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Daylight & Sunlight Assessments of a Residential Development at Kilgobbin Road, Stepaside Co. Dublin.

Applicant   Kilgobbin Apartments Limited.
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Prepared by John Healy
MSc Environmental Design of Buildings

Contents:

1. Introduction

The proposed Large-Scale Residential Development (LRD) will provide 120 no. apartment units within 2 no. blocks ranging in height from 4- to 6-storeys. The development will consist of; Block A, consisting of 44 no. units (27 no. 1 bed (2-person), 13 no. 2 bed (3-persons), 1 no. 2 bed (4-persons) and 3 no. 3 bed (5-persons) of 4- to 5-storeys height and of Block B, consisting of 76 no. units (40 no. 1 bed (2-persons), 12 no. 2 bed (3-persons), 16 no. 2 bed (4-persons) and 8 no. 3 bed (4-persons) of 5- to 6-storeys height.

The proposed development will provide all associated public open space and play area, 54 no. car parking spaces including accessible parking and Electric Vehicle parking, 273 no. bicycle parking spaces, 3 no. motorcycle parking spaces, bin/waste store and a plant room at ground floor level, 1 no. detached ESB substation and 1 no. detached bicycle store for Block A residents. The proposed development will also provide for all associated site development and infrastructural works including foul and surface water drainage, roads, footpaths, landscaping, boundary treatment and a pedestrian and cycling pathway connecting Belarmine Vale and Kilgobbin Road. Vehicular access to the development will be via Belarmine Vale.

1.1 Executive Summary

This report assesses the impact of the proposed development for Daylight and Sunlight on the neighbouring buildings and the quality of daylight and sunlight within the proposed development. This analysis is carried out based on the drawings of Downey.

The report has been prepared by John Healy - Diploma Architectural Technology, M.Sc Environmental Design of Buildings, PG Dip Digital Media. John is a Director at Digital Dimensions for the last 25 Years.

John has been working as a Daylight and Sunlight consultant for the last 15 years following completion of a Masters of Science in Environmental Design of Buildings at Cardiff University. The Masters focused on passive design strategies including daylight and sunlight optimisation. John has worked on an extensive list of projects over the years varying in scale and location from restricted city sites to urban and rural projects throughout Ireland. Some previous work include;

- Oscar Traynor Wood; 850 unit housing and apartment development for Glenveagh Homes / Dublin City Council.
- Belcamp North Dublin; 2527 unit residential scheme for Gannon Homes.
- Taylor's Lane Apartment Development; 402 units apartment development for Shannon Homes.
- Social Housing Bundles (SHB) 4&5; 17 social housing sites for the NDFA.
- No.9 -12 Dawson Street: Extension to listed office block in Dublin for Oakmount.

1.2 Assessment of Potential Impact to Daylight and Sunlight Availability on Adjacent Properties

1.2.1 Daylight to Adjacent Properties
Analysis demonstrated in Section 3 shows that there will be a negligible reduction in daylight in adjacent properties. The proposed development meets the recommendations for daylight in the BRE guidelines BR209:2022 (third edition).

1.2.2 Sunlight to Adjacent Properties
Analysis demonstrated in Section 4 shows that the adjacent dwellings will retain sunlight levels in excess of the recommended levels set out in the BRE guidelines (2022).

Analysis demonstrated in Section 5 shows that there will be minimal reduction to sunlight to adjacent communal and private amenity spaces and any perceived reduction will be negligible. This finding is supported by the shadow study in Section 9. All areas assessed continue to meet or exceed the recommendations of the BRE guidelines (2022).

1.3 Assessment of the Quality of Daylight and Sunlight within the Proposed Development
The residential units were designed in line with the recommendations of the BRE guidelines (2022). A number of design iterations were conducted to improve the daylight and sunlight within the proposed development. The guidelines clearly state that the targets are recommendations only and flexibility is required when setting and interpreting the targets.

The BRE guidelines (2022) recommends assessment methods set out in BS EN 17037 for daylight provision. BS EN 17037 contains a National Annex which sets out minimum daylight levels to be achieved in the UK and channel Islands. Ireland has a similar latitude and climate to the UK. The UK annex to BS EN 17037 states that the target values set out in EN 17037 Table A1 may be hard to achieve in the UK, it sets alternative minimum values for rooms to dwellings. The minimum illuminance levels set out in BS EN17037:2018+A1:2021 are: Kitchens and living spaces containing a kitchen 200lux (1.3%DF). Living rooms 150lux (1%DF) and bedrooms 100lux (DF0.7%).

The levels set out in the UK annex are used in this assessment, as the primary results to be achieved, because these are referenced in the BRE guidelines (2022), as recommended by the local authority. The BRE guidelines (2022) deals with daylight and sunlight to adjacent properties and defers to BS EN17037:2018+A1:2021 for daylight and sunlight within the proposed development and allows for a complete assessment of the proposed development and its surroundings. The BRE guidelines (2022) presents a discussion on aspects of daylight and sunlight and interpreting the results of these assessments.

IS EN17037:2018 does not set out any guidance for assessing the impact to daylight and sunlight from a proposed development on neighbouring buildings nor is there any Irish governmental guidance on interpreting results and percentages of units to achieve the target results in multi unit developments. IS EN17037:2018 does not set out room use specific targets but instead designates a Minimum and Target lux level to be achieved in all rooms regardless of use. The function of a room historically has been the key factor in informing the design of a building and the window sizes to allow adequate daylight levels for the task typical to that room to be achieved. The lack of variance in target levels for the tasks typical to a room can lead to substantially oversized windows in rooms with a lower requirement for daylight levels, for example bedrooms. The aim to achieve the minimum target lux level to all rooms in a multi unit residential building is not practical and could lead to overheating of units that have greater access to the sky and sunlight. This could also lead to higher energy usage due to oversized windows and a balance needs to be met.

The results for the Minimum and Target levels set out in Table A1 in IS EN17037:2018 are presented in the assessment as supplementary for completeness, however, conclusions can not be made due to lack of clear guidance on interpenetration of results.

There are existing mature trees in the vicinity, in particular along the southern boundary of the site. The assessment for daylight has been taken with retained trees in the model.

1.3.1 Assessment of Daylight in Accordance with BR209:2022 and BS EN 17037:2018+A1:2021

100% of the Living, Dining, Kitchen and Bedroom spaces within the proposed development achieve the target values set out in BS EN 17037:2018+A1:2021 Table NA1. These are the minimum values, per specified use, to be achieved in habitable rooms and meets the recommendations of the BRE guidelines (2022).

1.3.2 Sunlight within the Proposed Development

This scheme is well designed for sunlight, with 80.8% of units meeting the minimum recommended 1.5 direct sunlight hours. This is in line with the BRE guideline example for an apartment layout where 4 in 5 achieves the target sunlight hours.

Analysis demonstrated in Section 8 shows that the public and communal amenity spaces achieve 2 hours sunlight on the 21st March over in excess of 50% of the area. The proposed development meets the recommendations of the BRE guidelines (2022).

1.4 Supplementary Information - Assessment of Daylight in Accordance with IS EN 17037:2018

EN 17037:2018 sets out values for target illuminance, minimum target illuminance and fractions of reference plane to be achieved. The target and minimum target levels set out in EN17037:2018 are for any type of building; they do not take into account room use or make allowance for rooms that have a lesser requirement for daylight. The results of this assessment indicate a high level of daylight provision, with 97.4% of rooms achieving Minimum Illuminance and 96.7% achieving Target Illuminance. Appendix B identifies any rooms which do not achieve minimum or target illuminance levels.

To date there is no guidance from governmental bodies on the use or interpretation of IS EN 17037:2018. Apartment guidelines and local authorities guidelines refer to BR209 2022: "Site layout planning for daylight and sunlight" (third edition) which in turn references BS EN 17037. BS EN17037:2018+A1:2021 is the same as IS EN 17037:2018 with the addition of a National Annex (NA1) and the annex specifically refers to and sets room specific values for dwellings in the UK and Channel Islands. Therefore the assessment against IS EN 17037:2018 is included as supplementary information only, noting there are no room specific recommendations for daylight and because of this limitation, it is considered the recommendations made in the BRE guidelines (2022) are more appropriate.

1.5 Conclusions

Overall the design team worked in response to the context to ensure the proposed development performs with regards to achieving the best possible daylight and sunlight quality. All habitable rooms meet the minimum standard for daylight provision as per BS EN 17037:2018+A1:2021 as referred to in the BRE guidelines BR209:2022 (third edition).

In the assessment of daylight in accordance with IS EN 17037:2018, shown for supplementary information, the vast majority of habitable rooms achieve daylight provision as set out in IS EN 17037:2018

With regard to internal daylighting, Section 3.2 of the Urban Development and Building Heights: Guidelines for Planning Authorities (2018) states:

"Where a proposal may not be able to fully meet all 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, in respect of which the planning authority or An Bord Pleanála should apply their discretion, having regard to local factors including specific site constraints and the balancing of that assessment against the desirability of achieving wider planning objectives. Such objectives might include securing comprehensive urban regeneration and or an effective urban design and streetscape solution."

It is our opinion that all habitable rooms within the proposed development achieve the minimum target daylight levels set out in BS EN 17037:2018+A1:2021, as referred to in the BRE guidelines BR209:2022 (third edition) and no compensatory measures are required.

2. Methodology

2.1 Standards and Guidelines

Ministerial guidance is provided in Sustainable and Compact Settlements: Guidelines for Planning Authorities (2024) Section 5.3.7(b).

> *"In cases where a technical assessment of daylight performance is considered by the planning authority to be necessary regard should be had to quantitative performance approaches to daylight provision outlined in guides like A New European Standard for Daylighting in Buildings IS EN17037:2018, UK National Annex BS EN17037:2019 and the associated BRE Guide 209 2022 Edition (June 2022), or any relevant future standards or guidance specific to the Irish context."*

The Daylight and Sunlight assessments included in this report demonstrates the level of compliance with these three documents:
- BR209:2022 Site Layout Planning for Daylight and Sunlight (third edition), also referred to as the BRE guidelines (2022).
- BS EN 17037:2018+A1:2021 Daylight in Buildings, also referred to as the UK Annex.
- IS EN 17037:2018 Daylight in Buildings.

2.2 BRE Guidance Document BR209:2022 Site Layout Planning for Daylight and Sunlight (third edition)

In its opening summary, the BRE guidelines (2022) states that the report "is purely advisory and the numerical target values within it may be varied to meet the needs of the development and its location." The recommendations of the BRE guidelines (2022) are not suitable for rigid application to all developments in all contexts. This is of particular importance in the context of national and local policies for the consolidation and densification of urban areas.

The BRE guidelines (2022) sets out the assessment metrics to be applied when assessing the potential impact of a development on the daylight and sunlight of neighbouring properties. This is broadly in line with the previous version of the BRE guidelines (2011). The metrics for assessing impact to adjacent buildings for Daylight is the Vertical Sky Component (VSC) and Sunlight is the Annual Probable Sunlight Hours (APSH). Sunlight to adjacent amenity space is assessed through the measurement of sunlight availability on the 21st March and the plotting of shadow diagrams.

When assessing the quality of interior spaces in proposed developments, the BRE guidelines (2022) Appendix C states; "The guidance contained in this publication is intended to be used with BS EN 17037 and its UK National Annex." The BRE guidelines (2022) also states in Section 1.7 that "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 EN17037."

2.3 Daylight in Buildings EN 17037:2018

EN 17037 is a unified daylighting standard published by the European Committee for Standardization (CEN) in 2018. It is applicable across all countries within the EU including Ireland, with the Irish edition IS EN17037:2018. The standard is enacted in Britain under BS EN 17037:2018+A1:2021 with a UK National Annex for regional assessments. The daylight and sunlight assessment methods for internal daylight and sunlight provision are common to both the Irish Standard version and the UK version. The EN17037:2018 Standard deals exclusively with new developments and does not give guidance or metrics on loss of light or sunlight to existing properties.

The UK National Annex (NA) provides further recommendations for daylight provision in the UK and Channel Islands. The UK annex states that the daylight target levels in BS EN 17037:2018 Clause A.2 may be hard to achieve in buildings in the UK, in particular dwellings in urban areas with significant obstructions or tall trees outside. The UK annex sets out minimum daylight provision to be achieved in UK dwellings. Table NA.1 sets out room specific minimum values to be achieved in the UK and Channel Islands. All the rooms achieve the minimum DF factor levels set out in A1 for Bedrooms (DF0.7%), Living Rooms (1%DF) and Kitchens and Living Spaces containing a Kitchen(1.3%). The Daylight Factor percentage values are derived from minimum room specific illuminance levels set out in NA+1 and the Median External Diffuse Illuminance ($E_{v,d,med}$) for Dublin from Table A.3 EN17037:2018. The illuminance levels and corresponding DF% are given in Table 5 below.

2.4 Daylight to Existing Buildings

BRE guidelines (2022) Section 2.2.2 sets out which rooms need to be assessed for daylight.

> *"The guidelines here are intended for use for rooms in adjoining dwellings where daylight is required, including living rooms, kitchens and bedrooms. Windows to bathrooms, toilets, storerooms, circulation areas and garages need not be analysed. The guidelines may also be applied to any existing non-domestic building where the occupants have a reasonable expectation of daylight; this would normally include schools, hospitals, hotels and hostels, small workshops and some offices."*

A proposed development could potentially have a negative effect on the level of daylight that a neighbouring property receives, if the obstructing building is large in relation to its distance from the existing dwelling. BRE guidelines (2022) Section 2.2.4 states that "Loss of light to existing windows need not be assessed if the distance of each part of the new development from the existing window is three or more times its height above the centre of the existing window." In this report, we refer to this as the 'zone of influence'.

BRE guidelines (2022) Section 2.2.23 states; "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."

If a window falls within a 45° angle both in plan and elevation with a new development in place, the window may be affected and should be assessed.

For loss of daylight the BRE guidelines (2022) recommends calculation of the Vertical Sky Component. VSC can be defined as the amount of skylight that falls on a vertical window. It is the ratio of direct sky illuminance falling on the outside window, to the simultaneous horizontal illuminance under an unobstructed sky. The standard CIE Overcast Sky is used and the ratio is usually expressed as a percentage. The maximum value is just under 40% for a completely unobstructed vertical wall. The Vertical Sky Component on a window is a good measure of the amount of daylight entering it.

The BRE guidelines (2022) recommend one of two criteria is met when assessing for the Vertical Sky Component;
    a) Where the Vertical Sky Component at the centre of the existing window exceeds 27% with the new development in place then enough sky light should still be reached by the existing window.

    b) Where the Vertical Sky Component with the new development in place is both less than 27% and less than 0.8 times its former value, then the area lit by the window is likely to appear more gloomy, and electric light will be needed more of the time.

The BRE guidelines (2022) state that if the VSC is:
- At least 27%, then conventional window design will usually give reasonable results;
- Between 15% and 27%, then special measures (larger windows, changes to room layout) are usually needed to provide adequate daylight;
- Between 5% and 15%, then it is very difficult to prove adequate daylight unless very large windows are used;
- Less than 5%, then it is often impossible to achieve reasonable daylight, even if the whole window wall is glazed

This report assesses the percentage of direct sky illuminance that falls on the centre point of neighbouring windows that could be affected by the proposed development through the Vertical Sky Component (VSC) as per the methodologies contained in the BRE guidelines (2022).

2.5 Sunlight to Existing Buildings

The BRE guidelines (2022) recommend assessing the main living rooms and conservatories if they have a window wall facing within 90° of due south. Kitchens and bedrooms are less important but care should be taken not to block too much sun. If the proposed development is fully north of the existing window then sunlight need not be assessed.

The Annual Probable Sunlight Hours (APSH) is used to assess the quantity of sunlight for a given location. This is the total amount of sunshine for a given location on an unobstructed horizontal surface taking cloud cover into account. Statistical data from the Irish Meteorological Service is used to assess the APSH and the Winter Probable Sunlight Hours (taken to fall between the 21st of September and the 21st of March).

Table 1 below shows the average sunlight hours for each month and the maximum possible without any cloud cover. This gives the factor of possible sunlight hours for each month.

Met Éireann Sunlight Hours Data Set 1991-2020													
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Average Sunlight Hours/ Day	1:54	2:54	3:42	5:24	6:24	6:00	5:17	5:00	4:24	3:24	2:24	1:42	
Average Sunlight Hours/ Month	58:54	81:12	114:42	162:00	198:24	180:00	163:47	155:00	132:00	105:24	72:00	52:42	1449.1
Total Available Sunlight Hours	252	265	358	412	483	485	496	451	375	320	250	236	4383
Probable Sunlight Hours Ratio	23.4%	30.6%	32.9%	39.3%	41.1%	37.1%	33.0%	34.4%	35.2%	32.9%	16.8%	22.3%	33.1%

Table 1: Average monthly sunlight hours recorded at Dublin Airport - Data set 1991-2020

The BRE guidelines (2022) recommend that the centre of a window or 1.6m above ground for a door be assessed and it should receive at least 25% of the APSH and it should receive at least 5% during the period of 21st September to 21st March. If the available APSH is less than this then it should not be reduced below 0.8 times its former value or noticeable loss of sunlight may occur.

2.6 Sunlight to Gardens and Open Spaces

For calculations of sunlight analysis it is general practice to use March 21st. The BRE guidelines (2022) Section 3.3.17 states:

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

2.7 BRE Guidelines (2022) Appendix G: Calculations of Trees & Hedges

Trees are not usually included in the assessments of impact on neighbouring properties, unless specified otherwise. In relation to the effects of trees and hedges the BRE guidelines (2022) Section G1.2 states;

"It is generally more difficult to calculate the effects of trees on daylight because of their irregular shape and because some light will generally penetrate through the crown. Where the effects of a new building on existing buildings nearby is being analysed, it is usual to ignore the effects 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 BRE guidelines (2022) recommends that sometimes trees should be taken into account for the proposed development where the new development is proposed near large existing trees. This needs to be done by modelling a representative of the existing trees. Reflectance and transparency should be taken into account. Table G1 in BR209:2022 gives values for transparencies of tree crowns in summer and winter for deciduous trees, dense evergreen can be assessed as opaque. Table G2 gives general reflectance values for shades of trees.

2.8 BRE Guidelines (2022) Appendix H: Environmental Impact Assessment

The BRE guidelines sets out criteria for classification for assessment of impact where a new development affects a number of existing buildings or open spaces in relation to an Environmental Impact Assessment. The guide does not give a specific range or percentages but sets out parameters as set out below.

"Where the loss of skylight or sunlight fully meets the guidelines in this book, the impact is assessed as negligible or minor adverse. Where the loss of light is well within the guidelines, or only a small number of windows or limited area of open space lose light (within the guidelines), a classification of negligible impact is more appropriate. Where the loss of light is only just within the guidelines, and a larger number of windows or open space area are affected, a minor adverse impact would be more appropriate, especially if there is a particularly strong requirement for daylight and sunlight in the affected building or open space.

Where the loss of skylight or sunlight does not meet the guidelines in this book, the impact is assessed as minor, moderate or major adverse. Factors tending towards a minor adverse impact include:
  - *only a small number of windows or limited area of open space are affected*
  - *the loss of light is only marginally outside the guidelines*
  - *an affected room has other sources of skylight or sunlight*
  - *the affected building or open space only has a low level requirement for skylight or sunlight*
  - *there are particular reasons why an alternative, less stringent, guideline should be applied.*

Factors tending towards a major adverse impact include:
  - *a large number of windows or large area of open space are affected*
  - *the loss of light is substantially outside the guidelines*
  - *all the windows in a particular property are affected*
  - *the affected indoor or outdoor spaces have a particularly strong requirement for skylight or sunlight, e.g. a living room in a dwelling or a children's playground.*

Beneficial impacts occur when there is a significant increase in the amount of skylight and sunlight reaching an existing building where it is required, or in the amount of sunlight reaching an open space.

Beneficial impacts should be worked out using the same principles as adverse impacts. Thus a tiny increase in light would be classified as a negligible impact, not a minor beneficial impact."

The BRE guidelines does not set out a specific value range for the different classification of impact level of Minor, Moderate and Major to each window. For the purpose of this report one of five classification levels will be applied:

1. Imperceptible: There is no reduction in the VSC levels or where the levels are 95% of the existing value.
2. Negligible: A reduction in the VSC level but it retains a VSC >27% or <27% but >80% of the existing value.
3. Minor reduction: VSC below 27% but greater than 20%, or ratio greater than 65% of the existing value.
4. Moderate reduction: VSC below 20% but greater than 10%, or ratio greater that 50% of the existing value.
5. Major reduction: VSC below 10% or ratio less than 50% of the existing value.

A flexible approach should be taken when assessing the impact with daylight and sunlight being one of many factors that influence the environment when planning a new development. The evaluation of the impact should be considered in conjunction with other factors when determining the overall impact level to a property.

2.9 Assessment Model Parameters

The BRE guidelines (2022) recommends surface reflectances should represent real conditions and where reflectance values have not been measured or specified default values are set out in Table C4 of the guidance document. The surface reflectances have been specified and are set out in Table 2 below. This table also shows the input values for material used and additional assessment model input parameters.

Input Values for Assessment Model			
Surface Reflectance			
Element	Reflectance	Transmittance	Material Description
Internal walls	80%	0%	White Painted Walls
Internal ceiling	80%	0%	White Painted Ceiling
Floor - light wood	40%	0%	Light wood Flooring
External walls - proposed development	50%	0%	Brick
External walls - outside site	50%	0%	CIBSE
External ground	20%	0%	CIBSE
Glass		68%	Triple glazed clear glass
Maintenance Factor for Glass		Assessment Plane	
Suburban Vertical no overhang	0.96	Sensor Grid spacing	0.3m
Suburban Vertical sheltered by balcony or overhang	0.88	Sensor grid inset	0.35m
Framing Factor: Patio Doors	0.77	Minimum inset	0.3m
		Work plane offset	0.85m

Table 2: Surface reflectance parameters and input values for model calculations

2.10 Daylight in the Proposed Development.

The BRE guidelines (2022) Appendix C sets out interior daylight recommendations, it states; "BS EN 17037 supersedes BS8206 Part 2 'Code of practice for daylighting' which contained a method of assessment based on Average Daylight Factor, which is now no longer recommended."

BS EN 17037 sets out two methods for assessing daylight provision in proposed buildings. One method is called the **Illuminance method.** This is based on Target illuminances for daylight to be achieved across specified fractions of a reference plane at working plane height (0.85m) for half the daylight hours in a year. The Illuminance Method requires the use of a suitable weather file with local climate conditions and takes into account the orientation of the space.

The alternative method is called the **Daylight Factor Method.** This method is based on calculating the daylight factors achieved over specific fractions of a reference plane. The Daylight factor is the illuminance at a point on a reference plane in a space, divided by the illuminance on an unobstructed horizontal surface outdoors. This method uses an overcast sky for calculation and the assessment of the space is orientation independent. BS EN 17037 gives the Median External Diffuse Illuminance (Ev,d,med) for the capital cities throughout Europe to account for external local illuminance levels.

The UK committee formed the opinion that the Target Illuminance recommendations in Clause A.2 of BS EN 17037 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. In BS EN 17037:2018+A1:2021, the UK National Annex (NA) sets out additional minimum room specific Target Daylight Factor values for the UK. Clause NA.2 sets out illuminance values to be exceeded over at least 50% of the points on a reference plane 0.85m above the floor for at least half the daylight hours.

EN 17037:2018 sets out values for Minimum and Target levels to be achieved with a minimum, medium and high compliance level for each. The guideline recommends that the minimum level should be achieved for both target levels but it does not give guidance on the number of units or fraction within a multiple residential unit development that should achieve these values. Additionally it does not differentiate between room use and weighted targets for rooms which would have a lesser requirement. The UK annex sets out factors for UK specific settings where it is difficult to achieve natural daylighting.

The compliance calculation is based on an annual, climate-based simulation of interior illuminance distributions. The BRE guidelines (2022) refers to this method as the Illuminance Method. For each hour of the year, the percentage of the floor area achieving minimum and target illuminance thresholds are measured on a room-by-room basis. Two target types are set with the following criteria:

- Target Illuminance: 300 lux over 50% of floor area for at least 50% of daylight hours.
- Minimum Illuminance: 100 lux over 95% of floor area for at least 50% of daylight hours.

BS EN 17037 gives three levels of recommendation for daylight provision in an interior space: Minimum, Medium and High. The BRE guidelines (2022) Section C3 recommends for compliance with the standard, a space should achieve the Minimum level.

Daylight hours are defined as the 4380 hours with the most diffuse horizontal illuminance in the weather file. In addition to this baseline (Minimum) requirement, rooms can achieve Medium and High levels of compliance by meeting higher illuminance thresholds, as outlined in the table below:

Target Illuminance from Daylight over at least half the daylight hours		
Level of recommendation	Target illuminance E_T(lx) for half of the assessment grid	Minimum illuminance E_{TM}(lx) for 95% of the assessment grid
Minimum	300 lux	100 lux
Medium	500 lux	300 lux
High	750 lux	500 lux

Table 3: IS / BS EN 17037:2018 Target Illuminance from Daylight over at least half the daylight hours.

Target Daylight Factor (D) for Dublin*		
Level of recommendation	Target daylight factor D for half of the assessment grid	Minimum daylight factor D for 95% of the assessment grid
Minimum	2%	0.7%
Medium	3.5%	2%
High	5%	3.5%

Table 4: IS / BS EN 17037:2018 Target Daylight Factor (D) for Dublin.

Target Minimum Daylight Factor (D) for Dublin* based on UK National Annex		
Room Type	Target illuminance E_T(lx) for half of the assessment grid	Target daylight factor D from Table A.3 EN17037 $E_{v,d,med}$ for Dublin -14,900
Bedroom	100 lux	0.7%
Living Room	150 lux	1%
Kitchen	200 lux	1.3%

* EN17037 uses the latitude of the capital city of each European country to set individual values for daylight and sunlight metrics for use in setting the target levels to be achieved in a particular country.

Table 5: BS EN 17037:2018+A1:2021 Target Illuminance levels and Daylight Factor (D) for Dublin.

2.11 Sunlight within Proposed Developments

The BRE guidelines (2022) Section 3.1.7 states "that for large residential developments the overall sunlight potential can be initially assessed by counting the number of windows facing south, east and west and the aim should be to minimise the number of living rooms facing solely north, north-east or north-west unless there is some compensating factor such as an appealing view to the north." In Section 3.1.8 the guideline acknowledges that it may not be possible to have every living room facing within 90° of south in large developments, however, it recommends maximising the number of units with a southerly aspect.

