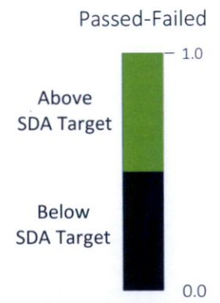
Daylight analysis results are illustrated below with green shaded area receiving targeted illuminance, 200Lux for KLDs & Kitchen, 150Lux for Living room and 100Lux for Bedrooms. Black shade is showing area where it's receiving less than targeted illuminance. A space is deemed compliant where >50% of areas achieve target illuminance.
Every room was determined to be compliant for SDA on these levels.



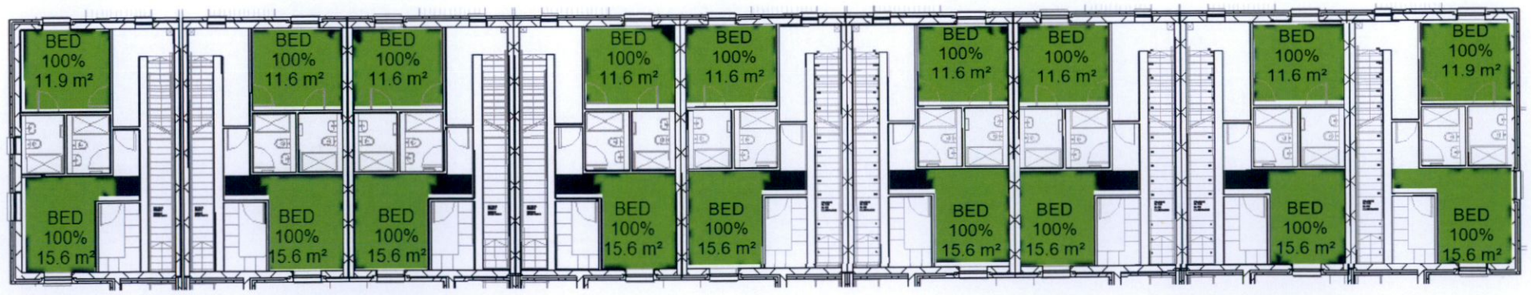
KEY

Level 00





Level 01

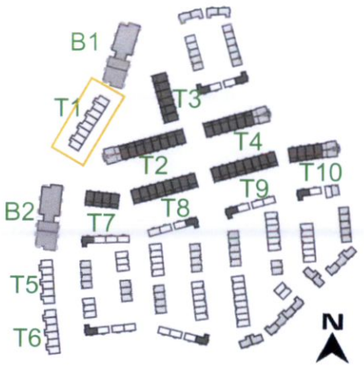


SDA Targets	> 50% at
Bedrooms	> 100 Lux
Living Areas	> 150 Lux
K/L/D / Kitchen	> 200 Lux

Terrace 1	Number of rooms		
	Pass	Fail	Total
Ground Floor	18	0	18
First Floor	18	0	18
Second Floor	18	0	18
Third Floor	27	0	27
	81	**0**	**81**
	100%	**0.0%**	

Results: Terrace 1

Daylight analysis results are illustrated below with green shaded area receiving targeted illuminance, 200Lux for KLDs & Kitchen, 150Lux for Living room and 100Lux for Bedrooms. Black shade is showing area where it's receiving less than targeted illuminance. A space is deemed compliant where >50% of areas achieve target illuminance.
Every room was determined to be compliant for SDA on these levels.



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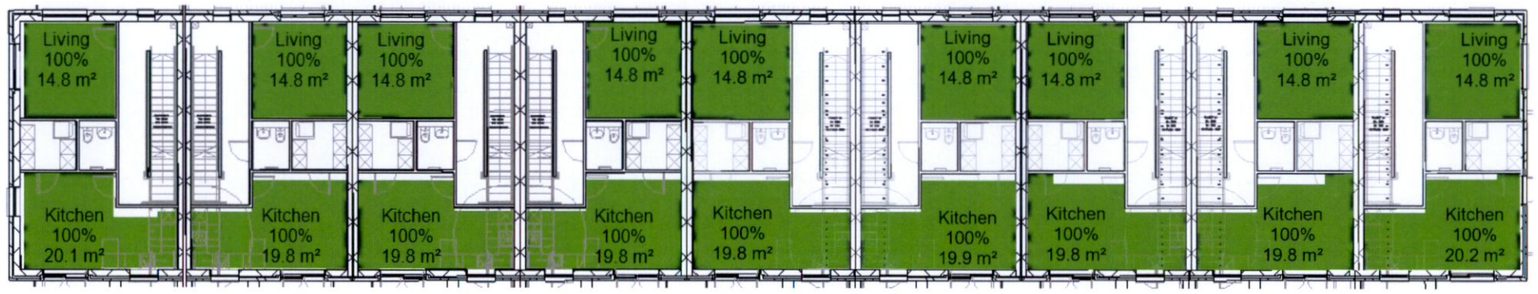
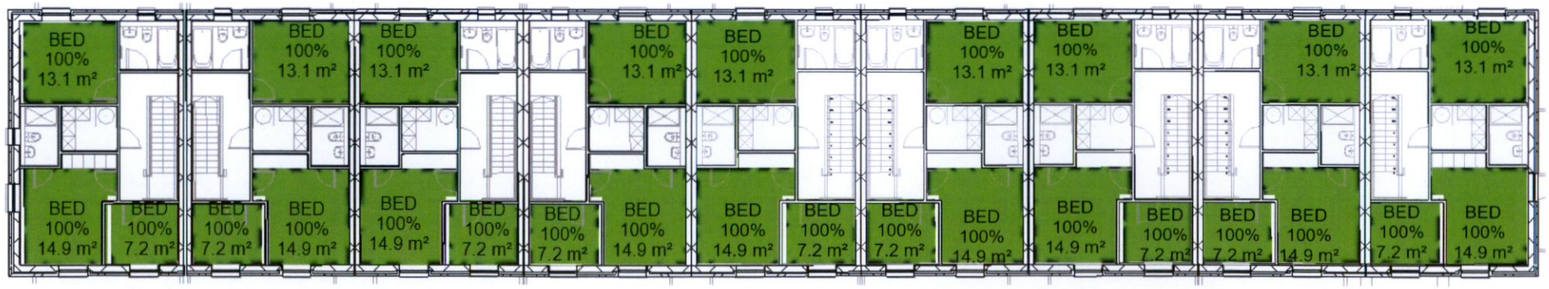
Level 02



Level 03

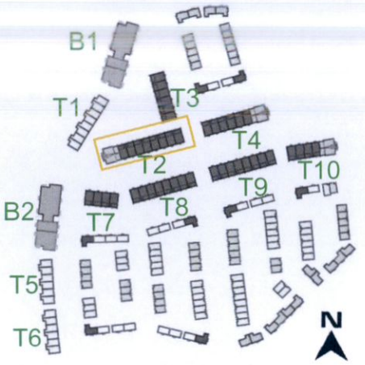


SDA Targets	> 50% at
Bedrooms	> 100 Lux
Living Areas	> 150 Lux
K/L/D / Kitchen	> 200 Lux

Terrace 1	Number of rooms		
	Pass	Fail	Total
Ground Floor	18	0	18
First Floor	18	0	18
Second Floor	18	0	18
Third Floor	27	0	27
	81	0	81
	100%	0.0%	

Results: Terrace 2

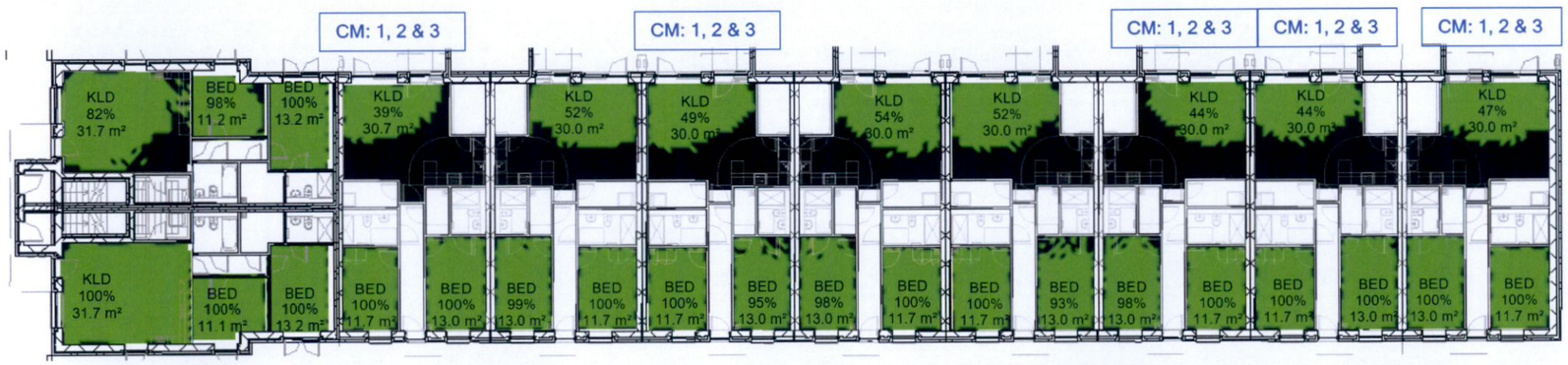
Daylight analysis results are illustrated below with green shaded area receiving targeted illuminance, 200Lux for KLDs and 100Lux for Bedrooms. Black shade is showing area where it's receiving less than targeted illuminance. A space is deemed compliant where >50% of areas achieve target illuminance.
5no. KLDs were found to be non-compliant and compensatory measures set out (blue box).
The rest of the rooms were determined to be compliant for SDA in this block.



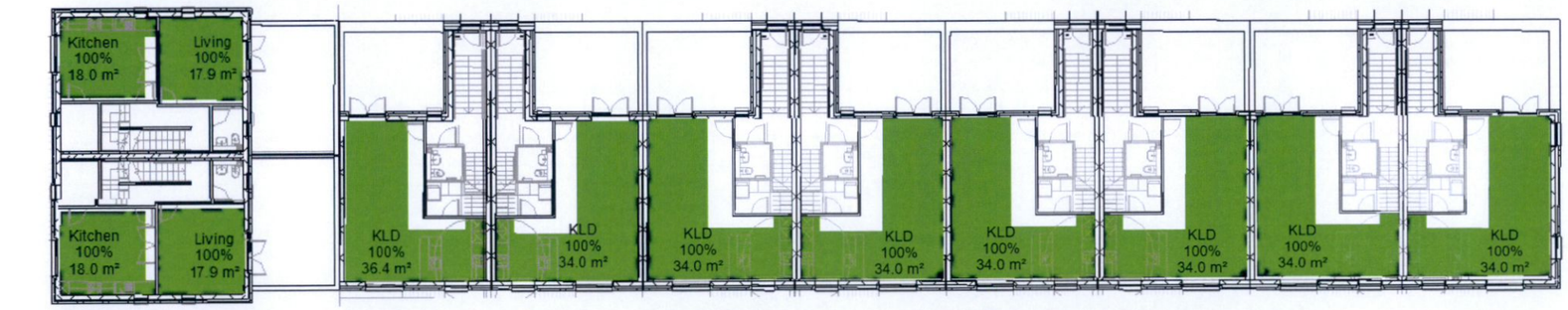
KEY

Compensatory Measures:
1. Daylight Adjacency
2. Sunlight
3. Aspect
4. Direct Access to Courtyard
5. Private Amenity Space

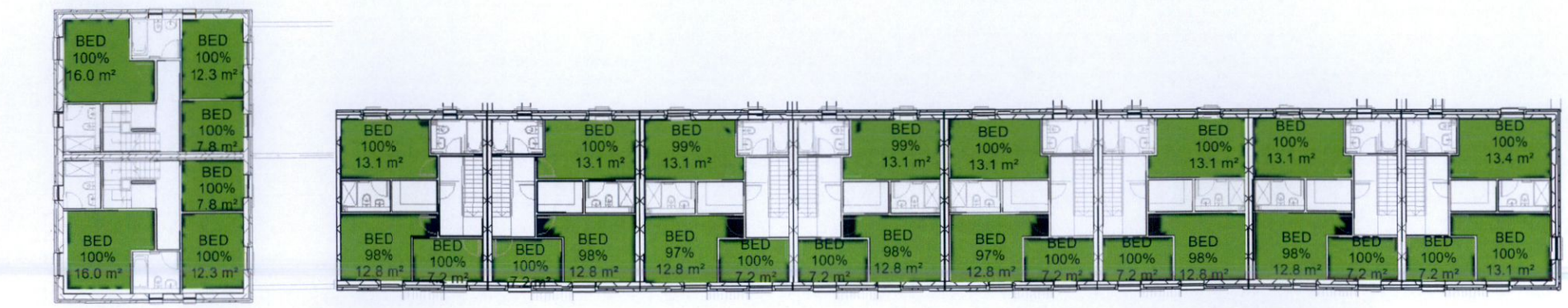
Level 00

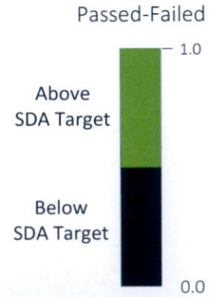


Level 01



Level 02



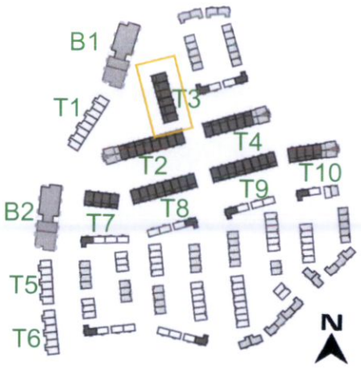


SDA Targets	> 50% at
Bedrooms	> 100 Lux
Living Areas	> 150 Lux
K/L/D / Kitchen	> 200 Lux

Terrace 2	Number of rooms		
	Pass	Fail	Total
Ground Floor	25	5	30
First Floor	12	0	12
Second Floor	30	0	30
	67	5	72
	93%	7%	

Results: Terrace 3

Daylight analysis results are illustrated below with green shaded area receiving targeted illuminance, 200Lux for KLDs and 100Lux for Bedrooms. Black shade is showing area where it's receiving less than targeted illuminance. A space is deemed compliant where >50% of areas achieve target illuminance.
1 KLD was found to be non-compliant and compensatory measures set out (blue box).
The rest of the rooms were determined to be compliant for SDA in this block.

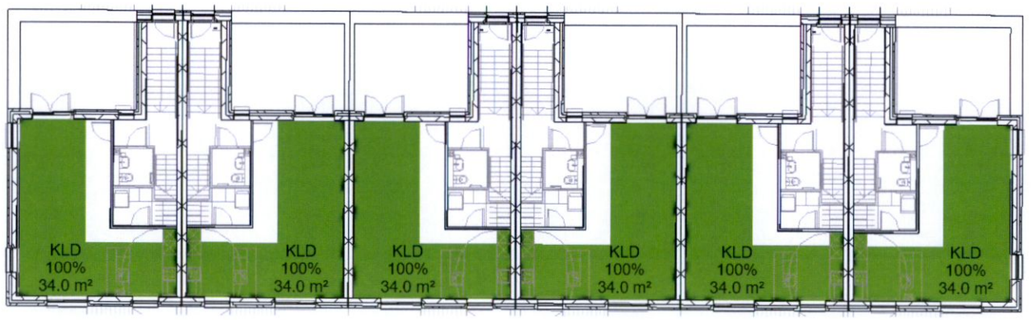


KEY

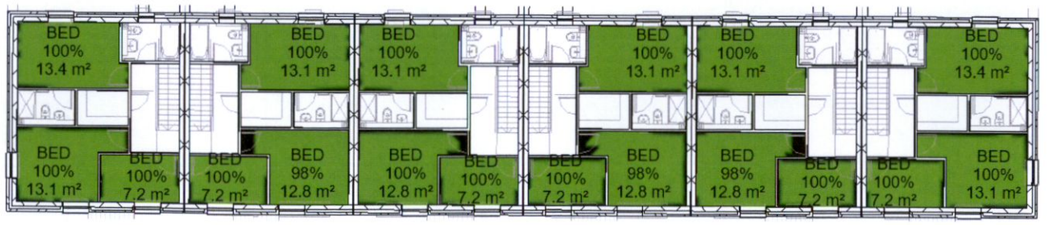
Compensatory Measures:
1. Daylight Adjacency
2. Sunlight
3. Aspect
4. Direct Access to Courtyard
5. Private Amenity Space

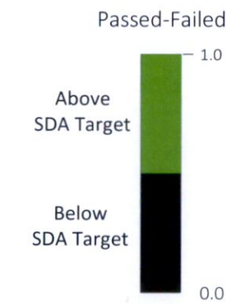
Level 00

Level 01



Level 02



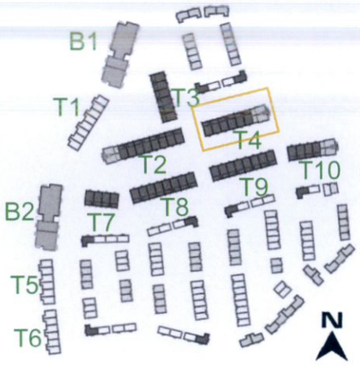


SDA Targets	> 50% at
Bedrooms	> 100 Lux
Living Areas	> 150 Lux
K/L/D / Kitchen	> 200 Lux

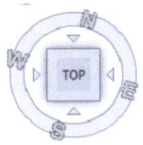
Terrace 3	Number of rooms		
	Pass	Fail	Total
Ground Floor	17	1	18
First Floor	6	0	6
Second Floor	18	0	18
	41	1	42
	98%	2%	

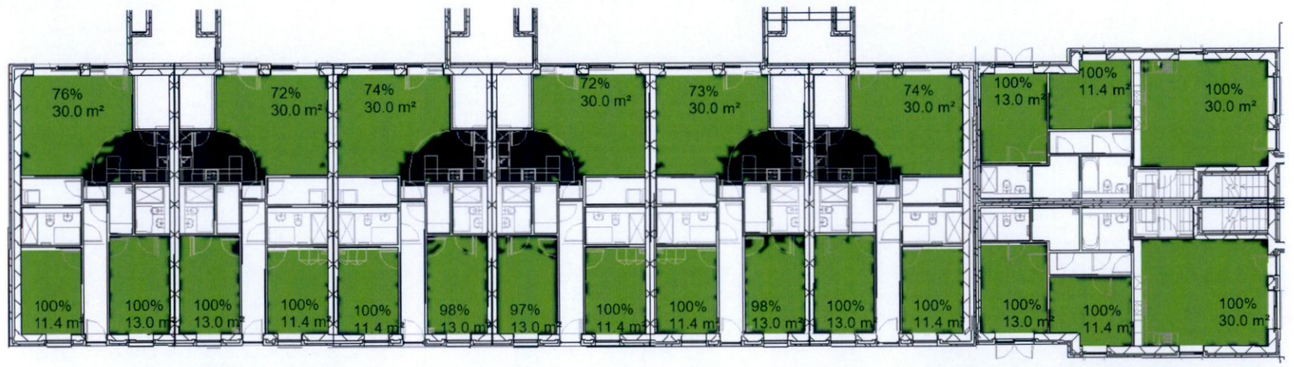
Results: Terrace 4

Daylight analysis results are illustrated below with green shaded area receiving targeted illuminance, 200Lux for KLDs & Kitchen, 150Lux for Living room and 100Lux for Bedrooms. Black shade is showing area where it's receiving less than targeted illuminance. A space is deemed compliant where >50% of areas achieve target illuminance.
Every room was determined to be compliant for SDA in this block.

