OCSC
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Multidisciplinary
Consulting Engineers

Daylight Sunlight Report

Adamstown Station District Centre
Masterplan – Phase II – Block G

Project No. Q066
13th October 2021

Daylight Sunlight Report

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DOCUMENT CONTROL & HISTORY

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EXECUTIVE SUMMARY

OCSC have been appointed to carry out a Daylight/ Sunlight study for the Adamstown Station District Centre Phase II Block G development located in Co. Dublin.

The aim of the study is to record and analyse the results for the following:

- The daylight levels within the living, kitchen and bedroom areas of selected apartments, to give an indication of the expected daylight levels throughout the proposed development;
- The expected sunlight levels within the living, kitchen and bedrooms areas within the proposed development;
- The quality of amenity space, being provided as part of the development, in relation to sunlight;
- Any potential daylight or sunlight impact the proposed development may have on properties adjacent to the site.

It is important to note that the performance targets which are included should be used with a degree of flexibility as per the extract below from the BRE Guide:

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

Internal daylight within the proposed development

The analysis confirms that across the entire development excellent levels of internal daylight are achieved. The majority of apartments not only meet but greatly exceed the recommendations outlined within the BRE Guidelines and British Standard BS8206, achieving a 98.7% compliance rate across the proposed apartments.

Sunlight to proposed development amenity spaces

In terms of sunlight access, excellent levels of sunlight are experienced across the proposed development. The communal amenity space provided exceed the BRE guidelines for sunlight on the test day of 21st of March.

Sunlight to windows within the proposed development

The annual probable sunlight hours assessment has shown that 67% of windows across the development achieve the recommended APSH values stated in the BRE Guidelines, while 76% of windows achieve the recommended values during the winter months, when sunlight is more valuable.

Impact to surrounding properties

The analysis also shows that the proposed building has imperceptible daylight, sunlight or overshadowing impact to neighbouring properties.

The calculation methodology for daylight and sunlight is based on the British Research Establishments "Site Layout Planning for Daylight and Sunlight: A Good Practice Guide" by PJ Littlefair, 2011 Second Edition.

DAYLIGHT SUNLIGHT REPORT

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1. INTRODUCTION

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The calculation methodology for daylight and sunlight is based on the British Research Establishments "Site Layout Planning for Daylight and Sunlight: A Good Practice Guide" by PJ Littlefair, 2011 Second Edition.

This report assesses the daylight and sunlight levels for minor design changes implemented to the development permitted under SDCC Reg. Ref. SDZ21A/0007.

2. SITE DESCRIPTION

The proposed development comprises the following:

- Repositioning of landscaped communal courtyard of Block G from first floor level to ground floor level due to removal of podium parking at level 0, and the consequential relocation of 83 no. car parking spaces to within the Block F car park and to on-street locations immediately adjacent to Block G, including ancillary site development and landscape works.
- The introduction of 9 no. ground floor units, facilitated by the removal of the podium from the core.
- A minor reduction to the overall provision of residential units from 185 to 184 no. apartment units.
- The provision of an additional unit and changes to the unit mix on Level 1.
- Adjustments to the location of the bicycle, plant, and waste stores serving Block G.
- Adjustments to Block G2 consisting of a minor reduction to the footprint of the Block by 0.6m, the removal of setback to the North (level 5) and adjustments to the Southern gable.

This application seeks permission for these minor design changes to the development permitted under SDCC Reg. Ref. SDZ21A/0007.

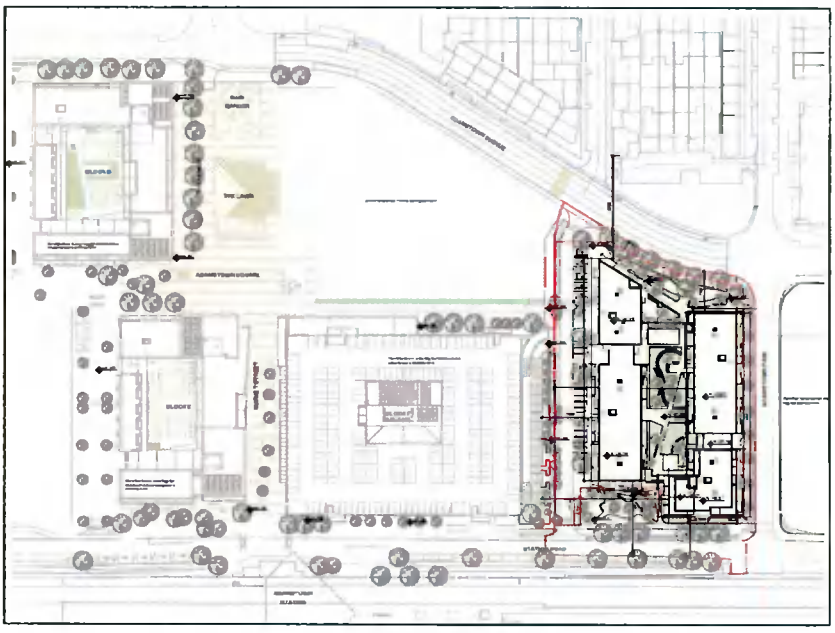

Figure 1 - Proposed Site Plan

3. RELEVANT PLANNING POLICIES

The following planning policies have been used as a point of reference within the daylight and sunlight assessment for the proposed development.

Relevant Planning Policy Number 1

The **Sustainable Urban Housing: Design Standards for New Apartments – Guidelines for Planning Authorities (December 2020)** outlines that *"Planning authorities should have regard to quantitative performance approaches to daylight provision outlined in guides like the BRE guide 'Site Layout Planning for Daylight and Sunlight' (2nd Edition) or BS 8206-2:2008 – 'Lighting for Buildings – Part 2: Code of Practice for Daylighting' when undertaken by development proposers which offer the capability to satisfy minimum standards of daylight provision."* They also outline that *"where an applicant cannot fully meet all of the requirements of the daylight provisions above, this must be clearly identified and a rationale for any alternative, compensatory design solutions must be set out, which planning authorities should apply their discretion in accepting taking account of its assessment of specific. This may arise due to a design constraint associated with the site or location and the balancing of that assessment against the desirability of achieving wider planning objectives. Such objectives might include securing comprehensive urban regeneration and or an effective urban design and streetscape solution."*

Relevant Planning Policy Number 2

The **Sustainable Residential Development in Urban Areas, DoEHLG 2009** outlines that *"Overshadowing will generally only cause problems where buildings of significant height are involved or where new buildings are located very close to adjoining buildings. Planning authorities should require that daylight and shadow projection diagrams be submitted in all such proposals. The recommendations of "Site Layout Planning for Daylight and Sunlight: A Guide to good Practice" (BRE 1991) or BS 8206 "Lighting for Buildings, Part 2 1992: Code of Practice for Daylighting" should be followed in this regard."*

Relevant Planning Policy Number 3

The **Urban Development and Building Heights – Guidelines for Planning Authorities (March 2018)** outlines the following

"At the scale of the site/building

• The form, massing and height of proposed developments should be carefully modulated so as to maximise access to natural daylight, ventilation and views and minimise overshadowing and loss of light.

• Appropriate and reasonable regard should be taken of quantitative performance approaches to daylight provision outlined in guides like the Building Research Establishment's 'Site Layout Planning for Daylight and Sunlight' (2nd edition) or BS 8206-2: 2008 – 'Lighting for Buildings – Part 2: Code of Practice for Daylighting'.

• Where a proposal may not be able to fully meet all the requirements of the daylight provisions above, this must be clearly identified and a rationale for any alternative, compensatory design solutions must be set out, in respect of which the planning authority or An Bord Pleanála should apply their discretion, having regard to local factors including specific site constraints and the balancing of that assessment against the desirability of achieving wider planning objectives. Such objectives might include securing comprehensive urban regeneration and or an effective urban design and streetscape solution."

4. BRE GUIDELINES FOR DAYLIGHT AND SUNLIGHT

The analysis of the development's potential and the quality of amenity for the new development, as well as for the surrounding properties once the scheme has been implemented, has been based on the Building Research Establishment (BRE) guidelines on "Site Layout Planning for Daylight and Sunlight. A Guide to Good Practice (Building Research Establishment Report, 2011)."

These guidelines provide the criteria and methodology for calculations pertaining to daylight and sunlight, and is the primary reference for this matter. The guide gives simple rules for analysing sites where the geometry of the surroundings is straightforward, supplementing them with graphical methods for complex sites.

However, it is important to note that the performance targets which are included should be used with a degree of flexibility as per the extract below from the BRE Guide:

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

BRE Guidelines refers to BS 8206[1] "Lighting for Buildings, Part 2 1992: Code of Practice for Daylighting" for guidance on the recommended internal daylight levels.

[1] The British Standard BS 8206: Part 2 (BS8206-02) has been withdrawn and replaced with IS EN 17037:2018 Daylight in Buildings. However, since the BRE Guidelines and some planning policy guidelines continue to make reference to the BS 8206, this standard has been used throughout the report.

5. PROPOSED DEVELOPMENT DESIGN

In order to ensure that daylight levels were maximised for the Adamstown Station District Centre Phase II Block G development, a number of key design strategies were analysed during concept design.

5.1. BUILDING MATERIAL SELECTION

The selection of materials play an important role in ambient daylight levels. The façade of the proposed development has been carefully selected to promote a sense of brightness and light and is composed of light materials. This will ensure light is reflected throughout the development. The inclusion of greenery to the amenity spaces will help to improve the sense of light and brightness within the apartments.

5.2. GLAZING TO WALL RATIO

The primary function of the glazing to wall ratio is to maximize daylight within the space while reducing solar gains within the proposed development. The other advantage in conjunction with appropriate materials is the more light coloured, reflective materials used externally, the more ambient daylight will be reflected to the surrounding areas. In addition, floor to ceiling heights have been maximised to further enhance the opportunity for improved daylight levels. Extensive analysis was undertaken on all building facades to ensure glazing widths were maximized to promote access to daylight. The image below illustrates the glazing to wall ratio of the proposed development.

Figure 2 - East Elevation Block G1 Glazing to Wall Ratio

5.3. AMENITY OPEN SPACES

Within the development high quality green open spaces have been included to allow occupants to spend quality time outdoors. The main ground floor courtyards has been carefully designed accommodating large areas of planting with seating and playing areas. The courtyards will ensure a light, bright and airy amenity space. The configuration of the podium courtyard will assist in improving the daylight levels of the apartments in this area and the sunlight penetration into the amenity spaces.

Figure 3 – Amenity Open Spaces

6. DAYLIGHT LEVELS WITHIN THE PROPOSED DEVELOPMENT

6.1. ASSESSMENT CRITERIA – INTERNAL DAYLIGHT

The method of calculation selected for the internal daylight analysis for this development is the Average Daylight Factor (ADF). This is the most detailed and thus most accurate method which considers not only the amount of sky visible from the vertical face of the window, but also the window size, room size and room use.

Architectural plans and elevations provided by Henry J Lyons Architects formed the basis for the internal daylight assessment.