The BRE guidelines (2022) Section 3.1.10 recommends that BS EN 17037 should be used to assess for interior access to direct sunlight. BS EN 17037 Table A.6 sets recommendations for access to sunlight and notes three levels of achievement; Minimum, Medium and High. In dwellings at least one habitable room, preferably a living room, should achieve the Minimum of 1.5 direct hours on a specified date between 1st February and 21st March, with a cloudless sky. This assessment uses the 21st March. The guidelines recommend a time step of 5 minutes or less for the assessment interval. The Minimum level to achieve is 1.5, the Medium level is 3 hours and the High level is 4 hours direct sunlight.

3. Daylight in Neighbouring Buildings

3.1 Site Overview

The proposed site is a greenfield in Kilgobbin, Sandyford, Dublin 18. It is bound to the west by open space along Belarmine Vale. There are residential properties to the north of the site in Sandyford Hall Drive and Sandyford Hall Close. The side elevation of the houses face towards the proposed development. The north-eastern boundary sees mature growth in the grounds of Kilgobbin House. East and in joint ownership of the development site is 'Riverside' Kilgobbin Road.

The southern boundary has mature vegetation along the open space around Kilgobbin Castle and the a property 'Thornberry', Kilgobbin Road.

Figure 1: Indicative view of the site, taken from Google Maps.
Please refer to architectural drawings for statutory boundaries.

3.2 Preliminary Assessment of Adjoining Dwellings

The BRE guidelines BR209:2022 (third edition) recommend that loss of light to existing windows need not be assessed if the distance of each part of the new development from the existing window is three or more times its height above the centre of the existing window. The zone of influence 3 times the height of the proposal is plotted in Figure 2 in yellow.

Section planes perpendicular to the window wall of the adjacent properties facing the proposed development are indicated in blue in Figure 2. The planes at locations A - F extend and **if** they intersect the proposed development, they are plotted in Figure 3 below.

The document also states that if part of a new building measured in a vertical section perpendicular to the main window wall of an existing building, from the centre of the lowest window, subtends an angle of more than 25º to the horizontal, then the diffuse light of the existing building may be adversely affected. If a window falls within a 45° angle both in plan and elevation with a new development in place then the window may be affected and should be assessed.

Figure 2: Proposed site plan showing the zone of influence (3 times the height of the proposed building) and direction of the window wall of adjacent residential properties.

3.3 Comment on Preliminary Assessment

Location A - No.17 Sandyford Hall Drive: In Figure 3 below, a section perpendicular to the side window wall indicates the 25º line would not be subtended by the proposed development. However it is close and this house has been selected for further assessment.

Location B - No.14 Sandyford Hall Close: In Figure 3 below, a section perpendicular to the side window wall indicates the 25º line would not be subtended by the proposed development, any reduction in available daylight is likely to be negligible. For completeness this house has been selected for further assessment.

Location C - No.9 Sandyford Hall Close: In Figure 2 above it can be noted that the windows in habitable rooms do not face towards the structures in the proposed development, any reduction in available daylight is likely to be negligible. No further assessment is required.

Location D - Kilgobbin House: In Figure 2 above it can be noted that the windows in habitable rooms do not face towards the structures in the proposed development, any reduction in available daylight is likely to be negligible. No further assessment is required.

Location E - Riverside: In Figure 3 below, a section perpendicular to the rear window wall indicates the 25º line would be subtended by the proposed development. The rear windows of Riverside are selected for further assessment.

Location F - Thornberry: In Figure 3 below, a section perpendicular to the rear window wall indicates the 25º line would not be subtended by the proposed development, any reduction in available daylight is likely to be negligible. No further assessment is required.

Section through window wall at location A — **17 Sandyford Hall Drive**

Section through window wall at location B — **14 Sandyford Hall Close**

Section through window wall at location E — **Riverside**

Section through window wall at location F — **Thornberry**
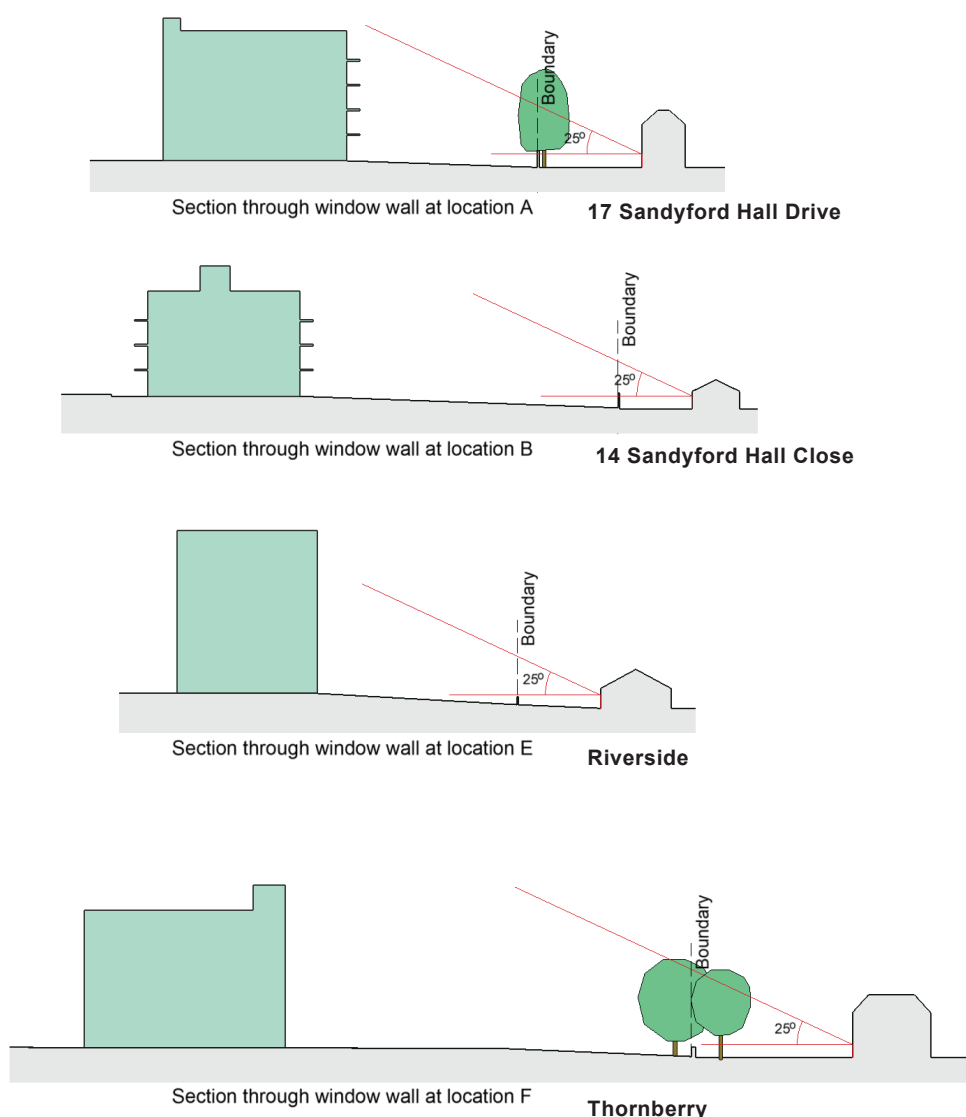
Figure 3: Section perpendicular to window wall at locations indicated in Figure 2.

3.4 Detailed Assessment to Adjoining Dwellings

The BRE guidelines BR209:2022 (third edition) recommend assessing the Vertical Sky Component (VSC) to adjacent properties, where the layouts are not known. Annual Probable Sunlight Hours (APSH) will also be assessed, where that is relevant.

The BRE guidelines recommends that if a window retains a VSC in excess of 27% with the proposed development in place then it will still receive enough daylight. If the existing VSC is below 27% or is reduced below 27% and below 0.8 times its former value then the diffuse light maybe adversely affected.

Test points representing windows in the adjacent dwellings at locations identified in the preliminary analysis are indicated in Figures 4 - 6. The results are shown in Tables 6 - 8 below.
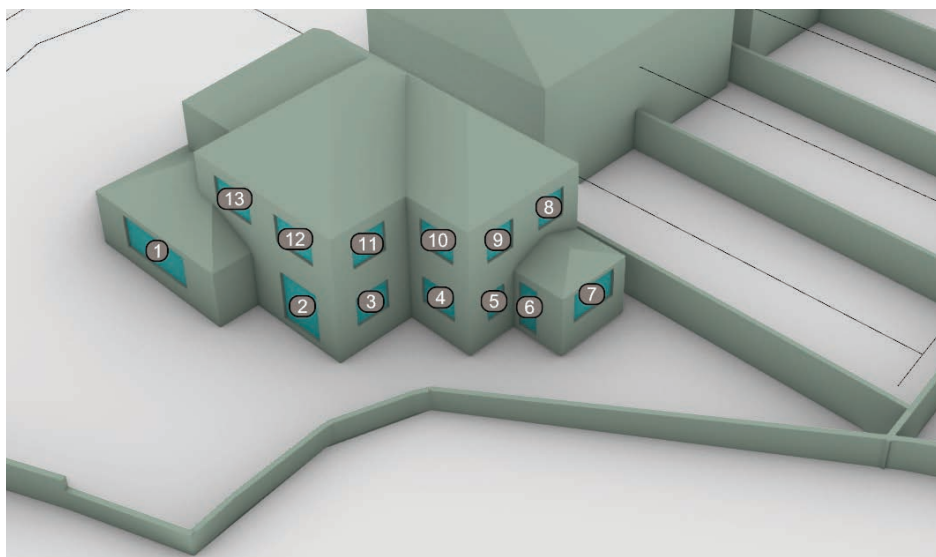
Figure 4: No.17 Sandyford Hall Drive - View of model locating VSC test points.

Vertical Sky Component					
Location	Vertical Sky Component Recommended Value > 27%		Ratio: Proposal to Existing Recommended > 80%	Area Weighted Average	Meets criteria if >27% VSC or <27% but >80% existing value	Comment
	Existing %	Proposed %				
1	37.2	31.4	84.3%		Y	Negligible
2	36.6	30.0	81.8%	83.0%	Y	Negligible
3	29.7	25.4	85.5%	83.0%	Y	Negligible
4	27.6	21.3	77.2%	81.0%	N	Minor Reduction
5	30.9	27.1	87.6%	81.0%	Y	Negligible
6	24.1	18.6	76.9%	84.8%	N	Minor Reduction
7	37.4	33.7	90.0%	84.8%	Y	Negligible
8	37.8	34.8	92.2%		Y	Negligible
9	37.8	34.6	91.5%		Y	Negligible
10	32.8	27.7	84.3%		Y	Negligible
11	33.9	30.5	90.0%		Y	Negligible
12	38.0	32.6	85.8%		Y	Negligible
13	38.0	33.0	86.9%		Y	Negligible

* The BRE guidelines states "an overall VSC may be derived by weighting each VSC element in accordance with the proportion of the total glazing area represented by its window."

Table 6: Vertical Sky Component

3.5 Comment on the Potential Impact to No.17 Sandyford Hall Close

The majority the windows retain a VSC in excess of 27% or are not reduced below 80% of the existing VSC value and any potential loss of daylight light will be minimal. Two windows ID 4 & 6 are noting a minor reduction in VSC, but these windows serve dual aspect rooms. When the area weighted calculation for VSC is considered, daylight to these rooms is above 80% of its former value, and meets the recommendations of the BRE guidelines. Any reduction in available daylight from the proposed development will be negligible to minor and meets the recommendations of the BRE guidelines BR209:2022 (third edition).
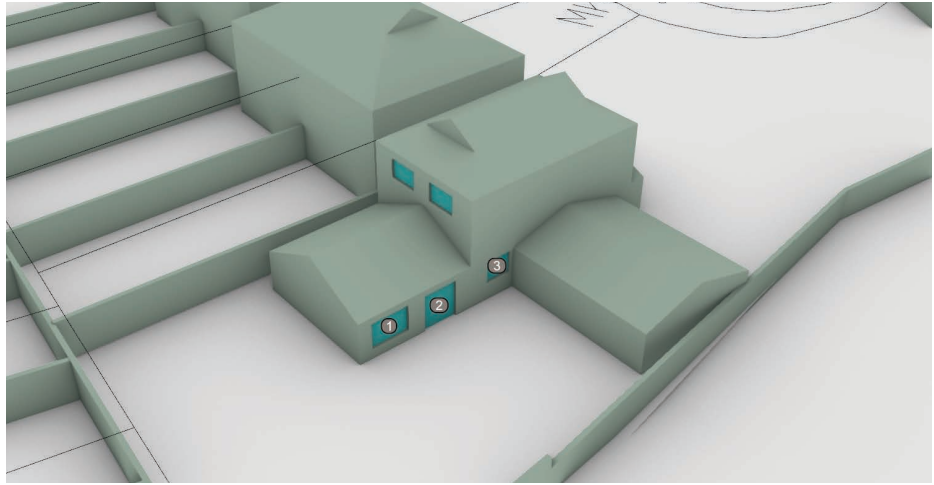
Figure 5: No.14 Sandyford Hall Close - View of model locating VSC test points.

Vertical Sky Component					
Location	Vertical Sky Component Recommended Value > 27%		Ratio: Proposal to Existing Recommended > 80%	Meets criteria if >27% VSC or <27% but >80% Existing Value	Comment
	Existing %	Proposed %			
1	35.8	31.0	86.6%	Y	Negligible
2	35.1	30.9	88.0%	Y	Negligible
3	31.6	28.4	90.0%	Y	Negligible

Table 7: Vertical Sky Component

3.6 Comment on the Potential Impact to No.14 Sandyford Hall Close

All windows retain a VSC in excess of 27% or are not reduced below 80% of the existing VSC value and any potential loss of daylight light will be minimal. Any reduction in available daylight from the proposed development will be negligible and meets the recommendations of the BRE guidelines BR209:2022 (third edition).
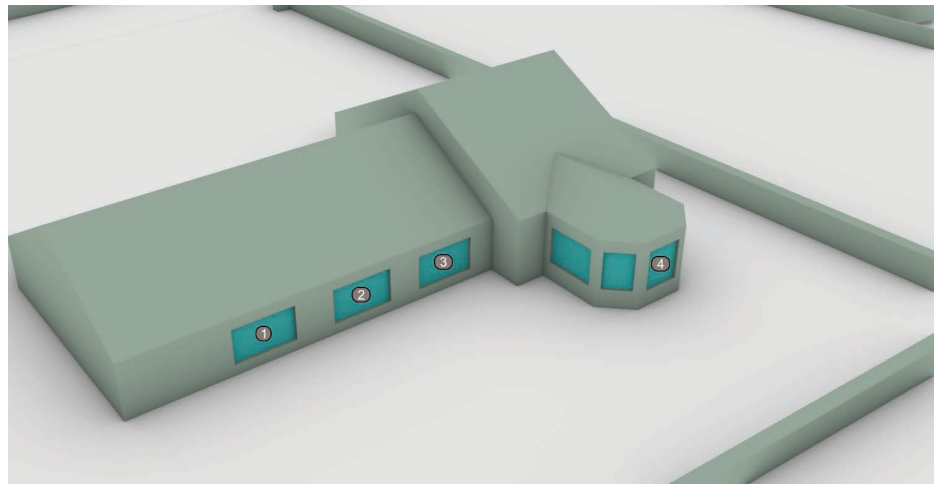
Figure 6: Riverside - View of model locating VSC test points.

Vertical Sky Component					
Location	Vertical Sky Component Recommended Value > 27%		Ratio: Proposal to Existing Recommended > 80%	Meets criteria if >27% VSC or <27% but >80% Existing Value	Comment
	Existing %	Proposed %			
1	37.0	30.8	83.4%	Y	Negligible
2	36.7	30.2	82.4%	Y	Negligible
3	34.2	27.7	81.0%	Y	Negligible
4	37.2	29.1	78.1%	Y	Negligible

Table 8: Vertical Sky Component

3.7 Comment on the Potential Impact to Riverside

All windows retain a VSC in excess of 27% or are not reduced below 80% of the existing VSC value and any potential loss of daylight light will be minimal. Any reduction in available daylight from the proposed development will be negligible and meets the recommendations of the BRE guidelines BR209:2022 (third edition).

4. Sunlight in Neighbouring Buildings

4.1 Sunlight in Neighbouring Dwellings (Annual Probable Sunlight Hours)

The BRE guidelines BR209:2022 (third edition) recommends assessing window walls for the APSH that face within 90º of due south. The guidelines state that;

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

For a proposed development to have a noticeable impact on the annual Probable Sunlight Hours the value need to be reduced below the recommended 25% annual or 5% in the winter period from September to March. If the value is either below this to begin with or is reduced below this then it should not be reduced below 0.8 times its former value

The BRE guidelines states that obstruction to sunlight may become an issues if
- *Some part of a new development is situated within 90° of due south of a main window wall of an existing building*
- *In the section drawn perpendicular to this existing window wall, the new development subtends an angle greater than 25° to the horizontal measured from the centre of the lowest window to a main living room.*

The windows in No.17 Sandyford Hall Drive and No.14 Sandyford Hall Close that face within 90° of due south are assessed regardless of use These are indicated in Figures 4 & 5 above, the results are set out in Tables 9 & 10 below. The windows in Riverside face north west, no further assessment is of Riverside is required.

Annual Probable Sunlight Hours - No.17 Sandyford Hall Drive								
	APSH >25% Target			Sept 21 - Mar 21 WPSH >5% Target			Meets criteria of >25% APSH and >5% PSH <u>Or</u> <25% or <5% PSH but >80% Existing Value	
Location ID	Existing	Proposed	Ratio	Existing	Proposed	Ratio		
	% of APSH	% of APSH	If less than 25% APSH Target >80%	% WPSH	% WPSH	If less than 5% WPSH Target >80%		
1	76.3%	60.9%	79.7%	28.4%	15.6%	54.8%	Y	Y
2	69.3%	52.0%	75.0%	28.2%	13.8%	49.0%	Y	Y
3	56.9%	43.2%	75.8%	24.0%	12.5%	52.2%	Y	Y
4	56.2%	39.9%	70.9%	26.4%	12.8%	48.6%	Y	Y
5	56.3%	43.9%	78.0%	23.5%	13.2%	56.2%	Y	Y
6	51.9%	36.6%	70.6%	24.5%	11.8%	48.1%	Y	Y
7	63.9%	52.2%	81.7%	23.9%	14.2%	59.3%	Y	Y
8	65.5%	57.9%	88.4%	24.0%	17.7%	73.7%	Y	Y
9	65.8%	56.7%	86.1%	24.0%	16.4%	68.5%	Y	Y
10	62.6%	49.9%	79.7%	27.1%	16.6%	61.1%	Y	Y
11	58.5%	47.7%	81.5%	24.0%	15.1%	62.7%	Y	Y
12	79.6%	65.9%	82.7%	30.0%	18.6%	62.0%	Y	Y
13	79.6%	68.0%	85.4%	30.1%	20.5%	68.0%	Y	Y

Table 9: Annual Probable Sunlight Hours to Neighbouring Properties

Annual Probable Sunlight Hours - No.14 Sandyford Hall Close								
	APSH >25% Target			Sept 21 - Mar 21 WPSH >5% Target			Meets criteria of >25% APSH and >5% PSH <u>Or</u> <25% or <5% PSH but >80% Existing Value	
Location ID	Existing	Proposed	Ratio	Existing	Proposed	Ratio		
	% of APSH	% of APSH	If less than 25% APSH Target >80%	% WPSH	% WPSH	If less than 5% WPSH Target >80%		
1	71.4%	59.3%	83.0%	25.7%	15.7%	60.9%	Y	Y
2	68.9%	58.3%	84.7%	23.4%	14.7%	62.6%	Y	Y
3	60.9%	53.7%	88.1%	17.8%	11.7%	66.1%	Y	Y

Table 10: Annual Probable Sunlight Hours to Neighbouring Properties

4.2 Conclusion on Annual Probable Sunlight Hours (APSH)

All windows assessed exceed the target values set out for annual and winter probable sunlight hours. The proposed development meets the recommendations of the BRE guidelines (2022) and any potential loss of sunlight will be negligible.

5. Sunlight to Amenity in Neighbouring Properties

The BRE guidelines BR209:2022 (third edition) indicates that for an amenity area to have good quality sunlight throughout the year, 50% of the space should receive in excess of 2 hours sunlight on the 21st March. It also states that front gardens need not be assessed for sunlight. Amenity spaces which are entirely south of the proposed development will not perceive any reduction in sunlight. The amenity space is assessed for the amount of direct sunlight received by the space in 5 minute intervals between 8am and 6pm on the 21st March over an analysis grid with a 300mm grid size and the average is calculated.

5.1 Amenity Space to Neighbouring Properties

The neighbouring amenity spaces were assessed for a potential impact on their sun of the ground. The existing and proposed generated analysis are shown in Figure 7, the results are shown in Table 11 below.
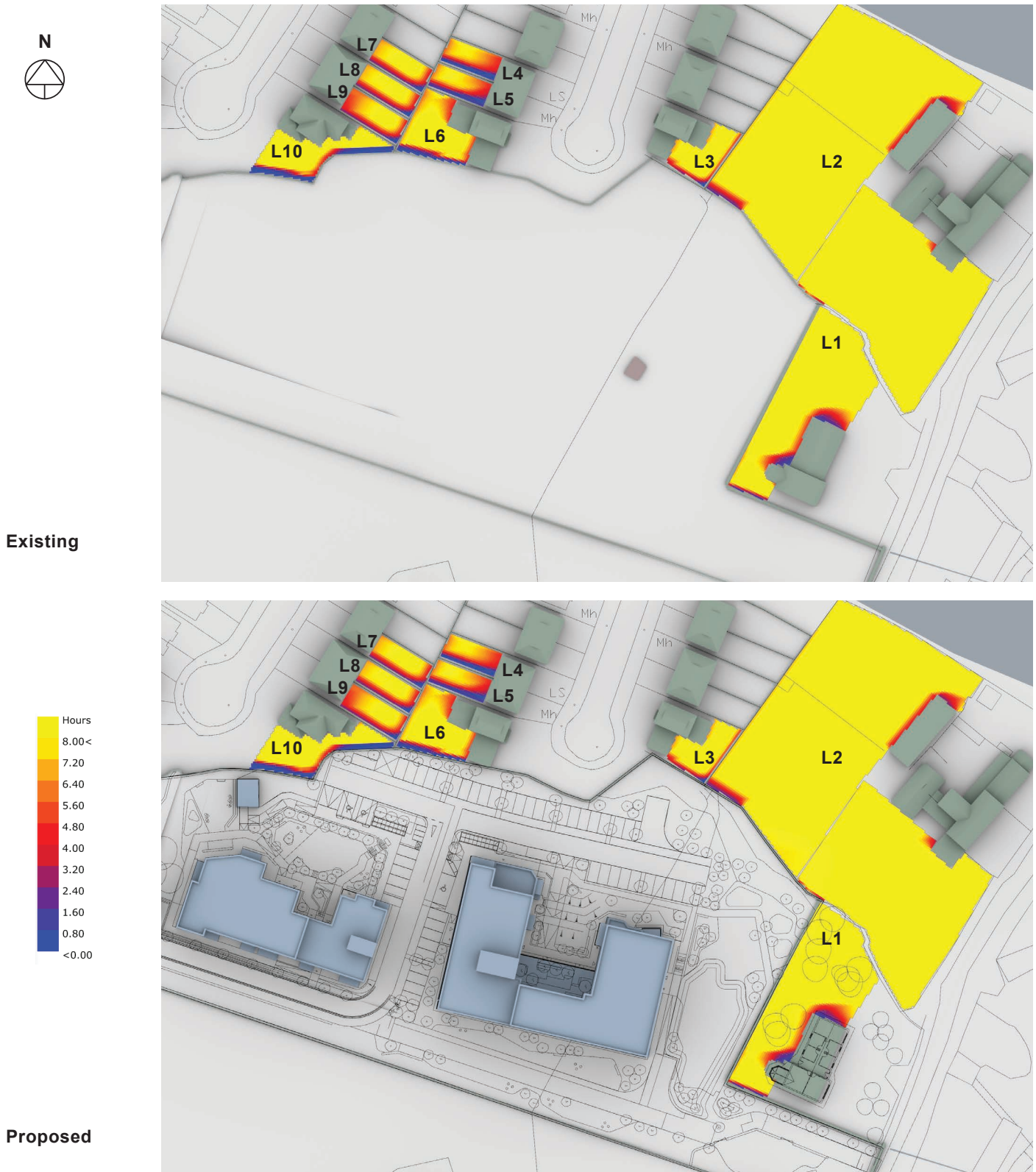
Figure 7: Existing & Proposed radiation map of amenity areas, showing available sunlight on 21st March. The scale represents the sunlight received from 0 - 8 hours.

Sunlight on the Ground - Adjacent Properties					
No.		% Area receiving 2 hours sunlight on 21st March		Ratio	Meets criteria of >50% area Or if <50% then target >80% Existing Value
	Location	Existing	Proposed	Proposed: Existing	
L1	Riverside	98.0%	97.6%	99.6%	Y
L2	Kilgobbin House	99.8%	99.8%	100.0%	Y
L3	No.09 Sandyford Hall Close	98.7%	98.7%	100.0%	Y
L4	No.10 Sandyford Hall Close	79.9%	79.9%	100.0%	Y
L5	No.12 Sandyford Hall Close	78.2%	78.2%	100.0%	Y
L6	No.14 Sandyford Hall Close	91.9%	91.9%	100.0%	Y
L7	No.11 Sandyford Hall Drive	95.4%	95.4%	100.0%	Y
L8	No.13 Sandyford Hall Drive	95.9%	95.9%	100.0%	Y
L9	No.15 Sandyford Hall Drive	96.2%	96.2%	100.0%	Y
L10	No.17 Sandyford Hall Drive	81.6%	81.6%	100.0%	Y

Table 11: Calculation of Sun on the Ground to Adjacent Amenity Areas

5.2 Conclusion

All the private amenity space to the surrounding properties were assessed for sunlight in accordance with the recommendations set out in BR209:2022. On the 21st March, all the amenity spaces will retain 2 hours sunlight over 50% of the area or will not be reduced below 80% of the existing levels. The proposed development meets the recommendations of the BRE guidelines (2022).

6. Daylight within the Proposed Development

All habitable rooms within the units were assessed for daylight provision by illuminance method. The Illuminance method assesses the daylight levels over at least 50% daylight hours in the year and uses a weather file data set. These methods take into account the orientation of the space. They provide an accurate representation of the daylight provision to a specific room in the context of the proposed environment.