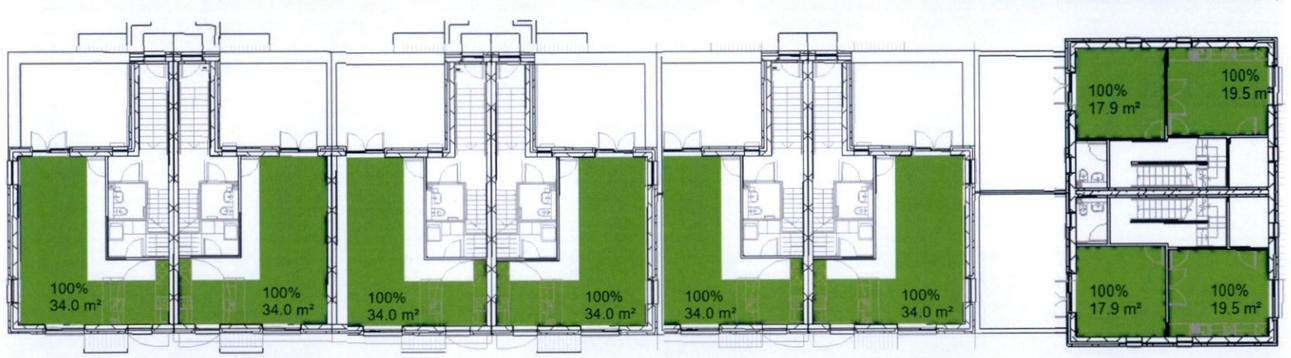


Level 00

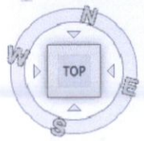


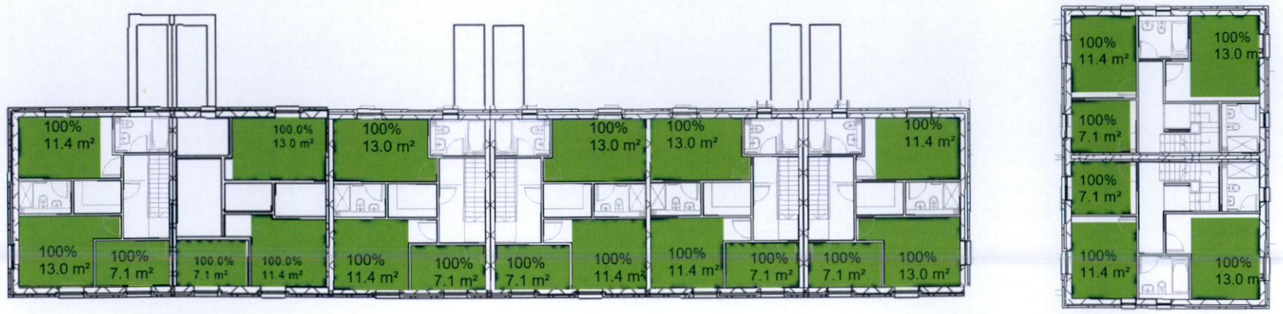


Level 01



Level 02





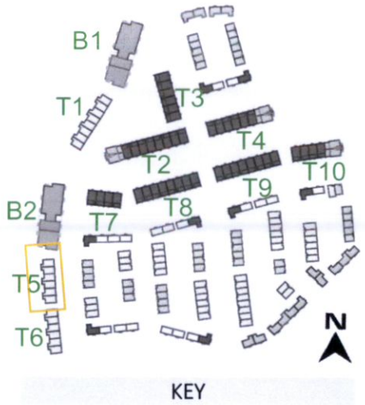
Passed-Failed

SDA Targets	> 50% at
Bedrooms	> 100 Lux
Living Areas	> 150 Lux
K/L/D / Kitchen	> 200 Lux

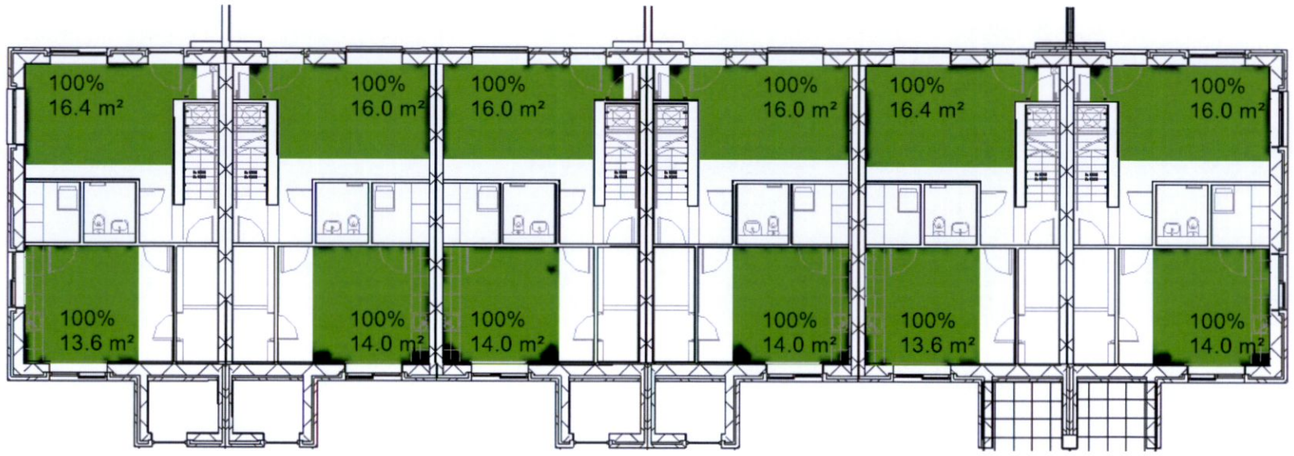
Terrace 4	Number of rooms		
	Pass	Fail	Total
Ground Floor	24	0	24
First Floor	10	0	10
Second Floor	24	0	24
	58	0	58
	100%	0%	

Results: Terrace 5

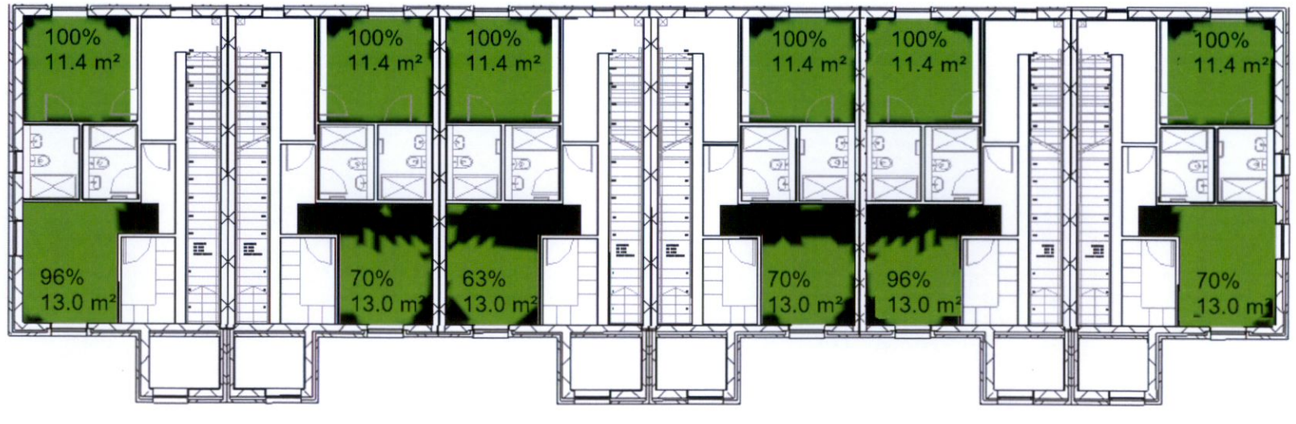
Daylight analysis results are illustrated below with green shaded area receiving targeted illuminance, 200Lux for KLDs & Kitchen, 150Lux for Living room and 100Lux for Bedrooms. Black shade is showing area where it's receiving less than targeted illuminance. A space is deemed compliant where >50% of areas achieve target illuminance.
Every room was determined to be compliant for SDA on these levels.

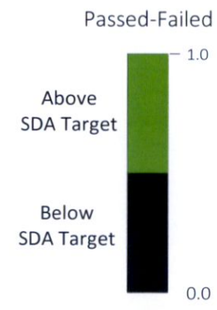


Level 00



Level 01



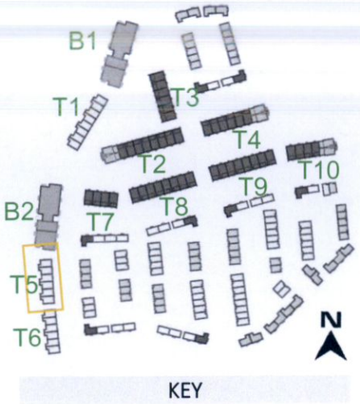


SDA Targets	> 50% at
Bedrooms	> 100 Lux
Living Areas	> 150 Lux
K/L/D / Kitchen	> 200 Lux

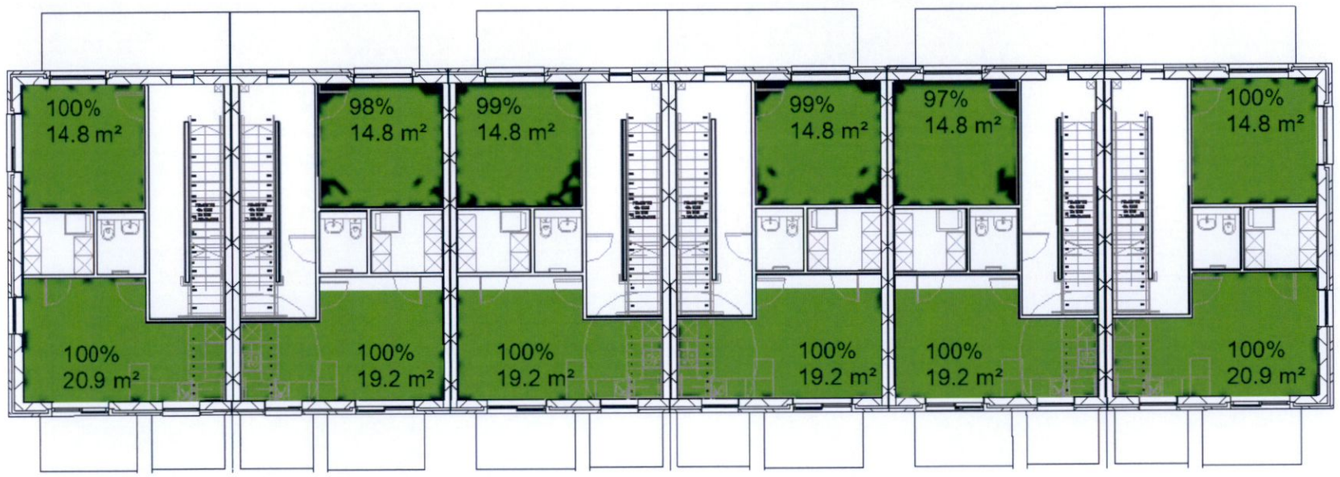
Terrace 5	Number of rooms		
	Pass	Fail	Total
Ground Floor	12	0	12
First Floor	12	0	12
Second Floor	12	0	12
Third Floor	18	0	18
	54	0	54
	100%	0%	

Results: Terrace 5

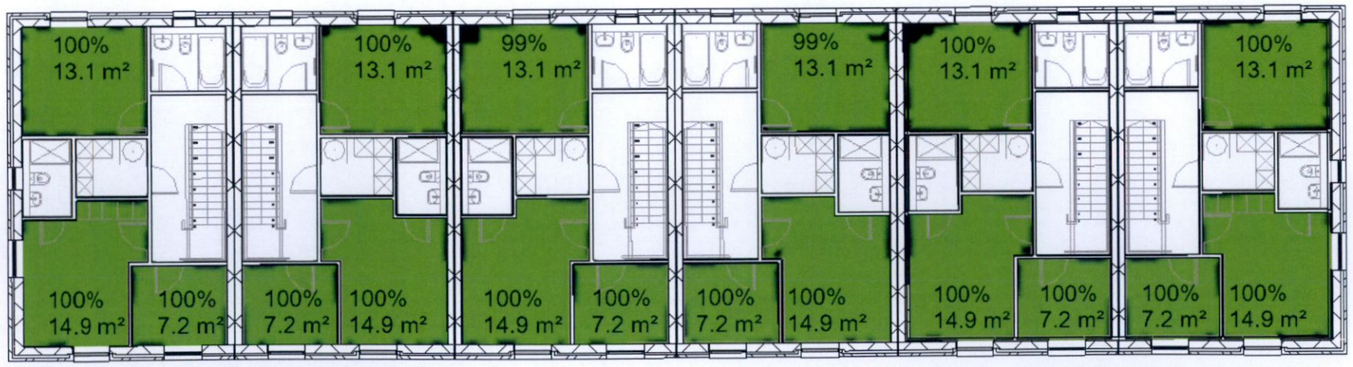
Daylight analysis results are illustrated below with green shaded area receiving targeted illuminance, 200Lux for KLDs & Kitchen, 150Lux for Living room and 100Lux for Bedrooms. Black shade is showing area where it's receiving less than targeted illuminance. A space is deemed compliant where >50% of areas achieve target illuminance.
Every room was determined to be compliant for SDA on these levels.

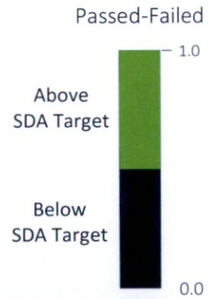


Level 02



Level 03



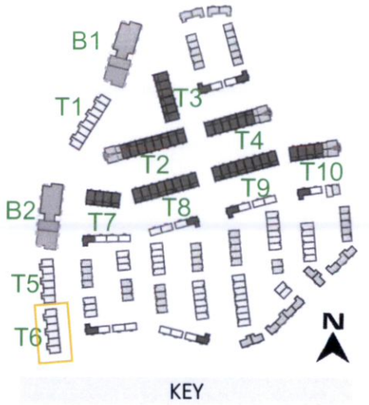


SDA Targets	> 50% at
Bedrooms	> 100 Lux
Living Areas	> 150 Lux
K/L/D / Kitchen	> 200 Lux

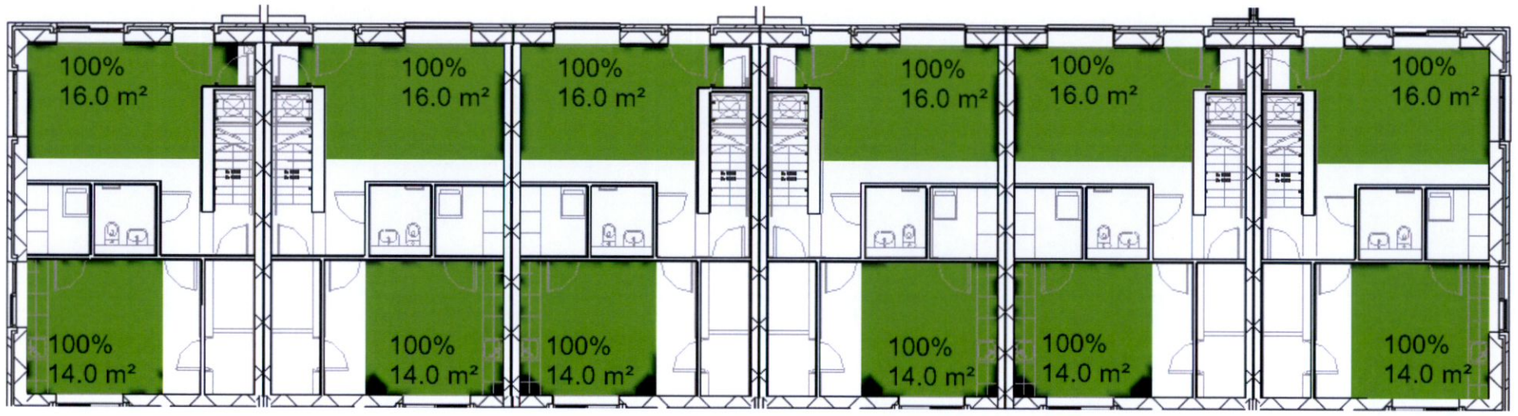
Terrace 5	Number of rooms		
	Pass	Fail	Total
Ground Floor	12	0	12
First Floor	12	0	12
Second Floor	12	0	12
Third Floor	18	0	18
	54	0	54
	100%	0%	

Results: Terrace 6

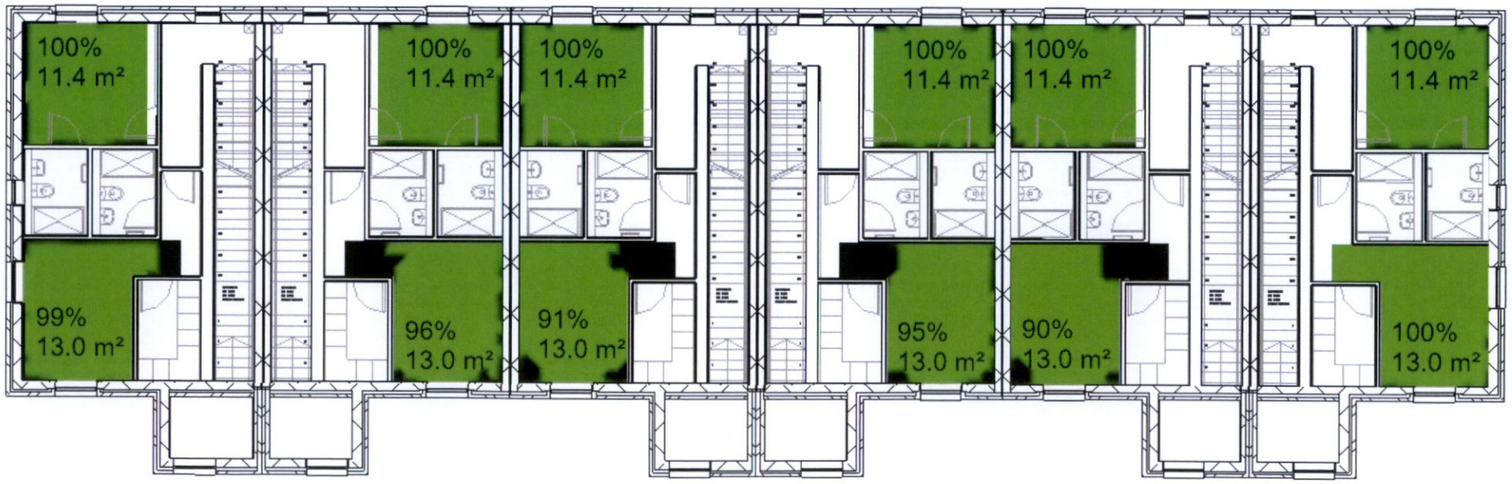
Daylight analysis results are illustrated below with green shaded area receiving targeted illuminance, 200Lux for KLDs & Kitchen, 150Lux for Living room and 100Lux for Bedrooms. Black shade is showing area where it's receiving less than targeted illuminance. A space is deemed compliant where >50% of areas achieve target illuminance.
Every room was determined to be compliant for SDA on these levels.



Level 00



Level 01

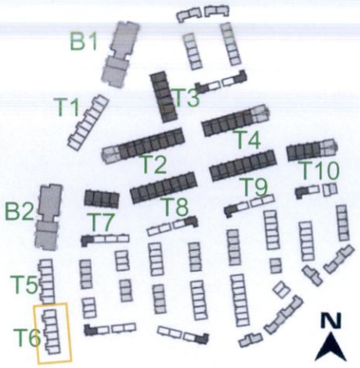


SDA Targets	> 50% at
Bedrooms	> 100 Lux
Living Areas	> 150 Lux
K/L/D / Kitchen	> 200 Lux

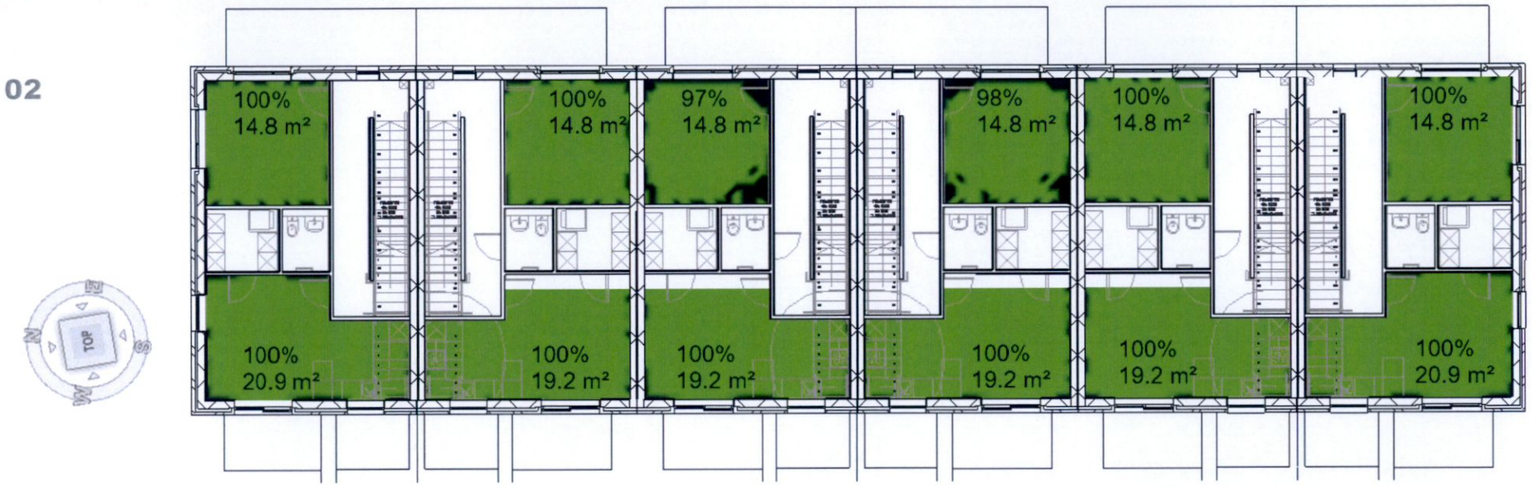
Terrace 6	Number of rooms		
	Pass	Fail	Total
Ground Floor	12	0	12
First Floor	12	0	12
Second Floor	12	0	12
Third Floor	18	0	18
	54	0	54
	100%	0%	

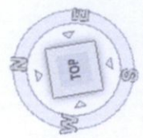
Results: Terrace 6

Daylight analysis results are illustrated below with green shaded area receiving targeted illuminance, 200Lux for KLDs & Kitchen, 150Lux for Living room and 100Lux for Bedrooms. Black shade is showing area where it's receiving less than targeted illuminance. A space is deemed compliant where >50% of areas achieve target illuminance.
Every room was determined to be compliant for SDA on these levels.

