Hill Street Dundalk

Daylight, Sunlight and Overshadowing Study

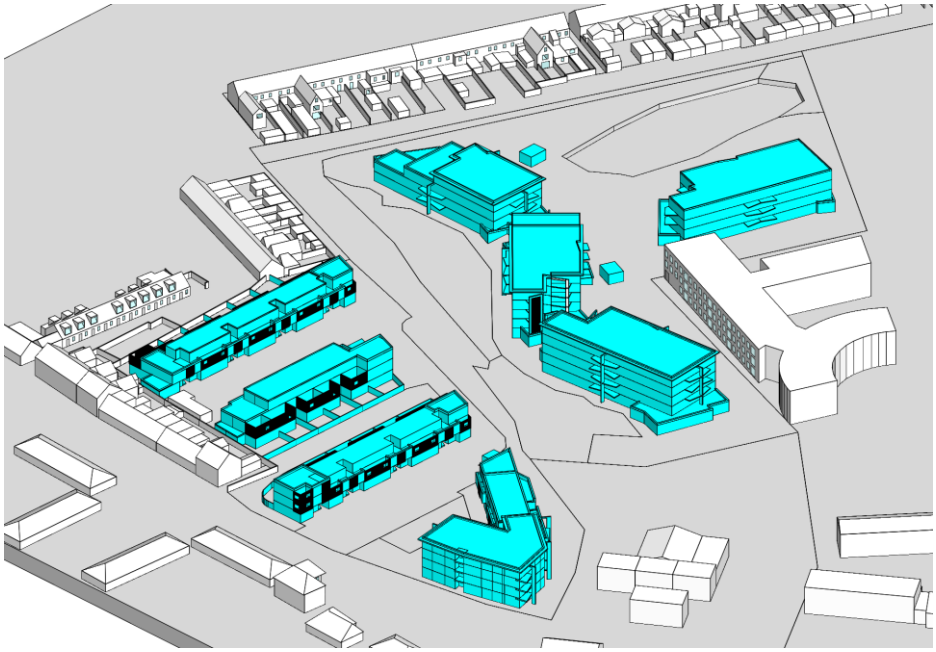

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Table of Contents

1 Executive Summary

This report summarises the analyses undertaken to quantify the Sunlight and Daylight performance of the Hill Street Development located in Dundalk, County Louth, Ireland. The report focuses on measuring the daylight and sunlight impact to the existing/permitted surrounding dwellings as well as the daylight and sunlight performance within the proposed development.

1.1 Planning Authority Guidelines

The Sustainable Urban Housing: Design Standards for New Apartments 2023 states the following in Section 6.6:

"Planning authorities should avail of appropriate expert advice where necessary and have regard 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 EN17037:2018 and the associated BRE guide 209 2022 Edition (June 2022) or any relevant future standards or guidance specific to the Irish context, when undertaken by development proposers which offer the capability to satisfy minimum standards of daylight provision."

With regards to daylighting and external sunlight exposure in particular, where different methodologies are found in each of the different standards, all methodologies have been employed for completeness to ensure appropriate and reasonable regard has been taken to address all assessments under all of the different standards. For clarity these are listed below and the following Section 1.2 denotes which standard is applicable for each assessment type:

- BRE Guide –3rd Edition of BR 209 BRE Site Layout Planning for Daylight and Sunlight
- BS EN 17037-2018+A1-2021 – Daylight in Buildings
    - This is the UK implementation of the European EN 17037-2018+A1-2021 standard. It supersedes BS 8206-2:2008 which is withdrawn in the UK. The BS EN standard includes a National Annex which addresses daylight requirements specific to dwellings which is notable as Ireland's climate matches closely with the UK.
- For completeness, IS EN 17037-2018+A1-2021 – Daylight in Buildings has been assessed and results included in Appendix C for information only.

1.2 Reference Standards & Summary of Assessments Undertaken

The various daylight and sunlight assessments that were undertaken using the IES VE software are based on a number of different standards which are referenced in the individual sections of this report. For clarity, the assessments that were undertaken are summarised below as well as the reference standards that were used for each (where applicable):

- **Shadow Analysis**
    - Assessed using shadow images cast at key times throughout the year, i.e. March 21st, June 21st and December 21st to determine if any overshadowing impact occurs and to what extent to any existing neighbouring dwellings in accordance with the BRE Guide (3rd Edition).

- **Sunlight to Amenity Spaces**
  - Assessed using annual Solar Exposure calculations to determine any impact to existing amenities and the sunlight received and also to assess the proposed developments amenity spaces to derive how much sunlight they can expect to receive in accordance with the BRE Guide (3rd Edition).
- **Sunlight to Existing Buildings**
  - Assessed using the Annual Probable Sunlight Hours (APSH) method in accordance with the BRE Guide (3rd Edition) - to determine any impact to sunlight received to the existing neighbouring building main living areas.
- **Sunlight to Proposed Buildings**
  - Assessed using Solar Exposure calculations in accordance with IS/BS EN 17037-2018+A1-2021 (BRE Guide 3rd Edition)
  - In both assessments above the aim is to derive how much sunlight proposed development can expect to receive.
- **Daylight to Existing Buildings**
  - Assessed using the Vertical Sky Component (VSC) method in accordance with the BRE Guide (3rd Edition) - to determine any impact to existing daylight received to the existing building neighbouring the site.
- **Daylight to Proposed Development**
  - Assessed in accordance with BS EN 17037-2018+A1-2021 National Annex Method 2 (BRE Guide 3rd Edition)
  - For completeness, IS EN 17037 non-annex results have been included in Appendix C for information only.
  - In all assessments above the aim is to derive how much daylight will be received within each of the apartments within the proposed development.
- **View Out**
  - Assessed in accordance with IS/BS EN 17037-2018+A1-2021 (BRE Guide 3rd Edition)
- **Glare**
  - Assessed in accordance with IS/BS EN 17037-2018+A1-2021 (BRE Guide 3rd Edition)

The following can be concluded based on the assessments undertaken:

1.3 Shadow Analysis

The shadow analysis illustrates different shadows being cast at key times of the year (March 21st, June 21st and December 21st) for the Existing Situation and the Proposed Scheme. The results from the study are summarised as follows:

1-36 Avenue Rd, Marshes Upper

Minimal additional shading visible from the proposed development during *December at 1000-1400. No additional shading is observed from the proposed development on these existing properties at any other period.

Mourne View Hall – Students Accommodations
Minimal additional shading visible from the proposed development during March 1600-1800, June 1800-2000 and *December at 1400. No additional shading is observed from the proposed development on these existing properties at any other period.

1-42 Dunmore, Marshes Upper
No additional shading is observed from the proposed development on these properties at any period throughout the year.

1-5 Mourne View Terrace & 1-5 Mourne View
No additional shading is observed from the proposed development on these properties at any period throughout the year.

Tara House, Cabra House, Callandale House & 1-4 Hughes Park
Minimal additional shading visible from the proposed development during March at 0800. No additional shading is observed from the proposed development on these existing properties at any other period.

1-15 Hill St, Townparks
Minimal additional shading visible from the proposed development during March at 0800 and *December at 1000. No additional shading is observed from the proposed development on these existing properties at any other period.

21-29 Gosling's Terrace, Townparks
Minimal additional shading visible from the proposed development during *December at 1000-1400. No additional shading is observed from the proposed development on these existing properties at any other period.

30-40 Gosling's Terrace, Townparks
Minimal additional shading visible from the proposed development during March at 0800 and *December at 1000-1400. No additional shading is observed from the proposed development on these existing properties at any other period.

*Overshadowing is showing in December when the sun is lower in the sky and shadows cast are much longer. Although this is the case, overshadowing is least noticeable during the winter months as there is a lot less sunlight available at this time of year and so the overall impact is vastly reduced.

The potential shading impact is quantified via the "Sunlight to Amenity Spaces" and "Daylight to Existing Buildings" sections of this report.

1.4 Sunlight to Amenity Spaces

As outlined in Section 3.3.17 of the BRE Guide (3rd Edition), for a space to appear adequately sunlit throughout the year, at least half of the garden or amenity area should receive at least 2 hours of

sunlight on March 21st. In the case of existing amenity spaces, if they are already below the 50% threshold then the BRE recommends the results kept to within 80% of the existing situation.

Existing Amenity Spaces
The existing private amenity spaces in the adjacent properties have been analysed and the results demonstrate they continue to receive similar level of sunlight even with the proposed development in place on March 21st, thus complying with the recommendations in the BRE Guide as outlined above.

Proposed Amenity Spaces
On March 21st, 100% of the combined public communal amenity areas and 90% of the combined proposed communal amenity areas within the development site will receive at least 2 hours of sunlight over their combined area. When considered individually, all communal and public open spaces are also complying with the BRE recommendations.

Ground floor apartments within Blocks E, F and G have private gardens to the rear. All these individual areas tested perform as expected. Those facing predominantly north are noted to be below the BRE Guide (2nd and 3rd Editions) recommendations as they are shaded by the property on the plot. Those south facing are achieving at least 2 hours of sunlight over 50% of their area on the 21st of March, complying with the BRE recommendations. It is worth noting that Blocks F and G have access to a communal area (no.5) which receives high levels of sunlight.

All the proposed private gardens greatly exceed the minimum private open space requirements of the Apartment Design Guidelines. In addition, ground floor apartments within Block E have additional private space to the South, adjoining the main living room.

1.5 Sunlight to Existing Buildings

This study considers the proposed scheme and tests if the Annual Probable Sunlight Hours (APSH) results for the living room windows are greater than 25% annual and 5% winter sunlight or are greater than 0.8 times their former value with the proposed development in place or the reduction in sunlight across the year is less than 4% with the proposed development in place.

Based on the criteria outlined in Section 3.2.9 of the BRE Guide 3rd Edition, none of the existing/adjacent buildings fit the requirements to be assessed and as such the APSH assessment was not conducted. The BRE guide (3rd Edition) notes that there should be no impact to sunlight for these properties.

“It is not always necessary to do a full calculation to check sunlight potential. The guideline above is met provided either the following is true:

- If the window wall faces within 90° of due south and no obstruction, measured in the section perpendicular to the window wall, subtends an angle of more than 25° to the horizontal. Again, obstructions within 90° of due north need not be counted.”

Given the statement above the surrounding dwellings adjacent to the proposed development were verified noting that, in a section perpendicular to the window wall, no angle subtended more than 25° in some cases they were sitting to the South of the development.

As noted above, none of the existing/adjacent properties have been assessed, as noted in Section 3.2.9 of the BRE Guide 3rd Edition, that these windows need not be analysed as sunlight impact will be unnoticeable to the existing occupants. The 25-degree test sections can be viewed in section 7.3 of the report.

1.6 Sunlight to Proposed Development

As the sunlight exposure assessment in accordance with BRE Guide 3rd Edition / IS/BS EN 17037-2018+A1-2021 considers the orientation of the rooms the following should be noted from section 3.1.11 of the guide.

"The BS EN 17037 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."

Of the 193 no. points tested 97% (187 no.) meet the BRE Guide 3rd Edition / IS/BS EN 17037:2018 sunlight exposure recommendations of greater than 1.5 hours on March 21st. Where windows do not meet this recommendation, this is predominantly as a result of their orientation, or as a consequence of the impact of balcony projections.

It should be noted that in the development of any apartment type building in particular, achieving in the region of 75% to 80% for this assessment would be considered very high and factors such site constraints and ultimately orientation play a huge part to the outcome of this assessment. In some instance and particularly a scheme like this where you have apartments on either side of a rectangular block that is constrained by the site orientation, 50% would be as highest percentage achievable with the apartments on one side not able meet requirements purely on orientation as noted and the inclusion of balconies within the design scheme (as a requirement).

Overall, the sunlight provision results to the proposed development in accordance with IS/BS EN 17037:23018 are considered excellent due to the fact that not all living rooms can face south and the inclusion of balconies.
Finally, the sunlight exposure results are visually represented in Appendix B.

1.7 Daylight to Existing Buildings

This study considers the Proposed Scheme and tests if the VSC results are greater than 27% or not less than 0.8 times the value of the Existing Situation.

Based on the criteria outlined in Section 2.2.5 of the BRE guidance (3rd Edition), only two of the neighbouring elevations require inclusion within the VSC assessment as the rest they did not meet the criterion as laid out within the BRE guide which is as follows.

It is not always necessary to do a full calculation to check daylight potential. The guideline above is met provided the following is true:

- no obstruction, measured in the section perpendicular to the window wall, subtends an angle of more than 25° to the horizontal.

Therefore, as noted above, only two of the neighbouring elevations require inclusion within the VSC assessment as the daylight impact will be unnoticeable to the occupants of the other neighbouring elevations. Please refer to section 9.2 25 Degree Rule for the section images produced as evidence for each of the qualifying views.

Of the 73 points tested, 90% (66 no. points) have a Proposed VSC value greater than 27% or not less than 0.8 times their former value compared to the Existing Situation. The remaining 7 points located in the student accommodation building have VSC values between 24.8% and 26.85% and hence adequate daylight should still be expected (as per Section 2.1.6 of the BRE Guide) given the presence of larger than conventional windows for the living spaces and the other spaces being bedrooms. These results are only marginally outside the recommendations and therefore when this is taken into consideration all of the points tested should receive adequate daylight.

1.8 Daylight to Proposed Development

For the daylight to proposed development assessment, one standard has been analysed: BS EN 17037-2018+A1-2021 National Annex (BRE Guide 3rd Edition). For completeness, IS EN 17037-2018+A1-2021 (BRE Guide 3rd Edition) non-annex results have been included in Appendix C.

There are two methods to assess daylight provision to the interior which are based on target values in either Table A.3 or NA.1 of BS EN 17037-2018+A1-2021 which are summarised as follows:

Method 1: This calculation method uses the daylight factor targets on the reference plane as per Table A.3. The assessment is carried out on a representative day and time during the year, i.e. 21st September @ 12:00 under standard CIE overcast sky conditions.

Method 2: This calculation method uses the illuminance targets on the reference plane as per Table NA.1. The assessment is carried out for each hour over the course of the year (8,760 hours) using a local weather file which accounts for varying sky conditions and sun positions throughout the year.

As outlined in Section 5.1.4 of the standard, the verification of daylight provision can be determined using either an adequate software or on-site measurements. When using a software, *"a representative model of the space is required together with the key parameters (such as any significant nearby obstructions, the assigned surface reflectance values and glazing transmissivity) that are a reasonable representation of those for the actual, completed building. This can be determined using either Method 1 or Method 2."*

Based on the above criteria, the daylight provision to the proposed development has been assessed using an adequate software (i.e. IES VE), using the Method 2 climate-based approach and targeting the minimum recommended values outlined in Table NA.1 of BS EN 17037-2018+A1-2021. (see section 10.1.1 for table NA.1)

The Method 2 climate-based approach was selected as it is a far more accurate assessment method compared to Method 1. Climate based daylight modelling (CBDM) is more accurate compared to a

calculation based on a single day during the year, i.e. Method 1. The amount of daylight varies throughout the year, primarily due to the sun's position, so it is essential the impact of daylight variance is properly considered. CBDM utilises an annual simulation linking location, shading, climate data (including solar intensity and cloud cover) together with the building properties. This provides a complete overview on how the daylight performance varies throughout the year due to changes in these factors.

According to the BRE 3 Guidelines presentation given by the Dun Laoghaire Rathdown consultant, Chris Shackleton, BS EN 17037-2018+A1-2021 National Annex is the appropriate assessment methodology to satisfy minimum standards of daylight provision. For completeness, IS EN 17037 non-annex results have been included in Appendix C.

The purpose of the calculations is to quantify an overall percentage of units which exceeds the daylight provision recommendations. Our proposed methodology is to complete the calculations for all of the apartments within the development. The objective of the design team is to maximise the number of units which exceed the minimum recommendations.

The following sections summarise the requirements and results for the BS EN 17037-2018+A1-2021 standard.

BRE Guide 3rd Edition / BS EN 17037-2018+A1-2021 National Annex

In the UK, EN 17037-2018+A1-2021 was adopted to form "BS EN 17037-2018+A1-2021". However, a National Annex was included which states:

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

The BS EN 17037-2018+A1-2021 National Annex provides target illuminance values for bedrooms, living rooms and kitchens within residential developments as per Table NA.1. It is also important to note that as the climate in Ireland is similar to the UK, the targets outlined in the BS EN National Annex could also be applied to dwellings in Ireland.

The BS National Annex also states:

"Where one room in a UK dwelling serves more than a single purpose, the UK committee recommends that the target illuminance is that for the room type with the highest value – for example, in a space that combines a living room and a kitchen the target illuminance is recommended to be 200 lx."

Therefore, combined LKDs were assessed using a 200-lux target illuminance (E_T).

Across the proposed development 98% of the tested rooms are achieving the daylight provision targets in accordance with Table NA.1 of BS EN 17037-2018+A1-2021 using Method 2.

Compensatory Measures

With regards to internal daylighting, Section 6.7 of the Sustainable Urban Housing: Design Standards for New Apartments December 2023, states the following:

"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 specifics. This may arise due to design constraints associated with the site or location and the balancing of that assessment against the desirability of achieving wider planning objectives. Such objectives might include securing comprehensive urban regeneration and or an effective urban design and streetscape solution."

Having regard to the statements above, it should be noted that throughout the design process the design team worked hard to optimise the whole development to maximise the daylight within the proposed scheme.

In addition to this, design features have been incorporated into the development where rooms do not achieve the daylight provision targets in accordance with the standards they were assessed against. These design features again help to balance off and compensate the lower levels of daylight measured in the applicable spaces and are summarised as follows:

- 35% of the apartment units have a floor area 10% greater than the minimum floor area requirements as required by the Design Standards (Dec 2023). Note that larger floor areas make it more difficult to achieve the recommended daylight levels. However, larger windows have been incorporated into the design which also improves the view out for the building occupants.
- 66% of the apartment units are dual aspect which is above the 50% minimum requirement as required by the Design Standards (Dec 2023). As a result, more apartment units than the recommended minimum will achieve quality daylight from dual-aspect orientations.
- The proposed scheme provides 2409sq.m of communal amenity space, thus exceeding the 1352sq.m required pursuant to the Design Standards (Dec 2023). In addition to this The proposed scheme provides 5250sq.m of public open space, thus exceeding the 4553.1sq.m required pursuant to the Development Plan.
- In addition to the outdoor space outlined above, the proposed scheme also provides 2151sq.m of seasonal recreation space.

In addition to this, specific compensatory measures for each space below the recommendations can be found in the table within Appendix A Section 12.2.

1.9 View Out

The View Out assessment is related to buildings such as offices or schools where seating layouts are typically fixed compared to domestic settings where an occupant can move around the space freely. In their own home occupants can choose to sit near to or even at a window which will inevitably provide the varying layers of a 'View Out' such as the ground, landscape or sky. This ability to choose their position within a domestic setting means they would always have access to a position in the apartment with the minimum requirements of 'View Out'. Therefore, all the properties would meet the minimum requirement as outlined in IS EN 17037-2018+A1-2021 / BS EN 17037-2018+A1-2021 National Annex (BRE Guide 3rd Edition).

1.10 Glare

As outlined in IS EN 17037-2018+A1-2021 / BS EN 17037-2018+A1-2021 National Annex (BRE Guide 3rd Edition), a Glare assessment is suggested in spaces where the *"expected activities are comparable to reading, writing or using display devices and the user is not able to choose freely their position and viewing direction".* Given that occupants within a domestic setting are free to move around, on this basis a glare assessment for the proposed development has not been carried out.

1.11 Observations

It is important to note that the recommendations within the BRE Guide (3rd Edition) itself states "*although it gives numerical guidelines these should be interpreted flexibly because natural lighting is only one of many factors in site layout design"*, Although this is true appropriate and reasonable regard has still been taken to the BRE guide.

Whilst the results shown relate to the criteria as laid out in the BRE Guide (3rd Edition), it is important to note that the BRE targets are guidance only and should therefore be used with flexibility and caution when dealing with different types of sites.

In addition, BRE Guide 3rd Edition also notes:

"This report is a comprehensive revision of the 2011 edition of Site layout planning for daylight and sunlight: a guide to good practice. It is purely advisory and the numerical target values within it may be varied to meet the needs of the development and its location."

Taking all of the above information into account and based on the results from each of the assessments undertaken, the proposed development performs well when compared to the recommendations in the BRE Guide 3rd Edition and BS EN 17037-2018+A1-2021 National Annex. With regards to the existing properties there is a negligible impact when considering sunlight and daylight as a result of the proposed development and the proposed development itself performs very well with the same regard.

2 Introduction

This report summarises the analyses undertaken to quantify the Sunlight and Daylight performance of the Hill Street Development located in Dundalk, County Louth, Ireland. The report focuses on measuring the daylight and sunlight impact to the existing/permitted surrounding dwellings as well as the daylight and sunlight performance within the proposed development.

2.1 Development Description

The proposed development will consist of 194no. apartments in 8no. distinctive blocks (A to H) ranging in height from part one storey to five storeys in height across the site together with all associated public, communal and private open space, car parking, cycle parking and site services. Site development works will include regrading of the site. The proposed development provides for a childcare facility within Block A, at ground floor level with a potential capacity of c.44 full time childcare spaces. The childcare facility will have its own outdoor play space and set down area as well as staff car parking and bicycle parking. In order to preserve the integrity of the existing pedestrian/cycle track and the open section of the River Blackwater that run north-south broadly through the centre of the site, two separate vehicular accesses are proposed to serve the development from the R132 Dubin Road/Hill Street. The first vehicular access will be a new access onto Dublin Road / Hill Street and will serve 75 dwellings. The second vehicular access is the existing access road onto Dublin Road at Mourne View Hall which will provide access to 119no. apartments

3 BRE – Site Layout Planning for Daylight and Sunlight (3rd Edition)

Access to daylight and sunlight is a vital part of a healthy environment. Sensitive design should provide sufficient daylight and sunlight to new residential developments while not obstructing light to existing homes nearby.

The 3rd Edition of the BR 209 BRE Site Layout Planning for Daylight and Sunlight, advise on planning developments for good access to daylight and sunlight and is widely used by local authorities to help determine the performance of new developments.

3.1 Impact Classification Discussion

BRE guidance in Appendix H (BRE Guide 3rd Edition) – Environmental Impact Assessment suggests impact classifications as minor, moderate and major adverse. It provides further classifications of these impacts with respect to criteria summarised in the table below.

Where the loss of skylight or sunlight fully meets the guidelines in the BRE guide (3rd Edition), the impact is assessed as negligible or minor adverse. Where the loss of skylight or sunlight does not meet the BRE guidelines, the impact is assessed as minor, moderate or major adverse.

Impact	Description
Negligible adverse impact	• *Loss of light well within guidelines,* ***or*** • *only a small number of windows losing light (within the guidelines)* ***or*** *limited area of open space losing light (within the guidelines)*

Minor adverse impact (a)	• *Loss of light only just within guidelines* ***and***
	  ○ *a larger number of windows are affected* ***or***
	  ○ *larger area of open space is affected (within the guidelines)*

Minor adverse impact (b)	• *only a small number of windows or limited open space areas are affected* • *the loss of light is only marginally outside the guidelines* • *an affected room has other sources of skylight or sunlight* • *the affected building or open space only has a low-level requirement for skylight or sunlight* • *there are particular reasons why an alternative, less stringent, guideline should be applied*
Major adverse impact	• *large number of windows or large open space areas are affected* • *the loss of light is substantially outside the guidelines* • *all the windows in a particular property are affected* • *the affected indoor or outdoor spaces have a particularly strong requirement for skylight or sunlight (living rooms / playground)*

4 Methodology

4.1 Planning Authority Guidelines

The Sustainable Urban Housing: Design Standards for New Apartments 2023 states the following in Section 6.6:

"Planning authorities should avail of appropriate expert advice where necessary and have regard 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 EN17037:2018 and the associated BRE guide 209 2022 Edition (June 2022) or any relevant future standards or guidance specific to the Irish context, when undertaken by development proposers which offer the capability to satisfy minimum standards of daylight provision."

With regards to daylighting and external sunlight exposure in particular, where different methodologies are found in each of the different standards, all methodologies have been employed for completeness to ensure appropriate and reasonable regard has been taken to address all assessments under all of the different standards. For clarity these are listed below and the following Section 4.1.2 denotes which standard is applicable for each assessment type:

- BRE Guide –3rd Edition of BR 209 BRE Site Layout Planning for Daylight and Sunlight
- BS EN 17037-2018+A1-2021 – Daylight in Buildings
    - This is the UK implementation of the European EN 17037-2018+A1-2021 standard. It supersedes BS 8206-2:2008 which is withdrawn in the UK. The BS EN standard includes a National Annex which addresses daylight requirements specific to dwellings which is notable as Ireland's climate matches closely with the UK. Given this information the BS EN 17037-2018+A1-2021 National Annex is the more appropriate assessment methodology to satisfy minimum standards of daylight provision within dwellings as the IS EN 17037-2018+A1-2021 does not include this annex relevant to dwellings.
- For completeness, IS EN 17037-2018+A1-2021 – Daylight in Buildings has been assessed and results included in Appendix C.

Finally, the latest BRE guide 'Site Layout Planning for Daylight and Sunlight' (3rd Edition) was published in June 2022. This now directly links to the new daylighting standards EN 17037-2018+A1-2021. Aside refinements to the BRE guide, the assessments are the same to what is found within the BRE guide 2nd Edition.

4.2 Reference Standards & Summary of Assessments Undertaken

The various daylight and sunlight assessments that were undertaken using the IES VE software are based on a number of different standards which are referenced in the individual sections of this report. For clarity, the assessments that were undertaken are summarised below as well as the reference standards that were used for each (where applicable):

- **Shadow Analysis**
  - Assessed using shadow images cast at key times throughout the year, i.e. March 21st, June 21st and December 21st to determine if any overshadowing impact occurs and to what extent to any existing neighbouring dwellings in accordance with the BRE Guide (3rd Edition).
- **Sunlight to Amenity Spaces**
  - Assessed using annual Solar Exposure calculations to determine any impact to existing amenities and the sunlight received and also to assess the proposed developments amenity spaces to derive how much sunlight they can expect to receive in accordance with the BRE Guide (3rd Edition).
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  - Assessed using the Annual Probable Sunlight Hours (APSH) method in accordance with the BRE Guide (3rd Edition) - to determine any impact to sunlight received to the existing neighbouring building main living areas.
- **Sunlight to Proposed Buildings**
  - Assessed using Solar Exposure calculations in accordance with IS/BS EN 17037-2018+A1-2021 (BRE Guide 3rd Edition)
  - In both assessments above the aim is to derive how much sunlight proposed development can expect to receive.
- **Daylight to Existing Buildings**
  - Assessed using the Vertical Sky Component (VSC) method in accordance with the BRE Guide (3rd Edition) - to determine any impact to existing daylight received to the existing building neighbouring the site.
- **Daylight to Proposed Development**
  - Assessed in accordance with BS EN 17037-2018+A1-2021 National Annex Method 2 (BRE Guide 3rd Edition)
  - For completeness, IS EN 17037 non-annex results have been included in Appendix C for information only.
  - In all assessments above the aim is to derive how much daylight will be received within each of the apartments within the proposed development.
- **View Out**
  - Assessed in accordance with IS/BS EN 17037-2018+A1-2021 (BRE Guide 3rd Edition)
- **Glare**
  - Assessed in accordance with IS/BS EN 17037-2018+A1-2021 (BRE Guide 3rd Edition)

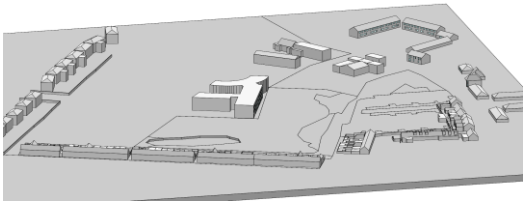
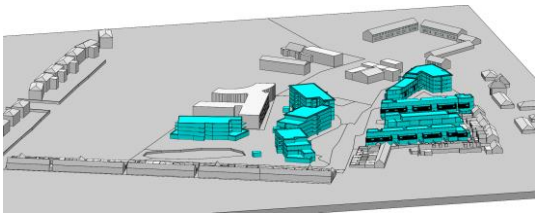
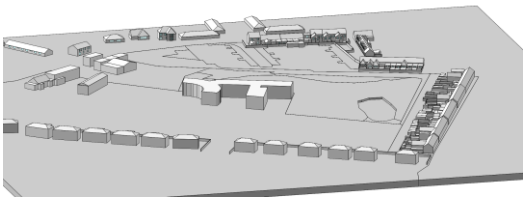
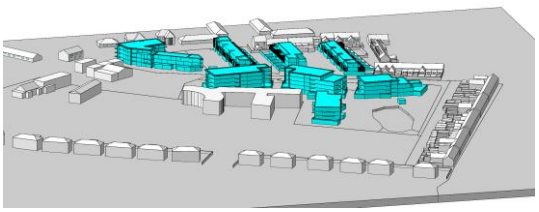
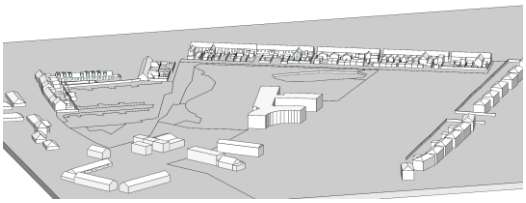
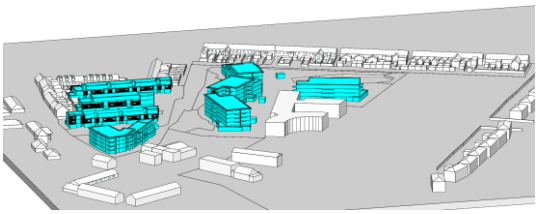
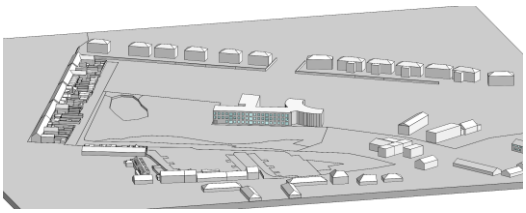
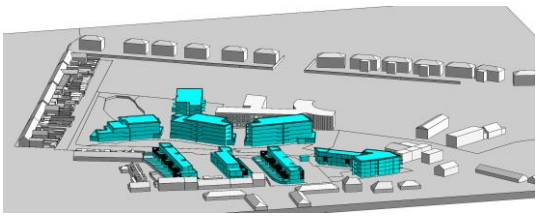
4.3 Orientation

The model orientation has been taken from drawings provided by the Architect with the resulting angle shown below used in the analysis.

Orientation	
	
	

4.4 Proposed Model

The following images illustrate the models created from the architectural information provided and the use of Google/Bing maps where information was absent.

	Existing Situation	Proposed Scheme
View looking from North of Site		
View looking from East of Site		
View looking from South of Site		
View looking from West of Site		

4.5 Potential Sensitive Receptors

To help understand the potential impact to surrounding buildings, potential sensitive receptors were identified as illustrated below.

	Proposed Site (approximate site boundary)
	1-36 Avenue Rd, Marshes Upper
	Mourne View Hall – Students Accommodations
	1-42 Dunmore, Marshes Upper
	1-5 Mourne View Terrace & 1-5 Mourne View
	Crosson Gas Station
	Tara House, Cabra House, Callandale House & 1-4 Hughes Park
	1-15 Hill St, Townparks
	21-29 Gosling's Terrace, Townparks
	30-40 Gosling's Terrace, Townparks
	19 Mourne View Hall

5 Shadow Analysis

The statistics of Met Eireann, the Irish Meteorological Service, show that the sunniest months in Ireland are May and June, based on 1991-2020 averages or latest: https://www.met.ie/climate/30-year-averages.

The following can also be shown:

- During December a mean daily duration of 1.7 hours of sunlight out of a potential 7.3 hours sunlight each day is received (i.e. only 23% of potential sunlight hours).
- During June a mean daily duration of 5.8 hours of sunlight out of a potential 15.9 hours sunlight each day is received (i.e. only 36% of potential sunlight hours).

Therefore, the impacts caused by overshadowing are generally most noticeable during the summer months and least noticeable during the winter months.

According to the BRE (3rd Edition) in Section 3.3.13:

"Where there are existing buildings as well as the proposed one, 'before' and 'after' shadow plots showing the difference that the proposed building makes may be helpful. In interpreting the impact of such differences, it must be borne in mind that nearly all structures will create areas of new shadow, and some degree of transient overshadowing of a space is to be expected."

Section 3.3.14 states:
"If a space is used all year round, the equinox (21 March) is the best date for which to prepare shadow plots as it gives an average level of shadowing"

In Section 3.3.15:
"As an optional addition, plots for summertime (for example 21 June) may be helpful as they will show the reduced shadowing then, although it should be borne in mind that 21 June represents the best case of minimum shadow, and that shadows for the rest of the year will be longer. Conversely if winter shadows (e.g. 21 December) are plotted, even low buildings will cast long shadows."

