

SUNLIGHT, DAYLIGHT AND SHADOW ASSESMENT

FOR

CORNAMADDY, ATHLONE

Project Reference:	J727
Revision Ref:	P01
Date Prepared:	29/6/2026
Date Issued:	05/08/2026
Prepared By:	Martin Obst

Contents

1.	INTRODUCTION.....	3
2.	EXECUTIVE SUMMARY	3
3.	STATEMENT OF EXPERIENCE	4
4.	GLOSSARY	4
5.	DAYLIGHTING ANALYSIS.....	8
6.	GARDENS DAYLIGHT/OVERSHADOWING STUDY	13
8.	CONCLUSION.....	15
9.	NOTES ON THE USE OF BRE GUIDANCE DOCUMENT (2022) "SITE LAYOUT PLANNING FOR DAYLIGHT AND SUNLIGHT"	16

1. INTRODUCTION

The development will comprise amendments to the permitted development as per LRD permission reference 318736-23 which comprises 175no. dwellings and 130 apartments, a creche and associated site works. The proposed development incorporates the following amendments:

1. Alteration to the permitted phasing with phase one incorporating a total of 130no. residential units of which there 102no. dwellings and 28no. duplex apartment units, in lieu of 129no. residential units as granted.
2. Phase one incorporating 102no. 2storey dwellings with the dwelling mix comprising 57no. 3bed units and 45no. 4bed units.
3. Phase one incorporating 2no. duplex apartment blocks which comprises 12no. 1bed triplex apartments, 8no. 2bed duplex apartments and 8no. 3bed duplex apartments. (overall units in phase one increasing from 129no. residential units as granted to 130no. residential units).
4. The provision of a Creche.
5. Alterations to the site layout in phase one comprising a reconfiguration of public open spaces, communal spaces and overall site layout along with public lighting, planting and boundary treatments to include boundary walls, railings & fencing.
6. Provision of a revised road layout to serve phase one.
7. All ancillary site development/construction works to facilitate foul, water and service networks for connection to the existing foul, water and ESB networks.
8. Provision of associated site infrastructure works to include for foul, water and storm water infrastructure.
9. Provision of 2no. ESB substations.

A Sunlight, daylight and shadow assessment has been prepared and accompanies this application to demonstrate compliance with the local requirement.

2. EXECUTIVE SUMMARY

JAK have been retained by the Applicant to carry out a sunlight, daylight and shadow assessment for the apartment and duplex units in proposed residential development in Stonehaven, Naas.

The calculations were carried out using the 'IES Virtual Environment' software and based on the layout drawings prepared by the Architect.

The proposed architectural plans, elevations and sections were analysed relative to the documents BRE guide 'Site Layout Planning for Daylight and Sunlight; A Guide to Good Practice', 2022, BS EN 17037:2018+A1 and I.S. EN17037-2018+A1-2021: Daylight in buildings. These documents include best practice guidelines for the provision of high quality living spaces with all subsequent results exceeding the minimum requirements.

The results of this study satisfy all the recommended values and the living spaces and outdoor spaces will provide an ample sunlit experience. An analysis was also performed on the impact to surrounding developments by the proposed scheme with the impact categorised as negligible for the majority of the adjacent dwellings. We have analysed different orientations of the duplex units as these would represent the worst case scenario for access to daylight and sunlight.

The focus of the study considers the following items with respect to the proposed new development:

- Average Daylight Factors – via average daylight factor calculations carried out for floor plans across the site of the proposed development.
- Daylight/Overshadowing to gardens.
- The adjacent residential units would not be adversely affected as the subtending angle with the proposed development is less than 25 degrees. VSC analysis is omitted in this case.



Fig 1. Development site, the subject of this application within the red line

3. STATEMENT OF EXPERIENCE

The simulation and reporting is carried out by Martin Obst (Principal Modelling & Sustainability Engineer) and Jonathan Kirwan (Senior Consulting Engineer/ Managing Director). Martin has over 5 years of experience using all modules of IES VE software and completed number of bespoke training sessions with IES VE focusing on areas covered in this report. He also is an experienced engineer with masters degree working in the industry for over 15 years. Jonathan has 28 years of experience in building services consultancy and is in private practice for over 20 years.

