

# ASSESSMENT OF SUNLIGHT & DAYLIGHT ACCESS WITHIN THE PROPOSED DEVELOPMENT

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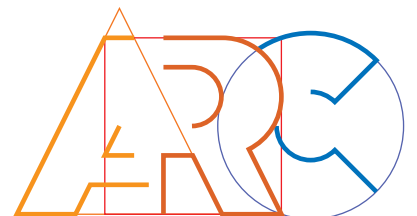
LANDS AT WOODBROOK, SHANKILL, CO. DUBLIN

JUNE 2019

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## 1.0 INTRODUCTION

ARC Architectural Consultants Ltd has been retained by the Applicant to prepare this assessment of sunlight and daylight access within the proposed development on lands at Woodbrook, Shankill, Co. Dublin.

### *Note on Reference to Context under Technical and Guidance Documents and on Reference to Methodology*

In order to avoid repetition, the sections outlining the relevant recommendations of technical and guidance documents and the methodologies used in undertaking this assessment have been set out in the Technical Appendix at the end of the written section of this report.

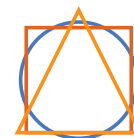
## 1.2 Relevant Characteristics of the Proposed Development

The proposed Strategic Housing Development broadly comprises: -

- 685no. residential units (207no. houses, 48no. duplex and 430no. apartments) in buildings ranging from 2 to 8-storeys.
- 1no. childcare facilities (c. 429 sq. m gross floor area).
- Provision of Woodbrook Distributor Road / Woodbrook Avenue from the Old Dublin Road (R119) to the future Woodbrook DART Station, including the provision of a temporary surface car park (164no. parking spaces including set down areas and ancillary bicycle parking and storage) adjacent the future Woodbrook DART Station in northeast of site.
- Provision of a series of linear parks and green links (Coastal Park and Corridor Park), including 2no. pedestrian / cycle links to Shanganagh Public Park and provision of interim landscaping of future public plaza to serve future Local Centre to allow full north / south connection, supplemented by smaller pocket parks.
- Provision of SuDS infrastructure and connection to existing surface water culvert on Old Dublin Road (R119).
- Provision of waste water infrastructure (pumping station including 24 hour emergency storage and rising foul main through Shanganagh Public Park to tie-in to existing services at St. Anne's Park Residential Estate).
- 2no. replacement golf holes on eastern side of railway line.
- All ancillary site development and infrastructural works, hard and soft landscaping and boundary treatment works.



Figure 1: Indicative diagram showing the location of apartment blocks and the proposed pocket park (in green) on the application site



## 2.0 ASSESSMENT OF DAYLIGHT ACCESS WITHIN THE PROPOSED DEVELOPMENT

Section 6.6 of the *Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities* states 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.”

BS 8206-2:2008: *Lighting for buildings - Part 2: Code of practice for daylighting*<sup>1</sup> states as follows at Section 5.5: Average daylight factor:

*“The average daylight factor is used as the measure of general illumination from skylight. It is considered good practice to ensure that rooms in dwellings and in most other buildings have a predominantly daylight appearance. In order to achieve this the average daylight factor should be at least 2%.”*

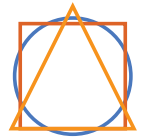
The British Standard goes on to recommend a minimum of 1% Average Daylight Factor for bedrooms; 1.5% Average Daylight Factor for living rooms and 2% Average Daylight Factor for kitchens. The British Standard states “Where one room serves more than one purpose, the minimum average daylight factor should 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%.” These minimum recommendations are also set out at Section 2.1.8 of the BRE Guide.

As part of this *Assessment of Sunlight & Daylight Access within the Proposed Development*, ARC undertook an assessment of the likely daylight access within the residential units within apartment blocks proposed as part of the subject application. A representative sample of rooms within the proposed apartment blocks was studied at the lowest levels of accommodation given that daylight access to lower levels will be the most obstructed in terms of daylight access so issues in respect of daylight access are most likely to occur at the lowest levels of accommodation. An emphasis was placed on analysis of rooms likely to receive lower levels of daylight (e.g. rooms with the potential to receive lower levels of daylight access due to their location within the proposed development and/or due to their layout and fenestration).