Compliance is demonstrated by a calculation of Daylight Provision with the illuminance method under BS EN 17037:2018+A1:2021. A summary of the results are presented in Table 12 below and a complete set of room results are shown in Appendix A.

For supplementary information, an assessment of Daylight Provision with the illuminance method under IS /BS EN 17037:2018 is undertaken. A summary of the results are presented in Table 13 below and a complete set of room results are shown in Appendix B.

6.1 Assessment for Daylight Provision BS EN 17037:2018+A1:2021

The UK National Annex (A1) contains minimum room specific target values for dwellings in the UK. The UK committee fully supports the recommendations of EN17037:2018 but considers the target daylight levels may be hard to achieve in UK dwellings, in particular in urban areas and areas with mature trees. The Target and Minimum levels set out in IS / BS EN17037:2018 does not take into account room use or make allowance for room that have a lesser requirement for daylight. The UK National Annex A1 in BS EN17037:2018+A1:2021 sets out room specific minimum values to be achieved in the UK and Channel Islands. These target values are set to achieve similar minimum daylight levels as the superseded Average Daylight Factor method (ADF) in BS8206-2 2008.

Minimum daylight provision UK NA.1 - BS EN 17037:2018+A1:2021					
	Room Use	Number of rooms	Target illuminance E_T(lx) for half of the assessment grid	Number of rooms to achieve target Lux over 50% of the assessment grid	Percentage of rooms achieving Target
All habitable rooms	LKD	116	200	116	100.0%
	Studio	4	200	4	100.0%
	Bedrooms	184	100	184	100.0%
Total		304		304	100.0%

Table 12: Summary of room for Target Illuminance compliance with BS EN 17037:2018+A1:2021. Individual room results can be viewed in Appendix A.

6.2 Conclusion

BR209:2022 recommends assessment methods set out in BS EN 17037 for daylight provision. 100% of the Living, Dining, Kitchen and Bedroom spaces achieve the target values set out in BS EN 17037:2018+A1:2021 section NA1. These are the minimum values, per specified use, to be achieved in habitable rooms.

6.3 Supplementary Information - Assessment for Daylight Provision IS / BS EN 17037:2018

A summary of Minimum and Target Illuminance levels under IS EN 17037:2018 Annex A Table A1 are set out in the table below.

Daylight provision Illuminance Method IS EN 17037:2018						
		Below Target	Minimum	Medium	High	Percentage of rooms achieving Target
All habitable rooms	Target Illuminance	3.3%	14.8%	27.0%	54.9%	96.7%
	Minimum Illuminance	2.6%	20.1%	26.0%	51.3%	97.4%

Table 13: Percentage of rooms at each level to IS/BS EN 17037:2018. Individual room results can be viewed in Appendix B.

The results indicate a high level of daylight provision, with 97.4% of rooms achieving Minimum Illuminance and 96.7% achieving Target Illuminance. The rooms will be bright and pleasant spaces.

The recommendations for Daylight provision in Table A1 are not specific for dwellings and do not make allowance for room use. BS EN 17037:2018+A1:2021 address this with the National Annex NA.1 which sets out room specific targets for dwellings and compliance for this is presented in Section 6.2.

7. Sunlight within the Proposed Development

7.1 Sunlight Hours

The BRE guidelines BR209:2022 (third edition) and BS EN 17037:2018+A1:2021 set out recommendations for sunlight hours to be achieved. It states that; *"For dwellings, at least one habitable room, preferably a main living room, should meet at least the minimum criterion."* The guidelines recommend the sunlight hours should be assessed preferably on the 21st March over the course of the day. The guidelines set three levels of achievement. Minimum 1.5h, Medium 3h and High 4h. The guideline does not set the percentage of units that need the achieve the recommendations but they do give an example of a well designed floor layout in the figure below where 4 out of 5 units in an apartment building would achieve the target sunlight.
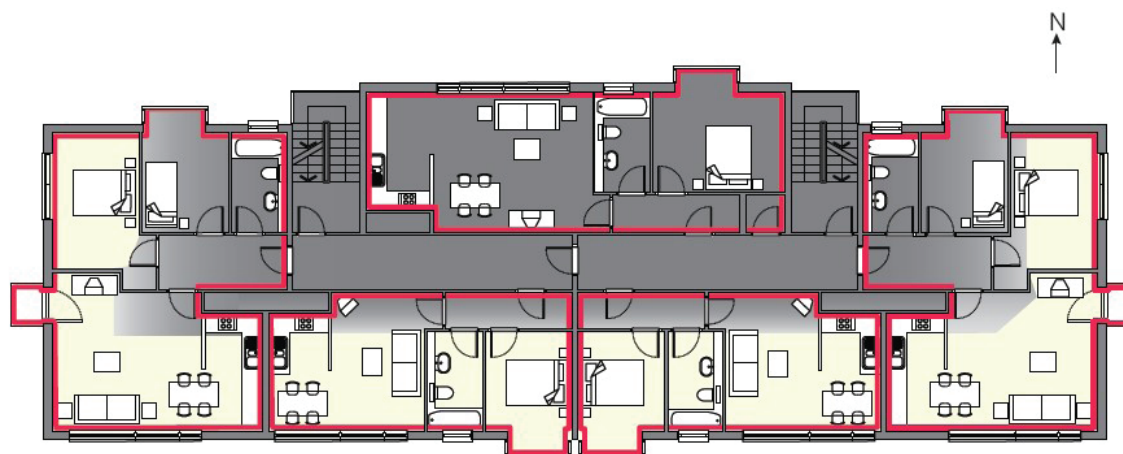
Figure 26: Careful layout design means that four out of the five flats shown have a south-facing living room

Figure 8: Extract from BR209:2022 Section 3 Sun-lighting: Diagram indicating sample floor plan to maximise units with a main living space facing south.

Appendix C details the results in the apartments, indicating if the LKD has a relevant south facing window. A summary of these results are displayed in the table below.

Sunlight Hours Summary Table									
	Total Units	LKD with a window within 90° South		Below recommendation <1.5 hours	Minimum >1.5 hours	Medium >3 Hours	High >4 Hours	Number meets criteria	Ratio meets criteria
		No.	Ratio						
All apartments	120	91	75.8%	23	20	13	64	97	80.8%

Table 14: Summary of results of assessment of Sunlight Hours

7.2 Comment on EN 17037 Sunlight Hours

The BRE guidelines recommend maximising the amount of units that have a window within 90° due south but does not have set targets. The guidelines acknowledges that for large developments with site constraints its not possible to achieve south facing windows to all main living spaces. In this development of 120 units 75.8% (91 no.) have window to a Living room or Kitchen/ Dining room which face within 90° south.

Often windows with an aspect of greater than 90° due south, to the north west or north east, will still receive sunlight, but it is likely to be lesser amounts especially in the winter period. In this development of 120 units 80.8% (97 no.) have a living spaces achieve the minimum recommended 1.5 direct sunlight hours.

7.3 Conclusion

This scheme is well designed for sunlight, with 80.8% (97 no.) of units meeting the minimum recommended 1.5 direct sunlight hours to a living space. This is in line with the BRE guideline example for an apartment layout where 4 in 5 achieves the target sunlight hours.

8. Sunlight to Amenity within the Proposed Development

The BRE guidelines BR209:2022 (third edition) indicate that for an amenity area to have good quality sunlight throughout the year, 50% of the ground, should receive in excess of 2 hours sunlight on the 21st of March. It also states that front gardens need not be assessed for sunlight.

8.1 Sunlight to amenity within the proposed development

The amenity area within this proposal have been assessed with a calculation of Sun on the Ground on the 21st March. Generated analysis is shown in Figure 9 and the results are set out in Table 15 below.
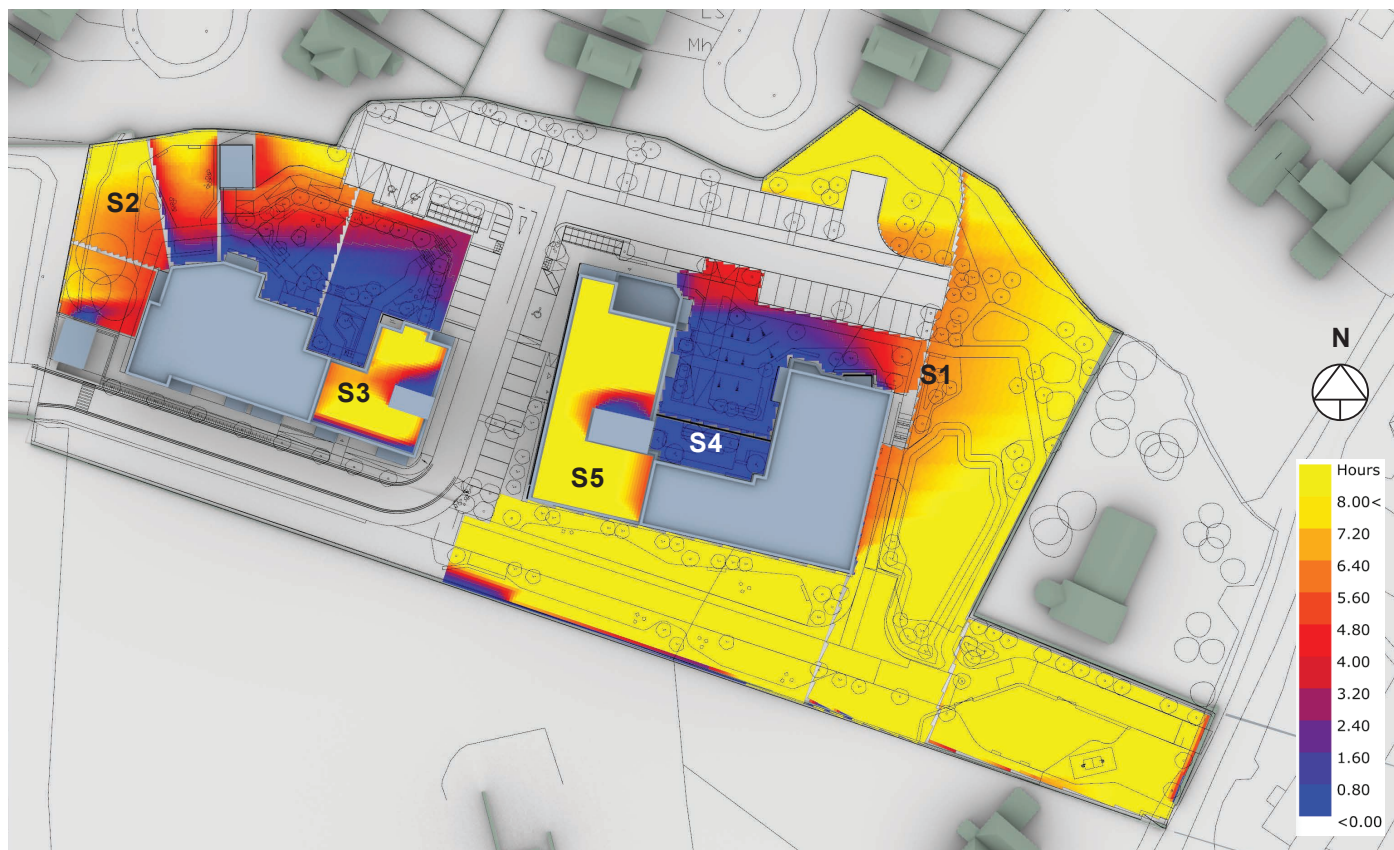
Figure 9: Radiation map of amenity within the proposed development, showing available sunlight on 21st March. The scale represents the sunlight received from 0 - 8 hours.

Sunlight on the Ground - Public & Communal Amenity				
ID No.	Details	% Area receiving 2 hrs sunlight on 21st March		Meets criteria if >50% area receiving 2 hrs sunlight on 21st March
			Area Weighted Average	
S1	Public Open Space	91.2%		Y
S2	Public Open Space	67.1%		Y
S3	Terrace Block A	82.4%		Y
S4	Terrace 01 Block B	0.0%	* Avg 77.9%	Y
S5	Terrace 05 Block B	96.9%	* Avg 77.9%	Y

Table 15: Calculation of Sun on the Ground to Amenity Areas within the Proposed Development

8.2 Conclusion

There are large areas of public amenity at ground level, which meet the BRE criteria of 2 hours sunlight on the 21st March over in excess of 50% of the area. There is a large communal terrace at roof level in Block A which meets the same BRE criteria. There are two amenity terraces in Block B, the area weighted average of these two amenity spaces meet the same BRE criteria.

The public and communal amenity spaces achieve 2 hours sunlight on the 21st March over in excess of 50% of the area. The proposed development meets the recommendations of the BRE guidelines (2022).

9. Shadow Study

9.1 BRE Guidance on Shadow Studies

The BRE guidelines recommend using the March Equinox due the equal length of the day and night time. It states:

> *"If a space is used all year round, the equinox (21 March) is the best date for which to prepare shadow plots as it gives an average level of shadowing. Lengths of shadows at the autumn equinox (21 September) will be the same as those for 21 March, so a separate set of plots for September is not required."*

June 21st and December 21st are provided below for information but it should be noted that the summer solstice is the best case scenario with shadows at their shortest. The summer solstice diagrams are included here with the Daylight Saving Time (UTC+1) applied. In Winter even low buildings will cast long shadows and it is common for large areas of the ground to be in shadow throughout the day especially in a built up area and sun barely rises above an altitude of 10° during the course of the day. The guidelines recommends that Sunlight at an altitude of 10° or less does not count. Below are the times for the Equinox and Solstice that the sun is above 10° altitude rounded to the nearest half hour.

Equinox: between 8:30 and 17:30
Summer Solstice: Between 6:30 and 20:00
Winter Solstice: Between 10:30 and 14:00

Section 9.2 shows the existing and proposed shadow diagrams for the Equinox on the 21st March at 2 hourly intervals during the day between 09:00 and 17:00.
Section 9.3 shows the existing and proposed shadow diagrams for the Summer Solstice on the 21st June at 2 hourly intervals during the day between 09:00 and 19:00.
Section 9.4 shows the existing and proposed shadow diagrams for the Winter Solstice on the 21st December at 2 hourly intervals during the day between 09:00 and 15:00.

The site is a greenfield site, there is no shadow cast from any structures in the existing condition. Shadow diagrams are a visual aid to understand where possible shading may occur. The use of shadow diagrams as an assessment method should be taken over the course of the day and not a specific time due to the transient nature of the sun and the shade caused by obstructions.

9.2 Shadow Casting Diagrams
March Equinox

Existing
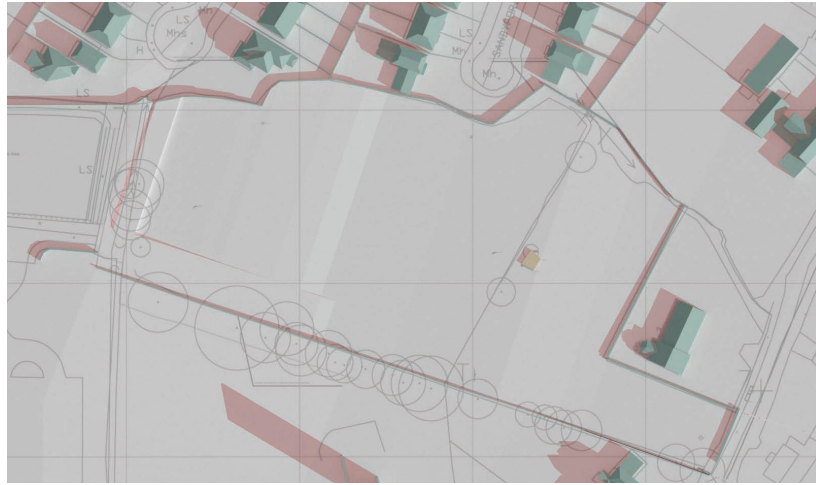
Proposed
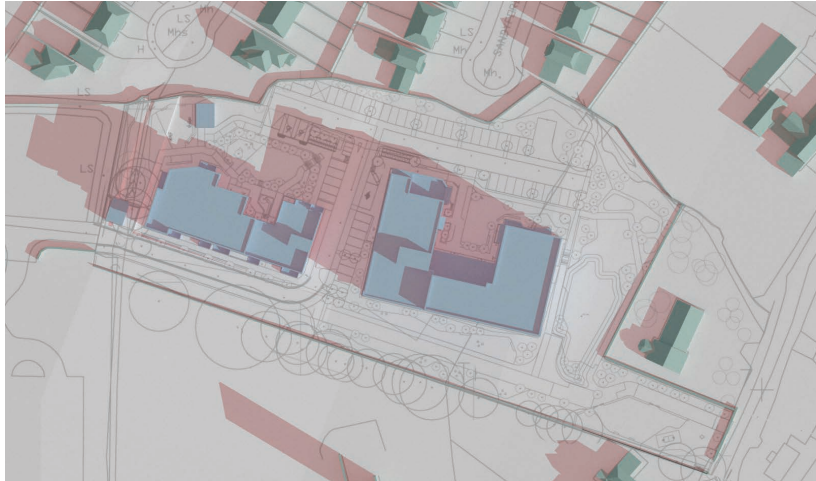
Existing Modelled
With Vegetation
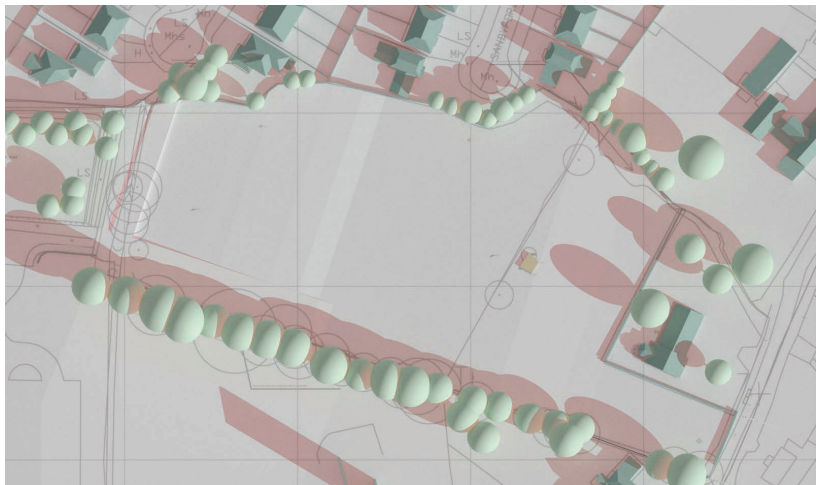
Proposed Modelled
With Vegetation

N
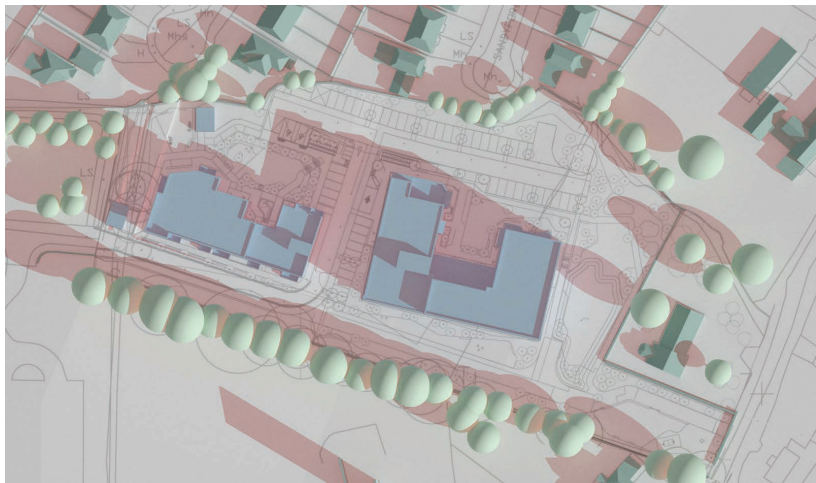
Figure 10: Shadow diagrams 21 March 09:00 UTC

Existing

Proposed

**Existing Modelled
With Vegetation**

**Proposed Modelled
With Vegetation**

N
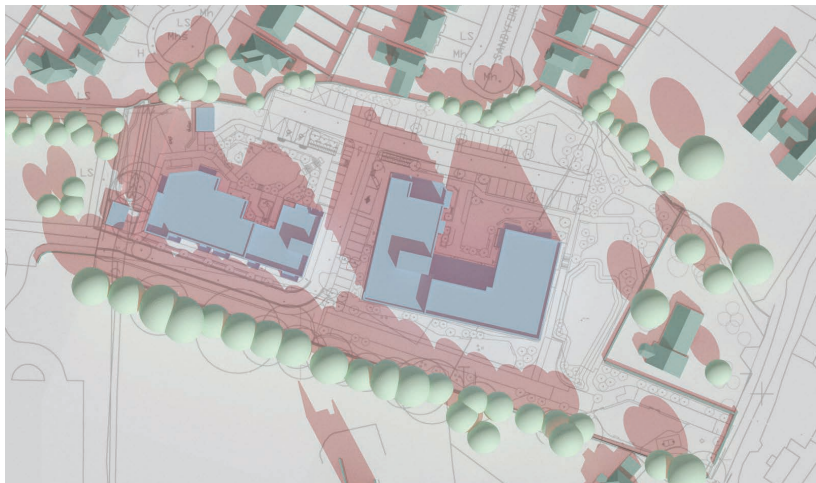
Figure 11: Shadow diagrams 21 March 11:00 UTC

Existing

Proposed
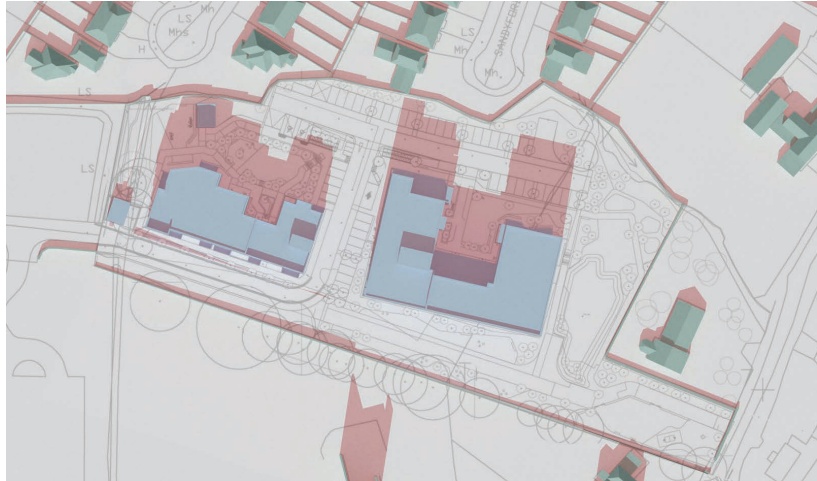
**Existing Modelled
With Vegetation**

**Proposed Modelled
With Vegetation**
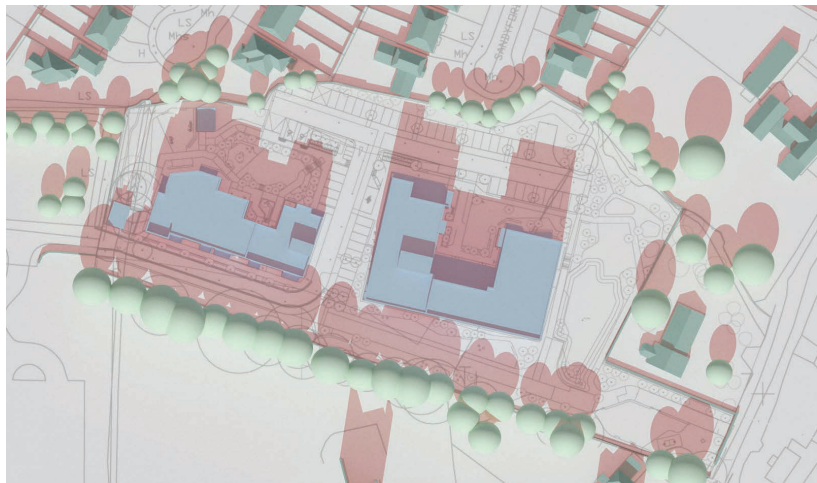
Figure 12: Shadow diagrams 21 March 13:00 UTC