JAK have vast experience of using the IES VE software and have In-depth knowledge & experience in understanding the significance of true modelling & its affects. As an experienced design & consultancy practice, we utilize & work with dedicated support to fully utilize functionality of the modelling programs we work with. We set our standards High & have a very good record in providing detailed reports for many state bodies, (inc. DOES, SEAI) and numerous successful planning applications for projects throughout Ireland & abroad.

4. GLOSSARY

TERMS AND DEFINITIONS

Skylight

Non directional ambient light cast from the sky and environment.

Sunlight

Direct parallel rays of light emitted from the sun.

Daylight

Combined skylight and sunlight.

Overcast sky model

A completely overcast sky model, used for daylight calculation.

Existing Baseline Model State

The development site in its existing condition on site, with no development on either the proposed site or the granted scheme to the north (ABP PL 06F.306102). This model state has been used when generating the baseline results for all the existing neighbouring properties.

Vertical Sky Component (VSC)

Ratio of that part of illuminance, at a point on a given vertical plane, that is received directly from an overcast sky model, to illuminance on a horizontal plane due to an unobstructed hemisphere of this sky. Usually the 'given vertical plane' is the outside of a window wall. The VSC does not include reflected light, either from the ground or from other buildings.

Average Daylight Factor (ADF)

Ratio of total daylight flux incident on the working plane to the area of the working plane, expressed as a percentage of the outdoor illuminance on a horizontal plane due to an unobstructed overcast sky model. Thus a 1% ADF would mean that the average indoor illuminance would be one hundredth the outdoor unobstructed illuminance.

Working plane

Horizontal, vertical or inclined plane in which a visual task lies. Normally the working plane may be taken to be horizontal, 850 mm above the floor in houses and factories, 700 mm above the floor in offices. The plane is offset 500 mm from the room boundaries.

BRE Recommended Target Value

When assessing the effect a proposed development would have on a neighbouring property, a target value will be applied. This applied target value is generated as per the criteria set out for each study in the BRE Guidelines. Alternative Target Value It could be appropriate to use alternative target values when conducting assessment of effect on existing properties. If such instances occur the rationale will be clearly explained and the instances where the alternative target values have been applied will be clearly identified.

Level of BRE Compliance

Each table in the study will have a column identified as "Level of BRE Compliance". This column identifies how an assessed instance performs in relation to the appropriate target value. If the instance is in compliance with the recommendations as made in the BRE Guidelines the value will be expressed as "BRE Compliant". If the instance does not meet the criteria as set out in the BRE Guidelines a percentage will be expressed to determine the level of compliance with the recommendation. This value determines the definition of effect.

DEFINITION OF EFFECTS

In order to categorise the varying degrees of compliance with the BRE Guidelines when assessing the effect a proposed development would have on the daylight and sunlight of an existing property, 3DDB have assigned numerical values to the levels of effect as listed in 'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' prepared by the Environmental Protection Agency (Draft of 2017), and to Directive 2011/92/EU (as amended by Directive 2014/52/EU). The list of definitions given below is taken from Table 3.3: Descriptions of Effects contained in the draft 'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' prepared by the Environmental Protection Agency. Some comment is also given below on what these definitions might imply in the case of sunlight access.

Note: There are many factors to be taken into consideration when determining levels of effect. We have included typical numerical values that we have used when assigning levels of effect. These values are not applied rigidly, but rather as a guide. Circumstances may occur that lead to a rationale being taken to interpret these guidelines differently. Such cases are always explained in the Analysis of Results section, if and when they occur.

Imperceptible

An effect capable of measurement but without significant consequences. For the purposes of this Sunlight and Daylight Assessment Report an "imperceptible" level of effect will be stated if the level of effect is within the criteria as recommended in the BRE Guidelines and the applied target value has been achieved.