The British Standard outlines a number of recommendations for daylight access within proposed development (1% Average Daylight Factor for bedrooms; 1.5% Average Daylight Factor for living rooms; 2% Average Daylight Factor for kitchens), although the British Standard recommends caution in applying the recommendations contained therein as part of the planning process. It states: “The aim of the standard is to give guidance to architects, engineers, builders and others who carry out lighting design. It is recognized that lighting is only one of many matters that influence fenestration. These include other aspects of environmental performance (such as noise, thermal equilibrium and the control of energy use) fire hazards, constructional requirements, the external appearance and the surroundings of the site. The best design for a building does not necessarily incorporate the ideal solution for any individual function. For this reason, **careful judgement needs to be exercised when using the criteria given in the standard for other purposes, particularly town planning control.**” [Emphasis added.]

For more detail on the methodology used in assessing daylight access, please refer to the Technical Appendix of this Report. The results of ARC’s analysis of likely daylight access within the proposed apartment blocks are set out in sections 2.1 to 2.5 below:

<sup>1</sup> It is noted that BS 8206-2:2008: *Lighting for buildings - Part 2: Code of practice for daylighting* was recently replaced with BS EN 17037:2018 *Daylight in Buildings*. However, given that the *Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities* refer to the BS 8206-2:2008 and not to BS EN 17037:2018, BS 8206:2008 has been referenced in the preparation of this report.



## 2.1 Daylight Access within the proposed Block A

For the purpose of this report, ARC made reference to the British Standard recommendation of 2% Average Daylight Factor for combined living / kitchen / dining rooms when assessing daylight access within the proposed Block A. The locations of the sample study rooms analysed as part of this analysis of daylight access within residences within the proposed apartment Block A are illustrated at Figure 2.1 below. For more detail on the methodology used in assessing daylight access, please refer to the Technical Appendix of this Report.

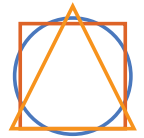
As indicated at Table 2.1 below, ARC's analysis suggests of representative sample rooms within the proposed Block A are likely to achieve Average Daylight Factors in excess of the minimum levels recommended by the British Standard for daylight access to combined living / kitchen / dining rooms.

**Table 2.1: Predicted daylight access to sample rooms within the proposed Block A**

Location	Floor	Room Type	Predicted Average Daylight Factor
Block A Zone 00a	Floor 00	Living / kitchen / dining room	3.40%
Block A Zone 00b	Floor 00	Living / kitchen / dining room	3.66%
Block A Zone 01a	Floor 01	Living / kitchen / dining room	3.20%
Block A Zone 01a	Floor 01	Living / kitchen / dining room	3.89%
Block A Zone 01a	Floor 01	Living / kitchen / dining room	2.69%



**Figure 2.1: Indicative diagram showing location of sample rooms within the proposed Block A assessed as part of this assessment of daylight access within the proposed development**



## 2.2 Daylight Access within the proposed Block B

For the purpose of this report, ARC made reference to the British Standard recommendation of 2% Average Daylight Factor for combined living / kitchen / dining rooms when assessing daylight access within the proposed Block B. The locations of the sample study rooms analysed as part of this analysis of daylight access within residences within the proposed apartment Block B are illustrated at Figure 2.2 below. For more detail on the methodology used in assessing daylight access, please refer to the Technical Appendix of this Report.

As indicated at Table 2.2 below, ARC's analysis suggests of representative sample rooms within the proposed Block B are likely to achieve Average Daylight Factors in excess of the minimum levels recommended by the British Standard for daylight access to combined living / kitchen / dining rooms.

