December 2025

Glenamuck North
Southern Site

Daylight and Sunlight Assessment Report

Applicant: Durkan Glenamuck Developments Limited

"The advice given here is not mandatory and the guide should not be seen as an instrument of planning policy; its aim is to help rather than constrain the designer. Although it gives numerical guidelines, these should be interpreted flexibly since natural lighting is only one of many factors in site layout design." - BR 209

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Report Contents

The following report has been prepared by 3D Design Bureau (3DDB). 3DDB have over eight years experience in producing daylight and sunlight assessments for large scale planning applications and are recognised as experts in the field. This report has been reviewed and overseen by Nicholas Polley and Richard Dalton. Nicholas is CEO of 3D Design Bureau and is a qualified Building Services Engineer (B.Sc.(Eng) Dip Eng) with over 25 years experience in the industry. Richard is Associate Director of 3DDB and has a bachelor's degree in Building Information Modelling (BIM) with over 20 years experience in the industry.

1.0 Executive Summary

1.1 Summary of Assessment

3D Design Bureau (3DDB) were commissioned to carry out a daylight and sunlight assessment, along with an accompanying shadow study for the proposed large-scale residential development at Glenamuck North (Southern site), Kilternan, Dublin 18.

The subject site lies within a designated development zone under the "Kiltiernan–Glenamuck Local Area Plan (2025)". It is located immediately north of the new Glenamuck Manor development. The site is bounded by the newly completed Glenamuck District Distributor Road to the north and the under-construction Glenamuck Link Distributor Road to the east.

The proposed scheme comprises a total of 135 no. residential units, including 65 no. houses and 70 no. duplex units, distributed across four 3-to-4 storey blocks. The duplex units form the basis of the scheme performance assessment.

Assessments have been broken down into the following two main categories, 'Impact Assessment' and 'Scheme Performance', of which there are subcategories as summarised below:

Explanations of key terms and the relevant daylight and sunlight assessment standards are included in the sections H.0 & I.0 at the end of this report.

Impact Assessment

In accordance with section 2.2 of the BRE Guidelines (BR 209 - 2022), the surrounding context was carefully considered to identify all properties and amenity spaces that may potentially be affected by the proposed development. Particular attention was given to the properties immediately to the south, including Nos. 163-166 Glenamuck Manor and the dwelling known as "Westgate". Following the BRE screening criteria, an initial assessment was undertaken to determine if the proposed development would give rise to adverse effect on these properties. The screening confirmed that no such impacts are likely to occur. Therefore, no further detailed quantitative assessment is required as part of this report.

A more detailed explanation of the criterion applied can be found in section "2.1 Impact Assessment, Window Selection Criteria" on page 6.

Scheme Performance

- **Daylight access:** Assessed for the habitable rooms of the proposed blocks of duplex units (highlighted in red in Figure 1.1 below) through a Spatial Daylight Autonomy (SDA) study.
- **Sunlight access:** Quantified through a Sunlight Exposure (SE) assessment for the same habitable rooms.
- **Sun On Ground (SOG):** This assessment is used to indicate the level of sunlight on March 21st in the proposed external amenity spaces (highlighted in green in Figure 1.1 below). March 21st, also known as the spring equinox, is chosen as the assessment date as daytime and night-time are of approximately equal duration on this date.

Figure 1.1: Indication of the proposed blocks of duplex-units (in red) and amenity spaces (in green) assessed for scheme performance.

The results of these scheme performance assessments, which are in accordance with the BRE Guidelines, can be found in section E.0 on page 23. These results are summarised in section 1.2 and explained in section "3.1 Analysis of Scheme Performance Results" on page 16.

Supplementary scheme performance studies have also been carried out. These include an SDA assessment under the I.S. EN 17037 criterion, and a No Sky Line (NSL) study within proposed habitable rooms. The results of the supplementary scheme performance assessments can be found in section F.0 on page 49.

Qualitative Assessment

In addition to the quantitative assessments detailed in the 'Impact Assessment' and 'Scheme Performance' sections, this report includes a qualitative assessment. This is provided through the false colour plans of the proposed SOG assessment (section E.4 on page 46) and the hourly renderings of the shadow study (section G.0 on page 65).

1.2 Scheme Performance Results Overview:

Spatial Daylight Autonomy (SDA):

Spatial Daylight Autonomy (SDA) BRE 209 Criteria	
Unit Count	70
Rooms Assessed	237
Without Trees	
Compliant	232
Non-compliant	5
Compliance Rate*	c. 98%
With Trees (Proposed and Existing Trees)	
Compliant	218
Non-compliant	19
Compliance Rate*	c. 92%
Note: It is the expert opinion of 3DDB that the appropriate criteria for SDA assessments are that of the BRE Guidelines (BRE 209)	

* Compliance rates stated for the SDA analysis are based on the rooms that have been assessed within the blocks of duplex units. Units which contain non-compliant rooms have had Compensatory Design Solutions provided by the project architects (see Page 16)

Sunlight Exposure (SE):

Sunlight Exposure (SE)	
Units Assessed	70
SE without deciduous trees	
Non-Compliant	0
Minimum	13
Medium	3
High	54
Compliance Rate*	100%
SE with trees as opaque objects	
Non-Compliant	15
Minimum	16
Medium	5
High	34
Compliance Rate*	c. 79%

For the interpretation of levels of Sunlight Exposure please refer to “H.2 Definition of Levels of Sunlight Exposure” on page 71.

* Compliance rates stated for the SE analysis are based on the units that have been assessed.

Sun On Ground (SOG) in proposed amenity areas:

Sun On Ground (SOG)	
Areas Assessed	5
Areas meeting the guidelines	4
Areas not meeting the guidelines	1
Compliance Rate*	c. 80%

* Compliance rates stated for the SOG assessment are based on the public and communal open space only.

1.3 Supplementary Assessment Results Overview

Spatial Daylight Autonomy (SDA) under I.S. EN 17037 Criterion:

Spatial Daylight Autonomy (SDA) under I.S. EN 17037 Criterion	
Unit Count	70
Rooms Assessed	237
Without Trees	
Compliant	222
Non-compliant	15
Compliance Rate*	c. 94%
With Trees (Proposed and Existing Trees)	
Compliant	181
Non-compliant	56
Compliance Rate*	c. 76%
Note: The study under the I.S. EN 17037 criterion should be considered a supplementary assessment. It is the expert opinion of 3DDB that the appropriate criteria are that of the BRE Guidelines (BRE 209)	

* Compliance rates stated for the SDA analysis are based on the rooms that have been assessed.

No Sky Line (NSL):

No Sky Line (NSL):	
Unit Count	70
Rooms Assessed	237
Yes	233
No	4
Compliance Rate*	c. 98%
Note: As the BRE Guidelines do not provide a recommended minimum for NSL in proposed developments, compliance rates for NSL are calculated using a criteria applied by 3DDB.	

* Compliance rates stated for the NSL analysis are based on the rooms that have been assessed.

2.0 Methodology

2.1 Impact Assessment, Window Selection Criteria

To determine the properties to be included in the impact assessment, the decision chart taken from Figure 20 of the BRE Guidelines has been followed, as shown in Figure 2.2.

Accordingly, all properties within a distance of three times the height of the proposed development, as illustrated in Figure 2.1, have been considered for impact assessment.

Figure 2.1: Properties within three times the height of the proposed development

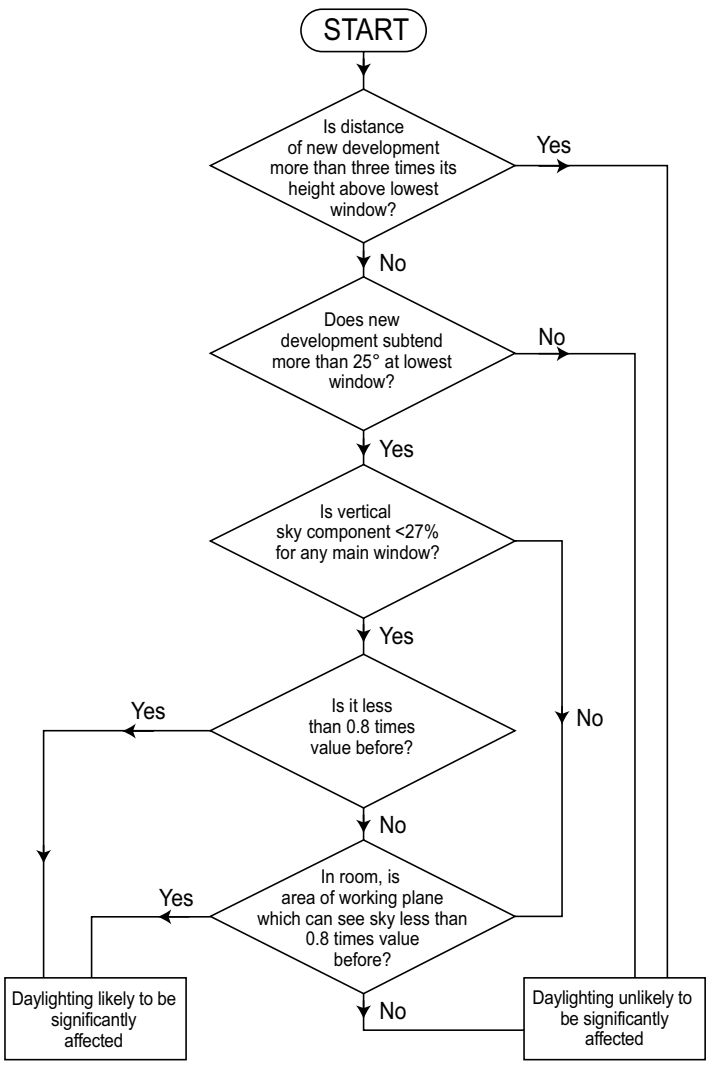

Figure 2.2: VSC decision chart, taken from BR 209.

As per the recommendation made in section 2.2.5 of the BRE Guidelines, a perpendicular section has been drawn from the main window wall of the potentially affected properties to determine if the proposed development subtends an angle of more than 25° at the lowest window.

If the proposed development subtends 25° in this section, then a VSC assessment should be conducted. However, if the proposed development does not subtend 25° in a perpendicular section, daylight is unlikely to be significantly affected and no further assessment is needed.

Furthermore, if a proposed obstruction falls within 45° when measured both in a plan and elevation view, then it is also appropriate to conduct a VSC impact assessment to determine if daylight will be affected. This is referred to in section 2.2.17 of the BRE Guidelines as the '45° approach'.

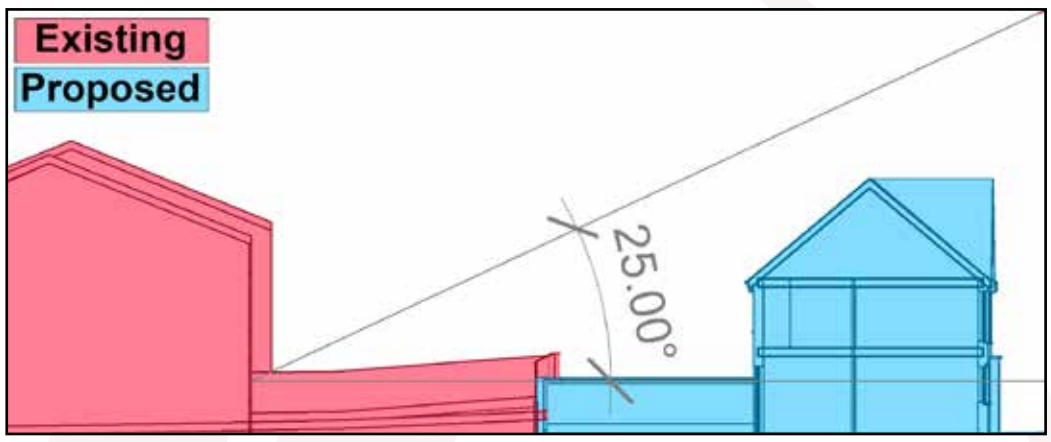

Figure 2.3: Section A-A taken through #163 Glenamuck Manor

Figure 2.3 shows a perpendicular section taken through #163 Glenamuck Manor which provides an example of where an existing window is within three times the height of the proposed development but the proposed development does not subtend 25° when measured in a perpendicular section.

Since no property in the surrounding context has the proposed development subtending 25° in a perpendicular section, or 45° when measured both in a plan and elevation view, no further quantitative assessment was conducted.

2.2 Preparing the analytical model

2.2.1 Building the Model States

The project architect, MCORM, supplied 3DDB with AutoCAD drawings and 3D models of the proposed development from which a 3D analytical model was created. Landscape drawings were provided by NMP Landscape Architects.

A site visit has not been conducted. A combination of survey information, aerial photography, available online photography and/or ordnance survey information were used to model the surrounding context and assessed buildings. **Note:** as the information gathered from online sources is not as accurate as surveyed information, a reasonable tolerance should be allowed to the placement of windows, boundary treatments and the results generated.

Baseline model state

As illustrated in Figure 2.4, the baseline model state reflects the existing environment. It includes the surrounding context and the subject site in their current standing. Existing trees were placed using a combination of survey data and photogrammetry information. The survey data was used to determine the location, size and species of individual trees and group of trees, particularly along the southern boundary, where a dense and mature band of vegetation provides screening to the buildings at “Westgate”. Given the ongoing evolution of the area, recent photogrammetry imagery was also incorporated to verify and supplement the survey data, ensuring that the tree model accurately reflects current site conditions.

As explained in section 2.1 of this report, section 2.2.5 of the BRE Guidelines recommend that impact assessments should be carried out 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. This criteria has been used to ensure all windows that could possibly sustain an adverse level of effect have been included in the model when running VSC and APSH/WPSH assessments. Since no property in the surrounding context meets this criterion, no impact assessment was carried out, and this model state was therefore not utilised for any quantitative assessments.

Figure 2.4: Model view of the baseline model state

Proposed model state

As illustrated in Figure 2.5, the proposed model state reflects the subject site if the development is built as proposed. This includes proposed landscaping on the subject site. Proposed buildings have been accurately positioned in their location on the subject site with relevant surrounding context included. Proposed trees were placed according to the information provided by the landscape architect.

All of the above information was subsequently used to prepare a digital analytical model in software specifically designed for daylight and sunlight analysis.

Relevant weather and climatic data has been obtained for this report using a localised EnergyPlus Weather File (IRL_EM_Casement.AP.039670_TMYx.epw).

Figure 2.5: Model view of the proposed model state

2.2.2 Trees

As stated in section 3.3.9 of the BRE Guidelines, the exact shapes of trees are “almost impossible to predict”. When modelling trees for this assessment tree geometry has been simplified. Where tree survey information was not provided, the position and size of existing trees have been estimated using photogrammetry information. The shape of the trees has been simplified and an average transmittance value has been applied using information from table G1 from the BRE Guidelines. Simplified models of proposed trees within the development have also been included according to the information provided by the landscape architect.

BR 209 provides guidance on how trees should be treated depending on the study being carried out, as summarised below:

Impact to Vertical Sky Component (VSC) and Annual / Winter Probable Sunlight Hours (APSH / WPSH)

Section G1.2 of the BRE Guidelines states that when assessing the effect a new development would have on existing buildings, “it is usual to ignore the effect of deciduous trees”. This is because daylight is at its scarcest and most valuable in winter when most trees will not be in leaf. Evergreen trees should be included, particularly where a dense belt or group of evergreens is specifically planned as a windbreak or for privacy purposes.

Sun On Ground (SOG)

Regarding SOG assessments, section G4.1 of the BRE Guidelines states:

“...trees and shrubs are not normally included in the calculation unless a dense belt or group of evergreens is specifically planned as a windbreak or for privacy purposes. This is partly because the dappled shade of a tree is more pleasant than the deep shadow of a building (this applies especially to deciduous trees).”

As such, deciduous trees have not been included in the calculation of SOG, unless there is a dense belt present or a group of trees specifically planned as a windbreak or for privacy purposes. Evergreen trees are included in the SOG assessment.

Sunlight Exposure (SE)

Section G3.1 of the BRE Guidelines states that as deciduous trees would not be in full leaf on the recommended assessment date (March 21st), sunlight would be expected to penetrate deciduous trees. However, as trees have so many variables, it is impossible to accurately represent how they would affect sunlight at a given time. The suggested methodology (BR 209) to allow for this is to run the sunlight exposure study in two states. First, with trees as opaque objects and secondly, without deciduous trees in the assessment model. This gives a range of potential sunlight hours.

Spatial Daylight Autonomy (SDA)

BR 209 recommends when assessing daylight in a proposed building, it is appropriate to run the assessment with trees represented over the course of the whole year. Light transmittance values for the modelled trees are varied to account for summer and winter foliage.

Taking average dates from *BRE Digest 350*, appropriate light transmittance values have been applied to deciduous trees to represent the ‘full leaf’ and ‘bare branch’ states.

Evergreen trees are represented as ‘full leaf’ throughout the year.

The BRE Guidelines (section G2.3) also state:

“The calculation model should account for the obstruction to daylight caused by the trees. This needs to be done by modelling a representative shape of the trees. Often trees are irregularly shaped and simple modelling, using height and spread data and assuming a circular tree, will give inaccurate results. A special survey on site is generally required to produce the required data on the tree profile, using a clinometer or other device to measure tree height. Buildings and other solid objects should also be taken into account.”

In the absence of a ‘special survey’ being conducted, as mentioned above, simplified models representing trees have been used. The information for these trees has been taken from photogrammetry information and an arborist report when available. A reasonable tolerance should be applied to the results generated to account for trees not being represented exactly as they appear on site.

Units have also been assessed without trees to give an understanding of how the architecture performs should trees not be factored into the calculation.

I.S. EN 17037 does not give any guidance on how trees should be represented. For the purpose of this report, the SDA calculation under the I.S. EN 17037 criteria has been carried out with trees represented in the same manner as the BR 209 assessment. Units have also been assessed without trees to give an understanding of how the architecture performs should trees not be factored into the calculation.

No Sky Line (NSL)

Because some sky can usually be seen through a tree canopy, deciduous trees are not included in the No Sky Line assessment model. Evergreen trees may be included in this assessment, particularly if there is a dense belt or group planned for windbreak or for privacy purposes.

Shadow Study

The hourly renderings of the shadow study will be generated with evergreen trees represented as opaque objects, where applicable, and without deciduous trees. This method best represents the methodology used for the impact assessment and allows for a better understanding of potential shadows cast by the proposed development through the tree canopy.

2.3 Quantitative Impact Assessment Overview

2.3.1 Effect on Vertical Sky Component (VSC)

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 their distance from the existing dwelling.

Section 2.1 outlines the decision process which was used to determine the appropriate properties to be included in the VSC impact assessment.

For proposed developments, all properties within a distance of three times the height of the proposed development are considered with regards to an impact assessment. Should the angle from the windows to the proposed development subtend 25° in a perpendicular section, then VSC is calculated in both the baseline and proposed model states, and a comparison made.

A no sky line assessment requires accurate dimensions and layouts of both rooms and windows. However, the required information is rarely available for existing dwellings. As such, it is not common practice to carry out a no sky line (NSL) impact assessment.

VSC can be defined as the amount of skylight that falls on a vertical wall or window.

Where applicable, this report assesses the percentage of direct sky illuminance that falls on the assessment point of neighbouring windows that could be affected by the proposed development.

Section 2.1.6 of the BRE Guidelines states 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 provide 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.

Where a VSC assessment is warranted, the values for each relevant window/room may be calculated in the corresponding model states, as outlined in section 2.2 on page 7. A comparison of these results can be used to indicate the level of effect.

A proposed development could possibly have a noticeable effect on the daylight received by an existing window, if the following occurs:

- The VSC value drops below the guideline value of 27%; **and**
- The VSC value is less than 0.8 times the existing value.

In instances where a baseline value is less than 1%, the impact will be considered '*non-applicable*' (n.a.).

Under BRE Guidelines (section 2.2.2), only habitable rooms need to be assessed for effect to VSC. In the absence of design layouts or floor plans, or information pertaining to the internal 'as-built' layouts, assumptions have been made regarding the function of the windows of the existing surrounding properties (i.e. what room type is served by the window being assessed).

Typically, the effect on ground floor windows is greater than the effect on windows of subsequent floors. However, floors above ground floor level may be included in this study to give a more comprehensive assessment.

Assessment Points

The VSC impact assessment is carried out on the windows/rooms of the neighbouring properties that could be affected by the proposed development as highlighted in Figure 1.1 on page 3.

The assessment points for measuring VSC are taken from the centre point of a standard window. If the window being assessed is a full height window, the assessment point is taken at 1600 mm above the finished floor level.

Weighted Averages

If it can be determined or reasonably assumed that multiple windows are servicing the same room, each window has been assessed and a room VSC will be calculated by applying a weighted average calculation to the results.

When calculating weighted averages the proportion of the total glazing area represented for each window is taken into account. It should be noted that estimations typically need to be made regarding window sizes, so a tolerance should be applied regarding calculated weighted averages.

In instances where weighted averages have been calculated, the VSC figures will be stated for each window on an individual basis as well as the calculated figure to be applied to the room, but the level of effect will only be stated for the room.

Project Assessment

Following the BRE decision chart, as illustrated in Figure 2.2 on page 6, no VSC impact assessment has been carried out on the windows/rooms of the neighbouring properties as the proposed development does not subtend 25° when measured in a perpendicular section from any of the existing windows.

This indicates that the proposed development would not have an adverse effect on the daylight of any of the existing properties.

2.3.2 Effect on Annual/Winter Probable Sunlight Hours (APSH/WPSH)

Annual/Winter Probable Sunlight Hours (APSH/WPSH) is a measure of sunlight that a given window may expect to receive over the period of a year. The percentage of APSH/WPSH that windows in existing properties receive might be affected by a proposed development.

A proposed development could potentially have a negative effect on the level of sunlight that a neighbouring property receives, if the obstructing building is located to the south and is large in relation to its distance from the existing dwelling. This can be determined if the distance of a proposed development is less than three times its height from an existing dwelling, or if the angle from an existing window to the proposed development subtends 25° to the horizontal when measured in a perpendicular section.

Whether a window is considered for APSH/WPSH impact assessment is based on its orientation. A south-facing window will, in general, receive the most sunlight. North facing windows may receive sunlight on only a handful of occasions in a year, and windows facing eastwards or westwards will receive sunlight only at certain times of the day. Taking this into account, section 3.2.3 of the BRE Guidelines suggest that windows with an orientation within 90 degrees of due south should be assessed.

Section 2.1 outlines the decision process which is used to determine the appropriate properties to be included in an APSH/WPSH impact assessment.

The APSH/WPSH for each of the assessed windows should be calculated in the relevant model states, as outlined in section 2.2 on page 7. A comparison between the results generated using these model states can be used to determine the level of effect.

If it can be determined or reasonably assumed that multiple windows are servicing the same room, the APSH/WPSH will be assessed for the room as opposed to each individual window. When APSH/WPSH is assessed for a room it considers sunlight coming from all windows, but does not double count if sunlight is reaching multiple windows at the same time.

If a room can receive more than 25% of APSH, including at least 5% of the WPSH, then the room should receive enough sunlight. Despite being two components of the same technical study, the results for APSH and WPSH are presented separately in this report. This approach distinguishes between annual and winter sunlight impacts, thereby facilitating a more detailed analysis of the effect of the proposed development.

A proposed development could possibly have a noticeable effect on the sunlight received by an existing window/room, if the following occurs:

- The APSH value drops below the annual (25%) or winter (5%) guidelines; **and**
- The APSH value is less than 0.8 times the baseline value; **and**
- There is a reduction of more than 4% to the annual APSH.

In some circumstances, the available sunlight during the winter period (WPSH) may both drop below the recommended minimum of 5% with a proposed value of less than 0.8 times the baseline value, but the reduction to annual probable sunlight (APSH) is less than 4%. Such occurrences are considered compliant with the BRE Guidelines (Section 3.2.6), and the impact to WPSH will be stated as '*n.a.*' on that basis.

Additionally, where a baseline value is less than 1%, the impact will be considered '*non-applicable*' (n.a.)

According to section 3.2.3 of the BRE Guidelines, only main living-rooms, or rooms comprising living space, need to be assessed for effect on sunlight. In the absence of design layouts or floor plans, or information pertaining to the internal 'as-built' layouts, all windows assumed to be servicing habitable rooms will be included in the APSH/WPSH assessment provided they are orientated within 90° of due south and are in relative close proximity to the proposed development.

Typically, the effect on ground floor windows is greater than the effect on windows of subsequent floors. However, floors above ground floor level may be included in this study to give a more comprehensive assessment.

Assessment Points

The assessment points for measuring APSH/WPSH are taken from the centre point of a standard window. If the window being assessed is a full height window, the assessment point is taken at 1600 mm above the finished floor level.

Project Assessment

Following the BRE decision chart, as illustrated in Figure 2.2 on page 6, no APSH/WPSH impact assessment has been carried out on the windows/rooms of the neighbouring properties as the proposed development does not subtend 25° when measured in a perpendicular section from any of the existing windows.

This indicates that the proposed development would not have an adverse effect on the sunlight of any of the existing properties.

2.3.3 Effect on Sun On Ground in Existing Gardens/Amenity Areas (SOG)

Section 3.3.17 of the BRE Guidelines recommend that for a garden or amenity area to appear adequately sunlit throughout the year, at least half the area should receive at least two hours of sunlight on March 21st. As the BRE Guidelines do not provide clear criteria on which neighbouring properties should be included in an impact on SOG study, 3DDB have carefully considered the neighbouring properties that may be affected when running the impact assessment. Gardens or amenity areas included in this study are typically located within close proximity, to the north of the proposed development.

Where a quantitative assessment has not been carried out it is on the basis that the omitted areas are unlikely to be adversely affected. Such instances may be because the areas are not deemed to be in close proximity to the proposed development or because they are located to the south. Should there be any concerns over the potential impact on any areas that have not been included in the quantitative assessment, a qualitative assessment may be carried out using a shadow study and/or false colour plans.