Not Significant

An effect which causes noticeable changes in the character of the environment but without significant consequences. For the purposes of this Sunlight and Daylight Assessment Report, a "not significant" level of effect will be stated if the level of effect is marginally outside of the criteria as stated in the BRE Guidelines. Typically a "not significant" level of effect will be applied if the level of daylight or sunlight is reduced to between 90-99% of the applied target value.

Slight

An effect which causes noticeable changes in the character of the environment without affecting its sensitivities. For the purposes of this Sunlight and Daylight Assessment Report, a "slight" level of effect will be stated if the level of daylight or sunlight is reduced to between 75-90% of the applied target value.

Moderate

An effect that alters the character of the environment in a manner that is consistent with existing and emerging trends. For the purposes of this Sunlight and Daylight Assessment Report, a "moderate" level of effect will be stated if the level of daylight or sunlight is reduced to between 50-75% of the applied target value. A "moderate" level of effect would be quite typical in instances where a proposed development is planned on an under-developed plot of land. The level of daylight and/or sunlight of an assessed property is reduced in a manner that is consistent with similar properties in the immediate surrounding area.

Significant

An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment. For the purposes of this Sunlight and Daylight Assessment Report a "significant" level of effect will be stated if the proposed development reduces the availability of daylight or sunlight of a neighbouring property to a low level. Typically a "significant" level of effect will be stated if the level of daylight or sunlight is reduced to between 30-50% of the applied target value.

Very Significant

An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment. For the purposes of this Sunlight and Daylight Assessment Report a “very significant” level of effect will be stated if the proposed development reduces the availability of daylight or sunlight of a neighbouring property to a very low level. Typically a “very significant” level of effect will be stated if the level of daylight or sunlight is reduced to between 10-30% of the applied target value.

Profound

An effect which obliterates sensitive characteristics. For the purposes of this Sunlight and Daylight Assessment Report, a “profound” level of effect will only be stated if the proposed development reduces the availability of daylight or sunlight of a neighbouring property to a level that is less than 10% of the applied target value.

Positive Effect

In relation to sunlight or daylight access, it is conceivable that there could be positive effects, but this implies that a development would involve a reduction of the size or scale of built form (e.g. such as the demolition of a building, which might result in an increase in sunlight access). Though that is possible, it is usually unlikely as most development involves the construction of new obstructions to sunlight access.

5. DAYLIGHTING ANALYSIS

For the purpose of demonstrating clear analysis, we have reviewed the whole site as shown on figure 1. We have selected the apartment units for the detailed analysis which are identified in Table 2. The selected apartments are the ones deemed to potentially have the poorest daylight due to development layout, orientation, and obstructions externally to the dwelling. Daylighting calculations were calculated using 'IES Virtual Environment' software.

British Standard "Daylight in buildings" (BS EN 17037) contains advice and guidance on interior daylighting. The guidance contained in this publication (BR 209) is intended to be used with BS EN 17037 and its UK National Annex[C1]. Other European countries have their own versions of EN17037, which do not include the UK National Annex. BS EN 17037 supersedes BS 8206 Part 2 "Code of practice for daylighting", which contained a method of assessment based on Average Daylight Factor, which is now no longer recommended. IS/BS EN 17037 gives three levels of recommendation for daylight provision in interior spaces: minimum, medium and high. For compliance with the standard, a daylit space should achieve the minimum level of recommendation.

The compliance calculation is based on an annual, climate-based simulation of interior illuminance distributions, BR209 refers to this method as the Illuminance Method. For each hour of the year, the percentage of the floor area achieving minimum and target illuminance thresholds are measured on a room-by-room basis. Two target types are set with the following criteria:

- Target Illuminance: 300 lux over 50% of floor area for at least 50% of daylight hours.
- Minimum Illuminance: 100 lux over 95% of floor area for at least 50% of daylight hours

Table 1. IS EN 17037:2018 Target Illuminance from Daylight over at least half the daylight hours

Level of recommendation	Target illuminance ET (lx) for half of the assessment grid	Minimum illuminance ETM (lx) for 95% of the assessment grid
Minimum	300 lux	100 lux
Medium	500 lux	300 lux
High	750 lux	500 lux

IS EN 17037 gives three levels of recommendation for daylight provision in interior spaces: minimum, medium and high. For compliance with the standard, a daylit space should achieve the minimum level of recommendation.

