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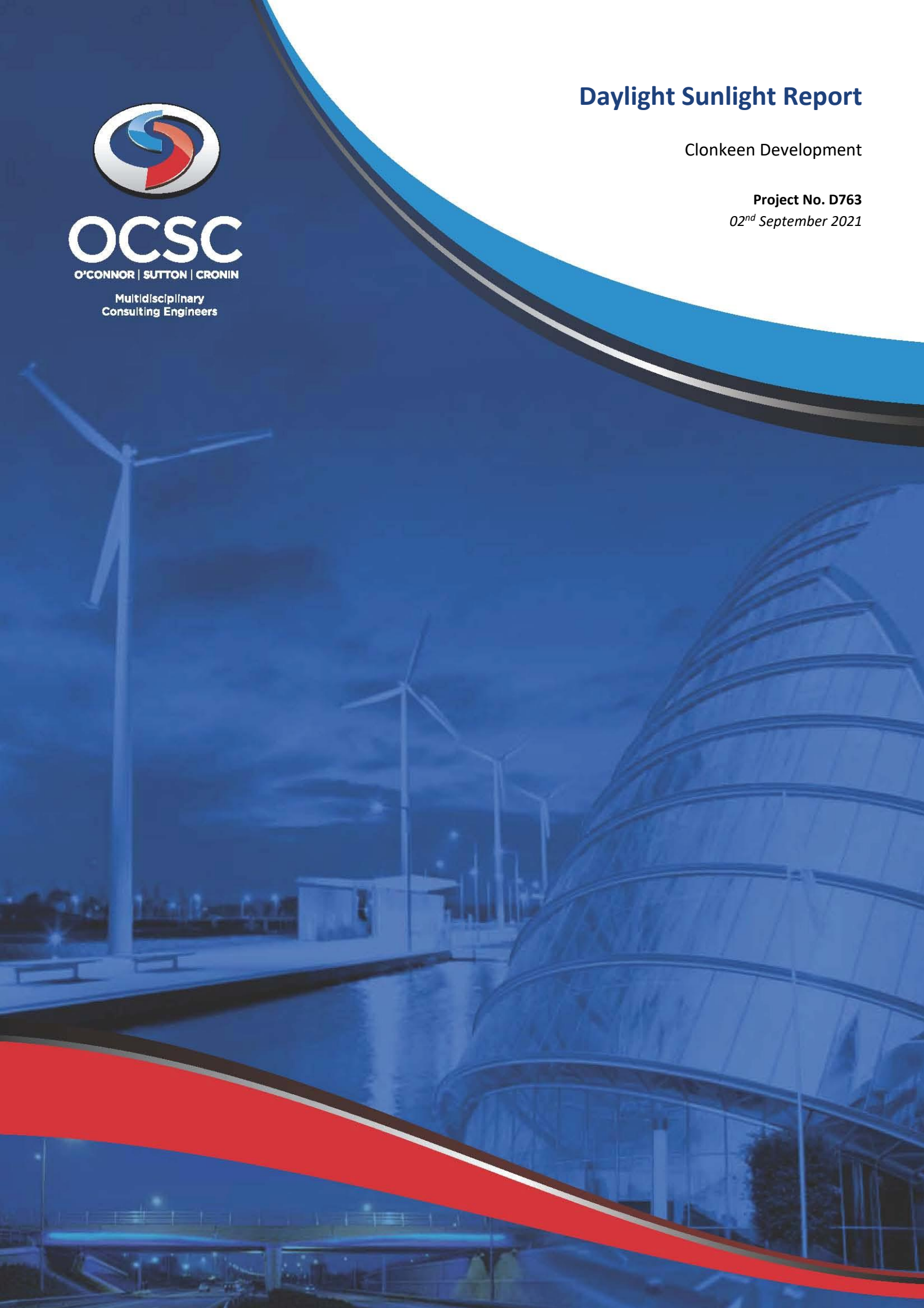
Daylight Sunlight Report

Clonkeen Development

Project No. D763

02nd September 2021



Daylight Sunlight Report

NOTICE

DOCUMENT CONTROL & HISTORY

OCSC Job No.: D763	Project Code	Originator Code	Zone Code	Level Code	File Type	Role Type	Number Series	Status/ Suitability Code	Revision
	D763	OCSC	XX	XX	RP	YS	0002	S4	P05

Rev.	Status	Authors	Checked	Authorised	Issue Date
5	For Planning R3	CA	PF	PF	02/09/2021
4	For Comment	CA	PF	PF	24/06/2021
3	For Planning R2	CA	PF	PF	16/12/2020
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1	For Comment	CA	PF	PF	02/11/2020

EXECUTIVE SUMMARY

OCSC has been appointed to carry out a Daylight/ Sunlight study for the Clonkeen Development located in Blackrock, 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 and duplexes, to give an indication of the expected daylight levels throughout the proposed development;
- The expected sunlight levels within the living areas and bedrooms 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;
- Any potential daylight or sunlight impact the proposed development may have on the adjacent playing pitches.

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 93.2% 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 development. The communal amenity spaces provided to the apartment areas greatly exceeds 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 62% of the windows across the development achieve the recommended APSH values stated in the BRE Guidelines, while 77% of windows achieve the recommended values during the winter months, when sunlight is more valuable.

Impact to neighbouring properties

The analysis also shows that the proposed development has negligible impact in relation to daylight and sunlight to windows of the surrounding properties. The overshadowing assessment has shown that a non-significant impact will be perceived by some of the surrounding open spaces located to the North and North East. However, further analysis has demonstrated that excellent levels of sunlight will continue to be received in all the surrounding gardens and the playing pitches once the proposed development is built, in line with BRE Guidelines recommendations.

The proposed scheme ensures adequate daylight levels within the proposed development and to safeguard the daylight and sunlight levels within the adjacent properties and playing pitches. A massing reduction to the apartment blocks has been implemented from the previously submitted scheme.

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.

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1. INTRODUCTION

OCSC has been appointed to carry out a Daylight/ Sunlight study for the Clonkeen Development located in Blackrock, Co. Dublin.

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- The daylight levels within the living, kitchen and bedroom areas of selected apartments and duplexes, to give an indication of the expected daylight levels throughout the proposed development;
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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.

2. DEVELOPMENT DESCRIPTION

Clonkeen Investments DAC intend to apply to An Bord Pleanála (the Board) for permission for a Strategic Housing Development with a total application site area of c. 3.3 ha, on a site located at Lands Adjoining Clonkeen College, Clonkeen Road, Blackrock, Co. Dublin. The development, with a total gross floor area of c 33,851 sq m, will provide 299 no. residential units and a 1 no. storey 353 sq m childcare facility with dedicated play area 231 sq m. The development will consist of 18 no. ground floor 3 bedroom duplex apartments and 18 no. 2 bedroom apartments above and 12 no. ground floor 2 bedroom apartments with 12 no. 3 bedroom duplex apartments above. The 60 no. duplex units are arranged in 6 no. three storey blocks. The development will also consist of 239 no. apartment units (111 no. 1 bedroom apartments, 120 no. 2 bedroom apartments and 8 no. 3 bed apartments) arranged in 4 no. 6 storey blocks over 1 no. storey basement; public open space, communal open space and private open space (including all balconies, terraces and individual unit gardens at all levels); 614 sq m communal resident facilities including concierge and welcome area (195 sq m), residents' flexible work facility (219 sq m), residents' lounge (100 sq m) and residents' gym area (100 sq m).

The development will also provide for the demolition of the 2 no. storey office building ('St. Helen's', Meadow Vale - 470 sq m) to facilitate new vehicular, pedestrian and cyclist access to the site, to the north of the proposed development via Meadow Vale.

The development will also include the provision of 2 no. designated play areas; internal roads and pathways; bin stores; 248 no. car parking spaces, including 167 no. at basement level and 2 no. shared vehicle (GoCar) spaces, 388 no. bicycle parking spaces, and 10 no. motorcycle parking spaces at basement and surface level; hard and soft landscaping; plant; boundary treatments including the repair and replacement of some existing boundary treatments; the provision of new surface water and foul drainage pipes and any required pipe diversion works or build over works; internal foul pumping station; a new internal access road and paths; changes in level; services provision and related pipework, ducting and cabling; electric vehicle charging points; 4 no. stormwater attenuation tanks; 1 no. ESB substation; photovoltaic panels; SUDS including green roof provision; signage; provision for future pedestrian access to Monaloe Park to the east of the development, including the provision of a pedestrian bridge, extending over the drainage ditch; public lighting and all site development and excavation works above and below ground. The application contains a statement setting out how the proposal will be consistent with the objectives of the Dún Laoghaire-Rathdown County Development Plan 2016-2022. The application contains a statement indicating why permission should be granted

for the proposed development, having regard to a consideration specified in section 37(2)(b) of the Planning and Development Act 2000, notwithstanding that the proposed development materially contravenes a relevant development plan or local area plan other than in relation to the zoning of the land.

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 Shoreline GA03 development.

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."*

The **Dún Laoghaire-Rathdown Development Plan (2017-2023)** outlines that the following criteria will be taken into account when assessing applications *"levels of privacy and amenity, the relationship of buildings to one another, including considerations of overlooking, sunlight/daylight standards and the appropriate use of screening devices."*

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."*

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. PROPOSED BUILDING DESIGN

In order to ensure that daylight levels were maximised for the Clonkeen Development, a number of key design strategies were analysed during concept design.

4.1. 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. The inclusion of greenery to the amenity spaces will help to improve the sense of light and brightness within the apartments.

4.2. GLAZING TO WALL RATIO

The primary function of the glazing to wall ratio is to maximize daylight within the space while reducing unnecessary solar gains within the proposed development. The other advantage in conjunction with appropriate materials is that 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 - Block A1 West Elevation Glazing to Wall Ratio

4.3. MASSING EVOLUTION FOR COMPLIANCE WITH DAYLIGHT AND SUNLIGHT

In order to safeguard the daylight and sunlight levels within the adjacent properties and playing pitches a number of development revisions were analysed. The following changes were implemented from the latest revision presented in December 2020 in response to ABP's feedback:

Design considerations to Blocks A1-A4 have been implemented, comprising an overall reduction in the height to six storeys including a setback top-most floor.

In order to address ABP concerns in relation to the proximity of Blocks B1-B4 to the rear gardens of dwellings on Meadow Vale, there blocks have been relocated to maintain a minimum distance of 11 meters to this boundary.

The below images shows the massing of Blocks A1-A4 for the previously proposed development and the updated development as per the current proposal, where it is evident the massing reduction.

Figure 3 - Previously Proposed Development

Figure 4 - Proposed Development with Revision

The position of bedrooms and living spaces were carefully analysed to ensure that daylight access to living spaces, where occupants spend most of their time, was maximized. Glazing levels were increased where possible, and positioning was closely evaluated.

5. 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 Guideline:

"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.

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 Scott Tallon Walker 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 5 - 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%.

Targeting a minimum ADF of 2% in open space kitchen/living rooms, results in significant challenges while seeking to comply with all other elements of the Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities (December 2020) , which are as follows:

- Amenity spaces: the guidance set out in the Sustainable Urban Housing: Design Standards for New Apartment document states that private amenity spaces shall be provided in the form of balconies at the upper levels. It is also stated that balconies are preferably accessed from living

rooms. In order to achieve the 2% in living/ kitchen spaces balcony spaces would need to be removed at the lower floors.

- Floor to ceiling height: in order to achieve an ADF of 2%, the floor to ceiling heights would have to be increased on all levels which would have a planning height impact.
- Solar gains: with the removal of the balconies, increased floor to ceiling height and extensive glazing area there is a risk of overheating within the apartments.

In addition, it must be also noted that the apartments within the Clonkeen development contain a kitchen which is expected to be used mainly for food preparation rather than occupants spending a long period of time sitting in the kitchen area. Instead, occupants are expected to spend most of their time in the living room area.

Based on the above, it has been a typical approach and common industry practice to set a benchmark of 1.5% (BS 8206 recommended ADF for living rooms) for open plan spaces that contain a kitchen and a living space.

The ADF benchmark of 1.5% was set out for living/kitchen spaces within the proposed apartments of the Clonkeen development during the assessment carried out for the initial planning stage submitted in December 2020. The assessment completed indicated a pass rate of 95.7% when compared to the 1.5% ADF benchmark. However, for this final application report, the higher ADF benchmark of 2%, in line with BS 8206 has been utilised to calculate the percentage rate of compliance.

It should be noted that whether the 1.5% or the 2.0% ADF is set as the benchmark for compliance, the same level of daylight will be experienced within the scheme, with the only change being the benchmark to which the compliance rate is calculated.

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. METHODOLOGY FOR SELECTION OF ROOMS FOR DAYLIGHT MODELLING

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. All different types of rooms across the lower levels have been analysed.

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 design and layout of each apartment and duplex 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.

6.3. DAYLIGHT REFLECTANCES

The surface reflectance values outlined in Table 1have 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

6.4. DAYLIGHT RESULTS – INTERNAL DAYLIGHT

This section outlines the units that were selected for assessment of internal daylight levels for the proposed Clonkeen Development. The results of the analysis are outlined in the accompanying tables.

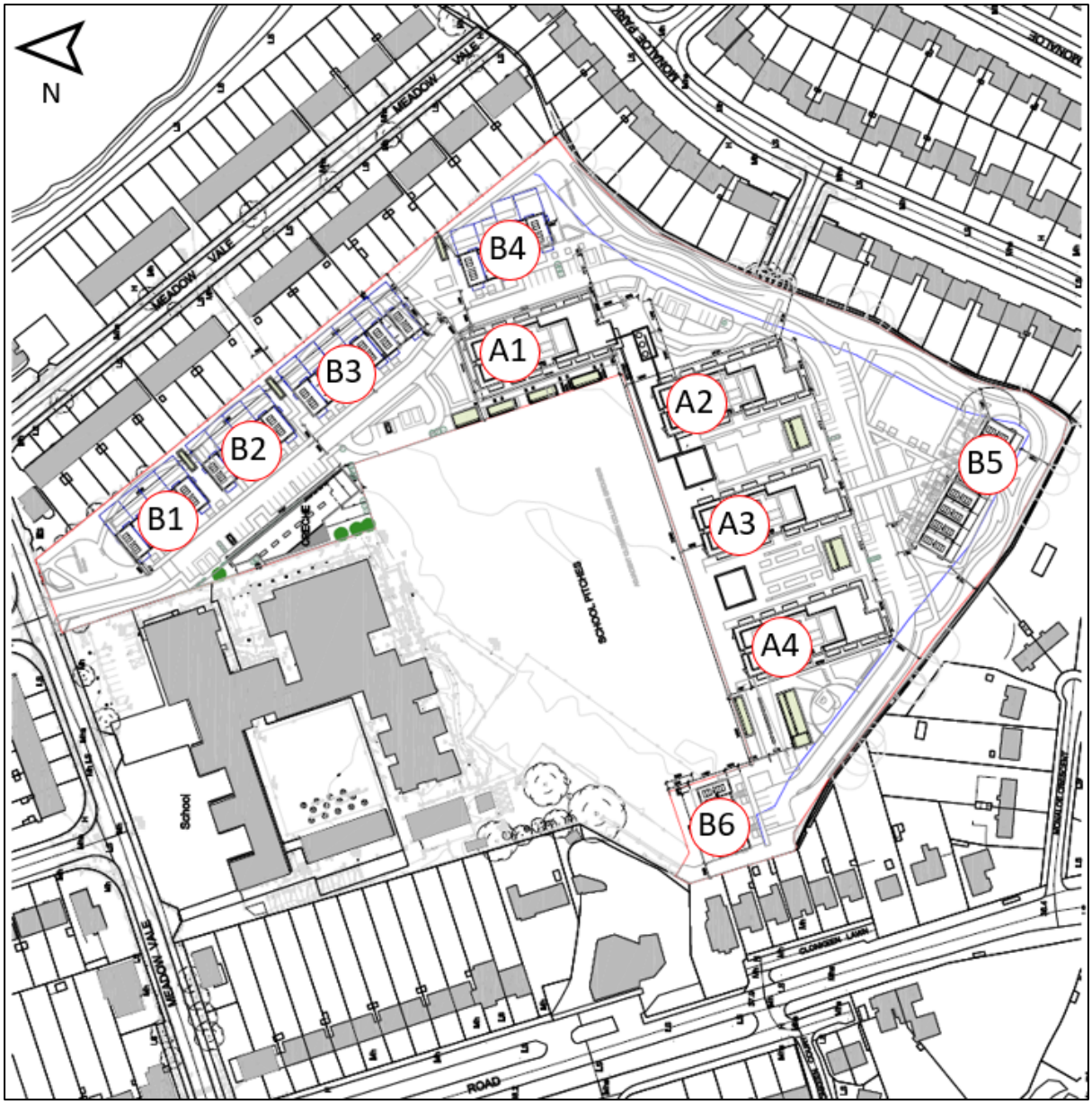

Figure 6 - Site Plan with Block References

The following images illustrate the rooms tested and their subsequent results are outlined in the accompanying tables.

