Parkgate Street Blocks B1 & C

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Daylight and Sunlight Analysis – Planning Report

Prepared for

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1. Executive Summary

This report identifies the daylight and sunlight analysis undertaken by IN2 Engineering Design Partnership for the proposed development on Parkgate Street, Dublin. The report has been prepared as a desktop exercise, with 3D massing and survey information provided by others. No site visits took place, as the provided information included all the relevant required data, and our understanding is that any survey information or 3D models provided was carried out by suitably qualified professionals.

Various software programs were utilised in the analysis of the proposed development. These included:

- Radiance Lighting Software
- TAS by EDSL

The specific methodology for each relevant topic is detailed in the corresponding section in the body of this report, as identified below.

Analysis Type	Relevance	Assessment Methodology	Compliance Guidelines Targets	Reference section of this report
Sunlight	Proposed Development Amenity Spaces	Sunlight Hours	BRE Guide BR 209 (2022 Edition)	Section 4.0 – Site Sunlight and Shading
Sunlight	Existing Neighbouring Amenity Spaces	Sunlight Hours	BRE Guide BR 209 (2022 Edition)	Section 5.0 – Impact on Neighbouring Buildings
Daylight	Existing Neighbouring Buildings	Vertical Sky Component	BRE Guide BR 209 (2022 Edition)	Section 5.0 – Impact on Neighbouring Buildings
Sunlight	Existing Neighbouring Buildings	Annual Probable Sunlight Hours	BRE Guide BR 209 (2022 Edition)	Section 5.0 – Impact on Neighbouring Buildings
Daylight	Proposed Development	Spatial Daylight Autonomy	BRE Guide BR 209 (2022 Edition)	Section 6.0 – Internal Daylight Analysis
Sunlight	Proposed Development	Sunlight Exposure	BRE Guide BR 209 (2022 Edition)	Section 7.0 – Exposure to Sunlight

Section 2 introduces the various Guidelines and Standards utilised throughout the Daylight / Sunlight analysis. Section 3 is a glossary of common terms found in the report. The specific methodology for each relevant topic is detailed in the corresponding section in the body of this report, as identified below.

Section 4 outlines the results of the assessed amenity spaces of the proposed development in accordance with the BRE Guide. The proposed amenity spaces were predicted to receive excellent overall sunlight availability, as all spaces were determined to receive at least 2 hours of sunlight on March 21st, as per the recommendations.

The impact of the proposed development on neighbouring buildings is discussed in Section 5. The neighbouring buildings were assessed for both Vertical Sky Component (VSC), a measure of potential daylight, and Annual Probable Daylight Hours (APSH), a measure of direct sunlight. The proposed development has been assessed against the extant planning permission on the site. As the proposed development is the same mass as the permitted it was determined that there would be no additional impact on the neighbours against what was previously granted.

Section 6 includes daylight analysis that has been undertaken for the kitchen/living/dining (KLD), and bedroom spaces in assessed units.

All units were assessed for the Spatial Daylight Autonomy (SDA) methodology as detailed in the BRE Guide. 90% of the rooms for the full Parkgate development were found to be compliant for BRE Guide recommendation and detailed results are presented in Appendix E.

Section 7 included the results for the Exposure to Sunlight Analysis. This metric assesses the sunlight availability to each unit. The proposed development achieves a high compliance rate, with 87% of units exceeding the minimum recommendations. Detailed results are included in Appendix F.

Any space with was determined to be below the BRE targets have been identified and compensatory measures set out.

In summary, this report confirms that best practice Daylight and Sunlight availability has been ensured for the proposed development at Parkgate Street with no impact on the existing neighbouring environment.

Standards and Guidelines

2. Standards and Guidelines

The following standards and guidance documents have been consulted when compiling this report to ensure compliance with the various Daylight and Sunlight requirements as applicable and relevant:

a) Sustainable Urban Housing: Design Standards for New Apartments (2023 version) (the "2023 Apartment Guidelines"). These are guidelines issued under section 28 of the 2000 Planning and Development Act (as amended).

b) DCC Development Plan 2022 -2028

c) The Building Research Establishment's (BRE) Site Layout Planning for Daylight and Sunlight: A guide to good practice (BRE 209) 3rd edition/ 2022 edition, (the "BRE Guide").

d) British Standard BS EN 17037:2018 – Daylight in Buildings (the "2018 British EN Standard").

e) Irish Standard IS EN 17037:2018 (the "2018 Irish EN Standard").

f) Sustainable Residential and Compact Settlement Guideline for Planning Authorities 2024, section 5.3.7.

It should be noted at the outset that the 2008 British Standard has been superseded by the 2018 British Standard, and BRE Guide 2nd Edition has been superseded by BRE Guide 2022 edition. Both previous revisions have now been withdrawn.

European Standard EN 17037:2018, which was approved by the Comité Européen de Normalisation (CEN) on 29 July 2018 has been adopted in the UK as BS EN 17037:2018, and in Ireland as IS EN 17037:2018. The texts of the 2018 British Standard and the 2018 Irish Standard are the same, with one exception. The exception is that the 2018 British Standard contains an additional "National Annex" which specifically sets out requirements within dwellings, to ensure some similarity to the now superseded 2008 British Standard.

This report has been therefore carried out based on the guidance contained within the Building Research Establishment's (BRE) Site Layout Planning for Daylight and Sunlight: A guide to good practice (BRE 209) 3rd edition/ 2022 edition, (the "BRE Guide"). This document is specifically designed to facilitate good building design within the planning context and is referenced in the 2023 Apartment Guidelines. The BRE Guide clarifies and expands on the methodologies contained in IS EN 17037 and BS EN 17037 with specific relevance to residential buildings, and as such has been deemed to take precedence over these other documents.

The 2023 Apartment Guidelines state:

"6.5 The provision of acceptable levels of natural light in new apartment developments is an important planning consideration as it contributes to the liveability and amenity enjoyed by apartment residents. In assessing development proposals, planning authorities must however weigh up the overall quality of the design and layout of the scheme and the measures proposed to maximise daylight provision with the location of the site and the need to ensure an appropriate scale of urban residential development."

"6.6 Planning authorities should ensure appropriate expert advice and input where necessary, and have regard to quantitative performance approaches to daylight provision outlined in guides like A New European Standard for Daylighting in Buildings EN17037 or UK National Annex BS EN17037 and the associated BRE Guide 209 2022 Edition (June 2022), or any relevant future guidance specific to the Irish context, when undertaken by development proposers which offer the capability to satisfy minimum standards of daylight provision.."

"6.7 Where an applicant cannot fully meet all of the requirements of the daylight provisions above, this must be clearly identified and a rationale for any alternative, compensatory design solutions must be set out, which planning authorities should apply their discretion in accepting taking account of its assessment of specific. This may arise due to a design constraints 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 DCC Development Plan, Volume 2: Appendices 16: Sunlight and Daylight notes:

3.6 Understanding and Expectations

The planning authority understand that, at present, there is some ambiguity in what may be considered the appropriate standard to apply for daylight and sunlight assessments. There is a period of transition at present, during which BS 8206-2 has been superseded, but the relevant guidance within BR 209 has not yet been updated. Thus, both BS 8206-2 and BS EN 17037 have relevance.

As such, both for clarity and as an interim measure during this transition period, the planning authority will look to receive relevant metrics from BR 209, BS 8206-2 and BS EN 17037. ***If, over the coming years, a revised version of BR 209 is to be issued, the guidance within this new version will take precedence. (EMPHASIS ADDED)***

This report has been therefore carried out based on the guidance contained within the Building Research Establishment's (BRE) Site Layout Planning for Daylight and Sunlight: A guide to good practice (BRE 209) 3rd edition/ 2022 edition, (the "BRE Guide"). This document is specifically designed to facilitate good building design within the planning context and is referenced in the 2023 Apartment Guidelines. The BRE Guide clarifies and expands on the methodologies contained in IS EN 17037 and BS EN 17037 with specific relevance to residential buildings, and as such has been deemed to take precedence over these other documents.

The Document notes in 4.0 Relevant Metrics that "Where the text below is unclear or where there is ambiguity over a particular piece of information, the relevant standard and guidance document shall always take precedence." Therefore, "Section 5.0 Assessment Methodologies" for proposed development included in the plan have been superseded and correct methodologies are noted below:

5.1 Performance of the Proposed Development		**Correct Methodology as per BRE Guide 2022**
Annual Probable Sunlight Hours on all relevant windows	*Not an applicable metric for the proposed development as per BRE Guide (2022) instead Exposure to Sunlight assessment should be utilised.*	Exposure to Sunlight for each dwelling.
Winter Sunlight Hours on all relevant windows	*Not an applicable metric for the proposed development as per BRE Guide (2022) instead Exposure to Sunlight assessment should be utilised.*	Exposure to Sunlight for each dwelling.
Sunlight on Ground in all amenity spaces	*Correct Methodology*	Sunlight on Ground in all amenity spaces
Average Daylight Factor in all habitable rooms	*Not an applicable metric for the proposed development as per BRE Guide (2022)*	Spatial Daylight Autonomy (to achieve Target Illuminance) or Median Daylight Factor in all habitable rooms.
No Sky Line in all habitable rooms	*Not an applicable metric for the proposed development as per BRE Guide (2022)*	
Target Illuminance in all habitable rooms	*Spatial Daylight Autonomy (to achieve Target Illuminance) or Median Daylight Factor in all habitable rooms.*	

The methodologies for impact on neighbours remain unchanged.

The BRE Guide (2022 Edition)

The BRE Guide describes its purpose in the following terms in the "Summary" section (v):

"This guide gives advice on site layout planning to achieve good sunlighting and daylighting, both within buildings and in the open spaces between them. It is intended to be used in conjunction with the interior daylight recommendations for new buildings in the British Standard Daylight in buildings, BS EN 17037. It contains guidance on site layout to provide good natural lighting within a new development; safeguarding of daylight and sunlight within existing buildings nearby; and the protection of daylighting of adjoining land for future development."

The BRE Guide also notes that:

"1.6 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 than constrain the designer. Although it gives numerical guidelines, these should be interpreted flexibly since natural lighting is only one of many factors in site layout design (see Section 5). In special circumstances the developer or planning authority may wish to use different target values. For example, in a historic city centre, or in an area with modern high-rise buildings, a higher degree of obstruction may be unavoidable if new developments are to match the height and proportions of existing buildings. Alternatively, where natural light is of special importance, less obstruction and hence more sunlight and daylight may be deemed necessary. The calculation methods in Appendices A and B are entirely flexible in this respect. Appendix F gives advice on how to develop a consistent set of target values for skylight under such circumstances."

"1.7 The guidance here is intended for use in the United Kingdom and in the Republic of Ireland, though recommendations in the Irish Standard IS EN 17037 may vary from those in BS EN 17037. Many of the principles outlined will apply to other temperate climates. More specific guidance for other locations and climate types is given in BRE Report Environmental site layout planning."

Therefore, if the situation arises where the targets identified within the Guide are not achieved, these should be highlighted and either justified in the context of the development/site, or where relevant and applicable, compensatory measures will be proposed. However, the Guide does not impose absolute standards that must be achieved under all circumstances. In the context of this report, any deviations from the Guide's recommendations have, therefore, been identified, with an approach throughout to ensure that good quality daylight/sunlight is achieved through analysis and design improvements as far as practicable and viable, as detailed in the report as relevant.

The main sections in the guide that the assessments within this report will reference (as applicable) are:

1. Light from the Sky (Daylight).

    1.1. New Development – Within Appendix C of the BRE Guide, the targets for internal daylight are provided for both optional methodologies, Climate Based Daylight Modelling (CBDM) with targets provided for Lux levels as determined through Spatial Daylight Autonomy (SDA), and Daylight Sky analysis with targets provided for Median Daylight Factor (MDF), please refer to internal daylight methodology section for detailed explanation of the methods utilised in this report.

    1.2. Existing Buildings – The guide sets a quantitative assessment method for determining the impact of new developments on light from the sky (VSC) on existing neighbouring buildings.

2. Sunlighting – Based on site location, longitude and latitude, and solar azimuths. i.e. buildings south of a site will not be impacted for sunlight in the northern hemisphere.

    2.1. New Development – The guide sets a quantitative method for determining sunlight to a habitable room within a dwelling.

    2.2. Existing Buildings – The guide sets a quantitative assessment method for determining the impact of new developments on sunlight, annual probable sunlight hours (APSH) and winter probable sunlight hours (WPSH), on existing neighbouring buildings.

    2.3. Gardens and open spaces – The amenity criteria set out is used for both proposed new amenity and the impact on existing neighbouring amenities.

The specific methodology for each topic (as relevant) is detailed in the relevant section in the body of this report.