N
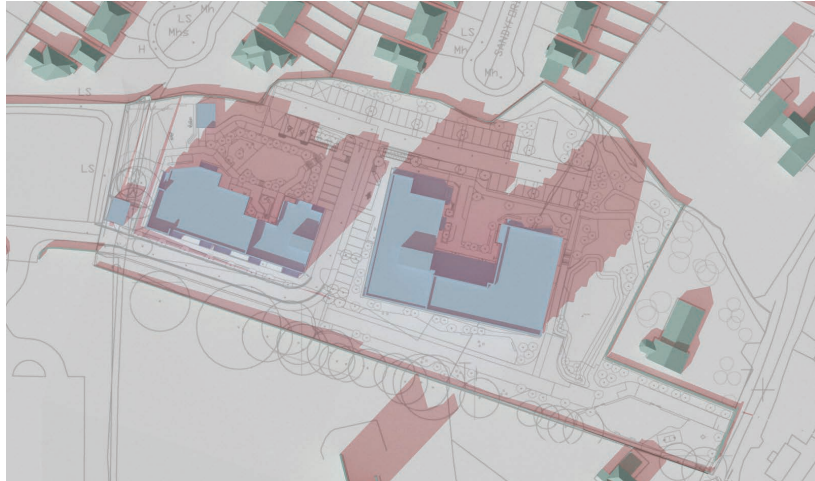
Existing

Proposed

**Existing Modelled
With Vegetation**
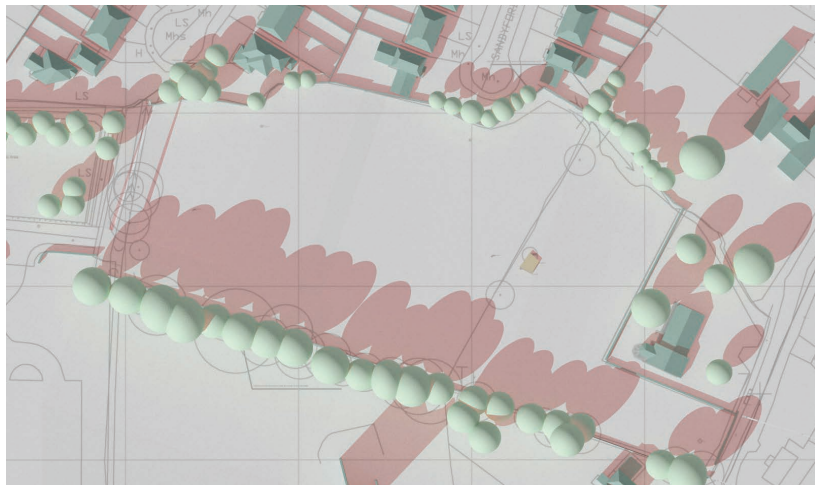
**Proposed Modelled
With Vegetation**
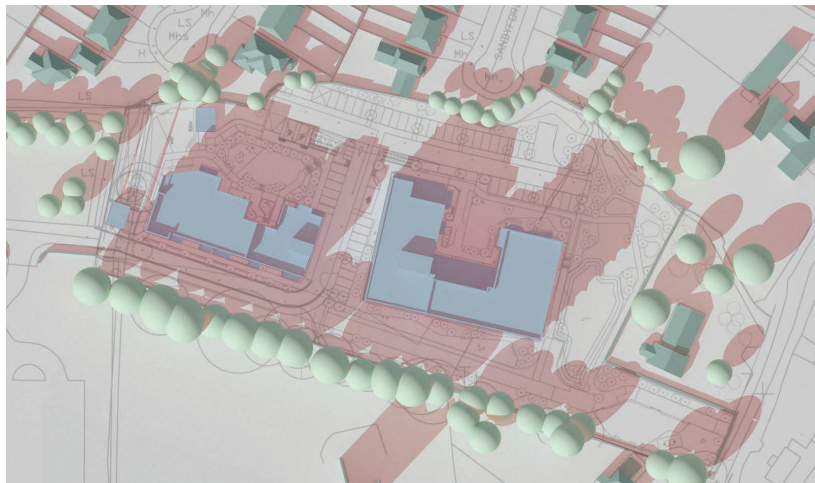
Figure 13: Shadow diagrams 21 March 15:00 UTC
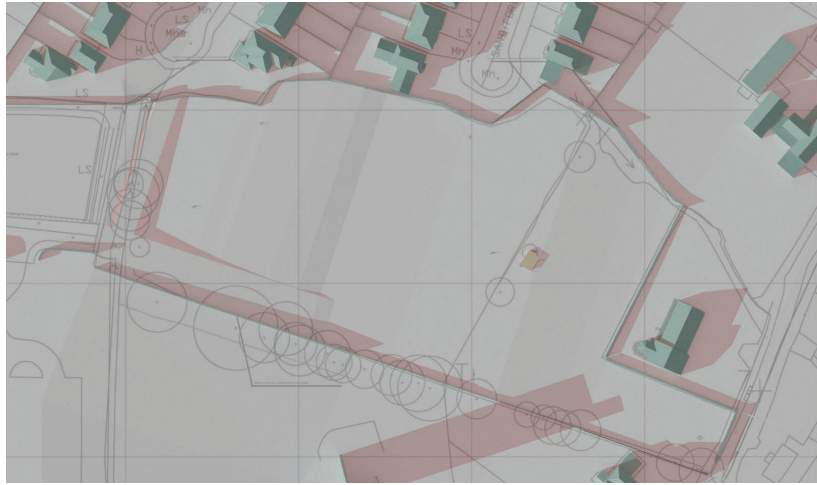
N

Existing
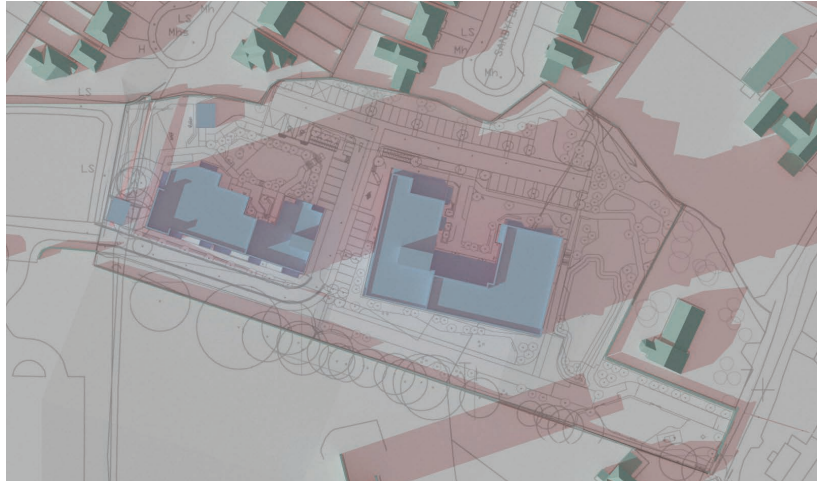
Proposed

**Existing Modelled
With Vegetation**
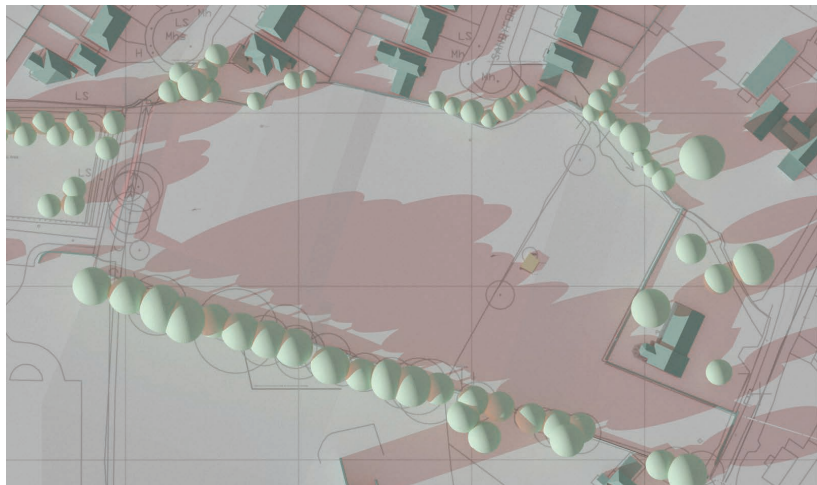
**Proposed Modelled
With Vegetation**

N
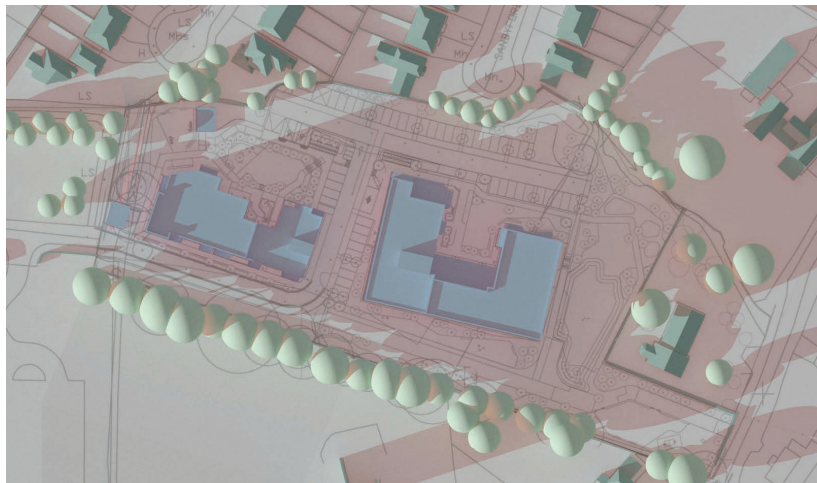
Figure 14: Shadow diagrams 21 March 17:00 UTC

**9.3 Shadow Casting Diagrams
June Solstice**

Existing

Proposed

**Existing Modelled
With Vegetation**

**Proposed Modelled
With Vegetation**

N

Figure 15: Shadow diagrams 21 June 09.00 UTC +1

Existing

Proposed

**Existing Modelled
With Vegetation**

**Proposed Modelled
With Vegetation**

Figure 16: Shadow diagrams 21 June 11:00 UTC +1

N
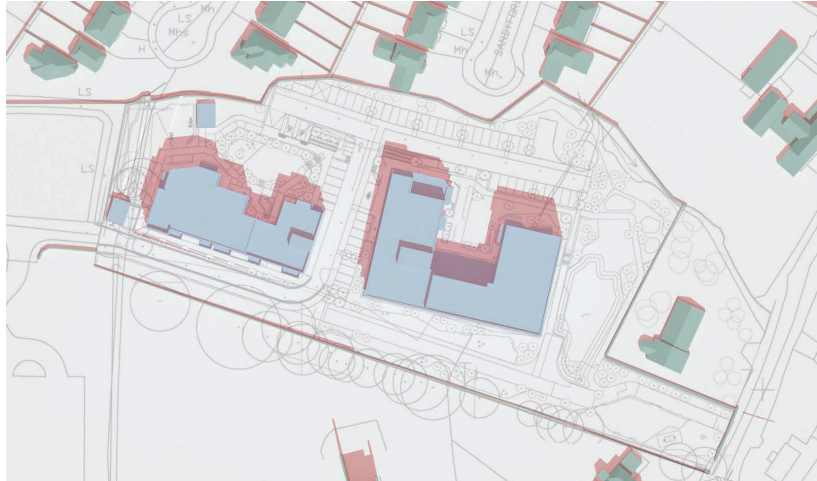
Existing

Proposed

**Existing Modelled
With Vegetation**

**Proposed Modelled
With Vegetation**
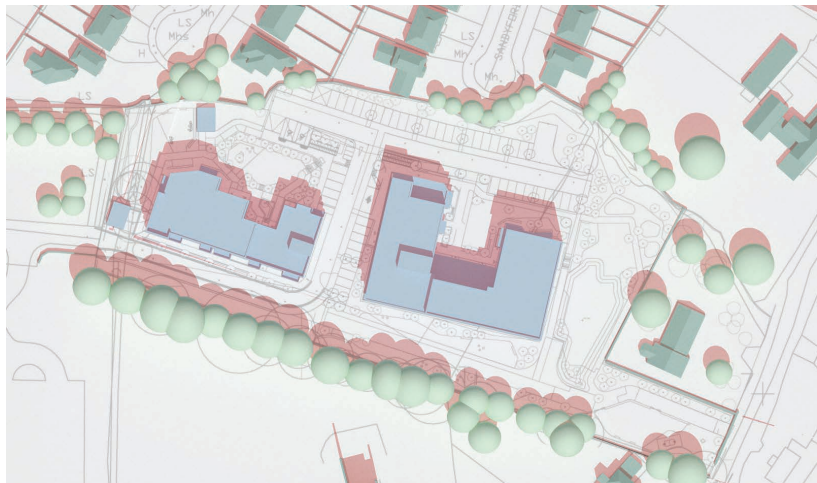
Figure 17: Shadow diagrams 21 June 13:00 UTC +1

N

Existing

Proposed

**Existing Modelled
With Vegetation**
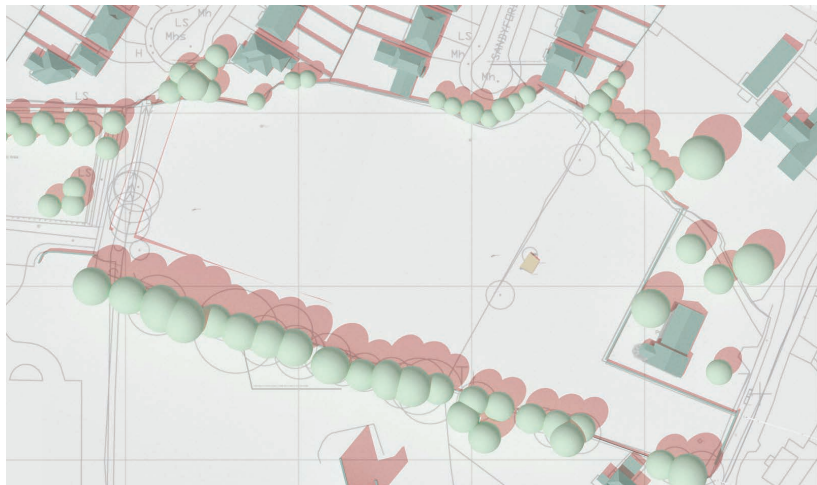
**Proposed Modelled
With Vegetation**
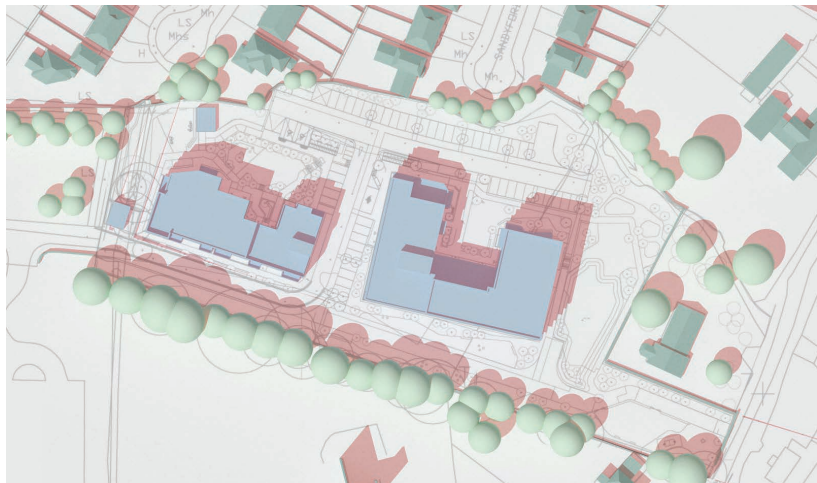
Figure 18: Shadow diagrams 21 June 15:00 UTC +1

N
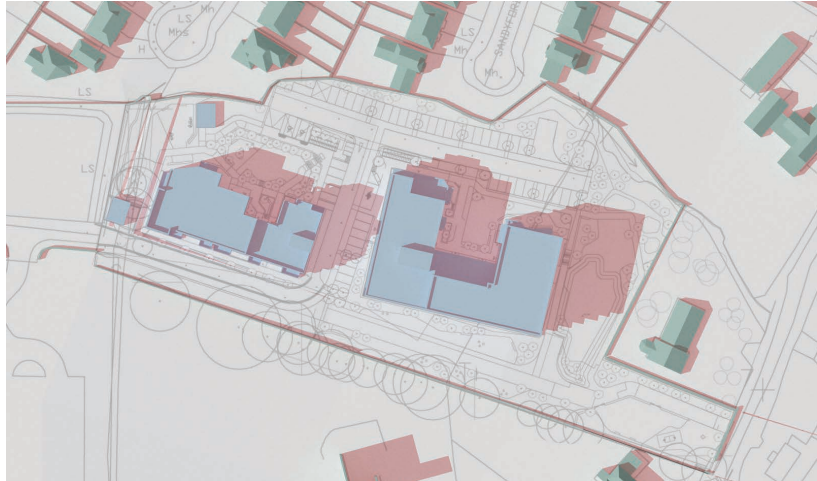
Existing

Proposed

**Existing Modelled
With Vegetation**

**Proposed Modelled
With Vegetation**

Figure 19: Shadow diagrams 21 June 17:00 UTC +1

N
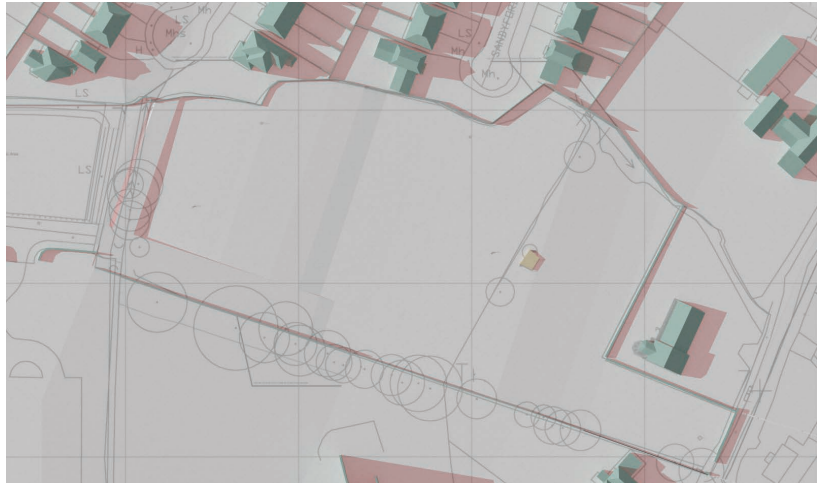
Existing

Proposed

**Existing Modelled
With Vegetation**

**Proposed Modelled
With Vegetation**

Figure 20: Shadow diagrams 21 June 19:00 UTC +1

N

9.4 Shadow Casting diagrams
December Solstice

Existing
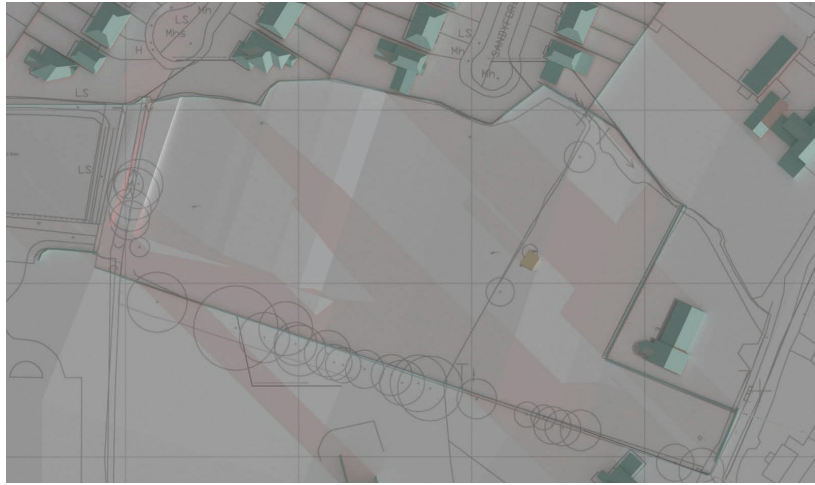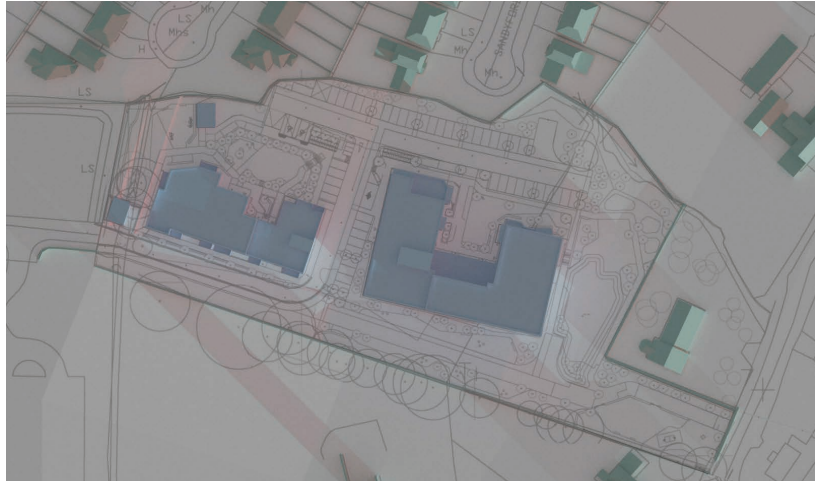
Proposed

Existing Modelled
With Vegetation
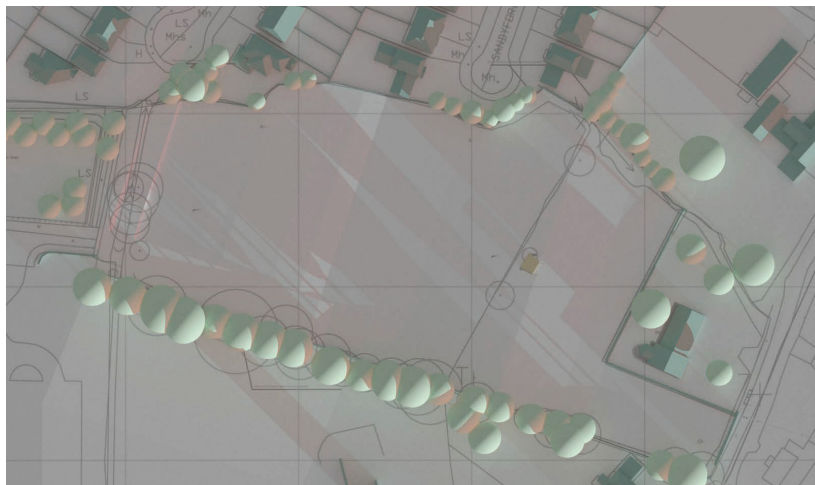
Proposed Modelled
With Vegetation

N
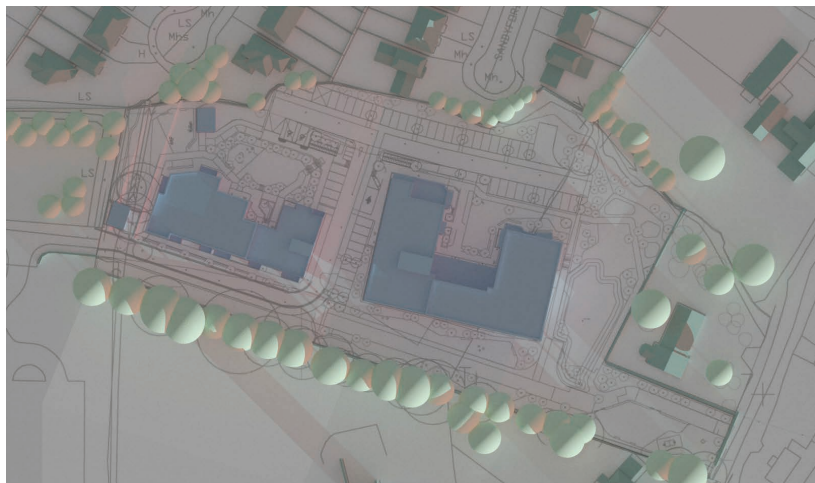
Figure 21: Shadow diagrams 21 December 09:00 UTC

Existing
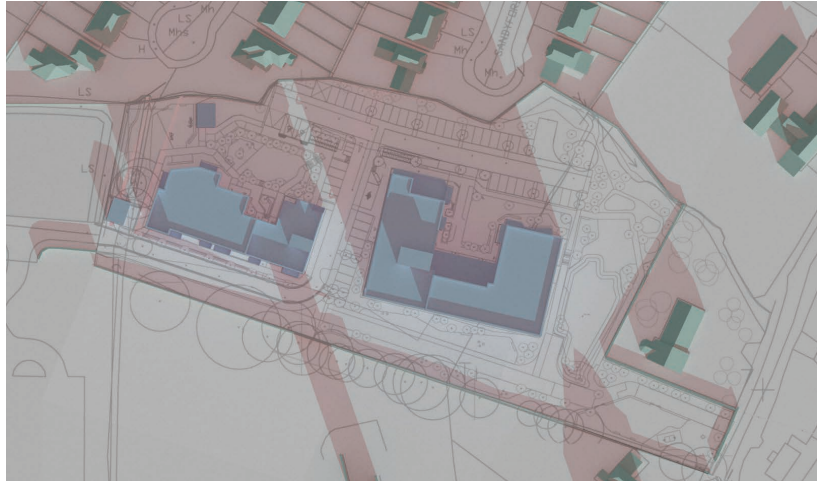
Proposed

**Existing Modelled
With Vegetation**
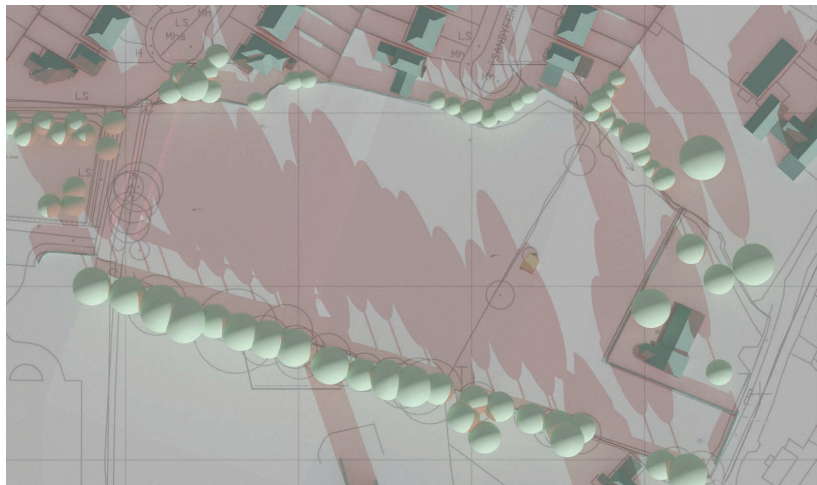
**Proposed Modelled
With Vegetation**
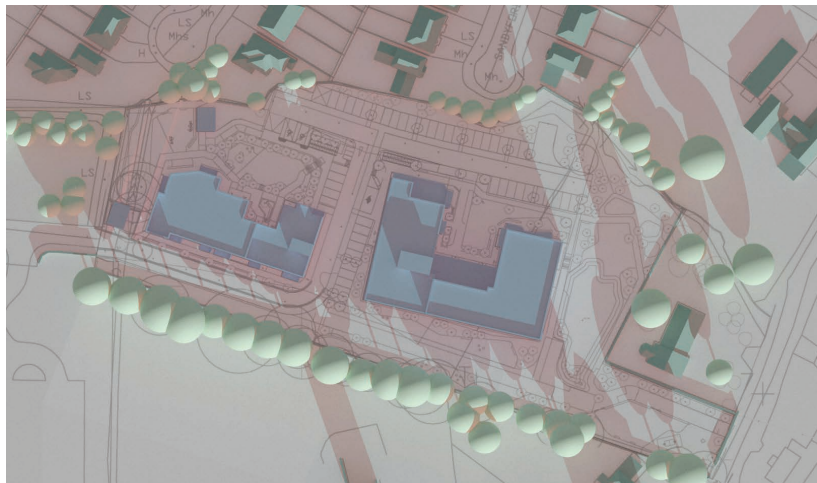
Figure 22: Shadow diagrams 21 December 11:00 UTC