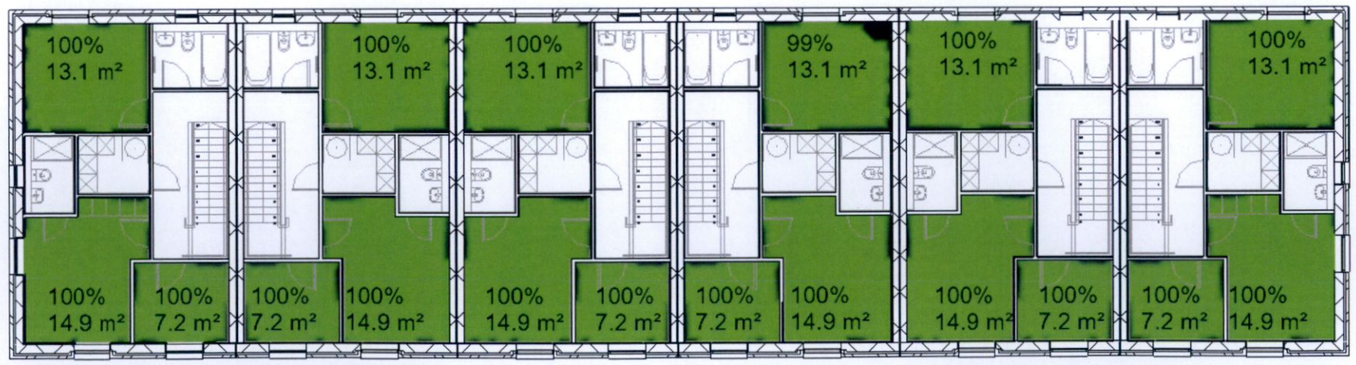


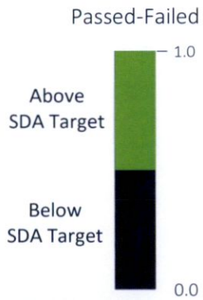
Level 02





Level 03



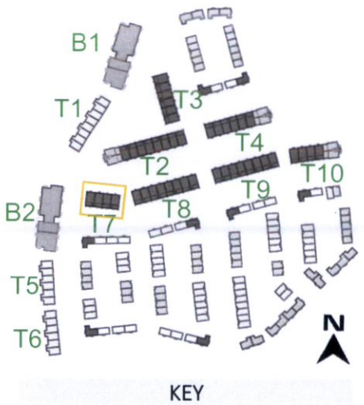


SDA Targets	> 50% at
Bedrooms	> 100 Lux
Living Areas	> 150 Lux
K/L/D / Kitchen	> 200 Lux

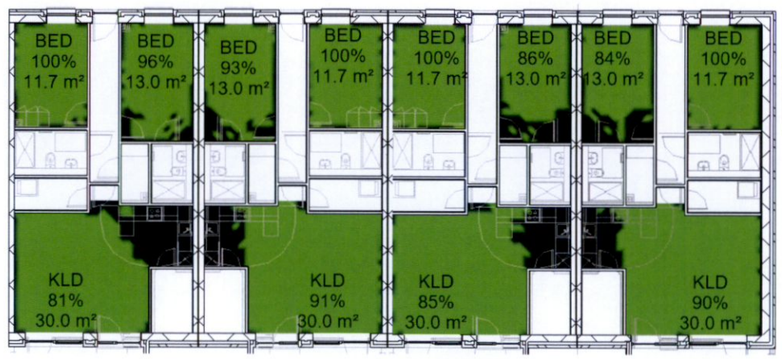
Terrace 6	Number of rooms		
	Pass	Fail	Total
Ground Floor	12	0	12
First Floor	12	0	12
Second Floor	12	0	12
Third Floor	18	0	18
	54	0	54
	100%	0%	

Results: Terrace 7

Daylight analysis results are illustrated below with green shaded area receiving targeted illuminance, 200Lux for KLDs and 100Lux for Bedrooms. Black shade is showing area where it's receiving less than targeted illuminance. A space is deemed compliant where >50% of areas achieve target illuminance.
Every room was determined to be compliant for SDA in this block.

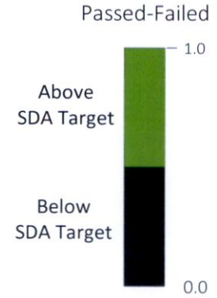


Level 00



Level 01

Level 02

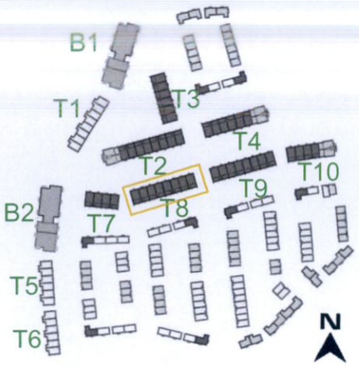


SDA Targets	> 50% at
Bedrooms	> 100 Lux
Living Areas	> 150 Lux
K/L/D / Kitchen	> 200 Lux

Terrace 7	Number of rooms		
	Pass	Fail	Total
Ground Floor	12	0	12
First Floor	4	0	4
Second Floor	12	0	12
	28	**0**	**28**
	100%	**0%**	

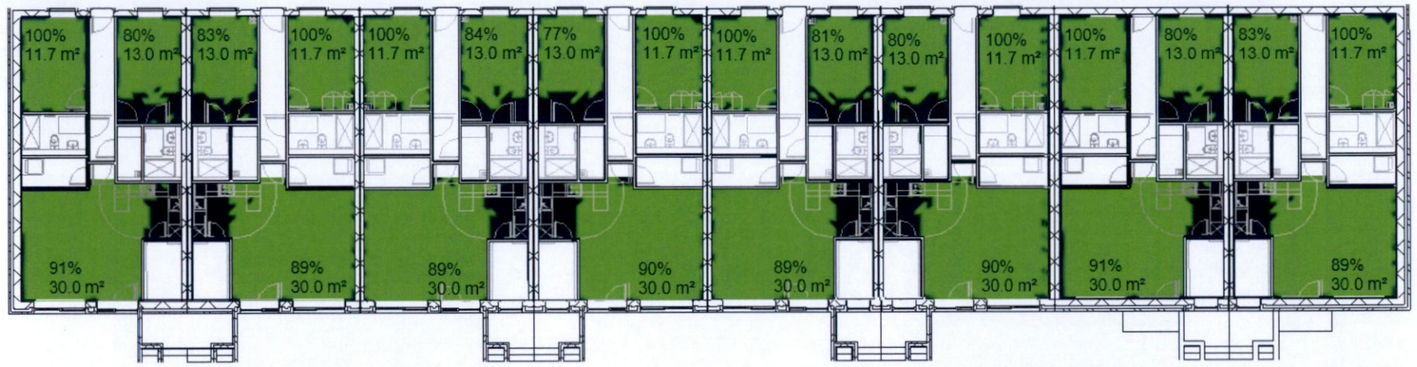
Results: Terrace 8

Daylight analysis results are illustrated below with green shaded area receiving targeted illuminance, 200Lux for KLDs and 100Lux for Bedrooms. Black shade is showing area where it's receiving less than targeted illuminance. A space is deemed compliant where >50% of areas achieve target illuminance.
Every room was determined to be compliant for SDA in this block.

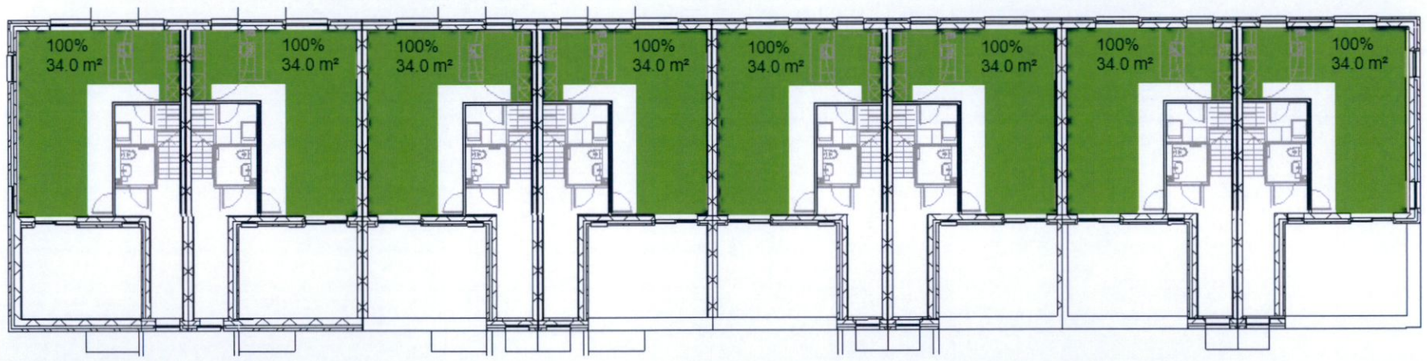


KEY

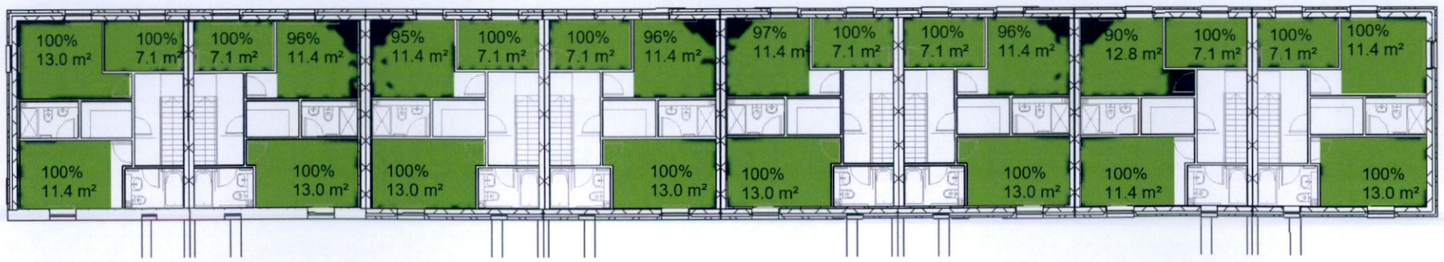
Level 00



Level 01



Level 02



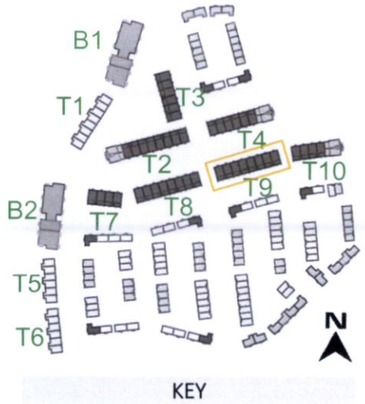
Passed-Failed

SDA Targets	> 50% at
Bedrooms	> 100 Lux
Living Areas	> 150 Lux
K/L/D / Kitchen	> 200 Lux

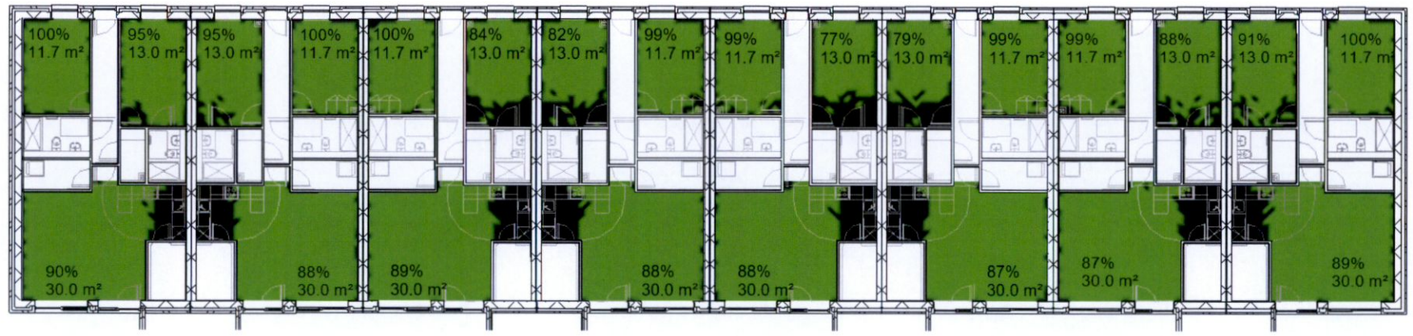
Terrace 8	Number of rooms		
	Pass	Fail	Total
Ground Floor	24	0	24
First Floor	8	0	8
Second Floor	24	0	24
	56	**0**	**56**
	100%	**0%**	

Results: Terrace 9

Daylight analysis results are illustrated below with green shaded area receiving targeted illuminance, 200Lux for KLDs and 100Lux for Bedrooms. Black shade is showing area where it's receiving less than targeted illuminance. A space is deemed compliant where >50% of areas achieve target illuminance.
Every room was determined to be compliant for SDA in this block.

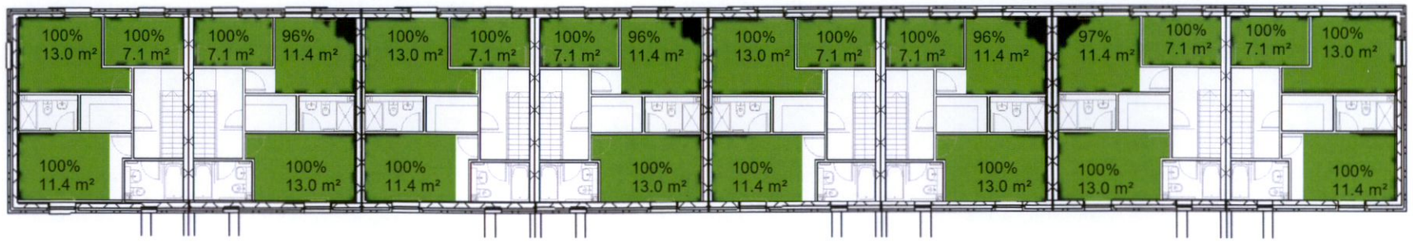


Level 00

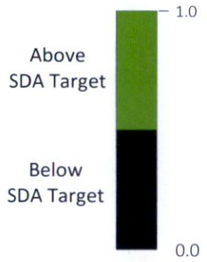


Level 01

Level 02



Passed-Failed

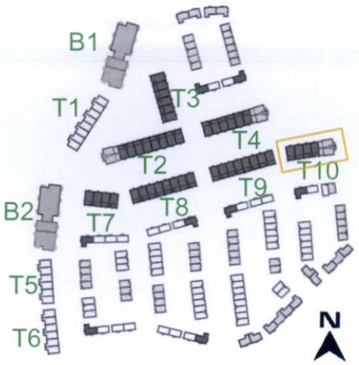


SDA Targets	> 50% at
Bedrooms	> 100 Lux
Living Areas	> 150 Lux
K/L/D / Kitchen	> 200 Lux

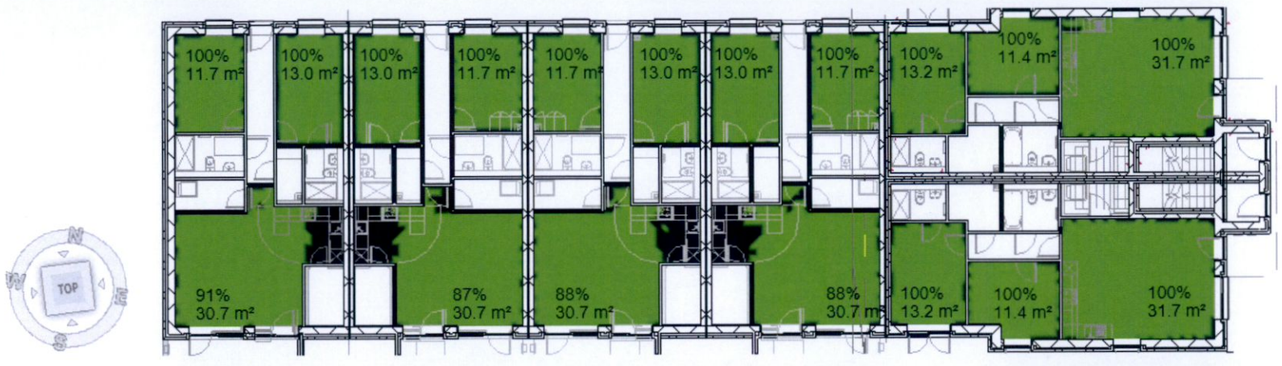
Terrace 9	Number of rooms		
	Pass	Fail	Total
Ground Floor	24	0	24
First Floor	8	0	8
Second Floor	24	0	24
	56	0	56
	100%	0%	

Results: Terrace 10

Daylight analysis results are illustrated below with green shaded area receiving targeted illuminance, 200Lux for KLDs & Kitchen, 150Lux for Living room and 100Lux for Bedrooms. Black shade is showing area where it's receiving less than targeted illuminance. A space is deemed compliant where >50% of areas achieve target illuminance.
Every room was determined to be compliant for SDA in this block.

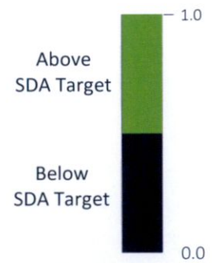


Level 00

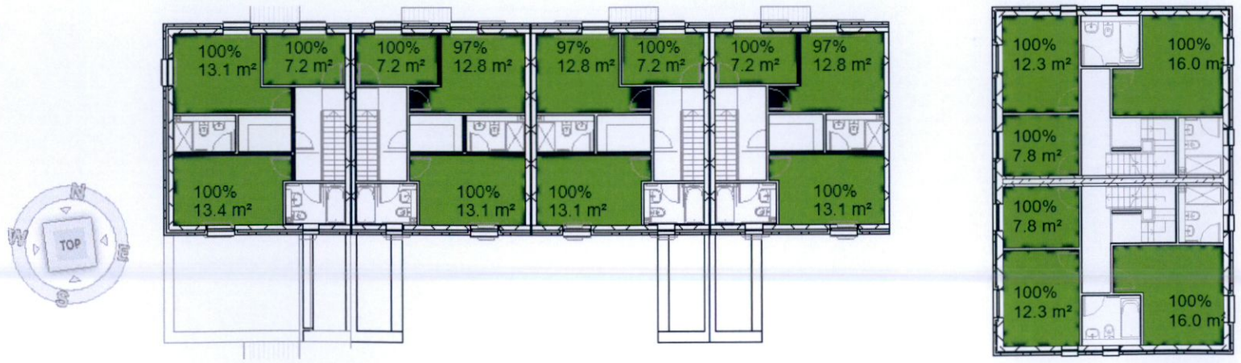


Level 01

Passed-Failed



Level 02



SDA Targets	> 50% at
Bedrooms	> 100 Lux
Living Areas	> 150 Lux
K/L/D / Kitchen	> 200 Lux

Terrace 10	Number of rooms		
	Pass	Fail	Total
Ground Floor	18	0	18
First Floor	8	0	8
Second Floor	18	0	18
	44	**0**	**44**
	100%	**0%**	

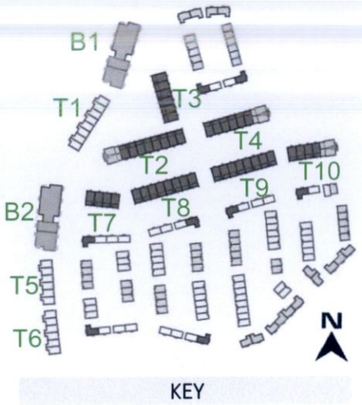
Appendix B

Exposure to Sunlight

(ETS)

Results Summary - ETS

The tables below give a breakdowns of compliance rates for the proposed scheme based on Exposure to Sunlight (ETS) and an overall ETS. ETS was assessed for each unit, and the tables are presenting the number of units in each block. It was determined that 99.6% of the assessed units were found to be compliant for the BRE Guide recommended sunlight hours. The sole non-compliant unit for sun lighting (located at Terrace 4, ground floor), was determined to be fully compliant for daylighting performance, as detailed in Appendix A.
Detailed results for exposure to sunlight analysis for each unit are provided in overleaf.