The 2018 British and Irish Versions of the EN Standards

The EN 17037:2018 standard—which is the basis of both the 2018 British EN Standard and the 2018 Irish EN Standard considers a metric based on median daylight, in order to ensure both extent and a degree of uniformity of daylight.

"A space is considered to provide adequate daylight if a target illuminance level is achieved across a fraction of the reference plane within a space for at least half of the daylight hours."

The BS EN 17037 standard varies from the IS EN 17037 standard as it contains a national annex developed by the Building Research Establishment (BRE) to specifically address daylight requirements in domestic dwellings. These requirements are further clarified in the BRE Guide, e.g.: the correct delineation of spaces allowing for the removal of corridor spaces attached to a room; the mandatory inclusion of kitchen spaces in combined living spaces; revised rational upper limits for surface reflectances; default framing factors; maintenance factors. None of which are specified in IS EN 17037, instead requiring, for example, daylight assessment on the ambiguously worded "at least on the required area of the space". Therefore, for domestic applications, the BRE Guide remains the most applicable document to utilise for daylight assessments.

The National Annex

As is noted above, the 2018 British Standard (BS EN 17037:2018) includes a "National Annex", containing "Further recommendations and data for daylight provision in the UK and Channel Islands". This is referenced further in the appendix of this report. As there is no equivalent in the 2018 Irish Standard, the 2018 British Standard National Annex will be referenced, which states:

"NA.1 Introduction: The UK committee supports the recommendations for daylight in buildings given in BS EN 17037:2018; however, it is the opinion of the UK committee that the recommendations for daylight provision in a space (see Clause A.2) may not be achievable for some buildings, particularly dwellings. The UK committee believes this could be the case for dwellings with basement rooms or those with significant external obstructions (for example, dwellings situated in a dense urban area or with tall trees outside), or for existing buildings being refurbished or converted into dwellings. This National Annex therefore provides the UK committee's guidance on minimum daylight provision in all UK dwellings."

NA.2 addresses minimum daylight provision in UK dwellings. It contains a table, in which target illuminance, ET (lx), levels are recommended for different room types. These are: bedroom at 100 lx; living room at 150 lx; and kitchen at 200 lx, which may be compared to EN 17037 (European standard including both BS EN 17037:2018 and IS EN 17037:2018)'s recommendation of 300 lux (irrespective of room application). The commentary is as follows:

"Even if a predominantly daylit appearance is not achievable for a room in a UK dwelling, the UK committee recommends that the target illuminance values given in Table NA.1 are exceeded over at least 50% of the points on a reference plane 0.85 m above the floor, for at least half of the daylight hours."

Sustainable Residential and Compact Settlement Guideline for Planning Authorities 2024 states:

"The provision of acceptable levels of daylight in new residential developments is an important planning consideration, in the interests of ensuring a high quality living environment for future residents. It is also important to safeguard against a detrimental impact on the amenity of other sensitive occupiers of adjacent properties.

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

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

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

Glossary

3. Glossary

Working Plane

The working plane is the notional plane where visual tasks, and on which predicted light levels would normally be undertaken. For a residential assessment, the working plane is defined by BRE Guide at 850mm above floor level.

Climate Based Daylight Modelling – Spatial Daylight Autonomy

Climate based daylight modelling, also referred to as CBDM, involves the use of a detailed daylight calculation methods where hourly (or sub-hourly) internal daylight illuminance values for a typical year are computed using hourly (or sub-hourly) sky and sun conditions derived from climate data appropriate to the site. CBDM assessments are therefore orientation dependent: i.e. a south facing window would be expected to receive more daylight than north facing etc.

This calculation method determines daylight provision directly from simulated illuminance values on the working plane with results determined in lux (a measure of light). CBDM is utilised for compliance with EN 17037 method 2 Spatial Daylight Autonomy (SDA).

Sunlight Exposure

Sunlight exposure is assessed on a window of at least one habitable room per dwelling (preferably a living room) for the number of hours of direct sunlight exposure on the 21st March.

Probable Sunlight Hours

Annual probable sunlight hours and winter probable sunlight hours, also referred to as APSH and WPSH, are used for the assessment of impact on neighbouring buildings by a proposed development. APSH and WPSH are a measure of probable direct sunlight to a window or surface and therefore are only relevant to windows within 90 degrees of south for buildings in the northern hemisphere. Therefore, any window with a northerly aspect (i.e. orientated between North and East and North and West) is therefore not assessed within the methodology.

Vertical Sky Component

Vertical Sky Component, also referred to as VSC, is used for the assessment of impact on neighbouring buildings by a proposed development with respect to daylight availability. VSC is a measure of the percentage of illuminance that a point can receive from the CIE Overcast Sky as a percentage of that received at unobstructed horizontal locations. In simple terms, how much of the sky that can be seen for a given point. VSC assessments do not included reflected light. VSC is calculated for compliance with BRE Guide.

Amenity Sunlight

Amenity sunlight is a measure of direct daylight received on an area over the duration of 21st March based on the sun's solar position for a geographical location. As the 21st March is the solar equinox, the sun is at its mid-point of travel position through the year, therefore representing an average condition throughout the year of how well sunlit an amenity space will be. It may be noted that in the Northern Hemisphere, the sun rises due east and sets due west. Amenity sunlight is calculated for compliance with BRE Guide.

Sunlight and Shading

4. Site Sunlight and Shading

4.1 Methodology

The BRE Site Layout Planning for Daylight and Sunlight Design Guide 209 (BRE Guide) provides guidance with regards to sunlighting and shading to external Amenity spaces within proposed developments.

The guidance recommends:

"That for it to appear adequately sunlit throughout the year, at least half of a garden or amenity area should receive at least two hours of sunlight on 21st March".

The methodology assesses sunlight performance at the Equinox, as this is the mid solar position throughout the year (as illustrated in Figure 4.1.1), with compliance indicative of spaces that will receive adequate sunlight and appealing useful spaces, including that the following attributes will be achieved as identified in BRE Guide:

- Provide attractive sunlit views (all year)
- Make Outdoor Activities like sitting out and children's play more pleasant (mainly warmer months).
- Encourage plant growth (mainly spring and summer).
- Dry out the ground, reducing moss and slime (mainly in colder months).

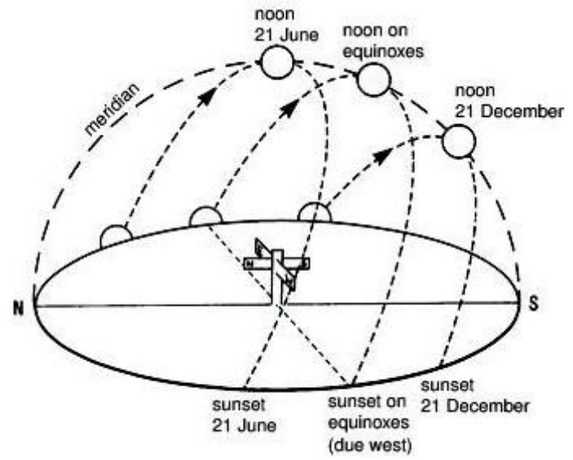


Fig 4.1.1 - Solar Position Throughout the Year

4.2 Results

Figures 4.2.1 and 4.2.2 illustrate that all amenity spaces were found to be compliant with the BRE Guide. Every proposed amenity space receives at least 2 hours of direct sunlight on March 21st. Green contours indicate areas that receive at least 2 hours of sunlight on March 21st, while darker contours indicate some degree of overshadowing.

Fig 4.2.1 – Ground Floor Amenity

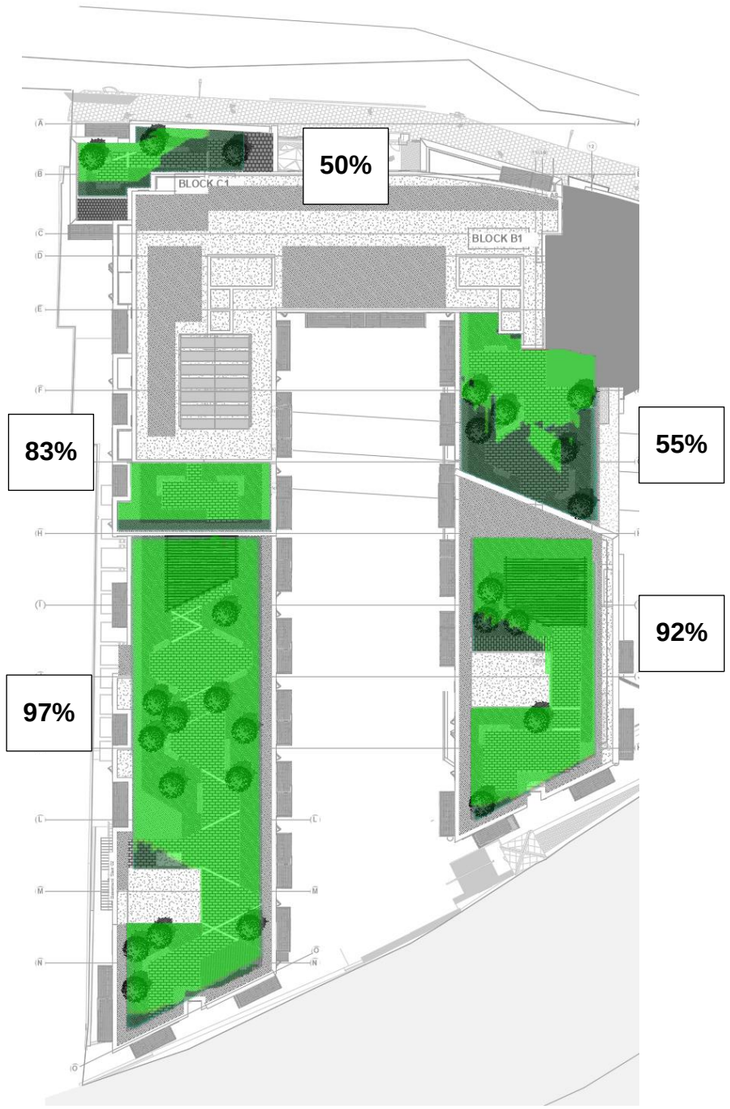


Fig 4.2.1 – Roof Top Amenity

Impact on Neighbouring Buildings

5. Impact on Neighbouring Buildings

5.1 Guidance

As set out within the introduction, the impact on existing buildings can be assessed utilising quantitative assessment method as detailed in the BRE Guide "Site Layout Planning for Daylight and Sunlight – A guide to good Practice (2022 Edition)".

BRE Guidelines state:

Light from the Sky

"If any part of a new building or extension, measured in a vertical section perpendicular to a main window wall of an existing building, from the centre of the lowest window, subtends an angle of more than 25° to the horizontal, then the diffuse daylighting of the existing building may be adversely affected. This will be the case if either:

- *the VSC measured at the centre of an existing main window is less than 27%, and less than 0.80 times its former value"*

The analysis is based on measuring the VSC (Vertical Sky Component) at the existing main windows. As per the BRE Guide, main windows included, living rooms, kitchens, and bedrooms. Existing windows with VSC above 27% after proposed development are considered to still receive good daylight availability and therefore not adversely affected.