N
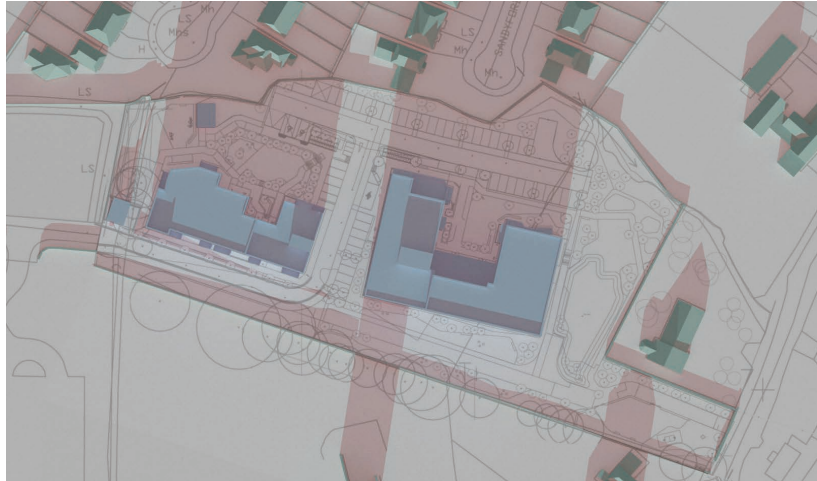
Existing

Proposed

**Existing Modelled
With Vegetation**
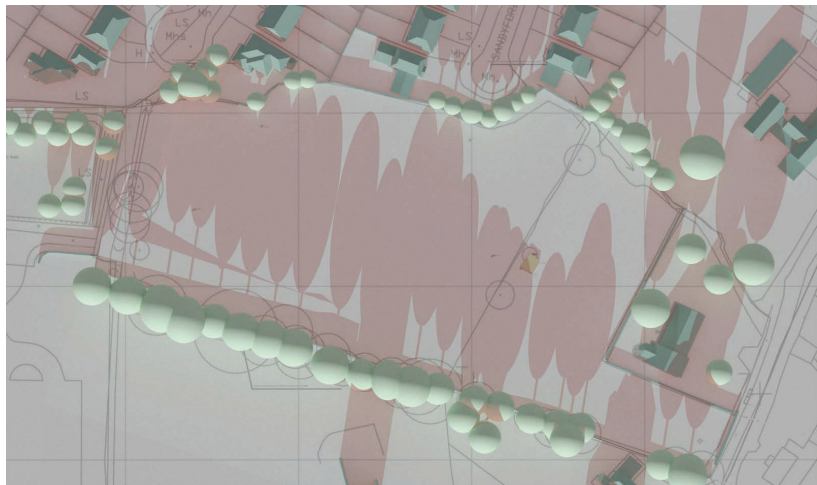
**Proposed Modelled
With Vegetation**
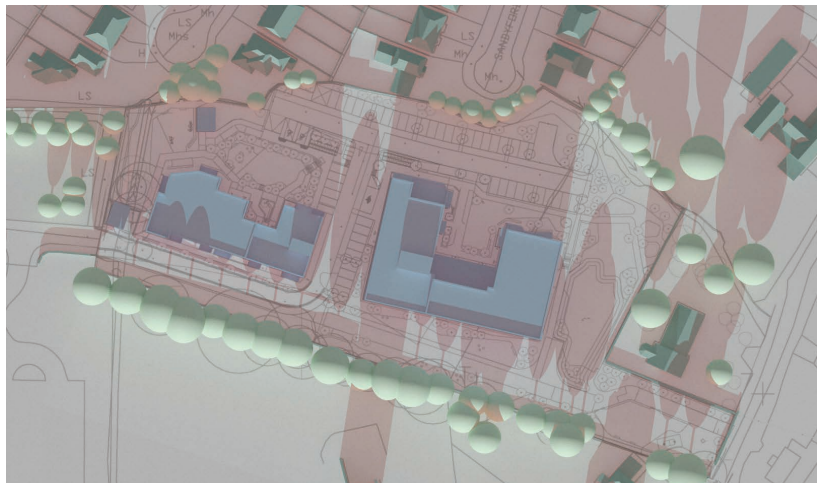
Figure 23: Shadow diagrams 21 December 13:00 UTC

N
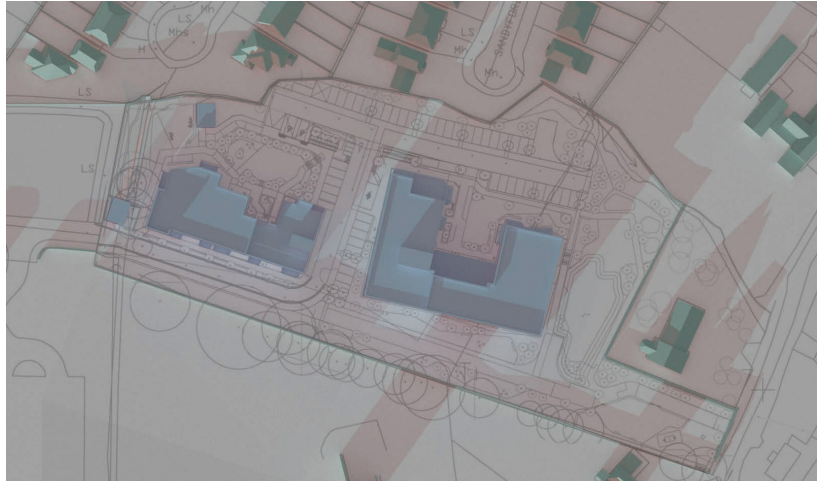
Existing

Proposed

**Existing Modelled
With Vegetation**
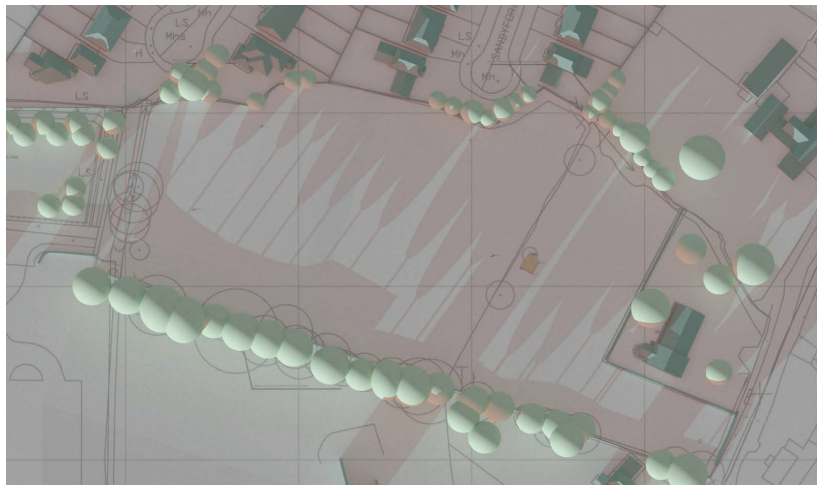
**Proposed Modelled
With Vegetation**
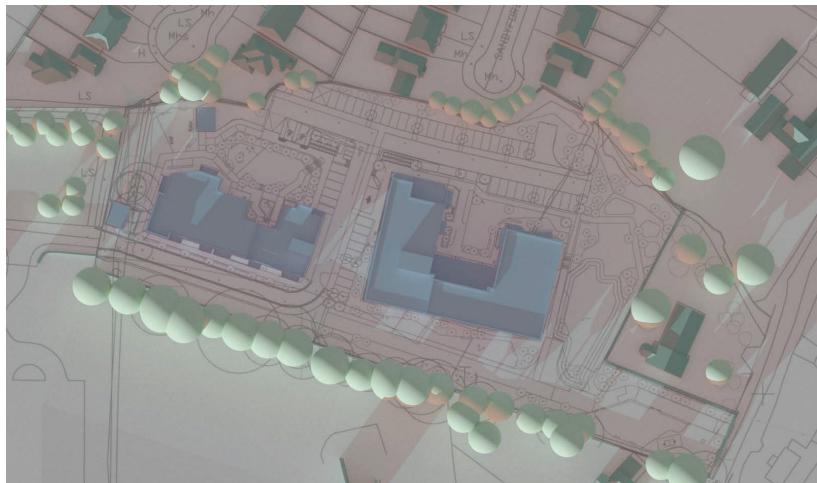
Figure 24: Shadow diagrams 21 December 15:00 UTC

N

Appendix A BS EN17037:2021+A1 Minimum room specific Daylight Provision in accordance with UK National Annex Table NA.1.

Block A

Ground Floor

First Floor

Second Floor

Figure 25: Block A - Floor plans indicating Daylight Provision to BS EN17037:2021+A1 Table NA.1

Block A

Third Floor

Fourth Floor

Figure 26: Block A - Floor plans indicating Daylight Provision to BS EN17037:2021+A1 Table NA.1

Block A - Minimum Illuminance Levels to BS EN17037:2018+A1:2021 - Table NA.1							
Space ID	Use	Area m2	Sensor Count	Target Lux	Mean Lux	% of grid target exceeded - Minimum 50% of Grid	Meets Criteria
A0-01.1	LKD	18.4	156	200	1202	100.0%	Y
A0-01.2	Bed	10.2	78	100	1296	100.0%	Y
A0-01.3	Bed	8.3	63	100	972	100.0%	Y
A0-02.1	Studio	17.1	144	200	525	69.4%	Y
A0-03.1	LKD	22.1	190	200	2388	100.0%	Y
A0-03.2	Bed	7.0	48	100	1094	100.0%	Y
A0-03.3	Bed	5.0	35	100	2885	100.0%	Y
A0-04.1	LKD	23.2	190	200	557	78.9%	Y
A0-04.2	Bed	10.4	88	100	1173	100.0%	Y
A0-05.1	LKD	23.2	190	200	605	82.6%	Y
A0-05.2	Bed	10.4	88	100	1165	100.0%	Y
A0-06.1	LKD	26.5	240	200	1648	100.0%	Y
A0-06.2	Bed	6.1	37	100	1451	100.0%	Y
A0-06.3	Bed	10.5	81	100	1833	100.0%	Y

Block A - Minimum Illuminance Levels to BS EN17037:2018+A1:2021 - Table NA.1							
Space ID	Use	Area m2	Sensor Count	Target Lux	Mean Lux	% of grid target exceeded - Minimum 50% of Grid	Meets Criteria
A0-07.1	LKD	22.2	184	200	1185	100.0%	Y
A0-07.2	Bed	12.9	104	100	1230	100.0%	Y
A0-08.1	LKD	23.0	192	200	482	100.0%	Y
A0-08.2	Bed	11.4	96	100	1237	100.0%	Y
A1-09.1	LKD	18.4	156	200	923	100.0%	Y
A1-09.2	Bed	10.1	78	100	1049	100.0%	Y
A1-09.3	Bed	8.3	63	100	795	100.0%	Y
A1-10.1	Studio	17.1	144	200	768	88.9%	Y
A1-11.1	LKD	22.1	190	200	1055	100.0%	Y
A1-11.2	Bed	7.0	48	100	856	100.0%	Y
A1-11.3	Bed	5.0	35	100	2089	100.0%	Y
A1-12.1	LKD	23.4	198	200	559	70.2%	Y
A1-12.2	Bed	10.2	88	100	1131	100.0%	Y
A1-13.1	LKD	27.7	250	200	458	61.6%	Y
A1-13.2	Bed	7.0	45	100	853	100.0%	Y
A1-13.3	Bed	5.7	34	100	1520	100.0%	Y
A1-13.4	Bed	12.0	104	100	970	100.0%	Y
A1-14.1	LKD	23.2	190	200	549	78.9%	Y
A1-14.2	Bed	10.4	88	100	1007	100.0%	Y
A1-15.1	LKD	23.2	190	200	532	77.4%	Y
A1-15.2	Bed	10.4	88	100	1018	100.0%	Y
A1-16.1	LKD	26.5	240	200	1329	100.0%	Y
A1-16.2	Bed	6.1	37	100	658	100.0%	Y
A1-16.3	Bed	10.5	81	100	858	100.0%	Y
A1-17.1	LKD	22.3	184	200	1095	100.0%	Y
A1-17.2	Bed	12.9	104	100	1179	100.0%	Y
A1-18.1	LKD	23.9	204	200	434	99.5%	Y
A1-18.2	Bed	10.0	85	100	1321	100.0%	Y
A1-18.3	Bed	8.0	56	100	674	100.0%	Y
A2-19.1	LKD	18.4	156	200	960	100.0%	Y
A2-19.2	Bed	10.1	78	100	1099	100.0%	Y
A2-19.3	Bed	8.3	63	100	828	100.0%	Y
A2-20.1	Studio	17.1	144	200	959	96.5%	Y
A2-21.1	LKD	22.1	190	200	1224	100.0%	Y
A2-21.2	Bed	7.0	48	100	1027	100.0%	Y
A2-21.3	Bed	5.0	35	100	2377	100.0%	Y
A2-22.1	LKD	23.4	198	200	639	75.8%	Y
A2-22.2	Bed	10.2	88	100	1267	100.0%	Y
A2-23.1	LKD	27.7	250	200	512	62.4%	Y
A2-23.2	Bed	7.0	45	100	963	100.0%	Y
A2-23.3	Bed	5.7	34	100	1685	100.0%	Y
A2-23.4	Bed	12.0	104	100	1110	100.0%	Y
A2-24.1	LKD	23.2	190	200	582	74.7%	Y
A2-24.2	Bed	10.4	88	100	1125	100.0%	Y
A2-25.1	LKD	23.2	190	200	558	77.9%	Y
A2-25.2	Bed	10.4	88	100	1132	100.0%	Y
A2-26.1	LKD	26.5	240	200	1385	100.0%	Y
A2-26.2	Bed	6.1	37	100	676	100.0%	Y
A2-26.3	Bed	10.5	81	100	887	100.0%	Y
A2-27.1	LKD	22.3	184	200	1125	100.0%	Y
A2-27.2	Bed	12.9	104	100	1217	100.0%	Y

Space ID	Use	Area m2	Sensor Count	Target Lux	Mean Lux	% of grid target exceeded - Minimum 50% of Grid	Meets Criteria
A2-28.1	LKD	23.9	204	200	443	100.0%	Y
A2-28.2	Bed	10.0	85	100	1375	100.0%	Y
A2-28.3	Bed	8.0	56	100	706	100.0%	Y
A3-29.1	LKD	18.4	156	200	994	100.0%	Y
A3-29.2	Bed	10.1	78	100	1192	100.0%	Y
A3-29.3	Bed	8.3	63	100	1148	100.0%	Y
A3-30.1	Studio	17.1	144	200	655	77.8%	Y
A3-31.1	LKD	22.1	190	200	1766	100.0%	Y
A3-31.2	Bed	7.0	48	100	1878	100.0%	Y
A3-31.3	Bed	5.0	35	100	2653	100.0%	Y
A3-32.1	LKD	23.4	198	200	1092	100.0%	Y
A3-32.2	Bed	10.2	88	100	1503	100.0%	Y
A3-33.1	LKD	27.7	250	200	588	73.6%	Y
A3-33.2	Bed	7.0	45	100	1100	100.0%	Y
A3-33.3	Bed	5.7	34	100	1877	100.0%	Y
A3-33.4	Bed	12.0	104	100	1303	100.0%	Y
A3-34.1	LKD	23.2	190	200	660	77.9%	Y
A3-34.2	Bed	10.4	88	100	1242	100.0%	Y
A3-35.1	LKD	23.2	190	200	616	78.9%	Y
A3-35.2	Bed	10.4	88	100	1243	100.0%	Y
A3-36.1	LKD	26.5	240	200	1410	100.0%	Y
A3-36.2	Bed	6.1	37	100	677	100.0%	Y
A3-36.3	Bed	10.5	81	100	883	100.0%	Y
A3-37.1	LKD	22.3	184	200	1142	100.0%	Y
A3-37.2	Bed	12.9	104	100	1248	100.0%	Y
A3-38.1	LKD	23.9	204	200	451	100.0%	Y
A3-38.2	Bed	10.0	85	100	1413	100.0%	Y
A3-38.3	Bed	8.0	56	100	723	100.0%	Y
A4-39.1	LKD	28.3	260	200	1301	100.0%	Y
A4-39.2	Bed	9.1	72	100	3662	100.0%	Y
A4-39.3	Bed	12.8	103	100	4488	100.0%	Y
A4-40.1	LKD	23.2	190	200	1511	97.9%	Y
A4-40.2	Bed	10.4	88	100	3402	100.0%	Y
A4-41.1	LKD	23.2	190	200	1404	94.2%	Y
A4-41.2	Bed	10.4	88	100	3427	100.0%	Y
A4-42.1	LKD	26.5	240	200	1638	100.0%	Y
A4-42.2	Bed	6.1	37	100	695	100.0%	Y
A4-42.3	Bed	10.5	81	100	908	100.0%	Y
A4-43.1	LKD	22.3	184	200	2631	100.0%	Y
A4-43.2	Bed	12.9	104	100	1843	100.0%	Y
A4-44.1	LKD	23.9	204	200	726	100.0%	Y
A4-44.2	Bed	10.0	85	100	3090	100.0%	Y
A4-44.3	Bed	8.0	56	100	1676	100.0%	Y

Block A - Minimum Illuminance Levels to BS EN17037:2018+A1:2021 - Table NA.1

Table 16: Minimum Daylight Provision BS EN17037:2018+A1:2021 Table NA.1 compliance for habitable rooms

Block B

Ground Floor

First Floor

Figure 27: Block B - Floor plans indicating Daylight Provision to BS EN17037:2021+A1 Table NA.1

Block B

Second Floor

Third Floor

Figure 28: Block B - Floor plans indicating Daylight Provision to BS EN17037:2021+A1 Table NA.1

Block B

Fourth Floor

Fifth Floor

Figure 29: Block B - Floor plans indicating Daylight Provision to BS EN17037:2021+A1 Table NA.1

Space ID	Use	Area m2	Sensor Count	Target Lux	Mean Lux	% of grid target exceeded - Minimum 50% of Grid	Meets Criteria
Block B - Minimum Illuminance Levels to BS EN17037:2018+A1:2021 - Table NA.1							
B0-01.1	LKD	24.3	212	200	1588	100.0%	Y
B0-01.2	Bed	10.5	81	100	477	100.0%	Y
B0-02.1	LKD	36.0	330	200	1021	100.0%	Y
B0-02.2	Bed	10.7	84	100	876	100.0%	Y
B0-02.3	Bed	9.9	82	100	506	100.0%	Y
B0-03.1	LKD	37.8	350	200	1449	100.0%	Y
B0-03.2	Bed	10.7	84	100	1248	100.0%	Y
B0-03.3	Bed	10.3	86	100	1282	100.0%	Y
B0-04.1	LKD	19.7	166	200	1338	100.0%	Y
B0-04.2	Bed	10.0	80	100	903	100.0%	Y
B0-04.3	Bed	9.8	80	100	1837	100.0%	Y
B0-05.1	LKD	33.2	284	200	912	81.3%	Y
B0-05.2	Bed	10.3	80	100	870	100.0%	Y
B0-05.3	Bed	10.0	80	100	1891	100.0%	Y
B0-06.1	LKD	26.9	217	200	1101	76.0%	Y
B0-06.2	Bed	7.1	56	100	1297	100.0%	Y
B0-07.1	LKD	21.9	185	200	1499	100.0%	Y
B0-07.2	Bed	9.8	80	100	1209	100.0%	Y
B0-08.1	LKD	22.6	205	200	1590	100.0%	Y
B0-08.2	Bed	7.9	64	100	1494	100.0%	Y
B0-09.1	LKD	37.8	350	200	2766	100.0%	Y
B0-09.2	Bed	10.7	84	100	1409	100.0%	Y
B0-09.3	Bed	10.3	86	100	1489	100.0%	Y
B0-10.1	LKD	22.9	195	200	1787	100.0%	Y
B0-10.2	Bed	9.7	73	100	1808	100.0%	Y
B1-11.1	LKD	23.9	225	200	541	73.8%	Y
B1-11.2	Bed	11.6	95	100	188	84.2%	Y
B1-12.1	LKD	21.7	188	200	664	100.0%	Y
B1-12.2	Bed	12.9	109	100	804	100.0%	Y
B1-13.1	LKD	26.3	237	200	1169	100.0%	Y
B1-13.2	Bed	9.8	80	100	427	100.0%	Y
B1-13.3	Bed	11.6	94	100	840	100.0%	Y
B1-14.1	LKD	23.4	221	200	846	100.0%	Y
B1-14.2	Bed	6.3	42	100	1250	100.0%	Y
B1-14.3	Bed	9.0	69	100	966	100.0%	Y
B1-14.4	Bed	14.7	113	100	889	100.0%	Y
B1-15.1	LKD	21.6	202	200	823	100.0%	Y
B1-15.2	Bed	13.6	110	100	691	100.0%	Y
B1-16.1	LKD	21.1	187	200	1670	100.0%	Y
B1-16.2	Bed	8.3	68	100	926	100.0%	Y
B1-16.3	Bed	12.0	99	100	594	100.0%	Y
B1-17.1	LKD	19.7	166	200	1219	100.0%	Y
B1-17.2	Bed	10.0	80	100	868	100.0%	Y
B1-17.3	Bed	9.8	80	100	1674	100.0%	Y
B1-18.1	LKD	26.6	232	200	1052	100.0%	Y
B1-18.2	Bed	10.3	80	100	841	100.0%	Y
B1-18.3	Bed	10.0	80	100	1716	100.0%	Y
B1-19.1	LKD	26.9	217	200	1107	100.0%	Y
B1-19.2	Bed	7.1	56	100	1271	100.0%	Y
B1-20.1	LKD	21.9	185	200	1345	100.0%	Y
B1-20.2	Bed	9.8	80	100	1171	100.0%	Y

Block B - Minimum Illuminance Levels to BS EN17037:2018+A1:2021 - Table NA.1							
Space ID	Use	Area m2	Sensor Count	Target Lux	Mean Lux	% of grid target exceeded - Minimum 50% of Grid	Meets Criteria
B1-21.1	LKD	22.7	205	200	1408	100.0%	Y
B1-21.2	Bed	7.9	64	100	1421	100.0%	Y
B1-22.1	LKD	21.1	187	200	2672	100.0%	Y
B1-22.2	Bed	8.4	68	100	1744	100.0%	Y
B1-22.3	Bed	12.1	99	100	1093	100.0%	Y
B1-23.1	LKD	22.8	193	200	1333	100.0%	Y
B1-23.2	Bed	13.6	110	100	1268	100.0%	Y
B1-24.1	LKD	22.5	186	200	1479	100.0%	Y
B1-24.2	Bed	9.6	73	100	1660	100.0%	Y
B1-25.1	LKD	19.6	170	200	513	97.1%	Y
B1-25.2	Bed	12.8	110	100	715	100.0%	Y
B1-26.1	LKD	26.5	244	200	443	64.3%	Y
B1-26.2	Bed	11.6	95	100	172	81.1%	Y
B2-27.1	LKD	23.9	225	200	702	86.2%	Y
B2-27.2	Bed	11.6	95	100	267	94.7%	Y
B2-28.1	LKD	21.7	188	200	1050	100.0%	Y
B2-28.2	Bed	12.9	109	100	936	100.0%	Y
B2-29.1	LKD	26.3	237	200	1431	100.0%	Y
B2-29.2	Bed	9.8	80	100	444	100.0%	Y
B2-29.3	Bed	11.6	94	100	878	100.0%	Y
B2-30.1	LKD	23.4	221	200	898	100.0%	Y
B2-30.2	Bed	6.3	42	100	1371	100.0%	Y
B2-30.3	Bed	9.0	69	100	1060	100.0%	Y
B2-30.4	Bed	14.7	113	100	986	100.0%	Y
B2-31.1	LKD	21.6	202	200	926	100.0%	Y
B2-31.2	Bed	13.6	110	100	797	100.0%	Y
B2-32.1	LKD	21.1	187	200	1932	100.0%	Y
B2-32.2	Bed	8.3	68	100	1025	100.0%	Y
B2-32.3	Bed	12.0	99	100	669	100.0%	Y
B2-33.1	LKD	19.7	166	200	1381	100.0%	Y
B2-33.2	Bed	10.0	80	100	1042	100.0%	Y
B2-33.3	Bed	9.8	80	100	1898	100.0%	Y
B2-34.1	LKD	26.6	232	200	1173	100.0%	Y
B2-34.2	Bed	10.3	80	100	1042	100.0%	Y
B2-34.3	Bed	10.0	80	100	1957	100.0%	Y
B2-35.1	LKD	26.9	217	200	1213	100.0%	Y
B2-35.2	Bed	7.1	56	100	1459	100.0%	Y
B2-36.1	LKD	21.9	185	200	1441	100.0%	Y
B2-36.2	Bed	9.8	80	100	1318	100.0%	Y
B2-37.1	LKD	22.7	205	200	1487	100.0%	Y
B2-37.2	Bed	7.9	64	100	1535	100.0%	Y
B2-38.1	LKD	21.1	187	200	2753	100.0%	Y
B2-38.2	Bed	8.4	68	100	1779	100.0%	Y
B2-38.3	Bed	12.1	99	100	1092	100.0%	Y
B2-39.1	LKD	22.8	193	200	1350	100.0%	Y
B2-39.2	Bed	13.6	110	100	1314	100.0%	Y
B2-40.1	LKD	35.7	297	200	1073	98.3%	Y
B2-40.2	Bed	5.0	30	100	2492	100.0%	Y
B2-40.3	Bed	7.5	48	100	1141	100.0%	Y
B2-40.4	Bed	7.7	64	100	1949	100.0%	Y
B2-41.1	LKD	32.8	288	200	577	81.3%	Y

Space ID	Use	Area m2	Sensor Count	Target Lux	Mean Lux	% of grid target exceeded - Minimum 50% of Grid	Meets Criteria
						Block B - Minimum Illuminance Levels to BS EN17037:2018+A1:2021 - Table NA.1	