As previously stated, in order to quantify the quality of daylight within a space, BRE Guidelines refer to the British standards BS 8206, which sets out minimum daylight factors to be achieved in the various room types within new build residential units.

Table 2 **Minimum average daylight factor**

Room type	Minimum average daylight factor %
Bedrooms	1
Living rooms	1.5
Kitchens	2

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

Figure 4 - BS 8206 – Table 2

BS 8206 outlines that for a room that serves more than one purpose, the minimum ADF should be that for the room type with the highest value. For example, in a combined living/kitchen spaces, the minimum recommended ADF value should be 2%.

In order to analyse the daylight requirements for the development a detailed 3D model was constructed of the entire development, in the Integrated Environmental Solutions Virtual Environment (IES VE) software package. A number of computer simulations were then undertaken in the IES VE software package to ascertain the ADFs achieved within the dwellings of the proposed development.

6.2. DAYLIGHT RESULTS – INTERNAL DAYLIGHT APARTMENTS

In line with common industry approach, units presented at the lower levels have been selected for analysis. Units are selected at the lower levels on the basis that they will receive the lowest levels of daylight due to their location, obstruction and position within the development. Another factor in unit selection is the layout of the apartment. Room depth and location of balconies also play an important role when it comes to daylight penetration within the room. Different types of rooms across the lower levels have been analysed, prioritizing the deep plan and more obstructed rooms.

As previously outlined, the daylight analysis is completed within the IES software and all room results are tabulated. Where a room ADF result falls short of the compliance benchmark, the same apartment type directly above is also modelled to show if that room achieves the compliance benchmark in the above level. This process is reiterated on each level above until the compliance benchmark is achieved. Where units at the lower level achieve the compliance benchmark, it is taken that the same unit type directly above will also achieve the compliance benchmark and therefore, no further modelling is required. The only exception is between ground and first floor levels, due to the usual reduction on the floor to ceiling height of the first floor level in comparison to the ground, a reduction on the daylight levels could be experienced.

Figure 5 illustrates an example of the rationale applied to calculate the percentage rate of compliance based on a sample of analysed rooms. The rooms identified with a text reference (A, B, C etc.) were selected for analysis. The results recorded for the assessed rooms will show as a pass or fail against the compliance benchmark. This pass or fail result is then applied to rooms with similar characteristics (room configuration, location or level of obstructions) and this rationale is shown in Figure 5, where rooms expected to receive a similar ADF result have been identified with a circle of the same colour.

The design and layout of each apartment type has been carefully considered with generous window openings being provided. Where the opportunity arises, rooms have been designed as dual aspect and bathroom and storage areas have been provided to the back of apartments to give living spaces greater access to daylight.

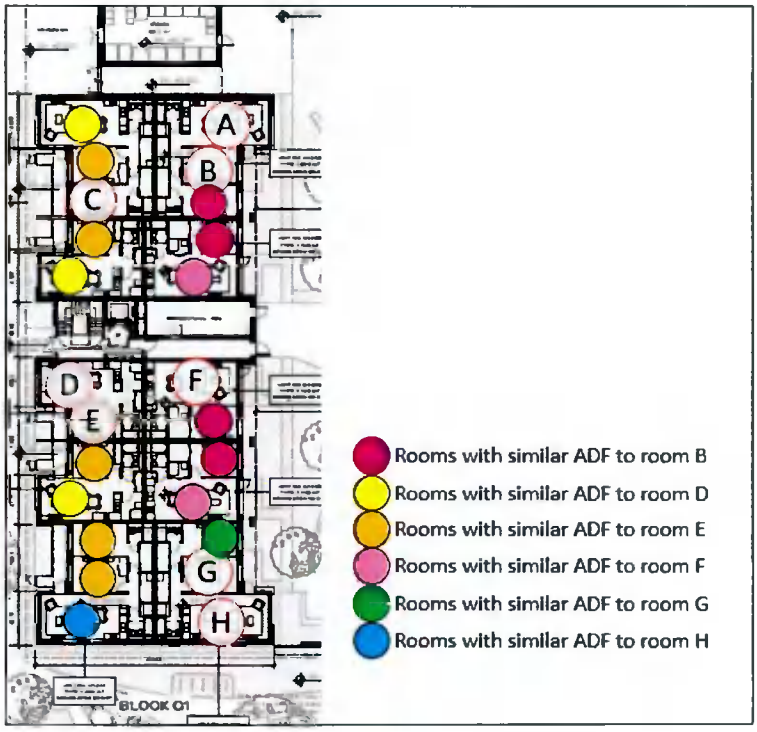

Figure 5 - Example of room's assumption at Ground Floor of Block G1

6.3. DAYLIGHT PARAMETERS

The surface reflectance values outlined in Table 1 have been used in the analysis.

Surface Type	Reflectance (%)
External Wall	40
Internal Partitions	70
Ceiling	70
Floor	40
Adjacent Buildings	40
Glazing Transmittance	70

Table 1 – Surface Reflectance Values

The ADF calculations are carried out in a working plane that lies 850mm above the floor and it is offset 500mm from the perimeter of the room. A grid of 250mm is used to calculate all different points within the room and the average of these points determines the ADF.

6.4. TREES

BRE Guideline outlines the following in relation to the inclusion of trees within daylight and sunlight calculations.

"The question of whether trees or fences should be included in the calculation depends upon the type of shade they produce. Normally trees and shrubs need not to be included, partly because their shapes are almost impossible to predict, and partly because the dappled shade of a tree is more pleasant than the deep shadow of a building (this applies specially to deciduous trees)."

Within Appendix H of the BRE Guidelines the following statements are outlined:

"It is generally more difficult to calculate the effects of trees on daylight because of their irregular shapes and because some light will generally penetrate through the tree crown. Where the effect of a new building on existing buildings nearby is being analysed, it is usual to ignore the effect of existing trees. This is because daylight is at its scarcest and most valuable in winter when most trees will not be in leaf. "

<u>When assessing the skylight in new dwellings:</u>

"Sometimes, however, trees should be taken into account, eg where a new dwelling is proposed near to large existing trees."

When assessing the sunlight in gardens:

"In assessing the impact of buildings on sunlight in gardens, trees and shrubs are not normally included in the calculation unless a dense belt or group of evergreens is specifically planned as a windbreak or for privacy purposes."

As above mentioned, it is typical to ignore the effect of trees. Therefore, no trees have been included within the calculations.

6.5. DAYLIGHT RESULTS – INTERNAL DAYLIGHT WITHIN PROPOSED APARTMENTS

This section outlines the apartment units that were selected for assessment of internal daylight levels for the proposed Adamstown Station District Centre Phase II Block G development. The results of the analysis are outlined in the accompanying tables.

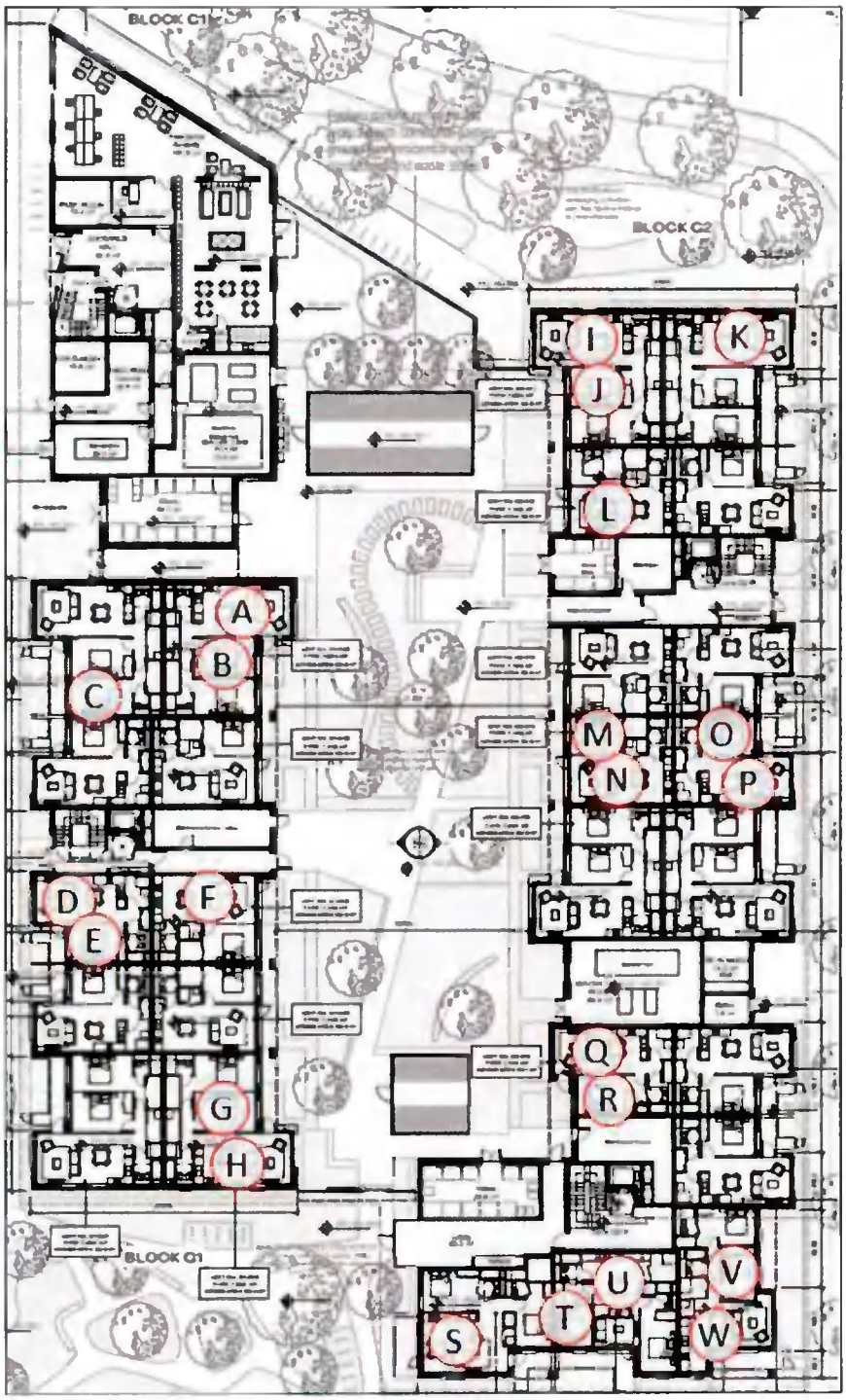

Figure 6 – Ground Floor Assessed Units

Unit		ADF target (%)	ADF results (%)	Meets minimum ADF target
A	Living/Dining/Kitchen	2.0	3.0	Y
B	Bedroom	1.0	1.6	Y
C	Bedroom	1.0	3.0	Y
D	Living/Dining/Kitchen	2.0	4.3	Y
E	Bedroom	1.0	2.6	Y
F	Living/Dining/Kitchen	2.0	1.5	N
G	Bedroom	1.0	1.7	Y
H	Living/Dining/Kitchen	2.0	5.4	Y
I	Living/Dining/Kitchen	2.0	4.6	Y
J	Bedroom	1.0	1.6	Y
K	Living/Dining/Kitchen	2.0	6.1	Y
L	Living/Dining/Kitchen	2.0	1.6	N
M	Bedroom	1.0	2.6	Y
N	Living/Dining/Kitchen	2.0	1.9	N
O	Bedroom	1.0	2.9	Y
P	Living/Dining/Kitchen	2.0	5.6	Y
Q	Living/Dining/Kitchen	2.0	2.1	Y
R	Bedroom	1.0	1.2	Y
S	Living/Dining/Kitchen	2.0	7.4	Y
T	Bedroom	1.0	2.1	Y
U	Living/Dining/Kitchen	2.0	2.5	Y
V	Bedroom	1.0	2.6	Y
W	Living/Dining/Kitchen	2.0	7.3	Y