March 21st, also known as the spring equinox, is chosen as the assessment date as daytime and night-time are of approximately equal duration on this date.

In accordance with section 3.3.9 of the BRE Guidelines, typically deciduous trees will not be included unless there is a particularly dense belt. The analytical model for SOG impact assessment includes evergreen trees, where applicable.

Where applicable, the percentage of assessed areas which can receive two hours or more of direct sunlight on March 21st is calculated in the relevant model states, as outlined in section 2.2 on page 7. A comparison between the results generated with these model states can be used to determine the level of effect.

A proposed development could possibly have a noticeable effect on the sunlight received by an existing garden and/or amenity area, if the following occurs:

- Half the area of the space does not receive at least two hours of sunlight during the spring equinox; **and**
- The area that receives more than two hours of sun on the spring equinox is less than 0.8 times its former value.

In instances where a baseline value is less than 1%, the impact will be considered '*non-applicable*' (n.a.)

Effect on sunlight to existing neighbouring gardens and/or amenity areas has been assessed to the north of the proposed development, as areas located to the south are unlikely to be affected as the sun does not cast shadows in this direction. Overshadowing is highly unlikely to occur in areas that are due south of any proposed development.

Project Assessment

No quantitative SOG impact assessment has been carried out on the areas surrounding the subject site. The areas considered for assessment are located to the south of the proposed development, meaning shadows will be cast in the opposite direction.

The false colour plans of the proposed SOG assessment section E.4 on page 46 and the hourly renderings of the shadow study in section G.0 on page 65, allow for a qualitative sunlight assessment of the surrounding areas.

2.4 Qualitative Assessment - Shadow Study

A shadow study has been carried out to allow a qualitative comparison between the relevant model states, as outlined in section 2.2 on page 7. This visual representation of the shadows cast by the proposed development can be found in the hourly shadow diagrams in the appendix results section G.0 on page 65.

Hourly renderings have been shown from sunrise to sunset on the following dates in 2025:

- Spring equinox: March 21st Sunrise 6:32 | Sunset 18:32. (GMT)
- Summer solstice: June 21st Sunrise 5:04 | Sunset 21:49. (BST) (Daylight savings)
- Winter solstice: December 21st Sunrise 8:45 | Sunset 16:00. (GMT)

The shadow study has been generated using the same model states as described in section 2.2.1. In certain cases, assumptions or estimations may have been made when modelling elements of the surrounding context and/or proposed site details when creating the various model states. Therefore, it is advisable for a reasonable tolerance to be applied when interpreting shadows in the qualitative assessment.

The hourly renderings of the shadow study will be generated without deciduous trees and with evergreen trees, where applicable, represented as opaque objects when present in the model states.

Note: The spring equinox (March 21st) and autumn equinox (21st September) yield similar shadows, albeit with a one hour difference as daylight saving time (BST) would be in effect. Only the spring equinox was included in the shadow study images in accordance with section 3.3.14 of the BRE Guidelines.

2.5 Quantitative Scheme Performance Assessment Overview

2.5.1 Spatial Daylight Autonomy in Proposed Habitable Rooms (SDA)

Since the publication of the 3rd edition of the BRE Guidelines (BR 209 - 2022), Spatial Daylight Autonomy (SDA) is the recommended metric for assessing daylight access within a proposed development. Spatial Daylight Autonomy replaces Average Daylight Factor (ADF) in this regard, which was the recommended metric under the 2nd edition of the BRE Guidelines (BR 209 - 2011).

Spatial Daylight Autonomy assesses whether a room receives sufficient daylight on a working plane during standard operating hours on an annual basis. A given target value should be achieved across 50% of the working plane for half of the daylight hours.

There are two methods for calculating SDA:

- **Calculation method using illuminance level:** This requires the use of a detailed daylight calculation method where hourly (or sub-hourly) internal daylight illuminance values for a typical year are computed using hourly (or sub-hourly) sky and sun conditions derived from climate data appropriate to the site. This calculation method determines daylight provision directly from simulated illuminance values on the reference plane. The illuminance value of at least half the required area of the space should equal or exceed the target values.
- **Calculation method using daylight factor:** The daylight factor method assumes a constant ratio between internal and external illuminance. The daylight factors in the space shall be calculated by any reliable method that is based on the ISO 15469:2004 standard overcast sky (TYPE 1 or TYPE 16). Daylight factors are to be predicted across grid of points on a plane 0.85m above the floor of the space. The daylight factor of at least half the required area of the space should equal or exceed the target values.

It is the opinion of 3DDB that the calculation method using illuminance level better represents a real-world scenario as it accounts for the quality of daylight based on orientation. As such, the illuminance methodology has been adopted as the preferred SDA assessment methodology by 3DDB. A localised EnergyPlus Weather File is used to apply the relevant climate information. In the case of this report, the weather file used is IRL_EM_Casement.AP.039670_TMYx.epw.

In terms of housing, *BR 209* provides target SDA values to be received across at least 50% of the working plane for at least half the daylight hours. The target values differ based on the function of the room assessed:

• 200 Lux for kitchens • 150 Lux for living rooms • 100 Lux for bedrooms

Where rooms serve more than one function, the higher SDA target value should be taken.

Under I.S. EN 17037 at least 50% of the working plane should receive above 300 lux for at least half the daylight hours, with 95% of the working plane receiving above 100 Lux for all rooms. The target SDA values do not vary depending on the room function under this criteria.

This study has assessed the Spatial Daylight Autonomy (SDA) received in the habitable rooms of the proposed development under the BR 209 criterion. The SDA of the proposed development has been calculated under the I.S. EN 17037 criterion as part of a supplementary assessment.

Defining Rooms

Definition of rooms are typically taken directly from the architectural drawings supplied by the project architect. Sometimes, the applied names of rooms may differ slightly. e.g. A “Kitchen / Living / Dining room (KLD)” may be referred to as a “Living / Kitchen / Dining room (LKD).

According to section 2.1.14 of the BRE Guidelines areas like bathrooms, stairwells, garages, and storage areas do not have a special requirement for daylight. As such these spaces have not been assessed.

Where an SDA assessment has been conducted, an indication of the assessed space in each room will be indicated in the floor plans that correspond to the SDA results in the appendix section “Proposed Duplex Floor Plans” on page 23.

Working Plane

The calculation of SDA is carried out on a hypothetical working plane which lies 850 mm from the finished floor level in residential units and 700 mm in academic and office spaces.

In the BR 209 study the working plane is offset 300 mm from the room boundaries. Under the I.S. EN 17037 criteria the working plane is offset 500 mm from the room boundaries. The working plane has a grid density of c. 300 mm.

Material Palette

Following consultation with the design team, material values used for SDA calculations are as per the table below:

Table No. 2.5.1 - Material Palette for SDA Calculations

Object	Material	Reflectance	Object	Material	Reflectance / Transmittance
Exterior walls	Standard Brick	0.3	Interior Walls	Pastel paint	0.7
	Light Brick	0.4	Interior Ceiling	White paint	0.8
	Dark Brick	0.15	Interior Floor	Light timber	0.4
	Render	0.6	Miscellaneous	Miscellaneous	0.5
	Concrete	0.4	Glass	Glass transmittance value	0.68
Ground cover	Paving	0.4		Maintenance factor	0.91
	Tarmac	0.2		Glass adjusted for maintenance	0.62
	Grass	0.2		Frosted glass	0.5

Project Assessment

The results for the study on SDA can be found in the appendix results section E.2 on page 30.

Analysis of the results can be found in section 3.1.1 on page 16.

The results of the supplementary SDA study under the I.S. EN 17037 criterion can be found in section F.0 on page 49.

This study indicates the daylight potential of the assessed units within the proposed development. As-built daylight performance within the occupied development may vary from the results of this assessment due to changes to the exterior context, weather conditions and/or occupiers choice of interior finishes and furniture placement.

2.5.2 Sunlight Exposure in Proposed Habitable Rooms (SE)

Since the publication of the 3rd edition of the BRE Guidelines (BR 209 - 2022), Sunlight Exposure (SE) is the recommended metric for assessing sunlight access within a proposed development. Sunlight Exposure replaces APSH/WPSH in this regard, which was the recommended metric under the 2nd edition of the BRE Guidelines (BR 209 - 2011).

Sunlight exposure (SE) is a measure of sunlight that a given window may expect to receive on a given date between the 1st of February and the 21st of March. Section 3.1.10 of the BRE guidelines suggests that March 21st (equinox) is used as the assessment date.

In the presence of trees, SE results have been generated, both with deciduous trees as opaque objects and without the inclusion of deciduous trees, in accordance with section G3 of the BRE Guidelines. Evergreen trees have been included as opaque objects, where applicable, in both states.

The level of sunlight exposure is categorised as follows:

- 1.5 Hours - Minimum
- 3 Hours - Medium
- 4 Hours - High

The recommendation for dwellings is that at least one habitable room, preferably a main living room, should receive at least the minimum criterion. Should no room within a given unit meet the recommended minimum level of sunlight exposure, it will be stated as non-compliant.

Sunlight exposure is carried out on habitable rooms within a proposed development. The assessment point for windows is 1.2m above the finished floor level, or 0.3m above the sill level (whichever is higher). If a room has multiple windows, the amount of sunlight received by each can be added together provided they occur at different times and sunlight hours are not double counted.

The criterion applies to rooms of all orientations, although if a room faces significantly north of due east or west it is unlikely to be met. As such, it is not always possible to achieve full compliance, especially in developments that contain single aspect units.

The sunlight exposure assessment focuses on habitable residential rooms. Unless sunlight access is deemed important for the functionality of a non-residential room in a proposed development, it will not be included in the study, which remains limited to residential rooms.

Project Assessment

The results for the study on sunlight exposure can be found in the appendix results section E.3 on page 38, with analysis of the results in section 3.1.2 on page 18.

This study predicts the sunlight potential of the proposed units assessed. Real-world performance post-construction can vary based on actual weather patterns and any alterations to the external environment.

2.5.3 Sun On Ground in Proposed Outdoor Amenity Areas (SOG)

Section 3.3.17 of the BRE Guidelines recommends that for a garden or amenity area to appear adequately sunlit throughout the year, at least half of it should receive at least two hours of sunlight on March 21st.

March 21st, also known as the spring equinox, is chosen as the assessment date as daytime and night-time are of approximately equal duration on this date.

The analytical model for SOG assessment in proposed amenity areas includes evergreen trees, where applicable, as per section G4.1 of the BRE Guidelines. Typically deciduous trees will not be included unless there is a particularly dense belt.

A quantitative SOG assessment may be carried out on the areas as indicated by the project architect. Shadow studies and false colour plans can allow for a qualitative assessment for all other areas.

The portion of each assessed space capable of receiving 2 hours of direct sunlight on March 21st should be calculated individually. These areas can be combined to give the development average where appropriate.

Project Assessment

The levels of sunlighting to proposed amenity areas, as indicated by the architect, have been assessed. However, it should be noted that the numbering of these spaces in the Daylight and Sunlight Assessment Report has been assigned by 3DDB specifically for the purposes of this report. If other consultants are referencing these spaces in their own reports, it is unlikely they will be numbered the same.

The results for the study on sun on ground in the proposed outdoor amenity areas (including a visual representation in the form of 2-hour false colour plans) can be found in the appendix results section E.4 on page 46, with analysis of the results in section 3.1.3 on page 19.

This analysis quantifies the anticipated sunlight levels within the assessed amenity areas. The as-built outcome is subject to variation, depending on real-world weather and any changes to the exterior setting.

2.5.4 No Sky Line in Proposed Habitable Rooms (NSL)

The no sky line divides the areas of the working plane which can receive direct skylight, from those which cannot. It indicates the distribution of direct daylight within a room.

Section D3 of the BRE Guidelines recommends the No Sky Line study as an appropriate metric for an impact assessment to daylight, but only where room layouts are known.

"The calculation can only be carried out where room layouts are known. Using estimated room layouts is likely to give inaccurate results and is not recommended."

All advice regarding NSL in the BRE Guidelines (section 2.2) is in relation to impact assessments. NSL is not mentioned in the BRE section regarding daylight in new developments. Nevertheless, an NSL assessment was carried out on the proposed development as a supplementary study as it is requested in the DCC Development Plan 2022-2028 (Section 5.1, Appendix 16). Although the proposed development is not under Dublin City Council's jurisdiction, the NSL study has been included to provide consistency across 3DDB daylight and sunlight assessments.

As the BRE Guidelines does not give advice on target NSL values for proposed rooms, no compliance rate has been stated. However a no sky line of 80% could be considered an appropriate figure given that section 2.2.10 of the BRE Guidelines state that supplementary electric lighting will be needed if a significant part of the working plane (20% of the room or more) lies beyond the no sky line.

The results of the supplementary NSL study can be found in section F.0 on page 49.

3.0 Analysis of Results

3.1 Analysis of Scheme Performance Results

3.1.1 Spatial Daylight Autonomy (SDA)

This study has assessed the Spatial Daylight Autonomy (SDA) for all habitable rooms within the blocks of duplex units, both with and without trees. This has ensured that a clear understanding has been obtained regarding the daylight potential of the proposed duplex units.

The proposed 70 no. duplex units contain approximately 237 no. habitable rooms.

Under the criteria as set out in the BR 209 considering trees, the SDA value in 218 no. habitable rooms meets or exceeds the appropriate target values. This gives an overall compliance rate of c. 92%.

An additional assessment excluding trees has shown a higher compliance rate of c. 98%, with only 5 no. rooms falling below the recommended minimum value. These non-compliant rooms are all LKD areas located on the ground floors of Blocks B and C. One room records an SDA of 39% (Unit C-06), while the remaining four record values between 44% and 46%, only marginally below the 50% target. It is important to note that this study indicates that existing and proposed trees account for 14 no. of the 19 no. non-compliant rooms.

Figure 3.1 highlights the non-compliant rooms at ground floor level, where most of them occur. Only two rooms at first floor level also show marginal shortfalls (47% and 48% in the Kitchen/Dining rooms of Units D-13 and C-07), although these are not shown in the figure below. The most pronounced reductions occur in Blocks C and D, which are located closest to the dense band of tall existing trees along the south-eastern boundary of the site, located in the adjacent property of Westgate. These, combined with the proposed new trees, understandably reduce daylight availability.

It is the opinion of 3DDB that while the impact of trees on SDA is expected, it should not be considered a major cause of concern. Whilst trees can contribute towards a reduction of daylight in some units, they also offer significant benefits, including mitigating heat gain, enhancing privacy, and providing a favourable outlook for occupants. As the existing trees lie outside the applicant's control, and because proposed trees play an integral role in the scheme's environmental, planning, and biodiversity objectives, their removal was not considered an appropriate mitigation measure.

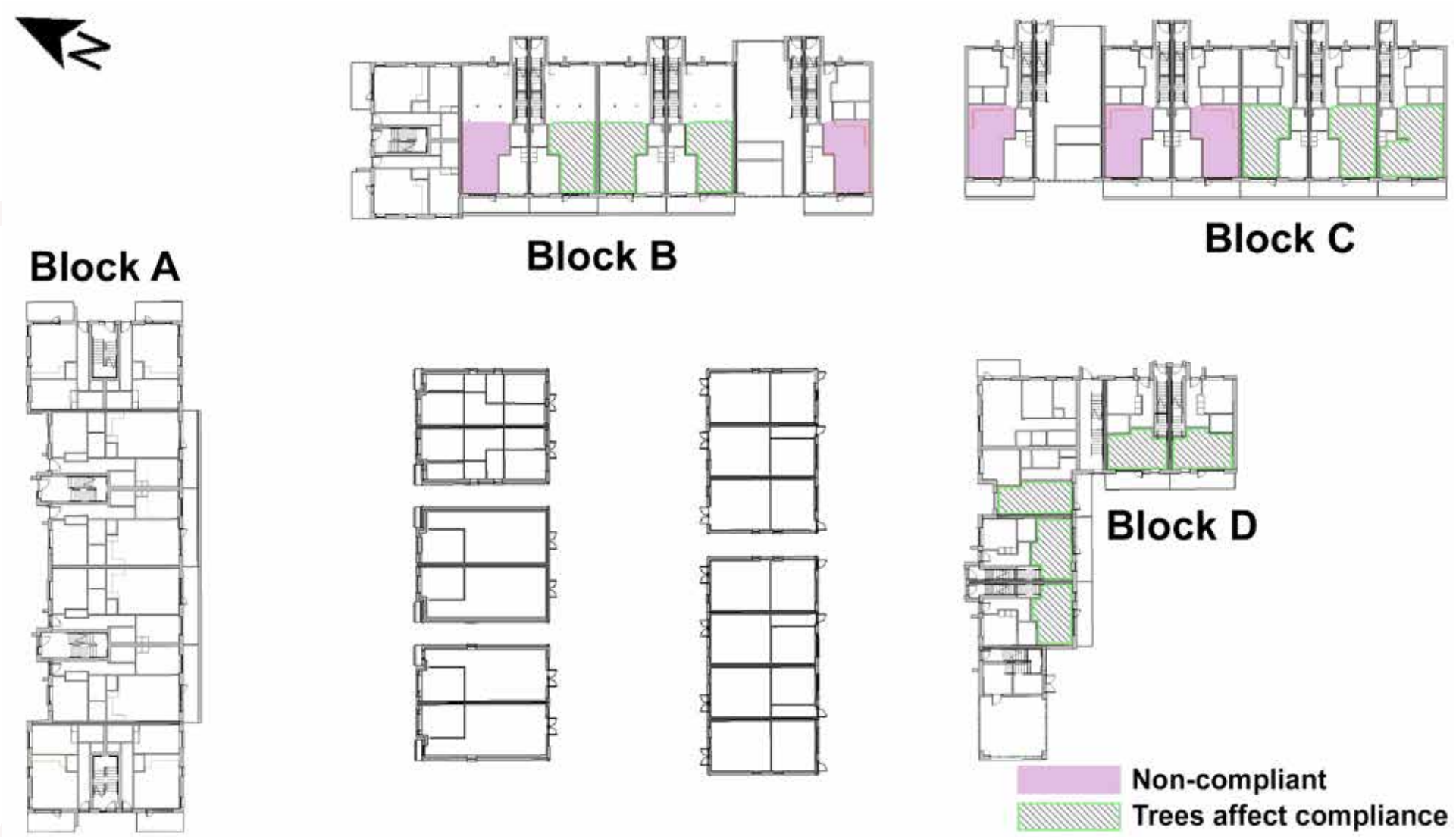

Figure 3.1: Highlighted rooms below the minimum recommendations for SDA on ground floor.

I.S. EN 17037 sets out more onerous recommendations for SDA. As such, the number of residential habitable rooms achieving compliance under this standard is 181 in the assessment that includes trees. This gives a reduced circa compliance rate of c. 76%. The additional SDA assessment, under this standard, that does not include trees has shown a compliance rate of c. 94%.

In cases where rooms comply with the criteria of BR 209 but do not meet the criteria of I.S. EN 17037, it is the recommendation of 3D Design Bureau that these rooms will be adequately daylit. This recommendation is based on the fact that BR 209 provides room-specific criteria, unlike I.S. EN 17037. BR 209 considers the varying daylight requirements for different room types, which I.S. EN 17037 does not account for.

This report identifies where assessed rooms do not meet the daylight targets set in section 2.1 of the BRE Guidelines. It is intended to inform the planning authority's discretionary review, which is based on an assessment of the project's specific circumstances.

The following list details each unit that does not achieve the recommended daylight levels in BR 209 with trees. The project architect has provided a rationale and a compensatory design solution for each instance:

> *"These dwellings enjoy living environment compensatory factors including aspects towards the attractive landscaped areas, vistas of light-coloured brickwork, windows and doors continuing down to floor level and opening to large private-use balconies.*
>
> *The design team has sought to find an acceptable compromise between the need to maximise daylight levels and other relevant factors such as density, building form, overheating risk, privacy and the provision of balconies."*

- **Unit B-01:** *The unit has a total area of 80.7 m², exceeding the 76 m² minimum. It also features an oversized private amenity space of 10.4 m², floor-to-ceiling windows, and access to a communal open space that is larger than the minimum requirement.*
- **Unit B-02:** *With a total area of 80.7 m² (above the 76 m² minimum), this unit benefits from an oversized 10.4 m² private amenity space, floor-to-ceiling windows, and a communal open space for the block that is above the minimum size.*
- **Unit B-03:** *This unit's total area is 80.7 m², which is over the 76 m² minimum. Compensatory features include an oversized private amenity space (10.4 m²), floor-to-ceiling windows, and access to a larger-than-required communal open space.*
- **Unit B-04:** *Exceeding the minimum area at 80.7 m², this unit is compensated with a 10.4 m² private amenity space, floor-to-ceiling windows, and access to a communal open space that is above the minimum required size.*
- **Unit B-05:** *The unit has a total area of 80.7 m², surpassing the 76 m² minimum. It includes an oversized private amenity space of 10.4 m², floor-to-ceiling windows, and access to a communal open space larger than the minimum requirement.*
- **Unit C-01:** *This unit's total area is 80.7 m² (over the 76 m² minimum). It is compensated by an oversized 10.4 m² private amenity space, floor-to-ceiling windows, and a communal open space for the block that exceeds the minimum size.*
- **Unit C-02:** *At 80.7 m², this unit is larger than the 76 m² minimum. It features an oversized private amenity space of 10.4 m², floor-to-ceiling windows, and access to a communal open space that is above the minimum requirement.*
- **Unit C-03:** *This unit has a total area of 80.7 m², exceeding the 76 m² minimum. It benefits from an oversized 10.4 m² private amenity space, floor-to-ceiling windows, and a larger-than-required communal open space.*
- **Unit C-04:** *With a total area of 80.7 m² (above the 76 m² minimum), this unit includes a 10.4 m² private amenity space, floor-to-ceiling windows, and access to a communal open space that is larger than the minimum size.*
- **Unit C-05:** *This unit's area of 80.7 m² is above the 76 m² minimum. Compensatory features are an oversized 10.4 m² private amenity space, floor-to-ceiling windows, and a communal open space that exceeds the minimum requirement.*
- **Unit C-06:** *The unit has a total area of 80.7 m², surpassing the 76 m² minimum. It is compensated with an oversized private amenity space of 10.4 m², floor-to-ceiling windows, and access to a larger-than-required communal open space.*
- **Unit C-07:** *This unit is significantly oversized at 115.4 m² (above the 90 m² minimum) and features a very large private amenity space of 26.1 m². It also has floor-to-ceiling windows and access to a communal open space that is above the minimum requirement.*
- **Unit D-01:** *With a total area of 51.1 m² (over the 45 m² minimum), this unit enjoys direct views onto the communal space, has floor-to-ceiling windows, and access to a communal open space that is larger than the minimum requirement.*
- **Unit D-02:** *This unit's area is 51.1 m², exceeding the 45 m² minimum. It is compensated with direct views of the communal space, floor-to-ceiling windows, and access to a larger-than-required communal open space.*
- **Unit D-03:** *At 55.5 m², this unit is larger than the 45 m² minimum. It benefits from direct views onto the communal space, floor-to-ceiling windows, and a communal open space that exceeds the minimum size.*
- **Unit D-05:** *This unit has a total area of 51.1 m² (above the 45 m² minimum). Compensatory features include direct views of the communal space, floor-to-ceiling windows, and access to a communal open space that is above the minimum requirement.*
- **Unit D-06:** *The total area is 51.1 m², exceeding the 45 m² minimum. This unit has direct views onto the communal space, floor-to-ceiling windows, and access to a larger-than-required communal open space.*
- **Unit D-13:** *This unit is significantly oversized at 112.4 m² (above the 90 m² minimum). It enjoys direct views onto the communal space for the block, features floor-to-ceiling windows, and has access to a communal open space that is larger than the minimum requirement.*

The rationale for all instances of non-compliance with the BR 209 criteria that can be attributed to the effect that trees have on daylight, is that the provision of trees is an important aspect of the proposed site layout. Where trees affect daylight potential, a conscious decision has been made by the design team in balancing daylight provision with an appropriate level of foliage.

Conclusion

In conclusion, It is the opinion of 3DDB that the achievement of the c. 98% compliance achieved under the 'no-tree' scenario reflects a well-considered approach to daylight access Given the dense belts of existing trees along the south-eastern boundary, along with proposed additional planting, the resulting c. 92% compliance with trees represents an understandable outcome.

Floor plans indicating unit numbers can be found in section E.1 on page 23. The results for the study on SDA can be seen in section E.2 on page 30.

3.1.2 Sunlight Exposure (SE)

A sunlight exposure assessment has been carried out on all habitable rooms within the blocks of duplex units. For these assessments, trees have been included in the analytical model as opaque objects. The assessments have been carried out in two states:

- All trees (evergreen and deciduous) included in assessment model.
- Only evergreen trees included in the assessment model.

This approach is in accordance with section 3.1 of the BRE Guidelines.

In total, 70 no. units have been assessed. Using the rationale explained in section H.2 on page 71, the level of sunlight exposure for the assessed units is as follows:

In the assessment carried out with all trees considered as opaque objects:

- high: 34 no. (at least 4 hours)
- medium: 5 no. (at least 3 hours)
- minimum: 16 no. (at least 1.5 hours)
- below minimum recommendation: 15 no. (less than 1.5 hours)

When only evergreen trees included in the assessment model:

- high: 54 no. (at least 4 hours)
- medium: 3 no. (at least 3 hours)
- minimum: 13 no. (at least 1.5 hours)
- below minimum recommendation: 0 no. (less than 1.5 hours)

The SE assessment has shown that, depending on the effect of trees, the circa compliance rate for the assessed units, in accordance with section G3.4 of the BRE Guidelines, is between 79% & 100%

Note: For a unit to be compliant under BR 209, only one habitable room within the unit needs to meet the guideline values.

