Daylight / Sunlight Assessment

Church Fields East, Mulhuddart, Dublin 15.

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This document has been prepared and checked in accordance with
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Issue	Date	Prepared by	Checked by	Approved by
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Comments

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1. Introduction

Waterman Moylan have been appointed to complete the daylight and sunlight report for the proposed residential development in Church Fields East, Mulhuddart, Dublin 15. The purpose of this report is to determine if the various parameters associated with daylight and sunlight meet the recommendations of BRE document 'Site Layout Planning for Daylight and Sunlight: a Guide to Good Practice' Third Edition (**BR 209-2022**).

The parameters assessed will include the following,

- illuminance within apartment blocks,
- sunlight to communal amenity areas, public open spaces, and pocket parks within the proposed development,
- overshadowing caused by the proposed development within the subject site and to the permitted Part 8 properties,
- vertical sky component to the permitted Part 8 properties,
- Annual Probable Sunlight Hours to the permitted Part 8 properties,

The proposed development and the permitted Part 8 properties have been assessed using a number of qualitative and quantitative methods to identify the areas of the development which were likely to receive the least daylight and to identify measures that could be taken to improve the daylight penetration. IES Virtual Environment simulation software was used to build a model of the proposed development to enable the necessary analysis to be completed.

The assessment of the properties includes the properties that have been permitted on adjacent lands (under a separate Part 8 planning permission grant) but which have not been constructed at the time of writing this report.

This Daylight & Sunlight Assessment Report presents the requirements set out in the relevant guidance documents, describes the methodologies employed to complete the analysis and details the results that were achieved.

2. Site Overview and Nature of Proposed Development

2.1 Site Location & Description

The proposed development relates to a site of c.5.52 hectares at Church Fields East, Mulhuddart, Dublin 15. The development site is located south of Damastown Avenue; west of Church Road; east of previously permitted residential development at Church Fields (Planning Reg. Ref.: PARTXI/012/21); and north of a permitted linear park (Eastern Linear Park Planning Reg. Ref.: PARTXI/012/21), in the townland of Tyrrelstown, Dublin 15. The proposed development seeks the construction of 217 no. residential units (ranging from 2 – 4 storeys in height) in a mixed tenure development, comprising of 121 no. houses and 96 no. apartments. The development will also include the provision of car parking, cycle parking, new pedestrian / cycle links, services, drainage and attenuation, and all associated site and infrastructural works.

Unit Type	1-Bed	2-Bed	3-Bed	4-Bed	Total
Houses	-	34	76	11	121
Apartment	36	56	4	-	96
Total	36	90	80	11	217

Table 1: Breakdown of Proposed Residential Units

Figure 1: Proposed development layout

2.2 Design Development Process

The daylight modelling results presented in Section 4 of this report have been achieved following a design development process between the Architect, Walsh Associates and Waterman Moylan. Preliminary drawings were analysed for compliance and feedback was given to the Architect.

In areas where non compliances were identified, the Architect looked to improve the access to daylight by increasing window sizes where possible and by modifying the position of the balconies to minimise the over-shading of the living areas. These changes had a positive impact on the daylight levels achieved and these improved results are reported in Section 4.

3. Relevant Standards and Assessment Approach

This Daylight and Sunlight Assessment follows the methodologies set out in the Building Research Establishment's (BRE) publication entitled "Site Layout Planning for Daylight and Sunlight. A Guide to Good Practice – Third Edition 2022 (hereinafter referred to as **BR209-2022**). This document is considered to be one of the primary sources of guidance on the subject of daylight and sunlight in residential developments. The 2022 Third Edition supersedes the previously issued 2018 document and aligns the BRE methodology with the methodology that is set out in EN-17037. All references to the methodologies identified in the British Standard (BS) 8206: Part 2 – Code of Practice for Daylighting and the 2022 document are now removed.

The Sustainable Urban Housing: Planning authorities should avail of appropriate expert advice where necessary and have regard 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 BR 209-2022 Edition (June 2022), or any relevant future standards or guidance specific to the Irish context, when undertaken by development proposers which offer the capability to satisfy minimum standards of daylight provision.

The BR 209-2022 sets out a number of key parameters and assessment methodologies that should be measured in order to assess the sunlight & daylight penetration into the buildings within a proposed development and also sets out the analysis that should be carried out to assess the impact of a proposed development might have on the permitted Part 8 properties adjacent.

3.1 Assessment Methodologies

BR 209-2022 identifies a number of metrics that can be used to assess the levels of daylight that can be expected in a dwelling.

3.1.1 Angle of Visible Sky

The Angle of Visible Sky can be used to provide a qualitative assessment of the amount of daylight that can be expected based on the angle between the mid pane of the window and continuous obstruction opposite to it.

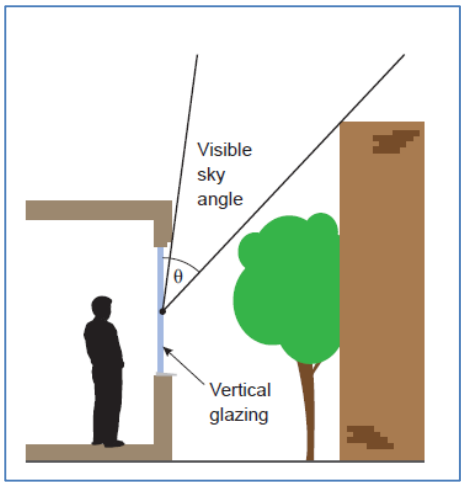

Figure 2: Angle of Visible Sky (Θ)

3.1.2 Vertical Sky Component (VSC)

The Vertical Sky Component (VSC) is the ratio of direct sky illuminance that falls on a vertical wall at a particular reference point to the simultaneous horizontal illuminance under an unobstructed sky. The maximum VSC is typically 40% for an unobstructed wall. The assessment of VSC assumes that the sky is completely overcast (CIE Overcast Sky), with no direct sunlight. As the sky model brightness is assumed unidirectional, there is therefore no difference in calculation for VSC for different orientations: i.e., Northerly aspect facades will receive identical natural light potential to Southerly, etc.

The Angle of Visible Sky and the VSC are effectively different ways of representing the same information, both will allow an assessment to be made of the day light available at a point on a building façade, and by extension the likelihood of adequate daylight being available within the rooms of a building, however they do not provide a method for measuring the specific internal daylight levels.

3.1.3 Illuminance (Lux) Levels – Proposed Dwellings

The method for determining if an indoor space will receive adequate daylight set out with the BR 209-2022 document has changed from previous versions. The guidance is now aligned with EN 17037:2018 and aims to ensure new buildings create spaces with significant daylight availability to provide adequate illumination to indoor surfaces.

The guidance provides two methods for assessing indoor daylight levels, (i) absolute illuminance levels, measured in Lux, and (ii) daylight factors. Both methods are deemed to be equivalent metrics. For the purposes of this report, the proposed development will be assessed against the Illuminance approach.

Target illuminance levels are provided within BR 209-2022 which correspond to the values identified in EN 17037. There is also an Annex included within EN 17037 which identifies targets that are deemed to be satisfactory for the United Kingdom, these UK specific targets are lower than those identified in the EN standard. Refer to Section 4.1.2 of this document for further details of the target illuminance levels.

Where one room serves more than one purpose, the minimum daylight target of the room type with the highest value has been applied.

3.1.4 Sunlight to Amenity

BR 209-2022 recommend that for external amenity spaces to appear adequately sunlit throughout the year, at least 50% of the amenity space should receive at least two hours of sunlight on March 21st. In order to prove that sunlight levels to amenity spaces achieve compliance a dynamic simulation was carried out using IES VE Suncast.

