



## DAYLIGHTING REPORT

### PROPOSED RESIDENTIAL DEVELOPMENT AT TRUSKEY EAST, TRUSKEY WEST, FREEPORT AND AHAGLUGGER, BEARNA, CO. GALWAY

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## **BEARNA HOUSING DEVELOPMENT, Bearna**

### **DAYLIGHT REPORT**

#### **1. EXECUTIVE SUMMARY**

- 1.1. The purpose of this report is to verify the daylight factors in the proposed Apartment Blocks comply with the requirements of BRE guide 'Site Layout Planning for Daylight and Sunlight' (2nd edition) and BS 8206-2: 2008 – 'Lighting for Buildings – Part 2: Code of Practice for Daylighting'.
- 1.2. The introduction of natural daylight provides a number of benefits including minimising the use of artificial lighting and hence reducing the energy consumption and CO<sub>2</sub> emissions of the building. In addition people value the variety of daylight and benefit from a view of the external environment. Daylight therefore has a beneficial effect on occupant wellbeing.
- 1.3. This evaluation is focussed on four apartments blocks A1, A2, A3 & A4.
- 1.4. Our findings indicate that, as shown in Appendix 1, the average daylight factor in the Living Rooms/Kitchens and Bedrooms comply with BRE guide 'Site Layout Planning for Daylight and Sunlight' (2nd edition) and BS 8206-2: 2008 – 'Lighting for Buildings – Part 2: Code of Practice for Daylighting' by achieving or exceeding the minimum daylight requirements in all cases.

## 2. DAYLIGHT REQUIREMENTS

- 2.1. BS 8206: Part 2: 2008 *Code of Practice for daylight* recommends the following minimum average daylight factors in dwellings; “In domestic interiors 2% will still give a feeling of daylight, though some tasks may require electric light. The BS 8206 code of practice recommends average daylight factors of at least 1% in bedrooms, 1.5% in living rooms and 2% in kitchens, even if a predominantly daylight appearance is not required”.

Room Type	Min Average Daylight Factor (%)
Bedrooms	1.0
Living Rooms	1.5
Kitchen/Dining	2.0

*Table 1 – Daylight Requirements*

## 3. MODEL INPUT DATA

- 3.1. The primary goal of daylighting analysis is the evaluation of the potential design to provide useful levels of natural illumination. This analysis was carried out using the FlucsPro module of the IES VE-Pro2019 suite of simulation software.
- 3.2. The calculation takes into account the direct and reflected, internal and external, component of daylight to determine the daylight factors within the calculated space.
- 3.3. The daylight factor at any point is the ratio of the interior illuminance at that point to the global horizontal illuminance under CIE standard overcast sky conditions. The interior illuminance is usually evaluated at work plane height.
- 3.4. Standard CIE overcast sky, as described by the International Commission on illumination, was used to analyse the design to ensure compliance with statutory minimum daylight provision and predict the daylight factor reduction caused by introducing new external obstructions to the local environment, such as a proposed nearby building.
- 3.5. Because overcast skies will generally be the duller, the daylight factor method should be considered a “worst case” evaluation, primarily suited to calculating

minimum values. As the sky luminance does not vary with azimuth, the orientation of the scene about the z-axis has no effect on the Daylight Factor.

- 3.6. Daylight factors are usually evaluated for uncluttered spaces. Since we are not interested in visualisation, the scene description usually accounts for only the important structural features of the space, and furniture etc. is excluded.
- 3.7. Daylight levels were simulated for the task area within each space. The task area considered was based on CIBSE guidance with requires a 500mm perimeter margin.
- 3.8. Quality settings – Reflections and shading from Inner and outer surfaces of this room and shading from surfaces of other visible rooms. Using the full progressive radiosity inter reflection method.
- 3.9. The task area and surface properties considered were as per Tables 2 and 3.