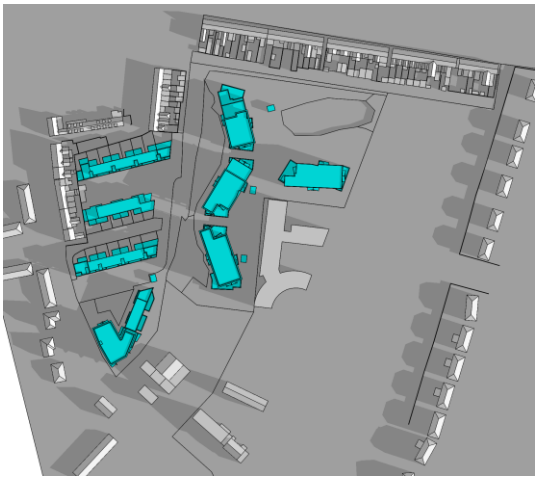
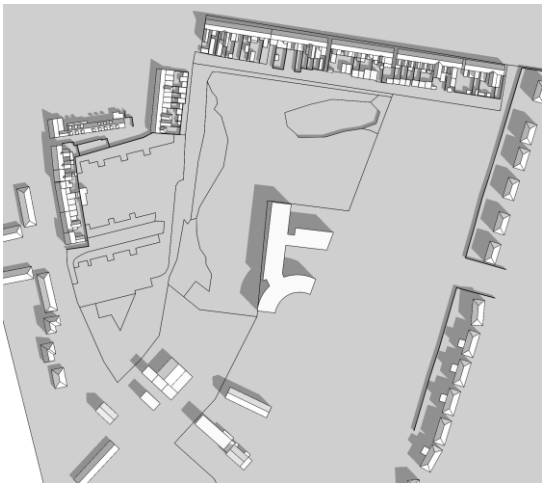
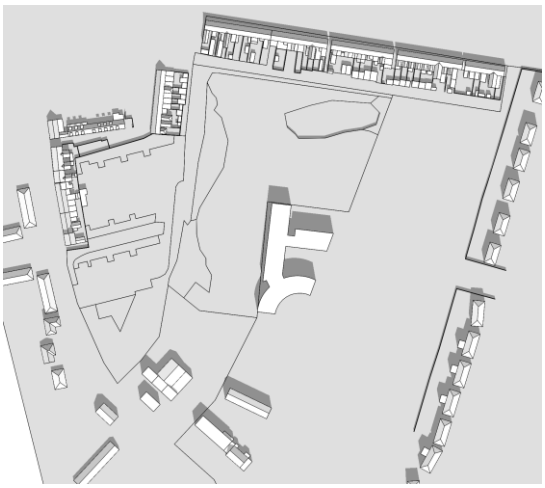
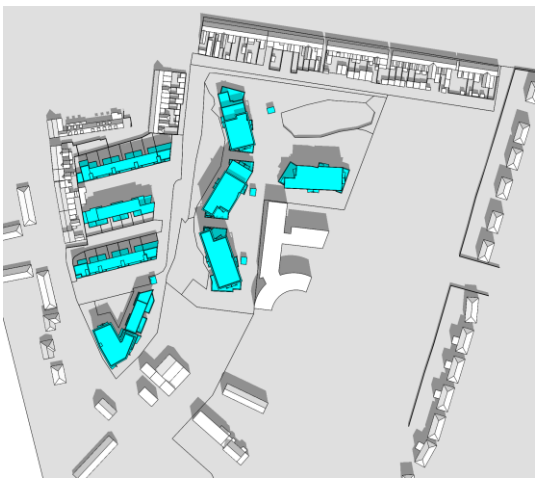
Based on the above, and for completeness, this section will consider the shadows cast by the proposed development on the following dates:

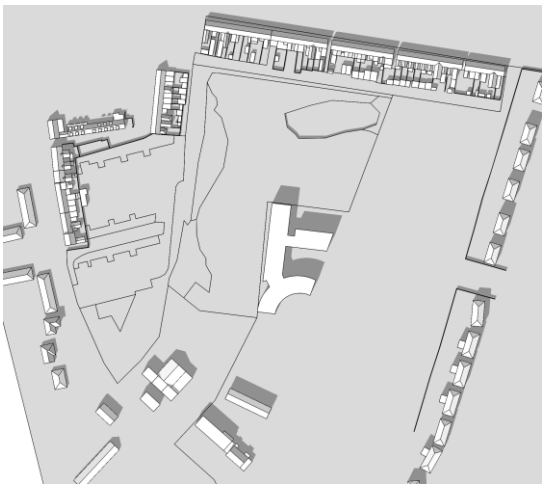
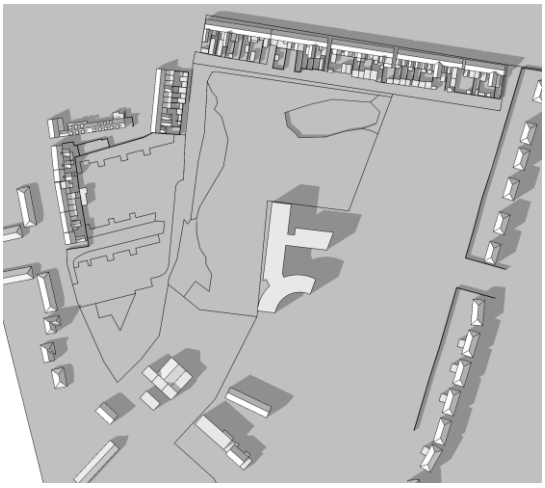
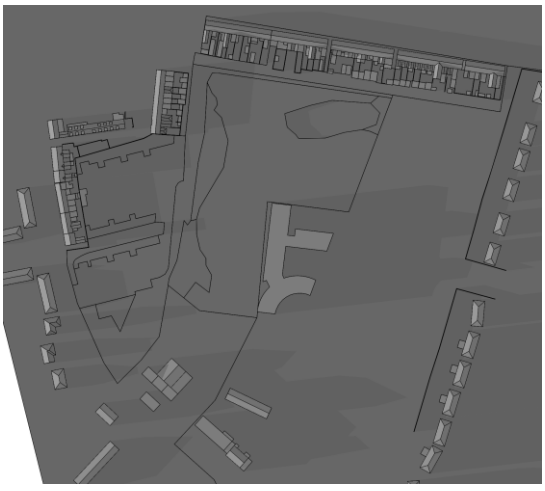
- March 21st / September 21st (Equinox)
- June 21st (Summer Solstice)
- December 21st (Winter Solstice)

These images illustrate shadows cast for 'perfect sunny' conditions with no clouds and assumed that the sun is shining for every hour shown. Given the discussion above it is important to remember that this is not always going to be the case.

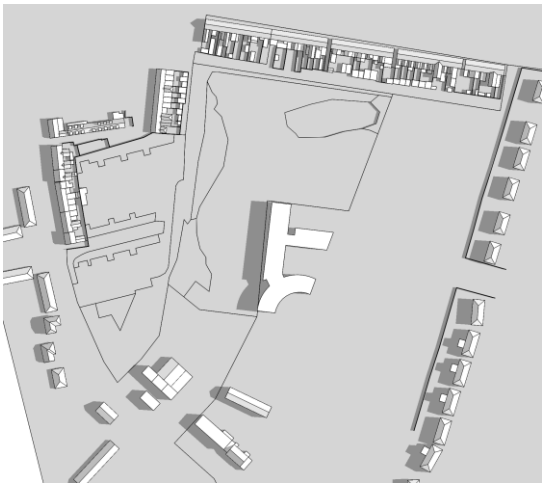
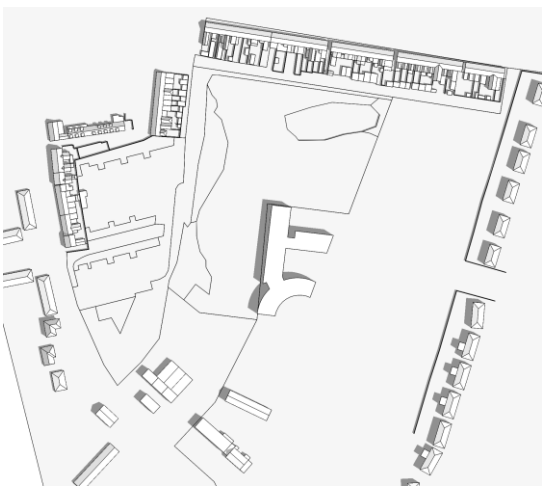
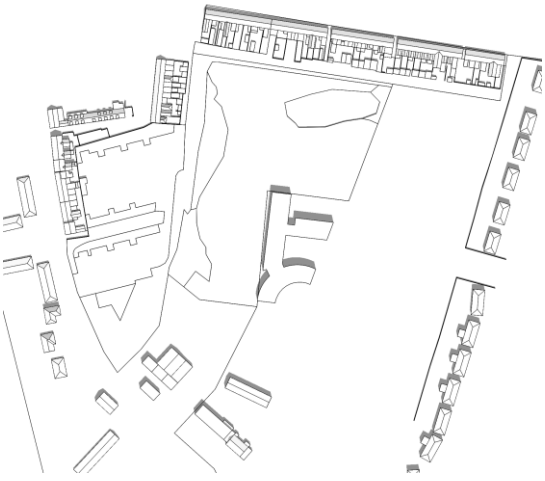
5.1 Plan View

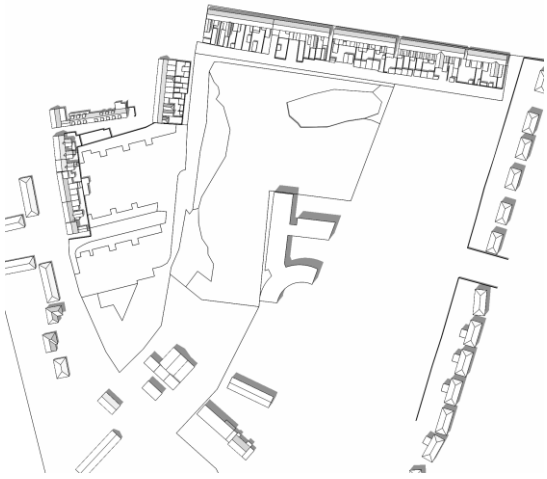
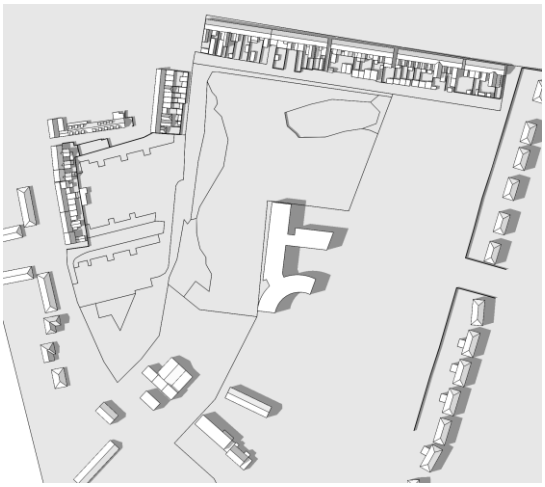
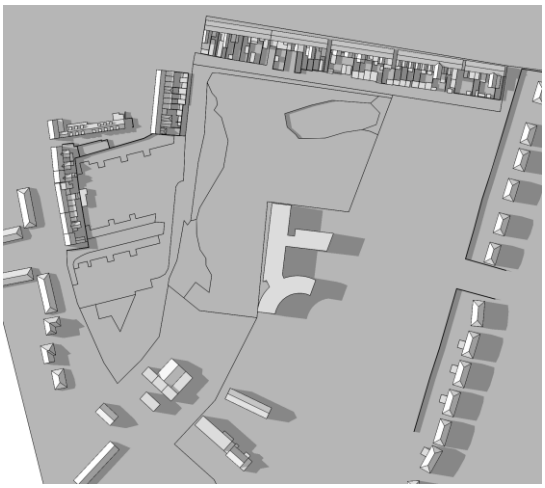
5.1.1 March 21st

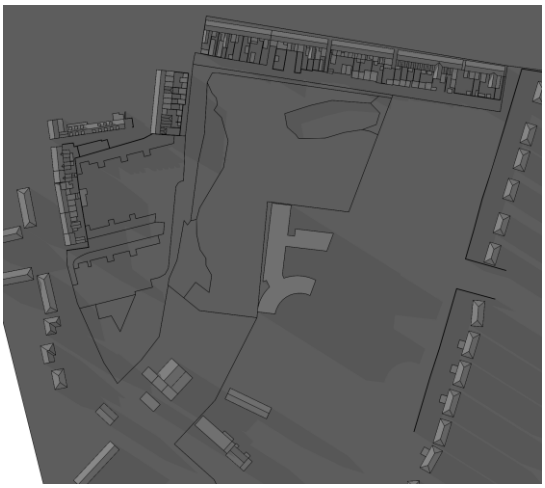
	Existing	Proposed
March 21st - 8:00		
March 21st - 10:00		
March 21st - 12:00		

	Existing	Proposed
March 21st - 14:00		
March 21st - 16:00		
March 21st - 18:00		

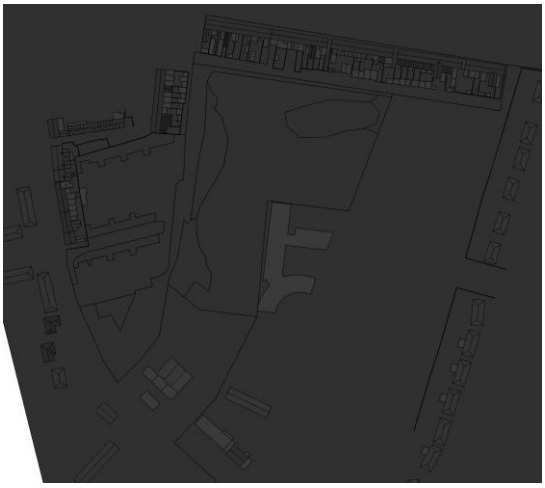
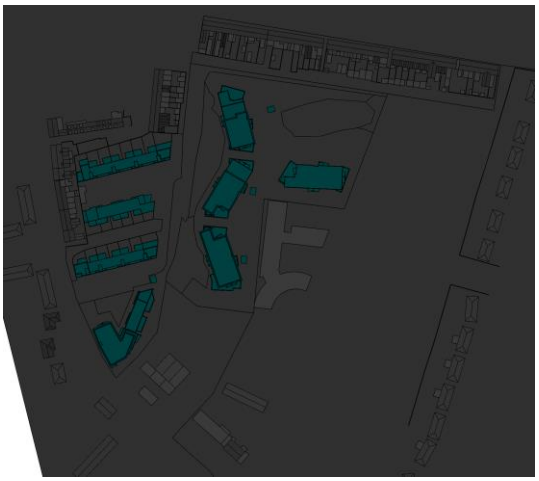
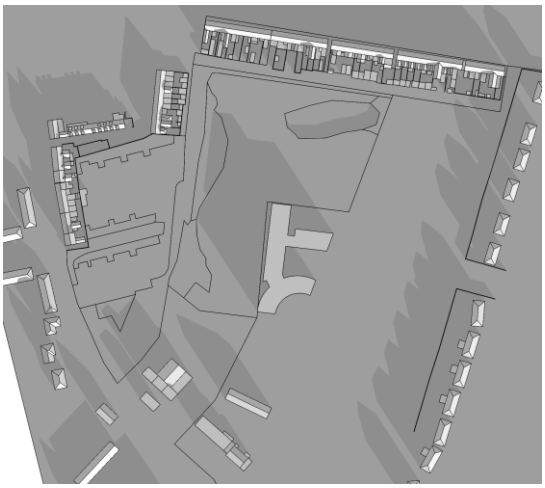
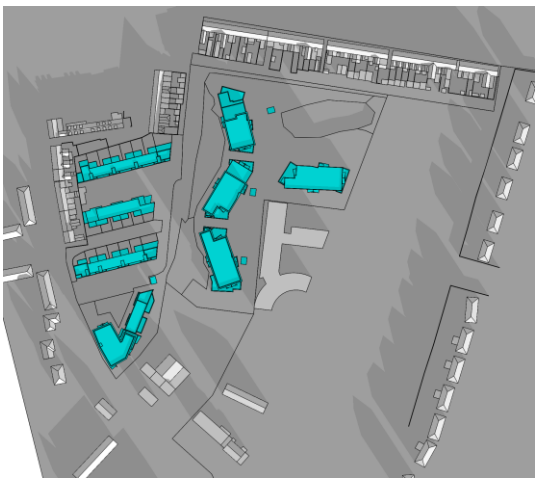
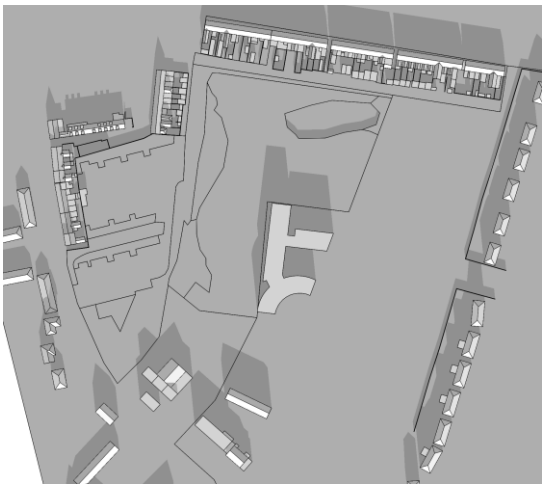
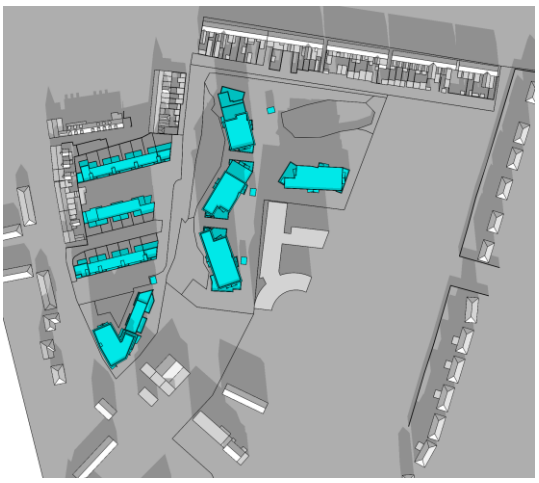
5.1.2 June 21st

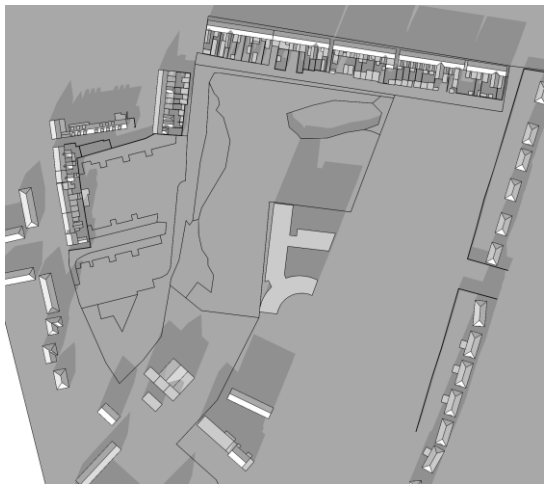
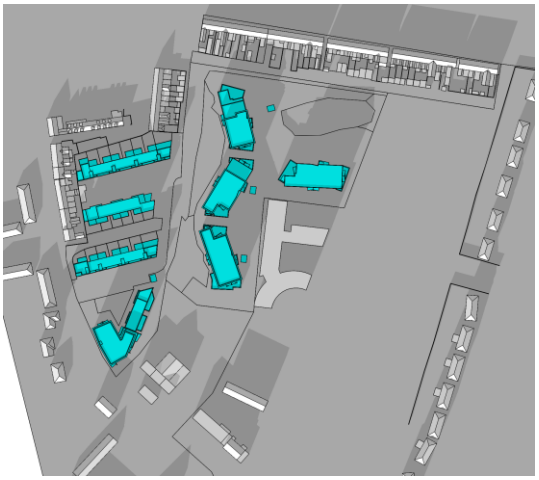
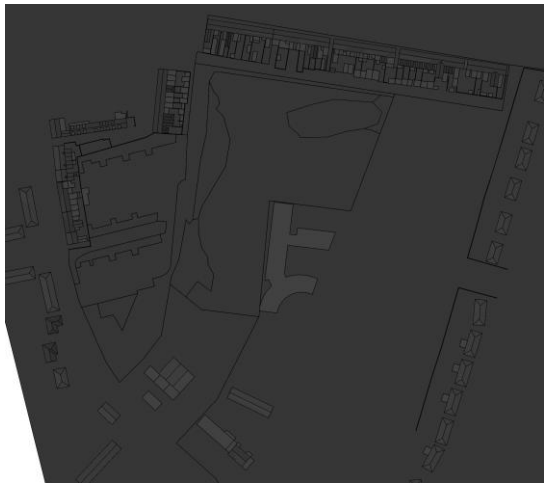
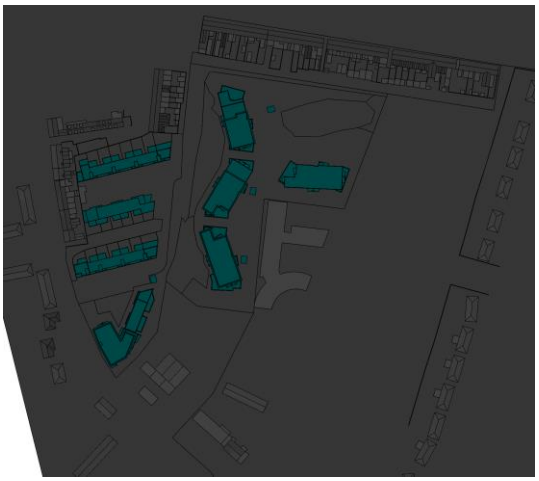
	Existing	Proposed
June 21st - 8:00		
June 21st - 10:00		
June 21st - 12:00		

	Existing	Proposed
June 21st - 14:00		
June 21st - 16:00		
June 21st - 18:00		

	Existing	Proposed
June 21st - 20:00		

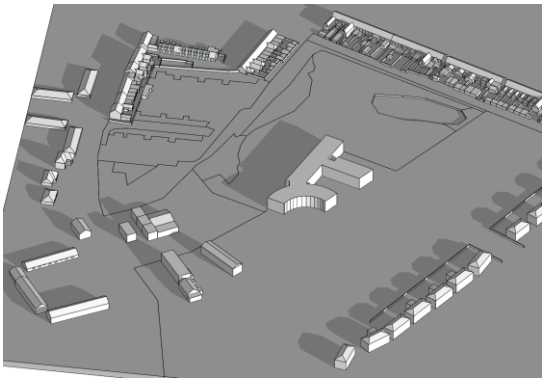
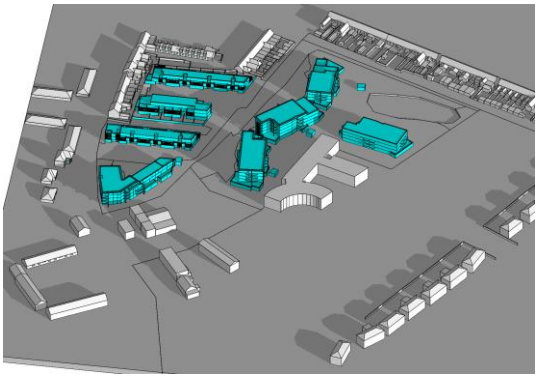
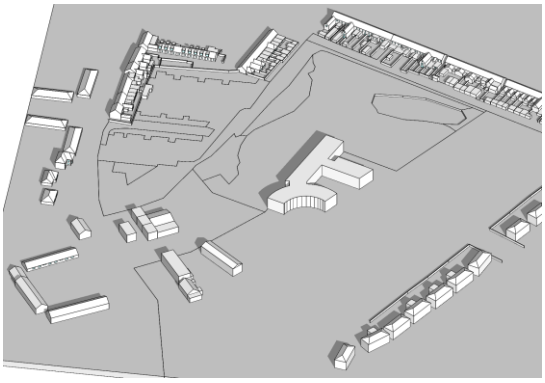
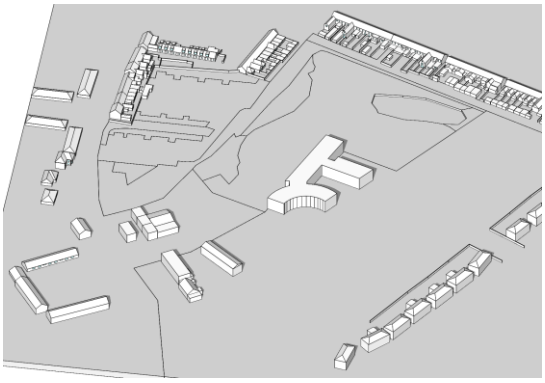
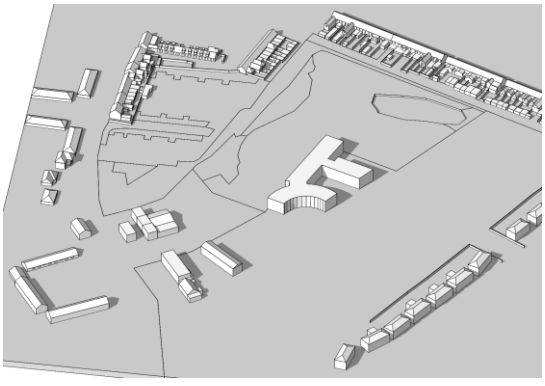
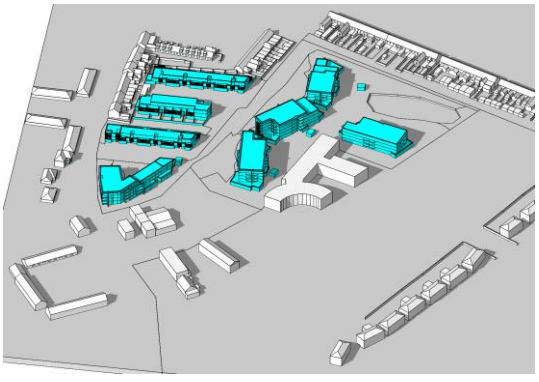
5.1.3 December 21st

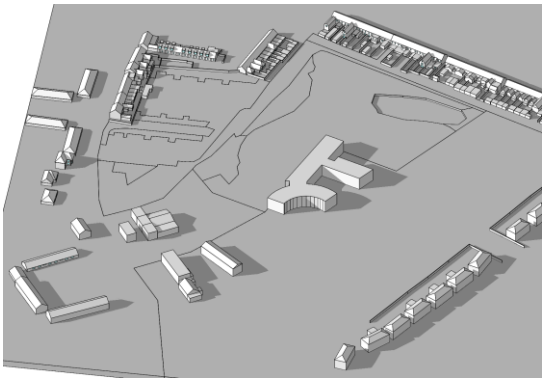
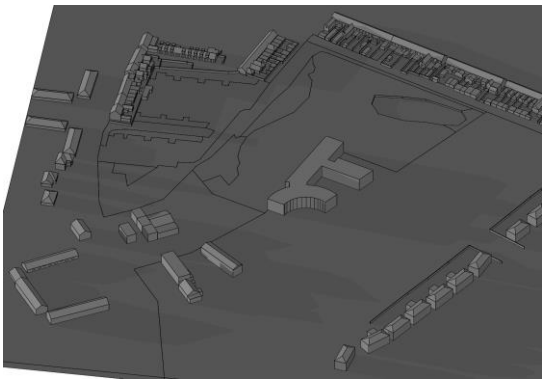
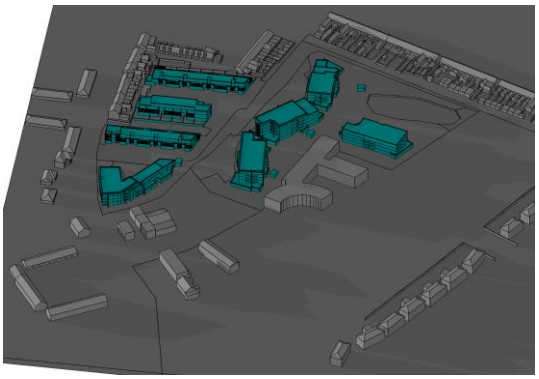
	Existing	Proposed
December 21st - 8:00		
December 21st - 10:00		
December 21st - 12:00		

	Existing	Proposed
December 21st - 14:00		
December 21st - 16:00		

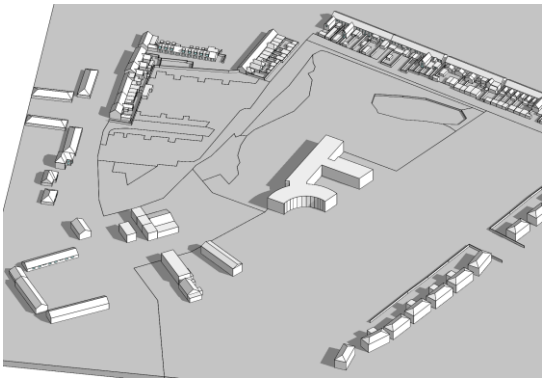
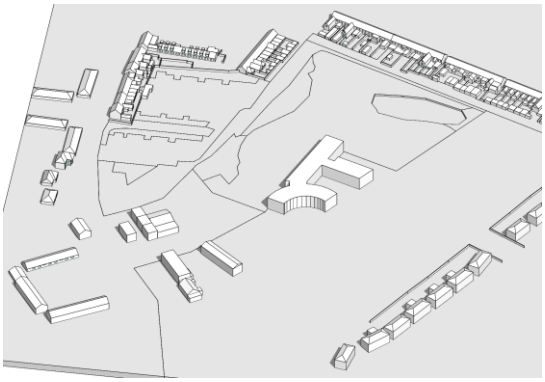
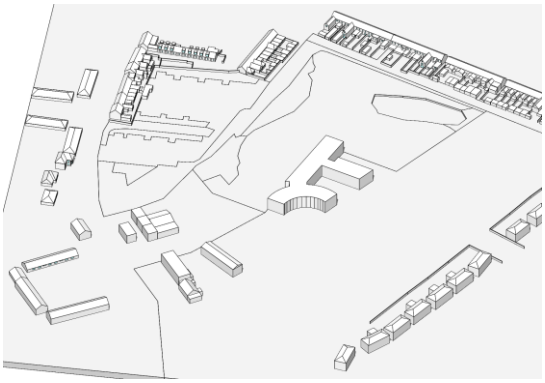
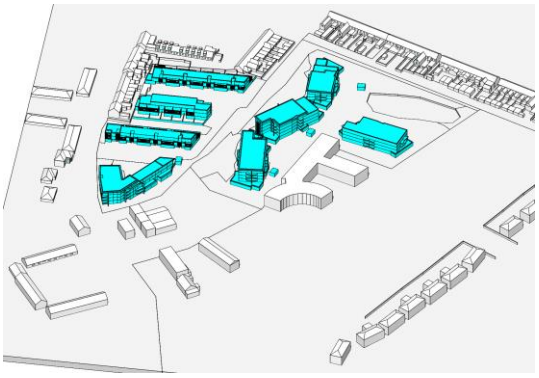
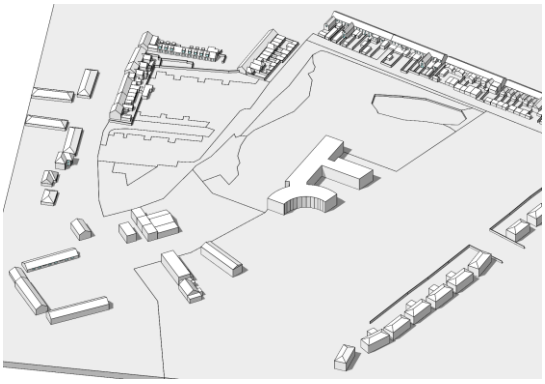
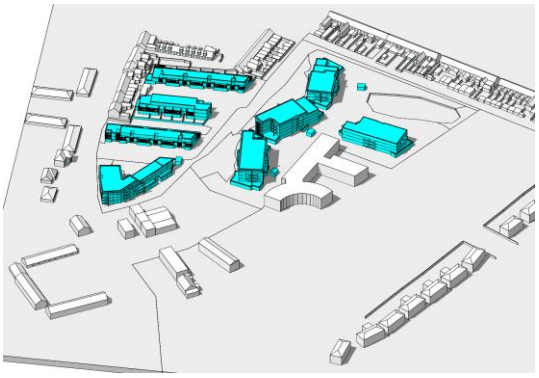
5.2 3D View

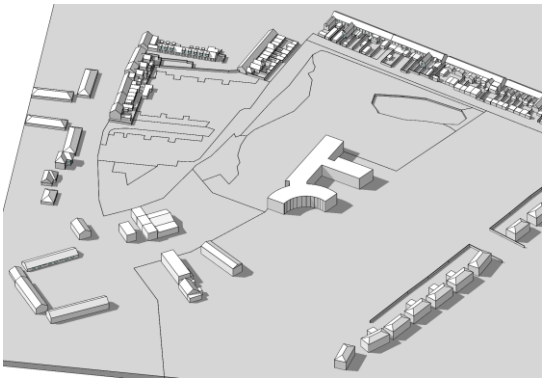
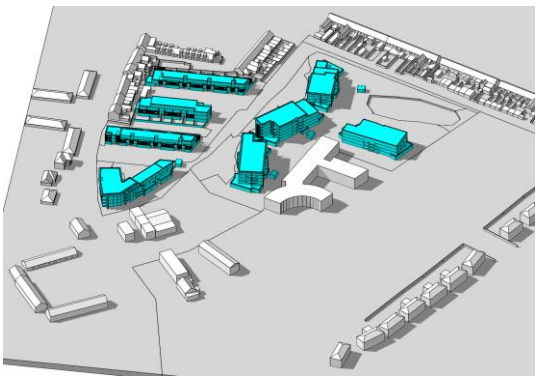
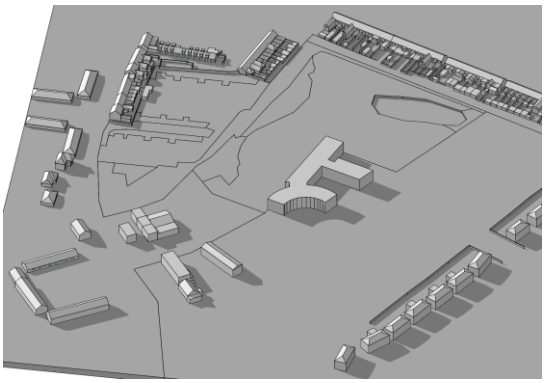
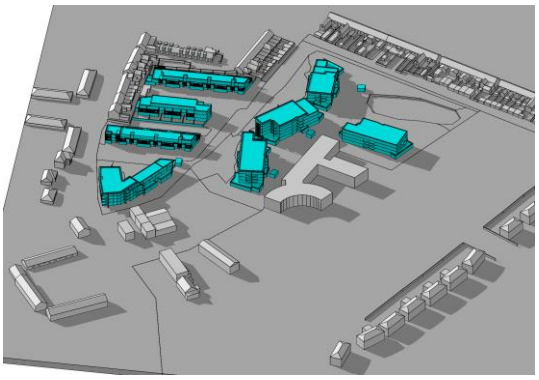
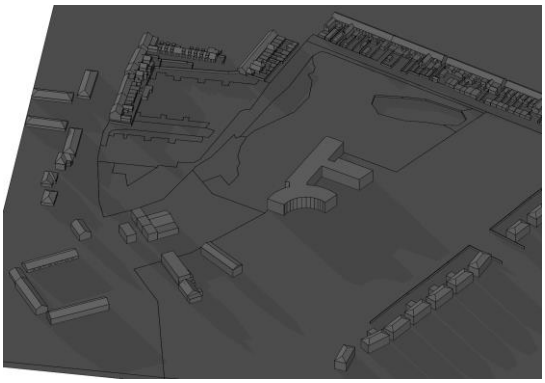
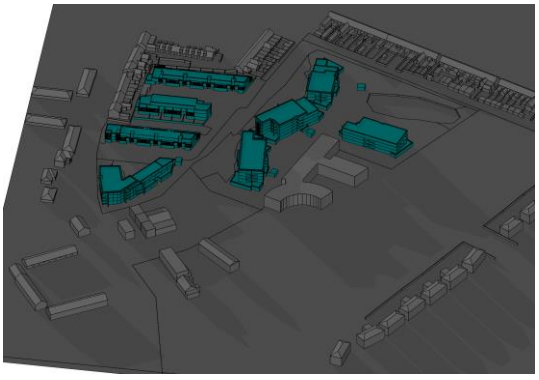
5.2.1 March 21st