Space ID	Use	Area m2	Sensor Count	Target Lux	Mean Lux	% of grid target exceeded - Minimum 50% of Grid	Meets Criteria
B2-41.2	Bed	11.6	95	100	243	95.8%	Y
B3-42.1	LKD	23.9	225	200	893	92.9%	Y
B3-42.2	Bed	11.6	95	100	409	100.0%	Y
B3-43.1	LKD	30.1	264	200	1195	100.0%	Y
B3-43.2	Bed	8.3	66	100	615	100.0%	Y
B3-43.3	Bed	14.0	120	100	679	100.0%	Y
B3-44.1	LKD	23.4	221	200	961	100.0%	Y
B3-44.2	Bed	6.3	42	100	1440	100.0%	Y
B3-44.3.	Bed	9.0	69	100	1136	100.0%	Y
B3-44.4	Bed	14.7	113	100	1070	100.0%	Y
B3-45.1	LKD	21.6	202	200	1011	100.0%	Y
B3-45.2	Bed	13.6	110	100	864	100.0%	Y
B3-46.1	LKD	21.1	187	200	2153	100.0%	Y
B3-46.2	Bed	8.3	68	100	1123	100.0%	Y
B3-46.3	Bed	12.0	99	100	732	100.0%	Y
B3-47.1	LKD	19.7	166	200	1531	100.0%	Y
B3-47.2	Bed	10.0	80	100	1238	100.0%	Y
B3-47.3	Bed	9.8	80	100	2115	100.0%	Y
B3-48.1	LKD	26.6	232	200	1277	100.0%	Y
B3-48.2	Bed	10.3	80	100	1220	100.0%	Y
B3-48.3	Bed	10.0	80	100	2127	100.0%	Y
B3-49.1	LKD	26.9	217	200	1289	100.0%	Y
B3-49.2	Bed	7.1	56	100	1638	100.0%	Y
B3-50.1	LKD	21.9	185	200	1507	100.0%	Y
B3-50.2	Bed	9.8	80	100	1421	100.0%	Y
B3-51.1	LKD	22.7	205	200	1535	100.0%	Y
B3-51.2	Bed	7.9	64	100	1635	100.0%	Y
B3-52.1	LKD	21.1	187	200	2794	100.0%	Y
B3-52.2	Bed	8.4	68	100	1786	100.0%	Y
B3-52.3	Bed	12.1	99	100	1101	100.0%	Y
B3-53.1	LKD	22.8	193	200	1350	100.0%	Y
B3-53.2	Bed	13.6	110	100	1324	100.0%	Y
B3-54.1	LKD	35.7	297	200	1225	99.0%	Y
B3-54.2	Bed	5.0	30	100	2497	100.0%	Y
B3-54.3	Bed	7.5	48	100	1143	100.0%	Y
B3-54.4	Bed	7.7	64	100	1978	100.0%	Y
B3-55.1	LKD	32.8	288	200	709	88.9%	Y
B3-55.2	Bed	11.6	95	100	324	100.0%	Y
B4-56.1	LKD	23.9	225	200	1095	96.9%	Y
B4-56.2	Bed	11.6	95	100	462	100.0%	Y
B4-57.1	LKD	30.1	264	200	1383	100.0%	Y
B4-57.2	Bed	8.3	66	100	628	100.0%	Y
B4-57.3	Bed	14.0	120	100	806	100.0%	Y
B4-58.1	LKD	23.4	221	200	1111	100.0%	Y
B4-58.2	Bed	6.3	42	100	1504	100.0%	Y
B4-58.3	Bed	9.0	69	100	1180	100.0%	Y
B4-58.4	Bed	14.7	113	100	1124	100.0%	Y
B4-59.1	LKD	21.6	202	200	1003	100.0%	Y
B4-59.2	Bed	13.6	110	100	918	100.0%	Y
B4-60.1	LKD	21.1	187	200	2165	100.0%	Y
B4-60.2	Bed	8.3	68	100	1202	100.0%	Y

Block B - Minimum Illuminance Levels to BS EN17037:2018+A1:2021 - Table NA.1							
Space ID	Use	Area m2	Sensor Count	Target Lux	Mean Lux	% of grid target exceeded - Minimum 50% of Grid	Meets Criteria
B4-60.3	Bed	12.0	99	100	785	100.0%	Y
B4-61.1	LKD	19.7	166	200	1523	100.0%	Y
B4-61.2	Bed	10.0	80	100	1158	100.0%	Y
B4-61.3	Bed	9.8	80	100	2212	100.0%	Y
B4-62.1	LKD	26.6	232	200	1350	100.0%	Y
B4-62.2	Bed	10.3	80	100	1342	100.0%	Y
B4-62.3	Bed	10.0	80	100	2245	100.0%	Y
B4-63.1	LKD	26.9	217	200	1326	100.0%	Y
B4-63.2	Bed	7.1	56	100	1677	100.0%	Y
B4-64.1	LKD	21.9	185	200	1536	100.0%	Y
B4-64.2	Bed	9.8	80	100	1473	100.0%	Y
B4-65.1	LKD	22.7	205	200	1549	100.0%	Y
B4-65.2	Bed	7.9	64	100	1683	100.0%	Y
B4-66.1	LKD	21.1	187	200	2815	100.0%	Y
B4-66.2	Bed	8.4	68	100	1780	100.0%	Y
B4-66.3	Bed	12.1	99	100	1109	100.0%	Y
B4-67.1	LKD	22.8	193	200	1352	100.0%	Y
B4-67.2	Bed	13.6	110	100	1327	100.0%	Y
B4-68.1	LKD	35.7	297	200	1345	98.7%	Y
B4-68.2	Bed	5.0	30	100	2513	100.0%	Y
B4-68.3	Bed	7.5	48	100	1142	100.0%	Y
B4-68.4	Bed	7.7	64	100	1980	100.0%	Y
B4-69.1	LKD	32.8	288	200	856	92.0%	Y
B4-69.2	Bed	11.6	95	100	407	100.0%	Y
B5-70.1	LKD	37.5	337	200	658	79.8%	Y
B5-70.2	Bed	13.1	114	100	2245	100.0%	Y
B5-70.3	Bed	10.1	81	100	3208	100.0%	Y
B5-70.4	Bed	12.3	106	100	2677	100.0%	Y
B5-71.1	LKD	26.8	231	200	1278	100.0%	Y
B5-71.2	Bed	10.7	90	100	1078	100.0%	Y
B5-72.1	LKD	22.7	205	200	1549	100.0%	Y
B5-72.2	Bed	7.9	64	100	1303	100.0%	Y
B5-73.1	LKD	21.1	187	200	2997	100.0%	Y
B5-73.2	Bed	8.4	68	100	2722	100.0%	Y
B5-73.3	Bed	12.1	99	100	1401	100.0%	Y
B5-74.1	LKD	22.8	193	200	1624	100.0%	Y
B5-74.2	Bed	13.6	110	100	3116	100.0%	Y
B5-75.1	LKD	35.7	297	200	1609	99.0%	Y
B5-75.2	Bed	5.0	30	100	3182	100.0%	Y
B5-75.3	Bed	7.5	48	100	2629	100.0%	Y
B5-75.4	Bed	7.7	64	100	3500	100.0%	Y
B5-76.1	LKD	32.8	288	200	1018	95.1%	Y
B5-76.2	Bed	11.6	95	100	396	100.0%	Y

Table 17: Minimum Daylight Provision BS EN17037:2018+A1:2021 Table NA.1 compliance for habitable rooms

Appendix B - Supplementary Information - IS/ BS EN17037:2018 Table A.1 Daylight Provision Room Results

Block A

Ground Floor
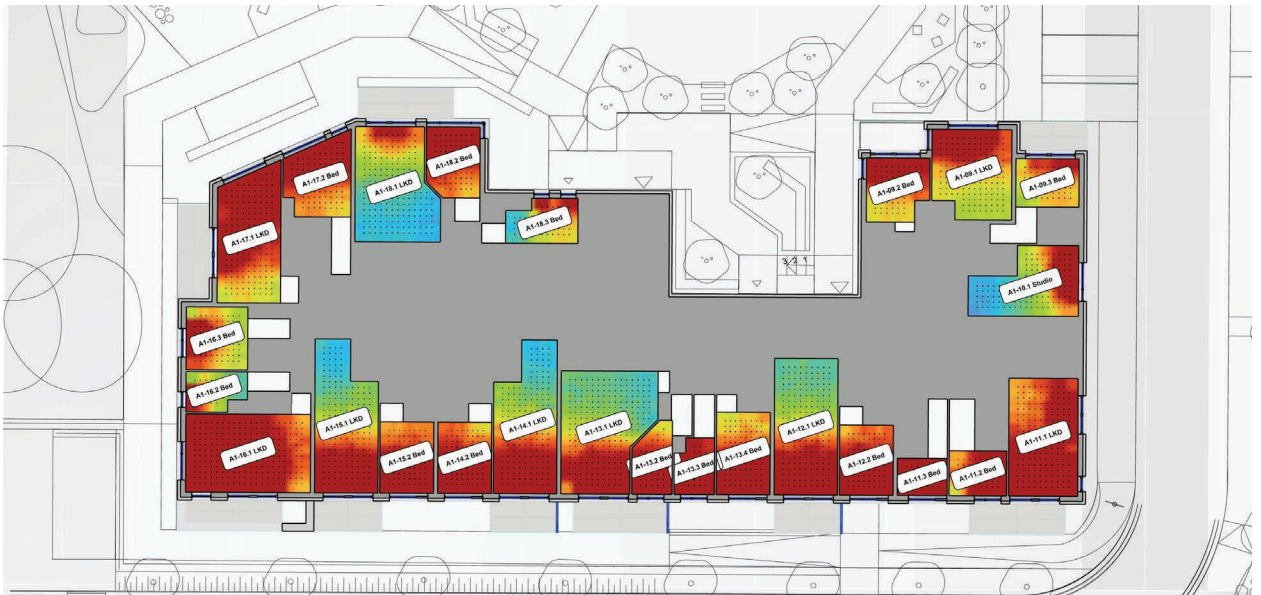
First Floor
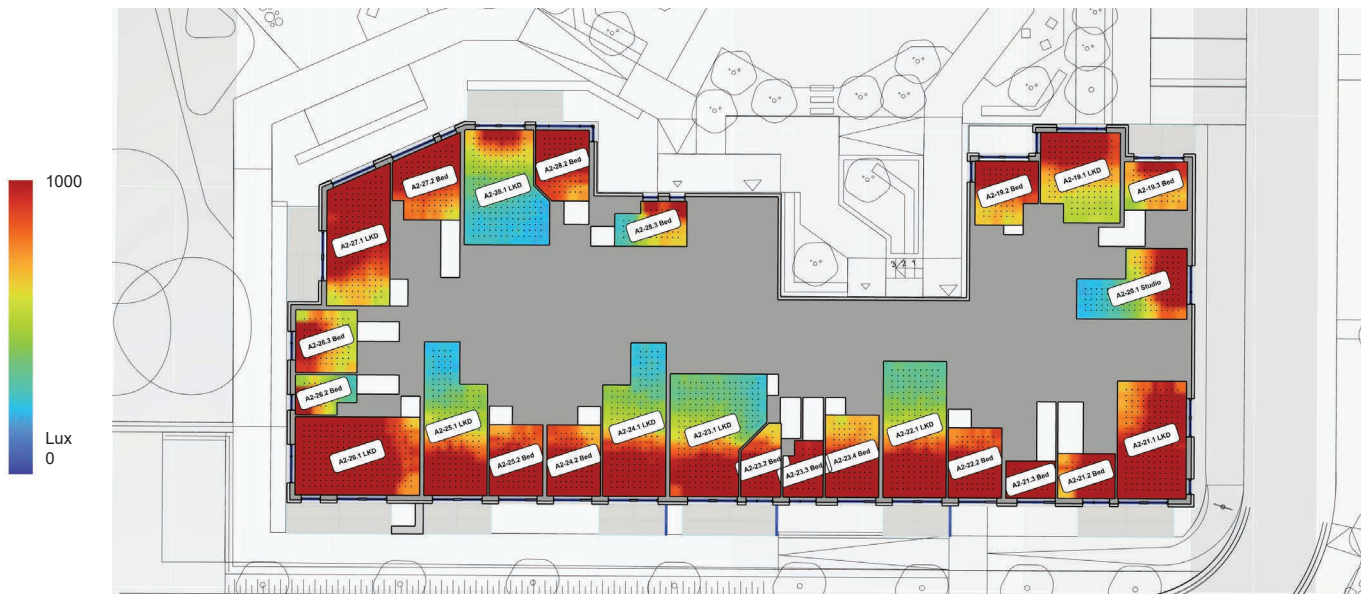
Second Floor

Figure 30: Block A - Daylight Provision and Annual Average Illuminance to all Habitable Rooms
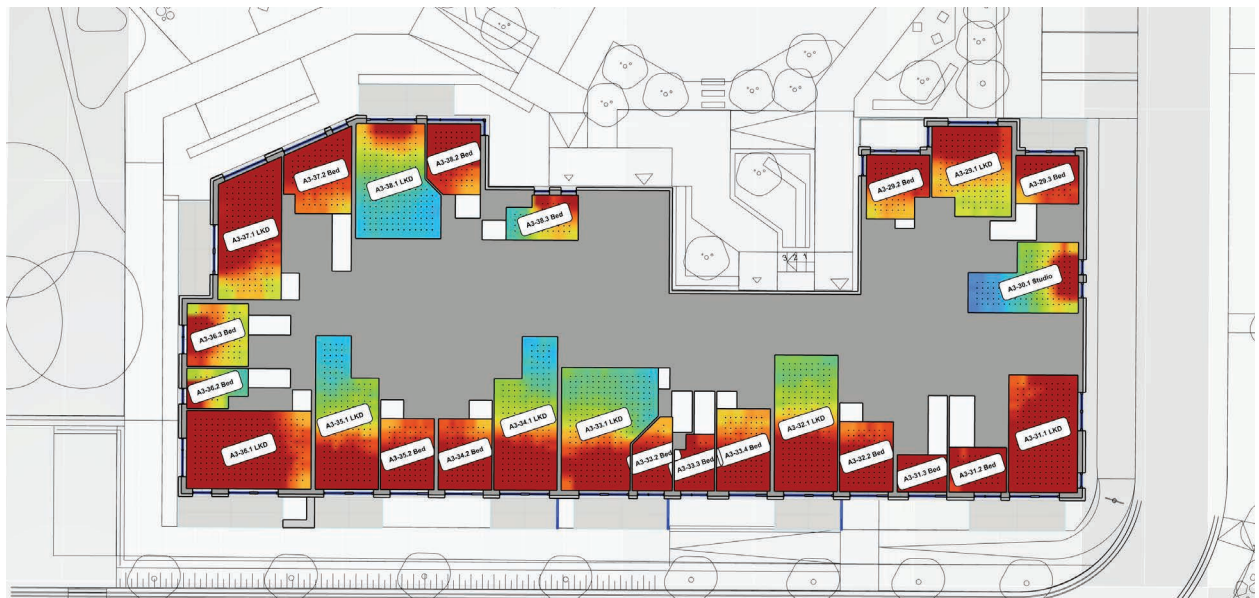
Block A

Third Floor
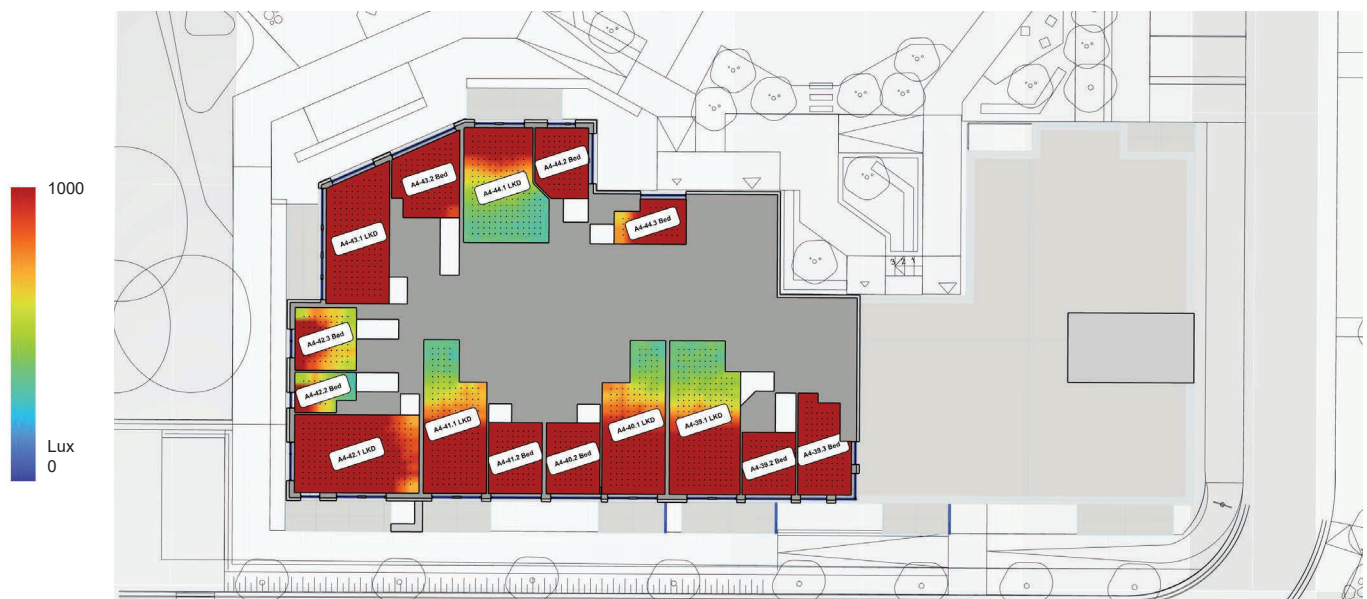
Fourth Floor

Figure 31: Block A - Daylight Provision and Annual Average Illuminance to all Habitable Rooms

Block A - EN17037:2018 Table A.1 Daylight Provision Room Schedule											
Space ID	Description	Area m2	Sensor Count	Target Illuminance	300lux_50	500lux_50	750lux_50	Minimum Target Illuminance	100lux_95	300lux_95	500lux_95
A0-01.1	LKD	18.37	156	High	82.0%	73.6%	60.2%	High	89.1%	76.5%	61.0%
A0-01.2	Bed	10.15	78	High	85.6%	78.0%	68.3%	High	90.2%	78.5%	66.2%
A0-01.3	Bed	8.29	63	High	80.8%	70.3%	56.6%	High	89.4%	77.3%	63.0%
A0-02.1	Studio	17.12	144	Fail	49.6%	27.6%	7.8%	Fail	49.4%	4.4%	0.4%
A0-03.1	LKD	22.07	190	High	85.6%	80.4%	73.7%	High	90.2%	81.1%	72.0%
A0-03.2	Bed	7.02	48	High	81.0%	72.2%	61.8%	High	85.8%	69.3%	56.4%
A0-03.3	Bed	5.04	35	High	86.6%	81.6%	75.1%	High	92.6%	83.7%	76.8%
A0-04.1	LKD	23.23	190	Minimum	60.5%	45.4%	31.8%	Minimum	63.2%	28.7%	9.1%
A0-04.2	Bed	10.37	88	High	76.8%	65.6%	54.8%	High	84.9%	66.9%	52.9%
A0-05.1	LKD	23.23	190	Minimum	62.9%	48.2%	36.9%	Minimum	66.1%	32.6%	10.5%
A0-05.2	Bed	10.37	88	High	76.3%	64.9%	54.2%	High	84.6%	67.1%	53.0%
A0-06.1	LKD	26.49	240	High	82.6%	75.4%	66.0%	High	88.4%	76.9%	65.3%
A0-06.2	Bed	6.06	37	High	83.0%	75.1%	63.3%	Medium	87.1%	69.0%	50.0%
A0-06.3	Bed	10.50	81	High	85.0%	77.6%	67.8%	High	90.2%	79.7%	69.1%

Space ID	Description	Area m2	Sensor Count	Target Illuminance	300lux_50	500lux_50	750lux_50	Minimum Target Illuminance	100lux_95	300lux_95	500lux_95
A0-07.1	LKD	22.23	184	High	82.4%	74.7%	61.8%	High	88.0%	73.6%	57.4%
A0-07.2	Bed	12.87	104	High	83.9%	76.6%	64.7%	High	89.5%	77.4%	63.9%
A0-08.1	LKD	23.01	192	Minimum	57.7%	34.5%	5.0%	Minimum	76.0%	34.7%	0.4%
A0-08.2	Bed	11.40	96	High	82.4%	73.7%	60.9%	High	87.4%	70.5%	53.5%
A1-09.1	LKD	18.38	156	Medium	77.3%	63.9%	48.7%	Medium	86.5%	68.0%	49.9%
A1-09.2	Bed	10.14	78	High	81.4%	71.8%	57.1%	High	88.4%	74.0%	56.4%
A1-09.3	Bed	8.29	63	Medium	76.7%	62.1%	46.5%	High	87.3%	70.4%	53.3%
A1-10.1	Studio	17.12	144	Minimum	60.5%	45.5%	27.5%	Minimum	62.4%	19.7%	3.5%
A1-11.1	LKD	22.07	190	High	77.0%	65.6%	54.4%	High	84.6%	67.0%	53.5%
A1-11.2	Bed	7.02	48	High	76.3%	65.1%	53.8%	High	83.5%	64.5%	50.5%
A1-11.3	Bed	5.04	35	High	83.9%	77.1%	68.6%	High	89.9%	80.6%	71.3%
A1-12.1	LKD	23.45	198	Minimum	62.3%	47.8%	35.4%	Minimum	73.6%	42.5%	21.8%
A1-12.2	Bed	10.23	88	High	75.5%	64.2%	53.1%	High	84.2%	66.2%	51.8%
A1-13.1	LKD	27.73	250	Minimum	54.5%	38.8%	23.3%	Minimum	69.6%	37.9%	14.9%
A1-13.2	Bed	7.05	45	High	75.5%	64.3%	53.3%	High	83.9%	65.9%	51.6%
A1-13.3	Bed	5.73	34	High	80.7%	71.9%	61.4%	High	86.1%	70.4%	57.2%
A1-13.4	Bed	12.03	104	Medium	73.3%	60.3%	48.5%	Medium	82.4%	60.7%	45.7%
A1-14.1	LKD	23.23	190	Minimum	62.9%	47.4%	34.4%	Minimum	66.3%	30.9%	7.9%
A1-14.2	Bed	10.37	88	High	75.0%	62.7%	51.4%	High	83.7%	64.7%	50.8%
A1-15.1	LKD	23.23	190	Minimum	59.9%	44.1%	32.2%	Minimum	64.8%	28.7%	7.5%
A1-15.2	Bed	10.37	88	High	75.0%	62.8%	51.9%	High	83.8%	65.4%	51.0%
A1-16.1	LKD	26.48	240	High	80.0%	70.7%	60.6%	High	86.3%	69.7%	56.5%
A1-16.2	Bed	6.06	37	Minimum	63.1%	42.6%	23.5%	Minimum	76.3%	37.0%	13.3%
A1-16.3	Bed	10.50	81	Medium	70.5%	53.8%	35.1%	Medium	84.1%	61.5%	38.8%
A1-17.1	LKD	22.25	184	High	81.0%	72.1%	58.6%	High	87.3%	71.1%	55.0%
A1-17.2	Bed	12.89	104	High	82.0%	73.8%	60.3%	High	88.9%	76.3%	60.7%
A1-18.1	LKD	23.91	204	Minimum	53.2%	25.0%	1.2%	Minimum	73.9%	29.3%	0.0%
A1-18.2	Bed	9.98	85	High	82.4%	73.9%	61.4%	High	89.1%	76.8%	62.3%
A1-18.3	Bed	7.97	56	Medium	75.4%	58.8%	41.2%	Minimum	77.6%	39.6%	6.9%
A2-19.1	LKD	18.38	156	High	77.7%	65.2%	50.5%	High	86.7%	68.9%	51.6%
A2-19.2	Bed	10.14	78	High	81.7%	72.7%	59.0%	High	88.4%	74.3%	57.3%
A2-19.3	Bed	8.29	63	Medium	77.3%	63.4%	48.4%	High	87.8%	71.8%	55.6%
A2-20.1	Studio	17.12	144	Medium	65.5%	52.6%	36.1%	Minimum	66.5%	27.9%	5.1%
A2-21.1	LKD	22.07	190	High	77.8%	66.6%	57.0%	High	84.9%	67.7%	54.1%
A2-21.2	Bed	7.02	48	High	75.8%	64.5%	53.7%	High	83.2%	64.3%	50.6%
A2-21.3	Bed	5.04	35	High	83.7%	77.3%	69.0%	High	89.8%	80.4%	70.9%
A2-22.1	LKD	23.45	198	Minimum	62.3%	47.8%	35.0%	Minimum	74.1%	43.2%	22.6%
A2-22.2	Bed	10.23	88	High	75.5%	64.3%	53.2%	High	84.4%	66.8%	52.6%
A2-23.1	LKD	27.73	250	Minimum	55.4%	40.3%	24.4%	Minimum	70.9%	39.0%	17.0%
A2-23.2	Bed	7.05	45	High	75.9%	65.0%	53.7%	High	83.4%	64.5%	50.2%
A2-23.3	Bed	5.73	34	High	81.1%	72.8%	62.0%	High	86.4%	71.5%	57.6%
A2-23.4	Bed	12.03	104	Medium	73.8%	60.9%	49.4%	Medium	82.9%	62.1%	47.0%
A2-24.1	LKD	23.23	190	Minimum	63.8%	48.7%	35.8%	Minimum	66.6%	31.5%	10.3%
A2-24.2	Bed	10.37	88	High	75.0%	62.9%	51.9%	High	83.5%	65.0%	50.9%
A2-25.1	LKD	23.23	190	Minimum	61.2%	45.7%	34.6%	Minimum	65.6%	30.1%	7.8%
A2-25.2	Bed	10.37	88	High	75.1%	63.7%	52.5%	High	84.3%	66.1%	52.1%
A2-26.1	LKD	26.48	240	High	80.5%	71.9%	61.6%	High	86.7%	71.5%	57.5%
A2-26.2	Bed	6.06	37	Minimum	64.1%	44.6%	25.1%	Minimum	75.3%	36.3%	11.6%
A2-26.3	Bed	10.50	81	Medium	71.7%	55.9%	38.3%	Medium	84.7%	63.2%	43.2%
A2-27.1	LKD	22.25	184	High	81.1%	72.3%	59.0%	High	87.7%	72.6%	57.0%