Sunlighting

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

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

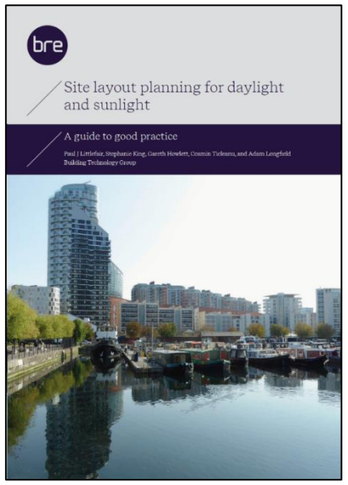


Fig 5.1.1 – BRE publication "Site Layout Planning for Daylight and Sunlight – A guide to good practice (Third Edition)

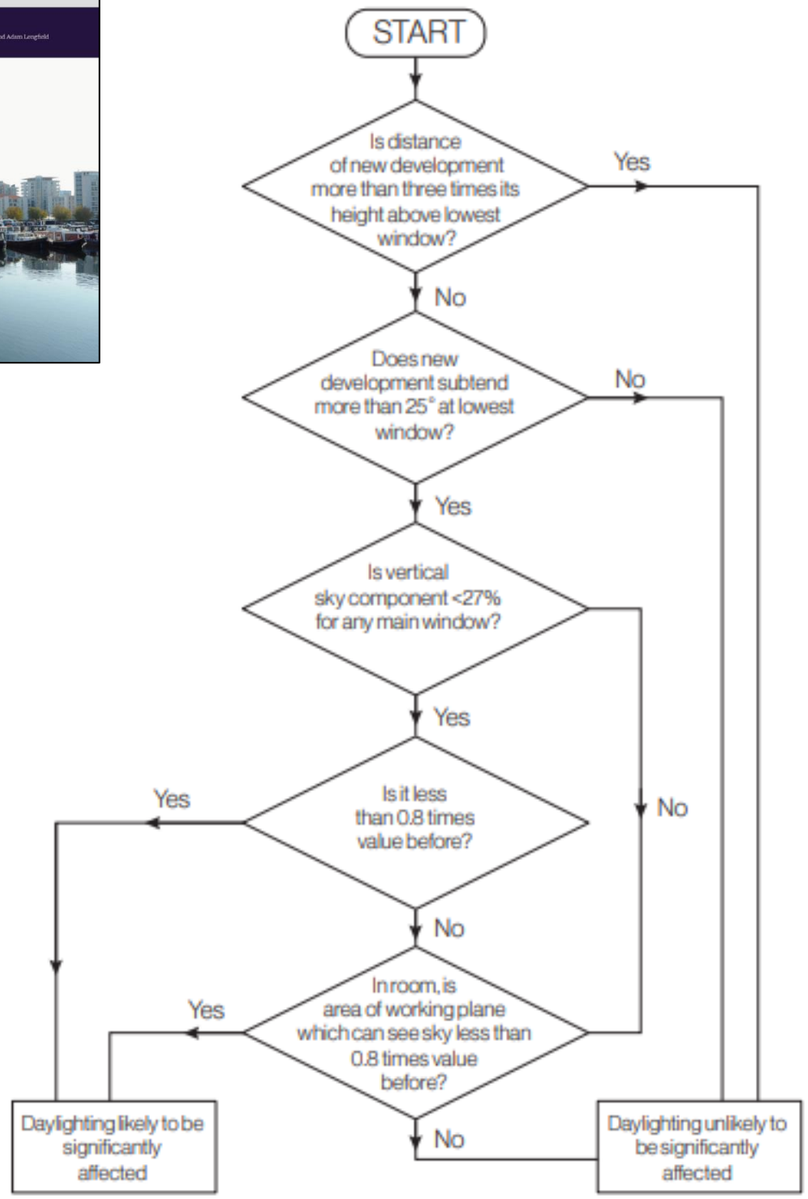


Fig 5.1.2 – BRE publication "Site Layout Planning for Daylight and Sunlight – A guide to good practice (Third Edition) Decision Chart

5.2 Methodology

The analysis therefore looked at existing windows for both daylight and sunlight.

The following neighbouring buildings were assessed.

- Montpelier Hill (as indicated)

Analysis was undertaken by calculating sunlight availability for the previously permitted scheme versus the proposed development for window locations façade of each dwelling as illustrated in Figure 5.2.1 below. It can be noted from the google maps image that the existing mature trees would have significant impact on the daylight and sunlight to the dwellings on Montpelier Hill, however, for the purpose of the analysis these trees have been excluded from this assessment as per BRE guide recommendations.

Fig 5.2.1 – Google Maps Image for Neighboring Dwellings on Montpelier Hill

5.3 Results – VSC (Daylight) to Neighbouring Dwellings

The below tables present the VSC results for all neighbouring dwellings analysed against the Permitted scheme as the baseline condition. The assessment is based on the following criteria:

- **Improved**: if the proposed development provides higher daylighting against the permitted development building.
- **None:** If there is no change in daylighting availability.
- **Negligible:** if the impact of the permitted development building vs the proposed (with amended block B2) is between 0.95-1.
- **Minor:** if the impact of the permitted development building vs the proposed (with amended block B2) is between 0.95 – 0.80.
- **Moderate:** if the impact of the permitted development building vs the proposed (with amended block B2) is between 0.80 – 0.50.
- **Major Adverse:** if the impact of the permitted development building vs the proposed (with amended block B2) is below 0.5.

The analysis indicated that all existing residences on Montpelier Hill assessed for daylight impact were found to achieve full compliance with BRE recommendations, as VSC values were predicted to be either remain above 27% and or any reduction was less than 20%. These dwellings would therefore not be adversely affected by the proposed development in terms of receipt of natural light.

Room Ref	VSC Permitted (%)	VSC Proposed (%)	Propsed/ Permitted (%)	Criterion 1 VSC Permitted < 27%	Criterion 1 VSC Proposed < 27%	Impact
Mount 28	28.2	28.2	1.00	No	No	None
Mount 30	25.1	25.1	1.00	No	No	None
Mount 32	27.9	27.8	1.00	No	No	None
Mount 34	23.5	23.5	1.00	No	No	None
Mount 36	27.9	27.9	1.00	No	No	None
Mount 38	27.9	27.9	1.00	No	No	None
Mount 40	26.8	26.8	1.00	No	No	None
Mount 42	26.9	26.9	1.00	No	No	None
Mount 44	24.6	24.6	1.00	No	No	None
Mount 46	28.1	28.1	1.00	No	No	None
Mount 48	27.5	27.5	1.00	No	No	None
Mount 50	29.0	29.0	1.00	No	No	None
Mount 52	25.7	25.7	1.00	No	No	None
Mount 54	18.4	18.4	1.00	No	No	None

Fig 5.3.1 – Predicted VSC Results

5.4 Results - Sunlight

Mount 28	76	76	1	21	21	1	1277	51	0	Yes	Yes	Yes	**Pass**
Mount 30	65	65	1	16	16	1	1277	51	0	Yes	Yes	Yes	**Pass**
Mount 32	79	79	1	23	23	1	1277	51	0	Yes	Yes	Yes	**Pass**
Mount 34	59	59	1	17	17	1	1277	51	0	Yes	Yes	Yes	**Pass**
Mount 36	71	71	1	22	22	1	1277	51	0	Yes	Yes	Yes	**Pass**
Mount 38	80	80	1	25	25	1	1277	51	0	Yes	Yes	Yes	**Pass**
Mount 40	71	71	1	24	24	1	1277	51	0	Yes	Yes	Yes	**Pass**
Mount 42	76	76	1	21	21	1	1277	51	0	Yes	Yes	Yes	**Pass**
Mount 44	63	63	1	14	14	1	1277	51	0	Yes	Yes	Yes	**Pass**
Mount 46	82	82	1	26	26	1	1277	51	0	Yes	Yes	Yes	**Pass**
Mount 48	77	77	1	25	25	1	1277	51	0	Yes	Yes	Yes	**Pass**
Mount 50	78	78	1	25	25	1	1277	51	0	Yes	Yes	Yes	**Pass**
Mount 52	64	64	1	20	20	1	1277	51	0	Yes	Yes	Yes	**Pass**
Mount 54	48	48	1	11	11	1	1277	51	0	Yes	Yes	Yes	**Pass**

Fig 5.4.1 – Predicted ASHP Results

Similarly, analysis undertaken for sunlight availability determined BRE compliance with regards to all existing dwellings assessed on Montpelier Hill, confirming their currently received sunlight would not be adversely affected by the proposed development.

Internal Daylight Analysis

6. Internal Daylight Analysis

6.1 Spatial Daylight Autonomy Methodology

Spatial Daylight Autonomy (SDA), method 2 EN17037, has been utilised for the assessment of internal daylight for the proposed development as it determines a more accurate result for building orientation and location as detailed in BRE Guide. These guidelines and standards have been outlined in Section 2.0.

The methodology utilises historic climate data (Dublin IWEC file 039690 was used for this assessment) predicting internal illumination due to natural light on an hour-by-hour basis, accounting for not only diffuse skylight but also the direct sunlight element. SDA results will differ for façade orientation, with those elevations with southerly aspect (correctly) being deemed to receive more daylight.

Fig 6.1.1 indicates overall compliance comparison, with green contours illustrating where daylight was predicted to achieve 100 Lux for bedroom 150 Lux for Livingroom and 200 Lux for KLD and Kitchen. These are the illuminance recommendations for dwellings included in Section C16 of the BRE Guide 2022 edition, based on BS.EN.17037:2018. Compliance for a room is then defined in the BRE Guide if at least 50% of the room achieves this target.

The daylighting models were calculated based on the following assumptions regarding transmittance and reflectance (as prescribed in the BRE Guide):

- Glazing Transmission = 68% with maintenance factor of 96%
- Ceilings: 80% reflectance
- Walls: 70% reflectance
- Floors: 40% reflectance

The daylight analysis accounted for all aspects that can potentially restrict natural light availability including any adjacent / opposing buildings, along with explicitly modelling typical Building Details as exampled in Figure 6.1.2 such as balcony structures, window frames, reveal and cill depth etc. in accordance with the architectural design. As the window frames have been explicitly modelled there is no requirement to include framing factors as prescribed in the BRE Guide.
Daylight Factors for each space were then calculated for a working plane height of 0.85m on a 0.25 x 0.25m grid basis and a wall offset of 0.3m (as defined in the BRE Guide) to enable a detailed calculation within each room (Figure 6.1.3), the median of which was then determined the space compliance.

Fig 6.1.1 –Daylight Analysis Results

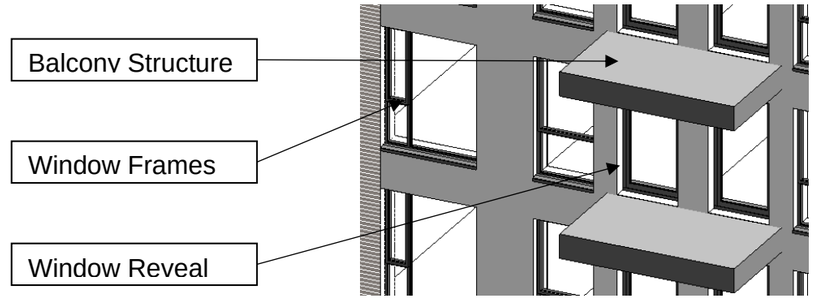


Fig 6.1.2 – Building Details included within Daylight Analysis (Sample)

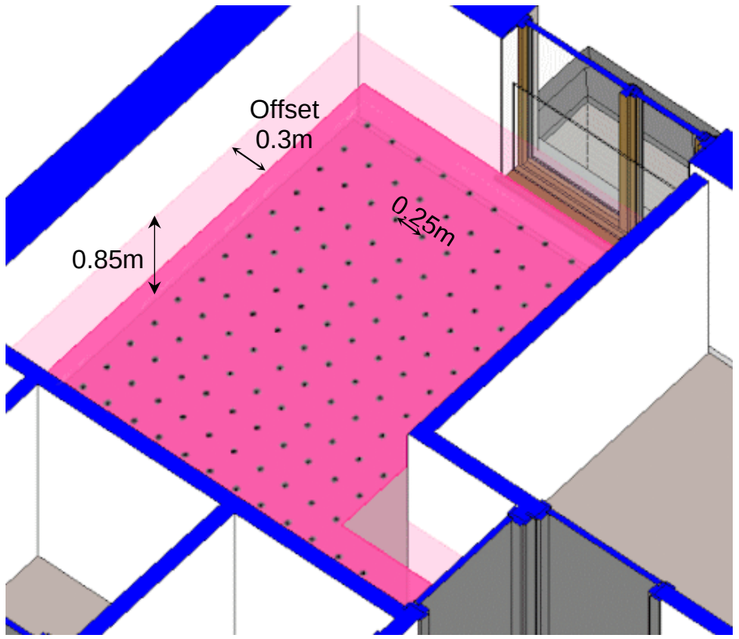


Fig 6.1.3 Calculating working plane

6.1 Spatial Daylight Autonomy Methodology (Cont'd)

The rooms have been assessed to the minimum areas as prescribed in the 2023 Apartment Guidelines, Fig 6.1.4 taking consideration for the notes in the BRE Guide which stipulate:

"Where a room has a shared use, the highest target should apply. For example in a bed sitting room in student accommodation, the value for a living room should be used if students would often spend time in their rooms during the day. Local authorities could use discretion here. For example, the target for a living room could be used for a combined living/dining/kitchen area if the kitchens are not treated as habitable spaces, as it may avoid small separate kitchens in a design. ***The kitchen space would still need to be included in the assessment area*** *" (****Emphasis added****)*

BRE Guide provides additional guidance on room definitions, identifying that corridors/ annexed entrances can be excluded from the assessment area as illustrated in Fig. 6.1.5.

Fig 6.1.6 illustrates an example of how the above has been interpreted to define areas of assessment (highlighted green). The blue highlighted area represents the excluded areas of the aforementioned corridor space. The assessment area is defined, ensuring:

- Minimum required room area as defined in Apartment Guidelines (i.e., min. 30m2 for 2bedroom 4 persons Apartment KLD).
- Inclusion of kitchen area within KLD (i.e. assessment to rear of room).
- Exclusion of circulation/ annexed entrances (i.e., adjacent to doors illustrated).