Table 2.2: Predicted daylight access to sample rooms within the proposed Block B

Location	Floor	Room Type	Predicted Average Daylight Factor
Block B Zone 00a	Floor 00	Living / kitchen / dining room	3.17%
Block B Zone 00b	Floor 00	Living / kitchen / dining room	3.59%
Block B Zone 01a	Floor 01	Living / kitchen / dining room	2.44%
Block B Zone 01b	Floor 01	Living / kitchen / dining room	2.39%
Block B Zone 01c	Floor 01	Living / kitchen / dining room	3.05%

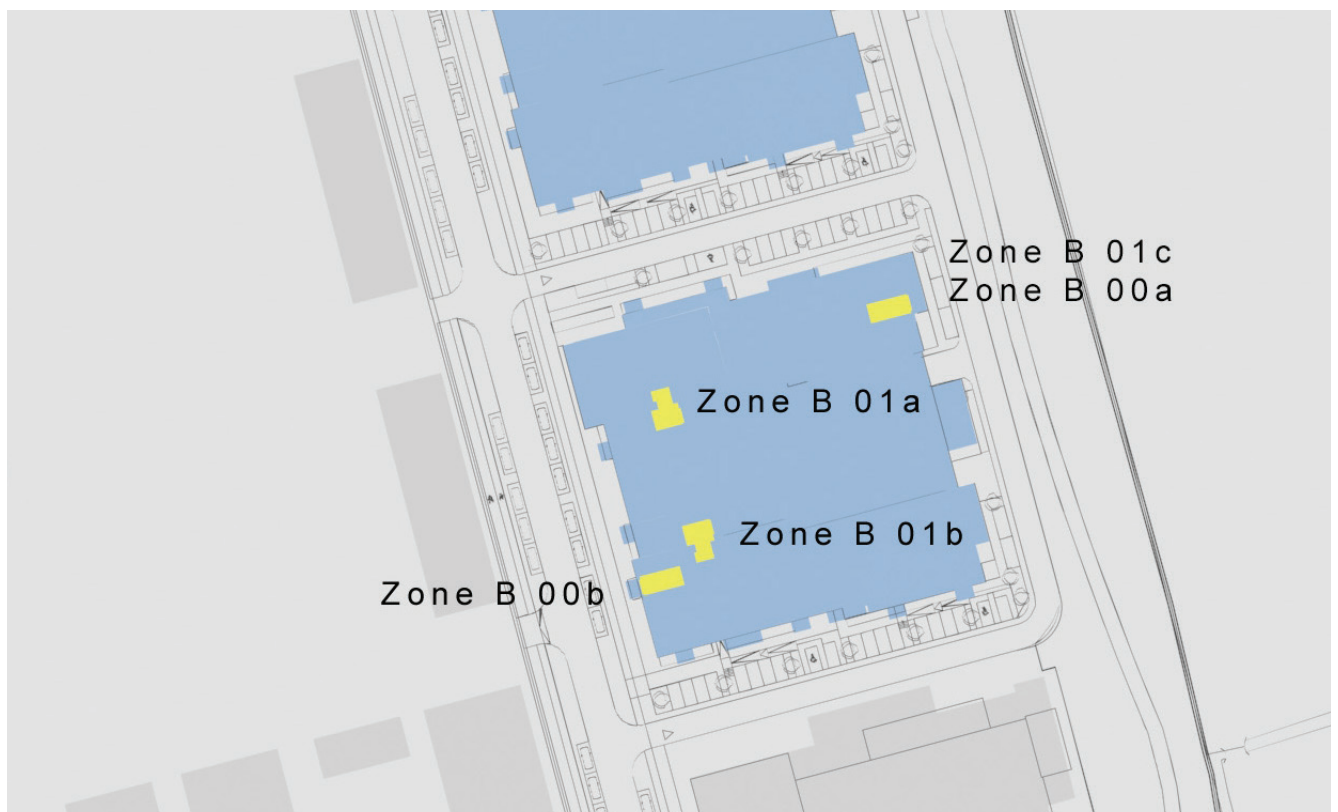


Figure 2.2: Indicative diagram showing location of sample rooms within the proposed Block B assessed as part of this assessment of daylight access within the proposed development