Block 1	Number of units		
	Pass	Fail	Total
First Floor	12	0	12
Second Floor	12	0	12
Third Floor	12	0	12
Fourth Floor	8	0	8
Fifth Floor	6	0	6
	50	0	50
	100%	0%	

Block 2	Number of units		
	Pass	Fail	Total
Ground Floor	10	0	10
First Floor	12	0	12
Second Floor	12	0	12
Third Floor	12	0	12
Fourth Floor	12	0	12
Fifth Floor	6	0	6
	64	0	64
	100%	0%	

Terrace 1	Number of units		
	Pass	Fail	Total
Type L (Level 00 & 01)	9	0	9
Type M (Level 02 & 03)	9	0	9
	18	0	18
	100%	0%	

Terrace 2	Number of units		
	Pass	Fail	Total
Type J (Level 00)	8	0	8
Type K (Level 01 & 02)	8	0	8
Type O (Level 00)	2	0	2
Type P (Level 01 & 02)	2	0	2
	20	0	20
	100%	0%	

Terrace 3	Number of units		
	Pass	Fail	Total
Type J (Level 00)	6	0	6
Type K (Level 01 & 02)	6	0	6
	12	0	12
	100%	0%	

Terrace 4	Number of units		
	Pass	Fail	Total
Type J (Level 00)	6	0	6
Type K (Level 01 & 02)	6	0	6
Type O (Level 00)	1	1	2
Type P (Level 01 & 02)	2	0	2
	15	1	16
	94%	6%	

Terrace 5	Number of units		
	Pass	Fail	Total
Type L (Level 00 & 01)	6	0	6
Type M (Level 02 & 03)	6	0	6
	12	0	12
	100%	0%	

Terrace 6	Number of units		
	Pass	Fail	Total
Type L (Level 00 & 01)	6	0	6
Type M (Level 02 & 03)	6	0	6
	12	0	12
	100%	0%	

Terrace 7	Number of units		
	Pass	Fail	Total
Type J (Level 00)	4	0	4
Type K (Level 01 & 02)	4	0	4
	8	0	8
	100%	0%	

Terrace 8	Number of units		
	Pass	Fail	Total
Type J (Level 00)	8	0	8
Type K (Level 01 & 02)	8	0	8
	16	0	16
	100%	0%	

Terrace 9	Number of units		
	Pass	Fail	Total
Type J (Level 00)	8	0	8
Type K (Level 01 & 02)	8	0	8
	16	0	16
	100%	0%	

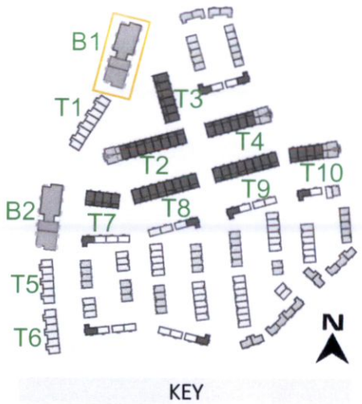
Terrace 10	Number of units		
	Pass	Fail	Total
Type J (Level 00)	4	0	4
Type K (Level 01 & 02)	4	0	4
Type O (Level 00)	2	0	2
Type P (Level 01 & 02)	2	0	2
	12	0	12
	100%	0%	

	Number of units		
	Pass	Fail	Total
Block 1	50	0	50
Block 2	64	0	64
Terrace 1	18	0	18
Terrace 2	20	0	20
Terrace 3	12	0	12
Terrace 4	15	1	16
Terrace 5	12	0	12
Terrace 6	12	0	12
Terrace 7	8	0	8
Terrace 8	16	0	16
Terrace 9	16	0	16
Terrace 10	12	0	12
	255	1	256
	99.6%	0.4%	

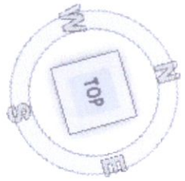
Overall ETS for the proposed scheme

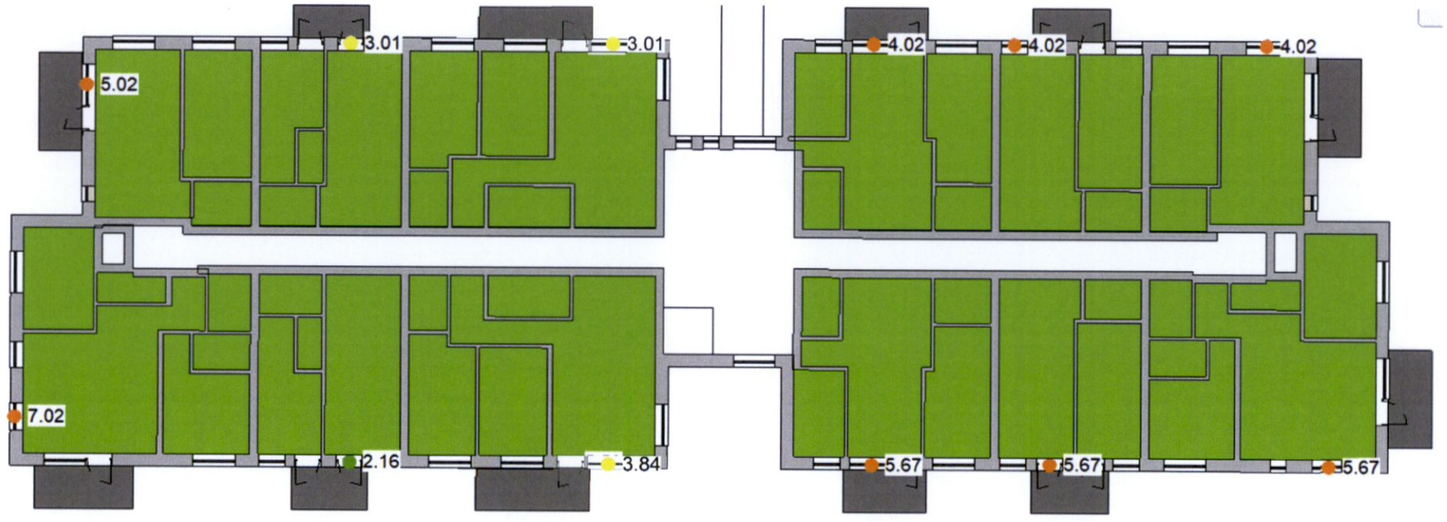
Results: Block 1

Sunlight Analysis as illustrated below, determined every unit was found to achieve the minimum recommendations on these levels.

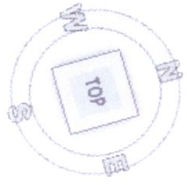


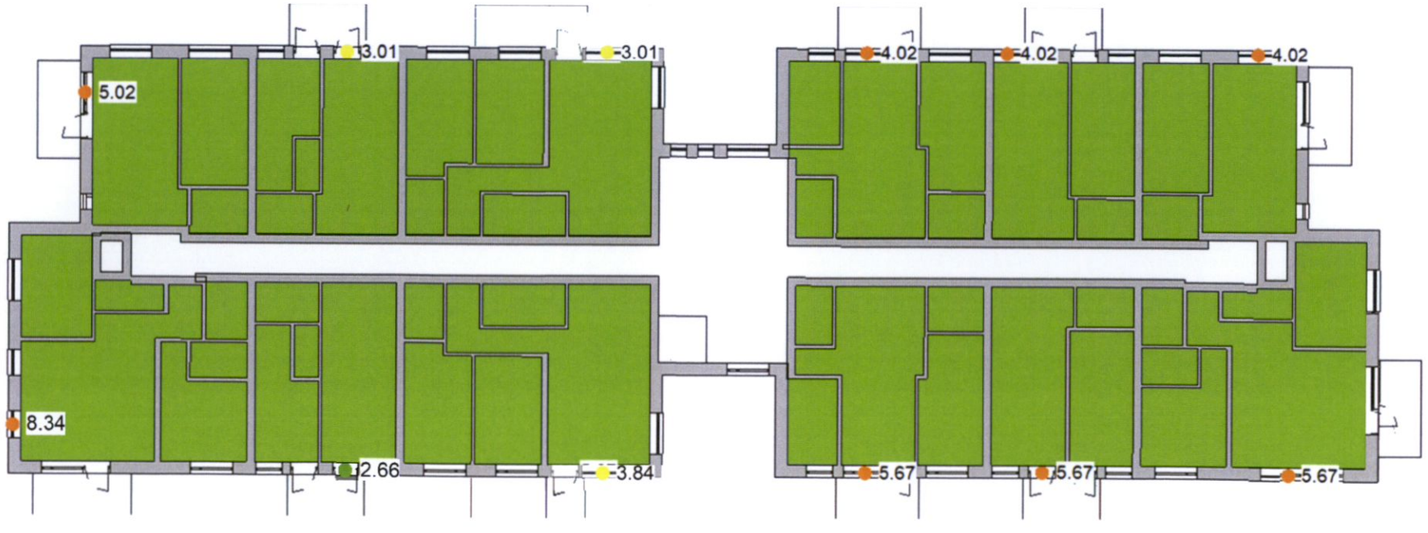
Level 01

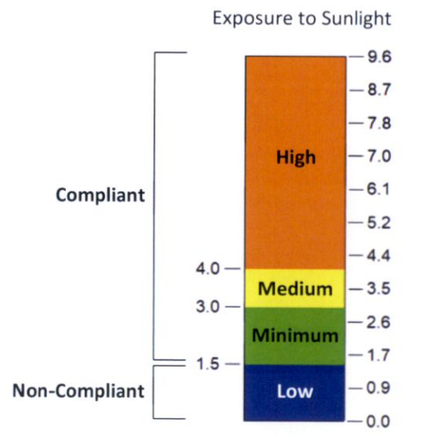




Level 02



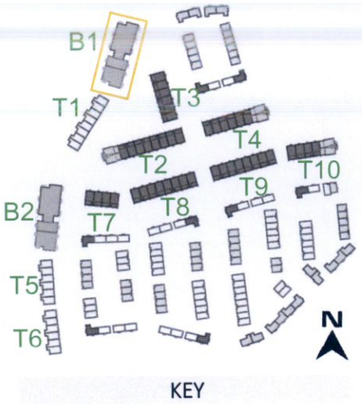




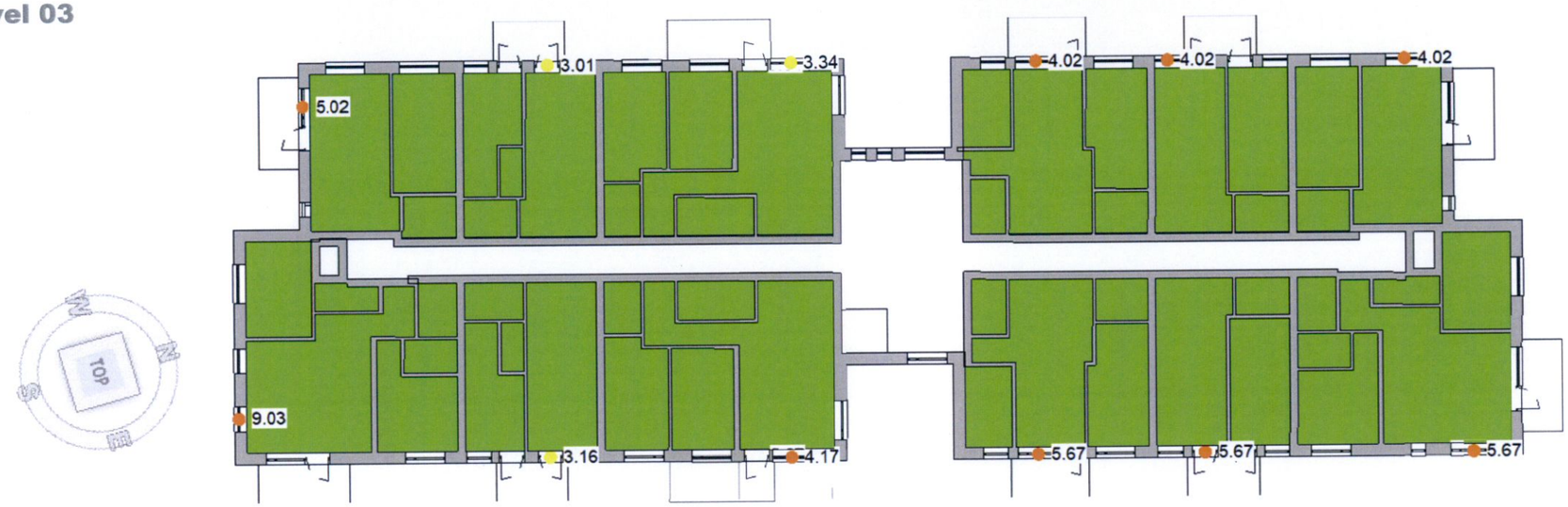
Block 1	Number of units		
	Pass	Fail	Total
First Floor	12	0	12
Second Floor	12	0	12
Third Floor	12	0	12
Fourth Floor	8	0	8
Fifth Floor	6	0	6
	50	0	50
	100%	0%	

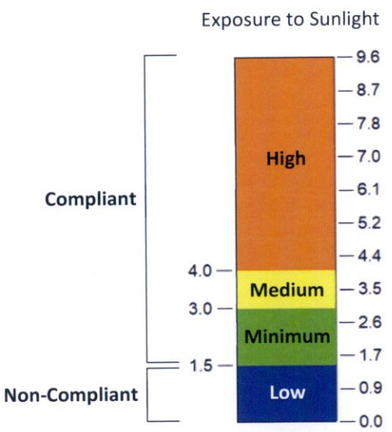
Results: Block 1

Sunlight Analysis as illustrated below, determined every unit was found to achieve the minimum recommendations on these levels.

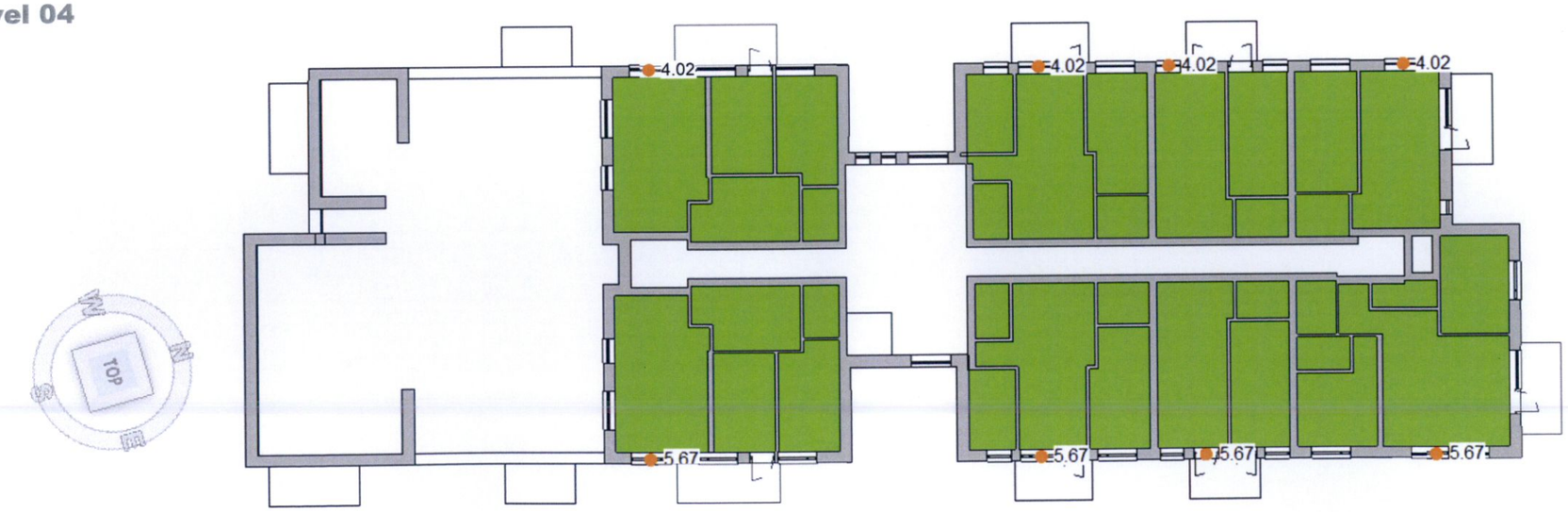


Level 03





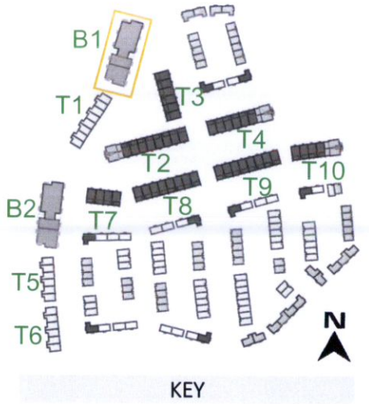
Level 04



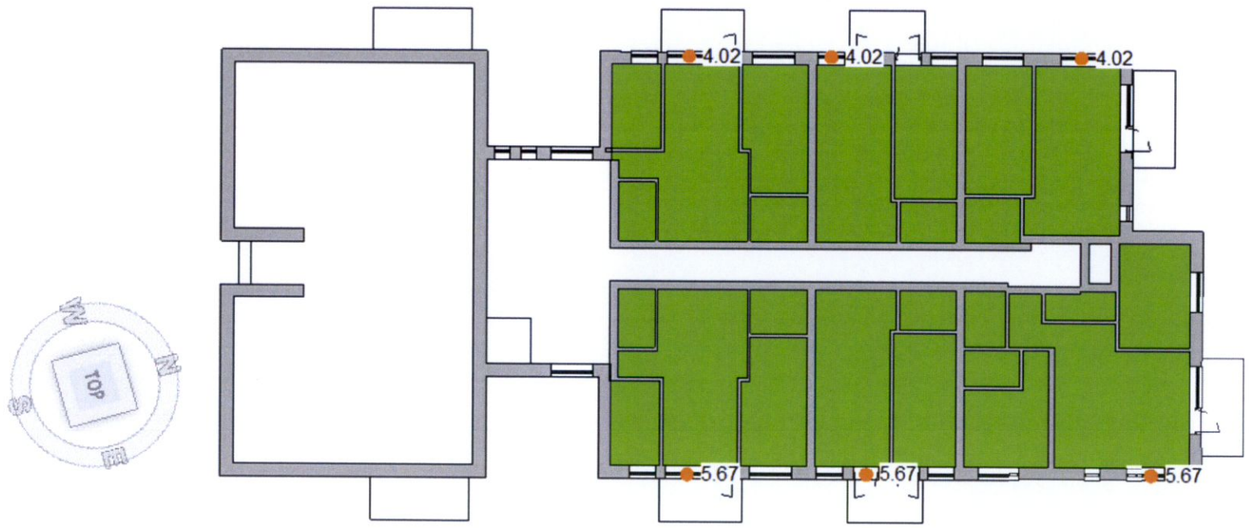
Block 1	Number of units		
	Pass	Fail	Total
First Floor	12	0	12
Second Floor	12	0	12
Third Floor	12	0	12
Fourth Floor	8	0	8
Fifth Floor	6	0	6
	50	0	50
	100%	0%	

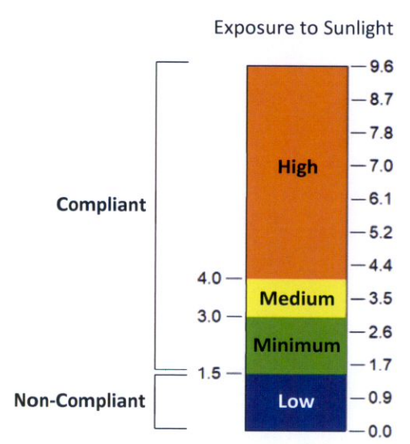
Results: Block 1

Sunlight Analysis as illustrated below, determined every unit was found to achieve the minimum recommendations on this level.