Table 2 – Average Daylight Factor Results – Ground Floor Assessed Units

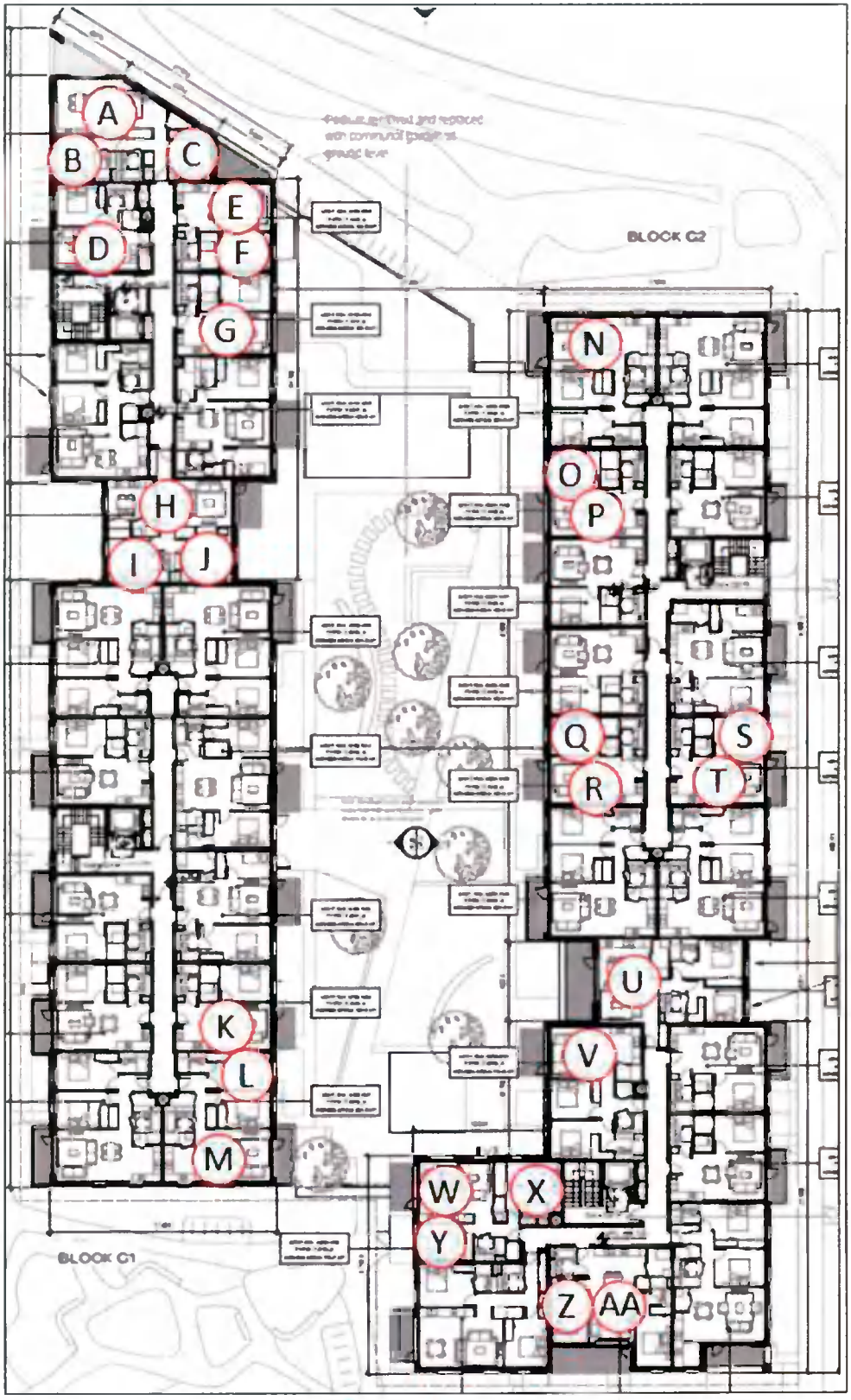

Figure 7 – First Floor Assessed Units

Unit		ADF target (%)	ADF results (%)	Meets minimum ADF target
A	Living/Dining/Kitchen	2.0	5.8	Y
B	Bedroom	1.0	4.8	Y
C	Bedroom	1.0	5.3	Y
D	Living/Dining/Kitchen	2.0	4.4	Y
E	Living/Dining/Kitchen	2.0	3.9	Y
F	Bedroom	1.0	4.0	Y
G	Living/Dining/Kitchen	2.0	2.9	Y
H	Living/Dining/Kitchen	2.0	2.0	Y
I	Bedroom	1.0	2.8	Y
J	Bedroom	1.0	3.0	Y
K	Living/Dining/Kitchen	2.0	2.1	Y
L	Bedroom	1.0	2.1	Y
M	Living/Dining/Kitchen	2.0	5.0	Y
N	Living/Dining/Kitchen	2.0	3.8	Y
O	Bedroom	1.0	3.0	Y
P	Living/Dining/Kitchen	2.0	2.4	Y
Q	Bedroom	1.0	4.0	Y
R	Living/Dining/Kitchen	2.0	2.8	Y
S	Bedroom	1.0	4.3	Y
T	Living/Dining/Kitchen	2.0	4.0	Y
U	Living/Dining/Kitchen	2.0	2.2	Y
V	Living/Dining/Kitchen	2.0	2.8	Y
W	Living/Dining/Kitchen	2.0	5.9	Y
X	Bedroom	1.0	2.3	Y
Y	Bedroom	1.0	3.2	Y
Z	Bedroom	1.0	5.3	Y
AA	Living/Dining/Kitchen	2.0	2.2	Y

Table 3 – Average Daylight Factor Results – First Floor Assessed Units

In summary, the vast majority of units not only meet but in the majority of cases exceed the Average Daylight Factor target recommended in BS 8206. Of the 471 rooms that comprise the development, only 6 fall slightly short of the BRE Guidelines and BS 8206 recommendations, therefore a 98.7% compliance rate is achieved across the development.

Total No. of Rooms	No. Living/ Kitchen Rooms Not Compliant with BS 8206 Guidelines (2.0% ADF)	No. Bedrooms Not Compliant with BS 8206 Guidelines (1.0% ADF)	Total No. Rooms Not Compliant with BS 8206 Guidelines	% of compliance with BS 8206
471	6	0	6	98.7%

Table 4 – Percentage of Compliance

6.6. DAYLIGHT RESULTS – ROOMS WITHIN APARTMENTS FALLING BELOW COMPLIANCE AND COMPENSATORY MEASURES INTRODUCED

In order to demonstrate that excellent levels of daylight are achieved in those units falling slightly short of compliance, the following image illustrates the ADF levels being achieved throughout the 'worst case' living room/kitchen located in the ground floor level. As expected, daylight levels are excellent within close proximity to the external wall and begin to drop off as you move towards the kitchen area which are typically located to the rear of the open space. It must be noted that the apartments within the Adamstown Block G development contain a kitchen which is designed to be used mainly for food preparation rather than occupants spending a long time sitting in the kitchen area. Instead, occupants are expected to spend most of their time in the living room area, where daylight penetration will be more appreciated. Therefore, it can be stated that even though some rooms fall slightly short of the compliance target set, they will still receive excellent levels of daylight within the zone closest to the external wall, where sitting areas are located and where occupants are expected to spend the majority of their time.

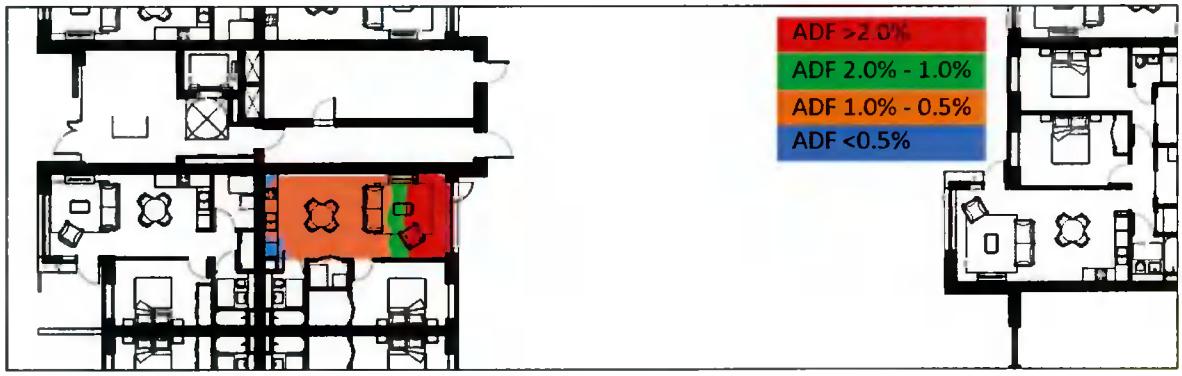

Figure 8 – Ground Floor Block G1 Unit F – 'Worst Case' Living/ Kitchen Room – Assessment with ADF Contours

It is worth emphasising again the fact that the guidelines for daylight are not mandatory and that the Sustainable Urban Housing: Design Standards for New Apartments – Guidelines for Planning Authorities (December 2020) outlines that *"where an applicant cannot fully meet all of the requirements of the daylight provisions above, this must be clearly identified and a rationale for any alternative, compensatory design solutions must be set out, which planning authorities should apply their discretion in accepting taking account of its assessment of specific. This may arise due to a design constraint associated with the site or location and the balancing of that assessment against the desirability of achieving wider planning objectives. Such objectives might include securing comprehensive urban regeneration and or an effective urban design and streetscape solution."*

In line with the objectives of the Sustainable Urban Housing: Design Standards for New Apartments, the proposed development seeks to balance ADF compliance with quality urban design and landscape. The proposed development seeks to deliver a high quality living environment through the provision of a high quality amenity areas, which residents can enjoy immediately adjacent to their homes. Additionally, the proposed development provides quality external private open space to all residential units, ensuring maximum opportunities to enjoy their residential living environment.

7. SUNLIGHT ASSESSMENT TO AMENITY SPACES WITHIN THE DEVELOPMENT

BRE Guidelines (2011) recommend that for external amenity spaces to appear adequately sunlit throughout the year, at least half of the garden or amenity space should receive at least two hours of sunlight on March 21st.