The amenity spaces were imported to IES VE via Auto CAD dxf files, and the footprint of the amenity area was traced and the geometry (position, bulk and height) of all proposed building structures were included in order to perform accurate IES VE Suncast simulations.

4. Daylight Assessment of Dwellings

As discussed in Section 3, a combination of methods was used to make an assessment of the daylight levels that will be achieved within the various apartments within the development. This assessment systematically identified the apartments that will have the most restricted access to daylight based on BR 209-2022 recommended Vertical Sky Angle obstruction angle of between 25° - 45°.

4.1 Angle of Visible Sky Assessment

In order to use the Angle of Visible Sky method to critically assess the scheme, a series of sections through the buildings were analysed to determine which apartments had the least advantageous “Angle of Visible Sky” as these are the apartments that are likely to perform the worst in terms of illuminance.

Due to the low-rise nature of the scheme overall and the fact that the apartment blocks are generally well spaced out, the majority of apartments have a favourable Angle of Visible Sky.

4.1.1 IES Model Data

The model was built in accordance with architectural Auto CAD layouts issued by Walsh Associates which included all blocks in the proposed development. IES VE model images of the proposed development and permitted Part 8 adjacent are presented below.

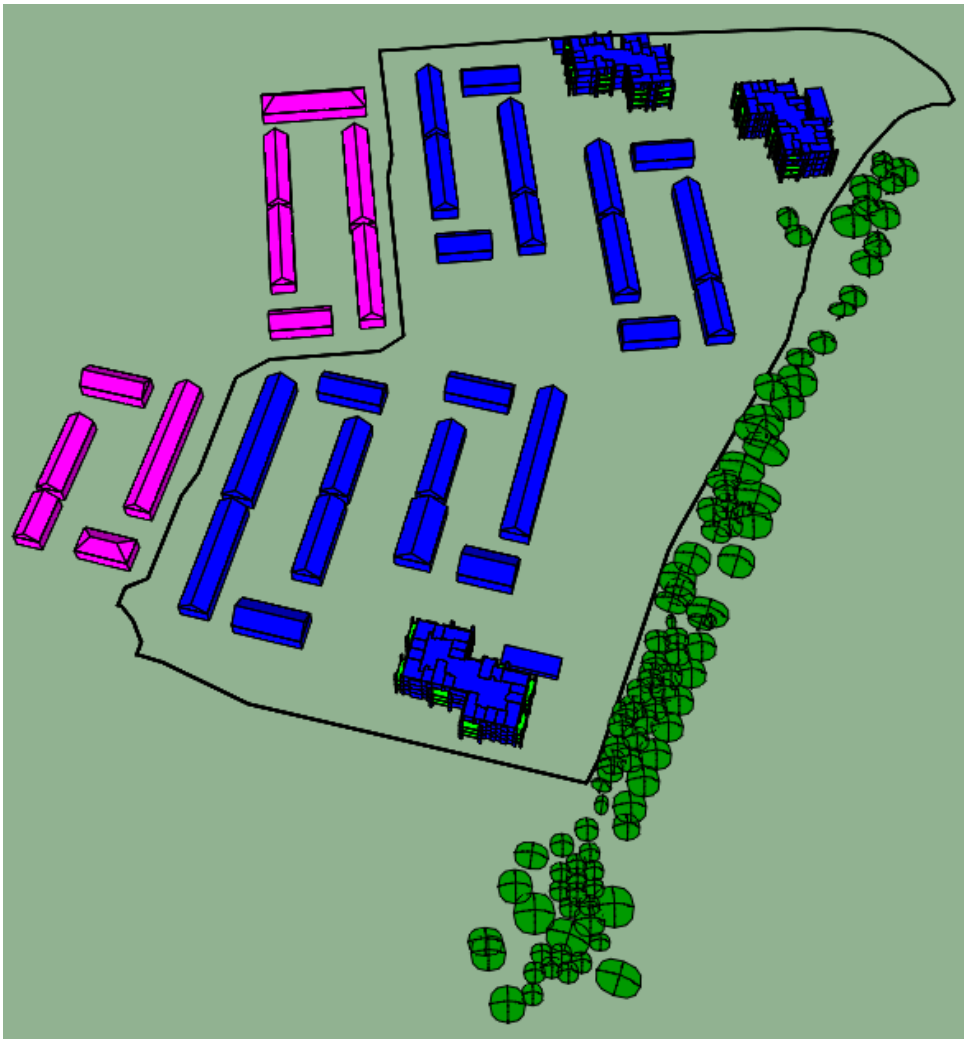

Figure 3 Church Fields East Housing Development, source IES VE

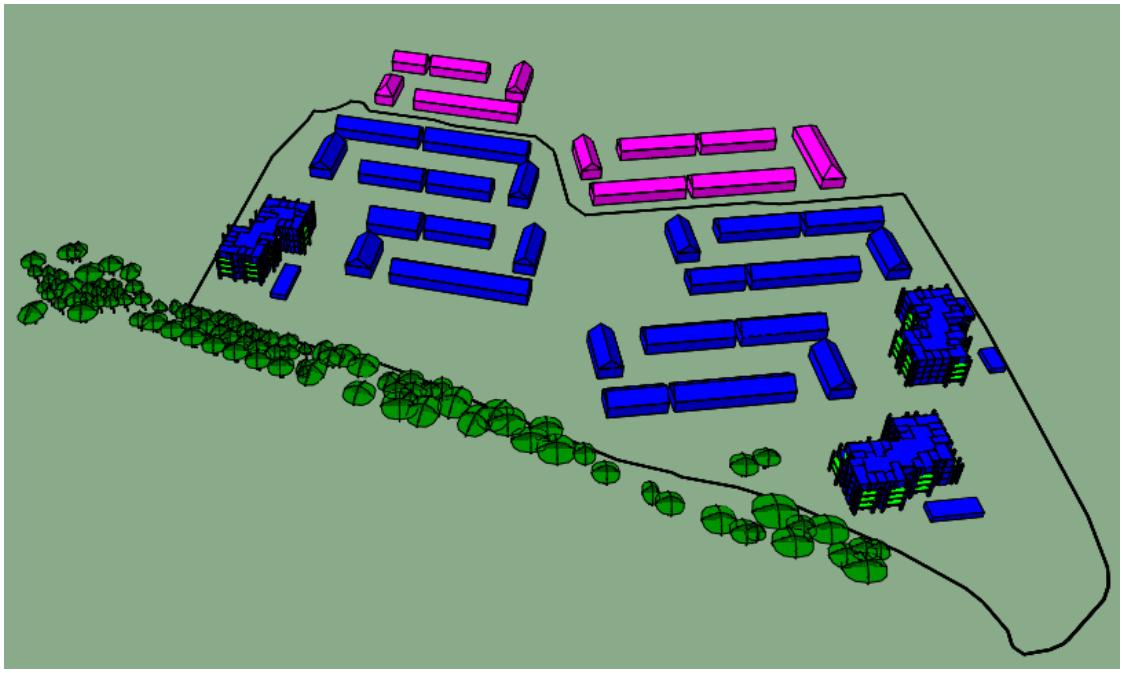

Figure 4 Church Fields East Housing Development, source IES VE

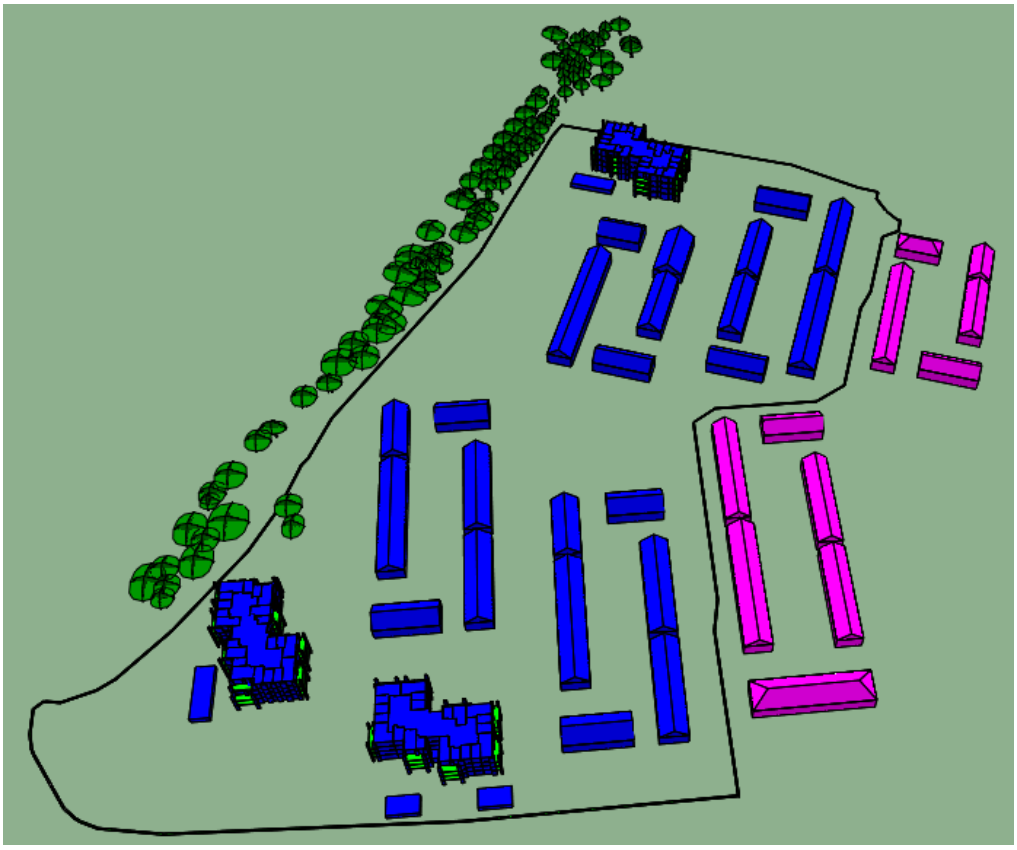

Figure 5 Church Fields East Housing Development, source IES VE

The following assumptions were made when modelling the illuminance in each unit.

- The model simulations were carried out using location specific weather file data in accordance with BRE Guidance.
- The following material properties were assigned in the model based on BR 209-2022 Table C4:

Table C4 – Recommended default surface reflectances	
Surface	**Default reflectance**
Interior walls	0.5
Ceilings	0.7
Floors	0.2
Exterior walls and obstructions	0.2
Exterior ground	0.2

Figure 6: Surface Reflectance, source; BRE Guide BR 209-2022 Third Edition

- Working Plane Height

  The working plane height in the model was taken as 0.85m. This is a typical value for domestic applications based on guidance within the BRE Guide “Site Layout Planning for Daylight and Sunlight” Third BR 209-2022.

4.1.2 Illuminance (Lux) Levels Results

As described in Section 3.1.3 the illuminance analysis has been carried out on all units in apartment blocks D, E & F based on the illuminance method described in BR 209-2022.

BR 209-2022 (and EN 17037) identify two target values for illuminance that should be satisfied in order for a room to be considered adequately daylit.