	Existing	Proposed
March 21st - 8:00		
March 21st - 10:00		
March 21st - 12:00		
March 21st - 14:00		

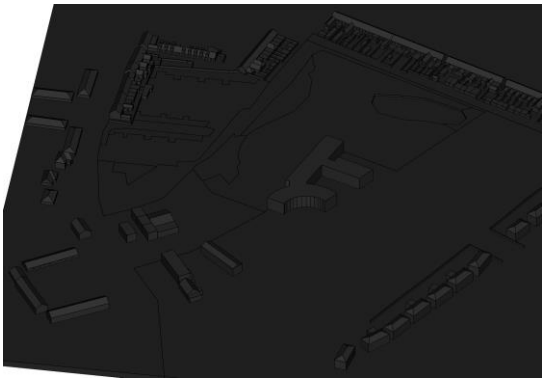
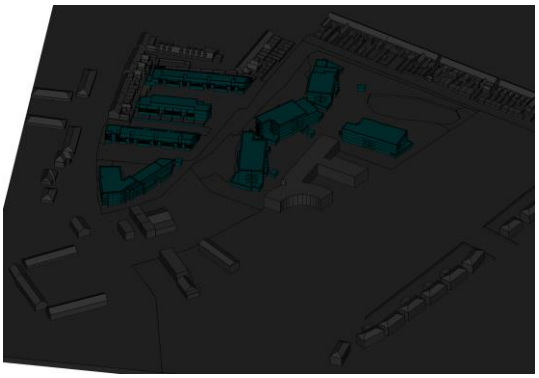
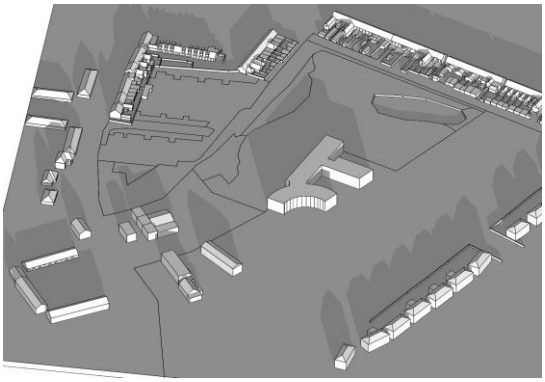
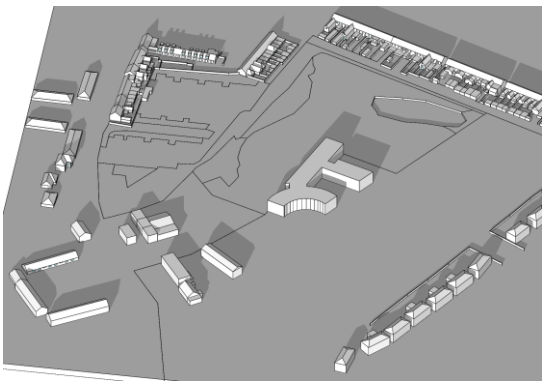
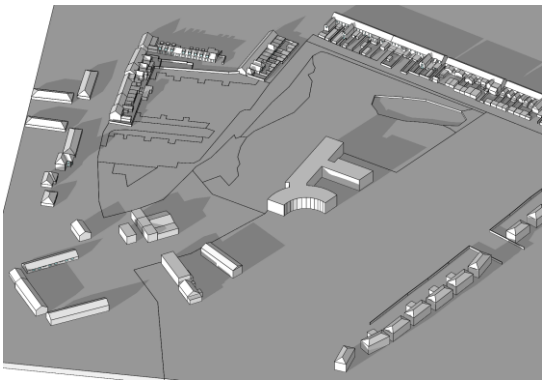
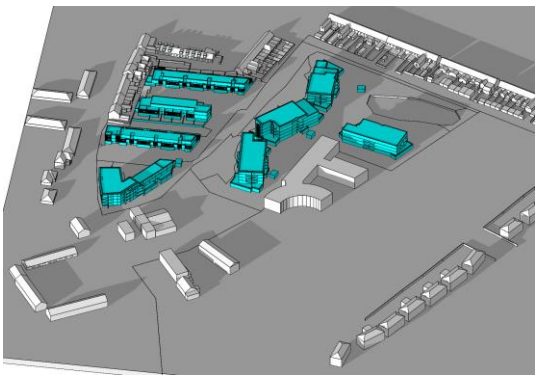
	Existing	Proposed
March 21st - 16:00		
March 21st - 18:00		

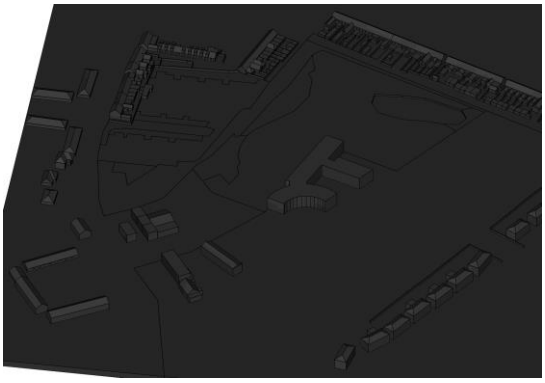
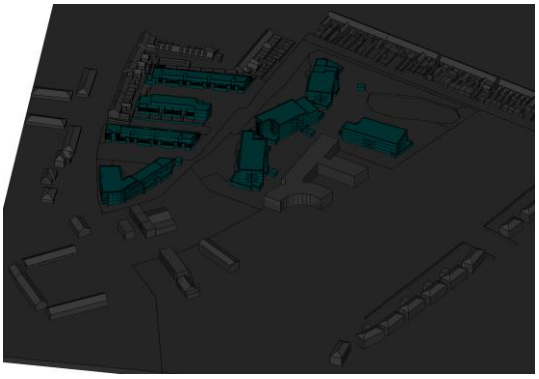
5.2.2 June 21st

	Existing	Proposed
June 21st - 8:00		
June 21st - 10:00		
June 21st - 12:00		
June 21st - 14:00		

	Existing	Proposed
June 21st - 16:00		
June 21st - 18:00		
June 21st - 20:00		

5.2.3 December 21st

	Existing	Proposed
December 21st - 8:00		
December 21st - 10:00		
December 21st - 12:00		
December 21st - 14:00		

	Existing	Proposed
December 21st - 16:00		

5.3 Discussion

The shadow analysis illustrates different shadows being cast at key times of the year (March 21st, June 21st and December 21st) for the Existing Situation and the Proposed Scheme. The results from the study are summarised as follows:

1-36 Avenue Rd, Marshes Upper

Minimal additional shading visible from the proposed development during *December at 1000-1400. No additional shading is observed from the proposed development on these existing properties at any other period.

Mourne View Hall – Students Accommodations

Minimal additional shading visible from the proposed development during March 1600-1800, June 1800-2000 and *December at 1400. No additional shading is observed from the proposed development on these existing properties at any other period.

1-42 Dunmore, Marshes Upper

No additional shading is observed from the proposed development on these properties at any period throughout the year.

1-5 Mourne View Terrace & 1-5 Mourne View

No additional shading is observed from the proposed development on these properties at any period throughout the year.

Tara House, Cabra House, Callandale House & 1-4 Hughes Park

Minimal additional shading visible from the proposed development during March at 0800. No additional shading is observed from the proposed development on these existing properties at any other period.

1-15 Hill St, Townparks

Minimal additional shading visible from the proposed development during March at 0800 and *December at 1000. No additional shading is observed from the proposed development on these existing properties at any other period.

21-29 Gosling's Terrace, Townparks

Minimal additional shading visible from the proposed development during *December at 1000-1400. No additional shading is observed from the proposed development on these existing properties at any other period.

30-40 Gosling's Terrace, Townparks

Minimal additional shading visible from the proposed development during March at 0800 and *December at 1000-1400. No additional shading is observed from the proposed development on these existing properties at any other period.

*Overshadowing is showing in December when the sun is lower in the sky and shadows cast are much longer. Although this is the case, overshadowing is least noticeable during the winter months as there is a lot less sunlight available at this time of year and so the overall impact is vastly reduced.

The potential shading impact is quantified via the “Sunlight to Amenity Spaces” and “Daylight to Existing Buildings” sections of this report.

6 Sunlight to Amenity Spaces

6.1 Guidance Requirements

The impact of the proposed development on the sunlight availability to the amenity spaces will be considered to determine how the amenity spaces perform when assessed against the BRE Guide (3rd Edition) which states the following in Section 3.3.17:

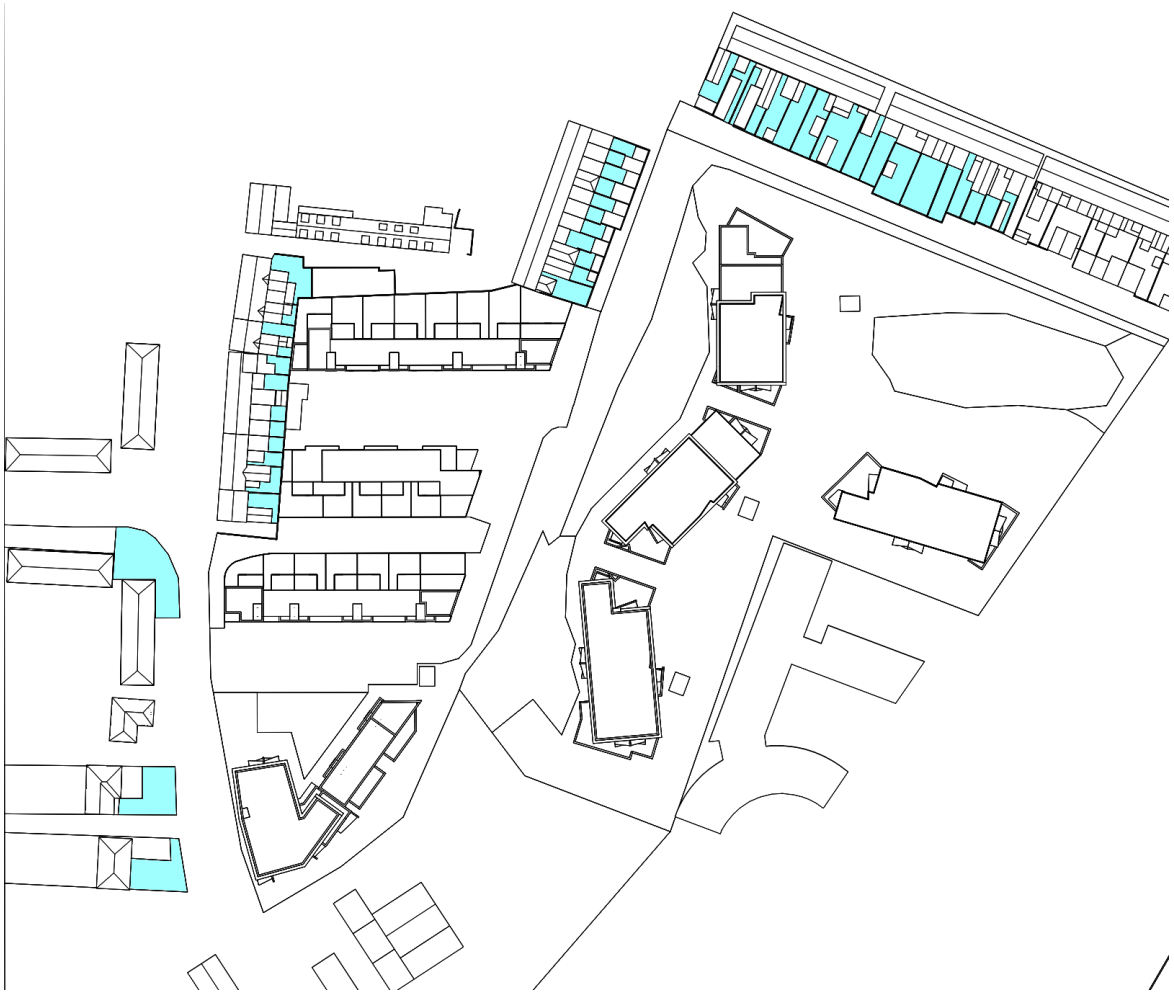
> Summary
>
> 3.3.17 It is recommended that for it to appear adequately sunlit throughout the year, at least half of a garden or amenity area should receive at least two hours of sunlight on 21 March. If as a result of new development an existing garden or amenity area does not meet the above, and the area that can receive two hours of sun on 21 March is less than 0.80 times its former value, then the loss of sunlight is likely to be noticeable. If a detailed calculation cannot be carried out, it is recommended that the centre of the area should receive at least two hours of sunlight on 21 March.

The BRE Guide (3rd Edition) states that for a space to appear adequately sunlit throughout the year, at least half of a garden or amenity space should receive at least 2 hours of sunlight on March 21st. In the case of existing amenity spaces, if they are already below the 50% threshold then the BRE recommends the results kept to within 80% of the existing situation.

6.2 Existing Amenity Spaces

This analysis will be performed on the amenity spaces illustrated in the image below.

Existing Amenity Areas

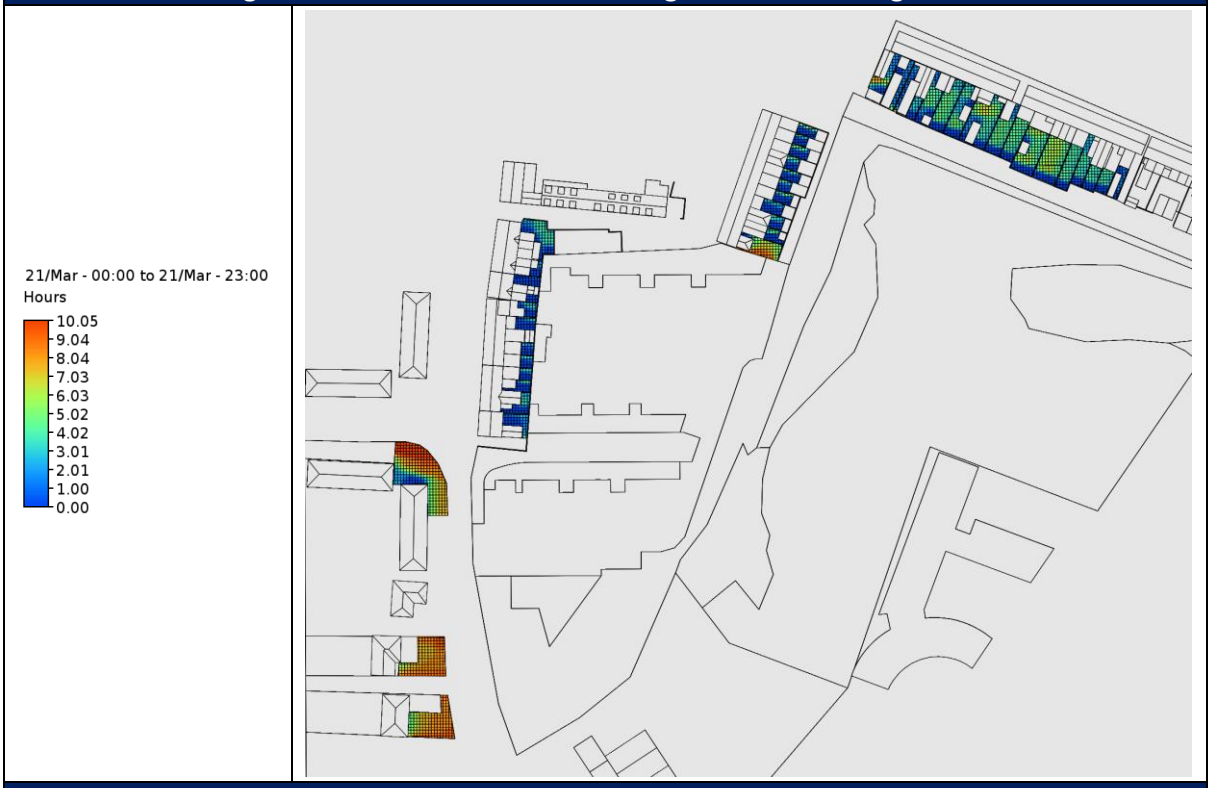


Existing Private Amenity

The following images illustrate the predicted results with respect to this space receiving at least 2 hours of sunlight on March 21st. Any areas that receive less than 2 hours of sunlight are colour-coded in grey.

6.2.1 Existing Amenity Space Results

Existing Situation: Absolute Scale Showing all Hours of Sunlight Received



Proposed Situation: Absolute Scale Showing all Hours of Sunlight Received

Existing Situation: Hours of Sunlight > 2 Illustrated in Red	
Receives more than 2 hours of sunlight Receives less than 2 hours of sunlight	
Proposed Situation: Hours of Sunlight > 2 Illustrated in Red	
Receives more than 2 hours of sunlight Receives less than 2 hours of sunlight	

6.2.2 Existing Amenity Area Results

Existing Amenity Area Results

Private Amenity Areas

Ref.	Area (m^2)	Existing Area >2 hrs		Existing Area with Proposed Development in Place >2 hrs		Proposed vs Existing (%)	Comment
		(m^2)	(%)	(m^2)	(%)		
1	271	248	91%	248	91%	100%	✓
2	154	154	100%	154	100%	100%	✓
3	147	147	100%	147	100%	100%	✓
4	84	50	60%	42	50%	84%	✓
5	14	1	7%	1	7%	100%	✓
6	29	0	0%	0	0%	100%	✓
7	11	0	0%	0	0%	100%	✓
8	27	8	30%	8	30%	100%	✓
9	28	5	18%	5	18%	100%	✓
10	18	1	6%	1	6%	100%	✓
11	18	5	28%	4	22%	80%	✓
12	18	4	22%	4	22%	100%	✓
13	24	4	17%	4	17%	100%	✓

Ref.	Area (m^2)	Existing Area >2 hrs		Existing Area with Proposed Development in Place >2 hrs		Proposed vs Existing (%)	Comment
		(m^2)	(%)	(m^2)	(%)		
14	35	14	40%	12	34%	86%	✓
15	46	11	24%	9	20%	82%	✓
16	25	4	16%	4	16%	100%	✓
17	17	4	24%	4	24%	100%	✓
18	26	8	31%	8	31%	100%	✓
19	21	7	33%	7	33%	100%	✓
20	24	5	21%	5	21%	100%	✓
21	17	6	35%	6	35%	100%	✓
22	25	7	28%	7	28%	100%	✓
23	31	7	23%	7	23%	100%	✓
24	21	7	33%	7	33%	100%	✓
25	23	7	30%	7	30%	100%	✓
26	63	58	92%	32	51%	55%	✓
27	48	31	65%	31	65%	100%	✓
28	35	6	17%	6	17%	100%	✓
29	25	6	24%	6	24%	100%	✓
30	25	13	52%	13	52%	100%	✓
31	63	40	63%	40	63%	100%	✓
32	87	75	86%	75	86%	100%	✓
33	79	60	76%	60	76%	100%	✓
34	122	99	81%	99	81%	100%	✓
35	71	53	75%	53	75%	100%	✓
36	72	61	85%	61	85%	100%	✓
37	108	87	81%	87	81%	100%	✓
38	139	120	86%	120	86%	100%	✓
39	68	58	85%	58	85%	100%	✓
40	56	46	82%	46	82%	100%	✓
41	35	25	71%	25	71%	100%	✓
42	35	25	71%	25	71%	100%	✓
43	20	0	0%	0	0%	100%	✓

6.3 Proposed Amenity Spaces

This analysis will be performed on the amenity spaces illustrated in the image below.

Proposed Amenity Spaces

Proposed Communal Amenities

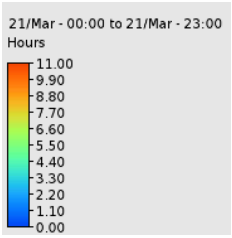
Proposed Public Amenities

Proposed Private Amenities

The following images illustrate the predicted results with respect to this space receiving at least 2 hours of sunlight on March 21st. Any areas that receive less than 2 hours of sunlight are colour-coded in grey.

6.3.1 Proposed Amenity Spaces Results

Proposed Development in place: Absolute Scale Showing all Hours of Sunlight Received



Proposed Development in place: Absolute Scale Showing all Hours of Sunlight Received

Receives more than 2 hours of sunlight

Receives less than 2 hours of sunlight

6.3.2 Proposed Amenity Results

Proposed Communal Amenity Results	
Proposed Communal Amenities Proposed Public Amenities Proposed Private Amenities	

Public Open Spaces

Ref	Total Area (m^2)	Area Receiving >2h (m2)	Percent Receiving >2h	Comment
1 (POS)	1,234	1,234	100%	✓
2 (POS)	3,396	3,396	100%	✓
3 (POS)	819	819	100%	✓
4 (Seasonal)	2,162	2,162	100%	✓
Total Public Open Spaces	**7,611**	**7,611**	**100%**	✓

Communal Open Spaces

Ref	Total Area (m^2)	Area Receiving >2h (m2)	Percent Receiving >2h	Comment
5 (COS)	573	505	88%	✓
6 (COS)	906	765	84%	✓
7 (COS)	295	295	100%	✓
8 (COS)	635	608	96%	✓
Total Communal Open Spaces	**2,409**	**2,173**	**90%**	✓

Proposed Private Spaces

Ref	Total Area (m^2)	Area Receiving >2h (m2)	Percent Receiving >2h	Comment
9	69	15	22%	x
10	73	0	0%	x
11	76	1	1%	x
12	80	5	6%	x
13	83	9	11%	x
14	86	10	12%	x
15	94	20	21%	x
16	107	15	14%	x
17	83	56	67%	✓
18	55	35	64%	✓
19	55	35	64%	✓
20	55	35	64%	✓
21	55	35	64%	✓
22	47	35	74%	✓
23	40	2	5%	x
24	58	0	0%	x
25	62	0	0%	x
26	62	0	0%	x
27	61	0	0%	x
28	61	0	0%	x
29	74	0	0%	x

6.4 Discussion

As outlined in Section 3.3.17 of the BRE Guide (3rd Edition), for a space to appear adequately sunlit throughout the year, at least half of the garden or amenity area should receive at least 2 hours of sunlight on March 21st. In the case of existing amenity spaces, if they are already below the 50% threshold then the BRE recommends the results kept to within 80% of the existing situation.

Existing Amenity Spaces

The existing private amenity spaces in the adjacent properties have been analysed and the results demonstrate they continue to receive similar level of sunlight even with the proposed development in place on March 21st, thus complying with the recommendations in the BRE Guide as outlined above.

Proposed Amenity Spaces

On March 21st, 100% of the combined public communal amenity areas and 90% of the combined proposed communal amenity areas within the development site will receive at least 2 hours of sunlight over their combined area. When considered individually, all communal and public open spaces are also complying with the BRE recommendations.

Ground floor apartments within Blocks E, F and G have private gardens to the rear. All these individual areas tested perform as expected. Those facing predominantly north are noted to be below the BRE Guide (2nd and 3rd Editions) recommendations as they are shaded by the property on the plot. Those south facing are achieving at least 2 hours of sunlight over 50% of their area on the 21st of March,

complying with the BRE recommendations. It is worth noting that Blocks F and G have access to a communal area (no.5) which receives high levels of sunlight.

All the proposed private gardens greatly exceed the minimum private open space requirements of the Apartment Design Guidelines. In addition, ground floor apartments within Block E have additional private space to the South, adjoining the main living room.

7 Sunlight to Existing Buildings

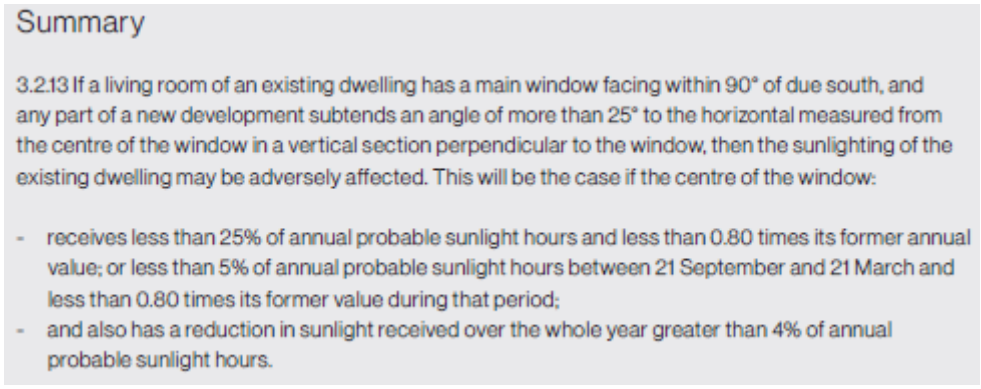
7.1 Guidance – BRE Guide (3rd Edition)

The BRE Guide (3rd Edition) states that interiors where the occupants expect sunlight should receive at least one quarter (25%) of annual probable sunlight hours, including at least 5% of annual probable sunlight hours during the winter months, between 21st September and 21st March.

Here 'probable sunlight hours' means the total number of hours in the year that the sun is expected to shine on unobstructed ground, allowing for average levels of cloudiness for the location in question.

If a window reference point can receive more than 25% of annual probable sunlight hours, including at least 5% of annual probable sunlight hours during the winter months between 21st September and 21st March, then the room should still receive enough sunlight. Any reduction in sunlight access below this level should be kept to a minimum.

If the available sunlight hours are both less than the amount given and less than 0.8 times their former value, either over the whole year or just during the winter months (21st September to 21st March) and reduction in sunlight across the year has a greater reduction than 4%, then the occupants of the existing building will notice the loss of sunlight.



Summary

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

- receives less than 25% of annual probable sunlight hours and less than 0.80 times its former annual value; or less than 5% of annual probable sunlight hours between 21 September and 21 March and less than 0.80 times its former value during that period;
- and also has a reduction in sunlight received over the whole year greater than 4% of annual probable sunlight hours.

BRE 3rd Edition guidance document Site Layout Planning for Daylight and Sunlight

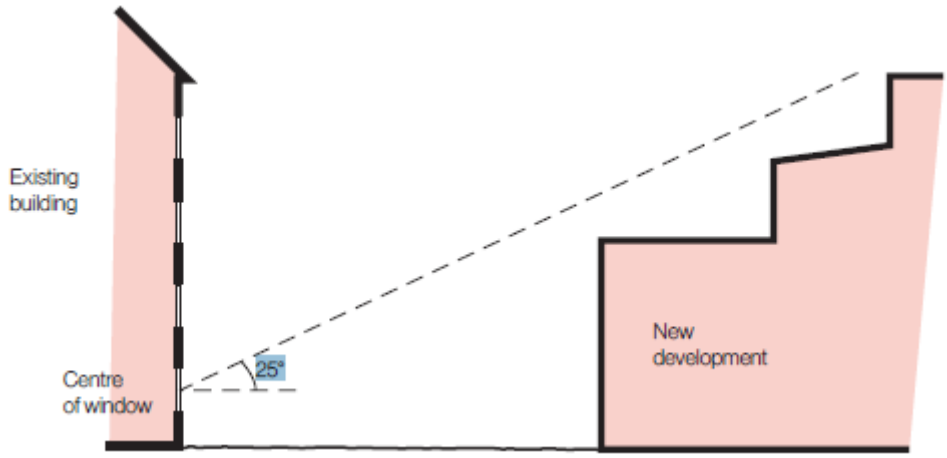
As such this study will compare the Existing Scheme and Proposed Schemes and consider if the values on the existing buildings meet the requirements outlined above when compared to their former value (that of the Existing scheme).

7.1.1 APSH Exclusions

The BRE recommendations note that if a new development sits within 90° of due south of any main living room window of an existing dwelling, then these should be assessed for APSH. However, there are several exceptional cases in which APSH is not required to be calculated, as indicated below:

3.2.9 It is not always necessary to do a full calculation to check sunlight potential. The guideline above is met provided either of the following is true:

- If the distance of each part of the new development from the existing window is three or more times its height above the centre of the existing window (note: obstructions within 90° of due north of the existing window need not count here).
- The window wall faces within 90° of due south and no obstruction, measured in the section perpendicular to the window wall, subtends an angle of more than 25° to the horizontal (Figure 14 in section 2.2). Again, obstructions within 90° of due north of the existing window need not be counted.
- The window wall faces within 20° of due south and the reference point has a VSC (section 2.1) of 27% or more.



BRE 3rd Edition guidance document Site Layout Planning for Daylight and Sunlight

Consequently, APSH will only be calculated for adjacent windows which meet the following conditions:

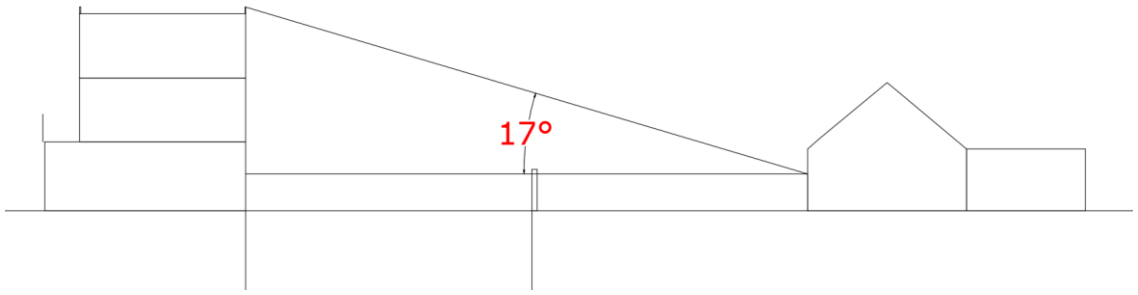
1. The height distance rule it not met and the existing building has living room with a main window which faces within 90 degrees of due south with the 25° rule not being met either.
2. Existing building is located to the North, East, or West of the Proposed Development.
3. The existing main living room window lies within 20 degrees of due south and has a VSC of less than 27%.

Taking the above into consideration, the existing properties north facing the proposed development have been excluded from this analysis. The existing dwellings which have living area windows that face within 90 degrees of South have been verified in the following section in the 25-degree rule to determine if they need to be included in this assessment.

7.2 25-Degree Rule

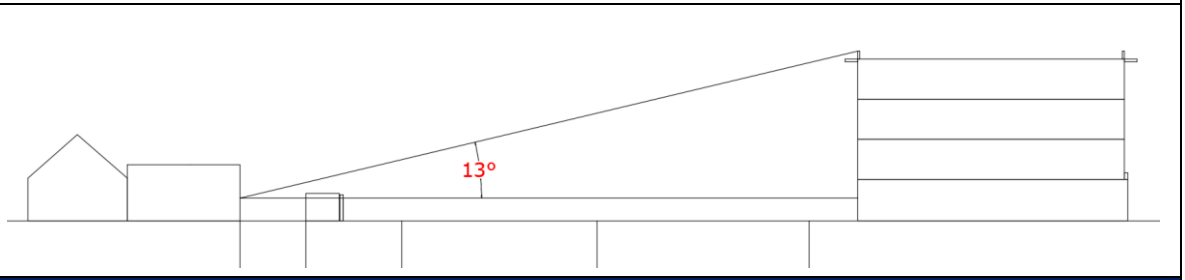
Taking the above into consideration, the existing properties north, east and west facing the proposed development have been excluded from this analysis. The existing dwellings which have living area windows that face within 90 degrees of South, the 25-degree check was carried out for the windows with the proposed development in place and verifying that the requirement was met, they were excluded from this assessment. The following screenshots show the 25-degree rule sections.

View 1



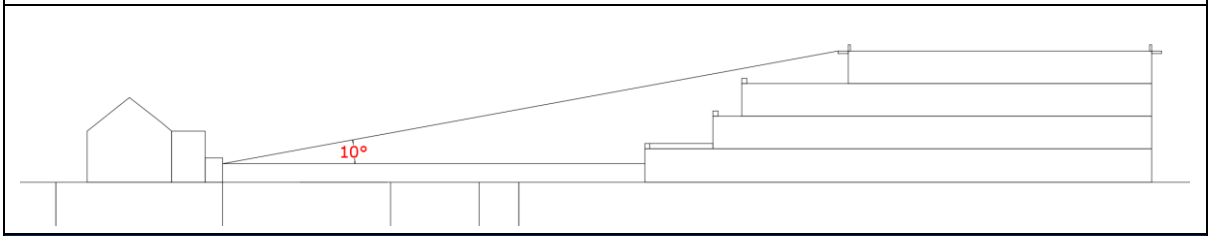
Can be excluded from the calculations – Angle 17° (less than 25°)

View 2



Can be excluded from the calculations – Angle 13° (less than 25°)

View 3



Can be excluded from the calculations – Angle 10° (less than 25°)

7.3 Discussion

This study considers the proposed scheme and tests if the Annual Probable Sunlight Hours (APSH) results for the living room windows are greater than 25% annual and 5% winter sunlight or are greater than 0.8 times their former value with the proposed development in place or the reduction in sunlight across the year is less than 4% with the proposed development in place.

Based on the criteria outlined in Section 3.2.9 of the BRE Guide 3rd Edition, none of the existing/adjacent buildings fit the requirements to be assessed and as such the APSH assessment was not conducted. The BRE guide (3rd Edition) notes that there should be no impact to sunlight for these properties.

"It is not always necessary to do a full calculation to check sunlight potential. The guideline above is met provided either the following is true:

- If the window wall faces within 90° of due south and no obstruction, measured in the section perpendicular to the window wall, subtends an angle of more than 25° to the horizontal. Again, obstructions within 90° of due north need not be counted."

Given the statement above the surrounding dwellings adjacent to the proposed development were verified noting that, in a section perpendicular to the window wall, no angle subtended more than 25° in some cases they were sitting to the South of the development.

As noted above, none of the existing/adjacent properties have been assessed, as noted in Section 3.2.9 of the BRE Guide 3rd Edition, that these windows need not be analysed as sunlight impact will be unnoticeable to the existing occupants. The 25-degree test sections can be viewed in section 7.3 of the report.

8 Sunlight to Proposed Development

8.1 Guidance – BRE Guide 3rd Edition / IS/BS EN 17037-2018+A1-2021

Section 5.3.1 of IS/BS EN 17037-2018+A1-2021 states that *"exposure to sunlight is an important quality criterion of an interior space and can contribute to human well-being."* Table A.6 from IS/BS EN 17037-2018+A1-2021 summarises the recommendation for daily sunlight exposure.