In order to show that sunlight levels within the development achieve compliance with current BRE Guidelines, a sunlight study has been carried out for the proposed development.

The red squares in Figure 9 highlight the areas that receive a minimum of 2 hours of sunlight on the 21st of March for the proposed development. It is evident at least 50% of the overall communal amenity spaces receive 2 hours or more of sunlight on March 21st, therefore compliance with BRE Guidelines is achieved.

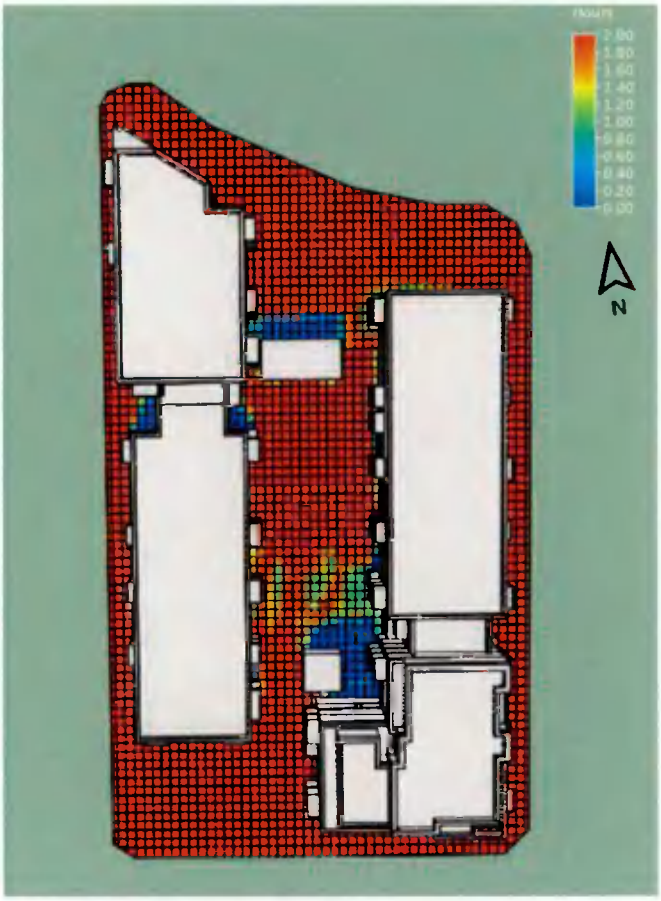

Figure 9 - Amenity Spaces - Hours of Sunlight on March 21st

Table 5 outlines the percentage of amenity space receiving at least 2 hours sunlight on March 21st. The majority of communal amenity space receives the recommended values in more than 50% of the area, therefore, compliance with BRE Guidelines is achieved.

	Percentage of area receiving ≥ 2hours sunlight on March 21st	Meets compliance with BRE Guidelines
External Amenity	93%	Y

Table 5 – Sunlight results – Communal amenity space

8. SUNLIGHT ASSESSMENT WITHIN THE PROPOSED DEVELOPMENT (APSH)

In order to determine the amount of sunlight that is received by windows within the proposed development, the Annual Probable Sunlight Hours (APSH) calculation method as outlined in BRE Guidelines has been used.

BRE Guidelines outline that in housing, the main requirement for sunlight is in living rooms, where it is valued at any time of the day but especially in the afternoon. BRE Guidelines also state that sunlight is less important in bedrooms and kitchens, however, all windows to occupied rooms have been included within the analysis.

The recommendation set out in BRE Guidelines state that in order to show that adequate sunlight reaches windows within occupied rooms, the centre of at least one window to a main living room must receive 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.

While the BRE criteria sets out these recommendations for living room windows to receive direct sunlight throughout the year, the guidance set out in the Sustainable Urban Housing: Design Standards for New Apartments states that balconies should adjoin and have a functional relationship with the main living areas of the apartment. They also state that it is preferable that balconies would be primarily accessed from living rooms, which can reduce the sunlight being received in some instances.

As the location of balconies have been designed to primarily comply with the apartment design guidelines, the amount of sunlight reaching these living room windows in some areas will naturally be reduced and achieving the recommended values within BRE Guidelines can become challenging.

The below table summarises the annual probable sunlight hours for the annual period and for the winter period based on the BRE recommendations.

	BRE Guidelines Check 1 APSH > 25% Annual Period	BRE Guidelines Check 2 APSH > 5% Winter Period
Percentage of Compliance	67%	76%

Table 6 – APSH Summary Table

The results from the analysis have shown that for the annual period, 67% of the windows across the development achieve the recommended APSH values stated in the BRE Guidelines, while 76% of windows achieve the recommended values during the winter months, when sunlight is more valuable. The shortfall in compliance can be attributed to the projection of balconies in some areas, and to the north facing windows.

It is important to note that even though the projection of balconies will impact the sunlight reaching the windows in some areas, it will provide occupants with an outdoor amenity space that will receive excellent levels of sunlight. In addition, BRE Guidelines outline the difficulty in achieving the recommended targets within apartments and they recommend to aim for a good design to minimise the number of dwellings that are only facing north, north east or north west, unless there is some compensating factors such as an appealing view to the north, which it is the case for the proposed development, that will have views into the green courtyard. In addition, all units will have access into the high quality amenity area.

It must be noted that the results within this report should be treated with certain degree of flexibility, based on the following statement in the BRE Guidelines:

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

The following images[2] illustrate the sunlight levels achieved within the proposed development.

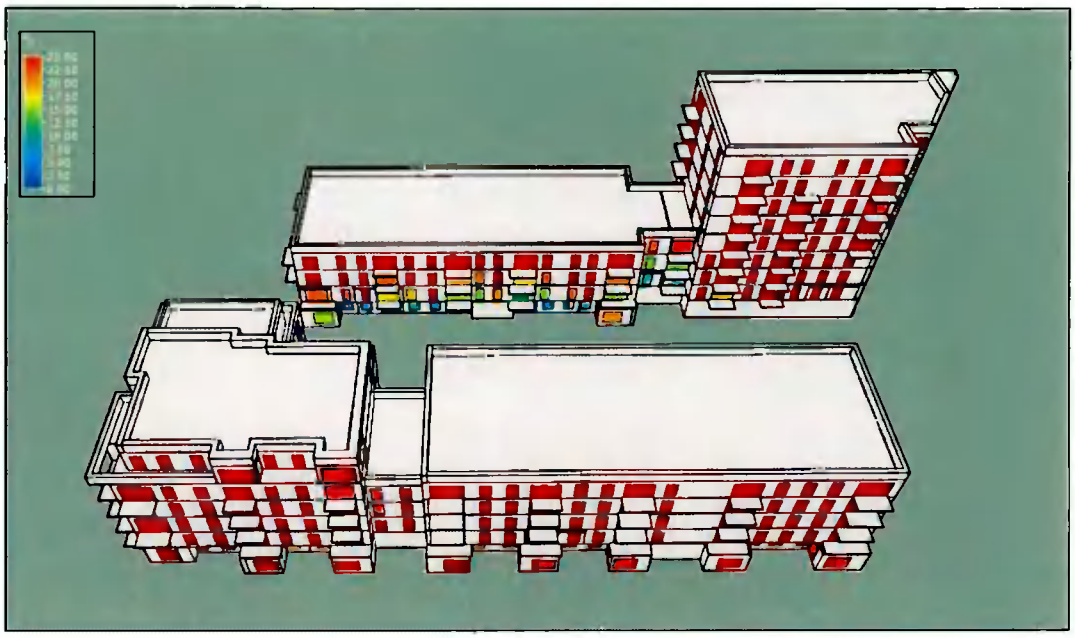

Figure 10 - Annual Probable Sunlight Hours – Annual Period – East Elevation

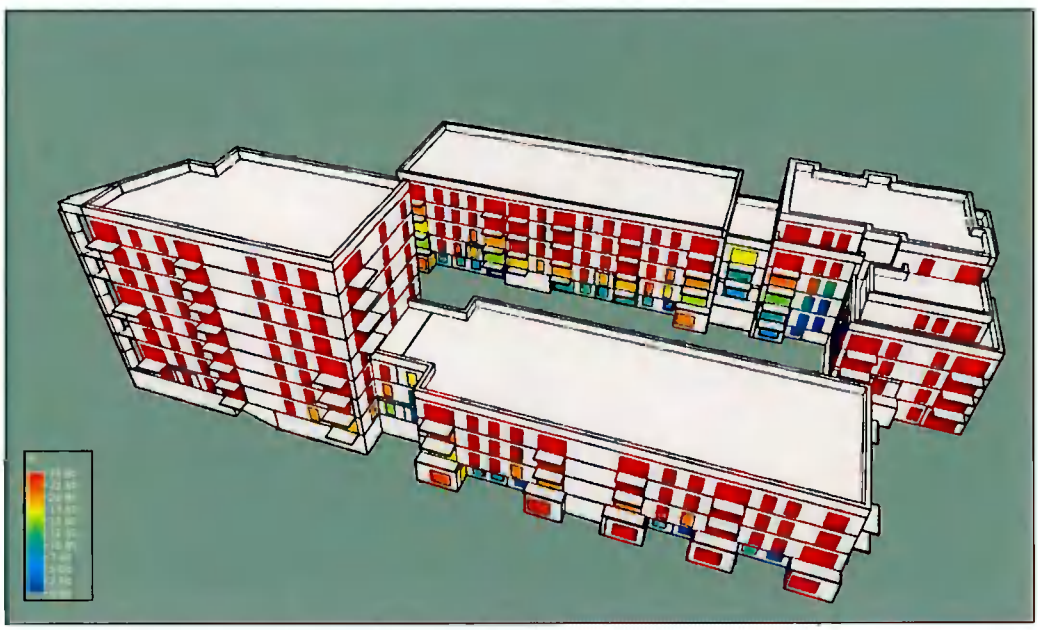

Figure 11 - Annual Probable Sunlight Hours – Annual Period – West Elevation

[2] Adjacent properties and bike storages were included as part of the analysis. However, they have been removed for the purpose of the image to allow better visibility.