- Target illuminance (E_T) should be achieved across at least half of the reference plane in a daylit space for at least half of the daylight hours.
- Minimum target illuminance (E_{TM}) should also be achieved across 95% of the reference plane for at least half of the daylight hours.

The target values for (E_T) & (E_{TM}) identified in BR 209-2022 (and EN 17037) are set out in Table C1 of BR 209-2022 and are as follows. It is noted within the standards that compliance with the “minimum” illuminance levels in the table below is sufficient to demonstrate compliance with the standard.

Figure 7: Target illuminance for Daylight, source; BRE Guide BR 209-2022 Third Edition

Table C1 – Target illuminances from daylight over at least half of the daylight hours		
Level of recommendation	**Target illuminance E_T (lx) for half of assessment grid**	**Target illuminance E_{TM} (lx) for 95% of assessment grid**
Minimum	300	100
Medium	500	300
High	750	500

The results of the illuminance calculations carried out using the IES software are presented in the tables below.

Block Reference	Unit	Type	BR 209-2022 Methodology 1 (%) (Compliance at ≥ 95% @ 100 lux)	BR 209-2022 Methodology 2 (%) (Compliance at ≥ 50% @ 300 lux)
D	Unit 1	K/L/D	99.0	94.9
D	Unit 1	Bed 1	98.4	93.7
D	Unit 1	Bed 2	98.2	93.1
D	Unit 2	K/L/D	99.1	94.3
D	Unit 2	Bed 1	95.5	84.1
D	Unit 3	K/L/D	98.1	93.5
D	Unit 3	Bed 1	95.0	82.3
D	Unit 4	K/L/D	98.9	94.8
D	Unit 4	Bed 1	96.9	91.8
D	Unit 4	Bed 2	97.6	92.1
D	Unit 5	K/L/D	98.2	94.2
D	Unit 5	Bed 1	97.9	93.4
D	Unit 5	Bed 2	97.9	93.2
D	Unit 6	K/L/D	98.5	94.5
D	Unit 6	Bed 1	97.7	92.8
D	Unit 6	Bed 2	97.4	92.0
D	Unit 7	K/L/D	95.5	90.4
D	Unit 7	Bed 1	95.1	83.9
D	Unit 8	K/L/D	98.1	93.9
D	Unit 8	Bed 1	95.3	86.1
D	Unit 8	Bed 2	97.4	91.1
D	Unit 9	K/L/D	98.9	94.9
D	Unit 9	Bed 1	98.4	93.7
D	Unit 9	Bed 2	98.2	93.2
D	Unit 10	K/L/D	98.2	93.5
D	Unit 10	Bed 1	95.3	80.7
D	Unit 11	K/L/D	98.2	93.6
D	Unit 11	Bed 1	95.2	78.6
D	Unit 12	K/L/D	98.9	94.8
D	Unit 12	Bed 1	96.9	91.9
D	Unit 12	Bed 2	97.7	92.2
D	Unit 13	K/L/D	98.2	94.1
D	Unit 13	Bed 1	98.1	93.4

D	Unit 13	Bed 2	97.9	93.2
D	Unit 14	K/L/D	98.4	94.5
D	Unit 14	Bed 1	98.1	93.3
D	Unit 14	Bed 2	97.6	92.7
D	Unit 15	K/L/D	95.7	89.3
D	Unit 15	Bed 1	95.3	82.2
D	Unit 16	K/L/D	98.0	93.9
D	Unit 16	Bed 1	95.6	83.7
D	Unit 16	Bed 2	97.4	92.1
D	Unit 17	K/L/D	99.0	94.9
D	Unit 17	Bed 1	98.5	93.9
D	Unit 17	Bed 2	98.2	93.2
D	Unit 18	K/L/D	98.5	94.3
D	Unit 18	Bed 1	95.4	80.8
D	Unit 19	K/L/D	98.3	94.0
D	Unit 19	Bed 1	95.2	79.5
D	Unit 20	K/L/D	98.9	94.9
D	Unit 20	Bed 1	96.9	92.1
D	Unit 20	Bed 2	97.9	92.5
D	Unit 21	K/L/D	98.2	94.1
D	Unit 21	Bed 1	98.1	93.4
D	Unit 21	Bed 2	97.9	93.2
D	Unit 22	K/L/D	98.9	95.1
D	Unit 22	Bed 1	98.2	93.8
D	Unit 22	Bed 2	98.1	93.5
D	Unit 23	K/L/D	95.9	89.6
D	Unit 23	Bed 1	95.5	81.8
D	Unit 24	K/L/D	98.0	93.9
D	Unit 24	Bed 1	95.7	83.4
D	Unit 24	Bed 2	97.5	92.2
D	Unit 25	K/L/D	99.3	95.5
D	Unit 25	Bed 1	98.5	94.0
D	Unit 25	Bed 2	98.2	93.3
D	Unit 26	K/L/D	99.3	95.8
D	Unit 26	Bed 1	97.6	91.1
D	Unit 27	K/L/D	99.5	96.0
D	Unit 27	Bed 1	97.6	91.8
D	Unit 28	K/L/D	99.4	96.0