Block A - EN17037:2018 Table A.1 Daylight Provision Room Schedule

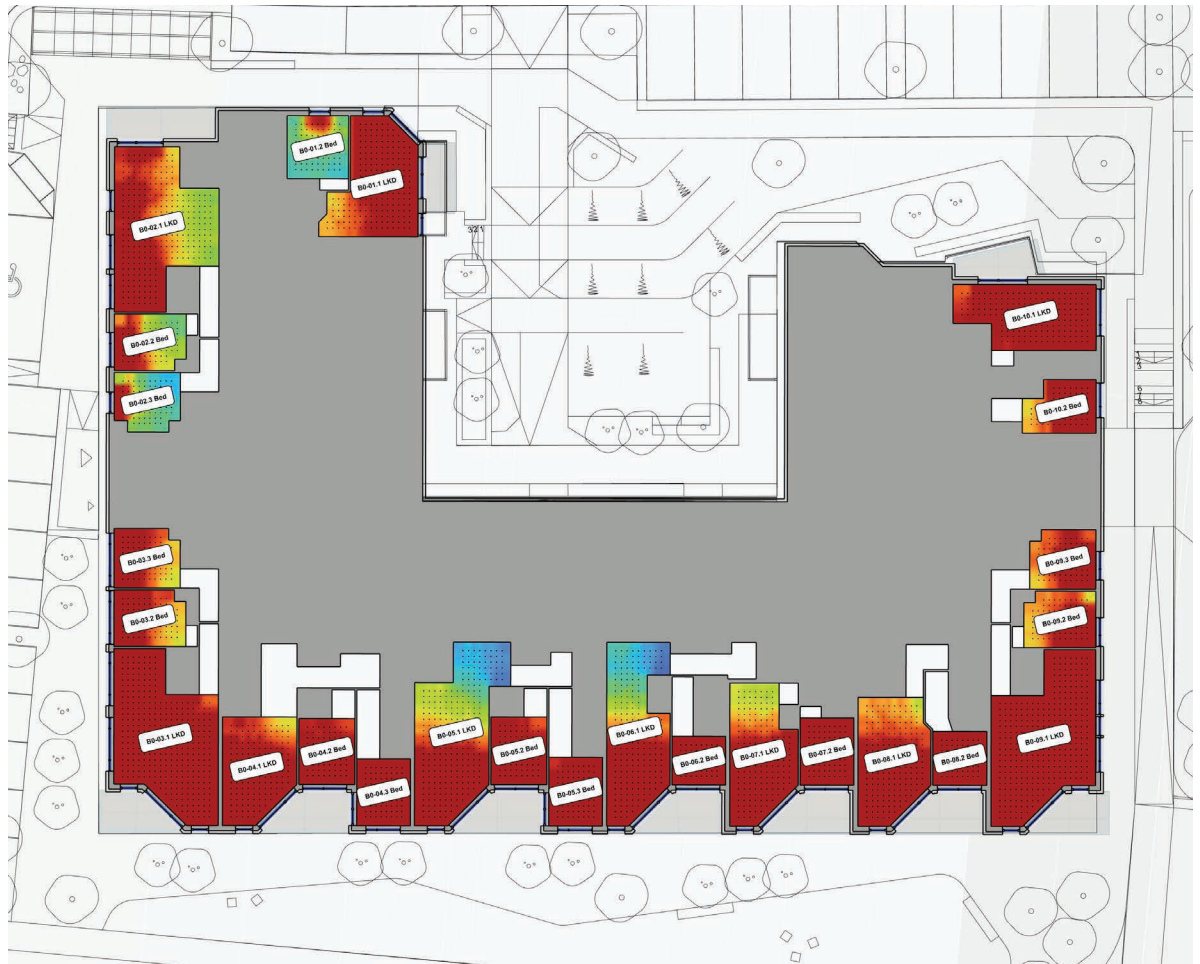| Block A - EN17037:2018 Table A.1 Daylight Provision Room Schedule											
Space ID	Description	Area m2	Sensor Count	Target Illuminance	300lux_50	500lux_50	750lux_50	Minimum Target Illuminance	100lux_95	300lux_95	500lux_95
A2-27.2	Bed	12.89	104	High	82.7%	75.1%	63.0%	High	89.3%	77.0%	62.9%
A2-28.1	LKD	23.91	204	Minimum	54.3%	28.2%	1.1%	Minimum	74.4%	31.3%	0.1%
A2-28.2	Bed	9.98	85	High	82.9%	75.3%	62.9%	High	89.1%	76.9%	62.8%
A2-28.3	Bed	7.97	56	Medium	76.0%	60.5%	43.9%	Minimum	78.4%	43.5%	10.4%
A3-29.1	LKD	18.38	156	High	78.0%	66.1%	51.7%	High	87.1%	69.7%	52.7%
A3-29.2	Bed	10.14	78	High	82.2%	74.1%	61.2%	High	88.7%	75.4%	59.4%
A3-29.3	Bed	8.29	63	High	81.8%	72.5%	59.7%	High	89.4%	77.2%	63.0%
A3-30.1	Studio	17.12	144	Minimum	55.8%	36.2%	14.7%	Minimum	56.1%	7.6%	3.2%
A3-31.1	LKD	22.07	190	High	80.0%	70.6%	61.3%	High	86.5%	72.6%	60.3%
A3-31.2	Bed	7.02	48	High	80.7%	71.6%	61.3%	High	86.5%	71.5%	58.3%
A3-31.3	Bed	5.04	35	High	84.1%	77.9%	69.4%	High	90.4%	81.3%	72.8%
A3-32.1	LKD	23.45	198	Medium	66.3%	52.5%	40.9%	Minimum	76.2%	48.5%	31.4%
A3-32.2	Bed	10.23	88	High	76.6%	65.8%	54.9%	High	84.7%	67.4%	53.7%
A3-33.1	LKD	27.73	250	Minimum	55.2%	39.5%	23.9%	Minimum	70.3%	39.2%	17.3%
A3-33.2	Bed	7.05	45	High	75.5%	64.4%	53.3%	High	83.8%	66.0%	51.8%
A3-33.3	Bed	5.73	34	High	81.6%	73.4%	62.9%	High	85.8%	69.4%	56.2%
A3-33.4	Bed	12.03	104	High	74.0%	61.5%	50.4%	Medium	83.0%	62.8%	48.3%
A3-34.1	LKD	23.23	190	Minimum	63.5%	48.3%	36.5%	Minimum	66.2%	30.9%	9.3%
A3-34.2	Bed	10.37	88	High	75.7%	64.1%	52.9%	High	84.6%	66.7%	52.8%
A3-35.1	LKD	23.23	190	Minimum	60.6%	44.9%	33.1%	Minimum	65.9%	31.1%	8.2%
A3-35.2	Bed	10.37	88	High	75.4%	64.0%	52.6%	High	84.5%	67.0%	52.9%
A3-36.1	LKD	26.48	240	High	80.0%	70.8%	60.6%	High	86.6%	71.1%	57.2%
A3-36.2	Bed	6.06	37	Minimum	64.6%	45.6%	25.7%	Minimum	77.4%	41.4%	14.3%
A3-36.3	Bed	10.50	81	Medium	71.1%	55.7%	38.9%	Medium	84.8%	63.4%	43.5%
A3-37.1	LKD	22.25	184	High	81.2%	72.5%	59.4%	High	87.7%	72.2%	56.5%
A3-37.2	Bed	12.89	104	High	82.4%	74.7%	62.6%	High	89.3%	77.1%	63.5%
A3-38.1	LKD	23.91	204	Minimum	55.3%	29.9%	1.2%	Minimum	74.7%	33.2%	0.1%
A3-38.2	Bed	9.98	85	High	83.0%	75.4%	63.3%	High	89.1%	76.9%	62.8%
A3-38.3	Bed	7.97	56	Medium	75.9%	60.8%	44.2%	Minimum	79.3%	47.1%	15.0%
A4-39.1	LKD	28.33	260	Medium	68.1%	54.9%	43.2%	Minimum	75.4%	46.3%	27.4%
A4-39.2	Bed	9.12	72	High	86.7%	81.9%	75.6%	High	92.0%	83.1%	75.9%
A4-39.3	Bed	12.78	103	High	89.4%	85.5%	81.2%	High	91.2%	82.1%	75.0%
A4-40.1	LKD	23.23	190	High	74.2%	61.8%	50.8%	Minimum	75.4%	46.4%	29.5%
A4-40.2	Bed	10.37	88	High	86.4%	81.4%	74.9%	High	91.4%	82.6%	75.1%
A4-41.1	LKD	23.23	190	Medium	72.6%	59.5%	47.6%	Minimum	74.9%	44.7%	25.9%
A4-41.2	Bed	10.37	88	High	86.6%	81.8%	75.3%	High	91.6%	82.7%	75.2%
A4-42.1	LKD	26.48	240	High	80.8%	72.6%	62.3%	High	86.8%	72.0%	58.2%
A4-42.2	Bed	6.06	37	Minimum	64.2%	45.7%	26.3%	Minimum	76.2%	40.1%	14.0%
A4-42.3	Bed	10.50	81	Medium	71.6%	56.1%	40.4%	Medium	84.7%	63.5%	44.3%
A4-43.1	LKD	22.25	184	High	89.2%	85.5%	79.5%	High	94.3%	86.4%	79.5%
A4-43.2	Bed	12.89	104	High	87.3%	81.5%	75.3%	High	92.2%	82.4%	74.7%
A4-44.1	LKD	23.91	204	Medium	68.1%	50.6%	28.0%	Medium	81.2%	52.4%	22.6%
A4-44.2	Bed	9.98	85	High	88.5%	84.1%	78.4%	High	94.3%	86.6%	81.1%
A4-44.3	Bed	7.97	56	High	86.9%	81.1%	73.8%	High	88.9%	76.0%	61.3%

Table 18: Block A - Daylight Provision individual values for all habitable rooms to EN 17037 Table A.1.

Block B

Ground Floor

First Floor

Figure 32: Block B - Daylight Provision and Annual Average Illuminance to all Habitable Rooms
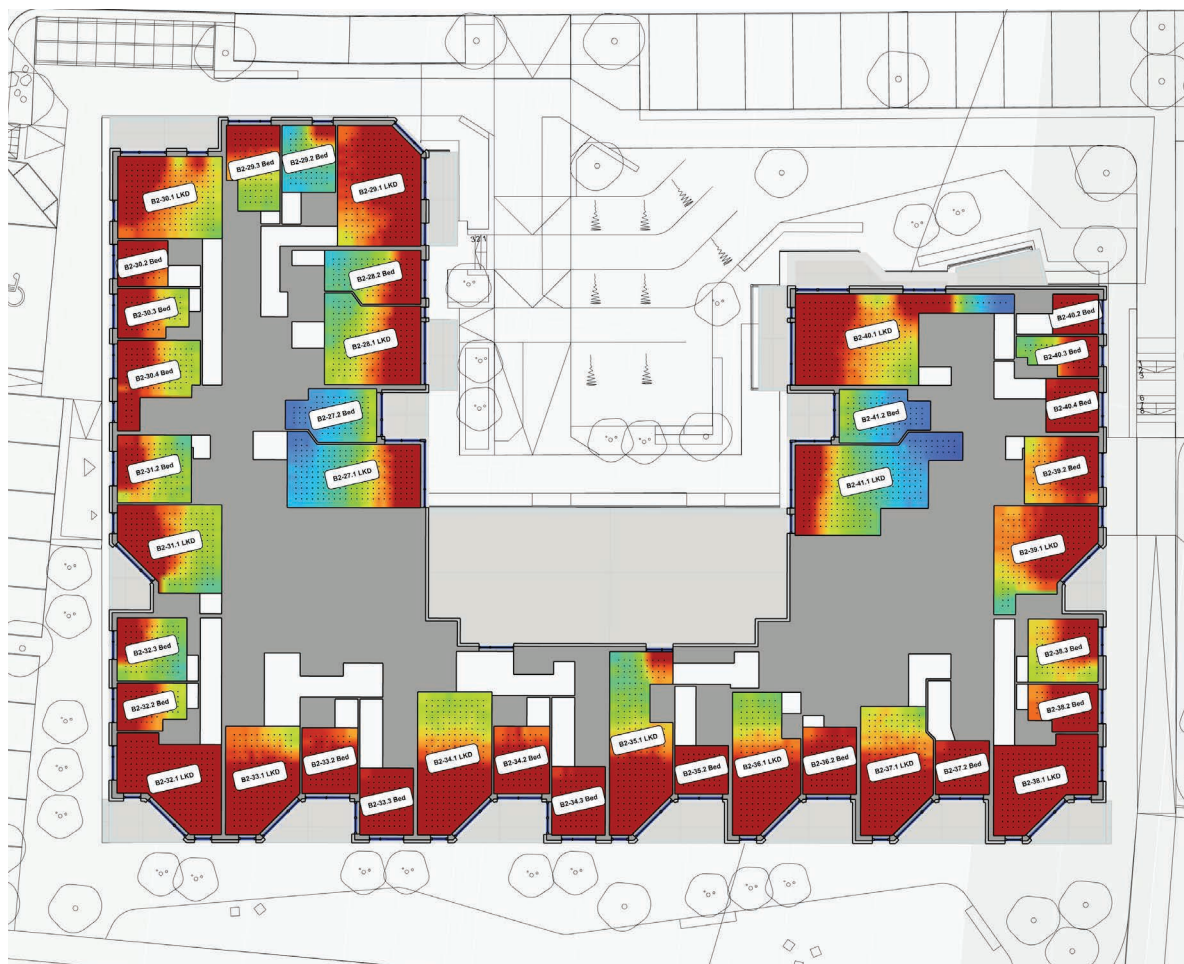
Block B

Second Floor

Third Floor

Figure 33: Block B - Daylight Provision and Annual Average Illuminance to all Habitable Rooms

Block B

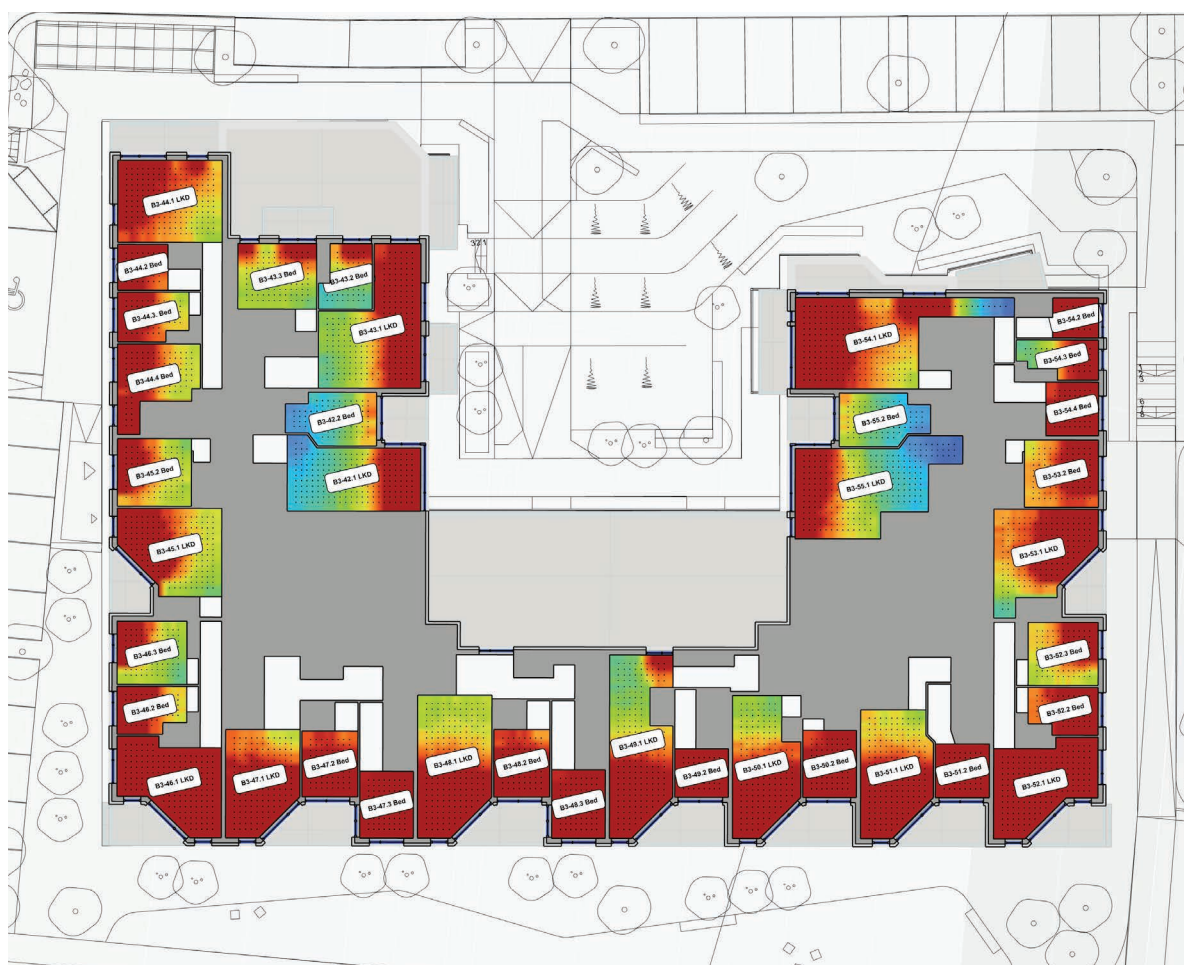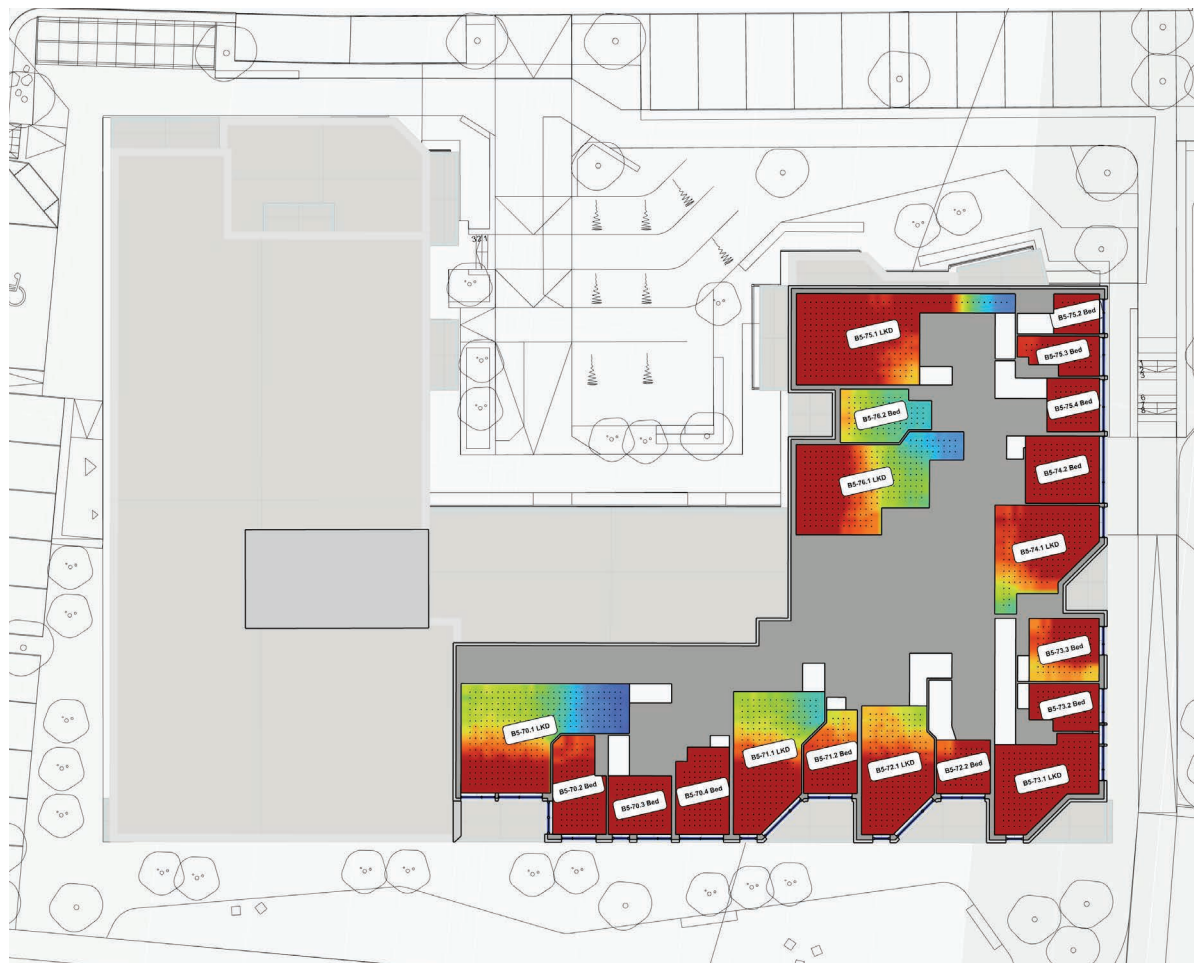**Fourth Floor**

Fifth Floor

Figure 34: Block B - Daylight Provision and Annual Average Illuminance to all Habitable Rooms

Block B - EN17037:2018 Table A.1 Daylight Provision Room Schedule												
Space ID	Description	Area m2	Sensor Count	Target Illuminance	300lux_50	500lux_50	750lux_50	Minimum Target Illuminance	100lux_95	300lux_95	500lux_95
B0-01.1	LKD	24.32	212	High	83.6%	76.0%	64.4%	High	87.4%	71.3%	55.4%
B0-01.2	Bed	10.49	81	Minimum	59.6%	35.5%	6.2%	Minimum	79.5%	45.5%	8.9%
B0-02.1	LKD	35.95	330	High	78.2%	66.1%	51.9%	Medium	83.8%	59.6%	39.4%
B0-02.2	Bed	10.70	84	Medium	70.2%	53.9%	35.8%	Medium	80.8%	53.5%	30.0%
B0-02.3	Bed	9.91	82	Minimum	54.7%	30.8%	10.6%	Minimum	69.7%	26.3%	4.3%
B0-03.1	LKD	37.84	350	High	82.4%	75.0%	65.0%	High	88.4%	76.7%	64.7%
B0-03.2	Bed	10.70	84	High	77.1%	64.4%	53.1%	High	85.9%	66.6%	51.1%
B0-03.3	Bed	10.33	86	High	78.0%	66.7%	54.8%	High	86.5%	68.4%	52.7%
B0-04.1	LKD	19.66	166	High	77.8%	67.9%	56.9%	High	83.9%	65.0%	50.6%
B0-04.2	Bed	10.03	80	High	76.2%	65.6%	53.9%	High	86.0%	69.6%	56.0%
B0-04.3	Bed	9.75	80	High	83.1%	76.4%	67.6%	High	88.4%	76.9%	65.5%
B0-05.1	LKD	33.16	284	Medium	66.3%	51.8%	40.4%	Minimum	53.9%	14.8%	4.9%
B0-05.2	Bed	10.29	80	High	76.3%	65.5%	54.1%	High	86.1%	69.7%	56.5%
B0-05.3	Bed	10.02	80	High	83.0%	76.0%	67.1%	High	88.0%	76.1%	64.9%
B0-06.1	LKD	26.93	217	Medium	69.1%	55.7%	43.8%	Minimum	56.1%	17.2%	5.3%
B0-06.2	Bed	7.07	56	High	80.7%	72.0%	61.8%	High	87.9%	75.6%	64.6%
B0-07.1	LKD	21.90	185	High	75.8%	64.7%	53.6%	Medium	81.1%	55.9%	42.1%
B0-07.2	Bed	9.80	80	High	77.6%	66.9%	56.1%	High	86.5%	72.0%	58.7%
B0-08.1	LKD	22.65	205	High	75.6%	64.4%	53.4%	Medium	83.2%	63.7%	48.2%
B0-08.2	Bed	7.89	64	High	80.2%	70.7%	60.8%	High	88.0%	75.9%	65.1%
B0-09.1	LKD	37.82	350	High	85.5%	79.8%	73.5%	High	90.6%	80.7%	72.2%
B0-09.2	Bed	10.70	84	Medium	73.3%	58.7%	43.4%	Medium	84.7%	65.4%	48.0%
B0-09.3	Bed	10.33	86	Medium	75.5%	62.5%	47.9%	High	85.5%	67.4%	50.9%
B0-10.1	LKD	22.88	195	High	83.4%	76.6%	65.6%	High	90.5%	79.8%	69.0%
B0-10.2	Bed	9.67	73	High	80.1%	70.1%	58.7%	Medium	85.0%	66.2%	49.3%
B1-11.1	LKD	23.85	225	Fail	49.5%	24.9%	8.4%	Minimum	55.7%	6.4%	1.5%
B1-11.2	Bed	11.63	95	Fail	13.2%	3.7%	1.8%	Fail	35.5%	2.5%	0.5%
B1-12.1	LKD	21.70	188	Minimum	60.3%	41.0%	21.1%	Minimum	74.4%	34.9%	12.2%
B1-12.2	Bed	12.93	109	Minimum	59.0%	40.3%	20.1%	Minimum	72.0%	31.0%	10.0%
B1-13.1	LKD	26.26	237	Medium	77.2%	63.0%	49.2%	High	86.2%	67.4%	50.3%
B1-13.2	Bed	9.79	80	Minimum	52.8%	24.6%	0.3%	Minimum	76.5%	34.8%	1.3%
B1-13.3	Bed	11.57	94	Medium	76.9%	61.7%	46.5%	Medium	84.2%	59.3%	38.4%
B1-14.1	LKD	23.35	221	Medium	77.0%	62.9%	47.7%	Medium	86.3%	67.3%	49.1%
B1-14.2	Bed	6.30	42	High	79.5%	69.3%	56.0%	High	87.9%	73.3%	57.9%
B1-14.3	Bed	8.96	69	Medium	74.3%	60.2%	44.8%	Medium	82.5%	58.2%	37.8%
B1-14.4	Bed	14.70	113	Medium	72.1%	57.3%	41.6%	Medium	82.0%	56.9%	34.7%
B1-15.1	LKD	21.59	202	Minimum	64.4%	48.8%	30.7%	Minimum	78.6%	49.6%	25.9%
B1-15.2	Bed	13.63	110	Minimum	64.5%	47.1%	26.7%	Medium	79.0%	50.0%	27.5%
B1-16.1	LKD	21.14	187	High	83.1%	76.6%	67.5%	High	88.7%	78.1%	67.1%
B1-16.2	Bed	8.34	68	Medium	72.7%	59.6%	45.9%	Medium	82.2%	58.5%	40.1%
B1-16.3	Bed	12.02	99	Minimum	59.8%	41.3%	20.4%	Minimum	76.0%	42.8%	17.6%
B1-17.1	LKD	19.68	166	High	75.5%	64.2%	53.1%	Medium	82.3%	60.7%	45.2%
B1-17.2	Bed	10.03	80	High	74.9%	63.3%	51.8%	High	84.4%	66.4%	52.1%
B1-17.3	Bed	9.76	80	High	81.8%	74.0%	64.2%	High	87.4%	74.6%	62.6%
B1-18.1	LKD	26.63	232	Medium	70.7%	57.2%	44.8%	Medium	81.6%	58.6%	41.2%
B1-18.2	Bed	10.30	80	High	74.2%	62.4%	50.6%	High	83.8%	65.6%	50.9%
B1-18.3	Bed	10.01	80	High	81.8%	73.8%	63.7%	High	87.0%	74.0%	61.6%
B1-19.1	LKD	26.93	217	Medium	70.1%	56.4%	44.1%	Medium	79.8%	51.9%	31.0%
B1-19.2	Bed	7.07	56	High	79.1%	68.9%	58.4%	High	87.5%	74.8%	62.8%
B1-20.1	LKD	21.90	185	Medium	72.6%	60.3%	47.8%	Medium	78.4%	51.8%	35.4%
B1-20.2	Bed	9.80	80	High	75.7%	64.7%	53.3%	High	85.5%	68.7%	55.0%