Minimum aggregate floor areas for living/dining/kitchen rooms, and minimum widths for the main living/dining rooms

Apartment type ***	Width of living/dining room	Aggregate floor area of living / dining / kitchen area*
Studio	4m**	30 sq m**
One bedroom	3.3 m	23 sq m
Two bedrooms (3 person)	3.6m	28 sq m
Two bedrooms (4 person)	3.6 m	30 sq m
Three bedrooms	3.8 m	34 sq m

** Note: An enclosed (separate) kitchen should have a minimum floor area of 6.5 sq. metres*
***Note: Combined living/dining/bed space, also includes circulation*
**** Note: Variation of up to 5% can be applied to room areas and widths subject to overall compliance with required minimum overall apartment floor areas.*

Fig 6.1.4 – Apartment Guidelines – Minimum Room Sizes

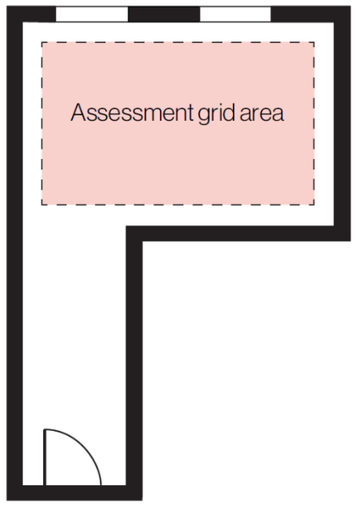


Fig 6.1.5 – BRE Guide Figure C3 – Assessment Area excluding Corridor

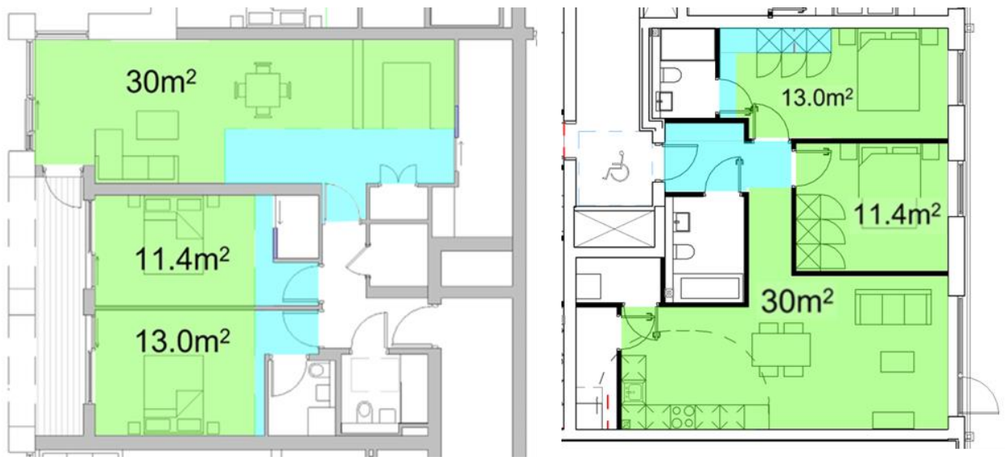
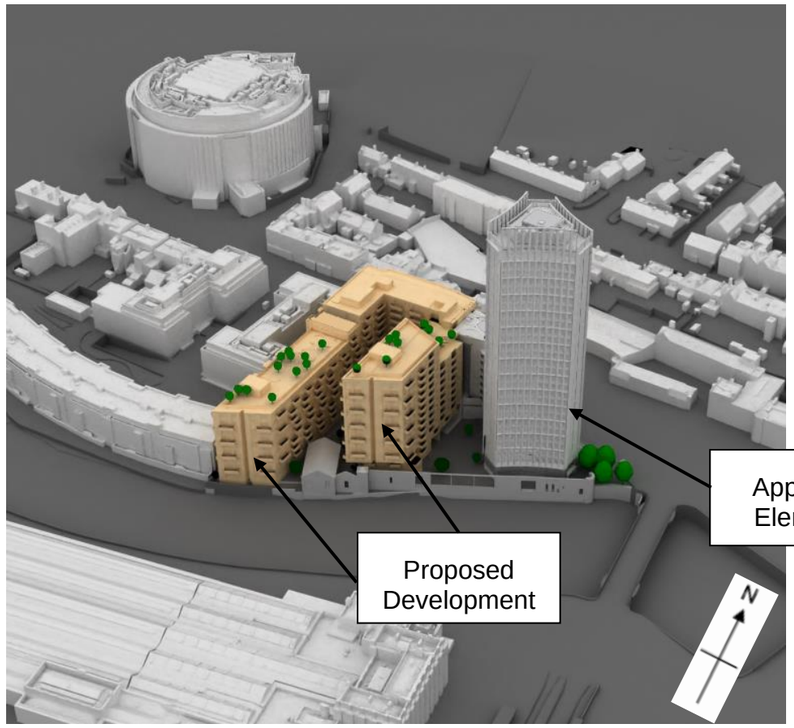


Fig 6.1.6 – Assessment Space Delineation

6.2 Results – Summary

The table below provide a breakdown of compliance rates for each room based on Spatial Daylight Autonomy (SDA) based on the full Parkgate development. The overall scheme was determined to be 90% compliant with the methodology utilised. Detailed results are included in Appendix E.

Level	No. of Rooms		
	Pass	Fail	Total
0	21	8	29
Mezz	46	19	65
1	52	24	76
2	63	18	81
3	66	15	81
4	69	12	81
5	67	14	81
6	71	10	81
7	72	4	76
8	51	1	52
9	37	0	37
10	15	0	15
11	15	0	15
Tower	425	0	425
B2	118	2	120
Total	1188	127	1315
	90%		



6.3 Compensatory Measures

The 2023 Apartment Guidelines state the following:

"[6.7] Where an applicant cannot fully meet all of the requirements of the daylight provisions above, this must be clearly identified and a rationale for any alternative, compensatory design solutions must be set out, which planning authorities should apply their discretion in accepting taking account of its assessment of specific. This may arise due to a design constraints 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."

Compensatory Design Solutions

The compensatory measures look to determine a balance between the spaces with reduced sunlight by identifying how other metrics for daylight and/or the unit's aspects can compensate for this reduced sunlight.

1. Daylight Adjacency

In cases where a room falls below the target, another room within the unit was found to be comfortably compliant for daylight. Therefore, despite the unit being slightly below the daylight target, each of these units has well daylit rooms.

2. ETS

In the case where a room falls below the target space is compensated by a high level of ETS (more than 3 hours).

3. Communal Open Space

Compensatory measures have been provided outside of the individual units with a large portion of the site being landscaped for communal open space. The proposed development includes the provision of a large quantum of communal open space.

4. Winter Garden

Some KLD's with below target SDA values have the compensatory measure of a winter garden. These winter gardens were determined to be full daylit and have the added advantage of being a sheltered space that can capture the aspect over the Phoenix Park.

5. Aspect

Some units with lower SDA results have the benefit of positive aspects onlooking the Pheonix Park or into the communal amenity space.

6. Location

The scheme location is of high benefit due to both it's proximity to the Pheonix Park and it's location a major transport node at Heuston Station.

Sunlight Analysis

7. Sunlight Analysis

7.1 Exposure to Sunlight

The BRE Guide outlines that:

"3.1.15 In general a dwelling, or non-domestic building that has a particular requirement for sunlight, will appear reasonably sunlit provided:

- *at least one main window wall faces within 90° of due south and*
- *a habitable room, preferably a main living room, can receive a total of at least 1.5 hours of sunlight on 21 March. This is assessed at the inside centre of the window(s); sunlight received by different windows can be added provided they occur at different times and sunlight hours are not double counted."*

As with Sunlight Amenity, the BRE Guide methodology therefore utilises the Equinox as being representative of the solar mid-position throughout the year, with the calculation of potential received sunlight during that day enabling a quantitative assessment in addition to idealised configuration of ensuring southerly aspect – preferably for living areas as described below:

"3.1.16 Where groups of dwellings are planned, site layout design should aim to maximise the number of dwellings with a main living room that meets the above recommendations."

The guide further notes that:

"3.1.10 For interiors, access to sunlight can be quantified. BS EN 17037[1] recommends that a space should receive a minimum of 1.5 hours of direct sunlight on a selected date between 1 February and 21 March with cloudless conditions. It is suggested that 21 March (equinox) be used. The medium level of recommendation is three hours and the high level of recommendation four hours. For dwellings, at least one habitable room, preferably a main living room, should meet at least the minimum criterion."

An analysis was undertaken for assessed units of the proposed development to assess the exposure to sunlight that each unit can receive, assessing initially KLD's and where these were found to be non-compliant, a check was undertaken to determine whether a Bedroom could achieve adequate sunlight in accordance with the methodology. It may be noted therefore that the tables and diagrams below indicate compliance for Exposure to Sunlight based on assessment of units as opposed to individual rooms, as is the case for Daylight analysis.

Figure 7.1.1 below is an example of how the results are illustrated, as presented within the report to indicate their Exposure to Sunlight classification in accordance with BRE Guide/ EN.17037 may be interpreted as follows:

Exposure to Sunlight			
Compliant		High	≥ 4.0 hrs
		Medium	3.0 – 4.0 hrs
		Minimum	1.5 – 3.0 hrs
Non-Compliant		Low	< 1.5 hrs

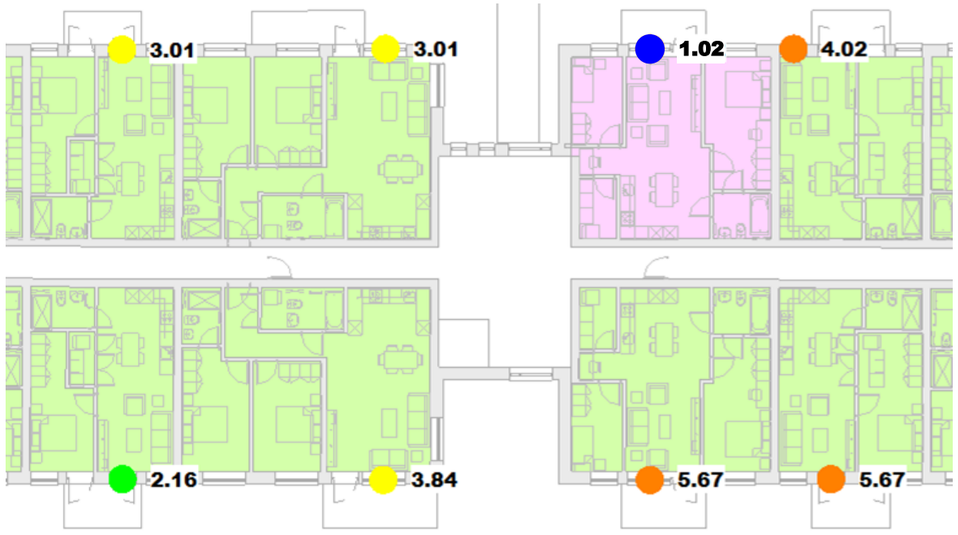


Fig 6.1.1 – Exposure to Sunlight Results – Example

In the example above, most KLD were determined to receive Medium to High range of Exposure to Sunlight, one unit was determined non-compliant and identified in pink.

7.2 Results – Summary

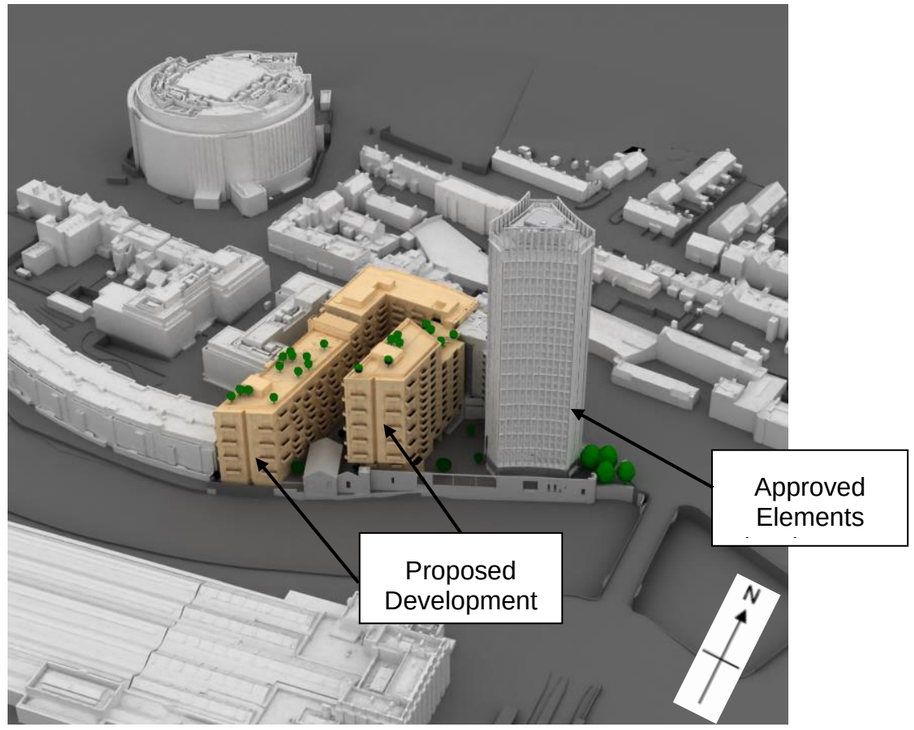
The table below gives a breakdown of compliance rates for the proposed scheme based on Exposure to Sunlight (ETS) and an overall ETS.