Task Area	
Working plane height (m)	0.700
Working plane margin (m)	0.500

Table 2 – Task Area

Surface	Reflectance
Floor	20
Wall	50
Ceiling	70
Glazing transmittance	70%

Table 3 – Surface Properties

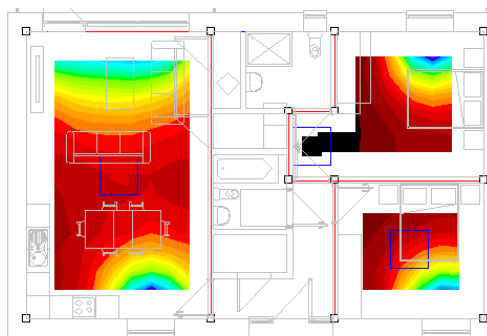


Figure 1 – Sample Apartment showing Area of Interest

#### 4. SAMPLE MODEL IMAGES

##### 4.1. Ground Floor

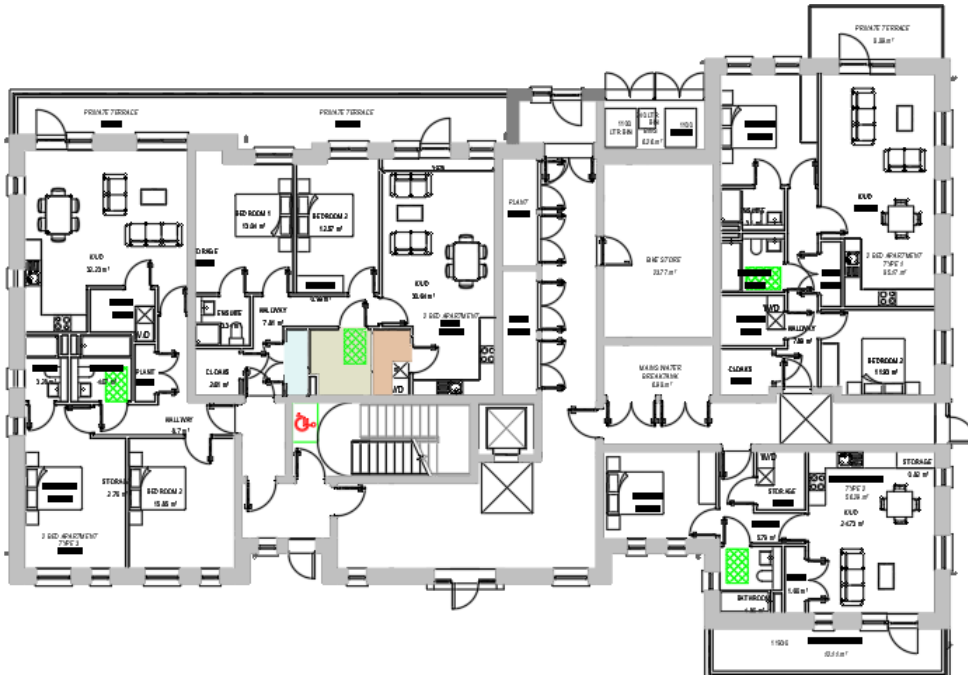


Figure 2 – Ground Floor Plan (Block A1)