D	Unit 28	Bed 1	97.5	92.6
D	Unit 28	Bed 2	98.2	93.1
D	Unit 29	K/L/D	99.3	96.0
D	Unit 29	Bed 1	98.1	93.4
D	Unit 29	Bed 2	97.9	93.3
D	Unit 30	K/L/D	99.3	95.9
D	Unit 30	Bed 1	98.4	94.1
D	Unit 30	Bed 2	98.4	94.1
D	Unit 31	K/L/D	98.2	94.4
D	Unit 31	Bed 1	96.5	91.3
D	Unit 32	K/L/D	99.3	95.8
D	Unit 32	Bed 1	97.6	92.6
D	Unit 32	Bed 2	97.8	93.0

Table 2: Block D Illuminance Results

Block Reference	Unit	Type	BR 209-2022 Methodology 1 (%) (Compliance at ≥ 95% @ 100 lux)	BR 209-2022 Methodology 2 (%) (Compliance at ≥ 50% @ 300 lux)
E	Unit 1	K/L/D	98.3	94.2
E	Unit 1	Bed 1	97.2	91.9
E	Unit 1	Bed 2	97.9	92.8
E	Unit 2	K/L/D	95.5	89.4
E	Unit 2	Bed 1	95.3	84.6
E	Unit 3	K/L/D	98.5	94.4
E	Unit 3	Bed 1	95.7	89.4
E	Unit 4	K/L/D	99.6	96.9
E	Unit 4	Bed 1	95.5	89.5
E	Unit 4	Bed 2	96.9	91.9
E	Unit 5	K/L/D	99.5	96.6
E	Unit 5	Bed 1	97.6	92.6
E	Unit 5	Bed 2	97.6	93.0
E	Unit 6	K/L/D	96.7	91.8
E	Unit 6	Bed 1	95.0	88.6
E	Unit 7	K/L/D	98.1	93.9

E	Unit 7	Bed 1	97.6	93.1
E	Unit 7	Bed 2	95.0	87.1
E	Unit 8	K/L/D	98.8	94.8
E	Unit 8	Bed 1	97.7	91.9
E	Unit 8	Bed 2	97.8	92.1
E	Unit 9	K/L/D	99.3	95.7
E	Unit 9	Bed 1	97.2	91.9
E	Unit 9	Bed 2	97.2	92.2
E	Unit 9	Bed 3	98.0	92.8
E	Unit 10	K/L/D	96.4	91.4
E	Unit 10	Bed 1	95.3	87.0
E	Unit 11	K/L/D	98.9	94.8
E	Unit 11	Bed 1	95.3	88.5
E	Unit 12	K/L/D	99.6	96.9
E	Unit 12	Bed 1	95.6	88.5
E	Unit 12	Bed 2	97.1	92.1
E	Unit 13	K/L/D	99.5	96.9
E	Unit 13	Bed 1	98.1	93.3
E	Unit 13	Bed 2	97.6	92.7
E	Unit 13	Bed 3	97.7	93.0
E	Unit 14	K/L/D	95.7	90.4
E	Unit 14	Bed 1	95.2	86.5
E	Unit 15	K/L/D	98.2	94.2
E	Unit 15	Bed 1	97.7	93.3
E	Unit 15	Bed 2	95.3	88.9
E	Unit 16	K/L/D	98.6	94.8
E	Unit 16	Bed 1	97.8	92.0
E	Unit 16	Bed 2	97.8	92.1
E	Unit 17	K/L/D	99.5	96.2
E	Unit 17	Bed 1	96.8	91.4
E	Unit 17	Bed 2	97.2	92.3
E	Unit 17	Bed 3	98.1	92.9
E	Unit 18	K/L/D	95.5	89.5
E	Unit 18	Bed 1	95.4	87.0
E	Unit 19	K/L/D	98.5	94.5
E	Unit 19	Bed 1	95.4	88.6
E	Unit 20	K/L/D	99.5	96.8
E	Unit 20	Bed 1	96.4	87.5

E	Unit 20	Bed 2	96.8	91.7
E	Unit 21	K/L/D	99.3	95.8
E	Unit 21	Bed 1	97.8	93.0
E	Unit 21	Bed 2	97.0	91.6
E	Unit 21	Bed 3	97.1	92.4
E	Unit 22	K/L/D	95.8	90.6
E	Unit 22	Bed 1	95.4	87.6
E	Unit 23	K/L/D	98.4	94.5
E	Unit 23	Bed 1	98.0	93.8
E	Unit 23	Bed 2	95.8	89.9
E	Unit 24	K/L/D	98.8	94.8
E	Unit 24	Bed 1	97.8	92.0
E	Unit 24	Bed 2	97.8	92.1
E	Unit 25	K/L/D	99.3	95.8
E	Unit 25	Bed 1	97.5	92.2
E	Unit 25	Bed 2	98.1	93.1
E	Unit 26	K/L/D	98.2	93.8
E	Unit 26	Bed 1	97.0	91.7
E	Unit 27	K/L/D	99.1	95.4
E	Unit 27	Bed 1	97.6	92.6
E	Unit 28	K/L/D	99.6	96.9
E	Unit 28	Bed 1	96.9	92.0
E	Unit 28	Bed 2	97.5	92.6
E	Unit 29	K/L/D	99.0	95.2
E	Unit 29	Bed 1	97.1	92.2
E	Unit 29	Bed 2	98.1	94.0
E	Unit 30	K/L/D	99.0	95.2
E	Unit 30	Bed 1	98.1	93.7
E	Unit 31	K/L/D	99.3	95.8
E	Unit 31	Bed 1	98.1	94.0
E	Unit 31	Bed 2	96.9	91.7
E	Unit 32	K/L/D	99.3	95.5
E	Unit 32	Bed 1	97.8	92.3
E	Unit 32	Bed 2	97.8	92.3

Table 3: Block E Illuminance Results

Block Reference	Unit	Type	BR 209-2022 Methodology 1 (%) (Compliance at ≥ 95% @ 100 lux)	BR 209-2022 Methodology 2 (%) (Compliance at ≥ 50% @ 300 lux)
F	Unit 1	K/L/D	99.2	95.4
F	Unit 1	Bed 1	96.8	91.2
F	Unit 1	Bed 2	98.2	93.2
F	Unit 2	K/L/D	98.9	94.7
F	Unit 2	Bed 1	97.2	91.7
F	Unit 2	Bed 2	95.3	87.8
F	Unit 3	K/L/D	98.5	94.1
F	Unit 3	Bed 1	95.6	78.7
F	Unit 4	K/L/D	99.3	95.7
F	Unit 4	Bed 1	95.7	89.3
F	Unit 4	Bed 2	98.1	93.4
F	Unit 5	K/L/D	99.5	96.0
F	Unit 5	Bed 1	98.1	94.1
F	Unit 5	Bed 2	98.2	94.1
F	Unit 6	K/L/D	98.5	94.8
F	Unit 6	Bed 1	95.2	89.1
F	Unit 7	K/L/D	97.6	93.3
F	Unit 7	Bed 1	96.7	88.1
F	Unit 8	K/L/D	99.5	96.1
F	Unit 8	Bed 1	98.3	94.4
F	Unit 8	Bed 2	96.5	90.6
F	Unit 9	K/L/D	99.3	95.4
F	Unit 9	Bed 1	97.0	91.2
F	Unit 9	Bed 2	98.2	93.4
F	Unit 10	K/L/D	99.0	95.3
F	Unit 10	Bed 1	97.7	92.8
F	Unit 10	Bed 2	95.6	88.4
F	Unit 11	K/L/D	99.0	95.2
F	Unit 11	Bed 1	95.7	85.3
F	Unit 12	K/L/D	99.5	96.1
F	Unit 12	Bed 1	95.3	88.7
F	Unit 12	Bed 2	98.1	93.4
F	Unit 13	K/L/D	99.4	96.0