ETS was assessed for each unit, and the tables are presenting the number of units per floor.

It was determined that 87% of the assessed units were found to be compliant for the BRE Guide recommended sunlight hours.

Detailed results for exposure to sunlight analysis for each unit are provided in Appendix F.

Level	No. of Units		
	Pass	Fail	Total
0	6	5	11
Mezz	18	9	27
1	22	10	32
2	24	10	34
3	27	7	34
4	28	6	34
5	20	14	34
6	28	6	34
7	31	2	33
8	20	2	22
9	13	2	15
10	6	0	6
11	6	0	6
Tower	199	0	199
B2	38	2	40
Total	486	75	561
	87%		



7.3 Compensatory Measures

The 2023 Apartment Guidelines state the following:

"[6.7] Where an applicant cannot fully meet all of the requirements of the daylight provisions above, this must be clearly identified and a rationale for any alternative, compensatory design solutions must be set out, which planning authorities should apply their discretion in accepting taking account of its assessment of specific. This may arise due to a design constraints 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."

Compensatory Design Solutions

The compensatory measures look to determine a balance between the spaces with reduced sunlight by identifying how other metrics for daylight and/or the unit's aspects can compensate for this reduced sunlight.

1. Daylight

In cases where a unit falls below the target, rooms within the unit were found to be comfortably compliant for daylight. Therefore, despite the unit being slightly below the sunlight target, each of these units has well daylit rooms.

2. Communal Open Space

Compensatory measures have been provided outside of the individual units with a large portion of the site being landscaped for communal open space. The proposed development includes the provision of a large quantum of communal open space.

3. Winter Garden

Some KLD's with below target ETS values have the compensatory measure of a winter garden. These winter gardens were determined to be full daylit and have the added advantage of being a sheltered space that can capture the aspect over the Phoenix Park.

4. Aspect

Some units with lower SDA results have the benefit of positive aspects onlooking the Pheonix Park or into the communal amenity space.

5. Location

The scheme location is of high benefit due to both it's proximity to the Pheonix Park and it's location a major transport node at Heuston Station.

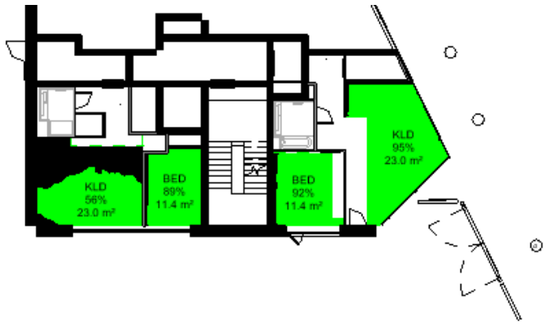
Appendix E – SDA (Spatial Daylight Autonomy) Results

Results – SDA: Ground Floor

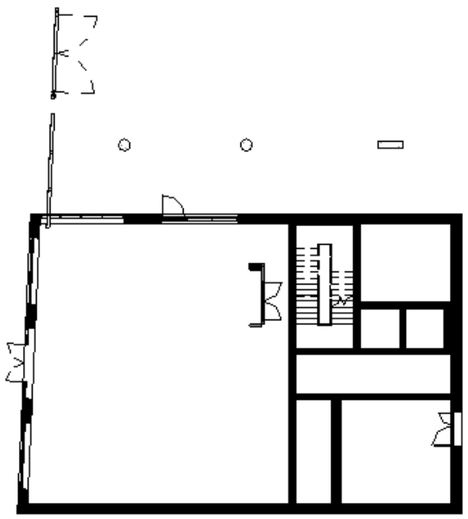
Daylight analysis results are illustrated below with green shaded area receiving targeted illuminance, 200Lux for KLDs, 150Lux for Living room, and 100Lux for Bedrooms. Black shade is showing area where it's receiving less than targeted illuminance. A space is deemed compliant where >50% of areas achieve target illuminance.

21 of the 29 rooms were determined to be compliant for SDA for this floor.

1, 3, 6



1, 3, 6



3, 6

3, 6

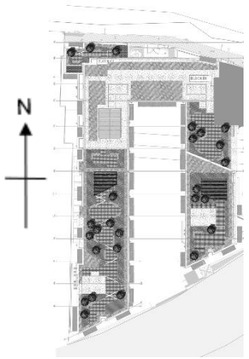
1, 3, 6

1, 3, 6

1, 3, 6

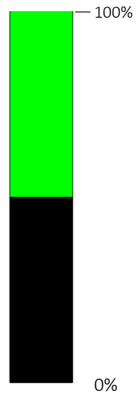
Compensatory Measures:

1 Daylight Adjacency
2 ETS
3 Communal Open Space
4 Winter Garden
5 Aspect
6 Location



Key Map

Passed-Failed

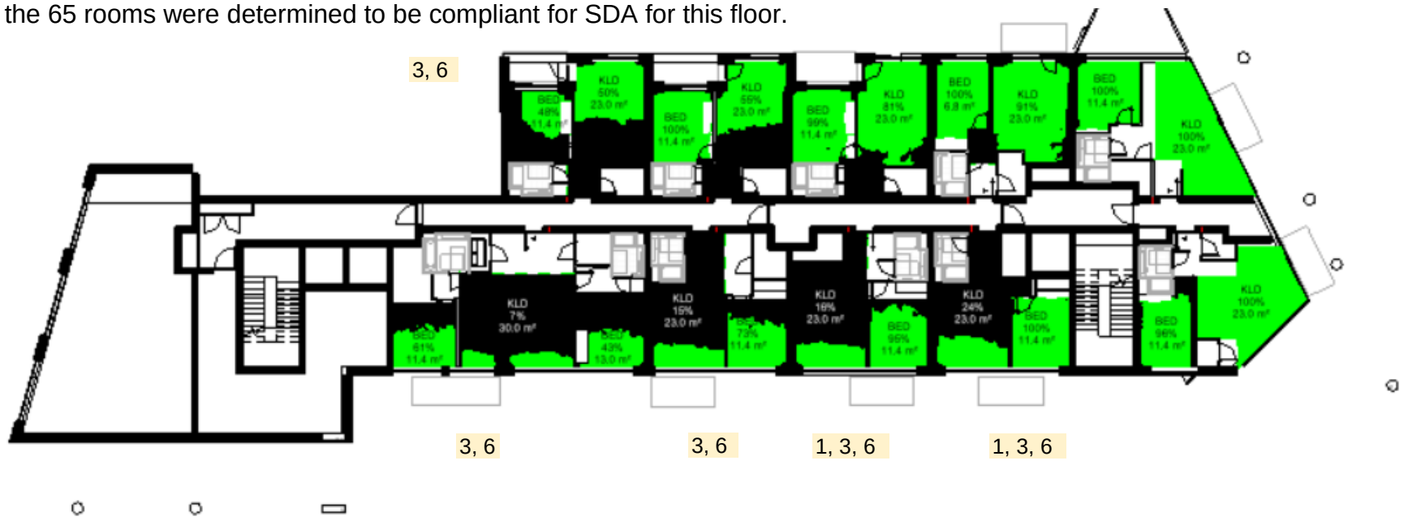


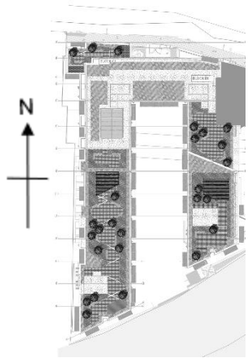
SDA Targets	> 50% at
Bedrooms	> 100 Lux
Living rooms	> 150 Lux
K/L/D / Kitchen	> 200 Lux

Results – SDA: Mezzanine

Daylight analysis results are illustrated below with green shaded area receiving targeted illuminance, 200Lux for KLDs, 150Lux for Living room, and 100Lux for Bedrooms. Black shade is showing area where it's receiving less than targeted illuminance. A space is deemed compliant where >50% of areas achieve target illuminance.

46 of the 65 rooms were determined to be compliant for SDA for this floor.



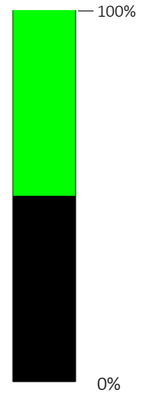


Key Map

Compensatory Measures:

1 Daylight Adjacency
2 ETS
3 Communal Open Space
4 Winter Garden
5 Aspect
6 Location

Passed-Failed

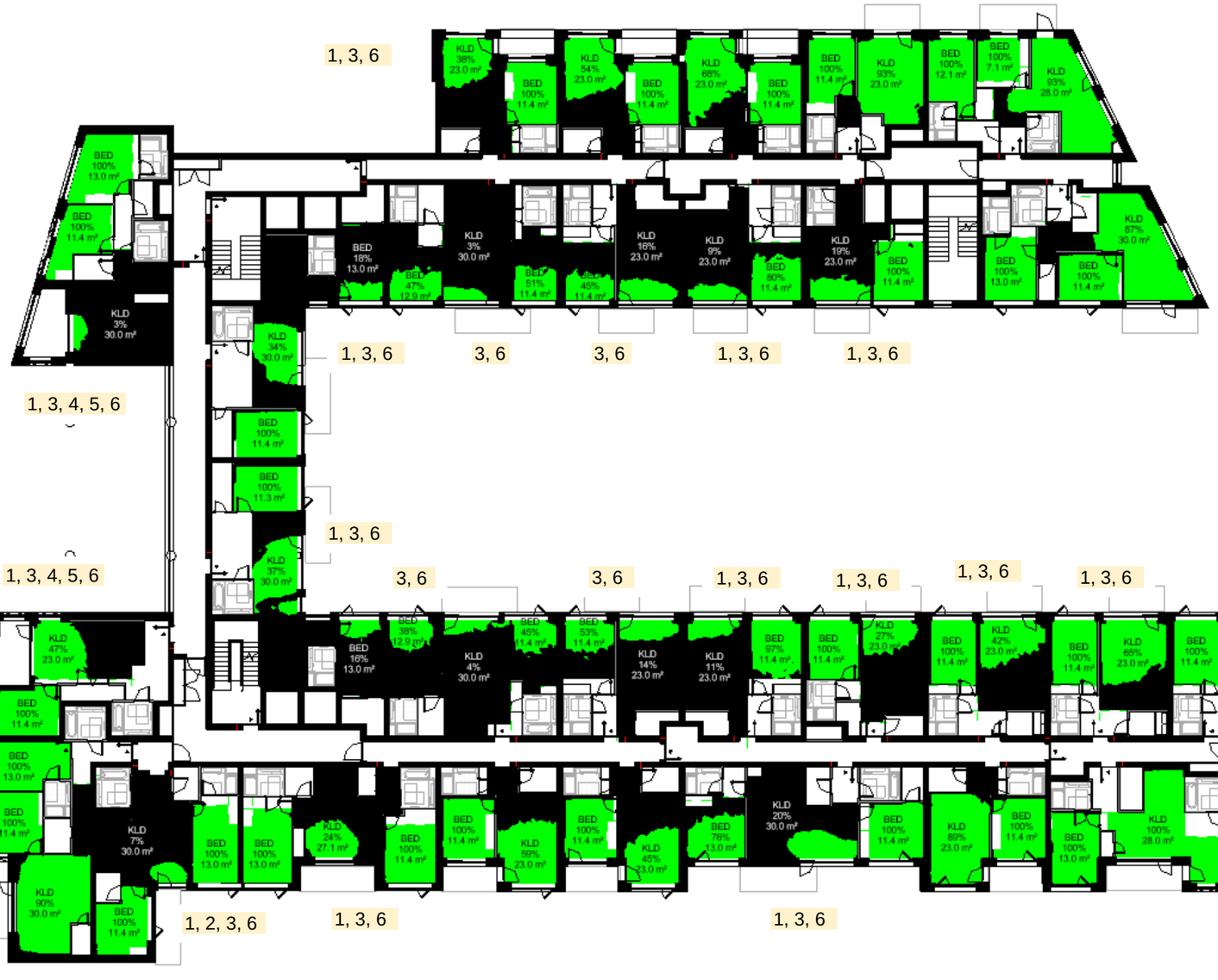


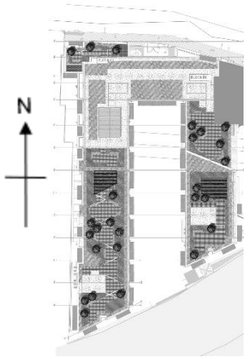
SDA Targets	> 50% at
Bedrooms	> 100 Lux
Living rooms	> 150 Lux
K/L/D / Kitchen	> 200 Lux

Results – SDA: First Floor

Daylight analysis results are illustrated below with green shaded area receiving targeted illuminance, 200Lux for KLDs, 150Lux for Living room, and 100Lux for Bedrooms. Black shade is showing area where it's receiving less than targeted illuminance. A space is deemed compliant where >50% of areas achieve target illuminance.