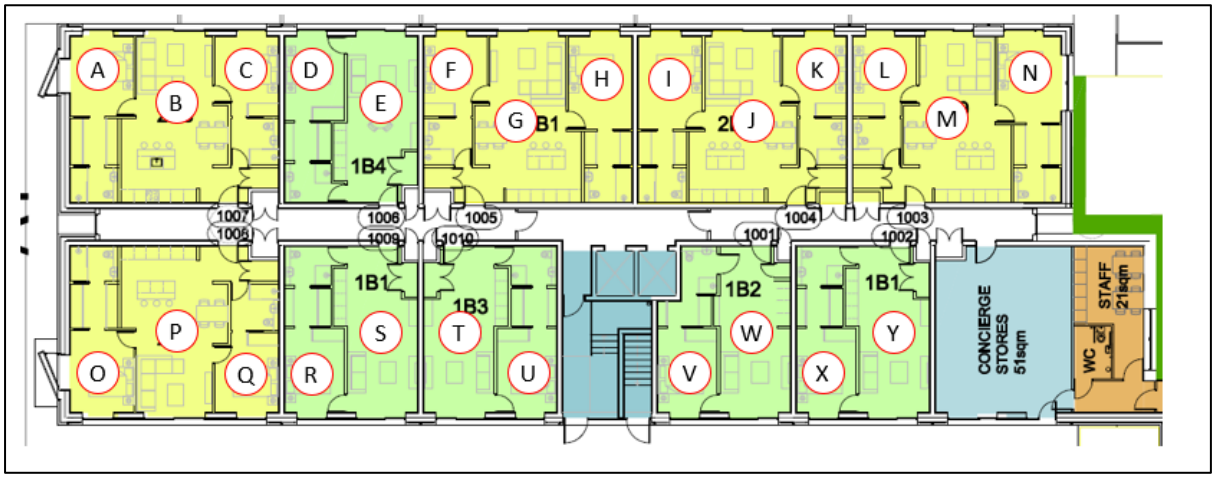

Figure 7 - Block A1 – Ground Floor Assessed Rooms

Unit		ADF target (%)	ADF results (%)	Meets minimum ADF target
A	Bedroom	1.0%	4.2%	Y
B	Living/ Kitchen/ Dining	2.0%	2.3%	Y
C	Bedroom	1.0%	4.0%	Y
D	Bedroom	1.0%	4.0%	Y
E	Living/ Kitchen/ Dining	2.0%	2.4%	Y
F	Bedroom	1.0%	4.4%	Y
G	Living/ Kitchen/ Dining	2.0%	2.4%	Y
H	Bedroom	1.0%	4.4%	Y
I	Bedroom	1.0%	4.4%	Y
J	Living/ Kitchen/ Dining	2.0%	2.4%	Y
K	Bedroom	1.0%	4.4%	Y
L	Bedroom	1.0%	4.4%	Y
M	Living/ Kitchen/ Dining	2.0%	2.4%	Y
N	Bedroom	1.0%	9.0%	Y
O	Bedroom	1.0%	3.8%	Y
P	Living/ Kitchen/ Dining	2.0%	2.3%	Y
Q	Bedroom	1.0%	3.5%	Y
R	Bedroom	1.0%	3.5%	Y
S	Living/ Kitchen/ Dining	2.0%	2.9%	Y
T	Living/ Kitchen/ Dining	2.0%	2.9%	Y
U	Bedroom	1.0%	3.5%	Y
V	Bedroom	1.0%	3.4%	Y
W	Living/ Kitchen/ Dining	2.0%	2.9%	Y
X	Bedroom	1.0%	3.3%	Y
Y	Living/ Kitchen/ Dining	2.0%	2.8%	Y

Table 2 – Average Daylight Factor Results – Block A1 – Ground Floor Assessed Rooms

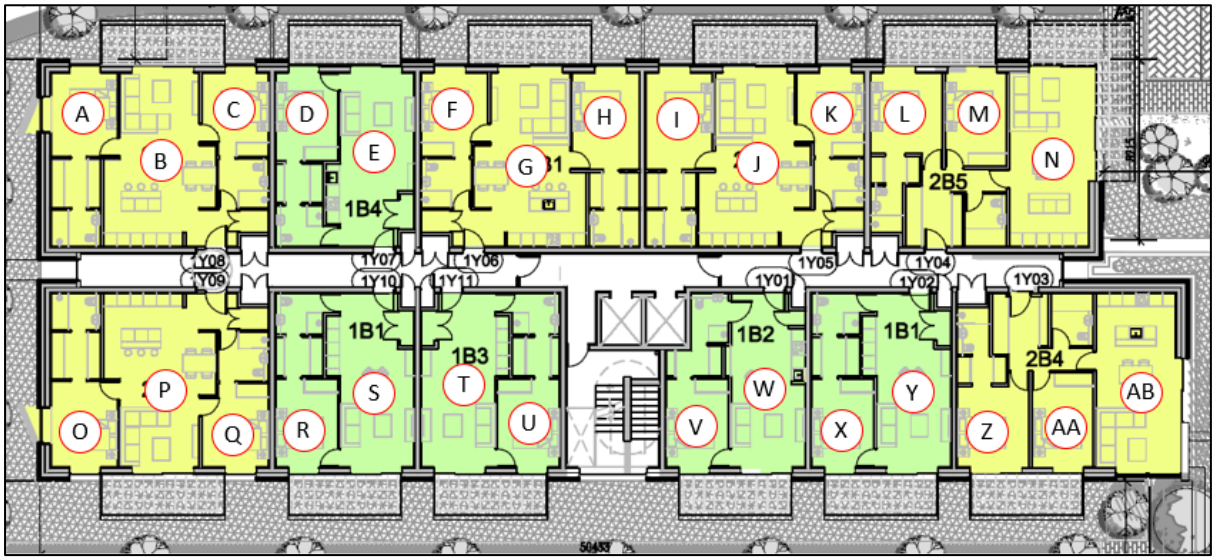

Figure 8 - Block A1 – First Floor Assessed Rooms

Unit		ADF target (%)	ADF results (%)	Meets minimum ADF target
A	Bedroom	1.0%	9.9%	Y
B	Living/ Kitchen/ Dining	2.0%	2.0%	Y
C	Bedroom	1.0%	4.0%	Y
D	Bedroom	1.0%	4.0%	Y
E	Living/ Kitchen/ Dining	2.0%	2.1%	Y
F	Bedroom	1.0%	4.0%	Y
G	Living/ Kitchen/ Dining	2.0%	2.1%	Y
H	Bedroom	1.0%	4.0%	Y
I	Bedroom	1.0%	4.0%	Y
J	Living/ Kitchen/ Dining	2.0%	2.1%	Y
K	Bedroom	1.0%	4.0%	Y
L	Bedroom	1.0%	4.1%	Y
M	Bedroom	1.0%	4.5%	Y
N	Living/ Kitchen/ Dining	2.0%	7.2%	Y
O	Bedroom	1.0%	8.1%	Y
P	Living/ Kitchen/ Dining	2.0%	2.1%	Y
Q	Bedroom	1.0%	3.9%	Y
R	Bedroom	1.0%	3.9%	Y
S	Living/ Kitchen/ Dining	2.0%	2.5%	Y
T	Living/ Kitchen/ Dining	2.0%	2.5%	Y
U	Bedroom	1.0%	3.9%	Y
V	Bedroom	1.0%	3.9%	Y
W	Living/ Kitchen/ Dining	2.0%	2.4%	Y
X	Bedroom	1.0%	3.9%	Y
Y	Living/ Kitchen/ Dining	2.0%	2.2%	Y
Z	Bedroom	1.0%	2.7%	Y
AA	Bedroom	1.0%	2.7%	Y
AB	Living/ Kitchen/ Dining	2.0%	5.0%	Y

Table 3 – Average Daylight Factor Results – Block A1 – First Floor Assessed Rooms

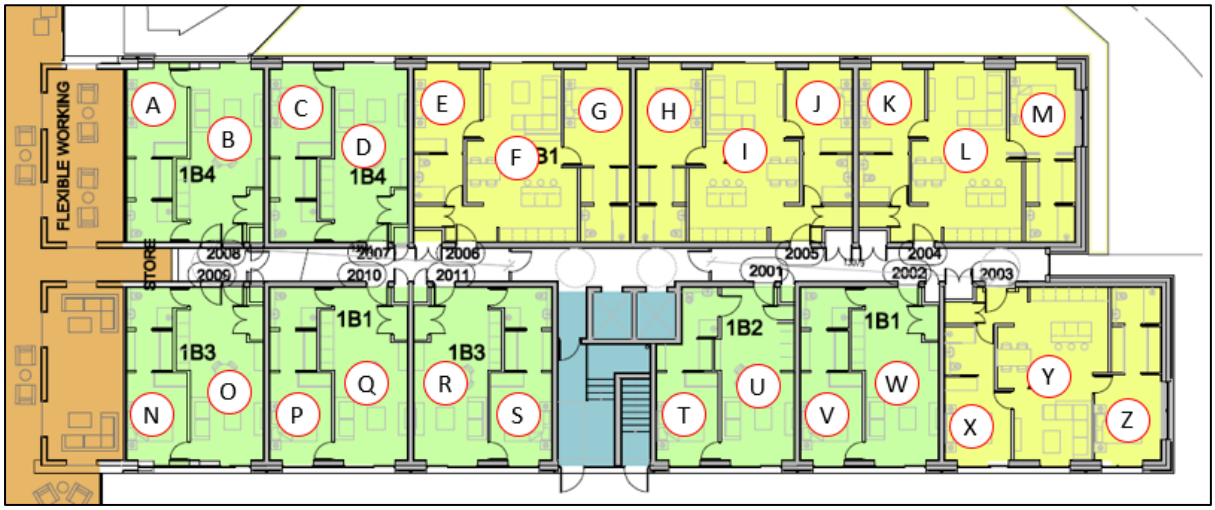

Figure 9 - Block A2 – Ground Floor Assessed Rooms

Unit		ADF target (%)	ADF results (%)	Meets minimum ADF target
A	Bedroom	1.0%	3.6%	Y
B	Living/ Kitchen/ Dining	2.0%	3.5%	Y
C	Bedroom	1.0%	3.9%	Y
D	Living/ Kitchen/ Dining	2.0%	3.5%	Y
E	Bedroom	1.0%	4.0%	Y
F	Living/ Kitchen/ Dining	2.0%	3.5%	Y
G	Bedroom	1.0%	3.8%	Y
H	Bedroom	1.0%	3.8%	Y
I	Living/ Kitchen/ Dining	2.0%	3.6%	Y
J	Bedroom	1.0%	4.0%	Y
K	Bedroom	1.0%	4.0%	Y
L	Living/ Kitchen/ Dining	2.0%	3.6%	Y
M	Bedroom	1.0%	9.0%	Y
N	Bedroom	1.0%	2.3%	Y
O	Living/ Kitchen/ Dining	2.0%	2.4%	Y
P	Bedroom	1.0%	2.6%	Y
Q	Living/ Kitchen/ Dining	2.0%	1.7%	N
R	Living/ Kitchen/ Dining	2.0%	1.7%	N
S	Bedroom	1.0%	2.6%	Y
T	Bedroom	1.0%	2.6%	Y
U	Living/ Kitchen/ Dining	2.0%	2.1%	Y
V	Bedroom	1.0%	2.6%	Y
W	Living/ Kitchen/ Dining	2.0%	1.9%	N
X	Bedroom	1.0%	3.5%	Y
Y	Living/ Kitchen/ Dining	2.0%	1.1%	N
Z	Bedroom	1.0%	8.3%	Y

Table 4 – Average Daylight Factor Results – Block A2 – Ground Floor Assessed Rooms

Figure 10 - Block A2 – First Floor Assessed Rooms

Unit		ADF target (%)	ADF results (%)	Meets minimum ADF target
A	Bedroom	1.0%	4.3%	Y
B	Living/ Kitchen/ Dining	2.0%	2.4%	Y
C	Bedroom	1.0%	4.8%	Y
D	Bedroom	1.0%	4.8%	Y
E	Living/ Kitchen/ Dining	2.0%	2.4%	Y
F	Bedroom	1.0%	4.8%	Y
G	Living/ Kitchen/ Dining	2.0%	2.5%	Y
H	Bedroom	1.0%	4.6%	Y
I	Bedroom	1.0%	4.5%	Y
J	Living/ Kitchen/ Dining	2.0%	2.7%	Y
K	Bedroom	1.0%	6.0%	Y
L	Bedroom	1.0%	6.0%	Y
M	Bedroom	1.0%	5.6%	Y
N	Living/ Kitchen/ Dining	2.0%	7.5%	Y
O	Bedroom	1.0%	4.0%	Y
P	Living/ Kitchen/ Dining	2.0%	1.5%	N
Q	Bedroom	1.0%	2.4%	Y
R	Bedroom	1.0%	2.4%	Y
S	Living/ Kitchen/ Dining	2.0%	1.3%	N
T	Living/ Kitchen/ Dining	2.0%	1.3%	N
U	Bedroom	1.0%	2.2%	Y
V	Bedroom	1.0%	2.2%	Y
W	Living/ Kitchen/ Dining	2.0%	1.6%	N
X	Bedroom	1.0%	2.4%	Y
Y	Living/ Kitchen/ Dining	2.0%	1.4%	N
Z	Bedroom	1.0%	2.8%	Y
AA	Bedroom	1.0%	2.8%	Y
AB	Bedroom	1.0%	5.8%	Y

Table 5 – Average Daylight Factor Results – Block A2 – First Floor Assessed Rooms

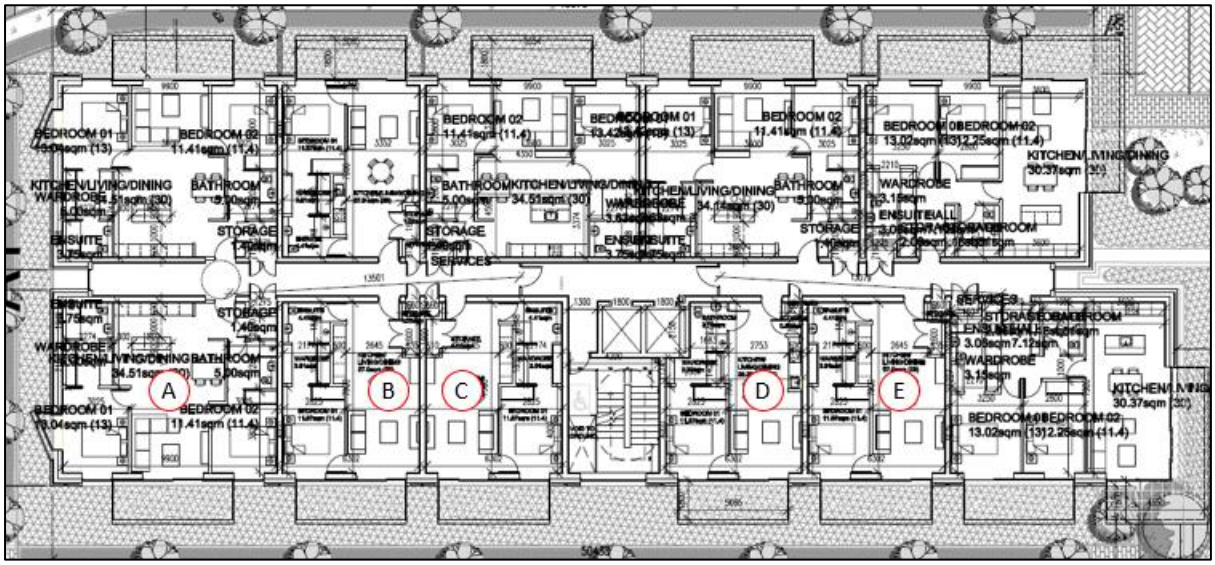

Figure 11 - Block A2 – Second Floor Assessed Rooms

Unit		ADF target (%)	ADF results (%)	Meets minimum ADF target
A	Living/ Kitchen/ Dining	2.0%	1.7%	N
B	Living/ Kitchen/ Dining	2.0%	1.5%	N
C	Living/ Kitchen/ Dining	2.0%	1.5%	N
D	Living/ Kitchen/ Dining	2.0%	1.7%	N
E	Living/ Kitchen/ Dining	2.0%	1.7%	N

Table 6 – Average Daylight Factor Results – Block A2 – Second Floor Assessed Rooms

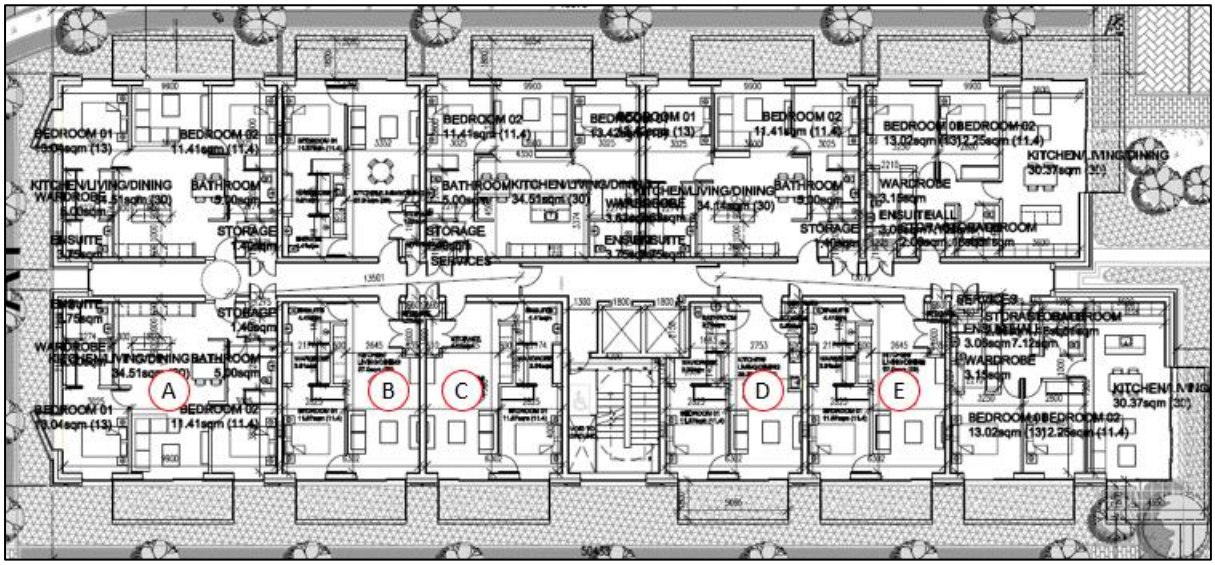

Figure 12 - Block A2 – Third Floor Assessed Rooms

Unit		ADF target (%)	ADF results (%)	Meets minimum ADF target
A	Living/ Kitchen/ Dining	2.0%	1.8%	N
B	Living/ Kitchen/ Dining	2.0%	1.7%	N
C	Living/ Kitchen/ Dining	2.0%	1.7%	N
D	Living/ Kitchen/ Dining	2.0%	1.9%	N
E	Living/ Kitchen/ Dining	2.0%	1.9%	N

Table 7 – Average Daylight Factor Results – Block A2 – Third Floor Assessed Rooms

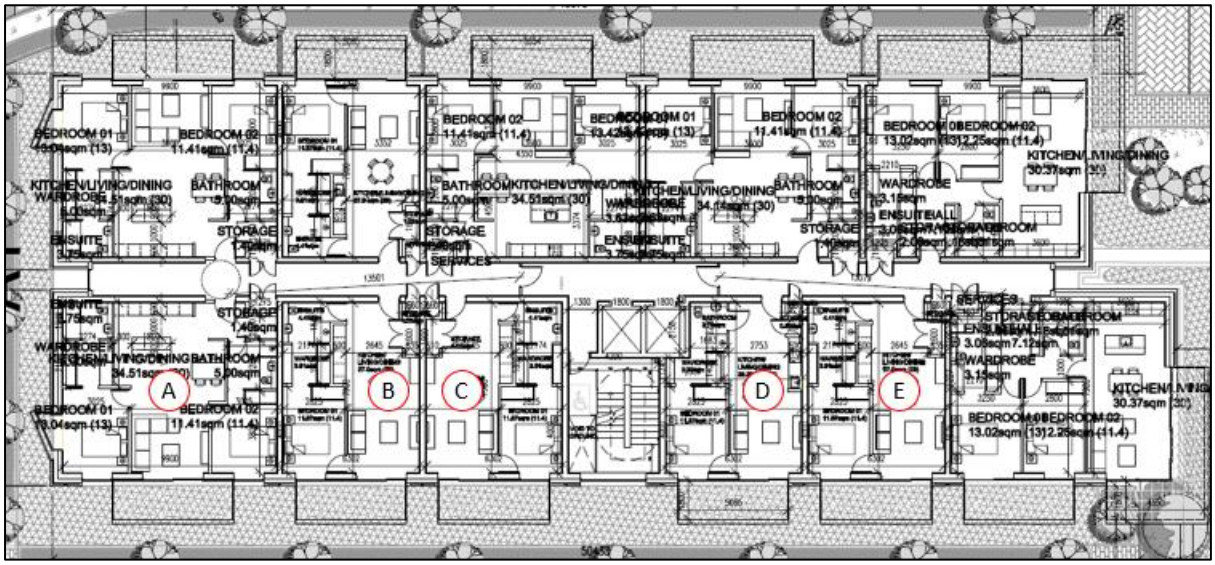

Figure 13 - Block A2 – Fourth Floor Assessed Rooms

Unit		ADF target (%)	ADF results (%)	Meets minimum ADF target
A	Living/ Kitchen/ Dining	2.0%	2.9%	Y
B	Living/ Kitchen/ Dining	2.0%	2.6%	Y
C	Living/ Kitchen/ Dining	2.0%	2.6%	Y
D	Living/ Kitchen/ Dining	2.0%	2.9%	Y
E	Living/ Kitchen/ Dining	2.0%	2.7%	Y