Table 2. IS EN 17037:2018 Target Daylight Factor (D) for Dublin

Level of recommendation	Target daylight factor D for half of the assessment grid	Minimum daylight factor D for 95% of the assessment grid
Minimum	2%	0.70%
Medium	3.50%	2%
High	5%	3.50%

Methodology

Sky Conditions

The sky conditions used in this simulation study was an unobstructed CIE standard overcast sky. The CIE Overcast Sky is used to give the worst-case scenario (in design terms) for illuminance and therefore is the most suitable design sky for Illuminance/Daylight Factor simulations.

Light from the sky

For new rooms the BRE guidelines recommend Illuminance and Daylight Factor Method. This method is based on calculating the daylight factors achieved over specific fractions of a reference plane. The Daylight factor is the illuminance at a point on a reference plane in a space, divided by the illuminance on an unobstructed horizontal surface outdoors. This method uses an overcast sky for calculation and the assessment of the space is orientation independent. BS EN 17037 gives the Median External Diffuse Illuminance ($E_{v,d,med}$) for the capital cities throughout Europe to account for external local illuminance levels.

Analysis results

The results in the table below are demonstrating the Daylight Factor results for the living room and kitchen areas combined. Our methodology demonstrates that 100% of the rooms achieve acceptable daylight levels. The north facing duplex would represent the worst case scenario and with all levels above repeating we can expect that all apartments achieve minimum DF values.

We have one of the apartment units. The DF results are same for all of these as the calculation is actually sky illuminance level and not direct sunlight.



Fig 2. Plan of worst case scenario duplex to be assessed for Illuminance



Fig 3. Plan of duplex and triplex units to be assessed for Illuminance

Table 3. Results IS EN 17037:2018 Target Illuminance from Daylight over at least half the daylight hours.

Ref	Room reference	Orien- tation	Floor area passing Illuminance method >100 lux>50% hours (minimum 50%)	Floor area passing Illuminance method >300 lux>50% hours (minimum 50%)	BRE minimum Compliance
	Duplex Type D1				
1	D1 GF Apt Kitchen/Living	E	100%	100%	Yes
2	D1 GF Apt bedroom 1	E	100%	100%	Yes
3	D1 GF Apt bedroom 2	W	100%	100%	Yes
4	D1 duplex Kitchen/Dining	E/W	100%	100%	Yes
5	D1 duplex Living	E	100%	100%	Yes
6	D1 duplex bed 1	W	100%	100%	Yes
7	D1 duplex bed 2	E	100%	100%	Yes
8	D1 duplex bed 3	E	100%	100%	Yes
	Triplex Type T1				
9	T1 GF Apt Kitchen/Living	E	100%	100%	Yes
10	T1 GF Apt bedroom 1	W	100%	100%	Yes
11	T1 FF Apt Kitchen/Living	E	100%	100%	Yes
12	T1 FF Apt bedroom 1	W	100%	100%	Yes
13	T1 SF Apt Kitchen/Living	E	100%	100%	Yes
14	T1 SF Apt bedroom 1	W	100%	100%	Yes