Level 05

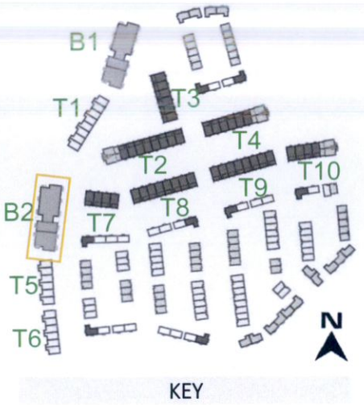




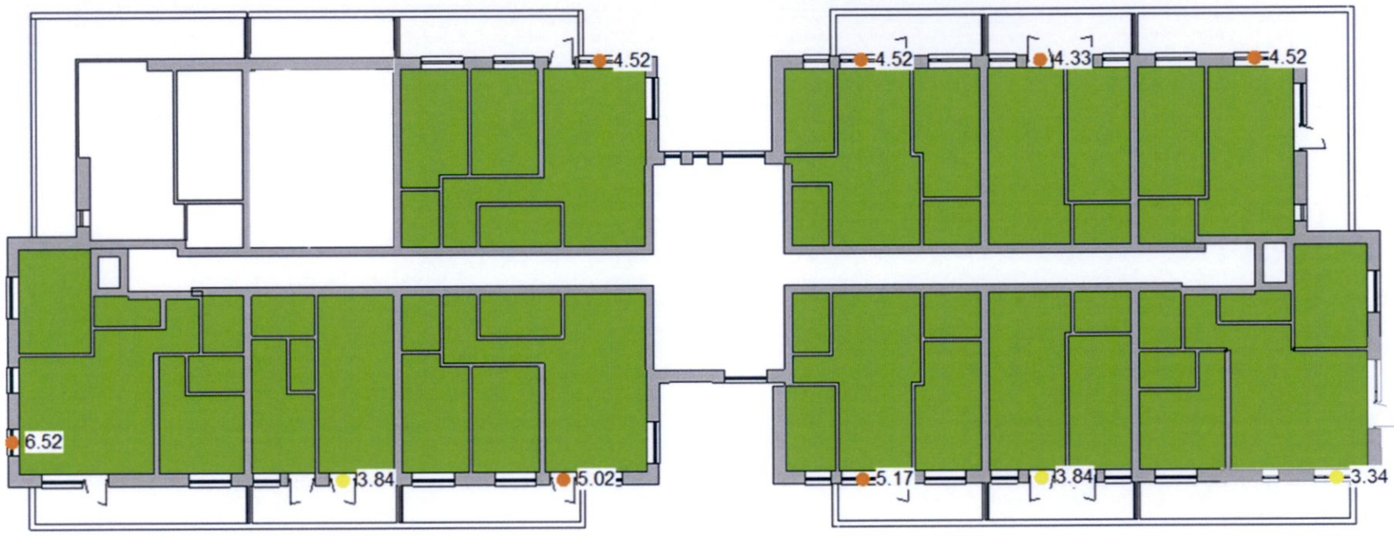
Block 1	Number of units		
	Pass	Fail	Total
First Floor	12	0	12
Second Floor	12	0	12
Third Floor	12	0	12
Fourth Floor	8	0	8
Fifth Floor	6	0	6
	50	**0**	**50**
	100%	**0%**	

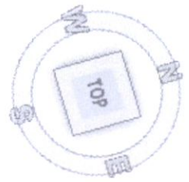
Results: Block 2

Sunlight Analysis as illustrated below, determined every unit was found to achieve the minimum recommendations on these levels.

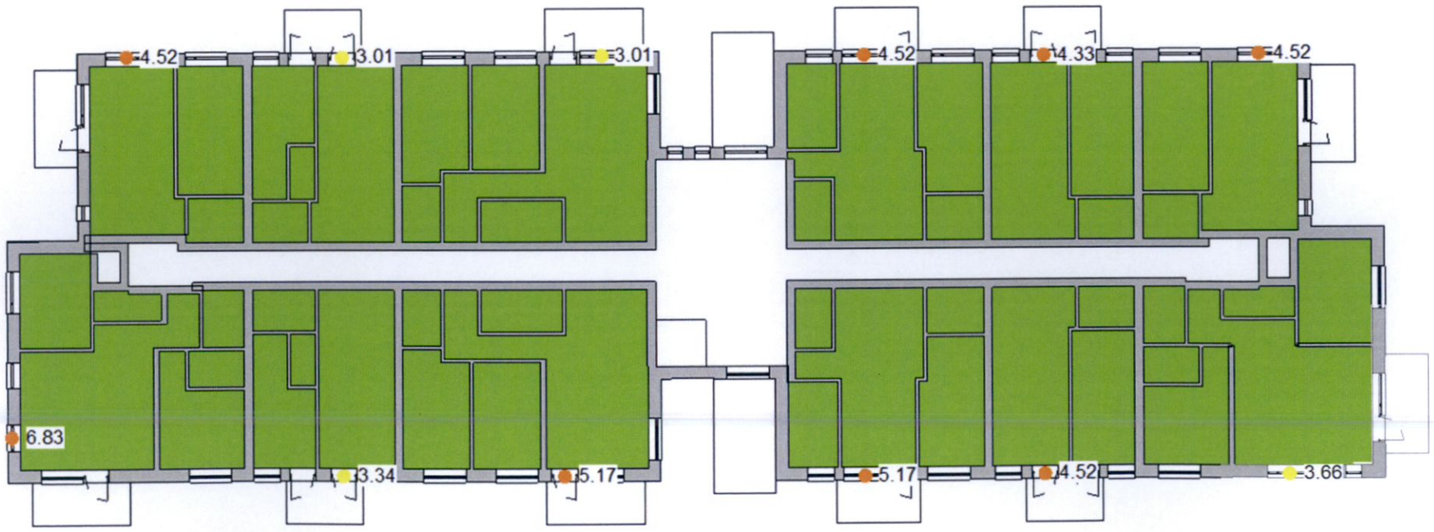


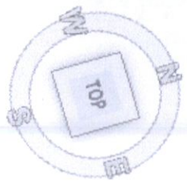
Level 00

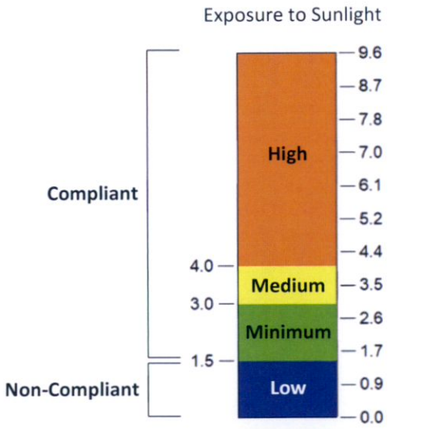




Level 01



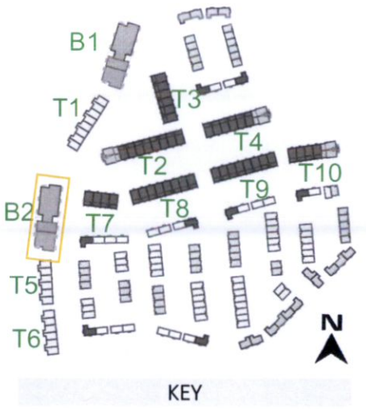




Block 2	Number of units		
	Pass	Fail	Total
Ground Floor	10	0	10
First Floor	12	0	12
Second Floor	12	0	12
Third Floor	12	0	12
Fourth Floor	12	0	12
Fifth Floor	6	0	6
	64	**0**	**64**
	100%	**0%**	

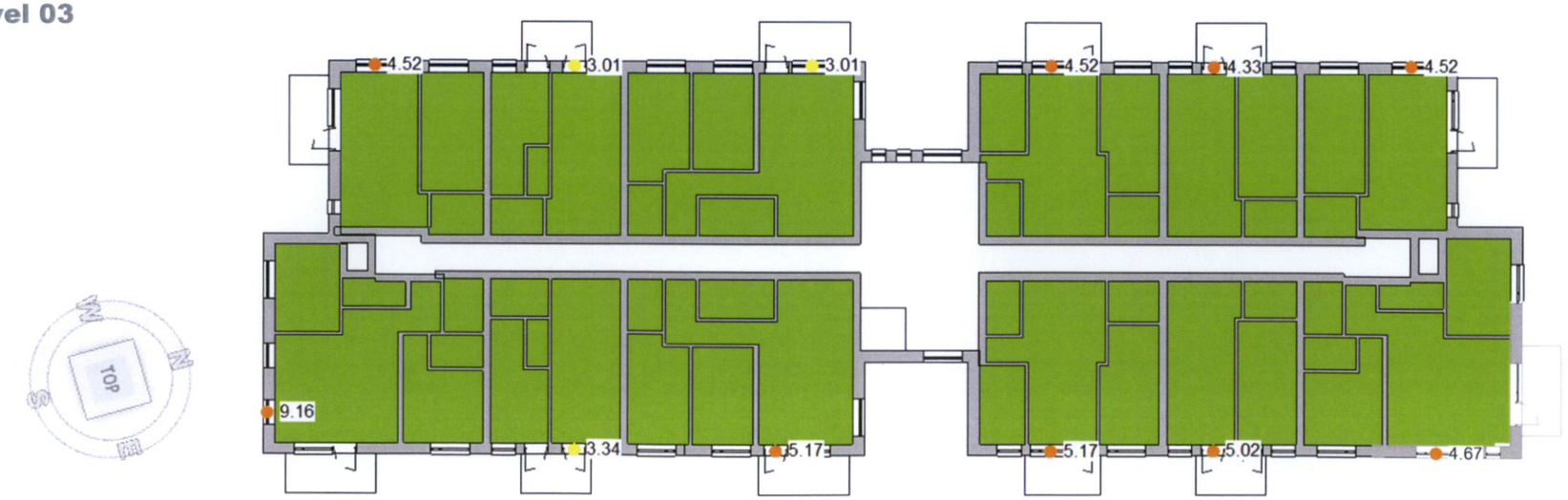
Results: Block 2

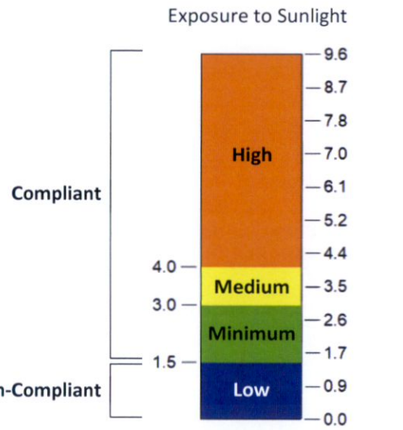
Sunlight Analysis as illustrated below, determined every unit was found to achieve the minimum recommendations on these levels.



Level 02

Level 03

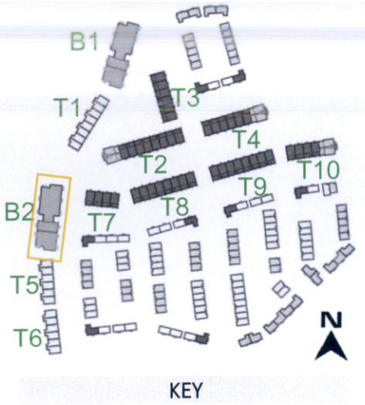




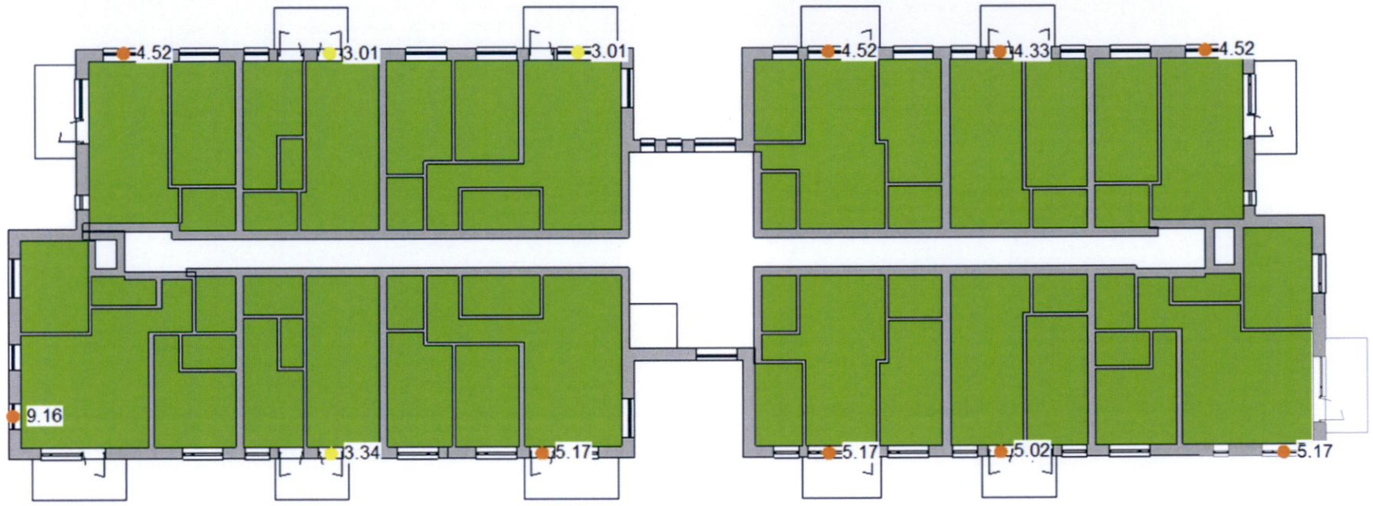
Block 2	Number of units		
	Pass	Fail	Total
Ground Floor	10	0	10
First Floor	12	0	12
Second Floor	12	0	12
Third Floor	12	0	12
Fourth Floor	12	0	12
Fifth Floor	6	0	6
	64	**0**	**64**
	100%	**0%**	

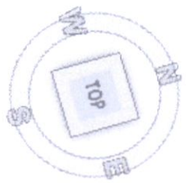
Results: Block 2

Sunlight Analysis as illustrated below, determined every unit was found to achieve the minimum recommendations on these levels.

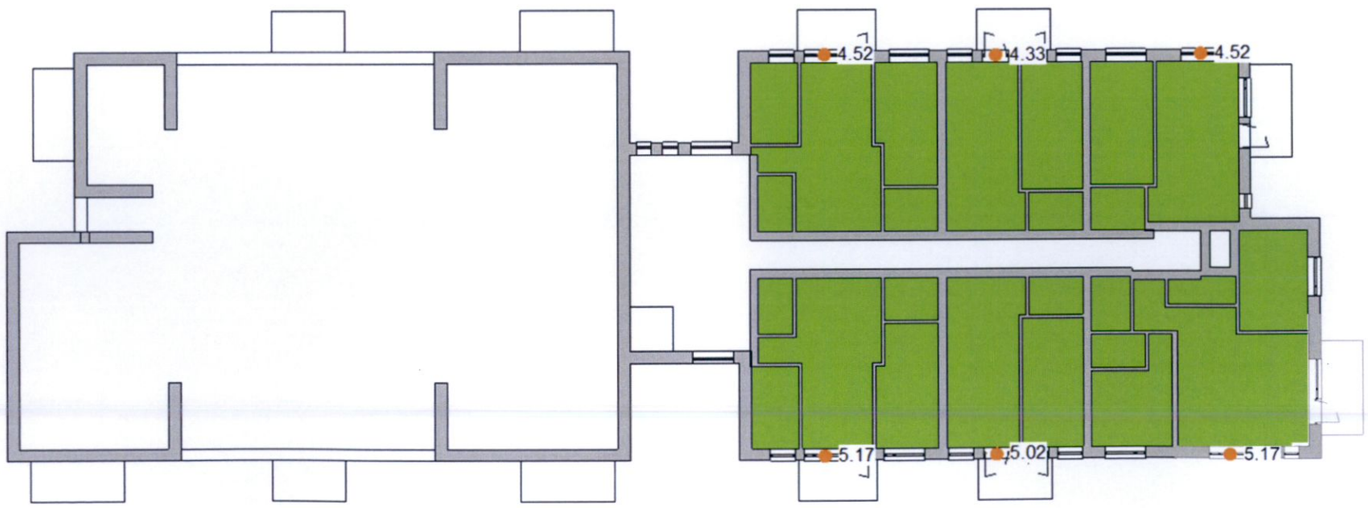


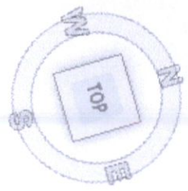
Level 04

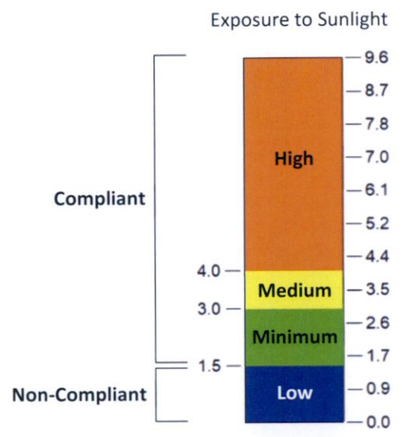




Level 05



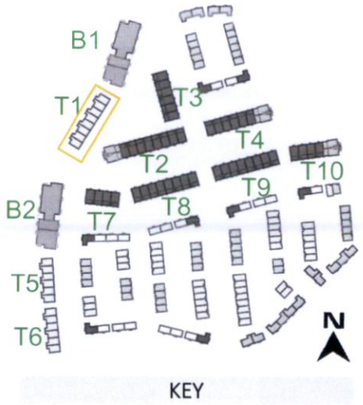


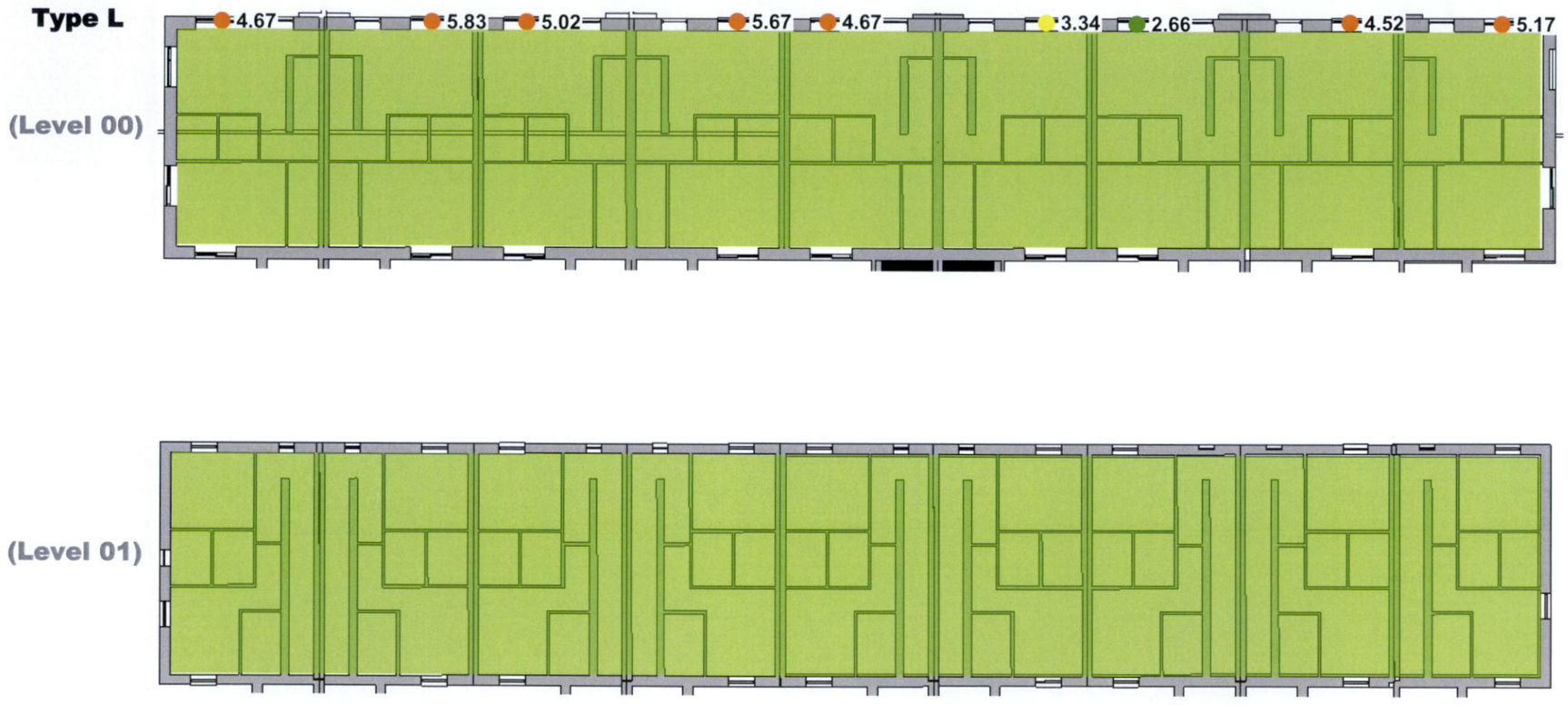


Block 2	Number of units		
	Pass	Fail	Total
Ground Floor	10	0	10
First Floor	12	0	12
Second Floor	12	0	12
Third Floor	12	0	12
Fourth Floor	12	0	12
Fifth Floor	6	0	6
	64	0	64
	100%	0%	

Results: Terrace 1

As illustrated below in the Sunlight Analysis, it was determined that every unit met the BRE Guide's minimum recommendations for Type L units in this block.