Table 8 – Average Daylight Factor Results – Block A2 – Fourth Floor Assessed Rooms

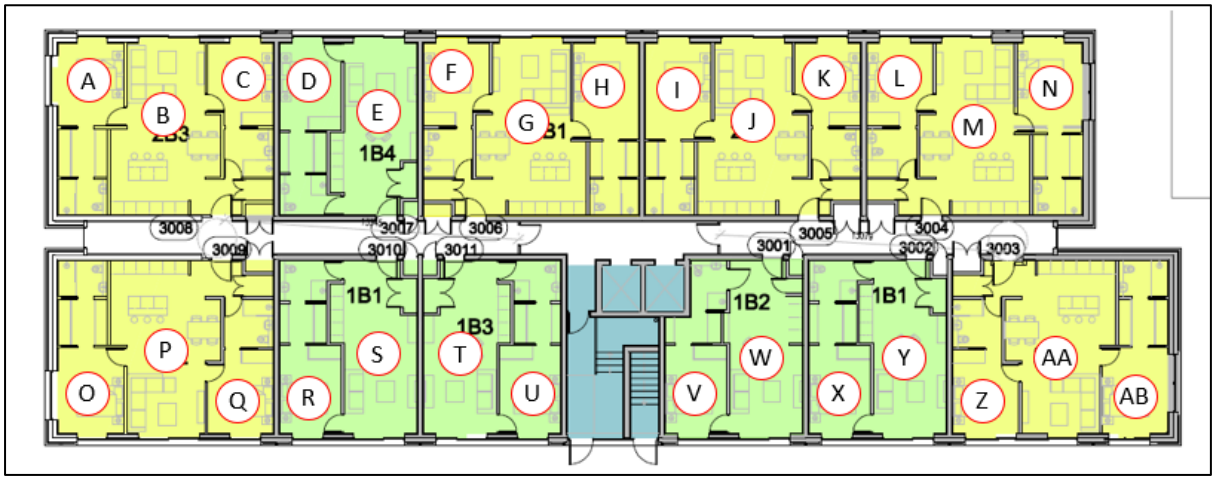

Figure 14 - Block A3 – Ground Floor Assessed Rooms

Unit		ADF target (%)	ADF results (%)	Meets minimum ADF target
A	Bedroom	1.0%	8.9%	Y
B	Living/ Kitchen/ Dining	2.0%	2.2%	Y
C	Bedroom	1.0%	3.5%	Y
D	Bedroom	1.0%	3.5%	Y
E	Living/ Kitchen/ Dining	2.0%	2.3%	Y
F	Bedroom	1.0%	3.3%	Y
G	Living/ Kitchen/ Dining	2.0%	1.7%	N
H	Bedroom	1.0%	3.8%	Y
I	Bedroom	1.0%	4.0%	Y
J	Living/ Kitchen/ Dining	2.0%	1.9%	N
K	Bedroom	1.0%	3.0%	Y
L	Bedroom	1.0%	3.0%	Y
M	Living/ Kitchen/ Dining	2.0%	1.8%	N
N	Bedroom	1.0%	8.3%	Y
O	Bedroom	1.0%	10.4%	Y
P	Living/ Kitchen/ Dining	2.0%	2.0%	Y
Q	Bedroom	1.0%	3.6%	Y
R	Bedroom	1.0%	3.6%	Y
S	Living/ Kitchen/ Dining	2.0%	1.8%	N
T	Living/ Kitchen/ Dining	2.0%	1.8%	N
U	Bedroom	1.0%	2.6%	Y
V	Bedroom	1.0%	2.6%	Y
W	Living/ Kitchen/ Dining	2.0%	1.9%	N
X	Bedroom	1.0%	2.6%	Y
Y	Living/ Kitchen/ Dining	2.0%	1.9%	Y
Z	Bedroom	1.0%	3.4%	Y
AA	Living/ Kitchen/ Dining	2.0%	1.2%	N
AB	Bedroom	1.0%	10.0%	Y

Table 9 – Average Daylight Factor Results – Block A3 – Ground Floor Assessed Rooms

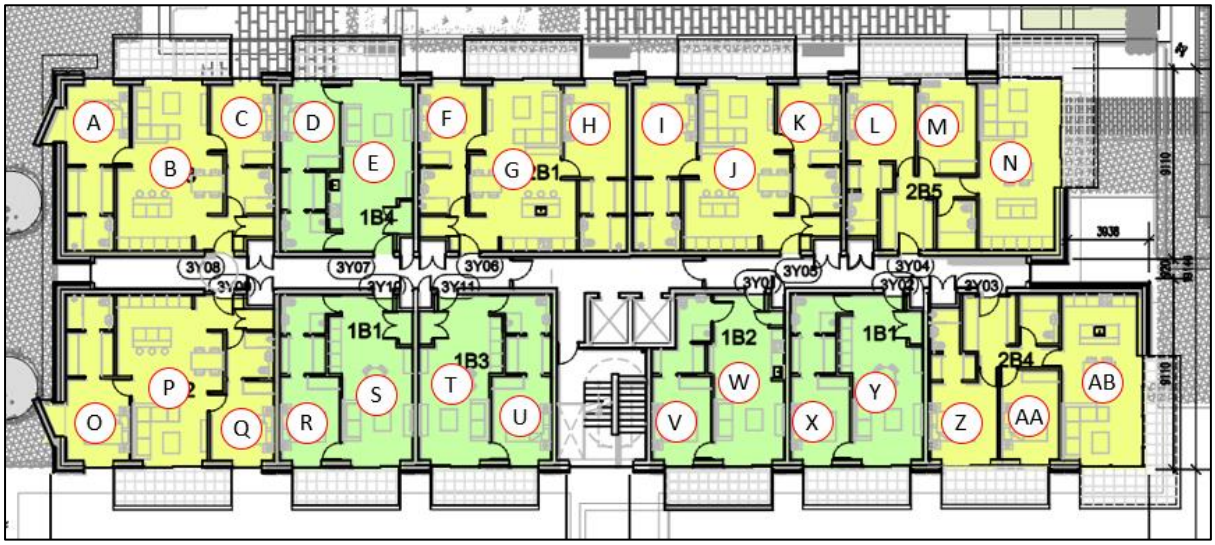

Figure 15 - Block A3 – First Floor Assessed Rooms

Unit		ADF target (%)	ADF results (%)	Meets minimum ADF target
A	Bedroom	1.0%	4.0%	Y
B	Living/ Kitchen/ Dining	2.0%	1.8%	N
C	Bedroom	1.0%	3.9%	Y
D	Bedroom	1.0%	3.9%	Y
E	Living/ Kitchen/ Dining	2.0%	1.6%	N
F	Bedroom	1.0%	3.8%	Y
G	Living/ Kitchen/ Dining	2.0%	1.6%	N
H	Bedroom	1.0%	3.8%	Y
I	Bedroom	1.0%	3.8%	Y
J	Living/ Kitchen/ Dining	2.0%	1.8%	N
K	Bedroom	1.0%	4.8%	Y
L	Bedroom	1.0%	4.8%	Y
M	Bedroom	1.0%	4.0%	Y
N	Living/ Kitchen/ Dining	2.0%	6.7%	Y
O	Bedroom	1.0%	3.8%	Y
P	Living/ Kitchen/ Dining	2.0%	1.5%	N
Q	Bedroom	1.0%	2.4%	Y
R	Bedroom	1.0%	2.4%	Y
S	Living/ Kitchen/ Dining	2.0%	1.3%	N
T	Living/ Kitchen/ Dining	2.0%	1.3%	N
U	Bedroom	1.0%	2.1%	Y
V	Bedroom	1.0%	2.1%	Y
W	Living/ Kitchen/ Dining	2.0%	1.6%	N
X	Bedroom	1.0%	2.4%	Y
Y	Living/ Kitchen/ Dining	2.0%	1.6%	N
Z	Bedroom	1.0%	2.8%	Y
AA	Bedroom	1.0%	2.8%	Y
AB	Bedroom	1.0%	5.6%	Y

Table 10 – Average Daylight Factor Results – Block A3 – First Floor Assessed Rooms

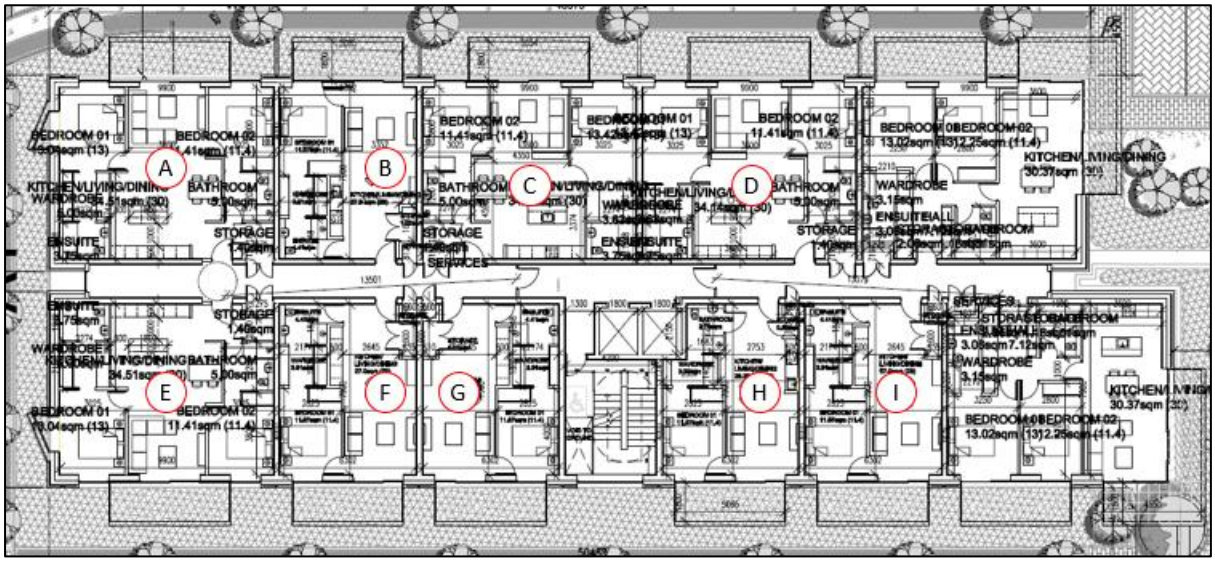

Figure 16 - Block A3 – Second Floor Assessed Rooms

Unit		ADF target (%)	ADF results (%)	Meets minimum ADF target
A	Living/ Kitchen/ Dining	2.0%	2.1%	Y
B	Living/ Kitchen/ Dining	2.0%	1.8%	N
C	Living/ Kitchen/ Dining	2.0%	1.8%	N
D	Living/ Kitchen/ Dining	2.0%	2.0%	Y
E	Living/ Kitchen/ Dining	2.0%	1.7%	N
F	Living/ Kitchen/ Dining	2.0%	1.5%	N
G	Living/ Kitchen/ Dining	2.0%	1.5%	N
H	Living/ Kitchen/ Dining	2.0%	1.7%	N
I	Living/ Kitchen/ Dining	2.0%	1.7%	N

Table 11 – Average Daylight Factor Results – Block A3 – Second Floor Assessed Rooms

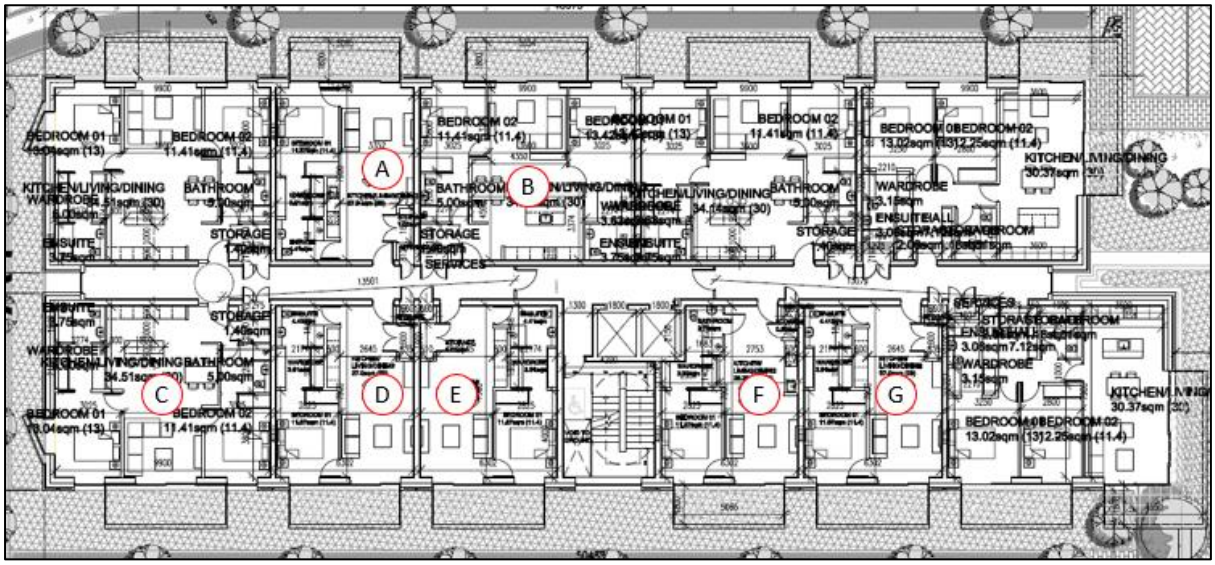

Figure 17 - Block A3 – Third Floor Assessed Rooms

Unit		ADF target (%)	ADF results (%)	Meets minimum ADF target
A	Living/ Kitchen/ Dining	2.0%	2.0%	Y
B	Living/ Kitchen/ Dining	2.0%	2.0%	Y
C	Living/ Kitchen/ Dining	2.0%	1.8%	N
D	Living/ Kitchen/ Dining	2.0%	1.7%	N
E	Living/ Kitchen/ Dining	2.0%	1.7%	N
F	Living/ Kitchen/ Dining	2.0%	1.9%	N
G	Living/ Kitchen/ Dining	2.0%	1.9%	N

Table 12 – Average Daylight Factor Results – Block A3 – Third Floor Assessed Rooms

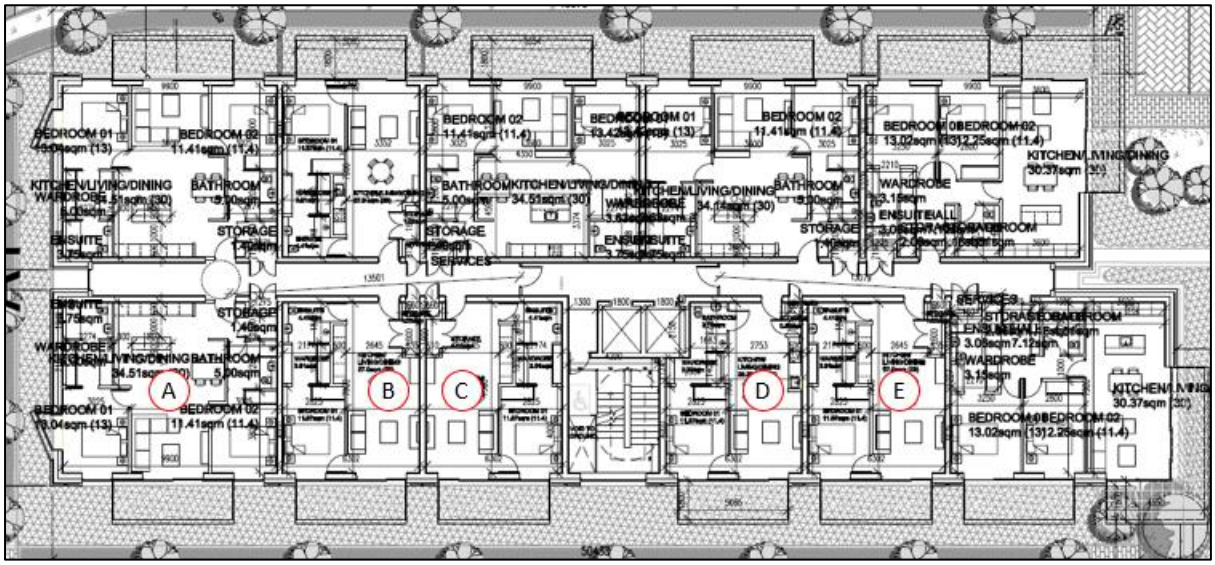

Figure 18 - Block A3 – Fourth Floor Assessed Rooms

Unit		ADF target (%)	ADF results (%)	Meets minimum ADF target
A	Living/ Kitchen/ Dining	2.0%	2.9%	Y
B	Living/ Kitchen/ Dining	2.0%	2.6%	Y
C	Living/ Kitchen/ Dining	2.0%	2.6%	Y
D	Living/ Kitchen/ Dining	2.0%	2.9%	Y
E	Living/ Kitchen/ Dining	2.0%	2.7%	Y

Table 13 – Average Daylight Factor Results – Block A3 – Fourth Floor Assessed Rooms

Figure 19 - Block A4 – Ground Floor Assessed Rooms

Unit		ADF target (%)	ADF results (%)	Meets minimum ADF target
A	Bedroom	1.0%	8.9%	Y
B	Living/ Kitchen/ Dining	2.0%	2.2%	Y
C	Bedroom	1.0%	3.5%	Y
D	Bedroom	1.0%	3.5%	Y
E	Living/ Kitchen/ Dining	2.0%	2.3%	Y
F	Bedroom	1.0%	3.3%	Y
G	Living/ Kitchen/ Dining	2.0%	1.7%	N
H	Bedroom	1.0%	3.8%	Y
I	Bedroom	1.0%	4.0%	Y
J	Living/ Kitchen/ Dining	2.0%	1.9%	N
K	Bedroom	1.0%	3.0%	Y
L	Bedroom	1.0%	3.0%	Y
M	Living/ Kitchen/ Dining	2.0%	1.8%	N
N	Bedroom	1.0%	8.3%	Y
O	Bedroom	1.0%	3.5%	Y
P	Living/ Kitchen/ Dining	2.0%	2.9%	Y
Q	Bedroom	1.0%	3.5%	Y
R	Living/ Kitchen/ Dining	2.0%	2.9%	Y
S	Living/ Kitchen/ Dining	2.0%	2.9%	Y
T	Bedroom	1.0%	3.5%	Y
U	Bedroom	1.0%	3.4%	Y
V	Living/ Kitchen/ Dining	2.0%	2.9%	Y
W	Bedroom	1.0%	3.3%	Y
X	Living/ Kitchen/ Dining	2.0%	2.8%	Y
Y	Bedroom	1.0%	3.6%	Y
Z	Living/ Kitchen/ Dining	2.0%	2.9%	Y
AA	Bedroom	1.0%	10.4%	Y