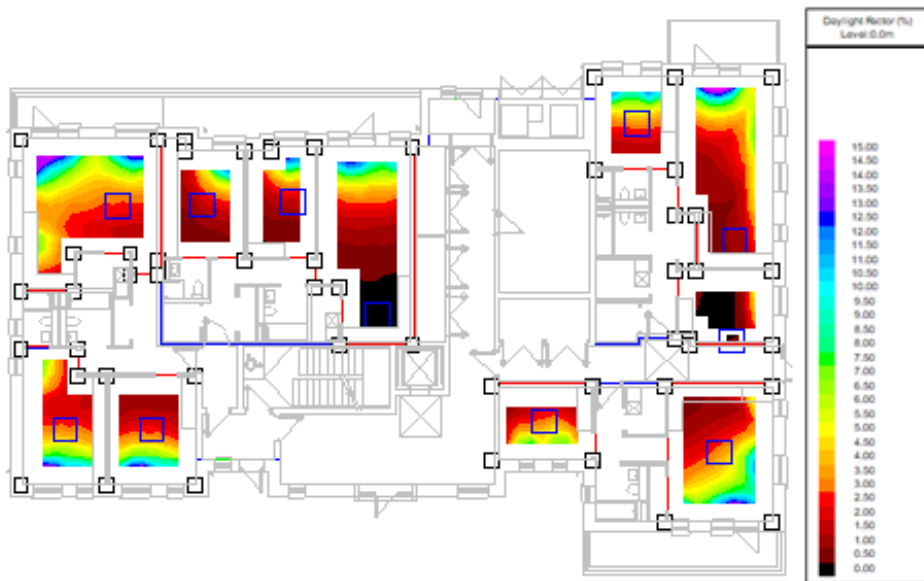


Figure 3 – Ground Floor Daylight Evaluation (Block A1)

4.2. First Floor

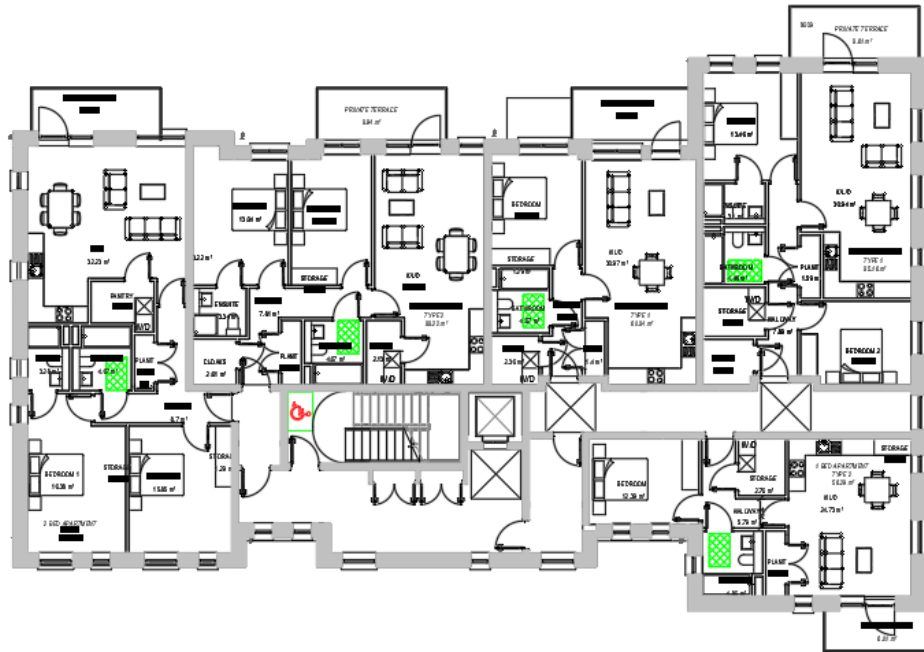


Figure 4 – First Floor Plan (Block A1)