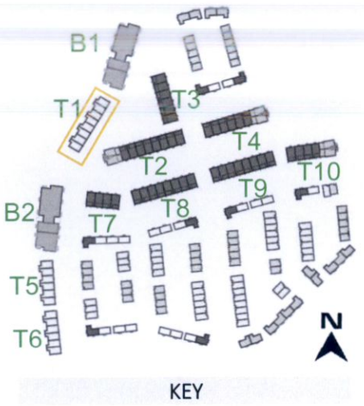




Terrace 1	Number of units		
	Pass	Fail	Total
Type L (Level 00 & 01)	9	0	9
Type M (Level 02 & 03)	9	0	9
	18	0	18
	100%	0%	

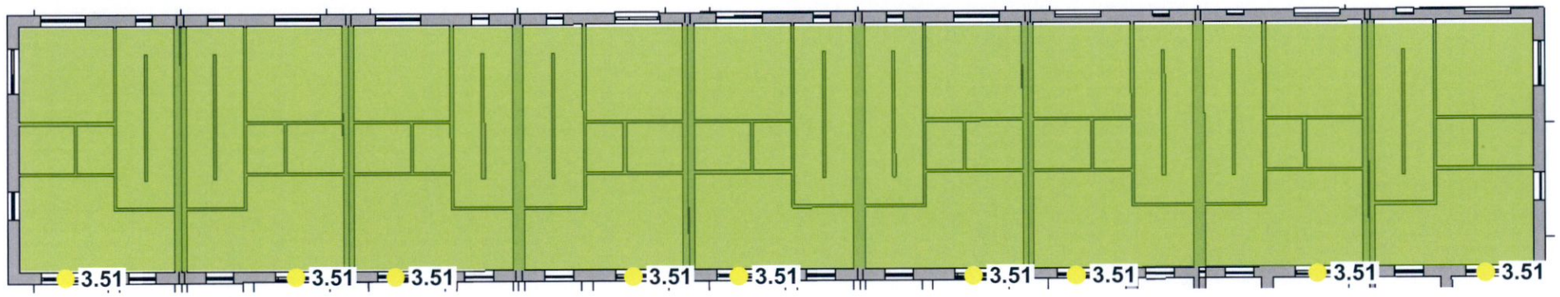
Results: Terrace 1

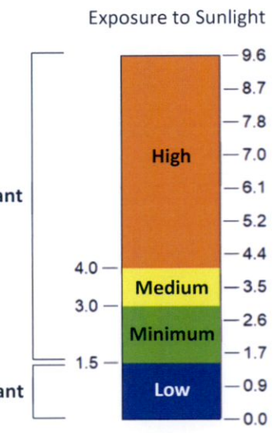
As illustrated below in the Sunlight Analysis, it was determined that every unit met the BRE Guide's minimum recommendations for Type M units in this block.



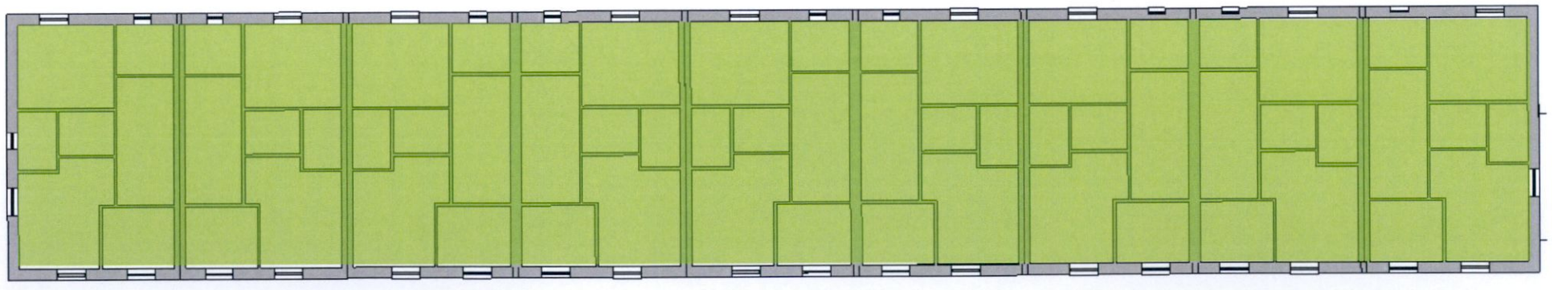
Type M

(Level 02)





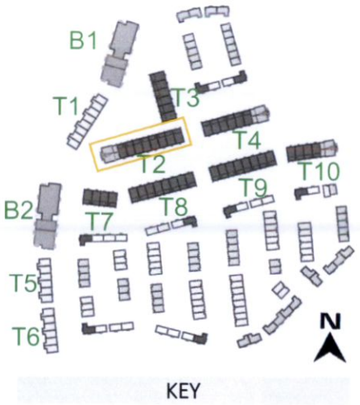
(Level 03)

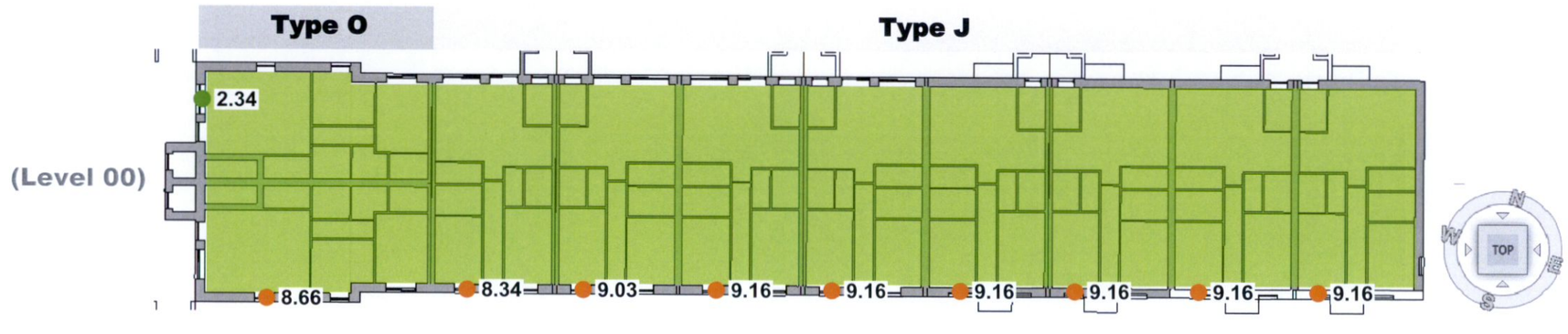


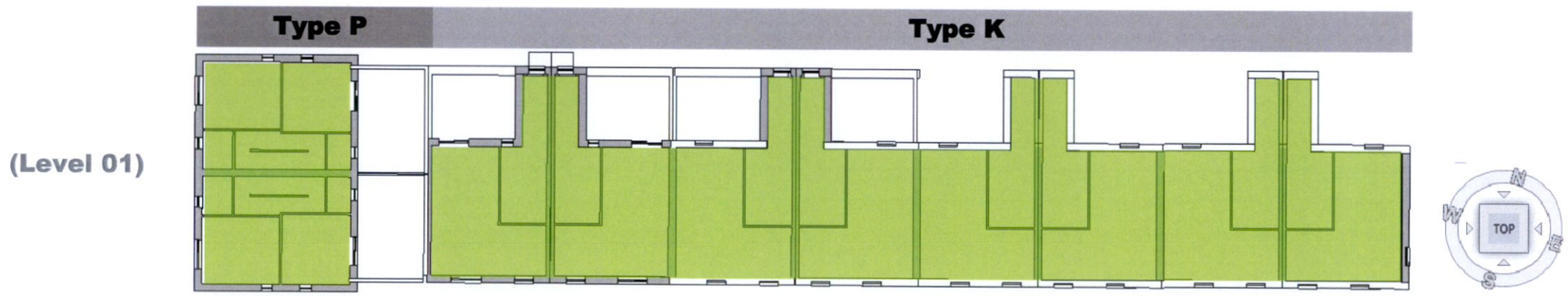
Terrace 1	Number of units		
	Pass	Fail	Total
Type L (Level 00 & 01)	9	0	9
Type M (Level 02 & 03)	9	0	9
	18	0	18
	100%	0%	

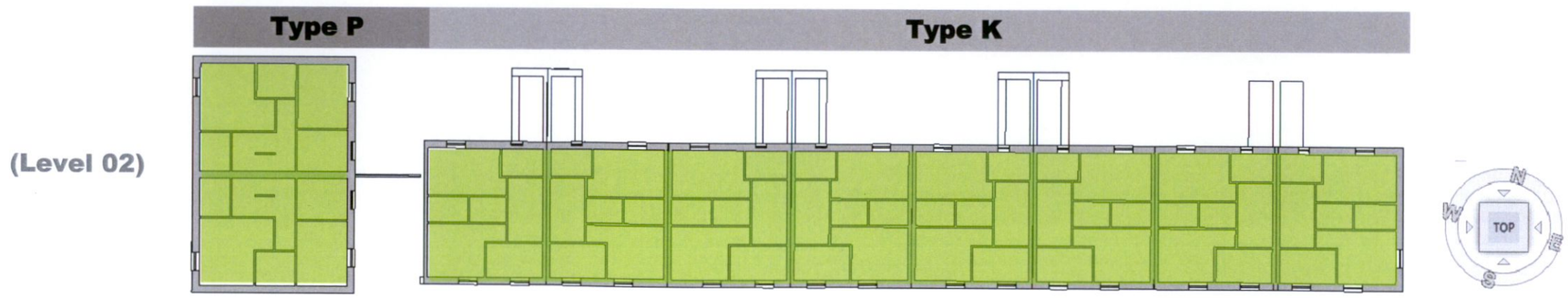
Results: Terrace 2

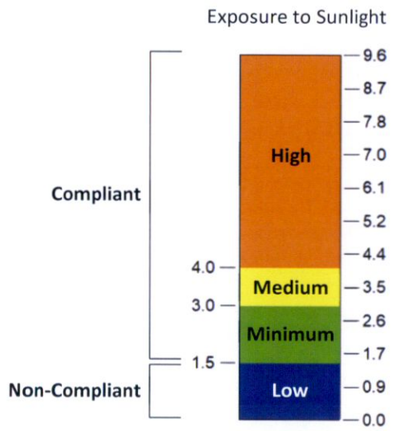
As illustrated below in the Sunlight Analysis, it was determined that every unit met the BRE Guide's minimum recommendations in this block.







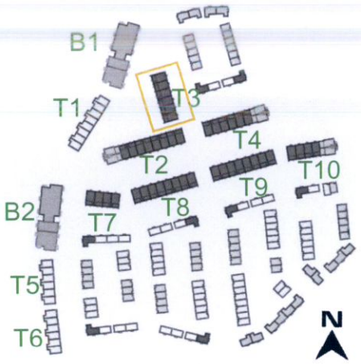




Terrace 2	Number of units		
	Pass	Fail	Total
Type J (Level 00)	8	0	8
Type K (Level 01 & 02)	8	0	8
Type O (Level 00)	2	0	2
Type P (Level 01 & 02)	2	0	2
	20	0	20
	100%	0%	

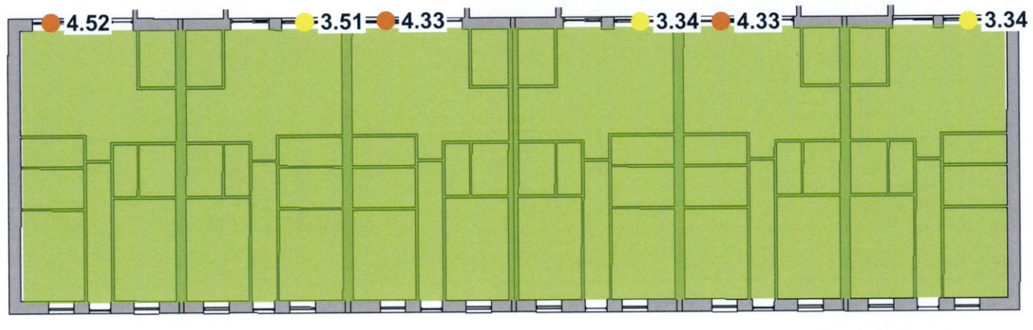
Results: Terrace 3

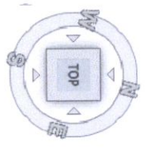
As illustrated below in the Sunlight Analysis, it was determined that every unit met the BRE Guide's minimum recommendations in this block.



Type J

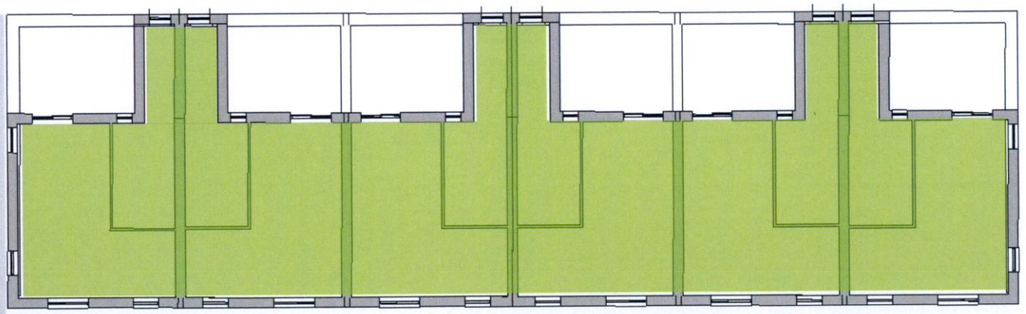
(Level 00)

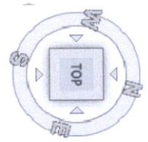




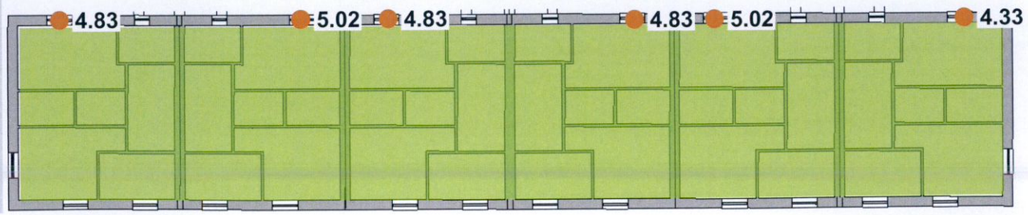
Type K

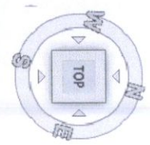
(Level 01)

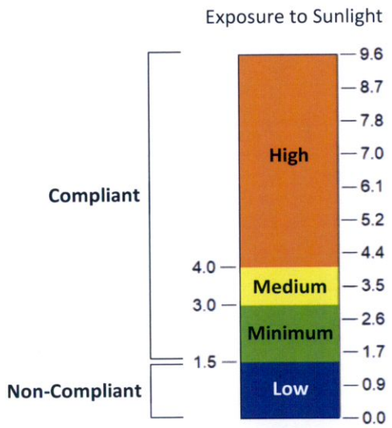




(Level 02)







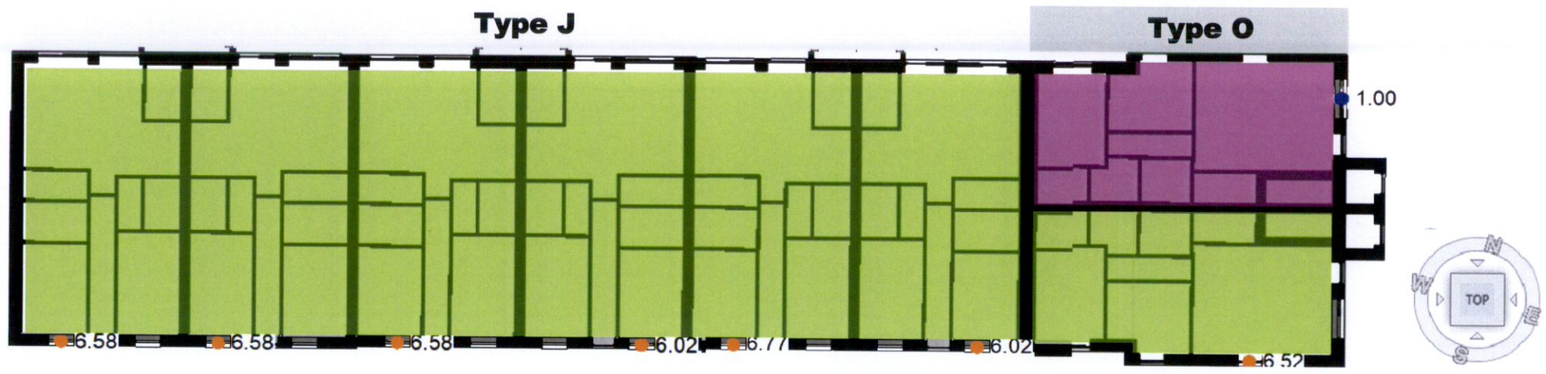
Terrace 3	Number of units		
	Pass	Fail	Total
Type J (Level 00)	6	0	6
Type K (Level 01 & 02)	6	0	6
	12	0	12
	100%	0%	

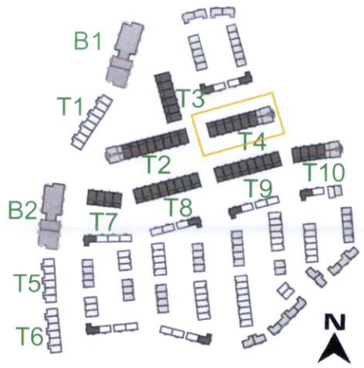
Results: Terrace 4

Sunlight Analysis as illustrated below, determined 15 out of 16 units on this block achieve the minimum recommendations. The pink shaded unit receives reduced sunlight due to Northerly aspect.