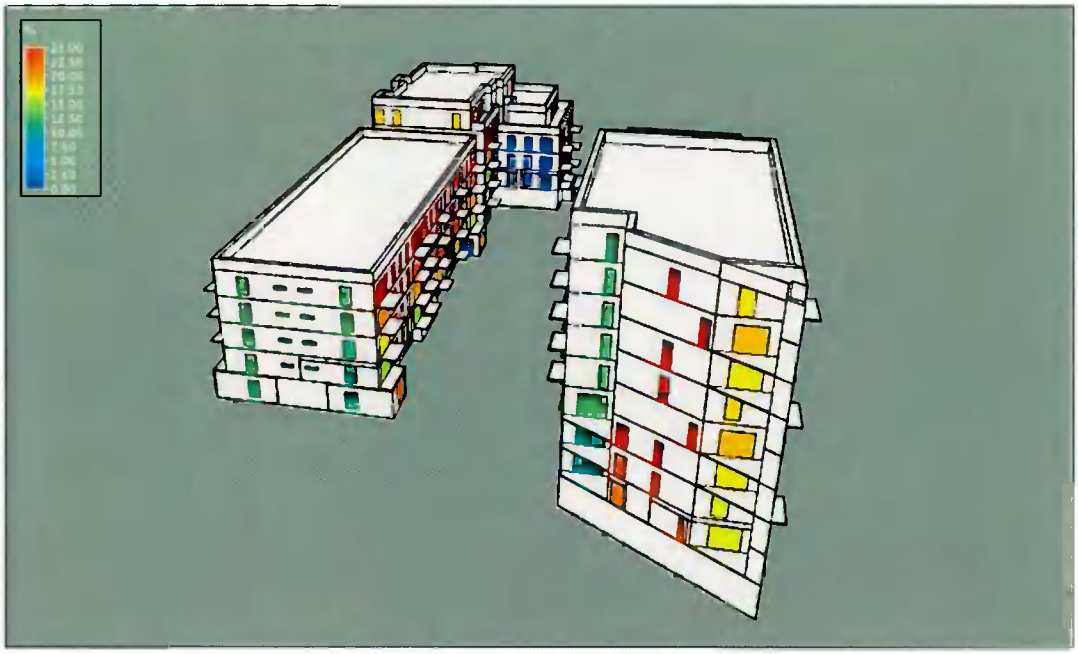

Figure 12 - Annual Probable Sunlight Hours – Annual Period – North Elevation

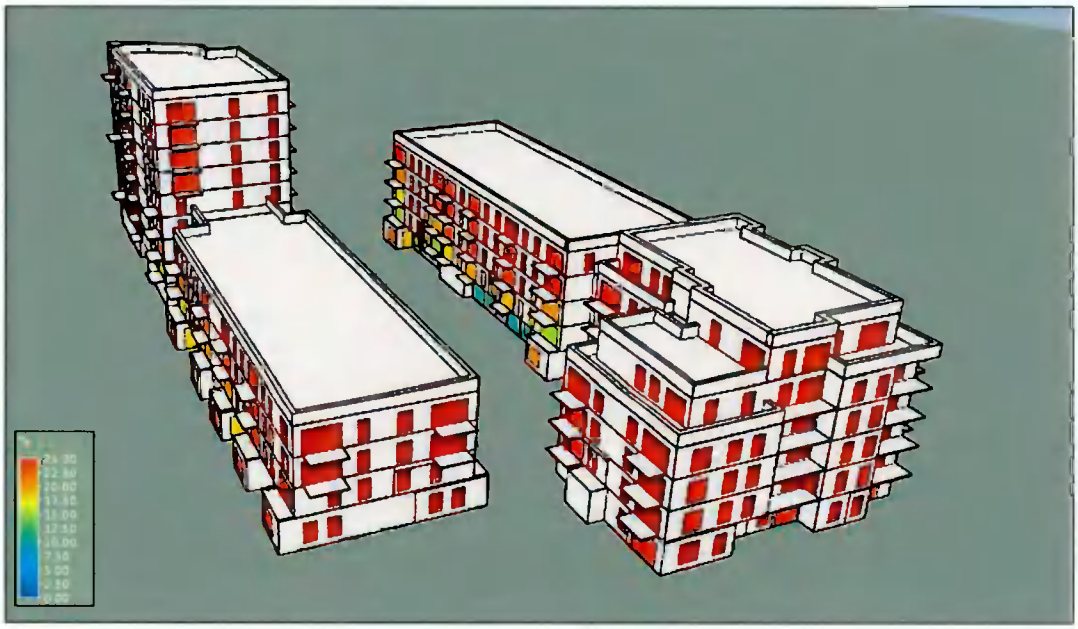

Figure 13 - Annual Probable Sunlight Hours – Annual Period –South Elevation

9. ASSESSING THE IMPACT ON SURROUNDING PROPERTIES

9.1. DAYLIGHT & SUNLIGHT IMPACT METHODOLOGY

As per the BRE Guidelines it is important to safeguard the daylight to nearby buildings, from a proposed development, where a reasonable expectation of daylight is required. The flow matrix below outlines the criteria to be assessed, as per the BRE Guidelines, in order to ascertain any potential impact to adjacent buildings from the proposed development.

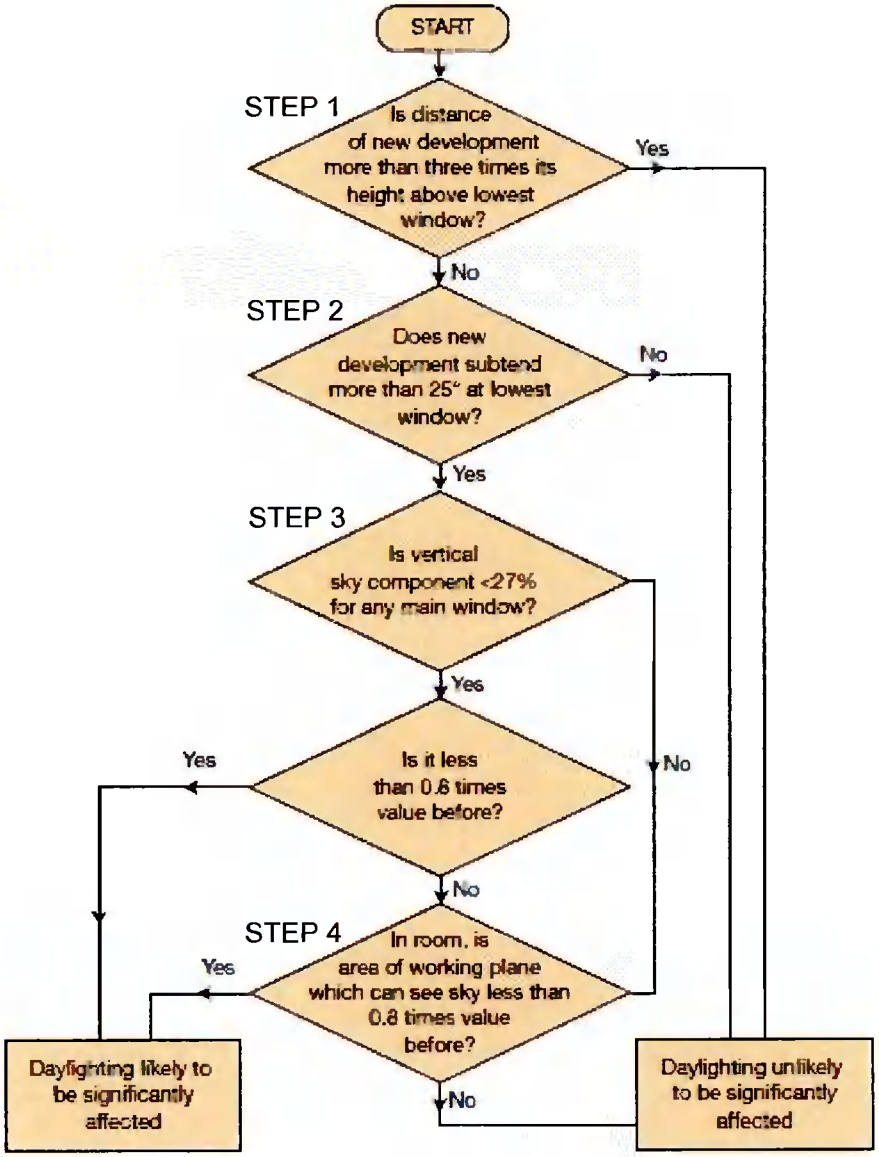

Figure 14 - Daylight Assessment Methodology

9.1.1 DISTANCE FROM THE PROPOSED DEVELOPMENT – STEP 1

As per the flow matrix, the loss of light to existing windows is not required to be analysed 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 windows. Otherwise, BRE guideline provide the following methods for assessing daylight availability.

9.1.2 25° LINE CRITERIA – STEP 2

In the first instance, if a proposed development falls beneath a 25° angle taken from a point 1.6 metres above ground level from any adjacent properties, then the BRE Guidelines say that no further analysis is required in relation to impact on surrounding properties as adequate skylight will still be available. If the proposed development extends beyond the 25° line then further analysis is required (Step 3).

9.1.3 VERTICAL SKY COMPONENT – STEP 3

The following method is known as the Vertical Sky Component (VSC). The VSC calculation is the ratio of the direct sky illuminance falling on the outside of a window, to the simultaneous horizontal illuminance under an unobstructed sky. The BRE Guide sets out two guidelines for the VSC:

- If the VSC at the centre of the existing window exceeds 27% with the new development in place, then enough sky light should still be reaching the existing window.
- If the VSC with the new development in place is both less than 27% and less than 80% its former value, then the reduction in light to the window is likely to be noticeable.
- This means that even if the VSC is less than 27%, as long as the VSC value is still greater than 80% of its former value, this would be acceptable and thus the impact would be considered negligible.

It is important to note that the VSC is a simple geometrical calculation which provides an early indication of the potential for daylight entering the space. However, it does not assess or quantify the actual daylight levels inside the rooms. If the VSC standard is not met on any window, Step 4 is then followed

9.1.4 NO SKY LINE – STEP 4

This method is the No Sky Line or Daylight Distribution Method. This method assesses the change in position of the No Sky Line between the existing and proposed situations. It does take into account the number and size of windows to a room, but still does not give any qualitative or quantitative assessment of the light in the room, only where sky can or cannot be seen. Thus, as this method is limited, Step 3 is considered more appropriate.

Sections 9.2 and 9.3 on the following pages outline the details of the analysis undertaken.

9.2. IDENTIFYING SENSITIVE RECEPTORS

Prior to following the flow matrix, first the key sensitive receptors around the site need to be identified. According to the BRE Guide, sensitive receptors are described as:

- Habitable rooms in residential buildings, where the occupants have a reasonable expectation of daylight;
- Other sensitive receptors are gardens and open spaces on adjacent properties to the new scheme, excluding public footpaths, front gardens and car parks. In accordance with the BRE Guide, windows are selected as sensitive receptors on the basis of being a habitable room facing the proposed development.

Similarly, amenities and open spaces are selected on the basis of being in the immediate vicinity of the proposed development. The primary purpose of a daylight, sunlight and overshadowing assessment is to determine the likely loss of light to adjacent buildings resulting from the construction of the proposed development.

Therefore, in this case, the proposed development is identified as the potential source of impact. The sensitive receptors identified for this study are windows of habitable rooms facing the site where the occupants have a reasonable expectation of daylight. Table 7 identifies all sensitive receptors analysed, whilst Figure 15 identifies their location.

Development name
Properties along Adamstown Ave
Properties at Stratton Ct
Properties along Adamstown Park

Table 7 – Sensitive Receptors surrounding Adamstown Station District Centre Phase II Block G development

The image below identifies the location of the sensitive receptors located in closest proximity to the proposed site.