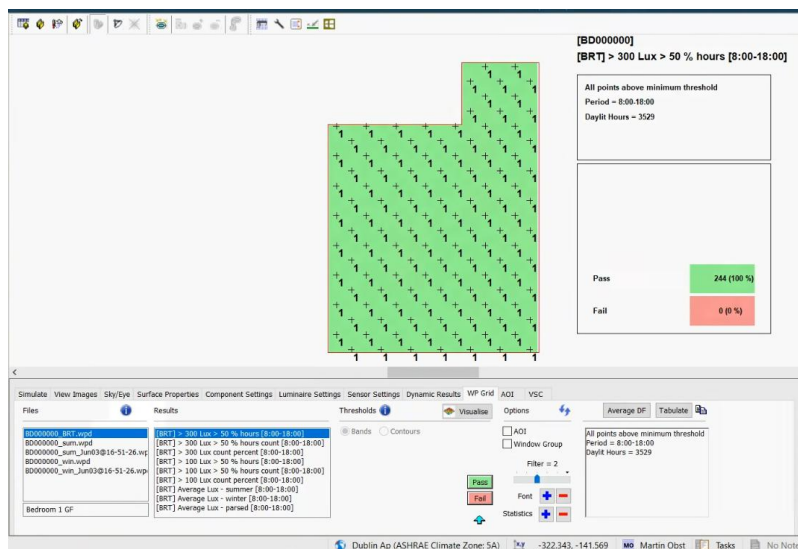


Fig 3. Illuminance method assessment interface for sample room (S1 Duplex Living room)

Table 4. Results IS EN 17037:2018 Target Daylight Factor (D) for Dublin

Ref	Room reference	Orien- tation	Floor area above Target daylight factor D of 1.3% (50% area minimum)	Floor area above Minimum daylight factor D of 0.7% (95% area minimum)	BRE minimum Compliance
	Duplex Type D1				
1	D1 GF Apt Kitchen/Living	E	100%	100%	Yes
2	D1 GF Apt bedroom 1	E	100%	100%	Yes
3	D1 GF Apt bedroom 2	W	100%	100%	Yes
4	D1 duplex Kitchen/Dining	E/W	100%	100%	Yes
5	D1 duplex Living	E	100%	100%	Yes
6	D1 duplex bed 1	W	100%	100%	Yes
7	D1 duplex bed 2	E	100%	100%	Yes
8	D1 duplex bed 3	E	100%	100%	Yes
	Triplex Type T1				
9	T1 GF Apt Kitchen/Living	E	100%	100%	Yes
10	T1 GF Apt bedroom 1	W	100%	100%	Yes
11	T1 FF Apt Kitchen/Living	E	100%	100%	Yes
12	T1 FF Apt bedroom 1	W	100%	100%	Yes
13	T1 SF Apt Kitchen/Living	E	100%	100%	Yes
14	T1 SF Apt bedroom 1	W	100%	100%	Yes