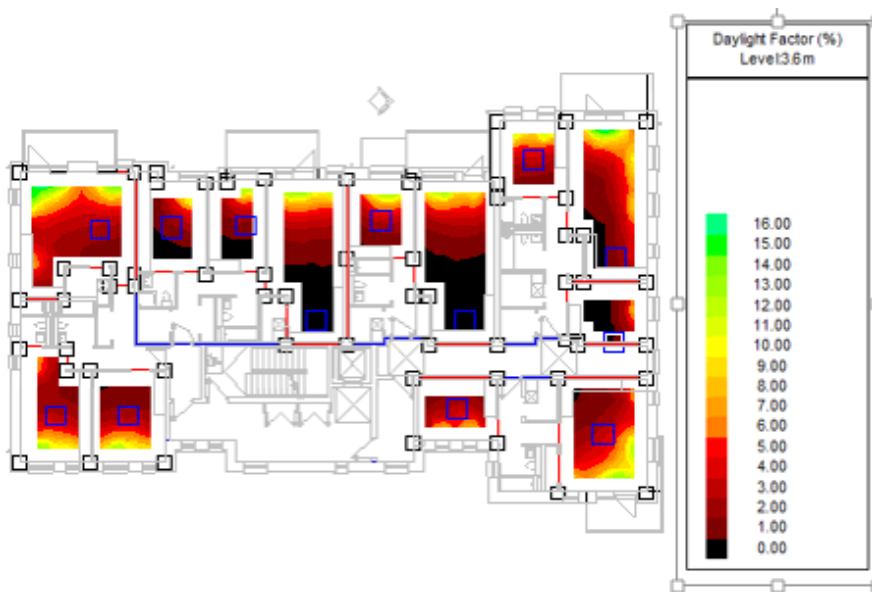


Figure 5 – First Floor Daylight Evaluation (Block A1)

### 4.3. Second Floor

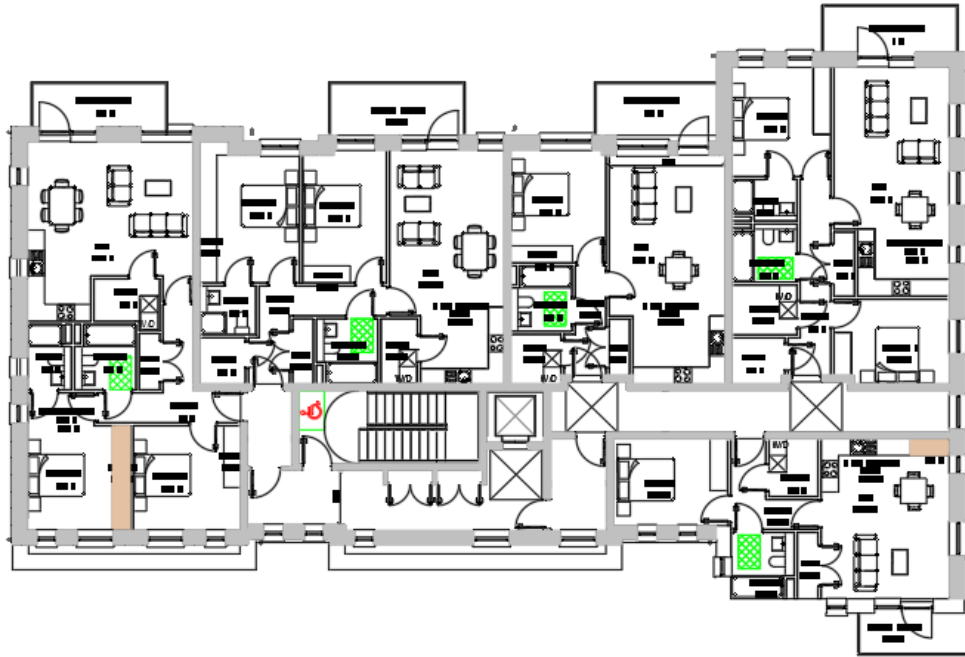


Figure 6 – Second Floor Plan (Block A1)