Whilst the criterion applies to rooms of all orientations, it should be noted that if a room faces significantly north of due east or west it is unlikely to be met. As such, it is not always possible to achieve full compliance.

When trees are considered invisible, the results demonstrate that all units have potential access to adequate sunlight, supported by the dual-aspect design of the proposed units.

With trees included, however, a number of units experience a reduction in sunlight. This includes one ground-floor unit in Block A and the first-floor unit directly above it, as well as one ground-floor unit in Block B, all of which fall below the recommended threshold after previously meeting the “minimum” category in the ‘no-tree’ scenario (Figure 3.2 below). A larger proportion of affected units are located in Block C (primarily at ground level) and throughout Block D. Many of these units achieve “high” levels of sunlight exposure when trees are treated as invisible, further highlighting the significant impact of vegetation. In particular, the dense belt of tall existing trees along the southern boundary obstructs most of the available sunlight from the south. As a result, the remaining sunlight from other orientations (largely north) is insufficient to meet the guideline thresholds.

Figure 3.2: Highlighted units below the minimum recommendations for SE on ground floor.

As noted in the SDA results, trees represent an important environmental and landscape component of the proposal. While the existing tree belt lies outside the applicant's control, the removal of newly proposed trees is not considered an appropriate mitigation measure due to their importance for landscape character, biodiversity, and the overall environmental strategy.

No recommendation is made regarding the performance of a development as a whole for SE performance within the BRE Guidelines. However, it is the opinion of 3DDB that the proposed development performs favourably in this regard, with non-compliance limited to localised areas adjacent to the existing dense band of trees.

The results for the study on SE in the habitable rooms of the proposed units can be seen in section E.3 on page 38.

3.1.3 Sun On Ground in Proposed Outdoor Amenity Areas

This study has assessed the level of sunlight on March 21st within the proposed amenity areas. In total 5 no. spaces have been assessed: 3 no public open spaces, and 2 no. communal open spaces (Figure 3.3 below)

Four of these areas exceed the recommended target as set out in section 3.3 of the BRE Guidelines, with 100% of their area receiving at least two hours of sunlight on 21 March. One communal open space, located adjacent to Block D (COS 2), does not achieve this minimum requirement in any part of its area.

Except for the dense belt of existing trees, the surrounding context is largely open field or low-rise development. As a result, all proposed amenity areas are generally unobstructed and capable of receiving excellent levels of sunlight. The only persistently shaded space is COS 2, overshadowed by the tall existing trees to the south. An additional assessment carried out with trees omitted demonstrates that COS 2 would receive excellent sunlight levels in the absence of this mature vegetation, confirming that the shortfall is attributable solely to the neighbouring tree belt rather than the proposed built form.

Although COS 2 does not meet BRE targets in the tree scenario, it remains functional, and future residents will benefit from several other well-sunlit spaces.

The results of the primary sunlighting study, along with the supplementary no-tree assessment, can be found in section E.4 on page 46.

Figure 3.3: Indication of the proposed public and communal amenity spaces included in the SOG analysis.

A visual representation of these readings can be seen in the false colour plan in section E.4 and in the hourly shadow diagrams for March 21st in section G.1 on page 65 of the appendix section of this report.

4.0 Conclusion

3D Design Bureau (3DDB) were commissioned to carry out a daylight assessment, sunlight assessment and shadow study for the proposed large-scale residential development at Glenamuck North (Southern site), Kilternan, Dublin 18.

The BRE decision chart, as outlined in section “2.1 Impact Assessment, Window Selection Criteria” on page 6, was used to screen neighbouring properties and amenity spaces for potential daylight and sunlight impacts. As no surrounding properties were identified as being at risk of experiencing adverse effects, the BRE guidance indicates that no further quantitative analysis is required. Accordingly, a full impact assessment has not been undertaken.

Figure 4.1: Indication of the proposed blocks of duplex-units (in red) assessed for scheme performance.

The scheme performance assessment for this report has quantified the level of daylight and sunlight within the proposed development.

Across the development, circa 92% of habitable rooms achieve the recommended daylight levels (SDA) when trees are included, rising to 98% in the ‘no-tree’ scenario, demonstrating a strong daylight performance, particularly given the presence of mature boundary vegetation facing Block D. In terms of sunlight exposure (SE), between 79% (all-tree state) and 100% (evergreen-only tree state) of units meet the guideline targets, with shortfalls primarily attributable to the dense belt of existing trees along the south-eastern boundary.

All but one of the proposed outdoor amenity areas meet the BRE recommended sunlight criteria. The single exception (within Block D) falls below target solely due to the overshadowing effect of the mature trees, as confirmed by the supplementary no-trees assessment. Importantly, the development provides a wider network of public and communal open spaces that receive excellent levels of sunlight and ensure high-quality outdoor amenity for future residents.

In conclusion, 3DDB can assert that the scheme performs favourably in both internal daylight and sunlight access and in the provision of well-lit outdoor amenity areas.

Appendix - Results

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Appendix Contents

Assessment criteria and detailed analysis of results can be found in the accompanying report.

E.0 Scheme Performance

E.1 Proposed Duplex Floor Plans

E.1.1 Proposed Duplex Floor Plans - Block A

Figure E.1: Block A - Site Location

Figure E.2: Block A - Ground Floor

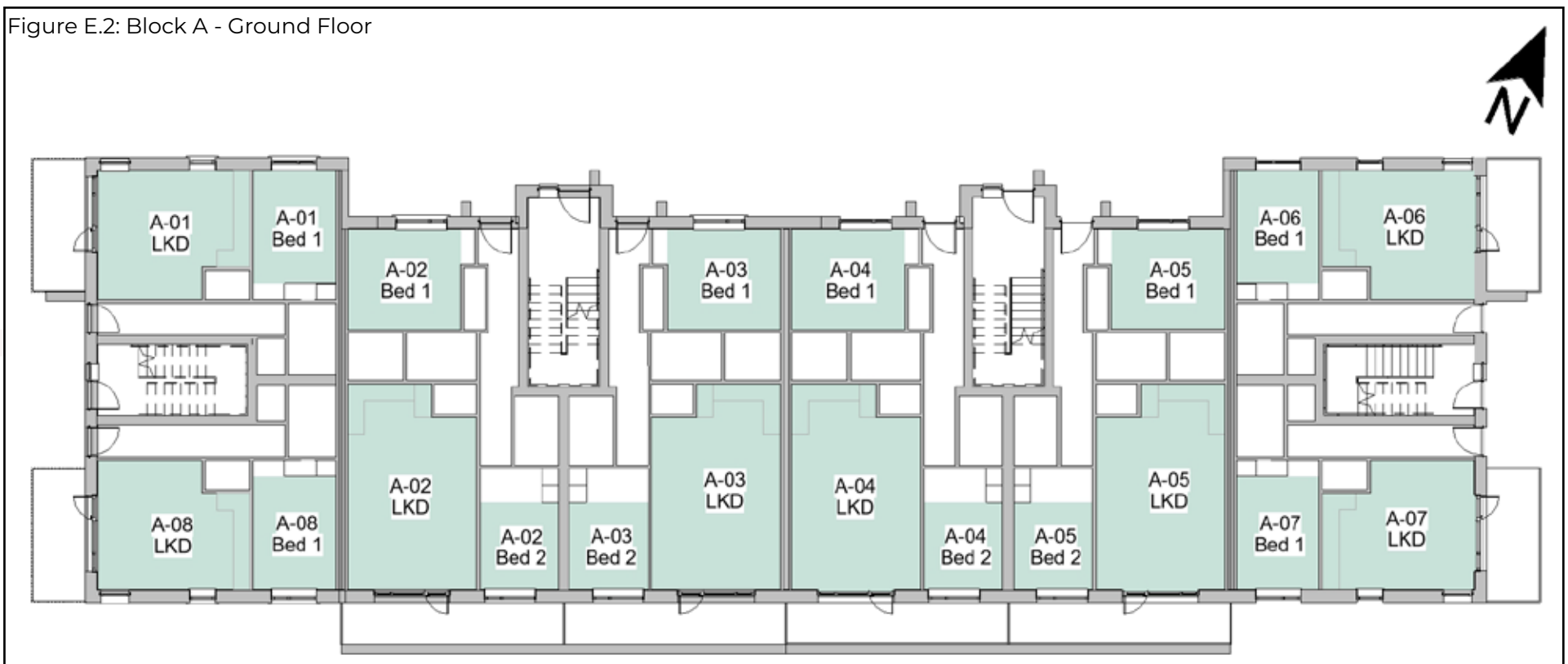


Figure E.3: Block A - First Floor

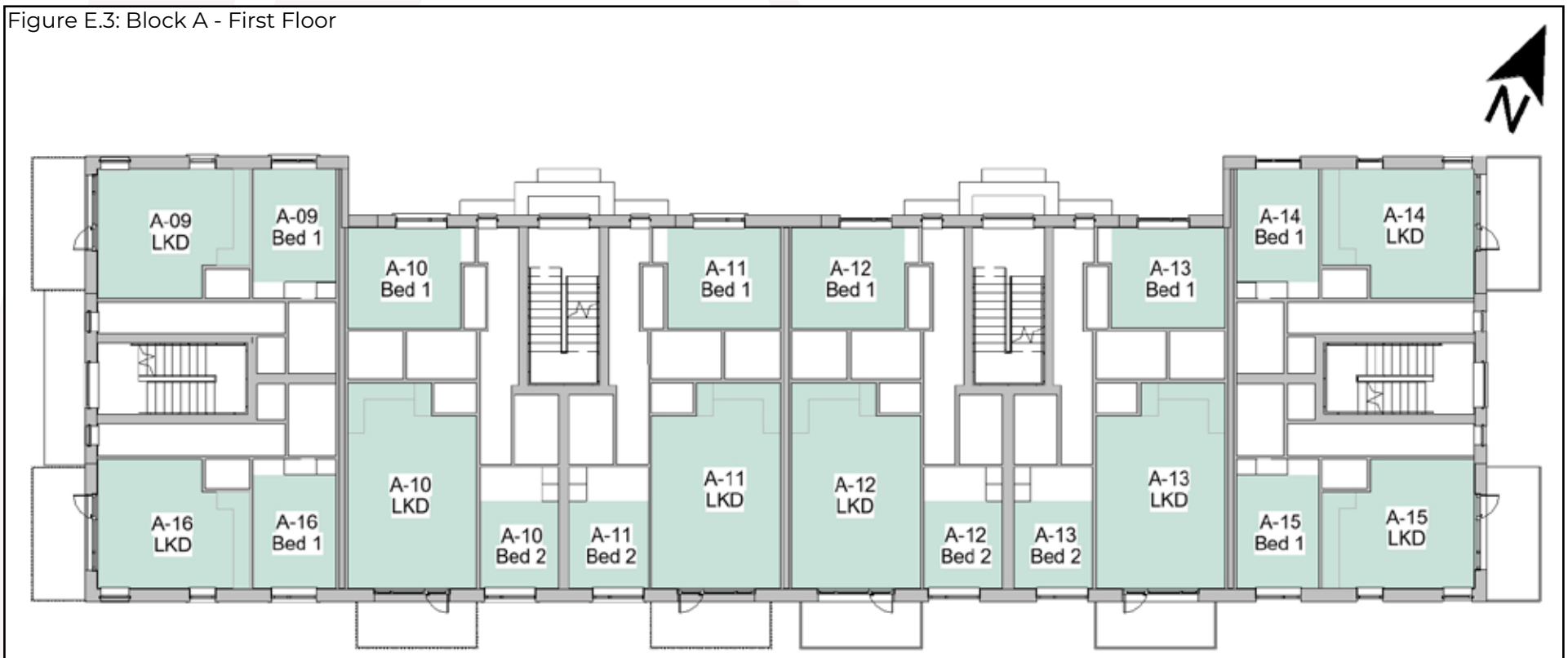


Figure E.4: Block A - Second Floor

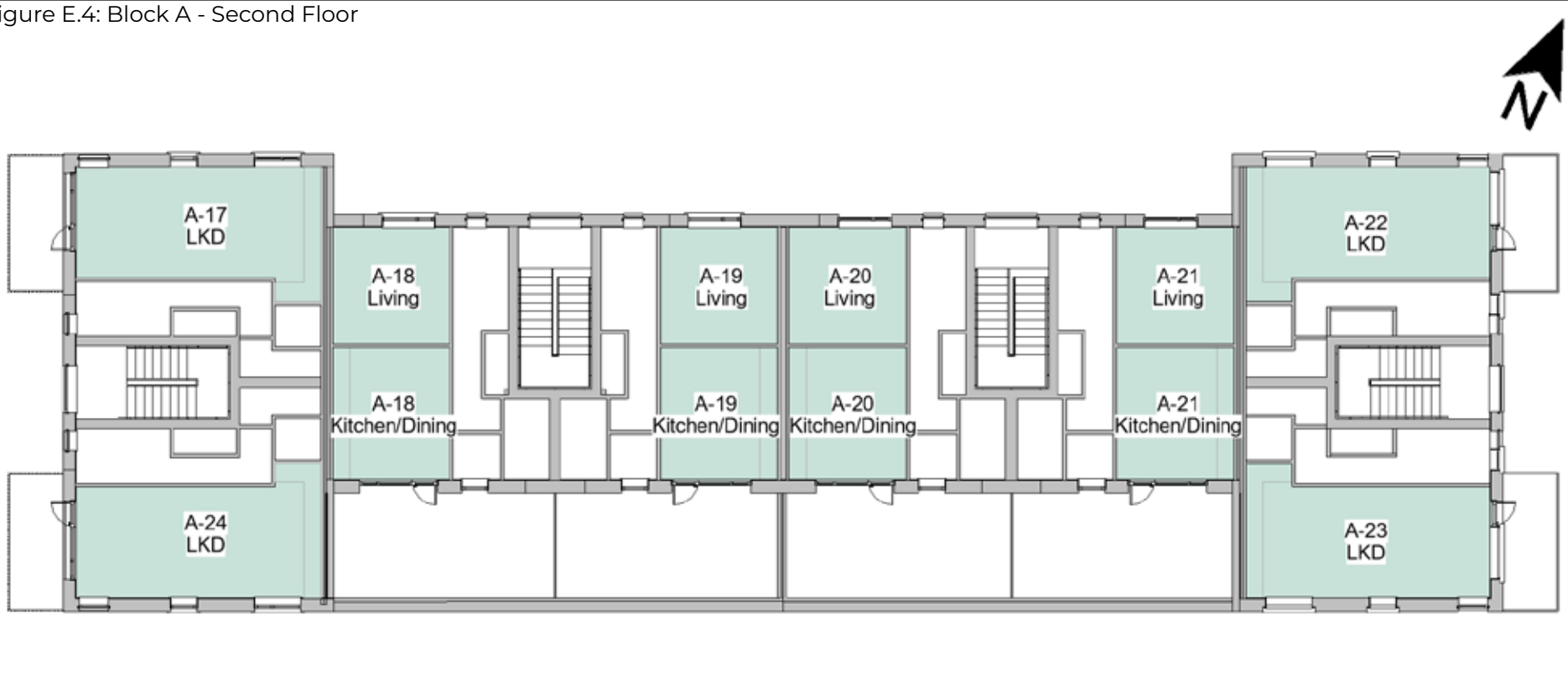
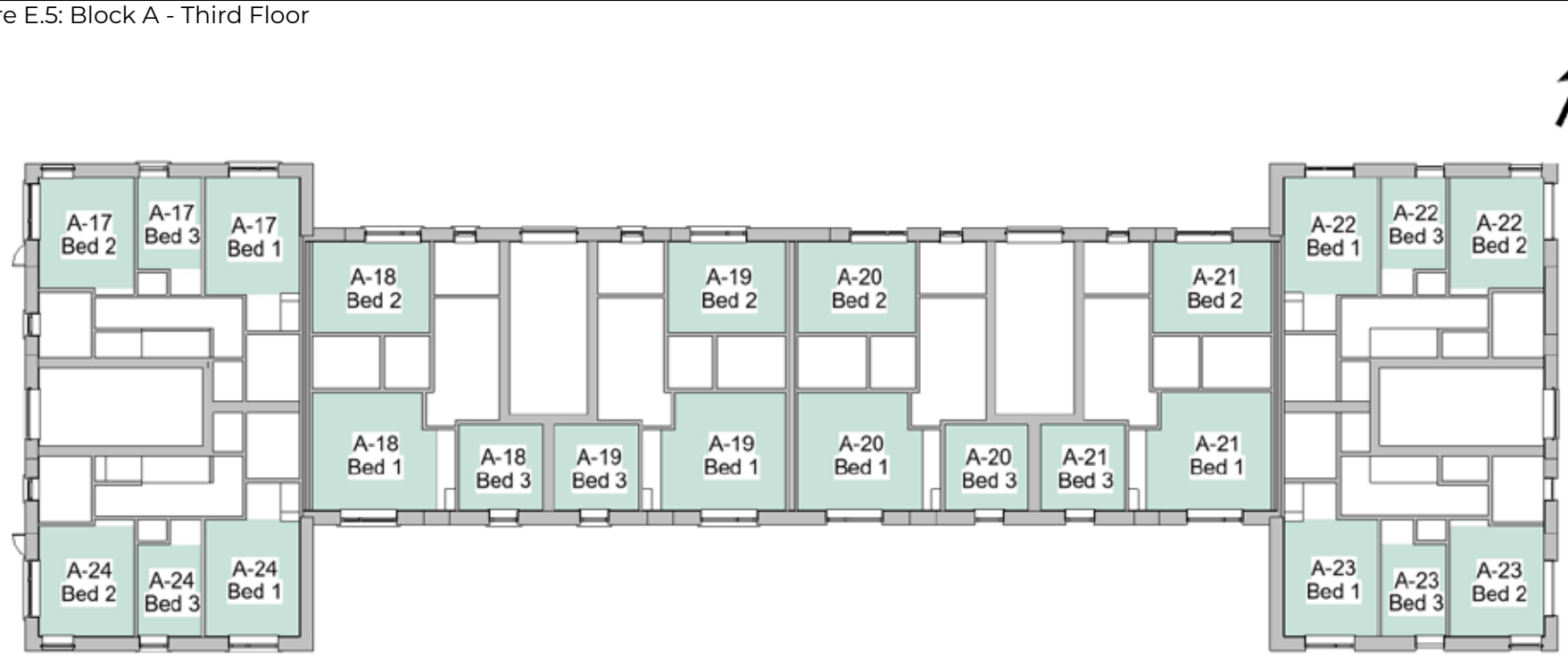