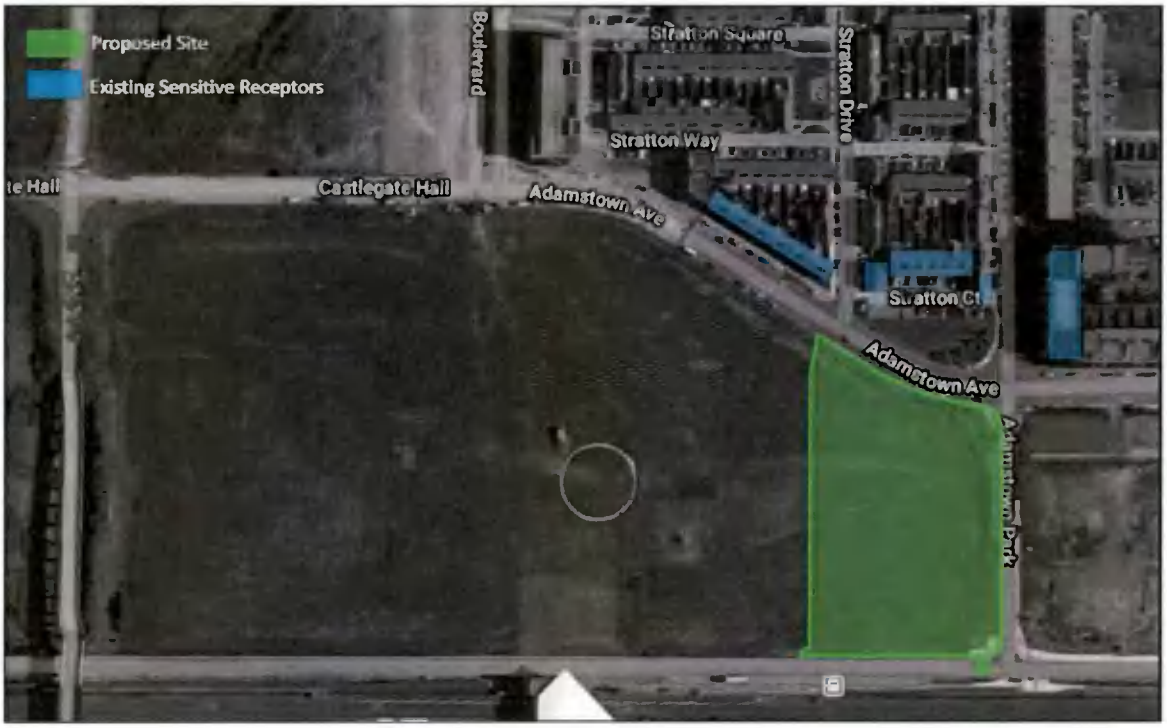

Figure 15 – Location of Sensitive Receptors

At the time of this planning submission, all planning applications in the area (Lodged Pending and Granted) were reviewed and it can be confirmed that all surrounding considerations have been included in the modelling application.

9.3. DAYLIGHT IMPACT ON SURROUNDING PROPERTIES

25 ^{o} line criteria

BRE Guidelines state that if a proposed development falls beneath a 25° line taken from a point 1.6 metres above ground level from any adjacent properties, then no impact is perceived and further analysis is not required.

The image below highlights in red the 25° line created. Some adjacent properties fall inside the 25° line therefore, VSC analysis was required to those properties.

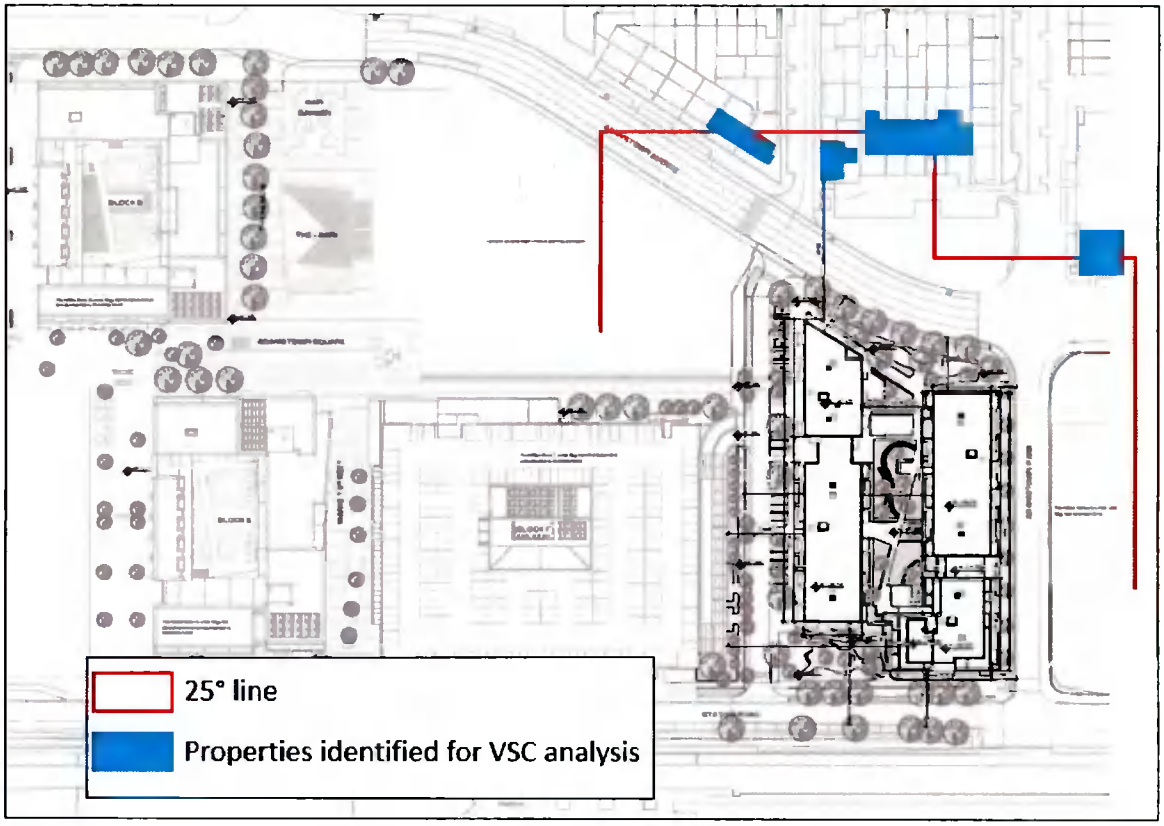

Figure 16 - 25° line

Vertical Sky Component

BRE Guidelines state that if the VSC is ≥ 27% with the new development in place, then enough sky light should still be reaching the existing window. If the VSC value is under 27%, in order for the window to perceive a negligible impact, the VSC with the proposed development in place should still be ≥80% of its former value.

As previously outlined, the adjacent properties that fall inside the 25° line have been selected for VSC analysis. In order to analyse the VSC levels within the selected adjacent properties, 'worst case' windows located at lower level were modelled for each house being analysed. The theory being that as floor level height increases so too does access to daylight. Therefore, if those windows located at lower levels are in line with BRE Guidelines recommendations, so will those located on the upper levels.

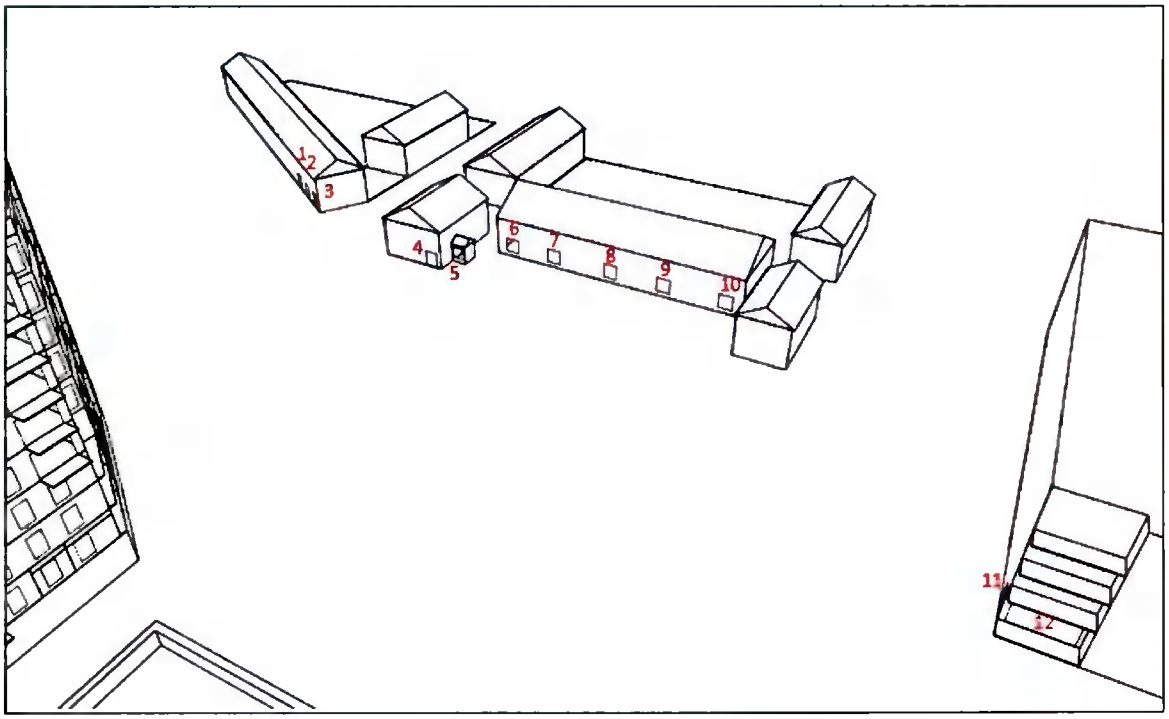

Figure 17 – Window References

Window Ref.	VSC existing development (%)	VSC proposed development (%)	Meets BRE minimum required VSC >27%	VSC % of its former value	Meets BRE minimum required VSC >80% of its former value
1	37.6	36.1	Y	NA (VSC>27% with proposed scenario)	NA
2	37.7	35.8	Y	NA (VSC>27% with proposed scenario)	NA
3	37.5	35.6	Y	NA (VSC>27% with proposed scenario)	NA
4	38.2	32.8	Y	NA (VSC>27% with proposed scenario)	NA
5	27.5	22.5	N	82%	Y
6	36.2	32.0	Y	NA (VSC>27% with proposed scenario)	NA
7	37.7	33.6	Y	NA (VSC>27% with proposed scenario)	NA
8	38.2	34.2	Y	NA (VSC>27% with proposed scenario)	NA
9	37.5	34.3	Y	NA (VSC>27% with proposed scenario)	NA
10	32.3	29.0	Y	NA (VSC>27% with proposed scenario)	NA
11	38.2	34.7	Y	NA (VSC>27% with proposed scenario)	NA
12	29.9	27.0	Y	NA (VSC>27% with proposed scenario)	NA

Table 8 – Vertical Sky Component Results

For the vast majority of adjacent properties the VSC results achieved for the adjacent properties with the proposed development exceeds 27%. Therefore, excellent levels of daylight will still be perceived once the proposed development is constructed. Only one window is receiving a VSC of less than 27%, the results for the existing scenario have been compared to the proposed scenario in this case, showing that the VSC with the proposed development in place is at least 80% of its former value. Therefore, an imperceptible impact will be perceived by any of the surrounding properties.