F	Unit 13	Bed 1	98.2	94.1
F	Unit 13	Bed 2	98.2	94.1
F	Unit 14	K/L/D	98.9	95.1
F	Unit 14	Bed 1	95.3	87.3
F	Unit 15	K/L/D	97.1	92.7
F	Unit 15	Bed 1	95.3	87.2
F	Unit 16	K/L/D	99.3	95.9
F	Unit 16	Bed 1	98.5	94.7
F	Unit 16	Bed 2	96.8	90.6
F	Unit 17	K/L/D	99.0	95.2
F	Unit 17	Bed 1	97.1	91.3
F	Unit 17	Bed 2	98.2	93.5
F	Unit 18	K/L/D	99.0	95.4
F	Unit 18	Bed 1	98.2	93.9
F	Unit 18	Bed 2	98.1	89.7
F	Unit 19	K/L/D	99.1	95.3
F	Unit 19	Bed 1	95.7	81.4
F	Unit 20	K/L/D	99.3	95.6
F	Unit 20	Bed 1	95.5	89.1
F	Unit 20	Bed 2	98.1	93.5
F	Unit 21	K/L/D	99.3	95.6
F	Unit 21	Bed 1	98.1	93.9
F	Unit 21	Bed 2	98.1	94.0
F	Unit 22	K/L/D	98.8	95.0
F	Unit 22	Bed 1	95.6	86.5
F	Unit 23	K/L/D	97.4	92.9
F	Unit 23	Bed 1	95.4	87.5
F	Unit 24	K/L/D	99.5	96.2
F	Unit 24	Bed 1	98.5	94.6
F	Unit 24	Bed 2	97.1	91.0
F	Unit 25	K/L/D	99.3	93.9
F	Unit 25	Bed 1	97.8	92.1
F	Unit 25	Bed 2	98.3	93.7
F	Unit 26	K/L/D	99.5	96.2
F	Unit 26	Bed 1	98.4	94.1
F	Unit 26	Bed 2	96.4	94.1
F	Unit 27	K/L/D	99.5	96.1
F	Unit 27	Bed 1	97.8	92.3

F	Unit 28	K/L/D	99.5	96.2
F	Unit 28	Bed 1	97.8	92.9
F	Unit 28	Bed 2	98.1	93.5
F	Unit 29	K/L/D	99.5	96.4
F	Unit 29	Bed 1	98.0	93.8
F	Unit 29	Bed 2	98.2	94.2
F	Unit 30	K/L/D	99.5	96.1
F	Unit 30	Bed 1	97.1	92.2
F	Unit 31	K/L/D	99.3	95.7
F	Unit 31	Bed 1	98.1	93.6
F	Unit 32	K/L/D	99.5	96.5
F	Unit 32	Bed 1	98.8	95.1
F	Unit 32	Bed 2	97.4	91.5

Table 4: Block F Illuminance Results

The illumination results illustrated in Tables 2, 3 & 4 confirm that the proposed apartment blocks D, E & F demonstrate illuminance levels recommended in BR 209-2022.

5. Impact on the Permitted Part 8 Buildings

The BR 209-2022 guidance report suggests that analyses of the impact of new developments on the adjacent Part 8 properties should be considered. To assess the potential impacts of a new structure or structures the report identifies a number of conditions that can be assessed, to determine if further detailed numerical daylight analysis is required.

The guidance suggests that if either of the following criteria are met that the development can be deemed to have no discernible impact on the daylight levels of the permitted Part 8 properties.

- If the distance of each part of the new development is three or more times greater than its height above the midpoint of the window in the adjacent Part 8 properties
- If the angle from the horizontal between the mid pane of a window of the permitted Part 8 properties and the highest point of the new structure is less than 25 degrees

All the apartment buildings on the site are a considerable distance from the site boundary and from the neighbouring properties and the 25-degree criteria referred to above is likely to be met in most cases. This would give confidence that the proposed development will have a negligible impact on the neighbouring properties. Nonetheless, a modelling exercise has still been undertaken to confirm that the impact of the proposed development is indeed negligible.

The following metrics were used.

- Vertical Sky Component
- Annual Probable Sunlight Hours

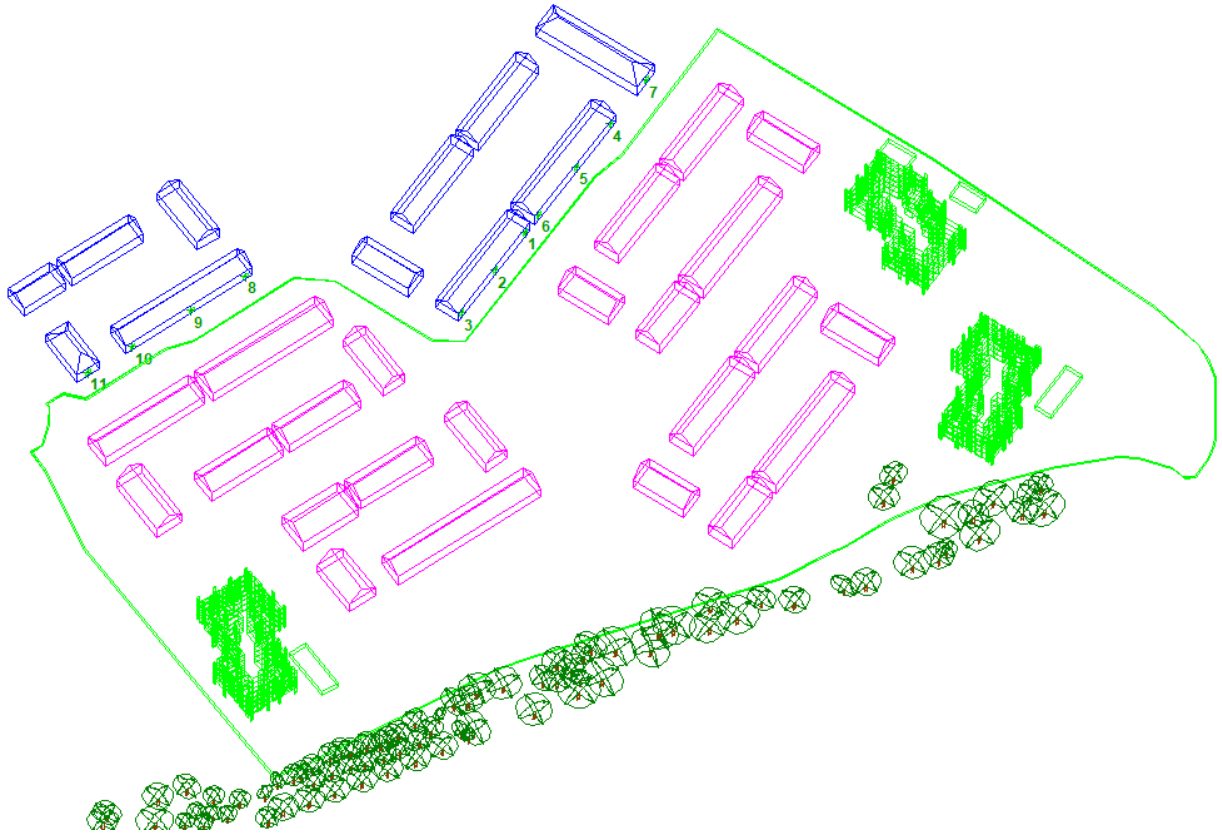

Figure 8: Overview of Permitted Part 8 Properties (shown in blue) & Numeric References (IES VE Model in Axonometric View)

5.1 Daylight/Sunlight Impact on Surrounding Properties

Due to the general low-rise nature of the development the impact on the surrounding permitted Part 8 properties is expected to be minimal.