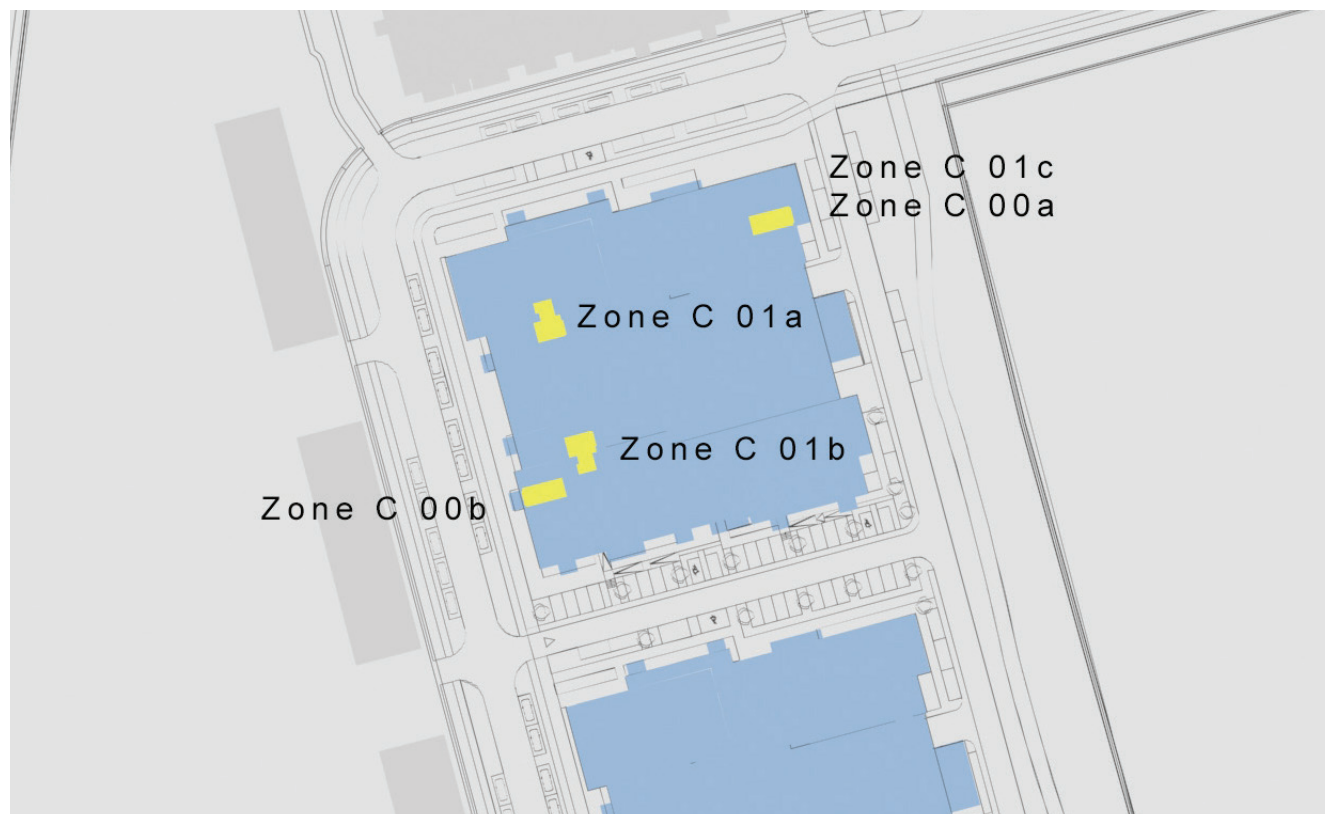
### 2.3 Daylight Access within the proposed Block C

For the purpose of this report, ARC made reference to the British Standard recommendation of 2% Average Daylight Factor for combined living / kitchen / dining rooms when assessing daylight access within the proposed Block C. The locations of the sample study rooms analysed as part of this analysis of daylight access within residences within the proposed apartment Block C are illustrated at Figure 2.3 below. For more detail on the methodology used in assessing daylight access, please refer to the Technical Appendix of this Report.

As indicated at Table 2.3 below, ARC's analysis suggests of representative sample rooms within the proposed Block C are likely to achieve Average Daylight Factors in excess of the minimum levels recommended by the British Standard for daylight access to combined living / kitchen / dining rooms.