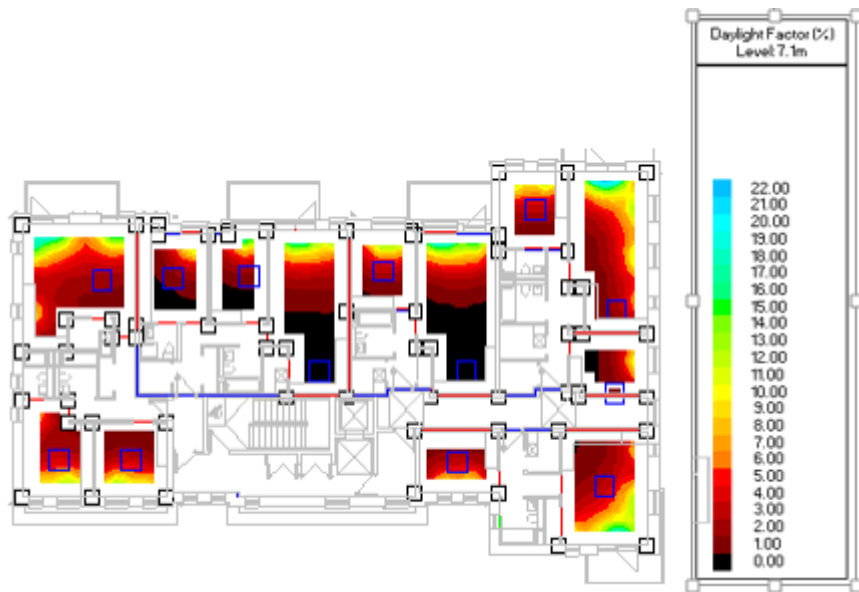


Figure 7 – Second Floor Daylight Evaluation (Block A1)



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## APPENDIX 1: DAYLIGHT FACTORS

**BLOCK A1**

<b>Daylight Factor (%)</b>	
<b>Room Name</b>	<b>Daylight Factor (%)</b>
<b>Ground Floor</b>	
<b>Apartment 88 – 2 Bed Type 3</b>	
Bedroom 1	4.6
Bedroom 2	4.0
Kitchen/Living/Dining Room	5.0
<b>Apartment 89 – 2 Bed Type 2</b>	
Bedroom 1	2.4
Bedroom 2	2.7
Kitchen/Living/Dining Room	2.5
<b>Apartment 90 – 2 Bed Type 1</b>	
Bedroom 1	4.5
Bedroom 2	1.1
Kitchen/Living/Dining Room	3.5
<b>Apartment 91 – 1 Bed Type 2</b>	
Bedroom 1	3.4
Kitchen/Living/Dining Room	4.4
<b>First Floor</b>	
<b>Apartment 92 – 2 Bed Type 3</b>	
Bedroom 1	4.5
Bedroom 2	4.0
Kitchen/Living/Dining Room	5.2
<b>Apartment 93 – 2 Bed Type 2</b>	
Bedroom 1	2.3
Bedroom 2	2.7
Kitchen/Living/Dining Room	2.9
<b>Apartment 94 – 1 Bed Type 1</b>	
Bedroom 1	4.2
Kitchen/Living/Dining Room	2.3
<b>Apartment 95 – 2 Bed Type 1</b>	
Bedroom 1	4.5
Bedroom 2	1.8
Kitchen/Living/Dining Room	4.2
<b>Apartment 96 – 1 Bed Type 2</b>	
Bedroom 1	3.6
Kitchen/Living/Dining Room	4.9
<b>Second Floor</b>	
<b>Apartment 97 – 2 Bed Type 3</b>	
Bedroom 1	4.8
Bedroom 2	4.0
Kitchen/Living/Dining Room	5.3
<b>Apartment 98 – 2 Bed Type 2</b>	
Bedroom 1	2.2
Bedroom 2	3.1
Kitchen/Living/Dining Room	3.0
<b>Apartment 99 – 1 Bed Type 1</b>	
Bedroom 1	4.1
Kitchen/Living/Dining Room	3.0

Table 4 – Daylight Factor Results – Block A1

Daylight Factor (%)	
Room Name	Daylight Factor (%)
<b>Second Floor</b>	
<b>Apartment 100 – 2 Bed Type 1</b>	
Bedroom 1	4.3
Bedroom 2	2.9
Kitchen/Living/Dining Room	5.6
<b>Apartment 101 – 1 Bed Type 2</b>	
Bedroom 1	3.7
Kitchen/Living/Dining Room	5.4