However, on review of the local topography, a significant variation in levels was identified and it was decided that further analysis was warranted. Window “receptors” were added to the relevant elevations of the permitted Part 8 properties. The window “receptor” measured the amount of daylight and/or sunlight that is incident on the elevation of the neighbouring properties in both the “before” and “after” scenario.

5.1.1 Vertical Sky Component (VSC) > 80% of its former value

A VSC assessment for the Part 8 dwellings and the impact of the proposed development was carried out. All selected windows (receptors) show compliance with the VSC method by achieving ≥80% of its former value, therefore no further impact will be perceived over the permitted Part 8 development.

Window Index	VSC of Receptor		Impact of Proposed development on baseline VSC (Target <20%)
	Baseline	Proposed	
1	39.92	37.36	6.4
2	39.89	37.63	5.7
3	39.85	37.24	6.5
4	39.82	35.64	10.5
5	39.88	36.22	9.2
6	39.89	36.72	7.9
7	39.98	35.29	11.7
8	39.20	34.61	11.7
9	39.68	34.48	13.6
10	39.89	34.94	12.4
11	39.98	36.42	8.9

Table 5: Vertical Sky Component Results (Permitted Part 8 Properties)

The vertical sky assessment demonstrates the impact the proposed development may have on the Part 8 properties when simulating the baseline VSC of the permitted Part 8 properties before introducing the proposed development. The results in Table 5 indicate some obstruction and impact from the proposed development but still satisfying the BR 209-2022 recommendation of <20%.

5.1.2 Annual Probable Sunlight Hours

Table 6 identifies the adjacent permitted Part 8 properties APSH and the subsequent impact of the development.

If the assessed point of a window can receive more than 25% of APSH, including at least 5% of APSH in the winter months, then the room should receive enough sunlight.

When measuring the effect, a proposed development will have on the APSH of the Part 8 windows, the APSH value should not drop below the absolute values of 25% annually or 5% during winter months. If the available sunlight hours are both less than the annual and winter BRE guidelines and less than 0.8 times their former value then the occupants of the Part 8 dwellings will notice a loss of sunlight or if the overall annual loss is greater than 4% of ASPH, the room may appear colder and less pleasant.

Window Index	APSH of Receptor	
	Annual APSH (Target >25%)	Winter APSH (Target >5%)
1	49.0	19.6
2	45.1	16.8
3	45.1	16.8
4	45.6	16.8
5	42.6	14.7
6	41.9	12.9
7	42.6	14.7
8	39.9	12.7
9	41.1	14.3
10	40.4	12.1
11	36.9	11.9

Table 6: Annual Probable Sunlight Hours Results (Permitted Part 8 Properties)

The results in Table 6 indicate that the permitted Part 8 properties receive a high percentage of sunlit hours annually and during the winter periods. The proposed development does not cause obstruction whereby radically reducing the probable sunlight to these properties.

6. Sunlight on the Proposed Amenity Areas

BRE Guidelines recommend that for external amenity spaces to appear adequately sunlit throughout the year, 50% of the garden or amenity space should receive a minimum two hours of sunlight on March 21st.

A sunlight study has been carried out using IES VE SunCast which is based on a model of the entire site, including all proposed building structures and the proposed communal amenity areas. The communal amenity areas, public open spaces and pocket parks are identified in Figure 9. The IES model and SunCast simulation was used to assess the sunlight that each of these communal amenity spaces will receive, the results of which are presented in Figure 10.

6.1 Sunlight on Amenity Areas – Proposed Development

Figure 10 shows a high-resolution grid with 5m^2 sections to identify the direct sunlight hours for each proposed amenity space. The colour coding transitions from blue (0 hours) to red (12 hours) signifying varying hourly totals of direct sunlight for a particular 5m^2 section.

Figure 9: Proposed Communal Amenity Spaces / Pocket Parks

Figure 10 – Sunlight to Communal Amenity Spaces, Public Open Spaces & Pocket Park – 100% >2 hours

Figure 10 illustrates the communal amenity spaces, public open spaces and pocket park achieve 100% direct sunlight above the minimum BR 209-2022 guidance of 2 hours on the 21st March.

7. Overshadowing on the Proposed Development & Adjacent Part 8 Properties

The overshadowing impact within the proposed development and to the adjacent Part 8 properties has been analysed.

7.1 Proposed Development & Part 8 Properties

The overshadowing images illustrate the impact on the proposed development and adjacent Part 8 properties during the Spring Equinox - March 21st and Winter Solstice - December 21st at 8am, 10am, 2pm, 4pm and 6pm.

Figure 11: Overshadowing image on March 21st at 8am (Source IES VE model)

Figure 12: Overshadowing image on March 21st at 10am (Source IES VE model)

Figure 13: Overshadowing image on March 21st at 2pm (Source IES VE model)

Figure 14: Overshadowing image on March 21st at 4pm (Source IES VE model)