10. SUNLIGHT IMPACT ON ADJACENT PROPERTIES (APSH)

In order to assess the sunlight access within the adjacent properties of Adamstown Block G development the Annual Probable Sunlight Hours (APSH) have been analysed.

BRE Guidelines outline that 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 sunlight of the existing dwelling may be adversely affected (refer to Figure 18).

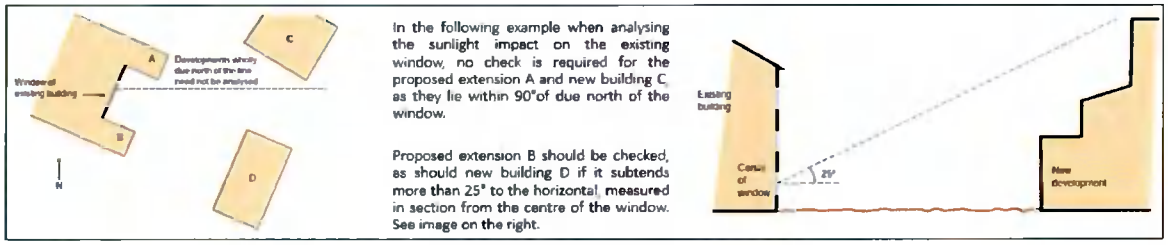

Figure 18 – BRE Extract of the methodology for rooms selection - APSH

The sunlight within adjacent properties may be adversely affected if the center of the window:

- Receives less than 25% of annual probable sunlight hours, or less than 5% of annual probable sunlight hours between September 21st and March 21st
- Receives less than 80% its former sunlight hours during either period
- Has a reduction in sunlight received over the whole year greater than 4% of annual probable sunlight hours

It must be noted that BRE Guidelines states that to assess loss of sunlight to an existing building, it is suggested that all main living rooms of dwellings should be checked if they have a window facing within 90° of due south and that kitchen and bedrooms are less important, although care should be taken not to block too much sun. As internal layouts for the adjacent properties were not available, a selection of 'worst case' windows located at lower level have been selected for analysis.

The image below illustrates the windows selected for analysis and the accompanying table outlines the APSH results.

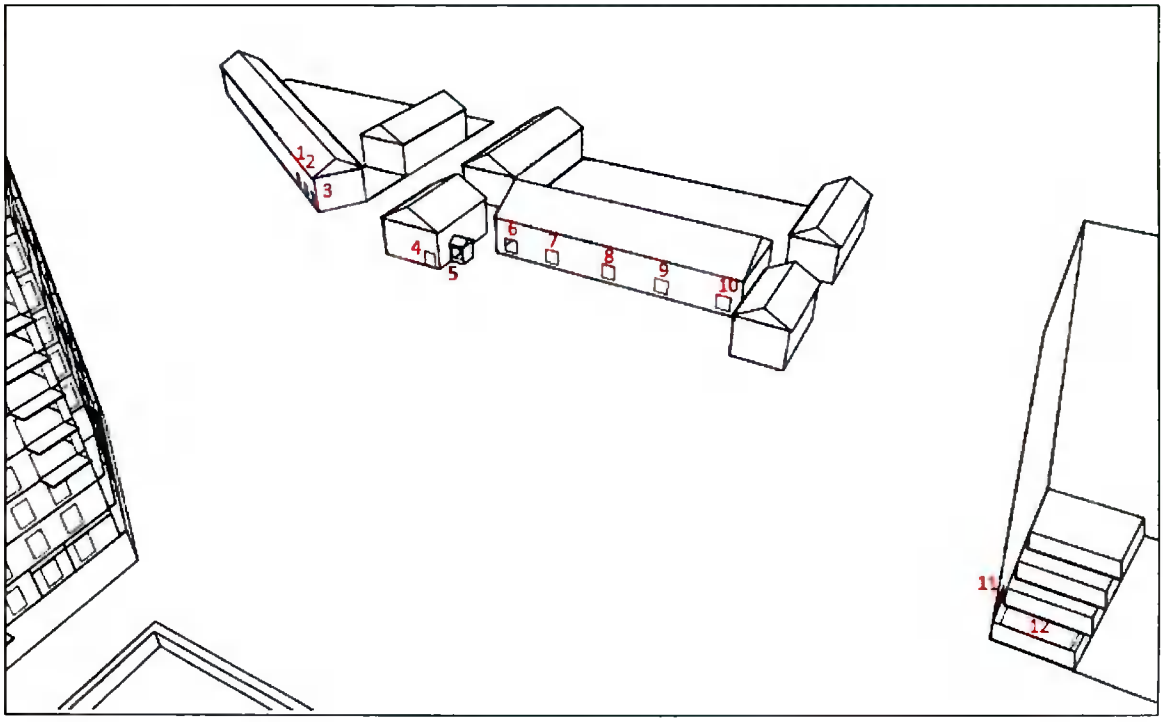

Figure 19 – Window References

Window Ref.	APSH (%) - Existing development		APSH (%) - Proposed development		Meets BRE minimum recommended APSH	
	Annual	Winter (Sep 21st – Mar 21st)	Annual	Winter (Sep 21st – Mar 21st)	Annual >25%	Winter (Sep 21st – Mar 21st) >5%
1	68.5	28.0	64.3	23.7	Y	Y
2	68.0	28.0	62.4	22.4	Y	Y
3	67.8	28.0	62.9	23.1	Y	Y
4	74.6	30.6	67.3	23.2	Y	Y
5	48.4	24.9	40.9	17.5	Y	Y
6	56.0	21.2	50.8	16.0	Y	Y
7	62.8	27.8	57.8	22.8	Y	Y
8	69.2	28.5	63.9	23.1	Y	Y
9	69.1	30.0	63.5	24.4	Y	Y
10	71.2	30.1	65.3	24.2	Y	Y
11	53.3	28.6	46.1	22.6	Y	Y
12	42.6	13.3	34.7	7.0	Y	Y

Table 9 – Annual Probable Sunlight Hours Results

All windows greatly exceed APSH values recommended in BRE Guidelines with the proposed development in place. Therefore, imperceptible impact will be perceived by any of the adjacent properties due to the proposed development.

11. OVERSHADOWING IMPACT TO SURROUNDING OPEN SPACES

BRE Guidelines state that *"if a space is used all year round, the equinox (March 21st) is the best date for which to prepare shadow plots as it gives an average level of shadowing. Lengths of shadows at the autumn equinox (September 21st) will be the same as those for March 21st, so a separate set of plots for September is not required. However, clock times for September will be one hour later, because British Summer Times (BST)".*

BRE Guidelines identify gardens (usually the main back garden of a house) as sensitive receptors that must be selected for analysis in order to assess the impact that will be perceived once the proposed development takes place. Therefore, the open spaces to the adjacent properties have been selected for analysis.

Based on the recommendations within the BRE Guidelines, March 21st has been used to create the overshadowing images. In addition, overshadowing images for June and December 21st have also been created to give an indication of the sunlight levels that will be received during the summer and winter months.

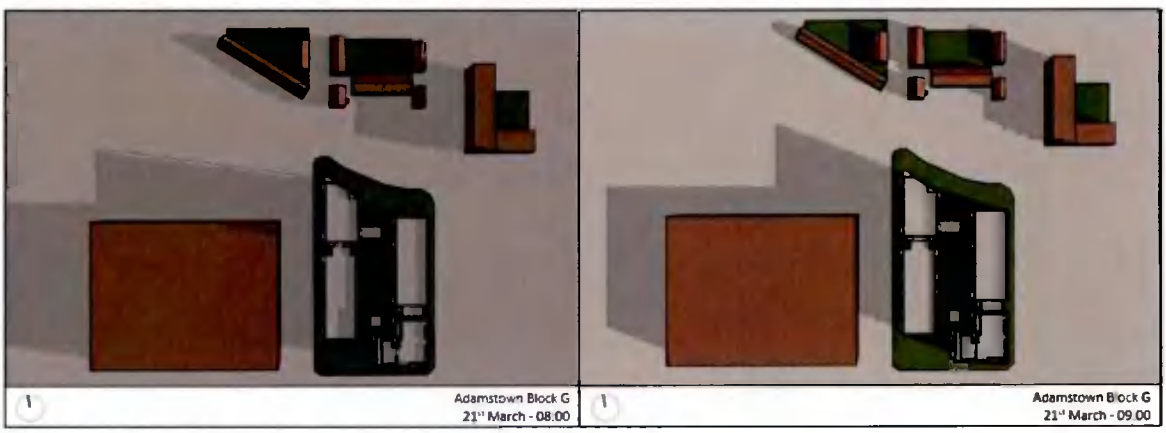

Figure 20 - Overshadowing Images on March 21st at 8 a.m. and 9 a.m.

Figure 21 - Overshadowing Images on March 21st at 10 a.m. and 11 a.m.

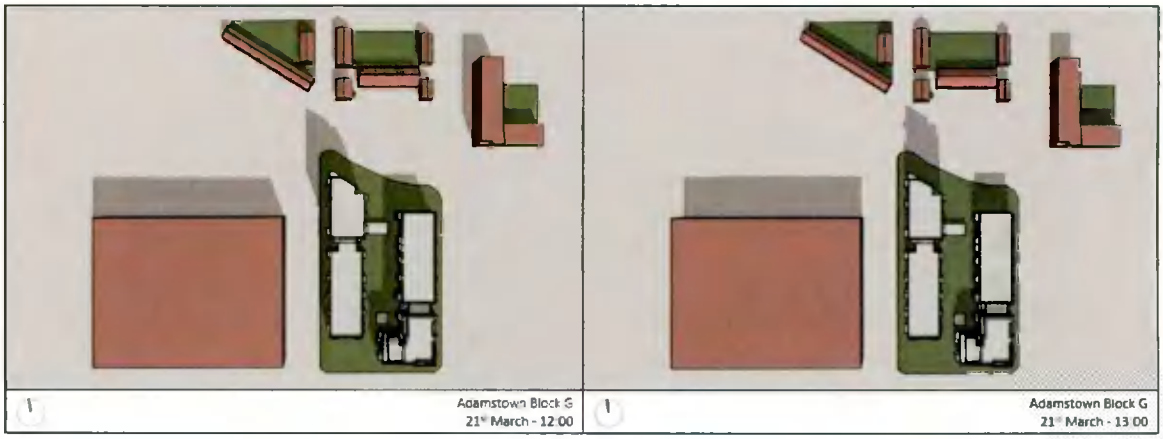

Figure 22 - Overshadowing Images on March 21st at 12 p.m. and 1 p.m.