Table A.6 — Recommendation for daily sunlight exposure

Level of recommendation for exposure to sunlight	Sunlight exposure
Minimum	1,5 h
Medium	3,0 h
High	4,0 h

Within the context of a domestic property, BRE Guide 3rd Edition/IS EN 17037:2018 states that at least one habitable space within a dwelling should receive the recommended minimum value of 1.5 hours of sunlight on the 21st of March. The test is carried out on a clear, cloud free day.

8.2 Sunlight Exposure Assessment

Based on the above criteria for BRE Guide 3rd Edition/IS/BS EN 17037-2018+A1-2021, all main living room windows within the proposed development have been assessed with the results included in the following sections.

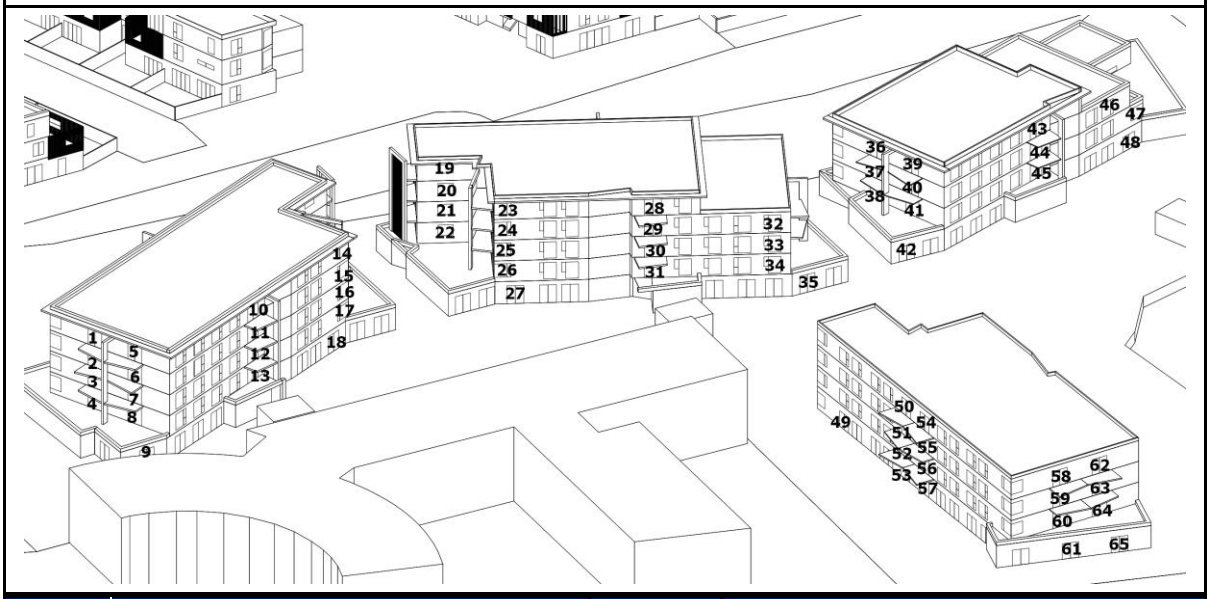
Please note, the "Comment" symbol in each of the tables represents the following:

BRE Guide 3rd Edition / IS/BS EN 17037-2018+A1-2021

✓ These rooms achieve the minimum 1.5 hours of recommended sunlight exposure on March 21st.

x These rooms do not achieve the minimum 1.5 hours of recommended sunlight exposure on March 21st.

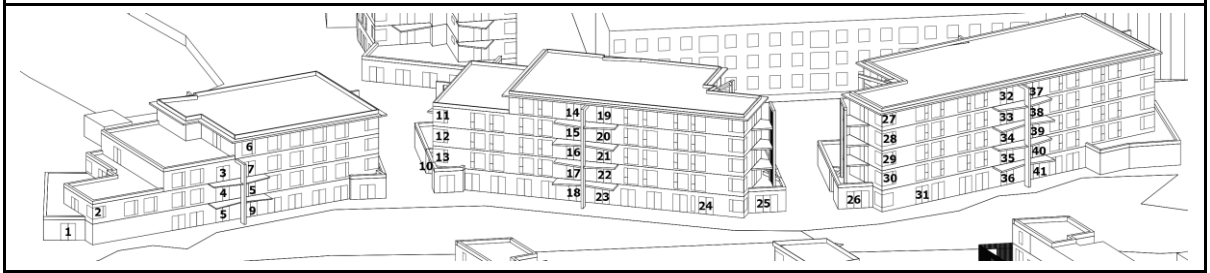
8.2.1 View 01 – Block A5



Ref.	BRE Guide 3rd Edition IS EN 17037:2018 Sunlight Exposure > 1.5 hrs	Ref.	BRE Guide 3rd Edition IS EN 17037:2018 Sunlight Exposure > 1.5 hrs
	Comment		Comment
1	✓	34	✓
2	✓	35	✓
3	✓	36	✓
4	✓	37	✓
5	✓	38	✓
6	✓	39	✓

Ref.	BRE Guide 3rd Edition IS EN 17037:2018 Sunlight Exposure > 1.5 hrs	Ref.	BRE Guide 3rd Edition IS EN 17037:2018 Sunlight Exposure > 1.5 hrs
	Comment		Comment
7	✓	40	✓
8	✓	41	✓
9	✓	42	✓
10	✓	43	✓
11	✓	44	✓
12	✓	45	✓
13	✓	46	✓
14	✓	47	✓
15	✓	48	✓
16	✓	49	✓
17	✓	50	✓
18	✓	51	✓
19	✓	52	✓
20	✓	53	✓
21	✓	54	✓
22	✓	55	✓
23	✓	56	✓
24	✓	57	✓
25	✓	58	✓
26	✓	59	✓
27	✓	60	✓
28	✓	61	✓
29	✓	62	✓
30	✓	63	✓
31	✓	64	✓
32	✓	65	✓
33	✓		

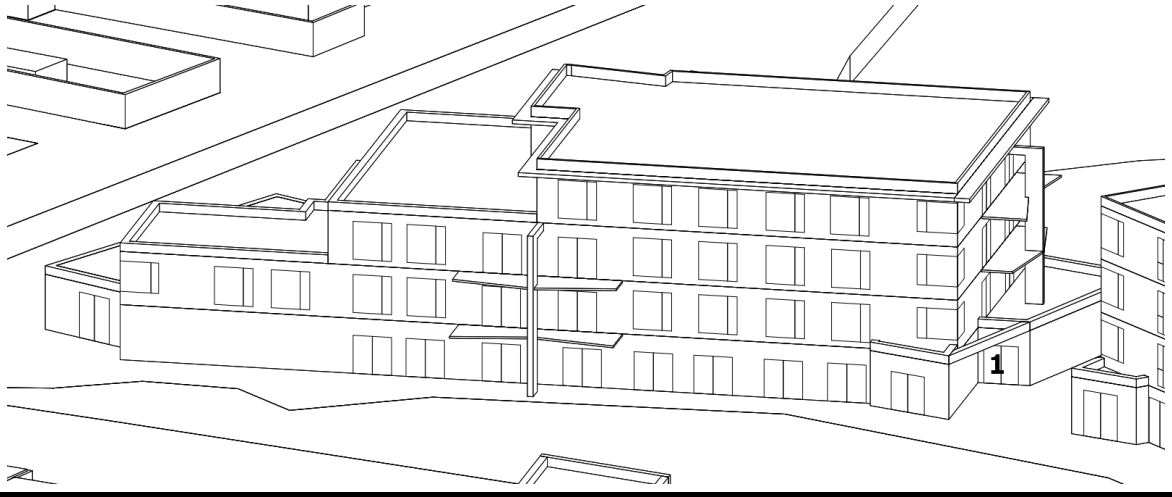
8.2.2 View 02 – Block A5



Ref.	BRE Guide 3rd Edition IS EN 17037:2018 Sunlight Exposure > 1.5 hrs	Ref.	BRE Guide 3rd Edition IS EN 17037:2018 Sunlight Exposure > 1.5 hrs
	Comment		Comment
1	✓	22	✓
2	✓	23	✓
3	✓	24	✓
4	✓	25	✓
5	✓	26	✓
6	✓	27	✓
7	✓	28	✓
8	✓	29	✓
9	✓	30	✓
10	x	31	✓
11	✓	32	✓
12	✓	33	✓
13	✓	34	✓
14	✓	35	✓

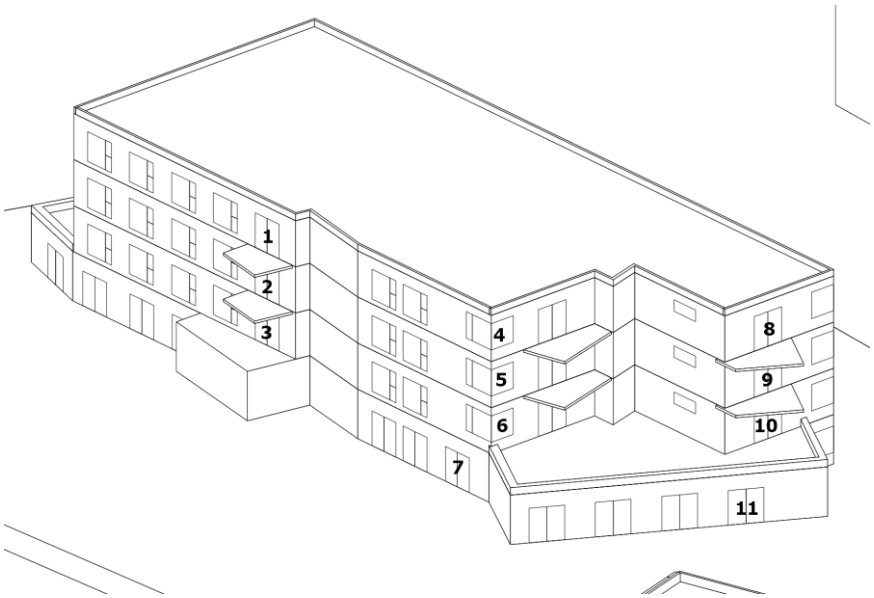
Ref.	BRE Guide 3rd Edition IS EN 17037:2018 Sunlight Exposure > 1.5 hrs Comment	Ref.	BRE Guide 3rd Edition IS EN 17037:2018 Sunlight Exposure > 1.5 hrs Comment
15	✓	36	✓
16	✓	37	✓
17	✓	38	✓
18	✓	39	✓
19	✓	40	✓
20	✓	41	✓
21	✓		

8.2.3 View 03 – Block C



Ref.	BRE Guide 3rd Edition IS EN 17037:2018 Sunlight Exposure > 1.5 hrs
	Comment
1	✓

8.2.4 View 04 – Block D



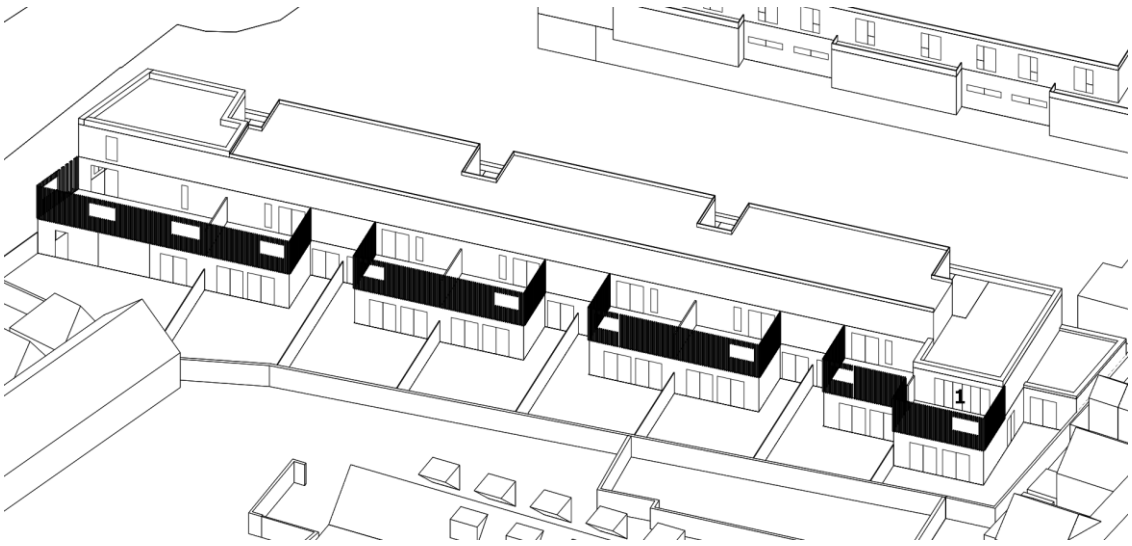
Ref.	BRE Guide 3rd Edition IS EN 17037:2018 Sunlight Exposure > 1.5 hrs	Ref.	BRE Guide 3rd Edition IS EN 17037:2018 Sunlight Exposure > 1.5 hrs
	Comment		Comment
1	x	7	x
2	x	8	✓
3	x	9	✓
4	✓	10	✓
5	✓	11	✓
6	✓		

8.2.5 View 05 – Blocks E, F & G

Ref.	BRE Guide 3rd Edition IS EN 17037:2018 Sunlight Exposure > 1.5 hrs	Ref.	BRE Guide 3rd Edition IS EN 17037:2018 Sunlight Exposure > 1.5 hrs
	Comment		Comment
1	✓	22	✓
2	✓	23	✓
3	✓	24	✓
4	✓	25	✓
5	✓	26	✓
6	✓	27	✓

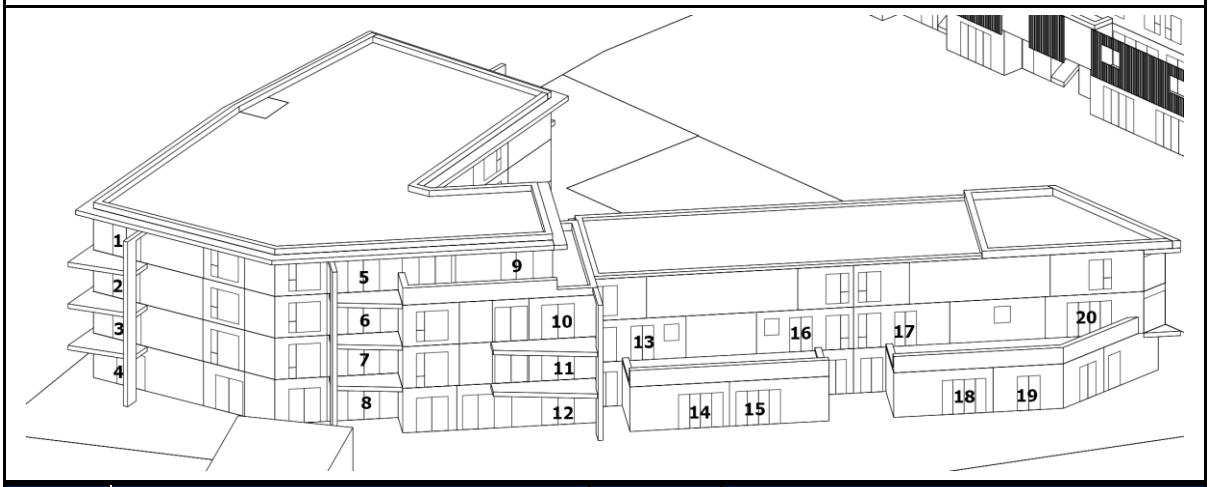
Ref.	BRE Guide 3rd Edition IS EN 17037:2018 Sunlight Exposure > 1.5 hrs	Ref.	BRE Guide 3rd Edition IS EN 17037:2018 Sunlight Exposure > 1.5 hrs
	Comment		Comment
7	✓	28	✓
8	✓	29	✓
9	✓	30	✓
10	✓	31	✓
11	✓	32	✓
12	✓	33	✓
13	✓	34	✓
14	✓	35	✓
15	✓	36	✓
16	✓	37	✓
17	✓	38	✓
18	✓	39	✓
19	✓	40	✓
20	✓	41	✓
21	✓	42	✓

8.2.6 View 06 – Block E



Ref.	BRE Guide 3rd Edition IS EN 17037:2018 Sunlight Exposure > 1.5 hrs
	Comment
1	x

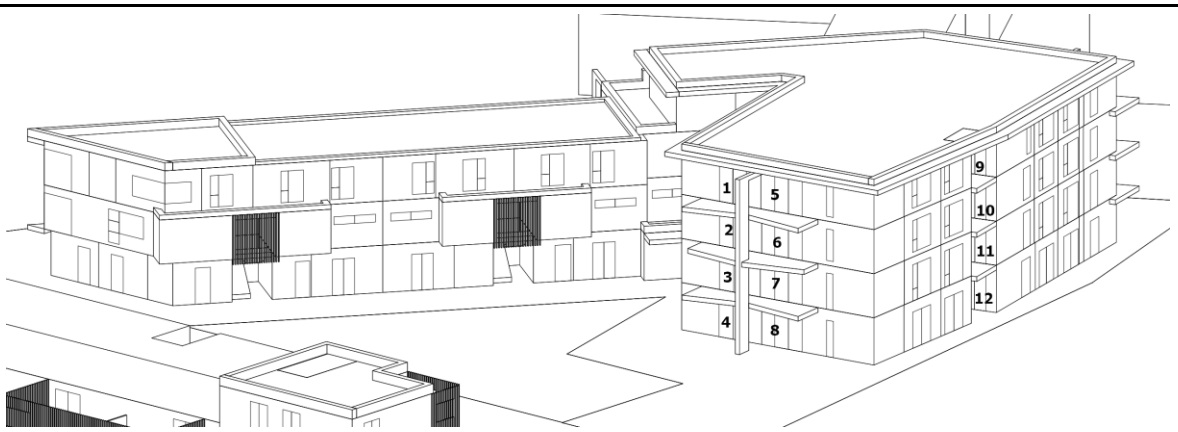
8.2.7 View 07 – Block H



Ref.	BRE Guide 3rd Edition IS EN 17037:2018 Sunlight Exposure > 1.5 hrs	Ref.	BRE Guide 3rd Edition IS EN 17037:2018 Sunlight Exposure > 1.5 hrs
	Comment		Comment
1	✓	11	✓
2	✓	12	✓
3	✓	13	✓
4	✓	14	✓
5	✓	15	✓
6	✓	16	✓
7	✓	17	✓
8	✓	18	✓
9	✓	19	✓

Ref.	BRE Guide 3rd Edition IS EN 17037:2018 Sunlight Exposure > 1.5 hrs	Ref.	BRE Guide 3rd Edition IS EN 17037:2018 Sunlight Exposure > 1.5 hrs
	Comment		Comment
10	✓	20	✓

8.2.8 View 08 – Block H



Ref.	BRE Guide 3rd Edition IS EN 17037:2018 Sunlight Exposure > 1.5 hrs	Ref.	BRE Guide 3rd Edition IS EN 17037:2018 Sunlight Exposure > 1.5 hrs
	Comment		Comment
1	✓	7	✓
2	✓	8	✓
3	✓	9	✓
4	✓	10	✓
5	✓	11	✓
6	✓	12	✓

8.3 Discussion

BRE Guide 3rd Edition / IS/BS EN 17037-2018+A1-2021

As the sunlight exposure assessment in accordance with BRE Guide 3rd Edition / IS/BS EN 17037-2018+A1-2021 considers the orientation of the rooms the following should be noted from section 3.1.11 of the guide.

"The BS EN 17037 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."

Of the 193 no. points tested 97% (187 no.) meet the BRE Guide 3rd Edition / IS/BS EN 17037:2018 sunlight exposure recommendations of greater than 1.5 hours on March 21st. Where windows do not meet this recommendation, this is predominantly as a result of their orientation, or as a consequence of the impact of balcony projections.

It should be noted that in the development of any apartment type building in particular, achieving in the region of 75% to 80% for this assessment would be considered very high and factors such site constraints and ultimately orientation play a huge part to the outcome of this assessment. In some instance and particularly a scheme like this where you have apartments on either side of a rectangular block that is constrained by the site orientation, 50% would be as highest percentage achievable with the apartments on one side not able meet requirements purely on orientation as noted and the inclusion of balconies within the design scheme (as a requirement).

Overall, the sunlight provision results to the proposed development in accordance with IS/BS EN 17037:23018 are considered excellent due to the fact that not all living rooms can face south and the inclusion of balconies.

Finally, the sunlight exposure results are visually represented in Appendix B.

9 Daylight to Existing Buildings

9.1 Guidance – BRE Guide (3rd Edition) / IS/BS EN 17037-2018+A1-2021

When designing a new development, it is important to safeguard the daylight to nearby buildings. The BRE Guide provides numerical values that are purely advisory. Different criteria may be used based on the requirements for daylighting in an area viewed against other site layout constraints. Another issue is whether the existing building is itself a good neighbour, standing a reasonable distance from the boundary and taking no more than its fair share of light. Any reduction in the total amount of skylight can be calculated by determining the vertical sky component at the centre of key reference points. The vertical sky component definition from the BRE Guide (3rd Edition) is described below:

Vertical sky component (VSC)	This is a measure of the amount of light reaching a window. It is the ratio of that part of illuminance, at a point on a given vertical plane, that is received directly from a CIE standard overcast sky, 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.

The maximum possible VSC value for an opening in a vertical wall, assuming no obstructions, is 40%. This VSC at any given point can be tested in RadianceIES, a module of IES VE.

For typical residential schemes the BRE Guide (3nd Edition) states the following in Section 2.2.7:

> 2.2.7 If this VSC is greater than 27% then enough skylight should still be reaching the window of the existing building. Any reduction below this level should be kept to a minimum. If the VSC, with the new development in place, is both less than 27% and less than 0.8 times its former value, occupants of the existing building will notice the reduction in the amount of skylight. The area lit by the window is likely to appear more gloomy, and electric lighting will be needed more of the time.

As such this study will compare the Existing scheme and Proposed scheme and consider if the values on the existing buildings are above 27% or not less than 0.8 times their former value (that of the Existing scheme).

It is also important to note that Section 2.1.6 of the BRE Guide states that if the VSC is between 15% and 27%, special measures such as larger windows can provide adequate daylight (refer to extract below).

> 2.1.6 The amount of daylight a room needs depends on what it is being used for. But roughly speaking, if θ is:
>
> - greater than 65° (obstruction angle less than 25° or VSC at least 27%) conventional window design will usually give reasonable results.
> - between 45° and 65° (obstruction angle between 25° and 45°, VSC between 15% and 27%) special measures (larger windows, changes to room layout) are usually needed to provide adequate daylight.
> - between 25° and 45° (obstruction angle between 45° and 65°, VSC between 5% and 15%) it is very difficult to provide adequate daylight unless very large windows are used.
> - less than 25° (obstruction angle greater than 65°, VSC less than 5%) it is often impossible to achieve reasonable daylight, even if the whole window wall is glazed.

9.2 25 Degree Rule

Section 2.2.5 of the BRE Guide states that if in a section perpendicular to the window wall, no angle subtended more than 25 degrees, as shown in the image below, it is not necessary to do a full calculation as the daylight impact will be unnoticeable to the occupants. The following screenshots show the section images produced as evidence for each of the qualifying views for the 25-degree rule. Two neighbouring elevations did not meet the criteria and have been assessed in the following section.

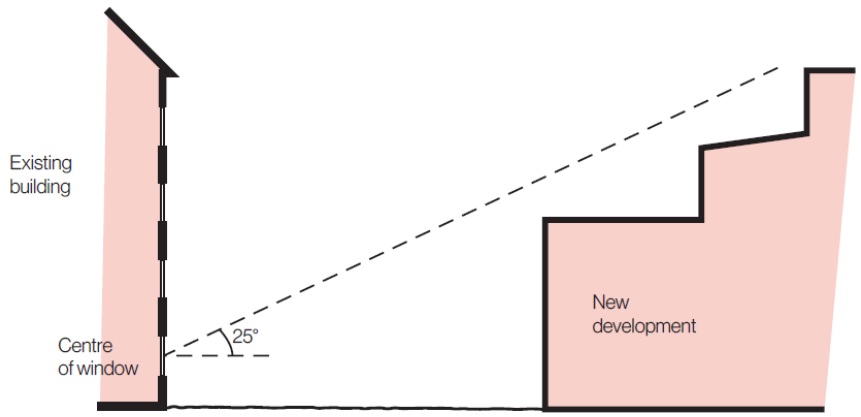
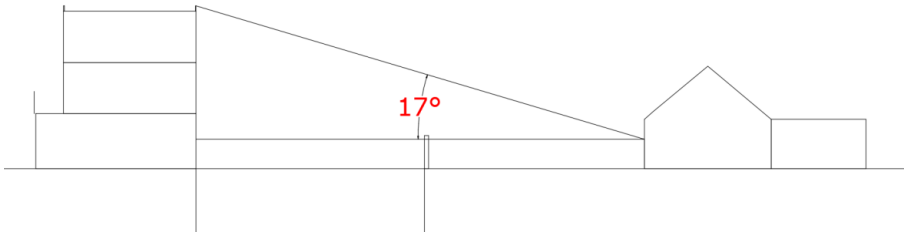


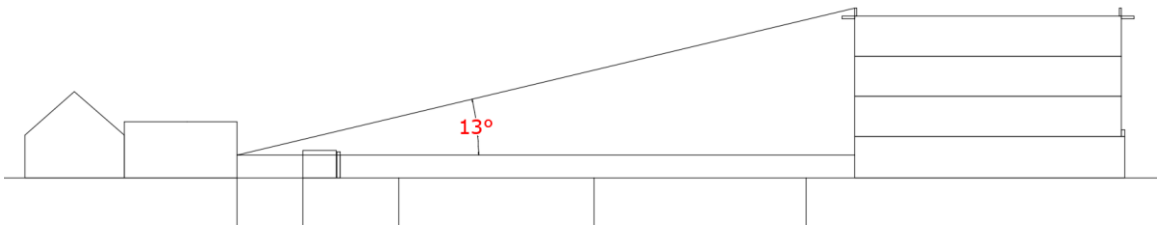
Figure 14: Section in plane perpendicular to the affected window wall

View 1



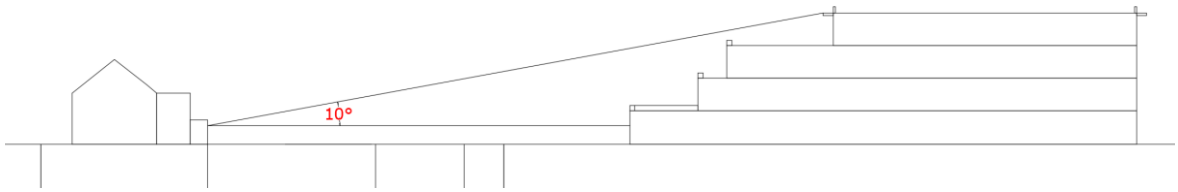
Can be excluded from the calculations – Angle 17° (less than 25°)

View 2



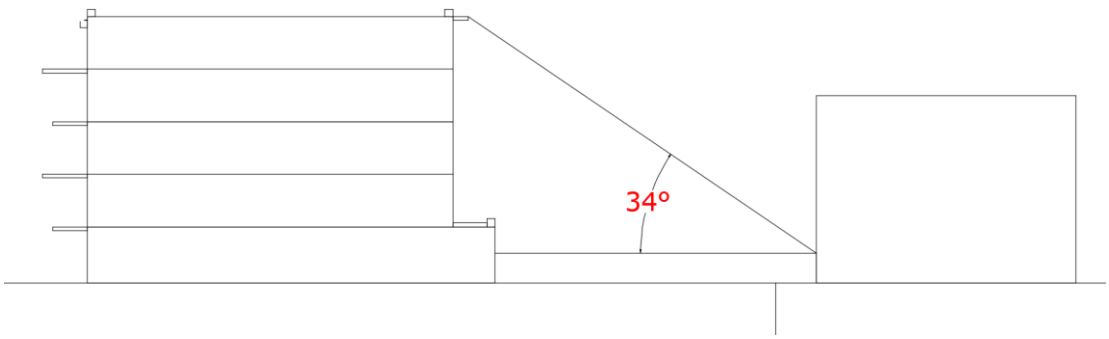
Can be excluded from the calculations – Angle 13° (less than 25°)

View 3



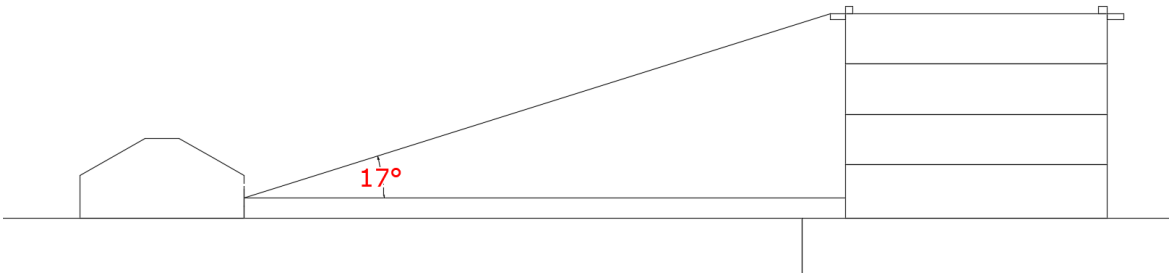
Can be excluded from the calculations – Angle 10° (less than 25°)

View 4



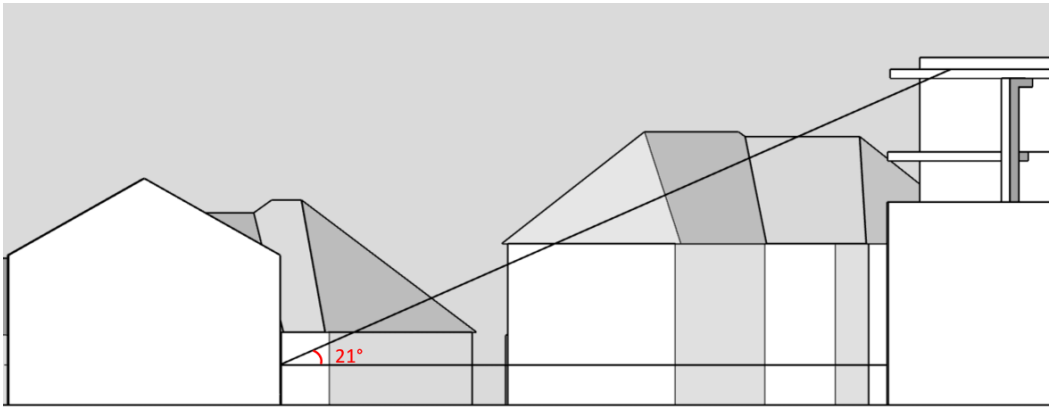
Included in the calculations – Angle 34° (more than 25°)

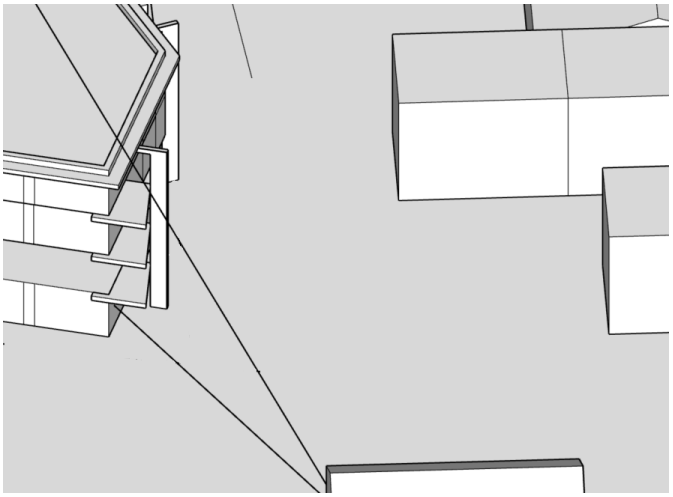
View 5



Can be excluded from the calculations – Angle 17° (less than 25°)

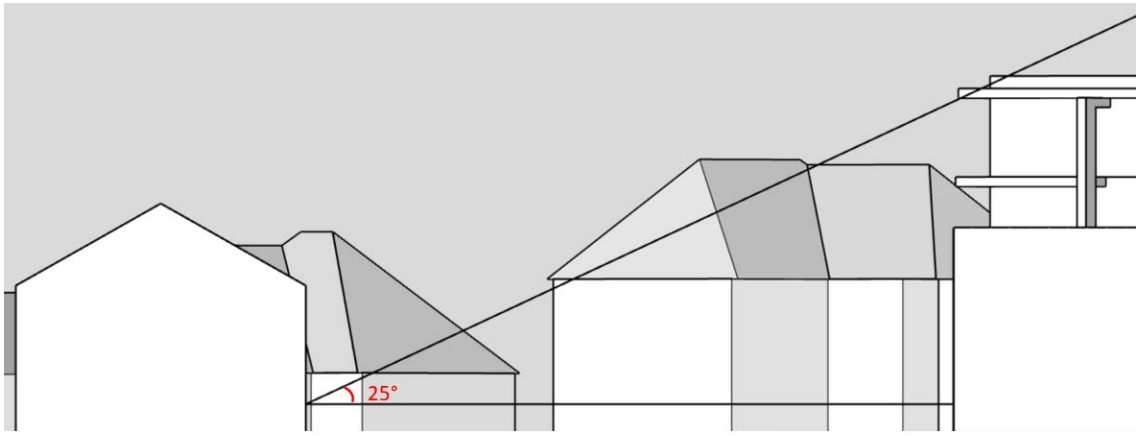
View 6 (Not Perpendicular to building)

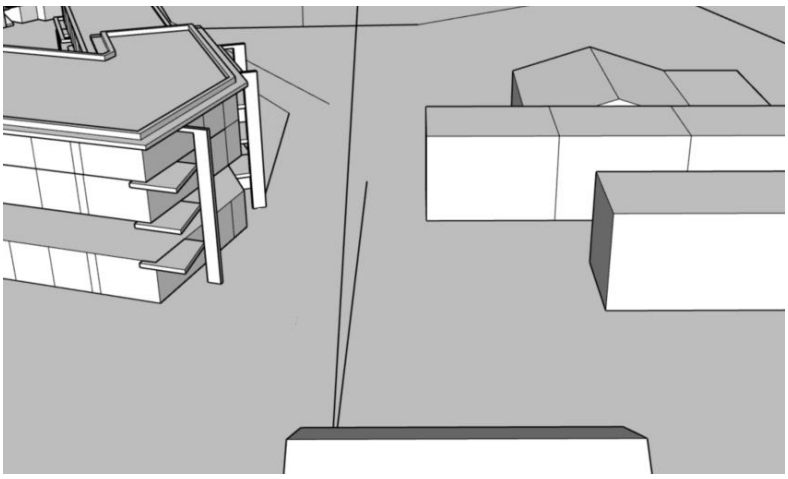




Can be excluded from the calculations – Angle 17° and not perpindicualr to the existing building.