**Table 2.3: Predicted daylight access to sample rooms within the proposed Block C**

Location	Floor	Room Type	Predicted Average Daylight Factor
Block C Zone 00a	Floor 00	Living / kitchen / dining room	3.17%
Block C Zone 00b	Floor 00	Living / kitchen / dining room	3.59%
Block C Zone 01a	Floor 01	Living / kitchen / dining room	2.44%
Block C Zone 01b	Floor 01	Living / kitchen / dining room	2.39%
Block C Zone 01c	Floor 01	Living / kitchen / dining room	3.05%



**Figure 2.3: Indicative diagram showing location of sample rooms within the proposed Block C assessed as part of this assessment of daylight access within the proposed development**



## 2.4 Daylight Access within the proposed Local Centre

For the purpose of this report, ARC made reference to the British Standard recommendation of 2% Average Daylight Factor for combined living / kitchen / dining rooms when assessing daylight access within the proposed Local Centre. The locations of the sample study rooms analysed as part of this analysis of daylight access within residences within the apartment block at the Local Centre are illustrated at Figure 2.4 below. For more detail on the methodology used in assessing daylight access, please refer to the Technical Appendix of this Report.

As indicated at Table 2.4 below, ARC's analysis suggests of representative sample rooms within the proposed Local Centre are likely to achieve Average Daylight Factors in excess of the minimum levels recommended by the British Standard for daylight access to combined living / kitchen / dining rooms.

**Table 2.4: Predicted daylight access to sample rooms within the proposed Local Centre**

Location	Floor	Room Type	Predicted Average Daylight Factor
Local Centre Zone 00a	Floor 00	Living / kitchen / dining room	4.30%
Local Centre Zone 00b	Floor 00	Living / kitchen / dining room	2.69%
Local Centre Zone 00c	Floor 00	Living / kitchen / dining room	2.41%
Local Centre Zone 01a	Floor 01	Living / kitchen / dining room	2.79%



**Figure 2.4: Indicative diagram showing location of sample rooms within the proposed Local Centre assessed as part of this assessment of daylight access within the proposed development**



## 2.5 Daylight Access within the proposed Pocket Park Block

For the purpose of this report, ARC made reference to the British Standard recommendation of 2% Average Daylight Factor for combined living / kitchen / dining rooms when assessing daylight access within the proposed Pocket Park apartment block. The locations of the sample study rooms analysed as part of this analysis of daylight access within residences within the proposed Pocket Park apartment block are illustrated at Figure 2.5 below. For more detail on the methodology used in assessing daylight access, please refer to the Technical Appendix of this Report.

As indicated at Table 2.5 below, ARC's analysis suggests of representative sample rooms within the proposed Pocket Park Block are likely to achieve Average Daylight Factors in excess of the minimum levels recommended by the British Standard for daylight access to combined living / kitchen / dining rooms.

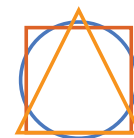
*Table 2.5: Predicted daylight access to sample rooms within the proposed Pocket Park Block*

Location	Floor	Room Type	Predicted Average Daylight Factor
Pocket Park Zone 00a	Floor 00	Living / kitchen / dining room	3.97%
Pocket Park Zone 01a	Floor 01	Living / kitchen / dining room	4.06%
Pocket Park Zone 01b	Floor 01	Living / kitchen / dining room	6.93%



*Figure 2.5: Indicative diagram showing location of sample rooms within the proposed Pocket Park Block assessed as part of this assessment of daylight access within the proposed development*