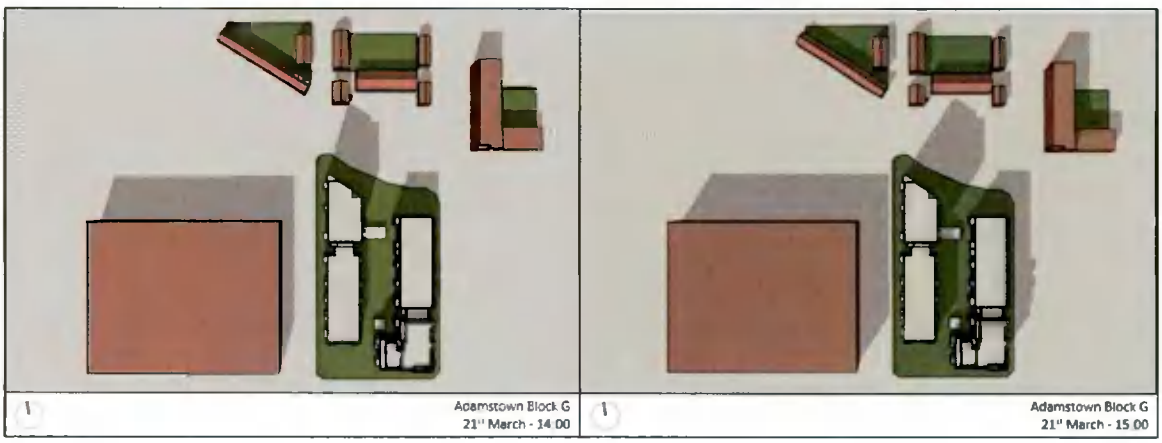

Figure 23 - Overshadowing Images on March 21st at 2 p.m. and 3 p.m.

Figure 24 - Overshadowing Images on March 21st at 4 p.m. and 5 p.m.

Figure 25 - Overshadowing Images on June 21st at 7 a.m. and 8 a.m.

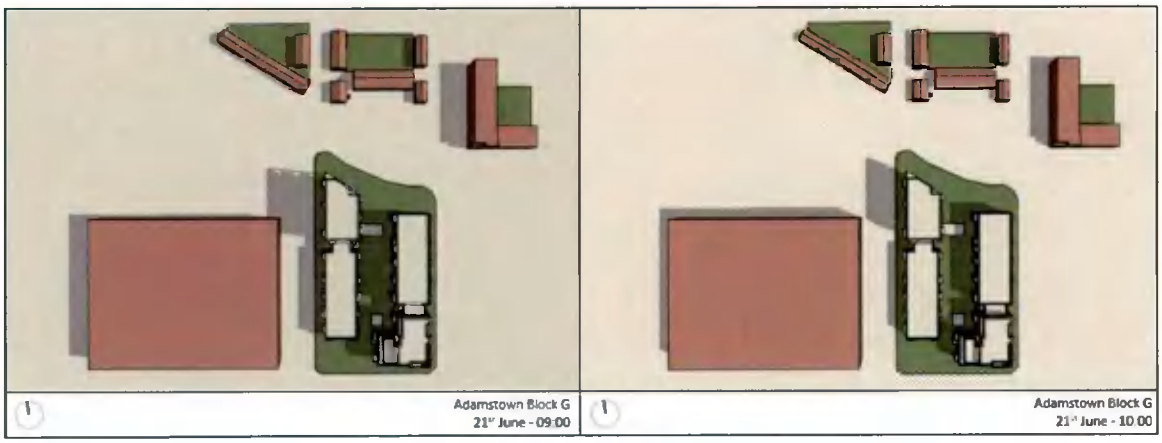

Figure 26 - Overshadowing Images on June 21st at 9 a.m. and 10 a.m.

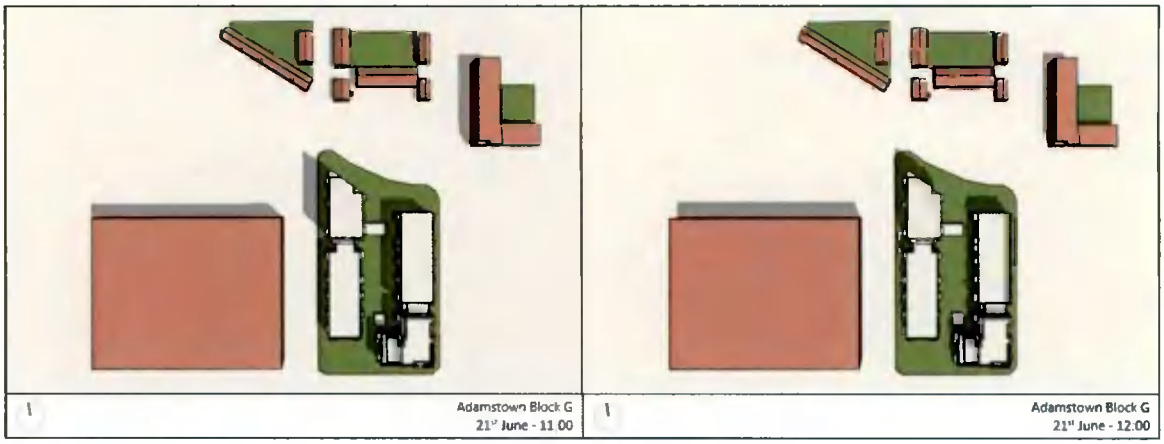

Figure 27 - Overshadowing Images on June 21st at 11 a.m. and 12 p.m.

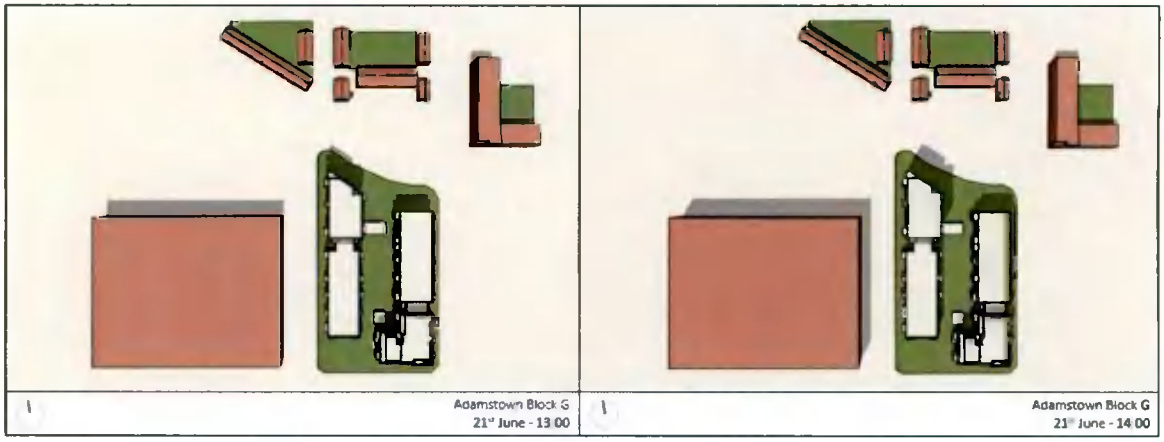

Figure 28 - Overshadowing Images on June 21st at 1 p.m. and 2 p.m.

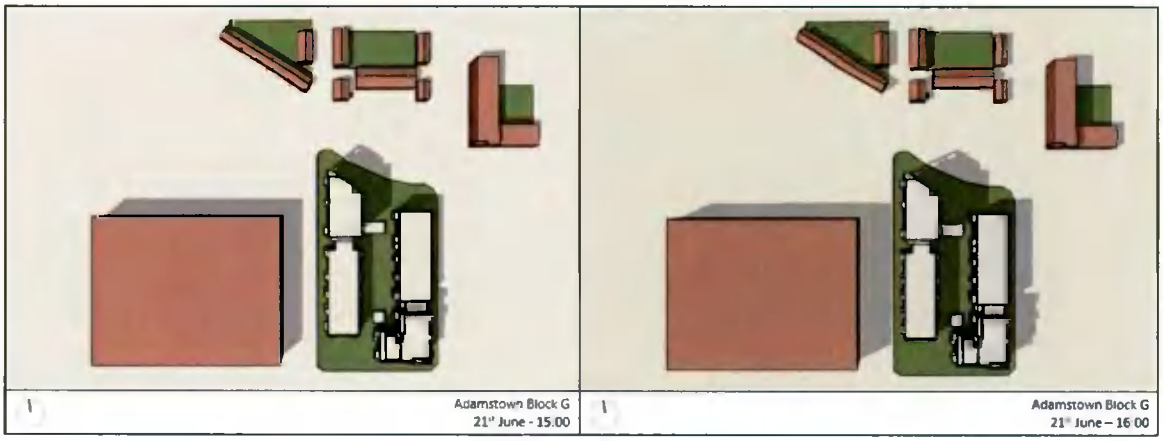

Figure 29 - Overshadowing Images on June 21st at 3 p.m. and 4 p.m.

Figure 30 - Overshadowing Images on June 21st at 5 p.m. and 6 p.m.

Figure 31 - Overshadowing Images on June 21st at 7 p.m. and 8 p.m.

Figure 32 - Overshadowing Images on December 21st at 10 a.m. and 11 a.m.

Figure 33 - Overshadowing Images on December 21st at 12 p.m. and 1 p.m.

Figure 34 - Overshadowing Images on December 21st at 2 p.m. and 3 p.m.

From the overshadowing images, it can be outlined that imperceptible overshadowing impact will be perceived by any of the surrounding properties.

12. CONCLUSION

The proposed Adamstown Station District Centre Phase II Block G development has been analysed in order to determine the following:

- The daylight levels within the living, kitchen and bedroom areas of selected apartments, to give an indication of the expected daylight levels throughout the proposed development;
- The expected sunlight levels within the living, kitchen and bedrooms areas within the proposed development;
- The quality of amenity space, being provided as part of the development, in relation to sunlight;
- Any potential daylight or sunlight impact the proposed development may have on properties adjacent to the site.

Calculations and methodology used are in accordance with BRE Guidelines for daylight and sunlight and based on the British Research Establishments "Site Layout Planning for Daylight and Sunlight: A Good Practice Guide" by PJ Littlefair, 2011 Second Edition, however, the following should be reiterated as previously outlined:

"The advice given here is not mandatory and this document should not be seen as an instrument of planning policy. Its aim is to help rather that constrain the designer. Although it gives numeral guidelines these should be interpreted flexibly because natural lighting is only one of the many factors in site layout design"

Internal daylight within the proposed development

The analysis confirms that across the entire development excellent levels of internal daylight are achieved. The majority of apartments not only meet but greatly exceed the recommendations outlined within the BRE Guidelines and British Standard BS8206, achieving a 98.7% compliance rate across the proposed apartments.

Sunlight to proposed development amenity spaces

In terms of sunlight access, excellent levels of sunlight are experienced across the proposed development. The communal amenity space provided exceed the BRE guidelines for sunlight on the test day of 21st of March.

Sunlight to windows within the proposed development

The annual probable sunlight hours assessment has shown that 67% of windows across the development achieve the recommended APSH values stated in the BRE Guidelines, while 76% of windows achieve the recommended values during the winter months, when sunlight is more valuable.

Impact to surrounding properties

The analysis also shows that the proposed building has imperceptible daylight, sunlight or overshadowing impact to neighbouring properties.

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