52 of the 76 rooms were determined to be compliant for SDA for this floor.



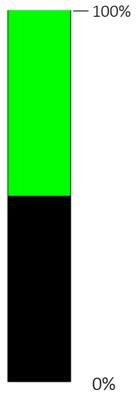


Key Map

Compensatory Measures:

1 Daylight Adjacency
2 ETS
3 Communal Open Space
4 Winter Garden
5 Aspect
6 Location

Passed-Failed

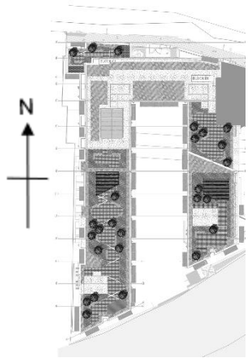


SDA Targets	> 50% at
Bedrooms	> 100 Lux
Living rooms	> 150 Lux
K/L/D / Kitchen	> 200 Lux

Results – SDA: Second Floor

Daylight analysis results are illustrated below with green shaded area receiving targeted illuminance, 200Lux for KLDs, 150Lux for Living room, and 100Lux for Bedrooms. Black shade is showing area where it's receiving less than targeted illuminance. A space is deemed compliant where >50% of areas achieve target illuminance.

63 of the 81 rooms were determined to be compliant for SDA for this floor.

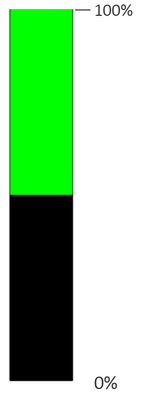


Key Map

Compensatory Measures:

1 Daylight Adjacency
2 ETS
3 Communal Open Space
4 Winter Garden
5 Aspect
6 Location

Passed-Failed

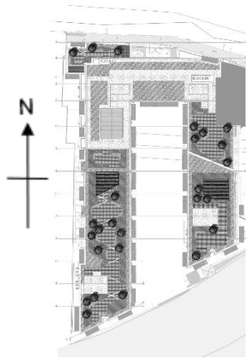


SDA Targets	> 50% at
Bedrooms	> 100 Lux
Living rooms	> 150 Lux
K/L/D / Kitchen	> 200 Lux

Results – SDA: Third Floor

Daylight analysis results are illustrated below with green shaded area receiving targeted illuminance, 200Lux for KLDs, 150Lux for Living room, and 100Lux for Bedrooms. Black shade is showing area where it's receiving less than targeted illuminance. A space is deemed compliant where >50% of areas achieve target illuminance.

66 of the 81 rooms to be compliant for SDA for this floor.



Key Map

Compensatory Measures:

1 Daylight Adjacency
2 ETS
3 Communal Open Space
4 Winter Garden
5 Aspect
6 Location

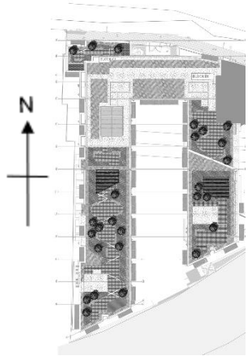
Passed-Failed

SDA Targets	> 50% at
Bedrooms	> 100 Lux
Living rooms	> 150 Lux
K/L/D / Kitchen	> 200 Lux

Results – SDA: Fourth Floor

Daylight analysis results are illustrated below with green shaded area receiving targeted illuminance, 200Lux for KLDs, 150Lux for Living room, and 100Lux for Bedrooms. Black shade is showing area where it's receiving less than targeted illuminance. A space is deemed compliant where >50% of areas achieve target illuminance.

69 of the 81 rooms were determined to be compliant for SDA for this floor.



Key Map

Compensatory Measures:

1 Daylight Adjacency
2 ETS
3 Communal Open Space
4 Winter Garden
5 Aspect
6 Location

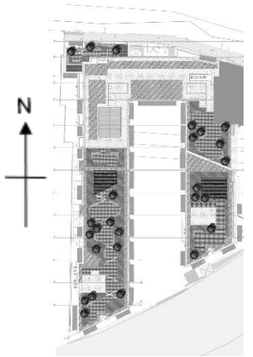
Passed-Failed

SDA Targets	> 50% at
Bedrooms	> 100 Lux
Living rooms	> 150 Lux
K/L/D / Kitchen	> 200 Lux

Results – SDA: Fifth Floor

Daylight analysis results are illustrated below with green shaded area receiving targeted illuminance, 200Lux for KLDs, 150Lux for Living room, and 100Lux for Bedrooms. Black shade is showing area where it's receiving less than targeted illuminance. A space is deemed compliant where >50% of areas achieve target illuminance.

67 of the 81 rooms were determined to be compliant for SDA for this floor.

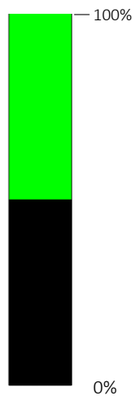


Key Map

Compensatory Measures:

1 Daylight Adjacency
2 ETS
3 Communal Open Space
4 Winter Garden
5 Aspect
6 Location

Passed-Failed

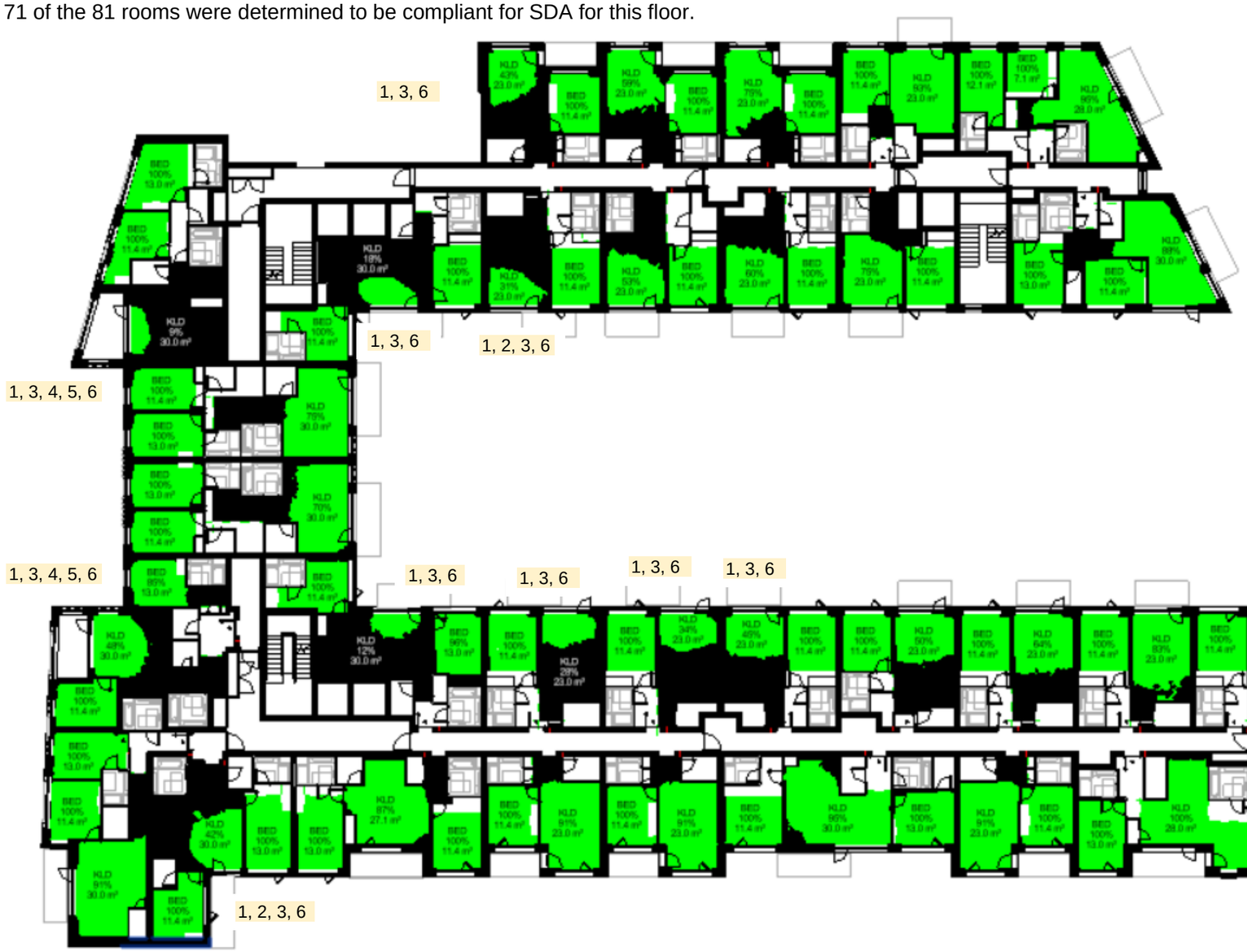


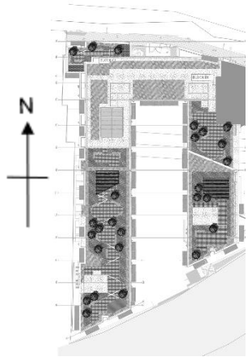
SDA Targets	> 50% at
Bedrooms	> 100 Lux
Living rooms	> 150 Lux
K/L/D / Kitchen	> 200 Lux

Results – SDA: Sixth Floor

Daylight analysis results are illustrated below with green shaded area receiving targeted illuminance, 200Lux for KLDs, 150Lux for Living room, and 100Lux for Bedrooms. Black shade is showing area where it's receiving less than targeted illuminance. A space is deemed compliant where >50% of areas achieve target illuminance.

71 of the 81 rooms were determined to be compliant for SDA for this floor.



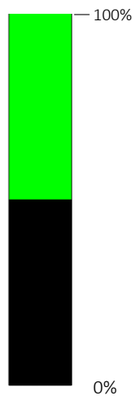


Key Map

Compensatory Measures:

1 Daylight Adjacency
2 ETS
3 Communal Open Space
4 Winter Garden
5 Aspect
6 Location

Passed-Failed

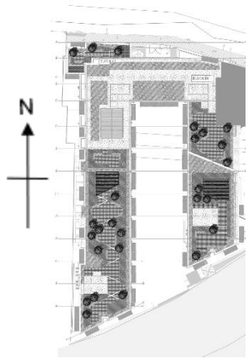


SDA Targets	> 50% at
Bedrooms	> 100 Lux
Living rooms	> 150 Lux
K/L/D / Kitchen	> 200 Lux

Results – SDA: Seventh Floor

Daylight analysis results are illustrated below with green shaded area receiving targeted illuminance, 200Lux for KLDs, 150Lux for Living room, and 100Lux for Bedrooms. Black shade is showing area where it's receiving less than targeted illuminance. A space is deemed compliant where >50% of areas achieve target illuminance.

72 of the 76 rooms were determined to be compliant for SDA for this floor.



Key Map

Compensatory Measures:

1 Daylight Adjacency
2 ETS
3 Communal Open Space
4 Winter Garden
5 Aspect
6 Location

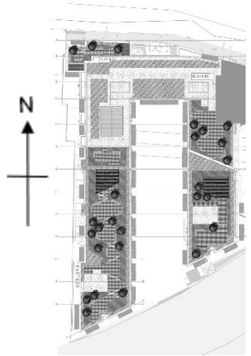
Passed-Failed

SDA Targets	> 50% at
Bedrooms	> 100 Lux
Living rooms	> 150 Lux
K/L/D / Kitchen	> 200 Lux

Results – SDA: Eighth Floor

Daylight analysis results are illustrated below with green shaded area receiving targeted illuminance, 200Lux for KLDs, 150Lux for Living room, and 100Lux for Bedrooms. Black shade is showing area where it's receiving less than targeted illuminance. A space is deemed compliant where >50% of areas achieve target illuminance.