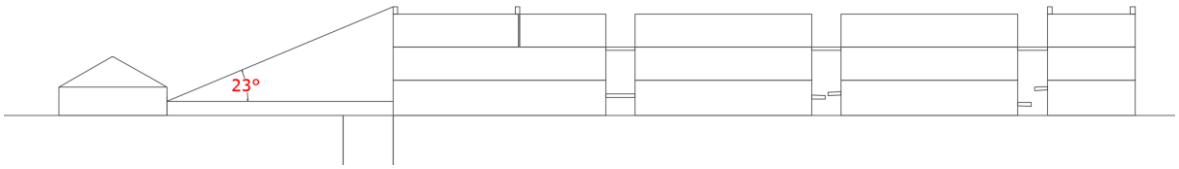
View 7 (Perpendicular to building)





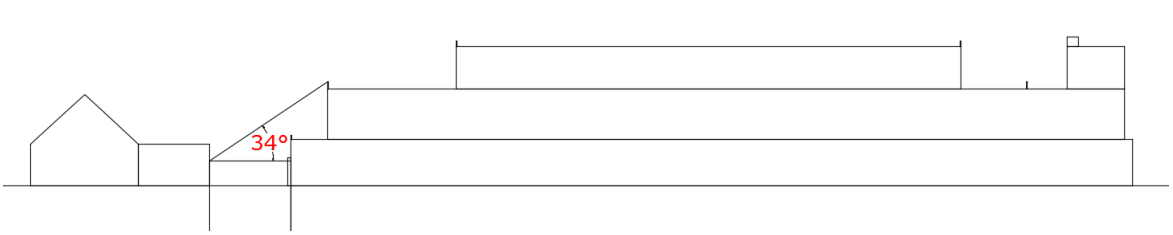
Can be excluded from the calculations – Angle 25° and does not intersect with the proposed building.

View 8



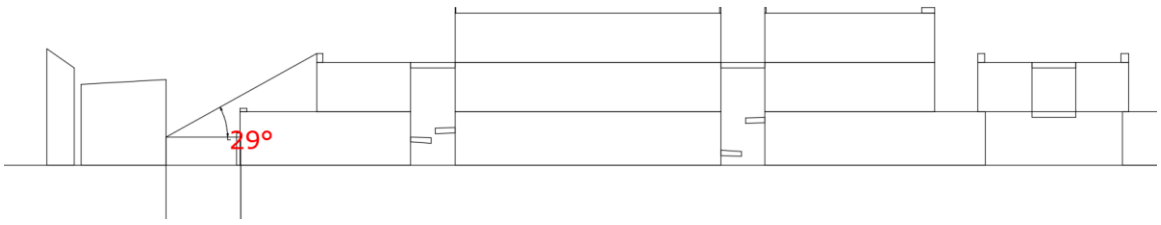
Can be excluded from the calculations – Angle 23° (less than 25°)

View 9



Included in the calculations – Angle 34° (more than 25°)

View 10



Included in the calculations – Angle 29° (more than 25°)

9.3 Assessment

Based on the above criteria, the locations in the following sections have been modelled and analysed with the results also included.

Please note, the "Comment" symbol in each of the tables represents the following:

✓ For these locations, the Proposed Scheme VSC value is greater than 27% or 0.8 times their former value (that of the Existing Situation/Permitted Scheme).

✓[1] For these locations, the Proposed Scheme VSC value is less than 0.8 times its former value (that of the Existing). However, the Proposed Scheme VSC values are between 15% and 27% and hence adequate daylight should still be expected (as per Section 2.1.6 of the BRE Guide) given the presence of larger than conventional windows.

x For these locations, the Proposed Scheme VSC value is less than 15% and less than 0.8 times its former value (that of the Existing Situation), therefore, it does not achieve the BRE recommendations.

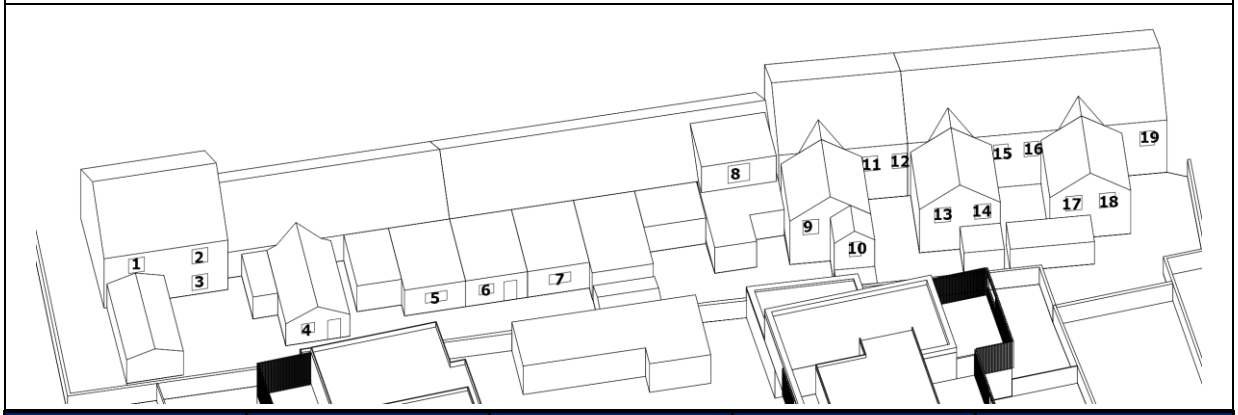
9.3.1 View 1: Mourne View Hall – Student Accommodations

Ref.	Existing Situation	Proposed Scheme VSC	Proposed VSC as a % of Existing Situation	Comment
1	39.09	33.66	86%	✓
2	38.91	30.45	78%	✓
3	39.02	33.83	87%	✓
4	38.93	30.48	78%	✓
5	39.02	33.92	87%	✓
6	38.89	30.65	79%	✓
7	39.02	34.03	87%	✓
8	38.85	31.31	81%	✓
9	38.67	28.48	74%	✓
10	39.14	34.01	87%	✓
11	38.90	31.19	80%	✓

Ref.	Existing Situation	Proposed Scheme VSC	Proposed VSC as a % of Existing Situation	Comment
12	38.66	28.17	73%	✓
13	39.18	34.35	88%	✓
14	38.92	31.57	81%	✓
15	38.63	29.27	76%	✓
16	39.13	34.15	87%	✓
17	39.06	31.68	81%	✓
18	38.72	28.85	75%	✓
19	39.13	34.44	88%	✓
20	38.94	31.60	81%	✓
21	38.66	28.79	74%	✓
22	39.12	34.43	88%	✓
23	38.91	31.21	80%	✓
24	38.61	28.79	75%	✓
25	39.27	33.62	86%	✓
26	38.84	31.04	80%	✓
27	38.55	28.01	73%	✓
28	39.07	33.97	87%	✓
29	39.00	30.87	79%	✓
30	38.74	27.90	72%	✓
31	39.08	33.32	85%	✓
32	38.78	30.49	79%	✓
33	38.83	27.49	71%	✓
34	39.07	33.20	85%	✓
35	38.87	29.98	77%	✓
36	38.71	26.85	69%	✓[1]
37	39.01	32.63	84%	✓
38	38.91	29.35	75%	✓
39	38.80	26.13	67%	✓[1]
40	39.04	32.42	83%	✓
41	38.95	29.11	75%	✓
42	38.68	25.76	67%	✓[1]
43	39.10	32.25	82%	✓
44	39.10	28.70	73%	✓
45	38.62	25.11	65%	✓[1]
46	39.20	31.88	81%	✓
47	38.87	28.36	73%	✓
48	38.82	24.99	64%	✓[1]
49	39.20	31.87	81%	✓
50	38.90	28.23	73%	✓
51	38.58	24.84	64%	✓[1]
52	39.16	31.48	80%	✓

Ref.	Existing Situation	Proposed Scheme VSC	Proposed VSC as a % of Existing Situation	Comment
53	39.05	28.08	72%	✓
54	38.67	24.80	64%	✓[1]

9.3.2 View 2: 1-15 Hill St, Townparks



Ref.	Existing Situation	Proposed Scheme VSC	Proposed VSC as a % of Existing Situation	Comments
1	38.63	34.91	90%	✓
2	38.7	34.99	90%	✓
3	33.19	29.61	89%	✓
4	36.81	30.25	82%	✓
5	36.56	27.67	76%	✓
6	35.09	28.02	80%	✓
7	30.6	28.15	92%	✓
8	36.03	33.39	93%	✓
9	34.47	29.43	85%	✓
10	38.56	28.45	74%	✓
11	26.24	24.54	94%	✓

Ref.	Existing Situation	Proposed Scheme VSC	Proposed VSC as a % of Existing Situation	Comments
12	27.4	25.72	94%	✓
13	38	33.63	89%	✓
14	38.38	34.89	91%	✓
15	26.65	26.47	99%	✓
16	26.73	25.96	97%	✓
17	38.11	35.9	94%	✓
18	37.97	35.91	95%	✓
19	33.46	33.14	99%	✓

9.4 Discussion

This study considers the Proposed Scheme and tests if the VSC results are greater than 27% or not less than 0.8 times the value of the Existing Situation.

Based on the criteria outlined in Section 2.2.5 of the BRE guidance (3rd Edition), only two of the neighbouring elevations require inclusion within the VSC assessment (Mourne View Hall and 1-15 Hill Street) as the rest they did not meet the criterion as laid out within the BRE guide which is as follows.

It is not always necessary to do a full calculation to check daylight potential. The guideline above is met provided the following is true:

- no obstruction, measured in the section perpendicular to the window wall, subtends an angle of more than 25° to the horizontal.

Therefore, as noted above, only two of the neighbouring elevations require inclusion within the VSC assessment as the daylight impact will be unnoticeable to the occupants of the other neighbouring elevations. Please refer to section 9.2 25 Degree Rule for the section images produced as evidence for each of the qualifying views.

Of the 73 points tested, 90% (66 no. points) have a Proposed VSC value greater than 27% or not less than 0.8 times their former value compared to the Existing Situation. The remaining 7 points located in the student accommodation building have VSC values between 24.8% and 26.85% and hence adequate daylight should still be expected (as per Section 2.1.6 of the BRE Guide) given the presence of larger than conventional windows for the living spaces and the other spaces being bedrooms. These results are only marginally outside the recommendations and therefore when this is taken into consideration all of the points tested should receive adequate daylight.

10 Daylight to Proposed Development

This section addresses daylight provision to the proposed development. The purpose of the calculations is to quantify an overall percentage of units which exceeds the daylight provision recommendations. Our proposed methodology is to complete the calculations for all of the apartments and duplexes within the development. The objective of the design team is to maximise the number of units which exceed the minimum recommendations.

10.1 Reference Standards

The daylight provision to the proposed development was assessed against the following standard:

- BRE Guide (3rd Edition) / BS EN 17037-2018+A1-2021

There are two methods to assess daylight provision to the interior which are based on target values in Table A.3 of BS EN 17037-2018+A1-2021 which are summarised as follows:

Method 1: This calculation method uses the daylight factor targets on the reference plane as per Table A.3. The assessment is carried out on a representative day and time during the year, i.e. 21st September @ 12:00 under standard CIE overcast sky conditions.

Method 2: This calculation method uses the illuminance targets on the reference plane as per Table NA.1. The assessment is carried out for each hour over the course of the year (8,760 hours) using a local weather file which accounts for varying sky conditions and sun positions throughout the year.

As outlined in Section 5.1.4 of the standard, the verification of daylight provision can be determined using either an adequate software or on-site measurements. When using a software, *"a representative model of the space is required together with the key parameters (such as any significant nearby obstructions, the assigned surface reflectance values and glazing transmissivity) that are a reasonable representation of those for the actual, completed building. This can be determined using either Method 1 or Method 2."*

Based on the above criteria, the daylight provision to the proposed development has been assessed using an adequate software (i.e. IES VE), using the Method 2 climate-based approach and targeting the minimum recommended values outlined in Table NA.1 of BS EN 17037-2018+A1-2021. (see section 10.1.1 for table NA.1)

The Method 2 climate-based approach was selected as it is a far more accurate assessment method compared to Method 1. Climate based daylight modelling (CBDM) is more accurate compared to a calculation based on a single day during the year, i.e. Method 1. The amount of daylight varies throughout the year, primarily due to the sun's position, so it is essential the impact of daylight variance is properly considered. CBDM utilises an annual simulation linking location, shading, climate data (including solar intensity and cloud cover) together with the building properties. This provides a complete overview on how the daylight performance varies throughout the year due to changes in these factors.

According to the BRE 3 Guidelines presentation given by the Dun Laoghaire Rathdown consultant, Chris Shackleton, BS EN 17037-2018+A1-2021 National Annex is the appropriate assessment methodology to satisfy minimum standards of daylight provision. For completeness, IS EN 17037 non-annex results have been included in Appendix C.

The following sections summarise the requirements for the BS EN 17037-2018+A1-2021 standard.

10.1.1 BRE Guide 3rd Edition / BS EN 17037-2018+A1-2021 National Annex

In the UK, EN17037-2018+A1-2021 was adopted to form "BS EN 17037-2018+A1-2021". However, a "National Annex NA" was included which states:

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

Whereas IS EN 17037-2018+A1-2021 does not provide different illuminance targets for different space types, the BS EN 17037:2018 National Annex provides target illuminance values for bedrooms, living rooms and kitchens within residential developments as per Table NA.1 below. It is also important to note that as the climate in Ireland is similar to the UK, the targets outlined in the BS EN National Annex could also be applied to dwellings in Ireland.

Table NA.1 — Values of target illuminance for room types in UK dwellings

Room type	Target illuminance E_T (lx)
Bedroom	100
Living room	150
Kitchen	200

The BS National Annex also states:
"Where one room in a UK dwelling serves more than a single purpose, the UK committee recommends that the target illuminance is that for the room type with the highest value – for example, in a space that combines a living room and a kitchen the target illuminance is recommended to be 200 lx."

Therefore, combined LKDs are to be assessed using a 200 lux target illuminance (E_T).

Finally, the BS National Annex also states that:

"It is the opinion of the UK committee that the recommendation in Clause A.2 – that a target illuminance level should be achieved across the entire (i.e. 95 %) fraction of the reference plane within a space – need not be applied to rooms in dwellings."

Therefore, when assessing the daylight provisions in residential dwellings in accordance with BS EN 17037-2018+A1-2021, only the target illuminance (E_T) will be assessed for Bedrooms, Living Rooms, Kitchens (or combined LKDs) on over 50% of the floor area over 50% of the available daylight hours. The minimum target illuminance (E_{TM}) or minimum target daylight factor (D_{TM}) will not be assessed.

10.2 Daylight Model Inputs

The following inputs were used in the study:

BRE Guide (3rd Edition) / IS EN / BS EN 17037-2018+A1-2021

- Weather File: Dublin.epw (15 year average)

Common Inputs to all Standards

- Working Plane Height: 0.85m
- Glazing Light Transmittance: 70%
- Window Frame thickness: 50 mm

The following surface reflectance values are used in the study:

Material Surface	Reflectance
External Wall	0.20
Internal Partition – White Paint	0.80
Roof – Default	0.20
Ground – Default	0.20
Floor/Ceiling (Floor) – Light Veneers	0.40
Floor/Ceiling (Ceiling) – White Paint	0.80

10.3 Daylight Results

The following tables summarise the daylight provision results for the tested spaces within all the apartment blocks and duplexes within the development under the BRE Guide 3rd Edition / BS EN 17037-2018+A1-2021 Method 2 National Annex. The purpose of the calculations is to quantify an overall percentage of rooms which exceed the recommendations. The objective of the design team is to maximise the number of units which exceed the recommendations. Individual room results can be viewed in Appendix A.

The results are summarised in the following tables:

Tested Spaces of Block A

A compliance rate of 100% is achieved under BRE Guide 3rd Edition / BS EN 17037-2018+A1-2021 Method 2 National Annex for the tested spaces of Block A within the proposed development. The daylight provision results are summarised below.

Rooms Tested	Total No. Rooms
Total No. Bedrooms Tested	65
Total No. LKDs Tested	34
Total No. Spaces Tested	**99**

BRE Guide 3rd Edition / BS EN 17037:2018+A1-2021 Method 2 National Annex Assessment				
Room Type	**Pass (No.)**	**Pass (%)**	**BR (No.)**	**BR (%)**
No. Bedrooms	65	100%	0	0%
No. LKDs	34	100%	0	0%
Total No.	**99**	**100%**	**0**	**0%**

*BR = Below Recommendations

Tested Spaces of Block B

A compliance rate of 99% is achieved under BRE Guide 3rd Edition / BS EN 17037-2018+A1-2021 Method 2 National Annex for the tested spaces of Block B within the proposed development. The daylight provision results are summarised below.

Rooms Tested	Total No. Rooms
Total No. Bedrooms Tested	63
Total No. LKDs Tested	34
Total No. Spaces Tested	**97**

BRE Guide 3rd Edition / BS EN 17037:2018+A1-2021 Method 2 National Annex Assessment				
Room Type	**Pass (No.)**	**Pass (%)**	**BR (No.)**	**BR (%)**
No. Bedrooms	63	100%	0	0%
No. LKDs	33	97%	1	3%
Total No.	**96**	**99%**	**1**	**1%**

*BR = Below Recommendations

Tested Spaces of Block C

A compliance rate of 99% is achieved under BRE Guide 3rd Edition / BS EN 17037-2018+A1-2021 Method 2 National Annex for the tested spaces of Block C within the proposed development. The daylight provision results are summarised below.

Rooms Tested	Total No. Rooms
Total No. Bedrooms Tested	46
Total No. LKDs Tested	24
Total No. Spaces Tested	**70**

BRE Guide 3rd Edition / BS EN 17037:2018+A1-2021 Method 2 National Annex Assessment				
Room Type	**Pass (No.)**	**Pass (%)**	**BR (No.)**	**BR (%)**
No. Bedrooms	46	100%	0	0%
No. LKDs	23	96%	1	4%
Total No.	**69**	**99%**	**1**	**1%**

*BR = Below Recommendations

Tested Spaces of Block D

A compliance rate of 99% is achieved under BRE Guide 3rd Edition / BS EN 17037-2018+A1-2021 Method 2 National Annex for the tested spaces of Block D within the proposed development. The daylight provision results are summarised below.

Rooms Tested	Total No. Rooms
Total No. Bedrooms Tested	55
Total No. LKDs Tested	28
Total No. Spaces Tested	**83**

BRE Guide 3rd Edition / BS EN 17037:2018+A1-2021 Method 2 National Annex Assessment				
Room Type	**Pass (No.)**	**Pass (%)**	**BR (No.)**	**BR (%)**
No. Bedrooms	55	100%	0	0%
No. LKDs	27	96%	1	4%
Total No.	**82**	**99%**	**1**	**1%**

*BR = Below Recommendations

Tested Spaces of Block E

A compliance rate of 100% is achieved under BRE Guide 3rd Edition / BS EN 17037-2018+A1-2021 Method 2 National Annex for the tested spaces of Block E within the proposed development. The daylight provision results are summarised below.

Rooms Tested	Total No. Rooms
Total No. Bedrooms Tested	33
Total No. LKDs Tested	16
Total No. Spaces Tested	**49**

BRE Guide 3rd Edition / BS EN 17037:2018+A1-2021 Method 2 National Annex Assessment				
Room Type	**Pass (No.)**	**Pass (%)**	**BR (No.)**	**BR (%)**
No. Bedrooms	33	100%	0	0%
No. LKDs	16	100%	0	0%
Total No.	**49**	**100%**	**0**	**0%**

*BR = Below Recommendations

Tested Spaces of Block F

A compliance rate of 100% is achieved under BRE Guide 3rd Edition / BS EN 17037-2018+A1-2021 Method 2 National Annex for the tested spaces of Block F within the proposed development. The daylight provision results are summarised below.

Rooms Tested	Total No. Rooms
Total No. Bedrooms Tested	30
Total No. LKDs Tested	12
Total No. Spaces Tested	**42**

BRE Guide 3rd Edition / BS EN 17037:2018+A1-2021 Method 2 National Annex Assessment				
Room Type	**Pass (No.)**	**Pass (%)**	**BR (No.)**	**BR (%)**
No. Bedrooms	30	100%	0	0%
No. LKDs	12	100%	0	0%
Total No.	**42**	**100%**	**0**	**0%**

*BR = Below Recommendations

Tested Spaces of Block G

A compliance rate of 100% is achieved under BRE Guide 3rd Edition / BS EN 17037-2018+A1-2021 Method 2 National Annex for the tested spaces of Block G within the proposed development. The daylight provision results are summarised below.

Rooms Tested	Total No. Rooms
Total No. Bedrooms Tested	30
Total No. LKDs Tested	15
Total No. Spaces Tested	**45**

BRE Guide 3rd Edition / BS EN 17037:2018+A1-2021 Method 2 National Annex Assessment				
Room Type	**Pass (No.)**	**Pass (%)**	**BR (No.)**	**BR (%)**
No. Bedrooms	30	100%	0	0%
No. LKDs	15	100%	0	0%
Total No.	**45**	**100%**	**0**	**0%**

*BR = Below Recommendations

Tested Spaces of Block H

A compliance rate of 92% is achieved under BRE Guide 3rd Edition / BS EN 17037-2018+A1-2021 Method 2 National Annex for the tested spaces of Block H within the proposed development. The daylight provision results are summarised below.

Rooms Tested	Total No. Rooms
Total No. Bedrooms Tested	61
Total No. LKDs Tested	32
Total No. Spaces Tested	**93**

BRE Guide 3rd Edition / BS EN 17037:2018+A1-2021 Method 2 National Annex Assessment				
Room Type	**Pass (No.)**	**Pass (%)**	**BR (No.)**	**BR (%)**
No. Bedrooms	61	100%	0	0%
No. LKDs	25	79%	7	21%
Total No.	**86**	**92%**	**7**	**8%**

*BR = Below Recommendations

Total Tested Spaces within the Proposed Development

A compliance rate of 98% is achieved under BRE Guide 3rd Edition / BS EN 17037-2018+A1-2021 Method 2 National Annex for the proposed development. The daylight provision results are summarised below.

Rooms Tested	Total No. Rooms
Total No. Bedrooms Tested	383
Total No. LKDs Tested	195
Total No. Spaces Tested	**578**

BRE Guide 3rd Edition / BS EN 17037:2018+A1-2021 Method 2 National Annex Assessment				
Room Type	**Pass (No.)**	**Pass (%)**	**BR (No.)**	**BR (%)**
No. Bedrooms	383	100%	0	0%
No. LKDs	185	95%	10	5%
Total No.	**564**	**98%**	**10**	**2%**

*BR = Below Recommendations

10.4 Compensatory Measures

Irish Standards and Design Development

With regards to internal daylighting, Section 6.7 of the Sustainable Urban Housing: Design Standards for New Apartments December 2023, states the following:

"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 specifics. This may arise due to design constraints associated with the site or location and the balancing of that assessment against the desirability of achieving wider planning objectives. Such objectives might include securing comprehensive urban regeneration and or an effective urban design and streetscape solution."

Having regard to the statements above, it should be noted that throughout the design process the design team worked hard to optimise the whole development to maximise the daylight within the proposed scheme.

In addition to this, design features have been incorporated into the development where rooms do not achieve the daylight provision targets in accordance with the standards they were assessed against. These design features again help to balance off and compensate the lower levels of daylight measured in the applicable spaces and are summarised as follows:

- 35% of the apartment units have a floor area 10% greater than the minimum floor area requirements as required by the Design Standards (Dec 2023). Note that larger floor areas make it more difficult to achieve the recommended daylight levels. However, larger windows have been incorporated into the design which also improves the view out for the building occupants.
- 66% of the apartment units are dual aspect which is above the 50% minimum requirement as required by the Design Standards (Dec 2023). As a result, more apartment units than the recommended minimum will achieve quality daylight from dual-aspect orientations.
- The proposed scheme provides 2409sq.m of communal amenity space, thus exceeding the 1352sq.m required pursuant to the Design Standards (Dec 2023). In addition to this The proposed scheme provides 5250sq.m of public open space, thus exceeding the 4553.1sq.m required pursuant to the Development Plan.
- In addition to the outdoor space outlined above, the proposed scheme also provides 2151sq.m of seasonal recreation space.

In addition to this, specific compensatory measures for each space below the recommendations can be found in the table within Appendix A Section 12.2.

11 Conclusion

The following can be concluded based on the assessments undertaken:

11.1 Shadow Analysis

The shadow analysis illustrates different shadows being cast at key times of the year (March 21st, June 21st and December 21st) for the Existing Situation and the Proposed Scheme. The results from the study are summarised as follows:

1-36 Avenue Rd, Marshes Upper

Minimal additional shading visible from the proposed development during *December at 1000-1400. No additional shading is observed from the proposed development on these existing properties at any other period.

Mourne View Hall – Students Accommodations

Minimal additional shading visible from the proposed development during March 1600-1800, June 1800-2000 and *December at 1400. No additional shading is observed from the proposed development on these existing properties at any other period.

1-42 Dunmore, Marshes Upper

No additional shading is observed from the proposed development on these properties at any period throughout the year.

1-5 Mourne View Terrace & 1-5 Mourne View

No additional shading is observed from the proposed development on these properties at any period throughout the year.

Tara House, Cabra House, Callandale House & 1-4 Hughes Park

Minimal additional shading visible from the proposed development during March at 0800. No additional shading is observed from the proposed development on these existing properties at any other period.

1-15 Hill St, Townparks

Minimal additional shading visible from the proposed development during March at 0800 and *December at 1000. No additional shading is observed from the proposed development on these existing properties at any other period.

21-29 Gosling's Terrace, Townparks

Minimal additional shading visible from the proposed development during *December at 1000-1400. No additional shading is observed from the proposed development on these existing properties at any other period.

30-40 Gosling's Terrace, Townparks
Minimal additional shading visible from the proposed development during March at 0800 and *December at 1000-1400. No additional shading is observed from the proposed development on these existing properties at any other period.

*Overshadowing is showing in December when the sun is lower in the sky and shadows cast are much longer. Although this is the case, overshadowing is least noticeable during the winter months as there is a lot less sunlight available at this time of year and so the overall impact is vastly reduced.

The potential shading impact is quantified via the "Sunlight to Amenity Spaces" and "Daylight to Existing Buildings" sections of this report.

11.2 Sunlight to Amenity Spaces

As outlined in Section 3.3.17 of the BRE Guide (3rd Edition), for a space to appear adequately sunlit throughout the year, at least half of the garden or amenity area should receive at least 2 hours of sunlight on March 21st. In the case of existing amenity spaces, if they are already below the 50% threshold then the BRE recommends the results kept to within 80% of the existing situation.

Existing Amenity Spaces
The existing private amenity spaces in the adjacent properties have been analysed and the results demonstrate they continue to receive similar level of sunlight even with the proposed development in place on March 21st, thus complying with the recommendations in the BRE Guide as outlined above.

Proposed Amenity Spaces
On March 21st, 100% of the combined public amenity areas and 90% of the combined proposed communal amenity areas within the development site will receive at least 2 hours of sunlight over their combined area. When considered individually, all communal and public open spaces are also complying with the BRE recommendations.

Ground floor apartments within Blocks E, F and G have private gardens to the rear. All these individual areas tested perform as expected. Those facing predominantly north are noted to be below the BRE Guide (2nd and 3rd Editions) recommendations as they are shaded by the property on the plot. Those south facing are achieving at least 2 hours of sunlight over 50% of their area on the 21st of March, complying with the BRE recommendations. It is worth noting that Blocks F and G have access to a communal area (no.5) which receives high levels of sunlight.

All the proposed private gardens greatly exceed the minimum private open space requirements of the Apartment Design Guidelines. In addition, ground floor apartments within Block E have additional private space to the South, adjoining the main living room

11.3 Sunlight to Existing Buildings

This study considers the proposed scheme and tests if the Annual Probable Sunlight Hours (APSH) results for the living room windows are greater than 25% annual and 5% winter sunlight or are greater than 0.8 times their former value with the proposed development in place or the reduction in sunlight across the year is less than 4% with the proposed development in place.

Based on the criteria outlined in Section 3.2.9 of the BRE Guide 3rd Edition, none of the existing/adjacent buildings fit the requirements to be assessed and as such the APSH assessment was not conducted. The BRE guide (3rd Edition) notes that there should be no impact to sunlight for these properties.

"It is not always necessary to do a full calculation to check sunlight potential. The guideline above is met provided either the following is true:

- If the window wall faces within 90° of due south and no obstruction, measured in the section perpendicular to the window wall, subtends an angle of more than 25° to the horizontal. Again, obstructions within 90° of due north need not be counted."

Given the statement above the surrounding dwellings adjacent to the proposed development were verified noting that, in a section perpendicular to the window wall, no angle subtended more than 25° in some cases they were sitting to the South of the development.

As noted above, none of the existing/adjacent properties have been assessed, as noted in Section 3.2.9 of the BRE Guide 3rd Edition, that these windows need not be analysed as sunlight impact will be unnoticeable to the existing occupants. The 25-degree test sections can be viewed in section 7.3 of the report.

11.4 Sunlight to Proposed Development

As the sunlight exposure assessment in accordance with BRE Guide 3rd Edition / IS/BS EN 17037-2018+A1-2021 considers the orientation of the rooms the following should be noted from section 3.1.11 of the guide.

"The BS EN 17037 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."

Of the 193 no. points tested 97% (187 no.) meet the BRE Guide 3rd Edition / IS/BS EN 17037:2018 sunlight exposure recommendations of greater than 1.5 hours on March 21st. Where windows do not meet this recommendation, this is predominantly as a result of their orientation, or as a consequence of the impact of balcony projections.

It should be noted that in the development of any apartment type building in particular, achieving in the region of 75% to 80% for this assessment would be considered very high and factors such site constraints and ultimately orientation play a huge part to the outcome of this assessment. In some instance and particularly a scheme like this where you have apartments on either side of a rectangular block that is constrained by the site orientation, 50% would be as highest percentage achievable with the apartments on one side not able meet requirements purely on orientation as noted and the inclusion of balconies within the design scheme (as a requirement).

Overall, the sunlight provision results to the proposed development in accordance with IS/BS EN 17037:23018 are considered excellent due to the fact that not all living rooms can face south and the inclusion of balconies.

Finally, the sunlight exposure results are visually represented in Appendix B.

11.5 Daylight to Existing Buildings

This study considers the Proposed Scheme and tests if the VSC results are greater than 27% or not less than 0.8 times the value of the Existing Situation.

Based on the criteria outlined in Section 2.2.5 of the BRE guidance (3rd Edition), only two of the neighbouring elevations require inclusion within the VSC assessment as the rest they did not meet the criterion as laid out within the BRE guide which is as follows.

It is not always necessary to do a full calculation to check daylight potential. The guideline above is met provided the following is true:

- no obstruction, measured in the section perpendicular to the window wall, subtends an angle of more than 25° to the horizontal.

Therefore, as noted above, only two of the neighbouring elevations require inclusion within the VSC assessment as the daylight impact will be unnoticeable to the occupants of the other neighbouring elevations. Please refer to section 9.2 25 Degree Rule for the section images produced as evidence for each of the qualifying views.

Of the 73 points tested, 90% (66 no. points) have a Proposed VSC value greater than 27% or not less than 0.8 times their former value compared to the Existing Situation. The remaining 7 points located in the student accommodation building have VSC values between 24.8% and 26.85% and hence adequate daylight should still be expected (as per Section 2.1.6 of the BRE Guide) given the presence of larger than conventional windows for the living spaces and the other spaces being bedrooms. These results are only marginally outside the recommendations and therefore when this is taken into consideration all of the points tested should receive adequate daylight.

11.6 Daylight to Proposed Development

For the daylight to proposed development assessment, one standard has been analysed: BS EN 17037-2018+A1-2021 National Annex (BRE Guide 3rd Edition). For completeness, IS EN 17037-2018+A1-2021 (BRE Guide 3rd Edition) non-annex results have been included in Appendix B.

The results under BS EN 17037-2018+A1-2021 National Annex are summarised below.

BRE Guide 3rd Edition / BS EN 17037-2018+A1-2021 National Annex

In the UK, EN 17037-2018+A1-2021 was adopted to form "BS EN 17037-2018+A1-2021". However, a National Annex was included which states:

"The UK committee supports the recommendations for daylight in buildings given in BS EN 17037:2018; however, it is the opinion of the UK committee that the recommendations for daylight provision in a

space (see Clause A.2) may not be achievable for some buildings, particularly dwellings. The UK committee believes this could be the case for dwellings with basement rooms or those with significant external obstructions (for example, dwellings situated in a dense urban area or with tall trees outside), or for existing buildings being refurbished or converted into dwellings. This National Annex therefore provides the UK committee's guidance on minimum daylight provision in all UK dwellings."

The BS EN 17037-2018+A1-2021 National Annex provides target illuminance values for bedrooms, living rooms and kitchens within residential developments as per Table NA.1. It is also important to note that as the climate in Ireland is similar to the UK, the targets outlined in the BS EN National Annex could also be applied to dwellings in Ireland.

The BS National Annex also states:

"Where one room in a UK dwelling serves more than a single purpose, the UK committee recommends that the target illuminance is that for the room type with the highest value – for example, in a space that combines a living room and a kitchen the target illuminance is recommended to be 200 lx."

Therefore, combined LKDs were assessed using a 200-lux target illuminance (E_T).

Across the proposed development 98% of the tested rooms are achieving the daylight provision targets in accordance with Table NA.1 of BS EN 17037-2018+A1-2021 using Method 2.

Compensatory Measures

With regards to internal daylighting, Section 6.7 of the Sustainable Urban Housing: Design Standards for New Apartments December 2023, states the following:

"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 specifics. This may arise due to design constraints associated with the site or location and the balancing of that assessment against the desirability of achieving wider planning objectives. Such objectives might include securing comprehensive urban regeneration and or an effective urban design and streetscape solution."

Having regard to the statements above, it should be noted that throughout the design process the design team worked hard to optimise the whole development to maximise the daylight within the proposed scheme.