Block B - EN17037:2018 Table A.1 Daylight Provision Room Schedule												
Space ID	Description	Area m2	Sensor Count	Target Illuminance	300lux_50	500lux_50	750lux_50	Minimum Target Illuminance	100lux_95	300lux_95	500lux_95
B1-21.1	LKD	22.65	205	Medium	73.1%	60.8%	48.9%	Medium	81.5%	57.7%	43.2%
B1-21.2	Bed	7.89	64	High	78.2%	67.7%	57.1%	High	86.7%	72.9%	59.8%
B1-22.1	LKD	21.12	187	High	84.7%	78.8%	71.5%	High	90.4%	80.8%	72.6%
B1-22.2	Bed	8.38	68	High	79.7%	69.4%	58.2%	High	86.1%	69.5%	55.0%
B1-22.3	Bed	12.05	99	Medium	68.7%	53.5%	36.0%	Medium	82.6%	59.4%	39.3%
B1-23.1	LKD	22.81	193	Medium	73.4%	59.4%	44.4%	Medium	82.5%	59.2%	40.2%
B1-23.2	Bed	13.60	110	Medium	72.9%	58.5%	43.1%	Medium	84.9%	66.0%	49.0%
B1-24.1	LKD	22.47	186	High	82.8%	75.0%	63.8%	High	86.6%	69.0%	51.6%
B1-24.2	Bed	9.64	73	High	78.6%	67.5%	55.0%	Medium	84.5%	64.8%	47.4%
B1-25.1	LKD	19.62	170	Minimum	50.7%	29.0%	8.7%	Minimum	69.6%	27.0%	2.5%
B1-25.2	Bed	12.79	110	Medium	74.7%	58.2%	40.7%	Medium	83.5%	56.9%	33.7%
B1-26.1	LKD	26.48	244	Fail	41.6%	14.1%	1.2%	Fail	30.8%	0.0%	0.0%
B1-26.2	Bed	11.63	95	Fail	9.7%	1.3%	0.4%	Fail	33.8%	0.8%	0.0%
B2-27.1	LKD	23.85	225	Minimum	56.2%	35.0%	15.6%	Minimum	61.5%	13.5%	2.5%
B2-27.2	Bed	11.63	95	Fail	23.6%	7.0%	3.6%	Fail	46.0%	4.9%	2.2%
B2-28.1	LKD	21.70	188	Medium	68.1%	51.6%	34.4%	Minimum	78.5%	46.1%	23.7%
B2-28.2	Bed	12.93	109	Minimum	63.2%	46.2%	25.6%	Minimum	75.0%	38.3%	15.3%
B2-29.1	LKD	26.26	237	High	78.6%	66.6%	53.2%	High	87.0%	70.9%	54.9%
B2-29.2	Bed	9.79	80	Minimum	54.1%	27.8%	0.8%	Minimum	76.7%	36.6%	2.9%
B2-29.3	Bed	11.57	94	Medium	77.4%	63.2%	48.8%	Medium	85.3%	62.6%	42.7%
B2-30.1	LKD	23.35	221	High	77.6%	65.1%	50.7%	High	86.8%	69.1%	51.9%
B2-30.2	Bed	6.30	42	High	80.7%	71.6%	59.7%	High	88.1%	74.4%	59.8%
B2-30.3	Bed	8.96	69	Medium	76.4%	62.8%	47.9%	Medium	84.5%	61.9%	42.4%
B2-30.4	Bed	14.70	113	Medium	74.5%	60.9%	46.2%	Medium	84.0%	61.6%	42.7%
B2-31.1	LKD	21.59	202	Medium	68.1%	53.6%	36.8%	Medium	80.3%	53.9%	32.8%
B2-31.2	Bed	13.63	110	Medium	67.2%	51.5%	33.1%	Medium	81.1%	55.4%	34.7%
B2-32.1	LKD	21.14	187	High	83.6%	77.7%	69.1%	High	89.5%	79.4%	69.2%
B2-32.2	Bed	8.34	68	High	76.4%	64.1%	50.8%	Medium	83.5%	62.2%	45.5%
B2-32.3	Bed	12.02	99	Minimum	64.4%	47.6%	27.0%	Medium	78.7%	50.1%	26.7%
B2-33.1	LKD	19.68	166	High	75.7%	64.8%	53.5%	Medium	82.6%	61.2%	45.5%
B2-33.2	Bed	10.03	80	High	74.8%	63.2%	51.6%	High	84.6%	67.4%	53.4%
B2-33.3	Bed	9.76	80	High	81.8%	74.1%	64.3%	High	87.4%	74.8%	63.2%
B2-34.1	LKD	26.63	232	Medium	70.7%	57.5%	44.7%	Medium	81.8%	58.8%	42.3%
B2-34.2	Bed	10.30	80	High	74.9%	63.3%	51.7%	High	84.4%	66.8%	52.7%
B2-34.3	Bed	10.01	80	High	81.9%	74.0%	64.2%	High	87.1%	74.2%	62.0%
B2-35.1	LKD	26.93	217	Medium	71.0%	57.8%	45.0%	Medium	80.0%	53.4%	33.6%
B2-35.2	Bed	7.07	56	High	79.5%	69.4%	59.2%	High	87.4%	74.4%	62.6%
B2-36.1	LKD	21.90	185	Medium	72.6%	60.2%	47.7%	Medium	78.2%	51.5%	35.6%
B2-36.2	Bed	9.80	80	High	75.6%	64.5%	53.0%	High	85.9%	69.5%	56.1%
B2-37.1	LKD	22.65	205	Medium	72.9%	60.7%	48.3%	Medium	81.7%	58.6%	43.7%
B2-37.2	Bed	7.89	64	High	78.4%	68.0%	57.4%	High	87.1%	74.0%	61.7%
B2-38.1	LKD	21.12	187	High	84.7%	78.9%	71.8%	High	90.3%	80.7%	72.5%
B2-38.2	Bed	8.38	68	High	79.7%	69.5%	58.3%	High	86.5%	70.7%	56.6%
B2-38.3	Bed	12.05	99	Medium	68.9%	54.3%	37.5%	Medium	83.1%	60.4%	41.2%
B2-39.1	LKD	22.81	193	Medium	73.7%	60.4%	46.1%	Medium	82.7%	60.5%	41.7%
B2-39.2	Bed	13.60	110	Medium	74.5%	61.0%	47.3%	High	85.3%	67.1%	50.7%
B2-40.1	LKD	35.71	297	High	78.4%	66.5%	52.1%	Medium	86.2%	66.5%	48.4%
B2-40.2	Bed	5.03	30	High	84.2%	77.9%	68.7%	High	90.3%	79.9%	69.6%
B2-40.3	Bed	7.49	48	Medium	73.0%	58.3%	42.7%	Minimum	79.3%	49.8%	26.5%
B2-40.4	Bed	7.69	64	High	81.2%	73.1%	62.0%	High	88.5%	76.9%	64.0%

Block B - EN17037:2018 Table A.1 Daylight Provision Room Schedule											
Space ID	Description	Area m2	Sensor Count	Target Illuminance	300lux_50	500lux_50	750lux_50	Minimum Target Illuminance	100lux_95	300lux_95	500lux_95
B2-41.1	LKD	32.79	288	Minimum	57.4%	38.1%	15.5%	Fail	45.1%	1.4%	0.0%
B2-41.2	Bed	11.63	95	Fail	26.0%	3.7%	2.1%	Fail	46.2%	2.8%	1.1%
B3-42.1	LKD	23.85	225	Minimum	59.4%	40.5%	20.4%	Minimum	64.5%	20.0%	4.6%
B3-42.2	Bed	11.63	95	Fail	37.7%	13.4%	5.4%	Minimum	54.8%	9.8%	4.1%
B3-43.1	LKD	30.14	264	Medium	76.5%	62.7%	48.9%	Medium	80.8%	52.5%	30.0%
B3-43.2	Bed	8.32	66	Minimum	66.9%	46.8%	21.9%	Minimum	80.1%	47.2%	16.0%
B3-43.3	Bed	14.04	120	Medium	71.0%	53.2%	31.5%	Medium	85.8%	63.3%	40.8%
B3-44.1	LKD	23.35	221	High	78.9%	68.1%	54.2%	High	86.9%	69.5%	52.9%
B3-44.2	Bed	6.30	42	High	81.3%	72.6%	61.7%	High	88.7%	76.6%	63.1%
B3-44.3.	Bed	8.96	69	High	77.6%	65.3%	51.3%	Medium	85.4%	64.8%	46.6%
B3-44.4	Bed	14.70	113	Medium	75.8%	62.9%	48.3%	Medium	85.4%	64.7%	46.6%
B3-45.1	LKD	21.59	202	Medium	71.0%	57.4%	42.3%	Medium	81.9%	58.1%	37.3%
B3-45.2	Bed	13.63	110	Medium	70.8%	56.1%	39.7%	Medium	83.0%	60.7%	42.4%
B3-46.1	LKD	21.14	187	High	84.4%	78.2%	70.1%	High	89.7%	79.6%	70.0%
B3-46.2	Bed	8.34	68	High	78.4%	67.5%	54.9%	Medium	85.2%	65.7%	49.3%
B3-46.3	Bed	12.02	99	Medium	67.0%	50.9%	32.2%	Medium	80.7%	54.7%	32.8%
B3-47.1	LKD	19.68	166	High	75.8%	64.8%	53.7%	Medium	82.8%	62.6%	46.4%
B3-47.2	Bed	10.03	80	High	75.1%	63.6%	52.3%	High	85.1%	68.0%	53.9%
B3-47.3	Bed	9.76	80	High	82.1%	74.3%	64.8%	High	87.4%	75.0%	63.4%
B3-48.1	LKD	26.63	232	Medium	71.5%	58.6%	46.1%	Medium	81.7%	58.6%	41.9%
B3-48.2	Bed	10.30	80	High	75.0%	63.6%	51.9%	High	85.1%	68.0%	54.2%
B3-48.3	Bed	10.01	80	High	81.9%	74.2%	64.5%	High	87.3%	74.4%	62.8%
B3-49.1	LKD	26.93	217	Medium	71.0%	57.8%	45.1%	Medium	80.2%	53.8%	33.8%
B3-49.2	Bed	7.07	56	High	80.3%	70.4%	60.3%	High	87.7%	75.0%	63.3%
B3-50.1	LKD	21.90	185	Medium	73.6%	61.1%	48.7%	Medium	78.5%	52.1%	35.8%
B3-50.2	Bed	9.80	80	High	75.7%	64.8%	53.1%	High	86.0%	69.7%	56.9%
B3-51.1	LKD	22.65	205	Medium	73.4%	61.3%	49.0%	Medium	82.0%	59.4%	43.9%
B3-51.2	Bed	7.89	64	High	79.0%	68.6%	57.9%	High	87.1%	73.8%	61.2%
B3-52.1	LKD	21.12	187	High	84.8%	79.1%	72.0%	High	90.0%	80.3%	71.9%
B3-52.2	Bed	8.38	68	High	80.1%	70.1%	59.4%	High	86.5%	70.6%	56.7%
B3-52.3	Bed	12.05	99	Medium	69.0%	54.5%	38.2%	Medium	83.0%	60.5%	42.0%
B3-53.1	LKD	22.81	193	Medium	74.2%	61.0%	46.8%	Medium	83.0%	60.9%	42.6%
B3-53.2	Bed	13.60	110	Medium	74.5%	61.1%	47.6%	High	85.2%	66.8%	51.0%
B3-54.1	LKD	35.71	297	High	79.8%	70.3%	56.7%	High	87.0%	70.2%	53.4%
B3-54.2	Bed	5.03	30	High	84.5%	78.3%	69.5%	High	90.3%	80.0%	69.8%
B3-54.3	Bed	7.49	48	Medium	71.8%	56.5%	41.5%	Minimum	78.8%	49.4%	25.8%
B3-54.4	Bed	7.69	64	High	81.1%	72.8%	61.5%	High	88.3%	76.2%	63.5%
B3-55.1	LKD	32.79	288	Minimum	65.5%	47.8%	28.5%	Minimum	52.7%	4.1%	1.1%
B3-55.2	Bed	11.63	95	Fail	43.2%	16.0%	5.1%	Minimum	59.1%	10.5%	3.4%
B4-56.1	LKD	23.85	225	Minimum	65.8%	49.4%	30.6%	Minimum	71.5%	31.0%	8.0%
B4-56.2	Bed	11.63	95	Fail	45.0%	19.9%	9.5%	Minimum	61.0%	15.4%	5.8%
B4-57.1	LKD	30.14	264	High	79.0%	67.1%	54.1%	Medium	82.4%	57.6%	37.7%
B4-57.2	Bed	8.32	66	Minimum	66.8%	47.8%	23.5%	Minimum	79.9%	48.9%	17.4%
B4-57.3	Bed	14.04	120	Medium	74.4%	58.6%	41.7%	Medium	86.6%	67.5%	48.9%
B4-58.1	LKD	23.35	221	High	80.6%	71.6%	58.1%	High	88.0%	73.6%	57.5%
B4-58.2	Bed	6.30	42	High	82.4%	74.4%	63.5%	High	88.9%	77.3%	64.2%
B4-58.3	Bed	8.96	69	High	78.2%	66.6%	53.0%	Medium	85.9%	66.1%	48.8%
B4-58.4	Bed	14.70	113	High	77.1%	64.8%	50.9%	High	86.2%	67.3%	50.2%
B4-59.1	LKD	21.59	202	Medium	72.3%	59.2%	43.6%	Medium	82.5%	60.3%	40.8%
B4-59.2	Bed	13.63	110	Medium	72.4%	58.2%	43.2%	Medium	84.8%	64.2%	46.6%

Space ID	Description	Area m2	Sensor Count	Target Illuminance	300lux_50	500lux_50	750lux_50	Minimum Target Illuminance	100lux_95	300lux_95	500lux_95
B4-60.1	LKD	21.14	187	High	83.9%	78.0%	69.6%	High	89.7%	79.9%	70.5%
B4-60.2	Bed	8.34	68	High	79.2%	69.0%	56.5%	High	86.4%	69.0%	53.4%
B4-60.3	Bed	12.02	99	Medium	68.6%	53.1%	35.7%	Medium	82.6%	59.6%	39.8%
B4-61.1	LKD	19.68	166	High	75.3%	64.4%	52.6%	Medium	82.8%	62.2%	45.9%
B4-61.2	Bed	10.03	80	Medium	73.7%	61.0%	48.8%	High	84.2%	66.5%	51.9%
B4-61.3	Bed	9.76	80	High	81.8%	74.2%	64.5%	High	87.6%	75.1%	63.7%
B4-62.1	LKD	26.63	232	Medium	71.6%	58.6%	45.8%	Medium	82.1%	59.8%	43.8%
B4-62.2	Bed	10.30	80	High	75.3%	64.1%	52.5%	High	85.0%	67.8%	53.6%
B4-62.3	Bed	10.01	80	High	81.9%	74.3%	64.6%	High	87.7%	75.3%	63.9%
B4-63.1	LKD	26.93	217	Medium	72.2%	59.5%	46.9%	Medium	81.3%	56.6%	37.8%
B4-63.2	Bed	7.07	56	High	79.6%	69.6%	59.3%	High	87.1%	73.8%	61.4%
B4-64.1	LKD	21.90	185	Medium	73.8%	61.5%	49.1%	Medium	78.8%	52.4%	36.2%
B4-64.2	Bed	9.80	80	High	76.1%	65.1%	53.6%	High	85.9%	69.9%	56.7%
B4-65.1	LKD	22.65	205	Medium	73.5%	61.3%	49.1%	Medium	81.7%	58.8%	43.6%
B4-65.2	Bed	7.89	64	High	79.1%	68.9%	58.3%	High	87.2%	74.0%	61.7%
B4-66.1	LKD	21.12	187	High	84.8%	79.1%	71.9%	High	90.2%	80.5%	72.0%
B4-66.2	Bed	8.38	68	High	80.0%	69.9%	59.3%	High	86.4%	70.3%	56.0%
B4-66.3	Bed	12.05	99	Medium	69.2%	55.0%	38.6%	Medium	83.2%	61.4%	43.8%
B4-67.1	LKD	22.81	193	Medium	74.6%	61.3%	47.4%	Medium	82.9%	60.8%	43.2%
B4-67.2	Bed	13.60	110	Medium	74.7%	61.4%	48.0%	High	85.2%	67.3%	52.1%
B4-68.1	LKD	35.71	297	High	81.2%	72.7%	60.2%	High	87.5%	72.1%	56.9%
B4-68.2	Bed	5.03	30	High	84.7%	78.6%	70.1%	High	89.9%	79.2%	68.7%
B4-68.3	Bed	7.49	48	Medium	71.6%	56.8%	41.6%	Medium	79.1%	50.5%	26.4%
B4-68.4	Bed	7.69	64	High	81.0%	72.7%	61.7%	High	88.3%	76.5%	63.9%
B4-69.1	LKD	32.79	288	Medium	71.7%	55.5%	39.8%	Minimum	60.1%	9.8%	2.7%
B4-69.2	Bed	11.63	95	Minimum	52.5%	26.3%	8.3%	Minimum	70.5%	25.1%	6.6%
B5-70.1	LKD	37.54	337	Minimum	59.2%	42.9%	26.7%	Fail	39.6%	4.2%	0.7%
B5-70.2	Bed	13.09	114	High	81.9%	74.0%	64.2%	High	85.9%	69.5%	56.5%
B5-70.3	Bed	10.12	81	High	85.2%	79.6%	72.9%	High	90.9%	81.7%	73.9%
B5-70.4	Bed	12.33	106	High	82.6%	75.2%	66.0%	High	87.4%	74.9%	63.2%
B5-71.1	LKD	26.84	231	Medium	68.0%	53.9%	42.8%	Minimum	74.5%	44.0%	24.3%
B5-71.2	Bed	10.72	90	Medium	72.6%	59.6%	47.0%	Medium	83.0%	63.6%	47.1%
B5-72.1	LKD	22.65	205	High	74.2%	62.8%	50.8%	Medium	82.2%	59.9%	44.3%
B5-72.2	Bed	7.89	64	High	76.0%	64.8%	53.5%	High	85.8%	69.4%	56.4%
B5-73.1	LKD	21.12	187	High	85.9%	80.8%	75.0%	High	91.4%	82.2%	75.6%
B5-73.2	Bed	8.38	68	High	85.1%	79.3%	71.6%	High	89.9%	79.4%	69.1%
B5-73.3	Bed	12.05	99	Medium	75.9%	62.8%	50.0%	High	85.2%	66.9%	51.3%
B5-74.1	LKD	22.81	193	High	77.8%	66.5%	54.8%	Medium	84.6%	65.5%	49.8%
B5-74.2	Bed	13.60	110	High	86.1%	80.7%	74.4%	High	92.1%	83.1%	76.1%
B5-75.1	LKD	35.71	297	High	83.2%	76.0%	65.6%	High	88.3%	75.2%	60.7%
B5-75.2	Bed	5.03	30	High	86.7%	81.6%	75.8%	High	92.2%	83.3%	76.4%
B5-75.3	Bed	7.49	48	High	85.4%	79.7%	72.4%	High	87.8%	74.7%	61.5%
B5-75.4	Bed	7.69	64	High	87.8%	83.1%	77.8%	High	93.2%	84.7%	78.6%
B5-76.1	LKD	32.79	288	Medium	76.0%	61.5%	47.7%	Minimum	69.5%	23.2%	5.2%
B5-76.2	Bed	11.63	95	Minimum	52.8%	26.5%	8.7%	Minimum	73.7%	33.9%	7.8%
B5-67.	LKD	36.4	357	High	84.2%	77.9%	68.7%	High	89.9%	79.4%	68.6%
B5-67.	Bed	13.4	117	High	85.1%	79.0%	70.7%	High	91.5%	81.6%	73.7%
B5-68.	LKD	25.9	220	High	83.5%	76.1%	63.6%	High	88.0%	73.3%	56.6%
B5-68.	Bed	11.9	104	High	79.5%	68.9%	55.7%	High	87.1%	70.4%	54.5%

Block B - EN17037:2018 Table A.1 Daylight Provision Room Schedule

Table 19: Block B - Daylight Provision individual values for all habitable rooms to EN 17037 Table A.1.

Appendix C - Sunlight Hours to Living Spaces within the Proposed Development

Block A - Sunlight Hours			
Unit ID	LKD window within 90° south	No. sunlight hours on 21st March	EN 17037:2018 Level of recommendation of exposure to sunlight
A0-01.1	No	0.0	Below criteria
A0-02.1	Yes	1.1	Below criteria
A0-03.1	Yes	4.9	High
A0-04.1	Yes	2.6	Minimum
A0-05.1	Yes	3.5	Medium
A0-06.1	Yes	2.0	Minimum
A0-07.1	No	1.5	Minimum
A0-08.1	No	0.0	Below criteria
A1-09.1	No	0.0	Below criteria
A1-10.1	Yes	2.7	Minimum
A1-11.1	Yes	5.3	High
A1-12.1	Yes	5.1	High
A1-13.1	Yes	2.5	Minimum
A1-14.1	Yes	2.3	Minimum
A1-15.1	Yes	2.2	Minimum
A1-16.1	Yes	3.3	Medium
A1-17.1	No	1.5	Minimum
A1-18.1	No	0.0	Below criteria
A2-19.1	No	0.0	Below criteria
A2-20.1	Yes	3.4	Medium
A2-21.1	Yes	6.3	High
A2-22.1	Yes	5.3	High
A2-23.1	Yes	2.8	Minimum
A2-24.1	Yes	3.0	Medium
A2-25.1	Yes	5.3	High
A2-26.1	Yes	6.8	High
A2-27.1	No	2.2	Minimum
A2-28.1	No	0.0	Below criteria
A3-29.1	No	0.0	Below criteria
A3-30.1	Yes	3.3	Medium
A3-31.1	Yes	7.3	High
A3-32.1	Yes	6.7	High
A3-33.1	Yes	5.6	High
A3-34.1	Yes	6.6	High
A3-35.1	Yes	6.2	High
A3-36.1	Yes	7.0	High
A3-37.1	No	2.7	Minimum
A3-38.1	No	0.1	Below criteria
A4-39.1	Yes	9.5	High
A4-40.1	Yes	9.5	High
A4-41.1	Yes	7.2	High
A4-42.1	Yes	7.2	High
A4-43.1	No	3.0	Medium
A4-44.1	No	0.3	Below criteria

Table 20: Sunlight Hours to Living Spaces

Block B - Sunlight Hours			
Unit ID	LKD window within 90° south	No. sunlight hours on 21st March	EN 17037:2018 Level of recommendation of exposure to sunlight
B0-01.1	Yes	2.1	Minimum
B0-02.1	No	0.5	Below criteria
B0-03.1	Yes	3.2	Medium
B0-04.1	Yes	4.8	High
B0-05.1	Yes	3.8	Medium
B0-06.1	Yes	4.9	High
B0-07.1	Yes	5.8	High
B0-08.1	Yes	6.0	High
B0-09.1	Yes	8.3	High
B0-10.1	Yes	4.8	High
B1-11.1	Yes	0.0	Below criteria
B1-12.1	Yes	0.0	Below criteria
B1-13.1	Yes	2.3	Minimum
B1-14.1	No	0.7	Below criteria
B1-15.1	Yes	1.8	Minimum
B1-16.1	Yes	5.4	High
B1-17.1	Yes	6.0	High
B1-18.1	Yes	6.0	High
B1-19.1	Yes	6.0	High
B1-20.1	Yes	6.0	High
B1-21.1	Yes	6.0	High
B1-22.1	Yes	8.6	High
B1-23.1	Yes	3.8	Medium
B1-24.1	Yes	5.3	High
B1-25.1	No	0.0	Below criteria
B1-26.1	No	0.0	Below criteria
B2-27.1	Yes	0.0	Below criteria
B2-28.1	Yes	2.5	Minimum
B2-29.1	Yes	4.2	High
B2-30.1	No	1.7	Minimum
B2-31.1	Yes	1.9	Minimum
B2-32.1	Yes	6.2	High
B2-33.1	Yes	6.0	High
B2-34.1	Yes	6.0	High
B2-35.1	Yes	6.0	High
B2-36.1	Yes	6.0	High
B2-37.1	Yes	6.0	High
B2-38.1	Yes	8.6	High
B2-39.1	Yes	4.2	High
B2-40.1	No	0.0	Below criteria
B2-41.1	No	0.0	Below criteria
B3-42.1	Yes	0.5	Below criteria
B3-43.1	Yes	3.9	Medium
B3-44.1	No	2.7	Minimum
B3-45.1	Yes	2.4	Minimum
B3-46.1	Yes	6.7	High
B3-47.1	Yes	6.0	High
B3-48.1	Yes	6.0	High
B3-49.1	Yes	6.0	High

Block B - Sunlight Hours			
Unit ID	LKD window within 90° south	No. sunlight hours on 21st March	EN 17037:2018 Level of recommendation of exposure to sunlight
B3-50.1	Yes	6.0	High
B3-51.1	Yes	6.0	High
B3-52.1	Yes	8.6	High
B3-53.1	Yes	5.1	High
B3-54.1	No	2.3	Minimum
B3-55.1	No	0.0	Below criteria
B4-56.1	Yes	4.2	High
B4-57.1	Yes	4.8	High
B4-58.1	No	3.1	Medium
B4-59.1	Yes	3.3	Medium
B4-60.1	Yes	6.7	High
B4-61.1	Yes	6.0	High
B4-62.1	Yes	6.0	High
B4-63.1	Yes	6.0	High
B4-64.1	Yes	6.0	High
B4-65.1	Yes	6.0	High
B4-66.1	Yes	8.6	High
B4-67.1	Yes	5.1	High
B4-68.1	No	3.1	Medium
B4-69.1	No	1.2	Below criteria
B5-70.1	Yes	0.0	Below criteria
B5-71.1	Yes	4.2	High
B5-72.1	Yes	4.2	High
B5-73.1	Yes	7.6	High
B5-74.1	No	4.6	High
B5-75.1	No	4.0	High
B5-76.1	Yes	4.4	High

Table 21: Sunlight Hours to Living Spaces