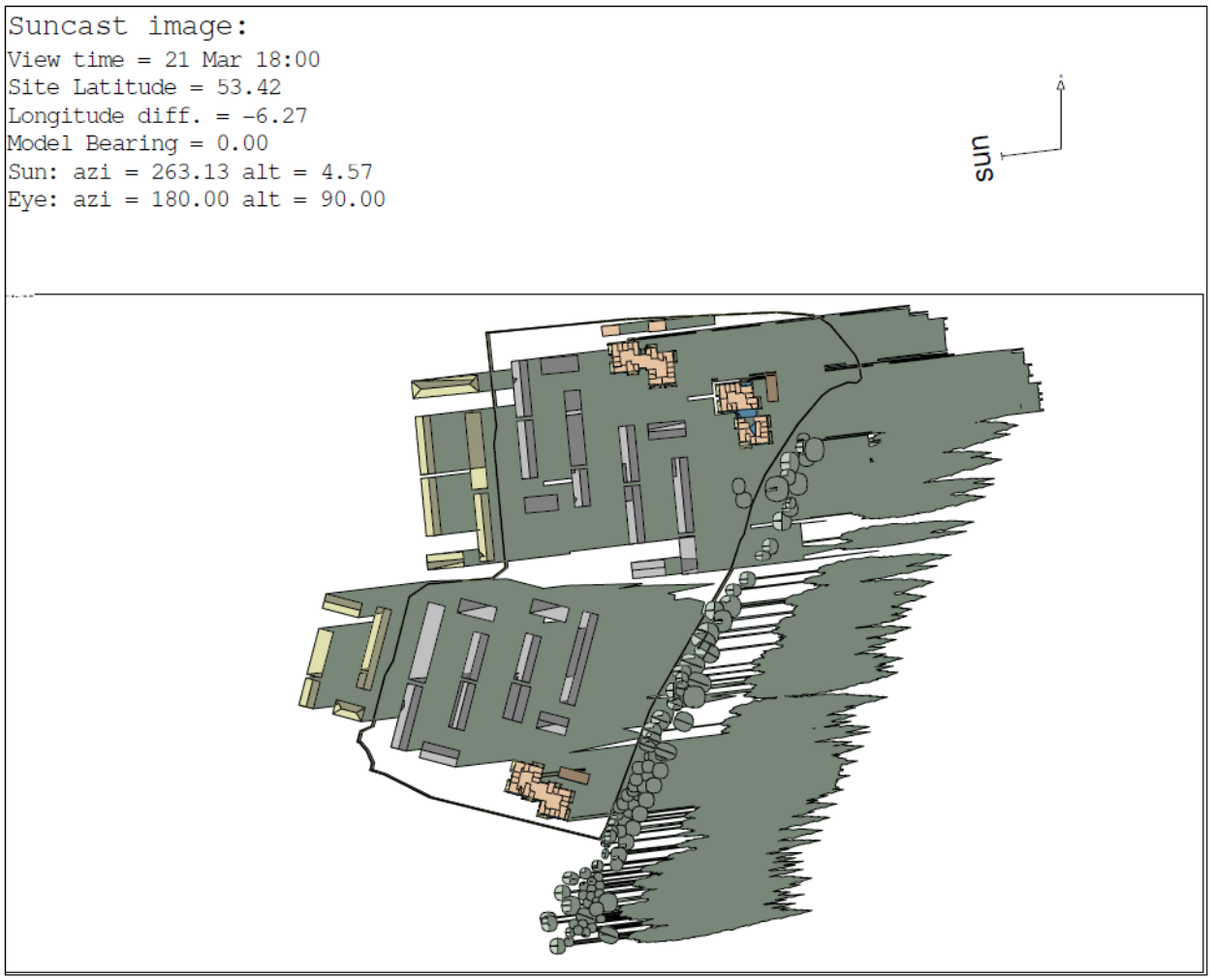

Figure 15: Overshadowing image on March 21st at 6pm (Source IES VE model)

Figure 16: Overshadowing image on December 21st at 8am (Source IES VE model)

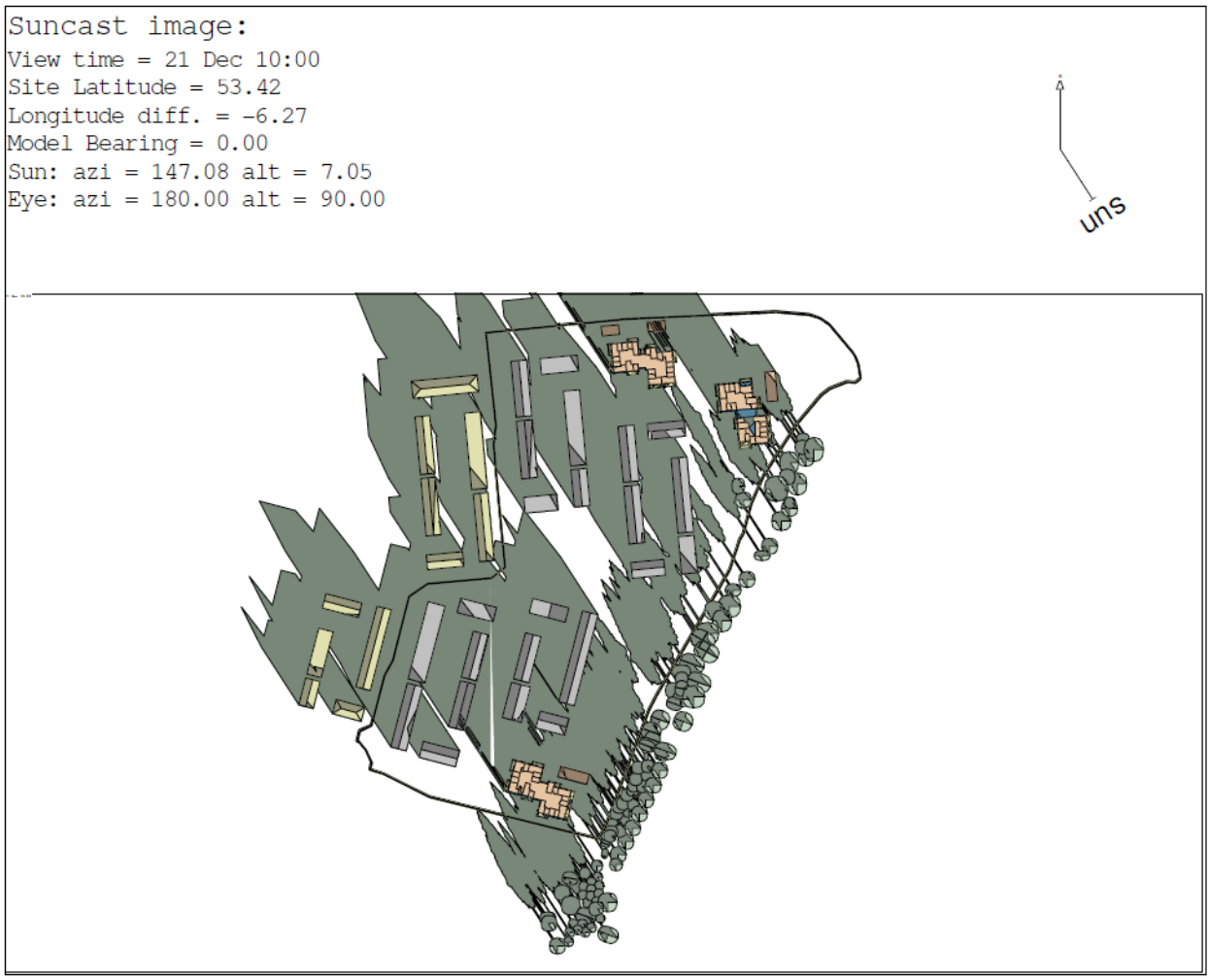

Figure 17: Overshadowing image on December 21st at 10am (Source IES VE model)