In addition to this, design features have been incorporated into the development where rooms do not achieve the daylight provision targets in accordance with the standards they were assessed against. These design features again help to balance off and compensate the lower levels of daylight measured in the applicable spaces and are summarised as follows:

- 35% of the apartment units have a floor area 10% greater than the minimum floor area requirements as required by the Design Standards (Dec 2023). Note that larger floor areas

make it more difficult to achieve the recommended daylight levels. However, larger windows have been incorporated into the design which also improves the view out for the building occupants.

- 66% of the apartment units are dual aspect which is above the 50% minimum requirement as required by the Design Standards (Dec 2023). As a result, more apartment units than the recommended minimum will achieve quality daylight from dual-aspect orientations.
- The proposed scheme provides 2409sq.m of communal amenity space, thus exceeding the 1352sq.m required pursuant to the Design Standards (Dec 2023). In addition to this The proposed scheme provides 5250sq.m of public open space, thus exceeding the 4553.1sq.m required pursuant to the Development Plan.
- In addition to the outdoor space outlined above, the proposed scheme also provides 2151sq.m of seasonal recreation space.

In addition to this, specific compensatory measures for each space below the recommendations can be found in the table within Appendix A Section12.2.

11.7 View Out

The View Out assessment is related to buildings such as offices or schools where seating layouts are typically fixed compared to domestic settings where an occupant can move around the space freely. In their own home occupants can choose to sit near to or even at a window which will inevitably provide the varying layers of a 'View Out' such as the ground, landscape or sky. This ability to choose their position within a domestic setting means they would always have access to a position in the apartment with the minimum requirements of 'View Out'. Therefore, all the properties would meet the minimum requirement as outlined in IS EN 17037-2018+A1-2021 / BS EN 17037-2018+A1-2021 National Annex (BRE Guide 3rd Edition).

11.8 Glare

As outlined in IS EN 17037-2018+A1-2021 / BS EN 17037-2018+A1-2021 National Annex (BRE Guide 3rd Edition), a Glare assessment is suggested in spaces where the *"expected activities are comparable to reading, writing or using display devices and the user is not able to choose freely their position and viewing direction".* Given that occupants within a domestic setting are free to move around, on this basis a glare assessment for the proposed development has not been carried out.

11.9 Observations

It is important to note that the recommendations within the BRE Guide (3rd Edition) itself states "*although it gives numerical guidelines these should be interpreted flexibly because natural lighting is only one of many factors in site layout design"*, Although this is true appropriate and reasonable regard has still been taken to the BRE guide.

Whilst the results shown relate to the criteria as laid out in the BRE Guide (3rd Edition), it is important to note that the BRE targets are guidance only and should therefore be used with flexibility and caution when dealing with different types of sites.

In addition, BRE Guide 3rd Edition also notes:

"This report is a comprehensive revision of the 2011 edition of Site layout planning for daylight and sunlight: a guide to good practice. It is purely advisory and the numerical target values within it may be varied to meet the needs of the development and its location."

Taking all of the above information into account and based on the results from each of the assessments undertaken, the proposed development performs well when compared to the recommendations in the BRE Guide 3rd Edition and BS EN 17037-2018+A1-2021 National Annex. With regards to the existing properties there is a negligible impact when considering sunlight and daylight as a result of the proposed development and the proposed development itself performs very well with the same regard.

12 Appendix A – Daylight Provision Results

The tables in the following sections summarise the daylight provision results for the rooms that were assessed in the proposed development. Note, within the tables the code "LKD" equates to combined Living, Kitchen, Dining area.

The results for the following daylight standard are included in each table:

- BRE Guide (3rd Edition) / BS EN 17037-2018+A1-2021 National Annex

Please note, the "Comment" symbol in each of the tables represents the following:

BRE Guide (3rd Edition) / BS EN 17037-2018+A1-2021 National Annex

✓ These rooms achieve the target illuminance (E_T) over the minimum floor area requirements, i.e. 100 lux for over 50% of bedroom floor areas, and 200 lux for over 50% of LKD floor areas.

x These rooms do not achieve the target illuminance (E_T) over the minimum floor area requirements.

12.1 Daylight Provision Results

12.1.1 Block A - Level 00

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition BS EN 17037:2018 Method 2 National Annex	
			Floor Area > E_T (%)	Comment
1	1	Bedroom	100	✓
	2	Bedroom	100	✓
	3	Bedroom	100	✓
	4	LKD	100	✓
2	5	Bedroom	100	✓
	6	Bedroom	100	✓
	7	LKD	72	✓
3	8	LKD	80	✓
	9	Bedroom	100	✓
	10	Bedroom	100	✓
4	11	Bedroom	100	✓
	12	LKD	80	✓
5	13	LKD	99	✓
	14	Bedroom	100	✓
	15	Bedroom	100	✓
	16	Bedroom	100	✓
6	17	LKD	51	✓
	18	Bedroom	100	✓
	19	Bedroom	100	✓

12.1.2 Block A - Level 01

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition BS EN 17037:2018 Method 2 National Annex	
			Floor Area > E_T (%)	Comment
1	1	LKD	62	✓
	2	Bedroom	100	✓
2	3	Bedroom	100	✓
	4	Bedroom	100	✓
	5	LKD	100	✓
3	6	LKD	100	✓
	7	Bedroom	100	✓
	8	Bedroom	100	✓
4	9	Bedroom	100	✓
	10	Bedroom	100	✓
	11	LKD	76	✓
5	12	LKD	76	✓
	13	Bedroom	100	✓
	14	Bedroom	100	✓
6	15	Bedroom	100	✓
	16	Bedroom	100	✓
	17	LKD	100	✓
7	18	LKD	100	✓
	19	Bedroom	100	✓
	20	Bedroom	100	✓

12.1.3 Block A - Level 02

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition BS EN 17037:2018 Method 2 National Annex	
			Floor Area > E_T (%)	Comment
1	1	LKD	69	✓
	2	Bedroom	100	✓
2	3	Bedroom	100	✓
	4	Bedroom	100	✓
	5	LKD	100	✓
3	6	LKD	100	✓
	7	Bedroom	100	✓
	8	Bedroom	100	✓
4	9	Bedroom	100	✓
	10	Bedroom	100	✓
	11	LKD	80	✓
5	12	LKD	79	✓
	13	Bedroom	100	✓
	14	Bedroom	100	✓
6	15	Bedroom	100	✓
	16	Bedroom	100	✓
	17	LKD	100	✓
7	18	LKD	100	✓
	19	Bedroom	100	✓
	20	Bedroom	100	✓

12.1.4 Block A - Level 03

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition BS EN 17037:2018 Method 2 National Annex	
			Floor Area > E_T (%)	Comment
1	1	LKD	77	✓
	2	Bedroom	100	✓
2	3	Bedroom	100	✓
	4	Bedroom	100	✓
	5	LKD	100	✓
3	6	LKD	100	✓
	7	Bedroom	100	✓
	8	Bedroom	100	✓
4	9	Bedroom	100	✓
	10	Bedroom	100	✓
	11	LKD	74	✓
5	12	LKD	80	✓
	13	Bedroom	100	✓
	14	Bedroom	100	✓
6	15	Bedroom	100	✓
	16	Bedroom	100	✓
	17	LKD	100	✓
7	18	LKD	100	✓
	19	Bedroom	100	✓
	20	Bedroom	100	✓

12.1.5 Block A - Level 04

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition BS EN 17037:2018 Method 2 National Annex	
			Floor Area > E_T (%)	Comment
1	1	LKD	75	✓
	2	Bedroom	100	✓
2	3	Bedroom	100	✓
	4	Bedroom	100	✓
	5	LKD	100	✓
3	6	LKD	100	✓
	7	Bedroom	100	✓
	8	Bedroom	100	✓
4	9	Bedroom	100	✓
	10	Bedroom	100	✓
	11	LKD	78	✓
5	12	LKD	83	✓
	13	Bedroom	100	✓
	14	Bedroom	100	✓
6	15	Bedroom	100	✓
	16	Bedroom	100	✓
	17	LKD	100	✓
7	18	LKD	100	✓
	19	Bedroom	100	✓
	20	Bedroom	100	✓

12.1.6 Block B - Level 00

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition BS EN 17037:2018 Method 2 National Annex	
			Floor Area > E_T (%)	Comment
1	1	LKD	100	✓
	2	Bedroom	100	✓
	3	LKD	59	✓
2	4	Bedroom	100	✓
	5	Bedroom	100	✓
	6	Bedroom	100	✓
	7	LKD	100	✓
3	8	LKD	78	✓
	9	Bedroom	100	✓
4	10	Bedroom	100	✓
	11	Bedroom	100	✓
	12	LKD	62	✓
5	13	LKD	65	✓
	14	Bedroom	100	✓
	15	Bedroom	100	✓
6	16	Bedroom	100	✓
	17	Bedroom	100	✓
	18	Bedroom	100	✓
	19	LKD	42	x
7	20	LKD	100	✓
	21	Bedroom	100	✓
	22	Bedroom	100	✓
	23	Bedroom	100	✓

12.1.7 Block B - Level 01

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition BS EN 17037:2018 Method 2 National Annex	
			Floor Area > E_T (%)	Comment
1	1	Bedroom	100	✓
	2	Bedroom	100	✓
	3	LKD	100	✓
2	4	LKD	100	✓
	5	Bedroom	100	✓
	6	Bedroom	100	✓
3	7	Bedroom	100	✓
	8	Bedroom	100	✓
	9	LKD	69	✓
4	10	LKD	64	✓
	11	Bedroom	100	✓
	12	Bedroom	100	✓
5	13	Bedroom	100	✓
	14	Bedroom	100	✓
	15	LKD	100	✓
6	16	LKD	100	✓
	17	Bedroom	100	✓
	18	Bedroom	100	✓
7	19	Bedroom	100	✓
	20	LKD	77	✓

12.1.8 Block B - Level 02

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition BS EN 17037:2018 Method 2 National Annex	
			Floor Area > E_T (%)	Comment
1	1	Bedroom	100	✓
	2	Bedroom	100	✓
	3	LKD	100	✓
2	4	LKD	100	✓
	5	Bedroom	100	✓
	6	Bedroom	100	✓
3	7	Bedroom	100	✓
	8	Bedroom	100	✓
	9	LKD	66	✓
4	10	LKD	67	✓
	11	Bedroom	100	✓
	12	Bedroom	100	✓
5	13	Bedroom	100	✓
	14	Bedroom	100	✓
	15	LKD	100	✓
6	16	LKD	100	✓
	17	Bedroom	100	✓
	18	Bedroom	100	✓
7	19	Bedroom	100	✓
	20	LKD	77	✓

12.1.9 Block B - Level 03

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition BS EN 17037:2018 Method 2 National Annex	
			Floor Area > E_T (%)	Comment
1	1	Bedroom	100	✓
	2	Bedroom	100	✓
	3	LKD	100	✓
2	4	LKD	100	✓
	5	Bedroom	100	✓
	6	Bedroom	100	✓
3	7	Bedroom	100	✓
	8	Bedroom	100	✓
	9	LKD	68	✓
4	10	LKD	68	✓
	11	Bedroom	100	✓
	12	Bedroom	100	✓
5	13	Bedroom	100	✓
	14	Bedroom	100	✓
	15	LKD	100	✓
6	16	LKD	100	✓
	17	Bedroom	100	✓
	18	Bedroom	100	✓
7	19	Bedroom	100	✓
	20	LKD	84	✓

12.1.10 Block B - Level 04

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition BS EN 17037:2018 Method 2 National Annex	
			Floor Area > E_T (%)	Comment
1	1	Bedroom	100	✓
	2	Bedroom	100	✓
	3	LKD	100	✓
2	4	LKD	100	✓
	5	Bedroom	100	✓
	6	Bedroom	100	✓
3	7	Bedroom	100	✓
	8	Bedroom	100	✓
	9	LKD	69	✓
4	10	LKD	69	✓
	11	Bedroom	100	✓
	12	Bedroom	100	✓
5	13	Bedroom	100	✓
	14	LKD	86	✓

12.1.11 Block C - Level 00

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition BS EN 17037:2018 Method 2 National Annex	
			Floor Area > E_T (%)	Comment
1	1	Bedroom	100	✓
	2	Bedroom	100	✓
	3	Bedroom	100	✓
	4	LKD	84	✓
2	5	LKD	29	x
	6	Bedroom	100	✓
	7	Bedroom	100	✓
	8	Bedroom	100	✓
3	9	Bedroom	100	✓
	10	Bedroom	100	✓
	11	LKD	61	✓
4	12	LKD	58	✓
	13	Bedroom	100	✓
	14	Bedroom	100	✓
5	15	Bedroom	100	✓
	16	LKD	55	✓
6	17	LKD	85	✓
	18	Bedroom	100	✓
	19	Bedroom	100	✓
	20	Bedroom	100	✓
7	21	LKD	58	✓
	22	Bedroom	100	✓
	23	Bedroom	100	✓

12.1.12 Block C - Level 01

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition BS EN 17037:2018 Method 2 National Annex	
			Floor Area > E_T (%)	Comment
1	1	LKD	66	✓
	2	Bedroom	100	✓
2	3	Bedroom	100	✓
	4	Bedroom	100	✓
	5	LKD	99	✓
3	6	LKD	100	✓
	7	Bedroom	100	✓
	8	Bedroom	100	✓
4	9	Bedroom	100	✓
	10	Bedroom	100	✓
	11	LKD	63	✓
5	12	LKD	67	✓
	13	Bedroom	100	✓
	14	Bedroom	100	✓
6	15	Bedroom	100	✓
	16	Bedroom	100	✓
	17	LKD	100	✓
7	18	LKD	100	✓
	19	Bedroom	100	✓
	20	Bedroom	100	✓

12.1.13 Block C - Level 02

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition BS EN 17037:2018 Method 2 National Annex	
			Floor Area > E_T (%)	Comment
1	1	LKD	66	✓
	2	Bedroom	100	✓
2	3	Bedroom	100	✓
	4	Bedroom	100	✓
	5	LKD	100	✓
3	6	LKD	100	✓
	7	Bedroom	100	✓
	8	Bedroom	100	✓
4	9	Bedroom	100	✓
	10	Bedroom	100	✓
	11	LKD	65	✓
5	12	LKD	67	✓
	13	Bedroom	100	✓
	14	Bedroom	100	✓
6	15	LKD	100	✓
	16	Bedroom	100	✓

12.1.14 Block C - Level 03

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition BS EN 17037:2018 Method 2 National Annex	
			Floor Area > E_T (%)	Comment
1	1	LKD	67	✓
	2	Bedroom	100	✓
2	3	Bedroom	100	✓
	4	Bedroom	100	✓
	5	LKD	100	✓
3	6	LKD	100	✓
	7	Bedroom	100	✓
	8	Bedroom	100	✓
4	9	Bedroom	100	✓
	10	Bedroom	100	✓
	11	LKD	100	✓

12.1.15 Block D - Level 00

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition BS EN 17037:2018 Method 2 National Annex	
			Floor Area > E_T (%)	Comment
1	1	Bedroom	100	✓
	2	Bedroom	100	✓
	3	Bedroom	100	✓
	4	LKD	100	✓
2	5	LKD	74	✓
	6	Bedroom	100	✓
	7	Bedroom	100	✓
	8	Bedroom	100	✓
3	9	Bedroom	100	✓
	10	Bedroom	100	✓
	11	LKD	51	✓
4	12	LKD	48	x
	13	Bedroom	100	✓
	14	Bedroom	100	✓
5	15	Bedroom	100	✓
	16	LKD	95	✓
6	17	LKD	100	✓
	18	Bedroom	100	✓
	19	Bedroom	100	✓
	20	Bedroom	100	✓
7	21	LKD	50	✓
	22	Bedroom	100	✓
	23	Bedroom	100	✓

12.1.16 Block D - Level 01

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition BS EN 17037:2018 Method 2 National Annex	
			Floor Area > E_T (%)	Comment
1	1	LKD	56	✓
	2	Bedroom	100	✓
2	3	Bedroom	100	✓
	4	Bedroom	100	✓
	5	LKD	100	✓
3	6	LKD	100	✓
	7	Bedroom	100	✓
	8	Bedroom	100	✓
4	9	Bedroom	100	✓
	10	Bedroom	100	✓
	11	LKD	61	✓
5	12	LKD	59	✓
	13	Bedroom	100	✓
	14	Bedroom	100	✓
6	15	Bedroom	100	✓
	16	Bedroom	100	✓
	17	LKD	100	✓
7	18	LKD	100	✓
	19	Bedroom	100	✓
	20	Bedroom	100	✓

12.1.17 Block D - Level 02

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition BS EN 17037:2018 Method 2 National Annex	
			Floor Area > E_T (%)	Comment
1	1	LKD	62	✓
	2	Bedroom	100	✓
2	3	Bedroom	100	✓
	4	Bedroom	100	✓
	5	LKD	100	✓
3	6	LKD	100	✓
	7	Bedroom	100	✓
	8	Bedroom	100	✓
4	9	Bedroom	100	✓
	10	Bedroom	100	✓
	11	LKD	64	✓
5	12	LKD	64	✓
	13	Bedroom	100	✓
	14	Bedroom	100	✓
6	15	Bedroom	100	✓
	16	Bedroom	100	✓
	17	LKD	100	✓
7	18	LKD	100	✓
	19	Bedroom	100	✓
	20	Bedroom	100	✓

12.1.18 Block D - Level 03

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition BS EN 17037:2018 Method 2 National Annex	
			Floor Area > E_T (%)	Comment
1	1	LKD	61	✓
	2	Bedroom	100	✓
2	3	Bedroom	100	✓
	4	Bedroom	100	✓
	5	LKD	100	✓
3	6	LKD	100	✓
	7	Bedroom	100	✓
	8	Bedroom	100	✓
4	9	Bedroom	100	✓
	10	Bedroom	100	✓
	11	LKD	66	✓
5	12	LKD	72	✓
	13	Bedroom	100	✓
	14	Bedroom	100	✓
6	15	Bedroom	100	✓
	16	Bedroom	100	✓
	17	LKD	100	✓
7	18	LKD	100	✓
	19	Bedroom	100	✓
	20	Bedroom	100	✓

12.1.19 Block E - Level 00

BE_L00

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition BS EN 17037:2018 Method 2 National Annex	
			Floor Area > E_T (%)	Comment
1	1	Bedroom	100	✓
	2	Bedroom	100	✓
	3	LKD	100	✓
	4	Bedroom	100	✓
2	5	LKD	100	✓
	6	Bedroom	100	✓
	7	Bedroom	100	✓
3	8	LKD	100	✓
	9	Bedroom	100	✓
	10	Bedroom	100	✓
4	11	Bedroom	100	✓
	12	Bedroom	100	✓
	13	LKD	100	✓
5	14	LKD	100	✓
	15	Bedroom	100	✓
	16	Bedroom	100	✓
6	17	Bedroom	100	✓
	18	Bedroom	100	✓
	19	LKD	100	✓
7	20	LKD	100	✓

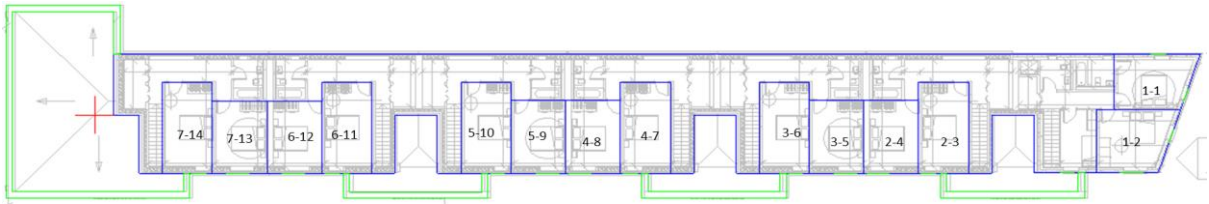
Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition BS EN 17037:2018 Method 2 National Annex	
			Floor Area > E_T (%)	Comment
	21	Bedroom	100	✓
	22	Bedroom	100	✓
8	23	Bedroom	100	✓
	24	Bedroom	100	✓
	25	Bedroom	100	✓
	26	LKD	100	✓

12.1.20 Block E - Level 01

BE_L01

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition BS EN 17037:2018 Method 2 National Annex	
			Floor Area > E_T (%)	Comment
9	1	Bedroom	100	✓
10	2	Bedroom	100	✓
11	3	LKD	100	✓
12	4	Bedroom	100	✓
13	5	LKD	100	✓
14	6	Bedroom	100	✓
15	7	Bedroom	100	✓
16	8	LKD	100	✓
	9	Bedroom	100	✓

12.1.21 Block E - Level 02



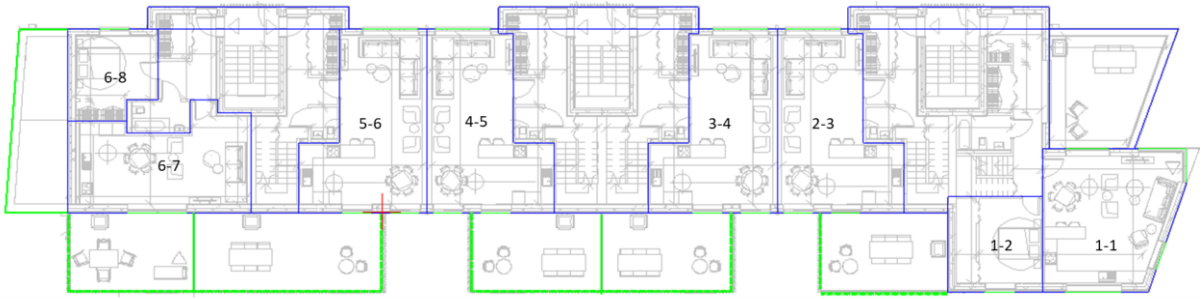
BE_L02

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition BS EN 17037:2018 Method 2 National Annex	
			Floor Area > E_T (%)	Comment
9	1	Bedroom	100	✓
	2	Bedroom	100	✓
10	3	Bedroom	100	✓
	4	Bedroom	100	✓
11	5	Bedroom	100	✓
	6	Bedroom	100	✓
12	7	Bedroom	100	✓
	8	Bedroom	100	✓
13	9	Bedroom	100	✓
	10	Bedroom	100	✓
14	11	Bedroom	100	✓
	12	Bedroom	100	✓
15	13	Bedroom	100	✓
	14	Bedroom	100	✓

12.1.22 Block F - Level 00

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition BS EN 17037:2018 Method 2 National Annex	
			Floor Area > E_T (%)	Comment
1	1	Bedroom	100	✓
	2	Bedroom	100	✓
	3	LKD	99	✓
	4	Bedroom	100	✓
2	5	LKD	100	✓
	6	Bedroom	100	✓
	7	Bedroom	100	✓
3	8	Bedroom	100	✓
	9	Bedroom	100	✓
	10	LKD	100	✓
4	11	LKD	100	✓
	12	Bedroom	100	✓
	13	Bedroom	100	✓
5	14	Bedroom	100	✓
	15	Bedroom	100	✓
	16	LKD	100	✓
6	17	LKD	100	✓
	18	Bedroom	100	✓
	19	Bedroom	100	✓
	20	Bedroom	100	✓

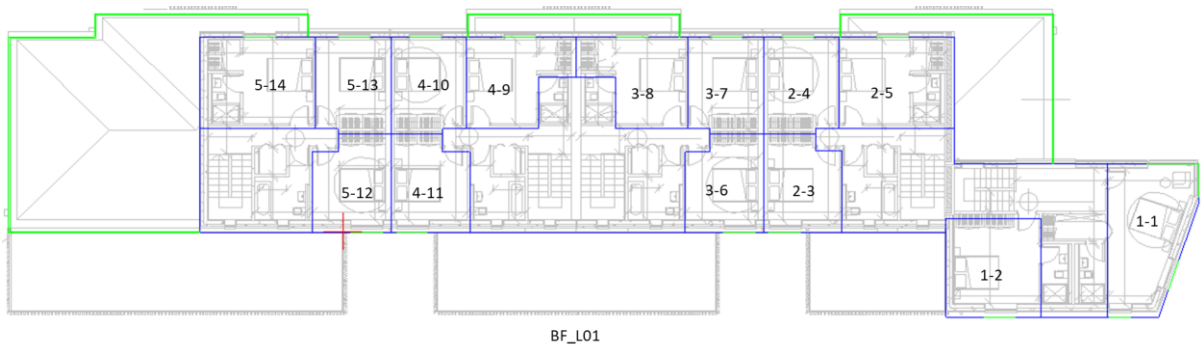
12.1.23 Block F - Level 01



BF_L01

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition BS EN 17037:2018 Method 2 National Annex	
			Floor Area > E_T (%)	Comment
7	1	LKD	100	✓
	2	Bedroom	100	✓
8	3	LKD	100	✓
9	4	LKD	100	✓
10	5	LKD	100	✓
11	6	LKD	100	✓
12	7	Bedroom	100	✓
	8	LKD	100	✓

12.1.24 Block F - Level 02



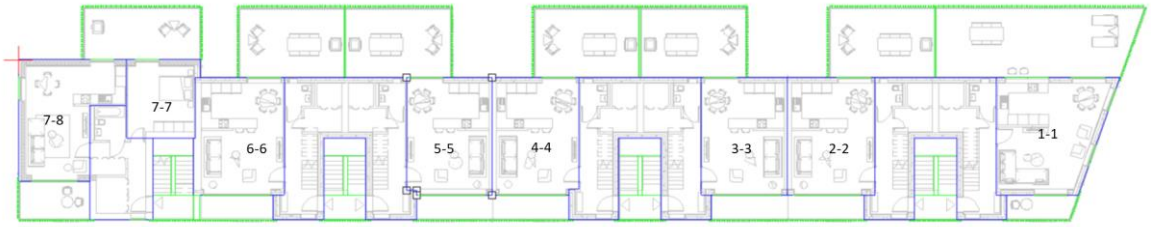
Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition BS EN 17037:2018 Method 2 National Annex	
			Floor Area > E_T (%)	Comment
7	1	Bedroom	100	✓
	2	Bedroom	100	✓
8	3	Bedroom	100	✓
	4	Bedroom	100	✓
9	5	Bedroom	100	✓
	6	Bedroom	100	✓
10	7	Bedroom	100	✓
	8	Bedroom	100	✓
11	9	Bedroom	100	✓
	10	Bedroom	100	✓
12	11	Bedroom	100	✓
	12	Bedroom	100	✓
13	13	Bedroom	100	✓
	14	Bedroom	100	✓

12.1.25 Block G - Level 00

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition BS EN 17037:2018 Method 2 National Annex	
			Floor Area > E_T (%)	Comment
1	1	Bedroom	100	✓
	2	Bedroom	100	✓
	3	LKD	100	✓
	4	Bedroom	100	✓
2	5	LKD	100	✓
	6	Bedroom	100	✓
	7	Bedroom	100	✓
3	8	LKD	100	✓
	9	Bedroom	100	✓
	10	Bedroom	100	✓
4	11	Bedroom	100	✓
	12	Bedroom	100	✓
	13	LKD	100	✓
5	14	LKD	100	✓
	15	Bedroom	100	✓
	16	Bedroom	100	✓
6	17	Bedroom	100	✓
	18	Bedroom	100	✓
	19	LKD	100	✓
7	20	Bedroom	100	✓

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition BS EN 17037:2018 Method 2 National Annex	
			Floor Area > E_T (%)	Comment
	21	Bedroom	100	✓
	22	LKD	100	✓

12.1.26 Block G - Level 01



BG_L01

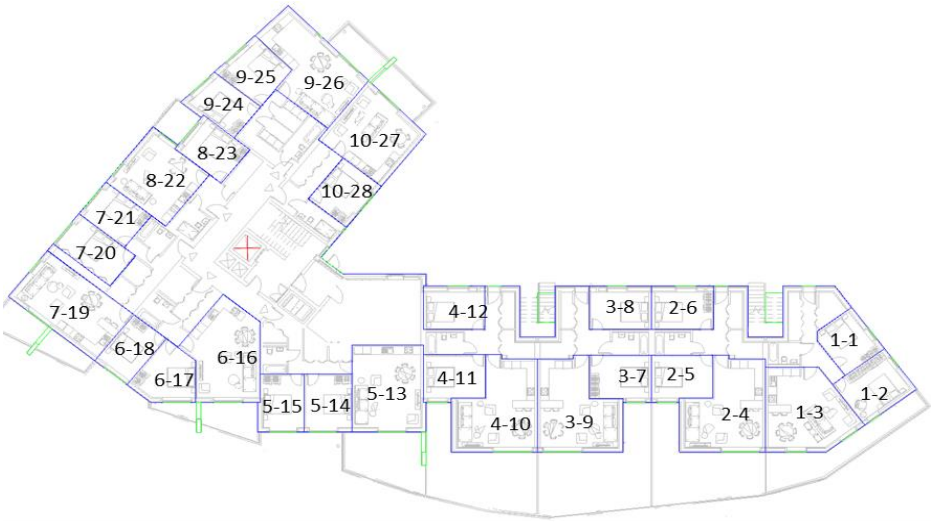
Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition BS EN 17037:2018 Method 2 National Annex	
			Floor Area > E_T (%)	Comment
8	1	LKD	100	✓
9	2	LKD	100	✓
10	3	LKD	100	✓
11	4	LKD	100	✓
12	5	LKD	100	✓
13	6	LKD	100	✓
14	7	Bedroom	100	✓
	8	LKD	100	✓

12.1.27 Block G - Level 02

BG_L02

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition BS EN 17037:2018 Method 2 National Annex	
			Floor Area > E_T (%)	Comment
8	1	Bedroom	100	✓
	2	Bedroom	100	✓
	3	Bedroom	100	✓
9	4	Bedroom	100	✓
	5	Bedroom	100	✓
10	6	Bedroom	100	✓
	7	Bedroom	100	✓
11	8	Bedroom	96	✓
	9	Bedroom	100	✓
12	10	Bedroom	100	✓
	11	Bedroom	96	✓
13	12	Bedroom	96	✓
	13	Bedroom	100	✓
14	14	Bedroom	100	✓
	15	LKD	100	✓

12.1.28 Block H - Level 00



BH_L00

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition BS EN 17037:2018 Method 2 National Annex	
			Floor Area > E_T (%)	Comment
1	1	Bedroom	100	✓
	2	Bedroom	100	✓
	3	LKD	100	✓
2	4	LKD	100	✓
	5	Bedroom	100	✓
	6	Bedroom	100	✓
3	7	Bedroom	100	✓
	8	Bedroom	100	✓
	9	LKD	100	✓
4	10	LKD	100	✓
	11	Bedroom	68	✓
	12	Bedroom	100	✓
5	13	LKD	70	✓

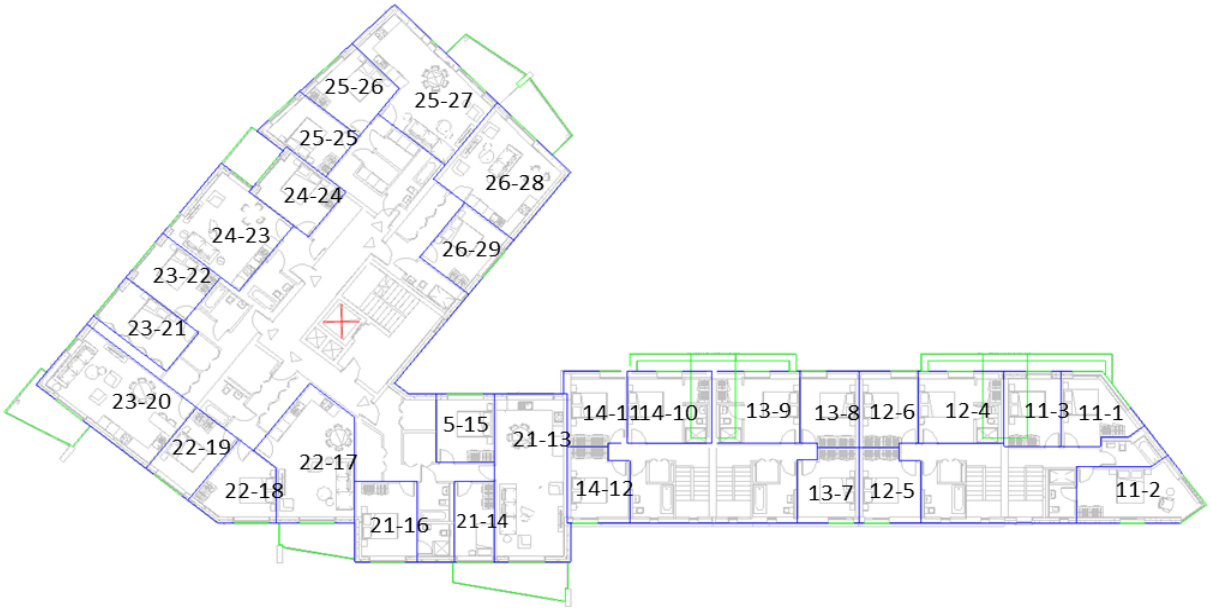
Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition BS EN 17037:2018 Method 2 National Annex	
			Floor Area > E_T (%)	Comment
	14	Bedroom	100	✓
	15	Bedroom	100	✓
6	16	LKD	47	x
	17	Bedroom	100	✓
	18	Bedroom	100	✓
7	19	LKD	100	✓
	20	Bedroom	100	✓
	21	Bedroom	100	✓
8	22	LKD	100	✓
	23	Bedroom	100	✓
9	24	Bedroom	100	✓
	25	Bedroom	100	✓
	26	LKD	83	✓
10	27	LKD	61	✓
	28	Bedroom	100	✓

12.1.29 Block H - Level 01

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition BS EN 17037:2018 Method 2 National Annex	
			Floor Area > E_T (%)	Comment
11	1	LKD	100	✓
12	2	LKD	100	✓
13	3	LKD	100	✓
14	4	LKD	92	✓
15	5	LKD	49	x
	6	Bedroom	100	✓
	7	Bedroom	94	✓
	8	Bedroom	100	✓
16	9	LKD	39	x
	10	Bedroom	100	✓
	11	Bedroom	100	✓
17	12	LKD	99	✓
	13	Bedroom	100	✓

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition BS EN 17037:2018 Method 2 National Annex	
			Floor Area > E_T (%)	Comment
	14	Bedroom	100	✓
18	15	LKD	93	✓
	16	Bedroom	100	✓
19	17	Bedroom	100	✓
	18	Bedroom	100	✓
	19	LKD	74	✓
20	20	LKD	33	x
	21	Bedroom	100	✓