Table 14 – Average Daylight Factor Results – Block A4 – Ground Floor Assessed Rooms

Figure 20 - Block A4 – First Floor Assessed Rooms

Unit		ADF target (%)	ADF results (%)	Meets minimum ADF target
A	Bedroom	1.0%	4.4%	Y
B	Living/ Kitchen/ Dining	2.0%	1.8%	N
C	Bedroom	1.0%	3.9%	Y
D	Bedroom	1.0%	3.9%	Y
E	Living/ Kitchen/ Dining	2.0%	1.6%	N
F	Bedroom	1.0%	3.8%	Y
G	Living/ Kitchen/ Dining	2.0%	1.6%	N
H	Bedroom	1.0%	3.8%	Y
I	Bedroom	1.0%	3.8%	Y
J	Living/ Kitchen/ Dining	2.0%	1.8%	N
K	Bedroom	1.0%	4.8%	Y
L	Bedroom	1.0%	4.8%	Y
M	Bedroom	1.0%	4.0%	Y
N	Living/ Kitchen/ Dining	2.0%	6.7%	Y
O	Bedroom	1.0%	8.1%	Y
P	Living/ Kitchen/ Dining	2.0%	2.1%	Y
Q	Bedroom	1.0%	3.3%	Y
R	Bedroom	1.0%	3.3%	Y
S	Living/ Kitchen/ Dining	2.0%	2.1%	Y
T	Living/ Kitchen/ Dining	2.0%	2.1%	Y
U	Bedroom	1.0%	3.1%	Y
V	Bedroom	1.0%	3.1%	Y
W	Living/ Kitchen/ Dining	2.0%	2.3%	Y
X	Bedroom	1.0%	3.4%	Y
Y	Living/ Kitchen/ Dining	2.0%	2.1%	Y
Z	Bedroom	1.0%	2.7%	Y
AA	Bedroom	1.0%	2.7%	Y
AB	Bedroom	2.0%	6.1%	Y

Table 15 – Average Daylight Factor Results – Block A4 – First Floor Assessed Rooms

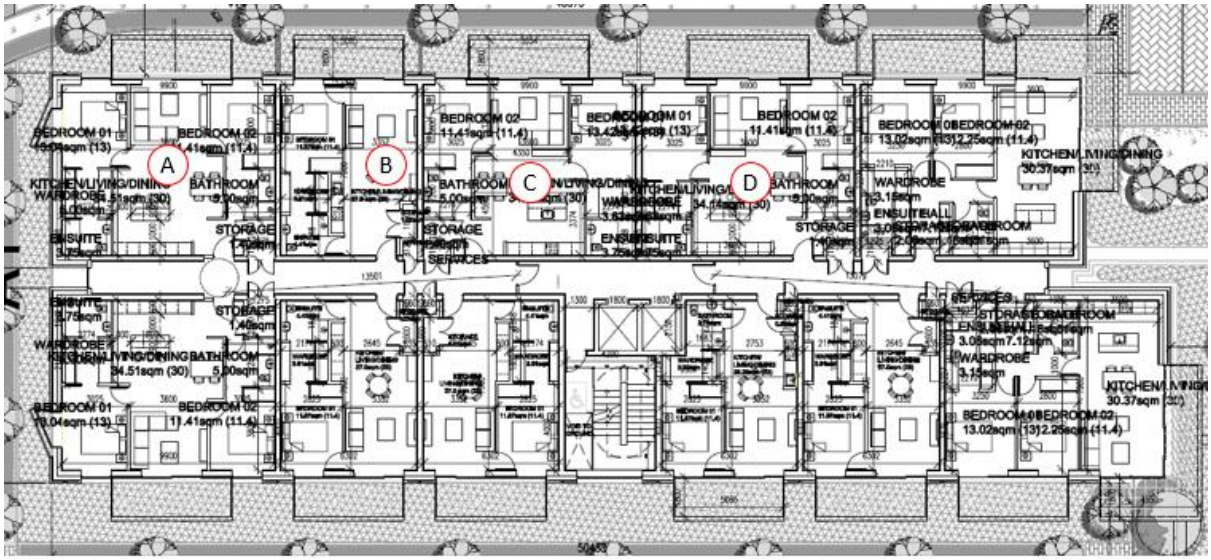

Figure 21 - Block A4 – Second Floor Assessed Rooms

Unit		ADF target (%)	ADF results (%)	Meets minimum ADF target
A	Living/ Kitchen/ Dining	2.0%	2.1%	Y
B	Living/ Kitchen/ Dining	2.0%	1.8%	N
C	Living/ Kitchen/ Dining	2.0%	1.8%	N
D	Living/ Kitchen/ Dining	2.0%	2.0%	Y

Table 16 – Average Daylight Factor Results – Block A4 – Second Floor Assessed Rooms

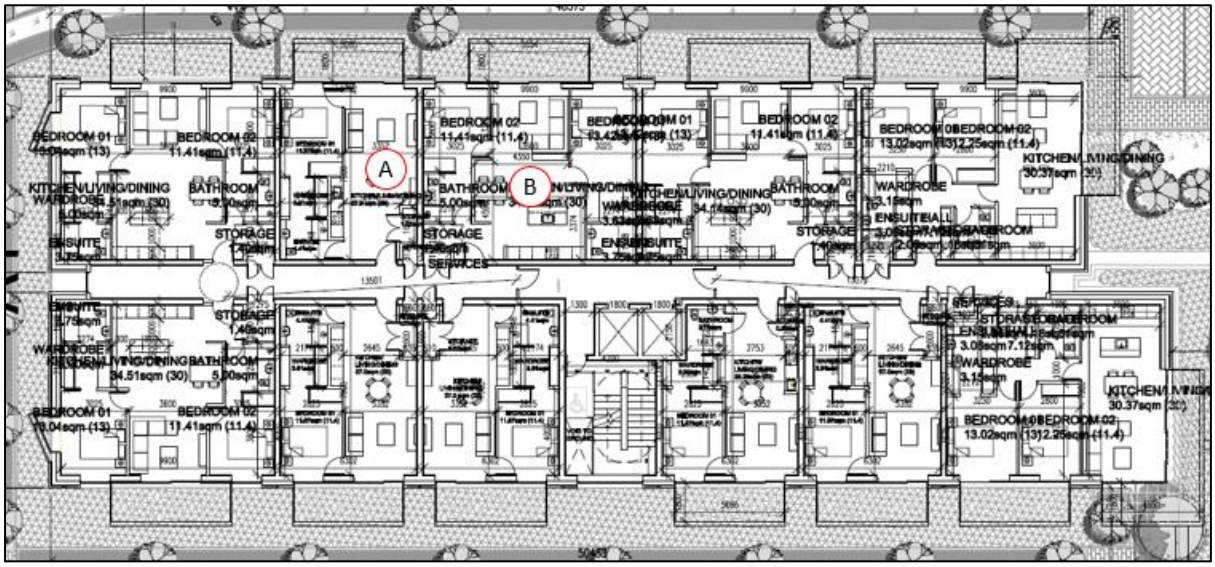

Figure 22 - Block A4 – Third Floor Assessed Rooms

Unit		ADF target (%)	ADF results (%)	Meets minimum ADF target
A	Living/ Kitchen/ Dining	2.0%	2.0%	Y
B	Living/ Kitchen/ Dining	2.0%	2.0%	Y

Table 17 – Average Daylight Factor Results – Block A4 – Third Floor Assessed Rooms

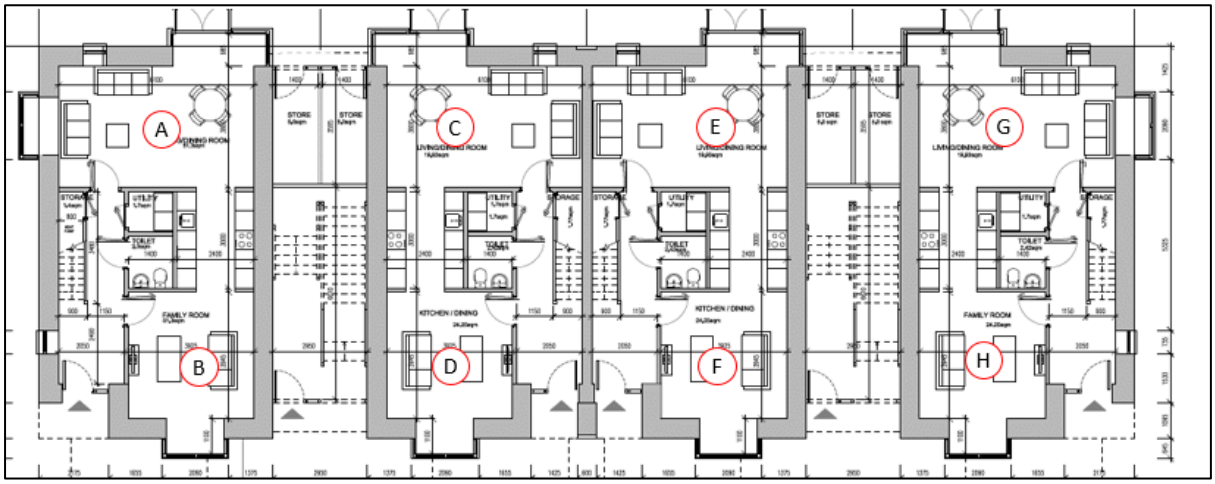

Figure 23 – Blocks B1/B2 (representative of Block B3) – Ground Floor Assessed Rooms

Unit		ADF target (%)	ADF results (%)	Meets minimum ADF target
A	Living/ Kitchen/ Dining	2.0%	7.5%	Y
B	Family Room	1.5%	3.6%	Y
C	Living/ Kitchen/ Dining	2.0%	7.3%	Y
D	Family Room	1.5%	3.6%	Y
E	Living/ Kitchen/ Dining	2.0%	7.3%	Y
F	Family Room	1.5%	3.6%	Y
G	Living/ Kitchen/ Dining	2.0%	7.5%	Y
H	Family Room	1.5%	3.6%	Y

Table 18 – Average Daylight Factor Results – Blocks B1/B2 (representative of Block B3) – Ground Floor Assessed Rooms

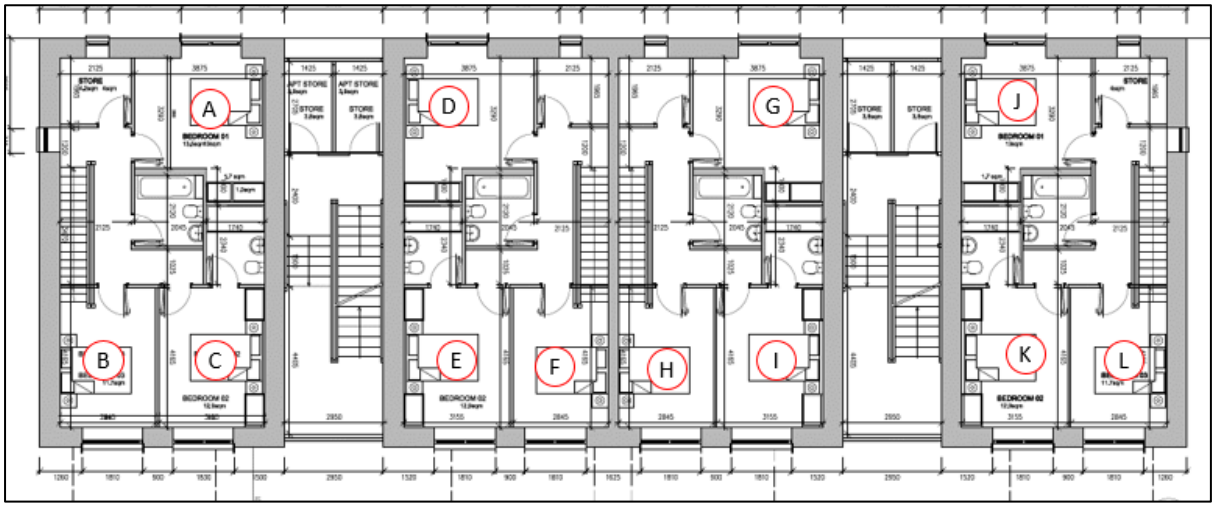

Figure 24 – Blocks B1/B2 (representative of Block B3) – First Floor Assessed Rooms

Unit		ADF target (%)	ADF results (%)	Meets minimum ADF target
A	Bedroom	1.0%	4.2%	Y
B	Bedroom	1.0%	3.7%	Y
C	Bedroom	1.0%	3.7%	Y
D	Bedroom	1.0%	4.2%	Y
E	Bedroom	1.0%	3.7%	Y
F	Bedroom	1.0%	3.7%	Y
G	Bedroom	1.0%	4.2%	Y
H	Bedroom	1.0%	3.7%	Y
I	Bedroom	1.0%	3.7%	Y
J	Bedroom	1.0%	4.2%	Y
K	Bedroom	1.0%	3.7%	Y
L	Bedroom	1.0%	3.7%	Y

Table 19 – Average Daylight Factor Results – Blocks B1/B2 (representative of Block B3) – First Floor Assessed Rooms

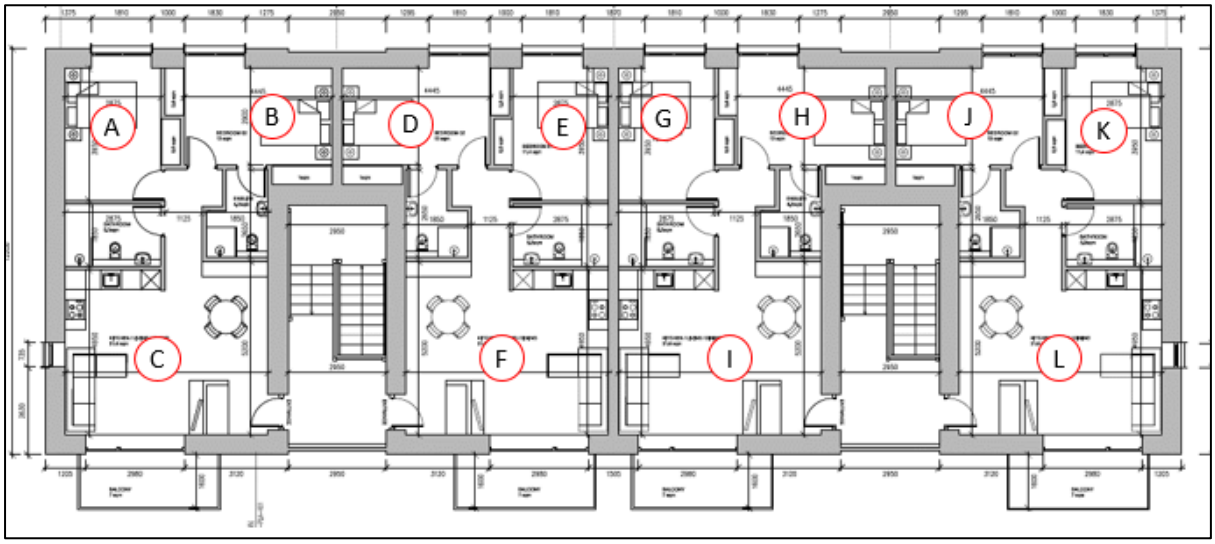

Figure 25 – Blocks B1/B2 (representative of Block B3) – Second Floor Assessed Rooms

Unit		ADF target (%)	ADF results (%)	Meets minimum ADF target
A	Bedroom	1.0%	6.4%	Y
B	Bedroom	1.0%	5.0%	Y
C	Living/ Kitchen/ Dining	2.0%	4.6%	Y
D	Bedroom	1.0%	5.0%	Y
E	Bedroom	1.0%	6.4%	Y
F	Living/ Kitchen/ Dining	2.0%	4.1%	Y
G	Bedroom	1.0%	6.4%	Y
H	Bedroom	1.0%	5.0%	Y
I	Living/ Kitchen/ Dining	2.0%	4.1%	Y
J	Bedroom	1.0%	5.0%	Y
K	Bedroom	1.0%	6.4%	Y
L	Living/ Kitchen/ Dining	2.0%	4.6%	Y

Table 20 – Average Daylight Factor Results – Blocks B1/B2 (representative of Block B3) – Second Floor Assessed Rooms

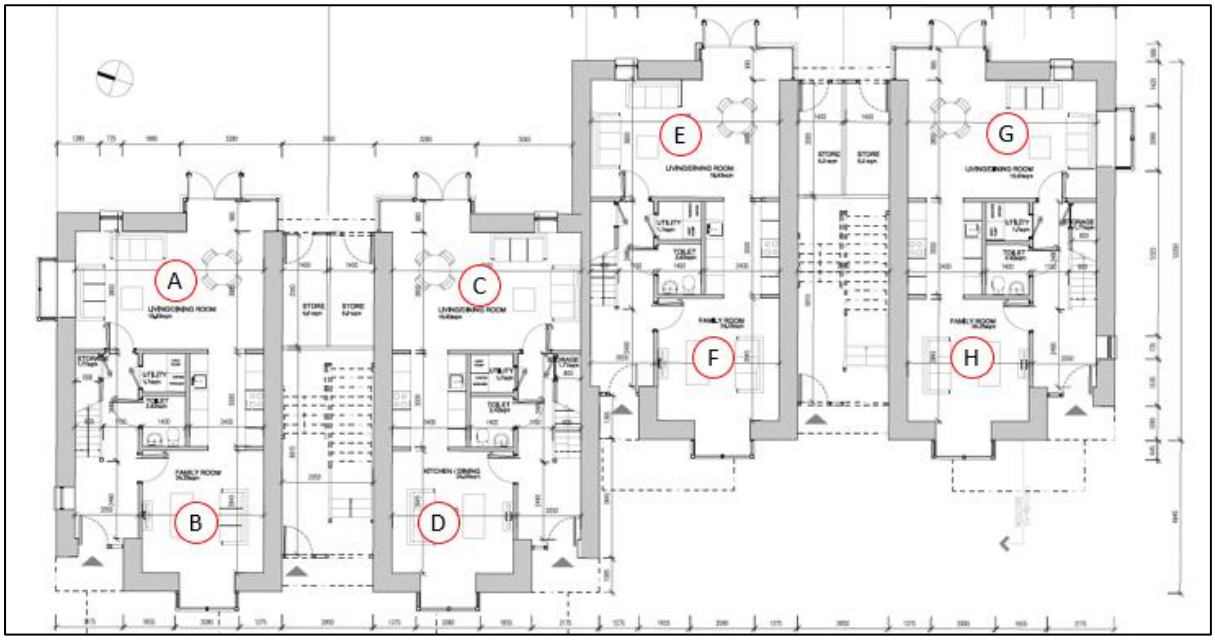

Figure 26 – Blocks B4 – Ground Floor Assessed Rooms

Unit		ADF target (%)	ADF results (%)	Meets minimum ADF target
A	Living/ Kitchen/ Dining	2.0%	7.3%	Y
B	Family Room	1.5%	3.6%	Y
C	Living/ Kitchen/ Dining	2.0%	6.4%	Y
D	Family Room	1.5%	3.6%	Y
E	Living/ Kitchen/ Dining	2.0%	6.8%	Y
F	Family Room	1.5%	2.8%	Y
G	Living/ Kitchen/ Dining	2.0%	7.4%	Y
H	Family Room	1.5%	3.6%	Y