### 3.0 ASSESSMENT OF SUNLIGHT ACCESS WITHIN THE POCKET PARK PROPOSED AS PART OF THE PROPOSED DEVELOPMENT

Appendix I of the *Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities* sets out the requirements for quantum of communal amenity space associated with developments of new apartments. The Apartment Guidelines do not prescribe requirements on the issue of sunlight access to proposed open spaces and does require that planning authorities have regard to quantitative performance approaches to sunlight provision in amenity spaces set out in the Building Research Establishment's *Site layout planning for daylight and sunlight: a guide to good practice* (the BRE Guide). However, notwithstanding this, ARC referenced Section 3 of the Building Research Establishment's *Site layout planning for daylight and sunlight: a guide to good practice* sets out design advice and recommendations for site layout planning to ensure good sunlight access suggests 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 sunlight at the equinox. The subject application proposes a pocket park (i.e. as indicated at Figure 1). Having regard to Section 3 of the BRE Guide, ARC undertook detailed quantitative analysis of the proportion of the pocket park in sunlight on 21st March and the results of this analysis are set out in Table 3.1. In the interests of completeness, Table 3.1 also shows the proportion of the pocket park in sunlight on 21st June.

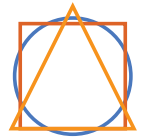
**Table 3.1: Approximate proportion of the proposed pocket park\* within the application site in sunshine on 21st March and 21st June**

Time	21st March	21st June
9:00	38%	86%
9:30	46%	86%
10:00	34%	80%
10:30	47%	83%
11:00	43%	83%
11:30	59%	81%
12:00	59%	81%
12:30	59%	89%
13:00	60%	84%
13:30	65%	91%
14:00	61%	91%
14:30	74%	93%
15:00	71%	98%
15:30	80%	100%
16:00	76%	100%
16:30	84%	100%
17:00	75%	100%

\* Please note that the area analysed does not include landscaping or boundary treatments (such as boundary walls).

ARC's analysis indicates that the proposed pocket park included as part of the proposed development is likely to be able to receive a level of sunlight access in excess of that recommended by the BRE Guide on 21st March. The proposed pocket park will, therefore, appear adequately sunlit throughout the year within the meaning of the BRE Guide. More than this, the proposed pocket park will receive some sunlight access throughout the day and throughout the year, including at mid winter. Therefore, in simple terms, ARC's analysis indicated that the pocket park will provide a location within the proposed development where residents can go to sit and enjoy the sunshine on a sunny day.

**Amy Hastings BCL BL MSc (Spatial Planning) MIPI**  
**June 2019**



## TECHNICAL APPENDIX

### **Explanatory Note**

To date, it is understood that no standards or guidance documents (statutory or otherwise) on the subject of sunlight and daylight access to buildings or open spaces have been prepared or published in Ireland. In the absence of guidance on the matter of sunlight and daylight access tailored to Irish climatic conditions, Irish practitioners tend to refer to the relevant *British Standard, BS 8206-2:2008: Lighting for buildings - Part 2: Code of practice for daylighting* (the British Standard) and to the Building Research Establishment's *Site layout planning for daylight and sunlight: a guide to good practice* (the BRE Guide). The standards for sunlight and daylight access in buildings (and the methodologies for assessment of same) suggested in the British Standard and the BRE Guide have been referenced in this Assessment of Sunlight and Daylight Access within the Proposed Development.

Neither the British Standard nor the BRE Guide set out rigid standards or limits. The BRE Guide is preceded by the following very clear warning as to how the design advice contained therein should be used:

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

That the recommendations of the BRE Guide are not suitable for rigid application to all developments in all contexts is of particular importance in the context of national and local policies for the consolidation and densification of urban areas or when assessing applications for highly constrained sites (e.g. lands in close proximity or immediately to the south of residential lands).

The purpose of this report is to provide a general indication of daylight performance and sunlight access within the proposed development on the basis of numerous assumptions outlined below and with reference to design tools set out in the guidance documents referenced above. ARC takes no responsibility for any errors introduced by the third party proprietary sunlight and daylight analysis software used to perform the quantitative assessment. This report does not offer a guarantee of daylight performance or sunlight access to existing or future occupants or owners of the application site or neighbouring lands.