Table 5 – Daylight Factor Results – Block A1

## BLOCK A2

Daylight Factor (%)	
Room Name	Daylight Factor (%)
<b>Ground Floor</b>	
<b>Apartment 102 – 2 Bed Type 1</b>	
Bedroom 1	4.2
Bedroom 2	1.0
Kitchen/Living/Dining Room	4.0
<b>Apartment 103 – 2 Bed Type 2</b>	
Bedroom 1	2.0
Bedroom 2	2.9
Kitchen/Living/Dining Room	2.9
<b>Apartment 104 – 2 Bed Type 3</b>	
Bedroom 1	4.0
Bedroom 2	4.0
Kitchen/Living/Dining Room	5.0
<b>First Floor</b>	
<b>Apartment 105 – 1 Bed Type 2</b>	
Bedroom 1	3.2
Kitchen/Living/Dining Room	4.8
<b>Apartment 106 – 2 Bed Type 1</b>	
Bedroom 1	4.5
Bedroom 2	2.1
Kitchen/Living/Dining Room	4.5
<b>Apartment 107 – 1 Bed Type 1</b>	
Bedroom 1	4.2
Kitchen/Living/Dining Room	2.4
<b>Apartment 108 – 2 Bed Type 2</b>	
Bedroom 1	2.3
Bedroom 2	2.7
Kitchen/Living/Dining Room	2.7
<b>Apartment 109 – 2 Bed Type 3</b>	
Bedroom 1	4.3
Bedroom 2	4.2
Kitchen/Living/Dining Room	4.8

Table 6 – Daylight Factor Results – Block A2

Daylight Factor (%)	
Room Name	Daylight Factor (%)
<b>Second Floor</b>	
<b>Apartment 110 – 1 Bed Type 2</b>	
Bedroom 1	3.4
Kitchen/Living/Dining Room	6.4
<b>Apartment 111 – 2 Bed Type 1</b>	
Bedroom 1	4.8
Bedroom 2	3.3
Kitchen/Living/Dining Room	5.8
<b>Apartment 112 – 1 Bed Type 1</b>	
Bedroom 1	4.6
Kitchen/Living/Dining Room	3.3
<b>Apartment 113 – 2 Bed Type 2</b>	
Bedroom 1	2.4
Bedroom 2	3.4
Kitchen/Living/Dining Room	3.3
<b>Apartment 114 – 2 Bed Type 3</b>	
Bedroom 1	4.5
Bedroom 2	4.3
Kitchen/Living/Dining Room	5.4

Table 7 – Daylight Factor Results – Block A2

## BLOCK A3

Daylight Factor (%)	
Room Name	Daylight Factor (%)
<b>Ground Floor</b>	
<b>Apartment 115 – 2 Bed Type C1</b>	
Bedroom 1	2.6
Bedroom 2	3.1
Kitchen/Living/Dining Room	3.9
<b>First Floor</b>	
<b>Apartment 116 – 2 Bed Type C3</b>	
Bedroom 1	3.7
Bedroom 2	4.4
Kitchen/Living/Dining Room	4.1

Table 8 – Daylight Factor Results – Block A3

**BLOCK A4**

<b>Daylight Factor (%)</b>	
<b>Room Name</b>	<b>Daylight Factor (%)</b>
<b>Ground Floor</b>	
<b>Apartment 117 – 2 Bed Type C2</b>	
Bedroom 1	3.8
Bedroom 2	3.8
Kitchen/Living/Dining Room	3.3
<b>Apartment 118 – 2 Bed Type C1</b>	
Bedroom 1	3.0
Bedroom 2	3.2
Kitchen/Living/Dining Room	5.1
<b>First Floor</b>	
<b>Apartment 119 – 2 Bed Type C3</b>	
Bedroom 1	4.1
Bedroom 2	3.4
Kitchen/Living/Dining Room	3.5
<b>Apartment 119 – 2 Bed Type C3</b>	
Bedroom 1	3.8
Bedroom 2	2.5
Kitchen/Living/Dining Room	4.3

*Table 9 – Daylight Factor Results – Block A4*