Figure E.5: Block A - Third Floor



E.1.2 Proposed Duplex Floor Plans - Block B

Figure E.7: Block B - Site Location

Figure E.6: Block B - Ground Floor

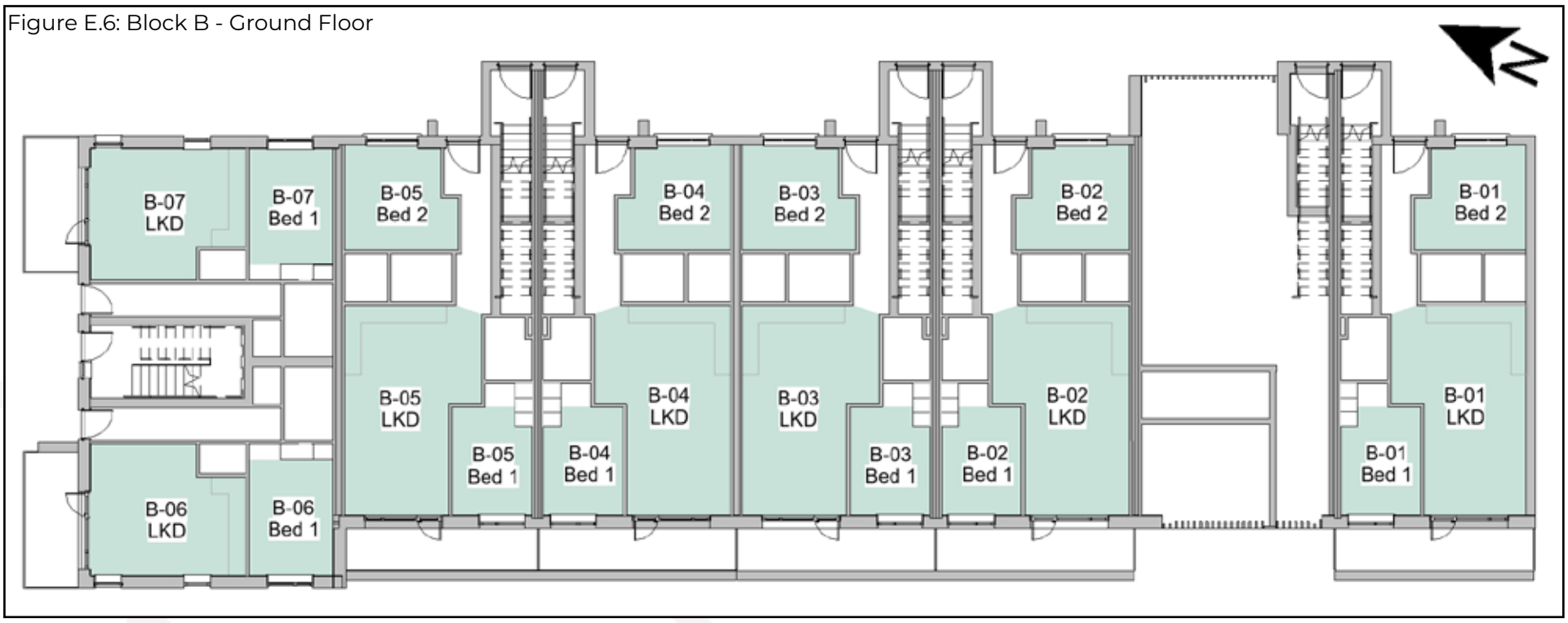


Figure E.8: Block B - First Floor

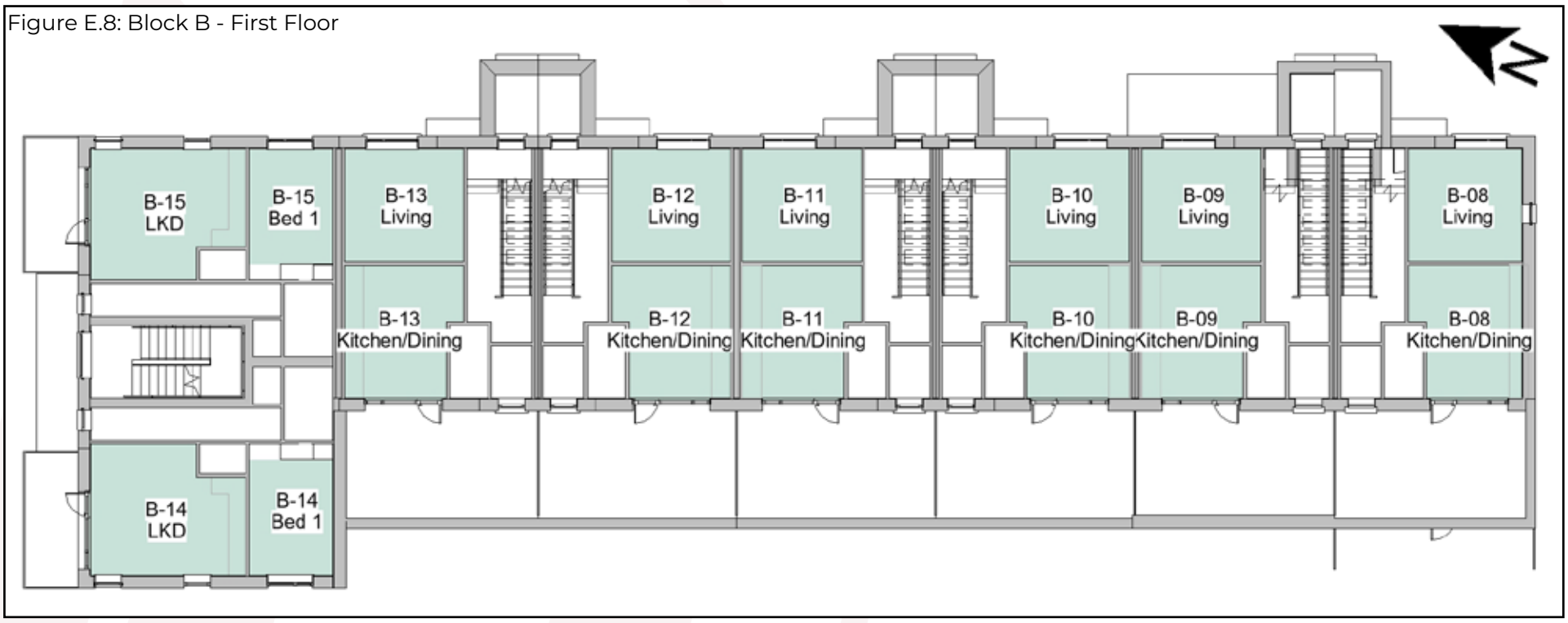


Figure E.9: Block B - Second Floor

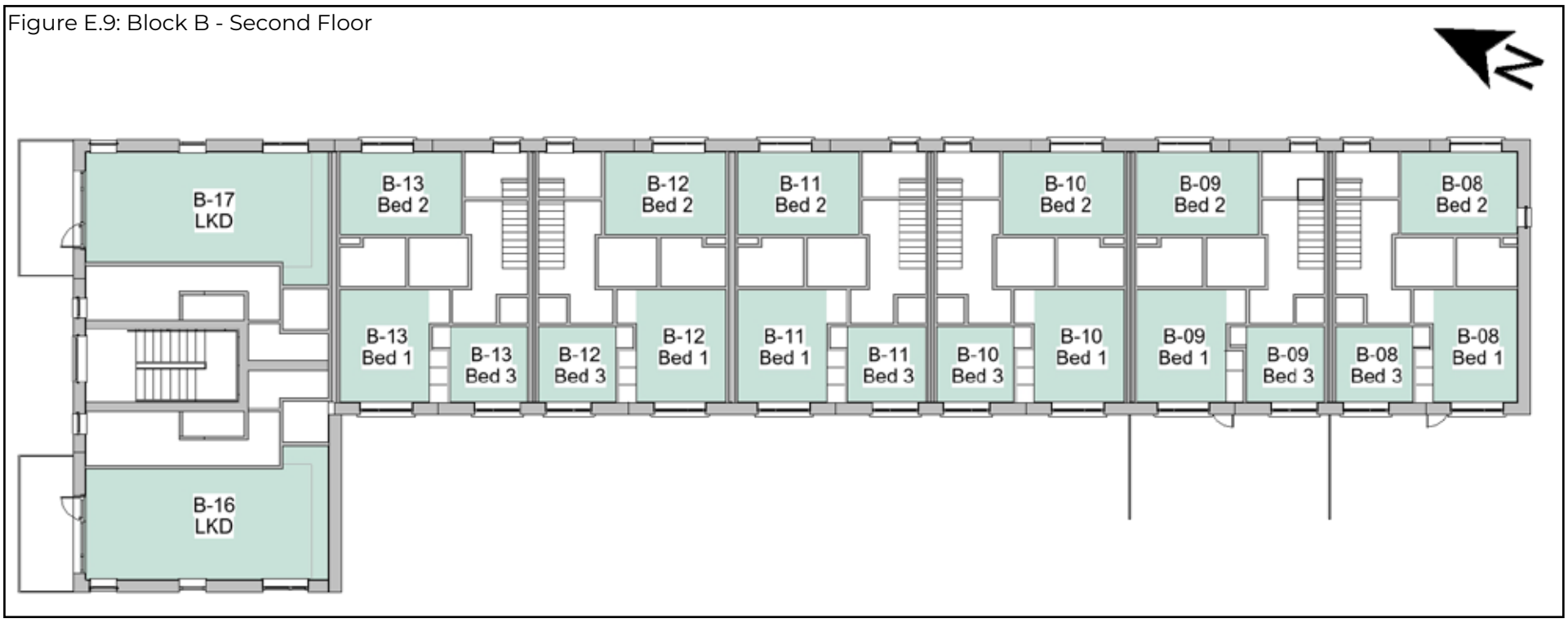
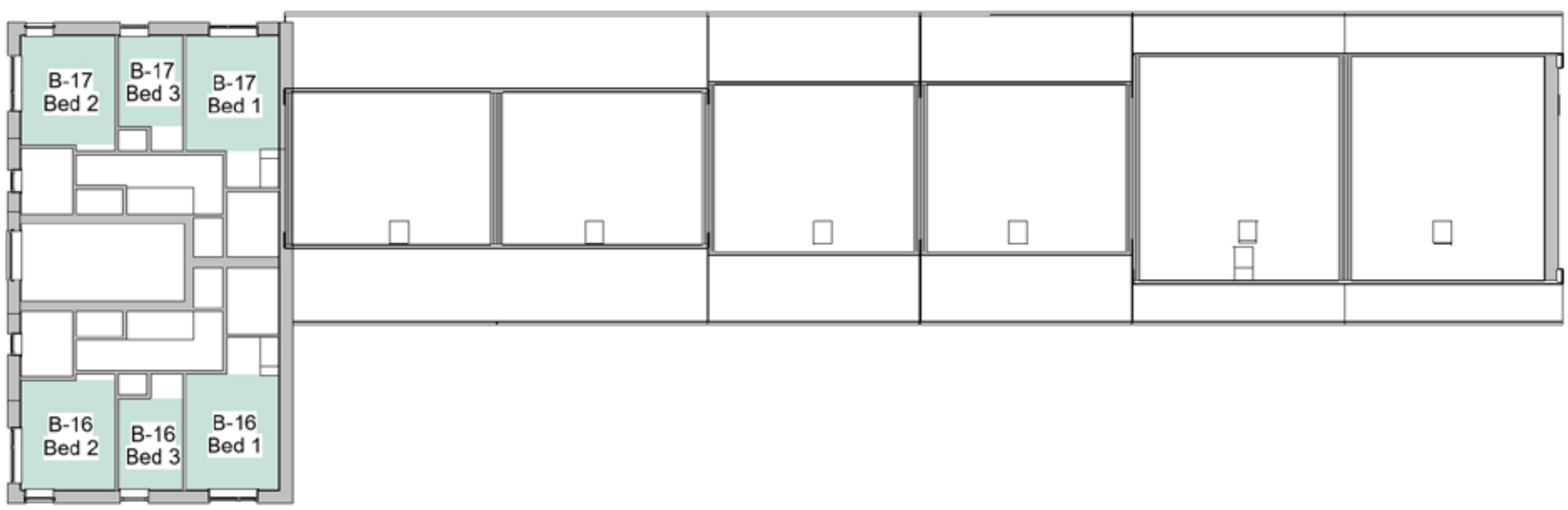


Figure E.10: Block B - Third Floor



E.1.3 Proposed Duplex Floor Plans - Block C

Figure E.12: Block C - Site Location

Figure E.11: Block C - Ground Floor

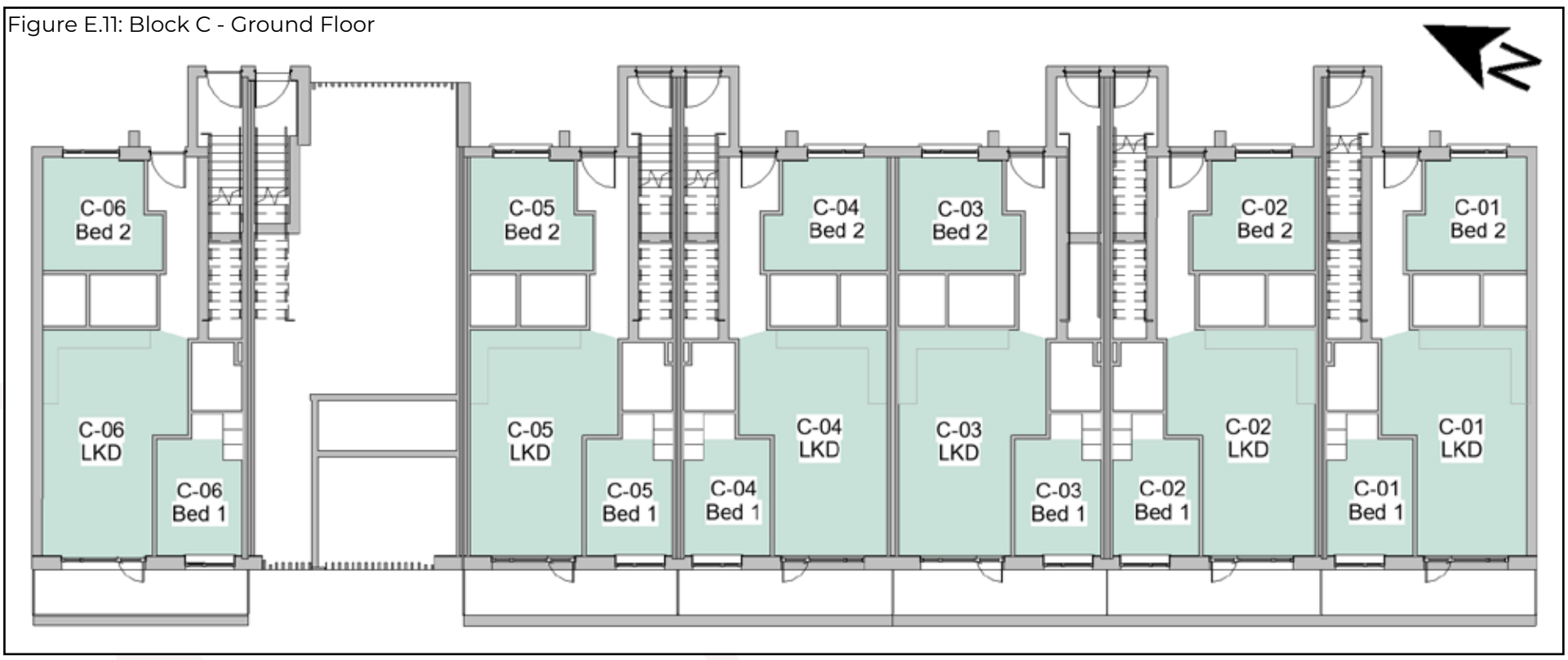


Figure E.13: Block C - First Floor

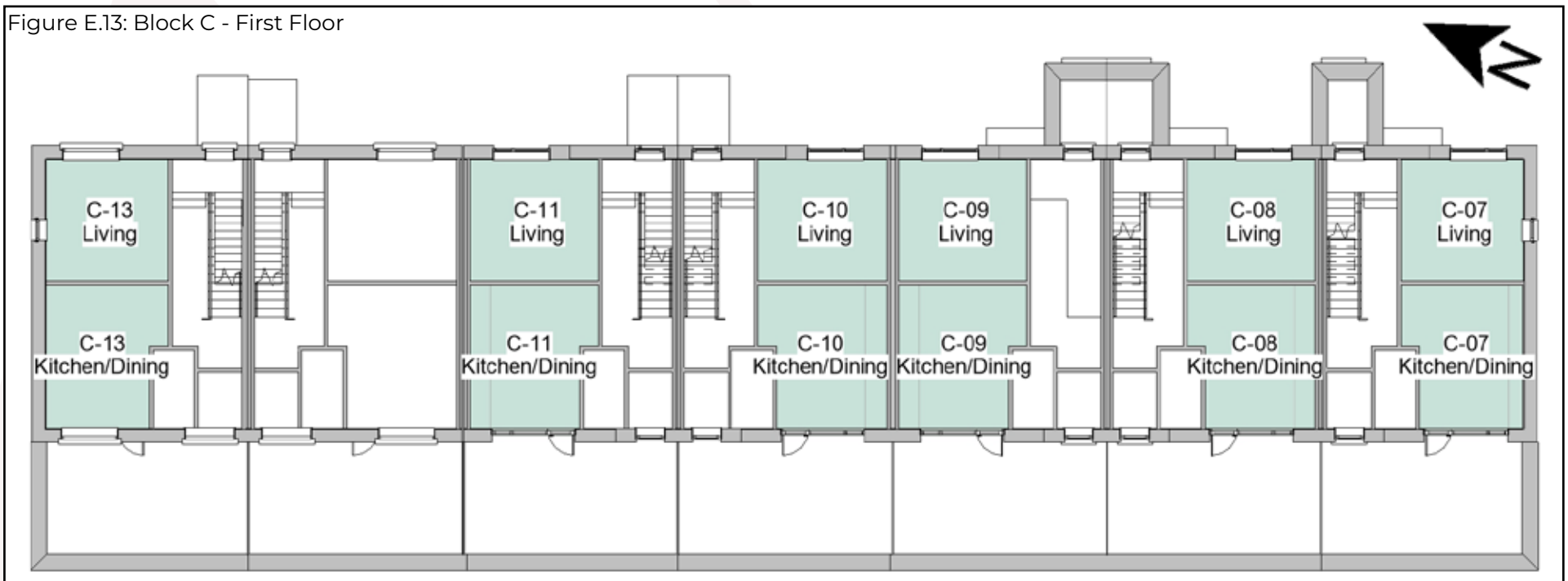
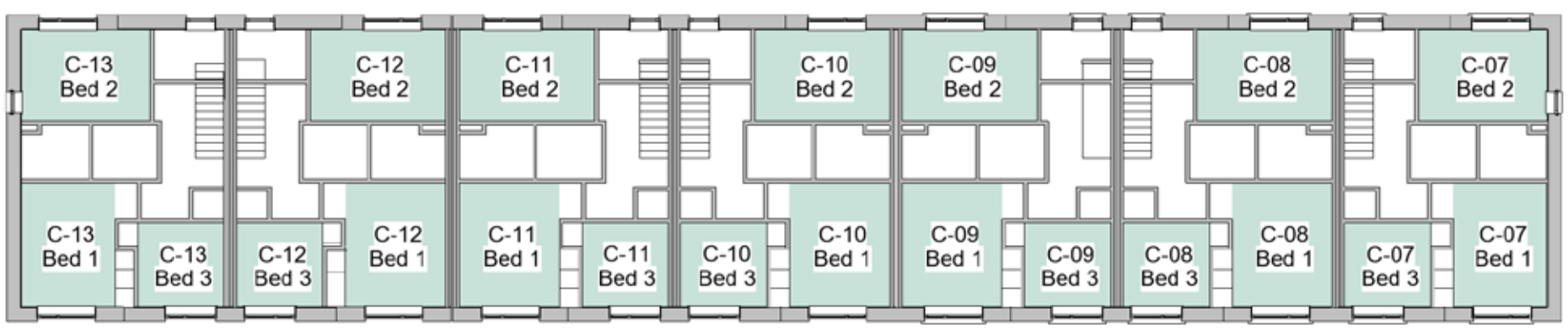


Figure E.14: Block C - Second Floor



E.1.4 Proposed Duplex Floor Plans - Block D

Figure E.16: Block D - Site Location

Figure E.15: Block D - Ground Floor

Figure E.17: Block D - First Floor

Figure E.18: Block D - Second Floor

E.2 Spatial Daylight Autonomy (SDA) in Proposed Units

Below is an example of the table used to describe the spatial daylight autonomy results in proposed units.

Table Example. E.2 - Scheme Performance SDA					
Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation >50%)		Compliance with BR 209 Criteria
			Without Trees	With Trees	
A	**B**	**C**	**D**	**E**	**F**

A: Unit Number

This column identifies the assessed unit. All unit numbers are determined by the architect's drawings, unless otherwise stated.

B: Room Description

Room Description details which room in the unit has been assessed, e.g. bedroom, LKD, etc.

C: Target Lux

Under BR 209 the appropriate target lux levels to be achieved across 50% of the working plane of a room differ depending on the room type. Kitchens have a target lux of 200, living rooms have a target lux of 150 and bedrooms have a target lux of 100. In a room providing more than one function, such as an LKD, the higher target value should be taken i.e. 200 Lux.

D: % of area above target Lux (Without Trees)

BR 209 recommends target lux levels to be achieved across at least 50% of the working plane for at least half the daylight hours. The target values differ depending on the room function, 200 lux for Kitchens, 150 lux for Living Rooms or 100 lux for Bedrooms.

This column states percentage of the working plane of the assessed room that is capable of receiving more than the appropriate target lux for at least half the daylight hours with trees excluded from the analytical model. The figures shown in this column should be considered part of a supplementary study that helps identify if trees are having an effect on daylight within the proposed units.

E: % of area above target Lux (With Trees)

BR 209 recommends target lux levels to be achieved across at least 50% of the working plane for at least half the daylight hours. The target values differ depending on the room function, 200 lux for Kitchens, 150 lux for Living Rooms or 100 lux for Bedrooms.

This column states percentage of the working plane of the assessed room that is capable of receiving more than the appropriate target lux for at least half the daylight hours with the foliage of deciduous trees varied to account for summer and winter conditions, i.e. full leaf and bare branch.

F: Compliance with BR 209 Criteria

This column states if the assessed room achieves the recommended level of daylight as per BR 209 with consideration to the various tree states.

If the target lux level is achieved across more than 50% of the working plane, for half the daylight hours, both with and without trees, this column will state: *'Compliant'*.

If the target lux level is not achieved across more than 50% of the working plane, for half the daylight hours, both with and without trees, this column will state: *'Non-compliant'*.

If the target lux level is achieved across more than 50% of the working plane, for half the daylight hours, without trees but is not achieved with trees, this column will state: *'Trees affecting compliance'*.

Compliance rates will be stated for SDA, both with and without trees.

It should be noted that the figures displayed in the table of results have been rounded off. A manual calculation of these figures may yield a negligible difference and should not be considered an error.

E.2.1 SDA Results: Block A

Table No. E.2.1 - SDA Results:					
Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation >50%)		Compliance with BR 209 Criteria*
			Without Trees***	With Trees**	
A-01	LKD	200	100%	100%	Compliant
A-01	Bed 1	100	100%	100%	Compliant
A-02	LKD	200	66%	57%	Compliant
A-02	Bed 1	100	100%	100%	Compliant
A-02	Bed 2	100	100%	100%	Compliant
A-03	LKD	200	64%	60%	Compliant
A-03	Bed 1	100	100%	100%	Compliant
A-03	Bed 2	100	100%	100%	Compliant
A-04	LKD	200	60%	53%	Compliant
A-04	Bed 1	100	100%	100%	Compliant
A-04	Bed 2	100	100%	100%	Compliant
A-05	LKD	200	70%	58%	Compliant
A-05	Bed 1	100	100%	100%	Compliant
A-05	Bed 2	100	100%	100%	Compliant
A-06	LKD	200	100%	100%	Compliant
A-06	Bed 1	100	100%	100%	Compliant
A-07	LKD	200	100%	100%	Compliant
A-07	Bed 1	100	100%	100%	Compliant
A-08	LKD	200	100%	100%	Compliant
A-08	Bed 1	100	100%	100%	Compliant
A-09	LKD	200	100%	100%	Compliant
A-09	Bed 1	100	100%	100%	Compliant
A-10	LKD	200	91%	86%	Compliant
A-10	Bed 1	100	100%	100%	Compliant
A-10	Bed 2	100	100%	100%	Compliant
A-11	LKD	200	89%	88%	Compliant
A-11	Bed 1	100	100%	100%	Compliant
A-11	Bed 2	100	100%	100%	Compliant
A-12	LKD	200	89%	87%	Compliant
A-12	Bed 1	100	100%	100%	Compliant
A-12	Bed 2	100	100%	100%	Compliant
A-13	LKD	200	91%	88%	Compliant
A-13	Bed 1	100	100%	100%	Compliant
A-13	Bed 2	100	100%	100%	Compliant
A-14	LKD	200	100%	100%	Compliant
A-14	Bed 1	100	100%	100%	Compliant
A-15	LKD	200	100%	100%	Compliant
A-15	Bed 1	100	100%	100%	Compliant
A-16	LKD	200	100%	100%	Compliant
A-16	Bed 1	100	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 2.5.1 on page 13.
** Under the BR 209 study the SDA has been calculated with indicative trees represented accounting for annual foliage.
*** The SDA assessment without trees indicates the level of daylight within the proposed development when trees are not included in the analytical model. This study provides an understanding of how trees affect daylight within the proposed development.
The SDA circa compliance rates across the entire scheme can be found in section 3.1.1 on page 16.
For floor plans of the assessed units please refer to section E.1 on page 23.

E.2.2 SDA Results: Block A

Table No. E.2.2 - SDA Results:					
Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation >50%)		Compliance with BR 209 Criteria*
			Without Trees***	With Trees**	
A-17	LKD	200	100%	100%	Compliant
A-17	Bed 1	100	100%	100%	Compliant
A-17	Bed 2	100	100%	100%	Compliant
A-17	Bed 3	100	100%	100%	Compliant
A-18	Kitchen/Dining	200	100%	100%	Compliant
A-18	Living	150	100%	100%	Compliant
A-18	Bed 1	100	100%	100%	Compliant
A-18	Bed 2	100	100%	100%	Compliant
A-18	Bed 3	100	100%	100%	Compliant
A-19	Kitchen/Dining	200	100%	100%	Compliant
A-19	Living	150	100%	100%	Compliant
A-19	Bed 1	100	100%	100%	Compliant
A-19	Bed 2	100	100%	100%	Compliant
A-19	Bed 3	100	100%	100%	Compliant
A-20	Kitchen/Dining	200	100%	100%	Compliant
A-20	Living	150	100%	100%	Compliant
A-20	Bed 1	100	100%	100%	Compliant
A-20	Bed 2	100	100%	100%	Compliant
A-20	Bed 3	100	100%	100%	Compliant
A-21	Kitchen/Dining	200	100%	100%	Compliant
A-21	Living	150	100%	100%	Compliant
A-21	Bed 1	100	100%	100%	Compliant
A-21	Bed 2	100	100%	100%	Compliant
A-21	Bed 3	100	100%	100%	Compliant
A-22	LKD	200	100%	100%	Compliant
A-22	Bed 1	100	100%	100%	Compliant
A-22	Bed 2	100	100%	100%	Compliant
A-22	Bed 3	100	100%	100%	Compliant
A-23	LKD	200	100%	100%	Compliant
A-23	Bed 1	100	100%	100%	Compliant
A-23	Bed 2	100	100%	100%	Compliant
A-23	Bed 3	100	100%	100%	Compliant
A-24	LKD	200	100%	100%	Compliant
A-24	Bed 1	100	100%	100%	Compliant
A-24	Bed 2	100	100%	100%	Compliant
A-24	Bed 3	100	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 2.5.1 on page 13.
** Under the BR 209 study the SDA has been calculated with indicative trees represented accounting for annual foliage.
*** The SDA assessment without trees indicates the level of daylight within the proposed development when trees are not included in the analytical model. This study provides an understanding of how trees affect daylight within the proposed development.
The SDA circa compliance rates across the entire scheme can be found in section 3.1.1 on page 16.
For floor plans of the assessed units please refer to section E.1 on page 23.

E.2.3 SDA Results: Block B

Table No. E.2.3 - SDA Results:					
Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation >50%)		Compliance with BR 209 Criteria*
			Without Trees***	With Trees**	
B-01	LKD	200	44%	38%	Non-compliant
B-01	Bed 1	100	100%	100%	Compliant
B-01	Bed 2	100	100%	100%	Compliant
B-02	LKD	200	50%	43%	Trees affecting compliance
B-02	Bed 1	100	100%	100%	Compliant
B-02	Bed 2	100	100%	100%	Compliant
B-03	LKD	200	51%	48%	Trees affecting compliance
B-03	Bed 1	100	100%	100%	Compliant
B-03	Bed 2	100	100%	100%	Compliant
B-04	LKD	200	50%	43%	Trees affecting compliance
B-04	Bed 1	100	100%	100%	Compliant
B-04	Bed 2	100	100%	100%	Compliant
B-05	LKD	200	46%	41%	Non-compliant
B-05	Bed 1	100	100%	100%	Compliant
B-05	Bed 2	100	100%	100%	Compliant
B-06	LKD	200	100%	100%	Compliant
B-06	Bed 1	100	100%	100%	Compliant
B-07	LKD	200	100%	100%	Compliant
B-07	Bed 1	100	100%	100%	Compliant
B-08	Kitchen/Dining	200	100%	100%	Compliant
B-08	Living	150	100%	100%	Compliant
B-08	Bed 1	100	100%	100%	Compliant
B-08	Bed 2	100	100%	100%	Compliant
B-08	Bed 3	100	100%	100%	Compliant
B-09	Kitchen/Dining	200	100%	100%	Compliant
B-09	Living	150	100%	100%	Compliant
B-09	Bed 1	100	100%	100%	Compliant
B-09	Bed 2	100	100%	100%	Compliant
B-09	Bed 3	100	100%	100%	Compliant
B-10	Kitchen/Dining	200	100%	100%	Compliant
B-10	Living	150	100%	100%	Compliant
B-10	Bed 1	100	100%	100%	Compliant
B-10	Bed 2	100	100%	100%	Compliant
B-10	Bed 3	100	100%	100%	Compliant
B-11	Kitchen/Dining	200	100%	100%	Compliant
B-11	Living	150	100%	100%	Compliant
B-11	Bed 1	100	100%	100%	Compliant
B-11	Bed 2	100	100%	100%	Compliant
B-11	Bed 3	100	100%	100%	Compliant
B-12	Kitchen/Dining	200	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 2.5.1 on page 13.

** Under the BR 209 study the SDA has been calculated with indicative trees represented accounting for annual foliage.

*** The SDA assessment without trees indicates the level of daylight within the proposed development when trees are not included in the analytical model. This study provides an understanding of how trees affect daylight within the proposed development.

The SDA circa compliance rates across the entire scheme can be found in section 3.1.1 on page 16.

For floor plans of the assessed units please refer to section E.1 on page 23.

E.2.4 SDA Results: Block B

Table No. E.2.4 - SDA Results:					
Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation >50%)		Compliance with BR 209 Criteria*
			Without Trees***	With Trees**	
B-12	Living	150	100%	100%	Compliant
B-12	Bed 1	100	100%	100%	Compliant
B-12	Bed 2	100	100%	100%	Compliant
B-12	Bed 3	100	100%	100%	Compliant
B-13	Kitchen/Dining	200	100%	100%	Compliant
B-13	Living	150	100%	100%	Compliant
B-13	Bed 1	100	100%	100%	Compliant
B-13	Bed 2	100	100%	100%	Compliant
B-13	Bed 3	100	100%	100%	Compliant
B-14	LKD	200	100%	100%	Compliant
B-14	Bed 1	100	100%	100%	Compliant
B-15	LKD	200	100%	100%	Compliant
B-15	Bed 1	100	100%	100%	Compliant
B-16	LKD	200	100%	100%	Compliant
B-16	Bed 1	100	100%	100%	Compliant
B-16	Bed 2	100	100%	100%	Compliant
B-16	Bed 3	100	100%	100%	Compliant
B-17	LKD	200	100%	100%	Compliant
B-17	Bed 1	100	100%	100%	Compliant
B-17	Bed 2	100	100%	100%	Compliant
B-17	Bed 3	100	100%	100%	Compliant

E.2.5 SDA Results: Block C

Table No. E.2.5 - SDA Results:					
Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation >50%)		Compliance with BR 209 Criteria*
			Without Trees***	With Trees**	
C-01	LKD	200	54%	13%	Trees affecting compliance
C-01	Bed 1	100	100%	46%	Trees affecting compliance
C-01	Bed 2	100	100%	100%	Compliant
C-02	LKD	200	58%	18%	Trees affecting compliance
C-02	Bed 1	100	100%	61%	Compliant
C-02	Bed 2	100	100%	100%	Compliant
C-03	LKD	200	54%	20%	Trees affecting compliance
C-03	Bed 1	100	100%	55%	Compliant
C-03	Bed 2	100	100%	100%	Compliant
C-04	LKD	200	46%	23%	Non-compliant
C-04	Bed 1	100	100%	100%	Compliant
C-04	Bed 2	100	100%	100%	Compliant
C-05	LKD	200	44%	24%	Non-compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 2.5.1 on page 13.