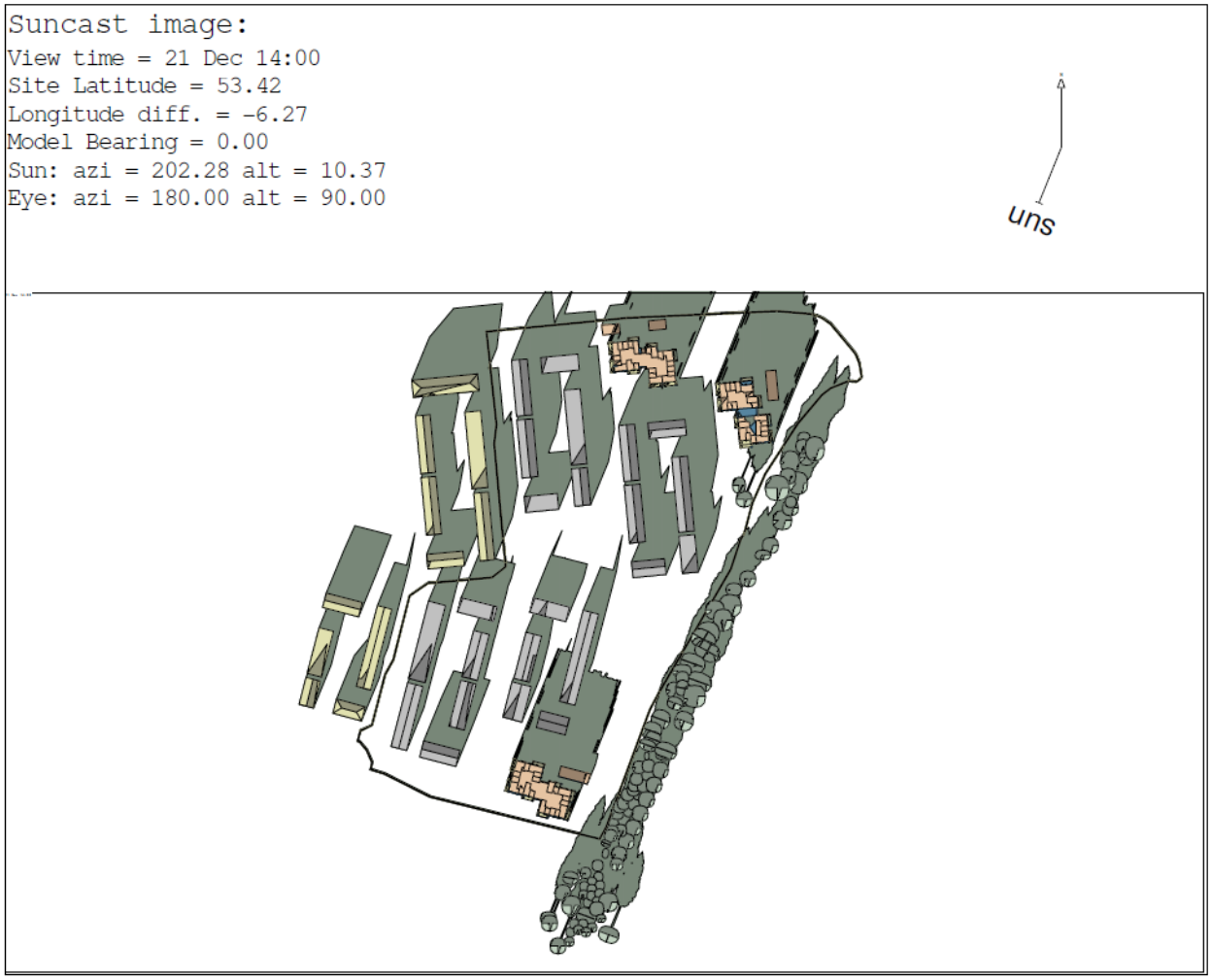

Figure 18: Overshadowing image on December 21st at 2pm (Source IES VE model)

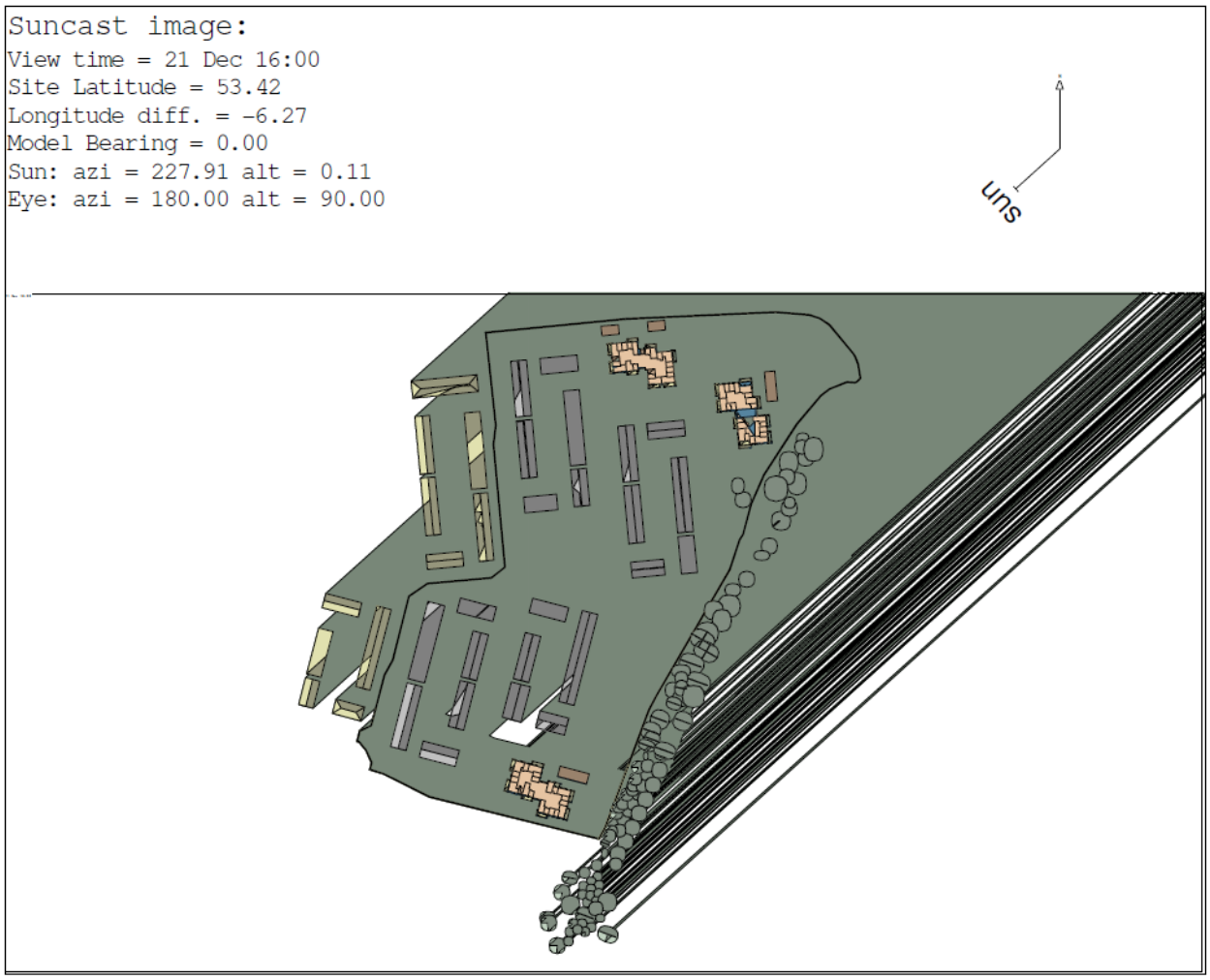

Figure 19: Overshadowing image on December 21st at 4pm (Source IES VE model)

Figure 20: Overshadowing image on December 21st at 6pm (Source IES VE model)

The overshadowing analysis shows the various shadows cast on two significant dates (March 21 and December 21), as well as the potential effects the proposed development might have on these properties at different times of the day, as shown in Figures 11 to 20.

The overall shadowing analysis shows that the planned development's closest neighbours will not be negatively impacted.

The proposed development's potential for overshadow on itself has also been assessed. Due to their placements and the sun path, the proposed apartment blocks D, E, and F will have little effect on the proposed houses, according to the analysis.

8. Results & Conclusions

Illuminance – Proposed Development

The illuminance analysis for the proposed development evaluated the living/kitchen/dining space and bedrooms across all apartment blocks D, E and F.

The results of the illuminance analysis demonstrate the following:

- The combined living/kitchen/dining, kitchen/dining, and living areas across the scheme demonstrate levels of illuminance above the BR 209-2022 recommended 100 lux across 95% of the measured space and 300 lux across 50% of the measured space therefore achieving compliance.
- The bedrooms across the scheme demonstrate levels of illuminance above the BR 209-2022 recommended 100 lux across 100% of the measured space and 300 lux across 50% of the measured space therefore achieving compliance.
- Overall, across the scheme, 100% of the spaces analysed demonstrate compliance with the BR 209-2022 recommended illuminance targets.

Sunlight to Proposed Communal Spaces & Pocket Parks

The results of the sunlight analysis to the communal amenity areas and pocket parks are as follows.

- The communal amenity areas & pocket parks demonstrate levels of sunlight above the recommend 2 hours over 50% of the area on the design test day 21st March therefore these spaces are shown to be fully compliant with the BR 209-2022 targets.

Overshadowing impact on Permitted Part 8 Properties

- The overshadowing assessment of the Part 8 properties illustrates the various shadows cast at two key dates (March 21st and December 21st) and the impact the proposed development may have on these properties at particular times of the day illustrated in Figures 11 to 20.
- The overall shadowing analysis identifies negligible impact on the adjacent properties nearest to the proposed development.

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UK and Ireland Office Locations