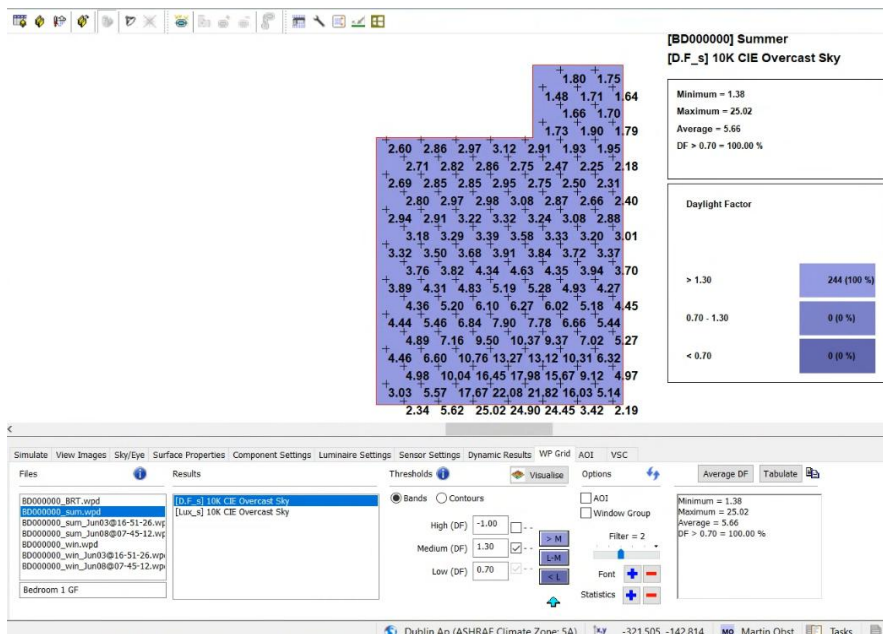
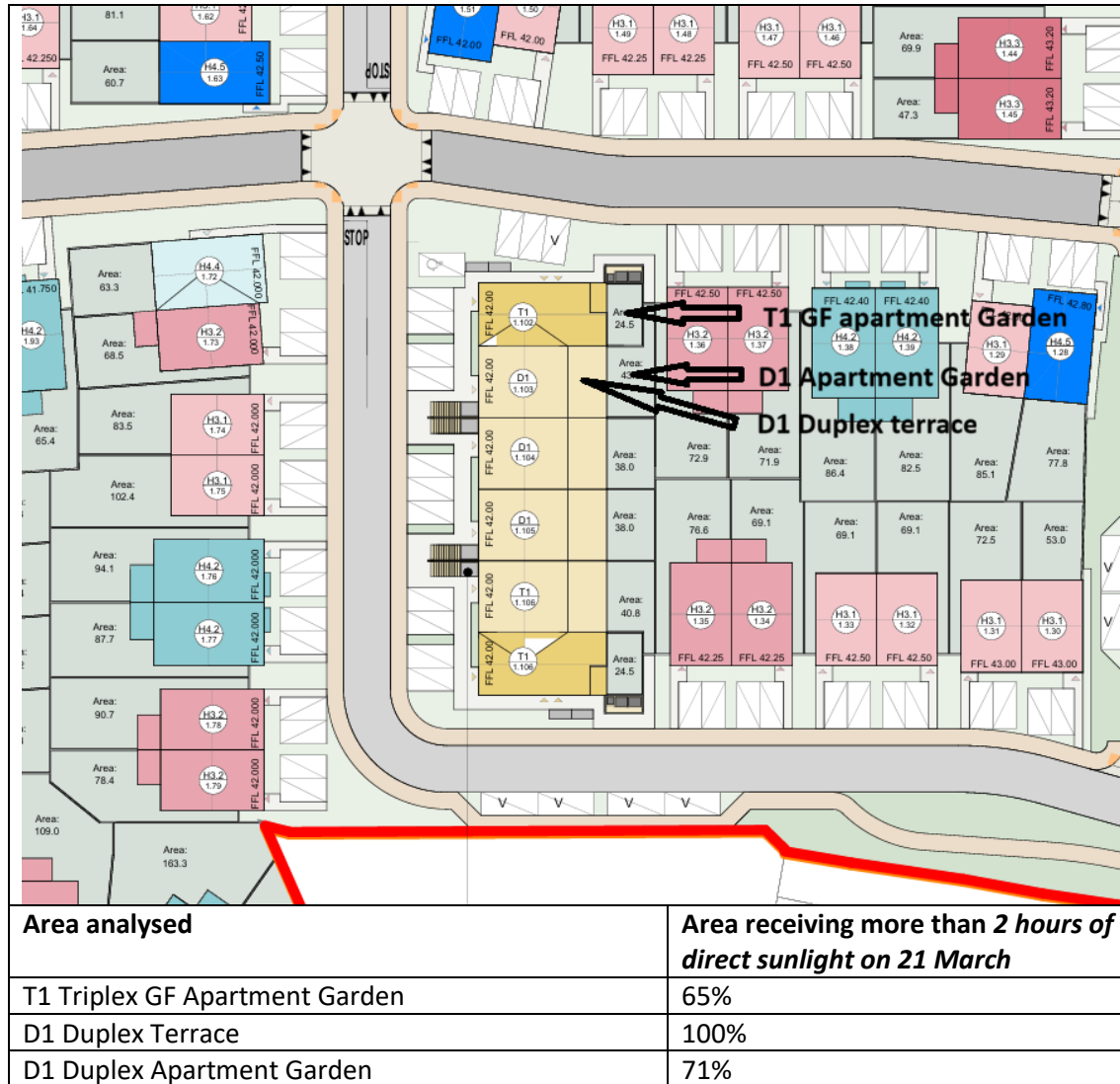