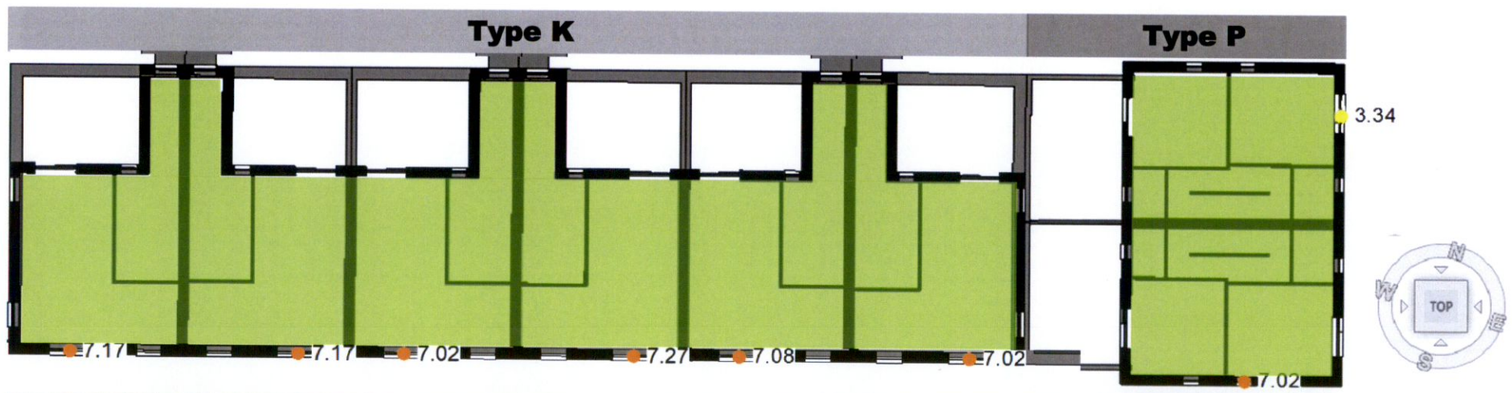
Compensatory Measure:
1. Good Daylight

(Level 00)

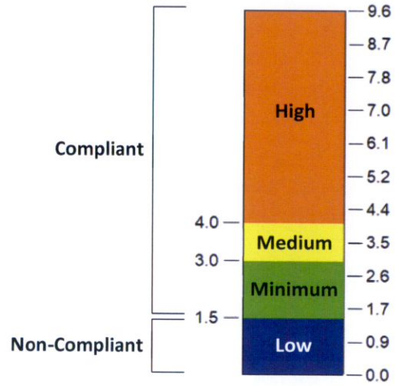




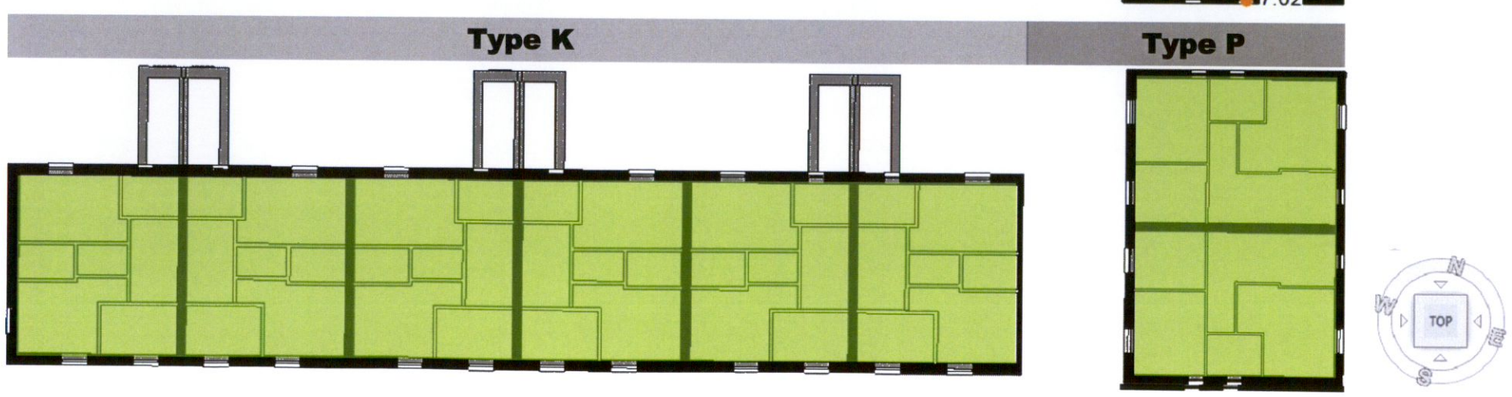
(Level 01)



Exposure to Sunlight



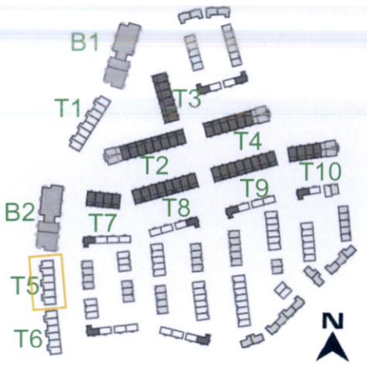
(Level 02)



Terrace 4	Number of units		
	Pass	Fail	Total
Type J (Level 00)	6	0	6
Type K (Level 01 & 02)	6	0	6
Type O (Level 00)	1	1	2
Type P (Level 01 & 02)	2	0	2
	15	1	16
	94%	6%	

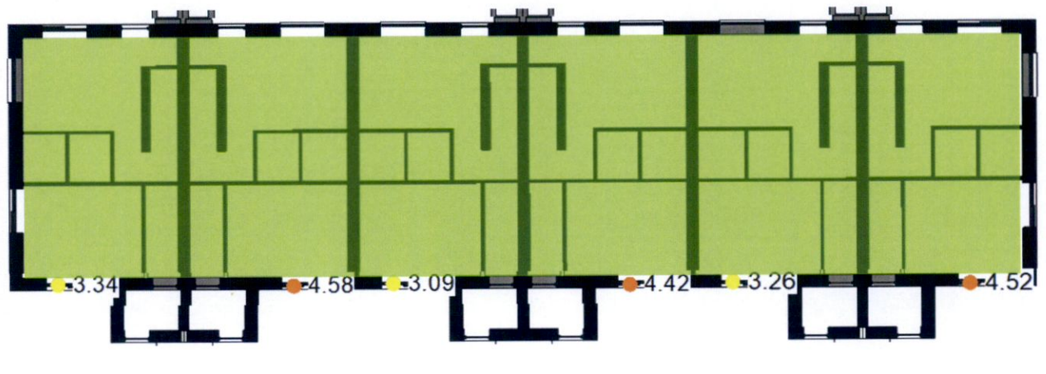
Results: Terrace 5

As illustrated below in the Sunlight Analysis, it was determined that every unit met the BRE Guide's minimum recommendations for Type L units in this block.

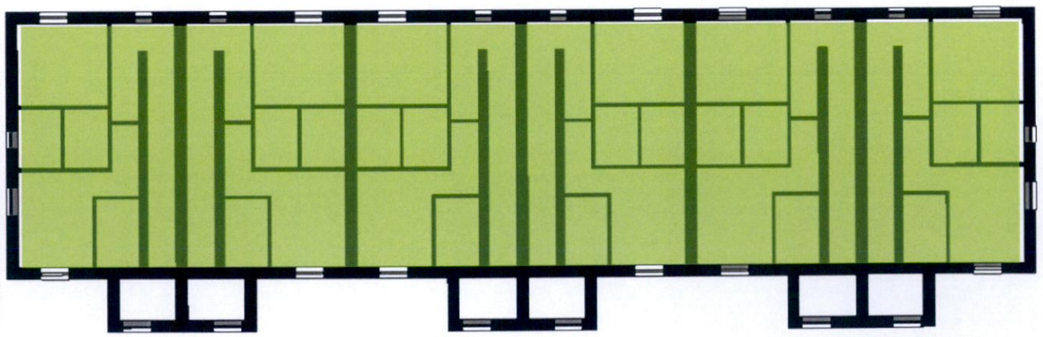


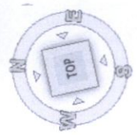
Type L

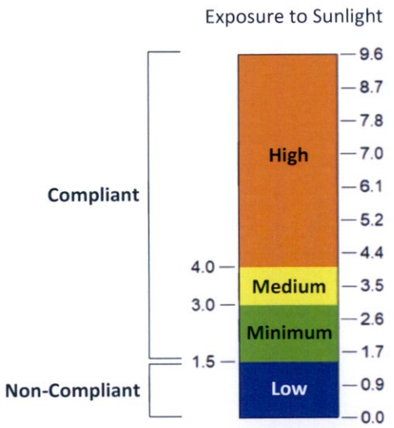
(Level 00)



(Level 01)



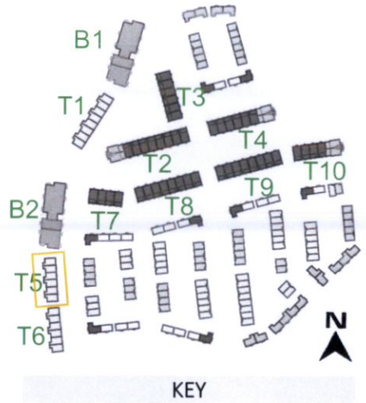




Terrace 5	Number of units		
	Pass	Fail	Total
Type L (Level 00 & 01)	6	0	6
Type M (Level 02 & 03)	6	0	6
	12	0	12
	100%	0%	

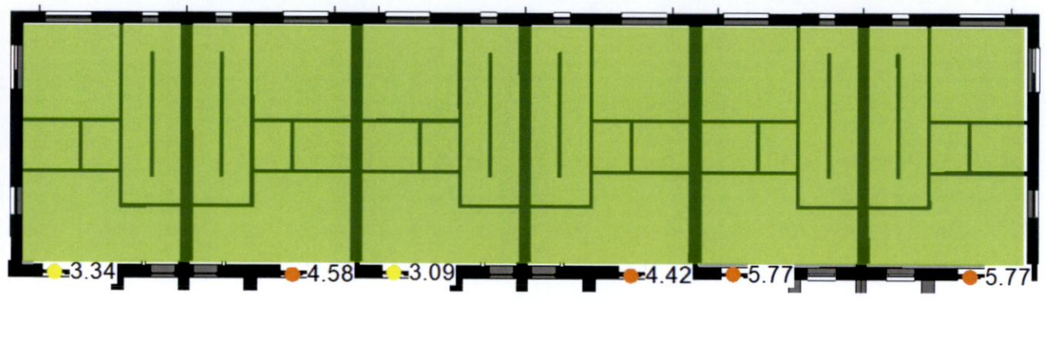
Results: Terrace 5

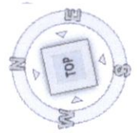
As illustrated below in the Sunlight Analysis, it was determined that every unit met the BRE Guide's minimum recommendations for Type M units in this block.

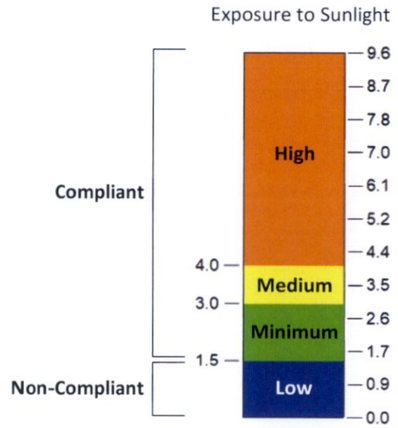


Type M

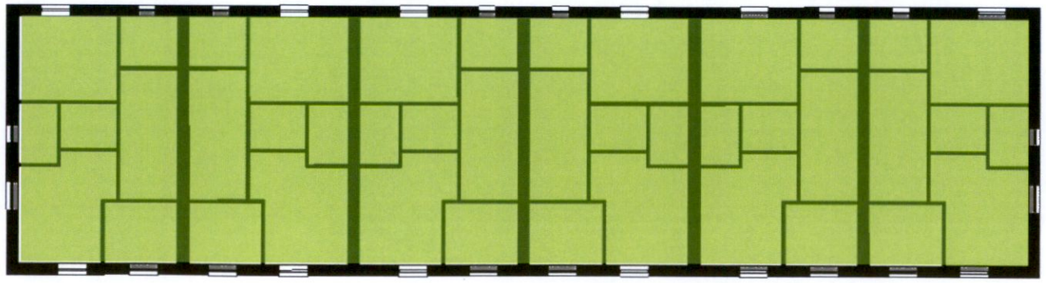
(Level 02)







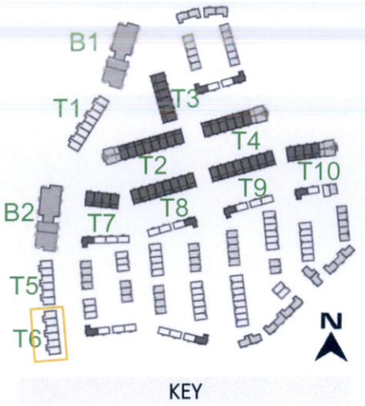
(Level 03)



Terrace 5	Number of units		
	Pass	Fail	Total
Type L (Level 00 & 01)	6	0	6
Type M (Level 02 & 03)	6	0	6
	12	0	12
	100%	0%	

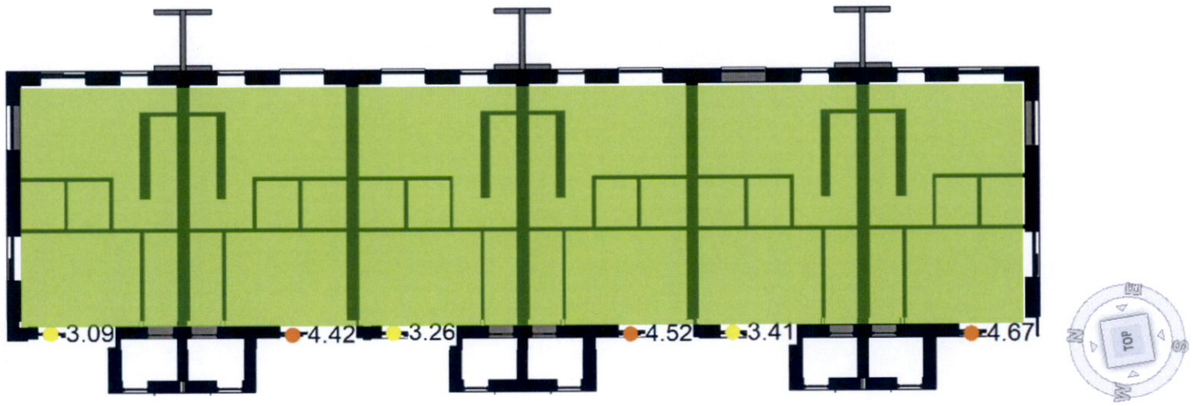
Results: Terrace 6

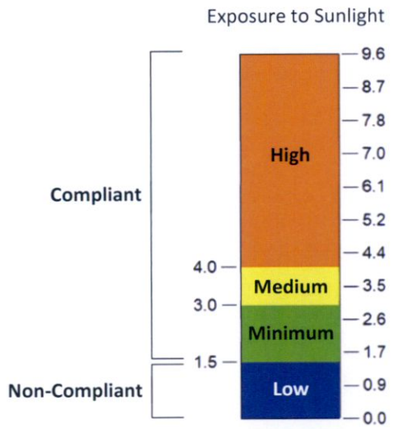
As illustrated below in the Sunlight Analysis, it was determined that every unit met the BRE Guide's minimum recommendations for Type L units in this block.



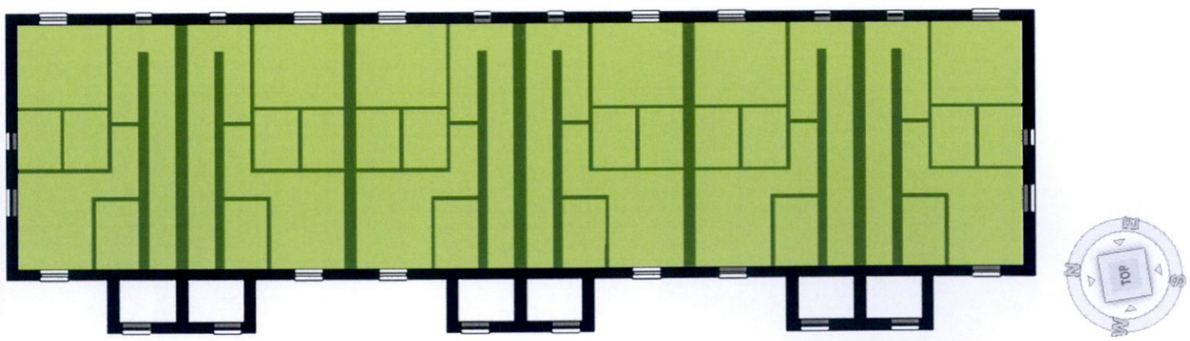
Type L

(Level 00)





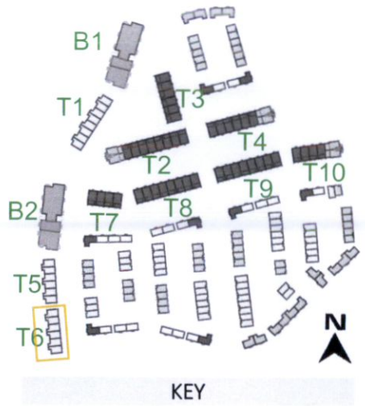
(Level 01)



Terrace 6	Number of units		
	Pass	Fail	Total
Type L (Level 00 & 01)	6	0	6
Type M (Level 02 & 03)	6	0	6
	12	0	12
	100%	0%	

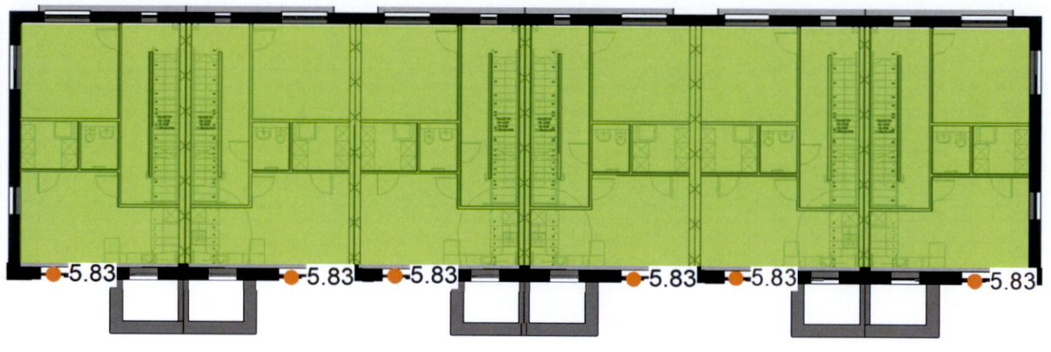
Results: Terrace 6

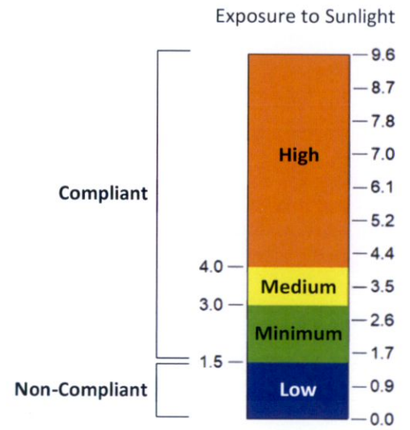
As illustrated below in the Sunlight Analysis, it was determined that every unit met the BRE Guide's minimum recommendations for Type M units in this block.



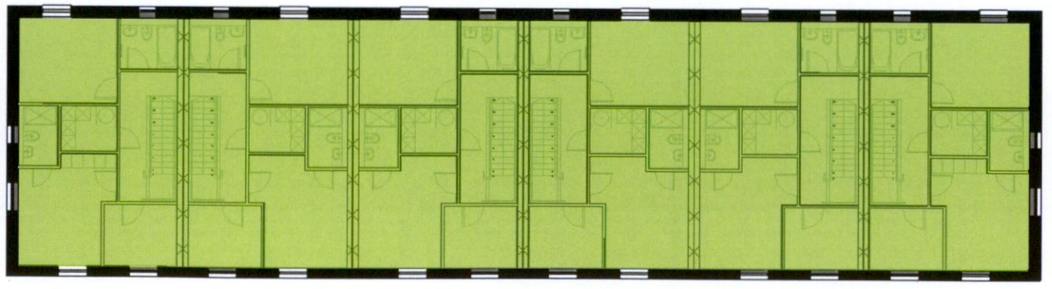
Type M

(Level 02)





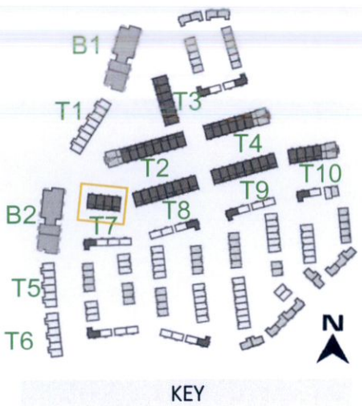
(Level 03)



Terrace 6	Pass	Fail	Total
Type L (Level 00 & 01)	6	0	6
Type M (Level 02 & 03)	6	0	6
	12	0	12
	100%	0%	

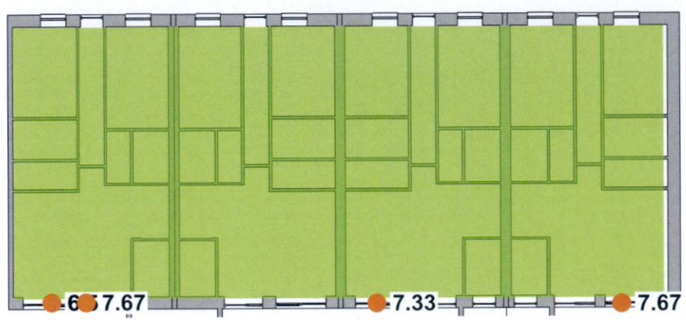
Results: Terrace 7

As illustrated below in the Sunlight Analysis, it was determined that every unit met the BRE Guide's minimum recommendations in this block.