51 of the 52 rooms were determined to be compliant for SDA for this floor.



Key Map

Compensatory Measures:

1 Daylight Adjacency

2 ETS

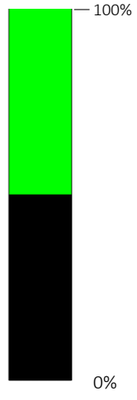
3 Communal Open Space

4 Winter Garden

5 Aspect

6 Location

Passed-Failed

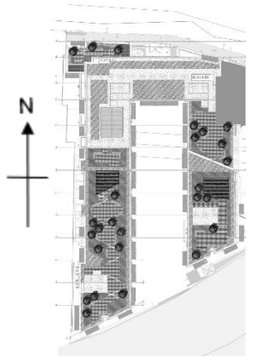


SDA Targets	> 50% at
Bedrooms	> 100 Lux
Living rooms	> 150 Lux
K/L/D / Kitchen	> 200 Lux

Results – SDA: Ninth Floor

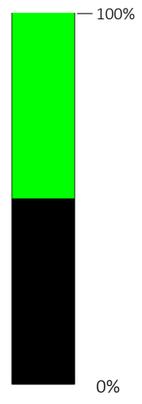
Daylight analysis results are illustrated below with green shaded area receiving targeted illuminance, 200Lux for KLDs, 150Lux for Living room, and 100Lux for Bedrooms. Black shade is showing area where it's receiving less than targeted illuminance. A space is deemed compliant where >50% of areas achieve target illuminance.

Every room was determined to be compliant for SDA for this floor.



Key Map

Passed-Failed



Compensatory Measures:

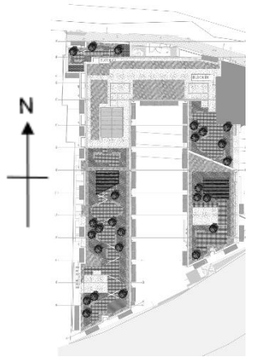
1 Daylight Adjacency
2 ETS
3 Communal Open Space
4 Winter Garden
5 Aspect
6 Location

SDA Targets	> 50% at
Bedrooms	> 100 Lux
Living rooms	> 150 Lux
K/L/D / Kitchen	> 200 Lux

Results – SDA: Tenth Floor

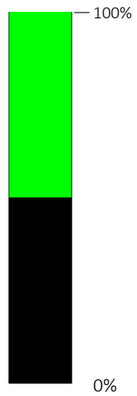
Daylight analysis results are illustrated below with green shaded area receiving targeted illuminance, 200Lux for KLDs, 150Lux for Living room, and 100Lux for Bedrooms. Black shade is showing area where it's receiving less than targeted illuminance. A space is deemed compliant where >50% of areas achieve target illuminance.

Every room was determined to be compliant for SDA for this floor.



Key Map

Passed-Failed



Compensatory Measures:

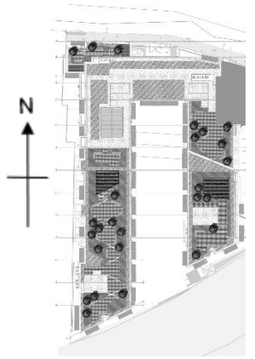
1 Daylight Adjacency
2 ETS
3 Communal Open Space
4 Winter Garden
5 Aspect
6 Location

SDA Targets	> 50% at
Bedrooms	> 100 Lux
Living rooms	> 150 Lux
K/L/D / Kitchen	> 200 Lux

Results – SDA: Eleventh Floor

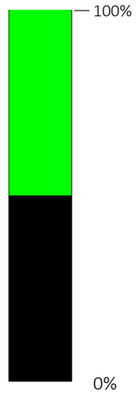
Daylight analysis results are illustrated below with green shaded area receiving targeted illuminance, 200Lux for KLDs, 150Lux for Living room, and 100Lux for Bedrooms. Black shade is showing area where it's receiving less than targeted illuminance. A space is deemed compliant where >50% of areas achieve target illuminance.

Every room was determined to be compliant for SDA for this floor.



Key Map

Passed-Failed



Compensatory Measures:

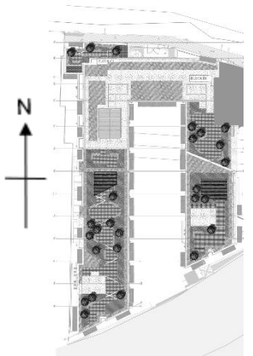
1 Daylight Adjacency
2 ETS
3 Communal Open Space
4 Winter Garden
5 Aspect
6 Location

SDA Targets	> 50% at
Bedrooms	> 100 Lux
Living rooms	> 150 Lux
K/L/D / Kitchen	> 200 Lux

Appendix F – ETS (Exposure to Sunlight) Results

Results – ETS: Gound Floor

Sunlight analysis results are illustrated below with green dots identifying units receiving targeted number of hours, at minimum of 1.5 hours. Blue dots identify units receiving less than targeted 1.5 hours. A unit is deemed compliant where a minimum of 1.5 hours is achieved on the 21st of March (Equinox).



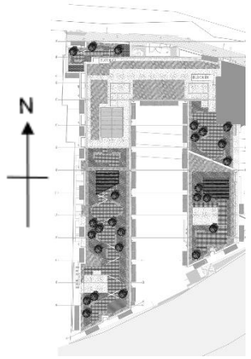
Key Map

Exposure to Sunlight		
Compliant	High	≥ 4.0 hrs
	Medium	3.0 – 4.0 hrs
	Minimum	1.5 – 3.0 hrs
Non-Compliant	Low	< 1.5 hrs

Compensatory Measures:
1 Daylight
2 Communal Open Space
3 Winter Garden
4 Aspect
5 Location

Results – ETS: Mezzanine

Sunlight analysis results are illustrated below with green dots identifying units receiving targeted number of hours, at minimum of 1.5 hours. Blue dots identify units receiving less than targeted 1.5 hours. A unit is deemed compliant where a minimum of 1.5 hours is achieved on the 21st of March (Equinox).



Key Map

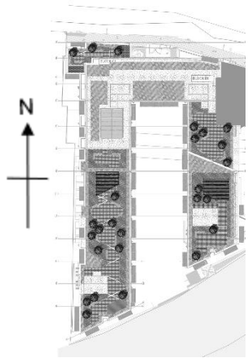
Exposure to Sunlight			
Compliant	High	≥ 4.0 hrs	
	Medium	3.0 – 4.0 hrs	
	Minimum	1.5 – 3.0 hrs	
Non-Compliant	Low	< 1.5 hrs	

Compensatory Measures:

1 Daylight
2 Communal Open Space
3 Winter Garden
4 Aspect
5 Location

Results – ETS: Level 1

Sunlight analysis results are illustrated below with green dots identifying units receiving targeted number of hours, at minimum of 1.5 hours. Blue dots identify units receiving less than targeted 1.5 hours. A unit is deemed compliant where a minimum of 1.5 hours is achieved on the 21st of March (Equinox).



Key Map

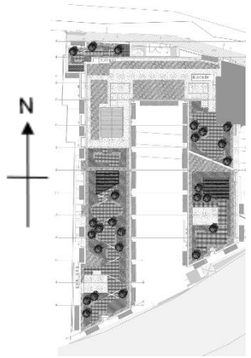
Exposure to Sunlight		
Compliant	High	≥ 4.0 hrs
	Medium	3.0 – 4.0 hrs
	Minimum	1.5 – 3.0 hrs
Non-Compliant	Low	< 1.5 hrs

Compensatory Measures:

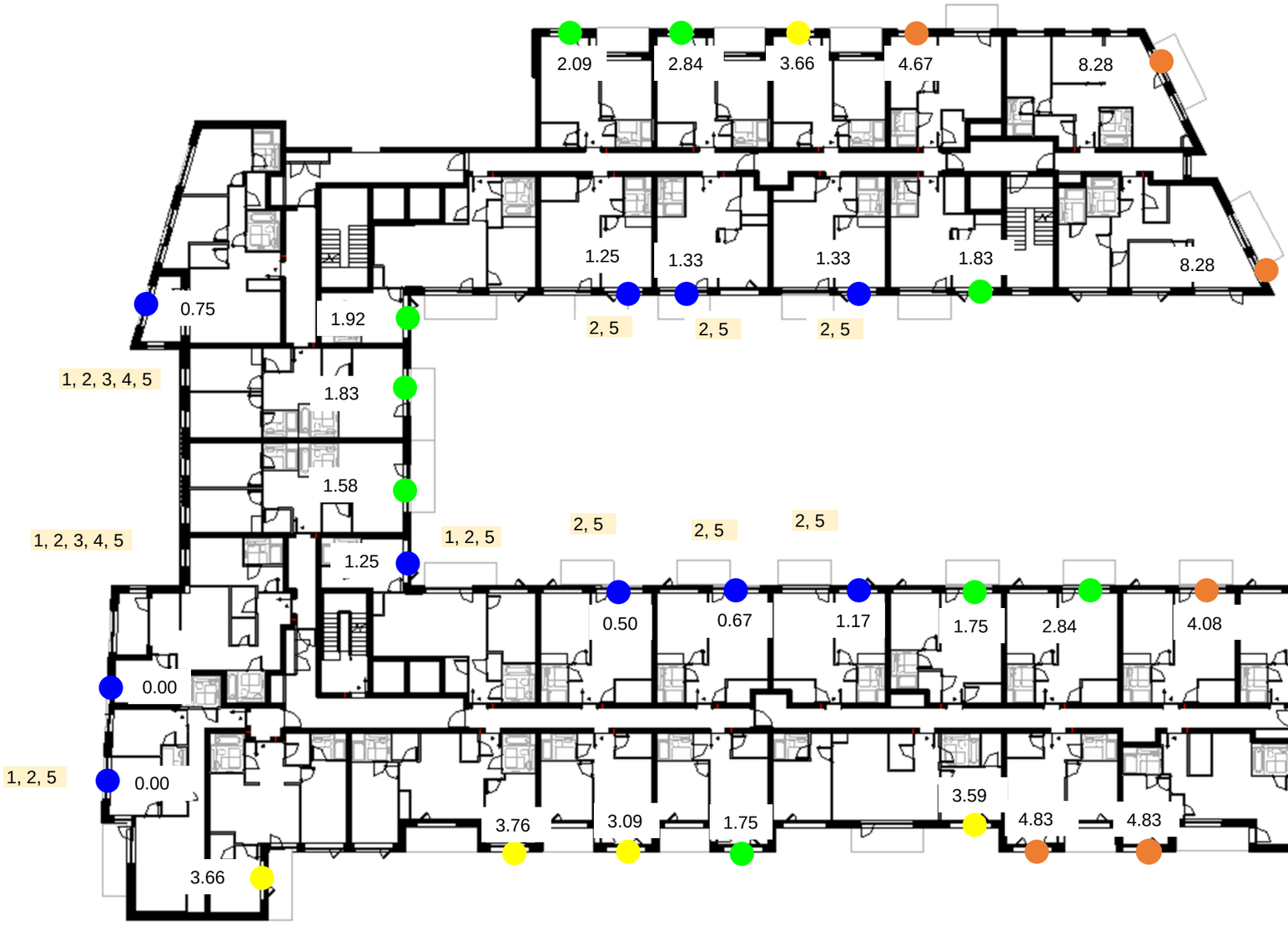
1 Daylight
2 Communal Open Space
3 Winter Garden
4 Aspect
5 Location

Results – ETS: Level 2

Sunlight analysis results are illustrated below with green dots identifying units receiving targeted number of hours, at minimum of 1.5 hours. Blue dots identify units receiving less than targeted 1.5 hours. A unit is deemed compliant where a minimum of 1.5 hours is achieved on the 21st of March (Equinox).



Key Map

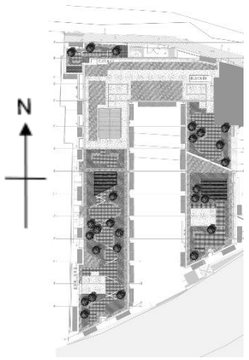


Exposure to Sunlight			
Compliant	High	≥ 4.0 hrs	
	Medium	3.0 – 4.0 hrs	
	Minimum	1.5 – 3.0 hrs	
Non-Compliant	Low	< 1.5 hrs	

Compensatory Measures:
1 Daylight
2 Communal Open Space
3 Winter Garden
4 Aspect
5 Location

Results – ETS: Level 3

Sunlight analysis results are illustrated below with green dots identifying units receiving targeted number of hours, at minimum of 1.5 hours. Blue dots identify units receiving less than targeted 1.5 hours. A unit is deemed compliant where a minimum of 1.5 hours is achieved on the 21st of March (Equinox).