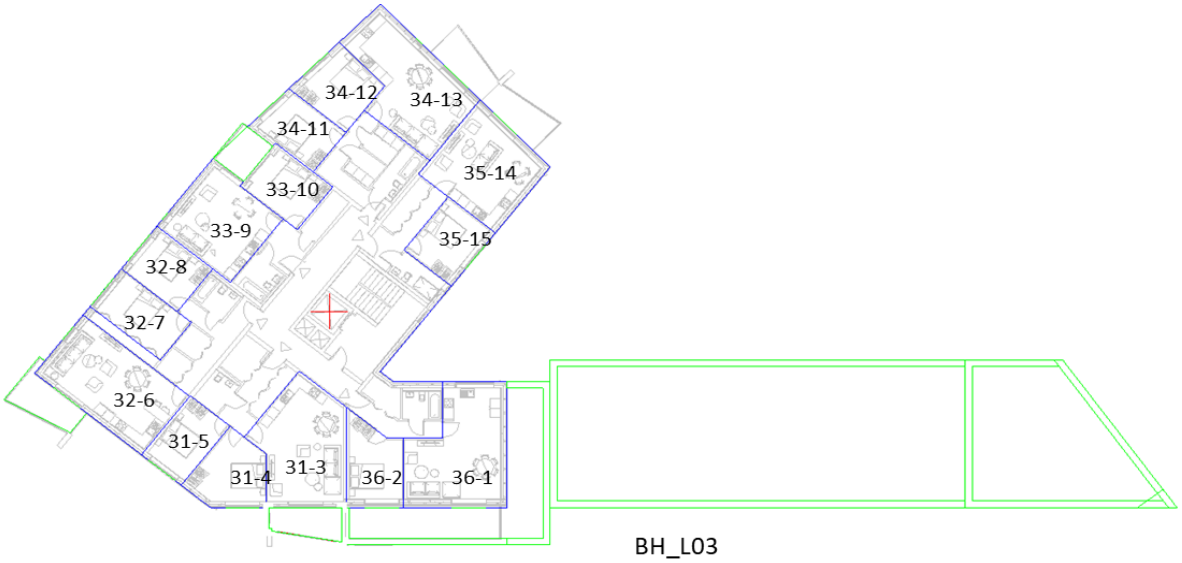
12.1.30 Block H - Level 02



Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition BS EN 17037:2018 Method 2 National Annex	
			Floor Area > E_T (%)	Comment
11	1	Bedroom	100	✓
	2	Bedroom	100	✓
	3	Bedroom	100	✓
12	4	Bedroom	100	✓
	5	Bedroom	100	✓
	6	Bedroom	100	✓
13	7	Bedroom	100	✓
	8	Bedroom	100	✓
	9	Bedroom	100	✓
14	10	Bedroom	100	✓
	11	Bedroom	100	✓
	12	Bedroom	100	✓

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition BS EN 17037:2018 Method 2 National Annex	
			Floor Area > E_T (%)	Comment
21	13	LKD	53	✓
	14	Bedroom	100	✓
	15	Bedroom	100	✓
	16	Bedroom	100	✓
22	17	LKD	46	x
	18	Bedroom	100	✓
	19	Bedroom	100	✓
23	20	LKD	99	✓
	21	Bedroom	100	✓
	22	Bedroom	100	✓
24	23	LKD	89	✓
	24	Bedroom	100	✓
25	25	Bedroom	100	✓
	26	Bedroom	100	✓
	27	LKD	80	✓
26	28	LKD	32	x
	29	Bedroom	100	✓

12.1.31 Block H - Level 03



Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition BS EN 17037:2018 Method 2 National Annex	
			Floor Area > E_T (%)	Comment
36	1	LKD	75	✓
	2	Bedroom	100	✓
31	3	LKD	100	✓
	4	Bedroom	100	✓
	5	Bedroom	100	✓
32	6	LKD	100	✓
	7	Bedroom	100	✓
	8	Bedroom	100	✓
33	9	LKD	15	x
	10	Bedroom	100	✓
34	11	Bedroom	100	✓
	12	Bedroom	100	✓
	13	LKD	84	✓

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition BS EN 17037:2018 Method 2 National Annex	
			Floor Area > E_T (%)	Comment
35	14	LKD	85	✓
	15	Bedroom	100	✓

12.2 Compensatory Measures Table for BS EN

Unit	IES Ref	Unit GIA (m²)	Compensatory Measures					
			Unit floor area > minimum standard	Unit floor area ≥ 10% minimum standard	Private amenity area ≥ minimum standard	Unit has direct access to private amenity space	Unit overlooks public or communal open space	Floor to ceiling height in excess of 2.4m
Block B - Level 00								
L00: B_06_LKD	19	110.3	✓	✓	✓	✓		✓
Block C - Level 00								
L00: C_02_LKD	5	109	✓	✓	✓	✓		✓
Block D - Level 00								
L00: D_04_LKD	12	76.4	✓		✓	✓		✓
Block H - Level 00								
L00: H_06_LKD	16	76.4	✓		✓	✓		✓
Block H - Level 01								
L01: H_15_LKD	5	122	✓	✓	✓	✓	✓	✓
L01: H_16_LKD	9	76.4	✓		✓	✓		✓
L01: H_20_LKD	20	55	✓	✓	✓	✓	✓	✓
Block H - Level 02								
L02: H_22_LKD	17	76.4	✓		✓	✓		✓
L02: H_26_LKD	28	55	✓	✓	✓	✓	✓	✓
Block H - Level 03								
L03: H_33_LKD	9	52	✓	✓	✓	✓		✓

13 Appendix B – Sunlight Exposure Results

13.1 Sunlight Exposure Results

The IS EN 17037-2018+A1-2021 (BRE Guide 3rd Edition) sunlight exposure results tabulated in Section 8.2 for the proposed development are visually represented in the following images. The windows highlighted in "red" achieve the minimum 1.5 hours of recommended sunlight on March 21st, while the windows highlighted in "blue" do not achieve the recommended value.

13.1.1 View 01 – Blocks A, B, C & D

Receives more than 1.5 hours of sunlight

Receives less than 1.5 hours of sunlight

65 out of 65 windows passing

13.1.2 View 02 – Blocks A, B & C

Receives more than 1.5 hours of sunlight

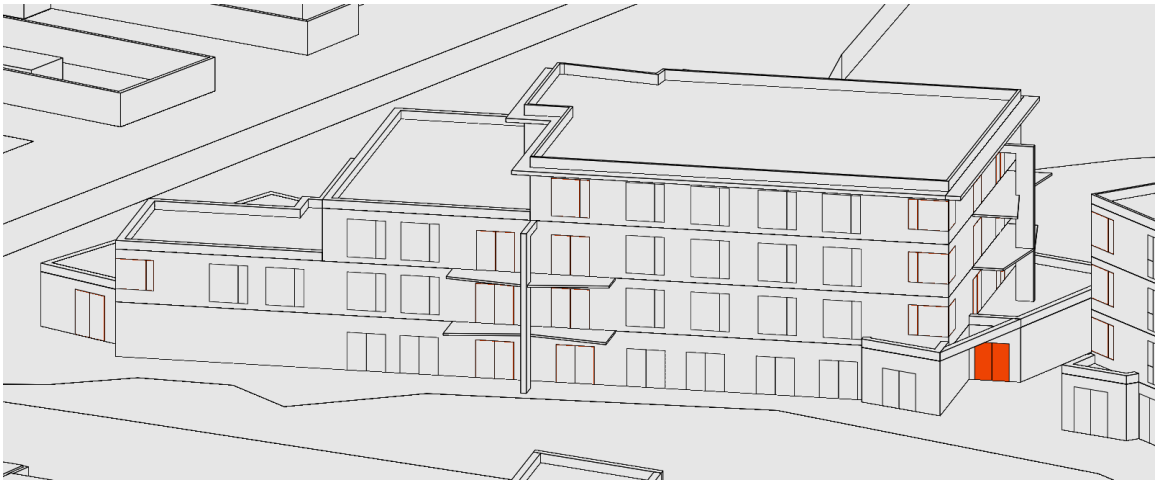
Receives less than 1.5 hours of sunlight

40 out of 41 windows passing

13.1.3 View 03 – Block C

Receives more than 1.5 hours of sunlight

Receives less than 1.5 hours of sunlight



1 out of 1 window passing

13.1.4 View 04 – Block D

Receives more than 1.5 hours of sunlight

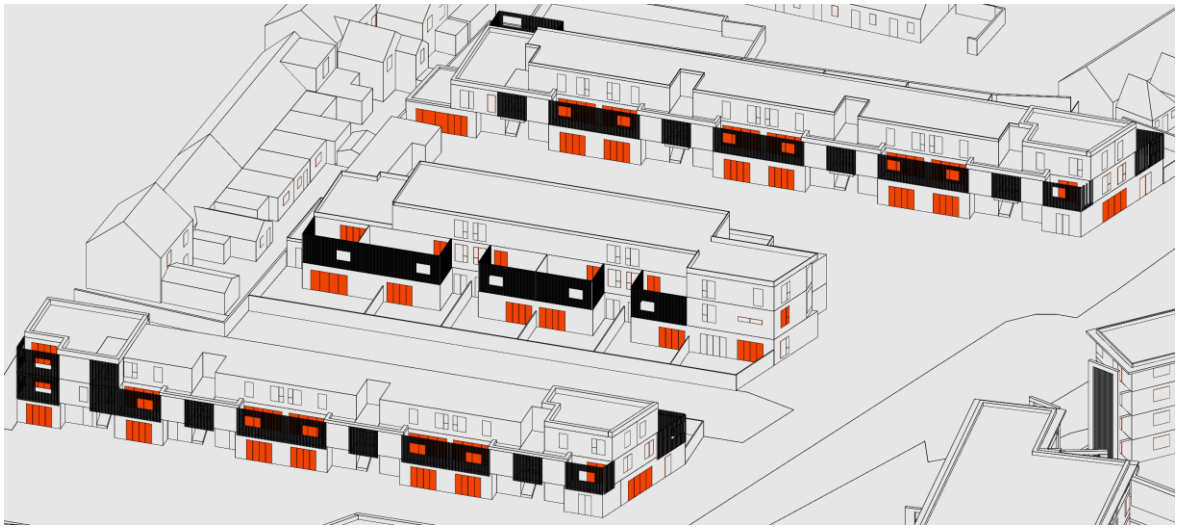
Receives less than 1.5 hours of sunlight

7 out of 11 window passing

13.1.5 View 05 – Blocks E, F & G

Receives more than 1.5 hours of sunlight

Receives less than 1.5 hours of sunlight

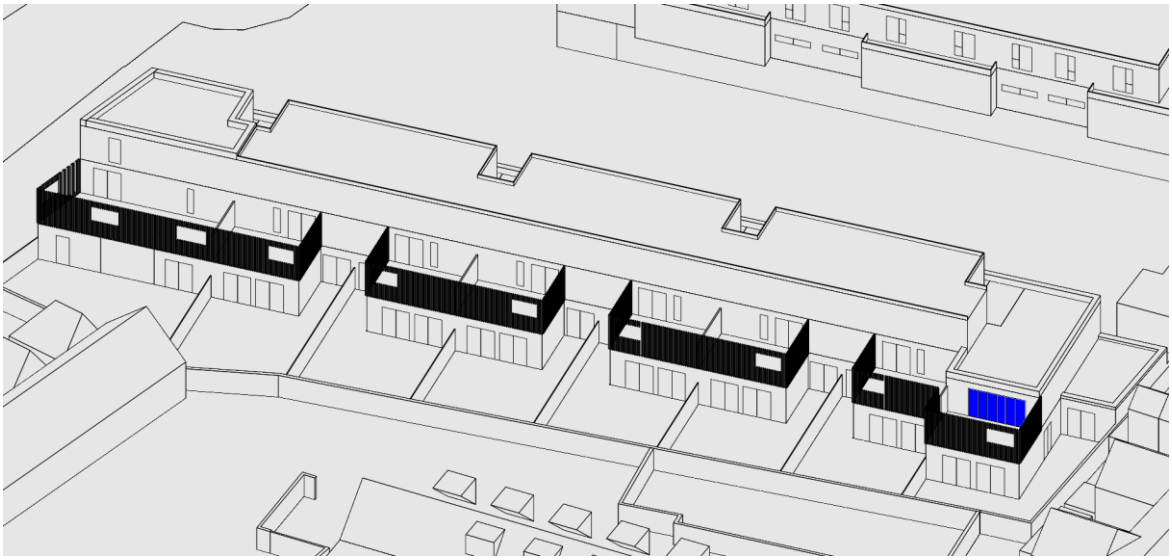


42 out of 42 windows passing

13.1.6 View 06 – Block E

Receives more than 1.5 hours of sunlight

Receives less than 1.5 hours of sunlight

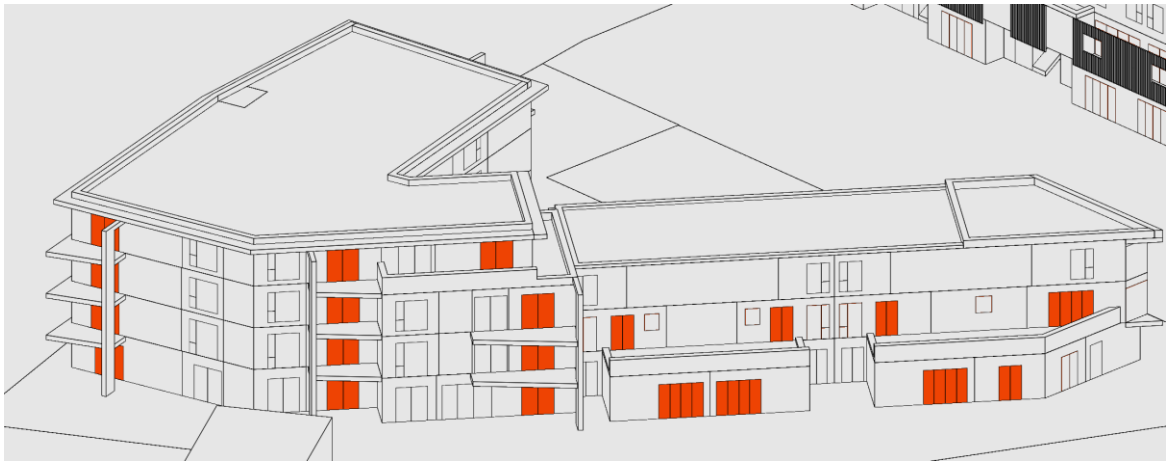


0 out of 1 window passing

13.1.7 View 07 – Block H

Receives more than 1.5 hours of sunlight

Receives less than 1.5 hours of sunlight

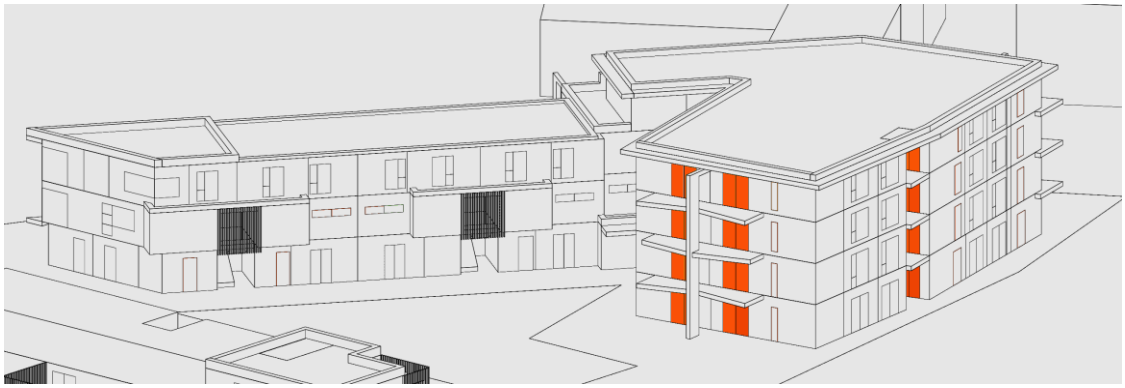


20 out of 20 windows passing

13.1.8 View 08 – Block H

Receives more than 1.5 hours of sunlight

Receives less than 1.5 hours of sunlight



12 out of 12 windows passing

14 Appendix C – BRE Guide 3rd Edition / IS EN 17037-2018+A1-2021

14.1 Standard Requirements - IS EN 17037-2018+A1-2021

As outlined in Section 5.1.2 of the IS EN 17037-2018+A1-2021 standard:

"A space is considered to provide adequate daylight if a target illuminance level is achieved across a fraction of the reference plane within a space for at least half of the daylight hours. In addition, for spaces with vertical or inclined daylight openings, a minimum target illuminance level is also to be achieved across the reference plane".

Annex A of IS EN 17037-2018+A1-2021 gives three levels of recommendation for the assessment of daylight provision in interior spaces which are summarised as follows:

"The three levels are: minimum, medium and high, and the minimum recommendation should be provided."

It is important to note that IS EN 17037-2018+A1-2021 does not provide different illuminance targets for different space types. Therefore, in the case of residential developments; bedrooms, living rooms, kitchens and combined LKDs all have the same daylight provision targets.

Table A.1 of IS EN 17037-2018+A1-2021 (included below) provides recommendations for daylight provision by daylight openings in vertical and inclined surfaces. Note, Table A.2 provides similar recommendations for daylight openings in horizontal surfaces, e.g. rooflights. As there are no rooflights in the proposed development, the recommendations in Table A.2 are not followed.

To achieve the minimum level of daylight provision for vertical and inclined openings as per Table A.1, the following must be achieved:

- A target illuminance (E_T) of 300 lux must be achieved on over 50% of the floor area for over 50% of the available daylight hours, and
- A minimum target illuminance (E_{TM}) of 100 lux must be achieved on over 95% of the floor area for over 50% of the available daylight hours.
- Both targets above must be satisfied for a space to be deemed compliant with the requirements.

Table A.1 — Recommendations of daylight provision by daylight openings in vertical and inclined surface

Level of recommendation for vertical and inclined daylight opening	Target illuminance E_T lx	Fraction of space for target level $F_{plane,\%}$	Minimum target illuminance E_{TM} lx	Fraction of space for minimum target level $F_{plane,\%}$	Fraction of daylight hours $F_{time,\%}$
Minimum	300	50 %	100	95 %	50 %
Medium	500	50 %	300	95 %	50 %
High	750	50 %	500	95 %	50 %
NOTE Table A.3 gives target daylight factor (D_T) and minimum target daylight factor (D_{TM}) corresponding to target illuminance level and minimum target illuminance, respectively, for the CEN capital cities.					

The recommendations in Table A.1 can also be expressed in terms of a daylight factor "D". Table A.3 provides the corresponding daylight factor (D) relative to a recommended target illuminance E_T (lx) and target minimum illuminance E_{TM} (lx) depending on the location for daylight openings in vertical and inclined surfaces. Note, Table A.4 provides similar target values for openings in horizontal surfaces, e.g. rooflights. As there are no rooflights in the proposed development, the recommendations in Table A.4 are not followed.

The extract from Table A.3 below is for Dublin with the daylight factor targets highlighted, i.e. to achieve the target illuminance (E_T) of 300 lux outlined in Table A.1, an equivalent target daylight factor is 2.0%. Furthermore, to achieve the minimum target illuminance (E_{TM}) of 100 lux outlined in Table A.1, an equivalent target daylight factor is 0.7%.

Table A.3 — Values of *D* for daylight openings to exceed an illuminance level of 100, 300, 500 or 750 lx for a fraction of daylight hours $F_{time,\%}$ = 50 % for 33 capitals of CEN national members

Nation	Capital [a]	Geographical latitude φ [°]	Median External Diffuse Illuminance $E_{v,d,med}$	*D* to exceed 100 lx	*D* to exceed 300 lx	*D* to exceed 500 lx	*D* to exceed 750 lx
Ireland	Dublin	53,43	14 900	0,7 %	2,0 %	3,4 %	5,0 %

Therefore, to achieve the minimum level of daylight provision for vertical and inclined openings as per Table A.3, the following must be achieved:

- A target daylight factor (D_T) of 2.0% must be achieved on over 50% of the floor area for over 50% of the available daylight hours, and
- A minimum target daylight factor (D_{TM}) of 0.7% must be achieved on over 95% of the floor area for over 50% of the available daylight hours.
- Both targets above must be satisfied for a space to be deemed compliant with the requirements.

There are two methods to assess daylight provision to the interior which are based on target values in either Table A.1 or Table A.3 which are summarised as follows:

Method 1: This calculation method uses the daylight factor targets on the reference plane as per Table A.3. The assessment is carried out on a representative day and time during the year, i.e. 21st September @ 12:00 under standard CIE overcast sky conditions.

Method 2: This calculation method uses the illuminance targets on the reference plane as per Table A.1. The assessment is carried out for each hour over the course of the year (8,760 hours) using a local weather file which accounts for varying sky conditions and sun positions throughout the year.

As outlined in Section 5.1.4, the verification of daylight provision can be determined using either an adequate software or on-site measurements. When using a software, *"a representative model of the space is required together with the key parameters (such as any significant nearby obstructions, the assigned surface reflectance values and glazing transmissivity) that are a reasonable representation*

of those for the actual, completed building. This can be determined using either Method 1 or Method 2."

Based on the above criteria, the daylight provision to the proposed development has been assessed using an adequate software (i.e. IES VE), using the Method 2 climate-based approach and targeting the minimum recommended values outlined in Table A.1 of IS EN 17037-2018+A1-2021.

The Method 2 climate-based approach was selected as it is a far more accurate assessment method compared to Method 1. Climate based daylight modelling (CBDM) is more accurate compared to a calculation based on a single day during the year, i.e. Method 1. The amount of daylight varies throughout the year, primarily due to the sun's position, so it is essential the impact of daylight variance is properly considered. CBDM utilises an annual simulation linking location, shading, climate data (including solar intensity and cloud cover) together with the building properties. This provides a complete overview on how the daylight performance varies throughout the year due to changes in these factors.

14.2 Daylight Provision Results

The tables in the following section summarise the daylight provision results for the rooms that were assessed in the proposed development. Note, within the tables the code "LKD" equates to combined Living, Kitchen, Dining area.

The results for the following daylight standard are included in each table:

- BRE Guide (3rd Edition) / IS EN 17037-2018+A1-2021

Please note, the "Comment" symbol in each of the tables represents the following:

BRE Guide (3rd Edition) / IS EN 17037-2018+A1-2021

✓ These rooms achieve both the target illuminance (E_T) and minimum target illuminance (E_{TM}) over the minimum floor area requirements, i.e. 300 lux for over 50% of their floor area (E_T) and 100 lux for over 95% of their floor area (E_{TM}).

x These rooms do not achieve both the target illuminance (E_T) and minimum target illuminance (E_{TM}) over the minimum floor area requirements.

14.2.1 Block A - Level 00

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition IS EN 17037:2018+A1-2021 Method 2 National Annex		
			Floor Area > E_T (%)	Floor Area > E_{TM} (%)	Comment
1	1	Bedroom	100	100	✓
	2	Bedroom	100	100	✓
	3	Bedroom	100	100	✓
	4	LKD	100	100	✓
2	5	Bedroom	100	100	✓
	6	Bedroom	100	100	✓
	7	LKD	51	100	✓
3	8	LKD	55	100	✓
	9	Bedroom	100	100	✓
	10	Bedroom	100	100	✓
4	11	Bedroom	100	100	✓
	12	LKD	63	100	✓
5	13	LKD	99	100	✓
	14	Bedroom	100	100	✓
	15	Bedroom	81	100	✓
	16	Bedroom	100	100	✓
6	17	LKD	37	92	x
	18	Bedroom	100	100	✓
	19	Bedroom	100	100	✓

14.2.2 Block A - Level 01

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition IS EN 17037:2018+A1-2021 Method 2 National Annex		
			Floor Area > E_T (%)	Floor Area > E_{TM} (%)	Comment
1	1	LKD	46	85	x
	2	Bedroom	100	100	✓
2	3	Bedroom	100	100	✓
	4	Bedroom	97	100	✓
	5	LKD	100	100	✓
3	6	LKD	100	100	✓
	7	Bedroom	100	100	✓
	8	Bedroom	100	100	✓
4	9	Bedroom	100	100	✓
	10	Bedroom	100	100	✓
	11	LKD	56	100	✓
5	12	LKD	54	100	✓
	13	Bedroom	100	100	✓
	14	Bedroom	100	100	✓
6	15	Bedroom	100	100	✓
	16	Bedroom	100	100	✓
	17	LKD	100	100	✓
7	18	LKD	78	100	✓
	19	Bedroom	100	100	✓
	20	Bedroom	100	100	✓

14.2.3 Block A - Level 02

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition IS EN 17037:2018+A1-2021 Method 2 National Annex		
			Floor Area > E_T (%)	Floor Area > E_{TM} (%)	Comment
1	1	LKD	54	100	✓
	2	Bedroom	100	100	✓
2	3	Bedroom	100	100	✓
	4	Bedroom	100	100	✓
	5	LKD	100	100	✓
3	6	LKD	100	100	✓
	7	Bedroom	100	100	✓
	8	Bedroom	100	100	✓
4	9	Bedroom	100	100	✓
	10	Bedroom	100	100	✓
	11	LKD	58	100	✓
5	12	LKD	55	100	✓
	13	Bedroom	100	100	✓
	14	Bedroom	100	100	✓
6	15	Bedroom	100	100	✓
	16	Bedroom	100	100	✓
	17	LKD	100	100	✓
7	18	LKD	89	100	✓
	19	Bedroom	100	100	✓
	20	Bedroom	100	100	✓

14.2.4 Block A - Level 03

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition IS EN 17037:2018+A1-2021 Method 2 National Annex		
			Floor Area > E_T (%)	Floor Area > E_{TM} (%)	Comment
1	1	LKD	60	100	✓
	2	Bedroom	100	100	✓
2	3	Bedroom	100	100	✓
	4	Bedroom	100	100	✓
	5	LKD	100	100	✓
3	6	LKD	100	100	✓
	7	Bedroom	100	100	✓
	8	Bedroom	100	100	✓
4	9	Bedroom	100	100	✓
	10	Bedroom	100	100	✓
	11	LKD	55	100	✓
5	12	LKD	56	100	✓
	13	Bedroom	100	100	✓
	14	Bedroom	100	100	✓
6	15	Bedroom	100	100	✓
	16	Bedroom	100	100	✓
	17	LKD	100	100	✓
7	18	LKD	100	100	✓
	19	Bedroom	100	100	✓
	20	Bedroom	100	100	✓

14.2.5 Block A - Level 04

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition IS EN 17037:2018+A1-2021 Method 2 National Annex		
			Floor Area > E_T (%)	Floor Area > E_{TM} (%)	Comment
1	1	LKD	59	100	✓
	2	Bedroom	100	100	✓
2	3	Bedroom	100	100	✓
	4	Bedroom	100	100	✓
	5	LKD	100	100	✓
3	6	LKD	100	100	✓
	7	Bedroom	100	100	✓
	8	Bedroom	100	100	✓
4	9	Bedroom	100	100	✓
	10	Bedroom	100	100	✓
	11	LKD	53	100	✓
5	12	LKD	58	100	✓
	13	Bedroom	100	100	✓
	14	Bedroom	100	100	✓
6	15	Bedroom	100	100	✓
	16	Bedroom	100	100	✓
	17	LKD	100	100	✓
7	18	LKD	100	100	✓
	19	Bedroom	100	100	✓
	20	Bedroom	100	100	✓

14.2.6 Block B - Level 00

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition IS EN 17037:2018+A1-2021 Method 2 National Annex		
			Floor Area > E_T (%)	Floor Area > E_{TM} (%)	Comment
1	1	LKD	100	100	✓
	2	Bedroom	100	100	✓
	3	LKD	44	100	x
2	4	Bedroom	100	100	✓
	5	Bedroom	84	100	✓
	6	Bedroom	81	100	✓
	7	LKD	100	100	✓
3	8	LKD	60	100	✓
	9	Bedroom	100	100	✓
4	10	Bedroom	100	100	✓
	11	Bedroom	100	100	✓
	12	LKD	43	100	x
5	13	LKD	42	100	x
	14	Bedroom	100	100	✓
	15	Bedroom	100	100	✓
6	16	Bedroom	100	100	✓
	17	Bedroom	100	100	✓
	18	Bedroom	95	100	✓
	19	LKD	22	59	x
7	20	LKD	99	100	✓
	21	Bedroom	100	100	✓
	22	Bedroom	100	100	✓
	23	Bedroom	100	100	✓

14.2.7 Block B - Level 01

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition IS EN 17037:2018+A1-2021 Method 2 National Annex		
			Floor Area > E_T (%)	Floor Area > E_{TM} (%)	Comment
1	1	Bedroom	100	100	✓
	2	Bedroom	100	100	✓
	3	LKD	100	100	✓
2	4	LKD	100	100	✓
	5	Bedroom	100	100	✓
	6	Bedroom	100	100	✓
3	7	Bedroom	100	100	✓
	8	Bedroom	100	100	✓
	9	LKD	47	100	x
4	10	LKD	45	100	x
	11	Bedroom	100	100	✓
	12	Bedroom	100	100	✓
5	13	Bedroom	100	100	✓
	14	Bedroom	100	100	✓
	15	LKD	94	100	✓
6	16	LKD	100	100	✓
	17	Bedroom	100	100	✓
	18	Bedroom	100	100	✓
7	19	Bedroom	100	100	✓
	20	LKD	63	100	✓

14.2.8 Block B - Level 02

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition IS EN 17037:2018+A1-2021 Method 2 National Annex		
			Floor Area > E_T (%)	Floor Area > E_{TM} (%)	Comment
1	1	Bedroom	100	100	✓
	2	Bedroom	100	100	✓
	3	LKD	100	100	✓
2	4	LKD	100	100	✓
	5	Bedroom	100	100	✓
	6	Bedroom	100	100	✓
3	7	Bedroom	100	100	✓
	8	Bedroom	100	100	✓
	9	LKD	44	100	x
4	10	LKD	47	100	x
	11	Bedroom	100	100	✓
	12	Bedroom	100	100	✓
5	13	Bedroom	100	100	✓
	14	Bedroom	100	100	✓
	15	LKD	100	100	✓
6	16	LKD	100	100	✓
	17	Bedroom	100	100	✓
	18	Bedroom	100	100	✓
7	19	Bedroom	100	100	✓
	20	LKD	63	100	✓

14.2.9 Block B - Level 03

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition IS EN 17037:2018+A1-2021 Method 2 National Annex		
			Floor Area > E_T (%)	Floor Area > E_{TM} (%)	Comment
1	1	Bedroom	100	100	✓
	2	Bedroom	100	100	✓
	3	LKD	100	100	✓
2	4	LKD	100	100	✓
	5	Bedroom	100	100	✓
	6	Bedroom	100	100	✓
3	7	Bedroom	100	100	✓
	8	Bedroom	100	100	✓
	9	LKD	48	100	x
4	10	LKD	47	100	x
	11	Bedroom	100	100	✓
	12	Bedroom	100	100	✓
5	13	Bedroom	100	100	✓
	14	Bedroom	100	100	✓
	15	LKD	100	100	✓
6	16	LKD	100	100	✓
	17	Bedroom	100	100	✓
	18	Bedroom	100	100	✓
7	19	Bedroom	100	100	✓
	20	LKD	67	100	✓

14.2.10 Block B - Level 04

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition IS EN 17037:2018+A1-2021 Method 2 National Annex		
			Floor Area > E_T (%)	Floor Area > E_{TM} (%)	Comment
1	1	Bedroom	100	100	✓
	2	Bedroom	100	100	✓
	3	LKD	100	100	✓
2	4	LKD	100	100	✓
	5	Bedroom	100	100	✓
	6	Bedroom	100	100	✓
3	7	Bedroom	100	100	✓
	8	Bedroom	100	100	✓
	9	LKD	47	100	x
4	10	LKD	47	100	x
	11	Bedroom	100	100	✓
	12	Bedroom	100	100	✓
5	13	Bedroom	100	100	✓
	14	LKD	67	100	✓

14.2.11 Block C - Level 00

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition IS EN 17037:2018+A1-2021 Method 2 National Annex		
			Floor Area > E_T (%)	Floor Area > E_{TM} (%)	Comment
1	1	Bedroom	100	100	✓
	2	Bedroom	100	100	✓
	3	Bedroom	100	100	✓
	4	LKD	67	100	✓
2	5	LKD	14	56	x
	6	Bedroom	59	100	✓
	7	Bedroom	100	100	✓
	8	Bedroom	100	100	✓
3	9	Bedroom	100	100	✓
	10	Bedroom	100	100	✓
	11	LKD	40	100	x
4	12	LKD	42	100	x
	13	Bedroom	100	100	✓
	14	Bedroom	100	100	✓
5	15	Bedroom	100	100	✓
	16	LKD	45	100	x
6	17	LKD	78	98	✓
	18	Bedroom	100	100	✓
	19	Bedroom	100	100	✓
	20	Bedroom	100	100	✓
7	21	LKD	38	100	x
	22	Bedroom	100	100	✓
	23	Bedroom	100	100	✓

14.2.12 Block C - Level 01

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition IS EN 17037:2018+A1-2021 Method 2 National Annex		
			Floor Area > E_T (%)	Floor Area > E_{TM} (%)	Comment
1	1	LKD	48	100	x
	2	Bedroom	100	100	✓
2	3	Bedroom	100	100	✓
	4	Bedroom	100	100	✓
	5	LKD	93	100	✓
3	6	LKD	99	100	✓
	7	Bedroom	100	100	✓
	8	Bedroom	100	100	✓
4	9	Bedroom	100	100	✓
	10	Bedroom	100	100	✓
	11	LKD	43	100	x
5	12	LKD	45	100	x
	13	Bedroom	100	100	✓
	14	Bedroom	100	100	✓
6	15	Bedroom	100	100	✓
	16	Bedroom	100	100	✓
	17	LKD	100	100	✓
7	18	LKD	100	100	✓
	19	Bedroom	100	100	✓
	20	Bedroom	100	100	✓

14.2.13 Block C - Level 02

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition IS EN 17037:2018+A1-2021 Method 2 National Annex		
			Floor Area > E_T (%)	Floor Area > E_{TM} (%)	Comment
1	1	LKD	48	100	x
	2	Bedroom	100	100	✓
2	3	Bedroom	100	100	✓
	4	Bedroom	100	100	✓
	5	LKD	98	100	✓
3	6	LKD	100	100	✓
	7	Bedroom	100	100	✓
	8	Bedroom	100	100	✓
4	9	Bedroom	100	100	✓
	10	Bedroom	100	100	✓
	11	LKD	45	100	x
5	12	LKD	46	100	x
	13	Bedroom	100	100	✓
	14	Bedroom	100	100	✓
6	15	LKD	100	100	✓
	16	Bedroom	100	100	✓