** Under the BR 209 study the SDA has been calculated with indicative trees represented accounting for annual foliage.

*** The SDA assessment without trees indicates the level of daylight within the proposed development when trees are not included in the analytical model. This study provides an understanding of how trees affect daylight within the proposed development.

The SDA circa compliance rates across the entire scheme can be found in section 3.1.1 on page 16.

For floor plans of the assessed units please refer to section E.1 on page 23.

E.2.6 SDA Results: Block C

Table No. E.2.6 - SDA Results:					
Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation >50%)		Compliance with BR 209 Criteria*
			Without Trees***	With Trees**	
C-05	Bed 1	100	100%	100%	Compliant
C-05	Bed 2	100	100%	100%	Compliant
C-06	LKD	200	39%	34%	Non-compliant
C-06	Bed 1	100	100%	100%	Compliant
C-06	Bed 2	100	100%	100%	Compliant
C-07	Kitchen/Dining	200	100%	48%	Trees affecting compliance
C-07	Living	150	100%	100%	Compliant
C-07	Bed 1	100	100%	100%	Compliant
C-07	Bed 2	100	100%	100%	Compliant
C-07	Bed 3	100	100%	100%	Compliant
C-08	Kitchen/Dining	200	100%	55%	Compliant
C-08	Living	150	100%	100%	Compliant
C-08	Bed 1	100	100%	100%	Compliant
C-08	Bed 2	100	100%	100%	Compliant
C-08	Bed 3	100	100%	100%	Compliant
C-09	Kitchen/Dining	200	100%	69%	Compliant
C-09	Living	150	100%	100%	Compliant
C-09	Bed 1	100	100%	100%	Compliant
C-09	Bed 2	100	100%	100%	Compliant
C-09	Bed 3	100	100%	100%	Compliant
C-10	Kitchen/Dining	200	100%	82%	Compliant
C-10	Living	150	100%	100%	Compliant
C-10	Bed 1	100	100%	100%	Compliant
C-10	Bed 2	100	100%	100%	Compliant
C-10	Bed 3	100	100%	100%	Compliant
C-11	Kitchen/Dining	200	100%	99%	Compliant
C-11	Living	150	100%	100%	Compliant
C-11	Bed 1	100	100%	100%	Compliant
C-11	Bed 2	100	100%	100%	Compliant
C-11	Bed 3	100	100%	100%	Compliant
C-12	Kitchen/Dining	200	100%	95%	Compliant
C-12	Living	150	100%	100%	Compliant
C-12	Bed 1	100	100%	100%	Compliant
C-12	Bed 2	100	100%	100%	Compliant
C-12	Bed 3	100	100%	100%	Compliant
C-13	Kitchen/Dining	200	100%	100%	Compliant
C-13	Living	150	100%	100%	Compliant
C-13	Bed 1	100	100%	100%	Compliant
C-13	Bed 2	100	100%	100%	Compliant
C-13	Bed 3	100	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 2.5.1 on page 13.

** Under the BR 209 study the SDA has been calculated with indicative trees represented accounting for annual foliage.

*** The SDA assessment without trees indicates the level of daylight within the proposed development when trees are not included in the analytical model. This study provides an understanding of how trees affect daylight within the proposed development.

The SDA circa compliance rates across the entire scheme can be found in section 3.1.1 on page 16.

For floor plans of the assessed units please refer to section E.1 on page 23.

E.2.7 SDA Results: Block D

Table No. E.2.7 - SDA Results:					
Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation >50%)		Compliance with BR 209 Criteria*
			Without Trees***	With Trees**	
D-01	LKD	200	100%	3%	Trees affecting compliance
D-01	Bed 1	100	100%	100%	Compliant
D-02	LKD	200	100%	7%	Trees affecting compliance
D-02	Bed 1	100	100%	100%	Compliant
D-03	LKD	200	100%	14%	Trees affecting compliance
D-03	Bed 1	100	100%	100%	Compliant
D-04	LKD	200	100%	100%	Compliant
D-04	Bed 1	100	100%	100%	Compliant
D-04	Bed 2	100	100%	100%	Compliant
D-05	LKD	200	99%	12%	Trees affecting compliance
D-05	Bed 1	100	100%	100%	Compliant
D-06	LKD	200	100%	12%	Trees affecting compliance
D-06	Bed 1	100	100%	100%	Compliant
D-07	LKD	200	100%	100%	Compliant
D-07	Bed 1	100	100%	99%	Compliant
D-08	Kitchen/Dining	200	100%	55%	Compliant
D-08	Living	150	100%	95%	Compliant
D-08	Bed 1	100	100%	100%	Compliant
D-08	Bed 2	100	100%	100%	Compliant
D-08	Bed 3	100	100%	58%	Compliant
D-09	Kitchen/Dining	200	100%	92%	Compliant
D-09	Living	150	100%	100%	Compliant
D-09	Bed 1	100	100%	100%	Compliant
D-09	Bed 2	100	100%	100%	Compliant
D-09	Bed 3	100	100%	67%	Compliant
D-10	LKD	200	100%	52%	Compliant
D-10	Bed 1	100	100%	100%	Compliant
D-11	LKD	200	100%	100%	Compliant
D-11	Bed 1	100	100%	100%	Compliant
D-11	Bed 2	100	100%	100%	Compliant
D-12	Kitchen/Dining	200	100%	51%	Compliant
D-12	Living	150	100%	99%	Compliant
D-12	Bed 1	100	100%	100%	Compliant
D-12	Bed 2	100	100%	100%	Compliant
D-12	Bed 3	100	100%	87%	Compliant
D-13	Kitchen/Dining	200	100%	47%	Trees affecting compliance
D-13	Living	150	100%	100%	Compliant
D-13	Bed 1	100	100%	100%	Compliant
D-13	Bed 2	100	100%	100%	Compliant
D-13	Bed 3	100	100%	71%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 2.5.1 on page 13.
** Under the BR 209 study the SDA has been calculated with indicative trees represented accounting for annual foliage.
*** The SDA assessment without trees indicates the level of daylight within the proposed development when trees are not included in the analytical model. This study provides an understanding of how trees affect daylight within the proposed development.
The SDA circa compliance rates across the entire scheme can be found in section 3.1.1 on page 16.
For floor plans of the assessed units please refer to section E.1 on page 23.

E.2.8 SDA Results: Block D

Table No. E.2.8 - SDA Results:					
Unit Number	Room Description	Target Lux*	% of area above target Lux* (recommendation >50%)		Compliance with BR 209 Criteria*
			Without Trees***	With Trees**	
D-14	LKD	200	100%	100%	Compliant
D-14	Bed 1	100	100%	100%	Compliant
D-15	LKD	200	100%	100%	Compliant
D-15	Bed 1	100	100%	100%	Compliant
D-16	LKD	200	100%	100%	Compliant
D-16	Bed 1	100	100%	100%	Compliant
D-16	Bed 2	100	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 2.5.1 on page 13.

** Under the BR 209 study the SDA has been calculated with indicative trees represented accounting for annual foliage.

*** The SDA assessment without trees indicates the level of daylight within the proposed development when trees are not included in the analytical model. This study provides an understanding of how trees affect daylight within the proposed development.

The SDA circa compliance rates across the entire scheme can be found in section 3.1.1 on page 16.

For floor plans of the assessed units please refer to section E.1 on page 23.

E.3 Sunlight Exposure (SE) in Proposed Units

Below is an example of the table used to describe the SE performance of proposed habitable rooms.

Table Example. E.3 - Scheme Performance Sunlight Exposure							
Unit Number	Room Description	Deciduous Trees as Opaque Objects			Without Deciduous Trees		
		SE Hours on March 21st	Level of SE on March 21st	Unit compliance based on highest performing room	SE Hours on March 21st	Level of SE on March 21st	Unit compliance based on highest performing room
A	**B**	**C**	**D**	**E**	**F**	**G**	**H**

A: Unit Number

This column identifies the assessed unit. All unit numbers are determined by the architect's drawings, unless otherwise stated.

B: Room Description

Room Description details which room of the unit has been assessed, e.g. bedroom, living room, etc.

C: SE Hours on March 21st (Deciduous Trees as Opaque Objects)

This column will state the number of hours the assessed room can expect to receive on March 21st with the assessment carried out with deciduous trees as opaque objects.

D: Level of SE on March 21st (Deciduous Trees as Opaque Objects)

BR 209 recommends a minimum sunlight exposure of 1.5 hours for a proposed unit with preference given to main living rooms. BR 209 categorise sunlight exposure as minimum, medium and high, this column will categorise the level of sunlight exposure with deciduous trees as opaque objects based on the following:

- Less than 1.5 hours: *Below minimum,*
- Between 1.5 hours and 3 hours: *Minimum*
- Between 3 hours and 4 hours: *Medium*
- More than 4 hours: *High*

E: Unit compliance based on highest performing room (Deciduous Trees as Opaque Objects)

A proposed unit is considered to be compliant provided any habitable room within the unit is capable of receiving at least 1.5 hours of sunlight on the assessment date. This column will identify the highest performing room within a unit and state compliance for the associated unit based on that room with the assessment carried out with deciduous trees as opaque objects.

Typically unit compliance will be stated for the best performing room per unit only, with lesser performing rooms indicated with a dash (-).

F: SE Hours on March 21st (Without Deciduous Trees)

This column will state the number of hours the assessed room can expect to receive on March 21st with the assessment carried out without deciduous trees.

G: Level of SE on March 21st (Without Deciduous Trees)

BR 209 recommends a minimum sunlight exposure of 1.5 hours for a proposed unit with preference given to main living rooms. BR 209 categorise sunlight exposure as minimum, medium and high, this column will categorise the level of sunlight exposure without deciduous trees using the same criteria as the study with deciduous trees as opaque objects.

H: Unit compliance based on highest performing room (Without Deciduous Trees)

A proposed unit is considered to be compliant provided any habitable room within the unit is capable of receiving at least 1.5 hours of sunlight on March 21st. This column will identify the highest performing room within a unit and state compliance for the associated unit based on that room with the assessment carried out without deciduous trees. Typically only one room per unit will be populated in this column, with lesser performing rooms indicated with a dash (-).

It should be noted that the figures displayed in the table of results have been rounded off. A manual calculation of these figures may yield a negligible difference and should not be considered an error.

E.3.1 SE Results: Block A

Table No. E.3.1 - Sunlight Exposure Results:							
Unit Number	Room Description	Deciduous Trees as Opaque Objects*			Without Deciduous Trees*		
		SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**	SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**
A-01	LKD	2.40	Minimum	Compliant	2.40	Minimum	Compliant
A-01	Bed 1	0.00	Below Minimum	-	0.00	Below Minimum	-
A-02	LKD	5.30	High	Compliant	6.40	High	Compliant
A-02	Bed 1	0.00	Below Minimum	-	0.00	Below Minimum	-
A-02	Bed 2	4.70	High	-	5.30	High	-
A-03	LKD	5.00	High	-	6.00	High	-
A-03	Bed 1	0.00	Below Minimum	-	0.00	Below Minimum	-
A-03	Bed 2	7.10	High	Compliant	7.30	High	Compliant
A-04	LKD	3.90	Medium	-	5.10	High	Compliant
A-04	Bed 1	0.00	Below Minimum	-	0.00	Below Minimum	-
A-04	Bed 2	5.00	High	Compliant	5.00	High	-
A-05	LKD	4.30	High	-	5.20	High	-
A-05	Bed 1	0.00	Below Minimum	-	0.00	Below Minimum	-
A-05	Bed 2	6.10	High	Compliant	6.80	High	Compliant
A-06	LKD	1.30	Below Minimum	Non-Compliant	2.30	Minimum	Compliant
A-06	Bed 1	0.00	Below Minimum	-	0.00	Below Minimum	-
A-07	LKD	5.80	High	Compliant	5.80	High	Compliant
A-07	Bed 1	5.00	High	-	5.00	High	-
A-08	LKD	8.80	High	Compliant	9.40	High	Compliant
A-08	Bed 1	6.30	High	-	7.70	High	-
A-09	LKD	2.60	Minimum	Compliant	2.60	Minimum	Compliant
A-09	Bed 1	0.00	Below Minimum	-	0.00	Below Minimum	-
A-10	LKD	7.60	High	-	7.60	High	-
A-10	Bed 1	0.00	Below Minimum	-	0.00	Below Minimum	-
A-10	Bed 2	7.90	High	Compliant	7.90	High	Compliant
A-11	LKD	7.70	High	-	7.70	High	-
A-11	Bed 1	0.00	Below Minimum	-	0.00	Below Minimum	-
A-11	Bed 2	7.90	High	Compliant	7.90	High	Compliant
A-12	LKD	7.60	High	-	7.60	High	-
A-12	Bed 1	0.00	Below Minimum	-	0.00	Below Minimum	-
A-12	Bed 2	7.90	High	Compliant	7.90	High	Compliant
A-13	LKD	7.40	High	-	7.40	High	-
A-13	Bed 1	0.00	Below Minimum	-	0.00	Below Minimum	-
A-13	Bed 2	7.80	High	Compliant	7.80	High	Compliant
A-14	LKD	1.20	Below Minimum	Non-Compliant	1.70	Minimum	Compliant
A-14	Bed 1	0.00	Below Minimum	-	0.00	Below Minimum	-
A-15	LKD	6.70	High	-	6.80	High	-
A-15	Bed 1	7.10	High	Compliant	7.10	High	Compliant
A-16	LKD	9.40	High	Compliant	9.40	High	Compliant
A-16	Bed 1	7.70	High	-	7.70	High	-

* Rooms are tested with deciduous trees as opaque objects and without deciduous trees to account for the range of possible sunlight hours.
** Section 3.1.15 of the BRE Guidelines recommends that for a unit to be compliant any room within the unit should receive a minimum of 1.5 hours of direct sunlight on March 21st, preferably a main living room. The SE circa compliance rates can be found in section 3.1.2 on page 18.
*** For the interpretation of levels of Sunlight Exposure please refer to “H.2 Definition of Levels of Sunlight Exposure” on page 71.
For floor plans of the assessed units please refer to section E.1 on page 23.

E.3.2 SE Results: Block A

Table No. E.3.2 - Sunlight Exposure Results:							
Unit Number	Room Description	Deciduous Trees as Opaque Objects*			Without Deciduous Trees*		
		SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**	SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**
A-17	LKD	5.30	High	-	5.30	High	-
A-17	Bed 1	0.00	Below Minimum	-	0.00	Below Minimum	-
A-17	Bed 2	5.40	High	Compliant	5.40	High	Compliant
A-17	Bed 3	0.00	Below Minimum	-	0.00	Below Minimum	-
A-18	Kitchen/Dining	4.80	High	-	4.80	High	-
A-18	Living	0.00	Below Minimum	-	0.00	Below Minimum	-
A-18	Bed 1	4.70	High	-	4.70	High	-
A-18	Bed 2	0.00	Below Minimum	-	0.00	Below Minimum	-
A-18	Bed 3	7.10	High	Compliant	7.10	High	Compliant
A-19	Kitchen/Dining	7.30	High	-	7.30	High	-
A-19	Living	0.00	Below Minimum	-	0.00	Below Minimum	-
A-19	Bed 1	7.90	High	Compliant	7.90	High	Compliant
A-19	Bed 2	0.00	Below Minimum	-	0.00	Below Minimum	-
A-19	Bed 3	7.10	High	-	7.10	High	-
A-20	Kitchen/Dining	7.00	High	-	7.00	High	-
A-20	Living	0.00	Below Minimum	-	0.00	Below Minimum	-
A-20	Bed 1	7.90	High	Compliant	7.90	High	Compliant
A-20	Bed 2	0.00	Below Minimum	-	0.00	Below Minimum	-
A-20	Bed 3	7.10	High	-	7.10	High	-
A-21	Kitchen/Dining	6.00	High	-	6.00	High	-
A-21	Living	0.00	Below Minimum	-	0.00	Below Minimum	-
A-21	Bed 1	6.10	High	-	6.10	High	-
A-21	Bed 2	0.00	Below Minimum	-	0.00	Below Minimum	-
A-21	Bed 3	7.10	High	Compliant	7.10	High	Compliant
A-22	LKD	2.50	Minimum	-	2.50	Minimum	-
A-22	Bed 1	0.00	Below Minimum	-	0.00	Below Minimum	-
A-22	Bed 2	2.70	Minimum	Compliant	2.70	Minimum	Compliant
A-22	Bed 3	0.00	Below Minimum	-	0.00	Below Minimum	-
A-23	LKD	7.70	High	Compliant	7.70	High	Compliant
A-23	Bed 1	7.70	High	-	7.70	High	-
A-23	Bed 2	7.30	High	-	7.30	High	-
A-23	Bed 3	7.10	High	-	7.10	High	-
A-24	LKD	9.40	High	Compliant	9.40	High	Compliant
A-24	Bed 1	7.70	High	-	7.70	High	-
A-24	Bed 2	9.40	High	-	9.40	High	-
A-24	Bed 3	7.10	High	-	7.10	High	-

* Rooms are tested with deciduous trees as opaque objects and without deciduous trees to account for the range of possible sunlight hours.
** Section 3.1 of the BRE Guidelines recommend that for a unit to be compliant any room within the unit should receive a minimum of 1.5 hours of direct sunlight on March 21st, preferably a main living room. The SE circa compliance rates can be found in section 3.1.2 on page 18.
*** For the interpretation of levels of Sunlight Exposure please refer to “H.2 Definition of Levels of Sunlight Exposure” on page 71.
For floor plans of the assessed units please refer to section E.1 on page 23.

E.3.3 SE Results: Block B

Table No. E.3.3 - Sunlight Exposure Results:							
Unit Number	Room Description	Deciduous Trees as Opaque Objects*			Without Deciduous Trees*		
		SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**	SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**
B-01	LKD	3.00	Medium	-	5.10	High	Compliant
B-01	Bed 1	3.70	Medium	Compliant	4.60	High	-
B-01	Bed 2	0.70	Below Minimum	-	2.70	Minimum	-
B-02	LKD	3.70	Medium	Compliant	4.10	High	-
B-02	Bed 1	3.70	Medium	-	5.30	High	Compliant
B-02	Bed 2	0.00	Below Minimum	-	0.00	Below Minimum	-
B-03	LKD	4.20	High	Compliant	5.30	High	Compliant
B-03	Bed 1	3.00	Medium	-	4.70	High	-
B-03	Bed 2	0.60	Below Minimum	-	0.60	Below Minimum	-
B-04	LKD	3.70	Medium	Compliant	5.10	High	Compliant
B-04	Bed 1	2.90	Minimum	-	4.70	High	-
B-04	Bed 2	0.30	Below Minimum	-	2.70	Minimum	-
B-05	LKD	4.00	High	Compliant	4.00	High	Compliant
B-05	Bed 1	2.60	Minimum	-	3.80	Medium	-
B-05	Bed 2	0.60	Below Minimum	-	0.60	Below Minimum	-
B-06	LKD	4.40	High	Compliant	4.80	High	Compliant
B-06	Bed 1	2.00	Minimum	-	3.30	Medium	-
B-07	LKD	1.10	Below Minimum	Non-Compliant	2.00	Minimum	-
B-07	Bed 1	0.00	Below Minimum	-	2.60	Minimum	Compliant
B-08	Kitchen/Dining	5.20	High	-	5.20	High	-
B-08	Living	5.60	High	-	5.60	High	-
B-08	Bed 1	5.20	High	-	5.20	High	-
B-08	Bed 2	6.80	High	Compliant	6.80	High	Compliant
B-08	Bed 3	5.20	High	-	5.20	High	-
B-09	Kitchen/Dining	5.30	High	Compliant	5.30	High	Compliant
B-09	Living	2.70	Minimum	-	2.70	Minimum	-
B-09	Bed 1	5.20	High	-	5.20	High	-
B-09	Bed 2	2.60	Minimum	-	2.60	Minimum	-
B-09	Bed 3	5.20	High	-	5.20	High	-
B-10	Kitchen/Dining	5.00	High	-	5.20	High	Compliant
B-10	Living	2.70	Minimum	-	2.70	Minimum	-
B-10	Bed 1	5.20	High	Compliant	5.20	High	-
B-10	Bed 2	2.70	Minimum	-	2.70	Minimum	-
B-10	Bed 3	5.20	High	-	5.20	High	-
B-11	Kitchen/Dining	5.30	High	Compliant	5.30	High	Compliant
B-11	Living	2.70	Minimum	-	2.70	Minimum	-
B-11	Bed 1	5.20	High	-	5.20	High	-
B-11	Bed 2	2.60	Minimum	-	2.60	Minimum	-
B-11	Bed 3	5.20	High	-	5.20	High	-
B-12	Kitchen/Dining	4.50	High	-	5.20	High	Compliant

* Rooms are tested with deciduous trees as opaque objects and without deciduous trees to account for the range of possible sunlight hours.

** Section 3.1 of the BRE Guidelines recommend that for a unit to be compliant any room within the unit should receive a minimum of 1.5 hours of direct sunlight on March 21st, preferably a main living room. The SE circa compliance rates can be found in section 3.1.2 on page 18.

*** For the interpretation of levels of Sunlight Exposure please refer to “H.2 Definition of Levels of Sunlight Exposure” on page 71.

For floor plans of the assessed units please refer to section E.1 on page 23.

E.3.4 SE Results: Block B

Table No. E.3.4 - Sunlight Exposure Results:							
Unit Number	Room Description	Deciduous Trees as Opaque Objects*			Without Deciduous Trees*		
		SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**	SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**
B-12	Living	2.70	Minimum	-	2.70	Minimum	-
B-12	Bed 1	5.20	High	Compliant	5.20	High	-
B-12	Bed 2	2.70	Minimum	-	2.70	Minimum	-
B-12	Bed 3	5.20	High	-	5.20	High	-
B-13	Kitchen/Dining	5.00	High	-	5.30	High	Compliant
B-13	Living	2.70	Minimum	-	2.70	Minimum	-
B-13	Bed 1	5.20	High	Compliant	5.20	High	-
B-13	Bed 2	2.60	Minimum	-	2.60	Minimum	-
B-13	Bed 3	5.20	High	-	5.20	High	-
B-14	LKD	4.80	High	Compliant	4.80	High	-
B-14	Bed 1	2.90	Minimum	-	5.30	High	Compliant
B-15	LKD	2.00	Minimum	-	2.00	Minimum	-
B-15	Bed 1	2.60	Minimum	Compliant	2.60	Minimum	Compliant
B-16	LKD	5.30	High	Compliant	5.30	High	Compliant
B-16	Bed 1	5.30	High	-	5.30	High	-
B-16	Bed 2	4.80	High	-	4.80	High	-
B-16	Bed 3	4.80	High	-	4.80	High	-
B-17	LKD	2.60	Minimum	Compliant	2.60	Minimum	Compliant
B-17	Bed 1	2.60	Minimum	-	2.60	Minimum	-
B-17	Bed 2	2.00	Minimum	-	2.00	Minimum	-
B-17	Bed 3	2.00	Minimum	-	2.00	Minimum	-

E.3.5 SE Results: Block C

Table No. E.3.5 - Sunlight Exposure Results:							
Unit Number	Room Description	Deciduous Trees as Opaque Objects*			Without Deciduous Trees*		
		SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**	SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**
C-01	LKD	0.00	Below Minimum	-	5.20	High	-
C-01	Bed 1	0.00	Below Minimum	-	5.30	High	Compliant
C-01	Bed 2	2.20	Minimum	Compliant	2.70	Minimum	-
C-02	LKD	0.00	Below Minimum	Non-Compliant	5.20	High	Compliant
C-02	Bed 1	0.00	Below Minimum	-	4.40	High	-
C-02	Bed 2	0.00	Below Minimum	-	0.00	Below Minimum	-
C-03	LKD	0.00	Below Minimum	-	4.90	High	Compliant
C-03	Bed 1	0.00	Below Minimum	-	4.70	High	-
C-03	Bed 2	0.60	Below Minimum	Non-Compliant	0.60	Below Minimum	-
C-04	LKD	0.00	Below Minimum	-	4.10	High	Compliant
C-04	Bed 1	0.10	Below Minimum	-	3.60	Medium	-
C-04	Bed 2	2.70	Minimum	Compliant	2.70	Minimum	-
C-05	LKD	1.40	Below Minimum	Non-Compliant	3.60	Medium	Compliant

* Rooms are tested with deciduous trees as opaque objects and without deciduous trees to account for the range of possible sunlight hours.

** Section 3.1 of the BRE Guidelines recommend that for a unit to be compliant any room within the unit should receive a minimum of 1.5 hours of direct sunlight on March 21st, preferably a main living room. The SE circa compliance rates can be found in section 3.1.2 on page 18.

*** For the interpretation of levels of Sunlight Exposure please refer to “H.2 Definition of Levels of Sunlight Exposure” on page 71.

For floor plans of the assessed units please refer to section E.1 on page 23.