Table 21 – Average Daylight Factor Results – Blocks B4 – Ground Floor Assessed Rooms

Figure 27 – Blocks B4 – First Floor Assessed Rooms

Unit		ADF target (%)	ADF results (%)	Meets minimum ADF target
A	Bedroom	1.0%	4.7%	Y
B	Bedroom	1.0%	4.3%	Y
C	Bedroom	1.0%	4.3%	Y
D	Bedroom	1.0%	4.5%	Y
E	Bedroom	1.0%	4.3%	Y
F	Bedroom	1.0%	4.3%	Y
G	Bedroom	1.0%	4.7%	Y
H	Bedroom	1.0%	3.0%	Y
I	Bedroom	1.0%	3.4%	Y
J	Bedroom	1.0%	4.7%	Y
K	Bedroom	1.0%	3.6%	Y
L	Bedroom	1.0%	3.8%	Y

Table 22 – Average Daylight Factor Results – Blocks B4 – First Floor Assessed Rooms

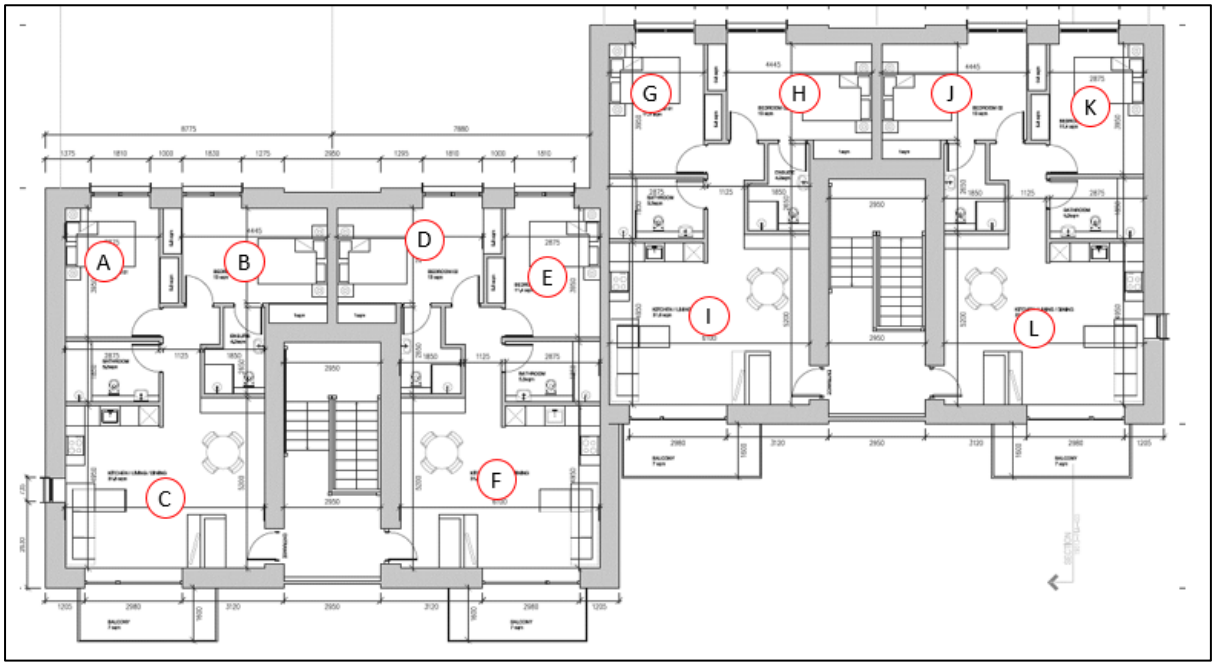

Figure 28 – Blocks B4 – Second Floor Assessed Rooms

Unit		ADF target (%)	ADF results (%)	Meets minimum ADF target
A	Bedroom	1.0%	6.4%	Y
B	Bedroom	1.0%	5.0%	Y
C	Living/ Kitchen/ Dining	2.0%	4.6%	Y
D	Bedroom	1.0%	4.8%	Y
E	Bedroom	1.0%	4.0%	Y
F	Living/ Kitchen/ Dining	2.0%	4.1%	Y
G	Bedroom	1.0%	6.4%	Y
H	Bedroom	1.0%	5.0%	Y
I	Living/ Kitchen/ Dining	2.0%	3.6%	Y
J	Bedroom	1.0%	5.0%	Y
K	Bedroom	1.0%	6.4%	Y
L	Living/ Kitchen/ Dining	2.0%	4.6%	Y

Table 23 – Average Daylight Factor Results – Blocks B4 – Second Floor Assessed Rooms

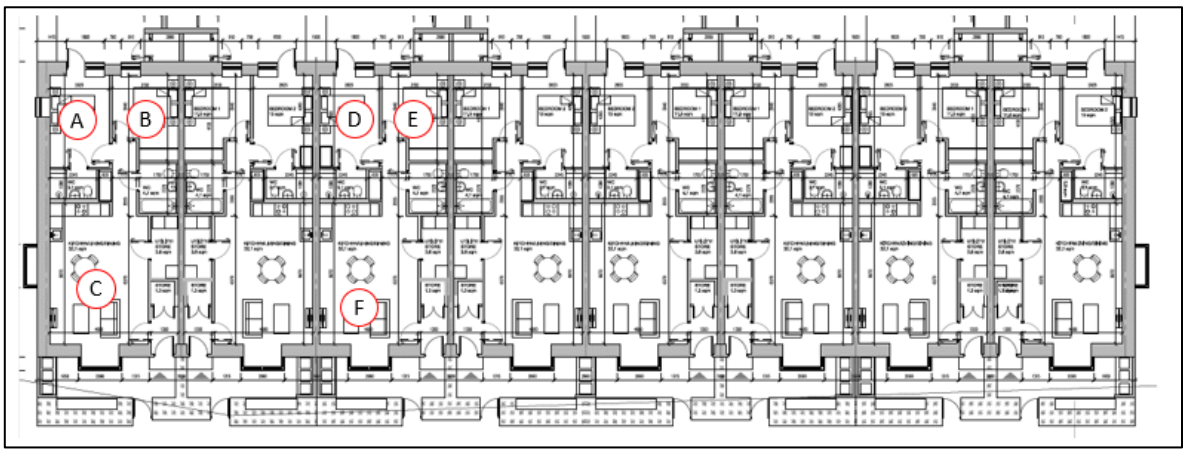

Figure 29 – Blocks B5 – Ground Floor Assessed Rooms

Unit		ADF target (%)	ADF results (%)	Meets minimum ADF target
A	Bedroom	1.0%	3.2%	Y
B	Bedroom	1.0%	5.3%	Y
C	Living/ Kitchen/ Dining	2.0%	4.2%	Y
D	Bedroom	1.0%	2.8%	Y
E	Bedroom	1.0%	5.3%	Y
F	Living/ Kitchen/ Dining	2.0%	4.1%	Y

Table 24 – Average Daylight Factor Results – Blocks B5 – Ground Floor Assessed Rooms

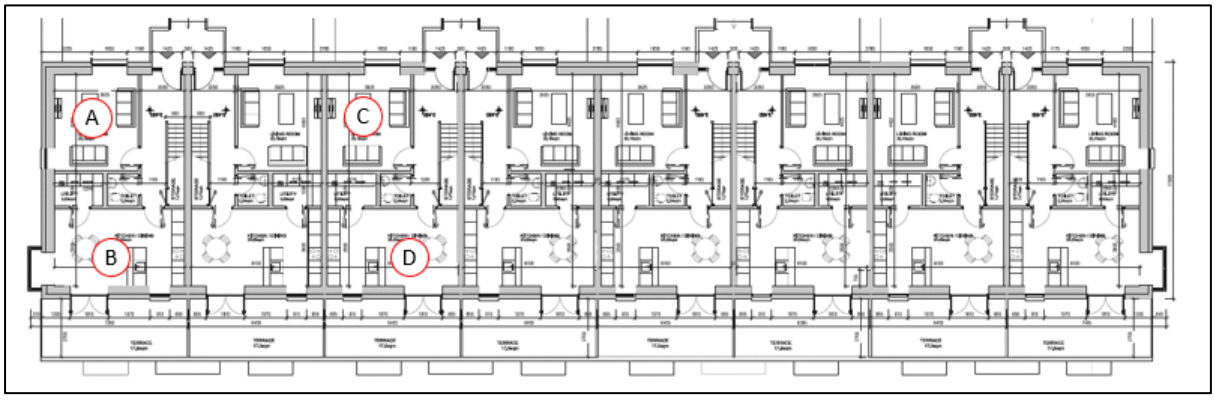

Figure 30 – Blocks B5 – First Floor Assessed Rooms

Unit		ADF target (%)	ADF results (%)	Meets minimum ADF target
A	Living Room	1.5%	3.3%	Y
B	Kitchen/ Dining	2.0%	8.1%	Y
C	Living Room	1.5%	3.9%	Y
D	Kitchen/ Dining	2.0%	5.6%	Y

Table 25 – Average Daylight Factor Results – Blocks B5 – First Floor Assessed Rooms

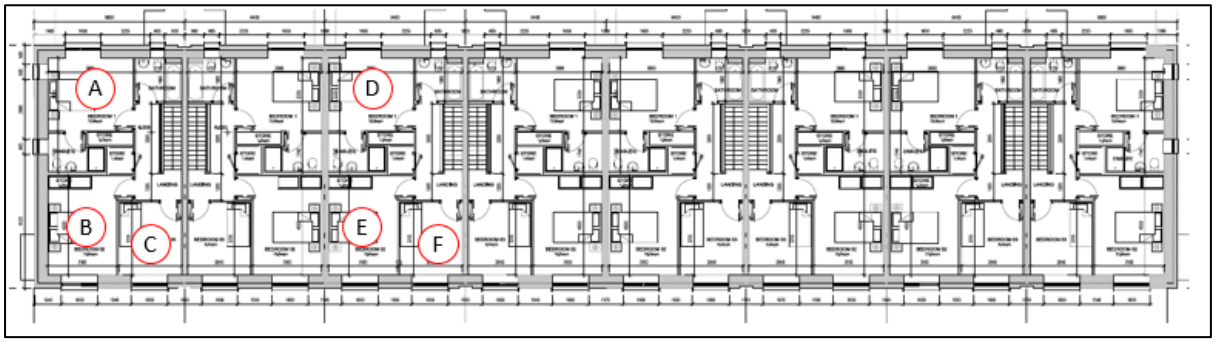

Figure 31 – Blocks B5 – Second Floor Assessed Rooms

Unit		ADF target (%)	ADF results (%)	Meets minimum ADF target
A	Bedroom	1.0%	2.9%	Y
B	Bedroom	1.0%	4.8%	Y
C	Bedroom	1.0%	5.1%	Y
D	Bedroom	1.0%	2.7%	Y
E	Bedroom	1.0%	4.4%	Y
F	Bedroom	1.0%	5.1%	Y

Table 26 – Average Daylight Factor Results – Blocks B5 – Second Floor Assessed Rooms

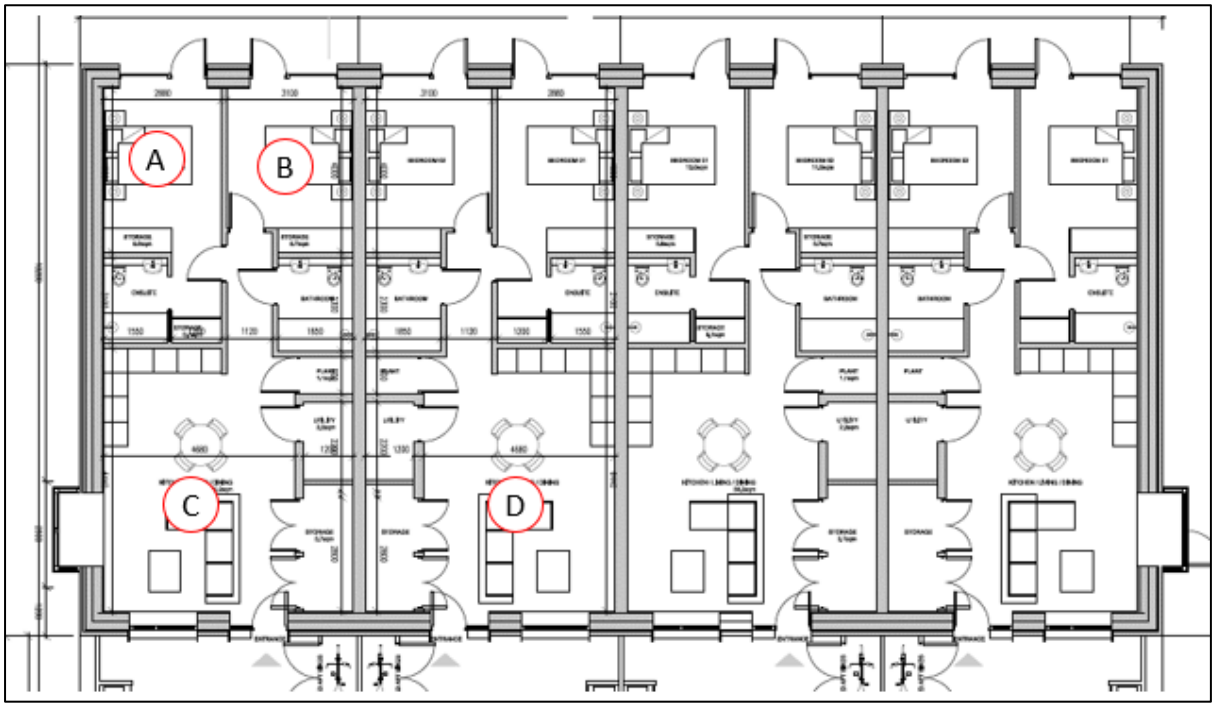

Figure 32 – Blocks B6 – Ground Floor Assessed Rooms

Unit		ADF target (%)	ADF results (%)	Meets minimum ADF target
A	Bedroom	1.0%	7.3%	Y
B	Bedroom	1.0%	7.9%	Y
C	Living/ Kitchen/ Dining	2.0%	5.9%	Y
D	Bedroom	1.0%	3.7%	Y

Table 27 – Average Daylight Factor Results – Blocks B6 – Ground Floor Assessed Rooms

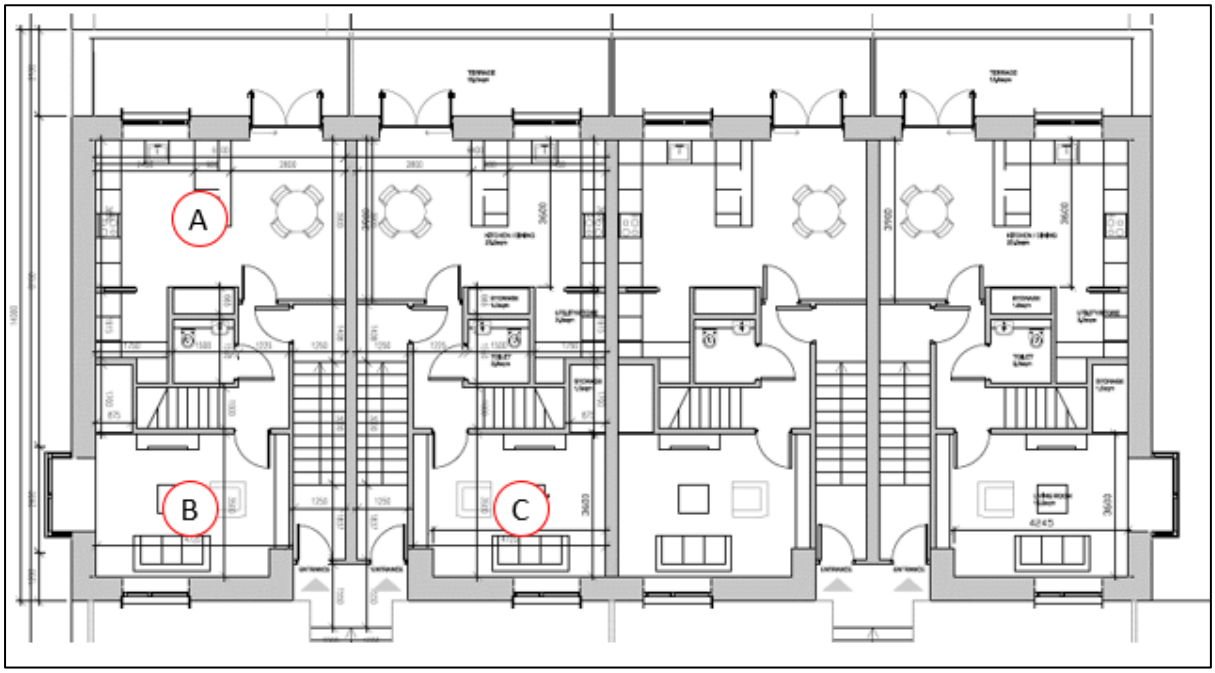

Figure 33 – Blocks B6 – First Floor Assessed Rooms

Unit		ADF target (%)	ADF results (%)	Meets minimum ADF target
A	Kitchen/ Dining	2.0%	5.4%	Y
B	Living Room	1.5%	7.4%	Y
C	Living Room	1.5%	3.7%	Y

Table 28 – Average Daylight Factor Results – Blocks B6 – First Floor Assessed Rooms

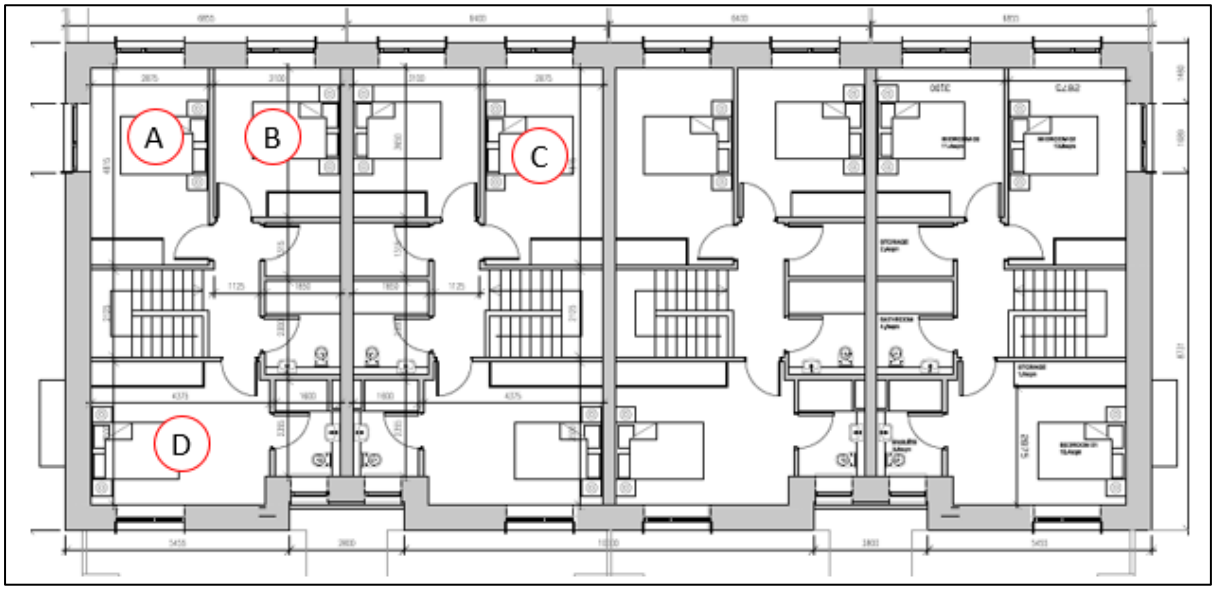

Figure 34 – Blocks B6 – Second Floor Assessed Rooms

Unit		ADF target (%)	ADF results (%)	Meets minimum ADF target
A	Bedroom	1.0%	7.2%	Y
B	Bedroom	1.0%	5.1%	Y
C	Bedroom	1.0%	4.4%	Y
D	Bedroom	1.0%	2.9%	Y

Table 29 – Average Daylight Factor Results – Blocks B6 – Second Floor Assessed Rooms

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 824 rooms that comprise the development, only 56 fall short of the BRE Guidelines and BS 8206 recommendations, therefore a 93.2% 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
824	56	0	56	93.2%

Table 30 – Percentage of Compliance

6.5. DAYLIGHT RESULTS – ROOMS WITHIN APARTMENTS FALLING BELOW COMPLIANCE

As previously stated, of the 814 rooms that comprise the development, only 56 fall short of the BRE Guidelines and BS 8206 recommendations, therefore a 93.2% compliance rate is achieved across the development.