14.2.14 Block C - Level 03

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition IS EN 17037:2018+A1-2021 Method 2 National Annex		
			Floor Area > E_T (%)	Floor Area > E_{TM} (%)	Comment
1	1	LKD	47	100	x
	2	Bedroom	100	100	✓
2	3	Bedroom	100	100	✓
	4	Bedroom	100	100	✓
	5	LKD	98	100	✓
3	6	LKD	100	100	✓
	7	Bedroom	100	100	✓
	8	Bedroom	100	100	✓
4	9	Bedroom	100	100	✓
	10	Bedroom	100	100	✓
	11	LKD	100	100	✓

14.2.15 Block D - Level 00

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition IS EN 17037:2018+A1-2021 Method 2 National Annex		
			Floor Area > E_T (%)	Floor Area > E_{TM} (%)	Comment
1	1	Bedroom	100	100	✓
	2	Bedroom	100	100	✓
	3	Bedroom	100	100	✓
	4	LKD	92	100	✓
2	5	LKD	46	100	x
	6	Bedroom	100	100	✓
	7	Bedroom	100	100	✓
	8	Bedroom	100	100	✓
3	9	Bedroom	100	100	✓
	10	Bedroom	100	100	✓
	11	LKD	38	100	x
4	12	LKD	36	95	x
	13	Bedroom	100	100	✓
	14	Bedroom	100	100	✓
5	15	Bedroom	100	100	✓
	16	LKD	68	100	✓
6	17	LKD	100	100	✓
	18	Bedroom	100	100	✓
	19	Bedroom	100	100	✓
	20	Bedroom	79	100	✓
7	21	LKD	31	100	x
	22	Bedroom	100	100	✓
	23	Bedroom	100	100	✓

14.2.16 Block D - Level 01

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition IS EN 17037:2018+A1-2021 Method 2 National Annex		
			Floor Area > E_T (%)	Floor Area > E_{TM} (%)	Comment
1	1	LKD	37	100	x
	2	Bedroom	100	100	✓
2	3	Bedroom	100	100	✓
	4	Bedroom	100	100	✓
	5	LKD	100	100	✓
3	6	LKD	100	100	✓
	7	Bedroom	100	100	✓
	8	Bedroom	100	100	✓
4	9	Bedroom	100	100	✓
	10	Bedroom	100	100	✓
	11	LKD	47	100	x
5	12	LKD	43	100	x
	13	Bedroom	100	100	✓
	14	Bedroom	100	100	✓
6	15	Bedroom	100	100	✓
	16	Bedroom	100	100	✓
	17	LKD	100	100	✓
7	18	LKD	100	100	✓
	19	Bedroom	100	100	✓
	20	Bedroom	100	100	✓

14.2.17 Block D - Level 02

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition IS EN 17037:2018+A1-2021 Method 2 National Annex		
			Floor Area > E_T (%)	Floor Area > E_{TM} (%)	Comment
1	1	LKD	41	100	x
	2	Bedroom	100	100	✓
2	3	Bedroom	100	100	✓
	4	Bedroom	100	100	✓
	5	LKD	100	100	✓
3	6	LKD	100	100	✓
	7	Bedroom	100	100	✓
	8	Bedroom	100	100	✓
4	9	Bedroom	100	100	✓
	10	Bedroom	100	100	✓
	11	LKD	49	100	x
5	12	LKD	49	100	x
	13	Bedroom	100	100	✓
	14	Bedroom	100	100	✓
6	15	Bedroom	100	100	✓
	16	Bedroom	100	100	✓
	17	LKD	100	100	✓
7	18	LKD	100	100	✓
	19	Bedroom	100	100	✓
	20	Bedroom	100	100	✓

14.2.18 Block D - Level 03

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition IS EN 17037:2018+A1-2021 Method 2 National Annex		
			Floor Area > E_T (%)	Floor Area > E_{TM} (%)	Comment
1	1	LKD	40	100	x
	2	Bedroom	100	100	✓
2	3	Bedroom	100	100	✓
	4	Bedroom	100	100	✓
	5	LKD	100	100	✓
3	6	LKD	100	100	✓
	7	Bedroom	100	100	✓
	8	Bedroom	100	100	✓
4	9	Bedroom	100	100	✓
	10	Bedroom	100	100	✓
	11	LKD	50	100	✓
5	12	LKD	50	100	✓
	13	Bedroom	100	100	✓
	14	Bedroom	100	100	✓
6	15	Bedroom	100	100	✓
	16	Bedroom	100	100	✓
	17	LKD	100	100	✓
7	18	LKD	100	100	✓
	19	Bedroom	100	100	✓
	20	Bedroom	100	100	✓

14.2.19 Block E - Level 00

BE_L00

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition IS EN 17037:2018+A1-2021 Method 2 National Annex		
			Floor Area > E_T (%)	Floor Area > E_{TM} (%)	Comment
1	1	Bedroom	100	100	✓
	2	Bedroom	100	100	✓
	3	LKD	100	100	✓
	4	Bedroom	100	100	✓
2	5	LKD	100	100	✓
	6	Bedroom	100	100	✓
	7	Bedroom	65	100	✓
3	8	LKD	100	100	✓
	9	Bedroom	100	100	✓
	10	Bedroom	100	100	✓
4	11	Bedroom	92	100	✓
	12	Bedroom	99	100	✓
	13	LKD	100	100	✓
5	14	LKD	100	100	✓
	15	Bedroom	100	100	✓
	16	Bedroom	75	100	✓
6	17	Bedroom	81	100	✓
	18	Bedroom	100	100	✓
	19	LKD	100	100	✓
7	20	LKD	100	100	✓

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition IS EN 17037:2018+A1-2021 Method 2 National Annex		
			Floor Area > E_T (%)	Floor Area > E_{TM} (%)	Comment
	21	Bedroom	100	100	✓
	22	Bedroom	82	100	✓
8	23	Bedroom	100	100	✓
	24	Bedroom	100	100	✓
	25	Bedroom	66	100	✓
	26	LKD	100	100	✓

14.2.20 Block E - Level 01

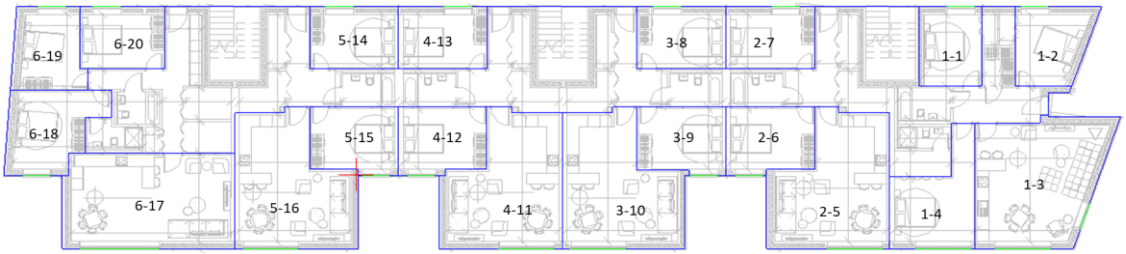
BE_L01

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition IS EN 17037:2018+A1-2021 Method 2 National Annex		
			Floor Area > E_T (%)	Floor Area > E_{TM} (%)	Comment
9	1	Bedroom	100	100	✓
10	2	Bedroom	100	100	✓
11	3	LKD	100	100	✓
12	4	Bedroom	100	100	✓
13	5	LKD	100	100	✓
14	6	Bedroom	100	100	✓
15	7	Bedroom	100	100	✓
16	8	LKD	100	100	✓
	9	Bedroom	100	100	✓

14.2.21 Block E - Level 02

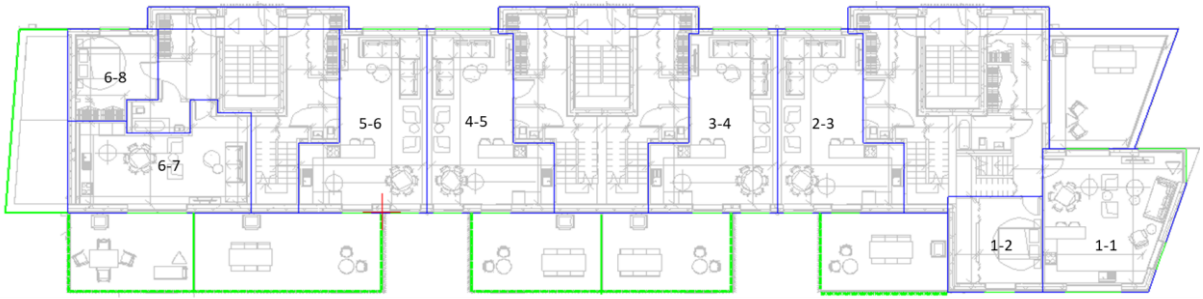
Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition IS EN 17037:2018+A1-2021 Method 2 National Annex		
			Floor Area > E_T (%)	Floor Area > E_{TM} (%)	Comment
9	1	Bedroom	100	100	✓
	2	Bedroom	100	100	✓
10	3	Bedroom	56	100	✓
	4	Bedroom	100	100	✓
11	5	Bedroom	100	100	✓
	6	Bedroom	69	100	✓
12	7	Bedroom	100	100	✓
	8	Bedroom	100	100	✓
13	9	Bedroom	100	100	✓
	10	Bedroom	81	100	✓
14	11	Bedroom	77	100	✓
	12	Bedroom	100	100	✓
15	13	Bedroom	100	100	✓
	14	Bedroom	86	100	✓

14.2.22 Block F - Level 00



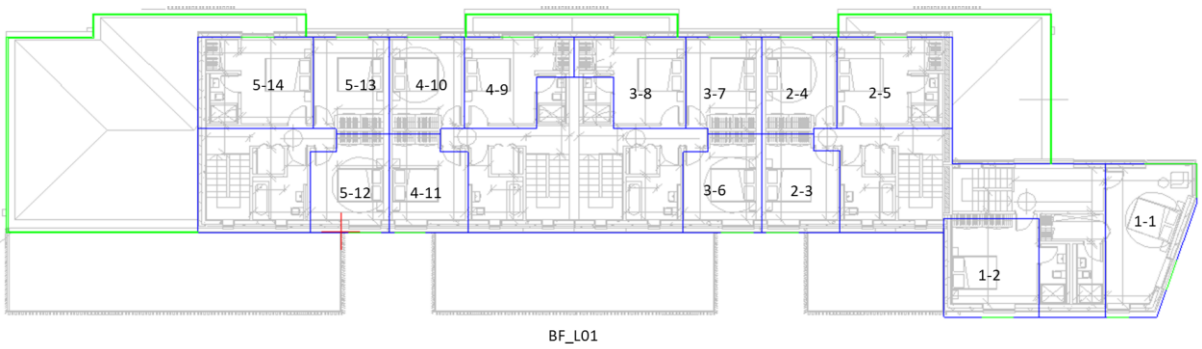
Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition IS EN 17037:2018+A1-2021 Method 2 National Annex		
			Floor Area > E_T (%)	Floor Area > E_{TM} (%)	Comment
1	1	Bedroom	70	100	✓
	2	Bedroom	100	100	✓
	3	LKD	96	99	✓
	4	Bedroom	100	100	✓
2	5	LKD	100	100	✓
	6	Bedroom	100	100	✓
	7	Bedroom	99	100	✓
3	8	Bedroom	72	100	✓
	9	Bedroom	45	100	x
	10	LKD	100	100	✓
4	11	LKD	100	100	✓
	12	Bedroom	77	100	✓
	13	Bedroom	100	100	✓
5	14	Bedroom	100	100	✓
	15	Bedroom	100	100	✓
	16	LKD	100	100	✓
6	17	LKD	100	100	✓
	18	Bedroom	100	100	✓
	19	Bedroom	100	100	✓
	20	Bedroom	100	100	✓

14.2.23 Block F - Level 01



Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition IS EN 17037:2018+A1-2021 Method 2 National Annex		
			Floor Area > E_T (%)	Floor Area > E_{TM} (%)	Comment
7	1	LKD	100	100	✓
	2	Bedroom	100	100	✓
8	3	LKD	93	100	✓
9	4	LKD	100	100	✓
10	5	LKD	99	100	✓
11	6	LKD	100	100	✓
12	7	Bedroom	100	100	✓
	8	LKD	100	100	✓

14.2.24 Block F - Level 02



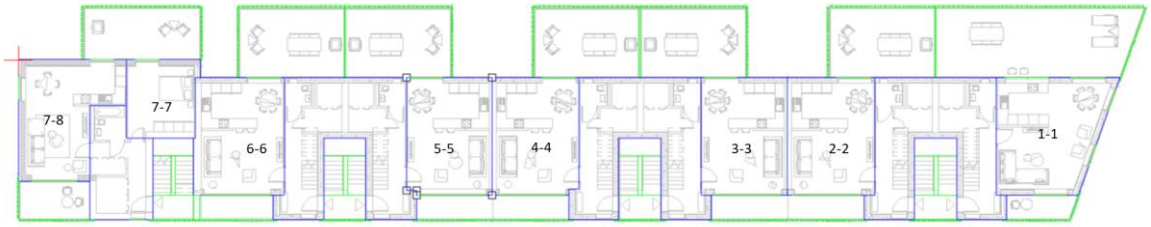
Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition IS EN 17037:2018+A1-2021 Method 2 National Annex		
			Floor Area > E_T (%)	Floor Area > E_{TM} (%)	Comment
7	1	Bedroom	100	100	✓
	2	Bedroom	100	100	✓
8	3	Bedroom	100	100	✓
	4	Bedroom	100	100	✓
9	5	Bedroom	99	100	✓
	6	Bedroom	100	100	✓
10	7	Bedroom	100	100	✓
	8	Bedroom	97	100	✓
11	9	Bedroom	99	100	✓
	10	Bedroom	100	100	✓
12	11	Bedroom	100	100	✓
	12	Bedroom	100	100	✓
13	13	Bedroom	100	100	✓
	14	Bedroom	100	100	✓

14.2.25 Block G - Level 00

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition IS EN 17037:2018+A1-2021 Method 2 National Annex		
			Floor Area > E_T (%)	Floor Area > E_{TM} (%)	Comment
1	1	Bedroom	100	100	✓
	2	Bedroom	100	100	✓
	3	LKD	100	100	✓
	4	Bedroom	100	100	✓
2	5	LKD	100	100	✓
	6	Bedroom	100	100	✓
	7	Bedroom	100	100	✓
3	8	LKD	100	100	✓
	9	Bedroom	100	100	✓
	10	Bedroom	100	100	✓
4	11	Bedroom	100	100	✓
	12	Bedroom	100	100	✓
	13	LKD	100	100	✓
5	14	LKD	100	100	✓
	15	Bedroom	100	100	✓
	16	Bedroom	100	100	✓
6	17	Bedroom	100	100	✓
	18	Bedroom	100	100	✓
	19	LKD	100	100	✓
7	20	Bedroom	100	100	✓

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition IS EN 17037:2018+A1-2021 Method 2 National Annex		
			Floor Area > E_T (%)	Floor Area > E_{TM} (%)	Comment
	21	Bedroom	100	100	✓
	22	LKD	100	100	✓

14.2.26 Block G - Level 01



BG_L01

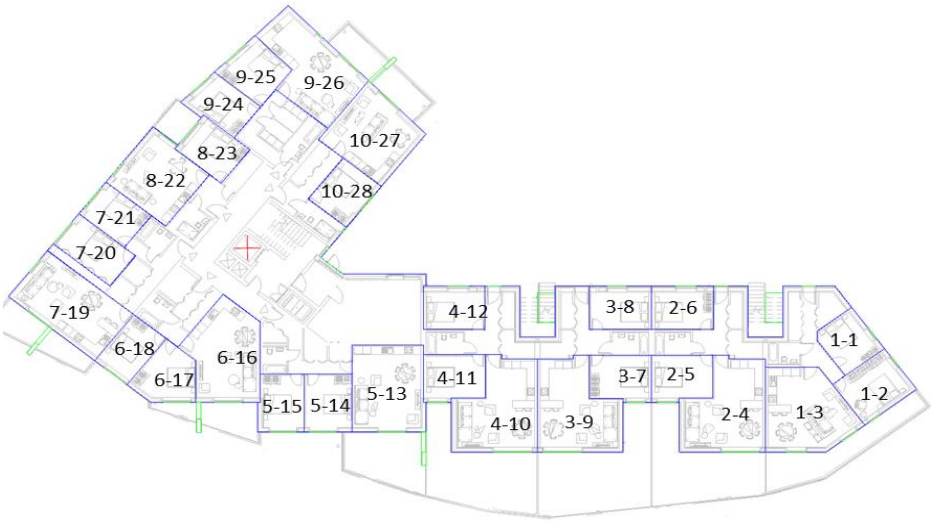
Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition IS EN 17037:2018+A1-2021 Method 2 National Annex		
			Floor Area > E_T (%)	Floor Area > E_{TM} (%)	Comment
8	1	LKD	100	100	✓
9	2	LKD	100	100	✓
10	3	LKD	100	100	✓
11	4	LKD	100	100	✓
12	5	LKD	100	100	✓
13	6	LKD	100	100	✓
14	7	Bedroom	100	100	✓
	8	LKD	100	100	✓

14.2.27 Block G - Level 02

BG_L02

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition IS EN 17037:2018+A1-2021 Method 2 National Annex		
			Floor Area > E_T (%)	Floor Area > E_{TM} (%)	Comment
8	1	Bedroom	100	100	✓
	2	Bedroom	100	100	✓
	3	Bedroom	100	100	✓
9	4	Bedroom	85	100	✓
	5	Bedroom	100	100	✓
10	6	Bedroom	100	100	✓
	7	Bedroom	67	100	✓
11	8	Bedroom	32	96	x
	9	Bedroom	90	100	✓
12	10	Bedroom	76	100	✓
	11	Bedroom	29	96	x
13	12	Bedroom	36	96	x
	13	Bedroom	68	100	✓
14	14	Bedroom	100	100	✓
	15	LKD	100	100	✓

14.2.28 Block H - Level 00



BH_L00

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition IS EN 17037:2018+A1-2021 Method 2 National Annex		
			Floor Area > E_T (%)	Floor Area > E_{TM} (%)	Comment
1	1	Bedroom	91	100	✓
	2	Bedroom	100	100	✓
	3	LKD	82	100	✓
2	4	LKD	81	100	✓
	5	Bedroom	59	100	✓
	6	Bedroom	94	100	✓
3	7	Bedroom	56	100	✓
	8	Bedroom	90	100	✓
	9	LKD	81	100	✓
4	10	LKD	83	100	✓
	11	Bedroom	17	68	x
	12	Bedroom	68	100	✓
5	13	LKD	33	100	x

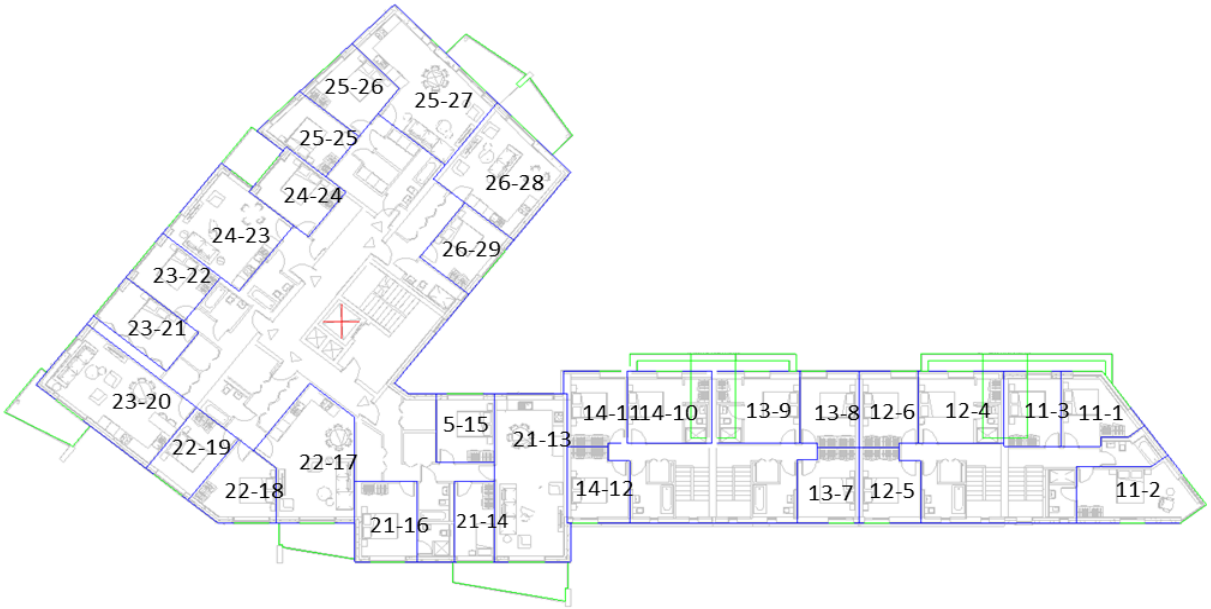
Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition IS EN 17037:2018+A1-2021 Method 2 National Annex		
			Floor Area > E_T (%)	Floor Area > E_{TM} (%)	Comment
	14	Bedroom	100	100	✓
	15	Bedroom	100	100	✓
6	16	LKD	25	98	x
	17	Bedroom	100	100	✓
	18	Bedroom	100	100	✓
7	19	LKD	100	100	✓
	20	Bedroom	100	100	✓
	21	Bedroom	100	100	✓
8	22	LKD	88	100	✓
	23	Bedroom	100	100	✓
9	24	Bedroom	100	100	✓
	25	Bedroom	100	100	✓
	26	LKD	45	99	x
10	27	LKD	27	100	x
	28	Bedroom	83	100	✓

14.2.29 Block H - Level 01

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition IS EN 17037:2018+A1-2021 Method 2 National Annex		
			Floor Area > E_T (%)	Floor Area > E_{TM} (%)	Comment
11	1	LKD	100	100	✓
12	2	LKD	99	100	✓
13	3	LKD	100	100	✓
14	4	LKD	57	100	✓
15	5	LKD	25	99	x
	6	Bedroom	100	100	✓
	7	Bedroom	21	94	x
	8	Bedroom	100	100	✓
16	9	LKD	19	89	x
	10	Bedroom	100	100	✓
	11	Bedroom	100	100	✓
17	12	LKD	73	100	✓
	13	Bedroom	100	100	✓

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition IS EN 17037:2018+A1-2021 Method 2 National Annex		
			Floor Area > E_T (%)	Floor Area > E_{TM} (%)	Comment
	14	Bedroom	100	100	✓
18	15	LKD	41	100	x
	16	Bedroom	86	100	✓
19	17	Bedroom	100	100	✓
	18	Bedroom	100	100	✓
	19	LKD	24	92	x
20	20	LKD	17	97	x
	21	Bedroom	91	100	✓

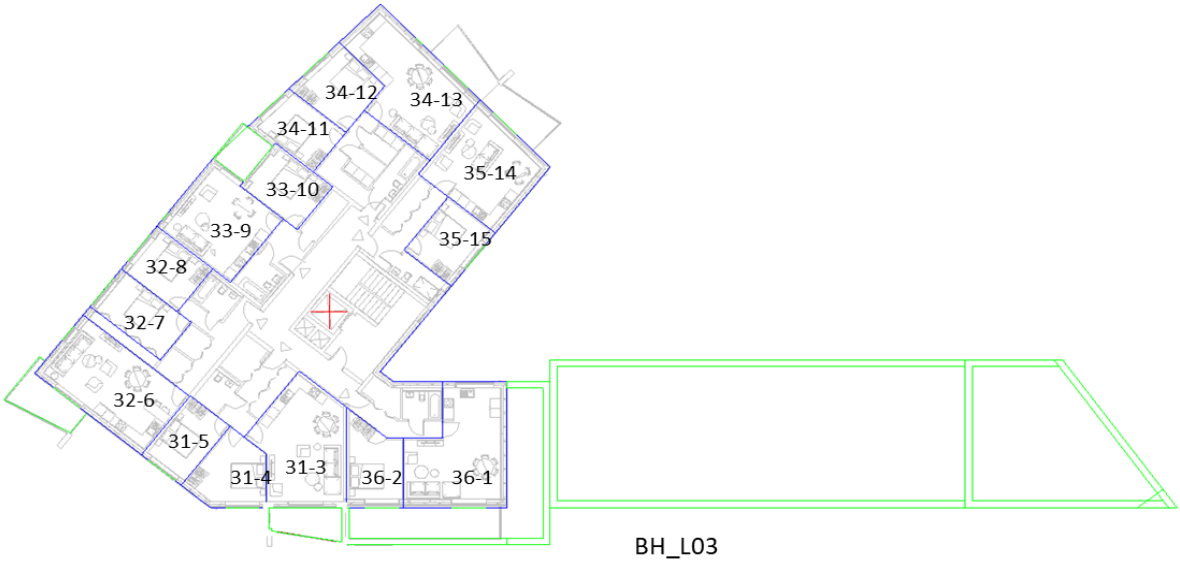
14.2.30 Block H - Level 02



Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition IS EN 17037:2018+A1-2021 Method 2 National Annex		
			Floor Area > E_T (%)	Floor Area > E_{TM} (%)	Comment
11	1	Bedroom	100	100	✓
	2	Bedroom	100	100	✓
	3	Bedroom	88	100	✓
12	4	Bedroom	50	100	✓
	5	Bedroom	100	100	✓
	6	Bedroom	83	100	✓
13	7	Bedroom	100	100	✓
	8	Bedroom	46	100	x
	9	Bedroom	39	100	x
14	10	Bedroom	40	100	x
	11	Bedroom	60	100	✓
	12	Bedroom	63	100	✓

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition IS EN 17037:2018+A1-2021 Method 2 National Annex		
			Floor Area > E_T (%)	Floor Area > E_{TM} (%)	Comment
21	13	LKD	39	88	x
	14	Bedroom	100	100	✓
	15	Bedroom	39	100	x
	16	Bedroom	100	100	✓
22	17	LKD	23	100	x
	18	Bedroom	100	100	✓
	19	Bedroom	100	100	✓
23	20	LKD	73	100	✓
	21	Bedroom	100	100	✓
	22	Bedroom	100	100	✓
24	23	LKD	35	100	x
	24	Bedroom	92	100	✓
25	25	Bedroom	100	100	✓
	26	Bedroom	100	100	✓
	27	LKD	24	92	x
26	28	LKD	16	84	x
	29	Bedroom	100	100	✓

14.2.31 Block H - Level 03



Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition IS EN 17037:2018+A1-2021 Method 2 National Annex		
			Floor Area > E_T (%)	Floor Area > E_{TM} (%)	Comment
36	1	LKD	63	100	✓
	2	Bedroom	100	100	✓
31	3	LKD	100	100	✓
	4	Bedroom	100	100	✓
	5	Bedroom	100	100	✓
32	6	LKD	100	100	✓
	7	Bedroom	100	100	✓
	8	Bedroom	100	100	✓
33	9	LKD	5	89	x
	10	Bedroom	50	100	✓
34	11	Bedroom	100	100	✓
	12	Bedroom	100	100	✓
	13	LKD	47	100	x

Unit No.	Ref.	Room Activity	BRE Guide 3rd Edition IS EN 17037:2018+A1-2021 Method 2 National Annex		
			Floor Area > E_T (%)	Floor Area > E_{TM} (%)	Comment
35	14	LKD	58	100	✓
	15	Bedroom	100	100	✓

14.3 Daylight Results

The following tables summarise the daylight provision results for the tested spaces Blocks A4 and A5 assessed within the development under the BRE Guide 3rd Edition / IS EN 17037-2018+A1-2021 Method 2.

The results are summarised in the following tables:

Tested Spaces of Block A

A compliance rate of 98% is achieved under BRE Guide 3rd Edition / IS EN 17037-2018+A1-2021 Method 2 for tested spaces in Block A within the proposed development. The daylight provision results are summarised below.

Rooms Tested	Total No. Rooms
Total No. Bedrooms Tested	65
Total No. LKDs Tested	34
Total No. Spaces Tested	**99**

BRE Guide 3rd Edition / IS EN 17037:2018+A1-2021 Method 2 Assessment				
Room Type	**Pass (No.)**	**Pass (%)**	**BR (No.)**	**BR (%)**
No. Bedrooms	65	100%	0	0%
No. LKDs	32	94%	2	6%
Total No.	**97**	**98%**	**2**	**2%**

*BR = Below Recommendations

Tested Spaces of Block B

A compliance rate of 88% is achieved under BRE Guide 3rd Edition / IS EN 17037-2018+A1-2021 Method 2 for tested spaces in Block B within the proposed development. The daylight provision results are summarised below.

Rooms Tested	Total No. Rooms
Total No. Bedrooms Tested	63
Total No. LKDs Tested	34
Total No. Spaces Tested	**97**

BRE Guide 3rd Edition / IS EN 17037:2018+A1-2021 Method 2 Assessment				
Room Type	**Pass (No.)**	**Pass (%)**	**BR (No.)**	**BR (%)**
No. Bedrooms	63	100%	0	0%
No. LKDs	22	65%	12	35%
Total No.	**85**	**88%**	**12**	**12%**

*BR = Below Recommendations

Tested Spaces of Block C

A compliance rate of 83% is achieved under BRE Guide 3rd Edition / IS EN 17037-2018+A1-2021 Method 2 for tested spaces in Block C within the proposed development. The daylight provision results are summarised below.

Rooms Tested	Total No. Rooms
Total No. Bedrooms Tested	46
Total No. LKDs Tested	24
Total No. Spaces Tested	**70**

BRE Guide 3rd Edition / IS EN 17037:2018+A1-2021 Method 2 Assessment				
Room Type	**Pass (No.)**	**Pass (%)**	**BR (No.)**	**BR (%)**
No. Bedrooms	46	100%	0	0%
No. LKDs	12	50%	12	50%
Total No.	**58**	**83%**	**12**	**17%**

*BR = Below Recommendations

Tested Spaces of Block D

A compliance rate of 87% is achieved under BRE Guide 3rd Edition / IS EN 17037-2018+A1-2021 Method 2 for tested spaces in Block D within the proposed development. The daylight provision results are summarised below.

Rooms Tested	Total No. Rooms
Total No. Bedrooms Tested	55
Total No. LKDs Tested	28
Total No. Spaces Tested	**83**

BRE Guide 3rd Edition / IS EN 17037:2018+A1-2021 Method 2 Assessment				
Room Type	**Pass (No.)**	**Pass (%)**	**BR (No.)**	**BR (%)**
No. Bedrooms	55	100%	0	0%
No. LKDs	17	61%	11	39%
Total No.	**72**	**87%**	**11**	**13%**

*BR = Below Recommendations

Tested Spaces of Block E

A compliance rate of 100% is achieved under BRE Guide 3rd Edition / IS EN 17037-2018+A1-2021 Method 2 for tested spaces in Block E within the proposed development. The daylight provision results are summarised below.

Rooms Tested	Total No. Rooms
Total No. Bedrooms Tested	33
Total No. LKDs Tested	16
Total No. Spaces Tested	**49**

BRE Guide 3rd Edition / IS EN 17037:2018+A1-2021 Method 2 Assessment				
Room Type	**Pass (No.)**	**Pass (%)**	**BR (No.)**	**BR (%)**
No. Bedrooms	33	100%	0	0%
No. LKDs	16	100%	0	0%
Total No.	**49**	**100%**	**0**	**0%**

*BR = Below Recommendations

Tested Spaces of Block F

A compliance rate of 98% is achieved under BRE Guide 3rd Edition / IS EN 17037-2018+A1-2021 Method 2 for tested spaces in Block F within the proposed development. The daylight provision results are summarised below.

Rooms Tested	Total No. Rooms
Total No. Bedrooms Tested	30
Total No. LKDs Tested	12
Total No. Spaces Tested	**42**

BRE Guide 3rd Edition / IS EN 17037:2018+A1-2021 Method 2 Assessment				
Room Type	**Pass (No.)**	**Pass (%)**	**BR (No.)**	**BR (%)**
No. Bedrooms	29	97%	1	3%
No. LKDs	12	100%	0	0%
Total No.	**41**	**98%**	**1**	**2%**

*BR = Below Recommendations

Tested Spaces of Block G

A compliance rate of 93% is achieved under BRE Guide 3rd Edition / IS EN 17037-2018+A1-2021 Method 2 for tested spaces in Block G within the proposed development. The daylight provision results are summarised below.

Rooms Tested	Total No. Rooms
Total No. Bedrooms Tested	30
Total No. LKDs Tested	15
Total No. Spaces Tested	**45**

BRE Guide 3rd Edition / IS EN 17037:2018+A1-2021 Method 2 Assessment				
Room Type	**Pass (No.)**	**Pass (%)**	**BR (No.)**	**BR (%)**
No. Bedrooms	27	90%	3	10%
No. LKDs	15	100%	0	0%
Total No.	**42**	**93%**	**3**	**7%**

*BR = Below Recommendations

Tested Spaces of Block H

A compliance rate of 76% is achieved under BRE Guide 3rd Edition / IS EN 17037-2018+A1-2021 Method 2 for tested spaces in Block H within the proposed development. The daylight provision results are summarised below.

Rooms Tested	Total No. Rooms
Total No. Bedrooms Tested	61
Total No. LKDs Tested	32
Total No. Spaces Tested	**93**

BRE Guide 3rd Edition / IS EN 17037:2018+A1-2021 Method 2 Assessment				
Room Type	**Pass (No.)**	**Pass (%)**	**BR (No.)**	**BR (%)**
No. Bedrooms	55	90%	6	10%
No. LKDs	16	50%	16	50%
Total No.	**71**	**76%**	**22**	**24%**

*BR = Below Recommendations

Total for the Proposed Development

A compliance rate of 89% is achieved under BRE Guide 3rd Edition / IS EN 17037-2018+A1-2021 Method 2 for all the blocks within the proposed development. The daylight provision results are summarised below.

Rooms Tested	Total No. Rooms
Total No. Bedrooms Tested	383
Total No. LKDs Tested	195
Total No. Spaces Tested	**578**

BRE Guide 3rd Edition / IS EN 17037:2018+A1-2021 Method 2 Assessment				
Room Type	**Pass (No.)**	**Pass (%)**	**BR (No.)**	**BR (%)**
No. Bedrooms	373	97%	10	3%
No. LKDs	142	73%	53	27%
Total No.	**515**	**89%**	**63**	**11%**

*BR = Below Recommendations