Fig 4. Daylight Factor method assessment interface for sample room (S1 Duplex Living room)

6. GARDENS DAYLIGHT/OVERSHADOWING STUDY

The layout of the rear gardens offers good access to daylight for the occupiers. We have analysed daylight to rear gardens of the terrace (apartment, duplex private open space & adjacent houses) and figure 4 gives illustrates the results as follows:



These were selected deemed as worst case scenario, due to their orientation and height of the duplex. The calculations were carried out using the 'IES Virtual Environment' software and based on the layout drawings prepared by the Architects and the information was collated on a letter issued to the client.

The proposed architectural plans, elevations and sections were analysed relative to the documents BRE guide 'Site Layout Planning for Daylight and Sunlight; A Guide to Good Practice' BR209 (2022), IS EN 17037 (2018): Daylight in buildings and. These documents include best practice guidelines for the provision of high-quality living spaces

Sunlight to Gardens

While providing good levels of daylight and sunlight in living spaces is important, it is also essential to apply the same mentality to outside spaces and amenity areas. An adequately lit

open space creates a rich ambience that any occupant would find appealing. The basis of this calculation is to assess if 50% of the public areas will achieve more than two hours' worth of sunlight during the spring equinox (21st March).

The predicted sunlight to the private gardens within the proposed development has been assessed based on BRE guidelines to verify that the amenity for residents will fall within acceptable parameters based on the worst case scenario.

Sunlight hours modelling

Using the IES VE software model in the Sunecast module an accurate shadow casting analysis was produced. This program replicates the azimuth and altitude of the sun for any specified time and date of the year, orientation, site latitude and site longitude at site location.