In order to demonstrate that excellent levels of daylight are achieved in those units falling short of compliance, the following image illustrates the ADF levels being achieved throughout a 'worst case' living room/kitchen. 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 Clonkeen 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 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 35 - Block A2 – 'Worst Case' Living 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."*

The proposed development seeks to deliver a high quality living environment through the provision of high quality open spaces, which residents can enjoy immediately adjacent to their homes, and connected via green networks to surrounding amenity areas. Additionally, the proposed development provides quality external private balconies 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 36 highlight the areas that receive a minimum of 2 hours of sunlight on the 21st of March for the proposed development. The majority of the communal amenity spaces receive 2 hours or more of sunlight on March 21st, therefore compliance with BRE Guidelines is achieved.

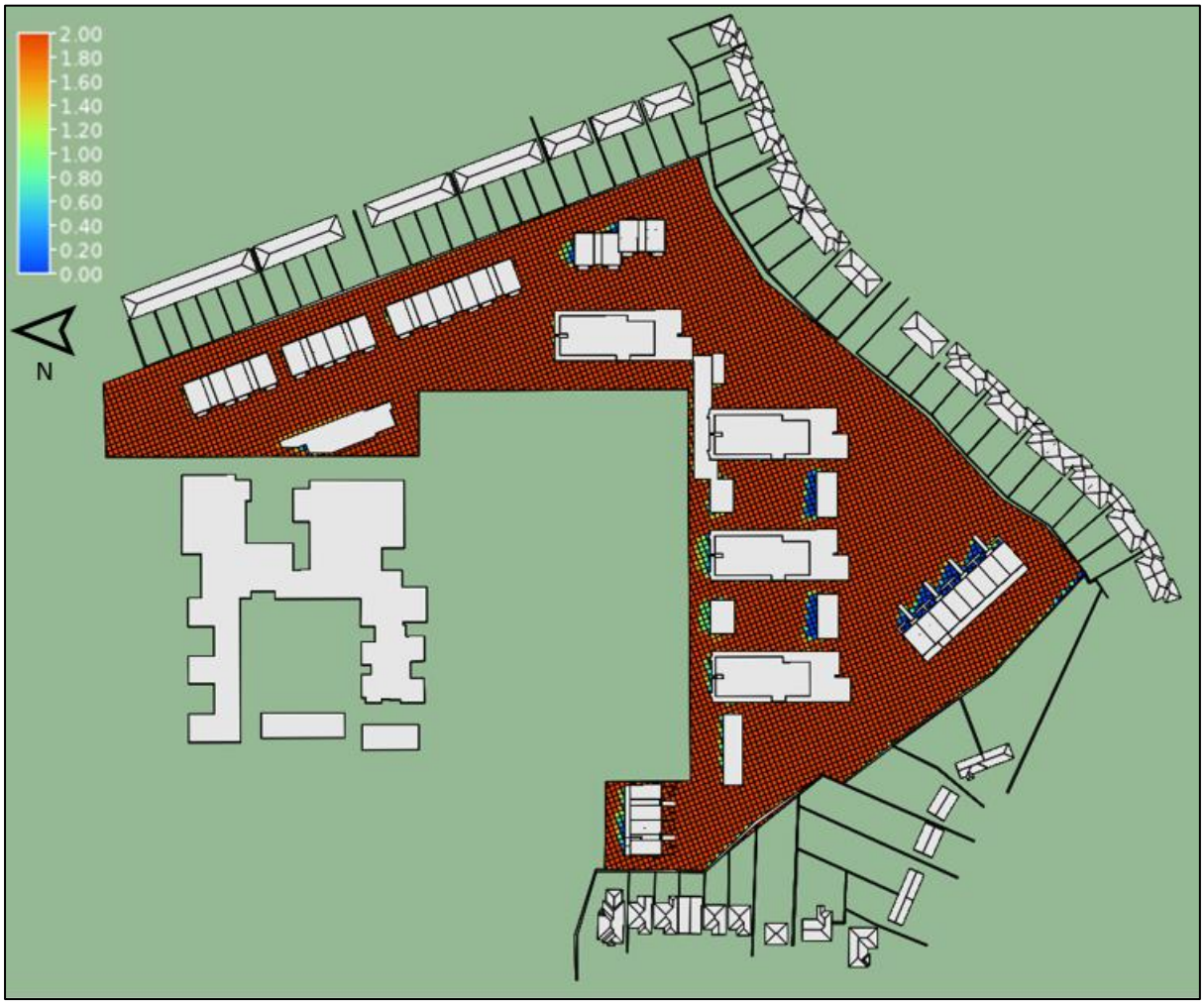

Figure 36 - Amenity Spaces - Hours of Sunlight on March 21st

Table 31 outlines the percentage of amenity space receiving at least 2 hours sunlight on March 21st. It is evident that the majority of amenity spaces receive the recommended value in more than 50% of the area, therefore, compliance with BRE Guidelines is achieved.

Garden	Percentage of area receiving ≥ 2hours sunlight on March 21st	Meets compliance with BRE Guidelines
Communal Amenity Space	97%	Y

Table 31 – Sunlight results – Communal amenity spaces

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 within the development 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 at lower floors will naturally be reduced and achieving the recommended values within BRE Guidelines can become challenging. Therefore, in addition to assessing the criteria recommended in the BRE Guidelines, a relaxed value has been set to give further reference in relation to sunlight levels.

The below table summarises the annual probable sunlight hours for the annual period and for the winter period based on the BRE recommendations. Two additional checks with relaxed benchmarks have also been carried out.

	BRE Guidelines Check 1 APSH > 25% Annual Period	BRE Guidelines Check 2 APSH > 5% Winter Period	Additional Check 1 APSH > 20% Annual Period	Additional Check 2 APSH > 15% Annual Period
Percentage of Compliance	62%	77%	75%	89%

Table 32 – APSH Summary Table

The results from the analysis have shown that for the annual period, 62% of the analysed windows achieve the recommended APSH values stated in the BRE Guidelines, while 77% of windows achieve the recommended values during the winter months, when sunlight is more valuable. When a relaxed benchmark of 20% and 15% is applied, 75% and 89% of the analysed windows achieve this alternative value, showing that a percentage of windows are falling only slightly short under the recommended targets. The shortfall in compliance can be attributed to the projection of balconies 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 Clonkeen development, since green areas and amenity spaces are provided along the whole development.

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".

In addition, BS8206 states that *"the degree of satisfaction is related to the expectation of sunlight. If a room is necessarily north facing or if the building is in a densely-built urban area, the absence of sunlight is more acceptable than when its exclusion seems arbitrary".*

The following images illustrate the sunlight levels achieved within the development.

Figure 37 – Annual APSH – West Elevation

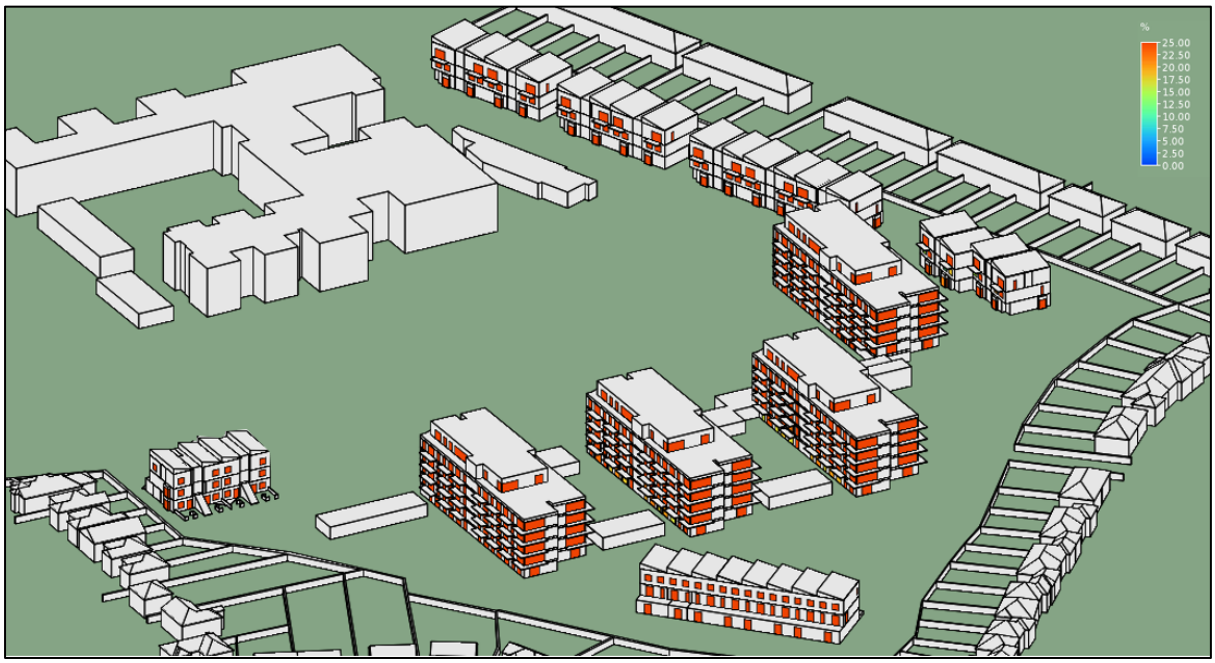

Figure 38 - Annual APSH – Southwest Elevation

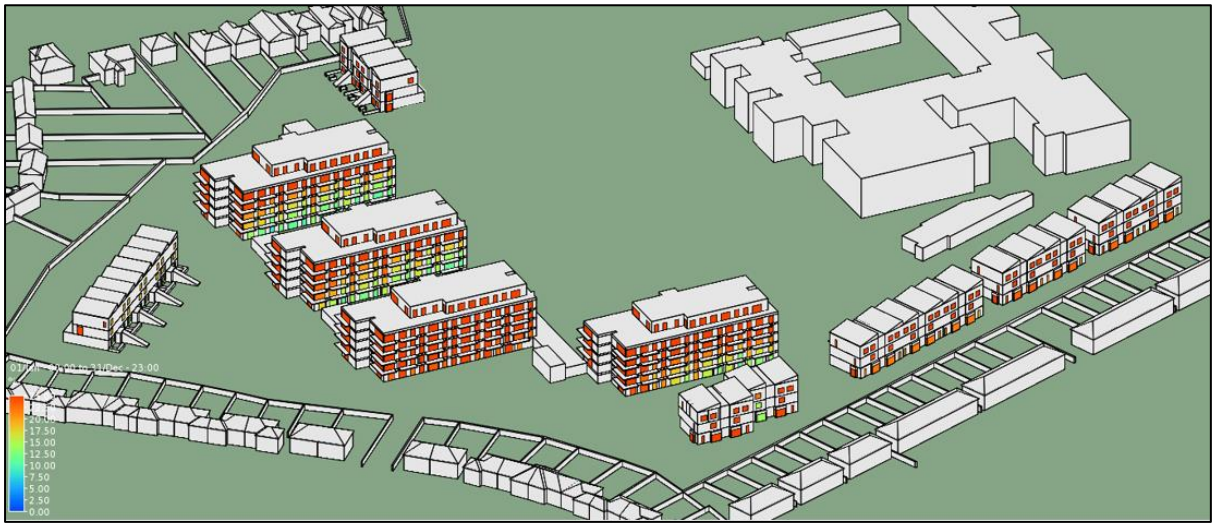

Figure 39 - Annual APSH – East Elevation

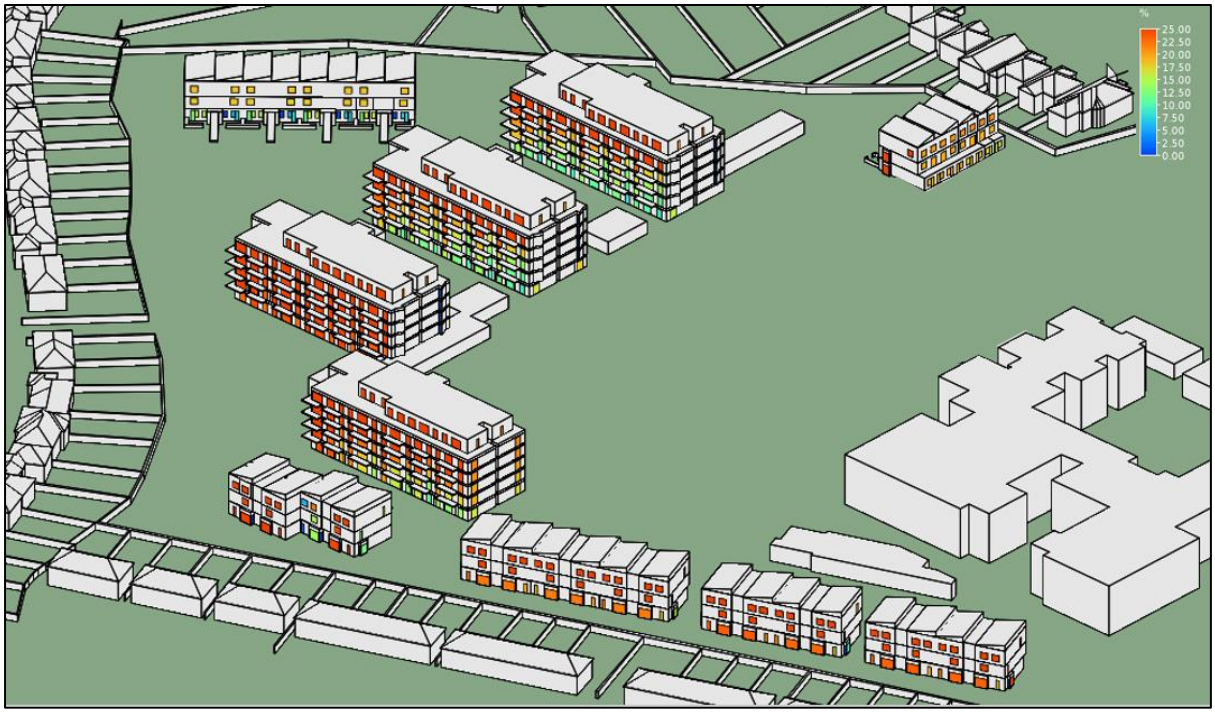

Figure 40 - Annual APSH – Northeast Elevation

It is important to note that the projection of balconies will impact the sunlight reaching the windows, however, it will provide occupants with an outdoor amenity space that will achieve excellent levels of sunlight.

In addition, the Sustainable Urban Housing: Design Standards for New Apartments document outlines that if an applicant cannot fully meet all the requirements of the daylight provisions from the BRE Guidelines and BS 8206, compensatory design solutions must be set out. Even though certain windows

are falling slightly short of compliance with the APSH due to their location and/or the projection of balconies, the proposed development has been designed to provide excellent views of high-quality green spaces as well as the provision of high-quality balconies within all apartments.