E.3.6 SE Results: Block C

Table No. E.3.6 - Sunlight Exposure Results:							
Unit Number	Room Description	Deciduous Trees as Opaque Objects*			Without Deciduous Trees*		
		SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**	SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**
C-05	Bed 1	0.50	Below Minimum	-	3.10	Medium	-
C-05	Bed 2	0.60	Below Minimum	-	0.60	Below Minimum	-
C-06	LKD	3.50	Medium	Compliant	4.00	High	Compliant
C-06	Bed 1	3.00	Medium	-	3.00	Medium	-
C-06	Bed 2	0.60	Below Minimum	-	0.60	Below Minimum	-
C-07	Kitchen/Dining	0.00	Below Minimum	-	5.20	High	-
C-07	Living	3.10	Medium	Compliant	6.80	High	Compliant
C-07	Bed 1	0.00	Below Minimum	-	5.10	High	-
C-07	Bed 2	3.10	Medium	-	6.80	High	-
C-07	Bed 3	0.00	Below Minimum	-	5.10	High	-
C-08	Kitchen/Dining	0.00	Below Minimum	-	5.20	High	Compliant
C-08	Living	2.70	Minimum	Compliant	2.70	Minimum	-
C-08	Bed 1	0.00	Below Minimum	-	5.10	High	-
C-08	Bed 2	2.60	Minimum	-	2.60	Minimum	-
C-08	Bed 3	0.30	Below Minimum	-	5.10	High	-
C-09	Kitchen/Dining	0.40	Below Minimum	-	5.10	High	Compliant
C-09	Living	2.70	Minimum	Compliant	2.70	Minimum	-
C-09	Bed 1	2.20	Minimum	-	5.10	High	-
C-09	Bed 2	2.60	Minimum	-	2.60	Minimum	-
C-09	Bed 3	0.60	Below Minimum	-	5.10	High	-
C-10	Kitchen/Dining	1.40	Below Minimum	-	4.90	High	-
C-10	Living	2.70	Minimum	-	2.70	Minimum	-
C-10	Bed 1	3.80	Medium	-	5.10	High	Compliant
C-10	Bed 2	2.70	Minimum	-	2.70	Minimum	-
C-10	Bed 3	4.20	High	Compliant	5.10	High	-
C-11	Kitchen/Dining	4.10	High	-	5.00	High	-
C-11	Living	2.70	Minimum	-	2.70	Minimum	-
C-11	Bed 1	5.10	High	Compliant	5.10	High	Compliant
C-11	Bed 2	2.60	Minimum	-	2.60	Minimum	-
C-11	Bed 3	4.70	High	-	5.10	High	-
C-12	Kitchen/Dining	4.80	High	-	4.80	High	-
C-12	Living	2.70	Minimum	-	2.70	Minimum	-
C-12	Bed 1	5.10	High	Compliant	5.10	High	Compliant
C-12	Bed 2	2.70	Minimum	-	2.70	Minimum	-
C-12	Bed 3	5.10	High	-	5.10	High	-
C-13	Kitchen/Dining	5.20	High	Compliant	5.20	High	Compliant
C-13	Living	2.70	Minimum	-	2.70	Minimum	-
C-13	Bed 1	5.10	High	-	5.10	High	-
C-13	Bed 2	2.60	Minimum	-	2.60	Minimum	-
C-13	Bed 3	5.10	High	-	5.10	High	-

* Rooms are tested with deciduous trees as opaque objects and without deciduous trees to account for the range of possible sunlight hours.

** Section 3.1 of the BRE Guidelines recommend that for a unit to be compliant any room within the unit should receive a minimum of 1.5 hours of direct sunlight on March 21st, preferably a main living room. The SE circa compliance rates can be found in section 3.1.2 on page 18.

*** For the interpretation of levels of Sunlight Exposure please refer to “H.2 Definition of Levels of Sunlight Exposure” on page 71.

For floor plans of the assessed units please refer to section E.1 on page 23.

E.3.7 SE Results: Block D

Table No. E.3.7 - Sunlight Exposure Results:							
Unit Number	Room Description	Deciduous Trees as Opaque Objects*			Without Deciduous Trees*		
		SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**	SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**
D-01	LKD	0.00	Below Minimum	Non-Compliant	6.30	High	Compliant
D-01	Bed 1	0.00	Below Minimum	-	0.00	Below Minimum	-
D-02	LKD	0.00	Below Minimum	Non-Compliant	4.50	High	Compliant
D-02	Bed 1	0.00	Below Minimum	-	0.00	Below Minimum	-
D-03	LKD	0.00	Below Minimum	Non-Compliant	2.30	Minimum	Compliant
D-03	Bed 1	0.00	Below Minimum	-	0.00	Below Minimum	-
D-04	LKD	1.90	Minimum	Compliant	2.20	Minimum	-
D-04	Bed 1	1.90	Minimum	-	2.30	Minimum	Compliant
D-04	Bed 2	0.30	Below Minimum	-	0.70	Below Minimum	-
D-05	LKD	0.00	Below Minimum	Non-Compliant	3.80	Medium	Compliant
D-05	Bed 1	0.00	Below Minimum	-	0.00	Below Minimum	-
D-06	LKD	0.00	Below Minimum	-	3.90	Medium	Compliant
D-06	Bed 1	0.30	Below Minimum	Non-Compliant	2.00	Minimum	-
D-07	LKD	0.70	Below Minimum	Non-Compliant	9.40	High	Compliant
D-07	Bed 1	0.10	Below Minimum	-	7.90	High	-
D-08	Kitchen/Dining	0.00	Below Minimum	-	0.00	Below Minimum	-
D-08	Living	0.00	Below Minimum	-	7.30	High	-
D-08	Bed 1	0.00	Below Minimum	-	0.00	Below Minimum	-
D-08	Bed 2	0.40	Below Minimum	-	7.70	High	Compliant
D-08	Bed 3	0.70	Below Minimum	Non-Compliant	7.10	High	-
D-09	Kitchen/Dining	0.00	Below Minimum	-	0.00	Below Minimum	-
D-09	Living	0.10	Below Minimum	-	6.30	High	-
D-09	Bed 1	0.00	Below Minimum	-	0.00	Below Minimum	-
D-09	Bed 2	1.90	Minimum	Compliant	7.40	High	Compliant
D-09	Bed 3	1.30	Below Minimum	-	7.10	High	-
D-10	LKD	0.30	Below Minimum	Non-Compliant	2.90	Minimum	Compliant
D-10	Bed 1	0.00	Below Minimum	-	0.00	Below Minimum	-
D-11	LKD	2.50	Minimum	-	2.50	Minimum	-
D-11	Bed 1	2.60	Minimum	Compliant	2.60	Minimum	Compliant
D-11	Bed 2	2.60	Minimum	-	2.60	Minimum	-
D-12	Kitchen/Dining	2.30	Minimum	-	2.70	Minimum	-
D-12	Living	0.00	Below Minimum	-	5.30	High	Compliant
D-12	Bed 1	2.70	Minimum	Compliant	2.70	Minimum	-
D-12	Bed 2	0.10	Below Minimum	-	5.30	High	-
D-12	Bed 3	0.00	Below Minimum	-	4.80	High	-
D-13	Kitchen/Dining	0.00	Below Minimum	-	2.70	Minimum	-
D-13	Living	0.00	Below Minimum	-	9.40	High	Compliant
D-13	Bed 1	1.00	Below Minimum	Non-Compliant	2.70	Minimum	-
D-13	Bed 2	0.10	Below Minimum	-	9.40	High	-
D-13	Bed 3	0.00	Below Minimum	-	4.80	High	-

* Rooms are tested with deciduous trees as opaque objects and without deciduous trees to account for the range of possible sunlight hours.

** Section 3.1 of the BRE Guidelines recommend that for a unit to be compliant any room within the unit should receive a minimum of 1.5 hours of direct sunlight on March 21st, preferably a main living room. The SE circa compliance rates can be found in section 3.1.2 on page 18.

*** For the interpretation of levels of Sunlight Exposure please refer to “H.2 Definition of Levels of Sunlight Exposure” on page 71.

For floor plans of the assessed units please refer to section E.1 on page 23.

E.3.8 SE Results: Block D

Table No. E.3.8 - Sunlight Exposure Results:							
Unit Number	Room Description	Deciduous Trees as Opaque Objects*			Without Deciduous Trees*		
		SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**	SE Hours on March 21st	Level of SE on March 21st***	Unit compliance based on highest performing room**
D-14	LKD	1.90	Minimum	Compliant	9.40	High	Compliant
D-14	Bed 1	0.30	Below Minimum	-	7.90	High	-
D-15	LKD	1.80	Minimum	Compliant	5.80	High	Compliant
D-15	Bed 1	0.00	Below Minimum	-	0.00	Below Minimum	-
D-16	LKD	2.50	Minimum	-	2.50	Minimum	-
D-16	Bed 1	2.60	Minimum	Compliant	2.60	Minimum	Compliant
D-16	Bed 2	2.60	Minimum	-	2.60	Minimum	-

* Rooms are tested with deciduous trees as opaque objects and without deciduous trees to account for the range of possible sunlight hours.
** Section 3.1 of the BRE Guidelines recommend that for a unit to be compliant any room within the unit should receive a minimum of 1.5 hours of direct sunlight on March 21st, preferably a main living room. The SE circa compliance rates can be found in section 3.1.2 on page 18.
*** For the interpretation of levels of Sunlight Exposure please refer to “H.2 Definition of Levels of Sunlight Exposure” on page 71.
For floor plans of the assessed units please refer to section E.1 on page 23.

E.4 Sun On Ground (SOG) in Proposed Outdoor Amenity Areas

Below is an example of the table used to describe SOG in proposed gardens and amenity spaces.

	Table Example. E.4 - Scheme Performance SOG				
Assigned Area Number	Assessed Area	Area Capable of Receiving 2 Hours of Sunlight on March 21st	Recommended Minimum	Level of Compliance with BRE Guidelines	Meets BR 209 Criteria
A	**B**	**C**	**D**	**E**	**F**

A: Assigned Area Number

This column indicates the number that 3DDB have assigned to the assessed areas, which is included for the sole purpose of aiding in the identification of the corresponding space shown in the corresponding figure.

B: Assessed Area

This column identifies the assessed garden/amenity area.

C: Area Capable of Receiving 2 Hours of Sunlight on March 21st

The percentage of the proposed area that can receive more than 2 hours of sunlight on March 21st.

D: Recommended Minimum

Section 3.3.17 of the BRE Guidelines state that the percentage of a garden/amenity area that can receive more than 2 hours of sunlight on March 21st should be 50%. The target value for all spaces is set to 50%.

E: Level of Compliance with BRE Guidelines

This column states the compliance of the assessed space with the *BRE Target Value*. If the assessed garden or amenity area complies with the BRE Guidelines this cell will state "*BRE Compliant*". If the garden or amenity area does not meet the criteria as set out in the BRE Guidelines, a percentage of compliance with the *recommended minimum* will be stated.

F: Meets BR 209 Criteria

This column states if the assessed area achieves the recommended level of sunlight on March 21st as per BR 209.

It should be noted that the figures displayed in the table of results have been rounded off. A manual calculation of these figures may yield a negligible difference and should not be considered an error.

E.4.1 Sun On Ground in Proposed Outdoor Amenity Areas

Table No. E.4.1 - SOG in Proposed Outdoor Amenity Areas Results:					
Assigned Area Number	Assessed Area	Area Capable of Receiving 2 Hours of Sunlight on March 21st	Recommended minimum	Level of Compliance with BRE Guidelines*	Meets BR 209 Criteria*
1	POS 1	99.97%	50.00%	BRE Compliant	Yes
2	POS 2	99.63%	50.00%	BRE Compliant	Yes
3	POS 3	99.95%	50.00%	BRE Compliant	Yes
4	COS 1	99.93%	50.00%	BRE Compliant	Yes
5	COS 2	0.59%	50.00%	1%	No
* Section 2.2.23 of the BRE Guidelines recommends that for a garden or amenity 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 March 21st.					

Figure E.19: Indication of the amenity areas that have been analysed.

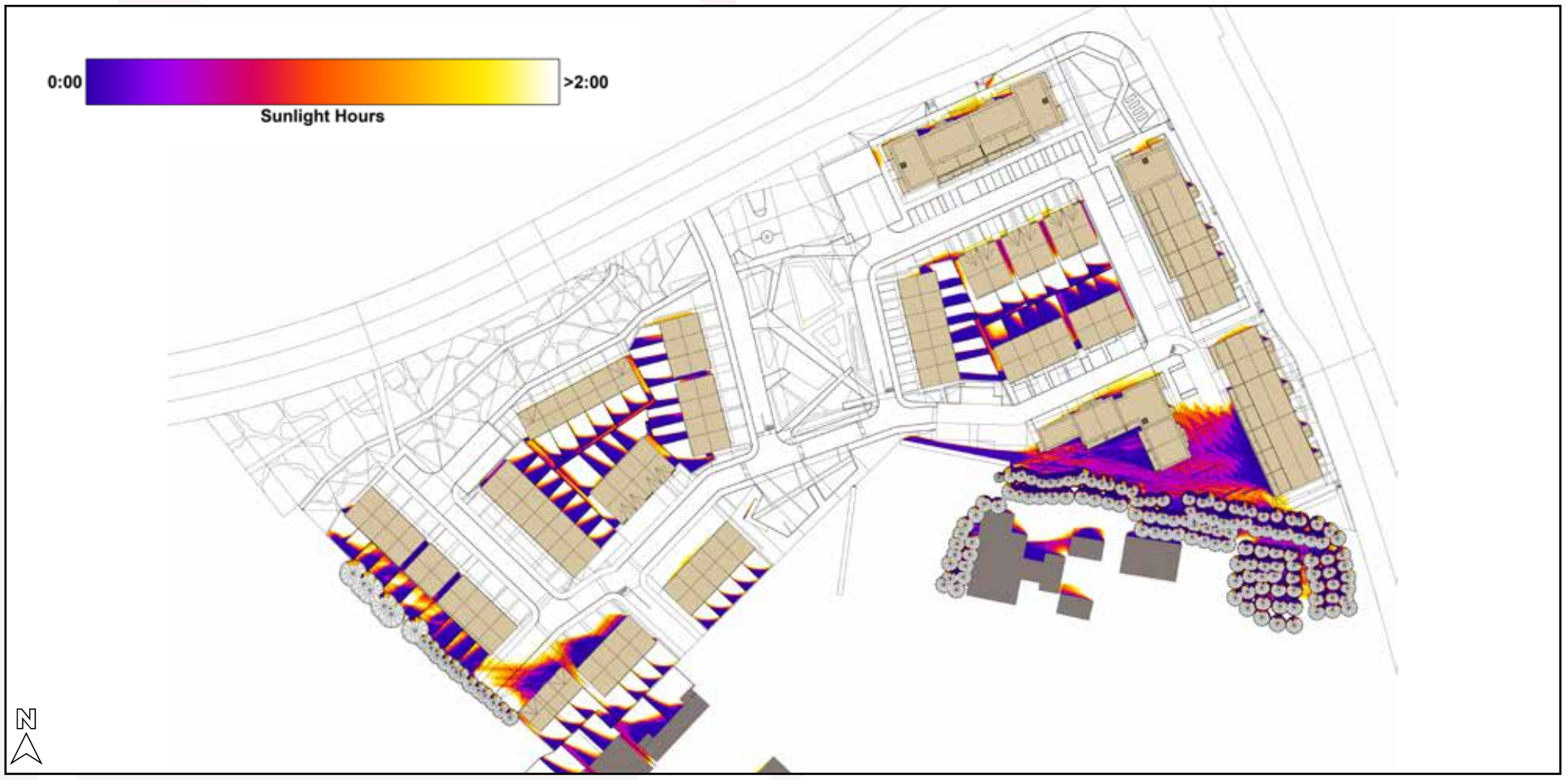


Figure E.20: Area capable of receiving 2 hours of sunlight on March 21st shown in white

E.4.2 Sun On Ground in Proposed Outdoor Amenity Areas - Supplementary 'no-tree' study

Table No. E.4.2 - SOG in Proposed Outdoor Amenity Areas Results:					
Assigned Area Number	Assessed Area	Area Capable of Receiving 2 Hours of Sunlight on March 21st	Recommended minimum	Level of Compliance with BRE Guidelines*	Meets BR 209 Criteria*
5	COS 2	99.08%	50.00%	BRE Compliant	Yes

* Section 2.2.23 of the BRE Guidelines recommends that for a garden or amenity 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 March 21st.

Figure E.21: Indication of the amenity areas that have been analysed.

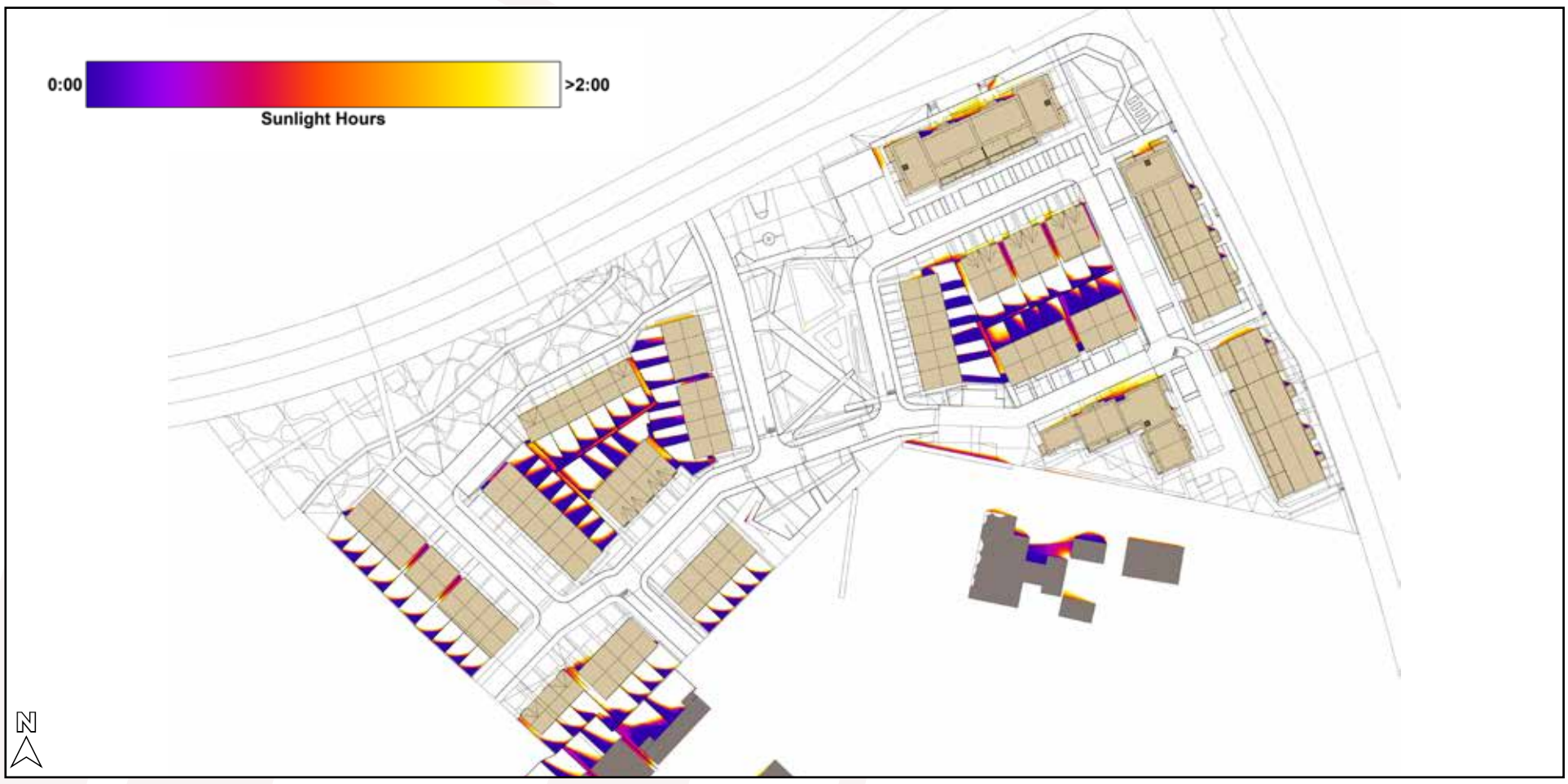


Figure E.22: Area capable of receiving 2 hours of sunlight on March 21st shown in white

F.0 Supplementary Study Results

F.1 SDA study, under the I.S. EN 17037 criteria

Below is an example of the table used to describe the supplementary study results for proposed units in the assessment of SDA under the I.S. EN 17037 criteria.

Table Example. F.1 - Supplementary Scheme Performance SDA (I.S. EN 17037 criteria)						
Unit Number	Room Description	No Trees		With Trees		Compliance with I.S. EN 17037 Criteria
		Area above 300 Lux	Area above 100 Lux	Area above 300 Lux	Area above 100 Lux	
A	**B**	**C**	**D**	**E**	**F**	**G**

A: Unit Number

This column identifies the assessed unit. All unit numbers are determined by the architect's drawings, unless otherwise stated.

B: Room Description

Room Description details which room in the unit has been assessed, e.g. bedroom, LKD, etc.

C: % of area above 300 Lux (No Trees)

I.S. EN 17037 recommends at least 50% of the working plane receives above 300 lux for at least half the daylight hours.

This column states percentage of the working plane of the assessed room that is capable of receiving more than 300 lux for at least half the daylight hours when the assessment is carried out without trees in the analytical model.

D: % of area above 100 Lux (No Trees)

I.S. EN 17037 recommends at least 95% of the working plane receives above 100 lux for at least half the daylight hours.

This column states percentage of the working plane of the assessed room that is capable of receiving more than 100 lux for at least half the daylight hours when the assessment is carried out without trees in the analytical model.

E: % of area above 300 Lux (Winter Trees)

I.S. EN 17037 recommends at least 50% of the working plane receives above 300 lux for at least half the daylight hours.

This column states percentage of the working plane of the assessed room that is capable of receiving more than 300 lux for at least half the daylight hours with the foliage of deciduous trees varied to account for summer and winter conditions, i.e. full leaf and bare branch.

F: % of area above 100 Lux (Winter Trees)

I.S. EN 17037 recommends at least 95% of the working plane receives above 100 lux for at least half the daylight hours.

This column states percentage of the working plane of the assessed room that is capable of receiving more than 100 lux for at least half the daylight hours with the foliage of deciduous trees varied to account for summer and winter conditions.

G: Compliance with I.S. EN 17037 Criteria

This column states if the assessed room achieves the recommended level of daylight as per I.S. EN 17037 with consideration to the various tree states.

If the recommended lux levels are achieved on the working plane, for half the daylight hours, both with and without trees, this column will state: *'Compliant'*.

If the recommended lux levels are not achieved on the working plane, for half the daylight hours, both with and without trees, this column will state: *'Non-compliant'*.

If the recommended lux levels are achieved on the working plane, for half the daylight hours, without trees but are not achieved with trees, this column will state: *'Trees affecting compliance'*.

Compliance rates will be stated for SDA compliance with trees in all of the above states.

It should be noted that the figures displayed in the table of results have been rounded off. A manual calculation of these figures may yield a negligible difference and should not be considered an error.

F.1.1 Supplementary SDA Results (I.S. EN 17037 criteria): Block A

Table No. F.1.1 - Supplementary SDA Results (I.S. EN 17037 criteria):						
Unit Number	Room Description	No Trees		With Trees		Compliance with I.S. EN 17037 Criteria*
		Area above 300 Lux*	Area above 100 Lux*	Area above 300 Lux*	Area above 100 Lux*	
A-01	LKD	100%	100%	100%	100%	Compliant
A-01	Bed 1	95%	100%	53%	100%	Compliant
A-02	LKD	47%	100%	37%	95%	Non-compliant
A-02	Bed 1	77%	100%	43%	100%	Trees affecting compliance
A-02	Bed 2	100%	100%	100%	100%	Compliant
A-03	LKD	47%	100%	41%	98%	Non-compliant
A-03	Bed 1	100%	100%	76%	100%	Compliant
A-03	Bed 2	100%	100%	100%	100%	Compliant
A-04	LKD	42%	99%	34%	91%	Non-compliant
A-04	Bed 1	84%	100%	59%	100%	Compliant
A-04	Bed 2	100%	100%	100%	100%	Compliant
A-05	LKD	49%	100%	40%	95%	Non-compliant
A-05	Bed 1	100%	100%	22%	100%	Trees affecting compliance
A-05	Bed 2	100%	100%	100%	100%	Compliant
A-06	LKD	100%	100%	67%	100%	Compliant
A-06	Bed 1	77%	100%	37%	100%	Trees affecting compliance
A-07	LKD	100%	100%	100%	100%	Compliant
A-07	Bed 1	98%	100%	77%	100%	Compliant
A-08	LKD	100%	100%	100%	100%	Compliant
A-08	Bed 1	100%	100%	83%	100%	Compliant
A-09	LKD	100%	100%	100%	100%	Compliant
A-09	Bed 1	100%	100%	92%	100%	Compliant
A-10	LKD	68%	100%	63%	100%	Compliant
A-10	Bed 1	98%	100%	87%	100%	Compliant
A-10	Bed 2	100%	100%	100%	100%	Compliant
A-11	LKD	69%	100%	65%	100%	Compliant
A-11	Bed 1	100%	100%	100%	100%	Compliant
A-11	Bed 2	100%	100%	100%	100%	Compliant
A-12	LKD	65%	100%	63%	100%	Compliant
A-12	Bed 1	99%	100%	93%	100%	Compliant
A-12	Bed 2	100%	100%	100%	100%	Compliant
A-13	LKD	70%	100%	66%	100%	Compliant
A-13	Bed 1	100%	100%	57%	100%	Compliant
A-13	Bed 2	100%	100%	100%	100%	Compliant
A-14	LKD	100%	100%	85%	100%	Compliant
A-14	Bed 1	100%	100%	25%	100%	Trees affecting compliance
A-15	LKD	100%	100%	100%	100%	Compliant
A-15	Bed 1	100%	100%	100%	100%	Compliant
A-16	LKD	100%	100%	100%	100%	Compliant
A-16	Bed 1	100%	100%	100%	100%	Compliant
A-17	LKD	100%	100%	100%	100%	Compliant
A-17	Bed 1	100%	100%	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 2.5.1 on page 13.
For floor plans of the assessed units please refer to section E.1 on page 23.