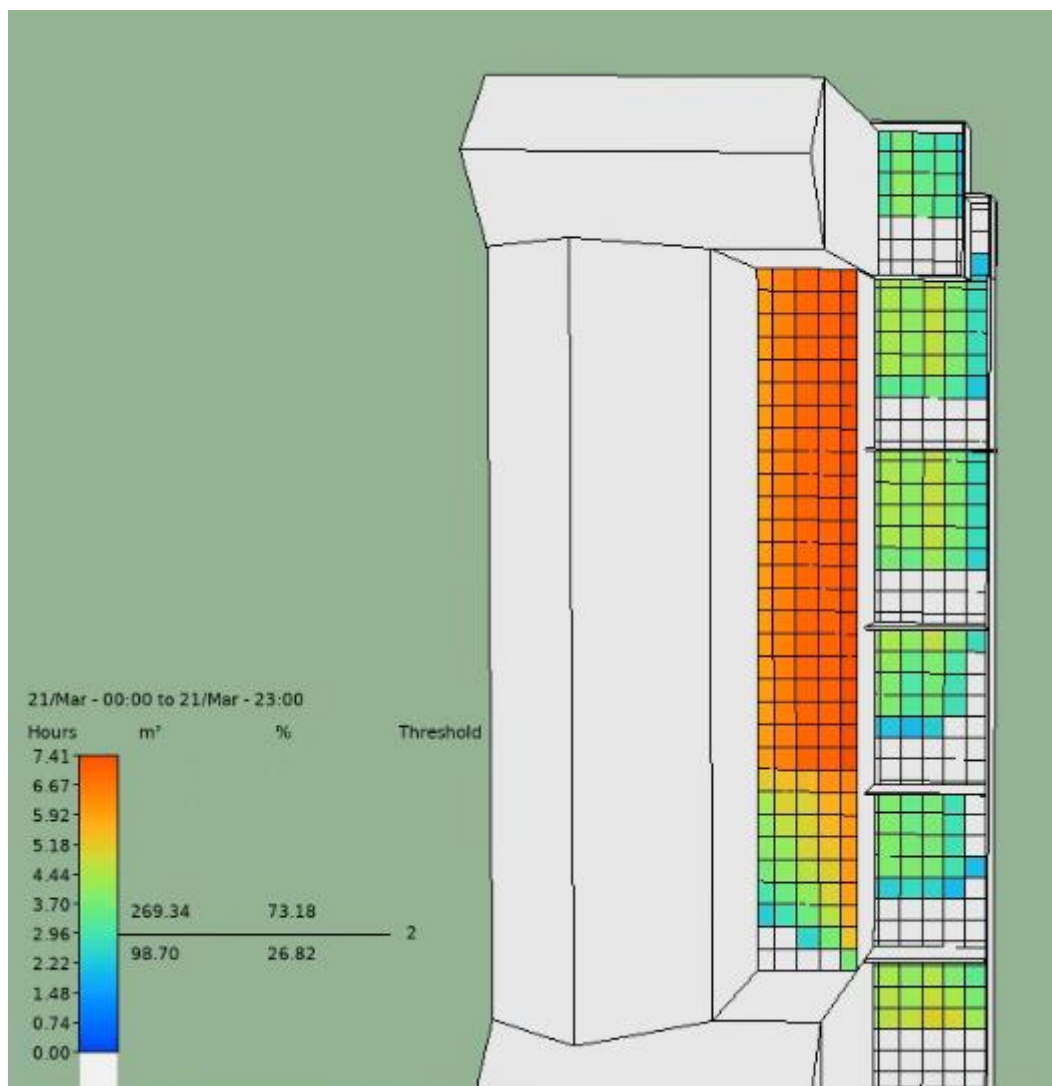


Fig.4 Sunlight to gardens of the block of triplex and duplex units

Figures above illustrate the results of the modelling. The blue coloured squares indicate areas which receive more than 2 hours of sunlight and the grey represent the areas below the 2 hour requirement.

8. CONCLUSION

The following can be concluded based on the studies undertaken:

Daylighting analysis

The proposed development will provide high quality living spaces with average daylight factor results exceeding the minimum requirements for all the rooms analysed. The results satisfy requirements of BRE 209 'Site Layout Planning for Daylight and Sunlight; A Guide to Good Practice', 2022, IS EN 17037 (2018): Daylight in buildings.

Access to daylight/shadow in the gardens

Rear of dwellings outdoor areas would exceed the BRE requirement and residents will be able to enjoy their private gardens with good access to sunlight.

Impact to existing buildings

The adjacent residential units would not be adversely affected as the subtending angle with the proposed development is less than 25 degrees as outlined in section 2.3 of BRE-209 guide. VSC analysis is omitted in this case. There is no impact to adjacent existing residential buildings.

9. NOTES ON THE USE OF BRE GUIDANCE DOCUMENT (2022) “SITE LAYOUT PLANNING FOR DAYLIGHT AND SUNLIGHT”.

The apartments were designed in line with the recommendations of the BRE guidelines. Numerous rounds of design iterations were conducted to improve the daylight and sunlight within in the proposed development. The guidelines clearly state that they are recommendations only and flexibility is required when setting and interpreting the targets. BR209:2022 recommends assessment methods set out in BS EN 17037 for daylight provision. BS EN 17037 contains a National Annex (NA1) which sets out minimum daylight levels to be achieved in the UK and Channel Islands. Ireland has a similar latitude and climate to the UK.

Neither the British Standard nor the BRE Guide set out rigid standards or limits. The BRE Guide section 1.6 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 aims 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. In special circumstances the developer or planning authority may wish to use different target values”.

Specific guidance on how alternative targets can be identified is provided in Appendix F of the BRE guide. 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. Given that the British Standard and the BRE Guide were drafted in the UK in the context of UK strategic planning policy, recommendations or advices provided in either document that have the potential to conflict with Irish statutory planning policy have been disregarded for the purposes of this analysis.