9. ASSESSING THE IMPACT ON SURROUNDING PROPERTIES

9.1. DAYLIGHT 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.

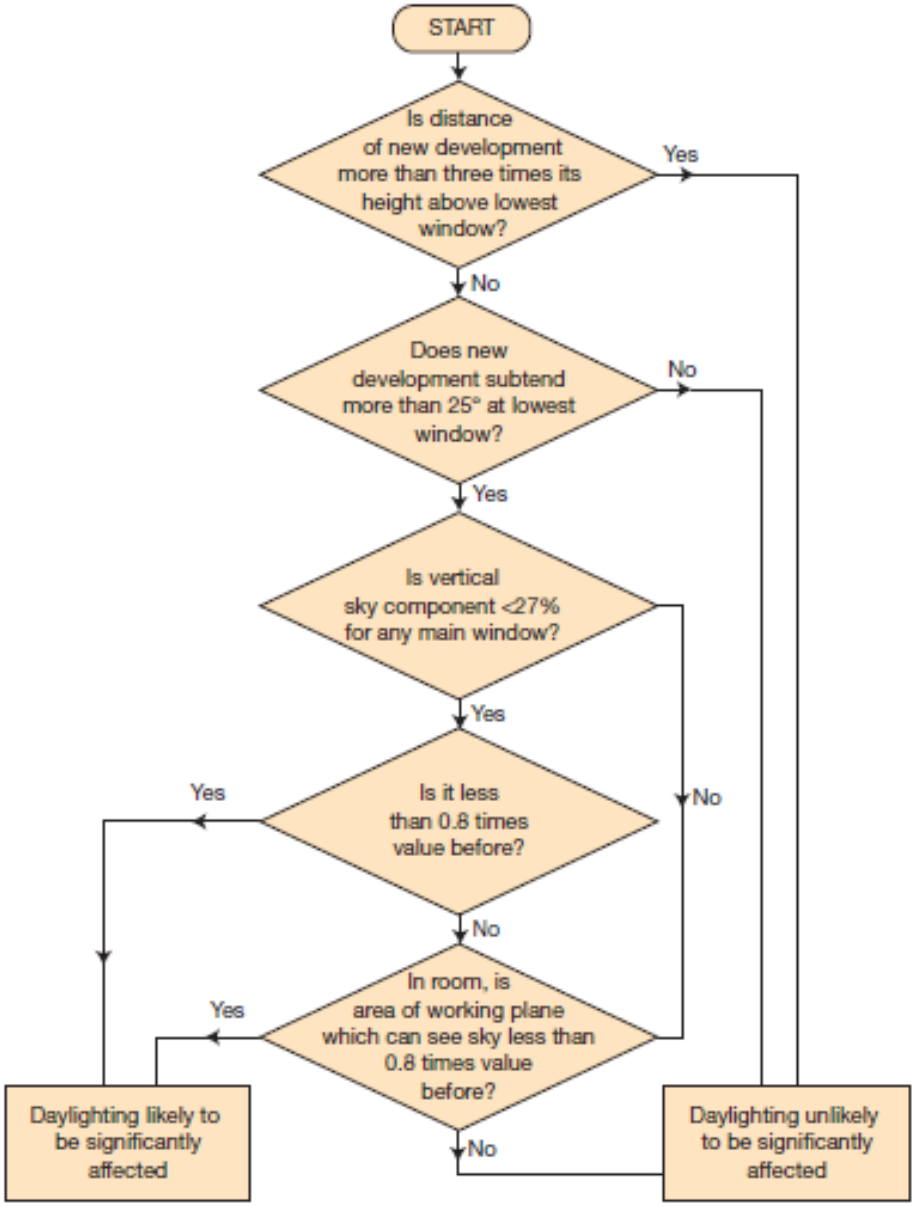

Figure 41 - Daylight Assessment Methodology

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 three main methods for assessing daylight availability.

9.1.1 25° LINE CRITERIA

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 2).

9.1.2 VERTICAL SKY COMPONENT

The second 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 3 is then followed

9.1.3 NO SKY LINE

The third 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 2 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 Guidelines, 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 33 identifies all sensitive receptors analysed, whilst Figure 42 identifies their location.

Sensitive Receptor Ref.	Development name
Ref. 1	Properties at Meadow Vale
Ref. 2	Properties at Monaloe Park Road
Ref. 3	Properties at Monaloe Cres
Ref. 4	Properties at Clonkeen Road

Table 33 – Sensitive Receptors surrounding Clonkeen Development

The image below identifies the location of the sensitive receptors.

Figure 42 - Location of Sensitive Receptors

9.3. DAYLIGHT IMPACT ON SURROUNDING PROPERTIES

25° line

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. The properties falling inside the 25° line are highlighted in blue which are selected for further analysis.

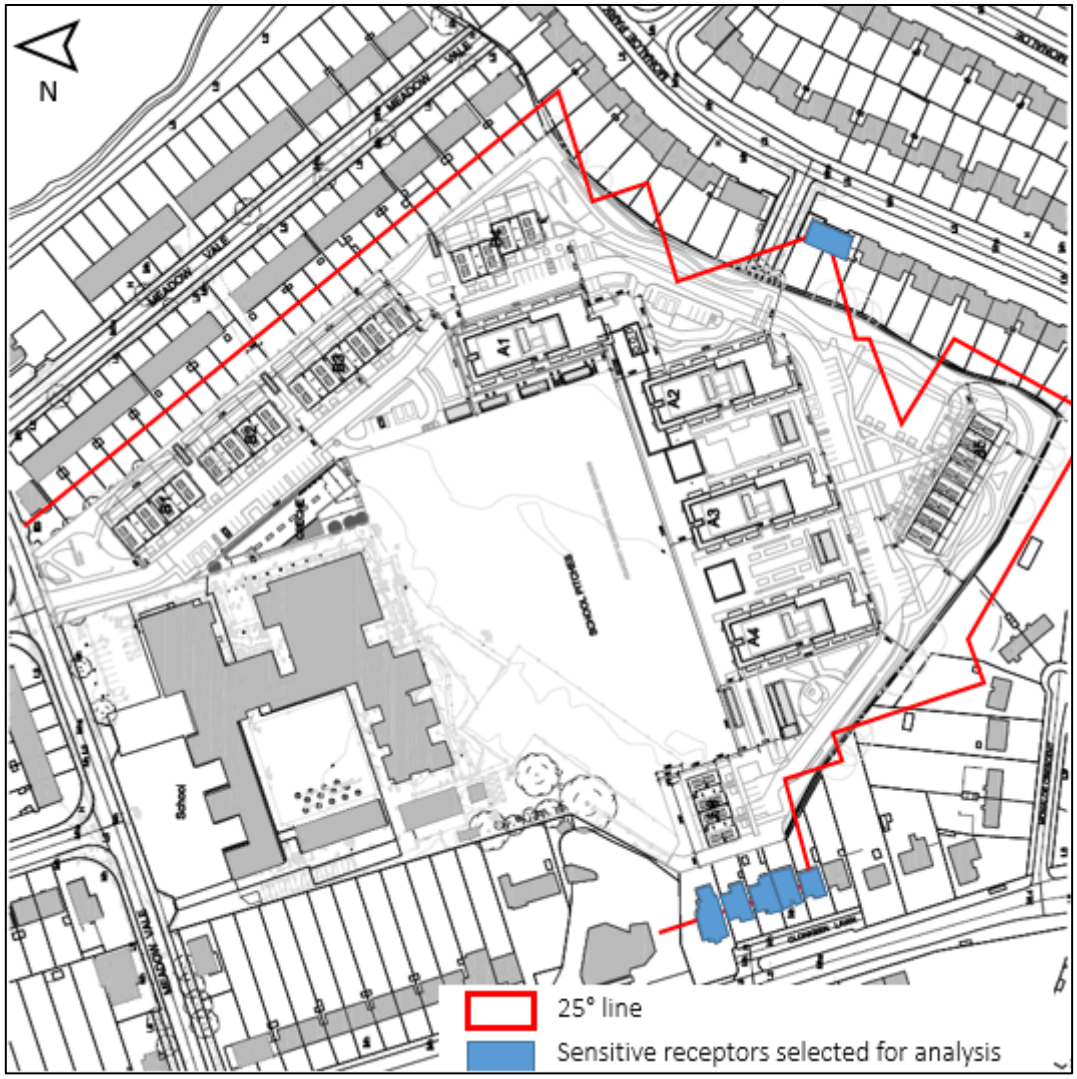

Figure 43 - 25° Line Criteria

Vertical Sky Component

As previously outlined, 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.

A selection of sensitive receptors falling inside the 25° line have been selected for VSC analysis. The ones selected for analysis are those located closer to the proposed development since they are considered a 'worst case' scenario. Even though sensitive receptors 1, 2 and 5 do not fall inside the 25°line, they have been selected for VSC analysis to give an indicative of the daylight levels that will be received within the houses located to that side of the proposed development. 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. In all cases, the VSC results achieved for the adjacent properties is greater than 27%. Therefore, excellent levels of daylight will still be perceived once the proposed development is constructed. The properties selected for analysis are those considered 'worst case' due to their proximity to the proposed development, therefore, if the analysis has identified no daylight impact for these properties, it can be assumed that the rest of properties will not perceive an impact due to the proposed development.

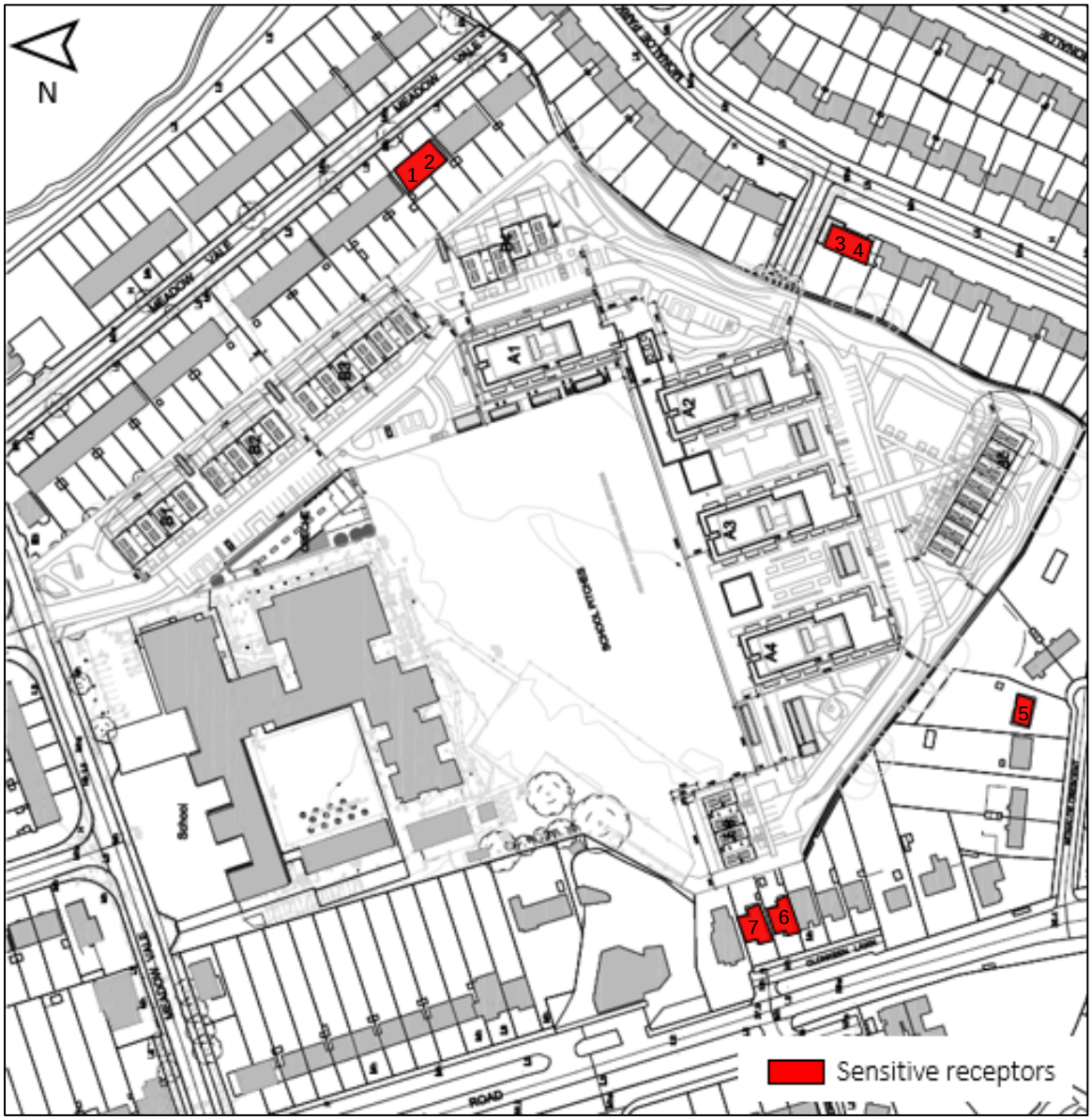

Figure 44 - Sensitive Receptors Reference – VSC Analysis

Sensitive Receptor Ref.	VSC proposed development (%)	Meets BRE minimum required VSC >27%
1	34.2	Y
2	34.1	Y
3	35.7	Y
4	35.9	Y
5	38.9	Y
6	31.4	Y
7	29.1	Y

Table 34 – VSC Results

9.4. OVERSHADOWING IMPACT TO SURROUNDING PROPERTIES

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)".*

Based on the recommendations within the BRE Guidelines, March 21st has been used to create the overshadowing images and analyse any potential impact due to the proposed Project. 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.

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. The figure below identifies the sensitive surrounding open spaces selected for analysis.

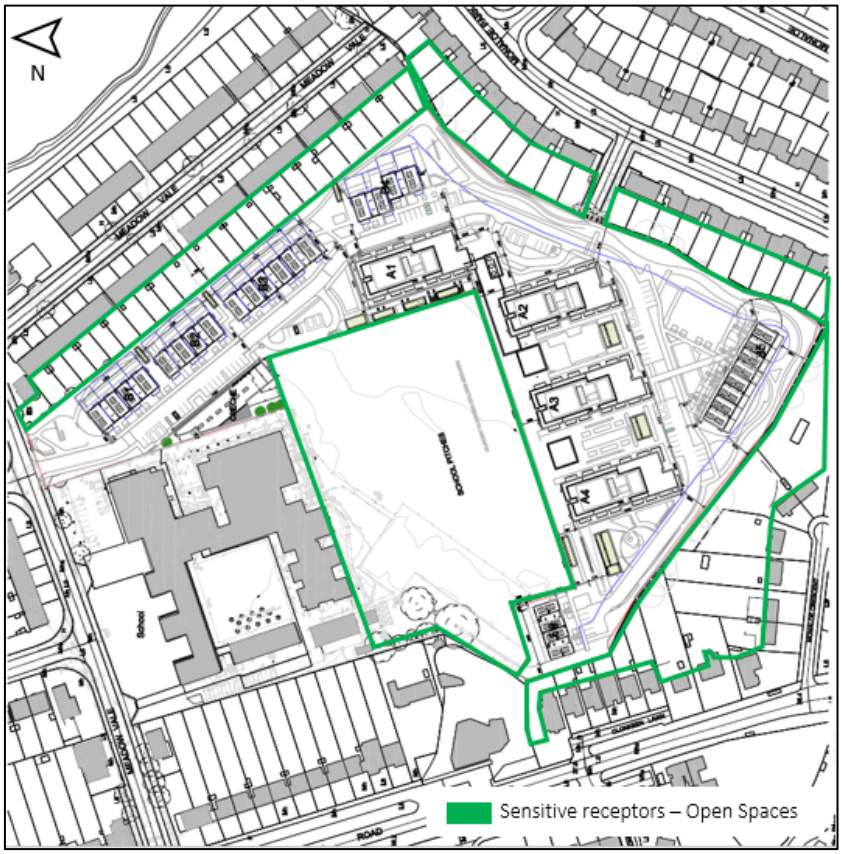

Figure 45 - Surrounding Sensitive Receptors - Open Spaces

The overshadowing impact on the surrounding gardens and the adjacent playing pitches has been analysed for the proposed scheme. The following overshadowing images illustrate the overshadowing impact on March, June and December 21st.

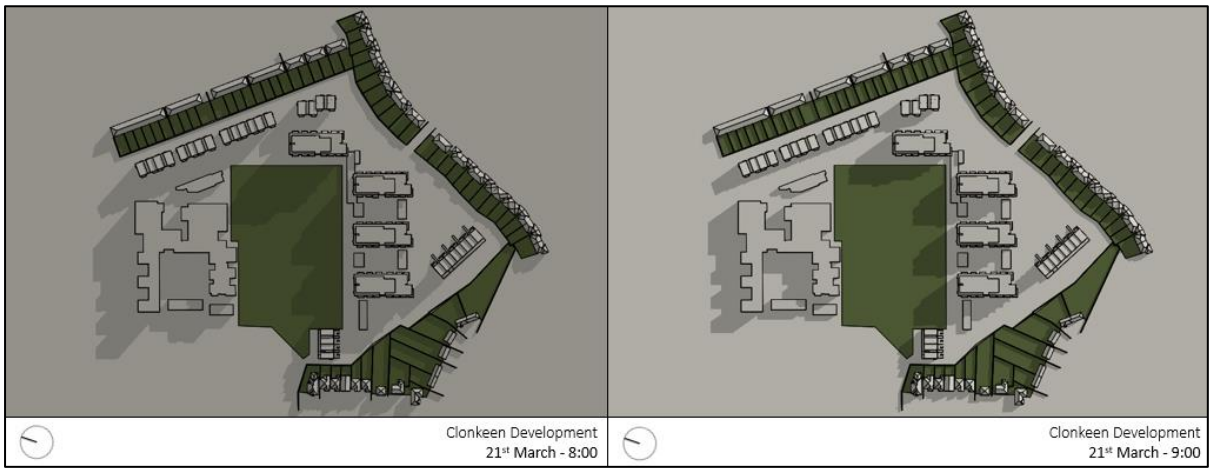

Figure 46 - Overshadowing Image on March 21st at 8 a.m. and 9 a.m.

Figure 47 - Overshadowing Image on March 21st at 10 a.m. and 11 a.m.

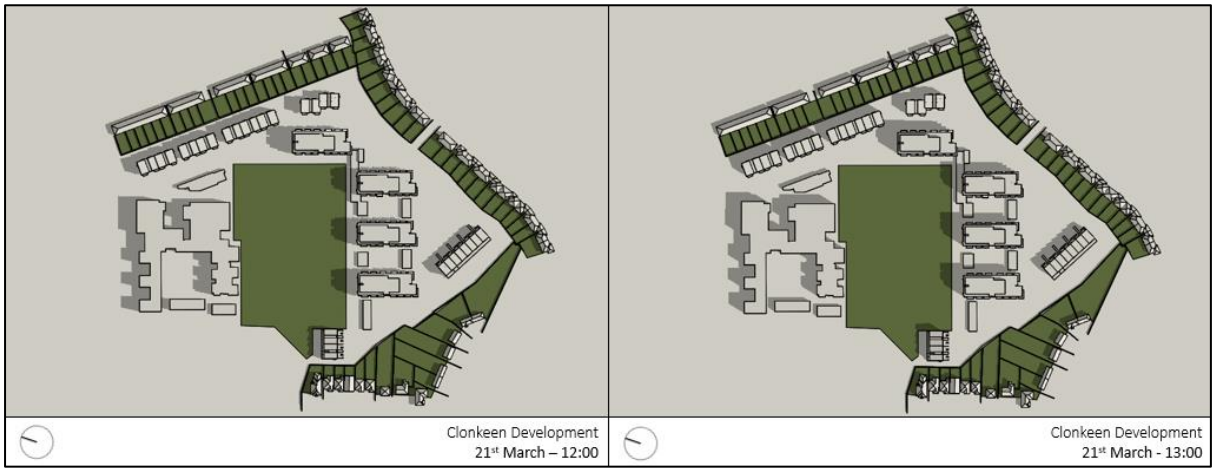

Figure 48 - Overshadowing Image on March 21st at 12 p.m. and 1 p.m.

Figure 49 - Overshadowing Image on March 21st at 2 p.m. and 3 p.m.

Figure 50 - Overshadowing Image on March 21st at 4 p.m. and 5 p.m.

Figure 51 - Overshadowing Image on June 21st at 7 a.m. and 8 a.m.