F.1.2 Supplementary SDA Results (I.S. EN 17037 criteria): Block A

Table No. F.1.2 - Supplementary SDA Results (I.S. EN 17037 criteria):						
Unit Number	Room Description	No Trees		With Trees		Compliance with I.S. EN 17037 Criteria*
		Area above 300 Lux*	Area above 100 Lux*	Area above 300 Lux*	Area above 100 Lux*	
A-17	Bed 2	100%	100%	100%	100%	Compliant
A-17	Bed 3	75%	100%	75%	100%	Compliant
A-18	Kitchen/Dining	100%	100%	100%	100%	Compliant
A-18	Living	99%	100%	99%	100%	Compliant
A-18	Bed 1	100%	100%	100%	100%	Compliant
A-18	Bed 2	100%	100%	100%	100%	Compliant
A-18	Bed 3	100%	100%	100%	100%	Compliant
A-19	Kitchen/Dining	100%	100%	100%	100%	Compliant
A-19	Living	100%	100%	100%	100%	Compliant
A-19	Bed 1	100%	100%	100%	100%	Compliant
A-19	Bed 2	100%	100%	100%	100%	Compliant
A-19	Bed 3	100%	100%	100%	100%	Compliant
A-20	Kitchen/Dining	100%	100%	100%	100%	Compliant
A-20	Living	99%	100%	99%	100%	Compliant
A-20	Bed 1	100%	100%	100%	100%	Compliant
A-20	Bed 2	100%	100%	100%	100%	Compliant
A-20	Bed 3	100%	100%	100%	100%	Compliant
A-21	Kitchen/Dining	100%	100%	100%	100%	Compliant
A-21	Living	100%	100%	100%	100%	Compliant
A-21	Bed 1	100%	100%	100%	100%	Compliant
A-21	Bed 2	100%	100%	100%	100%	Compliant
A-21	Bed 3	100%	100%	100%	100%	Compliant
A-22	LKD	100%	100%	100%	100%	Compliant
A-22	Bed 1	100%	100%	100%	100%	Compliant
A-22	Bed 2	100%	100%	100%	100%	Compliant
A-22	Bed 3	68%	100%	64%	100%	Compliant
A-23	LKD	100%	100%	100%	100%	Compliant
A-23	Bed 1	100%	100%	100%	100%	Compliant
A-23	Bed 2	100%	100%	100%	100%	Compliant
A-23	Bed 3	100%	100%	100%	100%	Compliant
A-24	LKD	100%	100%	100%	100%	Compliant
A-24	Bed 1	100%	100%	100%	100%	Compliant
A-24	Bed 2	100%	100%	100%	100%	Compliant
A-24	Bed 3	100%	100%	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 2.5.1 on page 13.
For floor plans of the assessed units please refer to section E.1 on page 23.

F.1.3 Supplementary SDA Results (I.S. EN 17037 criteria): Block B

Table No. F.1.3 - Supplementary SDA Results (I.S. EN 17037 criteria):						
Unit Number	Room Description	No Trees		With Trees		Compliance with I.S. EN 17037 Criteria*
		Area above 300 Lux*	Area above 100 Lux*	Area above 300 Lux*	Area above 100 Lux*	
B-01	LKD	31%	79%	26%	60%	Non-compliant
B-01	Bed 1	82%	100%	60%	100%	Compliant
B-01	Bed 2	96%	100%	67%	100%	Compliant
B-02	LKD	35%	90%	30%	76%	Non-compliant
B-02	Bed 1	88%	100%	68%	100%	Compliant
B-02	Bed 2	92%	100%	38%	100%	Trees affecting compliance
B-03	LKD	37%	92%	33%	86%	Non-compliant
B-03	Bed 1	78%	100%	66%	100%	Compliant
B-03	Bed 2	100%	100%	27%	100%	Trees affecting compliance
B-04	LKD	35%	93%	29%	80%	Non-compliant
B-04	Bed 1	76%	100%	66%	100%	Compliant
B-04	Bed 2	100%	100%	32%	100%	Trees affecting compliance
B-05	LKD	33%	87%	29%	66%	Non-compliant
B-05	Bed 1	78%	100%	64%	100%	Compliant
B-05	Bed 2	100%	100%	87%	100%	Compliant
B-06	LKD	98%	100%	87%	100%	Compliant
B-06	Bed 1	58%	100%	47%	100%	Trees affecting compliance
B-07	LKD	100%	100%	100%	100%	Compliant
B-07	Bed 1	100%	100%	77%	100%	Compliant
B-08	Kitchen/Dining	100%	100%	98%	100%	Compliant
B-08	Living	100%	100%	100%	100%	Compliant
B-08	Bed 1	100%	100%	100%	100%	Compliant
B-08	Bed 2	100%	100%	100%	100%	Compliant
B-08	Bed 3	100%	100%	100%	100%	Compliant
B-09	Kitchen/Dining	100%	100%	96%	100%	Compliant
B-09	Living	100%	100%	100%	100%	Compliant
B-09	Bed 1	100%	100%	100%	100%	Compliant
B-09	Bed 2	100%	100%	100%	100%	Compliant
B-09	Bed 3	100%	100%	100%	100%	Compliant
B-10	Kitchen/Dining	98%	100%	96%	100%	Compliant
B-10	Living	100%	100%	100%	100%	Compliant
B-10	Bed 1	100%	100%	100%	100%	Compliant
B-10	Bed 2	100%	100%	100%	100%	Compliant
B-10	Bed 3	100%	100%	100%	100%	Compliant
B-11	Kitchen/Dining	100%	100%	97%	100%	Compliant
B-11	Living	100%	100%	100%	100%	Compliant
B-11	Bed 1	100%	100%	100%	100%	Compliant
B-11	Bed 2	100%	100%	100%	100%	Compliant
B-11	Bed 3	100%	100%	100%	100%	Compliant
B-12	Kitchen/Dining	100%	100%	96%	100%	Compliant
B-12	Living	100%	100%	100%	100%	Compliant
B-12	Bed 1	100%	100%	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 2.5.1 on page 13.
For floor plans of the assessed units please refer to section E.1 on page 23.

F.1.4 Supplementary SDA Results (I.S. EN 17037 criteria): Block B

Table No. F.1.4 - Supplementary SDA Results (I.S. EN 17037 criteria):						
Unit Number	Room Description	No Trees		With Trees		Compliance with I.S. EN 17037 Criteria*
		Area above 300 Lux*	Area above 100 Lux*	Area above 300 Lux*	Area above 100 Lux*	
B-12	Bed 2	100%	100%	100%	100%	Compliant
B-12	Bed 3	100%	100%	100%	100%	Compliant
B-13	Kitchen/Dining	96%	100%	94%	100%	Compliant
B-13	Living	100%	100%	100%	100%	Compliant
B-13	Bed 1	100%	100%	100%	100%	Compliant
B-13	Bed 2	100%	100%	100%	100%	Compliant
B-13	Bed 3	100%	100%	100%	100%	Compliant
B-14	LKD	100%	100%	100%	100%	Compliant
B-14	Bed 1	100%	100%	92%	100%	Compliant
B-15	LKD	100%	100%	100%	100%	Compliant
B-15	Bed 1	100%	100%	100%	100%	Compliant
B-16	LKD	100%	100%	100%	100%	Compliant
B-16	Bed 1	100%	100%	100%	100%	Compliant
B-16	Bed 2	100%	100%	100%	100%	Compliant
B-16	Bed 3	100%	100%	100%	100%	Compliant
B-17	LKD	100%	100%	100%	100%	Compliant
B-17	Bed 1	100%	100%	100%	100%	Compliant
B-17	Bed 2	100%	100%	100%	100%	Compliant
B-17	Bed 3	89%	100%	89%	100%	Compliant

F.1.5 Supplementary SDA Results (I.S. EN 17037 criteria): Block C

Table No. F.1.5 - Supplementary SDA Results (I.S. EN 17037 criteria):						
Unit Number	Room Description	No Trees		With Trees		Compliance with I.S. EN 17037 Criteria*
		Area above 300 Lux*	Area above 100 Lux*	Area above 300 Lux*	Area above 100 Lux*	
C-01	LKD	39%	98%	6%	25%	Non-compliant
C-01	Bed 1	100%	100%	0%	48%	Trees affecting compliance
C-01	Bed 2	100%	100%	97%	100%	Compliant
C-02	LKD	41%	99%	9%	31%	Non-compliant
C-02	Bed 1	100%	100%	10%	68%	Trees affecting compliance
C-02	Bed 2	91%	100%	88%	100%	Compliant
C-03	LKD	40%	96%	13%	37%	Non-compliant
C-03	Bed 1	96%	100%	10%	62%	Trees affecting compliance
C-03	Bed 2	100%	100%	100%	100%	Compliant
C-04	LKD	33%	93%	15%	40%	Non-compliant
C-04	Bed 1	76%	100%	40%	100%	Trees affecting compliance
C-04	Bed 2	100%	100%	100%	100%	Compliant
C-05	LKD	31%	76%	14%	43%	Non-compliant
C-05	Bed 1	70%	100%	34%	100%	Trees affecting compliance
C-05	Bed 2	95%	100%	56%	100%	Compliant
C-06	LKD	29%	71%	23%	56%	Non-compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 2.5.1 on page 13.
For floor plans of the assessed units please refer to section E.1 on page 23.

F.1.6 Supplementary SDA Results (I.S. EN 17037 criteria): Block C

Table No. F.1.6 - Supplementary SDA Results (I.S. EN 17037 criteria):						
Unit Number	Room Description	No Trees		With Trees		Compliance with I.S. EN 17037 Criteria*
		Area above 300 Lux*	Area above 100 Lux*	Area above 300 Lux*	Area above 100 Lux*	
C-06	Bed 1	62%	100%	52%	100%	Compliant
C-06	Bed 2	97%	100%	97%	100%	Compliant
C-07	Kitchen/Dining	100%	100%	31%	100%	Trees affecting compliance
C-07	Living	100%	100%	100%	100%	Compliant
C-07	Bed 1	100%	100%	42%	100%	Trees affecting compliance
C-07	Bed 2	100%	100%	100%	100%	Compliant
C-07	Bed 3	100%	100%	97%	100%	Compliant
C-08	Kitchen/Dining	100%	100%	40%	100%	Trees affecting compliance
C-08	Living	100%	100%	100%	100%	Compliant
C-08	Bed 1	100%	100%	57%	100%	Compliant
C-08	Bed 2	100%	100%	100%	100%	Compliant
C-08	Bed 3	100%	100%	100%	100%	Compliant
C-09	Kitchen/Dining	100%	100%	48%	100%	Trees affecting compliance
C-09	Living	100%	100%	100%	100%	Compliant
C-09	Bed 1	100%	100%	79%	100%	Compliant
C-09	Bed 2	100%	100%	100%	100%	Compliant
C-09	Bed 3	100%	100%	100%	100%	Compliant
C-10	Kitchen/Dining	96%	100%	54%	100%	Compliant
C-10	Living	100%	100%	100%	100%	Compliant
C-10	Bed 1	100%	100%	91%	100%	Compliant
C-10	Bed 2	100%	100%	100%	100%	Compliant
C-10	Bed 3	100%	100%	100%	100%	Compliant
C-11	Kitchen/Dining	96%	100%	66%	100%	Compliant
C-11	Living	100%	100%	100%	100%	Compliant
C-11	Bed 1	100%	100%	100%	100%	Compliant
C-11	Bed 2	100%	100%	100%	100%	Compliant
C-11	Bed 3	100%	100%	100%	100%	Compliant
C-12	Kitchen/Dining	86%	100%	68%	100%	Compliant
C-12	Living	100%	100%	100%	100%	Compliant
C-12	Bed 1	100%	100%	100%	100%	Compliant
C-12	Bed 2	100%	100%	100%	100%	Compliant
C-12	Bed 3	100%	100%	100%	100%	Compliant
C-13	Kitchen/Dining	100%	100%	97%	100%	Compliant
C-13	Living	100%	100%	100%	100%	Compliant
C-13	Bed 1	100%	100%	100%	100%	Compliant
C-13	Bed 2	100%	100%	100%	100%	Compliant
C-13	Bed 3	100%	100%	100%	100%	Compliant
* For information regarding the criteria under the various guidelines including target Lux please refer to section 2.5.1 on page 13. For floor plans of the assessed units please refer to section E.1 on page 23.						

F.1.7 Supplementary SDA Results (I.S. EN 17037 criteria): Block D

Table No. F.1.7 - Supplementary SDA Results (I.S. EN 17037 criteria):						
Unit Number	Room Description	No Trees		With Trees		Compliance with I.S. EN 17037 Criteria*
		Area above 300 Lux*	Area above 100 Lux*	Area above 300 Lux*	Area above 100 Lux*	
D-01	LKD	100%	100%	0%	34%	Trees affecting compliance
D-01	Bed 1	63%	100%	17%	100%	Trees affecting compliance
D-02	LKD	100%	100%	0%	66%	Trees affecting compliance
D-02	Bed 1	63%	100%	44%	100%	Trees affecting compliance
D-03	LKD	68%	100%	4%	59%	Trees affecting compliance
D-03	Bed 1	52%	100%	22%	100%	Trees affecting compliance
D-04	LKD	100%	100%	84%	100%	Compliant
D-04	Bed 1	79%	100%	54%	100%	Compliant
D-04	Bed 2	100%	100%	96%	100%	Compliant
D-05	LKD	99%	100%	1%	75%	Trees affecting compliance
D-05	Bed 1	85%	100%	19%	100%	Trees affecting compliance
D-06	LKD	100%	100%	1%	66%	Trees affecting compliance
D-06	Bed 1	100%	100%	19%	100%	Trees affecting compliance
D-07	LKD	100%	100%	100%	100%	Compliant
D-07	Bed 1	100%	100%	15%	98%	Trees affecting compliance
D-08	Kitchen/Dining	60%	100%	28%	100%	Trees affecting compliance
D-08	Living	100%	100%	28%	100%	Trees affecting compliance
D-08	Bed 1	100%	100%	100%	100%	Compliant
D-08	Bed 2	100%	100%	24%	100%	Trees affecting compliance
D-08	Bed 3	100%	100%	7%	68%	Trees affecting compliance
D-09	Kitchen/Dining	59%	100%	50%	100%	Compliant
D-09	Living	100%	100%	33%	100%	Trees affecting compliance
D-09	Bed 1	100%	100%	100%	100%	Compliant
D-09	Bed 2	100%	100%	53%	100%	Compliant
D-09	Bed 3	100%	100%	14%	75%	Trees affecting compliance
D-10	LKD	100%	100%	20%	100%	Trees affecting compliance
D-10	Bed 1	87%	100%	56%	100%	Compliant
D-11	LKD	100%	100%	100%	100%	Compliant
D-11	Bed 1	100%	100%	95%	100%	Compliant
D-11	Bed 2	100%	100%	100%	100%	Compliant
D-12	Kitchen/Dining	67%	100%	27%	100%	Trees affecting compliance
D-12	Living	100%	100%	39%	100%	Trees affecting compliance
D-12	Bed 1	100%	100%	100%	100%	Compliant
D-12	Bed 2	100%	100%	63%	100%	Compliant
D-12	Bed 3	100%	100%	25%	96%	Trees affecting compliance
D-13	Kitchen/Dining	71%	100%	26%	100%	Trees affecting compliance
D-13	Living	100%	100%	53%	100%	Compliant
D-13	Bed 1	100%	100%	100%	100%	Compliant
D-13	Bed 2	100%	100%	67%	100%	Compliant
D-13	Bed 3	100%	100%	11%	82%	Trees affecting compliance

* For information regarding the criteria under the various guidelines including target Lux please refer to section 2.5.1 on page 13.
For floor plans of the assessed units please refer to section E.1 on page 23.

F.1.8 Supplementary SDA Results (I.S. EN 17037 criteria): Block D

Table No. F.1.8 - Supplementary SDA Results (I.S. EN 17037 criteria):						
Unit Number	Room Description	No Trees		With Trees		Compliance with I.S. EN 17037 Criteria*
		Area above 300 Lux*	Area above 100 Lux*	Area above 300 Lux*	Area above 100 Lux*	
D-14	LKD	100%	100%	100%	100%	Compliant
D-14	Bed 1	100%	100%	28%	100%	Trees affecting compliance
D-15	LKD	100%	100%	81%	100%	Compliant
D-15	Bed 1	100%	100%	100%	100%	Compliant
D-16	LKD	100%	100%	100%	100%	Compliant
D-16	Bed 1	100%	100%	100%	100%	Compliant
D-16	Bed 2	100%	100%	100%	100%	Compliant

* For information regarding the criteria under the various guidelines including target Lux please refer to section 2.5.1 on page 13.
For floor plans of the assessed units please refer to section E.1 on page 23.

F.2 Supplementary No Sky Line (NSL) assessment in proposed units.

Below is an example of the table used to describe the supplementary assessment results for 'No Sky Line' in proposed units.

Table Example. F.2 - Supplementary Scheme Performance NSL			
Unit Number	Room Description	No Sky Line (NSL)	
		% of room where the sky is visible from the working plane	Above 80%
A	**B**	**C**	**D**

A: Unit Number

This column identifies the assessed unit. All unit numbers are determined by the architect's drawings, unless otherwise stated.

B: Room Description

Room Description details which room in the unit has been assessed, e.g. bedroom, LKD, etc.

C: % of room where the sky is visible from the working plane

This column states the percentage of the room from which there is a direct line of sight to the sky when assessed at the working plane height, which is 850mm above the finished floor level in residential rooms or 700mm above the finished floor level in offices or classrooms.

D: Above 80%

Whilst the BRE Guidelines only provide recommendations for NSL in the context of an impact analysis, section 2.2.10 states that "Supplementary electric lighting will be needed if a significant part of the working plane (20% of the room or more) lies beyond the no sky line."

If this column states: *'Yes'*, it signifies that the sky will be visible from more than 80% of the working plane.

If this column states: *'No'*, it signifies that the sky will be visible from less than 80% of the working plane and supplementary electric lighting may be required.

F.2.1 Supplementary NSL Results: Block A

Table No. F.2.1 - Supplementary NSL Results:			
Unit Number	Room Description	No Sky Line (NSL)	
		% of room where the sky is visible from the working plane	Above 80%*
A-01	LKD	100%	Yes
A-01	Bed 1	99%	Yes
A-02	LKD	82%	Yes
A-02	Bed 1	96%	Yes
A-02	Bed 2	99%	Yes
A-03	LKD	79%	No
A-03	Bed 1	98%	Yes
A-03	Bed 2	99%	Yes
A-04	LKD	74%	No
A-04	Bed 1	96%	Yes
A-04	Bed 2	99%	Yes
A-05	LKD	83%	Yes
A-05	Bed 1	96%	Yes
A-05	Bed 2	99%	Yes
A-06	LKD	100%	Yes
A-06	Bed 1	99%	Yes
A-07	LKD	100%	Yes
A-07	Bed 1	98%	Yes
A-08	LKD	100%	Yes
A-08	Bed 1	99%	Yes
A-09	LKD	100%	Yes
A-09	Bed 1	99%	Yes
A-10	LKD	99%	Yes
A-10	Bed 1	96%	Yes
A-10	Bed 2	99%	Yes
A-11	LKD	99%	Yes
A-11	Bed 1	98%	Yes
A-11	Bed 2	99%	Yes
A-12	LKD	99%	Yes
A-12	Bed 1	97%	Yes
A-12	Bed 2	99%	Yes
A-13	LKD	99%	Yes
A-13	Bed 1	96%	Yes
A-13	Bed 2	99%	Yes
A-14	LKD	100%	Yes
A-14	Bed 1	99%	Yes
A-15	LKD	100%	Yes
A-15	Bed 1	99%	Yes
A-16	LKD	100%	Yes
A-16	Bed 1	99%	Yes

* Whilst the BRE Guidelines do not provide target values for NSL in a proposed development, section 2.2.10 states that “Supplementary electric lighting will be needed if a significant part of the working plane (20% of the room or more) lies beyond the no sky line.”

For floor plans of the assessed units please refer to section E.1 on page 23.

F.2.2 Supplementary NSL Results: Block A

Table No. F.2.2 - Supplementary NSL Results:			
Unit Number	Room Description	No Sky Line (NSL)	
		% of room where the sky is visible from the working plane	Above 80%*
A-17	LKD	100%	Yes
A-17	Bed 1	99%	Yes
A-17	Bed 2	100%	Yes
A-17	Bed 3	96%	Yes
A-18	Kitchen/Dining	99%	Yes
A-18	Living	97%	Yes
A-18	Bed 1	93%	Yes
A-18	Bed 2	96%	Yes
A-18	Bed 3	95%	Yes
A-19	Kitchen/Dining	99%	Yes
A-19	Living	98%	Yes
A-19	Bed 1	98%	Yes
A-19	Bed 2	98%	Yes
A-19	Bed 3	95%	Yes
A-20	Kitchen/Dining	99%	Yes
A-20	Living	97%	Yes
A-20	Bed 1	98%	Yes
A-20	Bed 2	96%	Yes
A-20	Bed 3	95%	Yes
A-21	Kitchen/Dining	99%	Yes
A-21	Living	97%	Yes
A-21	Bed 1	97%	Yes
A-21	Bed 2	98%	Yes
A-21	Bed 3	95%	Yes
A-22	LKD	100%	Yes
A-22	Bed 1	99%	Yes
A-22	Bed 2	100%	Yes
A-22	Bed 3	95%	Yes
A-23	LKD	100%	Yes
A-23	Bed 1	99%	Yes
A-23	Bed 2	100%	Yes
A-23	Bed 3	96%	Yes
A-24	LKD	100%	Yes
A-24	Bed 1	99%	Yes
A-24	Bed 2	100%	Yes
A-24	Bed 3	95%	Yes

* Whilst the BRE Guidelines do not provide target values for NSL in a proposed development, section 2.2.10 states that “Supplementary electric lighting will be needed if a significant part of the working plane (20% of the room or more) lies beyond the no sky line.”

For floor plans of the assessed units please refer to section E.1 on page 23.

F.2.3 Supplementary NSL Results: Block B

Table No. F.2.3 - Supplementary NSL Results:			
Unit Number	Room Description	No Sky Line (NSL)	
		% of room where the sky is visible from the working plane	Above 80%*
B-01	LKD	94%	Yes
B-01	Bed 1	98%	Yes
B-01	Bed 2	98%	Yes
B-02	LKD	81%	Yes
B-02	Bed 1	99%	Yes
B-02	Bed 2	97%	Yes
B-03	LKD	92%	Yes
B-03	Bed 1	99%	Yes
B-03	Bed 2	98%	Yes
B-04	LKD	93%	Yes
B-04	Bed 1	98%	Yes
B-04	Bed 2	98%	Yes
B-05	LKD	79%	No
B-05	Bed 1	99%	Yes
B-05	Bed 2	98%	Yes
B-06	LKD	99%	Yes
B-06	Bed 1	91%	Yes
B-07	LKD	100%	Yes
B-07	Bed 1	99%	Yes
B-08	Kitchen/Dining	99%	Yes
B-08	Living	99%	Yes
B-08	Bed 1	100%	Yes
B-08	Bed 2	100%	Yes
B-08	Bed 3	99%	Yes
B-09	Kitchen/Dining	99%	Yes
B-09	Living	97%	Yes
B-09	Bed 1	99%	Yes
B-09	Bed 2	96%	Yes
B-09	Bed 3	99%	Yes
B-10	Kitchen/Dining	98%	Yes
B-10	Living	97%	Yes
B-10	Bed 1	99%	Yes
B-10	Bed 2	96%	Yes
B-10	Bed 3	99%	Yes
B-11	Kitchen/Dining	99%	Yes
B-11	Living	97%	Yes
B-11	Bed 1	99%	Yes
B-11	Bed 2	96%	Yes
B-11	Bed 3	99%	Yes
B-12	Kitchen/Dining	98%	Yes
B-12	Living	97%	Yes

* Whilst the BRE Guidelines do not provide target values for NSL in a proposed development, section 2.2.10 states that “Supplementary electric lighting will be needed if a significant part of the working plane (20% of the room or more) lies beyond the no sky line.”

For floor plans of the assessed units please refer to section E.1 on page 23.

F.2.4 Supplementary NSL Results: Block B

Table No. F.2.4 - Supplementary NSL Results:			
Unit Number	Room Description	No Sky Line (NSL)	
		% of room where the sky is visible from the working plane	Above 80%*
B-12	Bed 1	99%	Yes
B-12	Bed 2	96%	Yes
B-12	Bed 3	98%	Yes
B-13	Kitchen/Dining	96%	Yes
B-13	Living	97%	Yes
B-13	Bed 1	97%	Yes
B-13	Bed 2	96%	Yes
B-13	Bed 3	99%	Yes
B-14	LKD	100%	Yes
B-14	Bed 1	96%	Yes
B-15	LKD	100%	Yes
B-15	Bed 1	99%	Yes
B-16	LKD	100%	Yes
B-16	Bed 1	99%	Yes
B-16	Bed 2	100%	Yes
B-16	Bed 3	95%	Yes
B-17	LKD	100%	Yes
B-17	Bed 1	99%	Yes
B-17	Bed 2	100%	Yes
B-17	Bed 3	95%	Yes

F.2.5 Supplementary NSL Results: Block C

Table No. F.2.5 - Supplementary NSL Results:			
Unit Number	Room Description	No Sky Line (NSL)	
		% of room where the sky is visible from the working plane	Above 80%*
C-01	LKD	96%	Yes
C-01	Bed 1	99%	Yes
C-01	Bed 2	98%	Yes
C-02	LKD	97%	Yes
C-02	Bed 1	99%	Yes
C-02	Bed 2	96%	Yes
C-03	LKD	90%	Yes
C-03	Bed 1	99%	Yes
C-03	Bed 2	98%	Yes
C-04	LKD	90%	Yes
C-04	Bed 1	89%	Yes
C-04	Bed 2	98%	Yes
C-05	LKD	80%	No
C-05	Bed 1	98%	Yes
C-05	Bed 2	98%	Yes

* Whilst the BRE Guidelines do not provide target values for NSL in a proposed development, section 2.2.10 states that “Supplementary electric lighting will be needed if a significant part of the working plane (20% of the room or more) lies beyond the no sky line.”