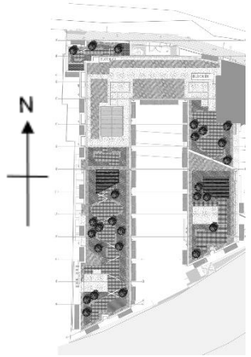
Key Map

Exposure to Sunlight			
Compliant	High	≥ 4.0 hrs
	Medium	3.0 – 4.0 hrs
	Minimum	1.5 – 3.0 hrs
Non-Compliant	Low	< 1.5 hrs

Compensatory Measures:
1 Daylight
2 Communal Open Space
3 Winter Garden
4 Aspect
5 Location

Results – ETS: Level 4

Sunlight analysis results are illustrated below with green dots identifying units receiving targeted number of hours, at minimum of 1.5 hours. Blue dots identify units receiving less than targeted 1.5 hours. A unit is deemed compliant where a minimum of 1.5 hours is achieved on the 21st of March (Equinox).



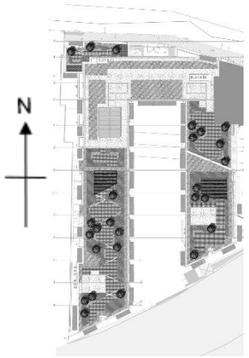
Key Map

Exposure to Sunlight			
Compliant	High	≥ 4.0 hrs
	Medium	3.0 – 4.0 hrs
	Minimum	1.5 – 3.0 hrs
Non-Compliant	Low	< 1.5 hrs

Compensatory Measures:
1 Daylight
2 Communal Open Space
3 Winter Garden
4 Aspect
5 Location

Results – ETS: Level 5

Sunlight analysis results are illustrated below with green dots identifying units receiving targeted number of hours, at minimum of 1.5 hours. Blue dots identify units receiving less than targeted 1.5 hours. A unit is deemed compliant where a minimum of 1.5 hours is achieved on the 21st of March (Equinox).



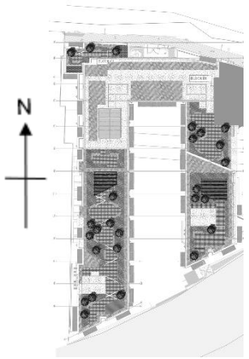
Key Map

Exposure to Sunlight			
Compliant	High	≥ 4.0 hrs
	Medium	3.0 – 4.0 hrs
	Minimum	1.5 – 3.0 hrs
Non-Compliant	Low	< 1.5 hrs

Compensatory Measures:
1 Daylight
2 Communal Open Space
3 Winter Garden
4 Aspect
5 Location

Results – ETS: Level 6

Sunlight analysis results are illustrated below with green dots identifying units receiving targeted number of hours, at minimum of 1.5 hours. Blue dots identify units receiving less than targeted 1.5 hours. A unit is deemed compliant where a minimum of 1.5 hours is achieved on the 21st of March (Equinox).



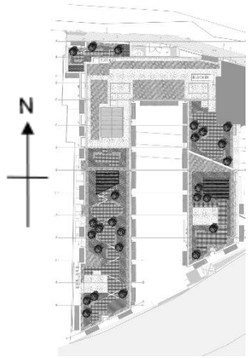
Key Map

Exposure to Sunlight			
Compliant	High	≥ 4.0 hrs	
	Medium	3.0 – 4.0 hrs	
	Minimum	1.5 – 3.0 hrs	
Non-Compliant	Low	< 1.5 hrs	

Compensatory Measures:
1 Daylight
2 Communal Open Space
3 Winter Garden
4 Aspect
5 Location

Results – ETS: Level 7

Sunlight analysis results are illustrated below with green dots identifying units receiving targeted number of hours, at minimum of 1.5 hours. Blue dots identify units receiving less than targeted 1.5 hours. A unit is deemed compliant where a minimum of 1.5 hours is achieved on the 21st of March (Equinox).



Key Map

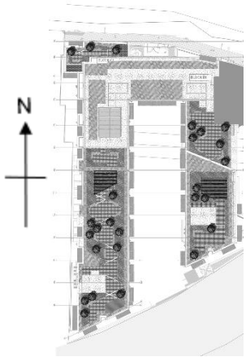
Exposure to Sunlight			
Compliant	High	≥ 4.0 hrs	
	Medium	3.0 – 4.0 hrs	
	Minimum	1.5 – 3.0 hrs	
Non-Compliant	Low	< 1.5 hrs	

Compensatory Measures:

1 Daylight
2 Communal Open Space
3 Winter Garden
4 Aspect
5 Location

Results – ETS: Level 8

Sunlight analysis results are illustrated below with green dots identifying units receiving targeted number of hours, at minimum of 1.5 hours. Blue dots identify units receiving less than targeted 1.5 hours. A unit is deemed compliant where a minimum of 1.5 hours is achieved on the 21st of March (Equinox).



Key Map

1, 2, 4, 5

1, 2, 4, 5

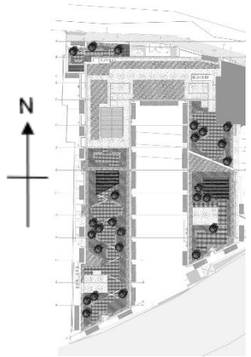
Exposure to Sunlight			
Compliant	High	≥ 4.0 hrs
	Medium	3.0 – 4.0 hrs
	Minimum	1.5 – 3.0 hrs
Non-Compliant	Low	< 1.5 hrs

Compensatory Measures:

1 Daylight
2 Communal Open Space
3 Winter Garden
4 Aspect
5 Location

Results – ETS: Level 9

Sunlight analysis results are illustrated below with green dots identifying units receiving targeted number of hours, at minimum of 1.5 hours. Blue dots identify units receiving less than targeted 1.5 hours. A unit is deemed compliant where a minimum of 1.5 hours is achieved on the 21st of March (Equinox).



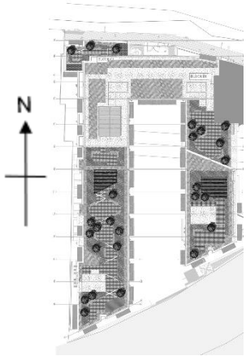
Key Map

Exposure to Sunlight			
Compliant	High	≥ 4.0 hrs
	Medium	3.0 – 4.0 hrs
	Minimum	1.5 – 3.0 hrs
Non-Compliant	Low	< 1.5 hrs

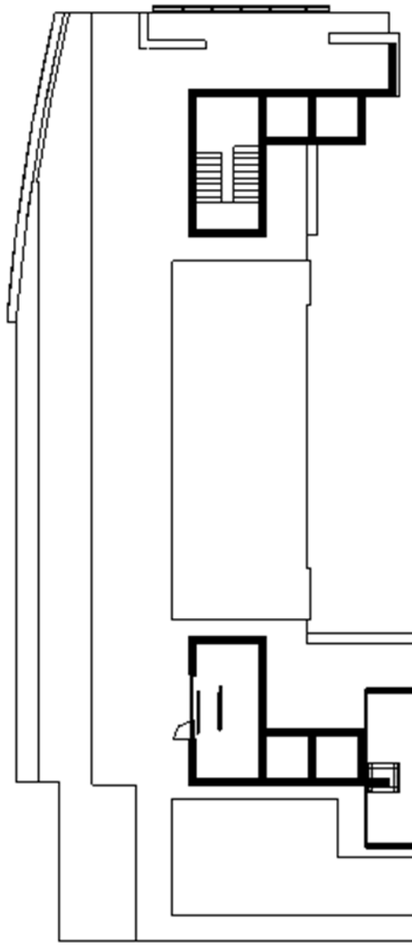
Compensatory Measures:
1 Daylight
2 Communal Open Space
3 Winter Garden
4 Aspect
5 Location

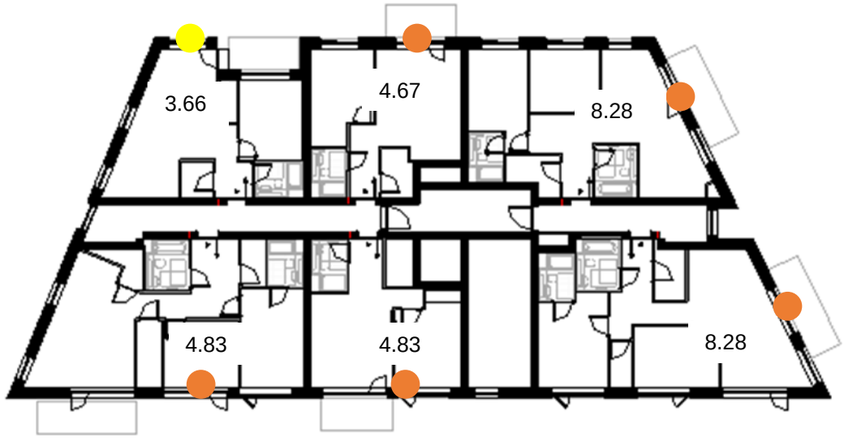
Results – ETS: Level 10

Sunlight analysis results are illustrated below with green dots identifying units receiving targeted number of hours, at minimum of 1.5 hours. Blue dots identify units receiving less than targeted 1.5 hours. A unit is deemed compliant where a minimum of 1.5 hours is achieved on the 21st of March (Equinox).



Key Map





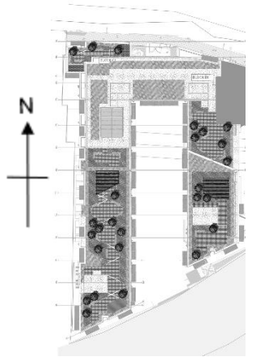
Exposure to Sunlight			
Compliant	High	≥ 4.0 hrs
	Medium	3.0 – 4.0 hrs
	Minimum	1.5 – 3.0 hrs
Non-Compliant	Low	< 1.5 hrs

Compensatory Measures:

1 Daylight
2 Communal Open Space
3 Winter Garden
4 Aspect
5 Location

Results – ETS: Level 11

Sunlight analysis results are illustrated below with green dots identifying units receiving targeted number of hours, at minimum of 1.5 hours. Blue dots identify units receiving less than targeted 1.5 hours. A unit is deemed compliant where a minimum of 1.5 hours is achieved on the 21st of March (Equinox).



Key Map

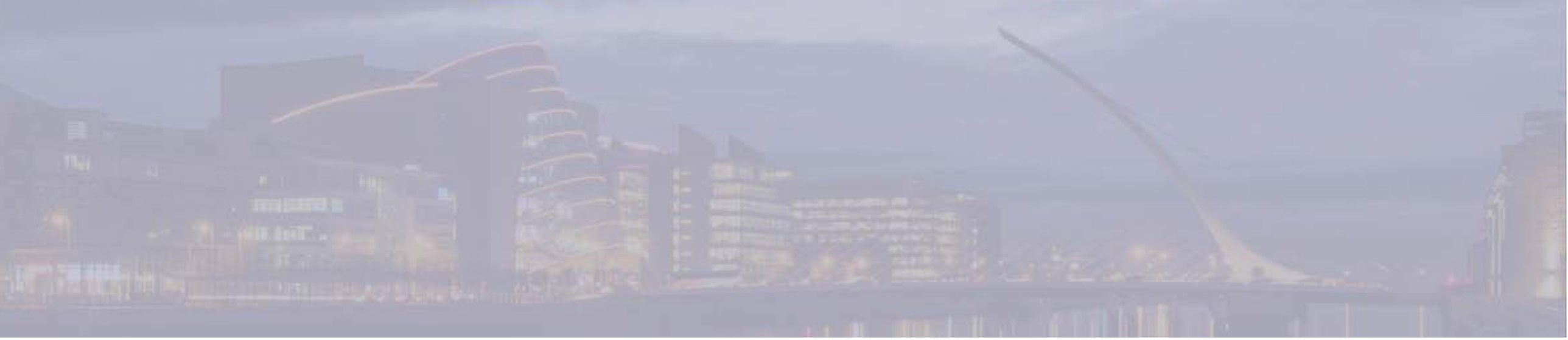
Exposure to Sunlight			
Compliant	High	≥ 4.0 hrs
	Medium	3.0 – 4.0 hrs
	Minimum	1.5 – 3.0 hrs
Non-Compliant	Low	< 1.5 hrs

Compensatory Measures:

1 Daylight
2 Communal Open Space
3 Winter Garden
4 Aspect
5 Location

IN2

Better spaces
start with people



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