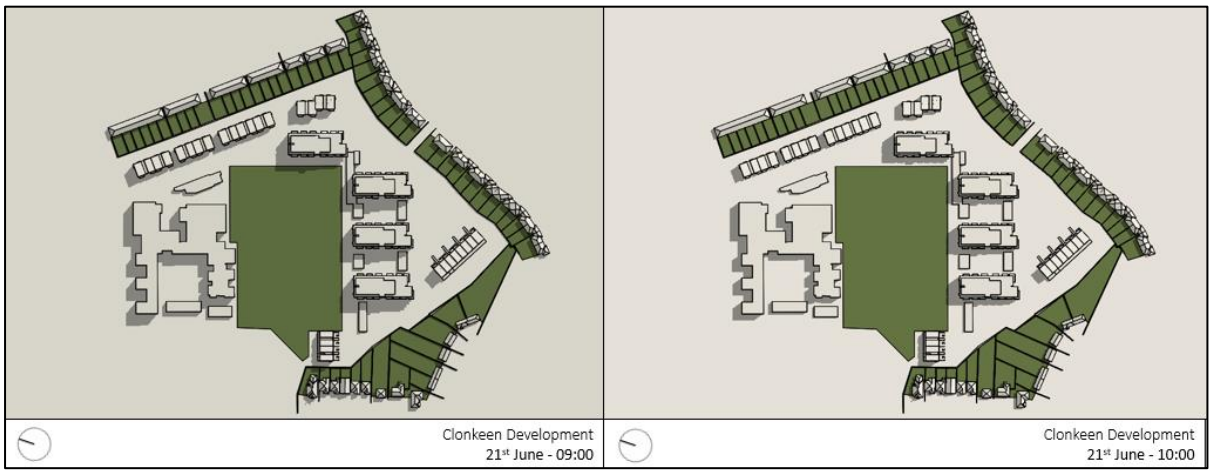

Figure 52 - Overshadowing Image on June 21st at 9 a.m. and 10 a.m.

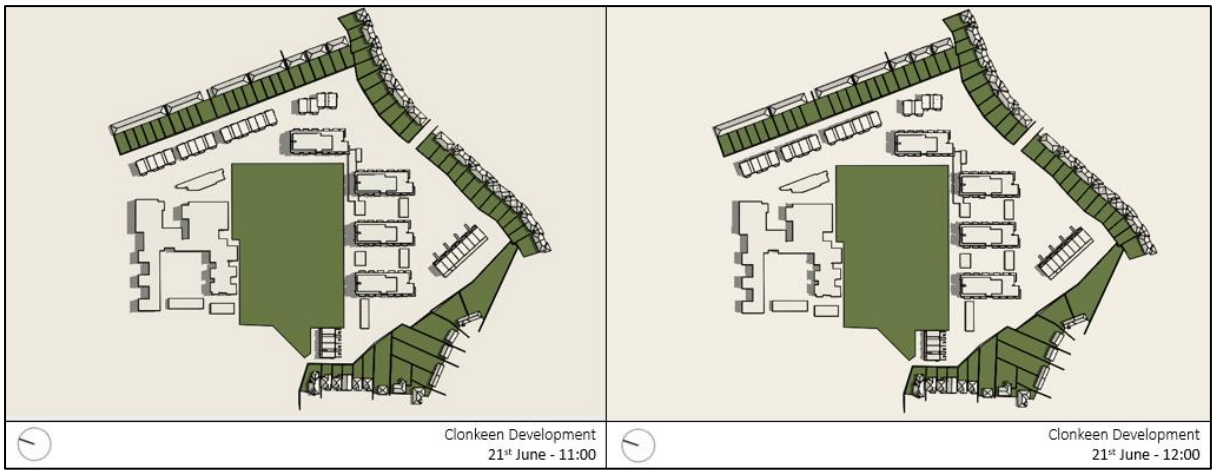

Figure 53 - Overshadowing Image on June 21st at 11 a.m. and 12 p.m.

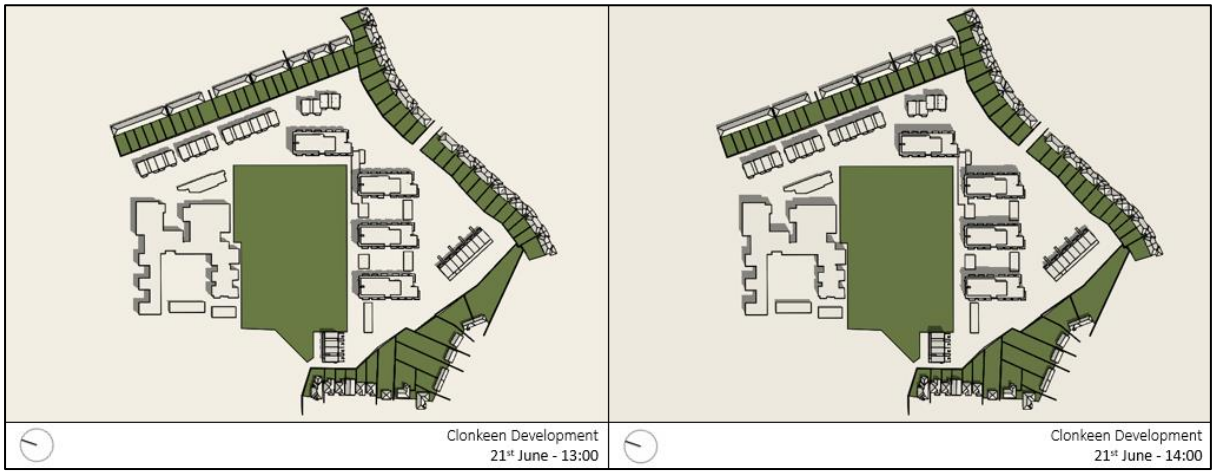

Figure 54 - Overshadowing Image on June 21st at 1 p.m. and 2 p.m.

Figure 55 - Overshadowing Image on June 21st at 3 p.m. and 4 p.m.

Figure 56 - Overshadowing Image on June 21st at 5 p.m. and 6 p.m.

Figure 57 - Overshadowing Image on June 21st at 7 p.m. and 8 p.m.

Figure 58 - Overshadowing Image on December 21st at 10 a.m. and 11 a.m.

Figure 59 - Overshadowing Image on December 21st at 12 p.m. and 1 p.m.

Figure 60 - Overshadowing Image on December 21st at 2 p.m. and 3 p.m.

The overshadowing images illustrate that there is a non significant impact on March 21st to some of the North East gardens after 3 p.m. and to the North playing pitches on the early morning. In order to demonstrate that excellent levels of sunlight are achieved even though there is a minor impact, further analysis was carried out.

The red squares in the following image, highlight the areas that receive a minimum of 2 hours of sunlight on the 21st of March. It is evident that all adjacent gardens and the surrounding playing pitches will continue to receive excellent levels of sunlight once the proposed development is built, with more than 50% of the area achieving at least 2 hours of sunlight on March 21st, in line with BRE Guidelines.

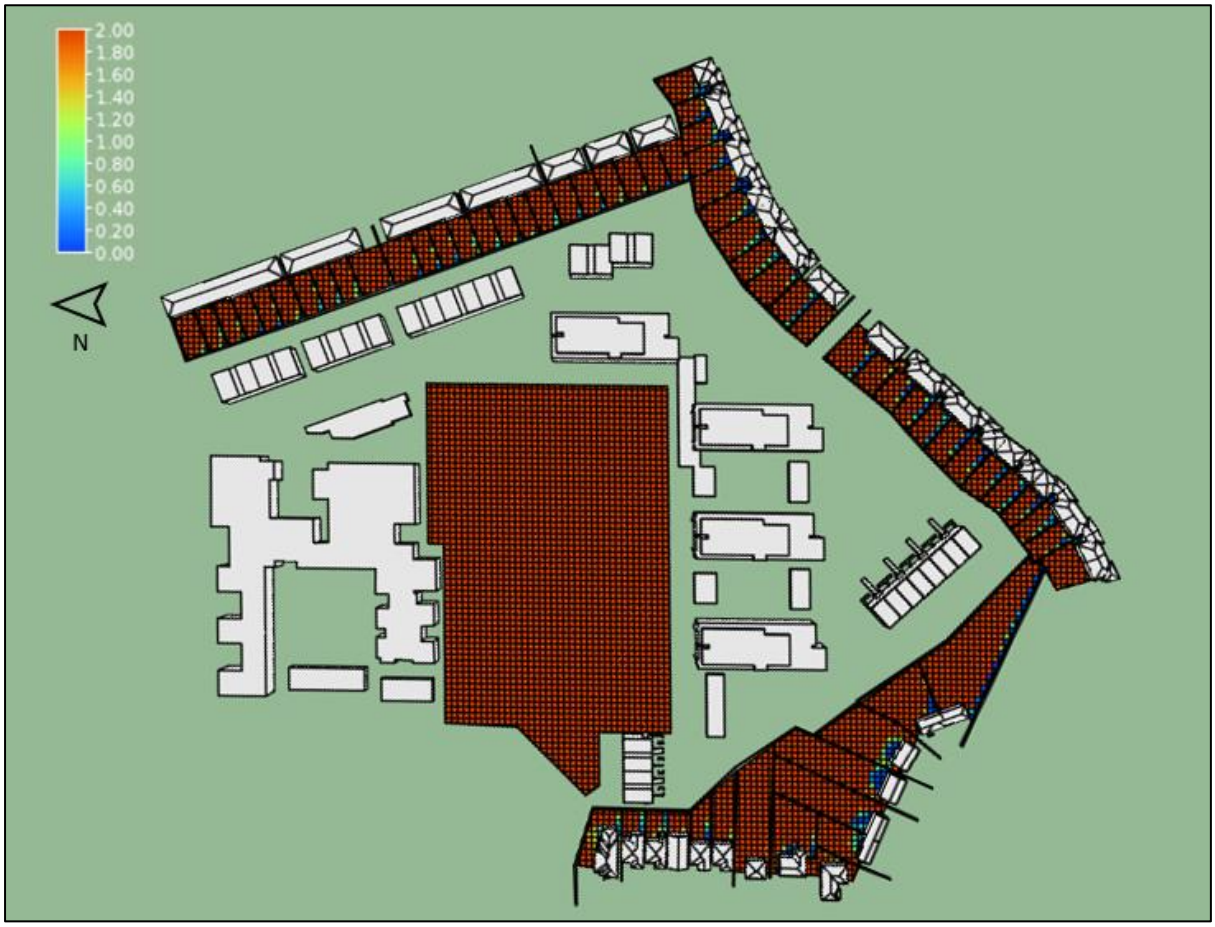

Figure 61 - Sunlight levels on March 21st

9.5. SUNLIGHT IMPACT TO SURROUNDING PROPERTIES (APSH)

In order to assess the sunlight access within the adjacent properties to the Clonkeen Development the Annual Probable Sunlight Hour (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 (a diagram explaining this is illustrated in Figure 62), then the sunlight 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, 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

Since BRE Guidelines outline that obstructions within 90° of due north of the existing windows are not required to be analysed, the properties selected for APSH analysis are those inside the 25° line located to the north of the proposed development. Sensitive receptors 1 and 2 do not fall inside the 25°line, however, since they are located to the North of the proposed development, they have been selected for APSH analysis.

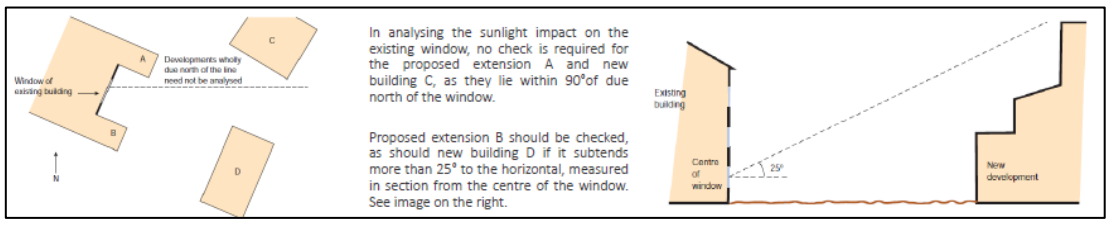

Figure 62 - APSH diagram to Selected Properties

As previously outlined, windows at lower levels have been modelled as they are considered to be the 'worst case'. The following image illustrates the windows selected for analysis and the results of the APSH assessment are outlined in the accompanying table.

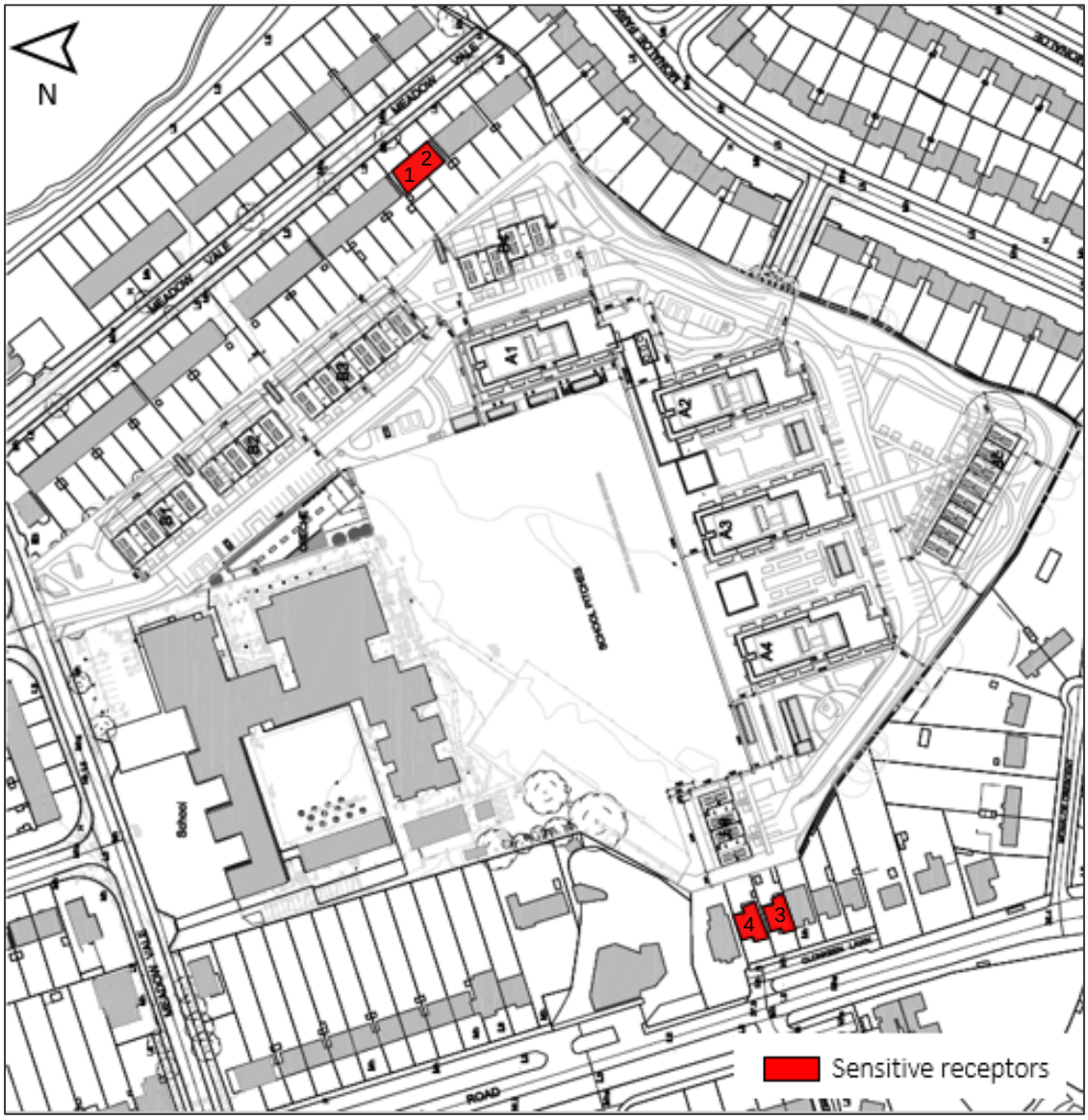

Figure 63 - Sensitive Receptors Reference – APSH Analysis

Sensitive Receptor Ref.	APSH (%) - Existing development		APSH (%) - Proposed development		Percentage of change from the permitted development (%)	
	Annual	Winter (Sep 21st – Mar 21st)	Annual	Winter (Sep 21st – Mar 21st)	Annual	Winter (Sep 21st – Mar 21st)
1	66	30	54	19	NA	NA
2	66	30	56	20	NA	NA
3	32	7	27	7	NA	NA
4	35	9	25	8	NA	NA

Table 35 – APSH Results

The APSH analysis has shown that the sensitive receptors selected for analysis are in compliance with BRE Guideline recommendations achieving more than 25% of APSH for the annual period and more than 5% for the winter period.

10. CONCLUSION

The proposed Clonkeen Development has been analysed in order to determine the following:

- The daylight levels within the living, kitchen and bedroom areas of selected apartments and duplexes, to give an indication of the expected daylight levels throughout the proposed development;
- The expected sunlight levels within the living areas and bedrooms 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;
- Any potential daylight or sunlight impact the proposed development may have on the adjacent playing pitches.

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 numerical guidelines these should be interpreted flexibly because natural lighting is only one of the many factors in site layout design"

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.

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 93.2% compliance rate across the proposed apartments.

Throughout the full development, comfortable and desirable spaces have been designed with floor to ceiling heights that enhance the opportunity for improved daylight levels and extensive glazing to every room enabling deep daylight penetration and providing enhanced views to a beautiful landscaped area.

Sunlight to proposed development amenity spaces

In terms of sunlight access, excellent levels of sunlight are experienced across the development. The communal amenity spaces provided to the apartment areas greatly exceeds 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 62% of the windows across the development achieve the recommended APSH values stated in the BRE Guidelines, while 77% of windows achieve the recommended values during the winter months, when sunlight is more valuable.

In order for the development to compensate for the shortfall in compliance in line with the Sustainable Urban Housing: Design Standards for New Apartments, an active landscape has been introduced within the design. The proposed landscape provides a series of open spaces which are connected by green corridors. Overall, the landscape masterplan provides an attractive green infrastructure, range of easily accessible amenities within open spaces which contributes to a healthy, secure and sustainable living environment.

Impact to neighbouring properties

The 25° line and VSC analysis have demonstrated that the proposed building has negligible daylight impact on any adjacent property.

The annual probable sunlight hour assessment has shown that all adjacent properties will achieve the minimum recommended BRE values after the proposed development is built. The assessment has shown that the 'worst case' adjacent properties selected for analysis achieve the minimum BRE Guideline recommendations, this demonstrates that excellent levels of APSH will be maintained within all adjacent properties.

The overshadowing assessment has shown that a non-significant impact will be perceived by some of the surrounding open spaces located to the North and North East. However, further analysis has demonstrated that excellent levels of sunlight will continue to be received in all the surrounding gardens and the playing pitches once the proposed development is built, in line with BRE Guidelines recommendations.

The proposed scheme ensures adequate daylight levels within the proposed development and to safeguard the daylight and sunlight levels within the adjacent properties and playing pitches. A massing reduction to the apartment blocks has been implemented from the previously submitted scheme.

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