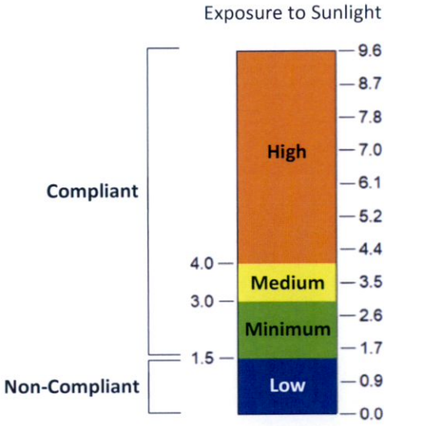


Type J

(Level 00)



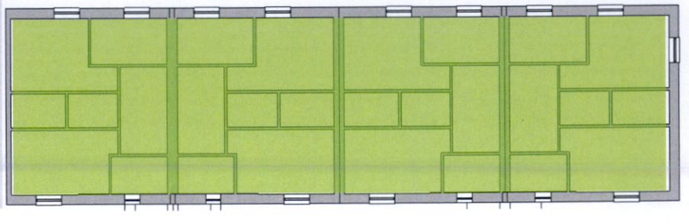
Exposure to Sunlight



Type K

(Level 01)

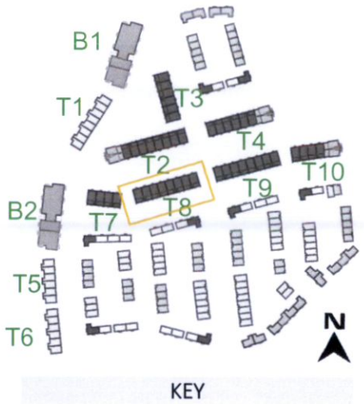
(Level 02)



Terrace 7	Number of units		
	Pass	Fail	Total
Type J (Level 00)	4	0	4
Type K (Level 01 & 02)	4	0	4
	8	0	8
	100%	0%	

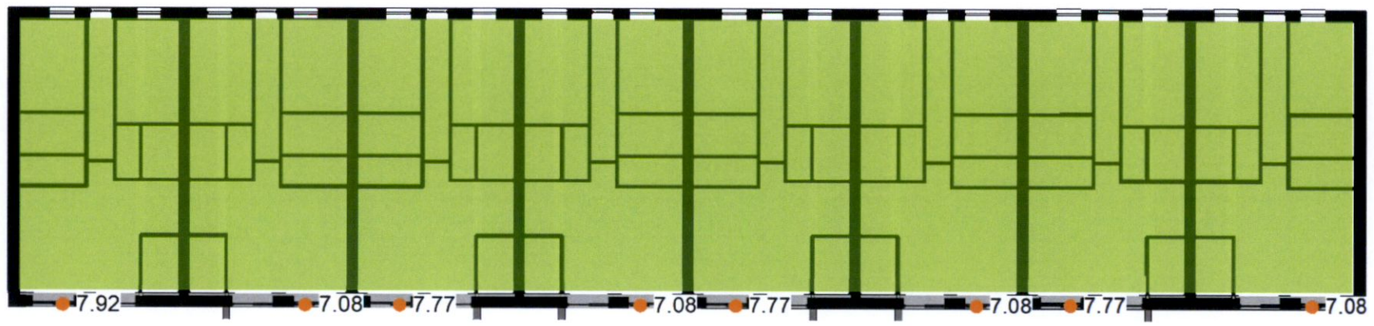
Results: Terrace 8

As illustrated below in the Sunlight Analysis, it was determined that every unit met the BRE Guide's minimum recommendations in this block.



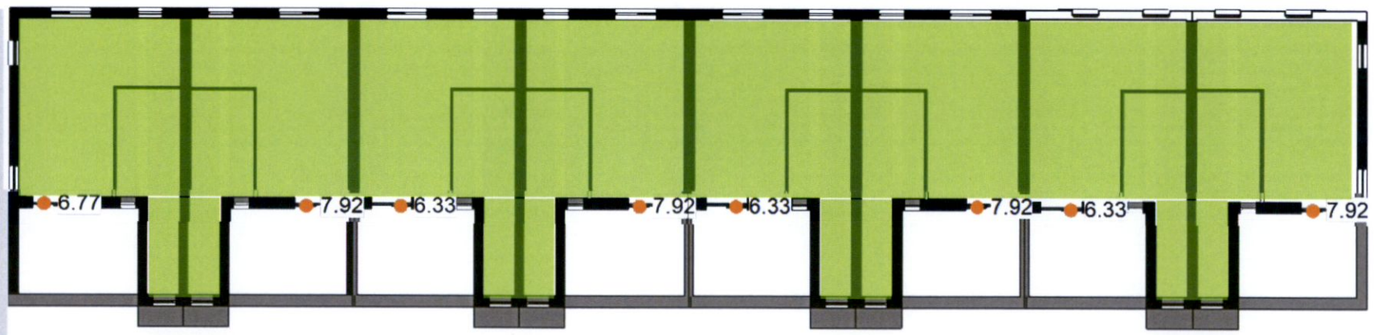
Type J

(Level 00)

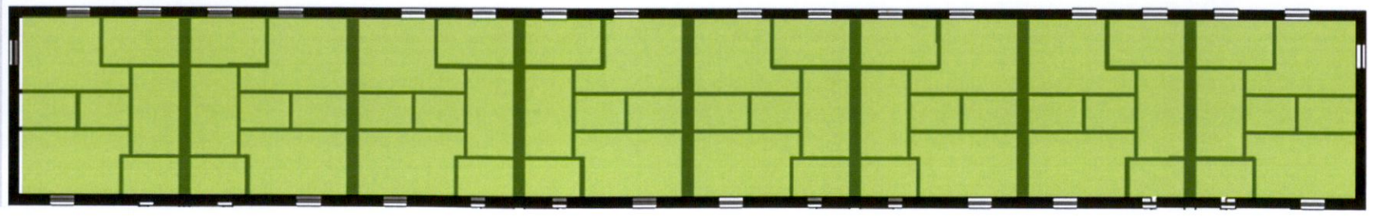


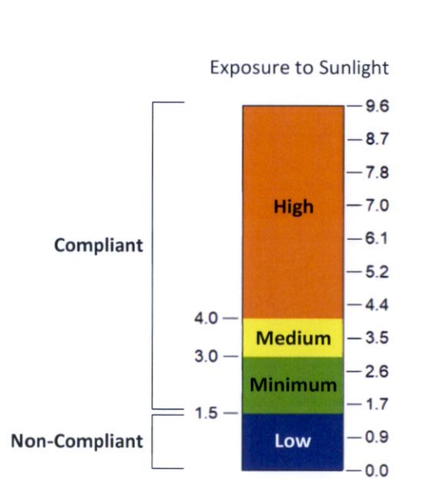
Type K

(Level 01)



(Level 02)

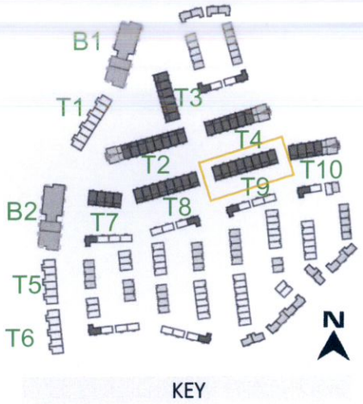




Terrace 8	Number of units		
	Pass	Fail	Total
Type J (Level 00)	8	0	8
Type K (Level 01 & 02)	8	0	8
	16	0	16
	100%	0%	

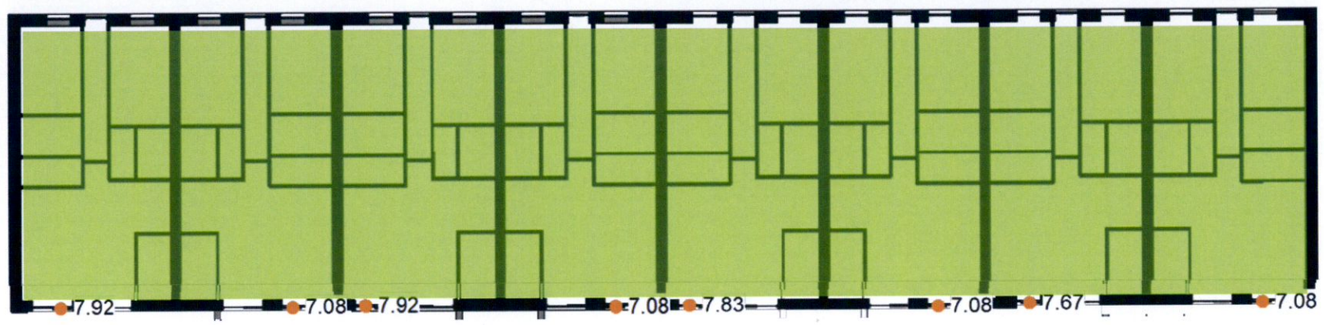
Results: Terrace 9

As illustrated below in the Sunlight Analysis, it was determined that every unit met the BRE Guide's minimum recommendations in this block.



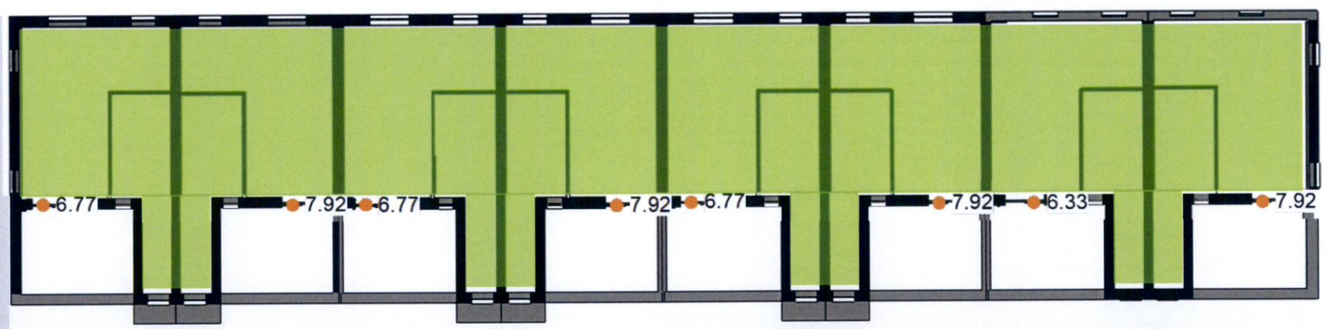
Type J

(Level 00)

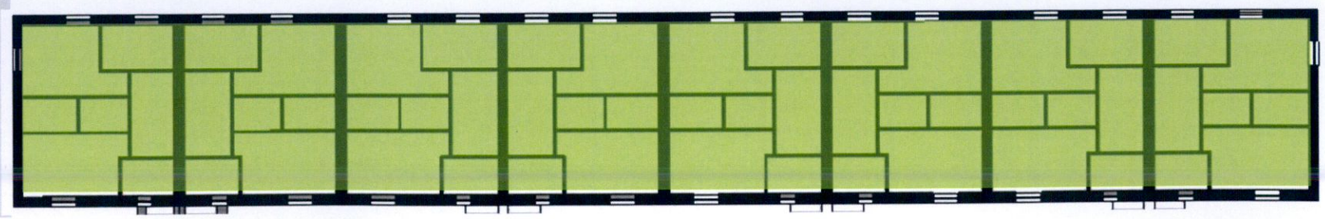


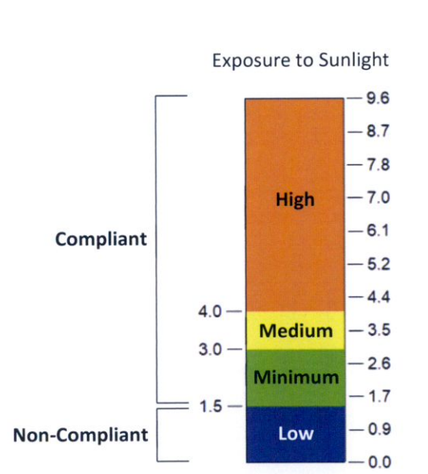
Type K

(Level 01)



(Level 02)

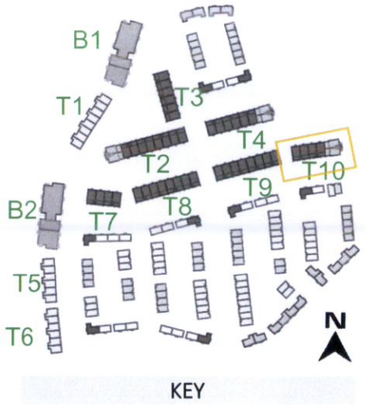




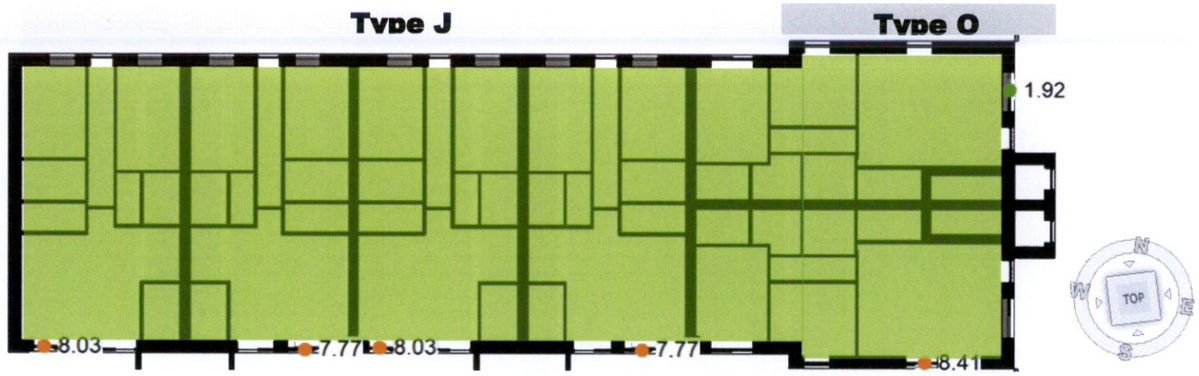
Terrace 9	Number of units		
	Pass	Fail	Total
Type J (Level 00)	8	0	8
Type K (Level 01 & 02)	8	0	8
	16	0	16
	100%	0%	

Results: Terrace 10

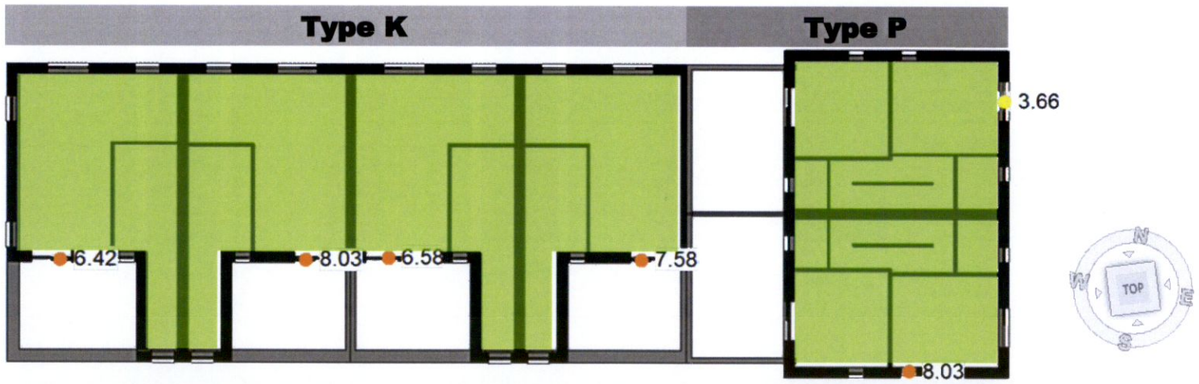
As illustrated below in the Sunlight Analysis, it was determined that every unit met the BRE Guide's minimum recommendations in this block.



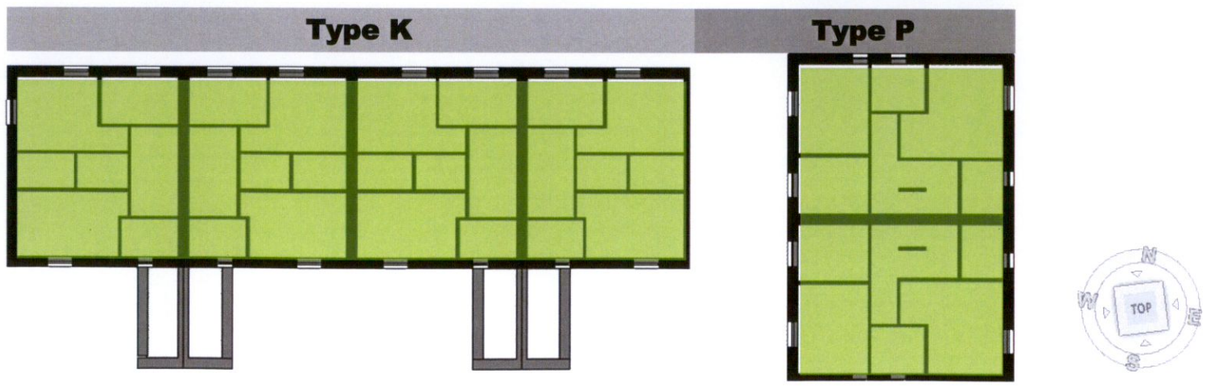
(Level 00)

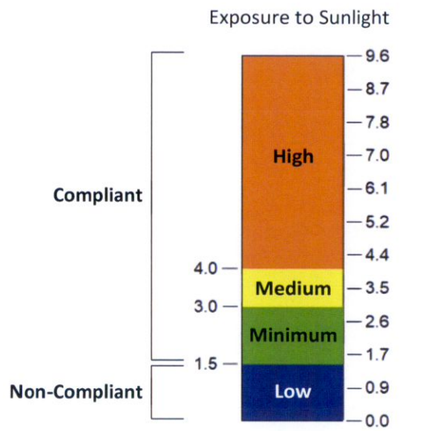


(Level 01)



(Level 02)





Terrace 10	Number of units		
	Pass	Fail	Total
Type J (Level 00)	4	0	4
Type K (Level 01 & 02)	4	0	4
Type O (Level 00)	2	0	2
Type P (Level 01 & 02)	2	0	2
	12	0	12
	100%	0%	

Appendix C – Clarifications

Impact of Trees

The BRE Guide provides the following guidance in relation to the impact of trees:

> *"G1.1 Trees and hedges vary in their effects on skylight and sunlight. Most tree species will cast a partial shade[G¹,G²]; for deciduous trees this will vary with time of year. However very little light can penetrate dense belts of evergreen trees, and the shade they cause will be more like that of a building or wall.*
>
> *G1.2 It is generally more difficult to calculate the effects of trees on daylight because of their irregular shapes and because some light will generally penetrate through the tree crown. Where the effect of a new building on existing buildings nearby is being analysed, it is usual to ignore the effect of existing trees. This is because daylight is at its scarcest and most valuable in winter when most trees will not be in leaf."*

The guide goes on to further note:

> ***"G2 Skylight in new dwellings obstructed by trees***
>
> *G2.1 Sometimes, however, trees should be taken into account, for example where a new dwelling is proposed near to large existing trees. "*
>
> ***"G3 Sunlight in new dwellings obstructed by trees***
>
> *G3.1 To assess sunlight provision to new dwellings, BS EN 17037 recommends the calculation of hours of sunlight received on a single day, assuming clear skies; 21 March is the suggested date. …. At this time of the year deciduous trees will not be in full leaf and therefore some sun will be expected to penetrate. However, it would be impossible to accurately simulate how the fragmented obstruction of a tree would obstruct direct sunlight to a point at a particular time."*
>
> ***"G4 Sunlight in gardens with trees***
>
> *G4.1 In assessing the impact of buildings on sunlight in gardens (see section 3.3), trees and shrubs are not normally included in the calculation unless a dense belt or group of evergreens is specifically planned as a windbreak or for privacy purposes. This is partly because the dappled shade of a tree is more pleasant than the deep shadow of a building (this applies especially to deciduous trees)."*

BRE have also clarified directly to IN2 that large existing belts of trees should be including and that:

> *"For proposed landscaping, trees and vegetation would usually need not be included if they would not impact daylight/sunlight to proposed areas, for example if they were low level (below sill height) or would not obstruct a room. Deciduous trees need not be included in assessment of sunlight to open spaces. Where a dense belt or group of trees is specifically planned as a windbreak or for privacy purposes, it is better to include these if they could obstruct daylight/sunlight. The growth of trees and their likely final size should be allowed for. In other situations professional judgement should be used. For example, if plans suggest a proposed tree would be likely to significantly obstruct a room then an account for it could be included."*

A review of the landscape plan was undertaken with the appointed Landscape Architect, and it was concluded that the species and their expected sizes do not necessitate their inclusion in the assessment. Therefore, for the purpose of the analysis within this report, there is no existing belt of trees that need to be accounted for, nor substantial proposed landscaping that would impact the assessment of the internal daylight assessment.

View Out

Whilst the metric to assess View Out is included in the BRE Guide, the following clarification is noted for housing:

> *"The method is most applicable to spaces with fixed seating locations such as offices and schools; it is less relevant to housing where people can move about in order to see out."*

Therefore, no assessment was determined to be required for this development.

Protection against Glare

The EN 17037 standard does include a metric for determining glare, the standard clarifies that the applicability is:

> "A glare assessment is suggested in spaces, where the expected activities are comparable to reading, writing or using display devices and the user is not able to choose freely his position and viewing direction. For glare protection, a movable or retractable solar protection device can individually be adjusted while fixed devices may need additional shading devices to support individual needs."

The BRE Guide notes:

> "Sunlight is also valued in non-domestic buildings. However, the requirement for sunlight will vary according to the type of non-domestic building, the aims of the designer and the extent to which the occupants can control their environment. People appreciate sunlight more if they can choose whether to be exposed to it, either by changing their positions in the room or using adjustable shading. Where prolonged access to sunlight is available, shading devices will also be needed to avoid overheating and unwanted glare from the sun. This can apply to housing as well."

Therefore, as the assessments within this report are for the residential sections of the development, where occupants can choose their locations and viewing direction, no assessment was determined to be required for this development.

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