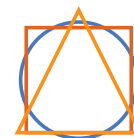
## SUNLIGHT ACCESS TO OPEN SPACES

### **Context under Technical and Guidance Documents**

Section 3.3 of the Building Research Establishment's *Site layout planning for daylight and sunlight: a guide to good practice* sets out design advice and recommendations for site layout planning to ensure good sunlight access to amenity spaces and to minimise the impact of new development on existing amenity spaces. The Guide suggests 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 sunlight at the equinox. The BRE Guide recommends that, as a rule of thumb, the centre of the space should receive at least two hours of sunlight on the 21st March in order to appear adequately sunlit throughout the year.

### **Assessment Methodology for Sunlight Access**

A three dimensional digital model of the proposed development and of existing buildings in the area was constructed by ARC Consultants based on drawings and three dimensional models supplied by the Design Team; and with reference to Dublin City Council's online planning register, on-site, satellite and aerial photography. Using the digital model, shadows were cast by ARC at several times of the day at the summer and winter solstices, and at the equinox. An equinox occurs twice a year: the March or vernal equinox (typically in or around the 20th to 21st March) and the September or autumnal equinox (typically in or around the 21st to 23rd September). For the purposes of this analysis and with reference to the BRE Guide, shadows were cast at several times of the day on 21st March.



The results are presented in shadow study diagrams associated with this report. Two separate pages have been prepared for each time period on each representative date as follows:

- **Receiving Environment:** this page shows the shadows cast by the existing buildings only. Existing buildings surrounding the application site are shown in light grey, while existing buildings on the application site are shown in orange. The shadows cast are shown in a dark grey tone.
- **Proposed Development:** this page shows the shadows cast by the existing buildings together with the shadows cast by the proposed development. The existing buildings surrounding the site are shown in light grey, while the proposed development and existing buildings to be retained on the application site are shown in blue. The shadows cast are shown in a dark grey tone.

## DAYLIGHT ACCESS TO BUILDINGS

### **Context under Technical and Guidance Documents**

BS 8206-2:2008: *Lighting for buildings - Part 2: Code of practice for daylighting*<sup>1</sup> states as follows at Section 5.5: Average daylight factor: "The average daylight factor is used as the measure of general illumination from skylight. It is considered good practice to ensure that rooms in dwellings and in most other buildings have a predominantly daylight appearance. In order to achieve this the average daylight factor should be at least 2%." The British Standard goes on to recommend a minimum of 1% Average Daylight Factor for bedrooms; 1.5% Average Daylight Factor for living rooms and 2% Average Daylight Factor for kitchens. The British Standard states "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%."

### **Assessment Methodology for Daylight Access**

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Daylight levels were assessed on the working plane (i.e., at work top level). The results of the analysis describe daylight access in terms of Average Daylight Factor (ADF), which expresses average daylight illuminance as a percentage of unobstructed outdoor illuminance. The factors considered in calculating Average Daylight Factor on the working plane include the light coming from the sky (i.e., the sky component), the light reflected from surfaces outside the room directly to the point being considered (i.e., the externally reflected component) and the light reflected from surfaces inside the room (i.e., the internally reflected component).

Having regard to the extreme variability in sky luminance over the course of any given day depending on weather conditions and the changing seasons, in order for daylight factor to be a meaningful and comparable measure of daylight access, it is necessary to assume a particular luminance distribution for the sky when calculating Average Daylight Factor. This daylight access analysis uses the Commission Internationale de l'Eclairage (CIE) Standard Overcast Sky Distribution model in its calculations, which is the standard sky most commonly used in daylight access analysis. This model assumes that sky luminance varies from horizon to zenith and is considered to correspond to an overcast day. As such, calculation of Average Daylight Factor in a room in circumstances where the sky luminance corresponds to the CIE Standard Overcast Sky Distribution could be considered to represent a worst case scenario. Unless specifically referenced, analysis of uniformity of daylight access within a room has not been carried out as part of this assessment.

<sup>1</sup> It is noted that BS 8206-2:2008: *Lighting for buildings - Part 2: Code of practice for daylighting* was recently replaced with BS EN 17037:2018 *Daylight in Buildings*. However, given that the *Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities* refer to the BS 8206-2:2008 and not to BS EN 17037:2018, BS 8206:2008 has been referenced in the preparation of this report.