For floor plans of the assessed units please refer to section E.1 on page 23.

F.2.6 Supplementary NSL Results: Block C

Table No. F.2.6 - Supplementary NSL Results:			
Unit Number	Room Description	No Sky Line (NSL)	
		% of room where the sky is visible from the working plane	Above 80%*
C-06	LKD	96%	Yes
C-06	Bed 1	98%	Yes
C-06	Bed 2	98%	Yes
C-07	Kitchen/Dining	99%	Yes
C-07	Living	100%	Yes
C-07	Bed 1	100%	Yes
C-07	Bed 2	100%	Yes
C-07	Bed 3	99%	Yes
C-08	Kitchen/Dining	99%	Yes
C-08	Living	97%	Yes
C-08	Bed 1	99%	Yes
C-08	Bed 2	96%	Yes
C-08	Bed 3	99%	Yes
C-09	Kitchen/Dining	98%	Yes
C-09	Living	97%	Yes
C-09	Bed 1	99%	Yes
C-09	Bed 2	96%	Yes
C-09	Bed 3	99%	Yes
C-10	Kitchen/Dining	98%	Yes
C-10	Living	97%	Yes
C-10	Bed 1	99%	Yes
C-10	Bed 2	96%	Yes
C-10	Bed 3	98%	Yes
C-11	Kitchen/Dining	98%	Yes
C-11	Living	97%	Yes
C-11	Bed 1	99%	Yes
C-11	Bed 2	96%	Yes
C-11	Bed 3	99%	Yes
C-12	Kitchen/Dining	98%	Yes
C-12	Living	97%	Yes
C-12	Bed 1	99%	Yes
C-12	Bed 2	96%	Yes
C-12	Bed 3	99%	Yes
C-13	Kitchen/Dining	99%	Yes
C-13	Living	98%	Yes
C-13	Bed 1	99%	Yes
C-13	Bed 2	100%	Yes
C-13	Bed 3	99%	Yes

* Whilst the BRE Guidelines do not provide target values for NSL in a proposed development, section 2.2.10 states that “Supplementary electric lighting will be needed if a significant part of the working plane (20% of the room or more) lies beyond the no sky line.”

For floor plans of the assessed units please refer to section E.1 on page 23.

F.2.7 Supplementary NSL Results: Block D

Table No. F.2.7 - Supplementary NSL Results:			
Unit Number	Room Description	No Sky Line (NSL)	
		% of room where the sky is visible from the working plane	Above 80%*
D-01	LKD	99%	Yes
D-01	Bed 1	98%	Yes
D-02	LKD	98%	Yes
D-02	Bed 1	98%	Yes
D-03	LKD	98%	Yes
D-03	Bed 1	99%	Yes
D-04	LKD	98%	Yes
D-04	Bed 1	99%	Yes
D-04	Bed 2	100%	Yes
D-05	LKD	97%	Yes
D-05	Bed 1	98%	Yes
D-06	LKD	99%	Yes
D-06	Bed 1	98%	Yes
D-07	LKD	100%	Yes
D-07	Bed 1	99%	Yes
D-08	Kitchen/Dining	99%	Yes
D-08	Living	99%	Yes
D-08	Bed 1	98%	Yes
D-08	Bed 2	99%	Yes
D-08	Bed 3	100%	Yes
D-09	Kitchen/Dining	99%	Yes
D-09	Living	100%	Yes
D-09	Bed 1	98%	Yes
D-09	Bed 2	97%	Yes
D-09	Bed 3	98%	Yes
D-10	LKD	100%	Yes
D-10	Bed 1	98%	Yes
D-11	LKD	100%	Yes
D-11	Bed 1	99%	Yes
D-11	Bed 2	100%	Yes
D-12	Kitchen/Dining	99%	Yes
D-12	Living	100%	Yes
D-12	Bed 1	98%	Yes
D-12	Bed 2	97%	Yes
D-12	Bed 3	98%	Yes
D-13	Kitchen/Dining	99%	Yes
D-13	Living	100%	Yes
D-13	Bed 1	98%	Yes
D-13	Bed 2	100%	Yes
D-13	Bed 3	100%	Yes

* Whilst the BRE Guidelines do not provide target values for NSL in a proposed development, section 2.2.10 states that “Supplementary electric lighting will be needed if a significant part of the working plane (20% of the room or more) lies beyond the no sky line.”

For floor plans of the assessed units please refer to section E.1 on page 23.

F.2.8 Supplementary NSL Results: Block D

Table No. F.2.8 - Supplementary NSL Results:			
Unit Number	Room Description	No Sky Line (NSL)	
		% of room where the sky is visible from the working plane	Above 80%*
D-14	LKD	100%	Yes
D-14	Bed 1	100%	Yes
D-15	LKD	100%	Yes
D-15	Bed 1	99%	Yes
D-16	LKD	100%	Yes
D-16	Bed 1	99%	Yes
D-16	Bed 2	100%	Yes

* Whilst the BRE Guidelines do not provide target values for NSL in a proposed development, section 2.2.10 states that "Supplementary electric lighting will be needed if a significant part of the working plane (20% of the room or more) lies beyond the no sky line."

For floor plans of the assessed units please refer to section E.1 on page 23.

G.0
G.1

Shadow Studies
Shadow Study 21 March

March 21st
Sunrise 6:32 | Sunset 18:32

Project: Glenamuck North – Southern Site

Applicant: Durkan Glenamuck Developments Limited

Proposed

3D DESIGN BUREAU

N

March 21st 7:00

March 21st 8:00

March 21st 9:00

March 21st 10:00

March 21st 11:00

March 21st 12:00

March 21st 13:00

March 21st 14:00

N

March 21st 15:00

March 21st 16:00

March 21st 17:00

March 21st 18:00

	Project: Glenamuck North – Southern Site		**Proposed**
	Applicant: Durkan Glenamuck Developments Limited		3D DESIGN BUREAU

G.2

Shadow Study 21 June

June 21st
Sunrise 5:04 | Sunset 21:49

Project: Glenamuck North – Southern Site

Applicant: Durkan Glenamuck Developments Limited

Proposed

3D DESIGN BUREAU

N

June 21st 6:00

June 21st 7:00

June 21st 8:00

June 21st 9:00

June 21st 10:00

June 21st 11:00

June 21st 12:00

June 21st 13:00

June 21st
Sunrise 5:04 | Sunset 21:49

Project: Glenamuck North – Southern Site

Applicant: Durkan Glenamuck Developments Limited

3D DESIGN BUREAU

Proposed

N

June 21st 20:00

June 21st 18:00

June 21st 16:00

June 21st 14:00

June 21st 21:00

June 21st 19:00

June 21st 17:00

June 21st 15:00

G.3

Shadow Study 21 December

December 21st
Sunrise 8:45 | Sunset 16:00

Project: Glenamuck North – Southern Site

Applicant: Durkan Glenamuck Developments Limited

Proposed

3D DESIGN BUREAU

N

December 21st 9:00

December 21st 10:00

December 21st 11:00

December 21st 12:00

December 21st 13:00

December 21st 14:00

December 21st 15:00

December 21st 16:00

H.0 Glossary

H.1 Terms and Definitions

Below is a list of daylight and sunlight terminology that may be used in this report depending on the assessments carried out.

Skylight
Non directional ambient light cast from the sky and environment.

Sunlight
Direct parallel rays of light emitted from the sun.

Daylight
Combined skylight and sunlight.

Overcast sky model
A completely overcast sky model, used for daylight calculation.

Cloudless sky model
A completely cloudless sky model, used for sunlight exposure calculation.

Model State
The model state is a term used to describe the configuration of the digital model used to run analysis. Model states will typically reflect a baseline state and a proposed or cumulative state. For a definition of the model states used in the analysis carried out in this report, please refer to “Preparing the analytical model” on page 7.

Vertical Sky Component (VSC)
Ratio of that part of illuminance, at a point on a given vertical plane, that is received directly from an overcast sky model, to illuminance on a horizontal plane due to an unobstructed hemisphere of this sky. Usually the ‘given vertical plane’ is the outside of a window wall. The VSC does not include reflected light, either from the ground or from other buildings.

Annual Probable Sunlight Hours (APSH) / Winter Probable Sunlight Hours (WPSH)
Annual Probable Sunlight Hours (APSH) and Winter Probable Sunlight Hours (WPSH) are a measure of sunlight that a given window may expect over a one-year period (1 Jan - 31 Dec), or the winter period (21 Sep - 21 Mar) respectively.

North facing windows may receive sunlight on only a handful of occasions in a year, and windows facing eastwards or westwards will receive sunlight only at certain times of the day. Taking this into account, section 3.2.9 of the BRE Guidelines suggest that windows with an orientation within 90 degrees of due north need not be assessed.

Sun On Ground (SOG)
Assessment of what portion of a garden or amenity space is capable of receiving 2 hours or more of direct sunlight on March 21st.

Sunlight Exposure (SE)
The number of hours of direct sunlight a room can expect to receive on a given date between February 1st and March 21st at a determined point on the windows.

Spatial Daylight Autonomy (SDA)
Spatial Daylight Autonomy assesses whether a space receives sufficient daylight on a working plane during standard operating hours on an annual basis. For compliance, the target value is achieved across 50% of the working plane for half of the occupied period.

No Sky Line (NSL)
The no sky line divides points on the working plane which can and cannot see the sky.

Working plane
Horizontal, vertical or inclined plane in which a visual task lies. Normally the working plane may be taken to be horizontal, 850 mm above the floor in houses and factories, 700 mm above the floor in offices. The plane is offset 300mm from the room boundaries under BR 209 criteria, and 500mm from the room boundaries under I.S. EN 17037 criteria.

LKD
Living / Kitchen / Dining room.

BRE Target Value
When assessing the effect a proposed development would have on a neighbouring property, a target value will be applied. This applied target value is generated as per the criteria set out for each study in the BRE Guidelines.

Alternative Target Value
It could be appropriate to use alternative target values when conducting assessment of effect on existing properties. If such instances occur the rationale will be clearly explained and the instances where the alternative target values have been applied will be clearly identified.

Level of BRE Compliance
Each table in the study that has a column identified as “Level of BRE Compliance”, identifies how an assessed instance performs in relation to the appropriate target value. If the instance is in compliance with the recommendations as made in the BRE Guidelines the value will be expressed as “BRE Compliant”. If the instance does not meet the criteria as set out in the BRE Guidelines a percentage will be expressed to determine the level of compliance with the recommendation. This value determines the definition of effect.

LUX
Lux is a standardised unit of measurement of light level intensity. A measurement of 1 lux is equal to the illumination of a one metre square surface that is one metre away from a single candle.

H.2 Definition of Levels of Sunlight Exposure

For interiors, access to sunlight can be quantified. BR 209 recommends that a space should receive a minimum of 1.5 hours of direct sunlight on a selected date between 1 February and 21 March with cloudless conditions. It is suggested that 21 March (equinox) be used. The medium level of recommendation is three hours and the high level of recommendation four hours. For dwellings, at least one habitable room, preferably a main living room, should meet at least the minimum criterion.

Level of Sunlight Exposure:

The level of sunlight exposure will be stated for each assessed room in the tables under section “E.3 Sunlight Exposure (SE) in Proposed Units” on page 38. Below is a list of the terms used to categorise the levels of sunlight exposure:

Below Minimum
Sunlight exposure will be categorised as ‘below minimum’ if the potential sunlight for the assessed room is less than 1.5 hours on March 21st. Note: the recommendation is that a room within a proposed unit is capable of receiving 1.5 hours of direct sunlight on March 21st. If an individual room of a proposed unit does not achieve this recommendation, it does not mean that the unit is non-compliant.

Minimum
A ‘minimum’ level of sunlight exposure will be stated if the potential sunlight for the assessed room is between 1.5 hours and 3 hours on March 21st.

Medium
A ‘medium’ level of sunlight exposure will be stated if the potential sunlight for the assessed room is between 3 hours and 4 hours on March 21st.

High
A ‘high’ level of sunlight exposure will be stated if the potential sunlight for the assessed room is greater than 4 hours on March 21st.

Unit Compliance:

In addition to the level of sunlight exposure expressed for each room, compliance will be stated on a unit-by-unit basis. A proposed unit is considered to be compliant if any habitable room within the unit is capable of receiving at least 1.5 hours of sunlight on the assessment date.

Non-Compliant
If no habitable rooms within a proposed unit can receive 1.5 hours of sunlight on the assessment date, the unit will be categorised as ‘Non-Compliant’.

Compliant
If at least one habitable room within a proposed unit can receive 1.5 hours or more of sunlight on the assessment date, the unit will be categorised as ‘Compliant’.

Typically unit compliance will be stated for the best performing room per unit only, with lesser performing rooms indicated with a dash (-). However, if more than one room in a given unit is considered to be the best performing room (i.e. they have the same number of SE hours on March 21st), then the unit compliance column will be populated in the first instance only.

I.0 Guidelines / Standards

Whilst the subject of this report is related to scheme performance only, this section refers to guidelines and standards for daylight and sunlight assessment for both impact assessment and scheme performance for informative purposes.

Overview

Neither the British Standard, European Standard, British Annex to the European Standard nor the BRE Guidelines (BR 209) set out rigid standards or limits. They are all considered advisory documents. The BRE Guide is preceded by the following very clear statement as to how the design advice contained therein should be used:

"*The advice given here is not mandatory and the guide should not be seen as an instrument of planning policy; its aim is to help rather than constrain the designer. Although it gives numerical guidelines, these should be interpreted flexibly since natural lighting is only one of many factors in site layout design.*"

That the recommendations of the BRE Guidelines are not suitable for rigid application to all developments in all contexts, is of particular importance in the context of national and local policies for the consolidation and densification of urban areas or when assessing applications for highly constrained sites (e.g. lands in close proximity or immediately to the south of residential lands). A compromise may have to be made concerning daylight and sunlight compliance to achieve national or local planning objectives.

It is the expert opinion of 3D Design Bureau, that the BRE Guidelines (*BR 209*) are the most appropriate guiding document for daylight and sunlight assessment. For daylight within proposed developments, a supplementary study has also been carried out under the criteria of *I.S. EN 17037*. The rationale for this opinion is outlined below.

BR 209 - Site Layout Planning for Daylight and Sunlight: a Guide to Good Practice (2022)

This document will be referred to as the *BRE Guidelines*, the *BRE Guide* or *BR 209* in this report.

At the time of writing this report, the BRE Guidelines are in the third edition (BR 209). The BRE Guidelines set out recommendations for appropriate levels of daylight and sunlight within a proposed development, as well as providing guidance on impacts arising from a proposed development to surrounding properties and amenity areas.

Upon publication of the 3rd Edition of the BR 209 (2022), the 2nd edition (2011) has been withdrawn. Among the updates from the 2nd to the 3rd edition are some changes in the recommended metrics to use for carrying out scheme performance assessments.

Daylight within proposed developments was previously assessed under the 2011 guidelines using an 'Average Daylight Factor' assessment (ADF). This has been replaced with a 'target illuminance assessment', also known as a 'Spatial Daylight Autonomy' assessment (SDA).

Sunlight within proposed developments was previously assessed under the 2011 guidelines using an 'Annual / Winter Probable Sunlight Hours' assessment (APSH/WPSH). This has been replaced with a 'Sunlight Exposure' assessment (SE). However, APSH/WPSH is still recommended for sunlight impact assessments.

As such, no ADF or APSH/WPSH assessment will be included as part of a scheme performance assessment under the updated guidelines.

Details of the criteria for new metrics, and all other relevant metrics, can be found in the methodology section on Page 6 of this report.

It is the expert opinion of 3D Design Bureau that the BRE Guidelines are the most appropriate guiding document for assessing daylight potential within a proposed development. The rationale for this opinion is outlined in the Dublin City Council development plan (2022-2028), which states:

"*Prior to 2018, Ireland had no standard for daylight. In 2018, the National Standards Authority of Ireland adopted EN 17037 to directly become IS EN 17037. It is important to note that no amendments were made to this document and unlike BS EN 317037 [sic – likely intended to reference BS EN 17037], it does not contain a national annex. It offers only a single target for new buildings (there are no space by space targets – e.g. a kitchen would have the same target as a warehouse or office). It does not offer guidance on how new developments will impact on surrounding existing environments. These limitations make it unsuitable for use in planning policy or during planning applications. BR 209 must still be used for this purpose.*"

While the BRE Guidelines draws reference from BS EN 17037, there are some subtle differences between BR 209 and BS EN 17037. For the purposes of this report, the BRE Guidelines (BR 209) is considered the appropriate reference document.

A detailed description of the various recommendations for impact assessment and scheme performance is contained in section "2.3 Quantitative Impact Assessment Overview" on page 10 of this report.

EN 17037:2018: Daylight in Buildings (2018)

*EN 17037 i*s a European Standard that provides recommendations for daylight within spaces. (Emphasis added)

EN 17037:2018 recommends that 300 lux should be received across 50% of a hypothetical reference plane of any room for half of the daylight hours of the year, with no less than 100 lux received across 95% of the reference plane. No distinction is made for the function of the room for target lux levels within this standard.

It is the opinion of 3D Design Bureau that these target values are less appropriate for proposed residential developments than the recommendations made in the BRE Guidelines, which apply room-specific target values for appropriate LUX levels.

Recommendations made in EN 17037 regarding Sunlight Exposure for proposed developments have been incorporated into the BRE Guidelines. As such, Sunlight Exposure is deemed the appropriate assessment for sunlight within habitable rooms of the proposed development.

EN 17037 also makes recommendations related to glare and quality of view out. These aspects are not addressed in this report as these assessments have less relevance in a residential context where occupants have the freedom to move about in order to improve level of glare or alter the view out.

I.S. EN 17037:2018 Daylight in Buildings (2018)

*I.S. EN 17037 i*s a direct adoption of the European Standard *EN 17037:2018* that provides recommendations for daylight within spaces.

The target values given within *I.S. EN 17037* are directly adopted from *EN 17037*. As such, there are no room-specific recommendations for daylight. Because of these limitations, it is the expert opinion of 3D Design Bureau, that the recommendations made in the *BRE Guidelines* are more appropriate to use than those within *I.S. EN 17037*.

Regardless, a supplementary SDA study has been carried out on the proposed development using the criterion of *I.S. EN 17037*, with compliance rates stated. However, this should be considered a supplementary study.

BS EN 17037:2018: Daylight in Buildings (2018)

BS EN 17037 is the British Annex to the European Standard (see above). The British Annex acknowledges that a rigid application of the European Standard "may not be achievable". It states *"... it is the opinion of the UK committee that the recommendations for daylight provision in a space [...] may not be achievable for some buildings, particularly dwellings."*

In BS EN 17037, daylight recommendations differ depending on the function of a room. Target lux levels are applied across 50% of the reference plane of a room for half of the daylight hours. The target lux levels are:

• 200 Lux for kitchens • 150 Lux for living rooms • 100 Lux for bedrooms

No minimum is stated to be achieved across 95% of the working plane. If a space has dual purposes it is advised that the higher target value should be applied.

Planning Design Standards for Apartments: Guidelines for Planning Authorities (2025)

In July 2025, the Department of Housing, Local Government and Heritage published an updated guidance document for new apartments, '*Planning Design Standards for Apartments: Guidelines for Planning Authorities, 2025*'. This document, which may be referred to by the simplified name *'Apartment Guidelines'*, supersedes the previous guidance document for apartments '*Sustainable Urban Housing: Design Standards for New Apartments, 2023*'.

Unlike the 2023 edition, the current Apartment Guidelines do not directly reference any specific guidance document for daylight and sunlight. Instead, they refer to '*Sustainable Residential Development and Compact Settlements Guidelines (2024)*':

"The provision of acceptable levels of natural light in new apartment developments is an important planning consideration, as it contributes to the liveability and amenity enjoyed by apartment residents. It is also important to safeguard against a detrimental impact on the amenity of other sensitive occupiers of adjacent properties. Section 5.3.7 of the SRDCSGs outlines requirements for the provision of acceptable levels of daylight in new residential developments and adjoining properties." (emphasis added.)

The relevant section of '*Sustainable Residential Development and Compact Settlements Guidelines*' (SRDCGS), 5.3.7, is referenced in the following section of this report.

Paragraph 6.7 of the superseded 2023 apartment guidelines states:

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

Although the above requirement has been removed from the 2025 apartment guidelines, the request remains in some local authority development plans. As such, the design team may still provide a rationale and/or compensatory design solutions for instances where daylight and/or sunlight recommendations have not been achieved.

Note: Section 3.2 of the '*Urban Development and Building Height Guidelines 2020'*, provides similar guidance as the '*2023 apartment guidelines'* as referenced above. However, it should be noted that at the time of publication of the *Urban Development and Building Height Guidelines (2020)*, BR 209 was in its second edition, first published in 2011. Since then, a third edition of BR 209 has been published (June 2022) and the 2nd edition has been withdrawn. BR 209 no longer references BS 8206-2:2008, which has also been withdrawn. The standard now referenced in BR 209 edition 3 is BS EN 17037.

Sustainable Residential Development and Compact Settlements Guidelines (2024)

Often referred to as "The Compact Growth Guidelines" this document advises on compact growth principles as a means to promote sustainable development, efficient land use, and infrastructure while minimizing sprawl and environmental degradation, contributing to sustainable urban growth, enhance liveability and support broader planning objectives.

In regard to daylight, section 5.3.7 states:

"The provision of acceptable levels of daylight in new residential developments is an important planning consideration,

in the interests of ensuring a high quality living environment for future residents. It is also important to safeguard against a detrimental impact on the amenity of other sensitive occupiers of adjacent properties.

(a) The potential for poor daylight performance in a proposed development or for a material impact on neighbouring properties will generally arise in cases where the buildings are close together, where higher buildings are involved, or where there are other obstructions to daylight. Planning authorities do not need to undertake a detailed technical assessment in relation to daylight performance in all cases. It should be clear from the assessment of architectural drawings (including sections) in the case of low-rise housing with good separation from existing and proposed buildings that undue impact would not arise, and planning authorities may apply a level of discretion in this regard.

(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.

In drawing conclusions in relation to daylight performance, planning authorities must weigh up the overall quality of the design and layout of the scheme and the measures proposed to maximise daylight provision, against the location of the site and the general presumption in favour of increased scales of urban residential development. Poor performance may arise due to design constraints associated with the site or location and there is a need to balance that assessment against the desirability of achieving wider planning objectives. Such objectives might include securing comprehensive urban regeneration and or an effective urban design and streetscape solution."

The Compact Growth Guidelines should be applied within statutory development plans and during the consideration of individual planning applications. Flexibility in interpretation allows planning authorities to tailor recommendations to specific local contexts and planning objectives.

Dun Laoghaire-Rathdown County Development Plan (2022-2028)

The guidance provided in the Dun Laoghaire-Rathdown County Development Plan 2022-2028 (DLR) references the 2nd Edition of the BRE guidelines (BR 209).

Section 12.3.4.2 of the DLR Development Plan states:

"Development shall be guided by the principles of Site Layout Planning for Daylight and Sunlight, A guide to good practice (Building Research Establishment Report, 2011) and/or any updated, or subsequent guidance, in this regard."

The DLR Development Plan allows for consideration of any updated or subsequent guidance and, therefore, the 3rd edition of the BRE guidelines (BR 209), which was released in 2022 after the publication of the DLR Development Plan, is considered as the primary document.

Guidelines / Standards Summary

According to the aforementioned guiding documents, the following assessments are typically conducted for a daylight and sunlight study, depending on the specific requirements of the project.

Impact on the Surrounding Properties

Impact to daylight is assessed through a Vertical Sky Component (VSC) on all relevant surrounding windows: A VSC impact assessment is typically conducted, where appropriate, on the relevant surrounding windows determined by the BRE decision chart as illustrated in Figure 2.2 on page 6.

Impact to daylight can be further assessed through a No Sky Line (NSL) on surrounding properties: Section D3 of the BRE Guidelines recommends a No Sky Line study "where room layouts are known". Consequently, NSL assessments are typically conducted only on properties where detailed floor plans have been provided.

Impact to sunlight in neighbouring properties is assessed through an Annual Probable Sunlight Hours (APSH) and Winter Probable Sunlight Hours (WPSH) on all relevant surrounding windows: An APSH/WPSH impact assessment is typically conducted, where appropriate, on the relevant surrounding windows/rooms that have an orientation within 90° of due south.

Impact to sunlight in neighbouring gardens and/or amenity areas is assessed through a Sunlight on Ground (SOG) in all surrounding amenity spaces: A SOG impact assessment is typically carried out, where appropriate, on the neighbouring gardens/ amenity spaces located within close proximity and to the north of the subject site.

Performance of the Proposed Development

Target Illuminance in all habitable rooms: A target illuminance assessment, also known as a Spatial Daylight Autonomy (SDA) assessment. The two recommended methodologies for this assessment are detailed in section 2.5.1 on page 13. In a scheme performance assessment, the SDA is typically calculated for the habitable rooms of the proposed development. A supplementary SDA assessment may also be conducted under the criteria of IS EN 17037.

When conducting a scheme performance assessment for sunlight in the habitable rooms of the proposed development, Sunlight Exposure (SE) is the relevant metric.

Sunlight on Ground (SOG) in all amenity spaces: A SOG assessment is typically carried out, for the amenity spaces of the proposed development.

No Sky Line (NSL) in all habitable rooms: An NSL assessment is typically conducted for the habitable rooms of the proposed development as a supplementary study as part of a scheme performance assessment.